THE OTTAWA HOSPITAL

PARENTERAL DRUG THERAPY MANUAL

Fortieth Edition

Editors

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With the aid of the Pharmacy and Therapeutics Committee
and
Approved by the Medical Advisory Committee

Special appreciation is extended to Mario Bédard, Lorraine Burns,
Alex Kuo and Annie Parker for their contribution.

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PREFACE

The Parenteral Drug Therapy Manual of The Ottawa Hospital arose out of the necessity to provide a convenient, accessible, reliable reference and guide to health professionals involved with parenteral drug administration. The initial manual was researched and developed in 1975 by Marilyn E. Brown-Morris, M.Sc., former pharmacy resident; the Manual has been maintained up-to-date by the Drug Information Service of the Pharmacy Department.

The recommendations in this Manual are policy at The Ottawa Hospital (TOH). This Manual is not a complete treatise on parenteral drugs; it is impossible to provide extensive therapeutic or compatibility information in such an abbreviated format. For such information, you are advised to contact your Drug Information Service. This Manual is designed to provide essential information on the parenteral administration of a drug once therapeutic and compatibility data have been assessed.

In this Manual, drugs that may be used parenterally are listed alphabetically by non-proprietary (generic) name at the head of the monograph. Under the heading of "Other Names", current brand names and alternative non-proprietary names are listed. In addition, some discontinued popular brand names are still listed under this section to allow easier retrieval. The "Other Names" section is not a comprehensive listing and should not be considered as an endorsement of any product nor imply that TOH stocks the particular brand listed.

This manual is based on documented statements from the literature and reflects evidence-based documented practice in a hospital setting. Therefore, the various sections of this manual are not solely based on the product monograph approved by Health Canada.

The section on "Potential Administration Hazards" does not necessarily contain all the side effects or hazards which may be encountered with parenteral therapy if these hazards are present with oral therapy. Consult other references (manufacturer's product monograph, Drug Information Service) for further information.

The doses listed in the section “Dosage” apply to adults, with normal renal and liver functions. Specialized dosage information (children, neonates, patients with renal and/or hepatic impairment), will be identified as such.

Statements in the “Compatibility, Stability” section assume preparation in a laminar flow hood with appropriate sterile technique. Information provided in this section refers to physical/chemical stability and not to sterility. Also consult NAPRA compounding standards.

The safe administration of drugs by Registered Nurses and Registered Practical Nurses is guided by the College of Nurses of Ontario Standards of Practice 2017 which state that knowledge, skill, judgement, and appropriate resources are necessary for the nurse to manage the patient safely. At TOH, Registered Practical Nurses require a specific skills set and must be on specific designated units for parenteral medication administration. Please refer to TOH Model of Nursing Clinical Practice Generic RPN Skills List and unit/area specific RPN Skills List for more details.

Adding Medication Below the Drip Chamber (IV Direct)

According to the Regulated Health Professionals Act (RHPA), administering intravenous medications below the drip chamber falls under the controlled act "administering a substance by injection or inhalation".

A Registered Nurse may acquire the skill of administering intravenous medication below the drip chamber by attending a general and/or unit specific lecture. Upon successfully acquiring this skill, the Registered Nurse may administer certain medications directly intravenously if all other provisions described in the Manual are satisfied.

At TOH, Registered Practical Nurses are not permitted to administer intravenous medications below the drip chamber.
Prerequisites for Medications

There may be prerequisites for the administration of certain drugs. These are defined below and the specific prerequisites are also indicated in the drug monographs. Unit-based protocols, once approved by the Pharmacy and Therapeutics Committee, will supersede these prerequisites. The drugs have been classified, according to prerequisite(s), into seven categories.

1. No prerequisite noted - Drugs which may be given by an RN in any area.

2. Respiratory Support - There must be an oral airway, manual ventilator (ambu bag), airway suctioning and oxygen equipment readily available on the unit.

3. Blood Pressure Monitoring - Drugs requiring use of non-invasive blood pressure monitoring with vital signs being monitored more frequently than q1h.

4. Continuous BP Monitoring - Drugs requiring invasive continuous arterial blood pressure monitoring and where a physician is available in-house to immediately attend STAT calls. However, if inserting an arterial line is not feasible or if the drug requiring continuous blood pressure monitoring is to be administered only for a short time period, “continuous blood pressure monitoring” can be performed by a non-invasive method such as ongoing frequent intermittent blood pressure monitoring (e.g., q10 minutes or as decided by the team).

5. Cardiac Monitoring - The patient must be connected to a cardiac monitor and the Registered Nurse giving the drug must have acquired the skill of ECG interpretation (except Neonatal ICU).

6. Ventilator Support - The patient must have an endotracheal tube or tracheostomy tube in situ and must be mechanically ventilated. The RN must have acquired the skill of ventilatory support.

7. Fetal Monitoring - The patient must be connected to an electronic fetal monitor and the Registered Nurse must have acquired the skill of interpreting the monitor strip.

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>aPTT</td>
<td>Activated partial thromboplastin time</td>
</tr>
<tr>
<td>ASA</td>
<td>Acetylsalicylic acid</td>
</tr>
<tr>
<td>AV</td>
<td>Atrioventricular</td>
</tr>
<tr>
<td>BP</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>CHF</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>CNS</td>
<td>Central nervous system</td>
</tr>
<tr>
<td>CrCl</td>
<td>Creatinine clearance</td>
</tr>
<tr>
<td>DMARDs</td>
<td>Disease-modifying antirheumatic drugs</td>
</tr>
<tr>
<td>D5W</td>
<td>Dextrose 5% in water</td>
</tr>
<tr>
<td>D10W</td>
<td>Dextrose 10% in water</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
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<tr>
<td>GI</td>
<td>Gastro-intestinal</td>
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<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>INR</td>
<td>International normalized ratio</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>LFT</td>
<td>Liver function tests</td>
</tr>
<tr>
<td>min</td>
<td>Minute(s)</td>
</tr>
<tr>
<td>NS</td>
<td>Normal saline</td>
</tr>
<tr>
<td>PO</td>
<td>Oral</td>
</tr>
<tr>
<td>PRN</td>
<td>As needed</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinylchloride</td>
</tr>
<tr>
<td>RL</td>
<td>Ringer’s lactate</td>
</tr>
<tr>
<td>RN</td>
<td>Registered Nurse</td>
</tr>
<tr>
<td>SC</td>
<td>Subcutaneous</td>
</tr>
<tr>
<td>SNRIs</td>
<td>Serotonin-norepinephrine reuptake inhibitors</td>
</tr>
<tr>
<td>SSRIs</td>
<td>Selective serotonin reuptake inhibitors</td>
</tr>
<tr>
<td>SWFI</td>
<td>Sterile water for injection</td>
</tr>
<tr>
<td>Temp</td>
<td>Temperature</td>
</tr>
<tr>
<td>TOH</td>
<td>The Ottawa Hospital</td>
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<tr>
<td>ULN</td>
<td>Upper limit of normal</td>
</tr>
</tbody>
</table>
**Definitions**

**IV Direct:** Also called IV Push. Administration of a relatively small volume of a concentrated solution of medication directly into the venous system via a peripheral or central venous access device. The injection is done below the drip chamber over at least 60 seconds (rapid IV direct should be given over 10-30 seconds).

**Intermittent IV infusion:** Administration by the intravenous route of a medication, usually mixed in an IV solution, over a short period of time and at specific times (ex: administration of IV ciprofloxacin over 60 minutes every 12 hours). Unless otherwise specified, dilute in 50-100 mL of compatible solution and administer over 15-60 minutes.

**Continuous IV infusion:** Administration by the intravenous route of medication usually mixed in an IV solution that is required on a continuous basis, without interruption, until the end of the treatment (ex: administration of a heparin infusion).

**Physician only:** Only a physician may administer this medication. This applies to all doses. The physician is expected to stay within a reasonable proximity on the patient's unit until the full effect of the medication has been observed. This may apply to a specific route of administration and/or to a specialty specific physician.

**Physician for first dose only:** A physician is required to administer the first dose of any new course of the medication during patient's hospitalization. The physician is expected to stay within a reasonable proximity on the patient's unit until the full effect of the medication has been observed. This may apply to a specific route of administration and/or to a specialty specific physician. A nurse may administer subsequent doses.

**RN in presence of physician:** A nurse may administer the medication when a physician is present. The physician is expected to be present for all doses, and stay within a reasonable proximity on the patient's unit until the full effect of the medication has been observed. This may apply to a specific route of administration and/or to a specialty specific physician.

**RN in presence of physician for first dose only:** A nurse may administer the medication but a physician is required to be present for the first dose of any new course during hospitalization. The physician is expected to stay within a reasonable proximity on the patient's unit until the full effect of the medication has been observed. This may apply to a specific route of administration and/or to a specialty specific physician. A nurse may administer subsequent doses.

**High alert medication:** Medication that has a higher risk of causing significant patient harm or fatality when used incorrectly. Heightened vigilance is required when preparing, handling, and administering this medication. TOH made its own list of high alert medications, based on that of the Institute of Safe Medication Practices (ISMP). Consult TOH policy 01636 (High alert medications).

**Non-cytotoxic Hazardous Drug / Cytotoxic Drug:** Hazardous drugs include both cytotoxic and non-cytotoxic drugs. According to The National Institute for Occupational Safety and Health (NIOSH) 2016 List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, drugs considered hazardous include those that exhibit one or more of the following six characteristics in humans or animals: carcinogenicity, teratogenicity or other developmental toxicity, reproductive toxicity, organ toxicity at low doses, genotoxicity, structure and toxicity profiles of new drugs that mimic existing drugs determined hazardous by the above criteria.
Intramuscular injection (IM):

At TOH, for IM injections to adults, refer to the Nursing policy 00040 (Medication Administration: IM Injections) and for IM injections to newborns, refer to the policy 00482 (Intramuscular Injection for the Newborn).

The three recommended sites for an IM injection are: 1) ventrogluteal site (gluteal muscles); 2) vastus lateralis (middle thigh); and 3) deltoid if the patient’s muscle mass is adequately developed. For children under 1 year old, only the vastus lateralis site is recommended.

The maximum volume, which may be given in any single IM injection, is 3 mL for adults and 2 mL for children. An exception is for the deltoid injection where a maximum of 2 mL should not be exceeded (approximately 1 mL or less is preferred).

Intramuscular injections should be administered using the Z-track method, except when the patient does not have sufficient muscle mass, in newborns or in an emergency situation.

Subcutaneous injection (SC):

May be given into outer aspects of upper arms, thighs and abdomen. The volume administered is usually between 0.5 and 2 mL.
POLICIES ON INTRAVENOUS SOLUTIONS AND MEDICATIONS

Objectives:

1. To minimize the risk of infection to the patients.
2. To help maintain mechanically trouble-free infusions.
3. Reduce complications related to additives.

Policies:


2. Parenteral products should be examined before and after they are ready for administration, for particulate matter by viewing the contents under a bright light. Hanging intravenous solutions should be inspected periodically for the formation of precipitates or for changes in colour. Ensure that the expiry date has not lapsed.

3. The nurse who prepares and adds medication to the bag or chamber must also initiate the administration of the solution. A “Medication Added” label must be affixed to the intravenous container/burette, stating the name of the drug, the dose added, the solution used, the nurse’s initials, the date and time of preparation, the date and time of start of the infusion, and the patient’s name.

4. The nurse who prepares medication for injection, as ordered by a physician, must retain the ampoule or vial for verification by the physician when the drug is prepared by the nurse but administered by the physician.

5. Use one chamber (Buretrol®, Soluset®, minibag) per drug. Before using a chamber for a second drug or before utilizing one chamber for any two drugs either simultaneously or one following another, verify compatibility with Pharmacy.

6. Mix any two drugs in a syringe or infusion bag only if their compatibility is known and/or has been verified by Pharmacy.

7. Flush medications through tubing with IV solution after each administration, but at a rate of drug delivery no faster than recommended.

8. Leave chamber/bag and tubing connected to the Y-injection site after each administration.

9. A physician’s order is required to convert a continuous infusion to a saline lock.

10. Peripheral saline locks are only recommended when the patient requires 4 or less infusion episodes per 24 hours. If more than 4 infusion episodes in 24 hours are required, the physician must order a continuous infusion.

For information regarding tubing and IV line changes, refer to The Ottawa Hospital Nursing Policy, Procedure + Protocol Manual.
PRIORITIES FOR USE OF PARENTERAL INFUSION PUMPS

PRIORITY 1

The following infusions “must” be administered via an infusion pump.

- A medication where cardiac monitoring, ventilator support or fetal monitoring is required.
- Algucosidase alfa
- Alteplase (TPA, Tissue plasminogen activator)
- Aminophylline
- Amiodarone
- Amino acids
- Blinatumomab
- Busulfan
- Cidofovir
- Daratumumab
- Dexmedetomidine
- Dobutamine
- Dopamine
- Eculizumab
- Edrophonium
- Epidural infusions
- Epinephrine
- Epoprostenol
- Eptifibatide
- Factor VIII (recombinant)
- Fat Emulsions
- Foscarnet
- Heparin
- Immune globulins (by intravenous route)
- Insulin continuous infusions
- Intra-arterial infusions (infusion pump not needed when used for blood pressure monitoring)
- Intrapeural infusions
- Intravenous infusions in hemodialysis vascular accesses
- Intravenous infusions in neonates
- Ketamine
- Lidocaine
- Magnesium sulfate (for eclampsia, preeclampsia and fetal neuroprotection)
- Nitroglycerin
- Nitroprusside
- Norepinephrine
- Opioids
- Oxytocin (for induction of labour)
- Phenytoin
- Potassium chloride (KCl) infusion when rate is greater than 10 mmol/hr or concentration greater than 40 mmol/L
- Quinine dihydrochloride
- Sodium chloride hypertonic 3%
- Subcutaneous infusions
- Temsirolimus
- Treprostinil
- Vancomycin
PRIORITY 2

The preferred method of infusion is via an infusion pump for the following medications:

* Amphotericin B
* Continuous central venous infusions
* Continuous chemotherapy infusions
* Fluid restriction to less than 50 mL/hr
* High alert medication infusions
* Multiple infusions for a specific time frame
* Phenytoin (loading dose)
* Potassium chloride (KCl) infusion where rate is less than 10 mmol/hr or concentration less than 40 mmol/L

PRIORITY 3

There will always be specific situations not indicated in Priority 1 and 2 listing that will warrant the use of an infusion pump.

Buretrols ® can also be used to control an infusion rate.
USEFUL FORMULAS

Ideal or lean body weight:

- Male = 50 + (2.3 X height in inches above 60)
- Female = 45.5 + (2.3 X height in inches above 60)

Dosing body weight:

Ideal body weight + 0.4 (actual body weight - ideal body weight)

Creatinine clearance:

\[
\text{mL/sec} = \frac{(140 - \text{age}) \times \text{weight (kg)}}{50 \times \text{serum creatinine (mcmol/L)}} \times 0.85 \text{ (for females)}
\]

\[
\text{mL/min} = \text{Calculated CrCl in mL/sec} \times 60
\]
INDICATIONS
- For reducing signs and symptoms, inducing clinical response, inhibiting the progression of structural damage, and improving physical function in adult patients with moderately to severely active rheumatoid arthritis who have had an inadequate response to one or more DMARDs and/or TNF (tumour-necrosis factor) antagonists (i.e., adalimumab, etanercept, and infliximab).
- For reducing signs and symptoms of moderately to severely active juvenile rheumatoid arthritis in children of 6 years of age and older who had an inadequate response to one or more DMARDs such as methotrexate.
- Treatment of adult patients with active psoriatic arthritis who have had an inadequate response to previous DMARDs.
- To be used as monotherapy or in combination with non-biologic DMARD therapy (refer to Miscellaneous section).

ADMINISTRATION
- For IV use: reconstitute each 250 mg vial with 10 mL of SWFI, using the silicone-free disposable syringe provided with each vial and an 18-21 gauge needle to obtain a 25 mg/mL solution. Gently swirl until contents are completely dissolved. Do NOT shake. Upon complete dissolution, the vial should be vented with a needle to dissipate any foam that may be present.
- Intermittent IV infusion: further dilute the reconstituted solution to 100 mL with NS as follows: from a 100 mL NS infusion bag, withdraw a volume equal to the volume of the reconstituted solution required for the patient’s dose. The dose of the reconstituted solution should then be added to the NS bag using the silicone-free disposable syringe provided with each vial. Gently mix. Final concentration of the solution will depend upon the amount of drug added, but will be no more than 10 mg/mL. Infuse over 30 minutes, using an infusion set with a sterile non-pyrogenic low-protein binding filter (pore size 0.2-1.2 micron).
- SC: in adults only. Use the 125 mg prefilled syringe. Allow the prefilled syringe to stand at room temp for 30-60 minutes after fridge removal prior to administration. Sites of injection are: front of the thigh (preferred), abdomen (except for the 2-inch area around the navel), outer area of upper arms. Inject into the pinched skin with a 45° angle. Rotate injection sites (at least 1 inch apart).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; anaphylactoid, anaphylaxis, hypotension, urticaria, dyspnea.
- Infusion-related reactions: reported within an hour of starting the infusion; greater than 1%: dizziness, headache, hypertension.
- GI: nausea.
- Infections: upper respiratory tract infection, nasopharyngitis, bronchitis, rhinitis, pneumonia, urinary tract infection, acute pyelonephritis, cellulitis, herpes infections.
- Local reactions: for both IV and SC administration; hematoma, pruritus, erythema.

Dosage
Adults:
- For IV administration: dosage based on weight: 500 mg (2 vials) if less than 60 kg; 750 mg (3 vials) if 60-100 kg; 1000 mg (4 vials) if more than 100 kg. To administer at 0, 2 and 4 weeks and then every 4 weeks.
- For SC administration:
  - Treatment of rheumatoid arthritis in abatacept-naïve patients: administer a first single IV loading dose as per above dosage, followed by 125 mg SC within a day and 125 mg SC once weekly thereafter.
  - Treatment of psoriatic arthritis: 125 mg SC once weekly. An IV loading dose is not needed.
  - For patients unable to receive an IV infusion or for those transitioning from IV therapy to SC administration: omit the IV loading dose and start 125 mg SC once weekly at the time the IV dose should have been given.

Pediatrics (6 years of age and older):
- For IV administration only: if less than 75 kg: 10 mg/kg/dose. If 75 kg or greater: follow the adult regimen. To administer at 0, 2 and 4 weeks and then every 4 weeks.
ABATACEPT
Orencia ®
Immunomodulator

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and prefilled syringes in the fridge; protect from light.
- Compatible with NS.
- Reconstituted and fully diluted solutions should be clear, colourless to pale yellow; do not use if opaque particles, discolouration or foreign particles are present.
- Reconstituted and fully diluted solutions are stable for 24 hours at room temp or in the fridge.
- Do not infuse in the same intravenous line with other agents.

MISCELLANEOUS

- Medications for the treatment of hypersensitivity reactions (e.g., acetaminophen, antihistamines, corticosteroids and/or epinephrine) should be available for immediate use in the event of a reaction.
- Live vaccines should not be given concurrently with abatacept or within 3 months of its discontinuation.
- Not recommended to be given concurrently with another biologic rheumatoid arthritis agent (i.e., adalimumab, anakinra, etanercept, infliximab), as there is an increased risk of serious infections.
- Abatacept may cause falsely elevated blood glucose readings on the day of infusion with blood glucose monitors using test strips with glucose dehydrogenase pyrroloquinolinequinone (GDH-PQQ); these test strips may react with maltose present in the abatacept formulation.

REFERENCES

2, 5, 74, 121.
INDICATIONS
- To rapidly lower intraocular pressure in acute glaucoma.
- Treatment of edema; diuresis.
- Has also been used to reverse metabolic alkalosis.

ADMINISTRATION
- Reconstitute 500 mg vial with at least 5 mL of SWFI to yield a solution containing not more than 100 mg/mL.
- IV direct: physician or RN. Administer 500 mg (or less) over at least 1 minute.
- Intermittent IV infusion.
- Do NOT inject IM; painful due to the alkaline pH.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash.
- GI: nausea, vomiting, diarrhea, metallic taste.
- CNS: drowsiness, confusion; paresthesia associated with hypokalemia.
- Aggravates metabolic acidosis.
- Renal: dysuria, crystalluria, renal colic, renal failure.

DOSAGE
- Adults: - edema: 5 mg/kg IV once daily (250-375 mg IV once daily).
  - glaucoma: 500 mg IV initially, followed by 125-250 mg IV q4h.
- Pediatrics: - for diuresis: 5 mg/kg or 150 mg/m² IV once daily.
  - glaucoma: 5-10 mg/kg IV q6h.
- Renal failure:
  
<table>
<thead>
<tr>
<th>CrCl</th>
<th>Dosing interval</th>
<th>Dosing interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 50 mL/min</td>
<td>q6h</td>
<td>q6h</td>
</tr>
<tr>
<td>10-50 mL/min</td>
<td>q12h</td>
<td>q12h</td>
</tr>
<tr>
<td>less than 10 mL/min</td>
<td>Do not administer as drug is ineffective</td>
<td>Do not administer as drug is ineffective</td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solution is stable for at least one week in the fridge; the manufacturer recommends use within 24 hours as there is no antibacterial preservative included.
- Stable for 5 days at room temp or 44 days in the fridge when diluted in D5W or NS at a concentration of 0.375 mg/mL in PVC containers.

MISCELLANEOUS
- Diuretic activity diminishes with continued use; to avoid loss of diuretic effect, may be given intermittently (e.g., on alternate days or for 2 days followed by a day of rest).
- Contraindicated in patients with hyperchloremic acidosis, hypokalemia or hyponatremia, Addison’s disease or other forms of adrenal failure, cirrhosis or severe renal failure.

REFERENCES
1, 3, 4, 40, 95, 216.
INDICATIONS

- Treatment of acetaminophen overdose when a potentially hepatotoxic quantity has been ingested. Decision to administer N-acetylcysteine (NAC) should be made by plotting the measured acetaminophen serum level on the Rumack-Matthew nomogram (available in the manufacturer’s product monograph) or by calling a Poison Centre.
- Prevention of contrast media-induced renal failure.

ADMINISTRATION

- Intermittent IV infusion: refer to Dosage section.
- Continuous IV infusion: refer to Dosage section.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: hypertension.
- GI: nausea, vomiting.

DOSAGE

Acetaminophen overdose:
- 21-hour IV protocol (standard): 150 mg/kg IV in 200 mL D5W over 60 minutes, then 50 mg/kg IV in 500 mL D5W over 4 hours, followed by 100 mg/kg IV in 1000 mL D5W over 16 hours. Total dose = 300 mg/kg over 21 hours. Infusing the initial dose of 150 mg/kg over a period of 60 minutes reduces risk of anaphylactoid reactions.
- 48-hour IV protocol (non standard): to favour if treatment with NAC is delayed until 10-24 hours after acetaminophen ingestion; 140 mg/kg IV as a loading dose in D5W over 60 minutes, followed by 70 mg/kg IV in D5W over 60 minutes q4h for 12 doses. Total dose = 980 mg/kg (in 13 doses) over 48 hours. Dilute each dose as per a ratio of 1 mL of NAC in 5 mL of D5W.
- Protocol from the Ontario, Manitoba, and Nunavut Poison Centres: dilute the 20% NAC vial solution with D5W to a concentration of 30 mg/mL (3%) according to patient weight:

<table>
<thead>
<tr>
<th>Patient Weight</th>
<th>Solution Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 20 kg</td>
<td>Remove 37.5 mL from a 250 mL bag of D5W. Add 37.5 mL of 20% NAC.</td>
</tr>
<tr>
<td>21-40 kg</td>
<td>Remove 75 mL from a 500 mL bag of D5W. Add 75 mL of 20% NAC.</td>
</tr>
<tr>
<td>41 kg or greater</td>
<td>Remove 150 mL from a 1000 mL bag of D5W. Add 150 mL of 20% NAC.</td>
</tr>
</tbody>
</table>

Loading dose for all patients: 60 mg/kg/hr (maximum of 6000 mg/hr) or 2 mL/kg/hr (maximum of 200 mL/hr) for 4 hours followed by the maintenance dose.

Maintenance dose:
- for typical dosing scenario: 6 mg/kg/hr (maximum of 600 mg/hr) or 0.2 mL/kg/hr (maximum of 20 mL/hr) until advised to stop by the Poison Centre or patient meets the Stopping Criteria (refer to Miscellaneous section).
- for high-risk patients*: 12 mg/kg/hr (maximum of 1200 mg/hr) or 0.4 mL/kg/hr (maximum of 40 mL/hr) until advised to stop by the Poison Centre or patient meets the Stopping Criteria (refer to Miscellaneous section). *High risk patients are defined according to various clinical and laboratory parameters.

../Cont.
.../Cont.

**DOSAGE** (Cont.)

Prevention of contrast media-induced renal failure:
- 150 mg/kg IV in 500 mL NS over 30 minutes immediately before contrast media injection followed by 50 mg/kg IV in 500 mL NS over 4 hours after contrast media injection.
  OR
- 600 mg or 1200 mg IV in 50-100 mL of NS or D5W over 15-30 minutes before contrast media injection followed by 600 mg or 1200 mg orally twice daily for 48 hours after contrast media injection (total of 3000 mg or 6000 mg). The higher dose regimen (total 6000 mg) may be preferred in patients receiving a large volume of contrast media.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Opened vials should be stored in the fridge and used within 96 hours.
- Stable for 14 days at room temp or 28 days in the fridge when diluted in D5W or NS at concentrations of 1 mg/mL or 60 mg/mL, in PVC or glass containers.
- Stable for 72 hours at room temp when diluted in D5W at a concentration of 30 mg/mL in PVC containers. However, the Ontario, Manitoba, and Nunavut Poison Centres recommend that each bag of 3% solution be changed after 24 hours.

**MISCELLANEOUS**

Acetaminophen overdose:
- The solution diluted to 3% is slightly hyperosmolar but is still considered safe for administration via a peripheral vein.
- Serum acetaminophen concentrations should be determined between 4 to 24 hours after suspected time of acute ingestion (to ensure that peak concentrations have occurred). If an extended release preparation of acetaminophen was ingested, repeat plasma levels every 4 hours until level peaks.
- NAC therapy should be started within 24 hours and preferably within 8-10 hours of acetaminophen ingestion to prevent liver damage.
- Acetaminophen levels should be repeated every 12 hours until undetectable (less than 66 mcmol/L).
- Ontario, Manitoba, and Nunavut Poison Centres Stopping Rules: acetaminophen level is undetectable and a minimum NAC infusion of 12 hours (including the loading dose) and AST/ALT of 100 international units/L or less (or falling and less than 50% peak) and INR less than 2 and patient is well.

Prevention of contrast media-induced renal failure:
- NAC administered exclusively by the oral route also offers some renal protection to prevent contrast media-induced renal failure (600 mg or 1200 mg po BID the day before and the day of the procedure).

**REFERENCES**
1, 2, 7, 8, 95, 208, 238, 263, 339, 417, 418, 419, 420, 503, 528, 529.
INDICATIONS

- Mucosal and cutaneous herpes simplex (HSV-1 and HSV-2) infections in immunocompromised patients.
- Severe initial genital herpes infections.
- Herpes simplex encephalitis.
- Varicella-zoster infections in immunocompromised patients.

ADMINISTRATION

- Reconstitute each 500 mg vial or 1 g vial with 10 mL or 20 mL, respectively, of SWFI without preservatives to make a 50 mg/mL solution; do not use bacteriostatic water that contains benzyl alcohol or parabens. Also available as 25 mg/mL and 50 mg/mL premixed solutions.
- Intermittent IV infusion: dilute in D5W or NS to a concentration no greater than 10 mg/mL and infuse over at least 60 minutes.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus; rarely angioedema and anaphylaxis.
- GI: nausea, vomiting.
- CNS: tremors, confusion, agitation, lethargy, hallucinations.
- Transient increases in liver enzymes.
- Renal: increased serum urea and creatinine; hematuria; possible crystallization in renal tubules if rate of administration too rapid or patient not adequately hydrated.
- Local reactions: venous irritation, phlebitis.

DOSAGE

- Adults and adolescents (12 years of age and older):
  Herpes simplex infections (mucosal and cutaneous) and severe initial genital herpes infections: 5 mg/kg q8h.
  Herpes simplex encephalitis: 10-15 mg/kg q8h.
  Varicella zoster infections: 10 mg/kg q8h.
- Pediatrics (younger than 12 years of age):
  Herpes simplex infections (mucosal and cutaneous) and severe initial genital herpes infections: 250 mg/m² q8h or 10 mg/kg q8h.
  Herpes simplex encephalitis and varicella zoster infections: 500 mg/m² q8h or 20 mg/kg q8h.
- Adjust dose in renal failure:
  CrCl (mL/min) 25-50 10-25 less than 10
  Dose 100% 100% 50%
  Interval (hr) 12 24 24 *
  * Administer after dialysis as drug is substantially removed by hemodialysis.
- Dosage for obese patients should be based on ideal body weight.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Reconstituted vials are stable for 12 hours at room temp.
- Stable at room temp for 24 hours when diluted in Ringer’s or RL.
- Stable for 37 days in the fridge or at room temp when diluted in D5W or NS at a concentration of 5 mg/mL in PVC containers.
- Stable for 21 days at room temp or 35 days in the fridge protected from light when diluted in D5W at concentrations of 1, 7 and 10 mg/mL in PVC containers.

…/Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 7 days at room temp or 35 days in the fridge protected from light when diluted in NS at concentrations of 1, 7 and 10 mg/mL in PVC containers.
- Refrigeration may result in the formation of a precipitate, which will redissolve at room temp without affecting potency.

MISCELLANEOUS

REFERENCES

1, 2, 4, 6, 40, 82, 95, 143, 366, 367.
INDICATIONS
- Moderately to severely active rheumatoid arthritis; can be used alone or in combination with methotrexate or other DMARDs.
- Moderately to severely active polyarticular juvenile idiopathic arthritis (JIA) in children 2 to 17 years of age with inadequate response to one or more DMARDs; should be used with methotrexate or as monotherapy if methotrexate is not tolerated or is inappropriate.
- Psoriatic arthritis; can be used in combination with methotrexate in adults who do not respond adequately to methotrexate alone.
- Active ankylosing spondylitis in adults with inadequate response to conventional therapy.
- Crohn’s disease, fistulizing Crohn’s disease and ulcerative colitis in adults with inadequate response to conventional therapy.
- Crohn’s disease in patients 13-17 years of age weighing at least 40 kg with inadequate response or intolerance to conventional therapy and/or a tumour necrosis factor alpha antagonist.
- Chronic moderate to severe plaque psoriasis in adults who are candidates for systemic therapy.
- Moderately to severely active hidradenitis suppurativa in adults and in patients 12-17 years of age weighing at least 30 kg who have not responded to conventional therapy.
- Treatment of non-infectious uveitis in adults with inadequate response to corticosteroids or as corticosteroid-sparing treatment in corticosteroid-dependent patients.
- Treatment of chronic non-infectious anterior uveitis in children 2-17 years of age in combination with methotrexate when response to conventional therapy is inadequate, not tolerated or inappropriate.

ADMINISTRATION
- SC: into thigh or abdomen (at least 2 inches from navel); rotate injection site.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, anaphylaxis (rare).
- CNS: headache, dizziness.
- Infections: patients receiving adalimumab may be more prone to develop infections, including tuberculosis and fungal infections.
- Local reactions: erythema, itching, hemorrhage, pain, swelling.

DOSAGE
Adults:
- Rheumatoid arthritis, psoriatic arthritis and ankylosing spondylitis: 40 mg SC every other week.
- Crohn’s disease, fistulizing Crohn’s disease and ulcerative colitis: 160 mg SC (as four SC injections of 40 mg in one day or as two SC injections of 40 mg per day for two consecutive days) at week 0, followed by 80 mg SC at week 2, followed by a maintenance regimen of 40 mg SC every other week beginning at week 4.
- Plaque psoriasis and uveitis: 80 mg SC as an initial dose (as two SC injections of 40 mg or one 80 mg SC injection of 80 mg), followed by 40 mg SC every other week, starting one week after initial dose.
- Hidradenitis suppurativa: 160 mg SC (as four SC injections of 40 mg in one day or as two SC injections of 40 mg per day for two consecutive days) at week 0, followed by 80 mg SC at week 2 (as two SC injections of 40 mg in one day), followed by a maintenance regimen of 40 mg SC every week beginning at week 4.
DOSAGE (Cont)

Pediatrics:
- Polyarticular JIA (2-17 years of age): 24 mg/m² to a maximum dose of 40 mg SC every other week.
- Crohn’s disease (13-17 years of age): 160 mg SC (as four SC injections of 40 mg in one day or as two SC injections of 40 mg in one day for two consecutive days) at week 0, followed by 80 mg SC at week 2 (given as two 40 mg SC injections in one day), followed by a maintenance regimen of 20 mg SC every other week, beginning at week 4.
- Hydradenitis suppurativa (12-17 years of age, weighing at least 30 kg): 80 mg SC at week 0, followed by 40 mg SC every other week starting at week 1; dosage can be increased to 40 mg every week if needed.
- Uveitis (2-17 years of age):
  - if child weighs less than 30 kg: 20 mg SC every other week; if child is 6 years of age or older, may be preceded by a 40 mg loading dose SC one week before maintenance therapy.
  - if child weighs 30 kg or more: 40 mg SC every other week; if child is 6 years of age or older, may be preceded by a 80 mg loading dose SC one week before maintenance therapy.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials, pens and prefilled syringes between 2-8°C. Do not freeze. Protect from light.
- Pens or prefilled syringes are stable for 14 days at room temp (not to exceed 25°C); discard if not used within that time period.

MISCELLANEOUS

- The vials are for pediatric use.

REFERENCES

1, 5, 53, 135.
**INDICATIONS**
- For the conversion of paroxysmal supraventricular tachycardia to sinus rhythm.
- To aid in the diagnosis of broad or narrow complex supraventricular tachycardia.

**ADMINISTRATION**
- IV direct: physician or RN in presence of physician. **Cardiac monitoring.** Administer undiluted rapidly over 1-2 seconds.
- Administer in a port as close to the patient as possible and follow with a rapid saline flush of the IV line or give directly into a peripheral vein.

**POTENTIAL ADMINISTRATION HAZARDS**
- The following effects may appear immediately after injection and generally last less than 1 minute:
  - facial flushing (18%)
  - shortness of breath (12%)
  - chest pressure (7%)
  - nausea (3%)
  - headache (2%)
  - lightheadedness (2%)
- Transient arrhythmias during time of conversion may appear on the ECG; these generally last only a few seconds without intervention.
- May cause bronchospasm in asthmatic patients.

**DOSAGE**
- Initial dose: 6 mg IV.
- Additional doses: if tachycardia does not respond in 1-2 minutes, give a second dose of 12 mg IV over 1-2 seconds. This 12 mg dose may be repeated once, if necessary.
- In patients on dipyridamole, smaller doses of adenosine are indicated.
- When given into a central line, an initial dose of 3 mg has been recommended by some investigators, with repeat of a 6 mg dose if tachycardia persists.

**COMPATIBILITY, STABILITY**
*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*
- Keep unopened vials at room temp. Crystallization can occur if kept in the fridge. Crystals will dissolve when warmed to room temp.
- Stable for 16 days at room temp or in the fridge in D5W or NS at a concentration of 0.75 mg/mL in PVC bags or polypropylene syringes.
- Stable for 14 days at room temp or in the fridge in D5W or NS at concentrations of 0.01 mg/mL and 0.05 mg/mL in polyolefin bags.

**MISCELLANEOUS**
- Caution when used with digoxin alone or digoxin in combination with verapamil (risk of ventricular fibrillation/flutter).
- In a patient on methylxanthines (theophylline, caffeine), adenosine may not be effective or larger doses may be required.
- May produce a higher degree of heart block in patients on carbamazepine.

**REFERENCES**
1, 2, 4, 40, 290.
## INDICATIONS

- Enzyme replacement therapy in patients with Fabry disease.

## ADMINISTRATION

- Allow vial and diluent to reach room temp prior to reconstitution (approximately 30 minutes). Reconstitute each 35 mg vial and 5 mg vial with 7.2 mL and 1.1 mL, respectively, of SWFI. Roll and tilt vial gently. Do NOT shake. Final concentration of 5 mg/mL.
- Intermittent IV infusion: further dilute with NS to a total final volume of 50 mL (if patient weight is 35 kg or less), 100 mL (if weight = 35.1-70 kg), 250 mL (if weight = 70.1-100 kg) or 500 mL (if weight is over 100 kg). Gently invert infusion bag to mix the solution. Initial infusion rate of no more than 0.25 mg/min (15 mg/hr). Infusion rate may be slowed in the event of infusion-related reactions. After patient tolerance to the infusion is well established, rate may be increased in increments of 0.05 to 0.08 mg/min (3-5 mg/hr) with each subsequent infusion. For patients of 30 kg and over, administration duration should not be less than 1.5 hours (based on patient tolerance).
- Do not use filter needles during preparation of the infusion.
- The diluted solution may be filtered through an in-line low protein-binding 0.2 micron filter during administration.

## POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylaxis (bronchospasm, hypotension, dyspnea), angioedema, dysphagia, urticaria, pruritus, rash, flushing, nasal congestion.
- Infusion-related reactions may be severe and include chills, fever, temperature change sensation, headache, nausea, rhinitis, dyspnea, chest pain/tightness, flushing, hypertension, somnolence, pruritus, and urticaria. If reaction occurs, slow infusion rate and/or administer acetaminophen, nonsteroidal anti-inflammatory drugs, antihistamines, and/or corticosteroids. Consider premedicating with these agents.
- CSN: dizziness, headache, paresthesias.

## DOSAGE

- 1 mg/kg IV every 2 weeks.

## COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened vials in the fridge.
- Reconstituted and diluted solutions may be stored in the fridge for up to 24 hours.
- Do not shake solutions.

## MISCELLANEOUS

- Use cautiously in patients with compromised cardiac function (higher risk of severe complications from infusion reactions).

## REFERENCES

5, 95.
INDICATIONS
- Hypoproteinemia.
- Treatment of hypovolemic shock.
- Thermal (burn) injury.
- Acute nephrotic syndrome.
- Respiratory insufficiency.
- Cardiopulmonary bypass.

ADMINISTRATION
- Continuous IV infusion (mandatory).
- The 25% preparation may be diluted with NS (preferred) or D5W if patient is sodium restricted.
- Rate of administration is variable depending on indication, blood volume, patient response and concentration of solution.
  - if normal blood volume: administer the 5% solution at a maximum rate of 2-4 mL/min, except in patients with hypoproteinemia where a maximum rate of 5-10 mL/min can be used. Administer the 25% solution at a maximum rate of 1 mL/min, except in patients with hypoproteinemia where a maximum rate of 2-3 mL/min can be used.
  - if hypovolemia: give as rapidly as tolerated; as plasma volume approaches to normal, slow the rate of the 5% solution to a maximum of 2-4 mL/min and the rate of the 25% solution to a maximum of 1 mL/min to minimize possibility of circulatory overload and pulmonary edema.
- Consult TOH Nursing policy 00045 (Blood and blood products – Administration of) for more information.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: in nature or due to protein overload: urticaria, chills, fever, nausea, vomiting, salivation, change in respiration, pulse and blood pressure.
- Cardiovascular: circulatory failure, elevated central venous pressure, precipitous hypotension.
- Respiratory: dyspnea, pulmonary edema.
- Risk of transmission of infectious agents, including viruses, and theoretically the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.

DOSAGE
- The 5% solution should be used in hypovolemic patients; the 25% solution should be used in patients with fluid or sodium restrictions.
- For hypovolemia:
  - Adults: 25 g (500 mL of a 5% solution) initially, may be repeated in 15-30 minutes if response inadequate. Usual daily maximum of 125 g.
  - Pediatrics: 0.5-1 g/kg/dose (10-20 mL/kg of a 5% solution). Maximum: 6 g/kg/day.
  - Neonates: 0.25-0.5 g/kg/dose (5-10 mL/kg of a 5% solution).
- Varies greatly depending on indication and clinical status of patient.
- Administration of more than 250 g (5 liters of a 5% solution or 1 liter of a 25% solution) in a period of 48 hours or less is not recommended.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Use within 4 hours after opening.
- Solution contains no preservatives; if solution shows turbidity or sediment, do not use.
- Compatible with NS and D5W.

MISCELLANEOUS
- Sodium content: approximately 14.5 mmol/100 mL (5% or 25% solution).
- Contraindicated in patients with severe anemia, cardiac failure, renal insufficiency, pulmonary edema or if history of allergic reaction to albumin.

REFERENCES
1, 4, 5, 40, 82, 95, 135.

Limited revision 2015, 2017, 2018
INDICATIONS
- Treatment of adults with metastatic renal cell carcinoma.
- Treatment of adults with metastatic malignant melanoma.

ADMINISTRATION
- Reconstitute each vial containing 22 million international units with 1.2 mL of SWFI (do NOT use bacteriostatic water or NS) to yield a solution containing 18 million international units/mL. During reconstitution, direct diluent against side of vial; gently swirl to avoid excess foaming; do NOT shake.
- Intermittent IV infusion: dilute dose in 50 mL of D5W and administer over 15 minutes.
- Continuous IV infusion.
- Desired concentration for IV administration is 30-70 mcg/mL; smaller or larger volumes of D5W may be used to maintain this concentration; refer to Compatibility, Stability section for more information.
- Do NOT use a filter for dilution or administration.
- SC.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Flu-like symptoms: fever, chills, rigor. Treatment with an antipyretic agent or a nonsteroidal anti-inflammatory agent (e.g., acetaminophen, ibuprofen) beginning immediately before the initiation of therapy and continuing for 12 hours after the last dose may minimize these symptoms. Meperidine may be administered to control the rigors.
- Cardiovascular: due to capillary leak syndrome: loss of vascular tone and extravasation of proteins and fluid into the extravascular space resulting in hypotension, cardiac arrhythmias, reduced organ perfusion, peripheral edema. May need vasopressors.
- GI: diarrhea, nausea, vomiting, GI bleeding/infarction.
- CNS: mental status changes (e.g., lethargy, somnolence, confusion, agitation). Continued administration in patients who develop moderate to severe lethargy or somnolence may lead to coma.
- Respiratory: dyspnea, pulmonary congestion.
- Renal dysfunction, oliguria.
- Hematologic: anemia, thrombocytopenia.
- Dermatologic: rash, pruritus.
- Local reactions: with SC administration, development of nodules at injection site; apply cold compress to reduce swelling and pain.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 0.6 million international units/kg IV q8h for a maximum of 14 doses. Repeat for another 14 doses after 9 days of rest.
- 18 million international units/m²/day given as a continuous 24 hour IV infusion for 5 days. Repeat after a 5-8 day rest period (Renal carcinoma).
- 18 million international units daily by SC injection for 5 days, followed by 2 day rest period. For additional cycles, a dosage of 9 million international units SC on days 1 and 2, followed by 18 million international units daily SC for the next 3 days (Renal carcinoma).
- Dose may be withheld if toxicity develops.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Keep unopened vials in the fridge. Protect from light.
- Reconstituted vials are stable for 48 hours at room temp or in the fridge.
- Not compatible in NS; will result in precipitation.
- Addition of albumin (final concentration of 0.1%) is necessary for dilution less than 30 mcg/mL to improve stability (see chart below); albumin to be added to D5W before aldesleukin.
- Plastic containers are preferred over glass.
- Stability of diluted solutions in D5W:

<table>
<thead>
<tr>
<th>Final Concentration (mcg/mL)</th>
<th>Stability of IV infusions (intermittent &amp; continuous) at room temp</th>
<th>Stability of IV continuous infusions at 32°C in CADD pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-30</td>
<td>48 hours. Add albumin</td>
<td>6 days. Add albumin</td>
</tr>
<tr>
<td>30-70</td>
<td>48 hours. Albumin not required</td>
<td>6 days. Add albumin</td>
</tr>
<tr>
<td>70-100</td>
<td>Unstable</td>
<td>Unstable</td>
</tr>
<tr>
<td>100-500</td>
<td>48 hours. Albumin not required</td>
<td>6 days. Albumin not required</td>
</tr>
</tbody>
</table>

MISCELLANEOUS

- 18 million international units = 1.1 mg of proteins.

REFERENCES

1, 2, 4, 40, 42, 129, 165.
PARENTERAL DRUG THERAPY MANUAL

INDICATIONS
- Treatment of patients with moderate to severe plaque psoriasis who are candidates for phototherapy or systemic therapy.

ADMINISTRATION
- Reconstitution: add very slowly 0.6 mL of the supplied SWFI to the vial, keeping the needle pointed to the vial wall, to obtain a final solution of 15 mg/0.5 mL. To avoid excessive foaming, do NOT shake or vigorously agitate. Swirl the contents gently during dissolution.
- IM: rotate injection site; new injection should be given at least 1 inch from an old site.
- Do NOT filter reconstituted solution during preparation or administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, angioedema.
- Infections: patients receiving alefacept may be more prone to infection.
- Lymphopenia: CD4+ and CD8+ T-cell counts may fall below normal range.
- Local reactions: pain, inflammation, bleeding, edema.

DOSAGE
- 15 mg IM once weekly for a course of up to 12 injections over a 12-week period; hold dose if CD4+ T-cell counts are below 250 cells/mCL.
- Intermittent re-treatment with subsequent courses may be initiated as needed, provided that total lymphocyte and CD4+ T-cell counts are within the normal range and a minimum 12-week interval has passed between courses of treatment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge; vials stable at temperatures up to 30°C for up to 48 hours.
- Reconstituted vials are stable for 4 hours in the fridge; any solution not used within 4 hours of reconstitution should be discarded.

MISCELLANEOUS
- Monitor CD4+ T-cell counts every 2 weeks during the 12-week dosing regimen.

REFERENCES
1, 2.
INDICATIONS
- Treatment of B-cell chronic lymphocytic leukemia (B-CLL) in patients who have been treated with alkylating agents and who have failed fludarabine therapy.
- Treatment of patients with previously untreated progressive B-CLL.

ADMINISTRATION
- Ensure premedication has been administered as recommended; refer to Dosage section.
- Do NOT shake vial prior to use.
- Intermittent IV infusion: **blood pressure monitoring.** Withdraw dose of alemtuzumab from the vial into a syringe; dilute into 100 mL of NS or D5W. Gently invert the bag to mix the solution. Infuse over 2 hours.
- SC: rotate sites on thighs or abdomen.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis, angioedema, rash, urticaria.
- Infusion-related reactions: hypotension, rigors, fever, shortness of breath, bronchospasm, chills and/or rash.
- To minimize the risk of infusion-related reactions, premedication should be administered prior to the first dose, when the dose is escalated, and as clinically indicated; refer to Dosage section.
- Cardiovascular: myocardial infarction, cardiac arrhythmias, hypotension, hypertension.
- GI: nausea, vomiting.
- CNS: headache, dizziness, vertigo; coma, syncope, convulsions (rare).
- Tumour lysis syndrome: hydrate patient and administer allopurinol in patients with high tumour load.
- Hematologic: lymphopenia, thrombocytopenia. Profound lymphopenia causes a variety of opportunistic infections (bacterial, viral, fungal and protozoan). Patients should receive oral anti-infective prophylaxis: trimethoprim-sulfamethoxazole equivalent to one double strength (DS) tablet twice a day 3 times a week and famciclovir 250 mg twice a day (or acyclovir 400 mg twice a day or valacyclovir 500 mg twice a day) upon initiation of therapy. Prophylaxis to be continued during treatment and for 2 months after completion of therapy or until CD4+ count is equal or greater than 200 cells/mL, whichever occurs later.
- Local reactions: with SC administration; injection-site skin reactions of mild to moderate severity during weeks 1 and 2. Ice packs or cold compresses may help to alleviate symptoms.

DOSAGE
- Premedication with oral diphenhydramine 50 mg and acetaminophen 650 mg 30 minutes prior to infusion is recommended prior to the first dose, when the dose is escalated and as clinically indicated to minimize the risk of infusion-related reactions. **Add hydrocortisone 200 mg IV (or equivalent) for severe infusion-related events and meperidine 25 mg IV to lessen rigors.**
- Initial dose: 3 mg daily; when this dose is tolerated (infusion-related toxicities are Grade 2 or less), increase daily dose to 10 mg; when the 10 mg dose is tolerated, initiate maintenance dose. In most patients, escalation to maintenance dose can be accomplished in 3 to 7 days.
- Maintenance dose: 30 mg daily administered 3 times a week on alternate days (i.e., Monday, Wednesday, Friday). Administer for up to 12 weeks.
- If therapy is interrupted for 7 or more days, reinstitute therapy with gradual dose escalation.
- Single dose greater than 30 mg or cumulative doses greater than 90 mg per week should not be administered.
- Refer to prescribing information for dosage modification in case of hematologic toxicity.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from direct sunlight. Do not freeze.
- Single-use vial; discard unused portion.
- Diluted solution is stable 8 hours at room temp or in the fridge, protected from light.

MISCELLANEOUS

REFERENCES

1, 2, 40, 118, 129, 165, 180, 539, 540.
INDICATIONS

- Management of hypocalcemia, secondary hyperparathyroidism, and osteodystrophy in patients with chronic renal failure.

ADMINISTRATION

- IV direct: physician or RN; undiluted; administer over 30 seconds.

POTENTIAL ADMINISTRATION HAZARDS

- Hypercalcemia, hyperphosphatemia (at excessive doses).

DOSAGE

- Dose titration for dialysis patients: initial dose of 1 mcg per dialysis session (2 to 3 times per week). If insufficient response after 1 week, increase dose in weekly increments of 1 mcg per dialysis session up to a maximum of 12 mcg per week.
- Maintenance: usual dose is around 6 mcg per week (range of 1.5 to 12 mcg per week).
- Dose should be titrated to maintain total serum calcium in the upper half of the normal range.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened ampoules between 2-8°C; protect from light.
- Not recommended to dilute in infusion fluids.
- May adsorb to plastic.

MISCELLANEOUS

REFERENCES

2, 95, 122.
ALFENTANIL

Alfenta ®

Opioid analgesic, Anesthesia adjunct

INDICATIONS

- As an analgesic adjunct for the induction and maintenance of anaesthesia.
- As an analgesic and suppressant of respiratory drive to assist with ventilator compliance for mechanically ventilated patients in the intensive care unit.
- As an additional analgesic during brief painful procedures, when given in bolus doses to supplement continuous infusion.

ADMINISTRATION

- IV direct: physician only; respiratory support. Administer undiluted or dilute dose to 10 mL with NS or D5W and give over a minimum of 3 minutes.
- Continuous IV infusion: dilute to achieve a concentration between 25-80 mcg/mL.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: bronchospasm, laryngospasm, anaphylaxis, itching, urticaria.
- Cardiovascular: bradycardia, hypo- or hypertension.
- GI: nausea, vomiting.
- Respiratory depression.
- Muscle rigidity, especially of the truncal muscles, is a common occurrence. The incidence can be reduced by pre-treatment with a neuromuscular blocking agent and/or a reduction in the dose/rate of administration.
- Antidote: naloxone.

DOSAGE

- For procedures shorter than 30 minutes - administer as a direct injection. Initial dose 5-20 mcg/kg with subsequent incremental doses of 2.5 mcg/kg to a maximum total dose of 40 mcg/kg.
- For procedures 30-60 minutes (ventilated patients) - administer as a direct injection. Initial dose of 20-50 mcg/kg with subsequent incremental doses of 5-15 mcg/kg to a maximum total dose of 75 mcg/kg.
- For procedures longer than 45 minutes (ventilated patients) - initial dose of 50-75 mcg/kg as a direct injection followed by a continuous infusion of 0.5-1.5 mcg/kg/min.
- Mechanically ventilated patients - Dose is dependant on many factors. Initiate infusion at 0.5 mcg/kg/min and adjust rate in increments of 0.25 mcg/kg/min. An initial loading dose of up to 50 mcg/kg may be required in certain patients. The majority of patients are adequately controlled on a continuous infusion of 0.2-2 mcg/kg/min. Supplemental bolus doses of 10-20 mcg/kg may be given during periods of increased stimulation due to painful procedures.
- In obese patients (more than 20% above ideal body weight), alfentanil doses should be calculated on the basis of lean body weight.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Protect from light.
- Compatible with NS, D5W, dextrose-saline solutions and RL.
- Stable for 16 weeks at 20°C exposed to light or 8°C when diluted in D5W at a concentration of 0.5 mg/mL in plastic syringes.

MISCELLANEOUS

REFERENCES

4, 5, 40.
INDICATIONS
- Replacement therapy in Pompe’s disease (deficiency of lysosomal alpha-glucosidase enzyme).

ADMINISTRATION
- Allow vials to reach room temp prior to reconstitution (takes approximately 30 minutes).
- Reconstitute each 50 mg vial with 10.3 mL SWFI by slowly adding in a drop-wise manner down the inside of the vial. Avoid direct forceful impact of the diluent on the powder to prevent foaming. Tilt and roll the vial gently to allow dissolution. Do NOT invert, swirl, or shake the vial. Final concentration is 5 mg/mL. Do NOT use if discoloured or foreign particles are present.
- Intermittent IV infusion (mandatory): slowly withdraw required dose to avoid foaming in the syringe. Infusion volume is dependent on patient’s weight, refer to table in product monograph for correct volume of NS to be used. Remove the airspace from the NS bag due to drug sensitivity to air-liquid surfaces and the risk of particle formation. Add the reconstituted dose slowly and directly into the NS, NOT into airspace, for a final concentration between 0.5-4/mL. Gently invert bag to mix. Avoid foaming; do NOT shake the bag. Administer via an in-line low protein binding 0.2 micron filter to remove visible thin white strands or translucent fibres of alglucosidase alfa. Start IV infusion at 1 mg/kg/hr; if no hypersensitivity or infusion-related events occurred after 30 minutes, increase rate by 2 mg/kg/hr every 30 minutes if tolerated to a maximum of 7 mg/kg/hr. If reactions occur, slow and/or stop the infusion.
- Protect from light both the reconstituted and diluted solutions.
- Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, acute cardiorespiratory failure, cardiac arrest, hypotension, bronchospasm and urticaria.
- Infusion-related reactions can occur with any dose and at any point during or after dose administration. Symptoms include: rash, urticaria, pruritus, fever, rigor, blood pressure fluctuation, increased heart rate, flushing, cough, tachypnea, low oxygen saturation, agitation, irritability and vomiting. Slowing or temporarily stopping the infusion may alleviate the symptoms. Severe reactions may be managed by the administration of antihistamines, antipyretics, corticosteroids, IV fluids, and/or oxygen.
- Severe skin and systemic immune-mediated reactions (e.g., ulcerative and necrotizing skin lesions).
- GI: diarrhea, constipation.
- Respiratory tract infection, otitis media, pneumonia.
- Anemia.

DOSAGE
- 20 mg/kg IV every 2 weeks. Round dose up to the nearest whole vial.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge. Do not freeze or shake.
- Reconstituted solution is stable 24 hours in the fridge protected from light. Do not freeze or shake.
- Diluted solution is stable 24 hours in the fridge protected from light in NS. Do not freeze or shake.

MISCELLANEOUS

REFERENCES
1, 2, 95, 208.
INDICATIONS

- Replacement therapy for congenital alpha\textsubscript{1}-antitrypsin deficiency associated with panacinar emphysema.

ADMINISTRATION

- Reconstitute 1 g vial with 20 mL of SWFI (supplied). Swirl gently to completely dissolve.
- Intermittent IV infusion: transfer exact dose using the filter needle provided by manufacturer into an empty sterile IV container. Administer at a rate of 0.08 mL/kg/min or greater; usual dose administered approximately in 15 minutes.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: pruritus, rash, hives, urticaria, dyspnea, hypotension, anaphylaxis.
- Cardiovascular: hypotension (rare).
- CNS: headache, somnolence, dizziness.
- Fever (occurring up to 12 hours after injection).
- Transient leukocytosis and dilutional anemia.

DOSAGE

- 60 mg/kg once weekly.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store between 2-25°C.
- Administer within 3 hours after reconstitution.
- Do not refrigerate after reconstitution.

MISCELLANEOUS

- Patients should be immunized against hepatitis B as the product is derived from pools of fresh human plasma.

REFERENCES

1, 2, 40.
INDICATIONS

- To maintain the patency of the ductus arteriosus in neonates until surgery can be performed.
- Has been used in for other indications e.g., circulatory deficiency (Raynaud's).

ADMINISTRATION

Patency of ductus arteriosus:
- Continuous IV infusion: **respiratory support, blood pressure monitoring, cardiac monitoring.**
  Dilute 500 mcg (1 mL) in 25-100 mL of D5W or NS. To minimize possibility of haze formation, add alprostadil directly to the IV infusion solution, avoiding contact with the walls of plastic containers. The infusion rate to deliver 0.1 mcg/kg/min can be calculated as follows:
  \[
  \text{Infusion rate (mL/hr)} = \frac{\text{Volume (mL) containing 500 mcg} \times \text{weight (kg)}}{83.3}
  \]
- Preferred route is intravenous via a large vein (peripheral or central) although alprostadil may be administered via an umbilical artery catheter positioned near ductus arteriosus.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: flushing, bradycardia or tachycardia, hypotension.
- GI: diarrhea.
- CNS: fever, seizures.
- Respiratory: apnea occurs in 10-12% of neonates, usually appearing in the first hour of the infusion.

DOSAGE

- Maintenance of patency of ductus arteriosus: initial infusion of 0.05 to 0.1 mcg/kg/min with subsequent reduction to lowest effective dose (this may be accomplished by reducing the dosage from 0.1 to 0.05 to 0.025 to 0.01 mcg/kg/min). Although doses up to 0.4 mcg/kg/min have been used, doses greater than 0.1 mcg/kg/min generally do not offer additional benefits.
- Refer to specialized references for doses for other indications.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules in the fridge.
- Stable for 24 hours at room temp when diluted in D5W or NS.

MISCELLANEOUS

REFERENCES

1, 2, 4, 40, 95, 513.

Limited revision 2015, 2016
**INDICATIONS**

- Lysis of coronary artery thrombi associated with evolving myocardial infarction.
- Acute ischemic stroke.
- Acute massive or submassive pulmonary embolism (PE).
- Acute peripheral arterial occlusion in patients with acute limb ischemia.

**ADMINISTRATION**

- Reconstitute each 50 mg vial with the diluent provided (SWFI) for a final concentration of 1 mg/mL. Gently swirl to mix; do NOT shake.
- Reconstitute each 100 mg vial according to manufacturer's instructions for a final concentration of 1 mg/mL. Use the transfer device provided. Gently swirl to mix; do NOT shake. Use a vented tubing with the glass bottle.
- Slight foaming upon reconstitution is NOT unusual.
- IV direct: physician or RN. Administer bolus dose over 1-2 minutes (see Dosage section).
- Intermittent IV infusion: may further dilute with NS or D5W; refer to Compatibility, Stability section for dilution. Must be administered by an infusion pump.
- Continuous infusion by arterial line: interventional radiologist.
- Refer to TOH stroke protocol for patient monitoring requirements.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; rash, urticaria, angioedema, anaphylactoid reactions.
- Cardiovascular: arrhythmias may occur with coronary artery reperfusion.
- GI: nausea, vomiting.
- Bleeding: internal (cerebral, retroperitoneal, GI, genitourinary, respiratory tract), epistaxis, gingival bleeding, hematuria, hematoma.
- Local reactions: extravasation can cause ecchymosis and/or inflammation.

**DOSAGE**

- Myocardial infarction: 15 mg IV over 2 minutes followed by 0.75 mg/kg IV (maximum 50 mg) over 30 minutes followed by 0.5 mg/kg IV (maximum 35 mg) over next 60 minutes.
- Acute ischemic stroke: 0.9 mg/kg IV (maximum 90 mg) with 10% of the total dose given as an IV bolus (over 1 minute) followed by the remaining 90% infused over 60 minutes.
- Acute massive or submassive PE: 100 mg IV over 2 hours; may be given as a 10 mg IV bolus followed by 90 mg infused over 2 hours.
- Acute peripheral arterial occlusion: weight-based regimen: 0.001-0.02 mg/kg/hr (maximum 2 mg/hr) intraarterially. Fixed dose regimen: 0.12-2 mg/hr intraarterially. Duration of infusion: varies depending on size and location of the occlusion; usually 6-48 hours.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened vials of Activase® between 2-30°C.
- Stable for 24 hours at room temp or in the fridge in SWFI at a concentration of 1 mg/mL when stored in a glass vial.
- Stable for 6 months in the freezer at -20°C in SWFI at a concentration of 1 mg/mL when stored in a polypropylene tube.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 48 hours in the fridge and for 14 days in the freezer at -25°C in SWFI at concentrations of 0.5 mg/mL, 1 mg/mL, 2 mg/mL when stored in a plastic syringe.
- Compatible with D5W and NS; not compatible with RL.
- When diluted in D5W, minimum concentration is 0.5 mg/mL; dilution to 0.16 and 0.09 mg/mL resulted in precipitation immediately and in 4 hours, respectively.
- When diluted in NS to a concentration of 0.2 mg/mL, no precipitation was observed. Stable for 24 hours at room temp in NS at a concentration of 0.01 mg/mL when stored in a plastic bag.
- During the period of reconstitution and infusion, protection from light is not necessary.
- Do not use solutions containing preservatives.

MISCELLANEOUS

- 50 mg = 29 X 10⁶ international units of tissue plasminogen activator.
- Avoid IM injections and excessive handling of patient; venipunctures should be performed carefully and as infrequently as possible to avoid bleeding; use compressible sites.

REFERENCES

1, 2, 4, 6, 95, 135, 162, 163, 212.
INDICATIONS
- For the restoration of function to central venous access devices (CVAD).

ADMINISTRATION
- Either the Cathflo ® product or Activase ® product may be used.
- Cathflo ®: reconstitute 2 mg vial with 2.2 mL of SWFI. Do NOT use bacteriostatic water. Slight foaming is NOT unusual. Gently swirl to mix; do NOT shake. Final concentration of 1 mg/mL.
- Activase ®: reconstitute the 50 and 100 mg vials with the accompanying 50 and 100 mL of SWFI for a final concentration of 1 mg/mL. Slight foaming is NOT unusual. Gently swirl to mix; do NOT shake.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; rash, urticaria, angioedema, anaphylactoid reactions.
- Bleeding (theoretical risk; has not been reported with Cathflo ® product).
- Systemic infection (due to potential for releasing localized infection into systemic circulation).

DOSAGE
- Patients weighing 30 kg or more: 2 mg (2 mL). For patients weighing less than 30 kg: dose is 110% of the internal lumen volume of their CVAD, not to exceed 2 mL.
- Instill appropriate dose into occluded catheter. After a 30 minute dwell time, inspect catheter function. If function not restored, dwell time may last up to 120 minutes. If necessary, a second 2 mg dose may be used and the whole procedure repeated once.
- Lower doses of 0.5 to 1 mg have also been used.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials of Cathflo ® in the fridge. Store unopened vials of Activase ® between 2-30°C.
- Stable for 24 hours at room temp or in the fridge in SWFI at a concentration of 1 mg/mL when stored in a glass vial.
- Stable for 6 months in the freezer at -20°C in SWFI at a concentration of 1 mg/mL when stored in a polypropylene tube.
- Stable for 48 hours in the fridge and for 14 days in the freezer at -25°C in SWFI at concentration of 0.5 mg/mL, 1 mg/mL, 2 mg/mL when stored in plastic syringes.
- Compatible with D5W and NS; not compatible with RL.
- When diluted in D5W, minimum concentration is 0.5 mg/mL; dilution to 0.16 and 0.09 mg/mL resulted in precipitation immediately and in 4 hours, respectively.
- When diluted in NS to a concentration of 0.2 mg/mL, no precipitation was observed. Stable for 24 hours at room temp in NS at a concentration of 0.01 mg/mL when stored in plastic bags.
- During the period of reconstitution and infusion, protection from light is not necessary.
- Do not use solutions containing preservatives.

MISCELLANEOUS

REFERENCES
1, 2, 4, 6, 95, 99, 162, 163, 212.
INDICATIONS
- Treatment of serious infections caused by gram-negative organisms (e.g., *Citrobacter*, *Ps. aeruginosa*, *Proteus*, *Klebsiella*, *E. Coli*, *Enterobacter*, *Serratia sp.*) that are resistant to other agents.

ADMINISTRATION
- Intermittent IV infusion: dilute in 100-250 mL of a compatible IV solution (for children, volume of diluent may be less). Administer over 30-60 minutes.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus (rare).
- Ototoxicity: auditory toxicity (e.g., high frequency hearing loss, tinnitus), and vestibular (e.g., vertigo, nystagmus, dizziness, ataxia, nausea, vomiting). Aminoglycoside-induced ototoxicity is usually irreversible.
- Nephrotoxicity: associated with persistently elevated trough serum levels. Usually reversible if drug is discontinued at first sign of azotemia.
- Risk of nephrotoxicity and ototoxicity is greater in patients with impaired renal function, and in those receiving high doses or prolonged therapy.
- Neurological: paresthesia, neuromuscular blockade (rare).
- Local reactions: irritation at injection site.

DOSAGE
- **Traditional dosing**: 5-7.5 mg/kg/dose with dosing interval according to creatinine clearance. Maximum of 15 mg/kg/day or 1.5 g/day. Refer to Miscellaneous section for monitoring serum levels.
- Renal failure: dosing interval must be extended, according to creatinine clearance. Adjustment based on TOH experience:
  
<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>greater than 72</th>
<th>42-72</th>
<th>18-42</th>
<th>6-18</th>
<th>less than 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval (hr)</td>
<td>8</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td>based on dialysis frequency and serum concentration</td>
</tr>
</tbody>
</table>

- **Extended interval dosing**: 15-20 mg/kg may be used in selected patients.
- Non-obese patients: doses should be calculated using actual body weight.
- Obese patients (20-30% above ideal body weight (IBW)): doses should be calculated using dosing body weight (DBW) = IBW + 0.4 X (actual body weight-IBW).

COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Stable for 24 hours at room temp, 60 days refrigerated and 30 days frozen in most IV solutions including D5W, NS and RL, at concentrations of 0.25 mg and 5 mg/mL when stored in PVC plastic bags.
- Faint yellowing of amikacin injection does not indicate loss of potency.

MISCELLANEOUS
- Safety for treatment periods longer than 14 days has not been established.
- Monitoring serum levels:
  - **Traditional dosing**:
    - serum levels pre-dose (through): taken 5 minutes before next dose; should be between 5-8 mg/L.
    - serum levels post-dose (peak): taken 30 minutes after the end of IV infusion or 60 minutes after IM injection; should be between 20-30 mg/L.
  - **Extended interval dosing**:
    - serum levels pre-dose (trough): taken 5 minutes before next dose; should be undetectable (i.e., less than 2.5 mg/L).
    - serum levels post-dose (peak): no need to monitor.

REFERENCES
1, 2, 4, 6, 40, 95, 143, 303.
**INDICATIONS**
- Treatment of acute exacerbations of asthma and chronic obstructive airway disease.
- Reduce bronchospasm in cystic fibrosis and acute descending respiratory infections.
- Relieve the periodic apnea and increase arterial blood pH in patients with Cheyne-Stokes respiration.
- Treatment of neonatal apnea and bradycardia of prematurity.

**ADMINISTRATION**
- **IV direct**: physician or RN. Dilute solution to 25 mg/mL and inject at a rate not exceeding 25 mg/min.
- **Intermittent IV infusion**: for loading dose. Dilute in 100 mL and give over 20-30 minutes; maximum rate of 25 mg/min.
- **Continuous IV infusion**: dilute in 500 mL to a final concentration of 1-5 mg/mL. Must be administered by an infusion pump.

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: palpitation, tachycardia, extrasystoles, hypotension, flushing.
- GI: nausea, vomiting, epigastric pain, abdominal cramps, anorexia.
- Rapid IV injection may cause flushing, dizziness, faintness, lightheadedness, palpitation, flushing, bradycardia, hypotension, precordial pain, and syncope.
- Signs suggestive of toxicity in adults and children are headache, nausea, vomiting, arrhythmias, seizures, irritability, restlessness. There may be no prodromal symptoms before the occurrence of severe toxicity.
- Signs suggestive of toxicity in neonates are tachycardia, vomiting, jitteriness, hyperreflexia and seizures.

**DOSAGE**
- **Loading dose**: 6 mg/kg in patients who have not received any aminophylline (or theophylline) in the previous 24 hours.
- **Maintenance**:

<table>
<thead>
<tr>
<th>Age or Clinical Condition</th>
<th>Aminophylline Infusion Rate mg/kg/hr (actual theophylline infused in parenthesis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonates up to 24 days of age</td>
<td>1.25 mg/kg q12h (1 mg/kg q12h)</td>
</tr>
<tr>
<td>Neonates over 24 days of age</td>
<td>1.875 mg/kg q12h (1.5 mg/kg q12h)</td>
</tr>
<tr>
<td>Infants 6 to 52 weeks of age</td>
<td>0.01 X age in weeks + 0.21 (0.008 X age in weeks + 0.21)</td>
</tr>
<tr>
<td>Children 1-9 years</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Children 9-12 years</td>
<td>0.875 (0.7)</td>
</tr>
<tr>
<td>Adolescents (12-16 years) non-smokers</td>
<td>0.625 (0.5)</td>
</tr>
<tr>
<td>Adolescents (12-16 years) smokers</td>
<td>0.875 (0.7)</td>
</tr>
<tr>
<td>Adults (16-60 years) healthy non-smokers</td>
<td>0.5 (0.4)</td>
</tr>
<tr>
<td>Adults (16-60 years) smokers</td>
<td>0.875 (0.7)</td>
</tr>
<tr>
<td>Elderly (older than 60 years of age)</td>
<td>0.375 (0.3)</td>
</tr>
<tr>
<td>CHF, cor pulmonale, liver dysfunction, sepsis with organ failure, shock</td>
<td>0.25 (0.2)</td>
</tr>
</tbody>
</table>
- Use ideal body weight to calculate dose.
- Theophylline blood levels should be monitored and infusion rate adjusted accordingly. Therapeutic range: 55-110 mcmol/L, except for neonatal apnea: 39-66 mcmol/L.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 48 hours at room temp in D5W, NS or dextrose-saline solutions in PVC plastic bags.

**MISCELLANEOUS**
- Aminophylline is a 2:1 complex of theophylline and ethylenediamine. Aminophylline 25 mg = theophylline 19.7 mg.

**REFERENCES**
1, 4, 6, 40, 82, 95, 513.
INDICATIONS
- Treatment of documented, life-threatening, frequently recurring ventricular fibrillation and hemodynamically unstable ventricular tachycardia in patients refractory to all other treatments.
- Acute control of supraventricular tachyarrhythmia, including recent-onset atrial fibrillation.
- Cardiac arrest.
- Can be used in patients for whom oral amiodarone is indicated but who are unable to take oral medication.

ADMINISTRATION
- IV direct: physician or RN; in cardiac arrest only. Administer undiluted IV direct through a central or peripheral line, followed by 10 mL of D5W or NS. Can also dilute to 20 mL with D5W or NS and administer IV direct.
- Intermittent IV infusion: cardiac monitoring. Dilute dose in 100 mL D5W and administer at a rate of 15 mg/min. Administer with an in-line 0.22 micron filter.
- Continuous IV infusion: cardiac monitoring. Dilute 900 mg (18 mL from the amiodarone vials) in 500 mL of D5W to obtain a final concentration of 1.8 mg/mL; use a glass or polyolefin container; PVC containing tubing may be used for administration. Concentrations from 1-6 mg/mL can also be used for subsequent maintenance infusions. Administer with an in-line 0.22 micron filter. Must be administered by an infusion pump. Due to risk of severe phlebitis, a central line should be used for infusions with a concentration greater than 2 mg/mL that will last for longer than 60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypotension, bradycardia, heart block, QT interval prolongation, heart failure.
- Respiratory failure.
- Local reactions: pain, phlebitis. (Refer to Administration section).

DOSAGE
- Cardiac arrest: 300 mg given by rapid IV bolus. May give a second dose of 150 mg (given over 10 minutes). Maximum dose of 2.2 g/day.
- Ventricular arrhythmias: initial dose of 1050 mg over the first 24 hours as follows:
  1) 150 mg over 10 minutes. Mix 150 mg (3 mL) in 100 mL D5W (1.5 mg/mL).
  2) 360 mg over 6 hours. Administer this dose by using the bag containing 900 mg in 500 mL of D5W (1.8 mg/mL; refer to Administration section); infuse at 1 mg/min (33 mL/hr), then
  3) 540 mg over 18 hours. Use the same 1.8 mg/mL solution and infuse at 0.5 mg/min (17 mL/hr). Supplemental doses of 150 mg over 10 min may be given for breakthrough arrhythmias. After the initial 24 hours, dosing can be maintained at 0.5 mg/min (17 mL/hr) (720 mg over 24 hours).
- Lower doses have generally been used for supraventricular arrhythmias (e.g., single doses of 5 mg/kg) but specific dose recommendations cannot be made.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 24 hours at room temp in D5W at concentration of 1-6 mg/mL in glass or polyolefin containers. Do not use an evacuated glass container since the buffer in these containers may cause precipitation of amiodarone.
- Stable for 2 hours in PVC bags.
- Stable for 21 days at room temp and 38 days in the fridge in D5W at a concentration of 2 mg/mL in polyolefin containers.
- Stability data in NS has been conflicting and therefore dilution in D5W is recommended.

MISCELLANEOUS
- For conversion from IV to oral amiodarone the manufacturer recommends an initial oral dose of 800-1600 mg daily for patients on IV amiodarone for less than 1 week, 600-800 mg daily for patients on IV amiodarone for 1-3 weeks, and 400 mg daily when on IV amiodarone for more than 3 weeks.

REFERENCES
1, 2, 4, 5, 11, 40, 95, 143, 146, 183, 208, 355.
AMPHOTERICIN B

Fungizone ®

Antifungal

Do NOT confuse amphotericin B with liposomal amphotericin B or with amphotericin B lipid complex. This monograph is specific to AMPHOTERICIN B.

INDICATIONS
- Progressive and potentially fatal systemic fungal infections, including aspergillosis, blastomycosis, candidiasis, coccidioidomycosis, cryptococcosis, histoplasmosis, mucormycosis and sporotrichosis.

ADMINISTRATION
- Reconstitute 50 mg vial with 10 mL of SWFI without preservatives for a concentration of 5 mg/mL. Shake vial until complete dissolution.
- Intermittent IV infusion: dilute in D5W (with a pH of greater than 4.2) to a maximum concentration of 0.1 mg/mL (i.e., 50 mg or less in 500 mL) when infused into a peripheral vein or to a maximum concentration of 0.25 mg/mL when infused via a central line. Flush the line with D5W before and after administration. Recommended infusion time is 2-6 hours, however infusion times of 1 to 2 hours have been used in patients with normal renal function. The preferred method of infusion is with an infusion pump.
- An in-line membrane filter may be used for infusion (optional); however, the pore size should not be less than 1 micron.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions, rash.
- Infusion-related reactions (occurring within 1-2 hours of starting the infusion especially with the first few doses): fever, shaking chills, headache, anorexia, nausea, vomiting, hypotension, dyspnea. Meperidine 25-50 mg IV may prevent/treat shaking chills; acetaminophen or ASA 650 mg po may prevent/treat fever; a corticosteroid IV/IM may prevent/treat febrile and other systemic reactions.
- Rapid IV infusion is associated with a more severe reaction consisting of hypotension, bronchospasm, hypokalemia, arrhythmias and shock.
- Nephrotoxicity: tubular necrosis, decreased glomerular filtration rate, azotemia. Permanent renal damage possible when cumulative dose exceeds 5 g. Hydration and sodium repletion prior to administration of amphotericin B may reduce risk of nephrotoxicity.
- Electrolyte disturbances: hypokalemia, hypomagnesemia, hypocalcemia.
- Local reactions: venous pain at injection site with phlebitis and thrombophlebitis (use pediatric scalp-vein needles, decrease infusion concentration, change injection site, add heparin 500-1000 units to the infusion); extravasation causes severe chemical irritation.

DOSAGE
- A test dose of 1 mg (1 mg in 20 mL of D5W) over 10-30 minutes is sometimes recommended followed by a 2-4 hour observation period.
- Total daily dosage may range from 0.25 mg/kg IV up to 1 mg/kg IV, with alternate day doses of up to 1.5 mg/kg. Therapy is usually initiated with a dose of 0.25-0.3 mg/kg IV and increased gradually (in increments of 5-10 mg/day), as tolerance permits.
- Maximum dosage of 1.5 mg/kg per 24 hours, given as an alternate day therapy (never exceed: risk of cardiorespiratory arrest).

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store dry powder in the fridge, protected from light. Also stable for 2-4 weeks at room temp, protected from light.
- Reconstituted solution is stable 24 hours at room temp (protected from light) and for 1 week in the fridge.
- Do not dilute with normal saline or with SWFI that contains preservatives as diluents other than D5W may cause precipitation.
- Stable for 24 hours at room temp or 35 days in the fridge in D5W at a concentration of 0.1 mg/mL in PVC plastic containers.
- Stable for 35 days in the fridge (protected from light) in D5W at concentrations of 0.1-0.25 mg/mL in PVC plastic containers.
- Stable for 5 days at room temp or in the fridge at concentrations of 0.2-1 mg/mL in PVC plastic containers.
- Although the manufacturer recommends light protection for aqueous solutions of amphotericin B, several reports indicate that for short-term exposure of 8 to 24 hours, little difference in potency is observed between light-protected and light-exposed solutions.

MISCELLANEOUS

REFERENCES

1, 2, 3, 4, 5, 40, 95, 143, 376, 394.
INDICATIONS
- Treatment of invasive fungal infections in patients who are refractory/intolerant of conventional amphotericin B therapy.

ADMINISTRATION
- Shake vial gently until no evidence of yellow sediment at the bottom.
- Transfer dose with 5-micron filter needle supplied with each vial.
- Intermittent IV infusion: dilute in D5W to a concentration of 1 to 2 mg/mL. Flush the line with D5W before and after administration. Administer at a rate of 2.5 mg/kg/hr; if infusion time exceeds 2 hours, resuspend by shaking the infusion bag every 2 hours.
- Do NOT use an in-line filter.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions, rash.
- Infusion-related reactions: less than with conventional amphotericin B; fever, shaking chills 1-2 hours after starting infusion are common with first few doses; nausea, vomiting; rarely hypotension and dyspnea.
- Nephrotoxicity: less than with conventional amphotericin B; increase in serum creatinine and renal failure; dose limiting renal toxicity may be observed.
- Electrolyte disturbances: hypokalemia, hypomagnesemia, hypocalcemia.

DOSAGE
Adults and pediatrics:
- 5 mg/kg once daily.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge; protect from light.
- Solution is yellow and opaque in appearance.
- Do not mix with NS; only compatible with D5W.
- Stable for 48 hours in the fridge and for an additional 6 hours at room temp when diluted in D5W at concentration of 1-2 mg/mL.

MISCELLANEOUS

REFERENCES
1, 2, 40.
AMPHOTERICIN B (LIPOSOMAL)

**Do NOT confuse liposomal amphotericin B with amphotericin B or with amphotericin B lipid complex. This monograph is specific to LIPOSOMAL amphotericin B.**

**INDICATIONS**
- Treatment of systemic or disseminated infections due to *Candida*, *Aspergillus*, or *Cryptococcus* in patients refractory or intolerant to conventional amphotericin B, or in renally impaired patients.

**ADMINISTRATION**
- Reconstitute 50 mg vial with 12 mL of SWFI (without a bacteriostatic agent); shake vial vigorously for 30 seconds to completely disperse the drug; final concentration is 4 mg/mL.
- Intermittent IV infusion: withdraw dose from reconstituted vial with a sterile syringe. Attach 5 micron filter (provided by manufacturer) and inject into a bag of D5W to get a final concentration between 0.5 to 2 mg/mL. Flush the line with D5W before and after administration. Infuse over 1 or 2 hours, depending on patient’s tolerance.
- In-line filter (no less than 1 micron) may be used (optional).

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylactoid reactions, rash.
- Infusion-related reactions: less than with conventional amphotericin B; fever, shaking chills, nausea, vomiting, hypotension, dyspnea.
- Nephrotoxicity: less than with conventional amphotericin B; increase in serum creatinine.
- Electrolyte disturbances: hypokalemia, hypomagnesemia, hypocalcemia.

**DOSAGE**
- 3 to 6 mg/kg IV daily.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in fridge or at room temp.
- Not compatible with NS.
- Reconstituted solution (4 mg/mL) is stable 14 days in the fridge (protected from light) in the original vials.
- Stable for 14 days in the fridge (protected from light) and 24 hours at room temp (exposed to light) in D5W at a concentration of 2 mg/mL in a polyolefin container.
- Stable for 11 days in the fridge (protected from light) and 24 hours at room temp (exposed to light) in D5W at a concentration of 0.2 mg/mL in a polyolefin container.
- Stable for 14 days in the fridge (protected from light) in D5W at a concentration of 2 mg/mL in a PVC container.
- Stable for 11 days in the fridge (protected from light) in D5W at a concentration of 0.2 mg/mL in a PVC container.

**MISCELLANEOUS**

**REFERENCES**
1, 2, 5, 40, 95, 143, 532.

Limited revision 2015, 2018, 2019
AMPICILLIN

Ampicin ®
Antibiotic - penicillin

INDICATIONS
- For moderate or severe infections due to organisms susceptible to ampicillin.
- Prevention of bacterial endocarditis associated with dental or respiratory tract procedures/surgery.

ADMINISTRATION
- **CHECK ALLERGY STATUS OF PATIENT.**
- For IV use: reconstitute each vial with SWFI as per manufacturer’s recommendation.
- IV direct: physician or RN. Concentration should not exceed 100 mg/mL. Administer at a maximum rate of 100 mg/min. Direct IV injections should be made slowly to avoid the possibility of seizures.
- Intermittent IV infusion: dilute in 50-100 mL (for a final concentration not exceeding 30 mg/mL) and administer over 15-30 minutes, not exceeding 100 mg/min.
- IM: reconstitute the 250 mg, 500 mg or 1000 mg vials with 1.9 mL, 1.8 mL or 3.5 mL of SWFI, respectively. Inject deep into a large muscle mass.
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: immediate (anaphylaxis) or delayed (rash, urticaria).
- Note: a maculopapular rash often occurs a few days after starting ampicillin therapy in patients with viral infections having leukemia or lymphoma or those on allopurinol; in most cases, rash appears to be nonimmunologic.
- CNS: possibility of seizures if IV direct administration is too rapid.
- Hematologic: anemia, leukopenia and thrombocytopenia.
- Local reactions: pain (IM injection); phlebitis (IV injection).

DOSAGE
- **Adults:**
  - Treatment: 250-2000 mg q6h.
    - In severe infections: 8-14 g daily, equally divided q3-4h.
  - Prevention of bacterial endocarditis: 2 g 30-60 minutes before skin incision or procedure.
- **Pediatrics (less than 40 kg):**
  - Treatment: 25-100 mg/kg daily, equally divided q6h.
    - In severe infections: 200-400 mg/kg daily, equally divided q4-6h. Maximum: 12 g/day.
  - Prevention of bacterial endocarditis: 50 mg/kg 30-60 minutes before skin incision or procedure.
    - Maximum: 2 g.
- Dose adjustment in renal failure:
  - CrCl (mL/min) | greater than 50 | 10-50 | less than 10
  - Dose | Usual | Usual | Usual
  - Interval (hr) | 6 | 6-12 | 12-24 *

* Drug is removed by hemodialysis.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Reconstituted solution stable for 60 minutes at room temp and 4 hours if refrigerated.
- Stable for 24 hours at room temp and 5 days in the fridge when diluted in NS at a concentration of 10 mg/mL.
- Stable for 2 hours at room temp and 4 hours in the fridge when diluted in D5W at a concentration of 10 mg/mL.
- Solution of ampicillin (10 mg/mL) has a pH of 8-10; a change in pH affects the stability.

MISCELLANEOUS

- 2.9 to 3.1 mmol Na/g.
- Monitor renal, hepatic and hematologic functions during prolonged therapy.

REFERENCES

1, 2, 4, 5, 40, 82, 95, 135, 216.
# AMSACRINE

## INDICATIONS
- Refractory adult acute leukemia.

## ADMINISTRATION
- Reconstitute with L-lactic acid diluent provided for a final concentration of 5 mg/mL. For this step, glass syringes are preferred to avoid reaction between amsacrine and plastic - if unavailable, plastic may be used providing the drug remains in the syringe for no more than 15 minutes.
- Intermittent IV infusion: **Cardiac monitoring** during and immediately after administration. Refer to Miscellaneous section for proper monitoring before and during administration. Dilute in 500 mL of D5W; infuse over 60-90 minutes.

## POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid.
- Cardiovascular: arrhythmias (rare, increased risk if hypokalemia).
- GI: nausea, vomiting.
- Hyperuricemia.
- Discolouration of urine (orange).
- Local reactions: phlebitis, inflammation and pain at injection site.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

## DOSAGE
- **Induction:** 
  - 75-125 mg/m²/day IV for 5 days. Repeat every 3 to 4 weeks.
  - increase dose by 20% in subsequent courses if patient has no significant toxicity in preceding course and marrow hypoplasia has not been achieved.
  - dose may be reduced by 20% if life threatening hemorrhage or infection occurred in preceding course.
- **Maintenance:** 
  - half the induction dose given every 4-8 weeks.
  - Dosage adjustment in renal failure: give 70-75% of normal dose when urea greater than 7 mmol/L or serum creatinine greater than 133 mcmol/L.
  - Dosage adjustment in hepatic failure: give 70-75% of normal dose when bilirubin greater than 34 mcmol/L.
  - Consult specific protocol.

## COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Not compatible with NS.
- Reconstituted solution stable 48 hours at room temp under ambient light.
- Solution is stable for 48 hours at room temp or 7 days in the fridge when diluted in D5W.

## MISCELLANEOUS
- Correct fluid and electrolyte imbalance before starting amsacrine.
- Ensure potassium level is normal immediately prior and during amsacrine infusion.

## REFERENCES
4, 5, 95, 124, 129, 165.
AUTHOR: J. Ryan

II. MANUFACTURER: Astellas

INDICATIONS
- Treatment of invasive candidiasis/candidemia in adult non-neutropenic patients.

ADMINISTRATION
- Reconstitute each vial of 100 mg with 30 mL of SWFI to get a concentration of 3.33 mg/mL.
- Intermittent IV infusion: transfer contents of 1 or 2 reconstituted vials into 100 mL or 200 mL, respectively, of D5W or NS to obtain a final concentration of approximately 0.77 mg/mL. Administer at a rate not exceeding 1.1 mg/min (i.e., 1.4 mL/min).

POTENTIAL ADMINISTRATION HAZARDS
- Infusion-related reactions: histamine-mediated reactions e.g., dyspnea, flushing, hypotension, pruritus, rash, urticaria. Infrequent when infusion rate does not exceed 1.1 mg/min.
- GI: diarrhea.
- Increases in ALT, AST and alkaline phosphatase.
- Hypokalemia.

DOSAGE
- Loading dose: 200 mg IV on day 1.
- Maintenance dose: 100 mg IV once daily, starting on day 2.
- No dosage adjustment required in patients with renal insufficiency or hepatic impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge; do not freeze.
- Reconstituted solution is stable for 60 minutes in the fridge; do not freeze.
- Reconstituted solution must be further diluted within 60 minutes of reconstitution.
- Diluted solution is stable for 24 hours in the fridge; do not freeze.

MISCELLANEOUS
- Safety and efficacy have not been established for the treatment of endocarditis, osteomyelitis or meningitis caused by Candida.
- Insufficient data to evaluate efficacy in neutropenic patients.

REFERENCES
1, 2, 40.

Limited revision 2015
ANTI-INHIBITOR COAGULANT COMPLEX

Feiba NF ®

Coagulation factor

INDICATIONS

- Prevention and control of hemorrhagic episodes in adults and children 6 years of age and older with hemophilia A or B who have developed inhibitor antibodies to factor VIII or IX.
- Control of life-threatening bleeding in patients who have acquired inhibitor antibodies to factors VIII, XI or XII.
- Reversal of dabigatran activity in case of emergency surgery/procedure or life-threatening bleeding.

ADMINISTRATION

- For IV use: warm diluent and lyophilized powder to room temp. Refer to manufacturer’s instructions for reconstitution and preparation of the infusion.
- Intermittent IV infusion: infuse at a rate not exceeding 2 units/kg/min. Flush IV line with NS before and after administration.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: urticaria, angioedema, GI manifestations, bronchospasm, hypotension, anaphylaxis. If severe hypersensitivity reaction occurs, stop infusion and treat patient appropriately.
- Infusion-related reactions: fever, chills, dizziness, nausea, hypertension. With a too rapid infusion, stabbing pain and numbness in the face and hypotension.
- Thromboembolic complications, including disseminated intravascular coagulation (rare). If any sign or symptom of thromboembolic complication occurs (blood pressure and pulse rate changes, respiratory distress, cough, chest pain), discontinue the infusion and investigate patient.
- Remote risk of transmission of infectious agents, including viruses, as this product is prepared from large pools of human plasma.
- Local reactions: pain at injection site.

DOSAGE

- Hemophilia A or B: 50-100 units/kg/dose IV, not exceeding 100 units/kg/dose and 200 units/kg/day for all bleeding conditions listed below. Refer below for more specific dosing; to continue treatment until bleeding is controlled.
  - Joint hemorrhage: 50-75 units/kg/dose IV q12h; may increase to 100 units/kg/dose IV q12h if needed.
  - Mucous membrane bleeding: 50 units/kg/dose IV q6h; if dose is increased, prolong the interval so maximum daily dose of 200 units/kg/day is not exceeded.
  - Soft tissue hemorrhage: 100 units/kg/dose IV q12h.
  - Other severe hemorrhage: 100 units/kg/dose IV q12h; may be given q6h if needed but at a lower dose so maximum daily dose of 200 units/kg/day is not exceeded.
  - Surgery: 50-100 units/kg/dose IV q6-12h, the first dose administered immediately prior to surgery (maximum: 200 units/kg/day).
  - Routine prophylaxis: 85 units/kg/dose (range: 70-100 units/kg/dose) IV every other day or 3-4 times a week.
- Hemorrhage in patients with acquired inhibitor antibodies to factors VIII, XI or XII: 50-100 units/kg/dose IV q8-12h (maximum: 200 units/kg/day).
- Reversal of dabigatran activity: 50 units/kg/dose IV once.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and diluent at room temp or in the fridge; do not freeze. Protect from light.
- Reconstituted solution is stable at room temp for 3 hours; do not refrigerate.
### MISCELLANEOUS

- Epinephrine, antihistamines and corticosteroids should be available for the treatment of hypersensitivity reactions.
- Systemic antifibrinolytics, such as aminocaproic acid or tranexamic acid, should not be administered within 6-12 hours of the anti-inhibitor coagulant complex due to the risk of thromboembolic events.
- Feiba NF ® does not contain heparin.

### REFERENCES

1, 5, 135.
INDICATIONS
- Prophylaxis and treatment of thrombotic and thromboembolic disorders in patients with hereditary antithrombin III deficiency (antithrombin III activity below 70% of normal); particularly valuable during surgery or pregnancy and delivery.

ADMINISTRATION
- Reconstitute the 450-550 and the 900-1100 international units vials with 10 mL and 20 mL, respectively, of the provided diluent (SWFI) as per manufacturer’s instructions. Use the provided double-ended needle.
- IV direct: physician or RN; administer at a maximum rate of 5 mL/min. Use the provided filter needle.
- Intermittent IV infusion: administer undiluted at a maximum rate of 5 mL/min with an administration set that contains a filter (range of 5-149 microns).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactic/anaphylactoid reactions, wheezing, angioedema, urticaria, chills, fever.
- Cardiovascular: tachycardia, hypotension, flushing; may be signs of hypersensitivity reactions.
- GI: nausea, vomiting, retching; may be signs of hypersensitivity reactions.
- CNS: headache, tingling, lethargy, restlessness (may be signs of hypersensitivity reactions). Tremor.
- Heparin-induced thrombocytopenia.
- Hematologic: hematoma, hematuria, hemorrhage.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.
- Local reactions: burning and stinging at the infusion site; may be signs of hypersensitivity reactions.

DOSAGE
- Disseminated intravascular coagulation (DIC):
  Initial dose (international units) = [desired ATIII activity (%) - baseline ATIII activity (%)] x body weight (kg) divided by 1%.
  Maintenance dose is also calculated using the formula stated above, except that the 1% is substituted instead, with the actual increase in ATIII activity (in %) produced by 1 international unit per kg of body weight, as determined by the measurement of ATIII activity following the administration of the initial dose.
- Other antithrombin III defects: Method 1: Initial dose: 1500 international units; maintenance dose: half the initial dose q 8-24 h.
  Method 2: Initial dose (international units) = [desired ATIII activity (%) - baseline ATIII activity (%)] x body weight (kg) divided by 2%.
  Maintenance dose is also calculated using the formula stated above, except that the 2% is substituted instead, with the actual increase in ATIII activity (in %) produced by 1 international unit per kg of body weight, as determined by the measurement of ATIII activity following the administration of the initial dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge, between 2-8°C; do not freeze.
- Use the reconstituted solutions immediately; do not refrigerate once reconstituted.

MISCELLANEOUS
- Biological half-life is around 2.5 days in patients with congenital antithrombin III deficiency; however, in DIC, the half-life can be reduced to a few hours.
- Antithrombin III is available from different manufacturers; this monograph is specific to the Antithrombin III NF ® brand from Baxter.

REFERENCES
2, 135.
ANTITHYMOCYTE GLOBULIN, EQUINE

**INDICATIONS**
- Prevention or treatment of acute allograft rejection (kidney, skin, cardiac, bone marrow).
- Treatment of aplastic anemia, lymphoma, agranulocytosis.

**ADMINISTRATION**
- Intradermal sensitivity testing is strongly recommended prior to administration of the initial dose. Refer to manufacturer's monograph for the full procedure.
- Intermittent IV infusion: dilute in 250-1000 mL of a compatible diluent, not exceeding a concentration of 4 mg/mL and gently mix. Contact of undiluted ATG with air may denature protein; therefore IV solution container should be inverted when ATG is added to prevent contact with air inside the container. Infuse over at least 4 hours into a large, high-flow central vein.
- Should be filtered through 0.2 to 1 micron filter during administration.
- Do NOT shake solution since excessive foaming and/or denaturation of the protein may occur.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis, rash; serum sickness.
- Infusion-related reactions: febrile reaction (51%), chills (16%); febrile reaction tends to decrease in severity after the first few doses of the drug. To prevent febrile reactions, patients should be pre-treated with an antipyretic (e.g., acetaminophen 650 mg PO), antihistamine (e.g., diphenhydramine 25-50 mg PO) or corticosteroid (e.g., hydrocortisone 25-50 mg IV) or combination of these.
- Hematologic: leukopenia (14%) and/or thrombocytopenia (30%).
- Local reactions: pain at injection site, thrombophlebitis, clotted fistulas or shunts.

**DOSAGE**
- Expressed in terms of equine IgG - several regimens suggested.
  - Renal allograft: 10-30 mg/kg/day for 14 days; may be followed by alternate day therapy for a total of 21 doses in 28 days. The first dose may be given within 24 hours before or after transplantation. Alternatively, the first dose may be delayed until the diagnosis of rejection.
  - Aplastic anemia: 10-20 mg/kg for 8-21 doses.
  - Bone marrow allograft: 7-20 mg/kg for 3-14 doses.
  - Pediatrics: renal allograft: 5-25 mg/kg/daily.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store in the fridge; protect from light.
- Stable for 24 hours in the fridge in NS, D5-1/2NS, D5-1/4NS at concentrations of up to 4 mg/mL.
- Stable for 24 hours in the fridge in 1/2NS or NS at a concentration of 1 mg/mL.
- Not stable in D5W alone.
- Manufacturer recommends that solution should not be used after a period of 24 hours from time of dilution (including administration time).

**REFERENCES**
1, 2, 95.
**INDICATIONS**

- Prevention or treatment of acute allograft rejection (kidney, heart, liver, bone marrow).
- Treatment of severe aplastic anemia.
- Prophylaxis of graft-versus-host disease (GVHD).

**ADMINISTRATION**

- Reconstitute each 25 mg vial with 5 mL of SWFI. Rotate vial gently.
- Intermittent IV infusion: dilute in a volume of NS or D5W corresponding to 50 mL per 25 mg (total volume usually 50-500 mL). Mix solution by inverting the bag gently once or twice. Infuse over a minimum of 6 hours for the first dose and 4 hours for subsequent doses.
- Infuse using a 0.22 micron filter into a high-flow vein (central venous catheter). If a high-flow vein (central venous catheter) is not available and dose has to be administered, dilute drug into NS (not D5W) with heparin 1000 units and hydrocortisone 20 mg to decrease risk of thrombophlebitis and deep vein thrombosis.
- Refer to TOH Renal Transplant Protocol if needed.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylactoid reactions (hypotension, respiratory distress, urticaria, purpura); anaphylaxis; rash; serum sickness.
- Infusion-related reactions: fever, chills; to minimize these reactions, manufacturer recommends to slow infusion rate and premedicate with acetaminophen (500-650 mg PO), antihistamines (diphenhydramine 25 mg IV or PO) and corticosteroids (methylprednisolone 2-5 mg/kg IV) 60 minutes prior to each infusion.
- Cardiovascular: hypertension, tachycardia.
- GI: nausea, diarrhea.
- Hematologic: leukopenia, thrombocytopenia.

**DOSAGE**

- Renal transplantation, adults:
  - Prevention of rejection: 1.5 mg/kg/day IV for at least 7 days beginning intraoperatively.
  - Treatment of rejection: 1.5 mg/kg/day IV for 7-14 days.
- Other regimens suggested according to the indication.
- Dosage adjustment for leukopenia and/or thrombocytopenia:

<table>
<thead>
<tr>
<th>WBC count (cells/mm³)</th>
<th>Platelet count (cells/mm³)</th>
<th>% reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-3000</td>
<td>50,000-75,000</td>
<td>50</td>
</tr>
<tr>
<td>less than 2000</td>
<td>less than 50,000</td>
<td>avoid</td>
</tr>
</tbody>
</table>

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge. Protect from light. Do not freeze.
- Reconstituted solution is stable for up to 24 hours at room temp but best to use it immediately.
- Stable for 24 hours at room temp in NS or D5W at a concentration of 0.5 mg/mL.
- Stable for 24 hours at room temp in NS at a concentration of 0.2 mg/mL and 0.3 mg/mL mixed with heparin 2 units/mL and hydrocortisone 0.05 mg/mL in a PVC bag; the same mixture precipitated in D5W.

**MISCELLANEOUS**

- Do not use in patients allergic to rabbit protein.
- Monitor WBC count (including lymphocytes), and platelets.

**REFERENCES**

1, 5, 40, 95, 131, 208.
**INDICATIONS**

- Acute, intermittent treatment of hypomobility (“off” episodes) in patients with advanced Parkinson’s disease as an adjunct to oral antiparkinsonian agents.

**ADMINISTRATION**

- SC: *blood pressure monitoring* only on first time dose or first dose increase; upper arms, thighs, or abdomen. Rotate injection site.
  - **FOR SC USE ONLY.** Crystallization with thrombus formation and pulmonary embolism if administered IV.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis, bronchoconstriction (due to presence of sulfites).
- Cardiovascular: orthostatic hypotension, syncope, edema, coronary events.
- GI: nausea, vomiting (initiate domperidone as an antiemetic at least 2 days prior to starting apomorphine; avoid 5HT3 antagonists [e.g., ondansetron, granisetron, palonosetron] due to additive hypotension).
- CNS: sudden onset of sleep, drowsiness, dizziness, dyskinesias, hallucinations, confusion.
- Respiratory: rhinorrhea.
- Yawning, priapism.
- Local reactions: bruising, granuloma, pruritus, induration, erythema, pain.

**DOSAGE**

- Initial dose (also called test dose): 2 mg (0.2 mL); may titrate up to 6 mg (0.6 mL) prn up to 5 times per day, with at least 2 hours between doses. Maximum total daily dose of 20 mg (2 mL).
- If therapy is interrupted for more than 1 week, resume treatment with a dose of 2 mg (0.2 mL) and re-titrate dose according to efficacy and tolerability.
- Dosage in renal impairment: reduce initial dose to 1 mg (0.1 mL) in mild to moderate impairment; contraindicated in severe renal impairment.
- Dosage in hepatic impairment: no dosage adjustment is recommended in mild to moderate impairment but use with caution; contraindicated in severe hepatic impairment.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled multi-dose pens between 15-30°C. Protect unopened pens from light.
- Opened prefilled pens can be used for a maximum of 48 hours.

**REFERENCES**

1, 5, 135.
INDICATIONS

- Prophylactic use to reduce perioperative blood loss and the need for blood transfusion in those patients undergoing cardiopulmonary bypass in the course of isolated coronary bypass graft surgery (CABG) who are at increased risk for blood loss and blood transfusion requirement.

ADMINISTRATION

- A premedication may be administered prior to the initial test dose; refer to Dosage section.
  - All intravenous doses should be administered through a central line and in operative settings where cardiopulmonary bypass can be rapidly initiated.
  - IV direct (for test dose): physician or RN; ventilatory support. Administer undiluted. Refer to Dosage section.
  - Intermittent IV infusion, Continuous IV infusion: ventilatory support. Administer undiluted or as a diluted solution. Refer to Dosage section.
  - Do not add aprotinin into the pump prime solution before the loading dose has been safely administered.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: pruritus, rash, urticaria, dyspnea, anaphylaxis (fatal and non fatal). Caution as some patients who did tolerate the test dose, still developed hypersensitivity with subsequent doses. There is an increased risk of anaphylaxis in patients with prior exposure to aprotinin (refer to Miscellaneous section for treatment and contraindication).
  - Cardiovascular: atrial fibrillation, hypotension, myocardial infarction, heart failure, tachycardia, bradycardia.
  - Respiratory effects: dyspnea, lung disorder, pleural effusion.
  - Renal dysfunction or need for dialysis in the perioperative period, especially in patients with pre-existing renal impairment (creatinine clearance less than 60 mL/min), on aminoglycosides or receiving other drugs that can alter renal function.
  - Local reactions: thrombophlebitis with repeated venipunctures and infusion.

DOSAGE

For prophylactic use during CABG:

- An H<sub>1</sub>-antagonist (e.g., diphenhydramine) and an H<sub>2</sub>-antagonist (e.g., ranitidine) may be administered 15 minutes prior to the initial test dose.
  - Test dose of 1 mL (10,000 KI units) administered over 1 minute; to give at least 10 minutes before the loading dose. If no reaction occurs, proceed with loading dose.
  - Loading dose: 200 mL (2,000,000 KI units) administered over 20-30 minutes after induction of anesthesia but before sternotomy; in patients with known previous exposure to aprotinin, the loading dose should be given prior to cannulation. When the loading dose is complete, proceed with the continuous IV infusion.
  - Continuous IV infusion: 50 mL/hr (500,000 KI units/hr) infusion until surgery is complete.
  - Pump prime dose: 200 mL (2,000,000 KI units) to add to recirculating priming fluid of the cardiopulmonary bypass circuit by replacement of an aliquot of the priming fluid, prior to the institution of cardiopulmonary bypass.
  - A lower dose regimen may also be used in low-risk patients: same test dose, loading dose of 100 mL (1,000,000 KI units), continuous IV infusion of 25 mL/hr (250,000 KI units/hr), pump prime dose of 100 mL (1,000,000 KI units).
  - Total dosages of aprotinin exceeding 7,000,000 KI units within a 24-hour period have not been studied in controlled trials.
APROTININ
Trasylol ®

Hemostatic agent

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Should be used immediately after dilution.
- Compatible with D20W, RL, and hydroxyethyl starch solution.
- No other drug should be administered concomitantly in the same IV line with aprotinin.
- Incompatible with heparin; to avoid physical incompatibility of aprotinin and heparin when adding to the pump prime solution, each agent must be added during recirculation of the pump prime solution to ensure adequate dilution before admixture with the other drug.

MISCELLANEOUS

- Emergency treatment for hypersensitivity and anaphylactic reactions should be readily available in the operating room (e.g., epinephrine, corticosteroids).
- Contraindicated in patients who had a known or suspected previous exposure to aprotinin during the last 12 months (as there is an increased risk of fatal anaphylactic reaction).
- In patients undergoing cardiopulmonary bypass with aprotinin, one of the two following methods is recommended to manage adequate anticoagulation: fixed heparin dosing or heparin titration. Activated clotting time (ACT) should be used to monitor anticoagulation.
- 1 KI unit = 0.14 mcg of aprotinin.

REFERENCES

1, 2, 40, 54, 95.
INDICATIONS
- Prophylaxis or treatment of thrombosis in patients with heparin-induced thrombocytopenia (HIT).
- As an anticoagulant in patients with or at risk of HIT who are undergoing percutaneous coronary intervention (PCI).

ADMINISTRATION
- For IV use: dilute 250 mg (2.5 mL) in 250 mL or 500 mg (5 mL) in 500 mL of NS, D5W or RL to obtain a final concentration of 1 mg/mL. Invert the diluent bag repeatedly for one minute to mix solution. The slight haziness that may appear upon the preparation should disappear rapidly upon mixing.
- IV direct: physician or RN; using the 1 mg/mL solution, administer loading dose over 3 to 5 minutes.
- Continuous IV infusion: using the 1 mg/mL solution, administer as per Dosage section for rate.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: (mostly in patients receiving thrombolytic agents and/or contrast material); airway reactions, skin eruptions.
- Cardiovascular: hypotension.
- GI: nausea, diarrhea.
- Hemorrhage (minor and major).
- Other: dyspnea, fever.

DOSAGE
For prophylaxis or treatment of thrombosis:
- 2 mcg/kg/min not to exceed 10 mcg/kg/min; adjust dose to target steady state aPTT of 1.5-3 times the initial baseline value (not to exceed 100 sec).
- If moderate liver impairment: initial dose of 0.5 mcg/kg/min.

As an anticoagulant in patients undergoing PCI:
- Loading dose of 350 mcg/kg over 3-5 minutes; followed by a continuous IV infusion of 25 mcg/kg/min. Five to 10 minutes after completion of loading dose, check the activated clotting time (ACT); if ACT between 300 and 450 seconds, proceed with PCI. If ACT less than 300 seconds, give an additional loading dose of 150 mcg/kg and increase the infusion rate to 30 mcg/kg/min and recheck the ACT in 5-10 minutes. If ACT greater than 450 seconds, decrease the infusion rate to 15 mcg/kg/min and recheck the ACT in 5-10 minutes. When a therapeutic ACT is achieved (between 300 and 450 seconds), the infusion dose in effect at that time should be continued for the duration of the procedure.
- If dissection, impending abrupt closure, thrombus formation during PCI or inability to achieve ACT greater than 300 seconds, give an additional loading dose of 150 mcg/kg followed by an increase in the infusion rate to 40 mcg/kg/min.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp; do not refrigerate; protect from light.
- Compatible with NS, D5W and RL.
- Stable for 24 hours at room temp in ambient indoor light when diluted in NS, D5W or RL at a concentration of 1 mg/mL.
- Stable for 96 hours at room temp or in the fridge when stored in the dark and diluted in NS, D5W or RL at a concentration of 1 mg/mL.
- Prepared solutions should not be exposed to direct sunlight.

MISCELLANEOUS

- No specific antidote is available.
- Anticoagulation parameters return to baseline within 2-4 hours after discontinuing infusion.
- Concomitant use of argatroban and warfarin results in prolongation of the INR beyond that produced by warfarin alone. Consult product monograph for monitoring.

REFERENCES

1, 5, 40, 95, 151, 240.
<table>
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<th>OTHER NAMES</th>
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ARGININE

INDICATIONS
- To evaluate the pituitary for the release of human growth hormone (HGH).
- Management of severe metabolic alkalosis.

ADMINISTRATION
- Intermittent IV infusion: dilute to a 10% solution (100 mg/mL) with sterile water, D5W or D10W. Only administer IV, due to its hypertonicity. For infusion rate, refer to Dosage section.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, swelling of hands and face.
- GI: especially with rapid infusion: nausea, vomiting.
- CNS: especially with rapid infusion: headache, numbness.
- Flushing especially with rapid infusion.
- Hyperkalemia in patients with renal failure.
- May interfere with acid-base balance (due to chloride content).
- Local reactions: venous, irritation with rapid infusion.

DOSEAGE
Adults:
- Growth hormone reserve test: 30 g (as 300 mL of a 10% solution).
  Schedule test in morning after overnight fast and a normal night rest. Bed rest is essential for at least 30 minutes before infusion begins. Administer dose over 30 minutes. Blood samples should be drawn at -30, 0 (start of infusion), 30, 60, 90, 120, and 150 minutes.
- Severe metabolic alkalosis: administer the following dose at a rate of 10 g/hr:
  Dose of arginine (g) = Desired decrease in HCO₃⁻ (mmol/L) X Weight (kg) / 9.6

Pediatrics:
- Growth hormone reserve test: 0.5 g /kg. For more instructions, refer to the adult growth hormone reserve test in the Dosage section.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Discard any vial in which the contents are not clear.
- Compatible in dextrose.

MISCELLANEOUS
- Exercise caution in patients with hyperchloremic acidosis due to high chloride content (0.475 mmol/mL) of arginine.
- Contraindicated in patients with highly allergic tendencies.
- Caution when used in patients with renal disease or anuria.

REFERENCES
1, 3, 5, 95, 167, 366, 367.

Limited revision 2015
ARIPiprazole

Abilify Maintena ®

Antipsychotic

INDICATIONS
- Treatment of acute and maintenance phases of schizophrenia in adults.
- Maintenance monotherapy treatment for bipolar I disorder in adults.

ADMINISTRATION
- Vials: following the instructions of the manufacturer and using its material provided with the vials, reconstitute the 300 mg and 400 mg vials with 1.5 and 1.9 mL of SWFI, respectively, to obtain a final concentration of 200 mg/mL. Shake vigorously the vials for 30 seconds to obtain a uniform milky-white homogenous suspension. Using the provided syringes and vial adapter, withdraw the exact volume to be injected.
- Prefilled dual chamber syringes: follow the manufacturer’s instructions for reconstitution; vertically shake the syringe for 20 seconds to ensure a uniform milky-white homogenous suspension.
- IM: before injection, select the appropriate needles: for injection into the gluteus: 22 gauge 1.5 inch for a non-obese patient or 21 gauge 2 inches for an obese patient; for the deltoid: 23 gauge 1 inch for a non-obese patient and 22 gauge 1.5 inch for an obese patient. Slowly inject deeply into the gluteus or deltoid; do NOT massage. Rotate injection between the 2 gluteal or deltoid muscles.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: orthostatic hypotension, tachycardia.
- GI: nausea, diarrhea.
- CNS: insomnia, headache, drowsiness, tremor, cognitive dysfunction, extrapyramidal reactions (akathisia), anxiety.
- Arthralgia, fatigue.
- Local reactions: pain, redness, swelling and induration at injection site.

DOSAGE
- 400 mg IM once a month (minimum interval 26 days); decrease to 300 mg once a month if patient experienced adverse drug reactions. If a dose is missed: refer to manufacturer’s instructions.
- Dosage to be adjusted in patients taking for more than 14 days, strong CYP3A4 inhibitors, strong CYP2D6 inhibitors or in patients known as poor CYP2D6 metabolizers; refer to manufacturer’s instructions.
- Dosage in renal impairment: no dosage adjustment.
- Dosage in hepatic impairment: no dosage adjustment in mild to moderate liver impairment; data is insufficient in patients with severe liver impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Vials:
- Store between 15-30°C.
- If dose is not withdrawn after reconstitution, keep the vial under 25°C for up to 4 hours; shake it vigorously for 60 seconds to re-suspend before withdrawing the dose.
- Do not store the reconstituted suspension in the syringe.

Prefilled dual chamber syringes:
- Store between 15-30°C. Protect from light. Do not freeze.

MISCELLANEOUS
- After the first injected dose, maintain patient on oral aripiprazole 10-20 mg per day or on current other oral antipsychotics for 14 days to maintain therapeutic concentrations.
- Do not use in patients using a strong CYP3A4 inducer for more than 14 days.

REFERENCES
1, 5, 135.

New monograph 2015; limited revision 2016, 2018
INDICATIONS
- For induction of remission and consolidation in patients with acute promyelocytic leukemia (APL), which is refractory to or has relapsed from retinoid and anthracycline therapy, and whose APL is characterized by the presence of the t(15;17) translocation or promyelocytic leukemia-retinoic-acid-receptor alpha (PML-RARα) gene expression.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in 100 to 250 mL of D5W or NS. Infuse over 1-2 hours or over up to 4 hours if acute vasomotor reactions occur (e.g., flushing, changes in BP, pallor).

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity.
- Cardiovascular: QT interval prolongation, arrhythmias, tachycardia, hypotension, hypertension, flushing, edema.
- GI: nausea, vomiting, dyspepsia, diarrhea.
- CNS: headache, insomnia, paresthesia.
- Electrolyte disturbances: change in potassium, magnesium, phosphate and calcium.
- Hematologic: hyperleukocytosis, thrombocytopenia.
- APL differentiation syndrome: can be fatal; if occurs, hold therapy and start immediately dexamethasone 10 mg IV BID for at least 3 days.
- Hyperglycemia.
- Cough, dyspnea.
- Tumour lysis syndrome.
- Dermatitis.
- Fatigue, chills, pyrexia.
- Local reactions: pain, erythema, edema.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Induction: 0.15 mg/kg/day IV until bone marrow remission; do not exceed 60 doses.
- Consolidation: 0.15 mg/kg/day IV for 25 doses over a period up to 5 weeks, starting 3-6 weeks after completion of induction therapy.
- Dosage in renal impairment: consider a reduced dose if CrCl is below 30 mL/min.
- Dosage in liver impairment: consider a reduced dose if severe impairment (Child-Pugh C).
- Consult manufacturer’s recommendations for dosage adjustment or discontinuation depending on toxicity.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp. Do not freeze.
- Stable for 24 hours at room temp and 48 hours in the fridge in D5W or NS.

MISCELLANEOUS
- ECG monitoring at baseline and twice a week (or more frequently if clinically indicated) while on treatment (induction and consolidation); consider continuous ECG monitoring in patients at risk of QT interval prolongation.
- Monitor electrolytes, blood glucose, hematologic, hepatic, renal and coagulation parameter tests at baseline and twice a week (or more frequently if clinically indicated) during induction and at least once weekly during consolidation.
- Avoid concomitant drugs that can prolong QT interval or induce electrolyte disorders.

REFERENCES
1, 2, 40, 129, 165.

New monograph 2015; limited revision 2016, 2017, 2018
INDICATIONS
- Treatment of severe and complicated malaria due to *Plasmodium falciparum*.

ADMINISTRATION

*Product from the United States (Walter Reed Supply):*
- Reconstitute each vial of 110 mg of artesunate base by slowly injecting (against vial wall) 11 mL of the provided phosphate buffer diluent to get a concentration of 10 mg/mL. Gently swirl for 5 to 6 minutes.
- IV direct: administer over 1-2 minutes into the tubing of a freely running IV solution of D5W or NS.
- IM (if IV access cannot be obtained).
- Administer dose within 60 minutes of reconstitution.
- Observe patient for 30 minutes following administration for signs of a hypersensitivity reaction.

*Product from China (Artesun ®):*
- Reconstitute each vial of 120 mg of artesunate base with the contents (2 mL) of the provided ampoule of sodium bicarbonate solvent. Shake the vial (not too vigorously) for several minutes to mix well until the powder is completely dissolved and the solution is clear. The solution should clear in a few minutes. Discard if the solution does not clear or a precipitate is present.
- IV direct (preferred): add the contents (10 mL) of the supplied ampoule of NS diluent to the vial containing the reconstituted artesunate solution. Shake to mix well. Solution should be clear. Discard if the solution appears cloudy or a precipitate is present. This will yield a concentration of artesunate of 10 mg/mL. Administer over 1-2 minutes into the tubing of a freely running IV solution of D5W or NS.
- IM (if IV access cannot be obtained): add 4 mL of the supplied NS diluent to the vial containing the reconstituted artesunate solution. Shake to mix well. Solution should be clear. Discard if the solution appears cloudy or a precipitate is present. This will yield a concentration of artesunate of 20 mg/mL. Preferred site of injection: anterior thighs; depending on volume to administer, may need to divide dose and inject in several sites.
- Administer dose within 60 minutes of reconstitution.
- Observe patient for 30 minutes following administration for signs of a hypersensitivity reaction.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity (rare): rash, urticaria, itching, swelling, watery eyes, dyspnea, hypotension, anaphylaxis.
- Cardiovascular: bradycardia.
- GI: anorexia, nausea, vomiting, cramps, diarrhea, taste alteration.
- CNS: dizziness, lightheadedness, headache, insomnia, tinnitus.
- Reversible decrease in reticulocyte count.
- Increased liver enzymes
- Arthralgias, muscle disorders, fatigue, fever, malaise, cough, nasal symptoms.
- Local reactions: pain at injection site.

DOSAGE
- **For adults and children weighing 20 kg and over:** 2.4 mg/kg IV/IM at time 0, 12, 24 and 48 hours (total of 4 doses or 9.6 mg/kg).
- **For children weighing less than 20 kg:** 3 mg/kg IV/IM at time 0, 12, 24 and 48 hours (total of 4 doses or 12 mg/kg).
- First dose should be administered STAT. May change to oral therapy (see Miscellaneous section) after the 3rd parenteral dose if patient can tolerate oral therapy.
.../Cont.

**DOSAGE** (Cont.)
- Dosage in renal impairment: no dosage adjustment is necessary.
- Dosage in hepatic impairment: no dosage adjustment is necessary.
- Obese patients should be dosed based on actual body weight (i.e., no maximum dose).

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

*Product from the United States (Walter Reed Supply):*
- Store unreconstituted vial between 2-10°C.
- Phosphate buffer diluent may be stored between 2-30°C; in colder temperatures, phosphate crystals or precipitate may form; these will dissolve if gently warmed. Diluent should only be used if solution is clear and colourless after warming.
- Stable 60 minutes after reconstitution. Discard any unused solution.

*Product from China (Artesun®):*
- Store manufacturer's package containing artesunate, sodium bicarbonate and NS at room temp below 30°C. Protect from light.
- Reconstituted solution should be stored below 30°C and used within 60 minutes. Discard any unused solution.

**MISCELLANEOUS**
- Follow-on oral therapy with either Malarone® (atovaquone and proguanil), or quinine with either doxycycline or clindamycin is essential, and should be started at least 4 hours after the last dose of artesunate.

**REFERENCES**
86, 97, 98, 115, 168, 553, 554, 555, 556. *Available via Health Canada's Special Access Programme through the Canadian Malaria Network*
**INDICATIONS**
- Acute lymphoblastic leukemia.
- Acute myeloid leukemia.
- Chronic lymphocytic leukemia.
- Melanoma, reticulosarcoma.

**ADMINISTRATION**
- For IV use:
  - Reconstitute each 10,000 international unit vial with 4 mL SWFI for a concentration of 2500 international units/mL. Rotate vial gently; do NOT shake.
  - Intermittent IV infusion: dilute in 50-250 mL of NS or D5W; infuse over a minimum of 30 minutes into the tubing of a freely running IV solution of NS or D5W.
- For IM use (preferred for intermittent treatment):
  - Reconstitute each 10,000 international unit vial with 2 mL NS for a concentration of 5000 international units/mL or with 1 mL NS for a concentration of 10,000 international units/mL. Rotate vial gently; do NOT shake.
- Filtering through a 5-micron filter during administration will remove gelatinous fibres that may develop in solution upon standing with no loss of potency.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: common: rash, urticaria, chills, facial edema, fever, anaphylaxis.
- GI: nausea, vomiting.
- Hyperuricemia.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- A test dose of 2 international units intradermally is usually recommended before administration of the first dose or if restarting therapy after several days of interruption.
- Continuous treatment: 200-1000 international units/kg/day IV/IM for 28 days; may continue for an additional 14 days if remission not achieved.
- Intermittent treatment: to give as 3 injections per week for 4 weeks: Monday and Wednesday 400 international units/kg; Friday 600 international units/kg; may continue for an additional 2 weeks if remission not achieved. For this regimen, IM route is preferred over IV due to a lower risk of anaphylactic reactions.
- Other dosing regimens have also been used.
- Consult specific protocol.

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Do NOT confuse asparaginase of E. Coli source with that of Erwinia source. This monograph is specific to asparaginase of E. Coli source.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened vials in the fridge.
- Reconstituted solution stable for 3 hours at room temp and 72 hours in the fridge.
- Stable for 8 hours in the fridge once diluted in 50-100 mL of D5W or NS.
- Stable for 7 days in the fridge in NS and RL at unspecified concentrations.

MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be kept near the patient when drug is administered.
- When Kidrolase ® (asparaginase from *E. coli*) causes a hypersensitivity reaction (but not anaphylaxis), substitute with Erwinia asparaginase.

REFERENCES

1, 5, 40, 129, 135, 165, 169, 208.
### INDICATIONS
- Acute lymphoblastic leukemia.
- Treatment of patients who developed hypersensitivity (but not anaphylaxis) with asparaginase derived from *E. Coli*.

### ADMINISTRATION
- Reconstitute each 10,000 unit vial with 2 mL NS for a concentration of 5000 units/mL or with 1 mL NS for a concentration of 10,000 units/mL. Do NOT use SWFI for reconstitution. Rotate vial gently; do NOT shake.
- Intermittent IV infusion: dilute in 100 mL of NS or D5W; infuse over a minimum of 30 minutes into the tubing of a freely running IV solution of NS or D5W.
- IM (preferred).
- SC.
- Filtering through a 5-micron filter during administration will remove gelatinous fibres that may develop in solution upon standing with no loss of potency.

### POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, urticaria, facial edema, chills, fever, anaphylaxis. Up to 33% of patients who developed a hypersensitivity reaction with asparaginase from *E. Coli* will also react to asparaginase Erwinia.
- GI: nausea, vomiting.
- Hyperuricemia.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

### DOSAGE
- 6000 units/m² 3 times weekly for 9 doses (3 weeks).
- Other regimens have also been used.
- Consult specific protocol.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge.
- Once reconstituted, drug may denature with formation of filaments on contact with the silicone rubber stopper; best to administer without delay or withdraw solution and transfer into a glass or polypropylene syringe.
- Reconstituted solution is stable for 2 hours at room temp or for 8 hours in the fridge in a glass or polypropylene syringe.

### MISCELLANEOUS
- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be kept near the patient when drug is administered.

### REFERENCES
5, 129, 165, 169.
ATEZOLIZUMAB
Tecentriq ®
Anti-neoplastic, Monoclonal antibody

INDICATIONS
- Treatment of locally advanced or metastatic urothelial carcinoma that has progressed during or following platinum-containing chemotherapy.
- Treatment of locally advanced or metastatic non-small cell lung cancer that has progressed during or following platinum-based chemotherapy.

ADMINISTRATION
- Intermittent IV infusion (mandatory): withdraw 20 mL of solution from the vial and dilute in 250 mL of NS. Gently invert bag to mix; do NOT shake. Administer initial dose over 60 minutes; if well tolerated, subsequent infusions may be administered over 30 minutes.
- May administer (optional) with a 0.2- to 0.22-micron sterile, non-pyrogenic, low-protein binding in-line filter.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications)
- Hypersensitivity: immune-mediated reactions, can be fatal; can involve any organ: dermatologic (pruritus, rash, bullous dermatitis, pemphigoid, erythema multiforme, Stevens Johnson syndrome, toxic epidermal necrolysis), cardiovascular (myocarditis), GI (diarrhea, colitis), pancreatitis, hepatitis, CNS (meningoencephalitis, neuropathies), endocrine (thyroid disorders, adrenal insufficiency, type 1 diabetes mellitus including diabetic ketoacidosis, hypophysitis), myositis, nephritis, ophthalmic (iritis, uveitis), respiratory (pneumonitis, interstitial lung disease). Use with caution in patients with co-morbidities such as colitis, hepatic impairment, and respiratory or endocrine disorders. Consult manufacturer’s recommendations for management of these reactions and when to withhold or discontinue treatment.
- Infusion-related reactions: dyspnea, fever, chills, hypotension. For mild or moderate infusion reactions, interrupt treatment or reduce infusion rate and closely monitor the patient; premedication with antipyretic and antihistamine may be considered. If reaction is severe, discontinue treatment.
- Cardiovascular: hypotension, peripheral edema.
- GI: nausea, vomiting, diarrhea, constipation, decreased appetite, abdominal pain.
- CNS: headache.
- Electrolyte disturbances: hypokalemia, hyponatremia, hypercalcemia.
- Endocrine and metabolic: hyperglycemia.
- Hematological: anemia, lymphocytopenia.
- Hepatic: elevated LFTs.
- Musculoskeletal: arthralgia, myalgia, back/neck pain, pain in extremities.
- Renal: increased creatinine, hematuria.
- Respiratory: cough, nasal congestion, dyspnea.
- Fever, chills, fatigue, asthenia, infection.

DOSAGE
- 1200 mg IV every 3 weeks.
- Dosage adjustment toxicity: consult manufacturer’s recommendations.
- Dosage in renal impairment: no dosage adjustment for creatinine clearance of 30 mL/min or greater; no data when creatinine clearance is less than 30 mL/min.
- Dosage in hepatic impairment: no dosage adjustment required for mild impairment; no data in moderate to severe hepatic impairment.
- Consult specific protocol.
**COMPATIBILITY, STABILITY**  
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8° C. Protect from light. Do not freeze. Do not shake.
- Stable for 24 hours in the fridge and 8 hours at room temp in NS in PVC, polyethylene, and polyolefin containers.
- Compatible only with NS.

**MISCELLANEOUS**

- AST, ALT, bilirubin, thyroid function, renal function, electrolytes, and glucose should be monitored prior to and periodically during treatment.

**REFERENCES**

1, 5, 129, 135, 165, 421.
INDICATIONS
- To facilitate endotracheal intubation.
- To provide skeletal muscle relaxation during surgery or mechanical ventilation.

ADMINISTRATION
- IV direct: physician trained in anesthesiology; RN may administer subsequent doses. Ventilator support, cardiac monitoring. Administer undiluted over 30-60 seconds.
- Continuous IV infusion: ventilator support, cardiac monitoring. Dilute to a final concentration of 0.2 mg/mL or 0.5 mg/mL.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: bradycardia, tachycardia, hypotension.
- Antidote: anticholinesterase agents such as neostigmine, edrophonium or pyridostigmine, in conjunction with an anticholinergic agent such as atropine or glycopyrrolate.

DOSAGE
- Initial:
  - usual: 0.4-0.5 mg/kg IV bolus.
  - when given concomitantly with isoflurane or enflurane or sevoflurane or desflurane: 0.25-0.35 mg/kg.
  - when given concomitantly with halothane, or following succinylcholine, or in patients with a history of cardiovascular disease or at greater risk of histamine release (allergies): 0.3-0.4 mg/kg.
- Maintenance:
  - 0.08-0.1 mg/kg IV bolus after 20-45 minutes of initial dose.
  - may be continued every 15-25 minutes or use larger doses for longer maintenance e.g., 0.15-0.2 mg/kg.
  - reduce maintenance dose by half when hypothermia is induced (e.g., cardiac bypass).
- Continuous IV infusion: 2-15 mcg/kg/min; reduce dosage for patients on isoflurane, enflurane, sevoflurane, desflurane or halothane.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge. Protect from freezing.
- Potency loss of 5% per month at room temp; when left at room temp, should be used within 14 days.
- Incompatible with alkaline solutions (e.g., barbiturates).
- Stable for 24 hours at room temp and in the fridge in D5W, NS, and D5-NS when diluted to 0.2 mg/mL or 0.5 mg/mL.

MISCELLANEOUS
- After IV administration of a 0.4-0.5 mg/kg dose, atracurium produces maximum neuromuscular blockade within 3-5 minutes and lasts about 20-35 minutes under balanced anesthesia.

REFERENCES
1, 4, 5, 40, 95.
**ATROPINE**

**INDICATIONS**
- Spasmolytic effect on smooth muscle.
- Decrease secretions (gastric, pancreatic, salivary and bronchial secretions).
- Antidote for anticholinesterase agents (e.g., physostigmine, neostigmine), certain species of Amanita (mushroom), and in cases of anticholinesterase pesticide poisoning.
- Antidote for nerve gas exposure (in the context of chemical warfare).
- Symptomatic sinus bradycardia and atrioventricular block.

**ADMINISTRATION**
- IV direct: physician or RN. **Cardiac monitoring.** Administer undiluted or diluted with 10 mL SWFI, at a rate of 1 mg/min.
- IM, SC.

**POTENTIAL ADMINISTRATION HAZARDS**
- Anticholinergic side effects: flushing, dry mouth and throat, dilated pupils, urinary retention, constipation, tachycardia.
- With overdoses, severe tachycardia, respiratory depression, delirium, fever.
- Antidote: physostigmine (controversial; only if severe or life-threatening symptoms of anticholinergic toxicity), diazepam to control delirium, pilocarpine to counteract mydriasis, respiratory assistance as needed.

**DOSAGE**

**Adults:**
- Smooth muscle relaxation and suppression of secretions: 0.4-0.6 mg 30-60 minutes preoperatively, then q4-6h prn.
- Bradycardia: 0.5 mg IV, repeated every 3-5 minutes prn up to total dose of 3 mg.
- Anticholinesterase poisoning (from pesticides, mushrooms): 1-2 mg repeated if needed every 5-60 minutes. In severe cases: 2-6 mg, repeated if needed every 5-60 minutes.
- For nerve gas exposure: 2-6 mg IV/IM; to repeat every 5-10 minutes until secretions are minimal, the skin is dry and ventilation (assisted or spontaneous) is adequate.

**Pediatrics:**
- Smooth muscle relaxation and suppression of secretions:
  - weight less than 5 kg: 0.02 mg/kg/dose 30-60 minutes preoperatively, then q4-6h prn.
  - weight more than 5 kg: 0.01-0.02 mg/kg/dose (minimum dose 0.1 mg; maximum dose 0.4 mg) 30-60 minutes preoperatively, then q4-6h prn.
- Bradycardia: 0.02 mg/kg (minimum single dose of 0.1 mg; maximum single dose 0.5 mg in children and 1 mg in adolescents); dose may be repeated once to a maximum total dose of 1 mg in children or 2 mg in adolescents.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable at room temp.

**REFERENCES**
1, 2, 3, 6, 11, 40, 82, 534, 535.
# PARENTERAL DRUG THERAPY MANUAL

## AUROTHIOMALATE

### OTHER NAMES
- Gold sodium thiomalate, Myochrysine®, Sodium aurothiomalate

### CLASSIFICATION
- Antirheumatic

## INDICATIONS
- Treatment of adult and juvenile rheumatoid arthritis, psoriatic arthritis, and Felty's syndrome.

## ADMINISTRATION
- IM (gluteal muscle is preferred).
- Inject drug immediately after transfer into syringe as drug is sensitive to light.
- After receiving the injection, patient should lie down for 10 minutes and be observed for 30 minutes due to the risk of anaphylaxis.

## POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactic shock, syncope, bradycardia, thickening of tongue, difficulty in swallowing and breathing, angioedema.
- Vasomotor (nitritoid) reactions: syncope, faintness, flushing, dizziness, sweating, malaise, headache, weakness, nausea, vomiting, blurred vision. These reactions are more frightening than harmful and do not usually require discontinuation of therapy.
- Transient disease flare may occur within 24 hours of injection and lasts 2 to 3 days.
- Skin and mucous membrane reactions: erythema to severe exfoliative dermatitis, vaginitis, stomatitis, pharyngitis, tracheitis; a metallic taste may precede oral mucous membrane toxicity.
- Hematologic: thrombocytopenia, aplastic anemia, leukopenia.
- Renal: nephrotic syndrome, glomerulitis with hematuria, proteinuria.
- Liver: hepatitis with jaundice.

## DOSAGE
- Adults:
  - 10 mg IM the first week, 25 mg the second week, then 25 to 50 mg weekly for the next 20 weeks or until toxicity occurs.
  - Maintenance: 25-50 mg IM tapered progressively to every 2 to 4 weeks according to clinical response and tolerance, and maintained indefinitely.
- Pediatrics: 10 mg IM the first week followed by 1 mg/kg/week. Do not exceed 50 mg per dose. Same dosage intervals as adults.
- Avoid using in patients with a CrCl of less than 50 mL/min.

## COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Protect ampoules from light.
- Solution is a pale yellow; do not use if solution has darkened.

## MISCELLANEOUS
- Complete blood count, urinalysis, and liver function tests should be performed routinely during therapy.

## REFERENCES
- 1, 2, 95, 216.
AVELUMAB
Bavencio™
Antineoplastic, Monoclonal antibody

INDICATIONS
- Treatment of metastatic Merkel cell carcinoma in previously treated patients.
- Treatment of locally advanced or metastatic urothelial carcinoma in patients previously treated with platinum-based chemotherapy.

ADMINISTRATION
- Ensure premedication has been administered. Refer to Dosage section.
- Intermittent IV infusion (mandatory): withdraw the required volume from the vial and dilute in 250 mL of NS or 1/2NS. Gently invert bag to mix; do NOT shake. Administer over 60 minutes using a PVC infusion set and a sterile, nonpyrogenic, low-protein binding polyethersulfone 0.2 micron in-line or add-on filter. Flush the line with NS or 1/2NS after administration.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: immune-mediated reactions; most occur during treatment but may occur after treatment discontinuation; can be severe or life-threatening; can involve any organ: hepatitis, pneumonitis, colitis, endocrine (thyroid disorders, adrenal insufficiency, type 1 diabetes mellitus, hypopituitarism), renal (nephritis, renal dysfunction), myocarditis, myositis, dermatologic (rash, pruritis, psoriasis, exfoliative dermatitis, erythema multiforme, pemphigoid), uveitis, arthritis, Guillain-Barré syndrome, sepsis. Use with caution in patients with co-morbidities such as colitis, hepatic impairment, respiratory or endocrine disorders. Consult manufacturer’s recommendations for management of these reactions and when to withhold or discontinue treatment.
- Infusion-related reactions: fever, chills, flushing, hypotension, dyspnea, wheezing, back pain, abdominal pain, urticaria; may be severe or life-threatening and can occur despite premedication. For mild infusion reactions, reduce the infusion rate by 50%. For moderate infusion reactions, interrupt treatment until symptoms have resolved or are mild and then restart at 50% of the infusion rate; premedication with acetaminophen and an antihistamine may be considered. For severe reactions, discontinue treatment.
- Cardiovascular: hypertension, hypotension, peripheral edema.
- GI: nausea, vomiting, constipation, diarrhea, abdominal pain, decreased appetite.
- CNS: dizziness, headache.
- Electrolyte disturbances: hypokalemia, hypernatremia, hypophosphatemia.
- Endocrine and metabolic: hyperglycemia.
- Hematologic: anemia, lymphocytopenia, neutropenia, thrombocytopenia.
- Hepatic: elevated LFTs and bilirubin.
- Musculoskeletal: pain, arthralgia, weakness.
- Respiratory: cough.
- Fever, fatigue.
- Urinary tract infection.

DOSAGE
- Premedication with acetaminophen (500-650 mg) and an antihistamine (e.g., diphenhydramine 25-50 mg) 30-60 minutes prior to the infusion is mandatory for the first 4 infusions. For subsequent cycles, premedication is administered based upon clinical judgment and presence/severity of prior infusion reactions.
- 10 mg/kg IV every 2 weeks.
- Dosage adjustment for toxicity: consult manufacturer’s recommendations.
- Dosage in renal impairment: no dosage adjustment required for CrCl greater than or equal to 15 mL/min. No data for CrCl less than 15 mL/min.
- Dosage in hepatic impairment: no dosage adjustment required for mild impairment (normal bilirubin and AST greater than ULN or bilirubin 1-1.5 times ULN) or moderate impairment (bilirubin 1.5-3 times ULN). No data available for severe impairment (bilirubin greater than 3 times ULN).
- Consult specific protocol. …/Cont.
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light. Do not freeze. Do not shake.
- Stable for 8 hours at room temp or 24 hours in the fridge in NS and 1/2NS at a concentration ranging from 0.016 to 8 mg/mL in polyethylene, polypropylene, and ethylene vinyl acetate infusion bags and glass bottles.
- Compatible with dextrose solutions.

### MISCELLANEOUS

- Complete blood count, liver function, renal function, and thyroid function should be monitored prior to and periodically during treatment.

### REFERENCES

1, 5, 129, 165, 208, 405.
**INDICATIONS**

- Treatment of intermediate-2 and high risk myelodysplastic syndrome in patients who are not eligible for stem cell transplant.
- Treatment of acute myeloid leukemia with 20-30% blasts and multi-lineage dysplasia in patients who are not eligible for stem cell transplant.

**ADMINISTRATION**

- For SC use: reconstitute each 100 mg vial by slowly injecting 4 mL SWFI to obtain a 25 mg/mL suspension. Vigorously shake until a uniform suspension is obtained; the suspension will remain cloudy.
- SC: using a 25-gauge needle, inject with an angle of 45-90° in thigh, abdomen or upper arm. Rotate sites of injection; administer new injection at least 2.5 cm from the previous site; avoid a red, bruised or tender area. For doses greater than 100 mg (4 mL), divide dose in 2 separate injection sites. (Note: at TOH, divide dose to a maximum volume of 2 mL per SC injection site). Just before injection, the contents of the syringe must be re-suspended by vigorously rolling it between the palms until a uniform cloudy solution is obtained.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, pruritus.
- GI: anorexia, nausea, vomiting, diarrhea, constipation.
- CNS: fever, headache, dizziness, confusion, insomnia, anxiety.
- Hematologic: anemia, neutropenia, thrombocytopenia.
- Hypokalemia, fatigue.
- Local reactions: erythema, induration, pain.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**

- 75 mg/m² SC once daily for 7 consecutive days to be repeated every 4 weeks.
- Dose to be adjusted based on hematologic values and renal function. Refer to manufacturer’s instructions.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials at room temp.
- Reconstituted suspension (25 mg/mL) is stable for 45 minutes at room temp or for 8 hours in the fridge.
- Not compatible with D5W or sodium bicarbonate.

**REFERENCES**

5, 129, 165.
INDICATIONS
- For short term use when patients are unable to take the oral form.
- Adjunct for the prevention of rejection in renal and other organ transplantation.
- Adjunct for treatment of auto-immune diseases.

ADMINISTRATION
- Reconstitute 50 mg vial with 5-15 mL SWFI. However, to obtain an exact concentration of 10 mg/mL, add 5 mL SWFI for reconstitution. Swirl until clear.
- IV direct: physician only. Administer over 5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL NS or D5W and infuse over 30-60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, cough, dyspnea, hypotension; other symptoms of hypersensitivity include fever, rigors, arthralgia, myalgia.
- GI: nausea, vomiting, diarrhea, anorexia.
- Hematologic: anemia, leukopenia, thrombocytopenia, bleeding, macrophage activation syndrome.
- Increased susceptibility to infection.

DOSAGE
- Renal transplantation: initial dose of 3-5 mg/kg/day IV, beginning at time of transplant. Dose reduction to maintenance levels of 1-3 mg/kg/day IV is usually possible.
- Other indications: dosage is individualized but ranges between 1-5 mg/kg/day IV.
- Dosing adjustment in renal failure:
  \[
  \begin{array}{ccc}
  \text{CrCl (mL/min)} & \text{greater than 50} & \text{50-10} & \text{less than 10} \\
  \text{Dose} & 100\% & 75\% & 50\% *
  \end{array}
  \]
  * A supplemental dose of 0.25 mg/kg is recommended following hemodialysis.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp (15-25°C); protect from light.
- Reconstituted solution (10 mg/mL) stable for approximately 2 weeks at room temp, but as it does not contain preservatives it is best to use it within 24 hours.
- Stable for 8 days at room temp or in the fridge in D5W at a concentration of 2 mg/mL in PVC containers.
- Stable for 16 days at room temp or in the fridge in NS or 1/2NS at a concentration of 2 mg/mL in PVC containers.
- Incompatible with methyl and propylparabens and phenol preservatives.

MISCELLANEOUS
- Temporary withdrawal or reduction in dosage may be necessary at the first sign of abnormally large fall in leukocyte count.
- Patients receiving allopurinol concomitantly require a reduction in dose to 1/3-1/4 of the usual dose of azathioprine.

REFERENCES
1, 2, 4, 5, 40, 216.

**NAME OF MEDICATION**

AZITHROMYCIN

**OTHER NAMES**

Zithromax ®

**CLASSIFICATION**

Antibiotic - macrolide

### INDICATIONS

- Severe infections of the lower respiratory tract (community-acquired pneumonia) and genitourinary tract (pelvic inflammatory disease) due to susceptible organisms.

### ADMINISTRATION

- Reconstitute each 500 mg vial with 4.8 mL of SWFI to obtain 100 mg/mL.
- Intermittent IV infusion: dilute reconstituted solution in 250 mL or 500 mL of NS, D5W or other compatible diluent to obtain a final concentration of 2 or 1 mg/mL respectively. Administer over at least 60 minutes.

### POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity (rare): angioedema, anaphylaxis, dermatologic reactions.
- Cardiovascular: cardiac arrhythmias such as QT interval prolongation and torsades de pointes in patient with risk factors (rare).
- GI: diarrhea (4.3%), nausea (3.9%), abdominal pain (2.7%), vomiting (1.4%).
- Local reactions: erythema, pain, swelling, tenderness.

### DOSAGE

- 500 mg IV once daily.

### COMPATIBILITY, STABILITY

*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*

- Store vials at room temp.
- Reconstituted solution stable 24 hours when stored at or below 30ºC.
- Stable for 24 hours at room temp or 7 days in the fridge in NS, 1/2NS, D5W, RL, D5-RL, dextrose-saline at a concentration of 1-2 mg/mL.

### MISCELLANEOUS

### REFERENCES

1, 2, 4, 6, 40, 95, 294.

Limited revision 2014, 2015
**AZTREONAM**

**AZTREONAM ®**

**Antibiotic - monobactam**

## INDICATIONS
- Treatment of serious infections including complicated and uncomplicated urinary tract infections, lower respiratory tract infections, skin and skin structure infections, gynecologic and intra-abdominal infections, gonorrhea, and septicemia caused by susceptible gram-negative organisms.

## ADMINISTRATION
- Reconstitute 1 and 2 g vials with 6 to 10 mL of SWFI for IV direct injection.
- Reconstitute each gram with at least 3 mL of SWFI for intermittent IV infusion or IM administration.
- Shake immediately and vigorously after reconstitution.
- IV direct: physician or RN. Administer over 3-5 minutes.
- Intermittent IV infusion: dilute reconstituted solution in 50-100 mL of D5W or NS to a final concentration not exceeding 20 mg/mL. Administer over 20-60 minutes.
- IM: into a large muscle.

## POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, anaphylaxis.
- GI: diarrhea, nausea, vomiting.
- Hepatic: transient increases in AST, ALT and phosphatase alkaline.
- Local reactions: phlebitis/thrombophlebitis at site of injection.

## DOSAGE
- Adults: 0.5–2 g q6–12h, depending on indication and severity of infection. Maximum recommended daily dose is 8 g.
- Pediatrics (older than 1 month of age): 90-120 mg/kg/day, divided q6-8h. Maximum daily pediatric dose should not exceed adult dose. For cystic fibrosis patients: 50 mg/kg/dose q6-8h; maximum daily dose of 8 g.
- Renal impairment: modify dosing interval based on creatinine clearance.

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose</th>
<th>usual initial dose, then 50% of usual dose for subsequent doses at usual intervals</th>
<th>usual initial dose, then 25% of usual dose for subsequent doses at usual intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Removed by hemodialysis; in serious or life-threatening infections, a supplemental dose equal to 1/8 of usual initial dose should be given after each dialysis session.

## COMPATIBILITY, STABILITY
*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*
- Compatible in NS, D5W, RL, Ringer’s injection, dextrose-saline solutions, D5-RL.
- Stable for 48 hours at room temp and 7 days in the fridge in D5W or NS at concentrations of 10 mg/mL and 20 mg/mL in PVC plastic containers.
- Stable for 37 days at room temp and 120 days in the fridge in NS at a concentration of 20 mg/mL.

## MISCELLANEOUS
- Potential for cross-allergenicity with beta-lactam antibiotics.

## REFERENCES
1, 4, 5, 40, 82, 95, 143.  
* Available via Health Canada’s Special Access Programme

Limited revision 2015
INDICATIONS
- Prophylaxis of acute organ rejection in *de novo* renal transplantation; to be used concurrently with cyclosporine (Neoral ®) and corticosteroid-based immunosuppression.

ADMINISTRATION
- Reconstitute 20 mg vial with 5 mL of SWFI for a final concentration of 4 mg/mL. Shake the vial gently to dissolve the powder.
- IV direct: physician or RN. Undiluted. Administer IV as a bolus over 30-60 seconds.
- Intermittent IV infusion: dilute with NS or D5W to a volume of 50 mL or greater and infuse over 20 to 30 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, pruritus, hypotension, tachycardia, respiratory difficulties.

DOSAGE
- Adults: 40 mg IV given in 2 divided doses. Give the first 20 mg dose within 2 hours prior to transplantation surgery, and the second dose of 20 mg 4 days following transplantation.
- Pediatrics: less than 35 kg: 2 doses of 10 mg IV each; for 35 kg or more: 2 doses of 20 mg IV each; the first dose to be given within 2 hours prior to transplantation surgery and the second dose 4 days after transplantation.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge.
- Reconstituted vials are stable for 4 hours at room temp and 24 hours in the fridge.
- Once diluted, solution should be infused immediately.

MISCELLANEOUS

REFERENCES
1, 2, 40, 95.
INDICATIONS

- Treatment of relapsed indolent B-cell non-Hodgkin lymphoma (NHL) in adults who did not respond to or progressed during or within 6 months of treatment with a rituximab-containing regimen.
- Treatment of symptomatic chronic lymphocytic leukemia (CLL) in treatment-naive adults.

ADMINISTRATION

- Ensure premedication has been administered if the patient experienced an infusion reaction with a prior bendamustine infusion.
- Reconstitute each 25 mg and 100 mg vial with 5 mL and 20 mL, respectively, of SWFI to obtain a concentration of 5 mg/mL. Shake well until the powder is completely dissolved (within 5 minutes). Do NOT use the reconstituted solution if particulate matter is still observed after 5 minutes.
- Intermittent IV infusion: dilute in 500 mL in NS or D2.5-1/2NS to obtain a final concentration within 0.2-0.6 mg/mL. Mix well. The solution should be clear, colourless to slightly yellow. Administer over 60 minutes when used for NHL and over 30 minutes for CLL.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, toxic skin reactions and bullous exanthema. Increased risk of severe skin reaction (e.g., Stevens-Johnson syndrome and toxic epidermal necrolysis) when administered with allopurinol.
- Infusion-related reactions: fever, chills, pruritus and rash. Rarely, anaphylaxis and anaphylactoid reactions in second and subsequent cycles. To prevent severe reactions, antihistamines (e.g., diphenhydramine), antipyretics (e.g., acetaminophen) and corticosteroids can be administered in subsequent cycles in patients who have previously experienced mild to moderate infusion reactions. Discontinuation treatment in patients with more severe reactions.
- Cardiovascular: hypertension, hypertensive crisis, cardiac failure, myocardial infarction, palpitations, angina, arrhythmias, pericardial effusion, tachycardia.
- GI: nausea, vomiting, diarrhea, constipation, stomatitis, abdominal pain, dyspepsia, anorexia, dysgeusia, dehydration.
- CNS: headache, dizziness, insomnia.
- Hematologic: neutropenia, thrombocytopenia, anemia, leukopenia.
- Hepatic: increased LFTs, hyperbilirubinemia.
- Respiratory: pneumonia, pulmonary fibrosis, dyspnea, cough, pharyngolaryngeal pain.
- Tumour-lysis syndrome as early as first treatment cycle (see Hypersensitivity section above in regards to the risk of using allopurinol); hyperuricemia, hyperglycemia, hypoglycemia, hypokalemia, hypomagnesemia, hyponatremia.
- Sepsis, septic shock, fatigue, peripheral edema, back pain.
- Local reactions: pain at infusion site, erythema, phlebitis, pruritus, swelling.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- Non-Hodgkin lymphoma (NHL): 120 mg/m² IV as monotherapy on days 1 and 2 of a 21-day cycle, up to 8 cycles.
- Chronic lymphocytic leukemia (CLL): 100 mg/m² IV as monotherapy on days 1 and 2 of a 28-day cycle, up to 6 cycles.
- Dosage modification in case of toxicity: refer to the manufacturer’s instructions.
***PARENTERAL DRUG THERAPY MANUAL***

<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytostasan hydrochloride, Treanda®</td>
<td>Antineoplastic</td>
</tr>
</tbody>
</table>

.../Cont.

**DOSAGE** (Cont.)

- Dosage in renal impairment: use with caution in patients with CrCL between 40-80 mL/min. Should not be used in patients with CrCL below 40 mL/min.
- Dosage in hepatic impairment: use with caution in patients with mild hepatic impairment (total bilirubin within 1.5 x upper limit of normal (ULN)) or AST/ALT/alkaline phosphatase within 2.5 x ULN). Should not be used in patients with moderate or severe hepatic impairment (when bilirubin is at least 1.5 x ULN or AST/ALT/alkaline phosphatase is at least 2.5 x ULN).
- Consult specific protocol.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials between 2-25°C, with excursions permitted up to 30°C. Protect from light.
- The reconstituted solution is stable for 30 minutes.
- Compatible with PVC or polyethylene bags.
- Diluted solutions are stable for 3 hours at room temp exposed to room light or for 24 hours in the fridge in NS, D2.5-1/2NS.

**MISCELLANEOUS**

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be available for the treatment of hypersensitivity and infusion-related reactions.
- Do not administer live attenuated vaccines while on bendamustine.
- Contains mannitol.

**REFERENCES**

1, 5, 40, 129, 165, 208.
INDICATIONS
- For relief of acute dystonic reactions induced by antipsychotic agents.
- Symptomatic treatment of parkinsonism when a more rapid response is desired.

ADMINISTRATION
- IV direct: physician only. Little advantage in giving IV since onset of effect is not faster than IM.
- IM: preferred.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: tachycardia, arrhythmias.
- GI: nausea, vomiting, dry mouth, constipation.
- CNS: nervousness; mental confusion and excitement at high doses.
- Weakness.
- Urinary retention, difficulty in urinating.
- Blurred vision, mydriasis.
- Dermatologic: dry skin, anhidrosis.

DOSAGE
- For acute dystonic reactions induced by antipsychotic agents: 1-2 mg IM/IV followed by 1-2 mg orally twice daily.
- Symptomatic treatment of parkinsonism: 1-2 mg IM/IV daily (range 0.5-6 mg/day). Given either in divided doses or single daily dose at bedtime. Doses should be increased gradually as effects of the drug are cumulative.
- Pediatrics: older than 3 years of age for acute dystonic reactions induced by antipsychotic agents: 0.02-0.05 mg/kg/dose IM/IV 1-2 times daily.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable at room temp.

MISCELLANEOUS
- Onset of action after IV/IM administration: within 15 minutes.

REFERENCES
1, 2, 82.
INDICATIONS
- Anti-inflammatory.
- Immunosuppressant agent.
- Prenatal treatment in pregnancies at risk of preterm delivery (24-34 weeks gestation) to hasten fetal maturation (e.g., lungs, cerebral blood vessels).

ADMINISTRATION
- IM.
- Intraarticular, intrasynovial, intralesional and at soft tissue sites.
- Shake well before using.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions.
- Electrolyte and fluid disturbances: fluid retention, sodium retention, potassium loss.
- Muscle weakness, steroid myopathy.
- Endocrine: Cushing syndrome, hyperglycemia.

DOSAGE
- For systemic effect: 1-2 mL/dose IM at intervals of 3 days to a week, as needed.
- For local effect: 1.5-12 mg (0.25-2 mL)/dose depending on size of tissue injected. Dose may be repeated if needed at intervals of 3 days to 2 weeks.
- To hasten fetal maturation (pregnant women between 24 and 34 weeks gestation at risk of preterm delivery within 7 days): two 12 mg (2 mL) doses IM given 24 hours apart.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Compatible with an equal volume of preservative free 1% or 2% lidocaine; preservatives (such as parabens or phenol) may cause flocculation of the suspension.
- Protect from light.
- Store between 2-30°C.

MISCELLANEOUS

REFERENCES
1, 5, 487.

Full revision 2012; limited revision 2016
# INDICATIONS
- First-line treatment of metastatic carcinoma of the colon or rectum, in combination with fluoropyrimidine-based (5-fluorouracil) chemotherapy.
- Treatment of patients with unresectable, locally advanced, metastatic or recurrent non-squamous non-small cell lung cancer (NSCLC), in combination with carboplatin/paclitaxel chemotherapy.
- Treatment of patients with glioblastoma after relapse or disease progression, following prior therapy.
- Treatment of platinum-resistant or –sensitive recurrent epithelial ovarian, fallopian tube and primary peritoneal cancer, in combination therapy.

# ADMINISTRATION
- Intermittent IV infusion: dilute dose in a total volume of 100 mL NS (final concentration should be within the range of 1.4-16.5 mg/mL). Infuse first dose over 90 minutes; if well tolerated, infuse second dose over 60 minutes; if well tolerated, infuse subsequent infusions over 30 minutes. An infusion rate of 0.5 mg/kg/min has also been used safely for administration of all doses, including the initial dose.

# POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity and infusion related reactions: anaphylaxis and anaphylactoid; rigors, dyspnea, hypertension, hypotension, flushing/redness, rash, chest pain. If occurs, stop infusion and start appropriate medical treatment.
- Cardiovascular: hypertension, hypotension, tachycardia, development of CHF, edema, thromboembolism (arterial), including stroke, transient ischemic attack, myocardial infarction.
- GI: nausea, vomiting, diarrhea; GI perforation: if occurs, bevacizumab should be discontinued permanently.
- Hemorrhage: tumour-associated and minor mucocutaneous hemorrhage; hemoptysis and pulmonary hemorrhage.
- Impairment of wound healing; if wound dehiscence requires medical intervention, bevacizumab should be discontinued permanently.
- Development of fistulas, necrotizing fasciitis (rare).
- Proteinuria.

# DOSAGE
- Metastatic colorectal cancer: 5 mg/kg IV for one dose once every 2 weeks.
- Locally advanced, metastatic or recurrent NSCLC: 15 mg/kg IV once every 3 weeks.
- Glioblastoma: 10 mg/kg IV once every 2 weeks; continue until progression of the underlying disease.
- Ovarian, fallopian tube or peritoneal cancer:
  - Platinum-sensitive: 15 mg/kg IV once every 3 weeks.
  - Platinum-resistant: 10 mg/kg IV once every 2 weeks OR 15 mg/kg IV once every 3 weeks.
  - High-risk cancer: 7.5 mg/kg IV once every 3 weeks.
- Consult specific protocol.

# COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze or shake.
- Single-use vials; discard unused portion.
- Stable for 48 hours between 2-30°C in NS.
- Do not mix with dextrose solutions as a concentration dependent degradation of bevacizumab has been observed.

# MISCELLANEOUS
- Hold bevacizumab for at least 28 days before or after major surgery and until the surgical incision is fully healed.

# REFERENCES
1, 5, 40, 129, 165, 295, 447.

Full revision 2012; limited revision 2013, 2014, 2015, 2016, 2017
BIVALIRUDIN

**INDICATIONS**
- Anticoagulant in patients undergoing percutaneous coronary intervention (PCI).
- Anticoagulant in patients with acute coronary syndromes (unstable angina or non ST-segment elevation myocardial infarction) in whom early PCI is planned.
- Anticoagulant in patients with heparin-induced thrombocytopenia (HIT) or at risk of HIT undergoing PCI or cardiac surgery.

**ADMINISTRATION**
- Reconstitute 250 mg vial with 5 mL of SWFI for a final concentration of 50 mg/mL. Gently swirl. Must be further diluted as per instructions below before administration.
- IV direct: physician or RN. Dilute each reconstituted 250 mg vial in 50 mL of NS or D5W to obtain a 5 mg/mL concentration. Administer calculated dose as IV bolus.
- Continuous infusion: dilute each reconstituted 250 mg vial in 50 mL NS or D5W to obtain a 5 mg/mL concentration (e.g., 250 mg/50 mL, 500 mg/100 mL, 1250 mg/250 mL). Infuse as per Dosage section. For continuous infusion of a lower concentration: dilute the reconstituted 250 mg vial in 500 mL of NS or D5W to obtain a final concentration of 0.5 mg/mL.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cardiovascular: hypotension, hypertension.
- GI: nausea.
- Bleeding, ranging from minor to major.
- Headache.
- Back pain.

**DOSAGE**
For patients undergoing PCI:
- 0.75 mg/kg IV bolus followed by an infusion of 1.75 mg/kg/hr for the duration of the PCI procedure. Five minutes after bolus has been given, an Activated Clotting Time (ACT) should be performed and an additional bolus of 0.3 mg/kg should be given if needed. Continuation of the infusion for up to 4 hours post-procedure using a 5 mg/mL solution is optional. After 4 hours, may continue if needed at 0.2 mg/kg/hr X 20 hours, using a 0.5 mg/mL solution.
- Dosage in renal impairment: bolus dose remains the same; continuous infusion rate is adjusted; the ACT should be monitored. Refer to product monograph for more details.

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>59-30</th>
<th>29-10</th>
<th>Less than 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-hour Infusion (mg/kg/hr)</td>
<td>1.75</td>
<td>1</td>
<td>0.25</td>
</tr>
</tbody>
</table>

For patients with acute coronary syndromes:
- 0.1 mg/kg IV bolus followed by an infusion of 0.25 mg/kg/hr prior to angiography and continued through angiography and as long as needed. If patient is medically treated, infusion of 0.25 mg/kg/hr may be continued for up to 72 hours. If patient proceeds to a PCI or a cardiac surgery, refer to product monograph for more details.

For patients going to cardiac surgery:
- On pump cardiac surgery: 1 mg/kg IV bolus followed by 2.5 mg/kg/hr as an IV infusion; terminate the infusion approximately 15 minutes prior to the anticipated end of cardiopulmonary by-pass. Refer to product monograph for more details.
- Off pump cardiac surgery: 0.75 mg/kg IV bolus followed by 1.75 mg/kg/hr as an IV infusion for the duration of the procedure. Refer to product monograph for more details.

…/Cont.
BIVALIRUDIN

Angiomax ®

Anticoagulant

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened vials at room temp.
- Reconstituted vial (50 mg/mL) is stable for 24 hours in the fridge.
- Stable for 24 hours at room temp at a concentration of 0.5 to 5 mg/mL.
- Compatible in NS and D5W.

MISCELLANEOUS

- For patients undergoing PCI, bivalirudin is intended for use with ASA (300-325 mg) daily. Clopidogrel can also be administered.
- Bivalirudin can be started 30 minutes after discontinuation of heparin IV or 8 hours after discontinuation of low molecular weight heparin SC.

REFERENCES

1, 2, 40, 95.
BLEOMYCIN
Blenoxane ®
Antineoplastic

INDICATIONS
- As an adjuvant to surgery and radiation therapy.

ADMINISTRATION
- For IV use: reconstitute 15 unit vial with 5-10 mL of NS or SWFI to provide a solution of 1.5-3 units/mL.
- IV direct: physician or RN; inject reconstituted solution slowly over 10 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of NS; infuse over at least 10 minutes.
- Continuous IV infusion: dilute in 500-1000 mL of NS per day and administer as a continuous infusion for 3-7 days.
- For IM or SC use: reconstitute 15 unit vial with 1-5 mL of NS or SWFI to provide a solution containing 3-15 units/mL.
- In patients known to have hypersensitivity to other drugs, may give a test dose of 1 unit IV prior to the first treatment. If no signs of hypersensitivity within 30 minutes, the remainder of the dose may be given.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid, wheezing, hypotension.
- GI: nausea, vomiting, anorexia.
- Fever, chills: occur a few hours after starting therapy and may last up to 4-24 hours. Hydrocortisone premedication (100 mg IV) may prevent or decrease the severity of this reaction. Acetaminophen can be used to control the fever.
- Dermatologic: radiation recall reactions (rare), facial flushing, rash.
- Malaise, weakness.
- Pneumonitis, dyspnea, pleuropneumonitis, rales.
- Local reactions: phlebitis.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Range: 0.25 to 0.5 units/kg or 10 to 20 units/m² IV/IM/SC given weekly or twice weekly.
- Cumulative dosage exceeding 400 units should be given with great caution because of the increased incidence of pulmonary toxicity associated with large cumulative dosages.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50 50-10 less than 10
  - Dose 100% 75% 50%
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge, but stable for 28 days at room temp.
- Solution reconstituted with NS stable for 4 weeks in the fridge or 2 weeks at room temp.
- Stable for 24 hours at room temp in NS at a concentration of 0.3-3 units/mL in glass and PVC containers.
- Stable for 28 days at room temp and protected from light in NS at a concentration of 0.6 units/mL in polypropylene syringes.
- Stable for 28 days at room temp, protected from light, in NS at a concentration of 0.15 units/mL in PVC bags.
- Do not dilute in D5W, due to lower stability.

MISCELLANEOUS
- Bleomycin is a mixture of peptides and should be described in units rather than in mg.

REFERENCES
1, 4, 5, 6, 40, 129, 143, 165, 216.

Full revision 2012; limited revision 2014, 2015, 2016, 2017, 2018
BLINATUMOMAB

**INDICATIONS**
- Treatment of adults with relapsed or refractory B-cell precursor acute lymphoblastic leukemia (ALL).
- Treatment of children with Philadelphia chromosome-negative relapsed or refractory B-cell precursor ALL.

**ADMINISTRATION**
- Ensure premedication has been administered as recommended; refer to Dosage section.
- An IV solution stabilizer is provided with the blinatumomab package and is used to coat the IV bag prior to addition of reconstituted drug in order to prevent its adhesion to IV bags and IV lines. Do NOT use the solution stabilizer for reconstitution of blinatumomab.
- Select a 250 mL bag of NS made of polyolefin, PVC non-diethylhexyl phthalate (non-DEHP), or ethylene vinyl acetate (EVA). Each bag typically contains an overfill for a starting volume between 265 mL and 275 mL; ensure volume of the bag is within these standards by adding or removing any NS. An empty bag made of polyolefin, PVC non-DEHP or EVA can also be used and filled with 270 mL of NS. Using a 10 mL syringe, transfer 5.5 mL of IV solution stabilizer to the IV bag containing NS. Gently mix the contents of the bag to avoid foaming. Discard remaining solution stabilizer vial.
- Reconstitute each 38.5 mcg blinatumomab vial with 3 mL of SWFI directed toward the side of the vial. Gently swirl contents to avoid excess foaming. Do NOT shake. Final concentration is 12.5 mcg/mL with a total volume of 3.1 mL. The resulting solution should be clear to slightly opalescent, colourless to slightly yellow. Do NOT use if the solution is cloudy or contains a precipitate.
- Continuous IV infusion: depending on the admixture to prepare (9 mcg/day, 28 mcg/day, 5 mcg/m²/day or 15 mcg/m²/day, each infused over 24, 48, 72 or 96 hours), the amount of blinatumomab to transfer into the NS bag will differ; refer to manufacturer’s specific instructions. Gently mix the contents of the bag to avoid foaming. Attach the IV tubing (polyolefin, PVC non-DEHP or EVA) to the IV bag with a sterile, non-pyrogenic, low protein-binding 0.2 or 0.22 micron in-line filter. Remove air from the IV bag. Prime the IV line with the prepared solution. Do NOT prime with NS. The entire volume of the admixed blinatumomab will be more than the volume administered to the patient (240 mL) to account for the priming of the IV line and to ensure that the patient will receive the full dose. Administer dose by infusing 240 mL at 10 mL/hr for a duration of 24 hours, 5 mL/hr for a duration of 48 hours, 3.3 mL/hr for a duration of 72 hours or 2.5 mL/hr for a duration of 96 hours. Discard any remaining solution.
- When changing the line or when at infusion completion, do NOT flush line into the patient with the blinatumomab solution as this will cause an inadvertent administration of a bolus dose.
- Must be administered by an infusion pump.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cytokine release syndrome: pyrexia, asthenia, headache, hypotension, total bilirubin increased, elevation of liver enzymes (AST and ALT), nausea, disseminated intravascular coagulation, capillary leak syndrome. Observe patient closely, especially during the first infusion of the first 2 cycles; median time of onset is 2 days. May need to interrupt the infusion or definitively discontinue the treatment.
- Cardiovascular: hypotension, hypertension, peripheral edema.
- GI: anorexia, abdominal pain, diarrhea, constipation, nausea, vomiting.
- CNS: dizziness, headache, insomnia, tremor, encephalopathy; more frequent in the elderly.
- Dermatologic: rash.
- Electrolyte disturbances: decreased potassium, magnesium, phosphate and calcium.
- Endocrine and metabolic: hyperglycemia, tumor lysis syndrome.
- Hematologic: myelosuppression, bleeding.
- Hepatic: increase in LFTs.
- Infections: can be severe; more frequent in the elderly.
- Respiratory: cough, dyspnea.
- Pancreatitis (rare, may be fatal).
- Fatigue, fever, musculoskeletal pain, chills.

…/Cont.
DOSAGE

- Hospitalization is recommended for the first 9 days of the first treatment cycle and the first 2 days of the second treatment cycle.
- Pre-phase treatment for patients with high tumour burden: for patients (adults and pediatrics) with 50% or more leukemic blasts or more in bone marrow or if peripheral blood leukemic blasts counts are over 15 x 10^9/L, treat with dexamethasone (maximum of 24 mg/day) for up to 4 days prior to the first dose of blinatumomab.
- Intrathecal chemotherapy CNS prophylaxis is recommended before and during blinatumomab therapy to prevent CNS ALL relapse.
- Premedication: Adults: dexamethasone 20 mg IV 60 minutes before first dose of blinatumomab of each cycle. Pediatrics: dexamethasone 10 mg/m^2 (maximum 20 mg) PO or IV 6-12 hours prior to the start of blinatumomab (cycle 1 day 1) followed by dexamethasone 5 mg/m^2 PO or IV within 30 minutes of the start of blinatumomab (cycle 1 day 1).
- 6-week cycles:
  - If patient weight is 45 kg or more: cycle 1: 9 mcg/day IV on days 1 to 7, then 28 mcg/day IV on days 8 to 28; after a 2-week treatment-free period, continue with cycles 2-5: 28 mcg/day IV on days 1 to 28; separate each cycle by a 2-week treatment-free period.
  - If patient weight is less than 45 kg: cycle 1: 5 mcg/m^2/day (maximum of 9 mcg/day) IV on days 1 to 7, then 15 mcg/m^2/day (maximum of 28 mcg/day) IV on days 8 to 28; after a 2-week treatment-free period, continue with cycles 2-5: 15 mcg/m^2/day IV on days 1 to 28; separate each cycle by a 2-week treatment-free period.
- Dosage modification if toxicity: refer to manufacturer's instructions.
- Dosage in renal impairment: no formal studies but accumulation may occur if CrCl is between 30-60 mL/min. No information if CrCl is below 30 mL/min or patient is on hemodialysis.
- Dosage in hepatic impairment: no formal studies but may not affect drug clearance; refer to manufacturer’s instructions.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials of blinatumomab and the solution stabilizer between 2-8°C; protect from light. Do not freeze.
- Blinatumomab vial and solution stabilizer vial are stable at room temp (23-27°C) for 8 hours if protected from light.
- Reconstituted vial is stable for 4 hours at room temp (23-27°C) or for 24 hours in the fridge, if protected from light.
- Diluted solution is stable for 96 hours at room temp (23-27°C) or 10 days in the fridge.

MISCELLANEOUS

REFERENCES

1, 5, 129, 135, 165.
**INDICATIONS**

- Treatment of progressive multiple myeloma in patients who have received at least one prior therapy and who have already undergone or are unsuitable for stem transplantation.
- Treatment of patients with previously untreated multiple myeloma who are unsuitable for stem cell transplantation.
- Treatment of mantle cell lymphoma in patients who have relapsed or were refractory to at least one prior therapy.

**ADMINISTRATION**

- For IV use: reconstitute the 3.5 mg vial with 3.5 mL NS to obtain a concentration of 1 mg/mL.
- For SC use: reconstitute the 3.5 mg vial with 1.4 mL NS to obtain a concentration of 2.5 mg/mL. If local reaction at site of injection occurs, may use a lower concentration i.e., 1 mg/mL by following the reconstitution instructions for IV use.
- IV direct: physician or RN; undiluted; inject as a bolus over 3-5 seconds into the tubing of freely running IV NS.
- SC: into the thighs or abdomen; rotate injection site. New injections should be given at least 2.5 cm from an old site. Avoid site that is tender, bruised, erythematous or indurated.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: angioedema, rash, urticaria.
- Cardiovascular: orthostatic/postural hypotension: may need pharmacological treatment, including hydration and/or adjustment of antihypertensive medications; CHF.
- GI: nausea, vomiting, diarrhea, abdominal pain, anorexia, constipation.
- CNS: dizziness, headache, insomnia.
- Dyspnea, cough.
- Fatigue, malaise, weakness, fever, rigors.
- Hematologic: thrombocytopenia, anemia, leukopenia.
- Peripheral neuropathy.
- Local reactions: skin irritation after SC injection. If occurs, administer SC with a less concentrated solution (1 mg/mL instead of 2.5 mg/mL) or consider switching to IV route.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**

- For relapsed multiple myeloma: 1.3 mg/m² IV or SC twice weekly for 2 weeks (days 1, 4, 8, 11) followed by a 10-day rest period (days 12-21). This 3-week period is considered a treatment cycle. Up to a total of 8 cycles may be administered. For extended treatment beyond 8 cycles, maintenance schedule is once weekly for 4 weeks (days 1, 8, 15, 22) followed by a 13-day rest period (days 23-35).
- Previously untreated multiple myeloma: administer for nine 6-week treatment cycles: cycles 1-4: 1.3 mg/m² IV twice weekly (days 1, 4, 8, 11, 22, 25, 29, 32) followed by a rest period till day 42; cycles 5-9: 1.3 mg/m² IV once weekly (days 1, 8, 22, 29) followed by a rest period till day 42.
- For mantle cell lymphoma: 1.3 mg/m² IV twice weekly for 2 weeks (days 1, 4, 8, 11) followed by a 10-day rest period (days 12-21). This 3-week period is considered a treatment cycle. Up to a total of 8 cycles may be administered. For extended treatment beyond 8 cycles, maintenance schedule is once weekly for 4 weeks (days 1, 8, 15, 22) followed by a 13-day rest period (days 23-35).
- At least 72 hours should elapse between consecutive doses.

.../Cont.
DOSAGE (Cont.)
- Dose can be reduced to 1 mg/m² or 0.7 mg/m² based on tolerability.
- Consider a dose reduction in hepatic impairment.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solution of 1 mg/mL is stable for 42 days at 23°C or 4°C when stored in its original vial.
- Reconstituted solution of 1 mg/mL is stable for 7 days at 5°C (in the dark) and 4 days at 22°C (exposed to indoor light) when stored in a plastic syringe.
- Reconstituted solution of 2.5 mg/mL is stable for 24 hours at room temp (with or without protection from light) or in the fridge (protected from light) when stored in its original vial.
- Reconstituted solution of 2.5 mg/mL is stable for 24 hours at room temp (exposed to indoor light) when stored in a plastic syringe.

MISCELLANEOUS

REFERENCES
1, 2, 129, 143, 157, 165, 166.
**INDICATIONS**
- Treatment of botulism.

**ADMINISTRATION**
- Intermittent IV infusion (mandatory): Administer the first 250 mL slowly within 30 minutes and the second 250 mL as an infusion (at TOH: infuse the second 250 mL over 60 minutes). Preferable to administer solution at body temperature.
- Monitor patient for symptoms of shock (anaphylaxis) during administration and for 2 hours after the end of the infusion.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis/anaphylactoid reactions (bronchospasm, shock, urticaria, nausea, headache). Onset within minutes to hours. (Antidote: epinephrine, corticosteroids, H1 and H2 receptor antagonists).
- Fever, chills, arterial hypertension; onset 1-2 hours after start of therapy; may need antipyretics and wet compresses for fever and meperidine for severe chills.
- Serum sickness: pruritus, urticaria, fever, arthralgia, neurological disorders; onset 7 (5-24) days after start of therapy; may need corticosteroids and/or plasma separation.

**DOSAGE**
- Initial dose for adults and children over 1 year old: 500 mL IV.
- May give an additional 250 mL IV 4 to 6 hours later, depending on clinical status.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store bottles in the fridge.
- Solution should be clear, colourless to pale yellow.
- Once bottle is opened, it should be used immediately.

**MISCELLANEOUS**
- Botulinum antitoxin is available in different preparations that are not interchangeable. This monograph is specific to the product Botulism-Antitoxin Behring ® from Novartis.
- Botulism-Antitoxin Behring ® contains equine protein with Clostridium Botulinum antitoxins Type A, B and E.
- A history of allergic reaction to equine protein is not a contraindication to administer the botulism antitoxin; consider concurrent administration of a medication to treat anaphylactic shock.

**REFERENCES**
*Available via Health Canada’s Special Access Programme or 246, 249. Public Health Division of Ontario Ministry of Health and Long-Term Care
INDICATIONS

- Treatment of strabismus and blepharospasm associated with dystonia.
- To reduce subjective symptoms and objective signs of cervical dystonia (spasmodic torticollis).
- Management of upper and lower limb spasticity related to stroke, spinal injury or cerebral palsy.
- Treatment of hemifacial spasm.
- Prophylaxis of headaches in adults with chronic migraine.
- Use in achalasia, chronic anal fissure and dysphonia (laryngeal dystonia).

ADMINISTRATION

- Reconstitute 100 unit vial with 1, 2, 4 or 8 ml of NS without preservative to get a final concentration of 10 units, 5 units, 2.5 units or 1.25 units per 0.1 mL, respectively. Reconstitute 200 unit vial with 1, 2, 4 or 8 ml of NS without preservative to get a final concentration of 20 units, 10 units, 5 units or 2.5 units per 0.1 mL, respectively. Inject diluent slowly during reconstitution; gently swirl; do NOT shake.
- IM (into affected muscles): physician only, with the appropriate qualifications and experience in the treatment and the use of required equipment; localization of the exact affected muscles with electromyographic guidance or nerve stimulation techniques may be useful.

POTENTIAL ADMINISTRATION HAZARDS

- Side effects may vary depending on sites of administration.
- GI: nausea, dry mouth.
- CNS: headache, dizziness.
- Ocular: diplopia, dry eyes, blurred vision, eyelid ptosis.
- Generalized fatigue, flu-like syndrome, fever.
- Potential for possible distant spread of the toxin from the site of injection with the following resulting symptoms: muscle weakness remote to the site of injection, dysphagia, aspiration pneumonia, speech disorders, respiratory depression.
- Development of antibodies with repeated injections (rare); will result in decreased efficacy.
- Local reactions: pain, swelling, hematoma, ecchymosis.

DOSAGE

- Dose depends on indication, number and location of the muscles that need to be injected, severity of the condition, presence of local weakness and patient’s prior response to treatment.
- Consult product monograph and specialized literature for exact dose to be injected.
- Adult maximum cumulative dose is 400 units or 7 units/kg, whichever is lower, in a 3-month interval.
- Pediatric maximum cumulative dose is 200 units or 6 units/kg, whichever is lower, in a 3-month interval.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store unopened vials in the fridge or freezer.
- Reconstituted solution is stable for 24 hours in the fridge; do not freeze.

MISCELLANEOUS

- Botulinum toxin is available in different preparations that are not interchangeable. This monograph is specific to the Botox ® product by Allergan.
- Caution when administered with an aminoglycoside as the latter can also affect neuromuscular transmission.

REFERENCES

1, 5, 95, 237.
INDICATIONS

- Treatment of Hodgkin lymphoma after failure of autologous stem cell transplant (ASCT) or after failure of at least two multi-agent chemotherapy regimens in patients who are not ASCT candidates.
- Post-ASCT consolidation treatment of patients with Hodgkin lymphoma at increased risk of relapse or progression.
- Treatment of systemic anaplastic large cell lymphoma after failure of at least one multi-agent chemotherapy regimen.
- Treatment of adult patients with primary cutaneous anaplastic large cell lymphoma (pcALCL) or CD30-expressing mycosis fungoides who have had prior systemic therapy.

ADMINISTRATION

- Ensure premedication has been administered if the patient experienced an infusion reaction with a prior brentuximab vedotin infusion.
- Reconstitute each 50 mg vial with 10.5 mL of SWFI to obtain a concentration of 5 mg/mL. Direct the stream toward wall of the vial. Gently swirl the vial to aid dissolution. Do NOT shake. The solution should be clear to slightly opalescent and colourless.
- Intermittent IV infusion: Dilute the required dose in at least 100 mL of NS, D5W or RL to obtain a final concentration between 0.4 and 1.8 mg/mL. Gently invert the bag to mix the solution. Administer over 30 minutes.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis, Stevens-Johnson syndrome.
- Infusion-related reactions: immediate or up to 2 days after administration; more common in patients who develop antibodies to brentuximab. Includes chills, nausea, swelling, throat tightness, urticaria, pruritus, rash, erythema, dyspnea, cough, wheezing, flushing, chest pain, hypotension, dizziness and fever. In cases of mild to moderate reactions, premedicate with an antipyretic (e.g., acetaminophen), an antihistamine (e.g., diphenhydramine) and a corticosteroid for subsequent infusions; discontinue treatment in severe cases.
- Cardiovascular: supraventricular arrhythmia, arterial thromboembolism.
- GI: nausea, vomiting, diarrhea, constipation, oral candidiasis, abdominal pain (can be severe), anorexia, dyspepsia, GI perforation (rare).
- CNS: anxiety, headache, insomnia. Peripheral neuropathy (sensory or motor); discontinue treatment if grade 4 neuropathy. Progressive multifocal leukoencephalopathy; discontinue treatment in such case.
- Hematologic: thrombocytopenia, anemia, lymphopenia. Neutropenia: if grade 3 or 4, growth factor administration (e.g., filgrastim) should be considered.
- Renal: urinary tract infection, pyelonephritis, renal failure (rare).
- Respiratory: pneumonia, upper respiratory tract infection, cough, dyspnea, pneumonitis, pneumothorax, nasal congestion.
- Tumour-lysis syndrome.
- Sepsis, septic shock, fatigue, fever, pain in extremity (can be severe), arthralgia, back pain, myalgia, hyperglycemia, hyperuricemia, peripheral edema.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- 1.8 mg/kg (maximum 180 mg) IV every 3 weeks for 8 to 16 cycles.
- Dosage modification in case of toxicity: refer to the manufacturer’s instructions.
- Consult specific protocol.

PRES. 48 (05/2002)
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store single-use vials in the fridge and protect from light. Unopened vials are stable for no more than 5 days (120 hours) cumulative exposure time at 25°C.
- Reconstituted solution is stable for 24 hours at room temp or in the fridge.
- Stable for 24 hours at room temp and in the fridge in NS, D5W and LR at a concentration of 0.4-1.8 mg/mL in PVC, ethylene vinyl acetate, polyolefin, polypropylene or polyethylene containers.

### MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be available for the treatment of hypersensitivity and infusion-related reactions.
- As a minimum, a complete blood count should be performed before each dose.
- Combination with bleomycin is contraindicated due to increased pulmonary toxicity.

### REFERENCES

1, 5, 40, 129, 165, 208, 337.
BUPIVACAINE
Marcaine®, Sensorcaine®
Local anesthetic

INDICATIONS
- Local or regional anesthesia and analgesia.

ADMINISTRATION
- Local infiltration.
- Peripheral nerve block including nerve plexus block.
- Retrobulbar block.
  - Central nerve block: spinal (intrathecal) or epidural.
    - Nurses may not administer epidural boluses unless using an infusion pump and following Unit policy.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity (rare): urticaria, edema.
- Cardiovascular: cardiovascular toxicity is a risk with large bolus techniques and can result in depression of the myocardium, hypotension, decreased cardiac output, heart block, bradycardia, ventricular arrhythmias, and cardiac arrest that is notoriously difficult to treat.
- CNS: excitation or depression: anxiety, dizziness, blurred vision, tremors, drowsiness, convulsions, loss of consciousness, and possibly respiratory arrest.
- CNS and cardiovascular events are usually dose-related and due to inadvertently high plasma levels. CNS toxicity manifests at lower plasma levels than cardiovascular toxicity, hence with continuous infusion techniques, problems are usually limited to CNS signs and symptoms.

DOSAGE
- The dose is influenced by many factors (e.g., area to be anesthetized, degree of anesthesia required, individual tolerance).
- All three concentrations may produce complete sensory block, but the effect on motor function increases as concentration increases.
- The highest concentration (0.75%) is not recommended for obstetrical anesthesia and analgesia.
- Local infiltration: up to 60 mL of the 0.25% or up to 30 mL of the 0.5% solution.
- Peripheral nerves: 5-40 mL of the 0.25% or 5-30 mL of the 0.5% solution.
- Retrobulbar block: 2-4 mL of the 0.75% solution.
- Caudal block: 15-30 mL of the 0.25% or 0.5% solution.
- Epidural (other than caudal block): 10-20 mL of the 0.25%, 0.5%, or 0.75% solution (where the 0.75% solution is used only for single dose anesthesia). For continuous infusions: 2-10 mL/hr of the 0.25% or 0.125%.
- Spinal: 0.8-2 mL using the 0.75% hyperbaric solution.
- Maximum single dose should not exceed 175 mg without epinephrine and 225 mg with epinephrine 1:200,000. Do not exceed 400 mg in 24 hours.
- Dosage reductions should be considered in elderly or debilitated patients and in those with severe hepatic impairment.
- Refer to product monograph for more specific dosing information.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 28 days at 5°C protected from light in NS at concentrations of 0.01-37.5 mg/mL when combined with either hydromorphone 0.01-43 mg/mL or morphine 0.01-43 mg/mL or fentanyl 0.15-43 mcg/mL in a polypropylene syringe or non-DEHP bag.
- Stable for 60 days at room temp (with light exposure) and in the fridge (protected from light) in NS at a concentration of 2.5 mg/mL (0.25%) when combined with morphine 5 mg/mL in a polypropylene syringe.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 91 days at room temp (with light exposure) or in the fridge (protected from light) in NS at a concentration of 2.5 mg/mL (0.25%) when combined with hydromorphone 0.02 mg/mL or 0.04 mg/mL in a polypropylene syringe.

MISCELLANEOUS

- Contraindicated for IV regional anesthesia (Bier block).
- Do not use in obstetric paracervical block anesthesia.
- Local anesthetics that contain preservatives should not be used for epidural or spinal anesthesia.
- 0.25% = 2.5 mg/mL; 0.5% = 5 mg/mL; 0.75% = 7.5 mg/mL.

REFERENCES

1, 4, 5, 14, 15, 95.
BUSERELIN

INDICATIONS
- Palliative treatment of hormone-dependent advanced prostate cancer.

ADMINISTRATION

Regular-release formulation:
- SC: rotate injection site.

Depot formulation:
- SC: in lateral abdominal wall. Implant rods should be kept horizontal before the injection. A local anesthetic may be used before the injection.

POTENTIAL ADMINISTRATION HAZARDS
- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: allergic asthma, dyspnea, anaphylactic/anaphylactoid shock.
- GI: nausea, flatulence, abdominal pain.
- Transient disease exacerbation: bone pain, urinary retention, urethral obstruction, thrombosis, lymphedema.
- Hot flushes.
- Local reactions: transient; pain, irritation, swelling, urticaria.

DOSAGE

Regular-release formulation:
- Induction: 500 mcg (0.5 mL) SC q8h for 7 days.
- Maintenance: 200 mcg (0.2 mL) SC daily.

Depot formulation:
- Inject SC the contents of one applicator, either 6.3 mg of buserelin every 2 months or 9.45 mg of buserelin every 3 months.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp; protect from light and freezing.
- Regular-release formulation: stable for 14 days at room temp after first opening.

MISCELLANEOUS
- Note that the depot formulation is available in two strengths: 6.3 mg (2-month formulation) and 9.45 mg (3-month formulation).
- Initial antiandrogen comedication (e.g., flutamide, bicalutamide, nilutamide, cyproterone) can be started about 7 days prior to the first buserelin injection and continued for 4 weeks following the injection to prevent the initial surge in testosterone levels.

REFERENCES
2, 129, 165.
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**INDICATIONS**
- Conditioning regimen (in combination with other antineoplastics and/or radiotherapy) prior to bone marrow transplantation for various malignancies.

**ADMINISTRATION**
- Ensure premedication with phenytoin or a benzodiazepine to prevent seizures has been administered; refer to Dosage section.
- Intermittent IV infusion: dilute with a volume of NS or D5W that is 10 times the volume of busulfan to give a final concentration of approximately 0.5 mg/mL. Administer over 2 hours through a central line via an infusion pump for the 0.8 mg/kg/dose and over 3-4 hours for the 3.2 mg/kg/dose.
- Flush the central venous catheter with 5 mL of NS or D5W before and after the infusion.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid, serum sickness, rash.
- Cardiovascular: tachycardia, hypertension, thromboembolism.
- GI: nausea, vomiting, diarrhea, constipation, stomatitis, anorexia, abdominal pain.
- CNS: dizziness, seizures.
- Dysuria, hematuria, oliguria.
- Respiratory: dyspnea, rhinitis, cough.
- Hyperglycemia, hypokalemia, hypomagnesemia, hypophosphatemia, tumour lysis syndrome.
- Chills, edema, fatigue, fever, pain.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- Premedicate all patients with phenytoin to prevent seizures; give a loading dose of phenytoin 24 hours prior to the first dose of busulfan and follow with maintenance doses until 48 hours after the last dose of busulfan. Prophylactic benzodiazepines can also be used instead of phenytoin.
  - 0.8 mg/kg by IV infusion q6h for 4 consecutive days, for a total of 16 doses.
  - 3.2 mg/kg by IV infusion once daily for 4 days.
- The dose should be based either on the ideal body weight or actual body weight, whichever is lower. In obese patients, the dose should be based on an adjusted body weight (in kg) as follows:
  
  \[ \text{Adjusted body weight} = \text{ideal body weight} + 0.25 \times (\text{actual body weight} - \text{ideal body weight}) \]
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules in the fridge (2-8°C).
- Stable for 8 hours (including infusion time) at room temp when diluted in D5W or NS at a concentration of 0.5 mg/mL.
- Stable for 12 hours (including infusion time) in the fridge when diluted in NS at a concentration of 0.5 mg/mL.

**MISCELLANEOUS**
- Use caution when administering busulfan to patients with a history of a seizure disorder, head trauma, or receiving medications that may lower the seizure threshold.

**REFERENCES**
2, 4, 40, 129, 165.
INDICATIONS
- Treatment of acute abdominal, facial, or laryngeal attacks of hereditary angioedema (HAE) of moderate to severe intensity (Berinert ®) in adults and children.
- Routine prevention of angioedema attacks in adults and adolescents with HAE (Cinryze ®).

ADMINISTRATION
- Ensure that Berinert ®/Cinryze ® vials and their diluents have reached room temp.
- **Berinert ®**: reconstitute the 500 and 1500 international units vials with 10 mL and 3 mL respectively of SWFI (diluent provided) using the transfer set provided (or any double-ended needle with a vented filter spike) to obtain a final concentration of 50 international units/mL or 500 international units/mL respectively. Gently swirl until completely dissolved; do NOT shake. The reconstituted solution should be colourless and clear (the solution from the 1500 units vial may be clear to opalescent). Transfer dose into the provided syringe. Refer to manufacturer’s instructions for a more detailed procedure.
- **Cinryze ®**: reconstitute each 500 international units vial with 5 mL of SWFI (diluent provided), using a filter transfer device (or any double-ended needle) to obtain a final concentration of 100 international units/mL. Gently swirl until completely dissolved; do NOT shake. The reconstituted solution should be colorless to slightly blue and clear. Transfer dose into a silicone-free syringe. Refer to manufacturer’s instructions for a more detailed procedure.
- **IV direct**: physician or RN. Administer in a separate line. administer Berinert ® 1500 slowly, Berinert ® 500 at a rate of 4 mL/min and Cinryze ® over 10 minutes at a rate of 1 mL/min.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, chest tightness, wheezing, hypotension, anaphylaxis; hypersensitivity symptoms may mimic HAE attacks.
- Cardiovascular: thrombotic events (arterial thrombosis, myocardial infarction, stroke, deep vein thrombosis, pulmonary embolism).
- GI: dysgeusia (Berinert ®), abdominal pain, nausea, vomiting, diarrhea.
- CNS: headache.
- Muscle spasms (Berinert ®).
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.
- Local reactions: pain, erythema, rash, inflammation, hematoma at injection site.

DOSAGE
- Berinert ®: 20 international units/kg IV once for an attack.
- Cinryze ®: 1000 international units IV every 3-4 days; frequency may vary depending on patients.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials (Berinert ® and Cinryze ®) between 2-25°C. Protect from light. Do not freeze.
- Berinert ®: reconstituted solution is stable for 8 hours at room temp; however, the Canadian manufacturer recommends infusing immediately after its reconstitution. Do not refrigerate or freeze reconstituted solution.
- Cinryze ®: reconstituted solution is stable for 24 hours at room temp; however, the Canadian manufacturer recommends infusing within 3 hours of its reconstitution.

MISCELLANEOUS
- Epinephrine, antihistamines and corticosteroids should be available for the treatment of hypersensitivity reactions.

REFERENCES
5, 40, 135.
INDICATIONS

- Treatment of patients with castration resistant (hormone refractory) metastatic prostate cancer previously treated with a docetaxel containing regimen; to use in combination with prednisone or prednisolone.

ADMINISTRATION

- Ensure premedication has been administered; refer to Dosage section.
- Intermittent IV infusion: two-step dilution process. **Step 1:** withdraw the entire content of the diluent (5.67 mL) and transfer into the 60 mg/1.5 mL of the cabazitaxel concentrate; inject slowly and direct the needle towards the inside wall of the vial to minimize foaming. Mix gently by repeated inversions for at least 45 seconds to obtain a clear solution; do NOT shake. Let it stand for about 5 minutes to allow some foam to dissipate. The resulting concentrate-diluent solution contains 10 mg/mL of cabazitaxel, with at least 6 mL of deliverable volume. Proceed immediately to step 2. **Step 2:** withdraw the required amount of the 10 mg/mL solution and dilute in a non-PVC container of D5W or NS to get a final concentration between 0.1-0.26 mg/mL. Mix the content by gently inverting the bag. Infuse over 60 minutes.
- Do NOT use PVC bags for dilution and polyurethane infusion sets for administration; PVC or polyethylene infusion sets can be used for infusing the solution.
- Administer with a 0.22 micron in-line filter.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: bronchospasm, hypotension, rash, erythema; may occur within a few minutes of cabazitaxel infusion, especially during first and second infusions. A premedication is recommended before each treatment (refer to Dosage section). Discontinue treatment if severe.
- Cardiovascular: hypotension, arrhythmias.
- GI: nausea, vomiting, diarrhea (may be severe and lead to dehydration, electrolyte imbalance and renal failure if left untreated).
- Asthenia, fatigue.
- Hematologic: anemia, leukopenia, neutropenia (including febrile neutropenia), thrombocytopenia.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- Premedicate at least 30 minutes before each infusion with an antihistamine (e.g., diphenhydramine 25 mg IV or equivalent), a corticosteroid (dexamethasone 8 mg IV or equivalent) and a H-2 receptor antagonist (ranitidine 50 mg IV or equivalent).
- 25 mg/m² IV on day 1 every 3 weeks with prednisone (or prednisolone) 10 mg daily on days 1-21. Adjust subsequent doses or discontinue treatment depending on toxicity; refer to manufacturer’s monograph for more details.
- Dosage in renal impairment: use with caution if CrCl is 50 mL/min or less as information is limited.
- Dosage in hepatic impairment: no formal studies were conducted. Do not use if bilirubin is at the upper limit of normal (ULN) or above or if AST/ALT are at 1.5 x ULN or greater.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Do not refrigerate.
- The concentrate-diluent solution (10 mg/mL) is stable for 60 minutes at room temp.
- The final diluted solution (0.10-0.26 mg/mL) is stable for 8 hours at room temp and for 48 hours in the fridge.

MISCELLANEOUS

- Appropriate equipment to treat hypotension and bronchospasm should be readily available.
- Avoid vaccination with a live or live-attenuated vaccine while on cabazitaxel.

REFERENCES

1, 5, 19, 165, 299.
### INDICATIONS
- Apnea of prematurity (caffeine citrate).
- Prophylaxis or symptomatic relief of headache following spinal puncture (post-lumbar puncture headache) (caffeine sodium benzoate).

### ADMINISTRATION
- Intermittent IV infusion: For apnea of prematurity: may administer undiluted or diluted with D5W; infuse loading dose over 30 minutes and maintenance dose over 10 minutes. For post-lumbar puncture headache: dilute 250 mg of caffeine base in 1000 mL and infuse over 60 to 90 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: tachycardia, palpitations.
- GI: GI distention, feeding intolerance, nausea, vomiting, gastritis.
- CNS: irritability, restlessness, jitteriness, insomnia.
- Diuresis.
- Hyperglycemia and hypoglycemia.

### DOSAGE
For apnea of prematurity:
- Loading dose: 10 mg/kg/dose (caffeine base) IV.
- Maintenance dose: 2.5-5 mg/kg/dose (caffeine base) IV once daily. If greater than one month of age, infant may require BID dosing.

For post-lumbar puncture headache:
- 250 mg (caffeine base) IV. Dose may be repeated after 1 to 4 hours if needed.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Extemporaneous preparation of caffeine 10 mg/mL (as citrate) in sterile water is stable for 342 days at 4°C or 22°C protected from light when stored in glass vials.
- Solution of caffeine citrate 10 mg/mL is stable for 180 days at room temp under fluorescent light in plastic syringes.
- Stable for 24 hours at room temp diluted in D5W, D5-1/4NS.

### MISCELLANEOUS
- IV solution has been used PO to treat apnea of prematurity.
- Therapeutic drug levels for apnea of prematurity: 40-100 micromol/L (trough level, taken 1 to 4 hours before next dose).
- Caffeine base 10 mg = caffeine citrate 20 mg = caffeine sodium benzoate 20 mg.

### REFERENCES
1, 4, 6, 18, 40, 82, 262, 319.

* Available via Health Canada’s Special Access Programme
CALCITONIN SALMON

INDICATIONS
- Treatment of symptomatic Paget’s disease of the bone.
- Treatment of hypercalcemia emergencies when a rapid decrease in serum calcium is required.
- Analgesic adjunct in osteoporotic vertebral crush fractures or intractable cancer pain from bone metastases.
- Treatment of osteoporosis.
- Treatment of phantom limb pain.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in 50 mL NS and infuse over 20-60 minutes. (At TOH, dilute dose in 250 mL NS and infuse over 6 hours).
- SC, IM.
- Consider performing a skin test prior to initiating therapy in patients with suspected sensitivity to calcitonin salmon. Consult manufacturer’s package insert for more information.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: bronchospasm, swelling of the tongue or throat, rash, urticaria.
- GI: nausea, vomiting, anorexia, metallic or salty taste.
- CNS: sedation, dizziness, headache, vertigo.
- Hypocalcemic tetany.
- Transient flushing of the face, ears, hands and feet; typically begins within minutes after injection and lasts up to 2 hours; may be minimized by administration at bedtime.
- Increased frequency of urination.
- Local reactions: swelling, pain, erythema, pruritus.

DOSAGE
- Paget’s disease: Initial: 100 international units SC/IM daily. Maintenance: 50-100 international units SC/IM 3 times weekly or daily.
- Hypercalcemia: 4 international units/kg SC/IM q12h, may be increased to 8 international units/kg q12h after 1 or 2 days. If response unsatisfactory after 2 more days, may increase further to 8 international units/kg q6h.
- Analgesic adjunct in osteoporosis vertebral fractures: 50-100 international units SC/IM daily.
- Bone metastases: 100-200 international units SC/IM daily.
- Osteoporosis: 100 international units SC/IM every other day.
- Phantom limb pain: 200 international units IV daily for a few days.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge but stable for 2 weeks at room temp.

MISCELLANEOUS

REFERENCES
1, 2, 5, 95, 300, 304, 362.
INDICATIONS
- Management of hypocalcemia and osteodystrophy in patients with chronic renal failure undergoing dialysis.
- Management of hypocalcemic tetany in premature infants.

ADMINISTRATION
- IV direct: physician or RN. Administer IV as bolus undiluted or diluted to a concentration of 0.5 mcg/mL with SWFI, NS or D5W; for patients in end-stage renal disease, administer through the catheter at the end of hemodialysis.

POTENTIAL ADMINISTRATION HAZARDS
- Hypercalcemia.
- Vitamin D intoxication.
- Local reactions: pain and redness at injection site.

DOSAGE
Adults: Initial - 0.5 mcg (0.01 mcg/kg) IV three times weekly (every other day).
- May be increased by 0.25-0.5 mcg every 2-4 weeks.
- Usually 0.5-3 mcg three times weekly.
Pediatrics: 0.01-0.05 mcg/kg IV three times weekly.
Infants: hypocalcemic tetany in premature infants: 0.05 mcg/kg IV daily for 5-12 days.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable at room temp. Protect from light.
- Binds to PVC containing equipment.
- Compatible with D5W and NS.
- Stable for 8 hours at room temp, exposed to normal room light either undiluted or diluted in SWFI, D5W or NS at a concentration of 0.5 mcg/mL in plastic syringes.

MISCELLANEOUS

REFERENCES
1, 2, 4, 5, 40, 82.
CALCIUM CHLORIDE

Electrolyte

Do NOT confuse calcium chloride with other calcium salts. This monograph is specific to calcium CHLORIDE.

INDICATIONS
- For severe cardiotoxicity or cardiac arrest due to hyperkalemia or hypermagnesemia.
- For shock associated with beta-blocker or calcium channel blocker overdose.
- Treatment of hypocalcemia.
- Adjunctive therapy to reduce spasms in renal, biliary, intestinal or lead colic.
- Relief of muscle cramps in treatment of insect bites or stings.

ADMINISTRATION
- IV direct: physician or RN. Cardiac monitoring. For severe cardiotoxicity or cardio-respiratory arrest due to hyperkalemia or hypermagnesemia; for treatment of severe hyperkalemia; for treatment of life-threatening hypocalcemia (at TOH). Administer dose over 2-5 minutes.
- Intermittent IV infusion: dilute each 1 g (10 mL of a 10% solution) in a minimum of 100 mL of NS or D5W. Infuse each gram over 1.5 to 3 hours. Note that the gluconate salt is usually preferred for administration in a bag.
- Should be administered slowly through a small needle into a large vein to avoid too rapid increase in serum calcium and extravasation of calcium solution into the surrounding tissue with resultant necrosis.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: rapid IV administration may cause bradycardia, vasodilation, hypotension, cardiac arrhythmias, syncope and cardiac arrest.
- Hypercalcemia.
- Tingling sensations, a metallic or chalky taste, a sense of oppression or "heat waves".
- Local reactions: vein irritation.

DOSAGE
- For severe cardiotoxicity or cardio-respiratory arrest due to hyperkalemia or hypermagnesemia, for treatment of severe hyperkalemia and for treatment of life-threatening hypocalcemia (at TOH): 500-1000 mg (5-10 mL of a 10% solution) IV over 2-5 minutes.
- For shock associated with beta-blocker or calcium-channel blocker overdose: 20 mg/kg (0.2 mL/kg of a 10% solution) IV over 5-10 minutes followed by an infusion of 20 mg/kg/hr if needed.
- Hypocalcemia: 500-1000 mg (5-10 mL of a 10% solution) IV; repeat as required according to patient’s response and serum calcium levels.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable at room temp.
- Compatible with NS and dextrose solutions.

MISCELLANEOUS
- Caution in digitalized patients; slow IV administration and close monitoring are recommended.
- Elemental calcium content is 27% (compared to 9% for the gluconate salt).
- Elemental calcium is 270 mg (13.5 mEq or 6.75 mmol) per g of calcium chloride.
- Calcium chloride 10% solution contains 1.36 mEq (0.68 mmol) calcium or 27.2 mg calcium per mL.

REFERENCES
1, 2, 3, 4, 27, 40, 95, 135, 263, 328, 366, 367.
Do NOT confuse calcium disodium edetate with calcium salts.  
This monograph is specific to calcium DISODIUM EDETATE.

INDICATIONS
- Adjunct in treatment of acute lead poisoning and lead encephalopathy.
- May be effective in treatment of poisoning by radioactive and nuclear fission products such as plutonium, thorium, uranium and yttrium.
- May be effective in treatment of other heavy metals such as chromium, manganese, nickel, zinc, and possibly vanadium.

ADMINISTRATION
- Intermittent IV infusion, Continuous IV infusion: dilute with NS or D5W to a concentration of 2-4 mg/mL. (e.g., 1 g dissolved in 250-500 mL). Administer over 8-12 hours or up to 24 hours. Shorter infusions (1-2 hours) have also been used when drug has been given in divided daily doses by intermittent IV infusions.
- Patients with lead encephalopathy and cerebral edema may experience a lethal increase in intracranial pressure following IV rapid infusion; the drug must then be infused slowly or given by IM route preferably.
- IM: add a local anesthetic (1 mL of 1% lidocaine to each mL of calcium EDTA) before injection. Total daily dose may be given in equally divided doses at 8-12 hour intervals.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypotension, cardiac rhythm irregularities.
- GI: nausea, vomiting, anorexia.
- CNS: tremors, headache, numbness, tingling.
- Histamine-like reactions including sneezing, nasal congestion and lacrimation may occur 4-8 hours after IV infusion; rash.
- Renal tubular necrosis with excessive daily dose.
- Local reactions: IV: thrombophlebitis if the concentration exceeds 5 mg/mL; IM: pain.

DOSAGE
Adults:
- 1000-1500 mg/m²/24 hours IV/IM or 2-4 g/24 hours IV/IM for 3 to 5 days.
- After 5 days, therapy is interrupted for 2-4 days followed by an additional 5 day course of therapy, if indicated.
- Dosage in renal impairment: use with extreme caution.
  
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<th>Cr (mcmol/L)</th>
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<td>177-265</td>
<td>500 mg/m² q24h X 5 days</td>
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<tr>
<td>265-354</td>
<td>500 mg/m² q48h X 3 doses</td>
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<td>greater than 354</td>
<td>500 mg/m² once weekly</td>
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Pediatrics: consult specialized texts.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Compatible with NS or D5W.
- Not compatible with Ringer's injection or RL.

MISCELLANEOUS
- May be given with dimercaprol for the treatment of severe lead poisoning.
- Urine flow must be established before drug is administered.
- If given as continuous IV infusion, stop the infusion for 60 minutes before blood is drawn for lead concentration to avoid a falsely elevated value.

REFERENCES
1, 4, 40, 95, 494.  
* Available via Health Canada’s Special Access Programme
Do NOT confuse calcium gluconate with other calcium salts. This monograph is specific to calcium GLUCONATE.

INDICATIONS
- For severe cardiotoxicity or cardiac arrest due to hyperkalemia or hypermagnesemia.
- For shock associated with beta-blocker or calcium channel blocker overdose.
- Treatment of hypocalcemia.
- Adjunctive therapy to reduce spasms in renal, biliary, intestinal or lead colic.
- Relief of muscle cramps in treatment of insect bites or stings.

ADMINISTRATION
- IV direct: physician or RN. **Cardiac monitoring.** For severe cardiotoxicity or cardio-respiratory arrest due to hyperkalemia or hypermagnesemia; for treatment of severe hyperkalemia; for treatment of life-threatening hypocalcemia (at TOH). Administer dose over 2-5 minutes.
- Intermittent IV infusion: dilute each 1 g (10 mL of a 10% solution) in a minimum of 50 mL of NS or D5W and infuse each gram over 30-60 minutes or add 30-40 mL of a 10% solution to 500-1000 mL and infuse over 3-12 hours.
- Should be administered slowly through a small needle into a large vein to avoid too rapid increase in serum calcium and extravasation of calcium solution into the surrounding tissue with resultant necrosis.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cardiovascular: rapid IV administration may cause bradycardia, vasodilation, hypotension, cardiac arrhythmias, syncope and cardiac arrest.
- Hypercalcemia.
- Tingling sensations, a metallic or chalky taste, a sense of oppression or “heat waves”.
- Local reactions: vein irritation.

DOSAGE
- For severe cardiotoxicity or cardio-respiratory arrest due to hyperkalemia or hypermagnesemia, for treatment of severe hyperkalemia and for treatment of life-threatening hypocalcemia (at TOH): 1500-3000 mg (15-30 mL of a 10% solution) IV over 2-5 minutes.
- For shock associated with beta-blocker or calcium channel blocker overdose: 60 mg/kg (0.6 mL/kg of a 10% solution) IV, followed by an infusion of 60 mg/kg/hr if needed.
- Hypocalcemia: 1000-3000 mg (10-30 mL of a 10% solution) IV; repeat as required according to patient’s response and serum calcium levels. May follow with an IV infusion.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable at room temp.
- Compatible with NS, dextrose, RL and sodium lactate 1/6 M.

MISCELLANEOUS
- Caution in digitalized patients; slow IV administration and close monitoring are recommended.
- Elemental calcium content is 9% (compared to 27% for the chloride salt).
- Elemental calcium is 90 mg (4.5 mEq or 2.25 mmol) per g of calcium gluconate.
- Calcium gluconate 10% solution contains 0.465 mEq (0.232 mmol) calcium or 9.3 mg calcium per mL.

REFERENCES
1, 2, 4, 27, 40, 95, 135, 263, 328, 366, 367.
## Indications
- Prevention of uterine atony and postpartum hemorrhage following elective or emergency cesarean section under epidural or spinal anesthesia.
- Prevention of uterine atony and postpartum hemorrhage following vaginal birth.

## Administration
- IV direct: physician or RN. Administer undiluted (at TOH: dilute dose with 10 mL of NS immediately prior to administration) as a bolus over 1 minute, only after the birth of infant. Can be administered either before or after the delivery of the placenta. There is a theoretical possibility for partial retention or trapping of the placenta if administered before delivery of the placenta.
- IM.

## Potential Administration Hazards
- Cardiovascular: hypotension, chest pain, tachycardia.
- GI: nausea, vomiting, abdominal pain, metallic taste.
- CNS: headache, dizziness, anxiety.
- Pruritus, flushing, feeling of warmth, sweating, chills.
- Back pain, tremor.
- Anemia.

## Dosage
- 100 mcg (1 mL) IV.
- 100 mcg (1 mL) IM following vaginal birth.

## Compatibility, Stability
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store ampoules in the fridge.
- Stable for 5 days if stored at 30°C.
- No compatibility data with IV solutions is available; however, experience at TOH of carbetocin injection through a Y-site connection with D5W, NS or RL has not lead to any visual compatibility problem.

## Miscellaneous
- Carbetocin should not be administered prior to delivery of the infant for any reason, including elective or medical induction of labour.
- Onset of uterine activity: 2 minutes; duration of uterine activity: 60 minutes for IV administration and 2 hours for IM administration.

## References
2, 17, 448, 459.
CARBOplatin

Indications
- Advanced ovarian carcinoma.
- Currently being used in a number of other neoplasms.

Administration
- Intermittent IV infusion, Continuous IV infusion: may further dilute in 100-250 mL of D5W or NS (final concentration range 0.3-10 mg/mL); infuse over 15-60 minutes. Has also been administered as a continuous IV infusion over 24 hours.
- Do NOT use needles, IV sets or equipment containing aluminum for preparation or administration; a black platinum precipitate will form if carboplatin comes in contact with aluminum and potency will decrease.

Potential Administration Hazards
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, pruritus, fever, swelling, anaphylaxis.
- GI: nausea, vomiting.
- Nephrotoxicity and neurotoxicity: less severe and less common than with cisplatin.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

Dosage
- 200-400 mg/m² IV as a single dose every 4 weeks.
- May also be dosed based on Calvert formula: Dose (mg) = AUC* in mg/mL/min X (GFR* in mL/min + 25), where AUC = 4-7, GFR may be approximated by using CrCl. Do not use Calvert formula if CrCl less than 20 mL/min; cap GFR at 125 mL/min.
- Dosage in renal impairment: use following recommendations if using BSA*-based dosing instead of Calvert formula:
  Method 1:
  - CrCl (mL/min) greater than 50 50-10 less than 10
  - Dose 100% 50% 25%
  Method 2:
  - CrCl (mL/min) 59-41 40-16 15 or less
  - Dose (mg/m²) 250 200 insufficient data
- Reduce dose by 25% in patients with prior myelosuppression.
- When used in combination with other antineoplastic agents, the carboplatin dose may require adjustment according to the treatment protocol.
- Consult specific protocol.

* AUC: area under the curve; GFR: glomerular filtration rate; BSA: body surface area

Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 21 days at room temp or in the fridge in D5W at a concentration of 0.5-4 mg/mL when stored in PVC bags.
- Stable for 28 days at room temp or in fridge, protected from light, in D5W at a concentration of 1 mg/mL when stored in PVC bags.
- Stable for 24 hours at room temp in NS at a concentration of 1 mg/mL when stored in glass containers.
- Stable for 5 days in the fridge or 24 hours at 37°C at a concentration of 10 mg/mL when stored in plastic syringes.

Miscellaneous

References
1, 2, 4, 129, 143, 165, 216.
INDICATIONS
- Treatment of postpartum hemorrhage due to uterine atony which has not responded to conventional therapy (IV oxytocin, uterine massage, IM ergot preparations).

ADMINISTRATION
- Deep IM.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular effects: hypertension, flushing.
- GI: nausea, vomiting, diarrhea.
- Fever, chills.

DOSAGE
- 250 mcg (1 mL) IM.
- Dosage may be repeated at 15-90 minute intervals until therapeutic response or to a maximum cumulative dose of 2 mg (8 doses).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge.

MISCELLANEOUS
- Usual doses of loperamide can be given to counteract the diarrhea associated with carboprost.
- Acetaminophen has been used to treat fever and chills.
- Use of carboprost is contraindicated in patients with known active cardiac, pulmonary, renal, hepatic disease or acute pelvic inflammatory disease.

REFERENCES
1, 2, 5, 95.
CARFILZOMIB
Kyprolis ®
Antineoplastic

INDICATIONS

- Treatment of multiple myeloma that has relapsed after 1 to 3 prior lines of therapy; to be used in combination with lenalidomide and dexamethasone or with dexamethasone alone.

ADMINISTRATION

- Ensure premedication and hydration have been administered prior to each infusion. Refer to Dosage section.

  - Reconstitute each 10 mg vial, 30 mg vial and 60 mg vial with 5 mL, 15 mL and 29 mL, respectively, of SWFI by using a 21-gauge or larger gauge hypodermic needle (0.8 mm or smaller external diameter needle) and injecting slowly toward the side of the vial to minimize foaming. Gently swirl or invert vial slowly for approximately 1 minute for complete dissolution. Do NOT shake. If foaming occurs, allow the solution to settle in the vial for approximately 5 minutes until solution is clear and foaming subsides. The concentration of the reconstituted solution is 2 mg/mL.

  - Intermittent IV infusion (mandatory): may administer undiluted or diluted; for dilution, withdraw the calculated dose from the reconstituted vial(s) using a 21-gauge or larger gauge hypodermic needle (0.8 mm or smaller external diameter needle) and dilute in 50 or 100 mL of D5W (do NOT dilute in NS). Infuse over 10 minutes when administered in combination with lenalidomide and dexamethasone (i.e., 20/27 mg/m² regimen) or over 30 minutes when administered with dexamethasone alone (i.e., 20/56 mg/m² regimen). Flush line with NS or D5W before and after administration.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).

- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

- Hypersensitivity: rare; rash.

- Infusion-related reactions: can occur immediately or up to 24 hours after administration. Consist of fever, chills, arthralgia, myalgia, facial flushing, facial edema, vomiting, weakness, shortness of breath, hypotension, syncope, chest tightness or angina. Hydration and premedication with dexamethasone are recommended to reduce the frequency and severity of these reactions.

- Cardiovascular: new or worsening cardiac failure, pulmonary edema, myocardial ischemia or infarction, deep vein thrombosis, pulmonary embolism, peripheral edema, hypotension, hypertension (including hypertensive emergency and crisis), pulmonary arterial hypertension (rare).

- GI: nausea, vomiting, diarrhea, constipation, abdominal pain, anorexia.

- CNS: headache, dizziness, insomnia, posterior reversible encephalopathy syndrome (rare).

- Dermatologic: erythema, hyperhidrosis.

- Endocrine and metabolic: hypokalemia, hyperkalemia, hypocalcemia, hypophosphatemia, hypomagnesemia, hyperglycemia.

- Hematologic: bleeding, anemia, neutropenia, lymphopenia, thrombocytopenia, thrombotic microangiopathy.

- Hepatic: increased LFTs.

- Renal: increased serum creatinine, acute renal failure.

- Respiratory: cough, respiratory tract infections, dyspnea, acute respiratory distress syndrome, infiltrative pulmonary disease.

- Tumour lysis syndrome.

- Fever, fatigue, myalgia, muscle spasm, arthralgia.

- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

.../Cont.
DOSAGE
- Premedicate with dexamethasone PO or IV at least 30 minutes but no more than 4 hours before carfilzomib administration. Adequate hydration is required for cycle 1: 30 mL/kg/day PO for 48 hours before starting therapy and 250-500 mL of IV fluids before each dose (recommended) and after each dose (prn); for subsequent cycles, hydrate as required.
- Carfilzomib in combination with lenalidomide and dexamethasone (28-day cycles):
  ● Cycle 1: 20 mg/m² IV on days 1 and 2. If tolerated, increase to 27 mg/m² IV on days 8, 9, 15 and 16.
  ● Cycles 2-12: 27 mg/m² IV on days 1, 2, 8, 9, 15 and 16.
  ● Cycles 13 and beyond: 27 mg/m² IV on days 1, 2, 15 and 16.
  ● Lenalidomide: 25 mg PO on days 1 to 21; dexamethasone: 40 mg PO/IV on days 1, 8, 15 and 22.
- Carfilzomib in combination with dexamethasone alone (28-day cycles):
  ● Cycle 1: 20 mg/m² IV on days 1 and 2. If tolerated, increase to 56 mg/m² IV on days 8, 9, 15 and 16.
  ● Cycles 2 and beyond: 56 mg/m² IV on days 1, 2, 8, 9, 15 and 16.
  ● Dexamethasone: 20 mg PO/IV on days 1, 2, 8, 9, 15, 16, 22 and 23.
- Dosing in patients with a body surface area (BSA) greater than 2.2 m²: calculate the carfilzomib dose using 2.2 m² as the BSA.
- No dosage adjustment is required for weight changes of 20% or less.
- Refer to manufacturer’s instructions to modify dosages depending on toxicity.
- Dosage in renal impairment: no dosage adjustment is necessary for carfilzomib.
- Dosage in hepatic impairment: decrease carfilzomib dose by 25% if mild to moderate impairment; no data in severe hepatic impairment.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light.
- The reconstituted solution, in SWFI in the vial or in a syringe, and the diluted solution, in D5W in the bag, are stable for 4 hours at room temp or for 24 hours in the fridge. The total time from reconstitution to administration should not exceed 24 hours.

MISCELLANEOUS
- Thromboprophylaxis is recommended in patients treated with carfilzomib in combination with dexamethasone alone or with lenalidomide and dexamethasone; choice of antithrombotic agent should be based on patient’s underlying risks and clinical status.
- Each mL of the reconstituted solution of carfilzomib contains 0.3 mmol (7 mg) of sodium; to take into account in patients on a restricted sodium diet.
- Consider starting an antiviral prophylaxis to decrease risk of herpes zoster virus reactivation.

REFERENCES
5, 129, 135, 165.
**INDICATIONS**

- Primary brain tumours, malignant lymphomas, malignant melanoma, multiple myeloma, gastrointestinal carcinoma.

**ADMINISTRATION**

- Reconstitute 100 mg vial with 3 mL of the supplied sterile diluent (absolute ethanol); allow diluent to reach room temp before use. Add 27 mL of SWFI for final concentration of 3.3 mg/mL in 10% ethanol.
- Intermittent IV infusion: dilute in 250 to 500 mL of NS or D5W; infuse over 1-2 hours.
- Glass bottles, polypropylene containers and a polyethylene tubing are recommended for administration.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity (rare).
- Cardiovascular: facial flushing with rapid infusion (may last 4 hours), hypotension, tachycardia, chest pain, myocardial ischemia (with high doses).
- GI: nausea, vomiting.
- Local reactions: burning, pain, chemical phlebitis at injection site.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**

- Usual adult dose: 150-200 mg/m² IV every 6 weeks as a single dose or divided into daily injections on 2 consecutive days.
- Repeat in 6 weeks if blood counts are acceptable; refer to manufacturer’s monograph for dosage adjustment according to the hematologic response of the patient to the preceding dose.
- Bone marrow transplant: higher doses used alone or in combination, e.g., 300-500 mg/m² IV (fatal without bone marrow/stem cell transplant).
- Discontinue if CrCl less than 10 mL/min.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Unopened vials of the dry powder should be kept in the fridge. Stable up to 7 days at room temp, but slow decomposition occurs (about 3% in 36 days). Temperatures of 30-32°C will cause deterioration; the powder will liquefy and appears as an oily film; vial should be discarded.
- Following reconstitution, solutions are stable for 24 hours in the fridge or 8 hours at room temp, protected from light.
- Dilutions in 500 mL NS or D5W protected from light in glass containers or polypropylene bags should be used within 8 hours. These solutions are also stable for 24 hours in the fridge followed by an additional 6 hours at room temp protected from light.

**MISCELLANEOUS**

**REFERENCES**

1, 2, 4, 40, 129, 165, 225.

Full revision 2012; limited revision 2014, 2015, 2016, 2017, 2018
INDICATIONS
- Empiric therapy for presumed fungal infections in febrile neutropenic patients.
- Treatment of invasive aspergillosis in patients who are refractory or intolerant to other therapies.
- Treatment of invasive candidiasis.
- Treatment of esophageal candidiasis.

ADMINISTRATION
- Reconstitute each 50 or 70 mg vial with 10.5 mL of either NS or SWFI. Note: allow vials to reach room temp before reconstitution.
- Intermittent IV infusion: dilute in 250 mL of NS, 1/2NS, 1/4NS or RL; administer over 60 minutes. For fluid-restricted patients or in some pediatric patients: dilute in 100 mL or in a reduced volume of NS, 1/2NS, 1/4NS or RL, not to exceed a final concentration of 0.5 mg/mL; administer over 60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, facial swelling, pruritus, sensation of warmth, bronchospasm, anaphylaxis.
- GI: nausea, vomiting, diarrhea.
- Fever, chills, flushing, headache.
- Local reactions: swelling and phlebitis at injection site.

DOSAGE
Adults:
- Empiric therapy in febrile neutropenic patients and invasive aspergillosis: 70 mg IV loading dose on day 1, followed by 50 mg IV daily thereafter. An increase to 70 mg daily may be considered in patients not responding and well tolerating the drug.
- Invasive candidiasis: 70 mg IV loading dose on day 1, followed by 50 mg IV daily thereafter.
- Esophageal candidiasis: 50 mg IV daily.
- Dosage in renal impairment: no dosage adjustment required.
- Dosage in hepatic impairment: no dosage adjustment required in patients with mild hepatic impairment (Child-Pugh score 5 to 6). For patients with moderate hepatic impairment (Child-Pugh score 7 to 9), maintain loading dose of 70 mg IV where recommended and decrease daily dose to 35 mg IV daily. There is no data in patients with severe hepatic impairment (Child-Pugh score > 9).
- If patient receives concomitant inducers of drug clearance (e.g., efavirenz, nevirapine, rifampin, dexamethasone, phenytoin, carbamazepine), a 70 mg daily dose may be considered.

Pediatrics (3 months to 17 years of age):
- For all indications: 70 mg/m² IV loading dose (maximum 70 mg) on day 1, followed by 50 mg/m² IV (maximum 70 mg) daily thereafter. If the 50 mg/m² is well tolerated but does not provide the expected benefit, the dose can be increased to 70 mg/m² (maximum 70 mg) daily.
- If patient receives concomitant inducers of drug clearance (e.g., efavirenz, nevirapine, rifampin, dexamethasone, phenytoin, carbamazepine) a 70 mg/m² (maximum 70 mg) daily dose may be considered.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Unopened vials should be stored between 2-8°C.
- Reconstituted solution is stable for up to 60 minutes between 15-25°C.
- Incompatible with dextrose.
- Compatible with NS, RL.
- Diluted solution is stable for up to 24 hours between 15-25°C or 48 hours between 2-8°C.

MISCELLANEOUS

REFERENCES
1, 2, 40, 82, 95.

Full revision 2012; limited revision 2015, 2016
INDICATIONS
- For severe infections of the respiratory tract, skin and soft tissue, biliary tract, genitourinary tract, bone and joints, septicemia and endocarditis due to susceptible organisms.
- Perioperative prophylaxis.

ADMINISTRATION
- For IV use: reconstitute 500 mg and 1 g vials with 10 mL of SWFI. Shake well until dissolved. If the reconstituted solution remains cloudy after 3 minutes, do NOT administer as it is a sign that the product precipitated.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of compatible solution and infuse over 10-60 minutes.
- Continuous IV infusion: dilute in an appropriate volume of compatible solution and administer as a continuous infusion.
- IM: reconstitute 500 mg and 1 g vials with 2 and 2.5 mL, respectively, of SWFI to provide solutions containing approximately 225 mg/mL and 330 mg/mL. Inject deep into a large muscle mass.
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults:
  - 0.5-2 g q6-8h, with a maximum dose of 12 g/day for severe, life-threatening infections.
  - For perioperative prophylaxis: 1-3 g (depending on weight) within 60 minutes before skin incision or procedure.
  - At TOH, follow this dosing guide for preoperative prophylaxis, depending on patient’s weight, as per TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis).

<table>
<thead>
<tr>
<th>Weight</th>
<th>Less than 60 kg</th>
<th>60-119 kg</th>
<th>120 kg and greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td>1 g</td>
<td>2 g</td>
<td>3 g</td>
</tr>
</tbody>
</table>
- Pediatrics: 25-100 mg/kg/day in 2-4 divided doses; maximum of 6 g/day.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50 50-10 less than 10
  - Dose 100% 100% 50%
  - Dosing Interval (hr) 8 12 24-48

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-25°C. Protect from light.
- Reconstituted solutions may range in colour from pale yellow to yellow, without a change in potency.
- Reconstituted solution is stable for 24 hours at room temp not exceeding 25°C and for 72 hours in the fridge protected from light according to manufacturer’s instructions.
- Stable for 30 days in the fridge in D5W at a concentration of 10 mg/mL when stored in PVC containers.
- Stable for 5 days at room temp and 24 days in the fridge in D5W at a concentration of 20 mg/mL when stored in PVC containers.
- Stable for 7 days at room temp and 15 days in the fridge in NS at a concentration of 20 mg/mL when stored in PVC containers.
- Stable for 13 days at room temp and 28 days in the fridge in SWFI at a concentration of 100 mg/mL and 200 mg/mL when stored in plastic syringes.
- Compatible with saline, dextrose and RL.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Positive Coombs’ test has been reported.

REFERENCES

1, 2, 4, 5, 40, 82, 135, 143, 148, 216, 305, 338.
INDICATIONS
- Treatment of lower respiratory tract infections, exacerbations of chronic bronchitis, urinary tract infections, skin and skin structure infections, meningitis and other CNS infections, complicated intra-abdominal infections and septicemia due to susceptible organisms.
- Empiric therapy in febrile neutropenia.

ADMINISTRATION
- For IV use: reconstitute the 1 g and 2 g vials with 10 mL of SWFI, D5W, or NS.
- IV direct: physician or RN. Administer 1 to 2 g over 3 to 5 minutes.
- Intermittent IV infusion: dilute with 50-100 mL NS, D5W, D10W, D5-NS, D5-RL and infuse over 30 minutes.
- IM: reconstitute 1 g vial with 2.4 mL of SWFI, NS, D5W or 0.5 to 1% lidocaine to provide a final concentration of 280 mg/mL. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults: mild to moderate infections: 0.5-1 g q12h
  severe infections: 2 g q8-12h
- Pediatrics (aged 2 months to 12 years old): 50 mg/kg q12h. For febrile neutropenia: 50 mg/kg q8h. (Maximum: 2 g/dose).
- Dosage in renal impairment:
  Method 1:
  \[
  \begin{array}{cccc}
  \text{CrCl (mL/min)} & \text{greater than 50} & \text{50-10} & \text{less than 10} \\
  \text{Dose} & 100\% & 50-100\% & 25-50\% \\
  \text{Dosing interval (hr)} & 8-12 & 24 & 24 \\
  \end{array}
  \]
  Method 2:
  \[
  \begin{array}{cccc}
  \text{CrCl (mL/min)} & \text{greater than 50} & \text{50-30} & \text{less than 11} \\
  \text{Dosage range depending on severity of infection} & 1-2 g & 1-2 g & 0.5-2 g & 0.25-1 g & \text{Hemodialysis *} \\
  \text{Dosing interval (hr)} & 8-12 & 12-24 & 24 & 24 & 24 \\
  \end{array}
  \]
  * On dialysis days, cefepime should be administered following dialysis.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- The colour of reconstituted solutions may darken without affecting potency.
- Reconstituted solutions are stable for 24 hours at room temp and 72 hours in the fridge, protected from light, according to manufacturer’s instructions.

…/Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 7 days in the fridge in NS or D5W at concentrations of 1-40 mg/mL in PVC containers.
- Stable for 14 days in the fridge and 24 hours at room temp in NS, D5W, SWFI at concentrations of 100 and 200 mg/mL in polypropylene syringes.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coombs' test has been reported.
- Considered as a 4th generation cephalosporin.

REFERENCES

1, 2, 4, 40, 82, 143, 216.
INDICATIONS
- For severe infections (lower respiratory tract infections, UTI, septicemia, skin and skin structure infections, intra-abdominal infections, gynecologic infections and CNS infections) due to susceptible organisms.
- Treatment of Lyme disease.
- Perioperative prophylaxis (not considered a drug of choice).

ADMINISTRATION
- For IV use: reconstitute each 500 mg, 1 g, or 2 g vial with 10 mL of SWFI.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion: further dilute with 50-100 mL NS or D5W and give over 20-30 minutes.
- Continuous IV infusion: dilute in 250-1000 mL NS or D5W and administer as a continuous infusion.
- IM: reconstitute the 500 mg, 1 g or 2 g vial with 2, 3 or 5 mL of SWFI, respectively; resultant solutions contain approximately 230, 300 or 330 mg/mL, respectively. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults:
  - mild uncomplicated infections: 1 g q12h
  - moderate to severe infections: 1-2 g q8h
  - very severe/life threatening infections: 2 g q4-8h
  - maximum daily dose of 12 g
  - perioperative prophylaxis: 1 g 30-90 minutes before skin incision
- Pediatrics (aged 1 month to 12 years old): 50-100 mg/kg/day in 3 divided doses. Severe infections: 150-200 mg/kg/day in 3 to 4 divided doses. Maximum dose of 12 g/day.
- Dosage in renal impairment:
  Method 1 :
  | CrCl (mL/min) | greater than 50 | 50-10 | less than 10 |
  | Dosing interval (hr) | 6-8 | 8-12 | 24 |
  Method 2 :
  if CrCl less than 20 mL/min: decrease dose by 50%.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solutions may range in colour from light yellow to amber. Discolouration of the solution may indicate a loss of potency.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Reconstituted solutions for IV or IM administration are stable for 12 hours at room temp and 24 hours in the fridge, according to Canadian manufacturers’ instructions.
- Stable for 24 hours at room temp and 7 days in the fridge when diluted in NS or D5W at a concentration of 50 mg/mL in PVC bags.
- Stable for 24 hours at room temp and 22 days in the fridge when diluted in NS or D5W at a concentration of 10 mg/mL in PVC bags.
- Compatible with dextrose, saline and RL.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coombs’ test has been reported.

REFERENCES

1, 2, 4, 5, 9, 40, 82, 143, 216.
INDICATIONS
- For severe infections (respiratory tract infections, skin and skin structure infections, bone and joint infections, genitourinary tract infections, intraabdominal infections and septicemia) due to susceptible organisms.
- Perioperative prophylaxis.

ADMINISTRATION
- For IV use: reconstitute 1 g vial with 10 mL and 2 g vial with 10 or 20 mL of SWFI, NS, or D5W.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of compatible solution and infuse over 10-60 minutes.
- Continuous IV infusion: dilute in up to 1000 mL of compatible solution and administer as a continuous infusion.
- IM: reconstitute each 1 g or 2 g vial by adding 2 mL or 4 mL, respectively, of SWFI, or 0.5% or 1% lidocaine (without epinephrine) to obtain approximately 400 mg/mL. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults: 1-2 g q4-8h, with a maximum dose of 12 g/day for severe, life-threatening infections.
  Perioperative prophylaxis: 1-2 g 30-60 minutes before skin incision and 1-2 g q6-8h for 24 hours postoperatively.
- Pediatrics (aged 3 months to 12 years old): 80-160 mg/kg/daily in 4-6 equal doses, maximum of 12 g/day.
- Dosage in renal impairment:
  CrCl (mL/min)              greater than 50  50-30  29-10  less than 10
  Dosing interval (hr)       6-8   8-12   12-24  24-48

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Dark brown solutions should not be used.
- Reconstituted solution is stable for 48 hours at room temp and 7 days in the fridge.
- Infusion stable for 24 hours at room temp or 13 days in the fridge when diluted in NS or D5W at a concentration of 20 mg/mL in PVC containers.
- Compatible with dextrose, saline and RL.

MISCELLANEOUS
- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coombs' test has been reported.

REFERENCES
1, 2, 4, 40, 82, 143, 216.
INDICATIONS
- For severe infections (lower respiratory tract infections, UTI, skin and skin structure infections, septicemia, bone and joint infections, intra-abdominal infections, gynecologic infections and CNS infections) due to susceptible organisms.
- Empiric therapy in febrile neutropenic patients.

ADMINISTRATION
- For IV use: reconstitute 1 g or 2 g vial with 10 mL of SWFI. Shake well until dissolved.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W and infuse over 15 to 30 minutes.
- Continuous IV infusion: dilute in an appropriate volume of NS or D5W and administer as a continuous infusion.
- IM: reconstitute 1 g vial with 3 mL of SWFI, or 0.5 or 1% lidocaine to obtain approximately 280 mg/mL. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults: range of 1-6 g/day in 2-3 divided doses; maximum dose: 6 g/day.
- Pediatrics (aged 1 month to 12 years old): 100-150 mg/kg/day in 3 divided doses; maximum dose: 6 g/day.
- Dosage in renal impairment:
  Method 1:
  - CrCl (mL/min) greater than 50 50-10 less than 10
  - Dosing interval (hr) 8-12 12-24 24-48
  Method 2:
  - CrCl (mL/min) 50-31 30-16 15-6 less than 6
  - Dosing moderate infections 1 g q12h 1 g q24h 500 mg q24h 500 mg q48h
  - Dosing severe infections 1.5 g q12h 1.5 g q24h 750 mg q24h 750 mg q48h

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solutions range from light yellow to amber. Colour changes do not necessarily indicate a loss of potency.
- Reconstituted solution stable for 24 hours at room temp and 7 days in the fridge.
- Stable for 24 hours at room temp or 7 days in the fridge in D5W or NS at concentrations from 1 to 40 mg/mL.
- Compatible with D5W, NS, RL.

MISCELLANEOUS
- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coombs' test has been reported.

REFERENCES
1, 2, 4, 5, 40, 82, 143, 216.
INDICATIONS

- Treatment of adults with hospital-acquired pneumonia (excluding ventilator-associated pneumonia) and community-acquired pneumonia caused by susceptible strains.

ADMINISTRATION

- Reconstitute the 500 mg vial with 10 mL of SWFI or D5W to obtain a concentration of 50 mg/mL; shake vigorously to dissolve, which may take up to 10 minutes. Allow foam to dissipate.
- Intermittent IV infusion: withdraw 5 mL of reconstituted solution for a 250 mg dose or 10 mL for a 500 mg dose and dilute in 125 mL or 250 mL, respectively, of NS, D5W or RL to obtain a final concentration of 2 mg/mL; gently invert bag 5-10 times to mix; do NOT shake. Infuse over 2 hours in patients with a CrCl of 150 mL/min or less and over 4 hours in patients with a CrCl of greater than 150 mL/min.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, anaphylaxis.
- Cardiovascular: phlebitis.
- GI: nausea, vomiting, diarrhea, colitis.
- CNS: seizures (more common in patients with pre-existing CNS/seizure disorders), headache, agitation.
- Electrolyte disturbances: hyponatremia.
- Hematologic: agranulocytosis, thrombocytopenia.
- Hepatic: increase in LFTs.
- Renal: renal failure.
- Local reactions: redness, pain, swelling, irritation at injection site.

DOSAGE

- Hospital-acquired pneumonia: 500 mg IV q8h for 7-14 days.
- Community-acquired pneumonia: 500 mg IV q8h for 4-14 days. Consider switching to oral treatment after at least 3 days of IV ceftobiprole, if clinically appropriate.
- Dosage in renal impairment:
  | CrCl (mL/min) | 80-50 | 49-30 | less than 30 | end-stage renal disease |
  | Dose (mg)   | 500   | 500   | 250    | 250 mg* |
  | Interval (hr)| 8     | 12    | 12     | 24      |

  *drug is removed by dialysis; administer after dialysis on dialysis days.
- Dosage in obesity: no dosage adjustment necessary in morbidly obese patients.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light.
- Reconstituted solution is stable for 60 minutes at room temp (25°C) or for 24 hours in the fridge.
- Diluted solution should be clear to slightly opalescent and yellowish in colour.
- Stable for 8 hours at room temp unprotected from light, 12 hours at room temp protected from light or 72 hours in the fridge protected from light in D5W at a concentration of 2 mg/mL in PVC, polyethylene, and glass containers.
- Stable for 8 hours at room temp unprotected from light, 24 hours at room temp protected from light, or 72 hours in the fridge protected from light in NS at a concentration of 2 mg/mL in PVC, polyethylene, and glass containers.
- Stable for 8 hours at room temp unprotected from light or 24 hours at room temp protected from light in RL at a concentration of 2 mg/mL in PVC, polyethylene, and glass containers. Do not refrigerate solutions diluted in RL.
- Compatible with RL; incompatible with other calcium-containing solutions.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Considered as a 5th generation cephalosporin.
- Positive Coombs test reported.
- Potential for false-positive result with alkaline picrate assay (Jaffé reaction) to measure serum creatinine and with urine glucose tests using the copper reduction technique (cupric sulfate).
- Each 500 mg dose contains approximately 1.3 mmol (29 mg) of sodium.
- 666.6 mg of ceftobiprole medocaril sodium corresponds to 500 mg of ceftobiprole.

REFERENCES

5, 135, 200, 208.
CEFTOLOZANE/TAZOBACTAM
Zerbaxa™

Antibiotic – cephalosporin with B-lactamase inhibitor

INDICATIONS
- Treatment of infections due to susceptible strains including beta-lactamase producing bacteria in the following conditions: complicated intraabdominal infections and complicated urinary tract infections, including pyelonephritis.

ADMINISTRATION
- Reconstitute the 1.5 g vial (1 g ceftolozane and 500 mg tazobactam) with 10 mL of SWFI or NS to obtain a volume of approximatively 11.4 mL; swirl to dissolve.
- Intermittent IV infusion: withdraw 11.4 mL (entire vial), 5.7 mL, 2.9 mL or 1.2 mL for a dose of 1.5 g, 750 mg (500 mg ceftolozane and 250 mg tazobactam), 375 mg (250 mg ceftolozane and 125 mg tazobactam) or 150 mg (100 mg ceftolozane and 50 mg tazobactam) respectively, and transfer into a 100 mL bag of NS or D5W; infuse over 60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylaxis.
- GI: nausea, diarrhea.
- CNS: headache.
- Fever.

DOSAGE
- 1.5 g IV q8h for 4-14 days.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50  50-30  29-15  end-stage renal disease on hemodialysis
  - Dose 1.5 g  750 mg  375 mg  loading dose 750 mg.
  - Interval (hr) 8 8 8 8
  - * on hemodialysis days, to administer at the earliest possible time after dialysis since approximately 2/3 of the dose is removed by hemodialysis.
- Dosage in hepatic impairment: no dosage adjustment is necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C; protect from light.
- Reconstituted solution is stable for 1 hour at room temp before its transfer and further dilution into a bag. Do not freeze.
- Diluted solution is stable for 24 hours at room temp or 7 days in the fridge in NS or D5W in PVC bags.
- Diluted solution should be clear and may vary from colourless to slightly yellow.

MISCELLANEOUS
- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Positive Coombs’ test has been reported.
- Tazobactam is included as a beta-lactamase inhibitor, which extends ceftolozane spectrum of coverage to include certain beta-lactamase producing bacteria.
- Each 1.5 g vial contains 1 g of ceftolozane and 500 mg of tazobactam. Doses are usually ordered as 1.5 g (1 g ceftolozane and 500 mg tazobactam), 750 mg (500 mg ceftolozane and 250 mg tazobactam), 375 mg (250 mg ceftolozane and 125 mg tazobactam), or 150 mg (100 mg ceftolozane and 50 mg tazobactam).

REFERENCES
5, 40, 95, 135.

New monograph 2017
INDICATIONS
- For severe infections (lower respiratory tract infections, septicemia, bone and joint infections, UTI, skin and skin structure infections, intra-abdominal infections, endocarditis, gonorrhea, gynecologic infections, and CNS infections) due to susceptible organisms.
- Perioperative prophylaxis (not considered a drug of choice).

ADMINISTRATION
- For IV use: reconstitute the 250 mg, 500 mg, 1 g and 2 g vials with 2.4 mL, 4.8 mL, 9.6 mL or 19.2 mL, respectively, of SWFI for a final concentration of 100 mg/mL.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion (preferred): dilute in 50-100 mL of NS, D5W or dextrose-saline combinations and infuse over 15-30 minutes.
- IM: reconstitute the 250 mg, 500 mg, 1 g and 2 g vials with 0.9 mL, 1.7 mL, 3.3 mL or 6.6 mL, respectively, of SWFI, NS, D5W, or 1% lidocaine to obtain approximately 250 mg/mL. More concentrated solutions (350 mg/mL) may be obtained by reconstituting the 500 mg, 1 g and 2 g vials with 1.1 mL, 2.2 mL or 4.4 mL, respectively, of above stated solutions. The more concentrated solution (350 mg/mL) is NOT recommended for the 250 mg vial size. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults: Usual dose: 1-2 g once daily or in equally divided doses twice daily.
  Meningitis: 2 g q12h.
  Gonorrhea: 250 mg IM as a single dose.
- Pediatrics: Usual dose: 50-75 mg/kg/day, given in 1 or 2 divided doses per day; maximum dose 2 g/day.
  Meningitis: 100 mg/kg/day given once daily or divided q12h. A loading dose of 100 mg/kg may be given at start of therapy. Maximum of 4 g/day.
  Gonorrhea: 125 mg IM as a single dose.
- Dosage in renal impairment: no dosage adjustment required.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Ceftriaxone is contra-indicated in neonates (less than or equal to 28 days of age) if they require (or are expected to require) treatment with calcium containing IV solutions (including TPN, RL) because of the risk of precipitation of ceftriaxone with calcium. A crystalline material was observed in the lungs and kidneys at autopsy of a small number of neonates who received ceftriaxone and calcium containing solutions.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Do not use diluents containing calcium (e.g., RL, Hartmann’s solution) to reconstitute or dilute ceftriaxone because a precipitate can form.
- Do not administer ceftriaxone simultaneously with calcium-containing IV solutions (including TPN, RL) via a Y-site because precipitation of ceftriaxone-calcium may occur. However, in patients other than neonates, ceftriaxone may be administered in the same line as a calcium containing solution, provided they are administered sequentially of one another and the infusion lines are thoroughly flushed between infusions with a compatible fluid.
- No interactions between ceftriaxone and oral calcium-containing products or between IM ceftriaxone and calcium-containing products (IV or oral) have been reported.
- Stable for 2 days at room temp and 10 days in the fridge when solutions are reconstituted with SWFI, D5W or NS to a concentration of 100 mg/mL for IV use.
- Stable for 24 hours at room temp and 3 days in the fridge when solutions are reconstituted with SWFI, D5W, NS or lidocaine 1% to a concentration of 250 mg/mL and 350 mg/mL for IM use.
- Stable for 3 days at room temp and 14 days in the fridge when diluted in D5W at a concentration of 40 mg/mL in a PVC container.
- Stable for 3 days at room temp and 30 days in the fridge when diluted in NS at a concentration of 40 mg/mL in a PVC container.
- Stable for 48 hours at room temp and 72 hours in the fridge when diluted in NS at a concentration of 10 mg/mL.
- Stable for 7 days at room temp and 12 weeks in the fridge when diluted in D5W at a concentration of 10 mg/mL in a glass bottle.
- Stable for 180 days at -20°C, 40 days in the fridge or 3 days at room temp when diluted with SWFI at a concentration of 100 mg/mL and stored in polypropylene syringes.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coombs' test has been reported.

REFERENCES

1, 2, 4, 5, 82, 95, 135, 143, 216.
CEFUROXIME

Kefurox ®, Zinacef ®

Antibiotic - cephalosporin

INDICATIONS
- For severe infections (respiratory tract infections, genitourinary tract infections, soft tissue infections, skin and skin structure infections, bone and joint infections, and septicemia) due to susceptible organisms.
- Perioperative prophylaxis.
- Has been used in the treatment of meningitis but is no longer considered a drug of choice; third generation cephalosporins are now preferred as they have been found to be clinically superior.

ADMINISTRATION
- For IV use: reconstitute the 750 mg and 1500 mg vials with 8 mL and 16 mL of SWFI, respectively, to get an approximate concentration of 90 mg/mL. Shake well until dissolved.
- IV direct: physician or RN. Administer slowly over 3-5 minutes.
- Intermittent IV infusion (preferred): dilute in 50-100 mL of D5W or NS and infuse over 15-60 minutes.
- Continuous IV infusion: dilute in 500-1000 mL of D5W or NS and administer as a continuous infusion.
- IM: reconstitute 750 mg vial with 3 mL of SWFI to obtain approximately 220 mg/mL. Inject deep into a large muscle mass.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, urticaria, pruritus, anaphylaxis.
- GI: diarrhea, nausea, vomiting, colitis.
- Hematologic: eosinophilia, leukopenia, neutropenia, thrombocytopenia.
- Hepatic: transient increase in LFT.
- Renal: transient increase in serum creatinine and urea.
- Local reactions: phlebitis (with IV administration); pain (with IM administration).

DOSAGE
- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults:
  - Usual dose: 750 mg-1.5 g q8h.
  - Surgical prophylaxis: 1.5 g 30-60 minutes before skin incision; repeat dose in the operating room after 4 hours when surgery is prolonged.
- Pediatrics (aged 1 month to 12 years old): 75-150 mg/kg/day in 3 divided doses. Maximum dose 6 g/day.
- Dosage in renal impairment:
  - Method 1:
    - CrCl (mL/min) greater than 50 50-10 less than 10
    - Dosing interval (hr) 8 8-12 24
  - Method 2:
    - CrCl (mL/min) greater than 20 20-10 less than 10
    - Dosing interval (hr) 750 mg-1.5 g q8h 750 mg q12h 750 mg q24h

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solutions may range in colour from light yellow to amber; solutions may darken without affecting potency.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Reconstituted solution (90-220 mg/mL) is stable 24 hours at room temp or 48 hours if in the fridge.
- Stable for 24 hours at room temp and 7 days in the fridge in NS or D5W at concentrations of 7.5 and 15 mg/mL in PVC containers.
- Stable for 30 days in the fridge in D5W or NS at concentrations of 5 and 10 mg/mL in PVC containers.

MISCELLANEOUS

- Potential for cross-allergenicity with other beta-lactam antibiotics.
- Beta-lactamase resistant.
- Positive Coomb's test has been reported.

REFERENCES

1, 2, 4, 5, 40, 82, 135, 143, 216, 338.
INDICATIONS

- Treatment of moderate to severe rheumatoid arthritis, with or without methotrexate.
- Treatment of moderate to severe psoriatic arthritis, with or without methotrexate, in patients who have failed one or more DMARDs.
- Treatment of active ankylosing spondylitis in patients who had an inadequate response to conventional therapy.

ADMINISTRATION

- SC: in the thigh or abdomen. Rotate site. Do not inject in skin that is tender, bruised, hard or red. If a 400 mg dose is given, use 2 separate injection sites.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rare; angioedema, dyspnea, hypotension, rash, serum sickness, urticaria. May occur after first administration; discontinue if occurs.
- Cardiovascular: hypertension, rate and rhythm disorders, CHF (new onset or worsening).
- GI: diarrhea, abdominal pain, gastritis, vomiting, dry mouth.
- CNS: headache, anxiety, dizziness.
- Elevation of liver enzymes.
- Infections: patients receiving certolizumab pegol may be more prone to develop infections, including tuberculosis, fungal or opportunistic infections. Discontinue if serious infection occurs.
- Fatigue, arthralgia, myalgia, back pain, fever.
- Local reactions: pain, erythema, hematoma, discolouration.

DOSAGE

- Loading dose for all indications: 400 mg (2 SC injections of 200 mg each) at week 0, 2 and 4.
- Maintenance dose for all indications: 200 mg SC every 2 weeks or alternatively, 400 mg SC every 4 weeks.
- Missed dose: if the next scheduled dose is within a week, do not administer missed dose and wait until next dose is due. If the next scheduled dose is one week or longer away, administer the missed dose as soon as possible then follow with the next scheduled dose.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled syringes in the fridge; do not freeze; protect from light.

MISCELLANEOUS

- Do not administer live or live attenuated vaccines concurrently with this drug.
- Do not use with other biologic DMARDs (e.g., abatacept, anakinra, rituximab, tocilizumab) because of possible increased risk of infections and similar toxicities.
- Patient should be tested for hepatitis B virus infection and tuberculosis before initiating therapy.
- May cause false elevation of aPTT.

REFERENCES

1, 5.

New monograph 2015; limited revision 2016
INDICATIONS

- Treatment of patients with epidermal growth factor receptors (EGFR) expressing metastatic colorectal cancer with the wild-type K-RAS gene: 1) in combination with irinotecan for patients who are refractory to other irinotecan-based chemotherapy; 2) as a single agent therapy for patients who are intolerant of irinotecan-based chemotherapy; or 3) as single agent therapy for patients who have failed both irinotecan- and oxaliplatin-based regimens and who have received a fluoropyrimidine.
- Initial treatment of locally or regionally advanced squamous cell carcinoma of the head and neck, in combination with radiation therapy.

ADMINISTRATION

- Ensure premedication has been administered prior to each infusion. Refer to Dosage section.
- Intermittent IV infusion (mandatory): do NOT shake or dilute the solution. Transfer desired dose to an empty sterile IV bag, bottle, or syringe. Prime administration line with NS before administration. Infuse dose by piggybacking to the patient’s infusion line via a low protein binding 0.22 micron in-line filter. Administer initial dose over 2 hours and maintenance dose over 60 minutes; do NOT administer at a rate exceeding 10 mg/min. Flush line with NS after administration.
- Monitor patient for 60 minutes following each infusion and for longer in those who experienced infusion reactions.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Infusion reactions: bronchospasm, stridor, hoarseness, urticaria, hypotension, shock, loss of consciousness, myocardial infarct and/or cardiac arrest. Administration of prophylactic preredications (refer to Dosage section) may lessen these infusion reactions, but they can still occur despite their use. For severe infusion reactions, stop the infusion immediately and discontinue permanently treatment with cetuximab. For mild to moderate reactions, slow the infusion rate by 50% (5 mg/min maximum) and treat symptoms as appropriate.
- GI: diarrhea, nausea, vomiting, abdominal pain, constipation, anorexia, mucositis, dehydration.
- Fever, headache, asthenia, fatigue, insomnia.
- Respiratory: dyspnea, cough, interstitial lung disease, pulmonary embolus.
- Hypomagnesemia, hypokalemia, hypocalcemia.
- Dermatologic: acneiform rash; limit sun exposure during treatment and for two months after stopping therapy.

DOSAGE

- Premedicate all patients with diphenhydramine 50 mg IV (at TOH, give PO) 30-60 minutes prior to each cetuximab dose. Adding a corticosteroid (e.g., dexamethasone 8 mg IV) at least before the first infusion (unless medically contraindicated) reduces the incidence of severe infusion reactions. Consider preredicating with a corticosteroid prior to each subsequent infusions.
- Colorectal cancer:
  - initial dose, either as monotherapy or combined with irinotecan: 400 mg/m² IV. Subsequent maintenance dose: 250 mg/m² IV weekly until disease progression or unacceptable toxicity.
  - 500 mg/m² IV every 2 weeks until disease progression or unacceptable toxicity.
- Squamous cell carcinoma of the head and neck: initial dose of 400 mg/m² IV administered 1 week prior to initial course of radiation therapy. Subsequent maintenance dose: 250 mg/m² IV weekly for the duration of radiation therapy. Complete infusion 60 minutes prior to radiation therapy.
- Decrease dose based on severity of acneiform rash; refer to manufacturer’s recommendations for specific dosage adjustments.
- Consult specific protocol.
.../Cont.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store in the fridge. Protect from freezing.
- Solution should be clear and colourless and may contain a small amount of easily visible, white, amorphous cetuximab particulates.
- Do not mix or dilute with other drugs.
- Prepared dose and unused portion in the vial are stable for 12 hours in the fridge or 8 hours at room temp (according to manufacturer).

MISCELLANEOUS

- Cetuximab is contraindicated in patients with known hypersensitivity to murine protein.
- Administration of a test dose does not reliably identify patients at risk for severe allergic reactions and is not recommended.

REFERENCES

1, 2, 6, 40, 95, 129, 165, 208, 552.
INDICATIONS
- For serious infections caused by susceptible organisms, where potentially less toxic drugs are ineffective or contraindicated: acute Salmonella typhi infections, meningeal infections, bacteremia, Rocky Mountain spotted fever, psittacosis.
- Cystic fibrosis regimens.
- Treatment of plague and tularemia (in the context of bioterrorism).

ADMINISTRATION
- Reconstitute 1000 mg vial with 10 mL of SWFI or D5W to obtain an approximate concentration of 100 mg/mL.
- IV direct: physician only. Administer over at least 1 minute.
- Intermittent IV infusion (preferred): dilute in 50-100 mL of D5W or NS; final concentration should not exceed 20 mg/mL. Infuse over 10-30 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: fever, rash, angioedema, urticaria, anaphylaxis.
- GI: nausea, vomiting, diarrhea; unpleasant taste with rapid IV administration.
- CNS: headache, confusion, depression, delirium; optic and peripheral neuritis with long-term use.
- Hematologic: dose-related, reversible bone marrow depression (common); idiosyncratic, non-dose-related, irreversible aplastic anemia with a high mortality rate (rare).
- Gray syndrome toxicity (type of circulatory collapse) in premature and full-term infants; has occurred in children up to 2 years of age.

DOSAGE
- Adults and pediatrics (full term infants from age 2 weeks and above):
  - Usual: 50 mg/kg/day IV in equally divided doses q6h.
  - Plague: 25 mg/kg IV q6h for 10 days.
  - Tularemia: 15 mg/kg IV q6h for 14-21 days.
  - Maximum dosage: 100 mg/kg/day, not to exceed 4 g/day.
- Premature infants, full term infants under 2 weeks of age, older infants with immature metabolic processes: 25 mg/kg/day IV in equally divided doses q8h.
- In patients with impaired renal and/or hepatic function, dosage must be reduced in proportion to the degree of impairment; monitor plasma chloramphenicol concentrations.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp (15-30°C).
- Reconstituted solution is stable for 30 days at room temp. Cloudy solutions should not be used.
- Stable 24 hours at room temp, exposed to light, in D5W or NS at a concentration of 10 mg/mL.

MISCELLANEOUS
- Hematologic studies (complete blood count) are recommended every 2 days during therapy to monitor for dose-related bone marrow suppression.
- Desired plasma levels: trough = 5-10 mcg/mL (5-15 mcg/mL for meningitis); peak = 10-20 mcg/mL (15-25 mcg/mL for meningitis). Take trough serum level 5 minutes before the next dose and peak serum level 30-90 minutes after the completion of IV dose.
- Sodium content: 2.25 mEq (52 mg)/g.

REFERENCES
1, 2, 4, 5, 6, 40, 82, 95, 208, 216, 536, 537.

Full revision 2012; limited revision 2015
INDICATIONS
- Psychotic disorders when oral route is not available.
- Treatment of intractable hiccups.
- Prevention and treatment of nausea and vomiting.

ADMINISTRATION
- IV direct: physician. Dilute with NS to maximum concentration of 1 mg/mL prior to IV administration. Maximum rate of administration is 1 mg/min in adults and 0.5 mg/min in children.
- Intermittent IV infusion: dilute in 50-100 mL NS; administer at a maximum rate of 1 mg/min for adults and 0.5 mg/min in children. For intractable hiccups, dilute dose in 500-1000 mL of NS and administer slowly.
- IM (preferred): slowly and deep into the gluteal muscle.
- SC: usually not recommended because of mild to severe local irritation; has been given as an intermittent SC injection in palliative care patients.
- Patients should be supine for at least 30 minutes after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis.
- Cardiovascular: hypotension - monitor BP during and after therapy; tachycardia, QTc interval prolongation.
- CNS: drowsiness, seizures, extrapyramidal effects.
- Anticholinergic effects: dry mouth, dry eyes, blurred vision, constipation, urinary retention.
- Pink to reddish discolouration of urine.
- Antidote: to counteract hypotension, use norepinephrine or phenylephrine and IV fluids; do not use epinephrine.

DOSAGE
Adults:
- Psychotic disorders: 25 mg IM/IV initially. Repeat 25-50 mg IM/IV in 60 minutes if required. Dose may be increased slowly to a maximum of 400 mg IM/IV q4-6h.
- Hiccups: 25-50 mg IM/IV/slow infusion q6h.
- Nausea/vomiting: 25-50 mg IM/IV q3-4h as needed.

Pediatrics (age 6 months and above):
- For psychotic disorders and nausea/vomiting: 0.5-1 mg/kg/dose IM/IV q6-8h. Maximum of 40 mg/day in children younger than 5 years of age (less than 22.7 kg) and 75 mg/day in children 5-12 years (22.7-45.5 kg).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light and avoid freezing.
- Discard pink or discoloured solutions. A slight yellow colour does not alter potency.
- Compatible with NS, D5W, dextrose-saline combinations, Ringer's and RL.

MISCELLANEOUS
- Avoid contact with skin and clothing due to the risk of contact dermatitis.

REFERENCES
1, 2, 4, 9, 40, 82, 95, 457.
**INDICATIONS**

- Treatment of cytomegalovirus (CMV) retinitis in patients with acquired immunodeficiency syndrome (AIDS).

**ADMINISTRATION**

- **Ensure protocol to reduce risk of renal impairment has been initiated; refer to specific protocol in the Dosage section.**
- Intermittent IV infusion: dilute dose in 100 mL NS; infuse over 60 minutes at a constant rate. Flush line with 10 mL NS before and after infusion. Must be administered via an infusion pump.

**POTENTIAL ADMINISTRATION HAZARDS**

- **Non-cytotoxic hazardous drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, fever, chills; can treat with antihistamine and/or acetaminophen; consider premedication for subsequent doses.
- GI: nausea, vomiting, diarrhea, anorexia.
- CNS: headache, pain.
- Hematologic: neutropenia, anemia.
- Ophthalmic: iritis, uveitis, decreased intraocular pressure.
- Renal: dose-dependent nephrotoxicity, proteinuria, Fanconi’s syndrome; refer to specific protocol in Dosage section to reduce risk of renal impairment.
- Respiratory: cough, dyspnea.
- Infection.
- Metabolic acidosis.
- Asthenia.

**DOSAGE**

- Induction dose: 5 mg/kg IV once weekly for 2 consecutive weeks.
- Maintenance dose: 5 mg/kg IV once every 2 weeks. Maintenance dose to be started 2 weeks after completion of induction treatment.
- **To reduce risk of renal impairment, the protocol below must be followed with each dose of cidofovir:**
  - Probenecid: 2 g orally 3 hours before cidofovir dose, followed by 1 g orally at 2 and 8 hours after completion of cidofovir infusion for a total probenecid dose of 4 g for each cidofovir dose.
  - Hydration: infuse at least 1 liter of NS over 1-2 hours immediately before starting cidofovir infusion; for patients who can tolerate additional fluid, infuse a second liter of NS over 1-3 hours. This second liter can be initiated either at the start of the cidofovir infusion or immediately afterward.
- Dosage in renal impairment: decrease maintenance dose to 3 mg/kg for remainder of therapy if serum creatinine increases by 27-35 mcmol/L from baseline; discontinue therapy if serum creatinine increases by 44 mcmol/L or greater from baseline or if proteinuria of 2+ or greater develops; do not initiate therapy if baseline creatinine clearance is 55 mL/min or lower or if baseline proteinuria is 2+ or greater (100 mg/dL or greater).
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-25°C.
- Stable for 24 hours in the fridge or at room temp in D5W or NS at concentrations of 0.21 mg/mL and 8.12 mg/mL in PVC or polyolefin containers; must be administered within 24 hours of preparation.
- Stable for 5 days in the fridge in NS at concentrations of 0.2 mg/mL and 8.1 mg/mL in PVC or polyolefin containers.
- Stable for 150 days in the fridge, at 25°C (exposed to or protected from light) and at 32°C in NS at a concentration of 6.25 mg/mL in polypropylene syringes.

MISCELLANEOUS

- Contraindicated if patient is receiving concomitant nephrotoxic drugs (e.g., aminoglycosides, amphotericin B, foscarnet, nonsteroidal anti-inflammatory agents, etc); at least 7 days should elapse between discontinuation of such drugs and administration of cidofovir.
- Serum creatinine and urine protein levels must be determined within 48 hours prior to each dose of cidofovir.
- White blood cell counts with differential should be monitored prior to each dose.

REFERENCES

1, 4, 5, 40, 95, 135, 143, 533.
INDICATIONS

- Broad spectrum antibiotic coverage (including some methicillin-resistant Staph aureus, Enterobacteriaceae and Pseudomonas aeruginosa) indicated for use in a variety of moderate to severe infections when oral therapy is not feasible.
- Treatment of anthrax, plague and tularemia (in the context of bioterrorism).

ADMINISTRATION

- Intermittent IV infusion: use premixed bag of 2 mg/mL or dilute the concentrate of 10 mg/mL for the required dose in NS, D5W or other compatible solution to a concentration of 1-2 mg/mL. Infuse over 60 minutes into a large vein. Flush line with D5W before and after administration of ciprofloxacin. See note in Compatibility section.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, fever, eosinophilia, anaphylaxis (rare).
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: dizziness, sedation, agitation, headache, confusion, tremors, insomnia.
- Myasthenia gravis exacerbation (rare, but serious); avoid using in patients with this condition.
- Local reactions: phlebitis, burning, pain, pruritus, paresthesia, erythema, swelling; more frequent if infused rapidly (e.g., over 30 minutes) or via a small vein.

DOSAGE

- Adults:
  - Usual dose is 200-400 mg IV q12h; maximum dose 400 mg IV q8h.
  - Anthrax: 400 mg IV q12h; to ADD 1 or 2 additional antimicrobials to which Bacillus anthracis is likely susceptible (rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin and clarithromycin).
  - Plague: 400 mg IV q12h for 10-14 days.
  - Tularemia: 400 mg IV q12h for at least 10 days.
- Pediatrics:
  - Usual dose: 20-30 mg/kg/day IV in divided doses q12h; maximum 800 mg/day.
  - Anthrax: 20-30 mg/kg/day IV in divided doses q12h; maximum 400 mg/dose; maximum 1000 mg/daily; initiated as part of a multiple anti-infective regimen, add 1 or 2 additional antimicrobials to which Bacillus anthracis is likely susceptible (rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin and clarithromycin).
  - Plague: 30 mg/kg/day IV in divided doses q12h; maximum 1000 mg/daily; for 10-14 days.
  - Tularemia: 30 mg/kg/day IV in divided doses q12h; maximum 1000 mg/daily; for at least 10 days.
  - Cystic fibrosis and in select cases: 30 mg/kg/day IV in divided doses q8-12h; maximum 1200 mg/day.
- Dosage in renal impairment:
  - Adults:
    Method 1:
    | CrCl (mL/min) | greater than 50 | 50-10 | less than 10 |
    | Dose          | 100%            | 50-75% | 50%          |
  - Pediatrics: adjust dosing interval in moderate to severe renal failure to q18-24h.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Available as a premixed, ready-to-use solution of 2 mg/mL in D5W and a concentrate of 10 mg/mL liquid which requires further dilution.
- Store vials and premixed bags at room temp. Protect from light and freezing.
- Premixed bag, out of overwrap, is stable for 14 days when protected from sunlight.
- Diluted concentrate is stable for 14 days in the fridge or at room temp in D5W, D10W, NS, dextrose-saline solutions, or RL at a concentration of 2 mg/mL.
- Ciprofloxacin is incompatible with many medications; flushing the line with D5W before and after its administration may reduce the risk of drug precipitation. From TOH experience, flushing with NS is not as effective to prevent some incompatibilities.

MISCELLANEOUS
- Switch to oral route when feasible. Equivalent regimens, IV to PO (regular release formulation):
  200 mg IV q12h = 250 mg PO q12h; 400 mg IV q12h = 500 mg PO q12h; 400 mg IV q8h = 750 mg PO q12h.
- Use in pediatrics is not routinely recommended but may be justified in special circumstances.

REFERENCES
1, 2, 4, 5, 9, 28, 40, 44, 82, 95, 143, 195, 216, 536, 537, 538.
INDICATIONS
- Adjunct to general anesthesia.
- To facilitate non-emergency endotracheal intubation.
- To provide skeletal muscle relaxation during surgery or mechanical ventilation.

ADMINISTRATION
- IV direct: physician trained in anesthesiology; RN may administer subsequent doses; ventilator support; cardiac monitoring; may administer undiluted over 5-10 seconds.
- Continuous IV infusion: ventilator support; cardiac monitoring. May further dilute to 0.1 mg/mL or 0.4 mg/mL in D5W or NS. At TOH: withdraw 20 mL from a 100 mL minibag of D5W or NS and discard. Add 40 mg (20 mL from cisatracurium 2 mg/mL vials) to the minibag to obtain a final concentration of 0.4 mg/mL.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylactic or anaphylactoid reactions, bronchospasm, rash, itching.
- Cardiovascular: hypotension, bradycardia, flushing.
Antidote: anticholinesterase agents such as neostigmine or edrophonium, in conjunction with an anticholinergic agent such as atropine or glycopyrrolate.

DOSAGE
- Cisatracurium should be administered by or under the supervision of experienced clinicians familiar with the agent. Dosage must be individualized in each case.
- Adults:
  - Initial: 0.15 to 0.2 mg/kg/dose for a duration of action of 55 and 61 minutes, respectively. Onset of action: 1.5 to 2 minutes.
  - Maintenance: 0.03 mg/kg/dose. Duration of action of approximately 20 minutes.
  - Continuous Infusion:
    maintenance: 1-2 mcg/kg/min. Up to 10 mcg/kg/min has been used in the intensive care setting.
- Pediatrics (above 2 years of age):
  - Initial: 0.1 mg/kg/dose. Onset of action within 2.8 minutes; duration of action of 28 minutes.
  - Maintenance: 0.03 mg/kg/dose. Duration of action of approximately 20 minutes.
  - Continuous Infusion: 1-4 mcg/kg/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge. Protect from light and freezing. Stable 45 days at room temp in original vial.
- Stable 30 days at room temp or in the fridge undiluted at a concentration of 2 mg/mL in polypropylene plastic syringes.
- Stable 30 days in the fridge in D5W or NS at a concentration of 0.1, 2, and 5 mg/mL in PVC containers.
- Stable 14 days at room temp in NS and stable 7 days at room temp in D5W at a concentration of 0.1 mg/mL in PVC containers.
- Stable 30 days at room temp in NS and stable 14 days at room temp in D5W at a concentration of 0.2 mg/mL in PVC containers.
- Stable 30 days at room temp in D5W or NS at a concentration of 5 mg/mL in PVC containers.
- Incompatible with alkaline solutions (e.g., barbiturate solutions).
- Incompatible with RL.

MISCELLANEOUS
- Product is hypotonic.

REFERENCES
1, 2, 4, 5, 40, 82, 135, 139, 208.
CISplatin

Cisplatinum, Platinol ®, Platinol-AQ ®

Antineoplastic

INDICATIONS
- Used in combination with other agents and/or therapies in the treatment of testicular, ovarian, cervical, bladder, head and neck, and lung cancers.
- Also used in a variety of other neoplasms.

ADMINISTRATION
- Intermittent IV infusion: For low doses: dilute in 50-100 mL of NS; infuse over 15-30 minutes. For higher doses: dilute in 2 L of NS; infuse over 6-8 hours; consult specific protocol.
- Continuous infusion: dilute in 1-2 L of NS and administer as a continuous infusion; consult specific protocol.
- A 50 mg vial is available in powder form via Health Canada Special Access Programme for certain indications.
- Do NOT use needles, IV sets or equipment containing aluminum for preparation or administration; a black platinum precipitate will form if cisplatin comes in contact with aluminum and potency will decrease.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid (facial edema, flushing, bronchoconstriction, hypotension and tachycardia); rash, urticaria.
- Cardiovascular: arterial thromboembolism, bradycardia, conduction disorder, hypertension.
- GI: nausea, vomiting, hiccups.
- Electrolyte disturbance, increased serum amylase, transient increase of liver enzymes and bilirubin.
- Hematologic: myelosuppression, anemia.
- Nephrotoxicity with hypokalemia and hypomagnesemia; pre-treatment hydration with NS (supplemented possibly with potassium chloride and magnesium sulfate) and concomitant mannitol or furosemide-induced diuresis are recommended to reduce nephrotoxicity. Consult specific protocol.
- Ototoxicity; dose related, cumulative and irreversible.
- Neurotoxicity, peripheral neuropathy.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Numerous dosing protocols exist (dependent on clinical criteria and concomitant therapy).
- Single agent therapy: 50-100 mg/m² IV every 3-4 weeks.
- For testicular cancer in combination therapy: 20 mg/m² IV daily for five consecutive days, every 3 weeks for 3-4 courses.
- Doses greater than 100 mg/m²/cycle IV every 3-4 weeks are rarely used; confirmation of higher doses is advised.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50
  - 50-10
  - less than 10
  - Dose 100% 75% 50% or discontinue
- Consult specific protocol.

COMPATIBILITY, STABILITY
- Store at room temp. Protect from light. Do not put in fridge or freezer as precipitate may form; however, the precipitate should dissolve at room temp without loss of potency.
## COMPATIBILITY, STABILITY (Cont.)

- Punctured vial is stable for 28 days at room temp if protected from light and 7 days at room temp if exposed to fluorescent room light.
- Diluted solution is stable for at least 24 hours at room temp in NS.
- At concentrations greater than 0.6 mg/mL precipitation occurs if refrigerated. More dilute solutions may be refrigerated. Discard diluted solutions with precipitate; they should not be warmed for redissolution.
- Minimise exposure to light.

## MISCELLANEOUS

## REFERENCES

1, 2, 4, 6, 40, 95, 129, 165, 208, 216.
CLADRIBINE
2-CdA, 2-Chlorodeoxyadenosine, Leustatin®

INDICATIONS
- Treatment of hairy cell leukemia.

ADMINISTRATION
- Intermittent IV infusion (daily), Continuous IV infusion (daily): dilute in 500 mL of NS; infuse over 2 or 24 hours.
- Continuous IV infusion (7 days): use a medication cassette; dilute to 100 mL in bacteriostatic NS (benzyl alcohol preserved); both the drug and NS should be passed through a 0.22 micron filter. Cassettes prepared for patients weighing more than 85 kg may have reduced preservative effectiveness.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare.
- GI: nausea (mild), anorexia, vomiting, diarrhea.
- Fever, chills, dizziness, headache, insomnia, fatigue.
- Hyperuricemia: can be minimized with allopurinol and hydration.
- Dermatologic: rash.
- Local reactions: redness, swelling, pain, thrombosis, phlebitis.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 0.09 mg/kg/day IV as an infusion for 5-7 days.
- Dosage in renal impairment:
  
<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 50</td>
<td>100%</td>
</tr>
<tr>
<td>50-10</td>
<td>75%</td>
</tr>
<tr>
<td>less than 10</td>
<td>50%</td>
</tr>
</tbody>
</table>
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge. Protect from light. Precipitate may form with low temperatures. In the presence of precipitate or if the vial freezes: allow the vial to warm naturally to room temp; do not heat or microwave. Vials with precipitate may be shaken. Potency and expiry are not affected, however, thawed vials should not be refrozen.
- Diluted solution may be stored in the fridge for up to 8 hours prior to initiation of infusion.
- Stable at room temp for at least 24 hours in NS.
- Incompatible in D5W.
- Stable 30 days at 4°C and 18°C in NS at a concentration of 0.016 mg/mL in PVC containers.
- Stable 14 days at 4°C in NS at a concentration of 0.024 mg/mL in glass containers.
- Dilutions for infusions in medication cassettes are stable for at least 7 days.

MISCELLANEOUS

REFERENCES
1, 2, 4, 40, 95, 129, 165, 216.
CLINDAMYCIN

Dalacin C ®

Antibiotic

INDICATIONS

- For severe infections caused by susceptible strain of gram positive staphylococci, streptococci (except E. faecalis), pneumococci and anaerobic bacteria when oral therapy is not feasible.
- For P. carinii pneumonia in patients with human immunodeficiency virus who failed conventional therapy.
- Perioperative prophylaxis, prevention of bacterial endocarditis.

ADMINISTRATION

- Intermittent IV infusion: dilute to a concentration not exceeding 18 mg/mL or use premixed bag and administer at a rate not exceeding 30 mg/min.
- Recommended concentration and minimum administration time from the manufacturer:

<table>
<thead>
<tr>
<th>Dose</th>
<th>Diluent</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 mg</td>
<td>50 mL</td>
<td>10 minutes</td>
</tr>
<tr>
<td>600 mg</td>
<td>50 mL</td>
<td>20 minutes</td>
</tr>
<tr>
<td>900 mg</td>
<td>100 mL (or if use premixed bag: 50 mL)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>1200 mg</td>
<td>100 mL</td>
<td>45 minutes</td>
</tr>
</tbody>
</table>

- Administration of more than 1200 mg in a single one hour infusion is not recommended.
- IM (deep).
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: maculopapular rash, urticaria, pruritus, fever, hypotension, rarely polyarthritis, anaphylactoid reactions.
- GI: unpleasant or metallic taste, nausea, vomiting, abdominal pain and tenesmus. Severe diarrhea and cramping; occasionally C. difficile associated diarrhea and colitis may develop, even up to several weeks following discontinuation of therapy.
- Hepatic and hematologic abnormalities.
- Local reactions: IV administration: thrombophlebitis, erythema, pain, swelling. IM administration: pain, induration, sterile abscess, reversible increase in serum creatine kinase.

DOSAGE

- Dosage and route of administration (IM/IV) should be determined by severity of infection, susceptibility of the causative organism(s), and condition of the patient. The IV route is preferable for patients with severe or life-threatening infections, or with lowered resistance resulting from debilitating conditions (e.g., malnutrition, trauma, surgery, diabetes, heart failure or malignancy, particularly if shock is present or pending).
- Adults:
  - Perioperative prophylaxis: 600-900 mg IV 30 minutes before skin incision.
  - Prevention of bacterial endocarditis: 600 mg IV/IM 30-60 minutes before procedure.
  - Treatment: usual: 600-2700 mg/day divided in 2 to 4 doses. For P. carinii pneumonia: 600-900 mg IV q6-8h in combination with oral primaquine. For life-threatening infections, dose may be increased up to 4800 mg/day.
- Single IM doses greater than 600 mg are not recommended.
- Pediatrics (over one month):
  - Prevention of bacterial endocarditis: 20 mg/kg IV 30-60 minutes before procedure. Maximum: 600 mg.
  - Treatment: 15-40 mg/kg/day divided in 3 to 4 doses, depending on type and severity of infection. Maximum: 3600 mg/day.

.../Cont.
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Crystals may form with low temperature storage or freezing; allow vial to warm naturally to room temp for crystal dissolution.
- Stable 22 days at room temp and 54 days in the fridge in D5W or NS at a concentration of 6 and 12 mg/mL in PVC containers.
- Stable 2 days at room temp under fluorescent light undiluted at a concentration of 150 mg/mL in polypropylene syringes.
- Compatible with RL.

### MISCELLANEOUS

### REFERENCES

1, 2, 4, 9, 40, 82, 95, 143.
**INDICATIONS**
- Management of hypercalcemia of malignancy following hydration.
- Adjunct in the management of osteolysis resulting from bone metastases of malignant tumours.

**ADMINISTRATION**
- Intermittent IV infusion: dilute daily dose in 500 mL of NS, D5W and administer over at least 2-6 hours. Infuse 1500 mg dose over at least 4 hours.
- SC infusion (chest, abdomen, thigh): dilute in 50 to 250 mL of NS or D5W and infuse over 2 to 3 hours; can also dilute in 1 L of NS or D5W and infuse over 6-24 hours.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, pruritus, urticaria; bronchospasm with acetylsalicylic acid sensitivity (rare).
- Cardiovascular: thrombophlebitis (with rapid infusion).
- GI: anorexia, vomiting, diarrhea, gastric pain.
- Hypocalcemia, hypophosphatemia, transient hyperparathyroidism.
- Nephrotoxicity: renal failure, proteinuria, increase in serum creatinine.
- Musculoskeletal pain.
- Osteonecrosis of the jaw; patients should have dental examinations prior to therapy and avoid invasive dental procedures while on treatment.
- Local reactions: SC infusion: pain, swelling, bruising, redness; can be alleviated by decreasing the rate of administration or changing the site of administration; application of heat may reduce local irritation.

**DOSAGE**
- Dehydration must be corrected with NS prior to treatment.
- Hypercalcemia: 300 mg IV daily for 2-5 days (maximum 7-10 days), until serum calcium returns to normal; or single 1500 mg IV dose.
- Bone metastases: 1500 mg IV as one dose every 3-4 weeks.
- Dosage in renal impairment:
  - **Method 1:**
    - CrCl (mL/min) 80-50 49-12 less than 12
    - Dose 75-100% 50-75% 50% or discontinue
  - **Method 2:**
    - CrCl (mL/min) greater than 50 50-10 less than 10
    - Dose 100% 25-50% avoid
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Bonefos ®: diluted solution is stable for 24 hours at room temp in D5W or NS.
- Clasteon ®: diluted solution is stable for 12 hours at room temp in D5W or NS.
- Stable 3 days at room temp exposed to light in D5W or NS at a concentration of 0.6 mg/mL in PVC or glass containers.
- Incompatible with bivalent ions and must not be mixed with calcium containing solutions such as RL.

**MISCELLANEOUS**
- Hypercalcemia: onset of action = 2-3 days; usually normalized after 3-6 days of therapy.

**REFERENCES**
2, 95, 129, 165, 208, 216, 457, 519, 520.

Full revision 2012; limited revision 2015
INDICATIONS
- Treatment of relapsed or refractory acute lymphoblastic leukemia (ALL)
- Treatment of refractory acute myeloid leukemia (AML).
- Treatment of refractory Langerhans cell histiocytosis in children 1 year of age and older.

ADMINISTRATION
- Intermittent IV infusion: Blood pressure monitoring. Transfer required dose via a 0.2 micron syringe filter in a sufficient amount of D5W or NS to obtain a final concentration of 0.15-0.4 mg/mL. Administer over 2 hours; some specific protocols may allow for 1 hour infusion.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, pruritus, Stevens-Johnson syndrome, toxic epidermal necrolysis.
- Cardiovascular: tachycardia, flushing, edema; hypotension: if hypotension occurs during the 5 days of administration, stop the infusion; treatment can be reinstituted at a lower dose if hypotension resolves on its own.
- GI: nausea, vomiting, diarrhea, abdominal pain, anorexia; enterocolitis (more frequent within 30 days of treatment and in combination therapy).
- CNS: headache, anxiety.
- Hematologic: myelosuppression can be severe: anemia, leukopenia, febrile neutropenia, thrombocytopenia.
- Hepatic: elevated ALT/AST, hyperbilirubinemia, hepatotoxicity.
- Renal: elevated creatinine.
- Infection, fever, palmar-plantar erythrodysesthesia syndrome, chills, fatigue, pain in extremities, epistaxis.
- Tumor lysis syndrome, hyperuricemia: consider prophylaxis with antihyperuricemics and alkalization of urine. Administer continuous IV fluids during the 5-day treatment period.
- Systemic inflammatory response syndrome, capillary leak syndrome (symptoms of tachypnea, tachycardia, hypotension, pulmonary edema): may be prevented by administration of corticosteroids (e.g., 100 mg/m² IV hydrocortisone on days 1 to 3). If occurs, discontinue the drug and institute supportive measures. Therapy may be restarted (usually at a lower dose) once patient is stable.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
Adults:
- ALL: 30-52 mg/m² IV per day for 5 days, every 2 to 6 weeks.
- AML: 15-40 mg/m² IV per day for 3-5 days, every 3 to 6 weeks.

Children (1 y.o. and older):
- ALL: 52 mg/m² IV per day for 5 days, every 2 to 6 weeks.
- Refractory Langerhans cell histiocytosis: 25 mg/m²/day IV for 5 days, every 28 days.
- Dosage adjustment due to toxicity: refer to manufacturer’s recommendations.
- Dosage in renal impairment: administer 50% of the dose if CrCl is 30-60 mL/min and use with caution. Contraindicated in patients with severe renal impairment (CrCl less than 30 mL/min).
- Dosage in hepatic impairment: use with caution in patients with mild to moderate impairment. Contraindicated in patients with severe hepatic impairment (AST and/or ALT more than 5 x ULN, and/or bilirubin more than 3 x ULN).
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at 25°C; excursions permitted between 15-30°C.
- Stable 24 hours at room temp diluted in D5W or NS at concentrations of 0.15-0.4 mg/mL.
- Stable for 28 days at room temp exposed to light or refrigerated protected from light undiluted (1 mg/mL) or in NS or D5W at concentrations of 0.2 and 0.6 mg/mL in polypropylene or polyethylene bags.

MISCELLANEOUS

- Contra-indicated in patients with a history of serious cardiac, renal, liver or pancreatic disease, and in patients with symptomatic CNS involvement.

REFERENCES

1, 5, 6, 95, 128, 135, 208.
ClomiPRAMINE *
Anafranil ®
Antidepressant

INDICATIONS
- Treatment of depressive disorders, obsessive compulsive disorders, phobias, cataplexy accompanying narcolepsy and chronic painful conditions when other routes of administration have failed.

ADMINISTRATION
- Intermittent IV infusion: dilute in 250-500 mL of D5W or NS and infuse over 1.5 to 3 hours.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus, anaphylaxis (rare).
- Cardiovascular: hypotension, arrhythmias, conduction defects may occur with excessive doses.
- GI: nausea, increased appetite.
- CNS: drowsiness, restlessness, dizziness, tremor, headache, myoclonus.
- Anticholinergic side effects: dry mouth, sweating, constipation, blurred vision, disturbances of micturition.
- Fatigue.
- Local reactions: thrombophlebitis and burning sensation with IV administration.

DOSAGE
- Presence of hypokalemia must be corrected before starting treatment.
- IV: initiate with 50-75 mg once daily for 3-5 days.
- IM: initiate with 25-50 mg daily and increase by 25 mg daily to maximum of 100-150 mg daily.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light and excessive heat.
- Stable 3 days at room temp in D5W or NS at a concentration of 0.2 mg/mL in PVC or glass containers.

MISCELLANEOUS
- Switch to oral route when feasible; clomipramine 25 mg IV is generally equivalent to clomipramine 50 mg PO; subsequent adjustment may be required.

REFERENCES
3, 29, 45, 208.
* Available via Health Canada’s Special Access Programme

Full revision 2012; limited revision 2015
# CLOXACILLIN

## Antibiotic - penicillin

### INDICATIONS

- Treatment of suspected or confirmed infections caused by susceptible penicillinase-producing staphylococci.
- Treatment of endocarditis, osteomyelitis, pneumonia, sepsis and soft-tissue infections caused by methicillin-sensitive *S.aureus* (MSSA).

### ADMINISTRATION

- **CHECK ALLERGY STATUS OF PATIENT.**
- **For IV use:** reconstitute vials of 500, 1000, and 2000 mg with 4.8, 9.6, and 6.8 mL of SWFI, respectively, to obtain a final concentration of 100 mg/mL, 100 mg/mL and 250 mg/mL, respectively.
- **IV direct:** physician or RN. Administer slowly over 2-4 minutes.
- **Intermittent IV infusion (preferred):** dilute in 50-100 mL of solution and administer over 30-40 minutes.
- **IM:** reconstitute the 500 mg vial with 1.7 mL of SWFI to obtain a final concentration of 250 mg/mL; shake well.

### POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, fever, chills, pruritus, serum-sickness, anaphylaxis.
- GI: nausea, vomiting, epigastric discomfort, flatulence, loose stools.
- Local reactions: phlebitis and thrombophlebitis with IV administration.

### DOSAGE

- **Usual - Adults:** 1-2 g q6h up to 2 g q4h for severe infections.
- **Pediatrics (infants and older children):**
  - Mild to moderate infections: 50-100 mg/kg/day in divided doses q6h (maximum 6 g/day).
  - Severe infections: 150-200 mg/kg/day in divided doses q4-6h; up to 300 mg/kg/day in select cases (dose limit: maximum 12 g/day; 2 g/dose).

### COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store at room temp.
- Reconstituted solution is stable for 24 hours at room temp or 48 hours in the fridge.
- Stable 18 days in the fridge and 24 hours at room temp, in NS or D5W at a concentration of 5-50 mg/mL in PVC containers.

### MISCELLANEOUS

- Cross-allergenicity with other beta-lactam antibiotics.

### REFERENCES

2, 4, 5, 9, 149.
CODEINE
Opioid analgesic

INDICATIONS
- For symptomatic relief of mild to moderate pain.
- Antitussive agent.

ADMINISTRATION
- IM.
- SC.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis (rare); pseudoallergic reactions due to histamine release: pruritus, urticaria.
- Cardiovascular: hypotension, syncope.
- GI: nausea, vomiting, constipation.
- CNS: sedation, dizziness, dysphoria, anxiety, somnolence.
- Respiratory depression.
- Sweating, flushing.

DOSAGE
- Pain: 30 mg IM/SC q4h as needed (range: 15-60 mg).
- Antitussive dose: 10-20 mg IM/SC q4-6h, as needed (maximum 120 mg/day).
- Dosage in renal impairment:
  | Crcl (mL/min) | greater than 50 | 50-10 | less than 10 |
  | Dose         | 100%            | 75%   | 50%          |

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light and avoid freezing. Discard if discoloured or contains a precipitate.
- Compatible in syringe with dimenhydrinate, glycopyrrolate or hydroxyzine.

MISCELLANEOUS
- The efficacy of codeine is dependent on its conversion to morphine by the body. There can be a high degree of variability in the extent of this metabolism amongst patients. Ultra-rapid metabolizers can be at increased risk of morphine toxicity and poor metabolizers may experience an absence of effect. Breastfed babies of nursing mothers taking codeine should be monitored for any signs of morphine toxicity; limit use to less than 3-4 days in nursing mothers.

REFERENCES
1, 2, 4, 95, 140, 216.
**INDICATIONS**
- Treatment of infections due to certain gram-negative organisms (e.g., *Acinetobacter baumannii*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*) when less toxic alternatives are contraindicated or ineffective.

**ADMINISTRATION**
- Reconstitute each 150 mg vial with 2 mL of SWFI. Swirl gently to avoid frothing; final concentration is 75 mg/mL of colistin base activity (CBA). Refer to Miscellaneous section for equivalence between CBA and colistimethate sodium (CMS).
- IV direct: physician or RN. Administer over 3-5 minutes.
- Intermittent IV infusion: dilute dose in NS, D5W, dextrose-saline combinations or RL and administer over 30-60 minutes.
- Continuous IV infusion: further dilute with 100-1000 mL of NS, D5W, dextrose-saline combinations or RL; see Dosage section for more information.
- IM.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: urticaria, rash, pruritus.
- GI: stomach upset, colitis.
- Nephrotoxicity (dose-dependent; may be reversible if drug is discontinued; avoid concomitant administration of other nephrotoxic drugs).
- Neurotoxicity: peripheral paresthesia, tingling of the extremities or of the tongue, dizziness, vertigo, blurred vision, slurred speech, ataxia, confusion, coma, psychosis, seizures, neuromuscular blockade.
- Respiratory: respiratory arrest, respiratory tract paralysis.
- Local reaction: severe pain with IM administration.

**DOSAGE**
- Dosages are expressed in terms of colistin base activity (CBA).

Method 1 (manufacturer’s recommendations):
- 2.5-5 mg/kg/day IM/IV in 2-4 divided doses depending on the severity of the infection.
- Although the manufacturer recommends weight-based dosing, pharmacokinetic data show that dosing based on body weight is not necessary (see Method 2).
- Continuous IV infusion: give half of the total daily dose IV direct, then 1-2 hours later give the other half by IV infusion over 22-23 hours.
- Obese patients: calculate the dose using ideal body weight.
- Dosage in renal impairment:
  - CrCl (mL/min)  79-50  49-30  29-10
  - Dose  2.5-3.8 mg/kg/day  2.5 mg/kg/day  1.5 mg/kg/dose
  - Dosing Interval (hr)  12  12-24  36
  - Maximum total daily dose (mg)  150-230  133-150  100

.../Cont.
DOSAGE (Cont.)

Method 2 (consensus guidelines; to achieve average steady-state plasma concentration [$C_{ss,avg}$] of 2 mg/L):
- Loading dose is recommended in patients where rapid attainment of therapeutic levels is required (e.g., critically ill patients). The following equation is used to calculate the loading dose:
  
  Loading dose (mg) = $C_{ss,avg}$ target (mg/L) x 2 x body weight (kg), where $C_{ss,avg}$ target = 2 mg/L.

  For obese patients, use ideal body weight. The loading dose should not exceed 300 mg IV.
- Maintenance dose: 300-360 mg/day IV in 2 divided doses administered q12h. The maintenance dose is started 12 hours after the loading dose.
- Dosage in renal impairment: renal function should be monitored and the daily dose adjusted:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Total daily dose</th>
<th>CrCl (mL/min)</th>
<th>Total daily dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 or greater</td>
<td>360 mg</td>
<td>39-30</td>
<td>195 mg</td>
</tr>
<tr>
<td>89-80</td>
<td>340 mg</td>
<td>29-20</td>
<td>175 mg</td>
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<tr>
<td>79-70</td>
<td>300 mg</td>
<td>19-10</td>
<td>160 mg</td>
</tr>
<tr>
<td>69-60</td>
<td>275 mg</td>
<td>9-5</td>
<td>145 mg</td>
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<tr>
<td>59-50</td>
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<td>0</td>
<td>130 mg</td>
</tr>
<tr>
<td>49-40</td>
<td>220 mg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Reconstituted solution is stable for 7 days in the fridge or at room temp.
- Reconstituted solution is stable for 24 hours at room temp or 48 hours in the fridge in polypropylene syringes.
- Diluted solution is stable for 24 hours in NS, D5W, dextrose-saline combinations, or RL.

MISCELLANEOUS
- Colistimethate is the inactive prodrug of colistin.
- Unit equivalency: 1 mg of CBA is equivalent to 30,000 international units; 1 mg of CMS is equivalent to 12,500 international units; 1 million international units is equivalent to 33 mg of CBA and to 80 mg of CMS.

REFERENCES
1, 2, 4, 40, 95, 135, 196, 423, 424.
**INDICATIONS**
- Diagnosis of adrenocortical insufficiency.
- Diagnosis of primary aldosteronism by adrenal vein sampling.
- For management of post-lumbar puncture headaches.
- For management of various collagen, dermatologic, endocrine, eye, and hemolytic diseases (depot formulation).

**ADMINISTRATION**

**Conventional cosyntropin (Cortrosyn ®):**
- Reconstitute 250 mcg vial with 1 mL of NS.
- IV direct: physician or RN. Dilute with 2-5 mL of NS and administer over 2 minutes.
- Intermittent IV infusion:
  - For a greater stimulus, when screening for adrenocortical insufficiency: dilute 250 mcg in a large volume of NS or D5W and administer over 4-8 hours (usually 40 mcg/hr over 6 hours).
  - Post-lumbar puncture headache: dilute dose in 250-1000 mL NS and infuse over 0.5-2 hours.
  - Continuous IV infusion: for adrenal vein sampling; at TOH, dilute 250 mcg in 250 mL of NS or D5W.
- IM.

**Depot formulation (Synacthen ® Depot):**
- IM administration only: shake slightly to resuspend suspension; administer slowly and deeply into the gluteal region.
- Observe patient for 60 minutes following a dose for any serious or potentially fatal allergic reactions.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity (rare): urticaria, pruritus, rash, dyspnea, severe malaise; preparation much less allergenic than corticotropin (ACTH) but cross-reactivity exists between cosyntropin and ACTH.
- Cardiovascular: bradycardia, tachycardia, hypertension, peripheral edema, flushing.
- Local reactions: pain, induration with IM administration.

**DOSAGE**

**Adults:**
- Diagnostic test for adrenocortical insufficiency:
  - Standard dose: 0.25 mg (250 mcg) - 0.75 mg (750 mcg) IV/IM of conventional cosyntropin.
  - Low dose: 0.001 mg (1 mcg) IV of conventional cosyntropin (serial dilutions to be prepared by pharmacy to obtain a 1 mcg/dose).
  - Depot formulation: 1 mg IM.
- Adrenal vein sampling: continuous IV infusion at a rate of 50 mcg/hr, starting 30 minutes before adrenal vein catheterization and continuing for the duration of the procedure.
- Post-lumbar puncture headache: 0.75-1 mg or 0.015 mg/kg as a single infusion; may repeat, if necessary, 24 hours later. Has also been given IM.
- Other diseases: depot formulation: average dose is 0.5-1 mg IM twice weekly (range of 0.5-1 mg every 2-3 days up to 2 mg at weekly or even longer intervals). Individualize to the smallest dose with the longest interval possible to achieve disease control.

**Pediatrics:**
- Diagnostic test: older than 2 years of age: 0.035 mg/kg IV/IM; dose limit 0.25 mg (250 mcg) of conventional cosyntropin.
  - 2 years old or younger: 0.125 mg (125 mcg) of conventional cosyntropin.
- Other diseases: depot formulation: refer to manufacturer’s information.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store conventional cosyntropin at room temp.
- Store depot formulation in the fridge and protect from light.
- Conventional cosyntropin: reconstituted solution is stable for 24 hours at room temp or 21 days in the fridge. Since it contains no preservatives, prolonged storage after reconstitution is not advised.
- Diluted solution is stable for 12 hours at room temp in NS and dextrose solution.
- Incompatible with blood or plasma products.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- Conventional cosyntropin and depot formulation of cosyntropin are not interchangeable.
- Patients taking inadvertent doses of cortisol or hydrocortisone on the day of the test could have abnormally high plasma cortisol levels at baseline and a paradoxical decrease in plasma cortisol level after cosyntropin.
- Prednisone, dexamethasone, betamethasone will not interfere with test when fluorometric analysis is used.
- Patients on estrogens may have abnormally high cortisol plasma levels before and after cosyntropin, but a normal incremental response to cosyntropin still occurs.
- Avoid pre-test doses of cortisone, hydrocortisone and spironolactone on the day of the test when fluorometric analysis is used. Spironolactone can be given on the day of the test if radioimmunoassay or competitive protein binding methods of analysis are used.
- Cosyntropin 0.25 mg is equivalent to 25 international units ACTH.

REFERENCES

1, 2, 9, 40, 82, 95, 135, 142, 144, 153, 160, 217, 416, 440.
CO-TRIMOXAZOLE

INDICATIONS
- Treatment of septicemia and meningitis, genito-urinary tract, pulmonary, gastrointestinal and skin and soft tissue infections due to susceptible organisms.
- Treatment of *Pneumocystis jiroveci* (carinii, PCP) pneumonia.

ADMINISTRATION
- Intermittent IV infusion: dilute each 5 mL ampoule (equivalent to 80 mg of trimethoprim and 400 mg of sulfamethoxazole) with 100-125 mL NS, D5W, dextrose-saline or Ringer's solutions; may dilute each 5 mL ampoule with 50-75 mL NS or D5W in fluid restricted patients. Administer a single dose over 60-90 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pulmonary infiltrates, cough, shortness of breath, serum sickness, anaphylaxis.
- GI: nausea, vomiting, anorexia, diarrhea.
- Hyperkalemia.
- Hematologic: anemia, thrombocytopenia, leukopenia; with high doses or prolonged duration of treatment.
- Local reactions: irritation, pain, phlebitis, inflammation.

DOSAGE
- Adults:
  - Severe infections: 160-240 mg of trimethoprim component IV q6-12h.
  - PCP: 16-20 mg/kg/day of trimethoprim component IV in 3-4 divided doses.
- Pediatrics:
  - Usual: 5-12 mg/kg/day of trimethoprim component IV, divided q6-12h.
  - PCP: 16-20 mg/kg/day of trimethoprim component IV, in 3-4 divided doses.
- Dosage in renal impairment:
  - CrCl (mL/min)
    - greater than 25
    - 25-15
    - less than 15
  - Dose
    - 100%
    - 50%
    - not routinely recommended
  - Interval
    - Usual
    - Usual
    - ----

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light.
- Use punctured vials within 48 hours.
- Stable 48 hours at room temp in D5W or NS when diluted 1:25 (i.e., 5 mL or 80 mg of trimethoprim component in 125 mL) in glass bottles.
- Stable 24 hours at room temp in D5W, NS or RL when diluted 1:20 (i.e., 5 mL or 80 mg of trimethoprim component in 100 mL).
- Stable 24 hours at room temp in D5W or NS when diluted 1:15 (i.e., 5 mL or 80 mg of trimethoprim component in 75 mL) and 1:10 (i.e., 5 mL or 80 mg of trimethoprim component in 50 mL) in PVC containers.
- Stable 12 hours at room temp in D5W when diluted 1:15 (i.e., 5 mL or 80 mg of trimethoprim component in 75 mL) and 1:10 (i.e., 5 mL or 80 mg of trimethoprim component in 50 mL) in glass bottles.
- Observe for cloudiness or evidence of precipitation especially with concentrated solutions.

MISCELLANEOUS
- Do not use in patients allergic to sulfa.
- Maintain adequate fluid intake to prevent crystalluria and stone formation.

REFERENCES
1, 2, 4, 9, 40, 82, 95, 135, 484.

Full revision 2012; limited revision 2013, 2015, 2019
INDICATIONS
- Treatment of breast cancer, lung cancer, multiple myeloma, neuroblastoma, ovarian cancer, retinoblastoma, mycosis fungoides, lymphomas, leukemias, and in various protocols for other neoplasms.
- Treatment of some autoimmune disorders.

ADMINISTRATION
- Reconstitute the 200 mg, 500 mg, 1000 mg or 2000 mg vials with 10 mL, 25 mL, 50 mL or 100 mL, respectively, with NS without preservatives to give a concentration of 20 mg/mL; do NOT use bacteriostatic NS that contains benzyl alcohol. Shake to dissolve for a clear solution.
- IV direct: physician or RN; undiluted; doses less than 500 mg; inject each 100 mg over at least 1 minute into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: dilute in 100-1000 mL of D5W or NS; infuse over 15 minutes to 4 hours, depending on doses and protocol.
- Continuous IV infusion: as per protocol.
- Aluminium-containing IV needles, syringes, or sets should NOT be used to prepare or administer cyclophosphamide.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare anaphylactoid reactions; rash, pruritus, hives.
- Infusion reaction: nasal congestion and facial discomfort with IV doses administered too rapidly (flushing, runny eyes, rhinorrhea, sinus congestion, sneezing during and immediately after infusion); slow the rate of administration or give as an infusion rather than IV direct.
- GI: nausea, vomiting.
- CNS: headache, dizziness.
- Hemorrhagic cystitis.
- Hyponatremia, syndrome of inappropriate anti-diuretic hormone secretion.
- Hyperuricemia.
- Radiation recall reaction (rare).
- Local reactions: chemical phlebitis, redness, swelling, pain.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 500 mg/m² to 1200 mg/m² IV every 3 weeks.
- 300 mg/m² IV once weekly.
- Dosage in renal impairment:
  | CrCl (mL/min) | greater than 50 | 50-10 | less than 10 |
  | Dose method 1 | 100% | 100% | 75% |
  | Dose method 2 | 100% | 50-75% | 50% |
- Consult specific protocol.

.../Cont.
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp (do not exceed 25°C). Protect from direct light. Do not use vial with melted content.
- Reconstituted vial is stable for 24 hours at room temp and 72 hours in the fridge.
- Diluted solutions in NS, D5W, or D5W in NS are stable 24 hours at room temp or for 72 hours in the fridge.
- Compatible with RL.

### MISCELLANEOUS

- Encourage patient to drink plenty of fluids during therapy and to void frequently to help prevent hemorrhagic cystitis.

### REFERENCES

1, 2, 4, 40, 129, 147, 165, 216.
INDICATIONS
- Prophylaxis or treatment of rejection after solid organ transplantation or bone marrow transplantation.
- For patients unable to take the oral solution pre- or postoperatively.

ADMINISTRATION
- Intermittent IV infusion, Continuous IV infusion: dilute each 50 mg (1 mL) with 20 to 100 mL (each 5 mL ampoule with 100 to 500 mL) of D5W or NS and infuse over 2 to 6 hours or continuously over 24 hours. Glass or non-PVC containers are preferred over PVC bags for infusion. Use non-PVC IV administration sets.
- The initial dose should be given 4-12 hours prior to transplantation.
- Observe patient for at least 30 minutes after the start of infusion and frequently thereafter for signs of any hypersensitivity.

POTENTIAL ADMINISTRATION HAZARDS
- **Non-cytotoxic hazardous drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: the cyclosporine injectable formulation contains Cremophor EL (polyoxyethylated castor oil) which has been reported to cause anaphylactoid reactions.
- Cardiovascular: hypertension.
- GI: nausea, vomiting, diarrhea.
- CNS: tremor, headache.
- Renal: dose-related nephrotoxicity.
- Hepatic: increase in serum bilirubin and liver enzymes.

DOSAGE
Adults/Pediatrics:
- Initiate with 3 to 5 mg/kg/day IV. Adjust dose to the desired blood or plasma concentration.
- For patients unable to take the oral formulation: treat with IV at one-third of the oral dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp. Protect from light and freezing.
- The Cremophor EL and ethanol vehicle cause significant leaching of diethylhexyl phthalate (DEHP) plasticizer from PVC containers and PVC administration sets.
- Cyclosporine is subject to significant sorption to PVC containers and PVC administration sets. Sorption is higher with dilutions in NS than with D5W.
- Stable for 48 hours at room temp or in the fridge in D5W at a concentration of 2 mg/mL in glass bottles.
- Stable 14 days at room temp in D5W or NS at a concentration of 0.2 and 2.5 mg/mL in polypropylene-polyolefin bags.
- Stable for 14 days at room temp in NS and D5W at a concentration of 2.5 mg/mL in ethylene vinyl acetate bags.
- Stable for 7 days at room temp in NS and D5W at a concentration of 0.2 mg/mL in ethylene vinyl acetate bags.
- Short term (less than 10 minutes) use of polypropylene syringes for preparation is considered safe. Cyclosporine should not be stored in plastic syringes due to leaching of rubber components from rubber tips of plungers.

REFERENCES
1, 2, 4, 6, 40, 48, 95, 135, 143, 340.
INDICATIONS
- Treatment of acute myelocytic leukemia, chronic myelocytic leukemia, acute lymphocytic leukemia and erythroleukemia.
- Combined with other antineoplastic drugs in various protocols.

ADMINISTRATION
- Reconstitute vials of 100 mg, 1 g, and 2 g with 5, 10, and 20 mL with D5W, NS, SWFI or bacteriostatic water for injection, respectively, to obtain a final concentration of 20 mg/mL, 100 mg/mL, and 100 mg/mL, respectively. For high dose therapy use preservative free NS only.
- Also available as a 100 mg/mL aqueous solution.
- IV direct: physician or RN; undiluted; each 100 mg over 1-3 minutes into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: doses less than 1 g/m²: dilute further with 50-100 mL of D5W or NS and infuse over 15-60 minutes. Dilute larger doses in 250 mL of D5W or NS and infuse over 1-3 hours.
- Continuous IV infusion.
- IM.
- SC.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid (rare).
- Cytarabine syndrome: flu-like syndrome, fever, rash, conjunctivitis. Symptoms usually resolve with drug discontinuation; corticosteroids can be used for treatment and prophylaxis. Cytarabine can be continued if patient responds to corticosteroids.
- GI: nausea, vomiting (especially with rapid IV administration of high doses).
- CNS: cerebellar syndrome, decreased consciousness and personality change (high doses); seizures.
- Respiratory: adult respiratory distress syndrome (ARDS) (high doses).
- Hematologic: leukopenia, neutropenia, thrombocytopenia.
- Hyperuricemia.
- Local reactions: pain and inflammation (rare); thrombophlebitis, cellulitis.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Usual in combination therapy: 2-6 mg/kg/day IV or 100-200 mg/m²/day IV for 5 to 10 days.
- High dose: 1-3 g/m² IV q12h for 2-6 days.
- Dosage in renal impairment: no dosage modification for standard doses; dosage modification only for high-dose therapy:
  
<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>greater than 60</th>
<th>60-45</th>
<th>45-30</th>
<th>less than 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td>100%</td>
<td>60%</td>
<td>50%</td>
<td>avoid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Protect from light.
- Reconstituted vial with bacteriostatic water for injection is stable for 48 hours at room temp. Vials reconstituted with preservative-free diluents should be used immediately. Discard hazy solutions.
- Vials of 100 mg/mL aqueous solution should be discarded 24 hours after opening.
- Stable for 7 days at room temp or in the fridge in D5W or NS at concentrations of 8, 24, and 32 mg/mL in PVC or glass containers.
- Stable 7 days at room temp in D5W or NS at a concentration of 0.5 mg/mL in PVC or glass containers.

MISCELLANEOUS

REFERENCES
1, 2, 4, 5, 40, 129, 143, 165, 200.
DACARBAZINE

INDICATIONS
- Palliative therapy of metastatic malignant melanoma.
- May also be used for Hodgkin’s disease, neuroblastoma and soft tissue sarcomas.

ADMINISTRATION
- Reconstitute 200 mg and 600 mg vials with 19.7 mL and 59.1 mL of SWFI, respectively, to obtain 10 mg/mL.
- IV direct: physician or RN; undiluted; inject over at least 1 minute into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion (preferred): dilute in 250-500 mL of D5W or NS; may be infused with an additional 250 mL of IV solution run at same time by piggyback to reduce vein irritation; infuse over 15-120 minutes. Longer infusion times (1-2 hours) are preferable to minimize pain.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- **Hypersensitivity:** anaphylactoid reactions (rare), rash.
- **Cardiovascular:** hypotension (high doses i.e., greater than 850 mg/m²).
- **GI:** nausea, vomiting, diarrhea.
- **CNS:** confusion, seizures.
- **Flu-like syndrome:** fever, myalgia, malaise (during or after treatment).
- **Dermatologic:** facial flushing, photosensitivity (rare).
- **Local reactions:** pain at injection site, phlebitis.
- **Extravasation hazard:** irritant. Subcutaneous or perivascular extravasation may result in tissue damage (necrosis) and severe pain. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Various dosing regimens: 2-4.5 mg/kg/day IV for 10 days every 3 weeks or 200-250 mg/m²/day IV for 5 days every 3-4 weeks or 375 mg/m² IV on days 1 and 15 every 4 weeks.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge, protect from light.
- Protect solutions from light while in storage.
- A colour change of the solution from its normal pale yellow colour or colourless to pink or red indicates decomposition.
- Reconstituted solution is stable for 24 hours at room temp and 96 hours in the fridge when protected from light.
- Stable for 8 hours at room temp (under normal room light conditions) or 24 hours in the fridge diluted with up to 500 mL of D5W or NS.
- Stable for 72 hours at room temp and 7 days in the fridge, protected from light, in D5W at a concentration of 1.4 mg/mL in PVC bags.

MISCELLANEOUS

REFERENCES
1, 4, 5, 6, 40, 129, 143, 165.
INDICATIONS
- Treatment of Wilms' tumour, rhabdomyosarcoma, Ewing's sarcoma and gestational trophoblastic neoplasia.
- May also be used for testicular carcinoma, ovarian germ cell tumour and Kaposi's sarcoma.

ADMINISTRATION
- Reconstitute with 1.1 mL of SWFI without preservative to a final concentration of 0.5 mg/mL. Do NOT use SW with preservatives as it may form a precipitate.
- IV direct: physician or RN; undiluted; inject over 2-3 minutes into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: dilute in 50 mL NS or D5W; do NOT dilute to a concentration lower than 10 mcg/mL; infuse over 10-15 minutes.
- Do NOT use an in-line cellulose ester membrane filter.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid (rare), rash.
- GI: nausea, vomiting, anorexia, abdominal pain.
- Dermatologic: flushing of face and torso, radiation recall reaction (rare).
- Hypocalcemia (rare).
- Fatigue, fever, chills.
- Local reactions: pain.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Wilms' tumour: 45 mcg/kg IV on day 1 every 3 weeks.
- Rhabdomyosarcoma: 15 mcg/kg/day or 0.4-0.6 mg/m²/day IV for 5 days in various schedules.
- Ewing's sarcoma: 1.25 mg/m² IV in various schedules.
- Gestational trophoblastic neoplasia: 12 mcg/kg/day IV for 5 days as a single agent or 500 mcg IV on days 1 and 2 in combination with other antineoplastic agents.
- Dosage should be based on body surface area in obese or edematous patients.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; protect from light.
- Reconstituted solution is stable for 24 hours at room temp or fridge.
- Stable for 24 hours at room temp exposed to light following dilution in D5W in glass and PVC containers.
- Compatible with NS, D5W.

MISCELLANEOUS

REFERENCES
1, 4, 5, 6, 40, 95, 129, 165.
INDICATIONS
- Prophylaxis of thrombosis related to surgery.
- Prophylaxis of thrombosis in medical patients who are at risk of thromboembolism due to severely restricted mobility during acute illness.
- Treatment of acute deep vein thrombosis (DVT).
- Unstable coronary artery disease (unstable angina and non-Q-wave myocardial infarction).
- Extended treatment and prevention of venous thromboembolism (VTE) in patients with cancer.
- Prevention of clotting in the extracorporeal system during hemodialysis and hemofiltration in connection with acute renal failure or chronic renal insufficiency.

ADMINISTRATION
- Continuous IV infusion: dilute 10 000 international units in 500 mL NS or D5W to obtain a final concentration of 20 international units/mL. Infuse at approximately 8 international units/kg/hr (for 100 international units/kg/12 hrs).
- SC: in the fat tissue of the lower abdomen u-shaped area around the navel; as an alternative, can also be injected into the side of the thigh (but not into the muscle tissue). With the thickness of skin held between the operator’s thumb and forefinger, insert the entire length of the needle vertically into the skin. To minimize bruising, injection sites should not be massaged after injection. Rotate site of injection daily.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylactoid reactions, pruritus, rash.
- Hematologic: bleeding (major and minor), thrombocytopenia.
- Risk of spinal or epidural hematoma that can result in permanent paralysis when epidural or spinal anesthesia or spinal puncture is used in conjunction with dalteparin.
- Transient increases in liver transaminases (AST, ALT); reversible on discontinuation of the drug.
- Local reactions: hematoma and pain at injection site; skin necrosis (very rare).

Antidote: The anticoagulant effect of dalteparin can be partially neutralized by protamine. Refer to protamine in this manual for more details.

DOSAGE
Prophylaxis of thrombosis related to surgery:
- General surgery with associated risk of thromboembolic complications: 2500 international units SC 1-2 hours before surgery, then 2500 international units SC once daily each morning until patient is mobilized.
- General surgery associated with additional risk factors and elective hip surgery: 5000 international units SC the evening before surgery, then 5000 international units SC once daily in the evening until patient is mobilized.
  OR
  As an alternative: 2500 international units SC 1-2 hours before surgery and 2500 international units SC 4-8 hours after surgery then 5000 international units SC each morning on the following days.
- Obese patients may need a higher prophylactic dose.

Prophylaxis of thrombosis in medical patients with severely restricted mobility:
- 5000 international units SC once daily.
DOSAGE (Cont.)

Treatment of acute DVT:
- 200 international units/kg SC once daily.
- If patient is at increased risk of bleeding, give 100 international units/kg SC twice daily or IV (as a continuous 12 hour infusion) for a total of 200 international units/kg over 24 hours.
- Dosage in obese patients is based on actual body weight.

Unstable coronary artery disease:
- 120 international units/kg SC twice daily, for up to 6 days; maximum single dose 10 000 international units/12 hours.

Extended treatment of VTE in patients with cancer:
- Month 1: 200 international units/kg SC once daily for the first 30 days.
- Month 2-6: 150 international units/kg SC once daily; refer to manufacturer’s monograph for more details.
- Dosage in obese patients is based on actual body weight.

Anticoagulation for hemodialysis and hemofiltration:
- Chronic renal failure, patients with no other bleeding risk: hemodialysis and hemofiltration for a maximum of 4 hours: IV bolus 5 000 international units; hemodialysis and hemofiltration for more than 4 hours: IV bolus 30-40 international units/kg, followed by IV infusion 10-15 international units/kg/hr.
- Acute renal failure, patients with high bleeding risk: IV bolus 5-10 international units/kg, followed by an infusion of 4-5 international units/kg/hr.

Dosage in renal impairment: use with caution when creatinine clearance is below 30 mL/min; consider dosage adjustment and monitoring of anti-Xa levels.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp.
- Stable for 24 hours at room temp in D5W or NS at a concentration of 20 international units/mL in glass or plastic containers.
- Stable for 30 days at room temp or in the fridge when drawn from multi-dose vials and stored in plastic syringes.

MISCELLANEOUS
- Dalteparin has only a moderate prolonging effect on clotting time assays, such as aPTT or thrombin time. For laboratory monitoring of effect, anti-Xa methods are recommended (although not routinely done, monitoring is recommended in special cases such as obesity, pregnancy and renal failure).
- Dalteparin should not be given to patients with a history of heparin-induced thrombocytopenia (risk of cross-reactivity), unless an in-vitro platelet aggregation test is negative.
- As the multi-dose vial contains benzyl alcohol, it is not recommended for use during pregnancy.

REFERENCES
1, 2, 4, 55, 95, 119, 120.
INDICATIONS

- Prevention of deep vein thrombosis (DVT) following orthopedic, major abdominal and thoracic surgery or in non-hemorrhagic stroke.
- Treatment of DVT or pulmonary embolism (PE) in patients with an acute episode of heparin-induced thrombocytopenia (HIT) and for DVT prophylaxis in patients with a history of HIT.
- Anticoagulant during cardiac procedures, peripheral vascular bypass, cardiopulmonary bypass, and hemodialysis in patients with HIT who require further anticoagulation.

ADMINISTRATION

- IV direct: physician or RN. For loading dose only. Administer undiluted or diluted in a small volume of IV solution over 5 minutes.
- Intermittent IV infusion: for loading dose only. Dilute in 50-100 mL of compatible IV solution and administer over 15-30 minutes.
- Continuous IV infusion: dilute 2250 anti-Xa units (1.8 mL of 750 anti-Xa units/0.6 mL = 3 amps) in 250 mL of D5W or NS to obtain a final concentration of 9 anti-Xa units/mL. More concentrated solutions may also be prepared.
- SC: anterolateral & posterolateral abdominal wall; rotate injection sites.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, allergic reactions.
- GI: nausea, constipation.
- Hematologic: major bleed, hematoma, bruises, hematuria, thrombocytopenia.
- Risk of spinal or epidural hematoma that can result in permanent paralysis when spinal/epidural anesthesia is used in conjunction with danaparoid.
- Local reactions: pain, hematoma.

Antidote: protamine is not a neutralizing agent for the activity of danaparoid. If critical bleeding occurs, fresh frozen plasma and plasmapheresis may be used.

DOSAGE

- Prophylaxis of DVT following surgery: 750 anti-Xa units SC q12h up to 14 days. Start preoperatively and to give the last preoperative dose 1-4 hours before surgery.
- Prophylaxis of DVT in nonhemorrhagic stroke: 1000 anti-Xa units IV bolus, then 750 anti-Xa units SC q12h for 7-14 days.
- HIT: DVT prophylaxis (current or past HIT):
  - 90 kg or less (current or past HIT): 750 anti-Xa units SC q8h or q12h for 7-10 days
  - more than 90 kg: current HIT: 1250 anti-Xa units SC q8h or q12h for 7-10 days
    past HIT: 1250 anti-Xa units SC q12h or 750 anti-Xa units SC q8h for 7-10 days
  - Note: Regardless of weight, may give an initial IV bolus of 1250 anti-Xa units for rapid attainment of prophylaxis levels if clinically necessary (i.e., current HIT)
DOSAGE (Cont.)

- HIT: DVT and PE treatment:
  If thrombosis is less than 5 days old:
  • IV loading dose: 55 kg or less: 1500 anti-Xa units (1.2 mL = 2 amps)
    55-90 kg: 2250 anti-Xa units (1.8 mL = 3 amps)
    more than 90 kg: 3750 anti-Xa units (3 mL = 5 amps)
  • Maintenance dose (after loading dose): IV infusion: 400 anti-Xa units/hr X 4 hours, then 300 anti-Xa units/hr X 4 hours, then 150-200 anti-Xa units/hr for 5-7 days. Adjust infusion rate to maintain plasma anti-Xa level between 0.5-0.8 anti-Xa units/mL.
    OR
    SC injections for 4-7 days: 55 kg or less: 1500 anti-Xa units q12h
    55-90 kg: 2000 anti-Xa units q12h
    more than 90 kg: 1750 anti-Xa units q8h

  If thrombosis is 5 days old or greater:
  • IV loading dose: 1250 anti-Xa units (regardless of weight)
  • Maintenance dose with SC injections:
    90 kg or less: 750 anti-Xa units q8h or q12h
    more than 90 kg: 750 anti-Xa units q8h or 1250 anti-Xa units q8h or q12h

- Consult manufacturer’s monograph for more specific dosing information according to each indication.
- Dosage in renal impairment: reduce dose by 25 to 50%; monitor plasma anti-Xa levels for further dosage adjustment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules between 2-30°C; protect from light.
- Stable 48 hours at room temp when diluted in NS, D5W, D5-1/2NS and RL.

MISCELLANEOUS

- Cross-reactivity between danaparoid and heparin-induced antibody is less than 10%.
- Monitor anticoagulant activity (via plasma anti-Xa levels) for patients with a weight outside the range of 55 to 90 kg or with renal failure. Consult manufacturer’s monograph for more information.

REFERENCES
2, 6, 95, 135, 445, 452, 545.
DANTROLENE

**INDICATIONS**
- Treatment of malignant hyperthermia crisis.
- For preoperative prophylaxis in individuals at risk of malignant hyperthermia.
- Treatment of neuroleptic malignant syndrome.

**ADMINISTRATION**
- Reconstitute each 20 mg vial with 60 mL SWFI (without preservative). Shake vial until solution is clear. Note: using warmed (up to 40°C) SWFI without preservative may decrease shaking time to obtain a clear solution from 3 minutes to 30 seconds.
- IV direct: physician or RN. For active treatment. Give as rapid IV injection.
- Intermittent IV infusion: for preoperative prophylaxis. Transfer the reconstituted dose to an empty sterile IV bag and infuse over 60 minutes. The solution should NOT be in contact with NS or DSW.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis, rash, pruritus, urticaria.
- GI: nausea, diarrhea.
- CNS: drowsiness, dizziness, lightheadedness, malaise.
- Muscle weakness which rarely may result in slurred speech, drooling, difficulty in swallowing, choking, decreased grip strength, difficulty in walking, and enuresis.
- Pulmonary edema, fatigue.
- Local reactions: thrombophlebitis (extravasation may cause local tissue damage due to high pH).

**DOSAGE**
- Treatment of malignant hyperthermia crisis in adults and pediatrics: initial dose of 2.5 mg/kg; repeat dose until signs of malignant hyperthermia are reversed. Cumulative doses greater than 10 mg/kg (up to 30 mg/kg) may be necessary. When symptoms are controlled, give 1 mg/kg IV q4-6h for at least 24 hours (if oral route is not possible).
- For prevention of malignant hyperthermia crisis prior to surgery: 2.5 mg/kg infused IV over 60 minutes - start 75 minutes before induction of anesthesia.
- Treatment of neuroleptic malignant syndrome: initial dose of 1-2.5 mg/kg; repeat dose, if needed, to a maximum cumulative dose of 10 mg/kg. When symptoms are controlled, 1 mg/kg q6h or 1 mg/kg/daily may be used.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solution is stable for 6 hours at room temp; protect from direct light.
- Not compatible with D5W or NS or bacteriostatic water.
- Not compatible with glass bottles.
- Do not use solution if cloudy or contains a precipitate.

**MISCELLANEOUS**
- Avoid concurrent use with verapamil or diltiazem due to possible cardiac depression and hyperkalemia.
- Each 20 mg vial contains 3 g of mannitol.

**REFERENCES**
1, 2, 6, 40, 95, 135, 208.

Full revision 2013; limited revision 2015, 2016
**INDICATIONS**

- Treatment of complicated skin and skin structure infections caused by susceptible strains of gram-positive microorganisms.
- Treatment of *Staphylococcus aureus* bloodstream infections including those with right-sided *Staphylococcus aureus* infective endocarditis (native valve) caused by methicillin-susceptible and methicillin-resistant strains.

**ADMINISTRATION**

- Reconstitution for Cubicin ®: prior to reconstitution, allow vial to sit at room temp for a few minutes. Reconstitute the 500 mg vial by slowly directing 10 mL of NS to vial sides to get a concentration of 50 mg/mL. Gently rotate vial for complete wetting of powder. Allow vial to sit undisturbed for approximately 10 minutes at room temp. Gently swirl vial until clear solution is obtained; this usually takes from 5-15 minutes. Avoid vigorous shaking.
- Reconstitution for Cubicin ® RF: reconstitute the 500 mg vial by injecting 10 mL of SWFI or bacteriostatic water for injection, using a 21 gauge transfer needle (or smaller in diameter) and pointing it toward the wall of the vial. Rotate or swirl the vial for a few minutes to dissolve the contents. Slowly remove the reconstituted solution (50 mg/mL concentration) from the vial using a 21 gauge needle (or smaller in diameter).
- IV direct: physician or RN. Administer over 2 minutes.
- Intermittent IV infusion: for Cubicin ®: dilute dose in NS to get a final concentration in the range of 2.5 to 20 mg/mL (typically 10 mg/mL) and infuse over 30 minutes. For Cubicin ® RF: dilute dose in 50 mL of NS to get a final concentration in the range of 1 to 14 mg/mL (typically 10 mg/mL) and infuse over 30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: pruritus, hives, shortness of breath, difficulty swallowing, truncal erythema, anaphylaxis.
- Cardiovascular: hypotension, hypertension.
- GI: diarrhea, constipation, nausea, vomiting.
- CNS: headache, dizziness, insomnia.
- Myopathy: muscular pain, weakness, creatine phosphokinase elevations.
- Abnormal LFT.
- Local reactions.

**DOSAGE**

- Complicated skin and skin structure infections: 4 mg/kg IV q24h for 7 to 14 days.
- *Staphylococcus aureus* bloodstream infections: 6 mg/kg IV q24h for 10 to 42 days, with an option for an additional 14 days.
- Dosage in renal impairment: if CrCl is less than 30 mL/min, administer a single dose (4 or 6 mg/kg) q48h. If possible, administer dose following completion of hemodialysis on hemodialysis days.
- Dosage in hepatic impairment: no dosage adjustment required if mild to moderate impairment (Child-Pugh class A or B); no data if severe impairment (Child-Pugh class C).

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Cubicin ®:
- Store vials in the fridge, although stable for 12 months at room temp.
- Reconstituted solution should range in colour from pale yellow to light brown.
- Reconstituted solution is stable for 12 hours at room temp or for 10 days in the fridge when left in the original vial.
- Stable for 10 days in the fridge in NS at concentrations of 2.5 mg/mL, 10 mg/mL and 20 mg/mL in PVC bags.
- Stable for 10 days in the fridge in NS at concentrations of 20 mg/mL and 50 mg/mL in polypropylene syringes.
- The combined time (vial and infusion bag) should not exceed 12 hours at room temp or 10 days in the fridge.
- Compatible with NS and RL; not compatible with dextrose solutions.
COMPATIBILITY, STABILITY (Cont.)

Cubicin ® RF:
- Store vials between 15-30°C.
- Reconstituted solution should be in range of colour from pale yellow to light brown.
- Reconstituted solution with SWFI: stable for 1 day at room temp and 3 days in the fridge when stored in the original vial or in a polypropylene syringe.
- Reconstituted solution with bacteriostatic water for injection: stable for 2 days at room temp when stored in the original vial or in a polypropylene syringe, 3 days in the fridge when stored in the original vial and 5 days in the fridge in a polypropylene syringe.
- Diluted solution in NS: if reconstituted originally with SWFI: stable for 19 hours at room temp and 3 days in the fridge. If reconstituted originally with bacteriostatic water for injection: stable for 2 days at room temp and 5 days in the fridge.
- Compatible with NS; not compatible with dextrose solutions.

MISCELLANEOUS

- Daptomycin is inactive against gram-negative bacteria.
- Daptomycin should not be used for the treatment of pneumonia.
- Plasma creatine phosphokinase levels should be measured at baseline and at least once weekly during therapy for all patients.

REFERENCES

1, 5, 6, 40, 306.
INDICATIONS
- Treatment of patients with newly diagnosed multiple myeloma who are ineligible for autologous stem cell transplant (to be used in combination with bortezomib, melphalan and prednisone).
- Treatment of patients with multiple myeloma who have received at least one prior therapy (to be used in combination with lenalidomide and dexamethasone, or bortezomib and dexamethasone).
- Treatment of patients with multiple myeloma who have received at least three prior lines of therapy including a proteasome inhibitor (PI) and an immunomodulatory agent (IMiD), or who are refractory to both a PI and an IMiD.

ADMINISTRATION
- Ensure premedication has been administered and follow with post-infusion medication if needed; refer to Dosage section.
- Intermittent IV infusion (mandatory): from a NS IV bag (see below for bag size), remove a volume of NS equal to the required volume for the daratumumab dose. Add required dose of daratumumab into the NS bag. The IV bags can be made of PVC, polypropylene, polyethylene or polyolefin blend. Gently invert to mix. Do NOT shake; do NOT freeze. Very small translucent to white proteinaceous particles may develop; do not use if discoloured or if visibly opaque or foreign particles are detected.
  - For first infusion: use a NS bag size of 1000 mL; infuse at 50 mL/hr for the first hour; if no infusion reactions occur, increase rate by 50 mL/hr every hour to a maximum rate of 200 mL/hr.
  - For the second infusion: can use a 500 mL bag only if no infusion reactions occurred during the first 3 hours of the first infusion (otherwise, follow same instructions as per first infusion above); infuse at 50 mL/hr for the first hour; if no infusion reactions occur, increase rate by 50 mL/hr every hour to a maximum rate of 200 mL/hr.
  - For the third and subsequent infusions: use a 500 mL bag and infuse at 100 mL/hr only if no infusion reactions occurred with rates of at least 100 mL/hr with the first 2 infusions (otherwise, follow same instructions as per second infusion above); if no infusion reactions occur, increase rate by 50 mL/hr every hour to a maximum rate of 200 mL/hr.
- Use an in-line sterile non-pyrogenic low-protein binding polyethersulfone filter (0.2-0.22 micron) for administration. The following administration sets are compatible: polyurethane, polybutadiene, PVC, polypropylene and polyethylene.
- Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, anaphylaxis.
- Infusion-related reactions: frequent during the first infusion and infrequent with subsequent infusions. Symptoms include: nasal congestion, cough, throat irritation, rhinitis, dyspnea, bronchospasm, nausea, chills, hypertension, pulmonary edema and hypoxia. Premedication and post-infusion medications decrease the incidence of reactions. Can occur during or up to 4 hours after the infusion (and up to 48 hours after the infusion without post-infusion medications). If a reaction occurs, stop the infusion and manage symptoms; once reaction has resolved, treatment can be restarted at half the last infusion rate, unless the reaction is severe (grade 4 severity or recurrence for a third time of a grade 3 reaction); in such case, discontinue the drug permanently.
- Cardiovascular: hypertension, hypotension, palpitations.
- GI: nausea, vomiting, anorexia, diarrhea, constipation.
- CNS: headache.
- Electrolyte disturbances: hypercalcemia, hypocalcemia, hyponatremia.
- Hematologic: anemia, neutropenia, thrombocytopenia.
- Hepatic: AST increase.
- Renal: serum creatinine increase.
- Respiratory: cough, dyspnea, bronchospasm, rhinitis, upper respiratory tract infections, pneumonia.
- Infections (including reactivation of hepatitis B virus and herpes zoster virus; refer to Miscellaneous section).
- Fatigue, musculoskeletal pain, fever.
- Local reactions: erythema.
DOSAGE

- Premedication for daratumumab monotherapy: to be administered 1-3 hours before daratumumab infusion: antipyretics (acetaminophen 650-1000 mg PO), antihistamines (diphenhydramine 25-50 mg IV/PO) and corticosteroids (methylprednisolone 100 mg IV or an equivalent dose of a long- or intermediate-acting corticosteroid) for the first infusion; may use a lower dose of the corticosteroid (e.g., methylprednisolone 60 mg IV) for subsequent infusions.

- Premedication for daratumumab combination therapy: same as above but, instead of methylprednisolone, administer dexamethasone 20 mg IV for the first infusion then consider PO for subsequent infusions.

- Post-infusion medication for daratumumab monotherapy: administer an oral corticosteroid (20 mg of methylprednisolone or an equivalent dose of a long- or intermediate-acting corticosteroid) on the first and second day after each infusion (beginning the day after the infusion).

- Post-infusion medication for daratumumab combination therapy: consider administering low-dose oral methylprednisolone (20 mg or less) or equivalent the day after the infusion. However, if dexamethasone is part of the regimen and is scheduled to be administered the day after daratumumab infusion, additional post-infusion medications may not be needed.

- In all patients with chronic obstructive pulmonary disease, respiratory infusion reactions may necessitate post-infusion administration of short- and long-acting bronchodilators with inhaled corticosteroids.

- Newly-diagnosed multiple myeloma: 16 mg/kg IV as per the following frequency:
  - weeks 1-6: weekly (total of 6 doses);
  - weeks 7-54: every 3 weeks (total of 16 doses);
  - weeks 55 onwards until disease progression: every 4 weeks.

- Relapsed/refractory multiple myeloma, as monotherapy or in combination with lenalidomide and dexamethasone: 16 mg /kg IV as per the following frequency:
  - weeks 1-8: weekly (total of 8 doses);
  - weeks 9-24: every 2 weeks (total of 8 doses);
  - weeks 25 onwards until disease progression: every 4 weeks.

- Relapsed/refractory multiple myeloma, in combination with bortezomib and dexamethasone: 16 mg /kg IV as per the following frequency:
  - weeks 1-9: weekly (total of 9 doses);
  - weeks 10-24: every 3 weeks (total of 5 doses);
  - weeks 25 onwards until disease progression: every 4 weeks.

- No dosage reduction should be done; in case of myelotoxicity, delay dose until bone marrow recovers and then administer full dose as above.

- Dosage in renal impairment: no dosage adjustment is necessary.

- Dosage in hepatic impairment: no dosage adjustment in mild impairment; not studied in moderate or severe impairment.

- Consult specific protocol.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Do not freeze or shake. Protect from light.

- The undiluted solution in vial should be colourless to yellow.

- The diluted solution (with NS) is stable for 24 hours in the fridge, protected from light, followed by 15 hours (including infusion time) at room temp (15-25°C) and exposed to room light.

.../Cont.
MISCELLANEOUS

- Emergency drugs and emergency resuscitation equipment must be available for the treatment of infusion-related reactions.
- Hepatitis B virus (HBV) reactivation may occur with daratumumab; perform HBV screening before starting therapy; monitor patients for HBV reactivation during and for at least 6 months following end of therapy.
- Herpes zoster virus reactivation may occur with daratumumab; start an antiviral prophylaxis within one week before initial treatment and continue until 3 months after completion of treatment.
- Daratumumab may interfere with cross-matching and red blood cell antibody screening; interference with indirect Coombs test may persist for up to 6 months after the last dose. Type and screen patient’s blood before initiating therapy if possible.

REFERENCES

**INDICATIONS**
- Treatment of anemia associated with chronic kidney disease.
- Treatment of chemotherapy-induced anemia in non-myeloid malignancies.

**ADMINISTRATION**
- IV direct (preferred in patients on hemodialysis): physician or RN. Administer undiluted from vial or use prefilled syringe, over at least 1 minute.
- SC: in the outer area of upper arms, abdomen (at least 2 inches from navel), front of middle thighs, buttocks. Rotate injection site.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis, angioedema, bronchospasm, rash, urticaria, Stevens-Johnson syndrome, toxic epidermal necrolysis.
- Cardiovascular: hypertension, hypotension, chest pain.
- GI: nausea, vomiting, diarrhea.
- CNS: headache, dizziness.
- Dyspnea.
- Peripheral edema.
- Infection.
- Myalgia, arthralgia, fatigue, fever.
- Thrombotic events.
- Pure red cell aplasia (rare).
- Local reactions: injection site pain or local redness, swelling or itching, vascular access thrombosis.

**Dosage**

**Anemia associated with chronic kidney disease:**
- Initial dose:
  - Patients of dialysis: 0.45 mcg/kg once weekly or 0.75 mcg/kg every 2 weeks; can be administered IV or SC but IV preferred.
  - Patients not on dialysis: 0.45 mcg/kg SC/IV every 4 weeks.
- Titrate dose in steps of 25% to target hemoglobin of 100 to 120 g/L. Do not exceed a hemoglobin level of 120 g/L. Do not exceed increase in hemoglobin of greater than 10 g/L in a 2-week period. Do not increase dose more frequently than once a month.
- Consult the manufacturer’s monograph for more details on dosing, including how to switch patients from erythropoietin to darbepoetin.

**Chemotherapy-induced anemia:**
- Do not initiate if hemoglobin is 100 g/L or greater.
- Two dosing regimens may be used: 500 mcg SC every 3 weeks or 2.25 mcg/kg SC once weekly with a maximum of 4.5 mcg/kg once weekly. Adjust dose to maintain the lowest hemoglobin level sufficient to avoid the need for red blood cell transfusion and not to exceed 120 g/L.
- Discontinue darbepoetin following completion of a chemotherapy course or after 8 weeks of therapy with no response.
- Consult manufacturer’s monograph for more details on dosage adjustment.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and prefilled syringes between 2-8°C. Protect from light. Do not freeze.
- Do not shake. Do not dilute.
- Single use only.
- Do not use if discoloured or precipitate present.

MISCELLANEOUS

- When darbepoetin therapy is started or the dose adjusted, hemoglobin should be measured on a weekly basis until stabilized and then monthly thereafter.
- High hemoglobin and/or high rate of rise of hemoglobin increases the risk of cardiovascular and neurological events.
- Blood pressure should be followed closely. Darbepoetin should not be used in patients with uncontrolled hypertension.
- Iron status should be evaluated, as the majority of patients will require iron supplementation.
- Patients experiencing pure red cell aplasia with other erythropoietin products should not be switched to darbepoetin.
- Needle cover of all prefilled syringes contains latex.

REFERENCES

1, 2, 40, 95, 135, 292.
INDICATIONS
- Treatment of myeloblastic and acute lymphoblastic leukemias.
- Induction of remission in chronic myeloid leukemia, reticulosarcoma, Ewing or Wilms’ tumours, lymphosarcoma and other malignant tumours.

ADMINISTRATION
- Reconstitute with 4 mL SWFI for a final concentration of 5 mg/mL. Shake gently to dissolve.
- IV direct: physician or RN; dilute in 10-15 mL of NS; inject over 2-3 minutes into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; infuse 50 mL over 10-15 minutes; infuse 100 mL over 30-45 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid (rare); fever and rash.
- Cardiovascular: transient arrhythmias, facial flushing with rapid injection.
- GI: nausea and vomiting.
- Dermatologic: radiation recall reaction (rare).
- Hyperuricemia.
- Red discolouration of urine for 1-2 days.
- Local reactions: pain, flare reaction (histamine release).
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Usual adult dose: initial therapy: 30-60 mg/m²/day IV for 3-6 days every 3-4 weeks (monotherapy) or 45 mg/m²/day IV for 2-3 days every 3-4 weeks (combination therapy). Maintenance: 30 mg/m² IV once weekly.
- To avoid cardiotoxicity, total cumulative dose should not exceed 900 mg/m² in adults with normal cardiac function or 400-450 mg/m² in adults with cardiac risk factors or in combination with thoracic radiation.
- Dosage adjustment needed in hepatic or renal impairment.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Reconstituted solution stable for 7 days at room temp. Protect from light.
- Contact between daunorubicin 5 mg/mL and aluminium may result in darkening of solution and formation of black patches on the aluminium surface after 12-24 hours.
- Colour change of reconstituted solution from red to blue-purple indicates decomposition; discard these solutions.
- Stable for 43 days at room temp, 4°C and -20°C protected from light in NS and D5W at a concentration of 0.1 mg/mL in PVC bags.
- Stable for 28 days at room temp protected from light in D5W, NS and RL at a concentration of 0.1 mg/mL in plastic syringes.
- Stable for 43 days at 4°C, protected from light in SWFI at a concentration of 2 mg/mL in polypropylene syringes.
- Stable for 80 hours at room temp in NS and D5W at a concentration of 5 mg/mL.
- Stable for 54 hours at room temp in RL at a concentration of 5 mg/mL.

MISCELLANEOUS
- Not interchangeable with liposomal daunorubicin.

REFERENCES
1, 2, 4, 5, 6, 40, 95, 129, 143, 165.
**INDICATIONS**
- Treatment of myelodysplastic syndrome.

**ADMINISTRATION**
- Reconstitute each 50 mg vial with 10 mL SWFI to obtain a 5 mg/mL solution.
- Intermittent IV infusion: immediately dilute reconstituted solution with 50 to 250 mL of cold (2-8°C) NS, D5W, or RL to a concentration of 0.1-1 mg/mL and infuse over 1 or 3 hours, depending on protocol.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- GI: nausea, diarrhea, constipation.
- CNS: headache, insomnia.
- Hematologic: neutropenia, thrombocytopenia, anemia.
- Fever, fatigue, cough.
- Hyperglycemia.
- Petechiae.
- Local injection site reactions: swelling, erythema, pain.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- 15 mg/m² IV infused over 3 hours; repeat q8h for 3 days. Repeat this cycle every 6 weeks for a minimum of 4 cycles; treatment to continue as long as patient continues to benefit.
- 20 mg/m² IV infused over 60 minutes once daily for 5 days. Repeat this cycle every 4 weeks.
- Dose to be adjusted or delayed based on hematologic values, renal function, hepatic function, and in the presence of active or uncontrolled infection. Refer to manufacturer's instructions.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Use reconstituted solution within 15 minutes. Drug concentration decreases by 10% after 5 hours at room temp.
- Stable for 7 hours in the fridge if prepared using cold (2-8°C) infusion fluids.

**MISCELLANEOUS**
- Caution when administering to patients with pre-existing hepatic or renal impairment.

**REFERENCES**
1, 5, 40, 60, 95, 152, 178.

* Available via Health Canada’s Special Access Programme
DEFEROXAMINE
Desferal ®
Chelating agent

INDICATIONS
- An adjunct in the treatment of acute iron intoxication.
- Treatment of chronic iron overload due to transfusion-dependent anemias.
- Diagnosis of aluminium overload (deferoxamine infusion test).
- Treatment of chronic aluminium overload in patients with end stage renal failure (ESRF) under maintenance dialysis.

ADMINISTRATION
- For IV & SC use: reconstitute the 500 mg vial and 2 g vial with 5 mL and 20 mL of SWFI respectively for a final concentration of 95 mg/mL (taking into account volume of powder). Do NOT reconstitute with NS.
- For IM use: reconstitute the 500 mg vial and 2 g vial with 2 mL and 8 mL of SWFI respectively for a final concentration of 213 mg/mL (taking into account volume of powder). Do NOT reconstitute with NS.
- Intermittent IV infusion, Continuous IV infusion (preferred for treatment of acute iron intoxication): dilute with NS, D5W or RL; maximum concentration of 250 mg/mL (taking into account volume of powder). For iron intoxication: infuse at a rate of 15 mg/kg/hr (higher rates up to 40-50 mg/kg/hr have been used in severe iron intoxication) for the first 1000 mg; after do NOT exceed 125 mg/hr. For chronic iron overload: infuse over 8-12 hours at a maximum rate of 15 mg/kg/hr.
- IM (for treatment of chronic iron toxicity).
- SC injection or SC infusion (for treatment of chronic iron toxicity).
- It should not be administered at the same time as blood transfusions (even if in 2 separate lines) to avoid confusion of the causal agent should hypersensitivity or infusion-related reactions occur.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, angioedema, rash, urticaria.
- Infusion-related reactions: following rapid IV infusion (greater than 15 mg/kg/hr), generalized erythema, urticaria, flushing, tachycardia, hypotension and shock may occur (due to possible histamine release).
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: headache, dizziness, neuropathy, paresthesia, precipitation of aluminium-related dialysis encephalopathy.
- Discolouration of urine (reddish colour).
- Arthralgia, myalgia.
- Fever.
- Increased frequency of opportunistic infections, especially Yersinia enterocolitica, Yersinia pseudotuberculosis and possibly fungi.
- Adult respiratory distress syndrome-like condition at high doses.
- Local reactions: pain, pruritus, erythema, swelling, burning, and induration at the site of injection or infusion.

DOSAGE
Adults:
- Acute iron intoxication: 1 g IV followed by 500 mg IV at 4-hour intervals for 2 doses. Depending on the clinical response of the patient, subsequent doses of 500 mg IV may be administered q4-12h. Maximum dose: 6 g/day. Maximum single dose should not exceed 2 g.
- Chronic iron overload: 0.5-1 g IM daily or 1-4 g/day by SC infusion or IV infusion (may be given as a 12 hour infusion, but in some patients, iron excretion is further increased by infusing the same dose over 24 hours).
- Diagnosis of aluminium overload: Adults with ESRF: 5 mg/kg IV single dose following dialysis or during the last 60 minutes of the hemodialysis session.
- Chronic aluminium overload: 5 mg/kg IV once weekly following dialysis or during the last 60 minutes of the hemodialysis session. Dosage and length of treatment should be individually determined.
- Consult manufacturer’s monograph.
DEFEROXAMINE

Desferal ®

Chelating agent

DOSAGE

Pediatrics:
- Acute iron intoxication: 20 mg/kg IV or 600 mg/m² IV (maximum 1 g), followed by 10 mg/kg IV or 300 mg/m² IV (maximum 500 mg) q4h for 2 doses. Further doses of 10 mg/kg IV or 300 mg/m² IV (maximum 500 mg) may be administered q4-12h based on clinical response. Alternative dosage: initial dose of 90 mg/kg IM followed by 45 mg/kg IM q4-12h. Maximum dose: 6 g/day. Maximum single dose should not exceed 1 g.
- Chronic iron overload: 0.5-1 g IM daily or 20-50 mg/kg/day by SC infusion or IV infusion over 8-12 hours. Maximum dose: 2 g/day.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at temperatures not exceeding 25°C.
- Reconstituted solutions are stable for 1 week at room temp, when protected from light; do not refrigerate.
- Reconstituted solution is clear and colourless to slightly yellow. Turbid solutions should not be used.
- Stable for 24 hours at room temp when diluted in NS, D5W and RL solutions.
- Stable for 14 days at 35°C in D5W or NS at a concentration of 5 mg/mL in natural rubber elastomeric reservoirs.
- Stable for 7 days at room temp in SWFI at a concentration of 210 mg/mL when stored in a PVC cassette.

MISCELLANEOUS

- Deferoxamine is not a substitute for standard treatment of iron intoxication (emesis, gastric lavage, suction and maintenance of airways, control of peripheral vascular failure and correction of acidosis).
- Contraindicated in patients with severe renal disease or anuria not on dialysis.
- Theoretically, 1 g of deferoxamine is capable of sequestering 85 mg of iron (as the ferric ion) and 41 mg of aluminium.

REFERENCES

1, 2, 4, 6, 40, 82, 95, 135, 143, 339.
DEFIBROTIDE

INDICATIONS
- Treatment of adults and pediatric patients with hepatic sinusoidal obstruction syndrome (SOS; formerly called hepatic veno-occlusive disease) with renal or pulmonary dysfunction following hematopoietic stem cell transplantation therapy.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in NS or D5W to obtain a concentration of 4 to 20 mg/mL. Gently mix. Solution should be clear, colourless to light yellow and without visible particles. Infuse over 2 hours using a 0.2 micron in-line filter. Flush with NS or D5W immediately before and after administration.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: pruritus, rash, wheezing, angioedema.
- Cardiovascular: hypotension.
- GI: nausea, vomiting, diarrhea.
- Hematologic: bleeding (e.g., GI tract, epistaxis, intracranial, cerebral, pulmonary); stop therapy if significant bleeding occurs.

DOSAGE
Adults and pediatrics (one month of age and older):
- 6.25 mg/kg IV q6h (25 mg/kg/day) for at least 21 days.
- Dosage in renal impairment: no dosage adjustment is necessary, including hemodialysis patients.
- Dosage in hepatic impairment: no dosage adjustment is necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Diluted solution stable for 4 hours at room temp and 24 hours in the fridge.

MISCELLANEOUS
- Do not administer concurrent medications that increase risk of hemorrhage such as warfarin, heparin, low molecular weight heparins (except for maintenance of central IV line and dialysis machine filtration), alteplase or other systemic anticoagulants or fibrinolytic therapy.
- Monitor carefully if patient receives antiplatelet therapy.
- Discontinue infusion at least 2 hours prior to an invasive procedure.
- Use with caution in patients with pig allergies as defibrotide is derived from porcine tissue.

REFERENCES
5, 95, 135.
## Indications
- Treatment of osteoporosis in postmenopausal women at high risk for fracture or who have failed or are intolerant to other osteoporosis therapy (Prolia ®).
- Treatment of osteoporosis in men at high risk for fracture (Prolia ®).
- To increase bone mass in men with nonmetastatic prostate cancer who are receiving androgen deprivation therapy and are at high risk for fracture (Prolia ®).
- To increase bone mass in women receiving adjuvant aromatase inhibitor therapy for nonmetastatic breast cancer (Prolia ®).
- Treatment and prevention of glucocorticoid-induced osteoporosis in women and men at high risk of fracture (Prolia ®).
- For reducing the risk of developing skeletal-related events (SRE) in patients with multiple myeloma and in patients with bone metastases from breast cancer, prostate cancer, non-small cell lung cancer and other solid tumours (Xgeva ®).
- Treatment of adults and skeletally mature adolescents with giant cell tumour of bone that is unresectable or where surgical resection is likely to result in severe morbidity (Xgeva ®).
- Treatment of hypercalcemia of malignancy that is refractory to IV bisphosphonates (Xgeva ®).

## Administration
- Prior to administration, bring to room temp in original container (allow to stand 15-30 minutes).
- SC: in upper arm, upper thigh or abdomen.

## Potential Administration Hazards
- GI: nausea, diarrhea.
- CNS: headache, insomnia, depression.
- Respiratory: dyspnea, cough.
- Dermatologic: dermatitis, eczema, rash; most of the reactions are not localized to the injection site.
- Back pain, extremity pain and musculoskeletal pain.
- Hypocalcemia especially in patients with severe renal failure (CrCl less than 30 mL/min or on dialysis); hypophosphatemia (Xgeva ®).
- Fatigue, asthenia.
- May increase risk of infections.

## Dosage
- Osteoporosis/to increase bone mass (Prolia ®): 60 mg SC once every 6 months.
- Preventing SRE in patients with multiple myeloma and in patients with bone metastases (Xgeva ®): 120 mg SC once every 4 weeks.
- Giant cell tumour of bone and hypercalcemia of malignancy (Xgeva ®): initial dose of 120 mg SC on days 1, 8 and 15 of month 1; maintenance dose of 120 mg SC every 4 weeks starting on day 1 of month 2.
- Dosage in renal impairment: no dosage adjustment required.

## Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store prefilled syringes and vials in the fridge; protect from light; do not freeze; avoid vigorous shaking.
- Stable for 30 days at room temp (up to 25°C), protected from light.

## Miscellaneous
- Ensure adequate intake of calcium and vitamin D.
- Monitor serum calcium level; level should be corrected before starting therapy.

## References
1, 2, 5, 129, 135.
DESMOPRESSIN
DDAVP ®, Octostim ®
Antidiuretic hormone analog

INDICATIONS
- Replacement therapy for central diabetes insipidus.
- To control bleeding in patients with hemophilia A and in Von Willebrand’s Disease (Type I).
- For prolonged bleeding times and hemorrhagic tendencies in uremic patients.

ADMINISTRATION
- IV direct: physician only. For diabetes insipidus only. Administer over 1 minute.
- Intermittent IV infusion: dilute in 50 mL (10 mL for children weighing 10 kg or less) of solution and administer over 20-30 minutes. For bleeding disorders only.
- IM, SC: preferred for diabetes insipidus; SC route can also be used for bleeding disorders.

 POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis (rare).
- Cardiovascular: facial flushing, mild hypotension or hypertension, tachycardia.
- GI: nausea, abdominal cramps.
- CNS: headache.
- Vulvar pain.
- Potential for water intoxication and hyponatremia when used for its hemostatic effects. Watch for signs and symptoms associated with hyponatremia: headache, nausea, vomiting, weight gain, restlessness, fatigue, lethargy, disorientation, depressed reflexes, loss of appetite, irritability, muscle weakness and/or spasms, abnormal mental status (e.g., confusion, decreased consciousness, hallucinations). May lead to seizures and coma.
- Thrombotic events (rare).
- Local reactions: erythema, swelling, burning pain at site of injection; occasional burning or pain along the vein of injection.

 DOSAGE
- Adults:
  - Diabetes insipidus: 1-4 mcg once daily IV, IM, SC as a single dose or in two divided doses.
  - Bleeding disorders: 0.3 mcg/kg or 10 mcg/m² IV or SC.
- Pediatrics:
  - Diabetes insipidus: 0.4 mcg once daily IV, IM, SC.
  - Bleeding disorders: 0.3 mcg/kg SC or IV.
- When used preoperatively, administer 30 minutes before procedure.
- When used for prevention/treatment of bleeding, repeated administration at intervals of less than 48 hours may increase the possibility of tachyphylaxis. However, if needed, a second dose may be administered 8-24 hours after the first dose.

 COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules in the fridge; do not freeze.
- Stable for 24 hours at room temp in NS or D5W at concentrations of 0.3 mcg/mL and 0.4 mcg/mL in PVC bags.

 MISCELLANEOUS
- Peak effect on blood clotting occurs 30 minutes after an IV dose and 60-90 minutes after a SC dose.
- Desmopressin 1 mcg = 4 international units.
- Equivalent dosage: 1 mcg IV = 10 mcg intranasal.

 REFERENCES
1, 2, 5, 40, 71, 73, 75, 95, 135, 449, 450.
DEXAMETHASONE
Decadron ®
Corticosteroid

INDICATIONS
- For short-term emergency corticosteroid therapy.
- Situations when a rapid and intense hormonal effect is desired, e.g., shock, hypersensitivity reactions, status asthmaticus, organ transplants, cerebral edema, hypercalcemia, bacterial meningitis.
- Antiemetic for chemotherapy-induced nausea and vomiting.
- Adrenocortical insufficiency.

ADMINISTRATION
- IV direct: physician or RN. Administer over 1 minute.
- Intermittent IV infusion: dilute in 50-100 mL with NS or D5W and administer over at least 15 minutes.
- Continuous IV infusion.
- IM, SC

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions, anaphylaxis, angioedema, urticaria.
- IV related reactions: burning and tingling in the perineal area may occur with rapid IV injections; slowing down may reduce the occurrence.
- GI: peptic ulcer, perforation, hemorrhage, nausea, pancreatitis, abdominal distension, increased appetite.
- CNS: mental disturbances (euphoria, mood swings, depression, personality changes, psychoses), insomnia, headache, vertigo.
- Hypokalemia, hyperglycemia.
- Increased intraocular pressure.
- Immunosuppression.
- Dermatologic: hypo- or hyper-pigmentation, bruising, scarring, induration, and sterile abscess.

DOSAGE
- Doses are highly variable; average dose range is 0.5-24 mg IM or IV daily; may be divided in 2-4 doses. Total dose usually does not exceed 80 mg/24 hours.
- Shock: 1-6 mg/kg IV as a single injection or 40 mg IV repeated q2-6h if needed or 20 mg IV followed by continuous IV infusion of 3 mg/kg/24 hours. High-dose therapy is continued until patient condition stabilizes and usually should not be used longer than 48-72 hours.
- Hypersensitivity reactions: 4-8 mg IV on the first day, then follow for the next 5 days with decreasing oral doses (1.5 mg q12h on days 2-3; 0.75 mg q12h on day 4 and 0.75 mg daily on days 5-6).
- Cerebral edema: 10 mg IV followed by 4 mg IM q6h until symptoms subside. Reduce dose after 2-4 days and discontinue gradually over 5-7 days. If recurrent or inoperable brain tumours, 2 mg IM or IV 2 or 3 times daily to relieve symptoms of increased intracranial pressure.
- Bacterial meningitis: 0.15 mg/kg IV q6h X 4 days; start first dose 10-20 minutes before or concurrently with first dose of antibiotic.
- Antiemetic for chemotherapy-induced nausea and vomiting: 8-20 mg IV before chemotherapy; additional lower doses may be given over the next 24-72 hours.

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<td>Corticosteroid</td>
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**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Stable for 55 days at room temp at a concentration of 10 mg/mL (original undiluted solution) when repackaged in 3 mL plastic syringes.
- Stable for 14 days at room temp protected from light in D5W or NS at concentrations of 0.66 mg/mL and 0.092 mg/mL in PVC bags.

**MISCELLANEOUS**

- Extreme caution in patients with diabetes, active tuberculosis, active peptic ulcer, fungal, viral or bacterial infections not controlled by medications.

**REFERENCES**

1, 4, 6, 40, 95, 135, 457.
DEXMEDETOMidINE  
**Precedex ™**  
**Sedative**

**INDICATIONS**
- For sedation of initially intubated and mechanically ventilated post-surgery patients in an intensive care setting for a maximum of 24 hours.
- For conscious sedation of non-intubated patients before and/or during procedures involving monitored anesthesia care (MAC) or awake fiberoptic intubation (AFI) in the operating room setting.

**ADMINISTRATION**
- Continuous IV infusion: **cardiac monitoring; continuous BP monitoring.** Prepare the infusion using one of the following 2 methods: 1) dilute 2 mL (200 mcg of base drug) from the concentrated solution with 48 mL of NS for a final volume of 50 mL and a concentration of 4 mcg/mL; shake gently to mix well; OR 2) use the ready-to-use solution (4 mcg/mL, 50 and 100 mL vials). To be used for loading and maintenance doses. Must be administered by an infusion pump.

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: hypotension, bradycardia, sinus arrest. (Antidote for severe bradycardia: atropine or glycopyrrolate). Transient hypertension can occur primarily during the administration of the loading dose. Decreasing the infusion rate may alleviate cardiovascular side effects.
- GI: dry mouth, nausea.
- Respiratory depression.
- Withdrawal symptoms: if administered for more than 24 hours and then stopped abruptly: nervousness, agitation, headache, rapid rise in blood pressure, elevated plasma catecholamine concentration.

**DOSAGE**
- Intensive care unit sedation:
  - Loading dose: 1 mcg/kg IV over 10-20 minutes if required.
  - Maintenance dose: 0.2-0.7 mcg/kg/hr IV to adjust to desired level of sedation. Although infusion rates up to 2.5 mcg/kg/hr have been used, doses over 1.5 mcg/kg/hr do not add any further benefit.
- Conscious sedation for MAC or AFI:
  - MAC: Loading dose: 0.5 or 1 mcg/kg IV over 10 minutes.
  - Maintenance dose: 0.6 mcg/kg/hr IV to start, with subsequent titration from 0.2-1 mcg/kg/hr.
  - AFI: Loading dose: 0.5 or 1 mcg/kg IV over 10 minutes.
  - Maintenance dose: 0.7 mcg/kg/hr IV.
- Duration of infusion should not exceed 24 hours.
- Dosage in renal impairment, hepatic impairment or in patients over 65 years of age: consider dose reduction for both the loading and maintenance infusions.
- Dose reductions may be required when co-administered with sedatives, hypnotics, anesthetics or opioids.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Compatible with D5W, NS, RL and mannitol 20%.
- Stable for 48 hours at room temp in NS at concentrations of 4, 8, 12 and 20 mcg/mL in PVC containers.
- Stable for 48 hours at room temp and for 14 days in the fridge when diluted in NS at a concentration of 4 mcg/mL in polypropylene syringes.
- May adsorb to some types of natural rubber; consider using components made with synthetic or coated natural rubber gaskets.

**MISCELLANEOUS**

**REFERENCES**
1, 2, 40, 94, 95, 135, 208, 307.
INDICATIONS
- Reduce the incidence and severity of cardiomyopathy associated with cumulative doses of doxorubicin exceeding 300 mg/m² in women with breast cancer who would benefit from continuing doxorubicin therapy above this cumulative dose.

ADMINISTRATION
- Reconstitute vials of 250 mg and 500 mg with 25 mL and 50 mL, respectively, of SWFI only to obtain a concentration of 10 mg/mL.
- Intermittent IV infusion: dilute with RL to a final concentration of 1.3-3 mg/mL; infuse over 15 minutes; refer to Dosage section for exact timing of administration in relation to doxorubicin.

POTENTIAL ADMINISTRATION HAZARDS
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Dermatologic: urticaria.
- Local reactions: pain.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 500 mg/m² IV in a ratio of 10:1 relative to the doxorubicin dose. Dose of 500 mg/m² should not be exceeded.
- Dexrazoxane should be given within a time period of 30 minutes before to 15 minutes after the start of the doxorubicin infusion.
- Dosage in renal impairment: when CrCl is less than 40 mL/min, reduce dose by 50% (i.e., give 250 mg/m²).
- Dosage in hepatic impairment: as doxorubicin dose is decreased, dexrazoxane will be decreased accordingly, keeping a ratio of 10:1.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solution is stable for 30 minutes at room temp or for up to 3 hours in the fridge.
- Stable for 60 minutes at room temp or for 4 hours in the fridge in RL at a concentration of 1.3-3 mg/mL.

MISCELLANEOUS
- Not indicated for use when initiating doxorubicin therapy; may interfere with antitumour effects of combination regimens.
- Even though controversial, dexrazoxane is considered an antineoplastic agent.

REFERENCES
1, 2, 4, 6, 40, 95, 129, 165.
INDICATIONS
- Fluid replacement and plasma volume expansion in the adjunctive treatment of certain types of shock, when whole blood or blood products are not available.
- May also be used for prophylaxis during surgical procedures with a high incidence of venous thrombosis and pulmonary emboli.
- In extracorporeal circulation, as a priming fluid in pump oxygenators.

ADMINISTRATION
- Continuous IV infusion (mandatory).
- Available as a 10% solution in NS or D5W ready for administration at a rate dependant on the amount of fluid loss.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions manifested as urticaria, chest tightness, nausea and vomiting, wheezing, hypotension; closely monitor patient during the first 5 minutes of infusion.
- Cardiovascular: vascular overload and pulmonary edema especially with large doses; increase in central venous pressure.
- Renal failure in extremely dehydrated patients.
- Hematologic: prolongation of bleeding time, decrease in plasma protein concentrations.

DOSAGE
- Shock: 10 to 20 mL/kg infused IV in the first 24 hours. Thereafter, 10 mL/kg daily for maximum of 5 days. The first 500 mL may be infused rapidly while monitoring central venous pressure closely.
- Prophylaxis of venous thrombosis and pulmonary embolism: 10 mL/kg IV initiated during surgery. Can give 500 mL/day for an additional 2 to 3 days. Thereafter, may give 500 mL every 2-3 days for up to 2 weeks.
- Extracorporeal circulation: dose varies with volume of pump oxygenators; generally 10-20 mL/kg is added to the perfusion circuit. Do not exceed 20 mL/kg.
- Dosage in renal impairment: adjust dose as excessive dosing may precipitate renal failure and anuria.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Use only clear solution.
- Dextran flakes may form in the solution; to redissolve, heat solution in water bath at 100°C until it becomes clear or autoclave at 110°C for 15 minutes.

MISCELLANEOUS
- State of hydration should be assessed. Monitor urine output.
- Caution in patients in whom sodium intake is restricted: 500 mL of 10% Dextran-40 in NS contains 77 mmol of Na and Cl. May wish to use dextran in dextrose.
- Depending on assay methods used, dextran may interfere with tests for blood typing and cross-matching, blood glucose, total proteins and bilirubin. To avoid misleading results, draw blood samples before initiation of dextran.

REFERENCES
1, 4, 40, 95, 135.
INDICATIONS
- For fluid and calorie replacement (5% and 10% solutions).
- Severe hypoglycemia (25% and 50% solutions).
- As an adjunct to insulin for the treatment of hyperkalemia.

ADMINISTRATION
- IV direct: physician or RN.
- Intermittent IV infusion.
- Continuous IV infusion.
- Rapid rates of administration of hypertonic solutions predispose to pain and phlebitis if a peripheral vein is used. Do NOT exceed a concentration of 10-12.5% for continuous infusion into a peripheral vein.
- Rate of administration: 0.5 g/kg/hr. Maximum: 0.8 g/kg/hr. Caution with higher rates of administration because of the risk of glucosuria. However, in certain circumstances, may be administered at a faster rate, i.e., up to 200 mg/kg/min; refer to Dosage section for more details.

POTENTIAL ADMINISTRATION HAZARDS
- CNS: hyperosmolar syndrome (mental confusion, loss of consciousness).
- Hyperglycemia and glycosuria; reactive hypoglycemia after abrupt discontinuation of concentrated dextrose infusion.
- Electrolyte and fluid disturbances, hypokalemia.
- Local reactions: pain, vein irritation, phlebitis.

DOSAGE
Adults:
- For treatment of severe hypoglycemia: 10-25 g (20-50 mL of 50% solution) IV over 1-3 minutes.
- For treatment of hyperkalemia: 5-10 units of regular insulin IV direct followed immediately by 25-50 g of dextrose (50-100 mL 50% solution) administered IV over 5 minutes.

Pediatrics:
- For treatment of hypoglycemia: infants 6 months of age and younger: 0.25-0.5 g/kg/dose IV; maximum: 25 g/dose.
- Infants older than 6 months of age and children: 0.5-1 g/kg/dose IV; maximum: 25 g/dose.
- For treatment of hyperkalemia: infants and children: 0.5-1 g/kg IV (using 25% or 50% solution) combined with 1 unit of regular insulin for every 4-5 g dextrose given; infuse over 30 minutes to 2 hours.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Dextrose has an acidic pH (4-4.2) and therefore specific compatibility information should be consulted when injected into an IV line containing another drug.

MISCELLANEOUS
- If dextrose 50% is ordered in a non-emergency situation (i.e., patient is stable), verify if patient can take an oral form of glucose.
- Dextrose solutions are an excellent media for microbial growth.
- Each g of IV dextrose provides 3.4 kcal; osmolarity of D10W: 505 mOsm/L and osmolarity of D25W: 1330 mOsm/L.

REFERENCES
1, 40, 82, 95, 135, 236, 328, 366, 367.
INDICATIONS

- Where very rapid response desired and oral route is not feasible, e.g., in acute anxiety and agitated states; oral absorption more reliable than IM.
- To alleviate symptoms of acute alcoholic withdrawal.
- To alleviate anxiety and provide sedation, light anesthesia and anterograde amnesia prior to endoscopic and surgical procedures or cardioversion.
- Adjunctive in status epilepticus.
- Adjunctive in skeletal muscle spasm.
- To prevent/treat seizures associated with nerve gas exposure (in the context of chemical warfare).

ADMINISTRATION

- IV direct (preferred): physician; RN for doses up to 10 mg/dose. Respiratory support. Administer slowly at a rate of 5 mg/min for adults and over a 3-minute period for infants and children but do not exceed a rate of 0.25 mg/kg over 3 minutes. Administer directly into a large vein to avoid thrombosis. If not possible, give into the tubing of a flowing IV solution as close as possible to the vein insertion.
- Intermittent IV infusion: refer to Compatibility and Stability section.
- IM: rarely justified because absorption is slow and erratic.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: hypotension (Antidote: norepinephrine or dopamine), bradycardia.
- CNS: amnesia, ataxia, confusion, drowsiness, dizziness.
- Respiratory depression (especially when dose exceeds 6 mg or when given too quickly).
- Laryngospasm: appropriate apparatus must be readily available to counteract.
- Local reactions: pain with injection, phlebitis.

Antidote: flumazenil will reverse all sedative effects.

DOSAGE

Adults:
- For anxiety: 2-10 mg IV; may repeat in 3-4 hours.
- For alcohol withdrawal: depending on severity of symptoms, 5-20 mg IV; to be repeated as needed to keep patient comfortable (intervals from 5 minutes to 4 hours have been used).
- For sedation, endoscopic procedure: 10 mg or less IV immediately prior to procedure; maximum dose up to 20 mg or 5-10 mg IM 30 minutes prior to procedure.
- For sedation, preoperative: 10 mg IV before surgery; maximum dose up to 20 mg.
- For sedation, cardioversion: 5 to 15 mg IV 5-10 minutes prior to procedure.
- For status epilepticus: 5-10 mg IV; may repeat every 10-15 minutes, up to a total dose of 30 mg. May repeat initial dose in 2-4 hours. Maximum dose in 24 hours is 100 mg.
- For muscle spasm: 5-10 mg IV; may repeat in 3-4 hours.
- For seizures associated with nerve gas exposure: 5-10 mg IV; repeat as indicated by respirator and seizure status.

Pediatrics:
- For sedation, muscle relaxation or anxiety: 0.04-0.3 mg/kg/dose IV q2-4h as needed to a maximum of 0.6 mg/kg in an 8-hour period. Maximum single dose: 10 mg.

.../Cont.
DiazePAM

Diazemuls ®, Valium ®

Benzodiazepine

DOSAGE (Cont.)

- For status epilepticus:
  - If child is younger than 5 years old: 0.2-0.5 mg/dose IV every 2-5 minutes to a maximum total dose of 5 mg; repeat in 2-4 hours as needed.
  - If child is 5 years old or older: 1 mg/dose IV every 2-5 minutes to a maximum total dose of 10 mg; repeat in 2-4 hours as needed or 0.2-0.5 mg/kg/dose IV every 15-30 minutes to a maximum total dose of 10 mg.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Protect from light.
- Do not mix with any other injectable drug.
- Dilution for IV infusion is not recommended. Precipitation can occur.
- Considerable amount of diazepam is adsorbed by plastic, PVC bags, PVC tubing, catheters, and infusion sets with a burette chamber. Patients may receive variable concentrations of the drug, depending on flow rate, type of administration set used and length of tubing.
- If dilution is imperative, add dilution solution to diazepam, not diazepam to solution. Polyethylene or glass containers and polyethylene/polypropylene plastic syringes are recommended for use.
- Diazepam is temporarily soluble diluted at least 1 mg/10 mL in NS, D5W, Ringer’s or RL in glass containers. Dilutions of 1:20 in NS, D5W, Ringer’s or RL should be used within 4 hours. Dilutions of 1:40 in NS, D5W, Ringer’s or RL should be used within 6 hours. Dilutions of 1:100 in NS, D5W or RL should be used within 24 hours. Do not use if cloudy or if precipitation present.
- Diazemuls ® may be diluted only in its own emulsion base (Intralipid or Nutralipid). Mixture must be used within 6 hours.

MISCELLANEOUS

- Oral route preferred whenever possible.
- Caution required for patients with low albumin, hepatic or renal impairment or respiratory insufficiency.
- The injectable preparation can be given rectally; it is given undiluted through a rectal cannula at a dose of 0.5 mg/kg (maximum: 20 mg).
- Diazemuls ® should not be used in the management of status epilepticus because of its delayed action.

REFERENCES

1, 4, 5, 6, 40, 82, 95, 135, 263, 367, 407, 527, 534.
DIGOXIN

INDICATIONS
- Treatment of congestive heart failure emergencies which cannot be controlled by oral medication, or when a rapid effect is desired.
- Control of ventricular response in supraventricular dysrhythmias.

ADMINISTRATION
- IV direct: physician; RN for doses up to 0.25 mg. Administer (undiluted or diluted at least fourfold with SWFI, NS, D5W or RL) over at least 5 minutes.
- Intermittent IV infusion: dilute dose in 50 mL of NS or D5W and infuse immediately over 5-10 minutes.
- IM: not advised due to erratic absorption, severe local irritation, and pain.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: angioedema, rash, pruritus, urticaria.
- Cardiovascular: atrial tachycardia with or without block, asystole, junctional tachycardia, AV dissociation, AV block, PR prolongation, premature ventricular contractions, ST segment depression, ventricular tachycardia, ventricular fibrillation.
- GI: nausea, vomiting, diarrhea, abdominal pain (clinical signs of digoxin toxicity).
- CNS: headache, dizziness, drowsiness, confusion, hallucinations (clinical signs of digoxin toxicity).
- Muscle weakness, fatigue.
- Blurred vision, halos, yellow or green vision (clinical signs of digoxin toxicity).
- Local reactions: extravasation can cause local irritation and sloughing.

Antidote: digoxin immune fab if severe toxicity.

DOSAGE
- IV loading dose: 50% of calculated dose given as first dose, then 25% given at 4 to 8 hours intervals for 2 doses.
  Adults: (10 years and older): 8-12 mcg/kg of lean body weight IV (usually a total dose of 0.5-1 mg).
  Pediatrics: Full term: 20-30 mcg/kg IV 2-5 years: 25-35 mcg/kg IV
  1-24 months: 30-50 mcg/kg IV 5-10 years: 15-30 mcg/kg IV
- IV maintenance dose: 25-35% of IV loading dose (usually 0.1-0.4 mg) given once daily. Infants and children less than 10 years of age should receive the daily maintenance dose divided q12h.
- Dosage in renal impairment:
  CrCl (mL/min) 50-10 less than 10
  Loading dose: 100% 50%
  Maintenance dose: 25-75% 10-25%
- When switching from oral or IM to IV therapy, decrease dosage by 20-25%.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp; protect from light.
- Stable for 48 hours at room temp or refrigerated in NS or D5W at a concentration of 2.5 mcg/mL.

MISCELLANEOUS
- Hypokalemia, hypercalcemia, hypomagnesemia and hypothyroidism predispose patient to toxicity.
- Following a single IV dose, effects are noticeable in 5-30 minutes and develop fully in 1-4 hours. (Half-life of IV digoxin is 33-44 hours if renal function is normal).
- For digoxin levels, draw blood sample just prior to a dose or at least 6-8 hours after the last dose.
- To convert serum digoxin concentration from nmol/L to ng/mL, multiply by 0.78.

REFERENCES
1, 4, 6, 40, 82, 95, 135.
INDICATIONS
- For the treatment of life-threatening digoxin intoxication.

ADMINISTRATION
- Reconstitute each 40 mg vial with 4 mL SWFI to obtain a solution of approximately 10 mg/mL. Gently mix; do NOT shake. Solution should be clear and colourless.
- IV direct: physician only. **Cardiac monitoring.** Reserve in situations where cardiac arrest is imminent.
- Intermittent IV infusion (preferred): **cardiac monitoring**. Dilute total dose in any desired amount of NS (at TOH, dilute in 50-100 mL) and infuse over at least 30 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, anaphylaxis.
- Cardiovascular: worsening of underlying condition e.g., atrial fibrillation, congestive heart failure.
- Hypokalemia.

DOSAGE
- A 40 mg vial will neutralize approximately 0.5 mg of digoxin.
- For dosing in patients in whom amount of acute ingestion of digoxin or serum digoxin concentration is unknown:
  - Adults: Chronic toxicity: 6 vials are usually adequate. Acute toxicity: 10-20 vials are usually adequate.
  - Pediatrics: Chronic toxicity (up to 20 kg): one vial is usually sufficient. Acute toxicity: may consider administering 10 vials, and observe patient. If needed, another 10 vials may be administered. Watch for volume overload.
- For dosing in patients in whom amount of acute ingestion of digoxin or serum digoxin concentration is known, refer to calculations below:
  - Calculations when ingestion of known amount (to round up to the nearest whole vial):
    Formula 1: Dose = number of tablets x strength of tablet x 0.8 (bioavailability) / 0.5 mg of digoxin bound/vial
  - Calculations based on steady-state serum digoxin concentrations (to round up to the nearest vial):
    Formula 2: Calculation with digoxin in nmol/L (S.I. units): Dose = (serum digoxin concentration in nmol/L x 0.781) (weight in kg) / 100
  - For infants and small children weighing 20 kg or less: dose calculated above as number of vials can be translated in mg for a more precise dose to administer:
    Formula 3: Dose (in mg) = (Dose in # of vials) x (40 mg/vial)

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unopened vials in the fridge.
- Reconstituted solutions stable for 4 hours in the fridge.
- Compatible with NS.
### MISCELLANEOUS

- Since digoxin immune Fab will interfere with digitalis assay, digoxin concentration measurement may be misleading until Fab fragments are eliminated from the body (may take several days in patients with normal renal function or a week or longer in patients with renal impairment).
- Digoxin immune Fab is derived from sheep Fab immunoglobulins fragments; patients with allergies to sheep proteins may be at higher risk for hypersensitivity reactions.
- Skin testing has not proved useful in predicting allergic response.
- To convert serum digoxin concentration from nmol/L to ng/mL multiply by 0.78.

### REFERENCES

1, 2, 40, 95.
INDICATIONS
- Symptomatic relief of migraine or other types of vascular headaches.

ADMINISTRATION
- IV direct: physician only for first dose; RN can administer repeat doses. Administer at a rate of 1 mg/min.
- IM, SC: preferred.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, facial edema, dyspnea.
- Cardiovascular: hypertension, myocardial ischemia, transient tachycardia or bradycardia.
- GI: nausea, vomiting, abdominal pain, diarrhea.
- CNS: dizziness.
- Weakness in the legs, muscle pain in the extremities, numbness and tingling of fingers and toes.
- Local reactions: edema and itching.

DOSAGE
- Migraine attack, cluster headache: 1 mg initially IV/IM/SC. May repeat q1h to a maximum of 3 mg in a 24-hour period (SC or IM route) or 2 mg in a 24-hour period (IV route); total weekly dose should not exceed 6 mg (by any route of injection).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp below 25°C. Protect ampoules from light and heat. Do not refrigerate.
- Do not use if solution becomes discoloured.

MISCELLANEOUS
- Use of antiemetics (e.g., metoclopramide 10 mg) prior to each dose is recommended due to the high incidence of nausea/vomiting.
- Contraindicated in patients with ischemic or vasospastic heart disease, coronary artery disease, peripheral vascular disease, uncontrolled hypertension, severely impaired hepatic or renal functions, pregnancy, breastfeeding, sepsis, basilar or hemiplegic migraine.
- Onset of action occurs in 15-30 minutes following IM administration and within a few minutes (usually less than 5 minutes) after IV administration. Duration of action is 3-4 hours following IM administration.

REFERENCES
1, 3, 5, 6, 40, 95, 135.
**INDICATIONS**
- Rapid conversion to sinus rhythm of paroxysmal supraventricular tachycardia (PSVT).
- Temporary control of rapid ventricular rate in atrial fibrillation or flutter.

**ADMINISTRATION**
- IV direct: first dose physician only. **Cardiac monitoring; blood pressure monitoring.** Administer undiluted over 2 minutes.
- Continuous IV infusion: **cardiac monitoring; blood pressure monitoring.** At TOH: dilute 125 mg (25 mL from a diltiazem 5 mg/mL vial) in 100 mL of D5W, NS or D5-1/2NS to obtain a final concentration of 1 mg/mL (125 mg/125 mL). For larger volumes of solution, may also dilute 250 mg (50 mL) in 250 mL of D5W, NS or D5-1/2NS (final concentration of 0.83 mg/mL) or 250 mg (50 mL) in 500 mL of D5W, NS or D5-1/2NS (final concentration of 0.45 mg/mL).

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: hypotension, flushing, vasodilation, cardiac conduction blocks, heart failure, arrhythmia.
- CNS: headache, dizziness.
- Local reactions: burning and itching at injection site.

**DOSAGE**
- Initial bolus of 0.25 mg/kg IV over 2 minutes.
- If response inadequate after 15 minutes, may give a second bolus of 0.35 mg/kg IV over 2 minutes.
- For continued heart rate control, an infusion may be started following the bolus dose(s) at a rate of 5 mg/hr IV and titrated to effect in increments of 5 mg/hr, but not to exceed 15 mg/hr for up to 24 hours.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store unopened vials in the fridge. Do not freeze. Stable for 1 month at room temp, then should be discarded.
- Stable for 24 hours at room temp or in the fridge when diluted with D5W, NS or D5-1/2NS at concentrations up to 1 mg/mL in glass or PVC containers.

**MISCELLANEOUS**
- Concomitant IV diltiazem and IV beta-blockers may cause significant cardiac depression. Therefore, co-administration (within a few hours) is contraindicated.
- Maximal heart rate reduction occurs within 2-7 minutes of bolus and persists for 1-3 hours.
- Contraindicated in patients with sick sinus syndrome (except if pacemaker in place), in patients with second- or third-degree AV block (except if pacemaker in place), in patients with severe hypotension or cardiogenic shock, in patients with ventricular tachycardia, in patients with atrial fibrillation or flutter when associated with an accessory bypass tract.

**REFERENCES**
1, 4, 6, 40, 95.
INDICATIONS
- To alleviate nausea and vomiting due to surgery, pregnancy, motion sickness.
- Treatment and prevention of radiation sickness.
- Symptomatic treatment of nausea and vertigo due to Menière’s disease and other vestibular disturbances.

ADMINISTRATION
- IV direct: physician or RN. If using the IM formulation (50 mg/mL), dilute each 50 mg (1 mL) with 10 mL of NS or D5W and administer slowly over 2 minutes. If using the IV formulation (10 mg/mL), may administer undiluted over 2 minutes.
- Intermittent IV infusion.
- IM, SC: use the 50 mg/mL concentration.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypotension, palpitations, tachycardia.
- GI: dry mouth.
- CNS: drowsiness, dizziness, headache, paradoxical CNS stimulation especially in children.
- Local reactions: pain at the injection site; undiluted solution of IM formulation given IV is irritating to the veins and may produce sclerosis.

DOSAGE
- For the treatment of nausea, vomiting, dizziness and vertigo associated with motion sickness: 50-100 mg q4-6h as needed. Maximum dose: 400 mg/24 hours.
- For nausea and vomiting due to surgery: 50 mg preoperatively; to be repeated postoperatively as needed to a maximum of 400 mg/24 hours.
- For radiation sickness: 50-100 mg 30-60 minutes before treatment; repeat as necessary after treatment. Maximum dose: 400 mg/24 hours.
- Acute attacks of vertigo due to Menière’s disease: 50 mg q6h.
- Pediatrics less than 12 years of age: 5 mg/kg/day or 150 mg/m²/day given in divided doses q6h. Maximum dose: 300 mg/day.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 7 days at room temp with exposure to light or 91 days in the fridge protected from light diluted in NS or D5W at concentrations of 0.5 mg/mL, 1 mg/mL and 2 mg/mL in PVC minibags.
- Stable for 60 days at room temp with exposure to light or in the fridge protected from light when diluted in NS at concentrations of 2.5 mg/mL, 5 mg/mL and 10 mg/mL in polypropylene syringes.
- Compatible with dextrose, saline and RL solutions.

MISCELLANEOUS
- Anti-emetic effects occur almost immediately after IV dose, 20-30 minutes after IM dose; duration of action is 3-6 hours.

REFERENCES
1, 2, 4, 6, 9, 56, 82, 95, 457.
INDICATIONS
- Treatment of severe allergic reactions.
- To reduce nausea and vomiting due to surgery, malignancy or antineoplastic agents.
- Prevention of allergic reactions during transfusion.
- Relief of pruritus.
- As a sedative for preoperative medication.
- Management of tremor early in parkinsonian syndrome and of drug-induced extrapyramidal reactions.

ADMINISTRATION
- IV direct (preferred): physician or RN. Administer undiluted or diluted in 10 mL with NS. Give at a maximum rate of 25 mg/min.
- Intermittent IV infusion.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions, rash, urticaria.
- Cardiovascular: hypotension, rapid pulse.
- CNS: sedation, dizziness, headache, paradoxical excitement.
- Anticholinergic effects (blurring of vision, constipation, difficulty in urination, dry mouth).
- Hemolytic anemia (very rare).
- Local reactions: irritation following subcutaneous or perivascular administration.

DOSAGE
- Adults: 25-50 mg q4h, with a maximum single dose of 100 mg. Maximum daily dosage: 400 mg.
- Pediatrics: 5 mg/kg/day or 150 mg/m²/day, given in 4 divided doses. Maximum daily dosage: 300 mg.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light as darkens on exposure to light. Do not freeze.
- Stable for 91 days at room temp or in the fridge, protected from light, diluted in NS or D5W, at concentrations of 0.25 mg/mL, 0.5 mg/mL and 1 mg/mL in PVC minibags.
- Stable for 28 days at room temp or in the fridge, protected from light, diluted in NS at concentrations of 1.25 mg/mL, 2.5 mg/mL and 5 mg/mL in polypropylene syringes.
- Compatible with NS, D5W, RL.

MISCELLANEOUS

REFERENCES
1, 4, 6, 40, 82, 95, 143, 188.
DIPHTHERIA ANTITOXIN *

INDICATIONS
- Treatment of diphtheria.

ADMINISTRATION
- In patients who have previously received horse proteins, refer to Dosage section for test dose and desensitization.
  - Intermittent IV infusion (restricted to very severe cases): dilute half the dose in 250-500 mL NS and infuse slowly over 2-4 hours; the other half should be given IM.
  - IM (preferred).
  - SC: for test dose only.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, urticaria, respiratory distress, vascular collapse, hypotension; serum sickness.
- GI: nausea, vomiting.
- Dry cough, hoarseness.
- Local reactions: pain, erythema and urticaria at injection site.

DOSAGE

Test dose:
- For patients who have previously received horse proteins without allergic reaction: administer 0.2 mL SC; if no allergic reaction occurs after at least 30 minutes, the remainder of the treatment dose can be given IM.
- For patients who have previously received horse proteins with allergic reactions (local or systemic): desensitize with 0.2 mL of a 1:10 dilution given SC; after 30 minutes, continue desensitization with 0.2 mL SC of undiluted solution. If no reaction after 30 minutes, the remainder of the treatment dose can be given IM.

Treatment dose:
- Pharyngeal or laryngeal disease of 48 hours duration: 250 international units/kg IM for one dose.
- Nasopharyngeal lesions: 500 international units/kg IM for one dose.
- Pretoxic diphtheria: 750-1000 international units/kg IM for one dose.
- Toxic diphtheria: 1000-2000 international units/kg IM for one dose.
- Diphtheria croup: 100,000 international units IM for one dose.
- If antitoxin is administered 3 days after onset of disease, double the dose.
- Refer to Administration section for IV administration in very severe cases.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store in the fridge.
- Once vial is opened, the solution must be used immediately.

MISCELLANEOUS
- Epinephrine must be available in case of acute hypersensitivity reaction.
- Appropriate antibiotic therapy (i.e., erythromycin, penicillin G) should be given simultaneously.

REFERENCES
31, 95, 176, 255. * Available through Ontario Public Health

Full revision 2013; limited revision 2015
PARENTERAL DRUG THERAPY MANUAL

NAME OF MEDICATION

DIPYRIDAMOLE

OTHER NAMES

Persantine ®

CLASSIFICATION

Diagnostic agent, Platelet aggregation inhibitor

INDICATIONS

- Stress testing with Thallium-201; to induce vasodilation for myocardial perfusion imaging in the diagnosis of coronary artery disease.

ADMINISTRATION

- Intermittent IV infusion: cardiac monitoring. Dilute with at least twice the injection volume with NS, 1/2NS, or D5W (i.e., each 1 mL of dipyridamole to be diluted with a minimum of 2 mL of fluid = 3 mL) for total volume of approximately 20-50 mL and infuse over 4 minutes for stress test. Parenteral aminophylline should be readily available.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity (rare): rash, urticaria, angioedema, laryngospasm, bronchospasm, anaphylactoid reactions.
- Cardiovascular: hypotension, ECG abnormalities, chest pain in patients with coronary artery disease; rare cases of myocardial ischemia, ventricular fibrillation, ventricular tachycardia.
- GI: nausea.
- CNS: headache, dizziness, seizures.
- Cerebrovascular events (rare): stroke, transient ischemic attack.
- Flushing.

- Antidote: aminophylline 50-250 mg as a slow IV injection (maximum rate of 50 mg over 30 seconds). If symptoms (bronchospasm, chest pain) are not relieved, sublingual nitroglycerin may be given.

DOSAGE

- Dipyridamole Stress Testing: usual dose is 0.57 mg/kg (maximum 60 mg), infused at a rate of 0.142 mg/kg/min for 4 minutes. Thallium-201 should be injected within 5 minutes following completion of dipyridamole administration.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Do not freeze. Protect from light.

MISCELLANEOUS

- The use of oral theophylline, aminophylline or caffeine may cause a false-negative thallium imaging. Stop 36 hours before test.
- Oral dipyridamole treatment should be stopped 24 hours prior to testing, as the sensitivity of the test may be impaired.

REFERENCES

1, 2, 40, 95.

Full revision 2013; limited revision 2015
**INDICATIONS**
- Used as an inotropic agent to increase cardiac output.

**ADMINISTRATION**
- Continuous IV infusion (mandatory): **cardiac monitoring, continuous BP monitoring**. Must dilute before use. Concentration of solution will depend on dosage and fluid requirement of each patient.
- Dilute in a compatible solution to obtain a final concentration of 1 mg/mL (250 mg/250 mL or 500 mg/500 mL), 0.5 mg/mL (250 mg/500 mL or 500 mg/1000 mL) or 0.25 mg/mL (250 mg/1000 mL). At TOH, add 500 mg (40 mL from 12.5 mg/mL dobutamine vials) to 500 mL of D5W or NS to obtain a final concentration of 1 mg/mL. Maximum concentration of 5 mg/mL (250 mg/50 mL or 500 mg/100 mL). Infusion rates are titrated to response; refer to Dosage section.
- Administer into a large vein.
- Must be administered by an infusion pump.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cardiovascular: increased heart rate, ectopic beats, premature ventricular beats, palpitations, chest pain, angina; rarely ventricular tachycardia. Elevation of blood pressure, especially systolic pressure.
- GI: nausea, vomiting.
- CNS: headache, fever.
- Dyspnea.
- Hypokalemia.
- Tingling sensation, paresthesia, mild leg cramps.
- Local reactions: phlebitis at the infusion site.

**DOSAGE**
- 2-20 mcg/kg/min. Doses as low as 0.5 mcg/kg/min and up to 40 mcg/kg/min have been used occasionally.
- Rate of infusion adjusted according to patient’s response, as determined by heart rate, presence of ectopic activity, blood pressure, urine flow, and, where possible, measurement of central venous or pulmonary wedge pressure, and cardiac output.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Stable for 48 hours at room temp and 7 days under refrigeration in NS and D5W at a concentration of 0.25 mg/mL in PVC bags.
- Stable for 48 hours at room temp in NS and D5W at a concentration of 1 mg/mL in PVC and glass containers.
- Pink colour change may occur, due to slight oxidation of drug. No significant loss of potency over 48 hours at room temp.
- Incompatible with calcium gluconate, potassium phosphate or alkaline solutions (e.g., sodium bicarbonate 5%).

**MISCELLANEOUS**
- Hypovolemia should be corrected prior to use of dobutamine.
- Use with extreme caution following myocardial infarction.
- May be ineffective if beta-blockers have been given.
- Unlike dopamine, dobutamine has no selective effect on renal blood flow.
- Onset of action occurs within 2 minutes; peak plasma levels of the drug and peak effects occur within 10 minutes after starting IV infusion. The effects of the drug cease shortly after discontinuing the infusion.

**REFERENCES**
1, 4, 6, 40, 82, 95, 135, 143, 366, 367.
INDICATIONS

- Treatment of operable node-positive, locally advanced or metastatic breast carcinoma, locally advanced or metastatic non-small cell lung cancer, metastatic ovarian cancer, recurrent and/or metastatic squamous cell carcinoma of the head and neck, and hormone-refractory metastatic prostate cancer.

ADMINISTRATION

- Ensure premedication with oral dexamethasone has been administered; refer to Dosage section for more information.
- Taxotere® concentrated solution requires reconstitution as follows: allow the vials to stand at room temp for about 5 minutes if stored under refrigeration. Reconstitute vial with provided diluent (ethanol 13%) for a final concentration of 10 mg/mL. Gently rotate for 45 seconds to allow full mixture of the concentrate and diluent. Do NOT shake. Allow the solution to stand for 5 minutes to allow most of the foam to dissipate; this premix solution should be clear.
- Accord, Pfizer and Sandoz brands of docetaxel solution are ready for dilution and do not need a prior reconstitution with a solvent.
- Intermittent IV infusion: dilute with 250 mL of NS or D5W for a final concentration of 0.3-0.74 mg/mL. Do NOT exceed the 0.74 mg/mL concentration; if a dose larger than 200 mg is required, increase the volume accordingly. Rotate the bag gently and thoroughly. Infuse over 60 minutes. Small doses have been given over less time.
- To prevent leaching of diethylhexyl phthalate (DEHP) plasticizer from containers, prepare solutions in non-DEHP containers and administer using non-DEHP administration sets.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare); rash, pruritus, flushing, chest tightness, back pain, dyspnea, drug fever, chills; most likely to occur during the first two cycles of docetaxel treatment, within the first few minutes after the infusion is started. Hypotension, bronchospasm or general rash/erythema are more severe reactions and may request stopping of the infusion for further assessment.
- Cardiovascular: arrhythmia, cardiotoxicity, hypertension.
- GI: nausea, vomiting, diarrhea, stomatitis, taste perversion.
- Dermatologic: desquamation, hand and foot syndrome.
- Hematologic: febrile neutropenia, leukopenia, anemia, thrombocytopenia.
- Neurologic: paresthesia, pain, burning sensation.
- Fluid retention (may need diuretic therapy): peripheral edema, pleural and pericardial effusion, ascites.
- Local reactions: hyperpigmentation, swelling, erythema, dry skin, phlebitis.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- Premedicate all patients with oral dexamethasone in order to reduce incidence/severity of fluid retention and also to reduce the severity of hypersensitivity reactions. For docetaxel regimens given every 3 weeks: dexamethasone 8 mg BID for 3 days, starting one day prior to treatment (except for prostate cancer where premedication should be dexamethasone 8 mg to take 12 hours, 3 hours and 60 minutes before docetaxel infusion). For weekly docetaxel regimens: dexamethasone 4-8 mg BID for 3 doses, starting 12 hours before docetaxel infusion (except for prostate cancer where premedication should be dexamethasone 8 mg 60 minutes before docetaxel infusion). May also replace the multiple dose oral regimen of dexamethasone by a single 20 mg IV of dexamethasone administered just before the docetaxel infusion.

.../Cont.
DOSAGE (Cont.)
- 75-100 mg/m² IV every 3 weeks.
- Other possible dosage for breast cancer: 35-40 mg/m² IV every week for 3 weeks (4-week cycles) or every week for 6 weeks (8-week cycles).
- Dosage in hepatic impairment: consult manufacturer’s recommendations.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge or at room temp and protect from bright light.
- Taxotere® reconstituted solution (10mg/mL) is stable for 21 days in the fridge or at room temp.
- Pfizer brand multi-dose vials can be punctured up to 3 times in a 28 day period when kept in the fridge.
- Stable for 28 days at room temp or in the fridge and protected from light in D5W or NS at 0.3 to 0.9 mg/mL in glass or polypropylene containers.
- Stable for 56 days at room temp or in the fridge and protected from light in D5W or NS at 0.3 mg/mL and 0.7 mg/mL in polypolyethylene copolymer bags.
- Stable for 35 days at room temp in NS at 0.4 mg/mL and 0.8 mg/mL in polypropylene-polyethylene copolymer bags.
- Manufacturers recommend to complete infusion within 4 hours of preparation.

MISCELLANEOUS

REFERENCES
1, 5, 6, 40, 95, 129, 143, 165, 208, 308, 454, 495.
DOPamine

INDICATIONS
- To correct hemodynamic imbalances in shock-like status (e.g., myocardial infarction, trauma, endotoxic septicemia, open-heart surgery).
- To increase renal blood flow and urine output.
- To improve cardiac output and stroke volume in severe congestive heart failure (CHF).

ADMINISTRATION
- Continuous IV infusion (mandatory): cardiac monitoring; continuous BP monitoring. Available only as premixed bags of 800 mcg/mL, 1600 mcg/mL and 3200 mcg/mL in D5W. Infusion rates are titrated to response; refer to Dosage section.
- Preferable to administer via a central line; however dopamine may be administered through a large peripheral vein (i.e., antecubital vein).
- Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: ectopic beats, tachycardia, anginal pain, palpitation, vasoconstriction, hypotension, cardiac conduction abnormalities, widened QRS complex, bradycardia, hypertension. Ventricular arrhythmias may occur with very high doses.
- GI: nausea, vomiting.
- CNS: headache, anxiety.
- High doses and infusion rates that are too rapid can result in hypertension and reduced urine output.
- Endocrine: hypoprolactinemia, hyperglycemia (since premixed with D5W).
- Respiratory: bronchospasm, dyspnea.
- Renal: azotemia.
- Piloerection.
- Local reactions: ischemia, can lead to gangrene.

DOSAGE
- 1-5 mcg/kg/min IV initially with gradual increases of 1-4 mcg/kg/min IV at 10-30 minute intervals up to 20-50 mcg/kg/min IV if required. An initial dose of 5-10 mcg/kg/min IV may be needed to correct hypotension in seriously ill patients. Infusion rate should be adjusted according to patient’s response.
- Infusion rates greater than 50 mcg/kg/min IV have been used in patients with advanced states of circulatory decompensation.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store bags at room temp. Protect from light. Do not freeze.
- Inactivated in alkaline media (e.g., sodium bicarbonate solutions), by iron salts and oxidizing agents.
- Solutions darker than slightly yellow or discoloured should not be used.
- Stable for 7 days at room temp after removal of manufacturer’s protective overwrap.

MISCELLANEOUS
- Contains sulfites.
- Contraindicated in patients with pheochromocytoma.

REFERENCES
1, 4, 5, 6, 40, 95, 135, 143, 366, 367.
Do NOT confuse doxorubicin with liposomal doxorubicin or with pegylated liposomal doxorubicin. This monograph is specific to DOXORUBICIN.

INDICATIONS

- Other uses include adrenocortical cancer, carcinoid syndrome (small bowel), chronic lymphocytic leukemia, Ewing’s sarcoma, gynecological sarcoma, hepatic cancer, islet cell cancer, mesothelioma, multiple myeloma, pancreatic cancer, prostate cancer, retinoblastoma, rhabdomyosarcoma, thymoma and urothelial carcinoma.

ADMINISTRATION

- Reconstitute 10 mg vial with 5 mL, 50 mg vial with 25 mL and 150 mg vial with 75 mL of SWFI, D5W or NS to obtain approximately 2 mg/mL. Do not reconstitute with diluents containing preservatives. Shake the vial and allow to dissolve. The solution is clear, red to red-orange.
- Also available as a premixed solution (2 mg/mL).
- IV direct: physician or RN; undiluted; inject over 3-10 minutes into the tubing of a freely running IV solution of D5W or NS, preferably via a butterfly needle into a large vein.
- Intermittent IV infusion: dilute doses less than 100 mg in 50-100 mL of D5W or NS; infuse over 10-30 minutes in a central line. For doses greater than 100 mg, dilute in 100-1000 mL of D5W or NS.
- Continuous IV infusion: large doses may be infused over 24 to 96 hours via a central line.
- Aluminium-containing apparatus should not be used in the preparation or administration of doxorubicin as the solution could darken and precipitate.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare), urticaria.
- Infusion-related reactions: rash, fever, chills.
- Cardiovascular: transient arrhythmias (can be fatal), abnormal ECG findings, bradycardia, AV and bundle-branch block. Delayed cumulative dose-dependent cardiomyopathy can be reduced with the administration of dexrazoxane.
- GI: acute nausea, vomiting, anorexia, diarrhea, mucositis, stomatitis, esophagitis, typhlitis, hemorrhage, necrotizing colitis, hyperpigmentation of the oral mucosa.
- Dermatologic: facial flushing with too rapid IV injection; photosensitivity; radiation recall reaction (rare).
- Hematologic: myelosuppression, leukopenia, neutropenia, thrombocytopenia, anemia.
- Hepatic: liver dysfunction, increased LFT.
- Hyperuricemia secondary to tumour-lysis syndrome; can be minimized with allopurinol and hydration.
- Renal: red discolouration of urine for 1-2 days.
- Local reactions: urticaria, phlebitis, pain at injection site, cellulitis (can be severe), streaking along the vein proximal to injection site with too rapid IV injection, phlebosclerosis if small vein is used or with repeated injections in same vein.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
DOXOrubicin

Adriamycin ®

Antineoplastic

TABLE

<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adriamycin ®</td>
<td>Antineoplastic</td>
</tr>
</tbody>
</table>

.../Cont.

DOSAGE

- Common monotherapy dose: 60-75 mg/m² IV every 3 weeks. The lower dose should be given to patients with inadequate marrow reserves due to old age, prior therapy or neoplastic marrow infiltration, as well as in the obese OR 20-30 mg/m² IV on each of 3 successive days repeated every 4 weeks (causes more stomatitis) OR 10-20 mg/m² IV weekly (causes less cardiotoxicity).
- Common dose in combination chemotherapy: 40-60 mg/m² IV every 3 to 4 weeks.
- Due to risk of cardiotoxicity, maximum cumulative dose is 550 mg/m² for 3 week cycle and 700 mg/m² for 1 week cycle in patients with no cardiac risk factor. Maximum cumulative dose is 400 mg/m² if previous or concomitant therapy, cardiotoxic agents or other risk factors.
- Dosage in hepatic impairment:
  - Bilirubin (mcmol/L) | % usual dose
  - 21-51 | 50%
  - 52-85 | 25%
  - greater than 85 | Do not administer
- Consult specific protocol.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Premixed solution should be stored in the fridge and protected from light. Refrigeration can lead to the formation of a gel which will return to a slightly viscous to a mobile solution after keeping 2 to 4 hours at room temp. Stable at room temp for 7 days.
- Store vials that require reconstitution at room temp. Protect from light.
- Reconstituted solution in NS is stable for 7 days at room temp, and 15 days in the fridge.
- Reconstituted solution in SWFI is stable for 6 months when refrigerated, and for at least 30 days frozen at -20°C.
- Reconstituted solution in D5W is stable for 4 days at room temp.
- Stable for 43 days at -20°C, 4°C and room temp in NS or D5W at a concentration of 0.1 mg/mL when stored in PVC bags in the dark.
- Stable for 124 days at room temp and in the fridge in NS at 1 mg/mL and 2 mg/mL in plastic syringes.
- Compatible with RL.
- Incompatible with fluorouracil, heparin and alkaline solutions.

MISCELLANEOUS

REFERENCES

1, 4, 5, 6, 40, 95, 129, 143, 165, 202, 208.
DOXOrubicin (Liposomal)

Myocet ™

Antineoplastic

**Do NOT confuse liposomal doxorubicin with doxorubicin or pegylated liposomal doxorubicin. This monograph is specific to LIPOSOMAL doxorubicin.**

### INDICATIONS
- Metastatic breast cancer (in combination with cyclophosphamide).

### ADMINISTRATION
- For reconstitution details, consult package insert.
  - Intermittent IV infusion (mandatory): dilute in NS or D5W to a concentration equal or greater than 0.04 mg/mL. Infuse over 60 minutes piggyback into a running IV line of NS or D5W.

### POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Infusion-related reactions: flushing, dyspnea, fever, facial swelling, headache, back pain, chills, tightness in chest and throat, hypotension. May be avoided by slowing infusion rate.
- Cardiovascular: arrhythmia, chest pain, pericardial effusion. Delayed cumulative dose-dependent cardiomyopathy, although incidence may be lower than with conventional doxorubicin.
- GI: nausea, vomiting, diarrhea, mucositis, stomatitis, anorexia.
- CNS: dizziness, malaise.
- Dermatologic: rash, radiation recall reaction.
- Hematologic: myelosuppression, neutropenia, thrombocytopenia.
- Fatigue, asthenia.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

### DOSAGE
- 60 to 75 mg/m² IV given every 3 weeks.
- Due to risk of cardiotoxicity, maximum cumulative dose is 750 mg/m² (including previous conventional doxorubicin).
- Dosage in hepatic impairment: if bilirubin is normal though ALT/AST are elevated: 75% of the usual dose.
  
<table>
<thead>
<tr>
<th>Bilirubin (mcmol/L)</th>
<th>% usual dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-51</td>
<td>50%</td>
</tr>
<tr>
<td>greater than 51</td>
<td>25% or avoid</td>
</tr>
</tbody>
</table>

- Consult specific protocol.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge (2-8°C). Do not freeze.
- Diluted product should be a red-orange, opaque, homogenous dispersion.
- Diluted solutions are stable for 8 hours at room temp or 72 hours in the fridge.

### MISCELLANEOUS
- Should not be administered to a patient allergic to eggs or egg products.

### REFERENCES
5, 165.
**INDICATIONS**
- AIDS-related Kaposi’s sarcoma.
- Metastatic breast cancer.
- Advanced ovarian cancer.

**ADMINISTRATION**
- Intermittent IV infusion (mandatory): for doses less than 90 mg, dilute in 250 mL of D5W. For doses of 90 mg or above, dilute in 500 mL of D5W. The infusion should be connected through a side port of a D5W IV infusion. For Kaposi’s sarcoma, administer over 30 minutes. For ovarian and breast cancer, initial maximum infusion rate of 1 mg/min recommended to minimize the risk of infusion-related reactions. In case of such reactions, administer the dose over 90 minutes as 5% of the dose over 15 minutes; if tolerated, then double the rate for the next 15 minutes; if still tolerated, complete the infusion over the next 60 minutes. If no infusion-related reactions, administer over 60 minutes for subsequent doses. Avoid rapid flushing of the infusion line.
- Do NOT use with any filter.

**POTENTIAL ADMINISTRATION HAZARDS**
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hyposensitivity: anaphylactoid reactions.
- Infusion-related reactions: may occur within minutes of start of infusion; asthma, urticarial rash, chest pain, fever, hypertension, tachycardia, pruritus, sweating, flushing, shortness of breath, facial swelling, headache, chills, back pain, tightness in chest and throat, hypotension, vasodilation, dyspepsia, nausea, dizziness, pharyngitis, convulsions. Usually associated with first infusion and may resolve by temporarily stopping the infusion. In rare cases, may need to administer antihistamines, corticosteroids, epinephrine and anticonvulsants.
- Cardiovascular: hypotension, tachycardia, ventricular arrhythmia. Delayed cumulative dose-dependent cardiomyopathy, although incidence is lower than with conventional doxorubicin.
- GI: nausea, vomiting, anorexia, stomatitis, constipation, dysgeusia.
- CNS: confusion, dizziness, seizure, vertigo.
- Dyspnea.
- Asthenia, fatigue.
- Dermatologic: rash, radiation recall reaction; palmar-plantar erythrodysesthesias (pyridoxine and corticosteroids can be used prophylactically for subsequent doses).
- Hematologic: myelosuppression, leukopenia, anemia, thrombocytopenia, neutropenia.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSEAGE**
- Kaposi’s sarcoma: 20 mg/m² IV every 2-3 weeks.
- Ovarian and breast cancer: 50 mg/m² IV every 4 weeks.
- Dosage in hepatic impairment:

<table>
<thead>
<tr>
<th>Bilirubin (mcmol/L)</th>
<th>% of usual dose for Kaposi's sarcoma</th>
<th>% of initial usual dose for breast or ovarian cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-51</td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td>greater than 51</td>
<td>25%</td>
<td>50%</td>
</tr>
</tbody>
</table>

* Subsequent doses may be increased depending on liver function tests.
DOXorubicin (Pegylated Liposomal)

**NAME OF MEDICATION**
DOXorubicin (Pegylated Liposomal)

**OTHER NAMES**
Caelyx ®

**CLASSIFICATION**
Antineoplastic

.../Cont.

**DOSAGE** (Cont.)
- Subsequent doses may be modified according to toxicities.
- Due to the risk of cardiotoxicity, maximum cumulative dose of doxorubicin is 550 mg/m² in patients with no risk factors or 400 mg/m² if previous or concomitant therapy or cardiotoxic agents.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge.
- Diluted solutions are stable for 24 hours in the fridge.
- The red liposomal dispersed product is visible in the solution.
- Do not use with any diluent other than D5W. Do not use any bacteriostatic agent (e.g., benzyl alcohol).

**MISCELLANEOUS**

**REFERENCES**
1, 4, 5, 6, 40, 129, 165.
DOXYCYCLINE

Vibramycin®

Antibiotic – tetracycline

INDICATIONS

- For infections due to sensitive organisms when oral therapy is not feasible.
- Acute Pelvic Inflammatory Disease (chlamydia, gonorrhea), in combination with cefoxitin.
- Treatment of syphilis.
- Treatment of anthrax, plague or tularemia in the context of bioterrorism.
- Treatment of severe malaria caused by *P. falciparum*, in combination with quinine or quinidine.

ADMINISTRATION

- Reconstitute the 100 mg vial with 10 mL of SWFI, NS, D5W, Ringer’s or RL.
- Intermittent IV infusion: further dilute each 100 mg with 100 mL to 1000 mL of NS, D5W, Ringer’s or RL to obtain a concentration of 0.1-1 mg/mL. Infuse over at least 60 minutes if final concentration is 0.5 mg/mL and over 2 hours if final concentration is 1 mg/mL. May be given over 4 hours. Protect from direct sunlight during infusion.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: maculopapular and erythematous rash, anaphylaxis, urticaria, angioneurotic edema, anapylactoid purpura, pericarditis.
- Cardiovascular: intracranial hypertension.
- GI: nausea, vomiting, diarrhea, anorexia, dysphagia, enterocolitis. Anogenital lesions.
- CNS: dizziness, lightheadedness.
- Dermatologic: photosensitivity.
- Hematologic: hemolytic anemia, thrombocytopenia, neutropenia, eosinophilia.
- Renal: dose-related increase in urea.
- Local reactions: thrombophlebitis with prolonged use.

DOSAGE

- Adults and pediatrics weighing over 45 kg:
  - 200 mg IV on day one given in one or in two divided infusions followed by 100 mg IV daily from day 2 onward. In severe infections, the daily dose may be increased to 200 mg IV (given in one or two infusions).
  - for anthrax: 100 mg IV q12h for at least 60 days; ADD 1 or 2 additional antimicrobials to which *B. anthracis* is likely susceptible (rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin and clarithromycin).
  - for plague: 100 mg IV q12h or 200 mg IV once daily for 10-14 days.
  - for tularemia: 100 mg IV q12h for 14-21 days.
  - for syphilis: 100-150 mg IV q12h for at least 10 days.
  - For pelvic inflammatory disease: 100 mg IV q12h for 14 days.
  - For malaria: 100 mg IV q12h for 7 days.

- Pediatrics (45 kg or less):
  - the usual dose is 4.4 mg/kg IV on day one given in one in or two divided infusions followed by 2.2-4.4 mg/kg/day IV given in one or two infusions from day 2 onward.
  - for anthrax, plague and tularemia: 2.2 mg/kg IV q12h.
  - for malaria: 2.2 mg/kg IV q12h for 7 days.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Stable for 72 hours in the fridge protected from light in NS, D5W or in Ringer’s at a concentration of 0.1-1 mg/mL. Once removed from the fridge, completion of infusion must be done within 12 hours.
- Stable for 48 hours at room temp protected from direct sunlight in NS or D5W at a concentration of 0.1-1 mg/mL.
- Stable for 6 hours at room temp protected from direct sunlight in RL at a concentration of 0.1-1 mg/mL.
- Stable for 12 hours at room temp protected from direct sunlight in Ringer’s at a concentration of 0.1-1 mg/mL.

MISCELLANEOUS

- Change to oral formulation when feasible.
- Can cause permanent discolouration of teeth if used in children under 8 years of age.
- Check expiry date on vials as outdated product can cause nephrotoxicity.

REFERENCES

1, 4, 5, 40, 82, 143.

* Available via Health Canada’s Special Access Programme
DROPERIDOL
Antiemetic

INDICATIONS
- Prevention and treatment of postoperative nausea and vomiting in patients for whom other treatments are ineffective or inappropriate.

ADMINISTRATION
- IV direct: physician or RN; cardiac monitoring*, blood pressure monitoring. Administer slowly over 1-2 minutes. Pediatrics: administer over 2-5 minutes.
- Intermittent IV infusion: cardiac monitoring*. Administer slowly at a rate no faster than those as IV direct.

* All patients should undergo a 12-lead ECG prior to administration of droperidol to determine if a prolonged QTc interval (i.e., QTc longer than 440 msec for males and 450 msec for females) is present; do NOT administer if there is a prolonged QT interval. Cardiac monitoring should start with treatment and continued for 2 to 3 hours after completing treatment.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis.
- Cardiovascular: hypotension and tachycardia with rapid administration; QT interval prolongation, torsades de pointes, ventricular arrhythmias, cardiac arrest, hypotension; severe hypotension in postoperatively period: do not use epinephrine as it may further lower BP, use norepinephrine or phenylephrine instead.
- CNS: anxiety, somnolence, delirium, hallucinations, nightmares, dizziness, depression, restlessness.
- Respiratory: respiratory depression or arrest, apnea, bronchospasm, laryngospasm.
- Shivering, chills, muscle rigidity, extrapyramidal reactions, neuroleptic malignant syndrome.

DOSAGE
- Adults: 0.625 to 1.25 mg IV; elderly: 0.625 mg IV.
- Pediatrics: older than 2 years of age and adolescents: 20-50 mcg/kg IV, up to a maximum of 1.25 mg IV.
- Can be repeated at least 6 hours later as needed; administration of subsequent doses should be done with caution.
- Dosage in renal or hepatic impairment (adults): 0.625 mg IV.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Stable for 7 days at room temp in NS or D5W at a concentration of 20 mg/L in PVC and glass containers.
- Stable for 7 days at room temp in RL at a concentration of 20 mg/L in glass containers.
- Stable for 24 hours at room temp in RL at a concentration of 20 mg/L in PVC containers.
- Stable for 28 days at room temp protected from light undiluted (2.5 mg/mL) in polypropylene syringes.
- Stable for 180 days at room temp protected from light in NS at a concentration of 0.625 mg/mL in polypropylene syringes.

MISCELLANEOUS
- May reduce pulmonary arterial pressure and interferes with hemodynamic monitoring.
- Potentiates the effects of opioids, barbiturates, tranquilizers, benzodiazepines, general anaesthetics, and alcohol.

REFERENCES
1, 4, 5, 40, 82, 95, 203, 214.
**ECULIZUMAB**

**Soliris ®**

**Antihemolytic, Monoclonal antibody**

**INDICATIONS**
- Treatment of paroxysmal nocturnal hemoglobinuria (PNH) to reduce hemolysis.
- Treatment of atypical hemolytic uremic syndrome (HUS) to reduce/inhibit complement-mediated thrombotic microangiopathy.
- Treatment of generalized myasthenia gravis (gMG) in adults.

**ADMINISTRATION**
- Intermittent IV infusion (mandatory): withdraw the required volume from vial(s) for the dose (i.e., 30 mL for a 300 mg dose, 60 mL for a 600 mg dose, 90 mL for a 900 mg dose, or 120 mL for a 1200 mg dose); transfer the dose to an empty infusion bag and further dilute with D5W, NS, 1/2NS or Ringer’s injection to obtain a final concentration of 5 mg/mL (since the concentration in the vials is 10 mg/mL, the volume of diluent to add in the bag is equal to the total volume of eculizumab for the dose as indicated above). Gently invert the bag to mix. Do NOT shake. Allow the diluted solution to reach room temp before administration. Infuse over 35 minutes in adults (do NOT exceed 2 hours if rate is slowed due to infusion reaction) and over 1-4 hours in pediatrics. Must be administered by an infusion pump.
- Monitor patient for at least 60 minutes following completion of infusion for signs and symptoms of hypersensitivity and infusion reaction.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, pruritus, anaphylaxis.
- Infusion-related reactions: cardiovascular instability, respiratory compromise; stop the infusion in such case.
- Cardiovascular: hypertension, hypotension, tachycardia, peripheral edema.
- GI: nausea, vomiting, diarrhea, abdominal pain, gastroenteritis.
- CNS: headache, insomnia.
- Hematologic: anemia, leukopenia.
- Infections: nasopharyngitis, sinusitis, upper respiratory tract infections, urinary tract infections, herpes simplex infections, meningococcal infections (even if patient has been vaccinated).
- Respiratory: cough, nasal congestion.
- Back pain, arthralgia, myalgia, weakness.
- Fatigue, fever.

**DOSAGE**

**Adults:**
- PNH: induction: 600 mg IV weekly for 4 doses; maintenance: 900 mg IV at week 5, then 900 mg IV every 2 weeks.
- Atypical HUS and gMG: induction: 900 mg IV weekly for 4 doses; maintenance: 1200 mg IV at week 5, then 1200 mg IV every 2 weeks.

**Pediatrics (2 months to less than 18 years old):**
- Atypical HUS:
  - weighing 5 kg to less than 10 kg: induction: 300 mg IV once; maintenance: 300 mg IV at week 2, then 300 mg IV every 3 weeks.
  - weighing 10 kg to less than 20 kg: induction: 600 mg IV once; maintenance: 300 mg IV at week 2, then 300 mg IV every 2 weeks.
  - weighing 20 kg to less than 30 kg: induction: 600 mg IV weekly for 2 doses; maintenance: 600 mg IV at week 3, then 600 mg IV every 2 weeks.
  - weighing 30 kg to less than 40 kg: induction: 600 mg IV weekly for 2 doses; maintenance: 900 mg IV at week 3, then 900 mg IV every 2 weeks.
  - weighing 40 kg and above: same regimen as adults.
ECULIZUMAB

Soliris ®

Antihemolytic, Monoclonal antibody

DOSAGE (Cont.)

For adults and pediatrics:
- Administer doses at these time points or within 2 days of these time points.
- Supplemental doses are required when there is concomitant support with plasmapheresis/plasma exchange or fresh frozen plasma infusion in order to maintain therapeutic plasma concentrations:
  - plasmapheresis/plasma exchange: if most recent dose is 300 mg: administer 300 mg IV within 60 min after each session. If most recent dose is 600 mg or more: administer 600 mg IV within 60 min after each session.
  - fresh frozen plasma infusion: if most recent dose is 300 mg or more: administer 300 mg IV 60 minutes prior to each fresh frozen plasma infusion.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze. Do not shake.
- Vials kept in their original carton are stable for a maximum of 3 days during a single excursion at room temp, not exceeding 25°C.
- Diluted solution is stable for 24 hours at room temp and in the fridge.

MISCELLANEOUS
- Administer vaccinations for the prevention of infection due to Neisseria meningitidis (serotypes A, C, Y, W-135 and B), Streptococcus pneumoniae and Haemophilus influenzae type b (Hib), according to the National Advisory Committee on Immunization (NACI) guidelines. If eculizumab is started in a patient less than 2 years of age or less than 2 weeks after the administration of meningococcal vaccine, prophylactic antibiotic therapy should be administered until 2 weeks after vaccination.
- Continue established anticoagulant therapy during eculizumab therapy.
- Monitor patients with PNH for at least 8 weeks after discontinuation of eculizumab to detect serious hemolysis.
- Monitor patients with atypical HUS for at least 12 weeks after discontinuation of eculizumab for signs and symptoms of thrombotic microangiopathy complications.
- In patients with PNH, serum LDH levels may be used to monitor response to therapy.
- In patient with atypical HUS, platelet counts, serum LDH and creatinine levels may be used to monitor response to therapy.

REFERENCES

1, 5, 40, 135.
EDARAVONE * 

OTHER NAMES 
Radicava™ 

CLASSIFICATION 
Neuroprotector 

INDICATIONS 
- Treatment of amyotrophic lateral sclerosis (ALS). 

ADMINISTRATION 
- Check the oxygen indicator on the overwrapped package prior to use: it should be pink. Do NOT use if the oxygen indicator has turned blue or purple before opening the package. 
- Intermittent IV infusion (mandatory): administer each 60 mg dose as two consecutive 30 mg/100 mL premixed IV infusion bags; infuse total dose over 60 minutes. 

POTENTIAL ADMINISTRATION HAZARDS 
- Hypersensitivity: redness, wheals, erythema multiforme, anaphylaxis (urticaria, hypotension, dyspnea). 
- CNS: gait disturbance, headache. 
- Dermatologic: dermatitis, eczema, tinea infection. 
- Endocrine: glycosuria. 
- Hematologic: hematoma. 
- Musculoskeletal: back pain, myalgia. 
- Respiratory: dyspnea, hypoxia, respiratory failure. 

DOSAGE 
- Initial treatment cycle: 60 mg IV once daily for 14 days, followed by a 14-day drug-free period. 
- Subsequent treatment cycles: 60 mg IV once daily for 10 out of 14 days, followed by a 14-day drug-free period. 
- Dosage in renal impairment: no dosage adjustment required. 
- Dosage in hepatic impairment: no dosage adjustment required for mild to moderate hepatic impairment; no data available for severe hepatic impairment. 

COMPATIBILITY, STABILITY 
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility) 
- Store between 15-30º C in overwrapped package. Protect from light. 
- Use within 24 hours once the overwrap package is opened. The overwrap package contains an oxygen indicator and an oxygen absorber to minimize oxidation. 

MISCELLANEOUS 
- Contains sulfites. 

REFERENCES 
1, 5, 135. 
* Available via Health Canada’s Special Access Programme 

New monograph 2019
**INDICATIONS**
- Diagnostic agent in suspected cases of myasthenia gravis (MG).
- Assessment of dosage adequacy of oral anticholinesterase therapy in MG.
- Differentiation of cholinergic and myasthenic crisis.
- Reversal of the effects of nondepolarizing neuromuscular blocking agents (e.g., atracurium, pancuronium, vecuronium).
- Differential diagnosis or slowing of supraventricular tachyarrhythmias.
- Treatment of paroxysmal atrial tachycardia.
- Evaluation of the function of demand pacemakers.

**ADMINISTRATION**
- IV direct: physician only. May be given undiluted.
  - For indications related to MG: See Dosage section.
  - For reversal of the effects of nondepolarizing neuromuscular blocking agents: single dose over 30-45 seconds.
  - For cardiac uses: **cardiac monitoring.** Administer as a bolus injection.
- Continuous IV infusion: **cardiac monitoring.** See Dosage section. Must be administered by an infusion pump.
- IM, SC (when IV administration is not possible).

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, anaphylaxis.
- Cardiovascular: bradycardia, arrhythmia, hypotension, cardiac arrest.
- GI: hypersalivation, nausea, vomiting, diarrhea, abdominal cramps, dysphagia, increased peristalsis.
- CNS: seizures, dysarthria, dysphonia.
- Ophthalmic: lacrimation, miosis, spasm of accommodation, diplopia, conjunctival hyperemia.
- Renal: urinary frequency and incontinence.
- Respiratory: bronchospasm, increased tracheobronchial secretions, laryngospasm, respiratory depression, respiratory arrest.
- Muscle weakness, cramps and fasciculations, diaphoresis.
- Local reaction: thrombophlebitis with IV administration.

**Antidote:** atropine.

**DOSAGE**
- Diagnosis of MG:
  - IV:
    - Adults: draw 10 mg in a syringe; give 2 mg IV over 15-30 seconds; if no reaction in 45 seconds, give the remaining 8 mg. After 30 minutes, the test may be repeated if necessary.
    - Children weighing more than 34 kg: give 2 mg IV over 15-30 seconds; if no reaction in 45 seconds, give 1 mg IV every 30-45 seconds OR 0.04 mg/kg or 1.2 mg/m² IV in 60 seconds, and followed by 0.16 mg/kg or 4.8 mg/m² IV if no response occurs within 45 seconds. Maximum total dose of 10 mg IV.
    - Children weighing 34 kg or less: give 1 mg IV over 15-30 seconds; if no reaction in 45 seconds, give 1 mg IV every 30-45 seconds OR 0.04 mg/kg or 1.2 mg/m² IV in 60 seconds, and followed by 0.16 mg/kg or 4.8 mg/m² IV if no response occurs within 45 seconds. Maximum total dose of 5 mg IV.
    - Infants: 0.1 mg IV, followed by 0.4 mg IV if no response. Maximum total dose of 0.5 mg IV.

.../Cont.


**PARENTERAL DRUG THERAPY MANUAL**

<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
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<tbody>
<tr>
<td>Enlon®, Tensilon®</td>
<td>Cholinesterase inhibitor</td>
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</table>

EDROPHONIUM

.../Cont.

**DOSAGE (Cont.)**

- Diagnosis of MG (Cont.):  
  - **IM/SC:**  
    - Adults: 10 mg IM as a single dose; if there is a reaction, 2 mg IM should be given 30 minutes later to rule out a false-negative reaction.  
    - Children weighing more than 34 kg: 5 mg IM.  
    - Children weighing 34 kg or less: 2 mg IM.  
    - Infants: 0.5-1 mg IM or SC.  
- Assessment of oral anticholinesterase therapy in MG:  
  - Adults: 1-2 mg IV administered 1 hour after oral intake of the other agent; to be repeated every 1-3 days until establishment of the proper dosage for the anticholinesterase agent.  
  - Children: 0.04 mg/kg IV administered 1 hour after oral intake of the other agent.  
- Differentiation of cholinergic and myasthenic crisis: 1 mg IV. If no further impairment within 1 minute, may repeat the dose.  
- Reversal of nondepolarizing neuromuscular blocking agents: 10 mg IV. May repeat every 5-10 minutes as needed. If doses of 15 mg or above are required, they should be preceded by atropine sulfate IV. Maximum total dose: 40 mg.  
- Diagnosis of supraventricular tachyarrhythmias, treatment of paroxysmal atrial tachycardia or evaluation of demand pacemakers: single dose of 5-10 mg IV.  
- Slowing of supraventricular tachyarrhythmias: Test dose of 2 mg IV. Repeat 2 mg IV every minute until arrhythmia is controlled; total dose of 10 mg IV. If heart rate decreases during bolus administration, may administer as an IV infusion at a rate of 0.25-2 mg/min.

**COMPATIBILITY, STABILITY**  
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Compatible with NS and D5W.

**MISCELLANEOUS**

- Use with caution in patients with asthma or taking a cardiac glycoside (e.g., digoxin).  
- Does not antagonize, and in fact may prolong the paralysis caused by succinylcholine.  
- Contains sulfites.

**REFERENCES**

1, 5, 40, 82, 135.
INDICATIONS
- Treatment of hypertension when oral therapy is not practical.
- Treatment of hypertensive crises.

ADMINISTRATION
- IV direct: physician only. Inject slowly over at least 5 minutes.
- Intermittent IV infusion: dilute in 50 mL of D5W, NS, D5-NS or D5-RL. Infuse over 60 minutes in patients at risk for severe hypotension.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, anaphylactoid reactions, angioedema, rash.
- Cardiovascular: hypotension, syncope.
- GI: nausea, constipation, diarrhea.
- CNS: headache, dizziness.
- Renal: oliguria, acute renal failure, progressive azotemia, increase in serum creatinine.
- Respiratory: cough.
- Hyperkalemia.
- Fatigue.

DOSEAGE
- Hypertension: 1.25 mg IV q6h. In patients on a diuretic: 0.625 mg IV q6h; may be repeated 60 minutes later if clinical response is not adequate, with subsequent doses of 1.25 mg IV q6h. Doses up to 5 mg IV q6h have been used for up to 36 hours.
- Hypertensive crises: 1.25–5 mg IV q6h prn.
- Dosage in renal impairment: If CrCl is less than 30 mL/min, 0.625 mg IV q6h; may be repeated 60 minutes later if clinical response is not adequate, with subsequent doses of 1.25 mg IV q6h. For dialysis patients, initial dose of 0.625 mg IV q6h.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Stable for 24 hours at room temp in D5W, NS, D5-NS, D5-RL.

MISCELLANEOUS
- Contraindicated in patients with a history of angioedema to any ACE inhibitor.
- Contraindicated in combination with amlodipine in patients with diabetes mellitus or moderate to severe renal impairment.
- Initial blood pressure response may take 15 minutes to 60 minutes; peak effect of the first dose may not occur until 4 hours after administration; peak effect of subsequent doses may be greater than that of the first dose.
- Switching to oral enalapril: from enalaprilat 1.25 mg IV q6h to oral enalapril at 5 mg once daily, and from enalaprilat 0.625 mg IV q6h to oral enalapril 2.5 mg once daily; titrate dose as needed.

REFERENCES
1, 5, 40, 135, 208.
INDICATIONS

- In combination with other antiretroviral agents for the treatment of human immunodeficiency virus-1 (HIV-1) infection in treatment-experienced patients.

ADMINISTRATION

- Reconstitute each vial with 1.1 mL of SWFI provided by the manufacturer to obtain a concentration of 90 mg/mL. Tap vial gently for 10 seconds and then allow to stand until powder goes completely into solution (which can take up to 45 minutes). The resulting solution should be clear, colourless and without bubbles or particulate matter. If the content is foamy or has gelled, allow more time for complete dissolution.
- SC: upper arm, anterior thigh, or abdomen. Rotate injection sites.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, fever, nausea, vomiting, chills, rigors, hypotension, and elevated serum transaminases.
- GI: nausea, diarrhea.
- CNS: insomnia.
- Hematology: eosinophilia.
- Bacterial pneumonia, sinusitis, cough, weight loss.
- Fatigue.
- Local reactions: frequent, may last over a week; discomfort, pain, induration, erythema, nodules, cysts, pruritus, ecchymosis, infection.

DOSAGE

- Adults: 90 mg SC BID.
- Pediatrics (6 years and older): 2 mg/kg SC BID, up to a maximum of 90 mg SC BID.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp.
- Reconstituted solution is stable for 24 hours in the fridge.

MISCELLANEOUS

REFERENCES

1, 5, 135, 208.
INDICATIONS
- Treatment of unstable angina and non-Q-wave myocardial infarction.
- Treatment of acute ST-segment elevation myocardial infarction (STEMI), including patients to be managed medically or with subsequent percutaneous coronary intervention (PCI).
- Prophylaxis of thromboembolic disorders.
- Treatment of deep vein thrombosis with or without pulmonary embolism.
- Bridging anticoagulation in patients who require temporary interruption of warfarin therapy.
- Prevention of thrombus formation in the extracorporeal circulation during hemodialysis.

ADMINISTRATION
- IV direct: physician or RN. Can be administered using the multidose vial or prefilled syringe. Flush IV line with sufficient amount of NS or D5W prior to and following the administration of enoxaparin. If a partial dose is to be administered from a prefilled syringe, ensure to expel the air bubble prior to administration. For doses less than 30 mg (i.e., for the additional bolus of 0.3 mg/kg for PCI): in order to ensure accuracy of small volume to be injected, may further dilute drug with DSW or NS to get a 3 mg/mL solution. Preparation: from a 50 mL minibag, withdraw 30 mL of solution; inject 60 mg of enoxaparin into the remaining 20 mL to obtain a 3 mg/mL solution; gently mix the bag. Volume to inject of diluted solution (mL) = patient weight (kg) x 0.1.
- SC: inject in the anterolateral or posterolateral abdominal girdle, alternating the left and right sides. With the thickness of skin held between the operator’s thumb and finger, introduce the entire length of the needle vertically into the skin. To minimize bruising, injection sites should be not massaged after injection.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, urticaria, angioedema, cutaneous vasculitis, anaphylaxis, anaphylactoid reaction.
- GI: nausea, diarrhea.
- CNS: confusion.
- Risk of spinal or epidural hematoma that can result in permanent paralysis when epidural or spinal anesthesia or spinal puncture is used in conjunction with enoxaparin. No spinal invasion should be performed for at least 12-24 hours after the last dose of enoxaparin and the next dose should be held until at least 2-4 hours after the procedure.
- Hematologic: bleeding, anemia, thrombocytopenia, thrombocytosis.
- Dermatologic: ecchymosis.
- Hepatic: transient asymptomatic elevations of liver transaminases (AST, ALT); reversible in 3-7 days after discontinuing the drug.
- Renal: hematuria.
- Respiratory: dyspnea.
- Fever, edema.
- Local reactions: hematoma, pain, irritation, skin necrosis (rare).

Antidote: The anticoagulant effect of enoxaparin can be partially neutralized by protamine. Refer to protamine in this manual for more details.

DOSAGE
- Treatment of unstable angina and non-Q-wave myocardial infarction: 1 mg/kg (up to 100 mg) SC q12h for 2-8 days.
- Treatment of acute STEMI: 30 mg IV single bolus dose plus 1 mg/kg SC dose, followed by 1 mg/kg SC q12h (maximum 100 mg/dose for the first 2 SC doses only). In patients of 75 year old and greater: no IV bolus; 0.75 mg/kg SC q12h (maximum 75 mg/dose for the first 2 SC doses only). Enoxaparin injection should be given between 15 minutes before and 30 minutes after the start of fibrinolytic therapy. Duration: 8 days or until hospital discharge.

.../Cont.
### ENOXAPARIN

**Lovonox ®**

**Anticoagulant**

### DOSAGE (Cont.)

- **For patients managed with PCI:**
  - In patients who have not received prior anticoagulant: 0.5–0.75 mg/kg IV bolus.
  - If last SC dose of enoxaparin was administered less than 8 hours before balloon inflation: no additional dose.
  - If last SC dose of enoxaparin was administered more than 8 hours before balloon inflation: 0.3 mg/kg IV bolus.

- **Prophylaxis of thromboembolic disorders:**
  - Orthopedic surgery: 30 mg SC q12h, starting 12-24 hours after surgery; alternatively for hip-replacement surgery, 40 mg SC q24h, starting 12 hours before or after surgery. Duration: 10-35 days.
  - Abdominal or colorectal surgery: 40 mg SC q24h for 7-10 days, starting 2 hours before surgery.
  - Bedridden medical patients at risk of deep vein thrombosis: 40 mg SC q24h until mobilization or hospital discharge.
  - Obese patients: if body mass index (BMI) of 40 kg/m² or higher OR if weight greater than 100 kg: 40 mg SC q12h.

- **Treatment of deep vein thrombosis with or without pulmonary embolism:**
  - 1 mg/kg SC q12h or 1.5 mg/kg SC q24h.
  - Obese patients: dose based on actual body weight (favor q12h dosing). If BMI of 40 kg/m² or higher: 0.7-0.8 mg/kg (may cap to 150 mg) SC q12h.

- **Bridging anticoagulation:** 1 mg/kg SC q12h or 1.5 mg/kg SC q24h. Do not administer enoxaparin within the 24 hour period before surgery. For procedures associated with a high risk of bleeding, resume enoxaparin 48-72 hours after surgery when adequate hemostasis has been achieved.

- **Prevention of thrombus formation in the extracorporeal circulation during hemodialysis:**
  - Initial dose: 0.5-1 mg/kg into the arterial line of the circuit at the beginning of the dialysis session.
  - For subsequent dialysis sessions: adjust dose if necessary.

- **Dosage in renal impairment:** use with caution; monitoring of anti-Xa levels; dosage adjustments recommended in cases of severe renal impairment (CrCl under 30 mL/min). Refer to manufacturer’s recommendation.

### COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials and prefilled syringes at room temp.
- Enoxaparin, when drawn from multi-dose vials and stored in plastic syringes, is stable for 10 days in the fridge. Change needle when ready to inject drug after storage.
- Compatible by y-site with NS and D5W.

### MISCELLANEOUS

- Enoxaparin should not be given to patients with a history of heparin-induced thrombocytopenia (risk of cross-reactivity), unless an *in vitro* platelet aggregation test is negative.
- For laboratory monitoring of effect, anti-Xa methods are recommended (although not routinely done, monitoring is recommended in special cases such as extremes of weights, pregnancy and renal failure). The recommended time for monitoring anti-Xa activity is 4 hours after a SC injection (peak activity).
- Enoxaparin potency in international units: 1 mg = 100 international units.
- As the multi-dose vial contains benzyl alcohol, it is not recommended for use during pregnancy or in neonates.
- Derived from porcine tissue.

### REFERENCES

1, 5, 87, 95, 119, 208, 408, 409
EPHEDrine

Indications
- Treatment of hypotension secondary to shock or anesthesia.
- Treatment of bronchospasm.

Administration
- IV direct: physician; RN may administer 10 mg or less. Continuous BP monitoring, cardiac monitoring. Best to dilute the dose to facilitate administration: dilute 50 mg (1 mL) with 9 mL of NS to get a concentration of 5 mg/mL. Administer at a rate of 10 mg/min.
- IM, SC.

Potential Administration Hazards
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: palpitations, tachycardia, angina, hypertension (may lead to intracranial hemorrhage); hypotension after several doses (due to direct cardiac depression and vasodilation).
- CNS: nervousness, restlessness, excitation, anxiety, insomnia, tremors, irritability. Dizziness, lightheadedness, vertigo, confusion, delirium, euphoria and hallucinations may occur with higher doses.
- Renal: painful urination, urinary retention.
- Weakness, mydriasis.

Dosage
- Hypotension: IV: 5-25 mg with additional doses every 5-10 minutes if needed.
  SC, IM: 25-50 mg (range 10-50 mg).
- Bronchospasm: 12.5-25 mg IM or SC.
- Maximum parenteral dosage: 150 mg/24 hours.

Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp; protect from light.
- Physically compatible with D5W, NS, dextrose-saline combinations, RL.
- Stable for 4 days at room temp undiluted at a concentration of 50 mg/mL in polypropylene and glass syringes.
- Stable for 60 days at room temp exposed to light or in the fridge in NS at a concentration of 5 mg/mL in polypropylene syringes.

Miscellaneous
- Should not be used or use with caution in patients with diabetes, hypertension, cardiovascular disease, hyperthyroidism, and narrow-angle glaucoma.
- Blood volume depletion should be corrected as fully as possible before ephedrine is instituted.
- Absorption and onset of action of ephedrine are more rapid following IM administration (within 10–20 minutes) than following SC administration.
- Ephedrine is less potent but longer acting than epinephrine and norepinephrine.

References
1, 4, 5, 40, 208.
# INDICATIONS

- Treatment of severe allergic (anaphylactic or anaphylactoid) reactions.
- Bronchospasm.
- In advanced cardiovascular life support (ACLS) during cardiopulmonary resuscitation (CPR): pulseless ventricular tachycardia, ventricular fibrillation, pulseless electrical activity, and asystole.
- Bradycardia and hypotension in post-cardiac arrest care.

## ADMINISTRATION

- **Check label carefully to ensure concentration of the solution used.**
- **IV direct:** physician or RN in presence of physician; *cardiac monitoring*. The 0.1 mg/mL solution prepacked in syringe does not require further dilution before giving it IV direct. If the 1 mg/mL solution is used, dilute dose 1 in 10 with NS to make a 0.1 mg/mL solution. Follow with 20 mL IV flush to ensure drug delivery to systemic circulation if injection done through a peripheral vein.
- **Continuous IV infusion:** *cardiac monitoring*. Dilute 1 mg in 250 or 500 mL of solution to obtain a final concentration of 4 or 2 mcg/mL, respectively. At TOH, dilute 1 mg in 250 mL or 4 mg in 1000 mL of solution to obtain a final concentration of 4 mcg/mL. More concentrated solutions such as 16 mcg/mL (4 mg/250 mL) can also be used. Administer preferably via central venous access to reduce the risk of extravasation and ensure good bioavailability. Must be administered by an infusion pump.
- **IM** (use the 1 mg/mL solution): preferred route over SC; into the anterolateral aspect of the thigh; avoid IM injection into buttocks.
- **SC** (use the 1 mg/mL solution), though delayed absorption vs. IM injection.

## POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cardiovascular: palpitation, tachycardia, hypertension, anginal pain, arrhythmias, cerebral hemorrhage.
- GI: nausea, vomiting.
- CNS: restlessness, nervousness, lightheadedness, fear, anxiety, tension, headache, dizziness, tremor.
- Renal: anuria, renal dysfunction.
- Respiratory: pulmonary edema, dyspnea.
- Weakness, pallor, mydriasis.
- Local reactions: ischemia, ulceration, necrosis.

## DOSAGE

**Adults:**

- **Hypersensitivity Reaction:**
  - Usual initial dose of 0.1-0.5 mg IM (preferred) or SC. May repeat dose every 5-15 minutes if anaphylactic shock, or every 20 minutes to 4 hours if asthma.
  - Severe anaphylactic shock: 0.1 to 0.25 mg IV over 5 to 10 minutes; dose may be repeated every 5-15 minutes or followed by a continuous IV infusion at an initial rate of 1 mcg/min and increasing to 4 mcg/min if necessary.
- **ACLS during CPR:** 1 mg IV over 1 minute or faster; may repeat every 3 to 5 minutes.
- **Post-cardiac arrest care:** initial rate of 2-10 mcg/min IV; range 0.1–0.5 mcg/kg/min IV.

…/Cont.
**EPINEPHrine**

**Adrenalin, Adrenaline**

**Sympathomimetic**

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### DOSAGE

**Children:**
- Hypersensitivity Reaction:
  - 0.01 mg/kg or 0.3 mg/m² IM (preferred) or SC (maximum 0.5 mg). May repeat dose every 5-15 minutes if anaphylactic shock.
  - Severe anaphylactic shock: initial dose of up to 0.1 mg IV over 5-10 minutes followed by a continuous infusion at an initial rate of 0.1 mcg/kg/min (to a maximum of 1.5 mcg/kg/min).
  - ACLS during CPR: 0.01 mg/kg IV (maximum 1 mg); may repeat every 3 to 5 minutes.

**Neonates:**
- ACLS during CPR: 0.01 to 0.03 mg/kg IV; may repeat every 3 to 5 minutes.

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### COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules and prefilled syringes at room temp and protect from light.
- Do not use solution if coloured or contains a precipitate.
- Compatible in D5W, NS, Ringer’s, RL

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### MISCELLANEOUS

- Should not be used or use with caution in patients with diabetes, cerebral arteriosclerosis, hypertension, cardiovascular disease, hyperthyroidism, shock (other than anaphylactic shock), narrow-angle glaucoma.
- Contains sulfites.
- Refer to TOH anaphylaxis algorithm.

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### REFERENCES

1, 2, 4, 5, 40, 95, 126, 135, 186, 230, 235, 266, 267, 364, 366, 367.
**INDICATIONS**

- Alone and in combination with other chemotherapeutic agents in a variety of tumour types such as lymphoma, cancer of the lung, breast, ovary and stomach.

**ADMINISTRATION**

- IV direct: physician or RN; administer undiluted; inject over at least 3-5 minutes into the tubing of a freely running IV solution of NS or D5W into a large vein. Flush with 20 mL of NS or D5W to ensure drug delivery to systemic circulation.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; infuse over 10-20 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity (rare): anaphylaxis, rash, pruritus, urticaria, chills, fever, shock.
- Cardiovascular: sinus tachycardia, ECG abnormalities, arrhythmias (acute and transient), delayed cumulative dose-dependent cardiomyopathy and heart failure.
- GI: nausea, vomiting, diarrhea, mucositis.
- Dermatologic: radiation recall reaction (rare), flushing (indicates of too rapid administration), photosensitivity(rare), skin hyperpigmentation (rare).
- Hematologic: leukopenia, neutropenia, febrile neutropenia, anemia, thrombocytopenia, thromboembolism (including fatal pulmonary embolism).
- Ophthalmic: conjunctivitis, keratitis.
- Renal: red colouration of urine (for 1-2 days after administration).
- Hyperuricemia, tumour lysis syndrome, fatigue.
- Local reactions: phlebitis, erythematous streaking (histamine release) and/or transient urticaria along the vein proximal to site of injection indicates a too rapid administration; usually subsides within 30 minutes.
- Extravasation hazard: vesicant. Can cause severe tissue necrosis without symptoms. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**

- Weekly: 12.5-25 mg/m² IV.
  Every 2 weeks: 35 mg/m² IV.
  Every 3 to 4 weeks: 50-150 mg/m² IV.
  Every 4 weeks: 60 mg/m² IV days 1 and 8, or days 1 and 15.
- Due to risk of cardiotoxicity, maximum lifetime cumulative dose is 650 mg/m² for patients with cardiac risk factors and 900-1000 mg/m² for patients without cardiac risk factors.
- Dosage in renal impairment: lower starting doses in patients with severe renal impairment.
- Dosage in hepatic impairment:
  Serum Bilirubin | AST | Dose
  21-51 mcmol/L OR 2-4 times upper limit of normal | 50% |
  above 51 mcmol/L OR above 4 times upper limit of normal | 25% |
  contraindicated in severe hepatic impairment
- Consult specific protocol.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge, protected from light.
- Stable for 43 days at 4°C and room temp protected from light in NS and D5W at a concentration of 0.1 mg/mL in PVC bags.
- Stable for 84 days at 8°C in NS at a concentration of 1 mg/mL in polypropylene syringes.
- Stable for 28 days in the fridge or at room temp in NS at a concentration of 0.5 mg/mL in polypropylene syringes.
- Avoid contact with any alkaline solution as it will result in hydrolysis of the drug.

MISCELLANEOUS

- Live and live attenuated vaccines should not be given concurrently with epirubicin.
- Cardiac monitoring in patients who have received mediastinal radiotherapy, therapy other anthracyclines (e.g., daunorubicin, doxorubicin, idarubicin) or anthracenediones (e.g., mitoxatrone), with pre-existing cardiac disease or already received epirubicin at cumulative doses above 650 mg/m².

REFERENCES

1, 5, 129, 143, 165.
EPOPROSTENOL  
Caripul ®, Flolan ®  
Vasodilator

INDICATIONS
- Long-term treatment of primary pulmonary hypertension and secondary pulmonary hypertension due to scleroderma spectrum of diseases in New York Heart Association Class III and Class IV patients who did not respond adequately to conventional therapy.

ADMINISTRATION
- For Flolan ®: reconstitute each 0.5 mg or 1.5 mg vial with 5 mL only with diluent provided. Withdraw the required amount and further dilute in the reservoir cassette to 100 mL with the diluent provided. Consult manufacturer’s monograph for details. Avoid contact with material containing polyethylene terephthalate (PET) or polyethylene terephthalate glycol (PETG) as this can lead to cracking or damage. Materials (infusion pump, cassette, external tubing) provided to patients through the Horizons Patient Support Program do not contain PET or PETG.
- For Caripul ®: reconstitute each 0.5 mg or 1.5 mg vial with 5 mL of SWFI or NS only. Withdraw the required amount and further dilute in the reservoir cassette to 100 mL with the identical diluent as used for the reconstitution. Consult manufacturer’s monograph for details.
- Continuous IV infusion (mandatory): continuous BP monitoring, cardiac monitoring while patient is in critical care areas. Refer to full monograph for infusion rate and concentration tables. During initiation of treatment, may be given peripherally. For chronic continuous administration, infusion via central venous catheter is necessary. Must be administered by an infusion pump (see manufacturer’s monograph for pump specifications); infuse through a 0.22 micron in-line filter.
- Interruptions in drug delivery or sudden large reductions in administration rate can lead to rapid return of pulmonary hypertension and can be fatal.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: chest pain, bradycardia, hypotension, tachycardia.
- GI: nausea, vomiting, diarrhea, abdominal pain, anorexia.
- CNS: anxiety, nervousness, dizziness, headache, tremor.
- Dermatologic: flushing, eczema, rash, urticaria.
- Jaw pain, flu-like symptoms, myalgia, chills, fever, sepsis, hemorrhage, hyperglycemia; epoprostenol should be discontinued in case of pulmonary edema during dosage initiation.

DOSAGE
Initiation of treatment:
- Initiate at 2 ng/kg/min IV and increase infusion rate in increments of 2 ng/kg/min at intervals of at least 15 minutes until dose-limiting pharmacological effects occur.

Dosage adjustments during continuous chronic infusion:
- If symptoms of pulmonary hypertension persist, recur or worsen, increase infusion rate by 1-2 ng/kg/min increments at intervals of at least 15 minutes until clinical response obtained.
- If side effects are not tolerated, decrease infusion rate gradually by 2 ng/kg/min decrements at intervals of at least 15 minutes until tolerable.
- In patients receiving lung transplants, dose was tapered after the initiation of cardiopulmonary bypass.

../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

For Flolan ®:
- Store epoprostenol and diluent vials between 15-25°C and protect from light.
- Flolan® is compatible only with specific sterile diluent accompanying the product.
- Before being transferred to an infusion pump: stable for 24 hours in the fridge and protected from light.
- Once placed in an infusion pump: stable for 24 hours between 2-8°C (change frozen gel packs q12h, or q8h if ambient temperature is near 30°C) and protected from direct sunlight.

For Caripul ®:
- Store vials between 15-30°C.
- If the diluted solution is used immediately:
  - stable for 48 hours at 25°C and protected from direct sunlight
  - stable for 24 hours at temperatures above 25°C up to 30°C and protected from direct sunlight.
- If not used immediately: stable for 8 days in the fridge protected from light, then:
  - stable for 24 hours at 25°C protected from direct sunlight at concentrations from 3000 ng/mL to less than 15,000 ng/mL.
  - stable for 48 hours at 25°C protected from direct sunlight at concentrations of 15,000 ng/mL and above.
  - stable for 24 hours at temperatures above 25°C up to 30°C and protected from direct sunlight (all concentrations).
- Short excursions to higher temperatures are permitted. Consult manufacturer’s monograph for details.

MISCELLANEOUS
- Contraindicated in patients with congestive heart failure secondary to severe left ventricular systolic dysfunction.
- Unless contraindicated, anticoagulant therapy should be administered in patients on epoprostenol to reduce the risk of pulmonary thromboembolism or systemic embolism.
- For the Flolan ® Information and Patient Care Program, contact Pharmaprix/Shoppers Drug Mart Specialty Health Network at 1-800-361-7090.
- For the Caripul ® Patient Support Program, contact Pharmaprix/Shoppers Drug Mart Specialty Health Network at 1-877-227-4785.

REFERENCES
1, 5, 40, 264, 268, 385.
INDICATIONS
- Treatment of patients with unstable angina, non-ST-segment elevation myocardial infarction and those subsequently undergoing percutaneous coronary interventions (PCI).
- Treatment of patients undergoing PCI.

ADMINISTRATION
- IV direct: physician or RN. For bolus dose only. Do not shake vials. Administer IV direct undiluted over 1-2 minutes, using the 2 mg/mL solution (from 10 mL vial).
- Continuous IV infusion: initiate immediately after bolus. Administer undiluted, using the 0.75 mg/mL solution (from 100 mL vial); spike vial with a vented infusion set within the circle of the stopper top. Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis (rare).
- Cardiovascular: hypotension.
- Hematologic: thrombocytopenia (may be severe); major bleed, including intracranial hemorrhage/stroke, a hemoglobin drop greater than 5 g/dL, bleed from arterial access site, GI or genito-urinary tracts, lungs and retroperitoneal area; minor bleed, including gross hematuria, hematemesis, or a hemoglobin drop greater than 3-4 g/dL. Risk is increased in patients weighing less than 70 kg.

DOSAGE
- Unstable angina/non-ST-segment elevation myocardial infarction: bolus dose of 180 mcg/kg IV, (maximum 22.6 mg) followed by a continuous IV infusion at a rate of 2 mcg/kg/min (maximum 15 mg/hr) until hospital discharge or between 2-4 hours before CABG surgery, up to 72 hours. For patients subsequently undergoing PCI during the initial 72 hours, continue infusion until hospital discharge or for up to 18-24 hours after the procedure, whichever comes first (total infusion time up to 96 hours).
- In PCI: bolus dose of 180 mcg/kg IV (maximum 22.6 mg) immediately before the initiation of PCI, followed by a continuous IV infusion at a rate of 2 mcg/kg/min (maximum 15 mg/hr); administer a second bolus 10 minutes after the first bolus. Continue IV infusion until hospital discharge or for up to 18-24 hours, whichever comes first (minimum of 12 hours).
- Dosage in renal impairment: in patients with a CrCl between 30-50 mL/min, no dosage adjustment of the bolus doses but reduce infusion rate to 1 mcg/kg/min (maximum 7.5 mg/hr). Eptifibatide treatment is not recommended if CrCl is below 30 mL/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge protected from light. Unopened vials are stable for 2 months at room temp and protected from light.
- Compatible with NS, D5-NS.

MISCELLANEOUS
- Eptifibatide is intended for use with ASA and heparin. Refer to product monograph for dosing.
- Use care in handling patients (bleeding precautions). When obtaining IV access, use compressible sites only.
- Restoration of platelet function (greater than 50%) towards baseline 4 hours after infusion discontinuation.
- Bleeding time returns to baseline within 4-6 hours after infusion is discontinued.

REFERENCES
1, 5, 40, 135.
ERGONOVINE
Ergometrine
Oxytocic

INDICATIONS
- Prevention and treatment of postpartum and postabortal hemorrhage due to uterine atony.
- As an adjunct in the diagnosis of coronary artery spasm in patients with variant angina.

ADMINISTRATION
- IV direct: physician only. **Blood pressure monitoring.** Dilute dose with 5 mL NS and administer at a rate of 0.2 mg/min.
- IM (preferred).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity.
- Cardiovascular: hypertension (if injected undiluted or too rapidly), palpitation, bradycardia, transient chest pain, thrombophlebitis.
- GI: nausea and vomiting (with too rapid injection), abdominal pain, diarrhea.
- CNS: dizziness, headache, tinnitus, hallucination, vertigo.
- Respiratory: dyspnea.
- Ergotism (intense vasoconstriction which may lead to gangrene) on prolonged therapy.

DOSAGE
- For postpartum/postabortal hemorrhage: 0.2 mg IV or IM; may be repeated q2-4h to a maximum of 1 mg (total of 5 doses).
- For diagnosis of coronary artery spasm: 0.05 mg IV during coronary angiography. Repeat every 5 minutes until onset of chest pain or a total dose of 0.4 mg. Dose range: 0.1-0.4 mg.

COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store ampoules in the fridge although stable for 60 days at room temp; protect from light.
- Do not use if discolouration occurs.
- Compatible with NS, D5W and RL. Should not be mixed with fluids for infusions.

MISCELLANEOUS
- Should not be used prior to delivery of the placenta.
- Onset of action: IM: 2-3 minutes; IV: 1 minute.
- Duration of action (uterine effect): IM: 3 hours; IV: 45 minutes.

REFERENCES
1, 2, 3, 6, 95, 135.

Full revision 2014; limited revision 2016
INDICATIONS
- Treatment of metastatic breast cancer in patients who have previously received at least two chemotherapeutic regimens (including an anthracycline and a taxane) for the treatment of metastatic disease.
- Treatment of adult patients with unresectable advanced or metastatic liposarcoma subtype of soft tissue sarcoma. Prior therapy should have included an anthracycline-containing regimen if appropriate.

ADMINISTRATION
- IV direct: administer undiluted IV over 2 to 5 minutes.
- Intermittent IV infusion: dilute in up to 100 mL of NS; administer over 2-5 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity
- Cardiovascular: QT interval prolongation, hypertension, edema, venous thromboembolism (rare).
- GI: nausea, vomiting, diarrhea, constipation, anorexia, abdominal pain, mucositis, dysgeusia.
- CNS: peripheral neuropathy (can be severe and last more than a year), headache, vertigo, dizziness, insomnia.
- Hematologic: neutropenia (can be severe), thrombocytopenia, anemia, leukopenia, bleeding (can be severe).
- Hepatic: abnormal LFTs.
- Dermatologic: rash, palmar-plantar erythrodysesthesia syndrome.
- Electrolyte disturbances: hypokalemia, hyperkalemia, hypocalcemia, hypercalcemia, hypomagnesemia, hypermagnesemia, hypophosphatemia.
- Renal: increased creatinine.
- Respiratory: dyspnea, cough, pharyngolaryngeal pain.
- Hyperglycemia, pancreatitis (rare), fatigue, fever, arthralgia, myalgia, back pain, bone pain, pain in extremity, conjunctivitis.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 1.4 mg/m² IV on days 1 and 8 of a 21-day cycle. Refer to manufacturer’s instructions for dosage adjustment in case of toxicity.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50 50-15 less than 15
  - Dose 1.4 mg/m² 1.1 mg/m² Not recommended
- Dosage in hepatic impairment: 1.1 mg/m² if mild hepatic impairment (Child-Pugh A), 0.7 mg/m² if moderate hepatic impairment (Child-Pugh B). Not recommended in patients with severe hepatic impairment (Child-Pugh C).
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Excursions to 30°C are permitted. Do not freeze.
- Stable for 14 days between 18-22°C or between 2-6°C exposed to light or protected from light, undiluted in polypropylene syringes.
- Stable for 24 hours at room temp exposed to light or 48 hours refrigerated in NS at concentrations of 0.005 mg/mL to 0.2 mg/mL in IV bags.
- Stable for 14 days between 18-22°C or between 2-6°C exposed to light or protected from light in NS at concentrations of 0.0175 mg/mL and 0.049 mg/mL in multilayer polyolefin containers.
- Incompatible with dextrose solutions.

MISCELLANEOUS
- Use with extreme caution in patients with significant cardiovascular impairment or pre-existing neuropathy.
- Correct electrolytes prior to starting treatment; monitor ECG in patients with cardiac conditions and electrolyte disturbances.

REFERENCES
5, 95, 135, 165, 208.
ERTAPENEM
Invanz ™
Antibiotic - carbapenem

INDICATIONS
- For the following moderate to severe infections caused by susceptible microorganisms: complicated intra-abdominal infections, complicated skin and skin structure infections, community acquired pneumonia, complicated urinary tract infections, and acute pelvic infections.

ADMINISTRATION
- For IV use: reconstitute the 1 g vial with 10 mL of SWFI, NS or bacteriostatic water for injection to get approximately 100 mg/mL of solution. Shake well to dissolve.
- Intermittent IV infusion: further dilute in 50 mL of NS (or if using a lower volume for pediatrics, do not exceed 20 mg/mL as a final concentration); infuse over 30 minutes.
- For IM use: reconstitute the 1 g vial with 3.2 mL of 1% lidocaine injection (without epinephrine) to get approximately 280 mg/mL of solution. Shake well.
- IM (deep IM injection).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis.
- GI: nausea, vomiting, diarrhea.
- CNS: headache.
- Local reactions: injection site reactions (thrombophlebitis).

DOSAGE
Adults and pediatrics 13 years of age and older:
- 1 g IV/IM once daily.
- Dosage in renal impairment: in patients with CrCl less than 30 mL/min including those on hemodialysis, the dose is reduced to 500 mg once daily. If ertapenem is given within 6 hours prior to hemodialysis, a supplementary dose of 150 mg is recommended.

Pediatrics:
- 3 months-12 years of age: 15 mg/kg/dose IV/IM q12h, but not to exceed 1 g/day.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solutions for IM use must be used within 60 minutes of preparation.
- Reconstituted solutions for IV use must be used within 6 hours of preparation.
- Reconstituted solutions for IV use may be stored in the fridge for up to 24 hours and then used within 4 hours after removal from the fridge.
- Stable for 20 hours at room temp and 6 days in the fridge in NS at a concentration of 10 mg/mL in PVC containers.
- Stable for 6 hours at room temp and 5 days in the fridge in NS at a concentration of 20 mg/mL in PVC containers.
- Stable for 30 minutes at room temp or 4 hours at room temp if refrigerated for 24 hours before, reconstituted to a concentration of 100 mg/mL with NS in a polypropylene syringe.
- Solutions may range from colourless to pale yellow without affecting potency.
- Do not mix drug in dextrose solutions but can be piggybacked in the same line as dextrose.

MISCELLANEOUS
- Potential for cross-allergenicity with other beta-lactam antibiotics.

REFERENCES
2, 40, 82, 135, 143, 222, 342.

Full revision 2014; limited revision 2015
INDICATIONS

- Severe infections due to penicillin-sensitive organisms in patients hypersensitive to penicillin.
- *Mycoplasma pneumoniae* and *Legionella pneumophila* infections.
- Treatment of diabetic gastroparesis.

ADMINISTRATION

- Reconstitute 500 mg or 1 g vial with 10 or 20 mL, respectively, of SWFI without preservatives to provide a solution of 50 mg/mL. If NS or solutions with preservatives are used to reconstitute, precipitation may occur (this restriction does not apply to the drug in piggyback containers).
- Intermittent IV infusion: dilute 1/4 of the daily dose in 100-1000 mL of NS or RL to obtain a concentration between 1 to 5 mg/mL. Infuse over 20-60 minutes.
- Continuous IV infusion: dilute entire daily dose in NS or RL to get a concentration of 1 mg/mL and infuse over 24 hours.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, urticaria, anaphylaxis.
- Cardiovascular: prolongation of the QT interval and development of ventricular arrhythmias (rare).
- GI: abdominal cramping and discomfort, nausea, vomiting, diarrhea.
- Local reactions: local pain and burning on injection; venous irritation and thrombophlebitis; minimize by further diluting drug and infusing slowly.

DOSAGE

- Adults:
  - infections: usual dose 250 mg-1 g IV q6h.
  - diabetic gastroparesis: 200 mg IV before each meal; switch to oral therapy (250 mg TID, 30 minutes before meals) when practical.
- Pediatrics:
  - infections: 15-20 mg/kg IV daily in divided doses or 300-600 mg/m²/day. For severe infections, up to 50 mg/kg daily but not to exceed 4 g daily.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp.
- Reconstituted solutions stable for 24 hours at room temp and 2 weeks if refrigerated.
- Infusions stable for 24 hours at room temp or in the fridge in NS.
- Solutions are most stable when the pH is in the range of 6-8 and become unstable and rapidly lose their potency at pH of 5.5 or below and at pH of 10 or above.
- Compatible with NS and RL. If a dextrose containing solution is used, add 1 mL of NaHCO₃ 4% per 100 mL of solution for enhanced stability.

MISCELLANEOUS

REFERENCES

1, 2, 4, 5, 40, 82, 95.
**ERYTHROPOIETIN**

**Epoetin alfa, Eprex®, Hematopoietic**

**INDICATIONS**
- Treatment of anemia associated with chronic renal failure.
- Treatment of anemia associated with zidovudine-treated/HIV-infected patients.
- Treatment of anemia in patients with non-myeloid malignancies, where anemia is due to the effect of concomitantly administered chemotherapy.
- To facilitate autologous blood collection and/or reduce allogeneic blood exposure in patients undergoing major elective surgery.

**ADMINISTRATION**
- IV direct: physician or RN. May be given undiluted over 1 to 5 minutes.
- SC: anterior abdominal wall and limbs. Maximum volume per site is 1 mL; if a larger volume needs to be administered, use more than one site. Alternate injection site. SC administration may increase the risk of immunogenicity.
- Selection of route of administration (IV or SC) may vary depending on the indication. Refer to Dosage section for more information.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis.
- Cardiovascular: dose-dependent increase in blood pressure (most often in chronic renal failure patients).
- CNS: headache, seizures.
- Dermatologic: erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis.
- Hematologic: thromboembolic events such as shunt thrombosis, deep vein thrombosis, pulmonary embolism, etc.
- Flu-like symptoms (arthralgia, myalgia, fever, headache, malaise, chills and diaphoresis) may appear 90-120 minutes after an IV bolus dose and disappear within 10-12 hours with no further treatment.
- Hyperkalemia, hypokalemia.
- Pure red cell aplasia (rare): mainly observed with SC route in patients with chronic renal failure.
- Local reactions: burning, pain, erythema.

**DOSAGE**
- Chronic Renal Failure: initiate therapy with 50-100 international units/kg IV (preferred if patient on hemodialysis) or SC three times weekly. Titrate in increments or decrements of 25 international units/kg to achieve target. Recommended hemoglobin range: 100-115 g/L, not to exceed 120 g/L. Rate of hemoglobin increase should not exceed 10 g/L in any 2-week period.
- HIV-Infected Patients: if endogenous serum erythropoetin levels are 500 mU/mL or below, initiate therapy with 100 international units/kg IV or SC three times weekly for 8 weeks. Titrate in increments of 50-100 international units/kg three times weekly to achieve target. Maximum dose of 300 international units/kg three times weekly. Hemoglobin levels should not exceed 120 g/L.
- Cancer patients: do not initiate if hemoglobin is 100 g/L or greater. Starting doses: 150 international units/kg SC three times weekly or 40 000 international units SC once weekly. Use the lowest dose sufficient to avoid blood transfusion. Hemoglobin levels should not exceed 120 g/L. Rate of hemoglobin increase should not exceed 10 g/L in any 2-week period. Discontinue when chemotherapy course is completed.
- To reduce allogeneic blood exposure in surgery patients: 600 international units/kg SC once weekly for 3 weeks prior to surgery (days -21, -14, -7) and on the day of surgery. If period prior to surgery is less than 3 weeks, give 300 international units/kg/day SC for 10 consecutive days prior to surgery, on the day of surgery and for 4 consecutive days immediately thereafter.
- To facilitate autologous blood collection: 600 international units/kg IV twice weekly for 3 weeks prior to surgery.
- Consult the manufacturer's monograph for more details on dosing and titration.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store in fridge; do not freeze. Protect from light.
- Do not shake as it may denature the glycoprotein.
- Prefilled syringes are stable for 7 days at room temp (not exceeding 25°C), exposed at normal room light (not direct sunlight).

MISCELLANEOUS
- Iron status should be evaluated for all patients; supplemental iron is recommended to support erythropoietin-stimulated erythropoiesis.
- Patients receiving erythropoietin prior to elective surgery, for the purposes of reducing the requirements for allogeneic blood transfusion, should receive adequate antithrombotic prophylaxis in order to reduce the incidence of deep venous thrombosis.

REFERENCES
1, 5, 95, 135, 522.
INDICATIONS
- Perioperative management of tachycardia and hypertension in patients at risk of myocardial ischemia.
- Rapid control of ventricular response in atrial fibrillation or flutter in situations requiring a short-acting agent.

ADMINISTRATION
- IV direct: physician or RN; cardiac monitoring, continuous BP monitoring. Using the 10 mg/mL-10 mL vial, give dose undiluted over 30 seconds.
- Continuous IV infusion: cardiac monitoring, blood pressure monitoring. Use 10 mg/mL-250 mL premixed bag.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: symptomatic hypotension (with diaphoresis, dizziness and headache), asymptomatic hypotension, bradycardia, heart block, flushing.
- GI: nausea.
- Bronchospasm.
- Local reactions: inflammation and induration at the site of injection.

DOSAGE
- For perioperative tachycardia and hypertension:
  Initial dose of 1.5 mg/kg IV to a maximum of 100 mg over 30 seconds. For persistent tachycardia and hypertension, may follow with an infusion of 0.15-0.3 mg/kg/min.

- For atrial fibrillation or flutter:
  Initial loading dose of 0.5 mg/kg IV over 1 minute followed by a maintenance infusion rate of 0.05 mg/kg/min for 4 minutes. If no response, repeat the 0.5 mg/kg loading dose and increase infusion rate to 0.1 mg/kg/min. Continue this titration process of 0.5 mg/kg loading doses and incremental increases of 0.05 mg/kg/min infusion rates. As the desired endpoint is approached, omit the loading dose and reduce the incremental infusion rate to 0.025 mg/kg/min. Maximum recommended infusion rate is 0.3 mg/kg/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and premixed bags at room temp.

MISCELLANEOUS
- Contraindicated in patients with second or third-degree AV block, sinus bradycardia, cardiogenic shock or overt cardiac failure.
- Concomitant use of IV esmolol with IV diltiazem or IV verapamil may cause significant cardiac depression. Therefore co-administration is contraindicated. Note that esmolol beta-blockade effects are dissipated 20-30 minutes after discontinuation of an infusion.
- Caution in diabetic patients as esmolol may mask tachycardia occurring during hypoglycemia (but dizziness and sweating may not be masked).
- Duration of action is very short (half-life = 9 minutes).
- Effect is relatively selective for beta-1 receptors.

REFERENCES
1, 2, 4, 5, 40.
INDICATIONS
- Treatment of abnormal uterine bleeding due to hormonal imbalance.
- Treatment of bleeding associated with uremia.

ADMINISTRATION
- Reconstitute each 25 mg vial with 5 mL of SWFI to obtain a straw-coloured solution at a concentration of 5 mg/mL. During reconstitution, add diluent slowly and direct it against the side of the vial. Mix solution gently; do NOT shake.
- IV direct: physician only. Administer slowly at a rate of 5 mg/min.
- Intermittent IV infusion: for controlling bleeding associated with uremia: dilute the dose in 50 mL of NS and infuse over 30-40 minutes.
- IM (not preferred because of delayed absorption).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, anaphylactoid reactions, angioedema, rash, urticaria.
- Cardiovascular: hypotension, flushing (with too rapid administration).
- GI: nausea, vomiting, ischemic colitis (rare).
- CNS: dizziness, headache, migraine, nervousness; increased risk of ischemic stroke in patients affected by migraines with aura.
- Hematologic: thrombotic disorder, including DVT, thrombophlebitis, retinal vascular thrombosis, cerebral embolism/stroke, pulmonary embolism.
- Edema.
- Local reactions: phlebitis, pain and edema at injection site.

DOSAGE
- For abnormal uterine bleeding: 25 mg IM or IV; repeat in 6-12 hours if necessary OR 25 mg IV q4-6 for 24 hours.
- For bleeding associated with uremia: 0.6 mg/kg/day IV (maximum 60 mg/day) for 5 days.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge.
- Reconstituted solution is stable for one month in the fridge.
- Compatible with NS, D5W, D10W.
- Incompatible with acid solutions.

MISCELLANEOUS
- Contains lactose.

REFERENCES
1, 5, 40, 81, 95, 208, 276, 277, 278.

Full revision 2014; limited revision 2015, 2016
INDICATIONS

- Moderately to severely active rheumatoid arthritis (RA) in adults (Enbrel®, Brenzys™ and Erelzi™).
- Moderately to severely active polyarticular juvenile idiopathic arthritis (JIA) in children aged 4 to 17 years who had inadequately responded to one or more DMARDs (Enbrel® and Erelzi™).
- Active psoriatic arthritis in adults (Enbrel®).
- Active ankylosing spondylitis in adults (Enbrel®, Brenzys™ and Erelzi™).
- Moderate to severe chronic plaque psoriasis in adults (Enbrel®).

ADMINISTRATION

- For multiple-use vial: reconstitute vial by adding very slowly 1 mL of supplied sterile bacteriostatic water for injection (contains benzyl alcohol) to obtain a clear and colourless solution of 25 mg/mL. Some foaming will occur and this is normal. Do NOT shake; swirl gently until dissolution (less than 10 minutes). Do NOT use vial adapter if multiple doses are to be withdrawn from the vial; use instead a 25-gauge needle for mixing and withdrawing the product and a 27-gauge needle for the injection.
- Do NOT filter reconstituted solution during preparation or administration.
- The single-use prefilled syringe and the single-use prefilled autoinjector contain 50 mg of etanercept and are ready to use; allow time to reach room temp (15-30 minutes) prior to injection without removing the needle cap.
- SC: sites of injection include the thigh, abdomen or upper arm, at least 1 inch from previous sites. Rotate injection sites.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, urticaria, angioedema, Stevens-Johnson syndrome, toxic epidermal necrolysis.
- Cardiovascular: chest pain, CHF, hypertension.
- CNS: headache, dizziness, seizures, paresthesia.
- GI: nausea, vomiting, diarrhea, dyspepsia, abdominal pain.
- Dermatologic: vasculitis, SC nodules, lupus erythematosus, erythema multiforme.
- Hematologic: rare though can be severe: neutropenia, leukopenia, anemia, pancytopenia, aplastic anemia.
- Infections: reactivation or new onset of infections, including tuberculosis and hepatitis B.
- Asthenia.
- Local reactions: generally occur during 1st month of therapy, last 3-5 days and do not require discontinuation of therapy: erythema, pruritus, pain, swelling, bleeding, bruising. Redness at previous injection sites.

DOSAGE

Adults:
- RA, psoriatic arthritis, ankylosing spondylitis: 50 mg SC per week.
- Plaque psoriasis: 50 mg SC twice a week (administered 3 or 4 days apart) for 3 months then 50 mg SC per week, although some patients may still need 50 mg SC twice a week as their maintenance dose.

Pediatrics:
- JIA: 0.8 mg/kg (maximum 50 mg per dose) SC once weekly OR 0.4 mg/kg (maximum 25 mg per dose) SC twice weekly given 72-96 hours apart.

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials, prefilled syringes and prefilled autoinjectors in the fridge protected from light; do not freeze. Do not shake.
- Enbrel ® and Brenzys ™: vials, prefilled syringes and prefilled autoinjectors are stable for 60 days at up to 27°C and protected from direct sunlight and humidity.
- Erelzi ™: prefilled syringes and prefilled autoinjectors are stable for 28 days at room temp (20-25°C) and protected from light and heat.
- Enbrel ®: reconstituted solution prepared with the provided diluent may be stored in the original vial for up to 14 days in the fridge and 12 hours at room temp.

MISCELLANEOUS

- Brenzys ™ and Erelzi ™ are classified as being biosimilar to Enbrel ®; therefore, these products are not interchangeable.
- Etanercept should not be administered in patients with active infection.
- Do not administer live vaccines while on etanercept.
- Prefilled syringes and prefilled autoinjectors contain latex (Enbrel ® only).

REFERENCES

1, 5, 82, 135.
ETHACRYNIC ACID

Sodium Edecrin®, Sodium ethacrynate

**CLASSIFICATION**
Diuretic

**INDICATIONS**
- Adjunct in treatment of acute pulmonary edema.
- For edema due to congestive heart failure, nephrotic syndrome or for hepatic cirrhosis with ascites when oral therapy is not possible.
- When edema has become refractory to other agents.

**ADMINISTRATION**
- Reconstitute each 50 mg vial with 50 mL of NS to obtain a solution of 1 mg/mL. Reconstitution with D5W is permitted if pH is above 5; otherwise, may result in a hazy or opalescent solution which should not be used.
- IV direct: physician or RN. Administer at a rate of 10 mg/min into the tubing of a freely running compatible IV solution.
- Intermittent IV infusion: infuse over 20-30 minutes.
- In case dose is repeated, use alternate administration site to avoid thrombophlebitis.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, Henoch-Schönlein purpura (vasculitis).
- Cardiovascular: hypotension (from excessive diuresis), tachycardia.
- GI: anorexia, malaise, abdominal discomfort or pain, nausea, vomiting, diarrhea (discontinue if severe), dysphagia, dry mouth, thirst, GI bleeding (especially if patient is heparinized), acute necrotizing pancreatitis.
- CNS: apprehension, headache, paresthesia, chills, tinnitus, vertigo, confusion, sense of fullness in ear; temporary or permanent deafness (especially if given with ototoxic drugs (such as aminoglycosides) or in patients with renal impairment).
- Hematology: rare: thrombocytopenia, neutropenia and agranulocytosis.
- Hepatic: increased LFT, jaundice.
- Hyperglycemia, hypernatremia, hypokalemia, hypocalcemia, hypomagnesemia, hypocloremic alkalosis; uricosuria, hyperuricemia, fever, hematuria, blurred vision, weakness, muscle cramps, fatigue.
- Local reactions: irritation, pain, thrombophlebitis.

**DOSAGE**
- Adults: 0.5-1 mg/kg/dose IV; usual dose: 50 mg; maximum dose: 100 mg.
- Pediatrics (children only, not for use in infants): 1 mg/kg/dose IV; maximum dose: 100 mg.
- Repeat doses not routinely recommended; however, if needed, repeat q8-12h.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solution is stable for 24 hours from preparation.
- Compatible with D5W, NS, D5-NS, Ringer’s and RL.
- Stable for 14 days at room temp or 22 days in fridge in NS at a concentration of 1 mg/mL in polypropylene syringes.

**MISCELLANEOUS**
- Potassium supplements should be used concomitantly in cirrhotic, nephrotic, or digitalized patients.

**REFERENCES**
1, 5, 6, 40, 82, 208, 279.
**INDICATIONS**
- For induction of general anesthesia.
- For induction during rapid sequence intubation.

**ADMINISTRATION**
- Ensure premedication has been administered prior to administration. Refer to Dosage section.
- IV direct: physician only; administer undiluted.
  - Propylene glycol formulation: solution should be clear; inject as a bolus over 30-60 seconds in a large vein.
  - Lipid emulsion formulation: shake ampoule just before use to ensure a homogenous solution; inject as a bolus over 30 seconds in a large vein; may be injected into the tubing of an IV infusion of NS that has temporarily been stopped.

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: hypertension, hypotension (if too rapid administration), arrhythmias, tachycardia, bradycardia.
- GI: nausea, vomiting.
- Respiratory: apnea and respiratory depression with high doses; hypoventilation, hyperventilation, cough, laryngospasm, hiccups, snoring.
- Chills. Mild to moderate transient skeletal muscle movements, including eye movements; these may be minimized with premedication of fentanyl or diazepam; refer to Dosage section.
- Decreased plasma cortisol and aldosterone levels persisting for 6-8 hours following administration and unresponsive to ACTH.
- Local reactions: transient venous pain at injection site.

**DOSAGE**
- Premedication for:
  - propylene glycol formulation: 0.1 mg of fentanyl IV immediately before induction.
  - lipid emulsion formulation: diazepam IV 10 minutes before induction or IM 1 hour before induction.
- Induction of general anesthesia with:
  - propylene glycol formulation: 0.3 mg/kg (range: 0.2-0.6 mg/kg) IV.
  - lipid emulsion formulation: 0.15-0.3 mg/kg IV.
- Induction during rapid sequence intubation: 0.3 mg/kg IV.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules and vials at room temp. Protect lipid emulsion formulation from light.

**MISCELLANEOUS**
- Etomidate in lipid emulsion formulation is available under the brand name Etomidate-Lipuro ® manufactured by B. Braun, while the propylene glycol formulation is manufactured by Pfizer as Amidate ® and by American Regent as Etomidate Injection.
- For etomidate in lipid emulsion formulation: do not administer in patients with a known hypersensitivity to soybean oil or egg lecithin.
- Following induction, onset of hypnosis occurs within 1 minute; duration of action is 3-5 minutes.
- Should not be used for rapid sequence intubation in septic patients.
- Etomidate has minimal cardiovascular and respiratory effects and provides a greater hemodynamic stability compared to commonly used agents.
- Reduces intracranial blood pressure to a similar degree as thiopental and propofol; however, in contrast to these agents, it maintains means arterial blood pressure and thus cerebral perfusion pressure.
- Etomidate exhibits no analgesic activity.

**REFERENCES**
1, 4, 5, 40, 95, 280, 282.

* Available via Health Canada’s Special Access Programme
ETOPOSIDE
VePesid®, VP-16
Antineoplastic

INDICATIONS
- Treatment of lung cancer (small cell, non-small cell), malignant lymphoma and testicular cancer.
- Can also be used in combination with other antineoplastics for a variety of tumour types.

ADMINISTRATION
- Intermittent IV infusion: dilute in NS or D5W to obtain a final concentration of 0.2-0.4 mg/mL; maximum concentration of 0.4 mg/mL as more concentrated solutions will lead to crystal formation; infuse over at least 30-60 minutes.
- Continuous IV infusion: dilute in NS or D5W to obtain a final concentration of 0.2-0.4 mg/mL; maximum concentration of 0.4 mg/mL as more concentrated solutions will lead to crystal formation.
- Use containers without diethylhexyl phthalate (DEHP) and non-DEHP tubing (with an in-line 0.22 micron filter); refer to Compatibility and Stability section.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid reaction (rare), rash, urticaria, pruritus.
- Cardiovascular: hypotension (associated with rapid IV administration of less than 30 minutes and with high doses).
- GI: nausea, vomiting, mucositis, esophagitis, anorexia, stomatitis, constipation, abdominal pain, diarrhea.
- CNS: headache, vertigo, seizures, confusion, somnolence, peripheral neuropathy.
- Dermatologic: palmar erythema (with high doses), radiation recall reaction (rare).
- Hematologic: anemia, thrombocytopenia, neutropenia, granulocytopenia, leukopenia.
- Weakness, fatigue, fever; metabolic acidosis and increased LFT at high doses.
- Local reactions: phlebitis at site of injection.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 35-150 mg/m²/day IV for 1-5 days every 3-7 weeks.
- 1800-2400 mg/m²/cycle as continuous IV infusion.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 50 50-10 less than 10
  - Dose 100% 75% 50% or discontinue
- Dosage in hepatic impairment:
  - Serum bilirubin (mcmol/L) less than 25 25-50 50-85 greater than 85
  - Dose 100% 50% 25% do not administer
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; protect from light.
- Stable for 96 hours at room temp in NS or D5W at 0.2 mg/mL in polyethylene containers.
- Stable for 22 days at room temp or 14 days in the fridge in NS at 0.2 mg/mL in glass containers.
.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 2 days at room temp or 7 days in the fridge in NS at 0.3 mg/mL in glass containers.
- Stable for 6 hours at room temp in NS or D5W at 0.4 mg/mL in polyethylene containers.
- Stable for 2 days in the fridge in NS at 0.4 mg/mL in glass containers.
- Stable for 8 hours at room temp in RL at 0.2 or 0.4 mg/mL in glass containers.
- Polysorbate 80 from the etoposide formulation can cause leaching of DEHP from PVC containers and tubing; therefore, non-DEHP containers and tubing are recommended for preparation and administration of etoposide solutions.

MISCELLANEOUS

REFERENCES

1, 5, 129, 165, 208, 287.
EXENATIDE

Bydureon ®, Byetta ®

Antidiabetic

INDICATIONS

- Treatment of type 2 diabetes mellitus; Byetta ® is used in combination with insulin glargine, metformin and/or a sulfonylurea, and Bydureon ® is used as monotherapy, in combination with metformin and/or a sulfonylurea, or in combination with basal insulin with or without metformin.

ADMINISTRATION

Bydureon ®:
- Let the pen at room temp for 15 minutes. Reconstitute the 2 mg dose with the diluent provided within the pen. Mix well by tapping until a uniform cloudy suspension is obtained. Refer to manufacturer’s instructions for more details.
- SC: in the upper arm, thigh, or abdomen; press the injection button with the thumb until hearing a click; hold in place for 10 seconds. Rotate injection sites.

Byetta ®:
- Ready-to-use solution within the pen.
- SC: in the upper arm, thigh or abdomen.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: generalized pruritus and/or urticaria, rash, angioedema, anaphylaxis, antibody formation.
- GI: nausea, vomiting, dyspepsia, gastroesophageal reflux disease, diarrhea, constipation.
- CNS: dizziness, nervousness, headache.
- Hypoglycemia (risk increased if used in combination with insulin glargine or a sulfonylurea; refer to Miscellaneous section); rapid weight loss.
- Pancreatitis.
- Renal dysfunction.
- Asthenia.
- Local reactions: pain, erythema, rash, itching, bruising, bleeding; in addition, for Bydureon ®: induration, nodules, abscess, cellulitis, necrosis.

 Dosage

- Bydureon ®: 2 mg SC once weekly at any time of the day, with or without meals.
- Byetta ®: 5 mcg SC BID. If required, after one month, dose can be increased to 10 mcg SC BID. Administer dose within 60 minutes before the morning and evening meal (or before the two main meals of the day, at least 6 hours apart). Do not administer after a meal.
- Dosage in renal impairment: use cautiously in patients with moderate renal impairment (CrCl 30-50 mL/min) and in those with renal transplantation. Not to be used in patients with end-stage renal disease, severe renal impairment (CrCl less than 30 mL/min), or when receiving dialysis.
- Dosage in hepatic impairment: no dosage adjustment expected as drug is mainly excreted by the kidney.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled pens between 2-8°C. Protect from light. Do not freeze.
- Bydureon ®: before reconstitution, the pen may be kept at room temp (not to exceed 30°C) for 28 days. Once reconstituted, solution should be injected immediately and the pen discarded.
- Byetta ®: when in use, the pen may be kept between 2-25°C for 30 days; do not store the pen with the needle attached.
- Do not mix with insulin.

.../Cont.
EXENATIDE
Bydureon ®, Byetta ®

MISCELLANEOUS
- Exenatide is a glucagon-like peptide-1 (GLP-1) receptor agonist, an incretin mimetic agent.
- Exenatide should not be used in the treatment of type 1 diabetes mellitus or diabetic ketoacidosis.
- When exenatide is added to insulin glargine or a sulfonylurea, consider decreasing the dose of the latter agents to reduce the risk of hypoglycemia.
- When switching from Byetta ® to Bydureon ®, increased glycemia can occur and should improve within 2 weeks.

REFERENCES
1, 2, 5, 95, 135.
FACTOR VIIA (RECOMBINANT)

Eptacog alfa (activated), NiaStase RT®

Coagulation factor

Do NOT confuse factor VIIA with other coagulation factors. This monograph is specific to factor VIIA.

INDICATIONS
- Treatment of bleeding episodes (including treatment and prevention of those occurring during and after surgery) in patients with hemophilia A or B with inhibitors to factors VIII or IX.

ADMINISTRATION
- For IV use: powder vial and diluent (histidine solvent) should be at room temp before reconstitution. If not at room temp, hold vials to bring them to room temp. Reconstitute powder vial by adding 1.1 mL of diluent for the 1 mg vial, 2.1 mL of diluent for the 2 mg vial, 5.2 mL of diluent for the 5 mg vial and 8.1 mL of diluent for the 8 mg vial. Inject diluent slowly along wall of vial; Do NOT inject diluent directly onto the powder. Gently swirl until dissolved.
- IV direct: physician or RN. Administer over 2-5 minutes.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, anaphylaxis (rare).
- Cardiovascular: hypertension, hypotension, edema.
- GI: nausea, vomiting.
- CNS: headache.
- Hematologic: thrombotic events (arterial and venous), hemorrhage.
- Fever, pain.
- Local reactions: redness and pain at injection site.

DOSAGE
- Dosage will depend on the nature and severity of the coagulation defect, the site of bleeding and the type of intervention.
- 35-90 mcg/kg IV q2h until achievement of hemostasis; dosage interval may then be extended from 2 to 6 hours.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store powder vial and diluent at room temp or in the fridge (2-25°C). Do not freeze. Protect powder and diluent from light.
- Reconstituted vials are stable at room temp or in the fridge for a maximum of 3 hours.
- Do not mix with infusion solutions.

MISCELLANEOUS
- Known hypersensitivity to mouse, hamster or bovine proteins is a contraindication to the use of the product.

REFERENCES
2, 95, 135.
FACTOR VIII (RECOMBINANT)

**Advate ®, Antihemophilic factor, Helixate FS ®, Kogenate FS ®**

Do NOT confuse factor VIII with other coagulation factors.
This monograph is specific to factor VIII.

**INDICATIONS**
- In patients with hemophilia A for the prevention and treatment of hemorrhagic episodes.
- Acquired hemophilia with low levels of factor VIII inhibitors.

**ADMINISTRATION**
- Prior to reconstitution, bring diluent and concentrate to room temp. Reconstitute the concentrate with diluent following manufacturer’s instructions.
- IV direct: physician or RN. Administer over 5-10 minutes or at the maximum rate of 10 mL/min (slower rates associated with fewer adverse effects).
- Intermittent IV infusion, Continuous IV infusion: transfer in a PVC reservoir. Initial infusion rate ranges from 1.8-9.5 international units/kg/hr (median rate: 3.5 international units/kg/hr). Must be administered by an infusion pump.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: fever, chills, facial swelling, flushing, rash, hives, hypotension, wheezing, anaphylaxis (rare).
- CNS: headache.
- Local reactions: burning, pruritus and erythema at injection site.

**DOSAGE**
- Should be carefully individualized based on coagulation studies performed prior to and during therapy.
- Dosage depends upon degree of deficiency, the antihemophilic factor (AHF) level desired, the weight of the patient, severity of bleeding and presence of factor VIII inhibitors.
- Approximate dose required to achieve a particular increase in AHF level:
  - international units required = body weight (kg) X 0.5 X desired AHF increase (in % of normal).
- Dose of 1 international unit of factor VIII/kg body weight administered raises the plasma VIII activity by approximately 2%.
- Consult specialized references for more detailed dosing information.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2-8°C. May store at room temp for 6 months (Advate ®) or 12 months (Kogenate FS ® and Helixate FS ®).
- Reconstituted solutions for IV direct injection should be kept at room temp and administered within 3 hours of reconstitution.
- Reconstituted solutions of Kogenate FS ® and Helixate FS ® for IV infusion are stable for 24 hours at room temp (up to 30°C) in a PVC container.
- Reconstituted solutions of Advate ® for IV infusion are stable for 12 hours at room temp in a PVC container.

**MISCELLANEOUS**
- Contraindicated in patients with known hypersensitivity to mouse or hamster proteins.
- One international unit is defined as the AHF activity present in 1 mL of normal, fresh-pooled plasma.

**REFERENCES**
1, 2, 23, 40, 95, 135.
FACTOR VIII/VON WILLEBRAND FACTOR COMPLEX (HUMAN)

**INDICATIONS**
- Hemophilia A: treatment and prophylaxis of bleeding in adult patients with congenital or acquired Factor VIII (FVIII) deficiency.
- Von Willebrand disease (VWD): for adults and pediatrics: 1) treatment and prevention of spontaneous and traumatic bleeding episodes unresponsive to desmopressin therapy or if contraindicated; 2) for prevention or treatment of excessive bleeding during or after surgery.
- Refer to manufacturer's monograph for specific indications, depending on brand used.

**ADMINISTRATION**
- **Humate P®**: ensure that Humate P® vial and its diluent have reached room temp. Using the transfer set provided, reconstitute each vial of 250 international (int.) units FVIII/600 int. units von Willebrand factor (VWF) and 500 int. units FVIII/1200 int. units VWF with 5 and 10 mL respectively of diluent provided, to obtain a final concentration of 50 int. units FVIII/120 int. units VWF per mL. Reconstitute the 1000 int. units FVIII/2400 int. units VWF vial with 15 mL of the diluent provided to obtain a final concentration of 67 int. units FVIII/160 int. units VWF per mL. Swirl vial to dissolve; do NOT shake. The solution should be clear or slightly opalescent. Transfer dose into a syringe. Refer to manufacturer's instructions for a more detailed procedure.
- **Wilate®**: ensure that Wilate® vial and its diluent have reached room temp. Using the transfer set provided, reconstitute the 500 international (int.) units FVIII/500 int. units von Willebrand factor (VWF) vial and the 1000 int. units FVIII/1000 int. units VWF vial with 5 mL and 10 mL respectively of the provided diluent, to obtain a final concentration of 100 int. units FVIII/100 int. units VWF per mL. Swirl vial to dissolve. The reconstituted solution should be clear or slightly opalescent, colourless or slightly yellow. Transfer dose into a syringe. Refer to manufacturer's instructions for a more detailed procedure.
- **Intermittent IV infusion**: slowly administer the syringe content at a rate not exceeding 4 mL/min for Humate P® and at a rate not exceeding 2-3 mL/min for Wilate®.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, pruritus, angioedema, wheezing, chest tightness, hypotension, anaphylaxis.
- Cardiovascular: edema (facial and peripheral), thrombotic events.
- GI: nausea, vomiting.
- CNS: dizziness, headache.
- Paresthesia, chills.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.
- Local reactions: pruritus and pain at injection site.

**DOSEAGE**

**Hemophilia:**
- Dosage and duration of the substitution therapy depend on the severity of the FVIII deficiency, the location and extent of the bleeding, the patient's clinical condition, and the product selected; refer to manufacturer's monograph for specific dosage recommendations.
- As a general rule, 1 int. unit of FVIII coagulant activity per kg body weight will increase the circulating FVIII level by approximately 2 int. units/dL.

**VWD:**
- Dosage should be adjusted according to the extent and location of bleeding, the type of surgery, the patient's clinical condition, and the product selected; refer to manufacturer's monograph for specific dosage recommendations.
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COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Humate-P ®:
- Store Humate-P ® vials and diluent in the fridge or at room temp (2-25°C). Do not freeze.
- Humate-P ® solution should be used within 3 hours after its reconstitution; do not refrigerate once reconstituted.

Wilate ®:
- Store Wilate ® vials and diluent between 2-8°C. Protect from light. Do not freeze.
- Wilate ® and its diluent can be stored on a single occasion for up to 6 months at room temp and must not return to the fridge.
- Wilate ® reconstituted solution should be used immediately.

MISCELLANEOUS

REFERENCES
5, 40, 135.
**FACTOR IX CONCENTRATE (HUMAN & RECOMBINANT)**

**INDICATIONS**
- Prevention and control of bleeding episodes caused by factor IX deficiency, also known as Hemophilia B or Christmas disease.

**ADMINISTRATION**
- Prior to reconstitution, bring diluent and concentrate to room temp. Do not exceed 37°C. Reconstitute according to manufacturer’s instructions.
- IV direct: physician or RN. Rate as per manufacturer’s recommendation.
- Intermittent IV infusion, Continuous IV infusion.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, chills (rigors), flushing, angioedema, dyspnea, wheezing, tachycardia, hypotension, anaphylaxis.
- GI: nausea, abnormal taste.
- CNS: headache, dizziness.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated (human-derived product only: Immunine VH ®).
- Local reactions: pain or burning along injection site, phlebitis.

**DOSAGE**
- Individualized depending upon degree of deficiency, the desired level of deficient factor, weight of patient and severity of bleeding.
- Should be based on coagulation studies performed prior to surgery and at regular intervals during treatment.
- Units required: body weight (kg) X 1.2 unit/kg X desired factor IX increase (in % of normal).
- For specific dosing recommendations, consult manufacturer’s information.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store Immunine VH ® between 2-8°C although stable at room temp for 3 months. Do not freeze.
- Store Benefix ® between 2-30°C.
- Following reconstitution, use within 3 hours to avoid bacterial contamination. Do not refrigerate reconstituted solution.

**MISCELLANEOUS**
- Contraindicated in patients with known hypersensitivity to hamster proteins (Benefix ®), to heparin (Immunine VH ®), with disseminated intravascular coagulation or fibrinolysis.
- One international unit of Factor IX corresponds to the activity of Factor IX present in 1 mL of fresh normal plasma.

**REFERENCES**
1, 2, 5, 40, 95.

Do NOT confuse factor IX concentrate with other coagulation factors. This monograph is specific to factor IX concentrate.
FAMOTIDINE

**Pepcid ®**

Histamine (H₂) receptor antagonist

**INDICATIONS**

- Treatment of intractable gastric or duodenal ulcers.
- Treatment of hypersecretory conditions (e.g., Zollinger-Ellison Syndrome).
- For short-term use in patients who are unable to take oral medications.
- Stress ulcer prophylaxis in critical care patients.

**ADMINISTRATION**

- IV direct: physician or RN. Dilute 20 mg (2 mL) in 3 mL or 8 mL of SWFI, NS, D5W or other compatible solution to obtain a final volume of 5 mL or 10 mL, respectively. Administer at a maximum rate of 10 mg/min.
- Intermittent IV infusion: further dilute each 20 mg dose in 100 mL and infuse over 15-30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, angioedema, bronchospasm, anaphylaxis.
- GI: constipation, diarrhea.
- CNS: headache, dizziness.
- Local reactions: transient irritation at the injection site.

**DOSAGE**

- Adults: 20 mg IV q12h. For hypersecretory conditions: 20 mg IV q6h; higher doses may be needed; adjust to clinical needs.
- Pediatrics (1 to 16 years): 0.25 mg/kg IV q12h, up to 40 mg/day.
- Dosage in renal impairment: when CrCl is 50 mL/min or less, reduce dose by half or increase dosing interval to 36 to 48 hours. Not removed by hemodialysis.

**COMPATIBILITY, STABILITY**

*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*

- Store vials in the fridge and protect from light. Do not freeze.
- Stable for 15 days at room temp or 63 days in the fridge in NS or D5W at a concentration of 0.2 mg/mL in PVC bags.
- Stable for 15 days at room temp in D5W or NS at a concentration of 0.2 mg/mL when stored in polypropylene syringes.
- Stable for 8 weeks in the freezer in D5W, NS or SWFI at a concentration of 2 mg/mL when stored in polypropylene syringes.
- Stable for 14 days in the fridge in D5W, NS or SWFI at a concentration of 2 mg/mL when stored in plastic syringes.
- Compatible with NS, D5W, D10W, RL.

**MISCELLANEOUS**

**REFERENCES**

1, 4, 5, 40, 82, 95, 135.
INDICATIONS

- As a source of calories and essential fatty acids for patients requiring total parenteral nutrition (TPN) over extended periods (over 5 days usually).
- Prevention or treatment of essential fatty acid deficiency (Intralipid ®).
- Treatment of local anesthetic-induced cardiac arrest unresponsive to conventional resuscitation.

ADMINISTRATION

- IV direct: physician only. For treatment of local anesthetic toxicity; administer bolus dose over 1 minute (20% solution).
- Intermittent IV infusion, Continuous IV infusion: in a peripheral or central vein as solution is isotonic. Rate:
  a) as a source of calories and essential fatty acids for patients requiring TPN and for prevention of fatty acid deficiency (Intralipid ®):
    - adults, 10% solution: 1 mL/min for the first 15-30 minutes. If no untoward effects, increase rate to 2 mL/min.
    - adults, 20% solution: 0.5 mL/min for the first 15-30 minutes. If no untoward effects, increase rate to 1 mL/min.
    - pediatrics, 10% solution: 0.1 mL/min for the first 10-15 minutes. If no untoward effects, increase rate to 0.5 mL/kg/hr. Do not exceed 100 mL/hr.
    - pediatrics, 20% solution: 0.05 mL/min for the first 10-15 minutes. If no untoward effects, increase rate to 0.5 mL/kg/hr. Do not exceed 50 mL/hr.
  b) as a source of calories and essential fatty acids for patients requiring TPN (ClinOleic ®, SMOFlipid ®):
    - ClinOleic ® (adults only): 0.5 mL/min for the first 10 minutes. If no untoward effects, increase rate gradually to desire rate after 30 minutes. Do NOT exceed 0.75 mL/kg/hr. Usual infusion time is between 12-24 hours per day.
    - SMOFlipid ® (adults only): increase gradually until a maximum rate of 0.75 mL/kg/hr. Usual infusion time is between 12-24 hours per day.
  c) for treatment of local anesthetic toxicity: refer to Dosage section.
- Must be administered by an infusion pump.
- A filter is not necessary when fat emulsions are administered as a single agent. A filter of 1.2 micron size may be required if fate emulsions are part of a 3-in-1 admixture. Consult manufacturer's monograph for specific requirements.
- Use a non-diethylhexyl phthalate (DEHP-free) administration set for ClinOleic ® and SMOFlipid ®.

POTENTIAL ADMINISTRATION HAZARDS

- GI: nausea, vomiting.
- Fever, chills, headache.
- Back or chest pain with dyspnea or cyanosis.
- Hyperlipidemia.

DOSAGE

Adults:
- TPN (Intralipid ®): initial dose: 1 g/kg/day IV or 500 mL of 10% or 20% IV on the first day. May increase dose gradually by 1 g/kg/day if needed.
- TPN (ClinOleic ®, SMOFlipid ®): usual dose of 1-2 g/kg/day (5-10 mL/kg/day) IV.
- Do not exceed 60% of patient’s total caloric intake or 2.5-3 g/kg/day.
- Essential fatty acid deficiency (Intralipid ®): prevention: 2-4% of total caloric intake IV (e.g., 500 mL of a 10% solution twice a week). Treatment: 8-10% of total caloric intake IV; may infuse up to once daily.

.../Cont.
FAT EMULSIONS
ClinOleic®, Fatty acids, Intralipid®, Lipid emulsions, Liposyn®, SMOFlipid®

CLASSIFICATION
Nutritional supplement

DOSAGE (Cont.)
- Treatment of local anesthetic toxicity: using a 20% solution, initial dose of 1.5 mL/kg IV over 1 minute, followed by a continuous infusion of 0.25 mL/kg/min IV. May repeat dose as a bolus once or twice (leave 5 minutes between boluses) and/or increase rate of the continuous infusion to 0.5 mL/kg/min if re-emergence or persistence of hemodynamic instability. Do not exceed a maximum cumulative dose of 12 mL/kg.

Pediatrics (Intralipid®):
- TPN: 0.5-1 g/kg/day IV. May increase dose gradually by 0.5 g/kg/day to a maximum of 3-4 g/kg/day.
- Essential fatty acid deficiency: prevention: 2-4% of total caloric intake IV. Treatment: 8-10% of total caloric intake IV.

Premature infants (Intralipid®):
- 0.5 g/kg/day IV using the 20% solution (avoid using the 10% solution in premature infants as its greater phospholipid load per g of triglyceride has been associated with a greater accumulation of plasma lipids). May increase dose gradually if needed to a maximum of 3-3.5 g/kg/day.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Intralipid®, SMOFlipid®: store up to 25°C. Do not freeze.
- ClinOleic®: store between 15-30°C. Do not freeze.
- Exposure to light, particularly phototherapy light, has been associated with increased lipid oxidation; the clinical significance remains to be determined.
- Do not use if emulsion appears to be layering out.
- Compatible through a Y-site connection with amino acids and dextrose.

MISCELLANEOUS
- Use with caution in pulmonary disease, severe liver disease, blood coagulation disorders, anemia or when there is a danger of fat embolism.
- Use with caution in jaundiced or premature infants as fatty acids may displace bilirubin bound to albumin.
- Contra-indicated in pancreatitis with hyperlipemia, pathologic hyperlipidemia, lipoid nephrosis, and severe egg or soybean allergies.
- Monitor serum triglycerides and free fatty acids.
- A 10% solution provides 1.1 kcal/mL and a 20% solution 2 kcal/mL.
- Fat emulsions have also been used in the management of overdose with highly lipophilic cardiotoxic medications other than local anesthetics.
- When fat emulsions are used in the context of drug overdoses, collect blood samples for lab values before their administration. Indeed, fat emulsions may produce falsely elevated readings of albumin, magnesium and glucose (colorimetric method only for glucose); also amylase, lipase, phosphate, creatinine, total protein, alanine aminotransferase, creatine kinase and bilirubin may not be measurable. A brief centrifugation of the blood sample may minimize the interference.

REFERENCES
1, 5, 40, 78, 82, 95, 135, 181, 185, 191, 268, 344, 345, 347, 390, 391, 513.
INDICATIONS
- An adjunct in the induction and maintenance of general and regional anaesthesia.
- As an anesthetic agent with oxygen and a skeletal muscle relaxant to provide anesthesia without the use of additional anesthetic agents in selected patients.
- For short-term analgesia during perioperative period.
- For short-duration minor surgery and in diagnostic procedures or treatments that require the patient to be awake or very lightly anesthetized (e.g., burn dressings, bronchoscopy, catheterization).
- For control of pain in palliative care and cancer patients.

ADMINISTRATION
- IV direct: physician or RN; **respiratory support**. Administer undiluted or dilute dose to 10 mL with NS or D5W and give slowly over 1-5 minutes.
- Continuous IV infusion: at TOH, transfer 5 mg (100 mL from fentanyl 50 mcg/mL vials) to an empty sterile minibag (final concentration: 50 mcg/mL). Must be administered by an infusion pump.
- IM, SC injection, SC infusion.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: bradycardia (Antidote: atropine), hypotension, hypertension.
- GI: nausea, vomiting, constipation, dry mouth.
- CNS: dizziness, mental clouding, sedation, confusion, drowsiness, headache.
- Respiratory depression.
- Skeletal and thoracic muscle rigidity associated with hypoventilation especially with rapid IV administration.
- Fatigue.

Antidote: naloxone (for respiratory depression).

DOSAGE
- Anesthetic Adjunct: Regional anesthesia: 50-100 mcg IM or IV when analgesia required.
  General anesthesia:
  - minor surgery: 2 mcg/kg IV.
  - moderate-major surgery: 2-20 mcg/kg IV followed by 25-100 mcg IV as necessary for maintenance.
  - open heart/complicated surgery: 20-50 mcg/kg IV followed by dose of 25 mcg to one half the initial dose IV as necessary for maintenance.
- As a general anesthetic: 50-100 mcg/kg (up to 150 mcg/kg may be required in certain cases) IV with oxygen and a skeletal muscle relaxant.
- Analgesia in perioperative period: intermittent dosing: 50-100 mcg IM or IV q1-2h as needed. As a continuous IV infusion: 25-200 mcg/hr or 1-2 mcg/kg/hr. Titrate to effect.
- Analgesia in palliative care and cancer patients: usual dosage range can be exceeded and is titrated to effect.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from light. Protect from freezing.
- Stable for 48 hours at room temp in D5W and NS at concentration of 5 mcg/mL in glass or PVC containers.
- Stable for 30 days at room temp or in the fridge in NS at a concentration of 20 mcg/mL in PVC containers.
COMPATIBILITY, STABILITY (Cont.)
- Stable for 28 days at room temp (and exposed to light) or in the fridge (and protected from light), undiluted (50 mcg/mL) in polypropylene syringes or PVC bags.
- Stable for 93 days at 5°C (protected from light) or 22°C (exposed to light) in NS at a concentration of 10 mcg/mL or 50 mcg/mL (undiluted) in polyolefin bags.

MISCELLANEOUS
- Onset of action after IV administration is almost immediate; duration of 30-60 minutes.
- Caution in patients on monoamine oxidase inhibitors (risk of serotonin syndrome) or taking strong CYP3A4 inhibitors (risk of fentanyl toxicity).

REFERENCES
1, 4, 5, 33, 40, 95, 135, 241, 252, 457.
## FERRIC GLUCONATE COMPLEX

### INDICATIONS
- Treatment of iron deficiency anemia in patients undergoing chronic hemodialysis who are receiving supplemental erythropoietin therapy.

### ADMINISTRATION
- **IV direct:** physician or RN; undiluted solutions may be administered slowly at a rate up to 1 mL/min (12.5 mg/min).
- **Intermittent IV infusion (at TOH, mandatory):** dilute each 62.5 mg of elemental iron (5 mL) in at least 50 mL of NS. Infuse at a rate of 125 mg/hr. At TOH: always infuse at a maximum rate of 62.5 mg/hr.
- Observe patient for signs and symptoms of hypersensitivity during and for at least 30 minutes after administration.

### POTENTIAL ADMINISTRATION HAZARDS
- **Hypersensitivity:** rare (fewer hypersensitivity reactions than iron dextran); rash, pruritus, wheezing, hypotension, anaphylaxis.
- **Infusion-related reactions:** hypotension associated with fatigue, malaise, lightheadedness, weakness, flushing or severe pain in the chest, back, flanks or groin with too rapid administration; not associated with drug hypersensitivity. Usually resolve within 1-2 hours; if symptomatic, administer volume expanders. Restart infusion when resolved.
- **GI:** nausea, vomiting, diarrhea.
- **CNS:** seizures.
- **Local reactions at injection site.**

### DOSAGE
- **Initial:** 125 mg of elemental iron (10 mL) IV during the dialysis session, up to a cumulative dose of 1000 mg of elemental iron administered over 8 sequential dialysis sessions (At TOH, first dose should not exceed 62.5 mg).
- **Maintenance:** lowest dose necessary to maintain the target levels of hemoglobin, hematocrit and iron.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp. Protect from light. Do not freeze.
- Must only be mixed with NS; use immediately after dilution in NS.
- Do not mix with other medications or add to parenteral nutrition solutions.
- Stable for 24 hours at room temp in NS and protected from light at a concentration of 0.25 mg/mL (62.5 mg/250 mL NS) in a plastic bag.

### MISCELLANEOUS
- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and resuscitation equipment must be available in case of acute hypersensitivity reaction.
- Not dialyzable.
- Ampoule contains 62.5 mg/5 mL of elemental iron.

### REFERENCES
1, 5, 40, 135, 348.
INDICATIONS
- To control acute bleeding episodes in patients with congenital fibrinogen deficiency, including afibrinogenemia and hypofibrinogenemia.

ADMINISTRATION
- Ensure vials of fibrinogen and diluent have reached room temp. Using an appropriate transfer device or syringe, reconstitute fibrinogen vial with 50 mL of SWFI (diluent provided) to obtain an approximate concentration of 20 mg/mL. Gently swirl the vial to ensure the product is fully dissolved (generally 5 to 10 minutes). Do NOT shake the vial to avoid formation of foam. After reconstitution, the solution should be colourless and clear to slightly opalescent.
- IV intermittent infusion: infuse directly from the reconstituted vial at a rate not exceeding 100 mg/min (5 mL/min) through a separate IV line.
- Consult TOH Nursing policy 00048 (Blood and blood products – Coagulation factor concentrate – Administration of) for more information.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, chest tightness, wheezing, dyspnea, hypotension, tachycardia, shock, anaphylaxis.
- Cardiovascular: thrombotic events (myocardial infarction, pulmonary embolism, deep vein thrombosis, arterial thrombosis).
- GI: nausea, vomiting.
- CNS: headache.
- Fever, chills.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.

DOSAGE
- Dose and frequency of administration are based on extent of bleeding, laboratory values and clinical condition. Determine fibrinogen level before and after the dose.
- If fibrinogen level is unknown: 70 mg/kg IV until target level of 1 g/L is maintained for at least 3 days if minor events (e.g., epistaxis, IM bleeding, or menorrhagia) or until target level of 1.5 g/L is maintained for 7 days if major events (e.g., head trauma, or intracranial hemorrhage).
- If level of fibrinogen is known, use this equation:

\[
\text{Dose of fibrinogen (mg/kg)} = \frac{\text{Target level (g/L)} - \text{measured level (g/L)}}{0.017}
\]

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-25°C. Protect from light. Do not freeze.
- Reconstituted solution is stable for 8 hours at room temp (20-25°C). Do not freeze reconstituted solution.

MISCELLANEOUS
- Epinephrine, antihistamines and corticosteroids should be available for the treatment of hypersensitivity reactions.
- Each single-use vial contains between 900-1300 mg of fibrinogen.

REFERENCES
1, 5, 40, 135.

New monograph 2017
INDICATIONS

- To decrease the incidence of infection (febrile neutropenia) in patients with non-myeloid malignancies receiving myelosuppressive antineoplastic agents.
- To decrease duration of neutropenia, fever, antibiotic use and hospitalization following induction and consolidation treatment for acute myeloid leukemia.
- To decrease duration of neutropenia and related clinical problems in post bone marrow transplant, peripheral stem cell mobilization, HIV-associated neutropenia and drug-induced neutropenia.
- To increase neutrophil counts and to reduce incidence and duration of infection in patients with congenital, cyclic or idiopathic chronic neutropenia.

ADMINISTRATION

- Do NOT shake vigorously.
- Intermittent IV infusion: dilute in 50-100 mL of D5W to obtain a final concentration between 5 and 15 mcg/mL; administer over 15-30 minutes or 4 hours (see Compatibility, Stability section).
- Continuous IV infusion: dilute in 50-100 mL of D5W and infuse over 24 hours (see Compatibility, Stability section).
- SC infusion: dilute in 10-50 mL of D5W and infuse over 24 hours (see Compatibility, Stability section).
- SC: outer area of upper arms, front of middle thighs, abdomen (except 2 inches around the navel), buttocks. Rotate injection site.
- Do NOT administer in the 24-hour period prior to or after chemotherapy administration, bone marrow infusion or stem cell infusion.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rare; rash, urticaria, facial edema, wheezing, dyspnea, hypotension, tachycardia, anaphylaxis.
- Bone pain (most common side effect of filgrastim), back pain.
- Hematologic: marked leukocytosis and thrombocytopenia (rare).
- Severe sickle cell crisis in patients with sickle cell disorders.
- Spleen rupture (rare).
- Local reactions: erythema, swelling or pruritus at site of injection; change site of administration frequently to minimize.

DOSEAGE

Adults:
- Myelosuppressive chemotherapy: initial dose of 5 mcg/kg/day as a SC injection, short IV infusion (over 15-30 minutes), continuous SC or continuous IV infusion. Doses may be increased in increments of 5 mcg/kg/day for each chemotherapy cycle according to the previous cycle’s neutrophil response. Therapy should be discontinued when the neutrophil count reaches 10 X 10^9/L after the nadir.
- Post bone marrow transplant: initial dose of 10 mcg/kg/day as an IV infusion over 4-24 hours or as a continuous 24-hour SC infusion.
- Peripheral stem cell mobilization: 10 mcg/kg/day as a SC injection (in the morning if treatment includes plerixafor) or continuous 24-hour infusion, to start at least 4 days before the first leukapheresis procedure and continue up to the last leukapheresis procedure.
- HIV-associated neutropenia: initial dose of 300 mcg SC 3 times a week.
- Idiopathic or cyclic neutropenia: initial dose of 5 mcg/kg/day SC (single or divided dose).
- Severe chronic neutropenia: initial dose of 12 mcg/kg/day SC (single or divided dose).
- Refer to manufacturer’s product monograph for more dosage information.
DOSAGE (Cont.)

Pediatrics:
- Oncology patients: 5 mcg/kg/day SC.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Neupogen ® and Grastofil ®:
- Store in the fridge; do not shake since bubbles or foam can form. Protect from light.
- Vials and prefilled syringes are stable for 14 days (Neupogen ®) or 15 days (Grastofil ®) at room temp (maximum 25°C); discard product if not used during this time period.
- At concentrations of 5-15 mcg/mL in D5W, human albumin must first be added to the D5W at a final concentration of 2 mg/mL to minimize filgrastim adsorption to infusion containers and equipment.
- Not stable in D5W at concentrations less than 5 mcg/mL (even in presence of albumin) or at any concentration in NS.
- Compatible with glass bottles when diluted in D5W; compatible with PVC and polyolefin bags when diluted in D5W plus albumin.

Neupogen ® only:
- Accidental exposure of vials or prefilled syringes to room temp (up to 30°C) or freezing temperatures does not affect the stability.
- Stable for 24 hours at room temp and 7 days in the fridge undiluted when stored in tuberculin syringes.
- Stable for 24 hours at room temp and 7 days in the fridge in D5W at concentrations between 5-15 mcg/mL (with albumin) and greater than 15 mcg/mL in plastic syringes and PVC containers.

Grastofil ® only:
- Accidental one-time exposure to temperatures up to 30°C or exposure to freezing temperatures (less than 0°C) does not affect the stability. Discard product if exposure has been greater than 24 hours or product has been frozen more than once.

MISCELLANEOUS

- Grastofil ® is classified as being biosimilar to Neupogen ®; therefore, these products are not interchangeable.
- The needle covers for the Grastofil ® and Neupogen ® prefilled syringes contain latex.

REFERENCES
1, 4, 5, 40, 135.
FLUCONAZOLE
Diflucan ®
Antifungal

INDICATIONS
- For systemic fungal infections (serious candidal infections, cryptococcal meningitis) and/or in patients who cannot tolerate oral fluconazole.

ADMINISTRATION
- Ready-to-use sterile bottles of 200 mg/100 mL.
- Intermittent IV infusion: administer at maximum rate of 200 mg/hr.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, angioedema, facial edema, anaphylaxis.
- GI: abdominal pain, nausea, vomiting, diarrhea.
- CNS: headache and dizziness.
- Transient elevation of LFTs.

DOSAGE
- Adults:
  - Loading dose: in patients with acute infections, may administer twice the recommended maintenance dose on the first day, not to exceed a maximum loading dose of 800 mg IV.
  - Maintenance dose: 100-400 mg IV once daily depending on infection. Higher doses (up to 800 mg daily) have been used in life-threatening infections.
- Pediatrics:
  - Loading dose: may administer twice the recommended maintenance dose on the first day, not to exceed 12 mg/kg IV.
  - Maintenance dose: 3-12 mg/kg IV once daily.
- Dosage in renal impairment: the manufacturer recommends to give initial loading dose of 50-400 mg for adults and to adjust maintenance dose as follows:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>% of Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 50</td>
<td>100%</td>
</tr>
<tr>
<td>50-21</td>
<td>50%</td>
</tr>
<tr>
<td>20-11</td>
<td>25%</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>100% after each dialysis</td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Do not freeze.
- The diluent in the ready-to-use bottle is NS.
- Stable for 24 hours at room temp in D5W and RL at a concentration of 1 mg/mL in PVC containers.

MISCELLANEOUS

REFERENCES
1, 4, 5, 95, 135, 221.
**FLUDARABINE**

**INDICATIONS**
- For the treatment of refractory chronic lymphocytic leukemia.
- For the treatment of refractory low-grade non-Hodgkin’s lymphoma.

**ADMINISTRATION**
- Intermittent IV infusion: dilute with 50-100 mL of NS or D5W to a maximum concentration of 1 mg/mL; infuse over 30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash (rare).
- GI: nausea, vomiting.
- Fever, chills.
- Hyperuricemia, tumour lysis syndrome.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSEAGE**
- 25-30 mg/m²/day IV for 5 consecutive days, every 28 days.
- Dosage in renal impairment: reduce dose to 50% (e.g., 20 mg/m²/day IV for 3 consecutive days) if CrCl is between 30-70 mL/min; do not administer if CrCl is less than 30 mL/min.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*
- Store vials in the fridge; do not freeze.
- Compatible with NS and D5W.
- Stable for at least 16 days at room temp and under normal light conditions in NS or D5W at a concentration of 1 mg/mL in glass vials. However, manufacturer recommends that the solution should be used within 8 hours of its preparation, as it does not contain any preservatives.

**MISCELLANEOUS**

**REFERENCES**
1, 2, 4, 129, 143, 165.
FLUMAZENIL

Anexate ®

Benzodiazepine antagonist

INDICATIONS
- For reversal of sedation in patients who received a benzodiazepine for general anesthesia or for conscious sedation.
- For the diagnosis or management of deliberate or accidental benzodiazepine overdosage.

ADMINISTRATION
- IV direct: physician or RN. Administer over 15 or 30 seconds as per Dosage section below.
- Continuous IV infusion: further dilute 1 or 2 mg in 50 mL of NS or D5W to obtain a final concentration of 0.02 mg/mL or 0.04 mg/mL, respectively. At TOH, withdraw 10 mL from a 50 mL minibag of D5W or NS and discard, then add 1 mg (10 mL from flumazenil 0.5 mg/5mL vials) to the minibag to obtain a final concentration of 0.02 mg/mL. Rate as per Dosage section below.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: transient increases in blood pressure and heart rate.
- GI: nausea, vomiting.
- Flushing.
- May precipitate benzodiazepine withdrawal reactions (dizziness, confusion, agitation, anxiety, tachycardia, diaphoresis, seizures) in patients on long-term benzodiazepine therapy.
- Local reactions: pain and redness at the site of injection. Avoid extravasation into perivascular tissues as irritant.

DOSAGE
- To reverse benzodiazepine-induced general anesthesia and conscious sedation:
  - Initial dose of 0.2 mg IV over 15 seconds. If no response at 60 seconds, may give additional 0.1 mg over 15 seconds and repeat at 60 second intervals to a maximum total dose of 1 mg (usual total dose is 0.3-0.6 mg).
- Known or suspected benzodiazepine overdosage:
  - Initial dose of 0.3 mg IV over 30 seconds followed by additional 0.3 mg injections, each administered over 30 seconds, at 60 second intervals to a maximum total dose of 2 mg. If sedation recurs, may use an infusion of 0.1-0.4 mg/hr.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Stable for 24 hours at room temp when diluted in NS, D5W or RL.

MISCELLANEOUS
- As flumazenil has a short duration of action (approximate half-life = 60 minutes) patients should be monitored (for 2 or more hours) for recurrence of sedation after flumazenil injection.
- Although flumazenil can reverse benzodiazepine-induced sedation, it has variable effects on benzodiazepine-induced respiratory depression.

REFERENCES
1, 4, 5, 40, 135.
INDICATIONS
- For ophthalmic fluorescence imaging of the fundus and of the iris vasculature.
- For scanning or imaging vascular flow in detached digits/flaps.
- For evaluation of ureteral patency during cystoscopy, as an alternative to indigotindisulfonate sodium.

ADMINISTRATION
- IV direct: physician or RN; administer rapidly for ophthalmic fluorescence imaging and evaluation of ureteral patency or over 5 minutes for scanning/imaging vascular flow in detached digits/flaps.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, bronchospasm, anaphylaxis. If allergy is suspected, refer to Dosage section for test dose.
- Cardiovascular: syncope.
- GI: nausea, vomiting, abdominal discomfort.
- CNS: dizziness, headache.
- Dermatological: pruritus; skin attains a temporary yellowish discolouration which fades in 6-12 hours.
- Urine attains a bright yellow colour which fades in 24-36 hours.
- Local reactions: thrombophlebitis.

DOSAGE
- For ophthalmic fluorescence imaging: 500 mg (5 mL of 10% solution) IV.
- For scanning or imaging vascular flow in detached digits/flaps:
  - For gross visual inspection: 15-20 mg/kg IV (black patients will require the higher dose of 20 mg/kg due to darker skin pigmentation).
  - For monitoring arterial insufficiency in revascularized digits for 24-72 hours: 1-1.5 mg/kg IV, repeated q2h.
- For evaluation of ureteral patency: 25-50 mg IV when starting cystoscopic evaluation.
- Test dose in case of suspected allergy: 0.05 mL intradermally; observe for 30-60 minutes.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp or fridge.
- Do not mix or dilute with other solutions.

MISCELLANEOUS
- Emergency drugs and resuscitation equipment must be available in case of hypersensitivity reaction.
- When used for evaluation of ureteral patency, fluorescein allows visualization approximately 5 minutes after IV administration.

REFERENCES
5, 95, 386, 387, 389.
FLUOROURACIL

Adrucil®, 5-Fluorouracil, 5-FU

INDICATIONS
- Treatment of breast, bladder, colorectal, gastric, head and neck, ovarian, pancreatic and prostate cancer.

ADMINISTRATION
- IV direct: physician or RN; undiluted; inject over 1-3 minutes into the tubing of a freely running IV solution of NS or D5W.
- Intermittent IV infusion: dilute in 50 mL of D5W or NS; infuse over 15 minutes.
- Continuous IV infusion: dilute in 500-1000 mL of D5W or NS; infuse as per protocol.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare).
- Cardiovascular: asymptomatic ECG changes, arrhythmia, cardiac ischemia.
- GI: nausea and rarely vomiting.
- Radiation recall reaction.
- Excessive lacrimation, conjunctivitis.
- Local reactions: chemical phlebitis.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Adults: various dosing regimens used:
  - 250-500 mg/m² IV daily X 5 consecutive days every 4 weeks.
  - 500-600 mg/m² IV on days 1 and 8 every 4 weeks.
  - 1000 mg/m² IV over 24 hours X 2 consecutive days every week or X 3 consecutive days every 3 weeks or X 4 consecutive days every 4-6 weeks.
- Pediatrics:
  - 500 mg/m²/day IV once or daily X 5 days;
  - 800-1200 mg/m² as a continuous infusion over 24-120 hours.
- Dosage in renal impairment: no adjustment required but consider reduction in severe renal impairment.
- Dosage in hepatic impairment: omit dose if bilirubin is above 4 times upper limit of normal.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Slight discolouration does not adversely affect potency; if dark yellow, discard as indicates greater decomposition.
  A precipitate may form if exposed to cold; redissolve by gently heating to 60°C and vigorous shaking.
- Compatible with NS, D5W, dextrose-saline and D5-RL.
- Stable for 14 days at room temp and in the fridge in D5W or NS at concentrations of 1 mg/mL and 10 mg/mL in PVC containers.
- Stable for 16 weeks in the fridge in D5W at a concentration of 10 mg/mL in PVC containers.
- Stable for 91 days in the fridge in NS at a concentration of 5 mg/mL in both glass and PVC containers.
- Stable for 72 hours at room temp (protected from light) in NS or D5W at concentrations of 12 mg/mL and 40 mg/mL in polypropylene syringes.
- Stable for 21 days at 30°C at a concentration of 50 mg/mL (undiluted) in polypropylene syringes.

MISCELLANEOUS

REFERENCES
1, 4, 5, 82, 129, 165.
## FLUPENTIXOL DECANOATE

### Other Names
- Fluanxol depot, Flupenthixol decanoate

### Classification
- Antipsychotic

### Indications
- Long-acting depot medication used for treatment of chronic psychosis.

### Administration
- IM: use at least a 21 gauge dry needle, give deep IM into large muscle, use Z track method, rotate sites.
- Aspirate before injection to avoid intravascular injection.
- Do NOT massage injection site.

### Potential Administration Hazards
- Cardiovascular: hypertension, hypotension, ECG changes.
- CNS: frequent extrapyramidal effects (akathisia, dystonia, dyskinesia, rigidity, tremor, tardive dyskinesia, etc); both alerting and sedating effects reported; can cause excitation.
- Neuroleptic malignant syndrome.
- Local reactions: pain at injection site and indurations seen rarely (at high doses).

### Dosage
- For patients not previously treated with long-acting depot antipsychotic: initial dose: 5 mg-20 mg IM.
- For patients previously treated with long-acting depot antipsychotics and had good tolerance: initial dose: 20-40 mg IM.
- Maintenance dose: 20-40 mg IM may be given 4-10 days after initial dose; adjust according to patient’s response; usual range from 20-80 mg every 2-4 weeks.

### Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp; protect from light.
- Do not let drug stand in syringe for longer than 15 minutes.

### Miscellaneous
- Peak plasma levels are obtained 4-7 days after dose administration.

### References
- 2, 51, 135.

Full revision 2014; limited revision 2015
FLUPHENAZINE DECANOATE

Modecate ®

Antipsychotic

INDICATIONS

- Long-acting depot medication used for treatment of chronic psychosis.

ADMINISTRATION

- IM: use at least 21 gauge dry needle, give deep IM into large muscle, use Z track method, rotate sites.
- Aspirate before injection to avoid intravascular injection.
- Do NOT massage injection site.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: hypertension, hypotension, very rare cases of QT interval prolongation.
- CNS: extrapyramidal symptoms (akathisia, dystonia, dyskinesia, rigidity, tremor, tardive dyskinesia, etc), drowsiness and insomnia.
- Neuroleptic malignant syndrome.
- Local reactions: pain at injection site.

DOSAGE

- Initial dose: 2.5-12.5 mg IM; a second dose of 12.5-25 mg may be given 4-10 days later.
- Usual maintenance dose: 12.5-100 mg IM every 3-4 weeks, adjusted according to patient’s response.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp; protect from light.
- Do not let drug stand in syringe for longer than 15 minutes.

MISCELLANEOUS

- First peak in 8-10 hours with a second peak 8-12 days later.

REFERENCES

1, 2, 51.
FOLIC ACID

INDICATIONS
- Treatment of macrocytic and megaloblastic anemias resulting from folate deficiency when GI absorption is impaired or oral therapy not possible (e.g., nutritional macrocytic anemia, megaloblastic anemias of pregnancy (adjuvant), infancy and childhood, megaloblastic anemia associated with primary liver disease, alcoholism, and cirrhosis, intestinal strictures, anastomoses, or sprue).
- Folic acid alone not indicated in pernicious anemia.

ADMINISTRATION
- IV direct: physician or RN. Administer 5 mg or less undiluted at a rate of 5 mg/min.
- Intermittent IV infusion: may dilute up to 5 mg with 50 mL NS or D5W to get a concentration of up to 0.1 mg/mL. Infuse over 30 minutes.
- Continuous IV infusion: may be added to maintenance IV solutions.
- IM, SC.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; rash, urticaria, bronchospasm.
- GI: rare, occur at high doses e.g., 15 mg/day: anorexia, nausea, abdominal distention, flatulence and a bitter/bad taste.
- CNS: rare, occur at high doses e.g., 15 mg/day: altered sleep patterns, difficulty in concentrating, irritability, excitement, depression, confusion, impaired judgement.
- Slight flushing or feeling of warmth.

DO dosage
Adults:
- Therapeutic dose: 0.25-1 mg IV/IM/SC daily.
- Maintenance dose: 0.4 IV/IM/SC mg daily.
- Higher doses recommended for tropical sprue: 3-15 mg IV/IM/SC daily.

Pediatrics:
- Therapeutic dose: 0.25-1 mg IV/IM/SC daily.
- Maintenance dose: 0.1 mg IV/IM/SC daily for infants, 0.3 mg IV/IM/SC daily for children 1-4 years, and 0.4 mg IV/IM/SC daily for older children.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp; protect from light.
- Stable for 24 hours at room temp and 28 days in the fridge in NS and D5W.

MISCELLANEOUS
- IV and oral doses are equivalent on a mg per mg basis.
- Administer with extreme caution to patients with undiagnosed anemia since folic acid may mask diagnosis of pernicious anemia.

REFERENCES
1, 2, 4, 6, 40, 82, 95, 135, 208.
INDICATIONS
- Antidote for ethylene glycol (such as antifreeze) or methanol (such as windshield washer fluid) poisoning.

ADMINISTRATION
- Intermittent IV infusion: dilute in a minimum of 100 mL of NS or D5W and infuse over 30 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: mild reactions (rash, eosinophilia).
- GI: nausea and bad taste/metallic taste.
- CNS: headache, dizziness and drowsiness.
- Local reactions: venous irritation and phlebosclerosis (especially if not diluted properly or administered too fast).

DOSAGE
- Initial dose of 15 mg/kg IV, followed by doses of 10 mg/kg q12h for 4 doses.
- If therapy is still needed beyond this 48 hour period, continue infusion with 15 mg/kg IV q12h thereafter until ethylene glycol or methanol levels are undetectable or below 3.2 mmol/L and 6 mmol/L, respectively, and the patient is asymptomatic with normal pH.
- If dialysis is performed, administer fomepizole q4h and consult Product Monograph for further dosing information.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Undiluted fomepizole solidifies at temperatures below 25°C. Liquefy by warming (holding in the hand or running under warm water). Solidification does not affect the efficacy, safety, or stability of fomepizole.
- Stable for at least 48 hours at room temp or in the fridge when diluted in D5W or NS; however, manufacturer recommends that the solution not be used beyond 24 hours due to absence of preservatives.

MISCELLANEOUS

REFERENCES
1, 2, 5, 40, 95, 263.
FONDAPARINUX

INDICATIONS
- Prophylaxis of thrombosis following orthopedic surgery of the lower limbs.
- Prophylaxis of thrombosis in patients undergoing abdominal surgery who are at high risk of thromboembolic complications such as cancer patients.
- Treatment of acute deep vein thrombosis (DVT) and pulmonary embolism (PE).
- Management of unstable angina (UA) or non-ST-segment elevation myocardial infarction (NSTEMI) for the prevention of death and subsequent myocardial infarction.
- Management of ST-segment elevation myocardial infarction (STEMI) for the prevention of death and myocardial infarction in patients managed with thrombolytics or who are to receive no reperfusion therapy initially.

ADMINISTRATION
- IV direct: physician or RN. Administer undiluted. Flush with NS after to ensure drug has been all administered.
- Intermittent IV infusion: dilute in 25-50 mL of NS and administer over 1-2 minutes.
- SC: in the fat tissue of the lower abdomen. With the thickness of skin held between the operator’s thumb and finger, introduce the entire length of the needle vertically into the skin. Alternate the left and right side of the abdomen at each injection.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: skin rash; rarely angioedema and anaphylactic/anaphylactoid reactions.
- Hematologic: bleeding, thrombocytopenia.
- Risk of spinal or epidural hematomas that can result in permanent paralysis when epidural or spinal anesthesia or spinal puncture is used in conjunction with fondaparinux.
- Transient increase of liver transaminases (AST, ALT).
- Local reactions: mild irritation at injection site.

DOSAGE
- Prophylaxis of thrombosis related to orthopedic surgery: 2.5 mg SC once daily; do not start initial dose earlier than 6 hours after surgical closure. Treatment to be continued for as long as the risk of thrombosis persists (usually around 7 days, although has been continued for up to 32 days in some cases).
- Prophylaxis of thrombosis related to abdominal surgery: 2.5 mg SC once daily; initial dose to start 6 to 8 hours after surgery. Treatment to be continued for 5 to 9 days (up to 10 days in some cases).
- Treatment of DVT and PE: if body weight is below 50 kg: 5 mg SC once daily; if body weight 50-100 kg: 7.5 mg SC once daily; if body weight is over 100 kg: 10 mg SC once daily. Concomitant anticoagulation with warfarin should be started within 72 hours. Fondaparinux should be continued for at least 5 days, or until warfarin effect is within target range (INR 2 to 3).
- Management of UA/NSTEMI: 2.5 mg SC once daily to continue for up to 8 days or until hospital discharge.
- Management of STEMI: 2.5 mg SC once daily; give first dose IV and subsequent doses SC. To continue for up to 8 days or until hospital discharge.
- Dosage in renal impairment: use with caution in patients with moderate renal impairment (CrCl: 30-50 mL/min). Do not use if CrCl is below 30 mL/min.
- Dosage in hepatic impairment: no dosage adjustment in mild to moderate impairment; no data in severe liver impairment.

.../Cont.
FONDAPARINUX

Arixtra ®

Anticoagulant

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp.
- Stable for 24 hours at room temp, diluted in 25-50 mL of NS.

MISCELLANEOUS

- Fondaparinux does not usually modify in a significant way the routine clotting tests (i.e., INR, a PTT). Although monitoring activity of fondaparinux is generally not required, the anti-Xa assay is the preferred test to measure its anticoagulant activity.
- Does not cross-react with serum from patients with heparin-induced thrombocytopenia (HIT); however, it should be used with caution in patients with a history of HIT.
- There is no specific antidote for fondaparinux overdosage.
- Fondaparinux should not be used as the sole anticoagulant during percutaneous coronary intervention (PCI) because of an increased risk of guiding catheter thrombosis. An effective anti-thrombin regimen such as unfractionated heparin should be administered as an adjunct to PCI, according to standard practice.
- In patients who are to undergo coronary artery bypass graft surgery, fondaparinux should not be given during the 24 hours before surgery and may be restarted 48 hours postoperatively.

REFERENCES

1, 2.
### Indications
- Prevention of nausea and vomiting induced by emetogenic cancer chemotherapy; to be used in combination with a 5-HT₃ antagonist (e.g., ondansetron) and dexamethasone.

### Administration
- Reconstitute the 150 mg vial of fosaprepitant (equivalent to 245.3 mg of fosaprepitant dimeglumine) with 5 mL of NS. To prevent foaming, add the NS slowly to the side of the vial and gently swirl the vial to aid dissolution. Avoid shaking and jetting saline into the vial.
- Intermittent IV infusion: transfer the contents of the vial to a sterile IV bag containing 145 mL NS to give a total volume of 150 mL and a final concentration of 1 mg/mL. Gently invert the bag 2-3 times to mix. Infuse over 20-30 minutes.

### Potential Administration Hazards
- Hypersensitivity: rare; flushing, erythema, dyspnea.
- Cardiovascular: hypertension.
- GI: nausea, hiccups, anorexia, diarrhea, abdominal pain, dyspepsia.
- CNS: headache, dizziness.
- Fatigue.
- Proteinuria, increased LFTs.
- Local reactions: pain, induration, erythema, pruritus, thrombophlebitis.

### Dosage
- 150 mg IV 30 minutes prior to chemotherapy on Day 1 only.
- Dosage in renal impairment: no dosage adjustment is necessary.
- Dosage in hepatic impairment: no dosage adjustment is necessary in mild to moderate insufficiency (Child-Pugh score 5-9); no data in severe insufficiency (Child-Pugh score greater than 9).

### Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge. No significant loss of potency when vials are stored at room temp (at or below 25°C) over a period of up to 10 days.
- Stable for 48 hours at room temp and in the fridge in NS or D5W at a concentration of 1 mg/mL.
- Incompatible with any solutions containing divalent cations (e.g., Ca, Mg, RL, Hartmann’s solution).

### Miscellaneous
- Fosaprepitant is the pro-drug of aprepitant.

### References
2, 95, 135, 165, 197.
FOSCARNET

**INDICATIONS**

- Treatment of cytomegalovirus (CMV) retinitis infection or CMV GI tract infections (e.g., colitis, esophagitis) in HIV-infected patients.
- Treatment of mucocutaneous herpes simplex virus (HSV) infections unresponsive to acyclovir in immunocompromised patients.

**ADMINISTRATION**

- Intermittent IV infusion: if using a central line, can administer the undiluted solution of 24 mg/mL; for peripheral vein administration, must further dilute with D5W or NS to a concentration of 12 mg/mL or less. Infuse the 40-60 mg/kg dose over at least 60 minutes, the 90 mg/kg dose over 1.5 to 2 hours and the 120 mg/kg dose over at least 2 hours. Administration rate not to exceed 1 mg/kg/min.
- Must be administered by an infusion pump.
- Refer to Miscellaneous section for concurrent hydration.

**POTENTIAL ADMINISTRATION HAZARDS**

- **Non-cytotoxic hazardous drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, pruritus.
- GI: nausea, vomiting, diarrhea.
- CNS: seizures, headache.
- Nephrotoxicity: renal impairment; may occur at any time but typically during week 2 of induction therapy.
- Fever.
- Electrolyte disturbances: hypocalcemia, hypo- or hyperphosphatemia, hypomagnesemia, hypokalemia.
- Hematologic: anemia, granulocytopenia.
- Local reactions: irritation if administered undiluted in peripheral veins.

**DOSAGE**

- CMV retinitis: induction: 60 mg/kg IV q8h or 90 mg/kg IV q12h for 14-21 days. Maintenance: 90-120 mg/kg IV once daily.
- CMV infections of GI tract: 90 mg/kg IV q12h for 21-28 days or until resolution of symptoms.
- HSV infections: 40 mg/kg IV q8h or q12h for 14-21 days or until healed.
- Dosage in renal impairment: refer to manufacturer’s information.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store bottles at room temp. Protect from high temperatures (over 40°C) and from freezing.
- Stable for 35 days at room temp or in the fridge in NS or D5W at a concentration of 12 mg/mL in PVC containers. However, solution contains no preservative and manufacturer recommends it to be used within 24 hours.

**MISCELLANEOUS**

- Adequate hydration is recommended during treatment with foscarnet to minimize renal toxicity: 750-1000 mL of NS or D5W prior to first dose to establish diuresis. For subsequent infusions, hydration can be given concurrently with each dose: 750-1000 mL of fluid with doses of 90-120 mg/kg and 500 mL of fluid with doses of 40-60 mg/kg. Volume of fluid may be decreased if clinically appropriate; oral hydration may also be possible in some patients.

**REFERENCES**

1, 4, 5, 40, 95, 135, 143. * Available via Health Canada’s Special Access Programme

Full revision 2014; limited revision 2015, 2018, 2019
**FOSPHENYTOIN**

**Cerebyx ®**

Anticonvulsant

**Do NOT confuse fosphenytoin with phenytoin.**

This monograph is specific to FOSPHENYTOIN.

**INDICATIONS**

- For control of generalized convulsive status epilepticus.
- For treatment or prophylaxis of seizures in neurosurgical patients.
- As a short-term parenteral replacement for oral phenytoin.

**ADMINISTRATION**

- Intermittent IV infusion: **cardiac monitoring, blood pressure monitoring, respiratory support**; continue the monitoring 10 to 20 minutes after completion of the injection. Monitoring required only for the loading dose. Dilute dose in NS or D5W for a concentration of 1.5-25 mg PE/mL (2.5-40 mg/mL) and infuse at a maximum rate of 150 mg PE/min (see Miscellaneous section for PE explanation).
- IM (not for status epilepticus).

**POTENTIAL ADMINISTRATION HAZARDS**

- Cardiovascular: hypotension, shock, cardiovascular collapse, arrhythmias. Minimize by administering at a rate not exceeding the rates above. Stop infusion if these occur.
- CNS: nystagmus, dizziness, headache, ataxia, tremor, agitation, somnolence.
- Burning, itching and/or paresthesia. Minimize by slowing or temporarily stopping the infusion.
- Dermatologic: rash, pruritus.
- Diplopia, tinnitus.

**DOSAGE**

- Loading dose for status epilepticus: 15-20 mg PE/kg IV.
- Non-emergent loading dose: 10-20 mg PE/kg IV or IM.
- Initial maintenance therapy: 4-6 mg PE/kg/day IV or IM. Adjustments may be needed as determined by serum levels i.e., 40-80 mcmol/L (10-20 mcg/mL).

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge; do not store at room temp for more than 48 hours.
- Stable for 30 days at room temp or in the fridge in D5W or NS at concentrations of 1-20 mg PE/mL in PVC bags.
- Stable for 7 days at room temp in D10W, D5-1/2NS, D5-RL and RL at concentrations of 1-20 mg PE/mL in PVC bags.
- Stable for 30 days at room temp and under refrigeration undiluted when packaged in polypropylene syringes.

**MISCELLANEOUS**

- The dosage of fosphenytoin is expressed in terms of phenytoin equivalents (PE) to avoid the need to do molecular weight-based adjustments when converting between the 2 agents (as each 75 mg of fosphenytoin is equivalent to 50 mg of phenytoin).
- Do not monitor phenytoin serum concentrations until conversion from fosphenytoin to phenytoin is complete, i.e., 2 hours after the end of IV infusion or 4 hours after IM injection.

**REFERENCES**

4, 5, 40, 135, 189.
FULVESTRANT

**INDICATIONS**
- Hormonal treatment of locally advanced or metastatic breast cancer in postmenopausal women, regardless of age, who have disease progression following prior anti-estrogen therapy.
- Treatment of estrogen receptor-positive, human epidermal growth receptor 2 (HER2)-negative locally advanced or metastatic breast cancer in postmenopausal women not previously treated with endocrine therapy.

**ADMINISTRATION**
- IM: inject slowly (1 to 2 minutes per injection) into the buttock. Refer to manufacturer’s monograph for detailed instructions on assembly and proper use of the safety needle (SafetyGlide systems).

**POTENTIAL ADMINISTRATION HAZARDS**
- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, urticaria and angioedema. May occur shortly after injection or several days after injection.
- GI: nausea, vomiting, constipation, diarrhea, anorexia.
- Hepatic: increase in transaminases, bilirubin and alkaline phosphatase.
- Hot flushes (vasodilation).
- Arthralgia, myalgia, back pain, pain in extremities, fatigue.
- Local reactions: injection site reactions with mild transient pain and inflammation; local pruritus and urticaria may occur even after uneventful injections and may develop with time into a systemic allergic response (e.g., widespread urticaria).

**DOSAGE**
- 500 mg (2 X 5 mL; 5 mL into each buttock) IM on days 0, 14, 28 and then q28 days thereafter.
- Dosage in renal impairment: no dosage adjustment if CrCl greater than 30 mL/min; not evaluated if CrCl is less than 30 mL/min.
- Dosage in hepatic impairment: no dosage adjustment in mild to moderate disease; not recommended in severe insufficiency.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store in the original container between 2-8°C.
- To ensure patient comfort, fulvestrant injection may be removed from the fridge and kept at room temp for up to 60 minutes or rolled gently between the hands before administration.

**MISCELLANEOUS**
- Due to structural similarity of fulvestrant and estradiol, fulvestrant can interfere with estradiol measurement by immunoassays, resulting in falsely elevated levels of estradiol.
- LFTs should be performed on a regular basis or when clinically indicated.

**REFERENCES**
1, 5, 129, 165.

**Full revision 2014; limited revision 2016, 2017, 2018, 2019**
INDICATIONS
- Treatment of edema (diuretic effect) associated with congestive heart failure, renal disease (including the nephrotic syndrome) and hepatic cirrhosis when oral therapy is not feasible.
- Adjunct in treatment of acute pulmonary edema.
- To increase renal excretion of calcium in the setting of hypercalcemia.

ADMINISTRATION
- IV direct: physician or RN; maximum dose to be given direct is 100 mg. Administer over 2 minutes.
- Intermittent IV infusion: dilute in 50-250 mL of D5W, NS or RL. Doses greater than 100 mg must be given at a rate not exceeding 4 mg/min.
- IM.
- SC, SC infusion (palliative care).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, dermatitis, angioedema, anaphylaxis, interstitial nephritis and cutaneous vasculitis.
- GI: nausea, vomiting, anorexia, diarrhea.
- CNS: blurred vision, dizziness.
- Electrolyte and fluid disturbances: hypokalemia, hypochloremia, hypomagnesemia, hypocalcemia, hyponatremia, hypovolemia; may cause postural hypotension. Elderly and sodium-restricted patients are more susceptible.
- Deafness (reversible), hearing impairment (reversible or permanent) or tinnitus with large parenteral doses administered rapidly.
- Hyperglycemia in diabetics, hyperuricemia.
- Local reactions: transient pain (IM injection) and thrombophlebitis (IV administration).

DOSAGE
Adults:
- Usual diuretic dose for edema: 20-40 mg IV or IM as a single injection. May repeat q2h. If no response, may increase dose in 20 mg increments.
- For oliguria of acute renal failure, where conventional doses produce inadequate diuresis: 250 mg IV. If inadequate response, a 500 mg IV dose may be infused.
- For acute pulmonary edema: 40 mg IV. If not satisfactory within 60 minutes, may increase to 80 mg IV.
- Continuous infusion: 10-40 mg/hr IV.
- Hypercalcemia: 40-80 mg IV q1-4h after volume expansion.

Pediatrics:
- 1-2 mg/kg/dose IM or IV q6-12h.
- Continuous infusion: 0.05 mg/kg/hr IV; titrate to effect.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Exposure to light may cause discolouration. Do not use if solution is yellow.
- Stable for 24 hours at room temp in D5W at concentrations of 0.2-0.6 mg/mL.
- Stable for 24 hours at room temp in NS at concentrations of 0.2-1 mg/mL in PVC containers.
- Stable for 24 hours at room temp and 26 days in the fridge in NS at a concentration of 1 mg/mL in PVC containers.
- Stable for 24 hours at room temp in RL at concentrations of 0.6-1 mg/mL.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 24 hours at room temp at a concentration of 10 mg/mL (undiluted) in polypropylene syringes.
- Stable for 84 days at room temp (protected from light) and in the fridge (protected from light) in NS at concentrations of 1.2-3.4 mg/mL stored in PVC bags and at concentrations of 1-8 mg/mL packaged in polypropylene syringes. All samples stable for another 7 days at room temp when exposed to fluorescent light.
- Not compatible via Y-site administration with Baxter premixed nitroglycerin solution in bottle.

MISCELLANEOUS

- Onset of action after IV administration: within 5 minutes; peak response within 20-60 minutes; duration of action: 2 hours.
- Average equivalent doses: 20 mg IV = 40 mg PO; caution as there can be great variability.

REFERENCES

1, 2, 4, 6, 40, 76, 81, 82, 95, 143, 457.
INDICATIONS
- Treatment of cytomegalovirus (CMV) infections in immunocompromised individuals.
- Prevention of CMV disease in transplant recipients at risk for CMV disease.

ADMINISTRATION
- Reconstitute the 500 mg vial with 10 mL of SWFI to obtain a 50 mg/mL solution. Do not use SWFI that contains parabens as a preservative as this may cause precipitation. Shake well until complete dissolution.
- Intermittent IV infusion: further dilute in 50-250 mL (usually 100 mL) of NS, D5W, Ringer’s or RL to a maximum concentration of 10 mg/mL. Administer over at least 60 minutes in a large peripheral vein or via a central line.

POTENTIAL ADMINISTRATION HAZARDS
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash.
- GI: nausea and vomiting.
- CNS: confusion, headache.
- Hematologic: frequent and can be severe: neutropenia, thrombocytopenia, anemia.
- Increase in serum creatinine, abnormal LFT.
- Local reactions: pain, phlebitis and inflammation at injection site (to minimize, use a large vein with adequate blood flow).

DOSAGE
For adults and pediatrics older than 3 months of age:
- Treatment of CMV infections:
  - Induction: 5 mg/kg IV q12h for 14-21 days.
  - Maintenance: 5 mg/kg IV once daily 7 days per week OR 6 mg/kg IV once daily 5 days per week.
- Prevention of CMV disease:
  - Initial: 5 mg/kg IV q12h for 7-14 days.
  - Maintenance: 5 mg/kg IV once daily 7 days per week OR 6 mg/kg IV once daily 5 days per week.

- Dosage in renal impairment:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>greater than 70</th>
<th>69-50</th>
<th>49-25</th>
<th>24-10</th>
<th>less than 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction/initial dose (mg/kg)</td>
<td>5</td>
<td>2.5</td>
<td>2.5</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>Interval (hr)</td>
<td>12</td>
<td>12</td>
<td>24</td>
<td>24</td>
<td>3 times/week*</td>
</tr>
<tr>
<td>Maintenance dose (mg/kg)</td>
<td>5</td>
<td>2.5</td>
<td>1.25</td>
<td>0.625</td>
<td>0.625</td>
</tr>
<tr>
<td>Interval (hr)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>3 times/week*</td>
</tr>
</tbody>
</table>

* Administer following hemodialysis

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solutions are stable for 12 hours at room temp and should not be refrigerated as precipitate may form.
- Incompatible with parabens-preserved solutions.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 35 days refrigerated and at room temp when diluted in NS or D5W at concentration of 1-5 mg/mL and stored in PVC containers.
- Stable for 35 days refrigerated and protected from light when diluted in D5W at 10 mg/mL and stored in PVC containers.
- Stable for 7 days at room temp and 80 days under refrigeration diluted in NS at concentrations of 1.4, 4 and 7 mg/mL in polypropylene syringes.

MISCELLANEOUS

- Ensure adequate hydration during treatment with ganciclovir.
- Monitor neutrophil, platelet counts and serum creatinine frequently.

REFERENCES

1, 2, 4, 5, 82, 135, 143.
GANIRELIX
Orgalutran ®
Gonadotropin-releasing hormone antagonist

INDICATIONS
- As a component of infertility regimens to inhibit premature luteinizing hormone surges in women undergoing controlled ovarian hyperstimulation.

ADMINISTRATION

POTENTIAL ADMINISTRATION HAZARDS
- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare; rash, facial swelling, dyspnea.
- GI: nausea, abdominal pain.
- CNS: headache, dizziness.
- Hot flushes, vaginal bleeding.
- Local reactions: redness, bruising.

DOSAGE
- 250 mcg SC once daily during the early to mid follicular phase of the menstrual cycle, usually for around 5 days (range 1 to 19 days).
- Follicle-stimulating hormone (FSH) treatment is usually started on the morning of day 2 or 3 of the menstrual cycle and ganirelix is started on the morning of day 7 or 8 of the cycle (or day 6 of FSH therapy).
- Treatment is continued until an adequate follicular response is achieved, at which time human chorionic gonadotropin (hCG) administration begins.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 15 and 30°C. Protect from light.

MISCELLANEOUS
- The needle cover of the prefilled syringe contains latex.

REFERENCES
1, 5, 95, 135.
<table>
<thead>
<tr>
<th>INDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Locally advanced or metastatic non-small cell lung cancer (alone or in combination with cisplatin).</td>
</tr>
<tr>
<td>- Locally advanced or metastatic adenocarcinoma of the pancreas.</td>
</tr>
<tr>
<td>- Locally advanced or metastatic transitional cell carcinoma of the bladder in combination with cisplatin.</td>
</tr>
<tr>
<td>- Unresectable locally recurrent or metastatic breast cancer in patients who have good performance status and have relapsed following adjuvant anthracycline-based chemotherapy (to give in combination with paclitaxel).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADMINISTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>- There are 2 types of formulation available: a lyophilized powder that requires reconstitution and a ready-to-use solution (38 mg/mL, 40 mg/mL and 100 mg/mL).</td>
</tr>
<tr>
<td>- Reconstitution of the lyophilized powder: add 5 mL, 25 mL or 50 mL of NS without preservatives to the 200 mg, 1 g and 2 g vials respectively. Invert vial to dissolve. Final concentration is 38 mg/mL.</td>
</tr>
<tr>
<td>- Intermittent IV infusion: for the reconstituted solution: administer undiluted or further dilute in NS to concentrations as low as 0.1 mg/mL. For the 38 mg/mL and 40 mg/mL ready-to-use solutions: administer undiluted or further dilute in NS or D5W to concentrations as low as 0.1 mg/mL. For the 100 mg/mL ready-to-use solution: further dilute in NS to obtain a final concentration between 0.1 and 10 mg/mL. All types of preparations are often diluted in 250 mL of NS. To infuse all types of preparations over 30 minutes (extending infusion time beyond 60 minutes will increase toxicity).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POTENTIAL ADMINISTRATION HAZARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- <strong>High alert medication:</strong> consult Corporate policy 01636 (High alert medications).</td>
</tr>
<tr>
<td>- <strong>Cytotoxic drug:</strong> consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).</td>
</tr>
<tr>
<td>- Hypersensitivity: rash, anaphylaxis (rare).</td>
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<tr>
<td>- GI: nausea, vomiting.</td>
</tr>
<tr>
<td>- Respiratory: acute shortness of breath, bronchospasm.</td>
</tr>
<tr>
<td>- Flu-like symptoms (fever, chills, fatigue, myalgia).</td>
</tr>
<tr>
<td>- Local reactions: injection site reactions.</td>
</tr>
<tr>
<td>- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Non-small cell lung carcinoma: 1000 mg/m² IV on days 1, 8, 15 of a 28 day cycle OR 1250 mg/m² IV on days 1, 8 of a 21 day cycle. For both regimens, cisplatin to be given at 100 mg/m² on day 1 of each cycle (to administer after gemcitabine).</td>
</tr>
<tr>
<td>- Pancreatic carcinoma</td>
</tr>
<tr>
<td>- Initial cycle: 1000 mg/m² IV once weekly for up to 7 weeks, followed by a one week rest.</td>
</tr>
<tr>
<td>- Subsequent cycles: 1000 mg/m² IV weekly for 3 weeks followed by a one week rest.</td>
</tr>
<tr>
<td>- Bladder carcinoma: 1000 mg/m² IV on days 1, 8, 15 of each 28 day cycle; cisplatin to be given at 70 mg/m² on day 1 of each 28 day cycle (to administer after gemcitabine).</td>
</tr>
<tr>
<td>- Breast cancer: 1250 mg/m² IV on days 1, 8 of each 21 day cycle; paclitaxel to be given at 175 mg/m² over 3 hours on day 1 of each cycle (to administer before gemcitabine).</td>
</tr>
<tr>
<td>- Dosage increase or reduction is based on the degree of toxicities: consult manufacturer’s monograph.</td>
</tr>
<tr>
<td>- Dosage in renal or hepatic impairment: insufficient information; use with caution.</td>
</tr>
<tr>
<td>- Consult specific protocol.</td>
</tr>
</tbody>
</table>

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Lyophilized powder vial:
  - Store lyophilized powder vials between 15-30°C.
  - Reconstituted solution (38 mg/mL in NS) is stable for 35 days at room temp and for 7 days in the fridge (crystals may develop when solution refrigerated for longer).
  - Reconstituted solution (38 mg/mL in NS) is stable for 35 days at room temp and under refrigeration in polypropylene syringes. Caution as refrigeration of reconstituted solution may cause crystal to develop.
  - Stable for 35 days at room temp and in the fridge in D5W or NS at concentrations of 0.1 mg/mL and 10 mg/mL in PVC containers.

- Ready-to-use solution (38 and 40 mg/mL):
  - Store vials between 2-8°C. Do not freeze.
  - Stable for 24 hours between 15-30°C when added to an empty container.
  - Stable for 24 hours between 15-30°C in NS or D5W in concentrations as low as 0.1 mg/mL.
  - Stable for 35 days at room temp (exposed to light) and for 116 days in the fridge (protected from light) in NS at concentrations of 0.1-26 mg/mL in PVC containers.
  - Stable for 35 days at room temp (exposed to light) in D5W at concentrations of 0.1-26 mg/mL in PVC containers.

- Ready-to-use solution (100 mg/mL):
  - Store vials at room temp (15-25°C).
  - Stable for 60 days at room temp and in the fridge in NS at concentrations between 0.1 to 10 mg/mL.

MISCELLANEOUS

REFERENCES
1, 4, 5, 26, 40, 129, 165.
**INDICATIONS**

- Treatment of serious infections caused by gram-negative organisms such as *Citrobacter, P. aeruginosa, Proteus, Klebsiella, E. coli, Enterobacter, and Serratia sp.* and for synergy in infections caused by gram-positive organisms such as *Enterococcus*.
- Treatment of plague (in the context of bioterrorism).
- Treatment of tularemia (in the context of bioterrorism).
- Perioperative prophylaxis.

**ADMINISTRATION**

- Intermittent IV infusion: dilute dose in 50-200 mL of D5W or NS (for children, volume of diluent should be consistent with the patient’s needs). Pre-mixed bags also available. Administer over 30 minutes to 2 hours.
- IM.
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rare; urticaria, rash, pruritus.
- Vestibular and auditory toxicity (risk factor: peak serum levels greater than 12 mg/L with traditional dosing).
- Nephrotoxicity (risk factor: trough serum levels greater than 2 mg/L).
- Potential for neuromuscular blockade (rare).
- Local reactions: pain at injection site; phlebitis.

**DOSAGE**

- **Traditional dosing**: 1-2 mg/kg/dose IV or IM with dosing interval according to creatinine clearance:
  - CrCl (mL/min) greater than 60: 8 hr
  - 60-40: 12 hr
  - 39-20: 24 hr
  - less than 20 or hemodialysis: frequency as per serum concentrations
  - Refer to Miscellaneous section for monitoring serum levels.
- **Extended interval dosing**: 4-7 mg/kg/dose IV or IM once daily in selected patients. Refer to Miscellaneous section for monitoring serum levels.
- Synergy (with beta-lactams) for infections with gram-positive organisms: 3 mg/kg/day IV or IM in 1 to 3 divided doses.
- Treatment of plague: 5 mg/kg IV or IM once daily OR 2 mg/kg loading dose followed by 1.7 mg/kg IV or IM q8h for 10 days.
- Treatment of tularemia: 5 mg/kg IV or IM once daily for 10 days.
- Perioperative prophylaxis: 5 mg/kg (3 mg/kg at TOH) IV within 60 minutes before skin incision.
- Obese patients: doses should be calculated using dosing body weight (DBW) = IBW (kg) + 0.4 X (actual body weight - IBW).

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Compatible with D5W, NS and RL.
- Stable for 48 hours at room temp and in the fridge in D5W and NS at a concentration of 1.2 mg/mL in PVC bags.
- Stable for 30 days at -20°C in NS or D5W at concentrations of 1 mg/mL in PVC bags.
- Stable for 30 days at room temp or in the fridge at a concentration of 40 mg/mL (undiluted) in polypropylene syringes.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 12 weeks in the fridge in NS at a concentration of 10 mg/mL in glass syringes.
- Incompatible with heparin.

MISCELLANEOUS

- Monitoring serum levels:
  - Traditional dosing: serum levels pre-dose: taken 5 minutes before next dose; should be less than 2 mg/L. serum levels post-dose: taken 30 minutes after the end of IV infusion or 60 minutes after the IM injection; should be less than 12 mg/L.
  - Extended interval dosing: serum levels pre-dose: taken 5 minutes before next dose; should be undetectable (i.e., less than 0.2 mg/L). serum levels post-dose: no need to monitor.

REFERENCES

1, 4, 5, 6, 95, 135, 143, 208, 303, 338.
GLATIRAMER ACETATE

Copaxone ®, Glatect ™

INDICATIONS
- Treatment of patients with relapsing-remitting multiple sclerosis.

ADMINISTRATION
- Allow prefilled syringe to reach room temp before the injection by removing it from refrigeration for at least 20 minutes.
- Do NOT expel small air bubbles in the syringe.
- SC: arms (upper back portion), thighs (front and outer part, 5 cm above the knee and 5 cm below the groin), hips (upper outer rear quadrant) and abdomen (at least 5 cm away from the navel). Rotate site of injection; do NOT inject in the same area more than once a week.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; anaphylactoid reactions, rash.
- Immediate post-injection reaction: transient self-limited systemic reaction occurring (sporadically and unpredictably) in 14% of patients within a few seconds to minutes of injection: facial flushing, chest tightness, dyspnea, palpitations, urticaria and anxiety. Lasts up to 30 minutes; usually resolves spontaneously without sequelae. Generally occurs several months after initiating glatiramer.
- GI: nausea.
- Local reactions: erythema, pruritus, pain, induration, edema, lipoatrophy, skin necrosis (rare).

DOSAGE
- Copaxone ®: 20 mg SC once daily (avoid giving 2 injections in the same 12-hour period) OR 40 mg SC 3 times weekly (at least 48 hours between doses).
- Glatect ™: 20 mg SC once daily (avoid giving 2 injections in the same 12-hour period).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store prefilled glass syringes in the fridge; protect from light. Do not freeze.
- Stable for one month at room temp protected from light.

MISCELLANEOUS
- Copaxone ® 20 mg/1 mL and 40 mg/1 mL products are not interchangeable.

REFERENCES
1, 5, 38, 95.
GLUCAGON (RECOMBINANT)
GlucaGen®, GlucaGen Hypokit®
Hyperglycemic agent

INDICATIONS
- In the emergency treatment of hypoglycemic reactions in diabetic patients receiving insulin. The drug is useful only if liver glycogen stores are normal.
- Diagnostic aid for radiologic examination of stomach, duodenum, small bowel and colon.
- Refractory cardiac failure (possesses inotropic and chronotropic actions).
- Beta-blocker overdose and calcium channel blocker overdose (possesses inotropic and chronotropic actions).
- To decrease motility and aid in removing foreign bodies in the lower esophagus, including food boluses.

ADMINISTRATION
- Reconstitute powder with manufacturer's diluent. Swirl gently until complete dissolution.
- IV direct: physician; RN may administer 1 mg or less in presence of physician. Administer at a rate of 1 mg/min.
- Continuous IV infusion: further dilute in D5W (at TOH: dilute 5 mg in 50 mL of D5W to obtain a concentration of 0.1 mg/mL).
- IM, SC.
- Do not use at concentrations greater than 1 mg/mL.
- Although GlucaGen® (Novo Nordisk) is not approved by Health Canada for IV or SC administration, there is strong documentation in the literature supporting its efficacy and safety by these routes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, respiratory distress, rarely hypotension and anaphylactic shock.
- Cardiovascular: transient increase in BP and heart rate. May administer phentolamine 5-10 mg IV if sudden increases in BP.
- GI: nausea and vomiting.
- Hypokalemia.

DOSAGE
Adults:
- Hypoglycemic reactions: 1 mg SC, IM or IV. If no response within 15 minutes, may repeat 1-2 times; consider also use of parenteral glucose.
- Diagnostic aid: 0.25-2 mg IV OR 1-2 mg IM before start of procedure.
- Beta-blocker or calcium channel blocker overdose: 3-10 mg IV over 3-5 minutes OR 0.05-0.15 mg/kg IV over 1-2 minutes. Follow with a continuous IV infusion of 1-5 mg/hr (maximum: 10 mg/hr). A patient may require up to 50 mg over a 24-hour period.
- Cardiac failure: 0.01-0.05 mg/kg IV bolus OR 1-3 mg/hr as continuous IV infusion.
- Foreign body obstruction in the esophagus: 0.5-2 mg IV. Repeat in 10 minutes if necessary.

Pediatrics:
- Hypoglycemic reactions: if weight more than 20 kg: 1 mg SC, IM or IV.
  if weight less than 20 kg: 0.5 mg OR 0.02-0.03 mg/kg (maximum: 0.5 mg) SC, IM or IV.
- If no response within 15 minutes, may repeat 1-2 times; consider also use of parenteral glucose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store Glucagon® (Lilly) between 15-30°C. Store GlucaGen® (Novo Nordisk) between 2-8°C, protected from light; do not freeze.
- The reconstituted product is clear and has water-like consistency. Discard any unused portion.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)
- Soluble at a pH of less than 3 or greater than 9.5; be cautious of the pH of any IV solution to which it is to be added.
- Stable in dextrose solutions; stability data in NS is conflicting.

MISCELLANEOUS
- When used for hypoglycemia, failure to respond necessitates immediate administration of dextrose IV.
- Carbohydrates should be given as soon as patient awakens. Use glucagon with dextrose in water for patients in hypoglycemic coma.
- 1 mg = 1 unit.
- Contains lactose.

REFERENCES
1, 5, 40, 82, 95, 205, 368.
GLYCOPRROLATE

**INDICATIONS**
- Adjunctive management of peptic ulcer disease when oral medication is not tolerated or when a rapid effect is desired.
- Preoperatively to reduce secretions.
- Intraoperatively to prevent cholinergic effects.
- Postoperatively during reversal of neuromuscular blockade to protect against the muscarinic effects (e.g., bradycardia, excessive secretions) of cholinergic agents such as neostigmine or pyridostigmine.
- To reduce upper airways secretions in palliative care patients.

**ADMINISTRATION**
- IV direct: physician or RN. May be given undiluted or may dilute with compatible fluids. Administer at a maximum rate of 0.2 mg/min.
- IM; SC (palliative care).
- SC infusion (palliative care).

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, pruritus, anaphylaxis.
- Cardiovascular: tachycardia, flushing.
- GI: vomiting, constipation, dry mouth, gastroesophageal reflux.
- CNS: headache.
- Ophthalmic: blurred vision, increased intraocular pressure (especially in patients with angle-closure glaucoma).
- Local reactions: pruritus, edema, erythema, pain at injection site.

**DOSAGE**

**Adults:**
- Adjunctive treatment of peptic ulcer disease: 0.1-0.2 mg IM or IV q4h, 3 or 4 times daily.
- Preoperative: 0.004 mg/kg IM 30-60 minutes before anesthesia induction.
- Intraoperative: 0.1 mg IV; may repeat every 2-3 minutes.
- Postoperative: 0.2 mg IV for each 1 mg of neostigmine or 5 mg of pyridostigmine, given either in same syringe as or before the anticholinesterase agent.
- In palliative care patients, to reduce upper airways secretions: 0.2-0.6 mg SC q2-4h prn (often given q4-8h prn) OR 1.2-2 mg/24 hrs as a continuous SC infusion.

**Pediatrics (children between 2 and 12 years of age):**
- Preoperative: 0.004-0.01 mg/kg IM 30-60 minutes before anesthesia induction.
- Intraoperative: 0.004 mg/kg IV up to a maximum of 0.1 mg. May repeat every 2-3 minutes.
- Postoperative: 0.2 mg IV for each 1 mg of neostigmine or 5 mg of pyridostigmine, given either in same syringe as OR before the anticholinesterase agent.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C.
- Stable for 48 hours at room temp in D5W, NS, Ringer’s, or D5-1/2NS at a concentration of 0.8 mg/L.
- Stable for 24 hours at room temp or in the fridge in NS at a concentration of 0.1 mg/mL in polypropylene syringes.
- Stable for 90 days at room temp or in the fridge at a concentration of 0.2 mg/mL (undiluted) in polypropylene syringes.
- Incompatible with drugs or solutions with an alkaline pH.

**MISCELLANEOUS**
- Retards gastric emptying; if more than 2 successive parenteral doses are given, nasogastric intubation is often necessary.
- Onset: 1 minute following IV injection and 15-30 minutes following IM or SC injection.

**REFERENCES**
1, 4, 5, 6, 40, 82, 95, 135, 208, 457, 505.

Full revision 2015; limited revision 2016
INDICATIONS
- Treatment of moderate to severe rheumatoid arthritis, in combination with methotrexate (SC and IV formulations).
- Treatment of moderate to severe psoriatic arthritis (PsA), as monotherapy or in combination with methotrexate (SC and IV formulations).
- Treatment of active ankylosing spondylitis (AS) in patients with an inadequate response or intolerance to conventional therapies (SC and IV formulations).
- Treatment of severe active non-radiographic axial spondyloarthritis in patients with an inadequate response or an intolerance to nonsteroidal anti-inflammatory drugs (NSAIDs) (SC formulation).
- Treatment of moderate to severe ulcerative colitis in patients who did not respond adequately or have contraindications to conventional therapy (including 5-ASA, corticosteroids, azathioprine, 6-mercaptopurine) (SC formulation).

ADMINISTRATION
- There are two formulations: one for IV use (vial) and one for SC use (prefilled syringe and autoinjector). Ensure using the correct one.
- Intermittent IV infusion: ensure to use the IV solution which has a concentration of 50 mg/4 mL (12.5 mg/mL); dilute dose by slowly adding it to a minibag to obtain a final volume of 100 mL NS (withdraw a volume of NS solution from a 100 mL minibag equal to the volume of golimumab solution that will be added and discard the withdrawn solution). Mix gently. Infuse over 30 minutes (+/- 10 minutes) with an in-line low protein-binding filter of 0.22 microns or less.
- SC: use the autoinjector (50 mg/0.5 mL or 100 mg/1 mL) or prefilled syringe (50 mg/0.5 mL or 100 mg/1 mL). Warm at room temp for 30 minutes before administration. Do NOT shake. Inject at a 90° angle for the autoinjector and at a 45° angle for the prefilled syringe (with the latter, pinch skin) into the thighs, abdomen (at least 2 inches below the navel) or outer area of the upper arms. If multiple injections are required, use a different site for each injection. Do NOT inject into areas where skin is tender, bruised, red, scaly or hard, has scars or stretch marks. Rotate injection sites. Refer to manufacturer instructions for more details.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria. Rarely anaphylaxis and serum sickness. May occur after first administration.
- Cardiovascular: hypertension, CHF (new onset or worsening).
- GI: constipation.
- CNS: dizziness.
- Elevation of liver enzymes.
- Infections: patients receiving golimumab may be more prone to develop infections, including tuberculosis, fungal or opportunistic infections. Discontinue if serious infection occurs.
- Anemia, leukopenia.
- Pyrexia.
- Local reactions: erythema, urticaria, induration, pain, bruising, paresthesia, irritation, pruritus.

 DOSAGE
- Rheumatoid arthritis, PsA and AS: 2 mg/kg IV at weeks 0, 4 and every 8 weeks thereafter OR 50 mg SC once a month.
- Non-radiographic axial spondyloarthritis and active ankylosing spondylitis: 50 mg SC once a month.
- Ulcerative colitis: 200 mg SC at week 0, 100 mg SC at week 2 and then 50 mg SC every 4 weeks thereafter. A maintenance dose of 100 mg SC every 4 weeks can also be considered.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials, autoinjectors and prefilled syringes between 2-8°C. Protect from light. Do not freeze. Do not shake.
- Vials, autoinjectors and prefilled syringes may be stored at temperature not exceeding 25°C for a single period of 30 days, protected from light; do not refrigerate afterwards.
- The diluted IV solution is stable for 6 hours at RT, protected from light, in NS.
### MISCELLANEOUS
- The needle cover of both the autoinjector and prefilled syringe contains latex.
- Do not administer live or live attenuated vaccines concurrently with this drug.
- Do not use with other biologic DMARDs (e.g., abatacept, anakinra, etanercept) because of possible increased risk of infections and similar toxicities.
- Patient should be tested for hepatitis B virus infection and tuberculosis before initiating therapy.

### REFERENCES
5.
**INDICATIONS**

- Induction of ovulation in women with primary hypothalamic amenorrhea.

**ADMINISTRATION**

- Reconstitute each vial of 0.8 mg with 8 mL of diluent provided (NS), immediately prior to use. Shake vial a few seconds to obtain a clear and colourless solution. Transfer to a polypropylene plastic reservoir.
- Intermittent IV infusion, Intermittent SC infusion: using a suitable pulsatile pump and infusion catheter. Pump should be set to deliver the doses over a pulse period of 1 minute, repeated every 90 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis.
- GI: nausea, vomiting, diarrhea, abdominal distension/discomfort; may be signs of ovarian hyperstimulation syndrome.
- Ovarian hyperstimulation syndrome (rare): sudden ovarian enlargement, ascites, pain, pleural effusion.
- Local reactions: thrombophlebitis, hematoma, swelling, infection, redness, induration at site of injection.

**DOSAGE**

- Recommended starting dose is 5 mcg IV/SC every 90 minutes. Dose range: 1 to 20 mcg.
- Response usually occurs within 2 to 3 weeks following initiation of therapy.
- When ovulation occurs, therapy should be continued for another 2 weeks to maintain the corpus luteum.
- Recommended treatment interval before dosage adjustment is 21 days.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C.
- Reconstituted solution is stable for 45 days between 24-37°C when stored in vials and reservoir bags.
- Stable for up to 16 hours in catheter tubing.

**REFERENCES**

2, 5, 95, 135.
INDICATIONS
- Treatment of prostate cancer and breast cancer.
- Treatment of endometriosis.
- As an endometrial thinning agent prior to endometrial ablation.
- Treatment of uterine leiomyoma.

ADMINISTRATION
- SC (anterior abdominal wall below the navel line).

POTENTIAL ADMINISTRATION HAZARDS
- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare), rash, erythema, urticaria.
- Cardiovascular: hot flashes, hypotension, hypertension, heart failure, myocardial infarction, QT interval prolongation.
- GI: nausea, vomiting, diarrhea.
- CNS: mood changes, depression, headache, dizziness.
- Tumour flare reaction (e.g., increased bone pain, spinal cord depression, urinary tract obstruction).
- Pituitary apoplexia (symptoms of sudden headache, vomiting, visual changes, altered mental status with sometimes cardiovascular collapse); may appear within the hour following injection and can be severe.
- Anemia, hyperglycemia, fatigue, sexual dysfunction, arthralgia.
- Local reactions: pain, erythema, bruising at injection site.

DOSAGE
- Prostate cancer:
  - 3.6 mg SC every 28 days.
  - 10.8 mg SC every 13 weeks using the “LA” preparation.
- Breast cancer and uterine leiomyoma:
  - 3.6 mg SC every 28 days.
- Endometriosis:
  - 3.6 mg SC every 28 days.
  - 10.8 mg SC every 12 weeks, using the “LA” preparation.
- Endometrial thinning:
  - 2 doses of 3.6 mg SC given 4 weeks apart, with surgery planned for between 0 and 2 weeks after the second injection.
- Dosage in renal impairment: no dosage adjustment required.
- Dosage in hepatic impairment: no dosage adjustment required.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2 and 25°C. Protect from light and moisture.

MISCELLANEOUS
- Note that two strengths are available: 3.6 mg (1 month formulation) and 10.8 mg (3 month formulation).
- To prevent the initial disease flare in patients with prostate cancer, begin antiandrogen therapy (e.g., bicalutamide, cyproterone, flutamide, nilutamide) 1 week prior to commencing goserelin therapy and continue for 2 weeks following the first injection.

REFERENCES
1, 5, 95, 129, 165.
GRANISETRON
Kytril ®
Antiemetic

INDICATIONS
- Prevention of nausea and vomiting associated with chemotherapy.
- Prevention and treatment of postoperative nausea and vomiting.

ADMINISTRATION
- IV direct: physician or RN. Administer undiluted over 30 seconds.
- Intermittent IV infusion: dilute dose in NS, D5W, or dextrose-saline to a total volume of 20-50 mL prior to administration. Infuse dose over 5 minutes, beginning within 30 minutes before initiation of chemotherapy.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, dyspnea, hypotension, urticaria.
- Cardiovascular: QT interval prolongation (rare).
- GI: constipation, diarrhea, abdominal pain.
- CNS: headache, somnolence.
- Serotonin syndrome (e.g., agitation, confusion, tachycardia, muscle twitching or stiffness, fever, loss of consciousness or coma) especially when administered with other serotonergic drugs.
- Asthenia.

DOSAGE
- Adults:
  - Chemotherapy-induced nausea and vomiting: 10-40 mcg/kg IV OR 1 mg IV.
  - Postoperative nausea and vomiting: 1 mg IV.
- Pediatrics:
  - Chemotherapy-induced nausea and vomiting: 10-40 mcg/kg IV.
  - Prevention of postoperative nausea and vomiting: 40 mcg/kg IV (maximum 0.6 mg).
- Dosage adjustment is not required in patients with renal or hepatic impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C. Protect from light. Do not freeze.
- Compatible with NS, D5W, dextrose-saline, mannitol 20%.
- Stable for 35 days at room temp or in the fridge in NS or D5W at concentrations of 0.008-0.53 mg/mL in PVC bags with or without dexamethasone 0.05-0.35 mg/mL.
- Stable for 7 days in NS and 14 days in D5W in the fridge at a concentration of 0.02 mg/mL in a disposable elastomeric infusion system.
- Stable for 14 days at room temp or in the fridge in NS or D5W at a concentration of 0.05, 0.07 or 0.1 mg/mL in polypropylene syringes.
- Stable for 24 hours at room temp exposed to light in NS or D5W at a concentration of 0.2 mg/mL in polypropylene syringes.
- Stable for 15 days at room temp or in fridge protected from light undiluted in polypropylene syringes.

MISCELLANEOUS

REFERENCES
1, 4, 5, 6, 65, 69, 82, 95, 143.
### HAEMOPHILUS B CONJUGATE VACCINE

**Act-HIB ®, Hiberix ®**

### INDICATIONS
- For routine immunization of all children between 2 and 59 months of age.
- For older children and adults with chronic conditions associated with increased risk of invasive *Haemophilus influenzae* type b disease such as persons with splenic dysfunction (e.g., sickle cell disease, asplenia), antibody deficiency, HIV infection or certain malignancies, solid organ transplant, as well as candidates and recipients of cochlear implants.

### ADMINISTRATION
- For Act-Hib ®: reconstitute vaccine with 0.5 mL of provided diluent; shake the vial gently until obtaining a clear and colourless solution. It can also be reconstituted with the vaccine Quadracel ® for additional immunization coverage; in this case, shake well until obtaining a cloudy uniform suspension.
- For Hiberix ®: reconstitute vaccine with the entire content of the diluent vial. Shake well until obtaining a clear and colourless solution. It can also be reconstituted with the vaccine Infanrix ®-IPV for additional immunization coverage; in this case, shake well until obtaining a cloudy uniform suspension.
- IM: into the deltoid muscle; for infants younger than 1 year of age into the anterolateral aspect of the mid-thigh.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity (rare): urticaria, pruritus, rash, facial and laryngeal edema, angioedema.
- GI: vomiting.
- CNS: drowsiness, irritability.
- Fever.
- Local reactions: pain, redness, swelling, induration at injection site.

### DOSAGE
- 0.5 mL IM.
- Refer to specific manufacturer’s monograph for complete dosage schedule.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Do not freeze.
- Use the vaccine immediately after its reconstitution.
- Consult the manufacturer’s monograph for information on additional vaccines that can be administered concomitantly (providing separate syringes and different sites are used).

### MISCELLANEOUS
- Epinephrine must be available in case of acute hypersensitivity reaction.
- The *Haemophilus* b conjugate vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- The rubber stopper of the diluent vial to reconstitute the Act-HIB ® vaccine contains latex.

### REFERENCES
1, 5, 31.
INDICATIONS
- To achieve rapid symptom control in acute and chronic psychosis (including schizophrenia and mania), acute delirium tremens, or severe malignant catatonic excitement.
- To control agitation in critically ill patients.
- For postoperative nausea and vomiting.

ADMINISTRATION
- IV direct: physician or RN; blood pressure monitoring for doses greater than 5 mg. Give at a rate no faster than 5 mg/min.
- Intermittent IV infusion: dilute dose in D5W.
- Continuous IV infusion: dilute in D5W to a concentration of 3 mg/mL or less (see Compatibility, Stability section).
- Although haloperidol is not approved by Health Canada for IV administration, the IM product may be given IV.
- IM, SC (palliative care).

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: venous thromboembolism, hypotension, tachycardia, angina, QT interval prolongation, rare reports of Torsade de pointes. The risk of Torsade de pointes is dose-dependant and increases as total daily dosages of 35-50 mg or more are exceeded and when the IV route is used.
- CNS: sedation, seizures, insomnia, restlessness, anxiety, euphoria, agitation, hallucinations, depression, confusion, headache, lethargy, vertigo, extrapyramidal reactions, such as akathisia or Parkinson-like condition.
- Neuroleptic malignant syndrome.
- Anticholinergic effects such as dryness of mouth, constipation, urinary retention, blurred vision, diaphoresis.
- Antidote: severe hypotension can be alleviated by administration of norepinephrine or phenylephrine. Epinephrine is contraindicated.

DOSSAGE
- Prompt control of agitated patients: 2-5 mg IM (in the elderly 0.5-1 mg IM) q4-8h prn; may repeat q1h prn. Dose must be individualized.
- Delirium: initial dose of 1-2 mg IV (in the elderly 0.25-0.5 mg IV) q2-4h.
- Continuous IV infusion: 10 mg initial IV bolus followed by initial IV infusion of 5-10 mg/hr. If no response after 30 minutes, repeat 10 mg IV bolus and increase infusion rate by 5 mg/hr.
- Postoperative nausea and vomiting: 0.5-2 mg IV/IM.
- Dosage in renal impairment: no adjustment required.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 15-30°C. Protect from light. Do not freeze.
- Stable for 7 days at room temp in NS when diluted between 0.1 and 0.75 mg/mL in glass vials.
- Stable for 7 days at room temp in D5W when diluted between 0.1 and 3 mg/mL in glass vials.
- Stable for 7 days at room temp in 1/2NS and RL at concentrations of 0.1-1 mg/mL in glass vials.
- Stable for 38 days at room temp in D5W at a concentration of 0.1 mg/mL in PVC and amber glass bottles.
- Incompatible with heparin.

MISCELLANEOUS
- Use in extreme caution, if at all, in patients with Parkinsonism and in the elderly.
- Consider a baseline ECG to assess for QTc interval prolongation.

REFERENCES
1, 4, 5, 6, 49, 51, 95, 135, 143, 369, 457.
**INDICATIONS**

- Long-acting depot medication used for treatment of chronic schizophrenia.

**ADMINISTRATION**

- Deep IM: use at least 21 gauge dry needle, give deep IM into large muscle, use Z track method, rotate sites.
- Aspirate before injection to avoid intravascular injection. Do NOT massage injection site.

**POTENTIAL ADMINISTRATION HAZARDS**

- Cardiovascular: venous thromboembolism, hypotension, angina, tachycardia, QT interval prolongation, Torsade de pointes, ventricular arrhythmias.
- CNS: extrapyramidal effects such as akathisia or Parkinson-like condition, seizures, drowsiness/insomnia, tardive dyskinesia.
- Neuroleptic malignant syndrome.
- Anticholinergic side effects: dry mouth, constipation, urinary retention, blurred vision, diaphoresis.
- Local reactions: inflammation and nodules at injection site (more common in gluteus).

**DOSAGE**

- Usual initial IM dose: 10 to 20 times the daily oral dose. If the IM dose is greater than 100 mg IM, administer in 2 injections 3 to 7 days apart.
- Usual maintenance dose: 50-200 mg IM every 4 weeks, adjusted according to patient’s response. Maximum of 450 mg/month.
- Dosage in renal and hepatic impairment: use with caution if severe impairment.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15 and 30°C. Protect from light. Do not freeze.
- Do not let drug stand in syringe for longer than 15 minutes.

**MISCELLANEOUS**

- Peak plasma levels can occur 1-9 days after injection; however it may take up to three months to reach steady-state levels with monthly dosing.

**REFERENCES**

1, 5, 51, 135.
INDICATIONS
- Treatment and prophylaxis of thromboembolic disorders.
- ST elevation myocardial infarction.
- Non-ST elevation acute coronary syndrome/unstable angina.
- Anticoagulation during percutaneous coronary intervention (PCI).
- As a heparin lock flush solution to maintain patency of indwelling catheters.

ADMINISTRATION
- IV direct: physician or RN. Administer undiluted over 1 minute.
- Intermittent IV infusion, Continuous IV infusion (preferred): may dilute with NS or D5W and administer as intermittent or continuous infusion. Except for fluid restricted patients, use a 100 unit/mL infusion solution of heparin by either: 1) diluting 25,000 units in 250 mL of D5W or NS (invert bag at least six times for complete mixing), OR 2) using a 250 mL premixed bag of 100 units/mL in D5W. Must be administered by an infusion pump.
- SC: pinch the skin for deep SC administration. Use a 25- or 26-gauge 1/2-inch needle. Administer on abdomen, above iliac crest. Rotate sites. Do NOT massage injection site.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: fever, chills, urticaria, rhinitis, lacrimation, asthma, anaphylactoid reactions; allergic vasospastic reactions.
- Hemorrhage. Increased risk of hemorrhage in patients with subacute bacterial endocarditis, renal or hepatic disease, severe hypertension. Continuous IV infusion has a lower incidence of bleeding complications than intermittent IV infusion.
- Heparin-induced thrombocytopenia (HIT).
- Hepatic: increased LFTs.
- Local reactions: irritation, erythema, pain, hematoma, ulceration at deep SC administration site.
Antidote: The anticoagulant effect of heparin can be neutralized by protamine. Refer to protamine in this manual for more details.

DOSAGE
- Treatment of thromboembolism: 5000 units (or 80 units/kg) IV bolus followed by a continuous IV infusion of 1300 units/hr (or 18 units/kg/hr) OR 5000 units IV bolus (bolus may also be given as 333 units/kg SC) followed by intermittent SC injections of 250 units/kg q12h OR 10,000 units IV bolus followed by intermittent IV infusions of 5000-10,000 units q4-6h.
- Prophylaxis of thromboembolism: 5000 units SC q8-12h. If administered prior to surgery: give first dose of 5000 units SC 2 hours prior to surgery.
- ST elevation myocardial infarction (alteplase or tenecteplase are also given): bolus of 60 units/kg IV (maximum 4000 units), followed by a continuous IV infusion of 12 units/kg/hr (maximum 1000 units/hr).
- Non-ST elevation acute coronary syndrome/unstable angina: initial bolus of 60 units/kg IV (maximum 4000 units), followed by an initial infusion of 12 units/kg/hr (maximum 1000 units/hr).
- PCI anticoagulation: if patient was not on anticoagulation therapy, 50 to 100 units/kg IV bolus; if patient has received prior anticoagulation, 2000 to 5000 units IV bolus.
- Infusion rates/injections to be adjusted to maintain therapeutic aPTT or heparin assay.
- To maintain patency of indwelling catheters: inject a solution of 10 units/mL or 100 units/mL in a sufficient quantity to fill the device.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Do not freeze.
- Compatible in NS, D5W, dextrose-saline solutions, Ringer's and RL.
- Solutions are colourless to slightly yellow.
- Infusions are stable for 24 hours at room temp.
- Stable for 8 hours at room temp and in the fridge in D5W or SWFI at a concentration of 300 units/mL in polypropylene syringes.
- Stable for 21 days at room temp and in the fridge in NS at a concentration of 500 units/mL in polypropylene syringes.

MISCELLANEOUS
- Derived from porcine tissues.
- At TOH, 2 pre-printed order forms are available for use: 1) in acute coronary syndromes or atrial fibrillation; 2) venous thrombosis.

REFERENCES
1, 4, 5, 40, 70, 135, 208.
Hepatitis A Vaccine

**Indications**
- For active immunization against infection caused by hepatitis A virus.

**Administration**
- Shake well to obtain a uniform suspension.
- **IM:** into the deltoid muscle for older children and adults and into the anterolateral area of the thigh for infants.
- **SC:** only for patients with bleeding disorders at high risk of hemorrhage with IM administration (e.g., thrombocytopenia, hemophilia).

**Potential Administration Hazards**
- **Hypersensitivity:** anaphylaxis/anaphylactoid reactions (rare), serum sickness-like reaction, angioedema, erythema multiforme, urticaria, rash, pruritus.
- **GI:** nausea, vomiting, diarrhea, abdominal pain, loss of appetite.
- **CNS:** headache, irritability, drowsiness.
- **Fever, myalgia, arthralgia, malaise, fatigue, asthenia.**
- **Local reactions:** pain, redness, warmth and swelling at injection site. Nodules with SC administration.

**Dosage**
- For adults:
  - Havrix 1440 ® and Vaqta ®: 1 mL IM.
  - Avaxim ®: 0.5 mL IM.
- For pediatrics:
  - Avaxim-Pediatric ®, Havrix 720 Junior ® and Vaqta ® Pediatric/Adolescent: 0.5 mL IM.
- Refer to specific manufacturer’s monograph and the Canadian Immunization Guide for complete dosage schedule and ages for which the individual vaccines are to be used.

**Compatibility, Stability**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials and prefilled syringes between 2-8°C. Do not freeze.
- Vaqta ® and Vaqta ® Pediatric/Adolescent are stable for 72 hours at up to 25°C.

**Miscellaneous**
- Epinephrine must be available in case of acute hypersensitivity reaction.
- Contains trace amounts of neomycin.
- The hepatitis A vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- Seroconversion following SC administration is slower than with IM administration.
- Human immune globulin does not appear to interfere with the response to the hepatitis A vaccine. When given at the same time, the two products should be administered at separate sites.

**References**
1, 5, 31, 135.
**INDICATIONS**

- Primary immunization against hepatitis B infection and to promote active immunity to hepatitis B infection in individuals considered at high risk of potential exposure to hepatitis B virus or hepatitis B surface antigen positive material (e.g., blood, blood products, body fluids).

**ADMINISTRATION**

- Shake well to obtain a uniform suspension.
- IM: into the deltoid for older children and adults, and into the anterolateral area of the thigh for infants.
- SC: only for patients with bleeding disorders at risk of hemorrhage with IM administration (e.g., thrombocytopenia, hemophilia).

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis/anaphylactoid reactions (rare), serum sickness-like reaction, angioedema, erythema multiforme, urticaria, rash, palpitations, dyspnea, arthritis, hypotension.
- GI: nausea, diarrhea, abdominal pain.
- CNS: headache, irritability, drowsiness.
- Respiratory: pharyngitis, symptoms of upper respiratory infection.
- Fever, fatigue, weakness, malaise.
- Local reactions: pain, pruritus, erythema, swelling, warmth, ecchymoses, induration; nodules with SC administration.

**DOSAGE**

- Usual adult dose: 20 mcg (Engerix ®-B) or 10 mcg (Recombivax HB ®) IM.
- Usual pediatric dose: 10 to 20 mcg (Engerix ®-B) or 2.5 to 10 mcg (Recombivax HB ®) IM depending on immunization schedule and age.
- Patients undergoing hemodialysis and immunocompromised patients often require doubling the dose and monitoring of antibody titers.
- Refer to specific manufacturer's monograph and the Canadian Immunization Guide for complete dosage schedule and ages for which the individual vaccines are to be used.

**COMPATIBILITY, STABILITY**

*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*

- Store vials between 2-8°C. Do not freeze.
- Recombivax HB ® is stable for 72 hours at room temp and between 0-2°C.

**MISCELLANEOUS**

- Epinephrine must be available in case of acute hypersensitivity reaction.
- The hepatitis B vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- Contraindications: sensitivity to yeast (Engerix ®-B and Recombivax HB ®) or to latex (Recombivax HB ®).
- Hepatitis B immune globulin does not appear to interfere with the response to hepatitis B vaccine. When given at the same time, the two products should be administered at separate sites.

**REFERENCES**

1, 5, 31.
INDICATIONS
- Cervarix ®: for girls and women 9–45 years of age for the prevention of infection caused by Human Papillomavirus (HPV) types 16 and 18 and diseases associated with these HPV types (such as cervical cancer, intraepithelial neoplasia and adenocarcinoma in situ).
- Gardasil ®: for girls and women 9–45 years of age and for boys and men 9–26 years of age for the prevention of infection caused by HPV types 6, 11, 16 and 18 and diseases associated with these HPV types (such as cervical, vulvar vaginal, anal, penile cancers and related intraepithelial neoplasia; genital warts; cervical adenocarcinoma in situ).
- Gardasil ® 9: same as Gardasil ® except coverage is against HPV types 6, 11, 16, 18, 31, 33, 45, 52, 58.

ADMINISTRATION
- Shake well before use.
- IM: into the deltoid region of the upper arm (Gardasil ®, Gardasil ® 9 and Cervarix ®) or in the higher anterolateral area of the thigh (Gardasil ® and Gardasil ® 9).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, bronchospasm, anaphylaxis/anaphylactoid reactions, angioedema, erythema multiforme.
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: dizziness, syncope with or without tonic-clonic movements, headache.
- Fever, fatigue, myalgia, arthralgia.
- Local reactions: pain, swelling, erythema, pruritus, hematoma at injection site.

DOSAGE
- Refer to specific manufacturer’s monograph and The Canadian Immunization Guide for complete dosage schedule.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and prefilled syringes between 2–8°C. Protect from light. Do not freeze.
- Gardasil ® and Gardasil ® 9 are stable for 72 hours between 8-25°C and between 0-2°C. Do not use if the content has frozen.
- Cervarix ® is stable for 72 hours between 8-25°C and for 24 hours between 25-37°C.

MISCELLANEOUS
- Epinephrine must be available in case of acute hypersensitivity reaction.
- Gardasil ® and Gardasil ® 9 are contraindicated in patients allergic to yeast protein.
- Inactivated vaccine made from virus-like particles.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.

REFERENCES
1, 5, 31.
INDICATIONS
- Reversal of warfarin therapy or vitamin K deficiency in patients exhibiting major bleeding manifestations or requiring urgent (less than 6 hours) surgical procedure.
- Reversal of rivaroxaban, apixaban and edoxaban activity in case of life-threatening bleeding.
- Reversal of dabigatran, if idarucizumab unavailable, in case of life-threatening bleeding.

ADMINISTRATION
- For IV use: warm diluent and concentrate to room temp. Do not exceed 37° C. Reconstitute the powder with the provided diluent and transfer filter set according to manufacturer’s instructions.
- Intermittent IV infusion: transfer dose to an empty sterile plastic bag (note: at TOH, this step is done by Transfusion Medicine). Before administration, flush IV line with NS or D5W; during administration, do NOT run in the same line with any other products including fluids with no medications (e.g., saline or dextrose solutions); after administration is completed, refill with NS or D5W. Manufacturers’ recommendation: For Octaplex ®: administer at an initial rate of 1 mL/min; after 10 minutes, if patient is tolerating well the infusion, may increase rate up to 3 mL/min. For Beriplex ® P/N: administer at the maximum rate of 8 mL/min.
- At TOH, administer both Octaplex ® and Beriplex ® P/N at a rate of 6 mL/min.
- Consult TOH Nursing policy 00045 (Blood and blood products: Administration).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, urticaria, flushing, chills, wheezing, angioedema, hypotension, chest tightness, tachycardia.
- GI: nausea.
- CNS: headache.
- Pyrexia.
- Thromboembolic complications (rare).
- Remote risk of transmission of infectious agents, including viruses, as this product is prepared from large pools of human plasma.
- Local reactions: burning at injection site.

DOSAGE
Reversal of warfarin therapy/vitamin K deficiency:
- Dose is expressed in mL and is based on the INR; a physician experienced in the treatment of coagulation disorders may be consulted. The following dosing regimen is suggested (this may differ from recommendations of the manufacturers):

<table>
<thead>
<tr>
<th>Initial INR</th>
<th>Less than 3</th>
<th>3 - 5</th>
<th>Greater than 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose in mL</td>
<td>40 mL IV</td>
<td>80 mL IV</td>
<td>120 mL IV</td>
</tr>
</tbody>
</table>
- If the INR is unknown and major bleeding is present: 80 mL IV.
- Single dose should not exceed 120 mL.
- Dose may be repeated in patients who continue to bleed or require urgent surgery if INR 10-30 minutes post administration is not corrected and there is insufficient time to wait for vitamin K to take effect.

Reversal of rivaroxaban, apixaban, edoxaban and reversal of dabigatran activity if idarucizumab unavailable:
- 50 units/kg (no maximum amount) IV.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store powder and diluent between 2 to 25°C; do not freeze; protect from light.
- Reconstituted solution should be clear or slightly opalescent.
- After reconstitution, the solution must be used immediately to ensure sterility; however, if not administered immediately, storage should not exceed 3 hours at room temp for Beriplex ® P/N or 12 hours at room temp for Octaplex ®.

MISCELLANEOUS

- Contains heparin; do not give to patients with a history of heparin-induced thrombocytopenia.
- Human prothrombin complex concentrate contains the following: factors II, VII, IX, X, Protein C and Protein S.
- Administration of vitamin K₁ (10 mg IV) is strongly recommended if INR reversal is required for longer than 6 hours (which is the half-life of human prothrombin complex); onset of action of vitamin K₁ is 4-6 hours when given IV.
- Onset of action is within 10-30 minutes and effect persists for 6-8 hours.

REFERENCES

5, 10, 46, 135, 174, 231, 242, 244, 273, 329.
INDICATIONS
- In essential and early malignant hypertension, as well as in hypertensive emergencies associated with pregnancy.
- IV use indicated only for conditions in which drugs cannot be taken orally or when there is an urgent need to lower blood pressure.

ADMINISTRATION
- IV direct: physician or RN in presence of physician for first dose only; blood pressure monitoring. May be given undiluted or diluted in 10-20 mL of NS. Inject over 1 minute in adults and over 3 to 5 minutes in children. To avoid hypotension, injection should be stopped frequently when blood pressure is falling.
- Intermittent IV infusion (preferred): RN in presence of physician for first dose only; blood pressure monitoring. Dilute dose in 50 mL of NS and infuse over 15 minutes.
- Continuous IV infusion (preferred): RN in presence of physician for start of the infusion only; blood pressure monitoring. Dilute 100 mg in 500 mL to 1000 mL of NS. Give slowly and adjust rate according to the blood pressure response.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, vasculitis, vascular collapse.
- Cardiovascular: postural hypotension, palpitations, flushing, tachycardia, angina.
- GI: nausea, vomiting, diarrhea, anorexia.
- CNS: depression, anxiety, headache, neuropathy, dizziness.
- Increased cerebral ischemia in predisposed patients.

DOSAGE
Adults:
- Hypertensive emergency in a non-pregnant patient: usual dose: 10-20 mg IV or IM (up to 40 mg has been used). Repeat as needed. Maximum is 300-400 mg/24 hours.
- Infusion: 0.02-0.3 mg/min until response; usual maintenance dose of 0.05-0.15 mg/min.
- Preeclampsia, eclampsia: initial dose of 5-10 mg IV or IM. Then follow by 5-20 mg IV or 5-10 mg IM every 20-40 minutes as required OR infuse at rate of 0.5-10 mg/hr IV (maximum total cumulative dose of 20 mg IV or 30 mg IM).

Pediatrics:
- 0.1-0.2 mg/kg (maximum 20 mg) IV/IM repeated q4-6h up to 1.7-3.5 mg/kg/day OR 50-100 mg/m²/day IV/IM in 4 to 6 divided doses; OR continuous IV infusion: 1.5 mcg/kg/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light. Do not refrigerate as it could precipitate or crystallize.
- Compatible with NS, Ringer's, RL, sodium lactate 1/6 M solutions.
- Incompatible with D5W.
- Colour change over a period of 8-12 hours does not affect potency if stored below 30°C.
- Stable for 24 hours at room temp in NS at a concentration of 0.2 mg/mL in PVC bags.
- Stable for 52 days at room temp in NS at a concentration of 0.35 mg/mL in PVC bags.
- Reacts with various metals to give yellow or pink solutions. Caution with metal filters. Minimize contact time with needles.

MISCELLANEOUS
- 25-50 mg IV is approximately equal to 75-100 mg oral hydralazine.
- After IV administration, the effect begins within 5-20 minutes. Maximum effect seen in 10-80 minutes and lasts for 2-6 hours. Effect begins within 10-30 minutes after IM administration.

REFERENCES
1, 2, 4, 5, 6, 40, 82, 95, 135, 143, 170.

Full revision 2015
**INDICATIONS**
- Treatment of status asthmaticus, severe allergic reactions and a variety of other inflammatory conditions.
- Treatment of existing or potential states of acute adrenocortical insufficiency when oral therapy is not feasible or a rapid and intense hormonal effect is required.

**ADMINISTRATION**
- For IV use: reconstitute powder of the Act-O-Vial with supplied diluent. Reconstitute powder of the NOVO/TEVA product with SWFI: 1.8 mL for the 100 and 250 mg vials, 3.8 mL for the 500 mg vial and 7.3 mL for the 1 g vial.
- IV direct: physician or RN. Administer undiluted over 30 seconds to several minutes.
- Intermittent IV infusion, Continuous IV infusion: may dilute with D5W or NS to a concentration of 0.1-1 mg/mL. Dose of 100-3000 mg may be added to 50 mL of D5W or NS in fluid restricted patients. Intermittent IV infusions can be given over 20-30 minutes.
- It is recommended that doses of 500 mg or greater be given over at least 10 minutes.
- IM: NOT preferred over IV for initial emergency use due to slower absorption. Reconstitute as directed. Administer in a large muscle, not the deltoid as may cause subcutaneous atrophy.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis/anaphylactoid reactions, angioedema, urticaria, bronchospasm, laryngeal edema.
- Cardiovascular: congestive heart failure, hypertension.
- GI: peptic ulcer, GI perforations with high doses. Prophylactic antacid may be considered.
- CNS: headache, seizures, euphoria, increased intracranial pressure, insomnia, mood swings, psychotic reactions.
- Ophthalmic: increased intraocular pressure.
- Hypernatremia, hypokalemia, fluid retention, hyperglycemia, hypothalamic-pituitary-adrenal axis suppression.
- Increased risk of severe infection.
- Burning or tingling of the perineal area. Acute myopathy with high doses.
- Local reactions: dermal and subdermal atrophy.

**DOSAGE**

**Adults:**
- Acute adrenal insufficiency: 100 mg IV bolus. Then 50-75 mg IV or IM q6h OR 10 mg/hr as a continuous IV infusion for 24 hours, then taper the dose over the next 72 hours.
- Stress dosing (surgery) in adrenally-suppressed patients: dosage range of 25 to 150 mg IV per day. Administer in 2 or 3 divided doses for daily doses greater than 25 mg.
- Anti-inflammatory or immunosuppression: 15-240 mg IV or IM q12h.
- Status asthmaticus: 1-2 mg/kg IV q6h for 24 hours then 0.5-1 mg/kg IV q6h.

**Pediatrics:**
- Acute adrenal insufficiency: 1-2 mg/kg IV bolus, then 25-250 mg/day IV or IM in divided doses q6-8h.
- Anti-inflammatory or immunosuppression: Children: 1-5 mg/kg/day or 30-150 mg/m²/day IV or IM divided q12-24h. Adolescents: 15-240 mg q12h IM or IV.
- Status asthmaticus: 1-2 mg/kg IV q6h for 24 hours, then 0.5-1 mg/kg IV q6h.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Reconstituted solution in the standard vials is stable for 3 days at room temp or in the fridge, if protected from light. Any unused portion must be discarded.
- Solu-Cortef®, Act-O-Vial: stable for 24 hours at room temp in NS or D5W, at a concentration of 1 mg/mL.
- Novo/Teva product: stable for 4 hours at room temp in NS or D5W, at a concentration of less than 1 mg/mL.
- Solu-Cortef®, Act-O-Vial and Novo/Teva product: 100 mg to 3 g stable for at least 4 hours in 50 mL (2 to 60 mg/mL) of D5W, NS or D5-NS.
- Compatible with D5W, D5-NS, NS, Ringer’s and RL.

MISCELLANEOUS

REFERENCES

4, 5, 6, 40, 82, 135.
**INDICATIONS**
- Relief of moderate to severe pain.

**ADMINISTRATION**
- IV direct: physician or RN; **respiratory support**. Administer undiluted or dilute dose to 10 mL of NS or D5W and give over at least 2-3 minutes.
- Intermittent IV infusion.
- Continuous IV infusion: add 20 mg (2 mL from hydromorphone 10 mg/mL vial) to 100 mL of NS or D5W to obtain a final concentration of 0.2 mg/mL (200 mcg/mL) OR add 20 mg (10 mL from hydromorphone 2 mg/mL ampoules) to 90 mL NS or D5W to obtain a final concentration of 0.2 mg/mL (200 mcg/mL). Must be administered by an infusion pump.
- IM (not preferred due to variable absorption).
- SC (preferred). Using a 30 gauge needle will cause less discomfort.
- SC infusion: can be diluted with SWFI, NS or D5W.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis (extremely rare); pseudoallergic reactions due to histamine release: sweating, flushing, pruritus, urticaria, rash.
- Cardiovascular: bradycardia, palpitations, tachycardia; circulatory depression, including hypotension (increased incidence with rapid IV injection).
- GI: dry mouth, constipation, nausea, vomiting.
- CNS: dizziness, sedation, lightheadedness, seizures (at high doses).
- Respiratory depression with rapid IV administration (Antidote: naloxone).
- Local reactions: pain at injection site (SC and IM); wheal/flare over vein (IV).

**DOSAGE**
- Opioid-naïve patients: SC/IM: 0.5-1 mg q4h prn; IV: 0.25-0.5 mg q1h prn. Titrate as required.
- These initial doses are for the average, healthy patient. Elderly patients and those with reduced renal or hepatic function may require lower doses while opioid experienced patients may need higher doses.
- For IV infusion initiate with 200 mcg/hr (0.2 mg/hr) and titrate as required. Usual dosage range: 500-3000 mcg/hr (0.5-3 mg/hr).
- Analgesia in palliative care and cancer patients: usual dosage range can be exceeded and is titrated to effect.
- Pediatrics: infants older than 6 months weighing more than 10 kg and children weighing less than 50 kg: initial dose of 0.01 to 0.015 mg/kg/dose IV q3-6h prn OR 0.003 to 0.005 mg/kg/hr as continuous IV infusion (maximum rate of 0.2 mg/hr).

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and ampoules at room temp, not in the fridge due to possible precipitation or crystallization. Protect from light.
- Stable for 42 days at room temp or in the fridge in NS or D5W at concentrations of 1 and 5 mg/mL in PVC containers.
- Stable for 60 days at 23°C exposed to light and refrigerated protected from light in NS at concentrations of 1.5 mg and 80 mg/mL in polypropylene syringes.
- Stable for 30 days at 30°C either undiluted at 10 mg/mL or diluted in NS to 0.1 mg/mL in polypropylene syringes.
- A slight yellowish discoloration has not been associated with loss of potency.
- Compatible with NS, D5W, D5-NS, D5-1/2NS, 1/2NS, Ringer’s, RL.
**MISCELLANEOUS**

- Hydromorphone is 5-7 times more potent than morphine on a mg to mg basis.
- Use with caution in patients with respiratory insufficiency.

**REFERENCES**

1, 2, 4, 5, 40, 82, 95, 135, 143, 170, 253.
INDICATIONS
- For the treatment of known or suspected cyanide poisoning.

ADMINISTRATION
- Reconstitute each 5 g vial with 200 mL NS (preferred; may use D5W or RL if NS not available), using the supplied transfer device. Rock or invert the vial for at least 60 seconds to dissolve. Do NOT shake. Reconstituted solution is dark red, at a concentration of 25 mg/mL. Use the supplied IV tubing with filter for infusion. Refer to manufacturer’s guide provided in the kit.
- Intermittent IV infusion: infuse first dose over 15 minutes; if a second dose is needed, infuse it over 15 minutes (for extremely unstable patients) to 2 hours based on patient’s condition.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, chest tightness, dyspnea, edema, pruritus, urticaria and rash.
- Cardiovascular: transient hypertension, chest discomfort.
- GI: nausea, abdominal discomfort.
- CNS: headache, dizziness.
- Dermatologic: reversible red colouration of the skin and mucous membranes that may last up to 15 days; acne-like rash.
- Hematologic: decreased lymphocyte count.
- Dark red colouration of urine that may last up to 35 days. Eye redness.
- Local reactions at injection site.

DOSEAGE
- Adults: 5 g IV. Repeat the dose if required. Maximum total dose is 10 g.
- Pediatrics (infants and children): 70 mg/kg IV (maximum dose: 5 g). Repeat dose if required. Maximum total dose is 140 mg/kg IV, not to exceed 10 g.
- No dosage adjustment is required in renal or hepatic impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store kit at room temp.
- Reconstituted solution is stable 6 hours in the fridge and at room temp, not to exceed 40°C. Do not freeze.
- Not compatible through Y-site with sodium thiosulfate, sodium nitrite and vitamin C.

MISCELLANEOUS
- The deep red colour of hydroxocobalamin interferes with many clinical laboratory tests and possibly with the function of hemodialysis machines; refer to manufacturer’s literature.
- Advise patients to avoid direct sun while their skin remains discoloured.
- 5 g of hydroxocobalamin neutralizes approximately 40 mcmol/L (1.04 mg/L) of cyanide in the blood.

REFERENCES
1, 5, 40, 270.
INDICATIONS

- Treatment of hypovolemia when plasma volume expansion is required.
- NOT a substitute for red blood cells or coagulation factors in plasma.

ADMINISTRATION

- Continuous IV infusion: rate of infusion depends on the clinical situation and the individual patient. The initial 10 to 20 mL is to be infused slowly, keeping the patient under close observation (due to possible anaphylactic/anaphylactoid reactions).

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylactic/anaphylactoid reactions (mild influenza-like symptoms, bradycardia, tachycardia, bronchospasm, non-cardiac pulmonary edema). If these reactions occur, discontinue administration immediately and initiate proper treatment and supportive measures.
- Increase in serum amylase (can interfere with the diagnosis of pancreatitis).
- Pruritus: more common with prolonged use of high doses; may be delayed in onset (typically 1 to 6 weeks after exposure). Generally unresponsive to treatment.
- Hematologic: at high doses, dilution of blood components (coagulation factors, plasma proteins, hematocrit), rare coagulation disorders.
- Overloading of the circulatory system (e.g., pulmonary edema).
- Renal toxicity, liver failure and increased mortality (in septic patients) in critically ill patients.

DOSAGE

- Total volume to give depends on the clinical situation and the individual patient, with a maximum of 50 mL/kg/day IV.
- Can be administered repetitively over several days, depending on clinical status of the patient.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Do not freeze.
- Use immediately after removing the overwrap.
- Compatible with NS, D5W and RL.

MISCELLANEOUS

- Monitor liver function during treatment.
- Available as a 6% solution in NS (Voluven®: Na: 154 mmol/L, Cl: 154 mmol/L. Osmolarity: 308 mosmol/L) or in an isotonic electrolyte solution (Volulyte®: Na: 137 mmol/L, K: 4 mmol/L, Mg: 1.5 mmol/L, Cl: 110 mmol/L, acetate: 34 mmol/L. Osmolarity: 286.5 mosmol/L).
- Note that in critically ill patients, use of crystalloid solution is favored over hydroxyethyl starch.
- Contraindicated in the following situations: patients with fluid overload (e.g., pulmonary edema, CHF), renal failure with oliguria or anuria not related to hypovolemia, sepsis, severe liver disease, patients on dialysis, severe hypernatremia or hyperchloremia, severe hyperkalemia (for Volulyte® only), intracranial bleeding, pre-existing coagulation or bleeding disorder, known hypersensitivity to hydroxyethyl starch.
- Has a volume effect of approximately 100% (of the infused volume) with at least 6 hour duration of effect.

REFERENCES

5, 95, 206, 269, 309.
INDICATIONS
- Treatment of anxiety in the acutely disturbed or hysterical patient.
- Treatment of the acute or chronic alcoholic with anxiety, withdrawal symptoms or delirium tremens.
- As pre- and postoperative, pre- and post-partum adjunctive medication to allay anxiety, to permit reduction in opioid dosage and to control emesis.
- Treatment of nausea and vomiting in the palliative patient.

ADMINISTRATION
- IM: deep into large muscle, preferably into the gluteus muscle in adults, or the midlateral muscles of the thigh in adults and children. Use in the deltoid area only if well developed.
- SC (palliative care).

POTENTIAL ADMINISTRATION HAZARDS
- GI: dryness of the mouth.
- CNS: drowsiness, confusion.
- Local reactions: marked discomfort, sterile abscess, erythema, irritation, tissue necrosis at IM injection site. Marked induration, necrosis, sloughing, swelling, petechial hemorrhage and abscess with SC administration.

DOSAGE
Adults:
- Psychiatric and emotional emergencies including acute alcohol withdrawal: 50-100 mg IM initially, repeated q4-6h prn.
- Nausea, vomiting, pre- and post-partum and pre- and postoperative adjunctive medication: 25-100 mg IM.
- Antiemetic in palliative patients: 10-50 mg IM or SC q6-8h.

Pediatrics:
- Anxiety: 0.5-1 mg/kg IM q4-6h prn. Maximum 100 mg/dose.
- Nausea, vomiting, pre- and postoperative adjunctive medication: 1.1 mg/kg IM. Maximum 100 mg/dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp and protect from light. Do not freeze.

MISCELLANEOUS

REFERENCES
1, 2, 4, 5, 82, 95, 135, 457.
Do NOT confuse hyoscine butylbromide with hyoscine hydrobromide (scopolamine hydrobromide). This monograph is specific to hyoscine BUTYLBROMIDE.

INDICATIONS
- For the relief of acute smooth muscle spasm and pain in gastrointestinal and genitourinary disorders in acutely ill patients.
- To prevent spasm with certain diagnostic procedures.
- To reduce respiratory and gastrointestinal secretions in palliative care patients.

ADMINISTRATION
- IV direct: physician or RN; administer undiluted at a rate of 20 mg/min.
- IM.
- SC, SC infusion (palliative care). For SC infusion, can dilute with SWFI, NS or D5W.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis/anaphylactoid reaction (rare), urticaria, rash, pruritus, angioedema.
- Cardiovascular: tachycardia, hypotension, flushing.
- GI: constipation, nausea, dry mouth.
- CNS: dizziness.
- Ophthalmic: increased intraocular pressure, mydriasis.
- Renal: urinary retention.
- Respiratory: shortness of breath.

DOSAGE
- Treatment of acute spasm: 10-20 mg IM, SC or IV per dose. Maximum of 100 mg/day.
- Prevention of spasm: 10-20 mg IM, 10 to 15 minutes before the diagnostic procedure.
- To reduce respiratory secretions: 20 mg SC every hour prn OR 20 mg SC stat then 20-120 mg/24 hours as a continuous SC infusion.
- To reduce GI secretions in inoperable intestinal obstruction with colic: 20 mg SC every hour prn OR 20 mg SC stat, then 60-300 mg/24 hours as a continuous SC infusion.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and ampoules between 15 and 30°C. Protect from light and heat. Do not freeze.
- Stable for 8 hours in NS, D5W, D10W, RL, Ringer's.

MISCELLANEOUS
- Contraindicated in patient with untreated narrow angle glaucoma, benign prostatic hypertrophy with urinary retention, megacolon, GI stenotic lesions, myasthenia gravis, tachycardia, angina and cardiac failure.

REFERENCES
5, 6, 135, 256, 457.
**INDICATIONS**
- Reduction of fever in adults.
- Management of moderate to severe pain in adults, as an adjunct to intravenous opioids.

**ADMINISTRATION**
- Intermittent IV infusion: dilute dose in 50 to 250 mL of D5W, NS or RL to obtain a final concentration of 4 mg/mL or less (i.e., an 800 mg dose requires at least 200 mL; a 400 mg dose, 100 mL; a 200 mg dose, 50 mL). Administer over 30 minutes.
- Ensure adequate hydration before administration to reduce risk of adverse effect on renal function.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylactic/anaphylactoid reactions; angioedema.
- Cardiovascular: fluid retention leading to hypertension and CHF; hypotension.
- GI: nausea, vomiting, flatulence, diarrhea, abdominal discomfort or pain, dyspepsia, GI ulceration and bleeding.
- CNS: dizziness, headache.
- Hematologic: prolonged bleeding time, anemia, neutropenia; hemolysis if administered undiluted.
- Urinary retention, renal failure.
- Hypernatremia, hyperkalemia, hypoproteinemia, increased urea.
- Dermatologic: serious skin reactions such as exfoliative dermatitis, Stevens-Johnson syndrome, toxic epidermal necrolysis.

**DOSAGE**
- Fever: 200-400 mg IV q4-6h prn.
- Pain: 400-800 mg IV q6h prn.
- Maximum 3200 mg/24 hours.
- Dosage in renal or hepatic impairment: not to use if moderate to severe impairment.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp.
- Stable for 24 hours at room temp, exposed to light, at a concentration of 4 mg/mL or less.
- Compatible with D5W, NS and RL.

**MISCELLANEOUS**
- Do not administer to patients with ASA intolerance (i.e., nasal polyps/rhinosinusitis, urticaria/angioedema or asthma after taking ASA or other NSAIDs) as cross-hypersensitivity has been reported.
- Do not administer for perioperative pain in patients undergoing coronary artery bypass graft surgery.

**REFERENCES**
1, 2, 5, 6, 40, 208.
INDICATIONS
- Treatment of hemodynamically significant patent ductus arteriosus in preterm infants less than 34 weeks gestational age when usual treatments are ineffective.

ADMINISTRATION
- Intermittent IV infusion: undiluted (preferred) or diluted in NS or D5W to a convenient volume; infuse over 15 minutes.
- Before and after administration, flush infusion line over 15 minutes with 1.5 to 2 mL of NS or D5W to avoid contact with any acidic solution.

POTENTIAL ADMINISTRATION HAZARDS
- GI: necrotizing enterocolitis, intestinal perforation.
- CNS: intraventricular hemorrhage, periventricular leukomalacia.
- Hematologic: thrombocytopenia, neutropenia.
- Respiratory: bronchopulmonary dysplasia, pulmonary hemorrhage.
- Renal: oliguria, fluid retention, hematuria, serum creatinine increase.
- May displace bilirubin from its binding site to albumin and cause bilirubin encephalopathy.

DOSAGE
- A course of therapy is defined as 3 IV doses given at 24 hour intervals: 1st dose: 10 mg/kg; 2nd and 3rd doses: 5 mg/kg.
- If the ductus arteriosus does not close 48 hours after the last injection or if it reopens, a second course of 3 doses may be given.
- Dose to be held until urine output returns to normal levels if anuria or manifest oliguria occurs after administration of 1st or 2nd dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Compatible with NS and D5W.

MISCELLANEOUS
- As ibuprofen may inhibit platelet aggregation, monitor premature neonates for signs of bleeding.

REFERENCES
88. * Available via Health Canada’s Special Access Programme

Full revision 2015; limited revision 2019
INDICATIONS
- To close a clinically significant patent ductus arteriosus in preterm infants weighing between 500 and 1500 g who are no more than 32 weeks of gestational age when usual treatments are ineffective.

ADMINISTRATION
- Intermittent IV infusion: dilute in D5W or NS to a convenient volume; infuse over 15 minutes via the closest port to insertion site.
- Administration via an umbilical arterial line has not been studied.
- Should not be administered simultaneously in the same IV line with total parenteral nutrition (TPN); if needed, stop TPN for 15 minutes before and after ibuprofen lysine administration, keeping line open with dextrose or saline.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: edema.
- GI: enterocolitis (with/without necrosis), GI perforation.
- CNS: intraventricular hemorrhage.
- Endocrine and metabolic: adrenal insufficiency, hypoglycemia, hypocalcemia, hypernatremia.
- Hematologic: anemia.
- Renal: oliguria, uremia, serum creatinine increase, hematuria, renal failure, urinary tract infection.
- Respiratory: apnea, respiratory infection, respiratory failure, atelectasis.
- Sepsis.
- Local reactions: irritating to tissue; avoid extravasation.

DOSAGE
- A course of therapy is defined as 3 IV doses given each at 24 hour intervals: 1st dose: 10 mg/kg; 2nd and 3rd doses: 5 mg/kg. Use birth weight for dosing.
- If the ductus arteriosus does not close or reopens, a second course may be given.
- Dosage in renal impairment: dose to be held at any time if urine output is less than 0.6 mL/kg/hr; resume course when renal function is back to normal.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Use diluted solution within 30 minutes of its preparation.
- Compatible with D5W and NS.
- Not compatible with TPN.

MISCELLANEOUS
- As ibuprofen may inhibit platelet aggregation, monitor premature neonates for signs of bleeding.
- Use with caution in neonates with elevated total bilirubin as ibuprofen lysine displaces bilirubin from albumin-binding sites.

REFERENCES
1, 5, 40, 82, 135.

* Available via Health Canada’s Special Access Programme

New monograph 2016; limited revision 2019
INDICATIONS

- Rapid conversion of recent onset atrial fibrillation or atrial flutter to sinus rhythm, as an alternative to electric cardioversion.

ADMINISTRATION

- IV direct: physician only; **cardiac monitoring**; undiluted; administer over 10 minutes.
- Intermittent IV infusion: physician only; **cardiac monitoring**; dilute dose in 50 mL of NS or D5W and infuse over 10 minutes.
- **Cardiac monitoring** required for at least 4 hours following administration or until QTc has returned to baseline. Longer period of monitoring required if arrhythmia develops or in patients with liver dysfunction.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: arrhythmias can occur up to 3 hours post infusion. Infusion should be stopped immediately if new arrhythmia develops, if original arrhythmia worsens or if sustained or nonsustained ventricular tachycardia or marked prolongation of QT or QTc occurs.
- GI: nausea.
- CNS: headache.

DOSAGE

- Adults: greater or equal to 60 kg: 1 mg
  - less than 60 kg: 0.01 mg/kg
- Post-cardiac surgery patients: greater or equal to 60 kg: 0.5 mg
  - less than 60 kg: 0.005 mg/kg.
- Infusion should be stopped as soon as arrhythmia is terminated.
- If the arrhythmia does not terminate within 10 minutes after the end of the initial infusion, dose may be repeated.
- It is not recommended to give more than 2 doses due to risk of adverse events associated with QT interval prolongation.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Stable for 24 hours at room temp and 48 hours in the fridge when mixed in NS or D5W.

MISCELLANEOUS

- Not recommended for patients with QTc longer than 440 msec.
- Hypokalemia and hypomagnesemia should be corrected before treatment to reduce the potential for proarrhythmia.
- Patients with bradycardia, CHF or low ejection fraction have increased risk of developing arrhythmias with ibutilide.
- Patients with atrial arrhythmias of longer duration are less likely to respond to ibutilide.
- Patients with atrial fibrillation of more than 2-3 days must be anticoagulated for at least 2 weeks before ibutilide is given.

REFERENCES

1, 2, 40, 95, 208.
ICATIBANT

Firazyr ®

Anti-angioedema agent

INDICATIONS

- Treatment of acute attacks of hereditary angioedema in adults with C-1 esterase inhibitor deficiency.

ADMINISTRATION

- SC: attach the provided 25 gauge needle to the syringe hub and screw on securely. Do not use a different needle. Inject SC over at least 30 seconds in the abdominal area, 2 to 4 inches below navel, and at least 2 inches away from any scar or area that is bruised, swollen or painful.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus.
- GI: nausea.
- CNS: headache, dizziness.
- Hepatic: increase of transaminases (AST and ALT).
- Fever, fatigue.
- Local reactions: hematoma, irritation, hypoesthesia, erythema, swelling, warm sensation, burning, itching, pain.

DOSAGE

- 30 mg SC; repeat dose in no less than 6 hours if response not complete or symptoms recur. Maximum of 90 mg (3 injections) per 24-hour period. Safety of more than 8 injections per month has not been studied.
- Dosage in renal impairment: no dosage adjustment necessary
- Dosage in liver impairment: no dosage adjustment necessary.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled syringes between 2-25°C; do not freeze.

MISCELLANEOUS

- Caution when administering to patients on an angiotensin-converting enzyme (ACE) inhibitor as icatibant may decrease its hypotensive activity.
- Do not use if patient has only pre-attack symptoms (paresthesia, or erythema).

REFERENCES

1, 5, 95, 135.

New monograph 2016
**INDICATIONS**
- Treatment of acute non-lymphocytic leukemia (ANLL) in adults (front line or refractory/relapsed disease).
- Treatment of acute lymphocytic leukemia (ALL) in adults and children (second line).

**ADMINISTRATION**
- IV direct: physician or RN; undiluted; inject over 5-10 minutes into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; infuse over 10-15 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis.
- Cardiovascular: transient arrhythmias (rare); facial flushing with rapid injection.
- GI: nausea and vomiting.
- Radiation recall reaction (rare).
- Hyperuricemia.
- Red discoloration of urine for 1-2 days.
- Local reaction: chemical phlebitis at injection site; local erythematous streaking along the vein with rapid injection.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSEAGE**
- **Adults**: ANLL: used in combination: 12 mg/m² IV daily for 3 days.
  - used alone: 8 mg/m² IV daily for 5 days.
  - ALL: used alone: 12 mg/m² IV daily for 3 days.
- **Pediatrics**: ALL: used alone: 8-10 mg/m² IV daily for 3 days.
- **Dosage in renal impairment**: CrCl 10-50 mL/min: 75% of the dose
  - CrCl less than 10 mL/min: 50% of the dose
- **Dosage in hepatic impairment**: if bilirubin of 40-85 mcmol/L, give 50% of the dose. If bilirubin greater than 85 mcmol/L, omit dose.
- Dose may be reduced in the presence of other toxicities.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C and protect from light.
- Compatible with NS, dextrose, dextrose-saline, and RL.
- Stable for 4 weeks at room temp if kept in the dark in NS or D5W at a concentration of 0.1 mg/mL.
- Stable for 72 hours at room temp if protected from light and for 6 hours at room temp when exposed to light in NS or D5W at a concentration of 0.01 mg/mL.
- Prolonged contact with alkaline solutions will result in degradation of the drug.

**REFERENCES**
1, 2, 4, 40, 129, 135, 165.
### INDICATIONS
- For the rapid reversal of the anticoagulant activity of dabigatran when required for an emergency surgery/procedure or for life-threatening or uncontrolled bleeding.
- NOT indicated for the reversal of other anticoagulants.

### ADMINISTRATION
- **IV direct:** physician or RN; administer each dose of 2.5 g (50 mL) one after the other, as a bolus drawn up in a syringe, for a total of 5 g (100 mL).
- **IV intermittent infusion:** infuse undiluted each 2.5 g dose (50 mL) over 5-10 minutes for a total of 5 g (100 mL). May infuse directly from the vial. Infuse the second vial within 15 minutes of the end of the infusion of the first vial.
- Flush IV line with NS before and after administration; do NOT mix with other drugs or solutions or run any infusions via the same IV line.
- Once solution is withdrawn from the vial, administration should begin within 60 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, hyperventilation, bronchospasm, anaphylaxis.
- GI: constipation.
- CNS: delirium, headache.
- Respiratory: pneumonia.
- Hypokalemia.
- Fever.

### DOSAGE
- 5 g (2 X 2.5 g vials).
- Repeat dose only in exceptional circumstances such as 1) recurrence of clinically significant bleeding with a prolonged clotting time; 2) if patient requires a second emergency procedure/surgery and has a prolonged clotting time.
- Dosage in renal impairment: no dosage adjustment necessary.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge; do not freeze or expose vials to direct heat. Do not shake. Protect from light.
- Unopened vials are stable for 48 hours at room temp if protected from light and for 6 hours if exposed to light.
- Opened vials can be kept for up to 1 hour between 15-25°C if away from direct heat and light and temperature does not exceed 25°C.

### MISCELLANEOUS
- If patient is clinically stable and adequate hemostasis has been achieved, dabigatran may be restarted 24 hours after idarucizumab administration, and other antithrombotic drugs (e.g. low-molecular weight heparins) can be started any time after idarucizumab.
- Caution in patients with hereditary fructose intolerance as idarucizumab contains sorbitol.
- The affinity of idarucizumab for dabigatran is approximately 350 times that of dabigatran for thrombin.

### REFERENCES
5,135, 379.
**INDICATIONS**
- Treatment of soft tissue sarcoma, pancreatic carcinoma, cervical carcinoma, and other neoplasms.

**ADMINISTRATION**
- Reconstitute 1 and 3 g vials with 20 and 60 mL of SWFI, respectively, to obtain a solution containing 50 mg/mL. Shake well until dissolved.
- Intermittent IV infusion: dilute to 0.6 to 20 mg/mL with D5W, NS or RL; infuse over 30 minutes to 4 hours.
- Continuous IV infusion: dilute to 0.6 to 20 mg/mL with D5W, NS or RL; infuse continuously over 24 hours or longer.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare; anaphylactoid reactions.
- GI: nausea and vomiting.
- CNS: encephalopathy (confusion, hallucinations, somnolence, dizziness, disorientation, agitation, seizures, coma).
- Syndrome of inappropriate antidiuretic hormone (SIADH).
- Renal: hemorrhagic cystitis, hematuria, dysuria, urinary frequency.
- Local reactions: chemical phlebitis.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- Usual: 50-60 mg/kg or 2-2.4 g/m² IV once daily for 5 consecutive doses OR 5-8 g/m² by continuous IV infusion over 24 hours, repeated every 3-4 weeks.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 60
    - Dose: 100%
  - 60-40
    - Dose: 75%
  - 40-20
    - Dose: 50%
  - less than 20%
    - Dose: discontinue
- Dosage in hepatic impairment:
  - Bilirubin: 1-2 x ULN
    - Dose: 100%
  - 2-4 x ULN
    - Dose: 75%
  - greater than 4 x ULN
    - Dose: discontinue
  - AST/ALT: less than 2 x ULN
    - Dose: 100%
  - 2-5 x ULN
    - Dose: 75%
  - greater than 5 x ULN
    - Dose: discontinu
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from heat.
- Reconstituted solution is stable for 7 days at room temp and 3-6 weeks under refrigeration.
- Stable for 7 days at room temp or 6 weeks in the fridge in D5W, NS or RL at concentrations of 0.6-20 mg/mL in glass, PVC and polyolefin containers.
- Stable for 24 hours at room temp in D5W, NS or RL at concentrations of 0.6 and 20 mg/mL in polypropylene syringes.
- Compatible with mesna.

**MISCELLANEOUS**
- Patient should receive adequate hydration prior to and during ifosfamide infusion (2 litres of oral or IV fluid per day).
- Concomitant mesna therapy is mandatory to prevent ifosfamide-induced hemorrhagic cystitis.
- Morning urinalysis for red blood cells is recommended before each dose of ifosfamide.

**REFERENCES**
1, 4, 5, 6, 40, 129, 165.
INDICATIONS

- Long term enzyme replacement therapy for patients with non-neuronopathic (Type I) or chronic neuronopathic (Type 3) Gaucher disease who exhibit non-neurological manifestations of the disease.

ADMINISTRATION

- For IV use: allow vials to reach room temp. Reconstitute 200 and 400 unit vials with 5.1 and 10.2 mL of SWFI, respectively, to give a concentration of 40 units/mL. Avoid excessive agitation during reconstitution. Allow several minutes for all bubbles to dissipate and drug to completely dissolve.
- Intermittent IV infusion: dilute dose with NS to a final volume of 100-200 mL and administer through a low-protein binding 0.2 micron in-line filter over 1-2 hours; maximum infusion rate of 1 unit/kg/min.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, urticaria, flushing, angioedema and anaphylactoid reactions. Using caution, reducing the rate of administration and pretreating with antihistamines and/or corticosteroids have allowed some hypersensitive patients to continue treatment.
- Cardiovascular: hypotension, tachycardia.
- GI: abdominal discomfort, nausea, vomiting, diarrhea.
- CNS: dizziness, headache, fever.
- Respiratory: dyspnea, cough.
- Local reactions: burning, swelling or sterile abscess at injection site.

DOSAGE

- Initial adult range: 2.5 units/kg IV three times per week up to 60 units/kg IV once every two weeks.
- Dose is individualized based on disease severity and patient’s response; dosages up to 240 units/kg IV once every 2 weeks have been administered.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge, although they are stable at room temp for 48 hours.
- Reconstituted vial is stable for 12 hours at room temp or in the fridge.
- Diluted solution in NS is stable for 24 hours in the fridge or at room temp.

REFERENCES

1, 5, 40, 95, 135.
IMIPENEM

Indications
- Moderate to severe infections due to susceptible organisms. Imipenem is effective against the majority of gram-positive and gram-negative aerobes and anaerobes.

Administration
- For IV use: reconstitute vial contents with 10 mL of selected solution for dilution (see Compatibility, Stability section), shake well and add to 90 mL of solution for infusion. Repeat this procedure using 10 mL of the diluted solution to ensure complete transfer of vial contents. Shake solution for infusion and let stand until clear.
- Intermittent IV infusion: dilute 250-500 mg doses with at least 100 mL and infuse over 20-30 minutes. Dilute doses of 750 mg and 1 g with at least 200 mL and infuse over 40-60 minutes. Do not exceed a maximum concentration of 5 mg/mL.

Potential Administration Hazards
- Hypersensitivity: rash, fever, pruritus and urticaria.
- GI: nausea, vomiting, diarrhea. Decrease the infusion rate if nausea and/or vomiting occur during administration.
- CNS: seizures have been reported in predisposed patients (e.g., renal failure, prior history of seizures). It is VERY important to adjust dose in patients with renal impairment.
- Local reactions: phlebitis/thrombophlebitis, infused vein pain, erythema, vein induration.

DOSAGE
- 250-1000 mg IV q6-8h depending on severity of infection. Maximum daily dose: 4 g or 50 mg/kg (whichever is less).
- Dosage in renal impairment:
  CrCl (mL/min)  70-31  30-21  20-0
  Dose (mg)     500   500   250-500
  Interval (hr)  6-8   8-12  12 *
  * dose is to be given after hemodialysis
- Reduce dose for patients less than 70 kg.
- Pediatrics: 3 months of age and older: 60-100 mg/kg/day IV divided into four equal doses (e.g., q6h). Maximum daily dose of 4 g.

Compatibility, Stability
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted solutions are stable for 4 hours at room temp and 24 hours at 5°C in the following diluents: D5W, D10W, dextrose-saline solutions, NS.
- Stable for 24 hours at room temp or in the fridge in NS or D5W at a concentration of 2.5 mg/mL in PVC, polyethylene or glass containers.
- Solutions of imipenem may range from clear to yellow. The potency is not affected by a yellow discolouration. Solutions should be discarded if they darken to brown.

Miscellaneous
- Each 500 mg vial of Primaxin ® contains 500 mg of imipenem and 500 mg of cilastatin; the latter prevents metabolism of imipenem in the kidney.
- Potential for cross-allergenicity with other beta-lactams antibiotics.
- Sodium content: 3.2 mmol/g.

References
1, 2, 4, 40, 41, 82.

Full revision 2015
IMMUNE GLOBULIN, HUMAN (INTRAVENOUS)

**INDICATIONS**
- Treatment of primary immune deficiency syndromes.
- May also be used as replacement therapy in patients with secondary immune deficiency syndromes (e.g., B-cell chronic lymphocytic leukemia, HIV) for prophylaxis of infections and in combination with antibiotics in severe infections.
- Treatment of immune thrombocytopenic purpura (ITP).
- Kawasaki syndrome; Guillain-Barré syndrome (GBS); chronic inflammatory demyelinating polyneuropathy (CIDP).
- To decrease the risk of infections and acute graft-versus-host disease following allogeneic bone marrow transplantation (BMT).

**ADMINISTRATION**
- For Gammagard S/D ®: reconstitute with SWFI (provided) as per manufacturer’s recommendations. Other preparations are ready-to-use solutions.
- Intermittent IV infusion: for Gammagard S/D ®: use provided vented infusion set that contains a 15 micron filter.
- Must be administered by an infusion pump.

<table>
<thead>
<tr>
<th>Product</th>
<th>Gammagard S/D 5%</th>
<th>Gammagard S/D 10%, Gammagard Liquid</th>
<th>Gamunex, IGIVnex</th>
<th>Panzyga</th>
<th>Privigen</th>
<th>Octagam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial rate for the first 30 minutes: (mL/kg/hr)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.6-1.2</td>
<td>0.6</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Maximum rate: (mL/kg/hr)</td>
<td>4</td>
<td>8</td>
<td>8.4 (4.8 for 1st dose)</td>
<td>4.8* or 8.4</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Maximum rate if risk of renal failure: (mL/kg/hr)</td>
<td>4</td>
<td>2</td>
<td>4.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* for 1st dose, if last dose was greater than 8 weeks ago, or for all ITP patients.

- Unless otherwise ordered, the following simplified infusion schedule can be used for all preparations:
  - 30 mL/hr for 30 minutes
  - 60 mL/hr for 15 minutes
  - 100 mL/hr for 15 minutes (remain at that rate until the end if patient is at risk of renal failure)
  - 200 mL/hr for 15 minutes (remain at that rate until the end if first dose of IVIG or for any dose of Gammagard S/D 5% or for all ITP patients receiving Panzyga)
  - 400 mL/hr for the remainder of the infusion when using IVIG preparations in other cases if the following criteria are met:
    - patient weighs at least 50 kg
    - first dose was well tolerated at a rate of 200 mL/hr
    - patient is not at risk of renal failure
- Obtain vital signs pre-infusion, at 15 minutes after the start of infusion, prior to each infusion rate increase, then hourly until completion once the maximum rate is reached and after completion of the infusion.
- Higher infusion rates are possible based on patient’s weight; refer to table to calculate patient specific rate.
- Lower infusion rate may be necessary based on patient tolerance.
- At TOH, there is no need to restart infusion at initial rate or initial vital signs monitoring when multiple bags/vials are used during the same administration session, assuming all vials/bags have the same lot number; however, in case of different lot numbers, the vital signs monitoring protocol needs to be restarted but the infusion can be continued at the same rate.
- Above infusion rate protocol to be followed each time with subsequent doses on different days.
- Consult TOH Nursing policy 00045 (Blood and blood products – Administration of) for more information.
IMMUNE GLOBULIN, HUMAN (INTRAVENOUS)

OTHER NAMES
- Gammagard liquid, Gammagard S/D®, Gamunex®, IgIVnex®, Octagam®, Panzyga®, Privigen®

CLASSIFICATION
- Passive immunizing agent

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, anaphylactoid reactions.
- Infusion-related reactions: fever, chills, flushing of the face, chest tightness, dizziness, nausea, vomiting, diaphoresis, hypotension/hypertension and acute lung injury (rare). These reactions generally occur 30 to 60 minutes after the start of the infusion. They are usually related to the rate of the infusion; therefore slowing or temporarily stopping the infusion may alleviate these reactions.
- CNS: headache, aseptic meningitis (rare).
- Hematologic: hemolysis, hemolytic anemia. Thrombotic effects: chest pain, myocardial infarction, CHF, cerebral infarct, ischemic encephalopathy, pulmonary embolism, peripheral deep vein thrombosis, retinal vein thrombosis.
- Renal: acute renal failure, osmotic nephrosis.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.

DOSAGE
- Dosing may vary based on specific product, therefore, it is best to consult manufacturer’s information for dosing recommendations.
- Primary and secondary immune deficiency syndromes: range of 100-800 mg/kg IV every 3-4 weeks. B-cell chronic lymphocytic leukemia: 400 mg/kg IV every 3-4 weeks. Pediatric HIV infection: 400 mg/kg IV every 4 weeks.
- ITP (induction): 1000 mg/kg/day IV for 1-2 days OR 400 mg/kg/day IV for 5 days.
  ITP (maintenance): 400-1000 mg/kg IV as a single infusion as needed.
- Kawasaki syndrome: 2 g/kg IV as a single dose; if no response may administer second dose.
- GBS: total dose of 2 g/kg IV given in divided doses over 2-5 days.
- CIDP: initial: total dose of 2 g/kg IV given in divided doses over 2-4 days. Maintenance: 1 g/kg IV every 3 weeks or 0.5 g/kg IV on 2 consecutive days every 3 weeks.
- BMT: 500 mg/kg IV on days -7 and -2 pre-transplant, then weekly through day 90 post-transplant.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Gamunex®: store in the fridge; however, it is stable for 6 months at room temp not exceeding 25°C. Can be diluted with D5W but not with NS. May use D5W or NS for flushing IV line.
- Gammagard S/D®: store unopened bottles at room temp not exceeding 25°C. Solution is stable for 24 hours in the fridge, or for 12 hours at room temp, or for 12 hours at room temp followed by 12 hours in the fridge when reconstituted with SWFI and stored in original glass bottles or transferred in a PVC bag.
- Privigen®: store at room temp or in the fridge. Keep in its original carton to protect from light. Can be diluted with D5W. Line can be flushed with D5W or NS. Discard partially used product after 24 hours.
- Octagam® and Panzyga®: store in the fridge; however, it is stable for 9 months at temperatures not exceeding 25°C.
- IGIVnex®: store in the fridge; however, it is stable for 6 months at temperature not exceeding 25°C. Can be diluted with D5W but not NS. May use D5W or NS for flushing the line.

MISCELLANEOUS
- Epinephrine must be available in case of acute hypersensitivity reaction.
- Avoid use in patients with IgA deficiency as they are more prone to develop anti-IgA antibodies which can lead to severe hypersensitivity reactions.

REFERENCES
1, 2, 4, 5, 40, 82, 95, 171, 192, 258, 259, 544.

Full revision 2015; limited revision 2017, 2019
IMMUNE GLOBULIN, HUMAN (SUBCUTANEOUS)

Hizentra™, SCIG, SC IgG

Passive immunizing agent

Do NOT confuse immune globulin for SC administration with those for IV administration. This monograph is specific to immune globulin for SC administration.

INDICATIONS

- Treatment of primary or secondary immune deficiency.
- Measles prophylaxis in patients with primary humoral immunodeficiency at risk of exposure or exposed to measles.
- Treatment of chronic inflammatory demyelinating polyneuropathy (CIDP) as maintenance therapy to prevent relapse of neuromuscular disability and impairment.

ADMINISTRATION

- SC infusion: abdomen, thigh, upper arm, upper leg or hip. Change sites at each weekly dose. A dose may be infused simultaneously in different sites that are at least 5 cm apart.
- Rate: maximum of 20 mL/hr per site for the first infusion. For subsequent infusions, maximum of 50 mL/hr per site as tolerated.
- Volume: maximum initial volume of 20 mL per site. For subsequent infusions, may increase to a maximum volume of 50 mL per site as tolerated.
- Do NOT shake.
- Refer to manufacturer’s instructions for a more detailed procedure.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, anaphylaxis (rare).
- Cardiovascular: hypotension, shock (rare).
- GI: nausea, diarrhea.
- CNS: headache, aseptic meningitis.
- Hematologic: rare; thrombotic events: deep vein thrombosis, pulmonary embolism, stroke.
- Back pain, pain at extremities.
- Fatigue, fever, chills.
- Cough.
- Risk of transmission of infectious agents, including viruses, and theoretically, the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.
- Local reactions: erythema, induration, local heat, pruritus, pain.

DOSAGE

- Adults and pediatrics (2 y.o. and older):
  - Treatment of immune deficiency: 100-200 mg/kg (0.5-1 mL/kg) SC once weekly. If a loading dose is required, may give 200-500 mg/kg (1-2.5 mL/kg) SC divided over several days. Switching from every 3-4 weeks IV immune globulin (IVIG) therapy: beginning 1 week after the last IVIG dose, give the same dose via the SC route, though divide the dose in equivalent weekly doses.
  - Measles prophylaxis: at least 200 mg/kg SC weekly for 2 consecutive weeks.

- Adults with CIDP: 200-400 mg/kg (1-2 mL/kg) SC once weekly, beginning one week after the last IVIG dose. The calculated weekly dose can be doubled for administration every 2 weeks or can be administered more frequently (2-7 times a week) by dividing the weekly dose by the desired number of times per week.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and prefilled syringes at room temp or in the fridge (range of 2 to 25° C). Protect from light. Do not freeze. Do not shake.
- The solution is clear and pale yellow to light brown.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- Hizentra™ contains L-proline as a stabilizer and is therefore contra-indicated in patients with hyperprolinemia.
- Avoid use in patients with IgA deficiency as they are more prone to develop anti-IgA antibodies which can lead to severe hypersensitivity reactions.

REFERENCES

1, 5, 82, 135.
INDICATIONS

- To localize ureteral orifices during cystoscopy and ureteral catheterization, and as a marker dye to identify severed ureters and fistulous communications.
- Originally used to determine renal function, but has largely been replaced by other agents that yield more precise results.
- Has been used as a marker dye in amniocentesis and for chromoendoscopy of the gastrointestinal tract.

ADMINISTRATION

- IV direct (preferred): physician only. Administer undiluted (dilution may lead to precipitation).
- IM.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, bronchoconstriction.
- Cardiovascular: hypertension, bradycardia.
- GI: nausea, vomiting.
- Skin discoloration following large doses.

DOSAGE

- 5 mL of a 0.8% solution (40 mg).
- Larger doses may be required when used IM.
- Smaller doses may be required in infants, children, and underweight patients to prevent skin discoloration.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Protect from light.

MISCELLANEOUS

REFERENCES

1, 3, 5, 95.

Full revision 2015
**INDICATIONS**
- For determining cardiac output, hepatic function and blood flow, and for ophthalmic fluorescence imaging.

**ADMINISTRATION**
- For IV use: reconstitute only with provided diluent to obtain a final concentration of 5 mg/mL or as required for procedure. The syringe to be used for administration should be rinsed with the provided diluent.
- IV direct: physician or RN.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: urticaria and anaphylactoid reactions; hypotension, bronchospasm, shock – may be related to dose and/or rate of administration.
- Transient elevation in unconjugated bilirubin.

**DOSAGE**
- Cardiac output test: adult: 5 mg; child: 2.5 mg; infant: 1.25 mg. Several doses are required but total dose should not exceed 2 mg/kg.
- Hepatic function test: 0.5 mg/kg (range 0.1-5 mg/kg).
- Ophthalmic fluorescence imaging: up to 40 mg in 2 mL of diluent.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp.
- Reconstituted solution is stable for 6 hours at room temp as per manufacturer’s package insert.

**MISCELLANEOUS**
- Solutions contain a small amount of sodium iodide and should be used with caution in patients sensitive to iodide.

**REFERENCES**
1, 3, 5, 95.

Full revision 2015
INDICATIONS
- To close patent ductus arteriosus in premature infants when usual medical management is ineffective.

ADMINISTRATION
- Reconstitute 1 mg vial with 1 or 2 mL of SWFI or NS without bacteriostatic agent (preserved diluents should not be used), to obtain a solution of 1 mg/mL or 0.5 mg/mL, respectively.
- Intermittent IV infusion: may be further diluted in NS to 0.1 mg/mL; infuse over 20-30 minutes.
- Do NOT administer via an umbilical catheter into vessels near the superior mesenteric artery.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypertension, edema.
- GI: vomiting, melena, transient ileus, necrotizing enterocolitis, gastric perforation.
- Hematologic: bleeding problems, decreased platelet aggregation.
- Renal: transient oliguria, anuria, hypercreatinemia, renal dysfunction.
- Acidosis, alkalosis, hypoglycemia, electrolyte disturbances.
- Local reactions: irritating to extravascular tissues; avoid extravasation.

DOSAGE
- Course of therapy usually consists of 3 doses administered at 12-24 hour intervals, with careful attention to urinary output. In general, may use 12-hour dosing interval if urine output is greater than 1 mL/kg/hr; use 24-hour dosing interval if urine output is less than 1 mL/kg/hr.
- According to age:  

<table>
<thead>
<tr>
<th>Age at 1st dose</th>
<th>dosage mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
</tr>
<tr>
<td>younger than 48 hrs of age</td>
<td>0.2</td>
</tr>
<tr>
<td>2-7 days</td>
<td>0.2</td>
</tr>
<tr>
<td>older than 7 days of age</td>
<td>0.2</td>
</tr>
</tbody>
</table>
- If ductus arteriosus closes or is significantly reduced in size 48 hours or more after completion of the first course, no further doses are necessary.
- If ductus arteriosus re-opens, a second course of 1 to 3 doses may be administered, each dose given at a 12-24 hour interval; use age at 1<sup>st</sup> dose of the first course.
- If anuria or marked oliguria (urine output less than 0.6 mL/kg/hr) is evident at the time of the second or third dose, do not give additional doses until the renal function has returned to normal.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Manufacturer suggests to prepare immediately prior to each administration as solutions are preservative-free.
- Reconstituted solution with SWFI (0.5 mg/mL) is stable for 14 days at room temp or in the fridge in polypropylene syringes.
- Reconstituted solution with SWFI (0.5 mg/mL) is stable for 14 days in the fridge or 12 days at room temp in its original glass vial.
- Reconstituted solution with NS (1 mg/mL) is stable for 16 days at room temp.
- Stable for 10 days at room temp in NS at a concentration of 0.1 mg/mL in glass vials.

MISCELLANEOUS

REFERENCES
1, 5, 40, 82, 89, 208, 319, 513.

* Available via Health Canada’s Special Access Programme.
INDICATIONS
- Moderate to severe Crohn’s disease in adults and children 9 years of age and older, and fistulizing Crohn’s disease in adults.
- Moderately to severely active ulcerative colitis in adults and children 6 years of age and older.
- Moderately to severely active rheumatoid arthritis (in combination with methotrexate).
- Active ankylosing spondylitis.
- Active psoriatic arthritis.
- Moderate to severe plaque psoriasis.

ADMINISTRATION
- Consider administration of premedication prior to each dose. Refer to Dosage section.
- For IV use: reconstitute each 100 mg vial with 10 mL of SWFI (can also use NS or 1/2NS) and allow to stand for 5 minutes. Do NOT shake to avoid excessive foaming. Inspect the reconstituted solution; it should be colourless to light yellow and opalescent; do NOT use if discoloured or opaque.
- Intermittent IV infusion: further dilute the reconstituted solution to 250 mL with NS. The infusion concentration should range between 0.4-4 mg/mL. Administer over at least 2 hours. Exception: for patients with rheumatoid arthritis and who have tolerated 3 initial 2-hour infusions, subsequent infusions may be given over a period of not less than 60 minutes. Safety of shortened infusions at doses greater than 6 mg/kg has not been studied.
- Use a low protein-binding in-line filter of 1.2 microns or less.
- Monitor patient closely (including vital signs) during and for at least for 30 minutes (at TOH, monitor for 60 minutes) after the end of the infusion.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity (during or within 2 hours of infusion): anaphylaxis, rash, hypotension, severe bronchospasm.
- Infusion-related reactions: urticaria, dyspnea, hypotension, hypertension, fever, chills, headache, pruritus, chest pain. Most of the reactions are mild and transient and may resolve with slowing of the infusion rate, discontinuing the infusion or providing treatment (e.g., diphenhydramine). If patient has experienced a previous infusion reaction to infliximab, consult manufacturer’s guidelines for more information.
- Delayed infusion reaction: serum sickness-like reaction, arthralgia, myalgia, fever, rash. Occurs in patients who have developed infliximab-specific antibodies, usually when restarting therapy after an extended period without treatment.
- GI: nausea, diarrhea, abdominal pain, dyspepsia.
- CNS: headache, dizziness.
- Flu-like symptoms.
- Infections: upper respiratory tract infections, urinary tract infections.
- Increase in ALT.

DOSAGE
- Premedication with oral diphenhydramine (25-50 mg) and acetaminophen (650 mg) may be administered prior to infusion to minimize risk of infusion-related reactions. Add oral prednisone 40 mg or IV hydrocortisone 100 mg or IV methylprednisolone 20-40 mg if patient has a history of acute infusion reactions and is not currently receiving steroids.
- Crohn’s disease: in adults and pediatrics: 5 mg/kg IV at weeks 0, 2 and 6, followed by 5 mg/kg every 8 weeks thereafter; dose may be increased in adults only up to 10 mg/kg in patients with an initial response but a subsequent loss of response or with an incomplete response.
- Fistulizing Crohn’s disease: 5 mg/kg IV at weeks 0, 2 and 6, followed by 5 mg/kg every 8 weeks thereafter; dose may be increased up to 10 mg/kg in patients with an initial response but a subsequent loss of response or with an incomplete response.

…/Cont.
DOSAGE (Cont.)

- Ulcerative colitis: in adults and pediatrics: 5 mg/kg IV at weeks 0, 2 and 6, followed by 5 mg/kg every 8 weeks; dose may be increased in adults only to 10 mg/kg to sustain clinical response and remission.
- Rheumatoid arthritis: 3 mg/kg IV at weeks 0, 2 and 6, then repeated every 8 weeks. Dose can increase up to 10 mg/kg as often as every 4 weeks.
- Ankylosing spondylitis: 5 mg/kg IV at weeks 0, 2 and 6, followed by 5 mg/kg every 6-8 weeks.
- Psoriatic arthritis, plaque psoriasis: 5 mg/kg IV at weeks 0, 2 and 6, followed by 5 mg/kg every 8 weeks.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge.
- Reconstituted solution (with SWFI, NS or 1/2NS) is stable for 24 hours at room temp.
- Diluted solution is stable for 24 hours at room temp or in the fridge in NS at concentrations of 0.4 and 4 mg/mL in PVC, ethyl vinyl acetate, polyethylene or polyolefin containers.

MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be kept near the patient when drug is administered.
- Patients should be evaluated for active or latent tuberculosis and for risk factors before starting therapy and periodically during therapy.
- Do not administer live vaccines concurrently with infliximab.
- Inflectra ® and Remsima ™ are classified as being biosimilar to Remicade ®; therefore, these products are not interchangeable.

REFERENCES

1, 2, 5, 40, 135, 143, 351.
INDICATIONS

- Vaccine to provide active immunization against the influenza virus. Recommended in the following groups of patients: adults and children with chronic diseases (cardiac, pulmonary, renal, diabetes, anemia and hemoglobinopathy), cancer, HIV, immunosuppression, conditions treated for long periods with acetylsalicylic acid, nursing home or chronic care facility residents, geriatrics, people capable of transmitting influenza to those at high risk, including health care personnel.

ADMINISTRATION

- Shake well before use (vial and prefilled syringe).
- IM: adults and older children, administer into the deltoid muscle; young children, administer into the anterolateral aspect of thigh.
- Influvac®: IM or deep SC.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rare.
- Fever, malaise, myalgias.
- Neurological disorders (rare).
- Oculorespiratory syndrome (rare).
- Local reactions: erythema, soreness and/or induration at injection site.

DOSAGE

- Administered annually.
- Adult dose: 0.5 mL.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store between 2-8°C; do not freeze.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- This monograph is specific to inactivated influenza virus vaccine.
- Influvac® contraindicated in patients allergic to gentamicin.
- Fluad® and Agriflu® contraindicated in patients allergic to kanamycin or neomycin.
- Vaxigrip® contraindicated in patients allergic to neomycin.
- Patients with a history of allergy to egg or egg products may be vaccinated using the trivalent inactivated vaccine in a setting where vaccines are routinely administered.
- Contains thimerosal as preservative, except for Influvac®, Fluad®, Agriflu®.
- Administration should be delayed, if possible, during an acute febrile illness or active infection of moderate to severe intensity.
- Vaccine can inhibit the clearance of warfarin and theophylline.
- Not for use in infants younger than 6 months.

REFERENCES

1, 2, 31.
INOTUZUMAB OZOGAMICIN
Besponsa™
Antineoplastic, Monoclonal antibody

INDICATIONS
- Treatment of relapsed or refractory CD22-positive B-cell precursor acute lymphocytic leukemia (ALL).

ADMINISTRATION
- **Ensure premedication has been administered prior to each infusion. Refer to Dosage section.**
- This product is light sensitive and should be protected from light at all times by using an ultraviolet protector (amber bag or foil) to cover the IV bag during its preparation and administration. A foil should also cover the syringe barrel if the reconstituted solution is not transferred immediately into the IV bag. The IV line can be exposed to light for approximately 1 hour duration i.e., the time required to administer the drug and flush the line.
- Allow vials to reach room temp before reconstitution. Reconstitute each 0.9 mg vial with 4 mL of SWFI to obtain a solution with a final concentration of 0.25 mg/mL. Gently mix; do NOT shake. Protect the reconstituted solution from light if not used immediately.
- Intermittent IV infusion: method 1: withdraw from a 50 mL PVC, polyolefin or ethinyl vinyl acetate bag containing NS a volume equal to the volume of the reconstituted solution required for the patient’s dose, then add the dose of inotuzumab ozogamicin to the NS bag. Method 2: add the dose of inotuzumab ozogamicin to an empty PVC, polyolefin or ethinyl vinyl acetate bag and then complete with NS to obtain a final volume of 50 mL. With both methods, the final concentration should be between 0.01 and 0.1 mg/mL. Gently mix; do NOT shake. Protect the reconstituted solution from light if not used immediately.
- Observe the patient during and for at least 60 minutes post-infusion for infusion-related reactions.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Infusion-related reactions: fever, chills, hypotension. If an infusion-related reaction occurs, stop the infusion and contact physician for appropriate treatment (e.g., corticosteroids, epinephrine, bronchodilators, oxygen). Depending on the reaction and its severity, could consider starting again the infusion but at a reduced rate.
- Cardiovascular: QTc interval prolongation.
- GI: nausea, vomiting, abdominal pain, constipation, diarrhea, anorexia.
- CNS: headache
- Hematologic: anemia, thrombocytopenia, neutropenia, lymphopenia.
- Hepatic: elevation of liver enzymes and bilirubin, veno-occlusive liver disease, ascites.
- Hyperuricemia, tumour lysis syndrome.
- Respiratory: dyspnea, epistaxis, upper respiratory tract infection, pneumonia.
- Fatigue, asthenia.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**Dosage**
- **Premedication:** methylprednisolone (or another corticosteroid), acetaminophen and diphenhydramine (or another antihistamine), 30 minutes to 2 hours before starting the infusion, especially with first dose.
- For cycle 1 (21 day duration; can extend to 28 days if patient experiences toxicity or achieves a complete response): day 1: 0.8 mg/m² IV; days 8 and 15: 0.5 mg/m² IV.
- For cycle 2 and beyond (28 day duration): day 1: 0.8 mg/m² IV (or 0.5 mg/m² IV if a dose reduction is needed or if patient achieves a complete response); days 8 and 15: 0.5 mg/m² IV.
- Based on toxicity, delay treatment or decrease dose by 25%; do not re-escalate after a dose reduction.
- Dosage in renal impairment: no adjustment required for CrCl of 15 mL/min or greater; no data for CrCl less than 15 mL/min.
- Dosage in hepatic impairment: no adjustment required for bilirubin of 1.5 x ULN or less and AST/ALT of 2.5 x ULN or less; no data for bilirubin greater than 1.5 x ULN and AST/ALT greater than 2.5 x ULN.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light.
- The reconstituted solution is stable for 4 hours in the fridge. Protect from light. Do not freeze.
- If not used immediately, the diluted solution may be stored in the fridge or at room temp. Protect from light. Do not freeze. The maximum time from reconstitution of vials to the end of the infusion should not exceed 8 hours. If the diluted solution is refrigerated, it should be brought to room temp for at least 1 hour before its administration.
- Discoloured solution or solution with particles should not be used.
- Compatible with NS only.

MISCELLANEOUS

REFERENCES

5, 129, 165, 381.
INDICATIONS

- Treatment of diabetes mellitus for patients who require a very short rapid-acting insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION

- Continuous IV infusion: for NovoRapid ®: dilute in a polypropylene bag of NS, D5W or D10W to obtain a final concentration between 0.05-1 unit/mL; for Fiasp ®: dilute in a polypropylene bag of NS or D5W to obtain a final concentration between 0.5-1 unit/mL. Note: insulin aspart has been administered IV in a limited number of patients. However, as it does not offer any clinical advantage over IV regular insulin and experience is limited, prefer regular insulin when this route is required. Insulin is known to bind to IV tubing. Priming IV tubing prior to initiation of the infusion will improve the accuracy of the insulin dose received by the patient during the first hour after initiation of therapy, or after a tubing change. Prior to connecting IV line to the patient, fill the IV line with the prescribed insulin infusion and let it stand 15 minutes. After 15 minutes, open the IV and rapidly flush 20 mL through the line to prime it. If there is no time to let insulin stand in the line, flush line with 20 mL of the insulin infusion over a 1 minute period immediately prior to connecting the tubing to the patient. Must be administered by an infusion pump.
- SC: in the upper arms, thighs, buttocks, or abdomen. Rotate injection site.
- SC infusion: undiluted as a continuous infusion. Rotate infusion site. Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Hypokalemia (especially with IV administration) as insulin shifts potassium into the cells.
- Local reactions: itching, swelling, redness; lipodystrophy (if no rotation of injection sites).

DOSAGE

- Dosage based on glycemia.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store in the fridge. Do not freeze.
- When in use, vials or cartridges may be kept at room temp for up to 28 days. Protect from excessive heat and sunlight.
- NovoRapid ®: stable for 24 hours at room temp in D5W, D10W or NS at concentrations of 0.05-1 unit/mL in polypropylene containers.
- Fiasp ®: stable for 24 hours at room temp in D5W and NS at concentrations of 0.5-1 unit/mL in polypropylene containers.
- Once diluted, an initial loss of insulin aspart occurs due to sorption to the bag; this sorptive loss is variable.

MISCELLANEOUS

- The Fiasp ® formulation contains niacinamide, which accelerates absorption.
- Kinetic profile of insulin aspart administered SC: onset of action: 10-15 minutes for NovoRapid ® and an average of 4 minutes for Fiasp ®; peak of action: 1-1.5 hours for NovoRapid ® and 1-3 hours for Fiasp ®; duration of action: 3-5 hours for both products.

REFERENCES

1, 2, 40, 95, 117, 135, 150.

Full revision 2015; limited revision 2016, 2017
INDICATIONS

- Treatment of type 1 or type 2 diabetes mellitus in patients aged 1 year and older who require a long-acting (basal) insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION

- SC: upper arms, thighs or abdomen. Do NOT use if solution is viscous or cloudy. Rotate injection sites.
- Note: although insulin degludec is a clear insulin, it should NOT be administered IV.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, urticaria, angioedema, anaphylaxis.
- Endocrine and metabolic: hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Monitor blood glucose carefully.
- Local reactions: rare; pain, hematoma, hemorrhage, erythema, nodules, swelling, rash, discolouration, pruritus, warmth sensation; lipodystrophy (if no rotation of injection sites).

 DOSAGE

**Type 1 diabetes mellitus:**
- Insulin-naïve patients (adults and pediatrics): the initial dose of insulin degludec should correspond to 1/3-1/2 of total daily insulin requirement (the remainder of the total daily dose should be administered as a short/rapid acting insulin in divided doses). Administer dose SC once daily; monitor blood glucose closely. Adjust dose based on glycemia.
- Switching from another basal (long- or intermediate-acting) insulin to insulin degludec (adults and pediatrics): the dose of insulin degludec should be 20% lower than that of the total daily dose of the previous basal insulin. Administer insulin degludec SC once daily; monitor blood glucose closely. Adjust dose based on glycemia.

**Type 2 diabetes mellitus:**
- Insulin-naïve patients (adults and pediatrics): initial dose of 10 units SC once daily. Adjust dose based on glycemia.
- Switching from another basal (long- or intermediate-acting) insulin to insulin degludec:
  - From once-daily basal insulin, except insulin glargine 300 units/mL (adults): the dose of insulin degludec should be the same as that of the previous basal insulin. Administer insulin degludec SC once daily; monitor blood glucose closely. Adjust dose based on glycemia.
  - From once-daily basal insulin, except insulin glargine 300 units/mL (pediatrics): the dose of insulin degludec should be 20% lower than that of the total daily dose of the previous basal insulin. Administer insulin degludec SC once daily; monitor blood glucose closely. Adjust dose based on glycemia.
  - From twice-daily basal insulin or insulin glargine 300 units/mL (adults and pediatrics): the dose of insulin degludec should be 20% lower than that of the total daily dose of the previous basal insulin. Administer insulin degludec SC once daily; monitor blood glucose closely. Adjust dose based on glycemia.

- Dosage in renal impairment: no dosage adjustment necessary. Monitor blood glucose closely.
- Dosage in hepatic impairment: no dosage adjustment necessary. Monitor blood glucose closely.

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COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled pens and cartridges between 2-8°C. Protect from light. Do not freeze.
- **Unopened** prefilled pens and cartridges are stable for 56 days at room temp (up to 30°C).
- **When in use:**
  - Prefilled pens: stable for 56 days at room temp (up to 30°C) or in the fridge, protected from heat and light (cap kept on the pen).
  - Cartridges: stable for 56 days at room temp (up to 30°C) protected from light. Do not refrigerate.
- Do not mix in the same syringe with any other types of insulin.

MISCELLANEOUS

- Kinetic profile of insulin degludec administered SC: onset of action: 1 hour; peak of action: 9-12 hours, although relatively flat curve; duration of action: longer than 42 hours.

REFERENCES

1, 5, 82, 95, 135.
INDICATIONS
- Treatment of adult patients with type 1 or type 2 diabetes mellitus who require a long-acting (basal) insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION
- SC: in the upper arms, thighs, buttocks or abdomen. Rotate injection sites.
- Note: although insulin detemir is a clear insulin, it should NOT be administered IV.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Local reactions: redness, swelling, inflammation, itching, pain; lipodystrophy (if no rotation of injection sites).

DOSAGE
- Dosage based on glycemia.
- In insulin-naïve type 2 diabetic patients: initial dose of 0.1-0.2 units/kg SC once daily in the evening or 10 units SC once to twice daily and subsequently adjusted according to patient’s need.
- In type 2 diabetic patients transferred from NPH insulin: initial dose at transfer can be identical (on a unit-for-unit basis) but dose may need to be retitrated according to glycemia; higher doses of insulin detemir may be required for similar hypoglycemic activity.
- To be administered once or twice daily.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2-8°C. Do not freeze. Protect from light.
- When in use, vials or cartridges may be kept at room temp for up to 42 days, providing temperatures do not exceed 30°C.
- Do not mix in the same syringe with any other types of insulin.

MISCELLANEOUS
- Kinetic profile of insulin detemir administered SC: onset of action: 1.5 hours; peak of action: relatively flat curve; duration of action: 12-24 hours.

REFERENCES
1, 2, 95, 117, 150.
INDICATIONS
- Treatment of adult patients with type 1 or type 2 diabetes mellitus who require a long-acting (basal) insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION
- SC: in the upper arms, thighs, buttocks or abdomen. Rotate injection sites.
- Note: although insulin glargine is a clear insulin, it should NOT be administered IV.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Local reactions: redness, swelling, itching, pain; lipodystrophy (if no rotation of injection sites).

DOSAGE
- Dosage based on glycemia.
- In insulin-naïve type 2 diabetic patients: initial dose of 10 units for Lantus ® and Basaglar ™ and 0.2 units/kg for Toujeo ™ SC once daily, to be adjusted according to patient's needs.
- In patients transferred from NPH insulin to insulin glargine (Lantus ®, Basaglar ™ or Toujeo ™): if patient on a once daily NPH regimen, transfer to same dose of insulin glargine; if patient on a twice daily NPH insulin regimen, transfer to a 20% total lower dose of insulin glargine given once daily.
- In patients switched from Lantus ® to Toujeo ™: initial dose of Toujeo ™ should be the same as the Lantus ®, but a higher dose may be needed to achieve target glucose levels.
- In patients switched from Toujeo ™ to Lantus ® or Basaglar ™: initial dose of Lantus ® or Basaglar ™ should be 20% lower than that of Toujeo ™.
- In patients switched from Lantus ® to Basaglar ™: initial dose of Basaglar ™ should be the same as the Lantus ®.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2-8°C. Do not freeze.
- Lantus ® and Basaglar ™: when in use, vials or cartridges may be kept at room temp for 28 days, providing temperatures do not exceed 30°C and they are kept away from direct light and heat.
- Toujeo ™: when in use, prefilled pens may be kept at room temp for 42 days, providing temperatures do not exceed 30°C and they are kept away from direct light and heat.
- Do not mix in the same syringe with any other types of insulin.

MISCELLANEOUS
- Kinetic profile of insulin glargine administered SC: onset of action: 1.5 hours for Lantus ® and over 6 hours for Toujeo ™; peak of action: relatively flat curve, but even flatter for Toujeo ™; duration of action: 24 hours for Lantus ® and more than 24 hours for Toujeo ™.
- Lantus ® (100 units/mL) and Basaglar ™ (100 units/mL) compared to Toujeo ™ (300 units/mL) are not bioequivalent as Toujeo ™ is less potent on an unit per unit basis; these products are therefore not interchangeable without dose adjustment.
- Basaglar ™ is classified as being biosimilar to Lantus ®; therefore, these products are not interchangeable.

REFERENCES
1, 5, 95, 117, 127, 135, 150.
INDICATIONS

- Treatment of diabetes mellitus for patients who require a very short rapid-acting insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION

- Continuous IV infusion: dilute in NS to obtain a final concentration of 0.05 to 1 unit/mL. Note: insulin glulisine has been administered IV in a limited number of patients. However, as it does not offer any clinical advantage over IV regular insulin and experience is limited, prefer regular insulin when this route is required. Insulin is known to bind to IV tubing. Priming IV tubing prior to initiation of the infusion will improve the accuracy of the insulin dose received by the patient during the first hour after initiation of therapy, or after a tubing change. Prior to connecting IV line to the patient, fill the IV line with the prescribed insulin infusion and let it stand 15 minutes. After 15 minutes, open the IV and rapidly flush 20 mL through the line to prime it. If there is no time to let insulin stand in the line, flush line with 20 mL of the insulin infusion over a 1 minute period immediately prior to connecting the tubing to the patient. Must be administered by an infusion pump.
- SC: in the upper arms, thighs, buttocks or abdomen. Rotate injection site.
- SC infusion: undiluted as a continuous infusion in the abdomen. Rotate infusion site. Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Hypokalemia (especially with IV administration) as insulin shifts potassium into the cells.
- Local reactions: itching, swelling, redness; lipodystrophy (if no rotation of injection sites).

DOSAGE

- Dosage based on glycemia.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store in the fridge. Do not freeze. Protect from sunlight.
- When in use, vials or cartridges may be kept at room temp (between 15-25°C) for up to 28 days.
- Infusion sets (reservoir, tubing, catheter) and insulin glulisine in the reservoir should be discarded after 2 days of use or after exposure to temperatures above 37°C.
- Stable for 48 hours at room temp in NS in PVC containers.
- Not compatible with dextrose-containing solutions and with Ringer’s injection.

MISCELLANEOUS

- Kinetic profile of insulin glulisine administered SC: onset of action: 10-15 minutes; peak of action: 1-1.5 hours; duration of action: 3-5 hours.

REFERENCES

1, 2, 40, 95, 117, 135, 150, 208.
INDICATIONS

- Treatment of diabetes mellitus for patients who require a very short rapid-acting insulin for the maintenance of normal glucose homeostasis.

ADMINISTRATION

- Continuous IV infusion: dilute in NS to obtain a final concentration of 0.1 to 1 unit/mL. Note: insulin lispro has been administered IV in a limited number of patients. However, as it does not offer any clinical advantage over IV regular insulin and experience is limited, prefer regular insulin when this route is required. Insulin is known to bind to IV tubing. Priming IV tubing prior to initiation of the infusion will improve the accuracy of the insulin dose received by the patient during the first hour after initiation of therapy, or after a tubing change. Prior to connecting IV line to the patient, fill the IV line with the prescribed insulin infusion and let it stand 15 minutes. After 15 minutes, open the IV and rapidly flush 20 mL through the line to prime it. If there is no time to let insulin stand in the line, flush line with 20 mL of the insulin infusion over a 1 minute period immediately prior to connecting the tubing to the patient. Must be administered by an infusion pump.
- SC: in the upper arms, thighs, buttocks or abdomen. Rotate injection site.
- SC infusion: undiluted as a continuous infusion. Rotate infusion site. Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Hypokalemia (especially with IV administration) as insulin shifts potassium into the cells.
- Local reactions: itching, swelling, redness; lipodystrophy (if no rotation of injection sites).

DOSAGE

- Dosage based on glycemia.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store in the fridge. Do not freeze. Protect from sunlight.
- When in use, vials or cartridges may be kept at room temp (below 30°C) for up to 28 days.
- Stable for 48 hours in the fridge followed by an additional 48 hours at room temp in NS at concentrations of 0.1-1 unit/mL.
- Compatible with D5W, D10W and NS.

MISCELLANEOUS

- Kinetic profile of insulin lispro administered SC: onset of action: 10-15 minutes; peak of action: 1-2 hours; duration of action: 3.5-4.75 hours.

REFERENCES

1, 2, 40, 95, 117, 135, 150.
**INDICATIONS**
- Treatment of diabetes mellitus patients (Type 1 or Type 2) who require an intermediate-acting insulin for the maintenance of normal glucose homeostasis.

**ADMINISTRATION**
- SC: in the upper arms, thighs, buttocks or abdomen. Rotate injection sites.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Local reactions: itching, swelling, redness; lipodystrophy (if no rotation of injection sites).

**DOSAGE**
- Dosage based on glycemia.
- To be administered once or twice daily.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2-8°C. Do not freeze. Protect from sunlight.
- When in use, vials or cartridges may be kept at room temp for up to 28 days.
- Stable for 5-7 days in the fridge in either glass or plastic syringes.
- Mixtures of the same manufacturer of human NPH insulin with human regular insulin are stable for 28 days in the fridge when stored in polypropylene and polypropylene-ethylene copolymer syringes.

**MISCELLANEOUS**
- Kinetic profile of NPH insulin administered SC: onset of action: 1-3 hours; peak of action: 5-8 hours; duration of action: up to 18 hours.

**REFERENCES**
1, 2, 4, 6, 117, 135.
INDICATIONS
For the 100 units/mL solution:
- Treatment of diabetes mellitus for patients who require a short-acting insulin for the maintenance of normal glucose homeostasis.
- Treatment of emergency situations such as diabetic acidosis or coma in diabetics.
- Treatment of hyperglycemia in patients on Total Parenteral Nutrition.
- Treatment of hyperkalemia with dextrose.
For the 500 units/mL solution (Entuzity ™):
- Treatment of diabetes mellitus for patients requiring more than 200 units of insulin per day.

ADMINISTRATION
- IV direct (using 100 units/mL solution only): physician or RN; administer over 1 minute.
- Continuous IV infusion (using 100 units/mL solution only): may dilute with commonly used IV fluids to give by infusion at concentrations of 0.05-1 unit/mL. At TOH, recommended infusion dilution is 2 units/10 mL (0.2 units/mL as 50 units in 250 mL) except for critical care areas where the recommended dilution is 1 unit/mL (100 units in 100 mL). Insulin is known to bind to IV tubing. Priming IV tubing prior to initiation of the infusion will improve the accuracy of the insulin dose received by the patient during the first hour after initiation of therapy, or after a tubing change. Prior to connecting IV line to the patient, fill the IV line with the prescribed insulin infusion and let it stand 15 minutes. After 15 minutes, open the IV and rapidly flush 20 mL through the line to prime it. If there is no time to let insulin stand in the line, flush line with 20 mL of the insulin infusion over a 1 minute period immediately prior to connecting the tubing to the patient. Must be administered by an infusion pump.
- SC (using 100 units/mL or 500 units/mL solution): in the upper arms, thighs, buttocks or abdomen. Rotate injection site.
- IM (using 100 units/mL solution only) (uncommon).

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; urticaria, rash, anaphylaxis.
- Hypoglycemia (Antidote: oral carbohydrates or 25-50% dextrose IV or glucagon IV/IM/SC). Follow blood glucose carefully.
- Hypokalemia (especially with IV administration) as insulin shifts potassium into the cells.
- Local reactions: itching, pain, swelling, redness; lipodystrophy (if no rotation of injection sites).

DOSAGE
- Dosage based on glycemia.
- In diabetic ketoacidosis (using 100 units/mL solution only): 0.15 units/kg OR 10 units initially IV direct, followed by an IV infusion of 0.1 units/kg/hr or 5-10 units/hr. If plasma glucose unchanged after 60 minutes, double the infusion rate.
- Hyperkalemia (using 100 units/mL solution only): 5-10 units IV direct followed immediately by 25-50 g of dextrose (50-100 mL 50% solution) IV administered over 5 minutes.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

For the 100 units/mL and 500 units/mL solutions:
- Store unopened vials, cartridges and pens in the fridge. Do not freeze. Protect from sunlight.
- Do not use if solution is not clear and colourless.
- When in use, vials, cartridges and pens should be kept at room temp and discarded after 28 days.

For the 100 units/mL solution:
- Human insulin is compatible with saline, dextrose and RL.
- Stable for 14 days in the fridge undiluted in polypropylene syringes.
- Mixtures of the same manufacturer of human NPH insulin with human regular insulin are stable for 28 days in the fridge when stored in polypropylene and polypropylene-ethylene copolymer syringes.

MISCELLANEOUS
- Kinetic profile of human regular insulin (100 units/mL) administered SC: onset of action: 30 minutes; peak of action: 2-3 hours; duration of action: 6.5 hours.
- After SC administration, mean peak serum insulin concentrations are lower for Entuzity™ compared to Humulin R®, and half-life of Entuzity™ is 4.5 hours compared to 3.6 hours for Humulin R®.

REFERENCES
1, 2, 4, 5, 6, 40, 95, 117, 328.
INTERFERON ALPHA-2B

Do NOT confuse interferon alpha-2B with interferon beta.
This monograph is specific to interferon ALPHA-2B.

INDICATIONS
- For the treatment of patients with chronic hepatitis C, chronic active hepatitis B, chronic myelogenous leukemia (CML), thrombocytosis associated with CML, multiple myeloma, non-Hodgkin’s lymphoma (NHL), malignant melanoma, AIDS-related Kaposi’s sarcoma, and hairy cell leukemia.

ADMINISTRATION
- Consider administration of premedication prior to each dose to decrease flu-like symptoms. Refer to Dosage section.
- Intermittent IV infusion:
  - Intron A® powder: reconstitute by adding 1 mL of supplied SWFI or bacteriostatic water. Do NOT shake. Dilute dose in 100 mL of NS for a final concentration of no less than 0.1 million units/mL. Infuse over 20 minutes.
  - Ready-to-use solution: dilute dose in 50 mL of NS for a final concentration of no less than 0.3 million units/mL. Infuse over 20 minutes.
- Dilution and rate of administration may be dependent on the specific dosing protocol used.
- SC: reconstitute powder with 1 mL of SWFI or bacteriostatic water or use ready-to-use solution. Do NOT shake.
  - Inject in anterior thighs, outer upper arms or abdomen (avoid navel or below waistline). Rotate injection sites.
- IM: reconstitute powder with 1 mL of SWFI or bacteriostatic water or use ready-to-use solution. Do NOT shake.
  - Inject in anterolateral thighs, upper arms or outer area of buttocks. Rotate injection sites. Avoid IM use if thrombocytopenia.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: urticaria, angioedema, bronchoconstriction, anaphylaxis (rare).
- Cardiovascular: hypotension (during or up to 2 days post therapy), cardiac arrhythmias.
- GI: anorexia, nausea, vomiting.
- CNS: depression, headache, confusion, altered mental status.
- Flu-like symptoms: fever, fatigue, chills, rigors, myalgia, anorexia, headache (reversible within 72 hours). Can be alleviated with premedication; refer to Dosage section.
- Local reactions: redness, pain, burning, bleeding, bruising, pruritus.

DOSAGE
- Premedication with acetaminophen 500 mg-1 g may be administered 30 minutes prior to interferon (and q4h after for up to 4 g per day) to alleviate flu-like symptoms. Meperidine 50 mg IV or chlorpromazine 25-50 mg IM prior to interferon may decrease chills and rigors.
- Chronic hepatitis C: 3 million units SC/IM 3 times per week. Dose may increase up to 10 million units 3 times per week.
- Chronic active hepatitis B: 30-35 million units per week SC/IM, administer as 5 million units daily or 10 million units 3 times per week.
- CML and thrombocytosis associated with CML: 4-5 million units/m² SC daily. Dose range: 0.5-10 million units/m² daily. Can be decreased to 3 times a week when white blood cells are controlled.
- Multiple myeloma: 3 million units/m² SC 3 times per week.
- NHL: 5 million units SC 3 times per week.
- Malignant melanoma: induction with 20 million units/m² IV for 5 consecutive days per week for 4 weeks followed by maintenance treatment with 10 million units/m² SC 3 times per week.
- Kaposi’s sarcoma: 30 million units/m² SC/IM 3 times per week.
- Hairy cell leukemia: 2 million units/m² SC 3 times per week.
- Specialized references should be consulted for specific dosing protocols.
- Dose can be adjusted according to efficacy and toxicity.

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COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials (powder and ready-to-use solution) in the fridge. However, the powder may also be stored at room temp for up to 4 weeks and the ready-to-use solution for up to 7 days.
- Stable for two weeks between 15-30°C or 30 days between 2-8°C after reconstitution with bacteriostatic water. Stable for up to 24 hours in the fridge after reconstitution with SWFI.
- Opened vials of the ready-to-use solution: the 10 million unit vials are stable for up to 7 days in the fridge and the 18 and 25 million unit vials are stable for up to 4 weeks in the fridge.
- Stable for 24 hours at room temp or in the fridge when diluted in NS.
- Stable for 24 hours at room temp or in the fridge in Ringer’s injection, RL, amino acids and sodium bicarbonate 5% at concentrations of 0.05-1 million unit/mL in glass bottles.
- Incompatible with D5W.

MISCELLANEOUS

- Adequate hydration should be maintained.
- Electrocardiograms prior to and during the course of treatment should be done in patients with pre-existing cardiac abnormalities and/or advanced stages of cancer.

REFERENCES

1, 2, 129, 135, 165.
INTERFERON BETA
Avonex®, Betaseron®, Extavia®, Rebif®

Do NOT confuse interferon beta with interferon alpha-2B.
This monograph is specific to interferon BETA.

INDICATIONS
- Treatment of the relapsing forms of multiple sclerosis (MS).
- Treatment of secondary progressive MS.
- Treatment of patients who have experienced a single demyelinating event with lesions typical of MS.

ADMINISTRATION
- Avonex® and Rebif® are provided as ready-to-use solutions.
- For Betaseron® and Extavia®, reconstitute 0.3 mg vial with the prefilled diluent syringe of sodium chloride 0.54% (1.2 mL) for a final concentration of 0.25 mg/mL. Do NOT shake.
- RN in presence of physician for first dose only.
- IM (Avonex®): thigh or upper arm.
- SC (Betaseron®, Extavia®, Rebif®): abdomen (except waistline), buttock, thigh or arm.
- Rotate site of injection.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: skin rash, urticaria, dyspnea, orolingual edema, anaphylaxis (rare).
- GI: abdominal pain, constipation, diarrhea, dry mouth, dyspepsia, nausea.
- CNS: mood disorders, depression.
- Flu-like symptoms: headache, fever, fatigue, chills, malaise, myalgia, rigors, arthralgia. Occur within hours or days after injection. Subside within a few months of therapy. Can be alleviated by acetaminophen or NSAID 4 hours before, at the time and 4 hours after injection.
- Myleosuppression.
- Local reactions: pain, inflammation, redness, induration. Tissue necrosis reported with SC administration.

DOSAGE
- Avonex®: 30 mcg (6 million international units) IM once weekly. May start at 1/4 dose (7.5 mcg) and increase dose weekly by 7.5 mcg until reach full dose of 30 mcg.
- Betaseron® and Extavia®: 0.25 mg (8 million international units) SC every other day. May start at 1/4 dose and increase gradually (25% every 1-2 weeks) over 6 weeks to the full dose.
- Rebif®: 44 mcg (12 million international units) SC three times weekly. May be reduced to 22 mcg (6 million international units) three times weekly if poorly tolerated. May start at 20% of the dose during the first 2 weeks, increase at 50% during weeks 3 and 4, and to the full dose thereafter.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Do not freeze.
- Avonex®: store prefilled syringes and autoinjectors in the fridge; however, they are stable 7 days at room temp. Protect from light.
- Betaseron® and Extavia®: store vials at room temp or fridge. After reconstitution, use product immediately or within 3 hours if stored in the fridge.
- Rebif®: store prefilled syringes, cartridges and pens in the fridge; however, they are stable for up to 1 month at room temp. Protect from direct light.

MISCELLANEOUS
- Avonex® and Rebif® are interferon beta-1a while Betaseron® and Extavia® are interferon beta-1b. These products are not interchangeable.

REFERENCES
1, 2, 95.

Full revision 2015; limited revision 2016, 2019
INDICATIONS
- Treatment of unresectable or metastatic melanoma, as monotherapy or in combination with nivolumab.

ADMINISTRATION
- Let the vials at room temp for approximately 5 minutes.
- Intermittent IV infusion (mandatory): withdraw the required dose and put into an empty glass bottle or IV bag (PVC or non-PVC). May be administered undiluted (5 mg/mL) or further diluted in NS or D5W to a final concentration of 1 to 4 mg/mL. Gently mix the solution by gentle inversion. Do NOT shake. The solution is clear to pale yellow and may contain translucent-to-white amorphous particles; discard if cloudy. Administer in a separate infusion line over 90 minutes for melanoma and over 30 minutes for renal cell carcinoma, through a low-protein-binding in-line filter (0.2 or 1.2 micron polyethersulfone filter or 0.2 micron nylon filter). Flush the line with NS or D5W at the end of infusion.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: immune-mediated reactions, can be fatal; can involve any organ. Most common reactions include enterocolitis, intestinal perforation, hepatitis, dermatitis (e.g., Stevens-Johnson syndrome, toxic epidermal necrolysis, severe rash), neuropathy (e.g., Guillain-Barré syndrome, severe sensory or motor neuropathy, myasthenia gravis), endocrinopathy (hypopituitarism, adrenal insufficiency or crisis, hypogonadism, hypothyroidism, hyperthyroidism, Cushing’s syndrome). Discontinue ipilimumab if reaction is severe and administer high-dose corticosteroids (i.e., 1 to 2 mg/kg/day of prednisone or equivalent) with or without additional immunosuppressive therapy; ocular manifestations should be treated with ophthalmic corticosteroids.
- Infusion-related reactions: pruritus, urticaria, flushing, rash, dyspnea, bronchospasm, hypotension, angioedema. If severe: discontinue ipilimumab permanently and treat reactions as needed (bronchodilators, epinephrine, diphenhydramine, corticosteroids). If mild to moderate: give diphenhydramine and decrease infusion rate; corticosteroids may be given though would decrease any beneficial immunologic effect of ipilimumab. May consider premedication for subsequent doses (diphenhydramine, acetylsalicylic acid).
- GI: diarrhea, nausea, vomiting, abdominal pain, anorexia, weight loss.
- CNS: headache.
- Dermatologic: rash, pruritus.
- Fatigue, fever, chills, arthralgia, myalgia.
- Local reactions at injection site.

DOSAGE
- For melanoma (with or without nivolumab): 3 mg/kg IV every 3 weeks for a total of 4 doses.
- For renal cell carcinoma: 1 mg/kg IV every 3 weeks for a total of 4 doses.
- Dosage in renal impairment: no dosage adjustment required in mild to moderate renal impairment.
- Dosage in hepatic impairment: no dosage adjustment necessary for mild hepatic insufficiency; has not been studied in patients with moderate or severe hepatic impairment.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge. Protect from light.
- Stable for 24 hours at room temp or in the fridge undiluted (5 mg/mL) or in NS or D5W at concentrations of 1-4 mg/mL.

MISCELLANEOUS
- Monitor LFTs, thyroid function and electrolytes before each dose.
- Contraindicated in patients with active, life-threatening autoimmune disease and in organ recipients.

REFERENCES
1, 5, 40, 95, 129, 165, 208.
Do NOT confuse irinotecan with liposomal irinotecan. This monograph is specific to IRINOTECAN.

INDICATIONS
- First-line therapy for patients with metastatic carcinoma of the colon or rectum, in combination with other antineoplastics.
- As a single agent for recurrent metastatic carcinoma of the colon or rectum in patients who received previously 5-fluorouracil.
- Also used for other types of cancer.

ADMINISTRATION
- Intermittent IV Infusion (mandatory): dilute in 250-500 mL D5W (preferred) or NS for a final concentration of 0.12-3 mg/mL; infuse over 90 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity (rare).
- Cardiovascular: bradycardia, vasodilation (flushing).
- GI: nausea, vomiting, abdominal pain, anorexia, weight loss, flatulence, salivation, diarrhea. Early onset diarrhea (occurring up to 24 hours of administration) is cholinergic in nature. It may be severe but is usually transient; may be managed by use of atropine (see cholinergic syndrome below). For late onset diarrhea (occurring more than 24 hours after administration), prompt use of loperamide is recommended, as diarrhea may be prolonged, leading to electrolyte disturbances; may be life threatening.
- CNS: dizziness, somnolence, insomnia, headache, speech disorder.
- Respiratory: dyspnea, non-productive cough, rhinitis, pneumonitis (infrequent).
- Fatigue, fever, chills, sweating, pain, tumour lysis, infection.
- Cholinergic syndrome: diarrhea, rhinitis, hypersalivation, miosis, lacrimation, diaphoresis, flushing and cramping. To prevent or treat: atropine 0.25-1 mg IV or SC.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSEAGE
- Combination therapy: 125 mg/m² IV once weekly on days 1, 8, 15, 22, followed by a rest period until next course begins on day 43 OR 180 mg/m² IV once every 2 weeks on days 1, 15, 29, followed by a rest period until next course begins on day 43.
- Monotherapy: 125 mg/m² IV once weekly on days 1, 8, 15, 22, followed by a rest period until next course begins on day 43 OR 350 mg/m² IV once every 3 weeks.
- Consider dose reduction in patients 70 years of age and older, patients with prior pelvic/abdominal radiotherapy, with performance status of 2 (as per WHO/ECOG scale), with moderately increased bilirubin (17-35 mcmol/L) and with Gilbert’s syndrome.
- Consult the manufacturer’s monograph for dosage modification guidelines.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; protect from light.
- Stable for 28 days at room temp or in the fridge, protected from light in both cases, in NS and D5W at concentrations of 0.4-2.8 mg/mL in PVC and low-density polyethylene containers.

…/Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 72 hours at room temp and exposed to light in NS and D5W at concentrations of 0.4-2.8 mg/mL in PVC and low-density polyethylene containers.
- Some solutions diluted in NS resulted in precipitation when refrigerated.

MISCELLANEOUS

- Contraindicated in patients on azole antifungals (e.g., ketoconazole, fluconazole, itraconazole) or receiving concurrent irradiation.

REFERENCES

2, 40, 129, 143, 165.
INDICATIONS

- Treatment of metastatic adenocarcinoma of the pancreas, in combination with 5-fluorouracil and leucovorin, in adult patients who have disease progression following gemcitabine-based therapy.

ADMINISTRATION

- Ensure premedication has been administered. Refer to dosage section.
- Intermittent IV infusion: withdraw the required amount from the vials and dilute dose in D5W or NS to a final volume of 500 mL. Gently invert the bag to mix. Infuse over 90 minutes. Do NOT use in-line filters.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: includes anaphylaxis.
- Infusion-related reactions: rash, urticaria, pruritus, periorbital edema.
- GI: nausea, vomiting, stomatitis, anorexia. Early onset diarrhea: occurs during or within 24 hours of administration, transient. May be accompanied by cholinergic symptoms (see Cholinergic syndrome below). Late-onset diarrhea: can be life-threatening; occurs more than 24 hours after IV administration (median onset of 8 days after infusion) and may lead to electrolyte disturbances and dehydration (see Electrolyte disturbances and metabolic below); initiate loperamide at the first sign and administer until the patient is without diarrhea for at least 12 hours, maximum duration of loperamide therapy of 48 hours. If diarrhea persists after 24 hours of loperamide therapy, add an antibiotic (e.g., a fluoroquinolone); if diarrhea is still present after 48 hours of loperamide therapy, discontinue loperamide and continue the antibiotic.
- Cholinergic syndrome: diarrhea, rhinitis, hypersalivation, miosis, lacrimation, bradycardia, diaphoresis, flushing, abdominal cramping. To prevent or treat: atropine 0.25 mg to 1 mg IV or SC.
- Electrolyte disturbances and metabolic: due to severe diarrhea: hypokalemia, hyponatremia, hypocalcemia, hypophosphatemia, hypomagnesemia, dehydration, weight loss; hypoalbuminemia.
- Hematologic: neutropenia, lymphopenia, anemia, thrombocytopenia.
- Hepatic: increase in LFTs.
- Respiratory: interstitial lung disease (has been observed with conventional irinotecan; unknown risk with liposomal irinotecan; closely monitor).
- Renal: increased serum creatinine.
- Fever, fatigue.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- Premedicate at least 30 minutes prior to each dose with a corticosteroid (dexamethasone or equivalent) and an antiemetic.
- 70 mg/m² (free base) IV every 2 weeks; administer liposomal irinotecan first, then leucovorin, followed by 5-fluorouracil.
- If patient is known to be homozygous for the UGT1A1*28 allele: initial dose of 50 mg/m² (free base) IV to be increased to 70 mg/m² if no drug toxicities within the first 2 weeks.
IRINOTECAN (LIPOSOMAL)

Other Names:
- Irinotecan liposome, Nanoliposomal irinotecan
- Onivyde®, Pegylated liposomal irinotecan

Classification:
Antineoplastic

DOSAGE (Cont.)
- Refer to manufacturer’s monograph to modify dosage according to toxicity.
- Dosage in renal impairment: usual dose if CrCl is 30 mL/min or greater; do not use if CrCl is lower than 30 mL/min (lack of data).
- Dosage in hepatic impairment: do not use in patients if bilirubin is greater than 34.2 mcmol/L, or AST/ALT are greater than 2.5 x ULN or 5 x ULN in presence of liver metastasis.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze.
- The diluted suspension may be stored for 4 hours at room temp (approximately 25°C), protected from light prior to infusion.
- The diluted suspension may be stored for 24 hours in the fridge protected from light prior to infusion. Do not freeze.

MISCELLANEOUS
- Do not use live vaccines; inactivated vaccines may be administered, but may lead to a decreased response.

REFERENCES
5, 95, 129, 135, 165.

New monograph 2018; limited revision 2019
Do NOT confuse iron dextran complex with iron sucrose or iron isomaltoside 1000. This monograph is specific to iron DEXTRAN COMPLEX.

INDICATIONS
- For iron-deficient patients when oral administration of iron is not feasible.

ADMINISTRATION
- IV direct: physician only. May be injected undiluted (maximum single dose 100 mg) at a rate not exceeding 50 mg/min.
- Deep IM (maximum single dose 100 mg), using the Z track method (preferred).
- Test dose:
  - before giving the first therapeutic dose, a test dose of 25 mg (adult) should be administered by the same route that the therapeutic dose will be given.
  - Monitor the patient closely for anaphylaxis during the first hour post test dose. If test dose well tolerated, administer remaining dose.
  - If there has been more than 3 months since the last injection, repeat the test dose before administration of therapeutic dose.
- A physician must be readily available for the first 15 minutes of the first dose.
- Observe patient for signs and symptoms of hypersensitivity during and for at least 30 minutes (60 minutes for test dose) after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylaxis (Antidote: epinephrine, antihistamines and corticosteroids): frequency between 0.1-0.6% for IM or IV administration. May occur anytime even if test dose or previous therapeutic dose has been well tolerated.
- Cardiovascular: flushing and hypotension with too rapid IV administration.
- Delayed-type reactions (arthralgia, backache, chills, dizziness, myalgia, pyrexia, headache, malaise, nausea, vomiting) have occurred 24-48 hours after administration and are dose-related, subsiding in 3-4 days with IV administration and 3-7 days with IM administration.
- GI: nausea, vomiting, diarrhea, altered taste, abdominal pain.
- Local reactions: phlebitis (with IV); soreness, inflammation and brown skin discoloration (with IM).

DOSAGE
- Test dose: 25 mg (0.5 mL) IM or IV.
- To calculate total dose of iron dextran in mL for iron deficiency anemia in adults, please refer to table in manufacturer’s monograph.
- Alternatively the following formula can be used:
  Dose (mL) = 0.0442 (Desired Hb (g/dl) - Measured Hb (g/dl)) X LBW + (0.26 X LBW in kg).
  Attention: the above formula uses American units (g/dl) to measure hemoglobin. The Canadian units are g/L.
  LBW = Lean Body Weight = Males: 50 kg + (2.3 kg per inch of patient’s height over 5 feet)
  Females: 45.5 kg + (2.3 per inch of patient’s height over 5 feet)
- For iron replacement due to blood loss: do not use manufacturer’s table or equation above. Use the following formula: Replacement iron (mg) = Blood loss (mL) X Hematocrit %.
- In adults: administer up to 100 mg of iron dextran (2 mL of undiluted solution) IV/IM daily until the total calculated dose has been administered.

.../Cont.
### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Do not freeze.
- Do not mix with other additives.
- Stable for 24 hours at room temp when diluted in NS or D5W.

### MISCELLANEOUS
- Epinephrine, antihistamines, corticosteroids and oxygen must be available in case of acute hypersensitivity reaction.
- Parenteral iron does not provide a more rapid response than oral therapy.
- Injectable solution contains 50 mg/mL of elemental iron.

### REFERENCES
1, 4, 5, 40, 95, 265.
INDICATIONS
- Treatment of iron deficiency anemia in adults who are intolerant or unresponsive to oral therapy.

ADMINISTRATION
- IV direct: physician or RN; undiluted or diluted with 20 mL of NS; administer at a rate of 250 mg/min; maximum single dose of 500 mg.
- Intermittent IV infusion: dilute dose in NS (using a maximum volume of 500 mL) to obtain a concentration of at least 1 mg/mL (not including the volume of iron). Administer doses of up to 1000 mg over at least 20 minutes and doses exceeding 1000 mg over at least 30 minutes; maximum single dose for infusion of 1500 mg.
- Observe patient for signs and symptoms of hypersensitivity and hypotension during and for at least 30 minutes after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, rash, bronchospasm, cardiorespiratory arrest, syncope, angioedema, anaphylactoid/anaphylactic reactions.
- Cardiovascular: hypotension, edema.
- GI: nausea, vomiting, constipation.
- CNS: headache.
- Electrolyte disturbances: hypophosphatemia.
- Nasopharyngitis.
- Local reactions: erythema; if extravasated: irritation, pain, long standing brown discoloration.

DOSAGE
- The total cumulative dose should first be determined, using either the Ganzoni equation or the Simplified table:
  - Ganzoni formula (usually used for patients with chronic kidney disease):
    \[
    \text{Iron need [mg]} = \text{body weight [kg]} \times (\text{Target Hb - Actual Hb} \ [g/dL]) \times 2.4 + \text{iron stores [mg]}
    \]
    **body weight**: use ideal body weight for obese patients; **Target Hb**: default is 15 g/dL but a lower value may be used based on clinical judgment; **iron stores** may vary from 500 to 1000 mg or use 10-15 mg/kg.

  - Simplified table (usually used for patients with iron deficiency from causes other than renal):


<table>
<thead>
<tr>
<th>Hemoglobin [g/dL]</th>
<th>Dose for weight less than 70 kg</th>
<th>Dose for weight of 70 kg and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 and greater</td>
<td>1000 mg</td>
<td>1500 mg</td>
</tr>
<tr>
<td>Less than 10</td>
<td>1500 mg</td>
<td>2000 mg</td>
</tr>
</tbody>
</table>

- The total cumulative dose can be given as a single IV direct injection not exceeding 500 mg OR as a single IV infusion not exceeding 20 mg/kg or 1500 mg. If the total cumulative dose exceeds these limits, divide in 2 doses by giving the maximum allowable dose in the first administration, if feasible; administer the 2 doses at least one week apart.
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15–30°C. Do not freeze.
- Opened vials should be used immediately.
- Once diluted in NS, iron solution should be administered immediately, as recommended by the manufacturer.
- Stable for 48 hours at 25°C and 30°C in NS at concentrations of 1 mg/mL and 4 mg/mL in non-PVC non-diethylhexyl phthalate (DEHP) containers.
- Compatible only with NS.

### MISCELLANEOUS

- Emergency drugs and resuscitation equipment must be available for the treatment of hypersensitivity reactions.
- Large doses may give a brown colour to serum when blood sample is drawn 4 hours after administration.
- Injectable solution contains 100 mg/mL of elemental iron.

### REFERENCES

5, 415.
INDICATIONS
- Treatment of iron deficiency anemia associated with chronic kidney disease (CKD).

ADMINISTRATION
- IV direct: physician or RN; undiluted solutions may be administered direct by slow IV injection over 2 to 5 minutes, not to exceed 200 mg (10 mL) per injection.
- Intermittent IV Infusion: 100 mg (5 mL) and 200 mg (10 mL) to be diluted in a maximum of 100 mL of NS only. Infuse over a minimum of 15 minutes. Doses of 300 to 500 mg should be diluted in a maximum of 250 mL of NS and infused over 1.5 hours for a 300 mg dose, 2.5 hours for a 400 mg dose and 3.5-4 hours for a 500 mg dose (TOH note: diluting to a final concentration of 1 to 2 mg/mL is adequate for IV infusion).
- Observe patient for signs and symptoms of hypersensitivity during and for at least 30 minutes after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, wheezing, dyspnea, hypotension, anaphylaxis.
- Cardiovascular: hypotension (occurs with rapid administration; infusions tend to lessen the risk), peripheral edema, chest pain.
- GI: nausea, vomiting, diarrhea, metallic taste, taste perversion.
- CNS: headache, dizziness.
- Muscle cramps, arthralgia, back pain, pain in extremity.
- Local reactions: phlebitis, burning, pain.

DOSAGE
For iron deficiency anemia in CKD:
- Hemodialysis patients: 100 mg IV during consecutive dialysis sessions to a total cumulative dose of 1000 mg (10 doses); may repeat treatment if needed.
- Peritoneal dialysis patients: two IV infusions of 300 mg 14 days apart followed by a single 400 mg IV infusion 14 days later (total cumulative dose of 1000 mg in 3 divided doses); may repeat treatment if needed.
- Non-dialysis patients: 200 mg IV on 5 different occasions within a 14-day period (total cumulative dose of 1000 mg in a 14-day period); may repeat treatment if needed. Limited experience with two 500 mg doses infused on day 1 and 14.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; do not freeze.
- Mix only with NS; mixing with other additives is not advised.
- Stable for 7 days at room temp or in the fridge undiluted (20 mg/mL) or diluted in NS at concentrations of 2-10 mg/mL and stored in plastic syringes.
- Stable for 7 days at room temp diluted in NS at concentrations 1-2 mg/mL in a bag.

MISCELLANEOUS
- As transferrin saturation values increase rapidly after IV administration of iron sucrose, serum iron values may only be reliably obtained 48 hours after the last IV dose.
- Vial contains 100 mg/5 mL of elemental iron.

REFERENCES
1, 5, 40, 135.
## INDICATIONS
- Treatment of active tuberculosis when oral route is not possible; to use in conjunction with other antitubercular drugs.
- Treatment of latent tuberculosis infection in patients at risk when oral route is not possible; to use as the sole antitubercular drug.

## ADMINISTRATION
- IM.

## POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, fever, lymphadenopathy, vasculitis.
- GI: nausea, vomiting, epigastric distress, dry mouth.
- CNS: paresthesia of the feet and hands which may progress to peripheral neuropathy (dose-related).
- Hepatic: elevated serum transaminases, elevated bilirubin, jaundice, hepatitis; common prodromal symptoms of hepatitis: anorexia, nausea, vomiting, fatigue, malaise, weakness, fever lasting over 3 days.
- Hematologic: agranulocytosis, anemia (hemolytic, sideroblastic, or aplastic), thrombocytopenia, eosinophilia, methemoglobinemia.
- Endocrine and metabolic: gynecomastia, pyridoxine deficiency, pellagra, hyperglycemia, metabolic acidosis.
- Rheumatic syndrome and lupus-like syndrome.
- Local reactions: irritation at site of injection.

## DOSAGE

**Adults and children 15 years of age and older:**
- For active tuberculosis: 5 mg/kg up to 300 mg IM once daily; if intermittent therapy: 15 mg/kg up to 900 mg IM 2 to 3 times a week.
- For latent tuberculosis infection: 5 mg/kg up to 300 mg IM once daily; if intermittent therapy: 15 mg/kg up to 900 mg IM twice a week.

**Pediatrics (children 14 years of age and younger):**
- For active tuberculosis: 10-15 mg/kg up to 300 mg IM once daily; if intermittent therapy: 20-30 mg/kg up to 900 mg IM twice a week.
- For latent tuberculosis infection: 10-20 mg/kg up to 300 mg IM once daily; if intermittent therapy: 20-40 mg/kg up to 900 mg IM twice a week.

- Dosage in renal impairment: no dosage adjustment required. Use with caution in severe renal impairment.
- Dosage in hepatic impairment: no dosage adjustment but caution is required; consider discontinuation if liver transaminases are over 3 to 5 times the ULN.

## COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp and protect from light. Do not freeze.
- Crystals may form when isoniazid is exposed to low temperatures; warming the vial to room temp will redissolve the crystals.

## MISCELLANEOUS
- Pyridoxine oral administration (10-50 mg daily for adults, 1-2 mg/kg daily for children) is recommended in patients who are malnourished or prone to neuropathy.
- Monitor liver function periodically.

## REFERENCES
1, 5, 95, 135, 216

*Available via Health Canada’s Special Access Programme*
ISOPROTERENOL

INDICATIONS
- Atrioventricular (AV) heart block, cardiac arrest, atropine-resistant bradycardia, Adams-Stokes syndrome.
- As an adjunct in the treatment of shock.
- Treatment of bronchospasm occurring during anesthesia.
- Aid in diagnosing the etiology of mitral regurgitation and in the diagnosis of coronary artery disease.

ADMINISTRATION
- IV direct (emergency situations only): physician or RN; cardiac monitoring; dilute 0.2 mg (1 mL) with NS or D5W to obtain a total volume of 10 mL at a concentration of 0.02 mg/mL; inject at a rate of 1 mL/min. Follow with a 20 mL flush with NS to ensure distribution to circulation.
- Continuous IV Infusion (preferred): cardiac monitoring. Dilute 1 mg in 250 or 500 mL of NS or D5W to obtain a final concentration of 0.004 or 0.002 mg/mL (4 or 2 mcg/mL), respectively. At TOH, dilute 1 mg in 250 mL of NS or D5W to obtain a final concentration of 4 mcg/mL. Infusion rate varies according to indication. Physician should be present to establish rate.
- SC, IM.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: tachycardia, palpitation, arrhythmias, coronary insufficiency, facial flushing.
- GI: nausea and vomiting.
- CNS: nervousness, restlessness, dizziness, headache.
- Weakness, tremor.
- Sweating.

DOSAGE
- Emergency treatment of cardiac arrhythmias: 20-60 mcg IV direct i.e., 1-3 mL of a 0.02 mg/mL diluted solution. May administer subsequent IV doses of 10 to 200 mcg (0.5-10 mL of a 0.02 mg/mL diluted solution) or use an IV infusion given at an initial rate of 5 mcg/min.
- Treatment of cardiac arrhythmias in less urgent situations: 200 mcg (1 mL of the undiluted 0.2 mg/mL solution) SC or IM initially, followed by 150-200 mcg SC or 20-1000 mcg IM depending on clinical response.
- Shock: use an IV infusion given at a rate of 0.5-5 mcg/min. Rates greater than 30 mcg/min have been used in advanced stages of shock.
- Bronchospasm during anesthesia: 10-20 mcg IV (0.5-1 mL of a 0.02 mg/mL diluted solution), repeated when necessary.
- Diagnostic aid: mitral regurgitation: 4 mcg/min IV infusion.
- cornary artery disease: 1-3 mcg/min IV infusion.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Solution should be colourless.
- Exposure to air or light may turn the solution to a pink to brownish-pink discoloration. Discard if discoloured or contains a precipitate.
- Stable for 24 hours in the fridge in D5W, NS, D5-NS, RL and D5-RL at a concentration of 2 mcg/mL in glass and PVC containers.
- Incompatible with sodium bicarbonate.

REFERENCES
1, 4, 5, 40, 95, 135.
INDICATIONS
- Treatment of blastomycosis, histoplasmosis, and aspergillosis in seriously ill patients.
- Empiric therapy in febrile neutropenic patients with suspected fungal infections.

ADMINISTRATION
- Intermittent IV Infusion: dilute 250 mg (25 mL) in 50 mL of NS (special bag provided by the manufacturer) for a total of 75 mL. Final concentration of 3.33 mg/mL. Either discard 15 mL or administer only 60 mL (200 mg) as a 60 minute infusion (1 mL/min). Use the filter set provided by the manufacturer. After administration, flush the infusion set with 15-20 mL of NS over 30 seconds to 15 minutes using the two-way stopcock.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, anaphylaxis (rare), angioedema, Stevens-Johnson Syndrome.
- Cardiovascular: transient asymptomatic decreased ejection fraction, CHF, pulmonary edema, peripheral edema.
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: headache, dizziness.
- Fever, fatigue.
- Hepatotoxicity and abnormal LFTs.
- Local reactions: infusion site reactions.

DOSAGE
- Loading dose: 200 mg IV twice daily on days 1 and 2 (4 doses).
- Maintenance dose: 200 mg IV once daily for the next 5 to 12 days.
- May be followed by oral treatment.
- Dosage in renal impairment: no dosage adjustment if CrCl is 30 mL/min or greater; do not use if CrCl is below 30 mL/min as one of the excipients, hydroxypropyl-B-cyclodextrin, is eliminated through glomerular filtration.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility).
- Store at room temp; protect from light and freezing.
- Stable for 48 hours at room temp when protected from light in NS at a concentration of 3.33 mg/mL in the special bag provided by the manufacturer.
- Compatible only with NS and stable only at a concentration of 3.33 mg/mL; other concentrations will lead to precipitation.
- Should not be co-administered with other fluids or drugs.

MISCELLANEOUS
- Quinidine, pimozide, CYP3A4-metabolized HMG-CoA reductase inhibitors (e.g., simvastatin, lovastatin, atorvastatin), oral midazolam, triazolam and ergot alkaloids (e.g., dihydroergotamine) are contraindicated with itraconazole IV.
- High potential for drug interactions through the cytochrome P4503A4.
- No information regarding cross-hypersensitivity with otherazole antifungal agents; caution should be used.

REFERENCES
1, 5, 40, 95, 208. * Available via Health Canada’s Special Access Programme
KADCYLA® TRASTUZUMAB EMTANSINE

**INDICATIONS**
- Monotherapy for patients with HER2-positive, metastatic breast cancer who received both prior treatment with trastuzumab and a taxane, separately or in combination. Patients should have either received prior therapy for metastatic disease or developed disease recurrence during or within 6 months after completing adjuvant therapy.

**ADMINISTRATION**
- Reconstitute each 100 mg or 160 mg vial by slowly injecting 5 mL or 8 mL, respectively, of SWFI to obtain a concentration of 20 mg/mL. Gently swirl until complete dissolution. Do NOT shake.
- Intermittent IV infusion (mandatory): Dilute required amount into 250 mL of 1/2NS or NS. Gently invert bag to mix; do NOT shake. When mixed in NS, must use an in-line filter (0.2 micron non-protein adsorptive or 0.22 micron polyethersulfone (PES) filter) during the infusion; when mixed in 1/2NS, filtering is not necessary. Administer initial dose over 90 minutes. If well tolerated, may administer subsequent doses over 30 minutes. Observe patient closely during infusion, for at least 90 minutes after the first infusion and at least 30 minutes after subsequent infusions.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactoid reaction, rash, pruritus.
- Infusion-related reactions: flushing, fever, chills, dyspnea, wheezing, bronchospasm, hypotension and tachycardia. Patient should be observed for infusion-related reactions, especially during the first infusion. Symptoms are usually mild to moderate and resolve within 24 hours of infusion. If needed, decrease infusion rate or interrupt infusion depending on severity of the reactions. Supportive therapy such as beta-agonists, antihistamines, antipyretics and corticosteroids may be required.
- Cardiovascular: reduced left ventricular ejection fraction, hypertension.
- GI: nausea, vomiting, constipation, diarrhea, abdominal pain, dry mouth, stomatitis, dyspepsia, dysgeusia.
- CNS: peripheral neuropathy (mostly sensory), paresthesia, headache, dizziness, insomnia.
- Hematologic: thrombocytopenia (more frequent in the Asian population), hemorrhage, epistaxis, anemia, neutropenia, leukopenia.
- Hepatic: increased LFTs, liver failure, nodular regenerative hyperplasia, portal hypertension, hyperbilirubinemia.
- Ophthalmic: blurred vision, conjunctivitis.
- Respiratory: cough, dyspnea, interstitial lung disease, pneumonitis, acute respiratory distress syndrome.
- Fatigue, peripheral edema, urinary tract infection, hypokalemia, musculoskeletal pain, arthralgia, myalgia.
- Extravasation hazard: irritant. Erythema, tenderness, irritation, pain, swelling. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- 3.6 mg/kg IV every 3 weeks. Dose reductions or treatment interruption may be necessary if not well tolerated. Doses should not be re-escalated after a dose reduction. Consult manufacturer’s dosing instructions for further details.
- Dosage in renal impairment: no dosage adjustment required in case of mild or moderate renal impairment (CrCl of 30 mL/min or greater).
- Dosage in hepatic impairment: consult manufacturer’s monograph.
- Dose adjustment is required in case of cardiotoxicity; consult manufacturer’s monograph.
- Consult specific protocol.

Do NOT confuse Kadcyla® trastuzumab emtansine with trastuzumab (Herceptin®). Kadcyla® trastuzumab emtansine contains a cytotoxic component, unlike trastuzumab. These products have different uses, toxicities, administration and dosages. This monograph is specific to KADCYLA® TRASTUZUMAB EMTANSINE.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge. Do not freeze.
- Reconstituted solution is stable for 24 hours in the fridge. It should be clear to slightly opalescent, colourless to pale brown.
- Diluted solutions are stable for 24 hours in the fridge in NS or 1/2NS in PVC or polyolefin bags.
- Not compatible with D5W.

MISCELLANEOUS
- Baseline cardiac assessment should be done for all patients and repeated every 3 months during treatment or more often if clinically indicated.
- LFTs should be performed prior to each dose.

REFERENCES
INDICATIONS

- As monotherapy for induction and maintenance of anesthesia during diagnostic and surgical procedures.
- For the induction of anesthesia prior to the administration of other general anesthetic agents or as a supplement to low potency anesthetic agents such as nitrous oxide.
- For pain management in patients refractory to standard treatments.
- For procedural analgesia/sedation.

ADMINISTRATION

- IV direct (for doses of 10 mg or less): physician or RN; respiratory support; inject first dose over 1 minute or at a rate of 0.5 mg/kg/min (35 mg/min for a 70 kg patient).
- IV direct (for doses greater than 10 mg): physicians trained in anesthesiology only for first dose. RN may give subsequent doses for patients on ventilator support; respiratory support; undiluted; inject over 1 minute or at a rate of 0.5 mg/kg/min (35 mg/min for a 70 kg patient).
- Continuous IV infusion: respiratory support; undiluted (10 mg/mL formulation) or diluted to 1-2 mg/mL in NS or D5W. Must be administered by an infusion pump.
- Continuous SC infusion: respiratory support. Dilute with NS to reduce discomfort.
- IM.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylaxis, erythema, morbilliform rash.
- Cardiovascular: hypertension, tachycardia; infrequently arrhythmias, hypotension, bradycardia.
- GI: increased salivation.
- CNS: postanesthesia: hallucinations, vivid dreams, confusion, excitement and delirium; may last up to 24 hours; more frequent in patients 15-65 years old and with IV administration. Prophylaxis and treatment with lorazepam, midazolam or haloperidol can help alleviate such symptoms. Sedation, increased intracranial pressure; may exacerbate psychotic symptoms.
- Respiratory: respiratory depression with rapid administration of high doses.
- Hypertonia, tonic and clonic movements.
- Renal: may cause severe and irreversible urinary tract toxicity with chronic administration.
- Ophthalmic: blurred vision, diplopia, nystagmus.
- Local reactions: pain and exanthema at injection site.

DOSAGE

Anesthesia:
- IV: induction 1-2 mg/kg (range 0.5-4.5 mg/kg).
- Maintenance: 50-100% induction dose prn or IV infusion of 0.1-0.5 mg/min. A continuous maintenance infusion can also be used with a range from 0.6 to 1.8 mg/kg/hr (42-126 mg/hr for a 70 kg patient).
- IM: induction 5-10 mg/kg (range 4-13 mg/kg).
- Maintenance: 50-100% induction dose prn.

Analgesia/Sedation:
- IV: usually 2.5-5 mg prn for cancer pain; 5-50 mg for procedural pain/sedation. Can be given as an initial dose of 1 kg (70 mg for a 70 kg patient) IV with incremental doses of 0.5 mg/kg (35 mg for a 70 kg patient) every 5 to 15 minutes prn or followed by a continuous infusion of 0.05-1.2 mg/kg/hr (3.5-84 mg/hr for a 70 kg patient); higher initial infusion rates (0.24-0.5 mg/kg/hr or 17-35 mg/hr for a 70 kg patient) have also been used. Titrate infusion rate as needed.
- IV: as an adjunct to opioid analgesia: 0.1-0.8 mg/kg (7-56 mg for a 70 kg patient) IV as an initial dose; may follow with a continuous infusion of 0.05 mg/kg/hr (3.5 mg/hr for a 70 kg patient), up to 0.4 mg/kg/hr (28 mg/hr for a 70 kg patient).

…/Cont.
## DOSAGE (Cont.)

- **SC:** usual dose 10-25 mg prn (range 2.5-25 mg) OR 0.5-1 mg/kg prn (range 0.125-2 mg/kg).
- Continuous SC infusion: 0.04-0.1 mg/kg/hr (2.8-7 mg/hr for a 70 kg patient). Daily dose can be increased by 0.1 mg/kg/hr or by 2-4 mg/hr q24h up to an usual maximum dose of 500 mg/24 hours; up to 3600 mg/24 hours have been used.
- **IM:** 0.5-5 mg/kg.
- Dosage in renal impairment: no dosage adjustment appears to be necessary.
- Dosage in hepatic impairment: prolonged duration of effect may warrant dose reduction.

## COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and ampoules at room temp. Protect from light.
- Undiluted solution is clear, colourless to slightly yellow. Exposure to light darkens the solution though does not cause product degradation. Do not use in case of precipitation.
- Incompatible with barbiturates and diazepam.
- Compatible with NS and D5W.
- Stable for 182 days at room temp exposed to light in SWFI at a concentration of 10 mg/mL stored in glass vials.
- Stable for 12 months between 23-27°C, 38-42°C and refrigerated in NS at a concentration of 1 mg/mL in polypropylene syringes.

## MISCELLANEOUS

## REFERENCES

5, 85, 95, 135, 208, 256, 310, 311, 457.
KETOROLAC
Ketorolac trometamol, Ketorolac tromethamine, Toradol®

INDICATIONS
- Short-term treatment of moderate to severe acute pain.
- Treatment of cancer pain in palliative care patients.

ADMINISTRATION
- IV direct: physician or RN; administer undiluted over at least 15 seconds, but preferably over 1-2 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of compatible solution and infuse over 15-30 minutes.
- Although ketorolac is not approved by Health Canada for IV administration, the IM product may be given IV as there is strong documentation in the literature supporting its efficacy and safety by this route.
- SC (palliative care): intermittent injection or continuous infusion.
- IM (deep).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactic/anaphylactoid reactions, angioedema, Stevens-Johnson syndrome, rash, toxic epidermal necrolysis, exfoliative dermatitis, erythema multiforme, bronchospasm.
- Cardiovascular: fluid retention/edema leading to hypertension and CHF, vasodilation.
- GI: nausea, vomiting, abdominal pain, diarrhea, dyspepsia, GI ulceration and bleeding.
- CNS: somnolence, headache, dizziness.
- Hepatic: increased LFTs.
- Sweating.
- Local reactions: pain at IM and intermittent SC injection site.

DOSAGE
- 10-30 mg IV/IM q4-6h prn, maximum 120 mg/day OR single dose of 60 mg IM or 30 mg IV.
- Geriatric patients, patients weighing less than 50 kg, or with renal impairment: 15 mg IV/IM q6h, maximum of 60 mg/day IV/IM OR single dose of 30 mg IM or 15 mg IV.
- Various studies indicate that single doses of 10 mg are equally effective as higher doses for acute pain.
- Parenteral therapy should not continue beyond 2 days, except in palliative care patients.
- Palliative care: 15-30 mg SC TID OR 30-60 mg/24 hours as a continuous SC infusion, up to 120 mg/24 hours.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules and vials at room temp. Protected from light.
- Compatible with D5W, NS, D5-NS, Ringer’s, RL.
- Stable for 21 days at room temp or under refrigeration in NS or D5W at concentrations of 0.3 mg/mL and 0.6 mg/mL in PVC plastic bags.
- Stable for 3 months when frozen in D5W at a concentration of 0.2 mg/mL in polyolefin bags; after subsequent microwave thawing, solution is still stable in the fridge for another 60 days, protected from light.

MISCELLANEOUS
- Do not administer to patients with ASA intolerance (i.e., nasal polyps/rhinosinusitis, urticaria/angioedema or asthma after taking ASA or other NSAIDs) as cross-hypersensitivity has been reported.
- Do not administer for perioperative pain in patients undergoing coronary artery bypass graft surgery.

REFERENCES
1, 4, 5, 6, 40, 95, 143, 256, 313, 353, 413.
LABETALOL

INDICATIONS
- For the emergency treatment of severe hypertension when prompt and urgent reduction of blood pressure is essential.

ADMINISTRATION
- IV direct: physician or RN; cardiac monitoring; continuous BP monitoring. Administer undiluted at a rate not exceeding 20 mg over 2 minutes.
- Continuous IV infusion: cardiac monitoring; blood pressure monitoring. Dilute 200 mg (40 mL) in 250 mL of a compatible solution for an approximate concentration of 2 mg/3 mL. At TOH: withdraw 10 mL from a 250 mL bag of D5W or NS and discard, then add 300 mg (60 mL from labetalol 5 mg/mL vials) in the bag for an approximate concentration of 1 mg/mL OR, for fluid-restricted patients, use undiluted labetalol (transfer contents of vials to an empty bag to obtain 1500 mg/300 mL or 600 mg/120 mL). Infuse as per Dosage section.
- Patient should be in supine position.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; anaphylactoid reactions, rash, pruritus, urticaria, dyspnea, angioedema.
- Cardiovascular: ventricular arrhythmias, bradycardia; orthostatic hypotension, likely to occur if supine patients are tilted upward or allowed to assume an upright position within 3 hours of IV administration.
- GI: nausea, vomiting, dyspepsia.
- CNS: somnolence, dizziness, headache.
- Renal: elevated urea and creatinine.
- Tingling of skin/scalp.
- Fatigue, malaise.
- Blurred vision.

DOSEAGE
- IV direct: Initial dose 20 mg, may repeat 20-80 mg at 10 minute intervals until desired supine BP or total of 300 mg has been given.
- Continuous IV infusion: initiate rate at 0.5-2 mg/min, adjust rate according to blood pressure; up to 8 mg/min has been used. The usual effective dose is 50-200 mg. Maximum cumulative dose of 300 mg; however, occasional clinical situation may require prolonged infusions and cumulative doses greater than 300 mg.
- Dosage in hepatic impairment: patients have required, on average, dose reductions of 50%.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Stable for 24 hours at room temp or in the fridge in NS at concentrations of 1.25 and 3.75 mg/mL.
- Stable for 72 hours at room temp or in the fridge in D5W, RL, Ringer’s, D5-Ringer’s, D5-RL, dextrose-saline solutions at concentrations of 1.25, 2.5 and 3.75 mg/mL.
- Incompatible with 5% sodium bicarbonate.

MISCELLANEOUS
- Maximum hypotensive effect occurs in 5-15 minutes.
- Concomitant use of IV labetalol with IV diltiazem or IV verapamil may cause significant cardiac depression. Therefore, co-administration (within a few hours) is contraindicated.

REFERENCES
1, 4, 5, 6, 40, 95, 135, 208.
INDICATIONS
- Management of partial-onset seizures in adult patients.

ADMINISTRATION
- Intermittent IV infusion: administer undiluted or diluted in NS, D5W or RL over 30-60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: multiorgan hypersensitivity: triad of rash, fever and other organ involvement (e.g., eosinophilia, hepatitis, nephritis, lymphadenopathy and/or myocarditis).
- Cardiovascular: PR interval prolongation, AV block, atrial flutter or fibrillation in patients with diabetic neuropathy and/or cardiovascular disease, ventricular tachyarrhythmia.
- GI: nausea, vomiting, diarrhea.
- CNS: dizziness, ataxia, vertigo, headache, somnolence, tremor, memory impairment, balance disorder.
- Fatigue.
- Local reactions: pain or discomfort, irritation, erythema.

DOSAGE
- Monotherapy: initial dose of 100 mg IV BID; can be increased if needed at weekly intervals by 50 mg BID to a maximum of 300 mg BID (600 mg/day).
- In combination with other anticonvulsants: initial dose of 50 mg IV BID, to be increased to 100 mg BID one week later; can be further increased if needed by 50 mg BID every week to a maximum of 200 mg BID (400 mg/day).
- Dosage in renal impairment: titrate with caution; no dosage adjustment needed if CrCl is greater than 30 mL/min; maximum dose of 300 mg/day if CrCl is 30 mL/min or less, including patients with end-stage renal disease. Hemodialysis will remove approximately 50% of the dose after a 4-hour session.
- Dosage in hepatic impairment: titrate with caution to a maximum dose of 300 mg/day in patients with mild to moderate impairment; not evaluated and therefore not recommended in patients with severe liver impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Stable for 24 hours at room temp when diluted in D5W, NS and RL in glass or PVC containers.

MISCELLANEOUS
- When transferring from IV to oral (and vice versa), administer at equivalent dose and frequency.
- IV administration has been used for up to 5 days; switch patients to oral route as soon as practical.
- An ECG before initiating therapy and when therapy is at steady-state is recommended in patients with known conduction problems and/or a history of severe cardiac disease.

REFERENCES
1, 5, 40, 135.
**INDICATIONS**
- Treatment or prevention of hematologic toxicity associated with folic acid antagonists (such as methotrexate).
- Treatment of megaloblastic anemia due to folate deficiency or congenital dihydrofolate reductase deficiency, when oral therapy is not feasible.
- As adjuvant therapy to 5-fluorouracil (5-FU) in the palliative treatment of patients with advanced colorectal cancer.

**ADMINISTRATION**
- IV direct: physician or RN; doses less than 100 mg may be given undiluted; due to the calcium content, inject at a rate no greater than 160 mg/min into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion: dilute in 50 mL (for doses up to 500 mg) or 100-500 mL (for higher doses) of a compatible IV solution; administer over 15-60 minutes, not exceeding 160 mg per minute due to the calcium content. Large doses may be infused over 1-6 hours.
- IM. Absorption is better from deltoid than gluteus. Rotate injection sites.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rare; anaphylactic/anaphylactoid reactions, rash, hives, pruritus, wheezing.
- GI: mucositis, stomatitis, diarrhea, enterocolitis (can be fatal) when combined with 5-FU.
- Leukopenia when combined with 5-FU.

**DOSAGE**

**Treatment of folic acid antagonist/methotrexate overdose:**
- Administer leucovorin IM/IV in amounts equal or greater to the suspected dose of the folic acid antagonist, preferably within the first hour, or within 24-36 hours when there is delayed excretion (e.g., presence of ascites, pleural effusion, renal insufficiency or dehydration); OR
- For large overdoses, up to 75 mg as an intermittent IV infusion within 12 hours of overdose, followed by 12 mg IM q6h for 4 doses; for less severe overdoses, 6-12 mg IM q6h for 4 doses; OR
- 10 mg/m² IV/IM q6h until methotrexate levels are under 0.1 mcmol/L.
- If creatinine has increased by more than 50% from pre-methotrexate administration or if methotrexate levels are still elevated 24 hours after leucovorin administration, increase the leucovorin dose to 100 mg/m² IV q3h until methotrexate level is under 0.1 mcmol/L.

**Prevention of hematologic toxicity from methotrexate chemotherapy:**
- 15 mg or 10-25 mg/m² IV/IM, starting 24 hours after methotrexate administration, q6h for 8-10 doses or until serum methotrexate level is under 0.05 mcmol/L.
- Increase the dose to 100 mg/m² IV q3h if serum creatinine has increased by more than 50% from pre-methotrexate administration or if methotrexate levels are above 1 mcmol/L, then decrease the dose to 10 mg/m² or 15 mg IV q3h until methotrexate level is 0.1 mcmol/L. Consult specific protocol.

**Megaloblastic anemia:**
- Due to folate deficiency: up to 1 mg/day IM/IV.
- Due to congenital deficiency of dihydrofolate reductase: 3-6 mg IM.

**Colorectal cancer:**
- 20-200 mg/m² IV daily X 5 days every 4-5 weeks, given before 5-FU OR 400 mg/m² IV for one dose on day 1 every 2 weeks. Consult specific protocol.
COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light.
- Stable for 7 days at room temp or in the fridge, protected from light, in NS at a concentration of 1 mg/mL in glass and polyolefin containers.
- Stable for 4 days at room temp or in the fridge, protected from light, in NS at concentrations of 1-1.5 mg/mL and in D5W at concentrations of 0.1-1.5 mg/mL in glass and PVC containers.
- Stable for 4 days at room temp or in the fridge, protected from light, in NS at concentrations of 0.1-0.5 mg/mL in glass containers.
- Stable for 24 hours at room temp, protected from light, in D10W or D10-NS at a concentration of 0.05 mg/mL.
- Stable for 24 hours at room temp in NS, D5W, RL and Ringer’s at a concentration of 0.05 mg/mL.
- Stable for 24 hours at room temp in RL and Ringer’s at concentrations of 0.06-1 mg/mL.
- Stable for 12 hours at room temp in D10W at concentrations of 0.06-1 mg/mL.
- Stable for 8 hours at room temp in D5-NS at a concentration of 0.05 mg/mL.
- Stable for 6 hours at room temp in D10-NS at concentrations of 0.06-1 mg/mL.
- Incompatible with 5-FU.

MISCELLANEOUS

- Timing of administration is critical, thus administer exactly as prescribed by physician.
- Oral absorption is saturable, thus doses greater than 25 mg should be given parenterally.
- Hydration (at least 3 litres/day) and alkalinization of the urine (pH greater or equal to 7) are recommended.

REFERENCES

1, 4, 5, 40, 95, 129, 135, 143, 165.
INDICATIONS

- Palliative treatment of advanced hormone-dependent prostate cancer.
- Treatment of breast cancer.
- Treatment of endometriosis, alone or in combination with norethindrone.
- In combination with iron therapy to treat anemia associated with uterine leiomyomata prior to surgery.

ADMINISTRATION

- Lupron Depot ® and Eligard ® injections are to be reconstituted with supplied diluent and prepared according to manufacturer’s directions.
- SC:
  - Lupron ® 5 mg/mL solution: allow product to reach room temp. Inject in abdomen or anterior thigh region. Rotate injection site.
  - Eligard ® all strengths: allow product to reach room temp. Inject in abdomen, upper buttock or any region with an adequate amount of SC tissue.
- IM (Lupron Depot ®): in gluteus, anterior thigh or deltoid. Rotate injection site.

POTENTIAL ADMINISTRATION HAZARDS

- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare), rash.
- Cardiovascular: hot flashes (from mild to severe; usually decrease with continued therapy), QT interval prolongation, edema.
- GI: nausea, vomiting.
- CNS: headache, seizures, depression, dizziness, paresthesia, insomnia.
- Fatigue, fever, malaise, musculoskeletal pain, asthenia.
- Disease flare (e.g., for prostate cancer: increase in bone pain, urinary tract obstruction, neuropathy, hematuria, spinal cord compression) during the first few weeks of therapy. May need an antiandrogen (cyproterone 100 mg BID, flutamide 250 mg TID, bicalutamide 50 mg daily or nilutamide 150 mg daily) given concurrently for the initial 1-2 weeks of therapy.
- Local reactions: bruising, redness, burning, pain at injection site.

DOSAGE

- Prostate cancer: 1 mg daily; 7.5 mg monthly; 22.5 mg every 3 months; 30 mg every 4 months; or 45 mg every 6 months. Refer to each specific product for route of administration.
- Endometriosis: 3.75 mg as a monthly IM depot injection (Lupron Depot ®) or 11.25 mg every 3 months as an IM depot injection (Lupron Depot ®) for 6 months. Retreatment can be performed for another 6 months only in combination with norethindrone.
- Uterine leiomyomata: 3.75 mg as a monthly IM depot injection for 3 months (Lupron Depot ®), or a single injection IM of 11.25 mg depot formulation (Lupron Depot ®).
- Breast cancer: 3.75 mg as a monthly IM depot injection (Lupron Depot ®) or 11.25 mg every 3 months as an IM depot injection (Lupron Depot ®).
- Consult specific protocol.
**LEUPROLIDE**

**Eligard®, Lupron®, Lupron Depot®**

**CLASSIFICATION**
Gonadotropin - releasing hormone analog

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### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- **Lupron®**: store 5 mg/mL vials in the fridge. Protect from light.
- **Lupron Depot®**: store at room temp. Reconstituted solution is stable for 24 hours; however, immediate use is recommended.
- **Eligard®**: store in the fridge; the unreconstituted product is stable for 8 weeks at room temp; the reconstituted product is stable for only 30 minutes.

### MISCELLANEOUS

- Due to different release characteristics, the different formulations or fractional doses of the same brand of product are not interchangeable.
- Do not use a combination of syringes to achieve a particular dose.

### REFERENCES

1, 5, 95, 129, 135, 165.
INDICATIONS
- For the management of status epilepticus.
- As an adjunct therapy in the management of patients with epilepsy who are unable to take oral levetiracetam.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in 100-250 mL of D5W, NS or RL, not exceeding a concentration of 15 mg/mL. Infuse over 15 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, Stevens-Johnson syndrome, toxic epidermal necrolysis, angioedema, anaphylaxis.
- CNS: behavioral problems (aggression, apathy, anger, agitation, anxiety, depersonalization, irritability, neurosis), headache, somnolence, dizziness, coordination difficulties, depression, increased risk of suicidality.
- Respiratory: nasopharyngitis, pharyngitis.
- Asthenia, fatigue.
- Infection.

DOSAGE
- Status epilepticus: 1000-3000 mg OR 40-60 mg/kg as a single IV dose; maximum dose: 4500 mg.
- Maintenance dose: 500 mg IV q12h; dose may be increased by 1000 mg/day (500 mg q12h) every 2 weeks to a maximum dose of 3000 mg/day (1500 mg IV q12h).
- Dosage in renal impairment (for maintenance dose):
  | CrCl (mL/min) | greater than 80 | 80-50 | 49-30 | less than 30 | dialysis* |
  | Dose (mg)     | 500-1500        | 500-1000 | 250-750 | 250-500 | 500-1000 |
  | Interval (hr) | 12              | 12       | 12     | 12      | 24      |
* As hemodialysis removes a substantial amount, give an additional dose of 250-500 mg after dialysis.
- Dosage in hepatic impairment: no dosage adjustment is necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 20-25°C, with excursions permitted between 15-30°C.
- Compatible with D5W, NS and RL.
- Compatible with lorazepam, diazepam and valproate sodium.
- Stable for 24 hours at room temp in NS, D5W and RL at concentrations up to 15 mg/mL in PVC bags.

MISCELLANEOUS
- Equivalent dosage: 500 mg oral BID = 500 mg IV BID.
- Switch to oral therapy as soon as possible.

REFERENCES
5, 40, 95, 135, 410, 411. * Available via Health Canada’s Special Access Programme
### INDICATIONS
- Treatment of primary systemic carnitine deficiency.
- Acute and chronic treatment of patients with an inborn error of metabolism that results in a secondary carnitine deficiency.
- Prevention and treatment of carnitine deficiency in patients undergoing hemodialysis.

### ADMINISTRATION
- IV direct: physician or RN; undiluted; inject slowly over 2-3 minutes.
- Intermittent IV infusion: dilute in NS or RL to a concentration of 0.5-8 mg/mL.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity.
- Cardiovascular: hypertension, hypotension, chest pain.
- GI: transient nausea and vomiting, diarrhea, abdominal pain, gastritis.
- CNS: seizures, headache, dizziness.
- Hypercalcemia.
- Fever, flu syndrome, asthenia, body odour.
- Local reactions: redness, swelling, tenderness.

### DOSAGE
- Metabolic disorder:
  - Initial dose: in case of metabolic crisis: 50 mg/kg IV followed by an equivalent dose over the following 24 hours (see Daily dose).
  - Daily dose: 50 mg/kg IV in divided doses q3-4h (and not less frequent than every 6 hours due to its short half-life).
  - Maximum daily dose: 300 mg/kg IV.
- Hemodialysis patients: 5-20 mg/kg IV in the venous return line after each dialysis session.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp and protect from light.
- Stable for 24 hours at room temp in NS and RL at concentrations of 0.5 to 8 mg/mL in PVC bags.

### MISCELLANEOUS
- Plasma carnitine levels should be monitored prior to initiating and during therapy.

### REFERENCES
5, 40, 95, 135.
INDICATIONS
- Broad spectrum antibiotic indicated for treatment of infections due to susceptible organisms when oral route is not feasible.

ADMINISTRATION
- Available in bags of premixed solution of 5 mg/mL in D5W.
- Intermittent IV infusion: infuse over a minimum of 60 minutes for doses of 250-500 mg and 90 minutes for a dose of 750 mg.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: mild to severe dermatologic reactions and anaphylaxis; can occur after the first dose. Discontinue therapy if rash or any symptoms develop.
- Cardiovascular: hypotension with rapid or bolus injection, QT interval prolongation and arrhythmias.
- GI: diarrhea, nausea, constipation.
- CNS: headache, dizziness, insomnia.
- Hypoglycemia, hyperglycemia.
- Myasthenia gravis exacerbation (can be fatal); avoid using in patients with this condition.
- Tendinitis and tendon rupture, especially in the elderly, patients receiving corticosteroids or transplant recipients.
- Local reactions: injection site reactions.

DOSAGE
- 250-750 mg IV once daily depending on indication.
- Dosage in renal impairment: initial and subsequent doses vary according to indication and degree of renal impairment. Consult manufacturer’s monograph for details.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store premixed solutions in the fridge or at room temp. Do not freeze. Keep infusion bags in overwrap until ready to use.
- Compatible IV solutions include NS, D5W, D5-NS and sodium lactate 1/6M.
- Incompatible with sodium bicarbonate, mannitol and multivalent cations (e.g., magnesium, calcium).

MISCELLANEOUS
- Patient should be well hydrated to prevent crystalluria or cylindruria.
- Use with caution in patients predisposed to seizures.
- Use in pediatrics is not routinely recommended but may be justified in special circumstances.

REFERENCES
1, 4, 5, 6, 40, 95, 135, 208.

Full revision 2016; limited revision 2017
**INDICATIONS**
- Replacement therapy for diminished or absent thyroid function of any etiology where a rapid repletion is required or whenever the oral route is not possible.
- Myxedematous stupor or coma.
- As an aid for organ preservation before harvesting for organ transplantation in brain-dead organ donor.

**ADMINISTRATION**
- Reconstitute lyophilized powder with 5 mL of NS without preservative to obtain a concentration of 100 mcg/mL; shake until a clear solution is obtained.
- IV direct (preferred): physician or RN; undiluted; administer at rate of 100 mcg/min.
- Continuous IV infusion: in brain-dead organ donor; dilute 250 mcg in 250 mL D5W for a final concentration of 1 mcg/mL. As a substantial amount of drug binds to PVC, use glass bottle or polyolefin bag for dilution. For administration, use non-PVC tubing or if a PVC tubing is used, flush tubing with levothyroxine solution before administration.
- IM: not preferred as absorption may be erratic.

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: tachycardia, chest pain; caution in patients with cardiovascular disease.
- GI: diarrhea, abdominal cramps, vomiting.
- CNS: nervousness, tremors, insomnia.
- Sweating.
- May potentiate effects of anticoagulants. Frequent prothrombin determinations are recommended.

**DOSAGE**
- Hypothyroidism: dosage is adjusted to clinical response and lab values; typical adult parenteral maintenance dose is 50-100 mcg/day. The usual initial parenteral dosage for maintenance therapy in adults who cannot take oral treatment should be approximately 50% (but some clinicians are using up to 80%) of the previously established oral dose, while that in children is one-half to three-fourth of the oral dose.
- Myxedema coma: initial dose of 100-500 mcg IV. Depending on response to first dose, 100-300 mcg IV or even greater on the second day; follow by daily doses of 50-100 mcg IV or 1.2 mcg/kg/day until oral replacement is feasible. Lower doses should be considered in geriatric patients and in those with cardiovascular disease.
- Organ preservation in brain-dead donor: 20 mcg IV bolus followed by 10 mcg/hr IV infusion OR 100 mcg IV bolus followed by 50 mcg IV bolus q12h.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp. Protect from light.
- Manufacturer recommends to use immediately following reconstitution and to discard unused portion.
- Reconstituted solution (100 mcg/mL in NS) is stable for 7 days in the fridge when repackaged in polypropylene syringes.
- Stable for 24 hours at room temp unprotected from light in D5W at a concentration of 1 mcg/mL in glass bottles and polyolefin bags.

**MISCELLANEOUS**
- Onset of effect in myxedema coma is 6-12 hours; maximum effect in up to 24 hours.
- Contraindicated in thyrotoxicosis, acute myocardial infarction or uncorrected adrenal insufficiency.

**REFERENCES**
1, 4, 5, 6, 40, 95, 108, 135.

Full revision 2016
LIDOCAINE

**INDICATIONS**
- Treatment of acute ventricular tachyarrhythmias.
- Treatment of acute and chronic neuropathic pain (refer to TOH Nursing policy 00063: Pain - intravenous or subcutaneous lidocaine for pain management).
- As a diluent to reconstitute some specific medications to decrease the pain associated with IM administration (lidocaine 0.5% or 1%, without epinephrine).

**ADMINISTRATION**
- IV direct: physician or RN; for cardiac or pain indications: cardiac monitoring, continuous BP monitoring; use 100 mg/5 mL prefilled syringes or 100 mg/5 mL solution. If administered for pain: physician to remain in attendance with the patient for at least 15 minutes after bolus dose. Rate as per Dosing section for both indications.
- Intermittent IV infusion, Continuous IV infusion: for cardiac indication: cardiac monitoring, continuous BP monitoring (not needed for pain indication). Dilute 1-2 g in 250-500 mL of D5W or NS or dilution as per Dosage section; may also use premixed bag containing D5W. Rate as per Dosage section. Must be administered by an infusion pump.
- SC infusion: for pain management only.
- IM: only when used as a diluent to reconstitute some specific medications to be administered IM.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylactoid/anaphylactic reactions, urticaria, edema.
- Cardiovascular: hypotension, bradycardia, cardiovascular collapse.
- GI: vomiting.
- CNS: drowsiness, apprehension, paresthesias, dizziness, euphoria, seizures.
- Respiratory depression.
- Muscle tremors.
- Local reactions: thrombophlebitis with IV administration; pain with IM administration.

**DOSAGE**

**Adults (for cardiac indications):**
- Loading: 0.5-1.5 mg/kg IV (e.g., 50-100 mg) given at a rate of 0.35-0.7 mg/kg/min (approximately 25-50 mg/min); if refractory after 5-10 minutes, a second bolus of 0.5-0.75 mg/kg IV (e.g., 25-50 mg) may be given. Maximum single dose should not exceed 100 mg. Maximum total loading dose: 3 mg/kg.
- Maintenance: a continuous infusion may be administered at a rate of 1-4 mg/min IV (20-50 mcg/kg/min). Reappearance of arrhythmias during an infusion should be treated with a small IV bolus dose (0.5 mg/kg) and an incremental infusion rate increase (maximum rate 4 mg/min). Use slower infusion rates (e.g., 1/2 of above infusion rates) in patients with decreased cardiac output (e.g., CHF), bradycardia, liver disease, or patients older than 65 years of age.
- No more than 200-300 mg should be administered during a 60 minute period.

**Adults (for pain indications as per TOH Nursing policy 00063 (Pain – intravenous or subcutaneous lidocaine for pain management)):**
- Palliative/chronic pain: 1.5 mg/kg slow IV direct over 2-4 minutes followed by 3.5-5 mg/kg in 500 mL of NS IV over 30-60 minutes.
- Acute pain: 1.5 mg/kg slow IV direct over 2-4 minutes followed by an infusion of 0.5-2 mg/kg/hr.
- Ideal body weight is to be used if body mass index is greater than 30.

.../Cont.
LIDOCAINE
Lignocaine, Xylocaine®, Xylocard®

Antiarrhythmic, Anesthetic

DOSAGE
Pediatrics (for cardiac indications):
- Loading dose of 0.5-1 mg/kg IV (maximum of 100 mg), repeated according to response with the total dose not exceeding 3-5 mg/kg.
- IV Maintenance: 10-50 mcg/kg/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Do not freeze.
- Compatible with D5W, NS, RL, 1/2NS, 1/4NS, D5-NS, D5-12NS, D5-RL.
- Stable for 90 days at room temp and in the fridge undiluted at 20 mg/mL in polypropylene syringes.

MISCELLANEOUS
- Duration of IV bolus dose is 10-20 minutes.
- Desired range of plasma concentration is approximately 6-21 mcmol/L (1.5-5 mcg/mL) for the treatment of ventricular arrhythmia, and 6-12 mcmol/L for pain control.

REFERENCES
1, 4, 5, 40, 95, 135.
**INDICATIONS**

- Treatment of serious infections due to susceptible streptococci or staphylococci when treatment with a penicillin is considered inappropriate.

**ADMINISTRATION**

- Intermittent IV infusion (mandatory): dilute each gram in at least 100 mL of a compatible fluid to obtain a maximum concentration of 10 mg/mL; infuse at a rate not exceeding 1 g per hour.
- Deep IM.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, urticaria, pruritus, erythema multiforme, angioedema, serum sickness, anaphylactic/anaphylactoid reactions.
- Cardiovascular: hypotension with too rapid administration.
- GI: nausea, vomiting, diarrhea (including *C. difficile*-associated diarrhea), colitis, abdominal pain, esophagitis.
- CNS: headache, tinnitus, dizziness.
- Hepatic: jaundice, abnormal LFTs, increased bilirubin.
- Myalgia, vaginitis.
- Local reactions: irritation, pain, induration, sterile abscess with IM administration; pain, erythema, swelling, thrombophlebitis with IV administration.

**DOSSAGE**

- Adults: 600-1000 mg IV q8-12h.
  600 mg IM q12-24h.
  Dose may be increased in more severe infections. Maximum of 8 g/day in life-threatening infections.
- Pediatrics, over 1 month of age: 10-20 mg/kg/day IV in 2 or 3 divided doses.
  10 mg/kg IM q12-24h.
  Maximum pediatric parenteral dose is 40 mg/kg/day or 8 g/day.
- Dosage in renal impairment: patients with severe renal impairment should receive 25-30% of the normal dose.
- Dosage in hepatic impairment: use with caution as the serum half-life may be 2-fold longer.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Stable for 24 hours at room temp in D5W, D10W, NS, D5-NS at a concentration of 1.2 mg/mL.
- Compatible with D10-NS, Ringer’s and sodium lactate 1/6M.

**MISCELLANEOUS**

- Contraindicated in patients allergic to clindamycin.
- Antagonizes the activity of erythromycin. Avoid such combination.
- Contains benzyl alcohol. Avoid use in pregnancy and in neonates.

**REFERENCES**

1, 4, 5, 40, 95, 135, 208.

Full revision 2016
INDICATIONS
- Vancomycin-resistant Enterococcus faecium (VREF) infections.
- Nosocomial and community acquired pneumonias caused by S. pneumoniae (penicillin-susceptible strains only) and S. aureus (methicillin-susceptible and -resistant strains).
- Methicillin-resistant staphylococcal (MRSA) infections if failure or intolerance to vancomycin.
- Complicated skin and skin structure infections (SSSI), including non-limb threatening diabetic foot infections, without osteomyelitis, caused by S. aureus (methicillin-susceptible and -resistant strains), S. pyogenes, or S. agalactiae.
- Uncomplicated SSSI caused by S.aureus (methicillin-susceptible strains only) and S. pyogenes.

ADMINISTRATION
- Intermittent IV infusion: premixed bags of 600 mg/300 mL in D5W; infuse over 30-120 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis, Stevens-Johnson syndrome.
- Cardiovascular: hypertension.
- GI: nausea, vomiting, diarrhea.
- CNS: headache, dizziness, seizures.
- Hematologic: myelosuppression (e.g., anemia, leukopenia and thrombocytopenia).
- Hepatic: elevated ALT and AST.
- Peripheral and optic neuropathy (can lead to vision loss). May be irreversible. Occurs mostly with treatments longer than 28 days.
- Lactic acidosis, hypoglycemia.

DOSAGE
- VREF: 600 mg IV q12h for 14 to 28 days.
- Pneumonia: 600 mg IV q12h for 7 to 21 days.
- SSSI: • non-diabetic foot infections: 600 mg IV q12h for 10 to 14 days.
  • diabetic foot infections: 600 mg IV q12h for 14 to 28 days.
- Dosage in renal impairment: no dosage adjustment is necessary; however, use with caution as metabolites may accumulate. Administer dose after hemodialysis session.
- Dosage in hepatic impairment: no adjustment necessary in mild to moderate impairment. Has not been evaluated in severe hepatic impairment (Child-Pugh C).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store bags at room temp. Protect from light. Do not freeze. Keep infusion bags in overwrap until ready to use.
- Compatible with D5W, NS, RL.
- Solutions may exhibit a yellow colour that can intensify over time without affecting potency.

MISCELLANEOUS
- Monitor blood counts weekly.
- Linezolid is a reversible non-selective inhibitor of monoamine oxidase. Has the potential to interact with adrenergic and serotonergic drugs.
- Avoid consuming foods/beverages with high tyramine content. Tyramine consumption should be less than 100 mg per meal.
- Linezolid should not be used in patients taking SSRIs or SNRIs because of risk of development of serotonin syndrome.
- Recommended to reduce doses of sympathomimetics, vasopressors, and dopaminergic agents prior to initiating linezolid.
- Switch to oral treatment at the same dosage when clinically appropriate.

REFERENCES
1, 5, 40, 68, 95, 135.

Full revision 2016
INDICATIONS
- Treatment of type 2 diabetes mellitus as monotherapy when metformin is inappropriate or as add-on therapy to metformin, with or without a sulfonylurea or basal insulin.
- Add-on combination to reduce the incidence of cardiovascular death in patients with type 2 diabetes mellitus and established cardiovascular disease.
- Chronic weight management in adults with a body mass index (BMI) of at least 30 kg/m², or at least 27 kg/m² if there is also one weight-related comorbidity (e.g., hypertension, type 2 diabetes mellitus, dyslipidemia).

ADMINISTRATION
- SC: in the upper arm, thigh, or abdomen. If basal insulin is part of the treatment regimen, both products can be administered in the same region, although not adjacent to each other.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus, angioedema, antibody formation, anaphylactic reaction.
- Cardiovascular: tachyarrhythmia, tachycardia, PR interval prolongation.
- GI: nausea, vomiting, dyspepsia, diarrhea, constipation. Minimized by increasing dose at weekly intervals.
- CNS: headache, dizziness.
- Hypoglycemia, fatigue.
- Pancreatitis.
- Renal dysfunction secondary to dehydration.
- Local reactions: bruising, pain, rash, erythema.

DOSAGE
- Diabetes: initial dose of 0.6 mg SC once daily without regard to meals for one week then increase to therapeutic dose of 1.2 mg SC daily. Based on clinical response, dose can be increased after at least one week to the maximum dose of 1.8 mg SC once daily.
- Weight management: initial dose of 0.6 mg SC daily; daily dose increased by 0.6 mg at weekly intervals to the maintenance and maximum dose of 3 mg SC daily. Discontinue treatment if less than 5% of body weight decrease by week 12 at the 3 mg daily dose.
- Dosage in renal impairment: use with caution in patients with moderate and severe renal impairment as there is limited data.
- Dosage in hepatic impairment: use with caution as there is limited data.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store prefilled multidose pens between 2-8°C. Do not freeze. Protect from light.
- When in use, the pen may be kept between 2-30°C for up to 30 days. Protect from excessive heat and sunlight; protect from light by using the pen cap when not in use.

MISCELLANEOUS
- Liraglutide is a glucagon-like peptide-1 (GLP-1) receptor agonist, an incretin mimetic agent.
- Liraglutide should not be used in the treatment of type 1 diabetes mellitus or diabetic ketoacidosis, in patients with multiple endocrine neoplasia syndrome type 2, or in patients with a personal or family history of medullary thyroid carcinoma.

REFERENCES
1, 5, 95, 135.
INDICATIONS
- Treatment of type 2 diabetes mellitus in adults in combination with metformin and/or a sulfonylurea, pioglitazone or basal insulin.

ADMINISTRATION
- SC: thigh, abdomen or upper arm. Rotate injection site. After administering the dose, remove the needle and replace the cap on the pen to protect from light.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylaxis, angioedema.
- Cardiovascular: PR interval prolongation.
- GI: nausea, vomiting, diarrhea, gastroparesis (avoid in patients with severe gastroparesis).
- CNS: headache, dizziness.
- Endocrine and metabolic: hypoglycemia (risk increased if used in combination with basal insulin or a sulfonylurea; refer to Miscellaneous section).
- Renal: renal failure.
- Pancreatitis.
- Local reactions: pain, pruritus, rash, erythema, hematoma, inflammation, irritation, nodule.

DOSAGE
- Initial dose of 10 mcg SC once daily for 14 days, then increase to maintenance dose of 20 mcg SC once daily.
- Administer dose within 1 hour before a meal (preferably the same meal of the day).
- If the 20 mcg daily maintenance dose is not tolerated, reduce to 10 mcg SC once daily and consider increasing the dose back to 20 mcg once daily maintenance dose within 4 weeks.
- Dosage in renal impairment: no dosage adjustment necessary when CrCl is 15 mL/min or greater, however closely monitor renal function and for occurrence of adverse events in patients with CrCl between 15-89 mL/min; not recommended when CrCl is less than 15 ml/min as has not been studied.
- Dosage in hepatic impairment: no dosage adjustment necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store prefilled pen between 2-8°C. Protect from light and excessive heat. Do not freeze.
- When in use, the pen may be kept at up to 30°C for 14 days.
- Solution in the pen should be clear and colourless.

MISCELLANEOUS
- Lixisenatide is a glucagon-like peptide-1 (GLP-1) receptor agonist, an incretin mimetic agent.
- Lixisenatide should not be used in the treatment of type 1 diabetes mellitus or diabetic ketoacidosis.
- When lixisenatide is added to basal insulin or a sulfonylurea, consider decreasing the dose of these latters to reduce the risk of hypoglycemia.

REFERENCES
1, 5, 95, 135.
INDICATIONS
- Preoperatively to produce sedation, relieve anxiety, and provide anterograde amnesia.
- Sedation in the critical care setting.
- Initial treatment of status epilepticus.
- Antiemetic adjunct for chemotherapy.
- To alleviate symptoms of acute alcohol withdrawal.
- Palliative care (e.g., agitation, sedation).

ADMINISTRATION
- IV direct: physician or RN; **respiratory support**: dilute dose in a syringe with an equal volume of a compatible solution. Gently invert several times to mix; do NOT shake vigorously to avoid air entrapment. Rate should not exceed 2 mg/min.
- Continuous IV infusion: dilute in D5W for a concentration of 2 mg/mL. At TOH, mix 40 mg (10 mL from lorazepam 4 mg/mL vials) with 10 mL D5W to obtain a final concentration of 2 mg/mL. Use a glass or a polyolefin container for dilution. Rate to be titrated according to response (see Dosage section).
  - IM (deep): undiluted.
  - SC: in palliative care, as an injection and infusion. For SC infusion, dilute to 2 mg/mL to reduce the risk of precipitation.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, anaphylactoid reactions, angioedema, rash.
- CNS: sedation, dizziness.
- Respiratory depression.
- Risk of propylene glycol toxicity when high dose continuous infusion (greater than 0.1 mg/kg/hr or 6 mg/hr) used for longer than 48 hours; monitor acid-base status, renal function, serum osmolality, electrolyte levels and osmol gap.
- Risk of polyethylene glycol toxicity with high doses (acute tubular necrosis).
- Local reactions: pain and erythema at injection site.
- Extravasation hazard: vesicant. Can cause arteriospasm in perivascular tissue, which can lead to gangrene.
  Consult the document "Extravasation of noncytotoxic intravenous agents associated with tissue necrosis" in TOH electronic formulary.

DOSAGE
- Preoperative, IV direct: - for sedation and relief of anxiety: 0.044 mg/kg IV (up to 2 mg) 15-20 minutes preoperatively.
  - for anterograde amnesia: 0.05 mg/kg IV (up to 4 mg, or 2 mg in patients over 50 years old).
  IM: 0.05 mg/kg (up to 4 mg, or 2 mg in patients over 50 years old) 2 hours preoperatively.
- Sedation in critical care: 0.02-0.06 mg/kg IV q2-6h OR 2 mg IV, followed by an IV infusion at 0.5-1 mg/hr; titrate to desired response and lowest effective dose. Dose range 0.25-10 mg/hr or 0.01-0.1 mg/kg/hr.
- Status epilepticus: 0.05-0.1 mg/kg IV (up to 4 mg); an additional dose of 0.05 mg/kg IV (up to 4 mg) may be required (after 10-15 minutes) if seizures recur or continue. Maximum: 8 mg per 12 hours.
- Antiemetic: 0.025-0.05 mg/kg (up to 4 mg) or 1.5 mg/m² (up to 3 mg) IM or IV 30-45 minutes pre-chemo then q4h prn.
- Alcohol withdrawal: 1-4 mg IV or IM; to be repeated as needed (IV: every 5-15 minutes; IM: every 30-60 minutes) to keep patient comfortable then every hour to maintain light somnolence.
- Palliative care: 0.5-2 mg SC q4-8h OR 4-20 mg SC infusion/24 hours.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge, protect from light. Do not freeze.
- Solution of 4 mg/mL in unopened vials from Sandoz is stable for 2 months at room temp; product should be discarded after this period. If exposure is up to a maximum of 7 days, the vial can be put back in the fridge and the product will be stable until the printed expiry date.
- Solution of 2 mg/mL in unopened vials from Sandoz is stable for 30 days at room temp; product should be discarded after this period.
- Compatible in SWFI, NS, and D5W, but solubility is highest in D5W.
- Lorazepam adsorbs to a significant amount to PVC bags.
- Stable for up to 24 hours at room temp at a concentration of 2 mg/mL and at concentrations of less than 0.08 mg/mL. Concentrations in the middle range of 0.08 to 1 mg/mL may be problematic as occasional precipitation may occur. Note that solutions in D5W at a concentration of 1 mg/mL have been stable for 24 hours at room temp only when prepared with the 2 mg/mL strength; precipitation occurred when prepared with the 4 mg/mL strength. This difference is explained by the fixed concentrations of solubilizing agents.

MISCELLANEOUS

- Lorazepam injection 4 mg/mL contains 80% v/v of propylene glycol and 18% v/v of polyethylene glycol.
- Lorazepam injection 2 mg/mL contains 77.5% v/v of propylene glycol and 20.3% v/v of polyethylene glycol.

REFERENCES

1, 4, 5, 40, 95, 135, 245, 254, 256, 335, 354, 457.
LOXAPINE
Loxapac ®
Antipsychotic

INDICATIONS
- Symptomatic management of psychotic episodes associated with schizophrenia in adults.

ADMINISTRATION
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: orthostatic hypotension, hypotension (Antidote if severe: norepinephrine or phenylephrine; do not use epinephrine), tachycardia, QTc interval prolongation (rare).
- GI: nausea, vomiting, constipation (can be severe), dry mouth.
- CNS: drowsiness, confusion, extrapyramidal symptoms (e.g., pseudoparkinsonism, akathisia and dystonia), seizures.
- Hematologic: venous thromboembolism.
- Neuroleptic malignant syndrome: hyperpyrexia, muscle rigidity, altered mental status, autonomic instability.
- Blurred vision, urinary retention, hyperglycemia.

DOSAGE
- Usual dose: 12.5-50 mg IM q4-6h or longer, adjusted to patient’s response.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules between 15-30°C.

MISCELLANEOUS
- Switch to oral therapy when feasible.

REFERENCES
5, 135.

Full revision 2016
INDICATIONS
- Prevention and treatment of seizures in toxemia of pregnancy (pre-eclampsia and/or eclampsia).
- For fetal neuroprotection of the preterm in women with imminent preterm birth (less than 32 weeks).
- Treatment of hypomagnesemia when oral therapy is not feasible.
- For ventricular fibrillation/pulseless ventricular tachycardia cardiac arrest associated with torsades de pointes.
- For polymorphic ventricular tachycardia with QT interval prolongation (torsades de pointes).
- For severe exacerbations of asthma in patients unresponsive to 1 hour of intensive conventional therapy.
- For severe migraine unresponsive to standard treatment.

ADMINISTRATION
- IV direct (in cardiac arrest situation only): physician or RN in presence of physician; respiratory support; cardiac monitoring. Dilute 1-2 g in 10 mL of D5W or NS (1 g = 5 mL of magnesium sulfate 20% solution [200 mg/mL]) and administer over 1-2 minutes.
- Intermittent IV infusion, Continuous IV infusion:
  - dilute with a compatible solution: for intermittent IV infusion: MAXIMUM CONCENTRATION of 200 mg/mL (20%). For continuous IV infusion, 20 g should be mixed in 500 mL; it is suggested to avoid using the 1 litre bags to distinguish from other large volume infusions.
  - infuse at a maximum rate of 1 g/hr when treating asymptomatic hypomagnesemia as higher infusion rate may exceed the renal threshold and result in disproportionate excretion of magnesium in the urine.
  - can infuse at a MAXIMUM RATE of 150 mg/min if situation is warranted; EXCEPT in severe eclampsia with seizures where a higher rate may be used.
  - in severe eclampsia with seizures: 4 g (i.e., 20 mL of magnesium sulfate 20% [200 mg/mL]) undiluted or diluted in 20 mL of solution (to obtain a 10% solution) administered over 3-4 minutes OR 4 g in 100-250 mL of solution over 20-30 minutes.
- Must be administered by an infusion pump when used for eclampsia, preeclampsia and fetal neuroprotection.
- IM: concentrations of 25 or 50% are generally used. As IM injections are very painful, this route should only be used when IV access is impossible.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Side effects associated with parenteral magnesium are caused by magnesium intoxication. See below for signs of hypermagnesemia.
- Cardiovascular: flushing, hypotension, ECG abnormalities, heartblock, circulatory collapse, hypothermia, cardiac arrest.
- GI: nausea, vomiting.
- CNS: drowsiness, confusion, ataxia.
- Muscle weakness, depression of reflexes, respiratory paralysis and depression.

Antidote: 5-10 mEq of calcium IV (e.g., approximately 10-20 mL of calcium gluconate 10%) to reverse respiratory depression and heart block.

DOSAGE
- Toxemia of pregnancy (pre-eclampsia and/or eclampsia): loading dose of 4 g IV followed by a continuous IV infusion of 1-2 g/hr. Maintenance dose can also be given at a dose of 4-5 g IM q4h. Do not exceed 30-40 g/24 hours.
- For fetal neuroprotection: loading dose of 4 g IV over 30 minutes followed by a continuous IV infusion of 1 g/hr until birth or for a maximum of 24 hours.
- Treatment of hypomagnesemia: dose depending on severity of hypomagnesemia. Mild to moderate (0.4-0.7 mmol/L): 1-4 g IV/IM. Severe (less than 0.4 mmol/L): 4-8 g IV/IM.

…/Cont.
DOSAGE (Cont.)

- For ventricular fibrillation/pulseless ventricular tachycardia cardiac arrest associated with torsades de pointes: 1-2 g IV over 1-2 minutes.
- For polymorphic ventricular tachycardia associated with QT interval prolongation (torsades de pointes): 1-2 g IV over 15 minutes.
- For severe exacerbations of asthma: a single dose of 2 g IV over 20-60 minutes.
- For severe migraine: a single dose of 1-2 g IV at a rate of 1 g/15 min.
- Dosage in renal impairment: dosage to be decreased; use with caution.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Stable for 3 months at room temp diluted in NS or RL at a concentration of 37 mg/mL in PVC bags and glass bottles.
- Stable for 30 days at room temp and 60 days in the fridge at a concentration of 200 mg/mL (undiluted 20% solution) in PVC bags.
- Stable for 30 days at room temp, fridge and -20°C diluted in RL at a concentration of 83.3 mg/mL in polyolefin bags.
- Stable for 24 hours at room temp diluted in D5W, D5-RL, D5-1/4NS, D5-1/2NS, D5-NS, RL, NS at a concentration of 1 mg/mL in PVC bags.

MISCELLANEOUS

- Contraindicated in patients with heart block.
- Observe patients carefully for signs and symptoms of hypermagnesemia and monitor serum magnesium concentrations at least once daily during repletion.
- 1 g of magnesium sulphate contains 4 mmol (8 mEq) magnesium.
- When hypomagnesemia and hypokalemia coexist, magnesium deficiency should be corrected to facilitate the correction of hypokalemia.

REFERENCES

1, 4, 6, 13, 16, 22, 24, 35, 36, 40, 95, 110, 135, 235, 272, 356, 357, 474.
INDICATIONS
- Measurement of glomerular filtration rate (GFR). However, inulin is a better choice.
- Prevention and/or treatment of the oliguric phase of acute renal failure before irreversible renal failure occurs.
- To reduce intracranial pressure and to treat cerebral edema in neurologic emergencies.
- To reduce intraocular pressure.
- Treatment of edema and ascites of nephrotic, cirrhotic, or cardiac origin.
- Promotion of urinary excretion of toxins following chemotherapy, radiation, or drug intoxications.

ADMINISTRATION
- Intermittent IV infusion, Continuous IV infusion: the rate, dosage and concentration will vary with the indication and patient's clinical state.
- May need a central vein for administration of the more concentrated solutions due to high osmolarity and depending on duration of the infusion.
- Use an administration set with a filter (5 microns or less) when infusing solutions containing 15% or more since mannitol crystals may be present (refer to Compatibility, Stability section if presence of crystals).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis and anaphylactoid reactions, rash, urticaria, chills.
- Cardiovascular: hypervolemia (may result in pulmonary edema), CHF, edema, angina-like chest pain, hypertension, hypotension.
- GI: dry mouth, nausea, vomiting.
- CNS: headache, dizziness, confusion, convulsions, lethargy, coma.
- Electrolyte disturbances: hyponatremia, hypernatremia, hyperkalemia, hypokalemia, thirst.
- Osmotic nephrosis (high doses), urinary retention.
- Blurred vision.
- Local reactions: thrombophlebitis.

DOSAGE
- Measurement of GFR: 20 g (100 mL of 20% solution) diluted in 180 mL of NS (total: 280 mL) and infused IV at a rate of 20 mL/min.
- Prevention of oliguria of acute renal failure: 50-100 g IV as a 5-25% solution. Generally, a more concentrated solution is used initially, followed by a 5 or 10% solution.
- Treatment of oliguria: initial test dose of approximately 0.2 g/kg as a 15 or 20% solution IV over 3-5 minutes; if urine output is at least 30-50 mL/hr over the next 2-3 hours, may proceed with full dose. A second test dose may be given if no response is seen. If still no response, re-evaluate need for mannitol. Full dose: 100 g IV as a 15-20% solution over 90 minutes to several hours.
- Intracranial/Intraocular pressure: 0.25-2 g/kg IV of a 15-25% solution given over 30-60 minutes has been used; may repeat q6-8h prn when used to decrease intracranial pressure.
- Edema/ascites: 100 g of a 10-20% solution given IV over 2-6 hours.
- Promotion of urinary excretion of toxins: initial IV loading dose of 25 g followed by an infusion at a rate that will maintain urinary output of at least 100 mL/hr but preferably 500 mL/hr with a positive balance of 1-2 litres. Total dose should not exceed 200 g.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Solutions of mannitol are stable at room temp but in concentrations of 15% or more, mannitol may crystallize when exposed to low temperatures.
- Crystals indicate a supersaturated solution that should be warmed to dissolve crystals then cooled to body temperature before administration. Do not use if crystals have not been completely dissolved.
- Compatible with D5W, D5-NS, LR, NS and Ringer’s solution.

MISCELLANEOUS

- Contraindicated in pulmonary edema, severe pulmonary congestion, severe CHF, severe dehydration, active intracranial bleeding (except during craniotomy) or in patients with well established anuria.

REFERENCES
1, 4, 5, 40, 95, 135, 208, 366, 367.
# INDICATIONS

- For immunization against measles, mumps and rubella in persons 12 months of age or older.

# ADMINISTRATION

- Reconstitute the vial with the entire volume of diluent provided; mix thoroughly until complete dissolution. The reconstituted solution should be clear yellow (MMR-II ®) or clear peach to fuchsia pink (Priorix ®).
- SC: preferably into the outer aspect of the upper arm.

# POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: urticaria, angioedema, anaphylaxis.
- Fever, sore throat, malaise, irritability, arthralgia, myalgia.
- Skin rash usually minimal but may be generalized; usually appears between the 5th and the 12th day.
- Local reactions: redness, pain, induration and tenderness at the injection site.

# DOSAGE

- 0.5 mL SC.
- Refer to specific manufacturer’s monograph for complete dosage schedule.

# COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vaccine between 2-8°C; diluent may be stored between 2-8°C or at room temp. Protect from light.
- Use the vaccine as soon as possible after reconstitution; however, it can be stored in the dark between 2-8°C for up to 8 hours. Discard if not used within this time.

# MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- The MMR vaccine is a live attenuated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity or in immunocompromised individuals.
- Contains trace amounts of neomycin (MMR-II ®, Priorix ®) and gelatin (MMR-II ® only).
- Although the MMR vaccine contains trace amount of egg protein, it has been administered safely in most egg-allergic patients; have adequate facilities available to manage anaphylaxis should it occur.
- Do not give human immune globulin concurrently with the vaccine as it could interfere with the immune response.
- The MMR vaccine is generally contraindicated in pregnant women because there is a theoretical risk to the fetus. Although one manufacturer (MMR-II ®) recommends to avoid pregnancy for 3 months following vaccination, health authorities consider that a one-month waiting period is sufficiently safe.

# REFERENCES

1, 5, 31.
INDICATIONS
- Treatment of endometriosis.
- Adjunctive and/or palliative treatment of endometrial and renal cell carcinoma.
- Hormonally dependent metastatic breast cancer.
- Contraception.

ADMINISTRATION
- Shake vigorously immediately before use to obtain a uniform suspension.
- IM: deep injection, undiluted.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus, angioedema, anaphylactoid reactions, anaphylaxis.
- GI: nausea, vomiting.
- Menstrual abnormalities, including amenorrhea.
- Local reactions: pain, residual lump, skin discoloration, sterile abscess, local atrophy, necrosis, edema.

DOSAGE
- Endometriosis: 50 mg IM weekly or 100 mg IM every 2 weeks for at least 6 months.
- Endometrial and renal cell carcinoma: 400-1000 mg IM every 1-4 weeks.
- Breast cancer: 500 mg IM daily for 28 days, followed by 500 mg IM twice weekly.
- Contraception: 150 mg IM every 3 months. First injection to be given within first five days of onset of normal menstrual period, within first five days post-partum if not breastfeeding or during the sixth post-partum week in women who breastfeed.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Protect from freezing.

MISCELLANEOUS

REFERENCES
1, 5, 165.

Full revision 2016
### PARENTERAL DRUG THERAPY MANUAL

<table>
<thead>
<tr>
<th>NAME OF MEDICATION</th>
<th>MELPHALAN</th>
</tr>
</thead>
</table>

#### OTHER NAMES
- Alkeran®, L-phenylalanine mustard (PAM),
- L-sarcoslyn

#### CLASSIFICATION
- Antineoplastic

### INDICATIONS
- Multiple myeloma, malignant melanoma, ovarian carcinoma, breast cancer, Ewing’s sarcoma, neuroblastoma, Waldenstrom’s macroglobulinemia when oral therapy is not feasible or desirable.
- Conditioning regimen for bone marrow transplantation (BMT).

### ADMINISTRATION
- Reconstitute the 50 mg vial with 10 mL of provided diluent for a final concentration of 5 mg/mL.
- IV direct: physician or RN; undiluted; inject slowly into an injection port or a central line of a freely running IV solution of NS.
- Intermittent IV infusion: dilute in 100 mL of NS to a concentration of 0.1-0.45 mg/mL; infuse over 15-30 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: urticaria, pruritus, edema, tachycardia, bronchospasm, dyspnea, hypotension, chest pain, anaphylactoid reactions, anaphylaxis.
- Cardiovascular: flushing with high doses.
- GI: nausea, vomiting.
- Increase in creatine phosphokinase, rhabdomyolysis.
- Local reactions: pain, irritation, warmth, tingling.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

### DOSAGE
- Multiple myeloma: 16 mg/m² IV every 2-4 weeks.
- BMT: 200 mg/m² IV for one dose on day-1 of BMT (these doses are fatal without BMT).
- Dosage in renal impairment (not for BMT dosing):
  - CrCl (mL/min) 50-10 less than 10
  - Dose 75% 50%
- Consult specific protocol.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Use as soon as possible after preparation; ideally, administration should be completed within 60 minutes of reconstitution.
- Stable for 2 hours after reconstitution at room temp. Do not store reconstituted vials in the fridge due to risk of precipitation.
- Stable for 50 minutes at 30°C and 3 hours at 20°C in NS at a concentration between 0.1 to 0.45 mg/mL.
- Stable for 6 hours in the fridge in NS at a concentration of 0.2 mg/mL in PVC containers.

### MISCELLANEOUS

### REFERENCES
- 1, 4, 5, 40, 129, 135, 165.

Full revision 2016; limited revision 2017, 2018
## INDICATIONS

- For active immunization for the prevention of invasive disease caused by *N. meningitidis* serogroup B in individuals from 2 months to 25 years old (Bexsero ®) and in patients 10 to 25 years old (Trumenba ™).

## ADMINISTRATION

- Shake well prefilled syringe before use to obtain a homogenous white suspension.
- IM: in the anterolateral thigh for infants; in the deltoid region for older children, adolescents and adults.

## POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, urticaria, anaphylaxis.
- GI: nausea, vomiting, diarrhea, change in appetite.
- CNS: headache, irritability, drowsiness.
- Respiratory: apnea may occur in premature infants, particularly if history of respiratory immaturity.
- Malaise, myalgia, arthralgia, fatigue, chills.
- Fever: prophylactic use of acetaminophen reduces the incidence and severity of fever without affecting the immunogenicity.
- Local reactions: pain, redness, induration, swelling at injection site.

## DOSAGE

- 0.5 mL IM.
- Refer to specific manufacturer’s monograph for complete dosage schedule.

## COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store prefilled syringes flat and between 2-8°C. Protect from light. Do not freeze.
- Trumenba™ is stable for a cumulative time of 96 hours at 25°C.

## MISCELLANEOUS

- The tip cap of the Bexsero ® prefilled syringe may contain latex.
- Epinephrine must be available in case of acute hypersensitivity reaction.
- The meningococcal vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.

## REFERENCES

5, 31, 135.

Full revision 2016; limited revision 2018, 2019
INDICATIONS

- For active immunization of children from 2 months of age, adolescents and adults for the prevention of invasive disease caused by \textit{N. meningitidis} serogroup C.

ADMINISTRATION

- For Menjugate ®: reconstitute vial with 0.6 mL of the diluent provided. Gently shake the vial until dissolution.
- No reconstitution necessary for Menjugate ® Liquid, Meningitec ® and NeisVac-C ®. Shake immediately prior to use to obtain a uniform suspension.
- IM: in the deltoid region for older children, adolescents and adults; in the anterolateral thigh for infants.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, urticaria, anaphylaxis, angioedema.
- GI: nausea, vomiting, diarrhea, change in appetite.
- CNS: headache, irritability, drowsiness, impaired sleeping.
- Fever, malaise, arthralgia, myalgia.
- Local reactions: pain, redness, swelling at injection site.

DOSAGE

- 0.5 mL IM.
- Refer to specific manufacturer's monograph for complete dosage schedule.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vaccine between 2-8°C. Do not freeze. Protect from light (for Menjugate ® and Menjugate ® Liquid).
- Menjugate ®: stable at room temp (up to 25°C) for 6 months before its reconstitution. Use reconstituted vaccine immediately.
- NeisVac-C ®: stable at room temp (up to 25°C) for 9 months.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- The meningococcal vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- Menjugate ®: tip cap of the syringe contains dry natural rubber (latex).

REFERENCES

5, 31,135.
MENINGOCOCCAL VACCINE, GROUPS A, C, Y, W-135

OTHER NAMES
Menactra ®, Menomune ®, Menevo ®, Nimenrix ®

CLASSIFICATION
Vaccine

INDICATIONS
- For active immunization of children, adolescents and adults for the prevention of invasive disease caused by N. meningitidis serogroups A, C, Y and W-135.
- Note: Menevo ® can be given in children from 2 months of age, Menactra ® from 9 months of age, Nimenrix ® from 6 weeks of age and Menomune ® from 2 years of age.

ADMINISTRATION
- Menomune ®, Menevo ®, Nimenrix ®: reconstitute vial with the diluent provided (in the case of Menevo ®, the diluent is the MenCWY component and the powder vial is the MenA component). Shake the vial until dissolution.
- Menactra ®: no reconstitution necessary. Shake the vial to obtain a uniform suspension before administration.
- Menactra ®, Menevo ®, Nimenrix ®: IM, preferably in the deltoid region for older children, adolescents and adults; in the anterolateral thigh for infants.
- Menomune ®: SC.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylaxis.
- GI: nausea, vomiting, diarrhea, change in appetite.
- CNS: headache, irritability, drowsiness.
- Fever, malaise, arthralgia, myalgia.
- Local reactions: pain, redness, swelling at injection site.

DOSAGE
- 0.5 mL IM or SC, depending on brand of meningococcal vaccine (refer to Administration section).
- Refer to specific manufacturer’s monograph for complete dosage schedule.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vaccine between 2-8°C. Do not freeze. Protect from light (Menevo ®, Nimenrix ®).
- Menomune ® single dose vial should be used within 24 hours of reconstitution and the multi-dose vial 35 days after reconstitution, provided the solution is kept between 2-8°C.
- Menevo ® is stable for 2 hours at 25°C following its reconstitution.
- Nimenrix ® is stable for 8 hours at 30°C following its reconstitution.

MISCELLANEOUS
- Epinephrine must be available in case of acute hypersensitivity reaction.
- The meningococcal vaccine is an inactivated vaccine.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- Menomune ® contains thimerosal and its vial stopper contains latex.

REFERENCES
5, 31, 135, 541.
MEPERIDINE

Demerol®, Pethidine

Opioid analgesic

INDICATIONS
- For preoperative sedation, as a supplement to anesthesia.
- For severe pain when oral route not feasible.
- For prevention or treatment of shaking chills caused by some medications (e.g., amphotericin B).

ADMINISTRATION
- IV direct: physician or RN; respiratory support. Administer undiluted or preferably, dilute dose to 10 mL with NS or D5W; inject over 4-5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; administer over 15-30 minutes.
- Continuous IV infusion: use a dilute solution of 1 mg/mL.
- IM, SC: with repeat doses, the IM route is preferred over SC due to local tissue irritation and induration with SC injection.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: pruritus, flushing, urticaria (histamine-release reaction); anaphylaxis.
- Cardiovascular: facial flushing, bradycardia, tachycardia, palpitation, hypotension.
- GI: nausea, vomiting, constipation.
- CNS: dizziness, sedation, seizures.
- Respiratory depression.
- Local reactions: pain; irritation and induration with SC injection.

Antidote: naloxone.

DO dosage
Adults:
- For preoperative sedation: 50-100 mg IM/SC 30-90 minutes before anesthesia.
- For pain: 50-150 mg IM/SC q3-4h prn; use a lower dose when administered intermittent IV. For continuous IV infusion: 15-35 mg/hr.
- For shaking chills: 0.5 mg/kg IV 20 minutes before expected time of onset of shaking chills OR 25-50 mg IV after onset of chills.
- Patient is at increased risk of CNS toxicity from the normeperidine metabolite, when meperidine is used for longer than 48 hours or in total dosage exceeding 600 mg/24 hours.

Pediatrics:
- For pain: over 6 months of age: 0.8-1 mg/kg/dose IV/IM/SC q2-3h prn. Maximum dose: 75 mg.

Dosage in renal impairment:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose</th>
<th>Compatibility, Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-10</td>
<td>75%</td>
<td>do not use due to accumulation of toxic metabolite (normeperidine)</td>
</tr>
<tr>
<td>less than 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 28 days at room temp or in the fridge, protected from light, in D5W or NS at concentrations from 0.25 to 30 mg/mL when stored in plastic syringes.
- Stable for 24 hours at room temp in NS at a concentration of 2.5 mg/mL in PVC bags.
- Stable for 36 hours at room temp in D5W at a concentration of 1.2 mg/mL in PVC bags.

MISCELLANEOUS
- 75 mg meperidine IM = 10 mg morphine IM.
- Contraindicated within 14 days of monoamine oxidase inhibitors administration.

REFERENCES
1, 2, 4, 5, 40, 82, 95, 135, 216, 293.
INDICATIONS

- Treatment of the following infections when caused by susceptible organisms: skin and skin structure infections, intra-abdominal infections, meningitis, respiratory tract infections, septicemia, urinary tract infections and febrile neutropenia.

ADMINISTRATION

- Reconstitute vial with SWFI (10 mL per 500 mg vial, 20 mL per 1 g vial) for a final concentration of 50 mg/mL. Shake vial until dissolution and then allow it to stand until solution is clear.
- IV direct: physician or RN. Administer over 5 minutes.
- Intermittent IV infusion: further dilute in NS, Ringer’s solution or D5W and infuse over 15-30 minutes.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, pruritus, urticaria, Stevens-Johnson syndrome, toxic epidermal necrolysis, drug reaction with eosinophilia and systemic symptoms (DRESS), erythema multiforme, acute generalized exanthematous pustulosis, anaphylaxis.
- GI: diarrhea, nausea, vomiting.
- CNS: headache, seizures (rare).
- Anemia.
- Local reactions: inflammation, phlebitis, thrombophlebitis, pain, edema at injection site.

DOSAGE

- Adults:
  - Usual dose 500-1000 mg IV q8h, up to 2000 mg IV q8h for meningitis.
  - Dosage of 500 mg IV q6h has been found as effective clinically and microbiologically as a regimen of 1 g IV q8h and is significantly less expensive.

- Pediatrics:
  - Over 3 months of age and weighing up to 50 kg: 10-40 mg/kg IV q8h.
  - Weighing more than 50 kg: use adult doses.

- Dosage in renal impairment, when dosed according to product monograph:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose (mg)</th>
<th>Interval (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than 50</td>
<td>500-2000</td>
<td>8</td>
</tr>
<tr>
<td>50-26</td>
<td>500-2000</td>
<td>12</td>
</tr>
<tr>
<td>25-10</td>
<td>250-1000</td>
<td>12</td>
</tr>
<tr>
<td>less than 10</td>
<td>250-1000</td>
<td>24 *</td>
</tr>
</tbody>
</table>

- Dosage in renal impairment for 500 mg q6h dosing:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose (mg)</th>
<th>Interval (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 and greater</td>
<td>500 mg</td>
<td>6</td>
</tr>
<tr>
<td>49-25</td>
<td>500 mg</td>
<td>8</td>
</tr>
<tr>
<td>24-10</td>
<td>500 mg</td>
<td>12</td>
</tr>
<tr>
<td>less than 10</td>
<td>500 mg</td>
<td>24 *</td>
</tr>
</tbody>
</table>

* removed by dialysis, therefore give after dialysis

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Vials reconstituted with SWFI are stable for 3 hours at room temp and up to 16 hours in the fridge.
- Stable for 22 hours in NS and 4 hours in D5W at room temp at a concentration of 1 mg/mL in PVC bags.

…/Cont.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 7 days in NS, 24 hours in D5W, and 48 hours in Ringer’s or RL in the fridge at a concentration of 1 mg/mL in PVC bags.
- Stable for 5 days in the fridge in NS at a concentration of 10 mg/mL in PVC bags.
- Stable for 5 days in NS, 48 hours in Ringer’s or RL in the fridge at a concentration of 20 mg/mL.
- Stable for 17 hours in NS and 8 hours in D5W at room temp at a concentration of 22 mg/mL.
- Stable for 3 days in NS, and 24 hours in D5W in the fridge at a concentration of 22 mg/mL.
- Stable for 12 hours at 25°C in NS at concentrations of 6 mg/mL, 8 mg/mL and 12 mg/mL in polyolefin containers.

MISCELLANEOUS

- May exhibit cross-allergy with penicillins or cephalosporins.
- Each gram of meropenem provides 3.92 mmol or 90.2 mg of sodium.

REFERENCES

1, 4, 5, 57, 82, 95, 123, 143, 261, 501, 502, 523, 524.
INDICATIONS
- Prevention of hemorrhagic cystitis associated with oxazaphosphorines (ifosfamide, cyclophosphamide).

ADMINISTRATION
- IV direct: physician or RN; dilute dose with NS, D5W, D5-1/2NS, or RL to a concentration of 20 mg/mL; inject over 3-5 minutes.
- Intermittent IV infusion: dilute with NS, D5W, D5-1/2NS, or RL to a concentration of 1 to 20 mg/mL; infuse over 15-30 minutes.
- Continuous IV infusion: dilute in an appropriate volume of NS, D5W, D5-1/2NS, or RL to a concentration of 1 to 20 mg/mL; infuse as per protocol.

POTENTIAL ADMINISTRATION HAZARDS
Note: at recommended doses, there are usually no side effects.
- Hypersensitivity: urticaria, rash.
- Cardiovascular: hypotension, tachycardia, flushing.
- GI: nausea, vomiting, diarrhea, abdominal pain, unpleasant taste in the mouth.
- CNS: headache, dizziness.
- Flu-like symptoms.
- Local reactions: thrombophlebitis and irritation (when undiluted).
- Extravasation hazard: irritant (when undiluted).

DOSAGE
- Different dosage regimens have been tried.
- Intermittent dosing regimen: mesna total dose equivalent to 60% of the oxazaphosphorine daily dose, given in 3 divided doses, i.e., mesna dose equivalent to 20% of the oxazaphosphorine dose given at 0, 4 and 8 hours.
- Continuous infusion: mesna dose equivalent to 20% of the oxazaphosphorine dose given IV direct as a loading dose, followed by a continuous infusion of the drug at a dose equivalent to 40% of the oxazaphosphorine dose, administered concomitantly with the oxazaphosphorine. The infusion must be continued for 8-24 hours after completion of the chemotherapy infusion.
- Mesna total daily dose is usually equivalent to 60-160% of the total daily dose of the oxazaphosphorines.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 48 hours at room temp in D5-1/2NS, RL and NS at concentrations of 1-20 mg/mL.
- Stable for 24 hours at room temp in D5W at a concentration of 1 mg/mL.
- Stable for 48 hours at room temp in D5W at a concentration of 20 mg/mL.
- Stable for 24 hours at room temp and 48 hours in the fridge in D5W and NS once diluted (no concentration specified; manufacturer’s information)

MISCELLANEOUS
- May cause false positive reactions in tests for ketone bodies in urine.
- Oral mesna dose = double IV dose.

REFERENCES
1, 5, 95, 129, 165, 208.

Full revision 2016; limited revision 2018
INDICATIONS
- Acute lymphocytic leukemia, choriocarcinoma, carcinoma of head and neck area, mycosis fungoides, breast cancer, bladder cancer, gastric cancer, lymphoma and sarcoma.
- Treatment of psoriasis, rheumatoid arthritis and Crohn’s disease.
- Management of ectopic pregnancy.

ADMINISTRATION
- IV direct: physician or RN; undiluted; inject at a rate of 10 mg/min into the tubing of a freely running IV solution of D5W or NS.
- Intermittent IV infusion, Continuous IV infusion: dilute with D5W or NS; infuse as per protocol, range from 20 minutes to 42 hours.
- IM.
- SC (usually for patients with psoriasis, rheumatoid arthritis or Crohn’s disease).

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis (rare).
- GI: nausea, vomiting, stomatitis.
- CNS: seizures with high doses, dizziness, headache.
- Dermatologic: radiation recall reaction, vasculitis, rash.
- Hematologic: leukopenia, thrombocytopenia, anemia.
- Hepatic: elevated liver function tests (usually transient and asymptomatic).
- Ophthalmic: blurred vision.
- Pleuritic chest pain.
- Hyperuricemia, tumour lysis syndrome.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

Antidote for overdosage: leucovorin (see monograph).

DOSAGE
- Oncology indications: usual doses: 25-40 mg/m² IV. High-dose therapy with leucovorin "rescue": 100 mg-15 g/m² IV have been given by infusion.
- Psoriasis and rheumatoid arthritis: 10-25 mg IM/SC weekly, with a maximum of 50 mg per week.
- Crohn’s disease: 15-25 mg IM/SC weekly.
- Ectopic pregnancy: 50 mg/m² IM; may be repeated once or twice depending on the serum beta-HCG level decline in the successive weeks.
- Dosage in renal impairment:
  - Method 1: CrCl (mL/min) 80-61 60-51 50-10 less than 10 Dose 75% 70% 30-50% avoid
  - Method 2: CrCl (mL/min) greater than 50 50-10 less than 10 Dose 100% 50% avoid
- Dosage in hepatic impairment: if bilirubin is 2.5-4 times the ULN or transaminases are greater than 3 times the ULN, give 75% of usual dose. Discontinue dose if bilirubin greater than 4 times the ULN.
- Consult specific protocol.
### COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials at room temp. Protect from light.
- Diluted solutions should be protected from light.
- Stable for 24 hours at room temp and 30 days in the fridge, protected from light, in D5W or NS at concentrations of 0.225 mg/mL and 24 mg/mL in PVC containers.

### MISCELLANEOUS

- Formulation preserved with benzyl alcohol should not be used for high-dose therapy or intrathecal injection; in these cases, preservative-free formulations should be used.
- High-dose methotrexate therapy requires leucovorin rescue, hydration and alkalinization of urine with sodium bicarbonate to reduce toxicity.

### REFERENCES

1, 4, 5, 37, 40, 95, 129, 143, 165, 216, 482.
INDICATIONS
- Management of moderate to severe pain.
- Treatment of nausea and vomiting.
- In palliative care patients to control agitation or for sedation.

ADMINISTRATION
- Intermittent IV infusion: **blood pressure monitoring.** Dilute dose in 50 mL of NS or D5W; infuse over 30 minutes.
- Continuous IV infusion: **blood pressure monitoring.** Dilute dose in 250-500 mL of NS or D5W; infuse as per Dosage section.
- IM (preferred route).
- SC, SC infusion: for palliative care patients.
- Only administer to non-ambulatory patients; patient must be kept supine for at least 6 hours but preferably 12 hours after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: orthostatic hypotension presenting as dizziness, fainting, or weakness. Usually occurs within 10-20 minutes following injection and may last up to 12 hours. (Antidote: norepinephrine or phenylephrine; not epinephrine). Tachycardia; may prolong QT interval.
- CNS: sedation, confusion, seizures, extra-pyramidal symptoms.
- Anticholinergic effects: dry mouth, urinary retention, constipation.
- Local reactions: irritation at SC injection site.

DOSAGE
Adults:
- For pain: 10-25 mg IV/IM q8h.
- For nausea and vomiting: 25 mg IM q6-8h OR 5-25 mg/day as a SC infusion.
- For agitation or sedation in palliative care patients: 12.5-50 mg SC/IV q4-6h, up to 300 mg/24 hours for agitation.

Pediatrics:
- For pain, nausea or vomiting: 0.0625-0.125 mg/kg/day IM in one or divided doses.
- In the context of palliative care: 0.0625 mg/kg/day in 250 mL D5W as a continuous IV infusion.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp, protect from light.
- Discard solutions if markedly discoloured.
- Compatible with D5W and NS.

MISCELLANEOUS
- May potentiate the action of other CNS depressants (barbiturates, analgesics, opioids, antihistamines); dose reductions by half are suggested during concomitant use.

REFERENCES
3, 4, 5, 95, 135, 260, 457.
INDICATIONS
- For the treatment of idiopathic and drug-induced methemoglobinemia.
- To visualize parathyroid gland before surgery.
- For refractory hypotension associated with septic shock and/or cardiac surgery.

ADMINISTRATION
- IV direct: physician only; undiluted; inject over at least 5 minutes.
- Intermittent IV infusion: dilute in an appropriate amount of D5W and infuse over 10-60 minutes.
- Continuous IV infusion: dilute in 1000 mL of D5W; rate as per Dosage section.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, hypotension, tachycardia, bronchospasm, anaphylaxis.
- Cardiovascular: precordial pain, hypertension.
- GI: nausea, vomiting, abdominal pain.
- CNS: dizziness, headache, confusion.
- Serotonin syndrome if administered in a patient already receiving drugs with serotonin reuptake inhibition properties (e.g., SSRIs [fluoxetine, fluvoxamine, sertraline, paroxetine, citalopram, escitalopram], SNRIs [venlafaxine, desvenlafaxine, duloxetine], clomipramine, etc): agitation or diaphoresis or hypertonia accompanied with pyrexia (above 38˚C), and tremor, hyperreflexia or clonus.
- Diaphoresis.
- Additional methemoglobinemia may occur if methylene blue is injected too fast or if high doses are used.
- Transient blue colouring of the skin, feces and urine.

DOSAGE
- For methemoglobinemia: 1-2 mg/kg IV or 25-50 mg/m² IV; repeat dose after 60 minutes if needed.
- To visualize parathyroid gland: 7.5 mg/kg in 500 mL of solution infused IV over 45-60 minutes prior to surgery.
- For refractory hypotension: 1-2 mg/kg IV; if needed, after a 2-hour interval, start an IV infusion of 0.25 mg-2 mg/kg/hr titrated to arterial blood pressure, for up to 6 hours.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Compatible with D5W.
- Avoid dilution is NS as may cause precipitation.

MISCELLANEOUS
- If patient is taking drugs with serotonin reuptake inhibition properties, consider stopping them before administration of methylene blue to avoid a serotonin syndrome reaction. A washout period equivalent to at least 4 to 5 half-lives is recommended. Treatment may be restarted 24 hours after the last dose of methylene blue.
- Provided as a 1% solution (10 mg/mL).
- Use with caution in patients with glucose-6-phosphate dehydrogenase deficiency.
- Caution in severe renal dysfunction.

REFERENCES
1, 50, 58, 63, 72, 79, 80, 95, 135, 208, 367.
INDICATIONS
- Treatment of opioid-induced constipation in patients with advanced illness, receiving palliative care and had an insufficient response to laxative therapy.
- Treatment of opioid-induced constipation in patients with chronic non-cancer pain.

ADMINISTRATION
- SC: in the upper arm, abdomen or thigh. Patient should be seated or recumbent during administration. Rotate injection site.

POTENTIAL ADMINISTRATION HAZARDS
- GI: nausea, diarrhea, flatulence, abdominal pain. Increased risk of GI perforation (stomach, duodenum, colon) if patient has localized or diffused reduction of structural integrity of GI mucosa, or has GI lesions; severe persistent abdominal symptoms could be signs of GI perforation.
- CNS: dizziness.

DOSAGE
- Opioid-induced constipation with advanced illness: dosage based on patient’s weight, administered as a SC injection every other day as needed with a maximum of 1 dose/24 hours:
  - 33 to less than 38 kg: 6 mg (0.3 mL)
  - 38 to less than 62 kg: 8 mg (0.4 mL)
  - 62 to 114 kg: 12 mg (0.6 mL)
  - 115 to 126 kg: 18 mg (0.9 mL)
  - For weight less than 33 kg or greater than 126 kg: 0.15 mg/kg with volume to be administered as per following equation:
    Patient’s weight (kg) x 0.0075 = volume (mL) to be injected; round to the nearest 0.1 mL.
- Opioid-induced constipation with chronic non-cancer pain: 12 mg SC once daily.
- Dosage in renal impairment: 50% of the dose if CrCl is less than 30 mL/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; do not freeze; protect from light.

MISCELLANEOUS
- Caution in patients with cancer, GI malignancy or ulcer, Ogilvie’s syndrome or receiving concomitant therapy with nonsteroidal anti-inflammatory drugs, corticosteroids or bevacizumab as these conditions increase the risk of GI perforation with methylnaltrexone.

REFERENCES
1, 5, 95, 135, 243.

Full revision 2016
INDICATIONS
- For anti-inflammatory or immunosuppressant effect.
- Situations when a rapid and intense hormonal effect is desired, e.g., hypersensitivity reactions, status asthmaticus, organ transplants, cerebral edema, hypercalcemia, spinal cord injury, shock, multiple sclerosis, lupus nephritis.

ADMINISTRATION
- Reconstitute the 40 mg, 125 mg, 500 mg and 1 g vial with 1 mL, 2 mL, 7.8 mL and 15.6 mL respectively of bacteriostatic water for injection or SWFI.
- IV direct: physician or RN; undiluted; for doses of 125 mg or less; inject over at least 5 minutes.
- Intermittent IV infusion: for doses greater than 125 mg; dilute dose in 50-100 mL of D5W or NS; infuse over 15-60 minutes or according to protocol.
- Continuous IV infusion.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis (rare).
- Cardiovascular: cardiac arrhythmias and/or circulatory collapse and/or cardiac arrest following rapid administration of high doses; bradycardia with large doses; hypertension; congestive heart failure.
- GI: peptic ulcer, gastrointestinal hemorrhage.
- CNS: delirium, mood changes, headache.
- Sodium and fluid retention, hypokalemia, hyperglycemia.
- Increased susceptibility to infections.

DOSEAGE
Adults:
- Dosage variable depending upon clinical condition; usual range is 10 to 250 mg IM/IV q4-24h.
- Adjunctive therapy in life-threatening conditions (e.g., shock): 30 mg/kg IV over a period of at least 30 minutes. The large doses may be repeated q4-6h for up to 48 hours. Also 100-250 mg q2-6h have been recommended.
- Status asthmaticus: 40-80 mg/day IV in 1 or 2 divided doses until peak expiratory flow is 70% of predicted or personal best.
- Multiple sclerosis exacerbations: 160 mg IV once daily for 7 days, followed by 64 mg every other day for 1 month. Dose regimens of 500 mg or 1 g IV daily for 3 to 5 days have also been used.
- Lupus nephritis: as pulse therapy; 500 mg to 1 g IV over 60 minutes daily for 3 days.

Pediatrics:
- For anti-inflammatory or immunosuppressive effect: 0.5-1.7 mg/kg/day IM or IV in divided doses q6-12h; dosage to be determined by severity of condition and response to therapy.
- Status asthmaticus: 0.5-1 mg/kg IV q12h (maximum 60 mg/day) until peak expiratory flow is 70% of predicted or personal best OR 1 mg/kg IV q6h on day 1.
MethylPREDNISolone (sodium succinate)

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Reconstituted solutions are stable for 48 hours at room temp when reconstituted with bacteriostatic water and for 24 hours when reconstituted with SWFI (due to risk of microbial contamination).
- Compatible with D5W, NS, D5-NS.
- Stable for 24 hours at room temp in D5W, NS, D5-NS at a concentration of 0.25 mg/mL.
- Stable for 4 days at room temp and for 3 weeks in the fridge in NS at concentration of 10 mg/mL stored in polypropylene syringes.

MISCELLANEOUS

- 4 mg methylprednisolone is equivalent to 20 mg hydrocortisone.
- Solu-Medrol ® 40 mg Act-O-Vial ® contains lactose produced from cow’s milk; it is contraindicated in patients with a known hypersensitivity to cow’s milk or its components or other dairy products.

REFERENCES

1, 4, 5, 6, 40, 82, 83, 95, 135, 208, 356, 357.
METOCLOPRAMIDE

**Maxeran ®, Reglan ®**

**Antiemetic**

### INDICATIONS

- An adjunct in the management of delayed gastric emptying associated with subacute and chronic gastritis or following vagotomy and pyloroplasty and other surgical procedures if oral therapy is not feasible.
- An adjunct to facilitate small bowel intubation.
- During radiographic examination of the upper GI tract.
- For the prevention of nausea and vomiting associated with cancer chemotherapy or surgery.
- For diabetic or post-surgical gastric stasis.

### ADMINISTRATION

- IV direct: physician or RN; for doses of 10 mg or less; administer undiluted over 1-2 minutes.
- Intermittent IV infusion (preferred over IV direct): further dilute in 50-100 mL of D5W or NS; infuse over at least 15 minutes.
- IM.
- SC.

### POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, urticaria, bronchospasm, angioedema.
- Cardiovascular: atrioventricular block, CHF, hypotension, hypertension, arrhythmias, flushing (with large IV doses).
- GI: nausea, diarrhea.
- CNS: drowsiness, restlessness, headache, dizziness.
- Transient akathisia manifested clinically as an urge to move the extremities or torso and anxiety with agitation (more frequent and more severe with IV direct injection).
- Extrapyramidal reactions including acute dystonic reactions (Antidote = diphenhydramine 50 mg IM or benztropine 1-2 mg IV/IM).
- Fatigue.

### DOSAGE

- **Adults:**
  - Usual dose: 10-20 mg IV/IM, may be repeated up to 4 times daily.
  - To facilitate small bowel intubation: 10 mg IV as a single dose.
  - Radiographic examination of the upper GI tract: 10 mg IV as a single dose.
  - Cancer chemotherapy nausea and vomiting: 1-2 mg/kg IV; may repeat twice q2h then three times q3h. Some clinicians use doses as high as 2.75 mg/kg (by IV infusion). Administer first dose 30 minutes prior to chemotherapy.
- **Pediatrics:**
  - Radiographic examination of small bowel or for intubation: 6-14 years: 2.5-5 mg IV as a single dose; younger than 6 years of age: 0.1 mg/kg IV as a single dose.
  - Gastroesophageal reflux: 0.1-0.2 mg/kg IV q6h as needed.
- Dosage in renal impairment: when initiating therapy, 50% of usual recommended doses if CrCl is less than 40 mL/min.

### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Protect ampoules from light and store at room temp. Solution should be colourless.
- Incompatible with sodium bicarbonate due to modification of pH.

.../Cont.
<table>
<thead>
<tr>
<th>NAME OF MEDICATION</th>
<th>METOCLOPRAMIDE</th>
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</table>

### OTHER NAMES
Maxeran®, Reglan®

### CLASSIFICATION
Antiemetic

**COMPATIBILITY, STABILITY** (Cont.)

- Stable for 48 hours at room temp in 50 mL of NS, D5W, D5-1/2NS, Ringer's and RL when protected from light or for up to 24 hours when stored at these temperatures and exposed to normal light.
- Stable for 90 days at 4°C, 60 days at 23°C and 7 days at 32°C at a concentration of 5 mg/mL in polypropylene syringes.
- Stable for 21 days at room temp in NS at a concentration of 0.5 mg/mL in polypropylene syringes.

### MISCELLANEOUS

- Anticholinergic drugs will antagonize the effects of metoclopramide.
- Can modify absorption of some medications administered orally.
- Not recommended for use in patients with epilepsy or extrapyramidal symptoms.

### REFERENCES

1, 4, 5, 6, 40, 95, 135, 208, 336, 420, 457, 546.
INDICATIONS
- Management of acute myocardial infarction.
- Treatment of cardiac arrhythmias.
- For ventricular rate control or treatment of hypertension when use of the oral route is not possible.
- Prophylaxis of atrial fibrillation after cardiac surgery.

ADMINISTRATION
- IV direct: physician for first dose only; RN may administer subsequent doses; cardiac monitoring; continuous BP monitoring. Undiluted; inject over at least 1 minute.
- Intermittent IV infusion (when oral route is not possible): cardiac monitoring; continuous BP monitoring. Dilute dose in 50 mL of D5W or NS and administer over 30-60 minutes.
- Continuous IV infusion: cardiac monitoring; continuous BP monitoring. Infuse undiluted or further dilute in a compatible solution as per Dosage section. At TOH: transfer 15 mg (15 mL from metoprolol 1 mg/mL vials/ampoules) to an empty sterile minibag for a concentration of 1 mg/mL OR withdraw 15 mL from a 50 mL minibag of D5W or NS and discard, then add 15 mg (15 mL from metoprolol 1 mg/mL vials/ampoules) to the minibag to obtain a final concentration of 0.3 mg/mL.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, urticaria.
- Cardiovascular: bradycardia (Antidote: atropine 0.25-0.5 mg; use isoproterenol if atropine not effective), congestive heart failure, hypotension, heart block.
- CNS: vertigo, dizziness, sedation.
- Respiratory: bronchospasm, dyspnea.
- Fatigue.

DOSAGE
- Acute myocardial infarction: 5 mg IV direct followed by two additional 5 mg doses at approximately 2-5 minute intervals. Thereafter, initiate oral metoprolol therapy 15 minutes after last IV dose.
- Cardiac arrhythmias: 2.5-5 mg IV direct every 2-5 minutes with a maximum of 15 mg over 10-15 minutes.
- Ventricular rate control/hypertension: 1.25-5 mg IV q6-12h, with a maximum of 15 mg IV q3-6h.
- Prophylaxis of atrial fibrillation after cardiac surgery: 1-3 mg/hr IV; to titrate as per patient response.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 36 hours at room temp in NS and D5W at a concentration of 0.3 mg/mL in PVC containers.

MISCELLANEOUS
- Concomitant use of IV metoprolol with IV diltiazem or IV verapamil may cause significant cardiac depression. Therefore, co-administration (within a few hours) is contraindicated.
- Equivalent beta-blocking effect when switching between oral and IV route of administration: can use 2.5:1 (oral: IV) ratio (example: 25 mg po q12h to 5 mg IV q6h). However, this ratio varies from one patient to the other (range 2:1 to 5:1).

REFERENCES
1, 4, 5, 40, 95, 107, 135.
**INDICATIONS**
- Treatment of infections due to susceptible anaerobic bacteria.
- Treatment of amebic liver abscess.
- Treatment of *Clostridium difficile*-associated diarrhea when oral route is not possible.
- Prevention of postoperative anaerobic sepsis in patients undergoing colorectal surgery.

**ADMINISTRATION**
- Intermittent IV infusion: use premixed bags of 500 mg/100 mL (5 mg/mL); infuse each 500 mg over 20 minutes.
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, pruritus.
- GI: diarrhea, nausea, vomiting, abdominal discomfort, metallic taste.
- CNS: seizures, ataxia, dizziness, drowsiness, headache, peripheral neuropathy (most commonly reported as numbness and paresthesias in extremities).
- Local reactions: thrombophlebitis.

**DOSAGE**
- Adults:
  - Treatment of infections: 500 mg IV q8h OR 7.5 mg/kg IV q6-8h. For anaerobic infections, may initiate treatment with a loading dose of 15 mg/kg IV. Maximum 4 g/day.
  - Prophylaxis in colorectal surgery: 15 mg/kg IV 60 minutes before skin incision, followed if necessary by 7.5 mg/kg IV at 6 and 12 hours after the initial dose OR 500 mg IV within 60 minutes prior to surgical incision.
  - Pediatrics (anaerobic infections): 30-40 mg/kg/day IV divided q6-8h. Maximum dose: 4 g/day.
  - Dosage in renal impairment: no need to adjust dosage.
  - Dosage in hepatic impairment: decrease dose or frequency if severe liver impairment.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Compatible with D5W, NS, RL.

**MISCELLANEOUS**
- Consumption of alcohol may produce a disulfiram-like reaction.

**REFERENCES**
1, 5, 40, 82, 95, 135, 216.
### INDICATIONS
- Treatment of patients with candidemia, acute disseminated candidiasis, candidal peritonitis and abscess infections, or esophageal candidiasis.
- Prophylaxis of *Candida* infections in patient undergoing hematopoietic stem cell transplantation (HSCT).

### ADMINISTRATION
- Reconstitute each 50 mg or 100 mg vial with 5 mL of NS or D5W, without a bacteriostatic agent to get a concentration of 10 mg/mL or 20 mg/mL, respectively. Gently dissolve the powder by swirling vial to minimize excessive foaming. Do NOT shake.
- Intermittent IV infusion: dilute dose in 100 mL NS or D5W. For pediatrics, dilute dose in an appropriate volume to obtain a final concentration between 0.5 to 4 mg/mL. For concentrations above 1.5 mg/mL, administer through a central catheter. Flush IV line with NS before and after infusion. Administer over 60 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid and anaphylaxis, including shock.
- Histamine-mediated reactions: rash, pruritus, facial swelling, vasodilation. Occur most often with a rapid infusion over less than 60 minutes.
- GI: nausea, vomiting, abdominal pain, diarrhea.
- Hematologic: leukopenia, neutropenia, thrombocytopenia, hemolysis, hemolytic anemia.
- Hepatic: increases in ALT, AST, alkaline phosphatase and bilirubin.
- Rigors, fever, headache, delirium.
- Local reactions: inflammation, phlebitis, thrombophlebitis; occur more often if micafungin is infused peripherally.

### DOSAGE
- Adults:
  - Treatment of candidemia and other *Candida* infections (other than esophageal candidiasis): 100 mg IV once daily. Mean duration of treatment is 15 days.
  - Treatment of esophageal candidiasis: 150 mg IV once daily. Mean duration of treatment is 15 days.
  - Prophylaxis of *Candida* infections in HSCT recipients: 50 mg IV once daily.

- Pediatrics (4 months and older):
  - Treatment of candidemia and other *Candida* infections (other than esophageal candidiasis): 2 mg/kg IV once daily with a maximum daily dose of 100 mg.
  - Treatment of esophageal candidiasis: weight of 30 kg or less: 3 mg/kg IV once daily; weight greater than 30 kg: 2.5 mg/kg IV once daily with a maximum daily dose of 150 mg.
  - Prophylaxis of *Candida* infections in HSCT recipients: 1 mg/kg IV once daily with a maximum daily dose of 50 mg.

- Dosage in renal impairment: no need to adjust dosage.
- Dosage in hepatic impairment: no need to adjust dosage in mild to moderate hepatic impairment.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; protect from light.
- Reconstituted solution is stable for 24 hours at room temp.

.../Cont.
COMPATIBILITY, STABILITY (Cont.)

- Diluted solution is stable for 24 hours at room temp, protected from light. However, it is not necessary to cover the infusion drip chamber or the tubing.
- Stable for 4 days at room temp, protected from light, in NS or D5W at concentrations of 0.25 mg/mL and 4 mg/mL in plastic bags.
- Stable for 7 days in the fridge, protected from light, in NS at concentrations of 0.125 mg/mL and 1 mg/mL in plastic bags.

MISCELLANEOUS

- Efficacy of micafungin against infections caused by fungi other than *Candida* has not been established.
- Micafungin has not been adequately studied for endocarditis, osteomyelitis and meningitis due to *Candida*.

REFERENCES

1, 5, 40, 143, 158.
**INDICATIONS**

- For induction of anesthesia.
- As a sedative agent.
- For agitation and seizures in palliative care patients.

**ADMINISTRATION**

- Prerequisites for IV injection (direct, continuous IV infusion) or IM administration are either
  i) ventilator support and ECG monitor or
  ii) pulse oximeter; supplemental oxygen should be available if needed.
    - Rapid IV direct: physician only for induction of anesthesia; *respiratory support*; use 1 mg/mL solution; inject over 20-30 seconds.
    - IV direct: physician or RN for sedation; *respiratory support*; use 1 mg/mL solution; inject over 2-3 minutes.
    - Continuous IV infusion: *respiratory support*; dilute with NS or D5W for a final concentration of 0.5 mg/mL or infuse undiluted (1 mg/mL). At TOH: withdraw 20 mL from a 100 mL minibag of D5W or NS and discard, then add 100 mg (20 mL from midazolam 5 mg/mL vials/ampoules) to the minibag to obtain a final concentration of 1 mg/mL. Titrate rate to patient response.
    - IM.
- SC, SC infusion: for palliative care patients.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylactoid, rash, pruritus, hives.
- Cardiovascular: hypotension, increase or decrease in heart rate.
- GI: hiccups, nausea, vomiting.
- CNS: headache, drowsiness, excessive sedation, rarely paradoxical agitation and involuntary movements.
- Respiratory depression and/or arrest, apnea, coughing; rarely tachypnea.
- Local reactions: pain with IM injection; tenderness, erythema, induration at IV administration site and pain during IV injection.

**DOSEAGE**

- Induction of anesthesia (administer over 20-30 seconds):
  - Premedicated patients: Initial dose: - Adults: range 0.15-0.35 mg/kg IV.
    - 55 years or older or patients with severe systemic disease: 0.15-0.2 mg/kg IV.
  - Unpremedicated patients: Initial dose: - Adults: 0.3-0.35 mg/kg IV.
    - 55 years of older: 0.3 mg/kg IV.
    - With severe systemic disease/debilitated: 0.15-0.25 mg/kg IV.
  - After approximately 2 minutes, increments of approximately 25% of initial dose may be given to complete induction.
  - Maintenance: administer in incremental doses of approximately 25% of initial dose when lightening of anesthesia is evident; repeat as necessary.
- Conscious sedation (administer over 2-3 minutes):
  - Initial dose: - Adult: 1-2.5 mg IV (approximately 0.015-0.03 mg/kg).
    - Elderly, chronically ill or debilitated: 1-1.5 mg IV.
  - After 2 minutes, dosage may be further titrated incrementally to a total dose of 5 mg. Elderly, chronically ill or debilitated patients or patients with limited pulmonary reserve may require 30% lower dose (total dose of 3.5 mg).
  - Maintenance: administer in increments of 25% of initial total dose.
.../Cont.

**DOSAGE** (Cont.)

- Preoperative sedation: 0.07-0.08 mg/kg IM 30-60 minutes preoperatively; decrease dose to 0.02-0.05 mg/kg IM for the elderly, chronically ill or debilitated.
- Infusion for sedation: loading dose of 0.01-0.05 mg/kg IV followed by 1-7 mg/hr IV OR 0.02-0.1 mg/kg/hr IV.
- SC (for palliative care): 1.5 mg q1h or 2.5 mg (up to 10 mg) q2-4h; continuous SC infusion of 10-60 mg/24 hours; some patients may need up to 240 mg/24 hours.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Compatible with D5W, NS and RL.
- Stable for 10 days at room temp, protected or not from light, in NS at a concentration of 1 mg/mL in PVC bags.
- Stable for 27 days at room temp or in the fridge, protected or not from light, in D5W at a concentration of 1 mg/mL in PVC or polyolefin bags.
- Stable for 36 days at room temp, protected from light, at a concentration of 5 mg/mL (undiluted) in polypropylene syringes.

**MISCELLANEOUS**

**REFERENCES**

1, 4, 5, 6, 40, 95, 111, 457.
MILRINONE

Primacor ®

Inotropic agent

INDICATIONS
- Short-term management of severe congestive heart failure, including low output states following cardiac surgery.

ADMINISTRATION
- Intermittent IV infusion: cardiac monitoring; for loading dose; undiluted or dilute in NS, 1/2NS or D5W to a total volume of 10 or 20 mL; administer over 10 minutes.
- Continuous IV infusion: cardiac monitoring; dilute the 20 mg/20 mL vial with 180, 113 or 80 mL of NS, 1/2NS or D5W to get a final concentration of 100 mcg/mL, 150 mcg/mL or 200 mcg/mL respectively. At TOH: withdraw 20 mL from a 100 mL minibag of D5W or NS and discard, then add 20 mg (20 mL from milrinone 1 mg/mL vials) to the bag to obtain a final concentration of 200 mcg/mL.
- Note: loading dose may also be administered from the bag prepared for the continuous infusion if rate set up accordingly.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash.
- Cardiovascular: arrhythmias (ventricular and supraventricular), hypotension, chest pain/angina.
- CNS: headache.

DOSAGE
- Loading dose (optional) of 50 mcg/kg IV over 10 minutes.
- Infusion dose of 0.125-0.75 mcg/kg/min IV; maximum dose of 1.13 mg/kg/day; titrate to clinical status.
- Dosage in renal impairment:
<table>
<thead>
<tr>
<th>CrCl (mL/min/1.73 m²)</th>
<th>50</th>
<th>40</th>
<th>30</th>
<th>20</th>
<th>10</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion dose (mcg/kg/min)</td>
<td>0.43</td>
<td>0.38</td>
<td>0.33</td>
<td>0.28</td>
<td>0.23</td>
<td>0.2</td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Milrinone is a clear colourless to pale yellow solution.
- Stable for 14 days at room temp or refrigerated in D5W or NS at a concentration of 200 mcg/mL in PVC containers.
- Stable for 7 days at room temp in D5W, NS, 1/2NS, and RL at a concentration of 400 mcg/mL in PVC containers.
- Do not mix with furosemide solutions.

MISCELLANEOUS

REFERENCES
1, 2, 4, 6, 40, 135, 283.
**INDICATIONS**
- Adenocarcinoma of stomach and colon.
- Has also been used for breast, cervical, head and neck, pancreatic, lung (non-small cell) and anal cancers.

**ADMINISTRATION**
- Reconstitute the 5 mg and 20 mg vials with 10 mL and 40 mL SWFI, respectively, to obtain an approximate concentration of 0.5 mg/mL. Shake well until dissolved.
- IV direct: physician or RN; undiluted over 5-10 minutes into the tubing of a freely flowing IV solution of NS or D5W.
- Intermittent IV infusion: dilute with 50 mL of NS (preferred) or D5W; infuse over 15-30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug**: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- GI: nausea, vomiting.
- Hematologic: leukopenia, thrombocytopenia.
- Dermatologic: radiation recall reaction (rare); dermatitis, often manifested as palmar rash with desquamation.
- Local reactions: pain at injection site, induration, thrombophlebitis.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- Various dosage regimens and protocols are used:
  - 10-15 mg/m² IV on day 1 or 3 every 4-8 weeks.
  - 10-20 mg/m² IV on day 1 every 6-8 weeks.
  - 2 mg/m²/day IV for 5 days, stop for 2 days, repeat X 1 (i.e., to give on days 1-5 and days 8-12), every 6-8 weeks.
- Dosage in renal impairment: if CrCl is less than 10 mL/min, give 75% of usual dose.
- Dosage according to hematologic toxicity:
  - if leucocytes: 2-2.9 x 10⁹/L and platelets: 25-74.9 X 10⁹/L, give 70% of previous dose.
  - If leucocytes are less than 2 X 10⁹/L and platelets are less than 25 X 10⁹/L, give 50% of previous dose.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp; protect from light.
- Reconstituted solutions (0.5 mg/mL) prepared with SWFI are stable for 1 week at room temp and 2 weeks under refrigeration, protected from light.
- Stable for 3 hours in D5W and for 12 hours in NS at room temp at a concentration of 20-40 mcg/mL.

**MISCELLANEOUS**

**REFERENCES**
1, 4, 5, 6, 40, 129, 165, 216.

Full revision 2016; limited revision 2017, 2018
MitoXANTRONE
Mitozantrone, Novantrone®

**INDICATIONS**
- Metastatic carcinoma of the breast.
- Non-Hodgkin's lymphoma.
- Acute leukemia, including non-lymphocytic.
- Hepatocellular cancer.
- Hormone refractory prostate cancer.
- Ovarian cancer.

**ADMINISTRATION**
- IV direct: physician or RN; dilute to at least 50 mL with NS or D5W; inject over at least 3-5 minutes into the tubing of a freely running IV solution of NS or D5W.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; infuse over 15-30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylactic reactions (rare).
- Cardiovascular: ECG changes and arrhythmias (transient), cardiomyopathy.
- GI: nausea, vomiting, diarrhea, stomatitis.
- Renal: blue-green discolouration of urine for 1-2 days, proteinuria, nephrotoxicity.
- Ophthalmic: conjunctivitis, blurred vision.
- Tumour lysis syndrome (rare).
- Local reactions: phlebitis, blue discolouration of vein.
- Extravasation hazard: vesicant; blue discolouration of the skin that slowly fades; rare cases of skin necrosis. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- Solid tumours: initial dose of 12-14 mg/m² IV q3weeks.
- Induction dose for acute leukemia: 12 mg/m²/day IV for 5 consecutive days, as a single agent; 10-12 mg/m²/day for 3 consecutive days when combined with cytarabine.
- Consolidation dose for acute leukemia: 12 mg/m²/day IV for 2 consecutive days.
- Dosage adjustment based on clinical status, degree and duration of myelosuppression.
- Dosage in hepatic impairment: reduce dose by 50%.
- Maximum lifetime dose: 140 mg/m².
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Partial vials may be stored for 7 days at room temp and for 14 days in the fridge.
- Cooling of the intact vials may cause precipitation that will redissolve upon warming.
- Stable for 7 days at room temp or refrigerated in D5W or NS at a concentration of 20 to 500 mcg/mL in PVC containers.
- Stable for 42 days at room temp or in the fridge at a concentration of 2 mg/mL in plastic syringes and glass vials.

**REFERENCES**
1, 4, 5, 40, 129, 165, 547, 548, 549.
Do NOT confuse morphine with apomorphine.
This monograph is specific to MORPHINE.

INDICATIONS
- Supplement to anesthesia.
- Treatment of acute pulmonary edema.
- Relief of moderate to severe acute and chronic pain.
- For pain associated with myocardial infarction (analgesic of choice).
- Treatment of dyspnea in palliative care patients.

ADMINISTRATION
- IV direct: physician or RN; respiratory support. Administer undiluted or dilute dose to 10 mL with NS or D5W and inject very slowly, at a rate of 3 mg/min.
- Intermittent IV infusion: dilute dose in 50 to 100 mL NS or D5W.
- Continuous IV infusion: Standard concentration is 1 or 2 mg/mL in D5W or NS. Patients on high doses may require more concentrated solutions. Must be administered by an infusion pump.
- SC, IM.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis (rare); pseudoallergic reactions due to histamine release: pruritus, urticaria.
- Cardiovascular: bradycardia, circulatory depression, hypotension (increased incidence with rapid IV administration).
- GI: nausea, vomiting, constipation, dry mouth.
- CNS: dizziness, confusion, drowsiness.
- Respiratory depression (Antidote: naloxone).
- Local reactions: pain at injection site; wheals with IV injection.

DOSAGE
Adults:
- Opioid-naïve patients: SC/IM: 2.5-5 mg q4h prn; IV: 1-2 mg q1h prn. Titrate as required. These initial doses are for the average healthy patient. Elderly patients and those with reduced renal or hepatic function require lower doses while opioid-experienced patients may need higher doses.
- Continuous IV Infusion: initiate at 0.8-10 mg/hr; increase stepwise until analgesia is achieved; in severe chronic pain, maintenance doses have ranged from 0.8-80 mg/hr, and occasionally higher doses (e.g., 150 mg/hr) have been required.
- Analgesia in palliative care and cancer patients: usual dosage range can be exceeded and is titrated to effect.
- Dyspnea in palliative care patients: 2-5 mg IV every 5-10 minutes until relief.

Pediatrics:
- 0.05 mg/kg/dose IV/IM/SC q2-4h prn as an initial dose; usual range 0.1-0.2 mg/kg/dose. Usual maximum dose: 2 mg for an infant, 4 mg for a child 1-6 years old, 8 mg for a child 7-12 years old and 10 mg for an adolescent.
- Continuous IV Infusion: for postoperative pain: 0.01-0.04 mg/kg/hr; for cancer pain: 0.025-2.6 mg/kg/hr.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp; protect from light.
- Stable for 7 days at room temp or refrigerated in D5W or NS at concentrations of 0.04-0.4 mg/mL in glass and PVC containers.
- Stable for 30 days at room temp in NS or D5W at a concentration of 5 mg/mL in PVC containers.

MISCELLANEOUS
REFERENCES
1, 4, 5, 40, 82, 135, 253.
INDICATIONS
- Treatment of respiratory tract infections (sinusitis, bronchitis, pneumonia) caused by susceptible micro-organisms when oral route is not feasible.
- Treatment of complicated intra-abdominal infections caused by susceptible microorganisms.
- Treatment of complicated skin and skin structure infections caused by susceptible organisms.

ADMINISTRATION
- Intermittent IV infusion: 400 mg in ready-to-use 250 mL bag of 0.8% saline to be administered IV over 60 minutes. A slow infusion into a large vein minimizes patient discomfort and reduces risk of venous irritation.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, rash, pruritus, facial or pharyngeal edema, dyspnea, anaphylaxis.
- Cardiovascular: QT interval prolongation.
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: dizziness, anxiety, agitation, confusion, tremor and seizures.
- Blood glucose disturbances (hyper- and hypoglycemia), usually in diabetic patients.
- Myasthenia gravis exacerbation (rare, but serious); avoid using in patients with this condition.

DOSAGE
- 400 mg IV once daily; duration of therapy (from 5 to 21 days) is dependent upon the type and severity of infection.
- Dosage in renal impairment: no dosage adjustment necessary.
- Dosage in hepatic impairment: no dosage adjustment necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store bags at room temp; do not refrigerate; protect from light.
- The intravenous solution usually has a normal yellow appearance.
- Compatible with NS, D5W, D10W and RL.

MISCELLANEOUS
- When switching from IV to oral administration, no dosage adjustment is necessary.
- Use in pediatrics is not routinely recommended, but may be justified in special circumstances.

REFERENCES
1, 5, 28, 40, 44.
INDICATIONS
- Vitamin supplement for patients receiving parenteral nutrition or for those who cannot take oral therapy.

ADMINISTRATION
- Intermittent IV infusion, Continuous IV infusion: dilute with not less than 500 mL but preferably 1000 mL of any commonly-used IV solution. Administer at prescribed rate of infusion fluids.

POTENTIAL ADMINISTRATION HAZARDS
- Rare when administered as recommended.
- Hypersensitivity: anaphylaxis, angioedema, urticaria, shortness of breath, pruritus, rash.
- Local reactions: irritation at injection site.

DOSAGE
- 10 mL IV daily; may be increased to 20 mL daily if required.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Refrigerate ampoules or vials and protect from light.
- Compatible with dextrose, saline, RL, amino acid solutions.
- Incompatible with alkaline solutions.
- Dilute immediately after opening ampoule and use within 24 hours after adding to IV solution. Do not use if any crystals have formed.

MISCELLANEOUS

REFERENCES
4, 5, 40.

Full revision 2016
### INDICATIONS

- Prophylaxis of organ rejection in patients receiving allogeneic renal, cardiac or hepatic transplants.

### ADMINISTRATION

- Reconstitute each 500 mg vial with 14 mL of D5W (to obtain 500 mg/15 mL); shake gently to dissolve.
- Intermittent IV infusion (mandatory): to obtain a final concentration of 6 mg/mL, further dilute 1 g dose in 140 mL D5W (for a total of 1 g in approximately 170 mL) or 1.5 g dose in 210 mL D5W (for a total of 1.5 g in approximately 255 mL). (At TOH, further dilute 1 g dose in 100 mL D5W for a total of 1 g in approximately 130 mL or 1.5 g dose in 250 mL D5W for a total of 1.5 g in approximately 295 mL). Infuse dose over at least 2 hours.

### POTENTIAL ADMINISTRATION HAZARDS

- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- GI: diarrhea, nausea, vomiting.
- Hematologic: leukopenia, phlebitis, thrombosis, pure red cell aplasia (very rare).
- Sepsis.
- Numerous adverse effects have been reported in clinical trials. While not specific to the IV preparation, they may occur during IV therapy. Please refer to manufacturer’s monograph for a complete listing.

### DOSAGE

Mycophenolate mofetil IV administration should start within 24 hours following transplantation.

- Renal transplant: 1 g IV twice daily.
- Cardiac transplant: 1.5 g IV twice daily.
- Hepatic transplant: 1 g IV twice daily.

### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Manufacturer recommends to begin the infusion within 4 hours of reconstitution and dilution of the product.
- Not compatible with solutions other than D5W.
- Stable for 7 days at 4° and 25° C in D5W at concentrations from 1 to 10 mg/mL in PVC bags.

### MISCELLANEOUS

- Product can be used IV for up to 14 days, but patients should be switched to the oral route as soon as they can tolerate oral medication.
- Mycophenolate mofetil should be used with standard cyclosporine and corticosteroid therapy.

### REFERENCES

1, 4, 5, 40, 490.
## INDICATIONS
- Prophylaxis of thrombosis related to surgery.
- Treatment of deep vein thrombosis (DVT).
- Treatment of unstable angina and non-Q-wave myocardial infarction (NQWMI).
- Prevention of clotting during hemodialysis.

## ADMINISTRATION
- **IV direct:** physician or RN. For first dose only when used in unstable angina and NQWMI. Administer undiluted over 30 seconds to 1 minute. Flush with NS after administration.
- **SC:** in the fat tissue of the lower abdomen; as an alternative, can also be injected into the side of the thigh (but NOT into the muscle tissue). With the thickness of skin held between the operator’s thumb and finger, introduce the entire length of the needle vertically into the skin. To minimize bruising, injection sites should NOT be massaged after injection. Rotate site of injection daily.

## POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Hypersensitivity:** rash, angioedema, allergic reactions, anaphylactoid reactions.
- **Hematologic:** bleeding (less than 5% incidence with prophylactic treatment, up to 10% with active treatment), thrombocytopenia.
- **Risk of epidural or spinal hematomas that can result in permanent paralysis when epidural or spinal anesthesia or spinal puncture is used in conjunction with nadroparin. No spinal invasion should be performed for at least 12 hours after a phophylactic dose and at least 24 hours after a therapeutic dose.**
- **Hepatic:** transient increase of liver transaminases (AST, ALT); reversible when drug is discontinued.
- **Local reactions:** hematomas at the injection site; skin necrosis (rare).

**Antidote:** The anticoagulant effect of nadroparin can be partially neutralized by protamine. Refer to protamine in this manual for more details.

## DOSAGE
- **Prophylaxis of thrombosis related to surgery:**
  - **General surgery:** 2850 anti-Xa international units SC once daily for at least 7 days, starting 2-4 hours before surgery.
  - **Hip surgery:** 38 anti-Xa international units/kg SC once daily for the first 3 postoperative days, starting 12 hours before surgery, if potential benefits outweigh the potential risks; starting postoperative day 4, dose should be increased to 57 anti-Xa international units/kg/day. Treatment to be continued for a total of at least 10 days.
  - **Obese patients may need a higher prophylactic dose; use actual body weight.**
- **Treatment of DVT:**
  - **171 anti-Xa international units/kg SC once daily until adequately anticoagulated with an oral anticoagulant.**
  - **In patients at increased risk of bleeding, a dose of 86 anti-Xa international units/kg SC twice daily is recommended.**
  - **Dosage in obese patients is based on actual body weight.**
- **Treatment of unstable angina and NQWMI:**
  - **Initial IV bolus dose of 86 anti-Xa international units/kg followed by SC injections of 86 anti-Xa international units/kg twice daily. Usual treatment duration is 6 days.**
DOSAGE (Cont.)

- Prophylaxis of clotting during hemodialysis:
  - 65 anti-Xa international units/kg into the arterial line at the start of each session; an additional dose may be given if session lasts longer than 4 hours; adjust dose for subsequent sessions to achieve plasma anti-Xa levels between 0.5-1 anti-Xa international units/mL.
  - In patients at risk of bleeding, use halved doses (i.e., 32.5 anti-Xa international units/kg); an additional smaller dose may be given if session lasts longer than 4 hours; adjust dose for subsequent sessions to achieve plasma anti-Xa levels between 0.2-0.4 anti-Xa international units/mL.

- Dosage in renal impairment: consider dosage adjustment and monitoring of anti-Xa levels.
  
  | CrCl (mL/min) | 50-30 | less than 30 |
  | Dose         | decrease by 25-33% | decrease by 25-33% if prophylaxis do not use if treatment |

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp.
- Compatible by Y-site with NS.

MISCELLANEOUS

- Nadroparin should not be given to patients with a history of heparin-induced thrombocytopenia (risk of cross-reactivity), unless an in vitro platelet aggregation test is negative.
- For laboratory monitoring of effect, anti-Xa methods are recommended (although not routinely done, monitoring is recommended in special cases such as obesity, pregnancy and renal failure). Peak activity occurs 4 hours after SC administration.

REFERENCES

5, 95, 119, 135, 296.
PARENTERAL DRUG THERAPY MANUAL

NAME OF MEDICATION
NALBUPHINE

OTHER NAMES
Nubain ®

CLASSIFICATION
Opioid analgesic

INDICATIONS
- Supplement to surgical anesthesia.
- Relief of moderate to severe pain.
- Preoperative and postoperative analgesia.
- Obstetrical analgesia during labour.
- As an adjunct to epidural opioids to reduce the severity of nausea, vomiting and pruritus.

ADMINISTRATION
- IV direct: physician or RN; respiratory support. Administer undiluted or dilute dose to 10 mL with NS or D5W; inject each 10 mg over 3-5 minutes.
- Intermittent IV infusion: dilute dose in 50 mL of D5W or NS; infuse over at least 15 minutes.
- SC, IM.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylactic/anaphylactoid reactions, rash, pruritus.
- GI: nausea, vomiting, dry mouth.
- CNS: sedation, dizziness, vertigo, headache.
- Respiratory depression (less than with morphine).
- Sweaty or clammy sensation.

Antidote: naloxone.

DOSAGE
- Analgesia: 10 mg (or 0.14 mg/kg) IV/IM/SC q3-6h. Single doses may be increased to 20 mg. Possesses analgesic ceiling effect, with no increase in pain relief with doses in excess of 0.4 mg/kg IV. Maximum total daily dose is 160 mg.
- Anesthesia induction: 0.3-3 mg/kg IV over 10-15 minutes, followed by maintenance doses of 0.25-0.5 mg/kg in single IV injections as needed.
- Pruritus: 5 mg IV; may repeat dose if pruritus not resolved.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stable for 48 hours at room temp in NS, D5-NS, or RL at concentrations of 3.3 mg/mL, 5 mg/mL, 6.7 mg/mL and 10 mg/mL.

MISCELLANEOUS
- Similar onset and duration of action as morphine.
- Nalbuphine is a mixed agonist-antagonist and may precipitate withdrawal in opioid-dependent individuals.

REFERENCES
1, 5, 40, 95, 208, 285.
NALOXONE

Narcan ®

Opioid antagonist, Antidote

INDICATIONS
- To reverse postoperative opioid depression.
- For diagnosis and treatment of respiratory depression in overdose situations induced by natural or synthetic opioids (including pentazocine, propoxyphene, butorphanol, nalbuphine, and methadone).
- For opioid-induced pruritus.

ADMINISTRATION
- IV direct: physician or RN; undiluted or diluted with SWFI; administer at a rate of 0.4 mg/15 seconds.
- Continuous IV infusion: dilute 2 mg in 500 mL D5W or NS to obtain a final concentration of 4 mcg/mL or 0.004 mg/mL; see Dosage section for administration rate. In fluid-restricted patients, may prepare a more concentrated solution such as 0.01 mg/mL (10 mcg/mL) or 0.1 mg/mL (100 mcg/mL). At TOH, add 2 mg (2 mL from a naloxone 1 mg/mL vial) to 500 mL of D5W or NS to obtain a final concentration of 0.004 mg/mL (4 mcg/mL). If need a high concentration for opioid overdose, withdraw 10 mL from a 100 mL bag of D5W or NS and discard, then add 12 mg (30 mL from naloxone 0.4 mg/mL, 10 mL vials) to the 90 mL bag for a total volume of 120 mL and a final concentration of 0.1 mg/mL (100 mcg/mL).
- IM, SC (neither are preferred).

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypotension, hypertension, ventricular tachycardia and fibrillation, pulmonary edema, cardiac arrest, especially in postoperative patients with pre-existing cardiovascular disease or taking concurrent cardiotoxic drugs.
- Reversal of analgesia in postoperative patients.
- May precipitate withdrawal symptoms in opioid-dependent patients (pain, hypertension, sweating, agitation, irritability).

DOSAGE
Adults:
- Postoperative opioid depression: initial dose of 0.1-0.2 mg IV, repeat at 2-3 minute intervals prn until desired response is obtained.
  For TOH patients from Acute Pain Service, refer to nursing policies 00059, 00060 and 00061 (Appendix 1-Naloxone administration) for naloxone administration protocol.
- Known or suspected opioid overdose: 0.4-2 mg IV/IM/SC; repeat at 2-3 minute intervals prn; if no response is observed after a total of 10 mg, diagnosis of opioid overdose should be questioned. Although an infusion is rarely indicated, it can be used initially at 0.4 mg/hr; titrate according to patient's response. Others recommend to administer on an hourly basis the equivalent of 2/3 of the bolus dose that resulted in reversal (e.g., if a patient responds to a 3 mg bolus, initiate at 2 mg/hr); titrate to effect. A second bolus equal to 1/2 the initial bolus should be given 15 minutes after the continuous infusion has started to prevent a decrease in naloxone blood levels.
- For opioid-induced pruritus: IV infusion of 0.25 mcg/kg/hr; may increase to 2.4 mcg/kg/hr depending on clinical response (for a 70 kg patient, range from 0.018 mg/hr to 0.17 mg/hr); monitor pain and check if naloxone is not reversing analgesia.

Pediatrics:
- Postoperative opioid depression: 0.005-0.01 mg/kg IV, repeat at 2-3 minute intervals prn until desired response is obtained.
- Known or suspected opioid overdose: up to 5 years old or weight up to 20 kg: 0.1 mg/kg/dose IV/IM/SC, repeat at 2-3 minute intervals prn until desired response is obtained. Over 5 years old or weight greater than 20 kg: 2 mg/dose IV/IM/SC, repeat at 2-3 minute intervals prn until desired response is obtained.

Note:
- The duration of action of opioids is often greater than that of naloxone; therefore, repeat doses (e.g., every 20-60 minutes) or an IV infusion may be necessary.
NALOXONE

NAME OF MEDICATION
NALOXONE

OTHER NAMES
Narcan ®

CLASSIFICATION
Opioid antagonist, Antidote

…/Cont.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp and protect from light.
- Do not mix with parenteral preparations containing bisulfite, sulfite or any solution or drug with an alkaline pH.
- Stable for 24 hours at room temp in D5W or NS at a concentration of 0.004 mg/mL (4 mcg/mL).

MISCELLANEOUS

- Naloxone is a pure antagonist with little or no agonist activity. In the absence of an opioid agent, the drug has no effect.
- Following IV administration: onset of action within 1-2 minutes; duration of action of 45 minutes.

REFERENCES

1, 2, 5, 40, 82, 95, 135, 208, 324.
NATALIZUMAB
Tysabri ®
Immunomodulator, Monoclonal antibody

INDICATIONS
- Monotherapy for relapsing-remitting multiple sclerosis.
- Management of moderate to severely active Crohn's disease in patients with inadequate response to or unable to tolerate conventional therapy and tumour-necrosis factor inhibitors.

ADMINISTRATION
- Intermittent IV infusion: dilute 300 mg in 100 mL of NS. Invert diluted solution gently to mix; do NOT shake. Infuse over 60 minutes. Flush line with NS after infusion is complete.
- Patient should be observed during the infusion and for 60 minutes after the end of the infusion.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; anaphylaxis, urticaria, dizziness, fever, rash, rigors, pruritus, nausea, angioedema, flushing, hypotension, dyspnea, chest pain. Usually occurs within 2 hours of the start of the infusion. If a hypersensitivity reaction occurs, discontinue drug immediately and initiate appropriate therapy.
- Infusion-related reactions (defined as any adverse event occurring within 2 hours of the start of the infusion): headache, dizziness, fatigue, urticaria, pruritus, rigors. Treat symptomatically, as appropriate.
- GI: gastroenteritis, nausea, abdominal discomfort, diarrhea, cholelithiasis.
- CNS: depression, suicidal ideation.
- Arthralgia or pain in extremities.
- Infections: increased risk of infections as natalizumab is an immunosuppressant; respiratory tract infections, urinary tract infections, influenza, vaginal infections, tooth infections, tonsillitis/pharyngitis, herpes infections and progressive multifocal leukoencephalopathy or PML (rare opportunistic viral infection of the brain that can lead to severe disability or death).
- Hepatic: increase in hepatic enzymes and total bilirubin.
- Dermatitis.

DOSAGE
- 300 mg IV once every 4 weeks.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge and protect from light. Do not shake and do not freeze.
- Store the diluted solution in the fridge (do not freeze) if immediate infusion is not possible; administration of the solution should be completed within 8 hours of its preparation.

MISCELLANEOUS
- Monitor for any new sign or symptom of PML.

REFERENCES
1, 5, 40, 95.

Full revision 2016
INDICATIONS

- Treatment of T-cell acute lymphoblastic leukemia (T-ALL) or T-cell lymphoblastic lymphoma (T-LBL) in patients who have not responded to or whose disease has relapsed following treatment with at least two chemotherapy regimens.

ADMINISTRATION

- Ready-to-use solution. Transfer dose into an empty, sterile glass or PVC container.
- Intermittent IV infusion: do NOT dilute prior to administration. Infuse over 2 hours.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- GI: diarrhea, nausea, vomiting, anorexia, constipation.
- CNS: somnolence (can progress to coma and death), confusion, dizziness, headache, ataxia, paresthesia, hypoesthesia, Guillain-Barré (GB) syndrome, peripheral neuropathy.
- Hematologic: anemia, leukopenia, neutropenia, thrombocytopenia.
- Respiratory: cough, dyspnea, pleural effusion.
- Asthenia, fatigue, myalgia, pyrexia.
- Edema.
- Tumour lysis syndrome, hyperuricemia: can be prevented by administration of fluids, allopurinol and alkalinization of urine.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE

- Adult: 1500 mg/m²/day IV administered on days 1, 3 and 5 and repeated every 21 days.
- Consult specific protocol.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Stable for 8 hours at room temp in PVC infusion bags and glass containers.

MISCELLANEOUS

REFERENCES

1, 5, 25, 165, 301.
INDICATIONS
- Reversal of postoperative neuromuscular blockade.
- Treatment of acute exacerbations of myasthenia gravis.
- Prophylaxis and treatment of postoperative urinary retention and intestinal atony.
- Treatment of acute intestinal pseudo-obstruction.

ADMINISTRATION
- IV direct: physician only; undiluted; rate should not exceed 0.5 mg/min.
- SC, IM.

POTENTIAL ADMINISTRATION HAZARDS
- Cholinergic symptoms: nausea, vomiting, diarrhea, abdominal cramps, miosis, salivation, sweating, bradycardia, hypotension, increased respiratory secretions, bronchoconstriction, etc.

Antidote: atropine 0.6-1.2 mg IV or glycopyrrolate 0.2-0.6 mg IV.

DOSAGE
- Reversal of neuromuscular blockade: 0.5-2.5 mg OR 0.03-0.07 mg/kg IV. Repeat as needed; total dose does not usually exceed 5 mg.
- Myasthenia gravis: 0.5-2.5 mg IV/SC/IM; repeat q1-3h as needed to a maximum 10 mg/24 hours.
- Postoperative urinary retention or intestinal atony: Prophylaxis: 0.25 mg SC/IM immediately before or after surgery, repeat q4-6h for 2-3 days. Treatment: 0.5 mg SC/IM/IV q4-5h. For urinary retention: if no response within 60 minutes, the patient should be catheterized; after the bladder has been emptied, continue with 0.5 mg SC/IM q3h for at least 5 doses.
- Treatment of intestinal pseudo-obstruction: 2-2.5 mg IV; repeat once if needed.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp and protect from light.
- Compatible with commonly-used IV solutions.
- Compatible with glycopyrrolate when mixed in the same syringe.

MISCELLANEOUS
- Not effective in neutralizing neuromuscular blockade produced by depolarizing agents such as succinylcholine.

REFERENCES
1, 4, 5, 6, 40, 95, 135.

Full revision 2016
INDICATIONS
- Treatment of acute decompenesated heart failure presenting with moderate to severe dyspnea.

ADMINISTRATION
- Reconstitute the 1.5 mg vial with 5 mL of diluent removed from a prefilled 250 mL plastic bag (D5W, D5-1/4NS, D5-1/2NS, NS) to obtain a 0.32 mg/mL solution. Roll vial gently to ensure complete reconstitution. Do NOT shake. Further dilute entire content of vial by transferring it in the original 250 mL plastic bag to obtain a final concentration of 6 mcg/mL. Invert bag several times for complete mixing.
- Prime the tubing with 5 mL of the prepared infusion solution before connecting to the IV access port and before withdrawing the loading dose.
- IV direct: physician only; blood pressure monitoring. Withdraw the appropriate loading dose from the prepared infusion bag and administer over 60 seconds.
- Continuous IV infusion: blood pressure monitoring; administer solution from the prepared infusion bag, as per dosage section.
- Nesiritide must NOT be administered through a heparin coated catheter.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: pruritus, rash, anaphylaxis (rare).
- Cardiovascular: arrhythmias, angina and hypotension; if marked hypotension, reduce dosage or discontinue infusion. May restart infusion without a loading dose and with a 30% reduction in the infusion rate following an appropriate period of observation and only after the patient has been stabilized.
- GI: nausea, vomiting.
- CNS: headache, insomnia, dizziness, anxiety.
- Back pain.
- Nephrotoxicity.
- Local reactions: catheter pain.

DOSAGE
- Loading dose: 2 mcg/kg IV. Volume of loading dose to be taken from the prepared infusion bag can be calculated using the following formula: Loading dose (mL) = patient weight (kg)/3.
- Infusion dose: to follow immediately loading dose, at a rate of 0.01 mcg/kg/min (0.1 mL/kg/hr). Infusion rate in mL/hr can be calculated using the following formula: Infusion rate (mL/hr) = patient weight (kg) x 0.1. Dose may be increased in increments of 0.005 mcg/kg/min (after a bolus of 1 mcg/kg) no more frequently than every 3 hours, up to a maximum dosage of 0.03 mcg/kg/min.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Reconstituted vial is stable for 24 hours in the fridge or at room temp; protect from light.
- Diluted solution is stable for 24 hours at room temp.
- Compatible with D5W, NS, D5-1/2NS and D5-1/4NS.

MISCELLANEOUS
- Limited experience with administration of nesiritide for longer than 96 hours.

REFERENCES
1, 40, 95, 135. * Available via Health Canada’s Special Access Programme

*(Available via Health Canada’s Special Access Programme)
INDICATIONS

- Acute treatment of pellagra.

ADMINISTRATION

- Intermittent IV infusion (preferred): dilute dose in 500 mL of NS; concentration should not exceed 10 mg/mL; infuse at a rate not exceeding 2 mg/min.
- IM.

POTENTIAL ADMINISTRATION HAZARDS

- GI: nausea, vomiting, diarrhea.
- CNS: headache, dizziness.
- Dermatologic (rare): flushing, rash, hives, facial erythema.

DOSAGE

- 25-100 mg IV q2-3h (maximum dose: 1 g daily) OR 50-100 mg/day IM, administered in 5 or more divided doses.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Compatible with NS.

REFERENCES

95.

Full revision 2016
**INDICATIONS**
- Control of blood pressure in perioperative hypertension and hypertensive emergencies.
- Congestive heart failure associated with acute myocardial infarction.
- Treatment of unstable angina.
- As a tocolytic agent for the treatment of uterine tachysystole during pregnancy/labour.

**ADMINISTRATION**
- IV direct (for the treatment of uterine tachysystole): physician or RN in presence of physician; **BP monitoring,** fetal monitoring. From a nitroglycerin premixed bottle of 50 mg/250 mL, withdraw 1 mL (200 mcg) and dilute with 9 mL of NS to get a final concentration of 20 mcg/mL (200 mcg/10 mL). Administer dose (usually 50 mcg=2.5 mL) over 2-3 minutes.
- Continuous IV infusion: cardiac monitoring; continuous BP monitoring. Use a premixed bottle OR dilute 25-50 mg from vials in 250-500 mL of D5W or NS in a glass or non-PVC plastic container and invert container several times to ensure uniform dilution. Concentrations up to 400 mcg/mL (0.4 mg/mL) may be used. At TOH, use premixed bottle OR add 50 mg (10 mL from a nitroglycerin 5 mg/mL vial) to 250 mL of D5W or NS in a glass or a non-PVC plastic container to obtain a final concentration of 200 mcg/mL (0.2 mg/mL). Administer via an infusion pump at a rate titrated to patient response (refer to Dosage section).

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: excessive hypotension, reflex tachycardia or bradycardia.
- GI: nausea, vomiting, abdominal pain.
- CNS: headache, dizziness, weakness, restlessness
- Tachyphylaxis with continued use.

**DOSAGE**
- When special non-PVC administration sets are used, initiate with 5-10 mcg/min, and increase every 3 to 5 minutes in 5 mcg/min increments. If no response at 20 mcg/min, increments of 10 mcg/min and later 20 mcg/min can be used. Maximum rate for unstable angina is 400 mcg/min, and that for hypertension is 100 mcg/min.
- When PVC administration sets are used, higher dosages are generally required; initiate with 25 mcg/min. Dosage is then titrated according to response and tolerance of the patient.
- Each patient must be individually titrated.
- For uterine tachysystole: 50 mcg IV every 3-5 minutes to a maximum of 200 mcg.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and premixed bottles at room temp. Protect from light; do not freeze.
- Baxter premixed nitroglycerin solution in glass bottle can be exposed to ambient light for up to 72 hours including time for administration.
- Only infusion containers made from glass or a plastic known to be compatible with nitroglycerin (i.e., polyolefin, polyethylene) are to be used.
- Nitroglycerin readily undergoes sorption to PVC containers and tubing. Special administration sets are marketed to avoid these potential problems.
- Stable for 28 days at room temp or in the fridge in D5W or NS at concentrations of 200 and 400 mcg/mL in glass and polyolefin containers.
- Compatible with RL, D5-RL, D5-1/2NS, D5-NS, 1/2NS, sodium lactate 1/6M.
- Baxter premixed nitroglycerin solution in glass bottle is not compatible with furosemide administered by Y-site.

**MISCELLANEOUS**
- Contraindicated in patients with hypotension or uncorrected hypovolemia, increased intracranial pressure, constrictive pericarditis, pericardial tamponade, and when taking riociguat, sildenafil, tadalafil or vardenafil.

**REFERENCES**
1, 4, 5, 6, 40, 70, 95, 135, 314, 315, 382.
INDICATIONS
- To treat hypertensive emergencies.
- To control blood pressure during surgery.
- To improve cardiac performance in refractory heart failure or acute myocardial infarction.

ADMINISTRATION
- Continuous IV infusion (mandatory): cardiac monitoring; continuous BP monitoring. Usually, dilute 50 mg in D5W or NS to obtain a final concentration of 50 mcg/mL (50 mg/1000 mL), 100 mcg/mL (50 mg/500 mL) or 200 mcg/mL (50 mg/250 mL). At TOH, dilute 50 mg (2 mL from a nitroprusside 25 mg/mL vial) in 100 mL D5W or NS to obtain a final concentration of 500 mcg/mL (0.5 mg/mL). Promptly wrap the infusion container in aluminium foil or other opaque material to protect from light (it is not necessary to cover the tubing). Administer via an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: retrosternal discomfort, palpitations, hypotension.
- GI: nausea, retching, vomiting, abdominal pain.
- CNS: apprehension, headache, agitation, somnolence, dizziness.
- Sweating, muscle twitching.
- Thiocyanate accumulation may occur at infusion rates faster than 2 mcg/kg/min; symptoms can include blurred vision and miosis, hyperreflexia, skin rash, tinnitus, bradycardia, metabolic acidosis, seizures and confusion.
- Local reactions: irritation at injection site.

Antidote: hydroxocobalamin or sodium thiosulfate.

DOSAGE
- Initiate with 0.25-0.3 mcg/kg/min IV and titrate every few minutes to effect. Usual rate is 3 mcg/kg/min. Maximum rate is 10 mcg/kg/min; the absence of a response to a dose of 10 mcg/kg/min after 10 min of therapy requires cessation of therapy as may indicate cyanide accumulation.
- Smaller doses are required in patients receiving concomitant antihypertensive medications and elderly patients.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light; do not freeze.
- Freshly prepared solutions range in colour from faint brown, brownish-pink, light orange to straw. Upon exposure to light, the colour of solutions changes from brown to blue. Highly discoloured solutions (blue, green or dark red) should be discarded.
- Stable for 48 hours at room temp when protected from light (with an opaque covering such as aluminium foil, and not amber plastic covering) in D5W, NS or RL at concentrations of 50 mcg/mL and 100 mcg/mL.

MISCELLANEOUS
- Onset: 30-60 seconds.
- Nitroprusside is metabolized to cyanide and then to thiocyanate which is then excreted by the kidney. Monitor thiocyanate levels if treatment is prolonged or high doses are used; levels should be less than 1 mmol/L (or 60 mg/L).
- Contraindicated in the treatment of compensatory hypertension, in patients with uncorrected hypovolemia or anemia and in patients with inadequate cerebral circulation; when used during surgery, it is also contraindicated in patients with hepatic or severe renal impairment, congenital (Leber’s) optic atrophy, tobacco amblyopia or disease states associated low vitamin B12 plasma levels.
- Caution in hypothyroidism and in patients with increased intracranial pressure.

REFERENCES
1, 5, 40, 95, 135, 208, 263.
INDICATIONS

- Treatment of unresectable or metastatic melanoma or for the adjuvant treatment of melanoma.
- Treatment of locally advanced or metastatic non-small cell lung cancer (NSCLC) with progression on or after platinum-based chemotherapy.
- Treatment of advanced or metastatic renal cell carcinoma (RCC).
- Treatment of recurrent or metastatic squamous cell carcinoma (SCC) of the head and neck with progression on or after platinum-based chemotherapy.
- Treatment of patients with classical Hodgkin lymphoma (cHL) that has relapsed or progressed after:
  1) autologous stem cell transplantation (ASCT) and brentuximab vedotin, or
  2) three or more lines of systemic therapy including ASCT.
- Treatment of advanced or metastatic hepatocellular carcinoma (HCC) in patients with intolerance to or progression on sorafenib therapy.

ADMINISTRATION

- Intermittent IV infusion: withdraw the required amount from the 10 mg/mL vials and transfer to a compatible container. The dose may also be diluted in NS or D5W. The 240 or 480 mg dosage may be diluted to a maximum total infusion volume of 120 mL. The 1 mg/kg and 3 mg/kg dosages may be diluted to a final concentration ranging from 1-10 mg/mL (if 10 mg/mL: no dilution is necessary). Gently invert container to mix; do NOT shake. Administer over 30 minutes through an in-line low protein-binding 0.2-1.2 micron filter. Flush line with NS or D5W after administration. When in combination with ipilimumab, infuse nivolumab first, followed by ipilimumab on the same day.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, anaphylactic reaction; immune-mediated reactions, can be fatal; can involve any organ. Most common reactions include endocrinopathies (e.g., hypothyroidism, hyperthyroidism, adrenal insufficiency, hypophysitis, hypopituitarism, diabetes mellitus and diabetic ketoacidosis), colitis, hepatitis, pneumonitis or interstitial lung disease, nephritis and renal failure, Stevens-Johnson syndrome, toxic epidermal necrolysis, encephalitis. Consult manufacturer’s recommendations for treating these reactions and when to withhold or discontinue treatment.
- Infusion-related reactions: chills, tremor, pruritus, rash, flushing, dyspnea, dizziness, fever, faintness. Patients with mild or moderate infusion reaction may continue to receive nivolumab (infusion rate may be slowed) with close monitoring; premedication may be considered. If reaction is severe, discontinue treatment.
- Cardiovascular: can be severe with combination therapy; edema, peripheral edema.
- GI: nausea, vomiting, diarrhea, constipation, decreased appetite, abdominal pain.
- CNS: headache, peripheral neuropathy.
- Electrolyte disturbances: hyponatremia, hypocalcemia, hypercalcemia, hyperkalemia, hypokalemia, hypomagnesemia.
- Hematologic: anemia, leukopenia, lymphopenia, thrombocytopenia.
- Respiratory: respiratory tract infection, cough, dyspnea.
- Elevated markers: LFTs, total bilirubin, amylase, lipase, creatinine, triglycerides, cholesterol.
- Fever, fatigue, vitiligo, musculoskeletal pain, weakness, urinary tract infection.
NIVOLUMAB
Opdivo ®
Antineoplastic, Monoclonal antibody

DOSAGE
- Monotherapy for unresectable or metastatic melanoma, NSCLC, RCC, SCC of the head and neck, cHL: 3 mg/kg IV every 2 weeks OR 240 mg IV every 2 weeks OR 480 mg IV every 4 weeks.
- Monotherapy for adjuvant treatment of melanoma and HCC: 3 mg/kg IV every 2 weeks.
- Combination therapy for unresectable or metastatic melanoma: 1 mg/kg IV every 3 weeks for the first 4 doses in combination with ipilimumab, followed by nivolumab as single-agent at 3 mg/kg IV every 2 weeks OR 240 mg IV every 2 weeks OR 480 mg IV every 4 weeks.
- Combination therapy for RCC: 3 mg/kg IV every 3 weeks for the first 4 doses in combination with ipilimumab, followed by nivolumab as single agent at 3 mg/kg IV every 2 weeks OR 240 mg IV every 2 weeks OR 480 mg IV every 4 weeks.
- Dosage in renal impairment: no adjustment in patients with CrCl 30 mL/min and above; insufficient data when CrCl is below 30 mL/min.
- Dosage in hepatic impairment: no adjustment in patients with mild hepatic impairment (abnormal AST or total bilirubin up to 1.5 X ULN); no data available for moderate to severe impairment.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze or shake.
- Solution in vial is clear to opalescent, colourless to pale-yellow and may contain a few translucent-to-white amorphous particles.
- Infusion must be completed within 24 hours of preparation.
- If not given immediately, the infusion solution is stable for 24 hours between 2-8°C, protected from light, undiluted or in NS or D5W in PVC, non-PVC or glass containers. Note that a maximum of 8 hours of the total 24 hours can be between 20-25°C and exposed to light.

MISCELLANEOUS
- Thyroid function, LFTs, blood glucose and electrolytes should be monitored at the start and during treatment.
- Contains 0.1 mmol (2.30 mg) of sodium per 10 mg of nivolumab.

REFERENCES
5, 129, 135, 165.
NOREPINEPHRINE BITARTRATE
Levarterenol, Levophed®, Noradrenaline bitartrate

Sympathomimetic

INDICATIONS
- Temporary maintenance of BP in acute hypotensive states produced by trauma, surgery, myocardial infarction, poliomyelitis, pheochromocytomectomy, sympathectomy, spinal anesthesia, septicemia, drug reactions, hemorrhage and blood transfusion reactions.
- Limited use in shock states while attempting to replace circulating blood volume.
- Adjunct in the treatment of cardiac arrest and profound hypotension.

ADMINISTRATION
- Continuous IV infusion (mandatory): cardiac monitoring; continuous BP monitoring. Must dilute before use. Concentration of solution will depend on dosage and fluid requirement of each patient. Dilute 4 mg or 8 mg (norepinephrine base) in D5W or D5-NS to obtain a final concentration of 4 mcg/mL (4 mg/1000 mL), 8 mcg/mL (4 mg/500 mL), 16 mcg/mL (4 mg/250 mL or 8 mg/500 mL) or 32 mcg/mL (8 mg/250 mL). At TOH, add 8 mg (8 mL from norepinephrine 1 mg/mL vials) to 250 mL of D5W to obtain a concentration of 32 mcg/mL (0.032mg/mL). Rate as per Dosage section. Whenever possible, infuse into a large vein.
- Check blood pressure every 2 minutes until desired level is reached, then every 5 minutes. Patient should never be left unattended while receiving the drug.
- Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: contains metabisulfite that may cause allergic-type reaction such as anaphylaxis, asthma.
- Cardiovascular: bradycardia (Antidote: atropine), arrhythmia.
- CNS: headache, weakness, dizziness, tremor, anxiety.
- Respiratory difficulty or apnea.
- Local reactions: blanching along the infused vein, may progress to superficial sloughing. If occurs, change infusion site.

DOSAGE
- Doses are expressed as the base form of norepinephrine.
- Average dose: initially 8-12 mcg/min IV or 0.1-0.5 mcg/kg/min IV; titrate to desired blood pressure.
- Usual maintenance dose: 2-4 mcg/min IV.
- Continue therapy until patient can maintain own BP then decrease gradually to prevent sudden drop in BP.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules at room temp. Protect from light; do not freeze.
- Do not use if pink or darker than slightly yellow or contains a precipitate.
- Compatible with NS, D5W, D10W, D5-NS, D5-1/2NS, D5-RL, RL but recommended for administration in dextrose in water or dextrose in saline solutions as dextrose protects against oxidation of the norepinephrine.
- Stable for 7 days at room temp exposed to light in D5W or NS at concentrations of 4 and 16 mcg/mL in PVC containers.
- Stability is affected when mixed with solutions that have a final pH of greater than 5.5-6.

MISCELLANEOUS
- Pressor therapy is not a substitute for replacement of blood/fluids.
- 1 mL of solution contains 1.88 mg of norepinephrine bitartrate which is equivalent to 1 mg of the base.

REFERENCES
1, 4, 5, 6, 40, 95, 101, 135, 208, 366, 367.

Full revision 2016; limited revision 2017, 2019
INDICATIONS
- Treatment of previously untreated chronic lymphocytic leukemia (CLL) in combination with chlorambucil.
- Treatment of Non-Hodgkin follicular lymphoma (FL) (in combination with bendamustine, followed by obinutuzumab monotherapy) that has relapsed after or is refractory to a rituximab-containing regimen.
- Treatment of previously untreated stage II, III or IV FL (in combination with chemotherapy, followed by obinutuzumab monotherapy).

ADMINISTRATION
- Ensure premedication has been administered as recommended; refer to Dosage section.
- For IV use: withdraw from vials the required amount of concentrated solution and dilute as follows: 4 mL (100 mg), 36 mL (900 mg) and 40 mL (1000 mg) added to 100 mL, 250 mL and 250 mL, respectively, of NS only. Gently invert bag to mix. Do NOT shake.
- Intermittent IV infusion (mandatory):
  - CLL: for the first dose of the first cycle: infuse the first 100 mg over 4 hours at 25 mg/hr; if no infusion-related reaction, administer the remaining 900 mg starting at 50 mg/hr, which can be increased by 50 mg/hr every 30 minutes (maximum: 400 mg/hr). For subsequent infusions, if no infusion-related reaction in previous infusion where the final infusion rate was 100 mg/hr or faster, initial infusion rate of 100 mg/hr which can be increased by 100 mg/hr every 30 minutes (maximum: 400 mg/hr).
  - FL: for day 1 of cycle 1: initial infusion rate of 50 mg/hr, which can be increased by 50 mg/hr every 30 minutes (maximum: 400 mg/hr). For subsequent infusions, if no infusion-related reaction or a mild reaction occurred in previous infusion where the final infusion rate was 100 mg/hr or faster, initial infusion rate of 100 mg/hr, which can be increased by 100 mg/hr every 30 minutes (maximum: 400 mg/hr).
  - Infusion rate may be slowed in the event of infusion-related reactions. Consult manufacturer’s recommendations for subsequent rate adjustment.
- Patients with pre-existing cardiac or pulmonary conditions should be monitored carefully during and after the infusion.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis, rash, pruritus.
- Infusion-related reactions: nausea, vomiting, diarrhea, hypotension, hypertension, flushing, tachycardia, atrial fibrillation, pyrexia, fatigue, chills, headache, dizziness, dyspnea, bronchospasm, laryngeal edema, larynx and throat irritation, wheezing, anaphylactic reactions; occur mainly during infusion of the first 1000 mg. If reactions occur, slow and/or stop the infusion. If reaction is severe, treatment should be interrupted or discontinued.
- Cardiovascular: arrhythmia, tachycardia, myocardial infarction, heart failure, acute coronary syndrome, angina; hypotension: withholding antihypertensive medications should be considered for 12 hours prior, during and for the first hour after the infusion.
- GI: nausea, vomiting, diarrhea, GI perforation (rare).
- Hematologic: myelosuppression, neutropenia, lymphopenia, leukopenia. Thrombocytopenia: can occur as soon as within 24 hours after first infusion and can lead to life-threatening hemorrhage; consider withholding concomitant medications which may increase bleeding risk, especially during the first cycle.
- Hepatic: elevated LFT, may be severe; possible reactivation of hepatitis B virus.
- Infections: increased risk of bacterial, fungal and viral infections from myelosuppression; may need antimicrobial prophylaxis.
- Respiratory: cough, dyspnea, upper respiratory tract infection, sinusitis.
- Progressive multifocal leukoencephalopathy (PML): rare, can be fatal. Report new onset of or changes in pre-existing neurological signs and symptoms. Discontinue obinutuzumab if PML is suspected.
- Tumour-lysis syndrome: hydrate patient and administer allopurinol or rasburicase in patients with high tumour load, high lymphocyte count (greater than 25 x 10⁹/L) and/or renal impairment (CrCl less than 70 mL/min).
- Fever, arthralgia, asthenia, hyperkalemia, hypocalcemia, hypokalemia, hyponatremia, increased creatinine, hypoalbuminemia.
- Local reactions: pain, erythema, hematoma, swelling, induration at injection site.

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DOSAGE

- Premedication for CLL cycle 1 days 1 and 2 and FL cycle 1 day 1: IV corticosteroid (prednisolone 100 mg, dexamethasone 20 mg or methylprednisolone 80 mg) completed at least 1 hour prior infusion, in combination with oral or injectable diphenhydramine 50 mg and oral acetaminophen 1000 mg given at least 30 minutes prior to the infusion. Premedication requirements for further cycles include oral acetaminophen 1000 mg; additional requirements vary according to infusion-related reaction in previous cycle or lymphocyte count. Consult manufacturer's recommendations.

- CLL: for the first 28-day cycle: 100 mg IV on day 1; if this dose is completed without changing the infusion rate, give the remaining 900 mg on the same day without delay; otherwise, administer the remaining 900 mg IV dose on day 2, then 1000 mg IV on days 8 and 15. For cycles 2 to 6: 1000 mg IV on day 1.

- Relapsed/refractory FL (28-day cycles): 1000 mg IV on days 1, 8 and 15 of the first cycle, then on day 1 for cycles 2 to 6 followed by every 2 months for up to 2 years.

- Previously untreated FL:
  - In combination with bendamustine (28-day cycles): as for relapsed/refractory FL;
  - In combination with CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone) or CVP (cyclophosphamide, vincristine, prednisone) (21-day cycles): 1000 mg IV on days 1, 8 and 15 of the first cycle, then on day 1 for cycles 2-8, followed by every 2 months for up to 2 years.

- Dosage in renal impairment: no dose adjustment required in patients with CrCl 30 mL/min and above; use with caution when CrCl is between 30 and 50 mL/min; no data if CrCl is below 30 mL/min.

- Consult specific protocol.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light. Do not freeze. Do not shake. Solution in vials should be clear, colourless to slight brown.

- Compatible with NS; incompatible with D5W. Do not mix with other IV solutions.

- Stable for 24 hours in the fridge then 48 hours at room temp (up to 30 °C) in NS at concentrations 0.4-4 mg/mL in PVC, polyethylene, polypropylene or polyolefin bags.

MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be available for the treatment of hypersensitivity and infusion-related reactions.

- Patient should be tested for hepatitis B virus infection before initiating therapy.

- Do not administer live vaccines concurrently with obinutuzumab therapy and until B-cell recovery.

REFERENCES

1, 5, 129, 135, 165.
INDICATIONS
- Control of diarrhea associated with vasoactive intestinal peptide (VIP) secreting tumours.
- Control of symptoms associated with metastatic carcinoid tumours (diarrhea, flushing) and carcinoid crisis (hypotension).
- Treatment of acromegaly.
- Treatment of GI and pancreatic fistulas.
- Treatment of bleeding gastro-esophageal varices.
- To prevent complications following pancreatic surgery in patients undergoing high risk procedures.

ADMINISTRATION
For octreotide solution:
- IV direct (for emergency situations such as carcinoid crisis, bleeding, gastro-esophageal varices): physician only; undiluted; inject over 3 minutes.
- Intermittent IV infusion: dilute dose in 50-100 mL of NS or D5W; infuse over 15-30 minutes.
- Continuous IV infusion: dilute 500 mcg in 250 mL of NS or D5W and administer as a continuous infusion at a rate of 25-200 mcg/hr. More concentrated solutions can be prepared depending on patient’s fluid requirements.
- SC: at the thigh, hip or abdomen; rotate injection site. Usual route of administration for VIP secreting tumours, metastatic carcinoid tumours and acromegaly because of delayed absorption, somewhat prolonged activity and patient convenience.
- Administer octreotide between meals and at bedtime to decrease GI side effects.

For octreotide suspension (LAR):
- Reconstitute as per instructions in the package insert.
- IM: deep intragluteal injection; alternate injection site.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: sinus bradycardia, conduction abnormalities and arrhythmias observed in patients with acromegaly and carcinoid syndrome.
- GI: nausea, vomiting, diarrhea, abdominal pain/cramps; incidence decreases with time; refer to Administration section to decrease GI effects. Also cholelithiasis, biliary sludge without stones, biliary duct dilation.
- Endocrine: mild and transient hyperglycemia and hypoglycemia.
- Local reactions: irritation at the injection site: pain, burning, redness and swelling; usually last no more than 15 minutes.

DOSAGE
For octreotide solution:
- For most indications: usually start with 50-100 mcg SC 1-3 times daily. Increase dose based on patient response; octreotide is usually given 2-4 times daily. Maximum recommended dose has not been established, but doses up to 1500-3000 mcg daily in divided doses have been given.
- Carcinoid crisis:
  - Prevention of carcinoid crisis in patients undergoing invasive procedures: for patients well controlled with octreotide LAR IM: supplemental dose of octreotide solution 250-500 mcg SC within 1-2 hours prior to procedure; for somatostatin analog-naive patients with functional neuroendocrine tumours and going for emergency surgery: 500-1000 mcg IV bolus OR 500 mcg SC, 1-2 hours prior to procedure.
  - Carcinoid crisis with hypotension, intraoperative: 500-1000 mcg IV bolus, this may be repeated every 5 minutes until symptoms are controlled OR 500-1000 mcg IV bolus followed by a continuous IV infusion of 50-200 mcg/hr during the procedure.
  - Carcinoid crisis with hypotension, postoperative: if supplemental doses were required during the procedure, continuous IV infusion of 50-200 mcg/hr for 24 hours followed by resumption of preoperative dosing regimen.
<table>
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<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
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<tr>
<td>Sandostatin ®, Sandostatin LAR ®</td>
<td>Somatostatin analog</td>
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**NAME OF MEDICATION**

**OCTREOTIDE**

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<th>DOSAGE (Cont.)</th>
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**For octreotide solution (cont.):**
- Bleeding gastro-esophageal varices: 50-100 mcg IV bolus (optional) followed by an IV infusion of 25-50 mcg/hr for 48 hours (up to 5 days in high risk patients).
- Prevention of complications following pancreatic surgery: 100 mcg SC TID for 7 days, starting on the day of the operation, at least 60 minutes before laparotomy.

**For octreotide suspension (LAR):**
- IM: initial dose of 20 mg IM every 4 weeks; may increase to 30 mg if symptoms persist after 2-3 months or may decrease to 10 mg if patient is well controlled. Before starting IM therapy, it is recommended to initiate SC therapy to control symptoms. Consult product monograph for how to switch patients from SC to IM therapy.

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<th>COMPATIBILITY, STABILITY</th>
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*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

**For octreotide solution:**
- Store multidose vials and ampoules in the fridge; protect from light.
- Vials and ampoules are stable for 2 weeks at room temp, protected from light.
- Stable for 30 days in the fridge undiluted (100 mcg and 500 mcg/mL) in polypropylene syringes.
- Stable for 96 hours at room temp exposed to light in NS at concentrations of 5, 50 and 250 mcg/mL in PVC containers.
- Stable for 24 hours in D5W.

**For octreotide suspension (LAR):**
- Store octreotide suspension in the fridge; protect from light.
- Octreotide suspension in vial can remain at room temp on the day of the injection; however, once reconstituted, the suspension should be administered immediately.

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<th>MISCELLANEOUS</th>
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<td>1, 4, 5, 40, 95, 135, 143, 412.</td>
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Full revision 2017; limited revision 2018, 2019
INDICATIONS

- Treatment of chronic lymphocytic leukemia (CLL) in combination with chlorambucil in patients who have not received prior therapy and for whom fludarabine-based therapy is considered inappropriate.
- Treatment of CLL in patients who are refractory to fludarabine and alemtuzumab.

ADMINISTRATION

- Ensure premedication has been administered prior to each infusion. Refer to Dosage section.
- Intermittent IV infusion (mandatory): Do NOT shake the vials. Dilute the required dose to 1000 mL with NS as follows: from a 1000 mL NS infusion bag, withdraw a volume equal to the volume from the vial(s) (20 mg/mL) for the patient’s dose. The dose from the vial(s) should then be added to the NS bag. Do NOT shake the bag; gently mix. Final concentration of the solution will depend upon the amount of drug added, but will be no more than 2 mg/mL. Administer through a peripheral line or indwelling catheter with supplied in-line filter infusion set. Flush line with NS before and after ofatumumab administration. Infusion rates as follows:
  - Previously untreated CLL: First infusion: Administer over 4.5 hours at an initial rate of 12 mL/hr. Then, 30 minutes later, increase the rate to 25 mL/hr; double the rate every 30 minutes (maximum rate: 400 mL/hr). Subsequent infusions: If the first infusion was tolerated, administer over 4 hours at an initial rate of 25 mL/hr; double the rate every 30 minutes (maximum rate: 400 mL/hr).
  - Refractory CLL: First and second infusions: Administer over 6.5 hours at an initial rate of 12 mL/hr. Then, 30 minutes later, increase the rate to 25 mL/hr; double the rate every 30 minutes (maximum rate: 200 mL/hr). Subsequent infusions: If the second infusion was well tolerated, administer over 4 hours at an initial rate of 25 mL/hr. Double the rate every 30 minutes (maximum rate: 400 mL/hr).

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity.
- Infusion-related reactions occur in most patients during the first two doses of ofatumumab and tend to decrease with subsequent infusions. Premedication (acetaminophen, antihistamine, corticosteroids) may reduce frequency and severity of infusion-related reactions; refer to Dosage section. Caution, as despite premedication, some of these infusion-related reactions have occurred, generally within 24 hours of the end of the infusion, and include: anaphylactoid/ anaphylactic reactions, bronchospasm, pulmonary edema, dyspnea, cough, myocardial infarction, bradycardia, hypertension, hypotension, flushing, cytokine release syndrome, nausea, diarrhea, fatigue, chills, pain, pyrexia, pruritus, rash and urticaria. Interrupt infusion if infusion-related reaction occurs; when patient is stable, restart at half the infusion rate (but not slower than 12 mL/hr) or restart at 12 mL/hr if infusion-related reaction was more severe; increase rate as per patient tolerance thereafter, not exceeding doubling the rate every 30 minutes.
- Cardiovascular: arrhythmias; refer also to infusion-related reactions.
- GI: repeated vomiting and abdominal pain early in the course of treatment may be a sign of bowel obstruction.
- Tumour lysis syndrome (rare); can be minimized with antihyperuricemics and hydration 12 to 24 hours prior to infusion.
- Progressive multifocal leukoencephalopathy (PML): rare, can be fatal; report new onset or changes in pre-existing neurological signs and symptoms. Discontinue ofatumumab if PML is suspected.
- Hematologic: neutropenia, thrombocytopenia, anemia.
- Possible reactivation of hepatitis B virus (HBV) in seropositive patients.
- Infections (bacterial, viral, fungal, including opportunistic infections).
OFATUMUMAB
Arzerra ™
Antineoplastic, Monoclonal antibody

DOSAGE

- Premedication 30 minutes to 2 hours before each infusion: oral acetaminophen 1000 mg, antihistamine (diphenhydramine 50 mg IV or cetirizine 10 mg oral or equivalent) and IV corticosteroid (methylprednisolone 40 mg or equivalent in previously untreated CLL patients, or methylprednisolone 80 mg or equivalent in refractory CLL patients; consult manufacturer's recommendations for possible corticosteroid dose reduction after the first 2 cycles).

- Previously untreated CLL (28-day cycles): Cycle 1: 300 mg IV on day 1, then 1000 mg IV on day 8. Subsequent cycles: 1000 mg IV on day 1 of each cycle until best response or a maximum of 12 cycles.

- Refractory CLL: 300 mg IV for the first infusion and 2000 mg IV for all subsequent infusions. The infusion schedule is 8 consecutive weekly infusions, followed 4 weeks later by 4 consecutive monthly (i.e., every 4 weeks) infusions.

- Dosage in renal impairment: use with extreme caution or avoid in patients with CrCl of 30 mL/min or less.

- Dosage in hepatic impairment: safety and efficacy have not been established, but unlikely to require a dosage reduction.

- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge, between 2-8°C. Protect from light. Do not freeze.

- The solution in the vials should be clear to opalescent, colourless to pale yellow and may contain a small amount of visible particles.

- Stable for 24 hours between 2-8°C diluted in NS in PVC or polyolefin bags.

- Infusion should be started within 12 hours of preparation.

MISCELLANEOUS

- Do not administer live viral vaccines while on ofatumumab; may administer inactivated vaccines but response rate to vaccination may be reduced.

- Screen all patients for HBV infection by measuring HBsAg and anti-HBc before initiating treatment

REFERENCES

1, 5, 6, 40, 129, 135, 165, 208.
INDICATIONS

- Rapid control of agitation in patients with schizophrenia and related psychotic disorders, and bipolar mania.

ADMINISTRATION

- Reconstitute 10 mg vial with 2.1 mL of SWFI for a final concentration of 5 mg/mL.
- IM (deep).
- Monitor patient for hypotension (including postural hypotension), bradyarrhythmia and/or hypoventilation for the first 2 to 4 hours following injection.

POTENTIAL ADMINISTRATION HAZARDS

- Cardiovascular: hypotension and/or syncope associated with bradycardia (infrequent).
- CNS: somnolence, dizziness, extrapyramidal reactions (e.g., acute dystonias).
- Neuroleptic malignant syndrome (rare): hyperpyrexia, muscle rigidity, altered mental status, autonomic instability.

DOSAGE

- Initial dose: usually 10 mg IM. Lower doses of 2.5, 5 or 7.5 mg may also be appropriate.
- Repeat doses: 5-10 mg IM may be repeated 2 hours after the first injection and a third dose no sooner than 4 hours after the second dose, if required.
- Maximum total dose per day is 30 mg, with no more than 3 injections in a 24 hour period.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C.
- Reconstituted solution is stable for 60 minutes at room temp.

MISCELLANEOUS

- If ongoing therapy with olanzapine is required, the patient should be switched to oral therapy as soon as possible.

REFERENCES

1, 5, 135.
OMALIZUMAB
Xolair ®
Immunomodulator, Monoclonal antibody

INDICATIONS
- Treatment of moderate to severe persistent asthma in patients 6 years of age and older with a positive reaction to a perennial aeroallergen and who are inadequately controlled with inhaled steroids.
- Treatment of chronic idiopathic urticaria in patients 12 years of age and older who remain symptomatic despite H1 antihistamine treatment.

ADMINISTRATION
- Reconstitute the 150 mg vial with 1.4 mL of SWFI to obtain a solution of 150 mg/1.2 mL (125 mg/mL). Swirl the vial gently for 1 minute to evenly wet the powder. Do NOT shake. Gently swirl the vial for 5-10 seconds approximately every 5 minutes to dissolve any remaining solids. The drug may take longer than 20 minutes to dissolve completely. Do NOT use the solution if content of the vial is not completely dissolved after 40 minutes.
- Also available as prefilled syringes of 75 and 150 mg. Take the box containing the syringe out of the fridge and leave it for about 20 minutes to reach room temp. Refer to manufacturer’s instructions for how to use the syringe.
- SC: in the deltoid region of the arm or in the thigh. Solution is slightly viscous therefore it may take 5 to 10 seconds to inject the drug; no more than 150 mg is to be injected at one site.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis (rare), urticaria, dermatitis, pruritus, throat and/or tongue edema.
- CNS: dizziness, headache.
- Infections: nasopharyngitis, sinusitus, upper respiratory tract infections, viral infections.
- Local reactions: bruising, burning, itching, pain, induration, swelling, erythema, bleeding.

DOSAGE
Adults and children 12 years of age and older:
- Asthma: 150-300 mg SC every 4 weeks OR 225-375 mg SC every 2 weeks. Dosing is based on the serum total IgE level before therapy and body weight; refer to manufacturer’s monograph for further details.
- Chronic idiopathic urticaria: 150 mg or 300 mg SC every 4 weeks.

Pediatrics (6 to 11 years of age):
- Asthma: 75-300 mg SC every 4 weeks OR 225-375 mg SC every 2 weeks. Dosing is based on the serum total IgE level before therapy and body weight; refer to manufacturer’s monograph for further details.

- Dosage in renal impairment: no dosage adjustment necessary.
- Dosage in hepatic impairment: no dosage adjustment necessary.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and prefilled syringes in the fridge; do not freeze.
- The reconstituted solution should be clear to slightly opalescent, colourless to pale brownish-yellow.
- The reconstituted solution should be used within 4 hours when stored at room temp or within 8 hours when stored in the fridge; protect from direct sunlight.
- Prefilled syringes can be kept at room temp for a cumulative time of 4 hours.

MISCELLANEOUS
- Each vial of 150 mg of omalizumab (1.2 mL) contains 145 mg of sucrose (0.5 calories or 2.3 Joules).
- The needle cap of the prefilled syringe may contain latex.

REFERENCES
1, 5.
ONDANSETRON
Zofran ®
Antiemetic

INDICATIONS
- Management of nausea and vomiting associated with chemotherapy.
- For the prevention and treatment of postoperative nausea and vomiting.
- Treatment of epidural opioid-induced pruritus.

ADMINISTRATION
- IV direct (restricted to patients younger than 65 years of age): physician or RN; only for 4 mg dose or less;
  administer undiluted or diluted to 10 mL with NS (dilution recommended to facilitate administration), over
  2-5 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W; infuse over 15 minutes.
- IM, SC (alternative routes if IV route not possible).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactic/anaphylactoid reactions, bronchospasm, hypotension, angioedema, urticaria, rash.
- Cardiovascular: dose-dependent QTc interval prolongation which can lead to torsades de pointes.
- GI: constipation, diarrhea.
- CNS: headache, dizziness.
- Transient increases in liver enzymes.

DOSAGE
Adults:
- Chemotherapy-induced nausea and vomiting:
  - highly emetogenic chemotherapy: 8 mg IV up to a maximum of 16 mg IV (in patients 75 years of age and
    older, do not exceed 8 mg as the initial dose) given at least 30 minutes prior to chemotherapy. Two additional
    doses of 8 mg IV may be given 4 and 8 hours after the initial dose. After 24 hours, follow with oral therapy as
    needed.
  - less emetogenic chemotherapy: 8 mg IV given at least 30 minutes prior to chemotherapy, followed by oral
    therapy post chemotherapy.
- Postoperative nausea and vomiting: 4 mg IV/IM given immediately before induction of anesthesia or
  postoperatively.
- Treatment of epidural opioid-induced pruritus: 4 mg IV.

Pediatrics:
- Chemotherapy-induced nausea and vomiting (6 months of age and older): 3-5 mg/m² IV or 0.15 mg/kg/dose IV
  (maximum: 16 mg/dose) infused over 15 minutes, at least 30 minutes before chemotherapy; to repeat twice at
  4-hour intervals for 3 doses total; may also switch to oral therapy post chemotherapy.
- Postoperative nausea and vomiting (1 month of age and older): 0.1 mg/kg IV, to a maximum of 4 mg; to be given
  immediately before induction of anesthesia or postoperatively.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules below 30°C; protect from light. Do not freeze.
- Compatible with NS, D5W, dextrose-saline combinations, RL.
- Stable for 48 hours at room temp, 14 days at 5°C and 3 months at -20°C in D5W or NS at concentrations of
  0.03 mg/mL and 0.3 mg/mL in PVC containers.
- Stable for 48 hours at room temp, 14 days at 4°C and 90 days at -20°C undiluted (2 mg/mL) or diluted with NS or
  D5W at concentrations of 0.25 mg/mL, 0.5 mg/mL and 1 mg/mL in plastic syringes.

…/Cont.
MISCELLANEOUS

- Avoid use of ondansetron in patients with congenital long QT syndrome. Use with caution in patients with other risk factors for QT interval prolongation such as electrolyte disturbances (hypokalemia, hypomagnesemia, hypocalcemia), congestive heart failure, bradyarrhythmias or taking other drugs that can lead to either QT interval prolongation or electrolyte disturbances.

REFERENCES

1, 4, 5, 6, 40, 82, 95, 143, 211, 226, 227, 239, 330.
INDICATIONS
- Treatment of metastatic colorectal cancer in combination with 5-fluorouracil and leucovorin.
- As an adjuvant treatment in stage III (Duke’s C) colon cancer after complete resection of primary tumour, in combination with 5-fluorouracil and leucovorin.
- Also effective for a number of other cancers, including breast, stomach, head and neck, lung, pancreas, ovary, testicular, prostate and cancer of unknown primary origin.

ADMINISTRATION
- Intermittent IV infusion: dilute in 250 to 500 mL of D5W only (NOT in NS or any chloride solution) to obtain a concentration not less than 0.2 mg/mL and not more than 0.7 mg/mL; infuse over 2 to 6 hours. The infusion line should be flushed with D5W prior to administration of oxaliplatin.
- To be given before 5-fluorouracil.
- Aluminium-containing IV needles, syringes or sets should not be used to prepare or administer oxaliplatin.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis, skin rash.
- Cardiovascular: hypotension, hypertension.
- GI: nausea, vomiting, diarrhea, mucositis.
- CNS: sensory neuropathy (cumulative, dose-related, usually reversible); pharyngolaryngeal dysesthesia (minimized by extending infusion time to 6 hours; antidote: antihistamines, bronchodilators); dysphasia; ataxia; cranial neuropathy.
- Hematologic: myelosuppression; immune hemolytic anemia (rare).
- Ophthalmic: conjunctivitis, lacrimation.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- 85 mg/m² IV repeated every 2 weeks when used in combination with 5-fluorouracil and leucovorin.
- Dosage adjustment required in patients who develop sensory neuropathies, severe diarrhea or severe neutropenia or thrombocytopenia. Refer to product monograph for further details.
- Dosage in renal impairment: CrCl of 30 mL/min and greater: 100% of dose; CrCl less than 30 mL/min: contraindicated.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light. Do not freeze.
- Stable for 24 hours at room temp and 48 hours in the fridge in D5W in the concentration range of 0.2 mg/mL to 2 mg/mL.
- Do not mix with sodium chloride or chloride containing solutions as it causes degradation of oxaliplatin.
- Compatible with leucovorin through a Y-site connection if leucovorin is diluted in D5W; do not combine in the same infusion bag.

MISCELLANEOUS
- Contraindicated in patients with a hypersensitivity to other platinum agents (cisplatin, carboplatin).

REFERENCES
1, 5, 40, 129, 165.
**INDICATIONS**

- Induction of labour when indicated in term or near-term pregnancies.
- Augmentation of labour in the first or second stage of labour when there is evidence of uterine hypocontractility or labour dystocia.
- To produce uterine contractions during the third stage of labour and to control postpartum bleeding and hemorrhage.
- Adjunctive therapy in the management of inevitable or incomplete abortion, or midtrimester elective abortion.

**ADMINISTRATION**

For induction/augmentation of labour:
- Oxytocin must NOT be administered IV direct in the antepartum patient.
- Continuous IV infusion: **blood pressure monitoring; fetal monitoring**. Dilute 10 units in 1000 mL of NS, D5W or RL. (At TOH birthing unit: dilute 20 units in 500 mL of RL, as per Obstetrics policy 00659 BU-Induction/Augmentation of labour: Oxytocin administration). Mix solution thoroughly. Must be piggybacked to mainline IV solution.
- Must be administered by an infusion pump.

Third stage of labour/postpartum:
- IV direct: physician or RN under physician supervision, with or after the delivery of the anterior shoulder of the infant; **blood pressure monitoring**. Dilute 5-10 units with 3-5 mL of NS and inject IV over 1-2 minutes.
- Continuous IV infusion: dilute 20-40 units in 1000 mL of NS, D5W or RL. (At TOH suggest to dilute 20 units in 500 mL or 1000 mL of RL). Mix thoroughly.
- IM.

Abortion:
- Continuous IV infusion: dilute 10 units in 500 mL of NS or D5W. Mix thoroughly.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis.
- Cardiovascular: hypotension, tachycardia, arrhythmia. Severe hypertension may occur following prophylactic administration of a vasoconstrictor in conjunction with caudal block anesthesia. Also fetal bradycardia.
- GI: nausea, vomiting.
- Uterine hyperstimulation.
- Water intoxication and seizures with prolonged IV infusion of oxytocin with excessive fluid load.

**dosage**

- Induction/augmentation of labour: administer at initial rate of 0.5-1 milliunits/min IV, and increase slowly in increments of 1-2 milliunits/min at 30-60 minute intervals depending on response up to suggested maximum of 20 milliunits/min; rates over 9-10 milliunits/min are rarely needed.
- Third stage of labour and postpartum hemorrhage: give 10 units IM OR 5 to 10 units IV direct OR administer a continuous IV infusion at a rate of 50-100 milliunits/min (3-6 units/hr), rate to be adjusted to maintain uterine contraction and control uterine atony.
- Abortion: 10 units as an IV infusion at 10-20 milliunits/min after suction, curettage or abortifacients; total dose should not exceed 30 units in a 12-hour period to avoid water intoxication.
### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Do not freeze.
- Stable for 28 days at room temp protected from light in RL at a concentration of 0.08 units/mL in PVC bags.
- Stable for 90 days at room temp protected from light in D5W or NS at a concentration of 0.08 units/mL in PVC bags.

### MISCELLANEOUS

- 1 unit of oxytocin = 2-2.2 mcg of pure oxytocin.
- 1 milliunit = 0.001 unit.

### REFERENCES

1, 4, 5, 40, 64, 95, 135, 143, 208.
PACLitaxel

**Do NOT confuse paclitaxel with nanoparticle, albumin-bound paclitaxel. This monograph is specific to PACLITAXEL.**

**INDICATIONS**
- Alone or in combination for the treatment of carcinoma of the ovary, breast or lung, or AIDS-related Kaposi’s sarcoma.
- Also used in other tumours (e.g., head and neck, gastrointestinal, genitourinary, gynecological, thyroid, thymoma, Ewing’s sarcoma, skin cancer, cancer of unknown primary origin).

**ADMINISTRATION**
- Ensure premedication has been administered. Refer to Dosage section.
- Intermittent IV infusion, Continuous IV infusion: dilute with NS, D5W, D5-NS or D5-RL to a final concentration of 0.3-1.2 mg/mL; infuse over 1-3 hours. May also be administered as a 24-hour infusion, depending on specific protocol.
- Use non-PVC IV containers and administration sets for dilution and administration (provided by Pharmacy). Infuse through a 0.22 micron in-line filter.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- **Hypersensitivity:** reactions commonly occur during the first hour of infusion of the first two cycles and are occasionally severe. Frequent monitoring of vital signs is recommended, particularly during the first hour of infusion. (At TOH, vital signs are monitored pre-infusion and then once every hour up to the end of the infusion; patients should be closely monitored throughout the infusion for other signs and symptoms of paclitaxel hypersensitivity).

  **Mild hypersensitivity** (i.e., mild flushing, rash, pruritus):
  - Continue paclitaxel infusion and observe closely for worsening symptoms.

  **Moderate hypersensitivity** (i.e., moderate rash, flushing, mild dyspnea, chest discomfort, mild hypotension):
  - Stop paclitaxel infusion, give diphenhydramine 25-50 mg IV and methylprednisolone 125 mg IV.
  - Once symptoms resolved, re-start paclitaxel infusion at 10% of the original rate for 15 minutes, then at 25% of the original rate for 15 minutes and if no further symptoms, resume original infusion rate.

  **Severe hypersensitivity** (i.e., respiratory distress requiring treatment, generalized urticaria, angioedema, hypotension requiring treatment):
  - Stop paclitaxel infusion.
  - Cardiac monitoring (if available) plus 1 litre NS IV bolus.
  - Give 0.3 mL of epinephrine (1 mg/mL) IM plus diphenhydramine 50 mg IV, ranitidine 50 mg IV, and methylprednisolone 125 mg IV.
  - If no or inadequate response, repeat epinephrine 0.3 mL IM plus salbutamol inhaler 2 puffs with aerochamber OR 2 mg/2 mL via nebulizer.
  - If hypotension persists: repeat 1 litre NS IV bolus. (see Ottawa Hospital Anaphylaxis Algorithm).
  - Further treatment with paclitaxel is possible, but is at the discretion of the treating physician.
- **Cardiovascular:** bradycardia, severe conduction abnormality (rare), hypotension during infusion. If patient experiences significant cardiac conduction abnormalities during administration, continuous ECG should be performed during subsequent therapy.
- **GI:** nausea, vomiting, diarrhea, inflammation of the cecum (rare).
- **Dermatologic:** radiation recall reactions (rare).
- **Local reactions:** phlebitis, erythema, discomfort, tenderness at site of injection.
- **Extravasation hazard:** irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
DOSAGE

- To minimize severe hypersensitivity reactions, premedicate with dexamethasone 20 mg PO 12 and 6 hours before paclitaxel infusion or 20 mg IV 30 minutes before paclitaxel infusion, diphenhydramine 50 mg IV (at TOH, give PO) and ranitidine 50 mg IV (or cimetidine 300 mg IV) 30-60 minutes before paclitaxel infusion.

- Initial dose is 135-175 mg/m² IV every three weeks.

- Consult specific protocol.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp and protect from light. Once punctured, the 5, 16.7 and 25 mL vials are stable for 28 days at room temp; the 50 mL and 100 mL pharmacy bulk vials should be used within 24 hours after puncture.

- Stable for 3 days at room temp when diluted in NS or D5W at a concentration of 0.3-1.2 mg/mL in polyolefin or polyethylene containers.

- Stable for 3 days at room temp or in the fridge in NS or D5W at a concentration of 0.1-1 mg/mL in polyolefin containers.

MISCELLANEOUS

REFERENCES

1, 4, 5, 129, 143, 165, 184.
PACLitaxel (nanoparticle, albumin-bound)

**Abraxane @, Nab-paclitaxel**

**Classification:** Antineoplastic

Do NOT confuse nanoparticle, albumin-bound paclitaxel with paclitaxel. This monograph is specific to NANOPARTICLE, ALBUMIN-BOUND paclitaxel.

### INDICATIONS
- Treatment of metastatic breast cancer.
- First-line treatment of metastatic adenocarcinoma of the pancreas, in combination with gemcitabine.
- Other uses: bladder/urothelial cancer and melanoma.

### ADMINISTRATION
- Reconstitute the 100 mg vial by injecting 20 mL of NS slowly over 1 minute and directing the solution flow onto the inside wall of the vial. Then allow vial to sit for a minimum of 5 minutes to ensure proper wetting of the lyophilized cake/powder. Gently swirl vial and/or invert vial slowly for at least 2 minutes until complete dissolution. If foaming or clumping occurs, stand solution for at least 15 minutes until foam subsides. Reconstituted solution should be milky and homogenous without visible particulates. Final concentration is 5 mg/mL.
- Intermittent IV infusion: inject the appropriate amount into an empty sterile PVC or non-PVC bag and infuse over 30 minutes (30-40 minutes in the case of pancreatic cancer).
- Use of specialized DEHP-free containers or administration sets is NOT necessary.
- Use of syringes and IV bags containing silicone oil as a lubricant during reconstitution and administration may cause proteinaceous strands. If strands are observed in IV bag, use a 15 micron filter (do not use a smaller pore size) to administer the solution; if the strands are observed and a 15 micron filter is not available, discard the product.

### POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare (less than 4%) and minor. Premedication to prevent hypersensitivity reactions is not required before administration.
- Cardiovascular: hypotension and bradycardia during the 30-minute infusion (usually asymptomatic), ECG abnormalities (usually asymptomatic), AV block.
- GI: nausea, vomiting, diarrhea, mucositis.
- CNS: sensory neuropathy.
- Respiratory: dyspnea, cough.
- Hematologic: neutropenia, leukopenia.
- Arthralgia, myalgia.
- Local reactions: at injection site.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

### DOSAGE
- Metastatic breast cancer: 260 mg/m² IV every 3 weeks. Dose can be reduced to 220 mg/m² then to 180 mg/m² or held/discontinued depending on severity of toxicity (neutropenia, sensory neuropathy), as per recommendations from the manufacturer.
- Metastatic cancer of the pancreas: 125 mg/m² IV on days 1, 8, 15 of each 28-day cycle. Follow with the infusion of gemcitabine. Nab-paclitaxel dose can be reduced to 100 mg/m² then to 75 mg/m² or discontinued depending on severity of toxicity (neutropenia, thrombocytopenia, sensory neuropathy, cutaneous toxicity, gastrointestinal toxicity), as per recommendations of the manufacturer.
DOSAGE (Cont.)

- Dosage in renal impairment:
  CrCl (mL/min) Dose
  30-90  100%
  Less than 30  discontinue

- Dosage in hepatic impairment: refer to manufacturer’s instructions for dosage modification based on AST and serum bilirubin.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the original containers at room temp, protected from light.
- Reconstituted solution should be used immediately but is stable for 8 hours in the fridge and protected from light when left in the vial.
- Stable for 8 hours at room temp at ambient light at a concentration of 5 mg/mL (undiluted) in a PVC container.

MISCELLANEOUS

- Each 100 mg vial of paclitaxel contains approximately 900 mg of albumin.
- The use of nab-paclitaxel in patients who had hypersensitivity reactions with “conventional” paclitaxel has not been studied.

REFERENCES

1, 5, 40, 129, 165.
INDICATIONS

- Long-acting depot medication for the treatment of schizophrenia (1-month injection Invega Sustenna ® and 3-month injection Invega Trinza ™) and schizoaffective disorder (1-month injection Invega Sustenna ®).
- Not indicated in the elderly with dementia due to increased risk of mortality.

ADMINISTRATION

1-month injection (Invega Sustenna ®):
- IM only: shake the prefilled syringe vigorously for at least 10 seconds. Attach appropriate needle (see Note at the bottom of this section for selecting the proper size). Remove air. Inject slowly deep into the muscle. The initial 2 doses must be administered in the deltoid muscle. The subsequent maintenance doses can be administered in either the deltoid or the gluteal muscle. Each dose should be administered as a single injection. Alternate sides (right, left) at each dose.
- Note: use needles included in the kit: use the 23 gauge needle for deltoid administration in patients weighing less than 90 kg; use the 22 gauge needle in all other situations.

3-month injection (Invega Trinza ™):
- IM only: shake the prefilled syringe vigorously with the tip up and a loose wrist for at least 15 seconds to ensure a uniform suspension (milky white colour). Attach appropriate needle (see Note at the bottom of this section for selecting the proper size). Within 5 minutes of shaking vigorously, inject slowly deep into the deltoid or gluteal muscle.
- In the event of an incomplete administration: do NOT re-inject the dose remaining in the syringe and do NOT administer another dose. Monitor and treat patient appropriately until the next scheduled 3-month injection.
- Note: use the thin wall needles included in the kit; use the 22 gauge 1-inch for deltoid administration in patients weighing less than 90 kg and the 22 gauge 1.5 inch in all other situations.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity (rare): angioedema, anaphylaxis, rash, hives, dyspnea, hypotension.
- Cardiovascular: QT interval prolongation, orthostatic hypotension, syncope, bradycardia, tachycardia.
- GI: dysphagia, constipation (can be severe), nausea, vomiting.
- CNS: extrapyramidal symptoms (tardive dyskinesia, parkinsonism, akathisia), sedation, dizziness, seizures, agitation, suicidal ideation, anxiety, headache.
- Hematologic: leukopenia, neutropenia, granulocytopenia; deep vein thrombosis, pulmonary embolism (very rare).
- Disruption of body temperature regulation.
- Hyperglycemia.
- Hyperprolactinemia.
- Neuroleptic malignant syndrome (rare): hyperpyrexia, muscle rigidity, altered mental status, autonomic instability.
- Local reactions: mild; pain, induration, redness, swelling.

DOSAGE

1-month injection (Invega Sustenna ®)
- For patients who have never taken long-acting injectable antipsychotics:
  - Initiation: 150 mg IM on day 1 and 100 mg IM on day 8.
  - Maintenance for schizophrenia: the usual dose is 75 mg (range 25-150 mg) IM every month, starting one month after the end of the initiation regimen.
  - Maintenance for schizoaffective disorder: range of 50 to 150 mg IM every month, starting one month after the end of initiating regimen.
PALIPERIDONE

Invega Sustenna®, Invega Trinza®

Antipsychotic

DOSAGE (Cont.)

- For patients who are switching from another long-acting injectable antipsychotic: start directly with the maintenance dose at the next scheduled injection, usually 75 mg (range 25-150 mg) IM every month. Refer to manufacturer’s monograph for specific dose conversion from long-acting risperidone to long-acting paliperidone.
- Dosage in renal impairment: in patients with mild renal impairment (CrCl from 50 to less than 80 mL/min), the initiation regimen is reduced to 100 mg IM on day 1 and 75 mg IM on day 8, and the maintenance dose is reduced to 50 mg IM once monthly. Not recommended in patients with CrCl under 50 mL/min.
- Dosage in hepatic impairment: no dose adjustment required in patients with mild to moderate impairment.

3-month injection (Invega Twinra™)

- To be used only after patient has been stabilized for at least 4 months on the 1-month paliperidone injectable formulation (Invega Sustenna®), with the last 2 doses being the same dosage strength.
- First dose: 3.5 x dose of 1-month injection (Invega Sustenna®) IM, to give when the next dose of Invega Sustenna® would have been due or up to 7 days before or after the next monthly dose date.
- Subsequent doses: 175-525 mg IM every 3 months; on exceptional occasions, may give the injection up to 2 weeks before or after the 3-month due date.
- Missed doses (i.e., more than 2 weeks past due date): refer to manufacturer’s instructions.
- Dosage in renal impairment: for mild renal impairment (CrCl from 50 to less than 80 mL/min), adjust dose using the 1-month injection (Invega Sustenna®) then transition to 3-month injection (Invega Trinza™) in a 3.5 to 1 ratio with a maximum dose of 350 mg. Not recommended in patients with a CrCl less than 50 mL/min.
- Dosage in hepatic impairment: no dosage adjustment required in patients with mild to moderate impairment.
- Refer to manufacturer’s instructions for switching from the 3-month injection (Invega Trinza™) to the 1-month injection (Invega Sustenna®) or to oral paliperidone sustained-release tablets.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store prefilled syringes at room temp.

MISCELLANEOUS

- Paliperidone is the active metabolite of risperidone.

REFERENCES

5, 95.
**PAMIDRONATE**

**Aredia ®**

**Bisphosphonate**

**INDICATIONS**
- For the treatment of hypercalcemia of malignancy following saline rehydration.
- Symptomatic Paget's disease of bone.
- Conditions associated with increased osteoclastic activity: predominantly lytic bone metastases and multiple myeloma.

**ADMINISTRATION**
- Intermittent IV infusion (mandatory): dilute in 250-500 mL of D5W or NS; infuse over 2-4 hours depending on the indication (refer to Dosage section).
- Note: dilution and slow IV administration prevent thrombophlebitis, severe local reactions and renal failure.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rare; angioedema, dyspnea, hypotension and anaphylaxis.
- Cardiovascular: arrhythmia, hypertension, hypotension (rare).
- GI: nausea, vomiting.
- Hypocalcemia, hypomagnesemia, hypophosphatemia.
- Fever (may last up to 48 hours), influenza-like symptoms (usually at first infusion only), malaise.
- Transient bone pain, arthralgia, myalgia.
- Local reactions: pain, redness, swelling, induration, thrombophlebitis.

**DOSAGE**

**Hypercalcemia:**
- Dose based on initial corrected serum calcium concentration (refer to Miscellaneous section for calculation of corrected serum calcium):
  - Serum calcium (mmol/L) less than 3 3-3.5 3.5-4 greater than 4
  - Dose of pamidronate (mg) IV 30 30-60 60-90 90
- Recommended maximum infusion rate is 22.5 mg/hr (i.e., 90 mg in 500 mL over 4 hours).

**Bone metastases:**
- 90 mg diluted in 250 mL and given IV over 2 hours every 3-4 weeks.
- Recommended infusion rate is 45 mg/hr.
- In a small trial, 90 mg of pamidronate in 250 mL NS was given over 60 minutes to patients with bone metastases without untoward effects.

**Multiple myeloma:**
- 90 mg diluted in 500 mL and given IV over 4 hours every 4 weeks.
- Recommended infusion rate is 22.5 mg/hr.

**Paget's disease:**
- Usual recommended total dose for a treatment course: 180-210 mg IV administered as 30 mg weekly for 6 weeks OR 30 mg on week 1, then 60 mg on weeks 3, 5 and 7 OR 60 mg every 2 weeks X 3 doses if retreatment.
- A 90 mg total dose for a treatment course (30 mg IV daily for 3 consecutive days) has also been used.
- Dilute each dose of 30 mg or 60 mg in at least 250 mL or 500 mL, respectively.
- Recommended infusion rate is 15 mg/hr.

…/Cont.
DOSAGE (Cont.)
- Dosage in renal impairment: maximum rate of 22.5 mg/hr. Not to administer if CrCl is below 30 mL/min unless in cases of life-threatening tumor-induced hypercalcemia where the benefit exceeds risk.
- In hemodialysis at TOH: usual dose of 60 mg in 250 mL NS given IV over 60 minutes. Range dose of 30-90 mg; 90 mg dose to be administered over 90 minutes.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from heat.
- Stable for 24 hours in the fridge (protected from light) in D5W or NS at concentrations of 0.06-0.36 mg/mL in PVC bags followed by 24-hour exposure at room temp exposed to light, for a total of 48 hours.
- Stable for 7 days at room temp and 30 days in the fridge in D5W at a concentration of 0.36 mg/mL in PVC bags.
- Calcium containing solutions should not be used (e.g., RL).

MISCELLANEOUS
- In tumour-induced hypercalcemia, corrected calcium levels should be monitored; use the following equation to correct serum calcium values:
  Corrected Ca (mmol/L): measured Ca (mmol/L) + (0.02 X [40-measured albumin in g/L]).

REFERENCES
# PARENTERAL DRUG THERAPY MANUAL

## NAME OF MEDICATION
PANCURONIUM

## CLASSIFICATION
Neuromuscular blocker

## INDICATIONS
- As an adjunct to anesthesia to induce muscle relaxation during surgery.
- To facilitate the management of patients undergoing endotracheal intubation or mechanical ventilation.

## ADMINISTRATION
- IV direct: physician trained in anesthesiology, RN may administer subsequent doses; **ventilator support; cardiac monitoring.** Inject undiluted over 60-90 seconds.
- Continuous IV infusion: **ventilator support; cardiac monitoring.** Dilute in a compatible solution; titrate rate to patient response (refer to Dosage section).

## POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; from histamine release: cutaneous flushing, bronchospasm, hypotension.
- Cardiovascular: increased heart rate, transient rise in BP.
- GI: excessive salivation if no anticholinergic premedication given.

Antidote: Anticholinesterase agents such as neostigmine in conjunction with an anticholinergic agent such as atropine or glycopyrrolate.

## DOSAGE
- **Adults:**
  - As an adjunct to anesthesia during surgery: initial doses of 0.04-0.1 mg/kg (40-100 mcg/kg) IV with additional doses of 0.01 mg/kg (10 mcg/kg) IV at 25-60 minute intervals if needed to sustain neuromuscular blockade for longer periods.
  - For endotracheal intubation: 0.06-0.1 mg/kg (60-100 mcg/kg) IV; doses up to 0.16 mg/kg (160 mcg/kg) have been used.
  - For mechanical ventilation: IV direct injection of 0.1-0.2 mg/kg q1-3h OR continuous IV infusion beginning with a loading dose of 0.03-0.1 mg/kg followed by a maintenance dose of 0.06-0.1 mg/kg/hr (60-100 mcg/kg/hr).

- **Pediatrics:**
  - As an adjunct to anesthesia during surgery: initial doses of 0.04-0.1 mg/kg (40-100 mcg/kg) IV with additional doses of 0.01 mg/kg (10 mcg/kg) IV at 25-60 minute intervals if needed to sustain neuromuscular blockade for longer periods. For neonates, due to extreme sensitivity to pancuronium, begin with a test dose of 0.02 mg/kg (20 mcg/kg) IV.

- Dosage in renal impairment: decrease dose to 50% if CrCl is 10-50 mL/min and avoid in patients with a CrCl below 10 mL/min.
- Dosage in hepatic impairment: use with caution; adjust dosage as necessary.

## COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules and vials in the fridge; however, pancuronium is stable for 6 months at room temp.
- Stable for 48 hours at room temp in D5W, D5-NS, D5-1/2NS, RL and NS in glass or plastic containers.

## MISCELLANEOUS
- Onset: 2-3 minutes. Duration: 30-45 minutes.
- Caution in patients with myasthenia gravis and debilitated states.
- Effect is potentiated by inhalation anesthetics, aminoglycosides, opioids, corticosteroids, acid-base and/or electrolyte disturbances.

## REFERENCES
1, 4, 5, 40, 95, 216, 263.
**INDICATIONS**

- Monotherapy treatment of patients with epidermal growth factor receptors (EGFR) expressing metastatic colorectal carcinoma with non-mutated (wild-type) RAS after failure of fluoropyrimidine-, oxaliplatin-, and irinotecan-containing chemotherapy regimens.
- Treatment of previously untreated patients with non-mutated (wild-type) RAS metastatic colorectal carcinoma in combination with 5-fluorouracil, leucovorin and oxaliplatin (FOLFOX).

**ADMINISTRATION**

- Intermittent IV infusion (mandatory): doses up to 1000 mg: dilute in 100 mL NS and infuse over 60 minutes. Can be administered over 30-60 minutes for subsequent infusions if first one was well tolerated. Doses over 1000 mg: dilute in 150 mL NS and infuse over 90 minutes. Dilute with NS only. Mix solution by gentle inversion. Do NOT shake. Final concentration not to exceed 10 mg/mL. Solution should be clear and colourless and may contain a small amount of visible, translucent-to-white amorphous, panitumumab particles. Administer via a low-protein-binding 0.2 micron or 0.22 micron in-line filter. Flush line with NS before and after administration.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: early and late onset reactions.
- Infusion reactions: anaphylaxis, angioedema, bronchospasm, fever, chills, and hypotension. For severe infusion reactions, stop the infusion immediately and treatment with panitumumab should be permanently discontinued. For mild to moderate reactions, slow the infusion rate by 50%.
- GI: nausea, diarrhea, abdominal pain, anorexia, vomiting, constipation.
- Dermatologic: dermatitis, paronychia, pruritus, erythema, acneiform rash, skin fissures. May need topical hydrocortisone 1% and oral antibiotics.
- Respiratory: dyspnea, cough.
- Fatigue.
- Hypomagnesemia, hypocalcemia, hypokalemia.

**DOSAGE**

- RAS testing must be performed prior to administration.
- 6 mg/kg (actual body weight) IV every 14 days, until disease progression or undesirable toxicity.
- Hold or decrease dose based on severity of rash or other adverse reactions; refer to manufacturer’s recommendations for specific dosage adjustments.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials in the fridge. Protect from light. Do not freeze and do not shake.
- Diluted solution is stable 6 hours at room temp and 24 hours in the fridge (according to manufacturer). Do not freeze.
- Do not mix with other drugs or dilute with infusion solutions other than NS.

**MISCELLANEOUS**

- Patients should limit sun exposure; use of skin moisturizers and sunscreen is encouraged to avoid exacerbation of dermatologic effects.

**REFERENCES**

1, 5, 40, 95, 129, 165.
PANTOPRAZOLE

INDICATIONS
- Treatment of conditions where a rapid reduction of gastric acid secretion is required, such as reflux esophagitis or Zollinger-Ellison syndrome, in patients who cannot tolerate oral medications.
- Prophylaxis of recurrent upper GI bleeding.

ADMINISTRATION
- Reconstitute each 40 mg vial with 10 mL of NS to obtain a concentration of 4 mg/mL.
- IV direct: physician or RN; undiluted; inject over 2-5 minutes.
- Intermittent IV infusion: dilute dose in 50-100 mL of NS or D5W; infuse over 15 minutes.
- Continuous IV infusion: withdraw 20 mL from a 100 mL NS or D5W minibag and add 80 mg of pantoprazole (20 mL) for a final concentration of 0.8 mg/mL; infuse at 8 mg/hr (10 mL/hr).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: pruritus, exanthema, anaphylaxis.
- GI: diarrhea, abdominal pain.
- CNS: headache.
- Local reactions: inflammation, bruises.

DOSAGE
- Gastro-duodenal ulcer or reflux esophagitis: 40 mg IV once daily.
- Zollinger-Ellison syndrome: 80 mg IV q12h; can be increased to q8h if needed.
- Prophylaxis of recurrent upper GI bleeding: loading dose of 80 mg IV, followed by a continuous IV infusion at a rate of 8 mg/hr for 72 hours OR loading dose of 80 mg IV followed by an intermittent IV infusion of 40 mg q6-12h for 72 hours.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp. Protect from light.
- Reconstituted solutions must be used within 24 hours of initial puncture of the stopper.
- According to manufacturers: the reconstituted solution must be diluted within 3 hours of the initial puncture of the stopper; when further diluted, stable for 21 hours at room temp in NS at a concentration of 0.4 mg/mL or 0.8 mg/mL and for 12 hours at room temp when diluted in D5W at the same concentrations. However, longer stability data are available from other sources; see below.

For brands with EDTA (Teva, Fresenius Kabi)
- Stable for 20 days at 4°C in NS at concentrations between 0.16 mg/mL and 0.8 mg/mL in PVC bags; these solutions are stable for an additional 6 hours at room temp after their fridge storage.
- Stable for 11 days at 4°C in D5W at concentrations between 0.16 mg/mL and 0.8 mg/mL in PVC bags; these solutions are stable for an additional 8 hours at room temp after their fridge storage.
- Stable for 48 hours at 23°C in NS at concentrations between 0.16 mg/mL and 0.8 mg/mL in PVC bags.
- Stable for 24 hours at 23°C in D5W at concentrations between 0.16 mg/mL and 0.8 mg/mL in PVC bags.
- Stable for 96 hours in the fridge and at room temp in NS at a concentration of 4 mg/mL in polypropylene syringes.
- Compatible with RL.

.../Cont.
COMPATIBILITY, STABILITY  (Cont.)

For brands without EDTA (Sandoz, Pharmascience):
- Reconstituted solution (4 mg/mL) is stable for 3 days at room temp, exposed to light, in glass vials.
- Reconstituted solution (4 mg/mL) is stable for 28 days in the fridge, protected from light, in polypropylene syringes.
- Solution stable for 3 days at room temp (normal lighting) and 28 days in the fridge (protected from light) in NS at concentrations of 0.4 mg/mL and 0.8 mg/mL in PVC bags.
- Solution stable for 2 days at room temp (normal lighting) and 14 days in the fridge (protected from light) in D5W at a concentration of 0.4 mg/mL in PVC bags.
- Solution stable for 3 days at room temp (normal lighting) and 28 days in the fridge (protected from light) in D5W at a concentration of 0.8 mg/mL in PVC bags.

MISCELLANEOUS

REFERENCES

1, 2, 4, 5, 6, 40, 77, 125, 223, 359, 517.
PAPAVERINE
Vasodilator

INDICATIONS
- To decrease vascular spasms such as those associated with myocardial infarction, angina, peripheral and pulmonary embolism, peripheral vascular disease, and cerebral angioplastic states.
- To decrease visceral spasms, such as ureteral, biliary and GI colic.

ADMINISTRATION
- IV direct: physician only, undiluted or diluted in an equal volume of SWFI; inject slowly over a 1-2 minute period since arrhythmias and fatal apnea may result from rapid injection.
- IM, SC.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: arrhythmias with rapid IV injection; hypertension or hypotension.
- GI: anorexia, nausea, abdominal distress.
- CNS: drowsiness, headache, vertigo.
- Respiratory: apnea with rapid IV injection.
- Sweating, facial flushing.
- Local reactions: thrombophlebitis at injection site.

DOSAGE
- Adults: 30-120 mg IV/IM/SC. May repeat q3h as necessary. In treating cardiac extrasystoles: 2 doses may be administered 10 minutes apart.
- Pediatrics: 6 mg/kg/day IV/IM/SC in 4 divided doses.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp, protect from light. Crystallization may occur at low temperatures; in such cases, warm the vial and shake well until complete dissolution.
- Yellow discoloration of papaverine does not appear to be related to drug decomposition.
- Compatible with NS, dextrose, Ringer's injection and sodium lactate 1/6 M solutions.
- Incompatible with RL.

MISCELLANEOUS
- Administer with caution to patients with glaucoma or liver disease.

REFERENCES
1, 4, 5, 40, 95, 135.

Full revision 2017
**INDICATIONS**
- Prevention and treatment of secondary hyperparathyroidism associated with chronic renal failure stage 5 patients on hemodialysis.

**ADMINISTRATION**
- IV direct: (via a hemodialysis line), physician or RN. Administer undiluted as a bolus at any time during hemodialysis.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: pruritus, rash, urticaria, oral and facial edema, angioedema.
- GI: nausea, vomiting, taste changes (metallic taste), dry mouth, Gi bleed.
- CNS: headache, dizziness.
- Hypercalcemia related to vitamin D intoxication: patient may be asymptomatic or presents with early signs of intoxication such as weakness, headache, somnolence, nausea, vomiting, dry mouth, constipation, muscle pain, bone pain and metallic taste.
- Hyperphosphatemia.
- Fever, chills.

**DOSAGE**
- Dose depends on parathyroid hormone (PTH) level; target range for intact PTH level in chronic renal failure stage 5 patients is no more than 1.5 to 3 times the non-uremic ULN.
- Initial dose: 0.04 to 0.1 mcg/kg IV at dialysis, no more frequently than every other day.
- If a satisfactory response is not obtained, dose may be increased by 2-4 mcg at every 2 to 4 week intervals; single doses as high as 0.24 mcg/kg have been safely administered.
- Refer to product monograph for suggested dosing guidelines according to PTH level.
- Relative dosing of paricalcitol to calcitriol is 4:1. When converting a patient from calcitriol to paricalcitol, the initial dose of paricalcitol should be 4 times greater than the patient’s dose of calcitriol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 15-25°C; protect from light and freezing.
- Do not mix with heparin as its effect will be neutralized by propylene glycol, an excipient of the paricalcitol formulation.

**MISCELLANEOUS**
- Monitor serum calcium and phosphorus levels frequently, at least twice a week during dosage adjustment then at least monthly once dosage is established.
- Monitor serum PTH level at least every 3 months or more often during titration.
- Caution if patient is on digoxin as digoxin toxicity is potentiated by hypercalcemia.
- Caution if patient is starting or discontinuing an inhibitor of cytochrome P450 3A4 isoenzyme as paricalcitol is partly metabolized by these enzymes.
- Contains ethanol 20% v/v and propylene glycol 30% v/v.

**REFERENCES**
1, 5, 40, 95.

* Available via Health Canada’s Special Access Programme
**INDICATIONS**

- To decrease the incidence of febrile neutropenia in patients with non-myeloid malignancies receiving myelosuppressive chemotherapy.

**ADMINISTRATION**

- Do NOT shake; allow prefilled syringe to reach room temp for at least 30 minutes before injection.
- SC: back of the upper arms, abdomen (2 inches away from navel), front upper thighs, upper outer buttocks.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis, rash, urticaria.
- Adult respiratory distress syndrome.
- Medullary bone pain.
- Local reactions: pain, induration, local erythema.

**DOSAGE**

- A dose of 6 mg SC given once per cycle of chemotherapy.
- Should not be administered less than 14 days before next chemotherapy and no sooner than 24 hours after chemotherapy.
- Dosage in renal impairment: no dosage adjustment required, including in end-stage renal disease.

**COMPATIBILITY, STABILITY**

*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*

**Neulasta ®:**
- Store prefilled syringes in the fridge; protect from light.
- Stable for 72 hours at room temp.
- Avoid freezing; if accidentally frozen, allow to thaw in the fridge before administration; if frozen for a second time, discard.

**Lapelga ™:**
- Store prefilled syringes in the fridge; protect from light.
- Stable for 15 days at room temp (not above 25°C).
- Avoid freezing; if accidentally frozen, allow to thaw in the fridge before administration; if exposure was greater than 24 hours or frozen more than once, discard.

**MISCELLANEOUS**

- The needle cover on the prefilled syringe contains latex.

**REFERENCES**

1, 5, 135.
PEMBROLIZUMAB

**Keytruda ®, Lambrolizumab**

**Antineoplastic, Monoclonal antibody**

**INDICATIONS**
- Treatment of unresectable or metastatic melanoma.
- Treatment of metastatic non-small cell lung carcinoma (NSCLC) with positive PD-L1 expression previously untreated or treated with platinum-containing chemotherapy.
- Treatment of refractory or relapsed classical Hodgkin lymphoma.
- Treatment of locally advanced or metastatic urothelial carcinoma previously treated with platinum-containing chemotherapy.
- Treatment of adult and pediatric patients with relapsed or refractory primary mediastinal B-cell lymphoma (PMBCL).

**ADMINISTRATION**
- Use the ready-to-use vials of 100 mg/4 mL OR reconstitute the 50 mg vial of lyophilized powder with 2.3 mL of SWFI to obtain a concentration of 25 mg/mL. Direct the stream toward wall of the vial. Slowly swirl the vial until dissolved. Do NOT shake. Allow up to 5 minutes for the bubbles to clear.
- Intermittent IV infusion: dilute required dose in NS or D5W to obtain a final concentration of 1-10 mg/mL. Gently invert bag to mix. Administer over 30 minutes using a sterile, non-pyrogenic, low-protein binding 0.2 to 5 micron inline or add-on filter.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: immune-mediated reactions, can be fatal; can involve any organ. Most common reactions include pruritus, rash, Stevens-Johnson syndrome, toxic epidermal necrolysis, pneumonitis, colitis, hepatitis, nephritis and endocrinopathies (adrenal insufficiency, hypophysitis, hypopituitarism, hyperthyroidism, hypothyroidism, diabetes mellitus, diabetic ketoacidosis). Consult manufacturer’s recommendations for treating these reactions and when to withhold or discontinue treatment.
- Infusion-related reactions: rigors, chills, wheezing, pruritus, flushing, rash, hypotension, hypoxemia, fever. Patients with mild or moderate infusion reaction may continue to receive pembrolizumab with close monitoring. Premedication with antipyretic and antihistamine may be considered. If reaction is severe, discontinue treatment.
- Cardiovascular: facial and peripheral edema.
- GI: nausea, vomiting, diarrhea, constipation, abdominal pain, decreased appetite.
- CNS: headache.
- Electrolyte disturbances: hyponatremia, hypocalcemia, hyperkalemia.
- Hematologic: anemia, lymphopenia, leukopenia, thrombocytopenia.
- Hepatic: increased LFTs.
- Renal: increase creatinine.
- Hyperglycemia, hypercholesterolemia, hypertriglyceridemia, decreased serum bicarbonate, hypoalbuminemia.
- Fever, fatigue, arthralgia, myalgia, cough, weight loss, transient tumour size increase.

**DOSAGE**
- **Adults:**
  - Melanoma: 2 mg/kg IV (maximum of 200 mg) every 3 weeks OR 200 mg IV as a fixed dose every 3 weeks.
  - NSCLC: 2 mg/kg IV (maximum of 200 mg) every 3 weeks OR 200 mg IV as a fixed dose every 3 weeks.
  - Hodgkin lymphoma: 200 mg IV every 3 weeks.
  - Urothelial carcinoma: 200 mg IV every 3 weeks.
  - PMBCL: 200 mg IV every 3 weeks.
- **Pediatrics:**
  - PMBCL: 2 mg/kg IV (maximum of 200 mg) every 3 weeks.
- Dosage in renal impairment: no dose adjustment needed for patients with CrCl 30 mL/min or greater; no data available if CrCl is less than 30 mL/min.
- Dosage in hepatic impairment: no dose adjustment needed for patients with mild hepatic impairment (abnormal AST with normal total bilirubin OR total bilirubin 1.5 - 1.5 X ULN); no data available in case of moderate to severe impairment.
- Consult specific protocol.
### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store the ready-to-use vials of 100 mg/4 mL between 2-8°C. Protect from light. Do not freeze. Do not shake.
- Store 50 mg vials of lyophilized powder between 2-8°C. Stable for 24 hours at room temp.
- Reconstituted solution should be clear to slightly opalescent and colorless to slightly yellow; can contain translucent to white proteinaceous particles.
- Reconstituted and diluted solutions are stable for 6 hours at room temp, or in the fridge for no more than 24 hours from the time of reconstitution. Do not freeze.

### MISCELLANEOUS

- Thyroid function, renal function, blood glucose and LFTs should be monitored at the start and during treatment.

### REFERENCES

1, 5, 129, 135, 165, 208.
### INDICATIONS
- Treatment of malignant pleural mesothelioma in combination with cisplatin in patients whose disease is unresectable or who are not candidates for curative surgery.
- Treatment of nonsquamous non-small cell lung cancer (NSCLC) as monotherapy or with cisplatin.

### ADMINISTRATION
- **Ensure premedication has been administered as recommended; refer to Dosage section.**
- Reconstitute each 100 mg and 500 mg vial with 4.2 mL and 20 mL of preservative-free NS, respectively, for a concentration of 25 mg/mL.
- Intermittent IV infusion (mandatory): dilute dose with preservative-free NS to a final total volume of 100 mL; infuse over 10 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: includes anaphylaxis.
- GI: nausea, vomiting, anorexia, constipation, diarrhea (see premedication in the Dosage section to decrease GI toxicity).
- Dermatologic: rash (see premedication in the Dosage section to decrease dermatologic toxicity).
- Hematologic: anemia, leukopenia, neutropenia, thrombocytopenia (see premedication in the Dosage section to decrease hematologic toxicity).
- Fatigue.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

### DOSAGE
- **Premedication:**
  1) to decrease hematologic & GI toxicity: folic acid 0.4-1 mg PO daily and vitamin B₁₂ 1000 mcg IM every 9 weeks (i.e., every 3 cycles) beginning 1 week before starting pemetrexed and continued for 3 weeks after the last dose of pemetrexed.
  2) to decrease dermatologic toxicity: dexamethasone 4 mg PO BID for 3 days beginning the day before pemetrexed administration.
- For mesothelioma and NSCLC: 500 mg/m² IV every 21 days.
- Dosage in renal impairment: do not administer to patients with CrCl below 45 mL/min.
- For dose reductions based on toxicity, consult the manufacturer’s monograph.
- Consult specific protocol.

### COMPATIBILITY, STABILITY
*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*
- Store vials at room temp.
- Reconstituted solution may range in colour from colourless to yellow or green-yellow.
- Reconstituted solution (25 mg/mL) is stable for 2 days at room temp and 31 days in the fridge in polypropylene syringes.
- Stable for 24 hours at room temp or in the fridge in NS or D5W at concentrations of 2, 10 and 20 mg/mL in PVC containers. Longer storage period may lead to formation of microparticulates.
- Incompatible with solutions containing calcium (e.g., RL, Ringer’s).

### MISCELLANEOUS

### REFERENCES
1, 5, 40, 84, 129, 165, 380.
PENICILLIN G

INDICATIONS
- Treatment of infections caused by pneumococci, *N. meningitidis*, beta-hemolytic and non-hemolytic streptococci and gonococci, treatment of syphilis, actinomycosis and anthrax.

ADMINISTRATION
- **CHECK ALLERGY STATUS OF PATIENT.**
- Reconstitute vials as per manufacturer's directions.
- Intermittent IV infusion (preferred): dilute in 100 mL of a compatible solution; for adults, infuse over 30 minutes-2 hours and for children, over 15-30 minutes.
- Continuous IV infusion: dilute in 1-2 L of a compatible solution (volume of solution to be determined based on daily fluid requirements).
- IM: solutions containing up to 100,000 units/mL may be used with minimum discomfort; higher concentrations are physically possible and may be used when needed.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylaxis.
- GI: diarrhea.
- CNS: with very high dosage, particularly in patients with renal insufficiency: hallucinations, confusion, lethargy, hyperreflexia, seizures.
- Hypernatremia.
- Renal: acute interstitial nephritis (rare).
- Local reactions: phlebitis and thrombophlebitis with IV administration; pain and sterile abscess with IM administration.

DOSAGE
- Adults and children 12 years and up: usual daily dose: 1,000,000-24,000,000 units/day IV/IM in 4-12 divided doses.
- Pediatrics (1 month to 12 years): 25,000-400,000 units/kg/day IV/IM in 4-6 divided doses.
- Dosage in renal impairment:
  - **Method 1**
    - CrCl (mL/min) 50-10
    - Dose 75%
    - Less than 10
    - Dosing interval (hr) q8-12
  - **Method 2**
    - CrCl (mL/min) 50-10
    - Dose 75%
    - Less than 10
    - Dosing interval (hr) q12-18h

COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp.
- Reconstituted solutions stable for 7 days in the fridge or 24 hours at room temp.
- Infusions usually stable for 24 hours at room temp or fridge in D5W and NS.
- Most stable at pH of 6-7.2. Rapid inactivation of penicillin occurs at a pH of below 5 or above 8. Examples of additives with a low pH include ascorbic acid, tetracycline; examples of additives with a high pH include aminophylline, sodium bicarbonate and sodium salts of barbiturates.

MISCELLANEOUS
- 1 million units of penicillin G Na yield 2 mmol Na⁺ (46 mg).
- Approximately 300 mg are equivalent to 500,000 units of penicillin G.

REFERENCES
1, 4, 5, 40, 82, 95, 135, 216.

Full revision 2017
Benzathine Benzyl penicillin, Bicillin LA®
Antibiotic - penicillin

INDICATIONS
- Prophylaxis of recurrent rheumatic fever.
- Treatment of treponematosis: syphilis (caused by Treponema pallidum), bejel (caused by Treponema pallidum endemicum), yaws (caused by Treponema pertenue) and pinta (caused by Treponema carateum).
- Treatment of streptococcal infections (Group A without bacteremia): mild to moderate infections of the upper respiratory tract (e.g., pharyngitis).

ADMINISTRATION
- CHECK ALLERGY STATUS OF PATIENT.
- IM (deep): inject slowly at a steady rate into the gluteus muscle (for infants and small children, midlateral thigh); may need more than one injection site for administration of one dose; rotate injection site if dose is repeated.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis.
- GI: nausea, vomiting, diarrhea.
- Hoigne's syndrome: immediate toxic reaction consisting of bizarre behaviour and neurologic reactions (auditory/visual disturbances, unusual taste, anxiety, confusion, agitation, weakness, dizziness, palpitation, seizures, fear of impending death); generally transient, lasting 5 to 30 minutes.
- Jarisch-Herxheimer reaction: headache, fever, chills, sweating, sore throat, myalgia, arthralgia, malaise, tachycardia, hypertension followed by hypotension. Occurs generally 2-12 hours post-injection and subsides within 12-24 hours. This reaction is due to release of toxins from bacteria when killed; it is not considered a drug allergy; can be treated with antipyretics.
- Neurological damage if injected into or near a nerve.
- Local reactions: pain, sterile abcess (rare).

DOSAGE
Adults:
- Prophylaxis of recurrent rheumatic fever: 1.2 million units IM every 4 weeks (every 3 weeks in high-risk patients) OR 600,000 units IM every 2 weeks.
- Syphilis:
  - Primary, secondary and early latent (less than 1 year duration): 2.4 million units IM as a single dose.
  - Late latent syphilis, latent syphilis of unknown duration or tertiary syphilis not involving the CNS: 2.4 million units IM once weekly for 3 weeks.
  - Sexual contacts in the preceding 90 days to primary, secondary and early latent syphilis: 2.4 million units IM as a single dose.
- Yaws, bejel and pinta: 1.2 million units IM as a single dose.
- Upper respiratory streptococcal infections: 1.2 million units IM as a single dose.

Pediatrics:
- Prophylaxis of recurrent rheumatic fever:
  - 27 kg or less: 600,000 units IM every 4 weeks (every 3 weeks in high-risk patients).
  - Greater than 27 kg: 1.2 million units IM every 4 weeks (every 3 weeks in high-risk patients); maximum dose: 1.2 million units/dose.

../Cont.
DOSAGE (Cont.)

- Syphilis:
  - Congenital (less than 2 years of age): 50,000 units/kg IM as a single dose.
  - Primary, secondary, early latent (less than 1 year duration): 50,000 units/kg IM as a single dose; maximum dose: 2.4 million units/dose.
  - Late latent syphilis or latent syphilis of unknown duration: 50,000 units/kg IM every week for 3 weeks; maximum dose: 2.4 million units/dose.
- Upper respiratory streptococcal infections:
  - Less than 27 kg: 300,000-600,000 units IM as a single dose.
  - 27 kg and over: 900,000-1.2 million units IM as a single dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store syringes in the fridge; protect from freezing.
- Stable for 7 days at room temp not exceeding 30°C.

MISCELLANEOUS

- Time to peak concentration: within 12-24 hours; serum levels usually detectable for 1-4 weeks, depending on the dose.
- Available as a pre-packed syringe of 1.2 million units/2 mL.

REFERENCES

1, 5, 59, 82, 95.
**PENTAMIDINE ISETHIONATE**

**Pentacarinat®, Pentamidine isetionate**

**Antiparasitic**

**INDICATIONS**
- Treatment and prophylaxis of *Pneumocystis jirovecii* (formerly *Pneumocystis carinii*) pneumonia (PCP).

**ADMINISTRATION**
- For IV and IM use: reconstitute the 300 mg vial with 3 mL of SWFI to yield final concentration of 100 mg/mL.
- Intermittent IV infusion: **blood pressure monitoring.** Dilute with 50-500 mL of NS or D5W to a concentration of 1-2 mg/mL; administer over at least 60 minutes, preferably over 2 to 3 hours.
- IM: normally not recommended due to poor local tolerance; reserve for patients in whom IV therapy is not possible.
- Keep patient in a supine position; monitor blood pressure immediately before, during administration and several times thereafter until blood pressure is stable.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, pruritus, urticaria, anaphylactoid reactions, anaphylaxis.
- Cardiovascular: arrhythmias, hypotension, especially with rapid IV administration.
- GI: nausea, vomiting, abdominal pain, dysgeusia, pancreatitis.
- CNS: dizziness, confusion, hallucinations, neuralgia.
- Renal: acute renal failure, increased serum creatinine.
- Hematologic: leukopenia, thrombocytopenia.
- Dermatologic: facial flushing, dry skin.
- Hypoglycemia (can be severe and/or prolonged) and hyperglycemia.
- Local reactions: phlebitis with IV use; pain, erythema, and tenderness with IM administration.

**DOSAGE**
- **PCP treatment:**
  - 4 mg/kg IV/IM once daily for 14-21 days.
  - Dosage in renal impairment (CrCl less than 35 mL/min): for life-threatening infections: 4 mg/kg once daily for 7-10 days then 4 mg/kg on alternate days to complete the course of 14 doses. For less severe infections, 4 mg/kg on alternate days for 14 doses.
- **PCP prophylaxis:** 4 mg/kg IV once monthly.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp; protect from light.
- Reconstituted solution stable for 48 hours at room temp, protected from light.
- Stable for 48 hours at room temp, exposed to normal fluorescent light in NS or D5W at a concentration of 1-2 mg/mL in PVC containers.

**MISCELLANEOUS**
- 1.74 mg of pentamidine isethionate = 1 mg of pentamidine base.

**REFERENCES**
1, 4, 5, 40, 95, 143, 367.
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Full revision 2017
## INDICATIONS
- Analgesic for moderate to severe pain when oral therapy is not feasible.
- Adjunct to surgical anesthesia.
- As a preoperative or preanesthetic sedative and analgesic.
- As an obstetric analgesic during labour.
- Treatment of epidural opioid-induced pruritus.

## ADMINISTRATION
- **IV direct:** physician or RN; *respiratory support*. Undiluted or dilute each 5 mg with at least 1 mL of SWFI; inject at a rate of 5 mg/min.
- **IM (preferred), SC:** rotate site of injection.

## POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, urticaria, edema of the face.
- Cardiovascular: hypertension, hypotension, tachycardia, shock.
- **GI:** nausea, vomiting, constipation.
- CNS: confusion, visual hallucinations, euphoria, dizziness, sedation, lightheadedness.
- Respiratory: respiratory depression, dyspnea, laryngospasm.
- May precipitate withdrawal symptoms in opioid-dependent patients.
- Local reactions: stinging, induration, nodules, cutaneous depression at injection site; possible severe tissue damage (sclerosis) with SC injection.

Antidote: naloxone.

## DOSAGE
- Analgesic (other than labour pain):
  - **IM/SC:** 30-60 mg q3-4h prn. A single dose should normally not exceed 1 mg/kg. Maximum of 360 mg/day.
  - **IV:** 30 mg q3-4h prn OR 5-15 mg q2h prn. A single dose should normally not exceed 0.5 mg/kg. Maximum of 360 mg/day.
-Labour pain:
  - **IM:** 30 mg as a single dose.
  - **IV:** 20 mg; may be repeated q2-3h up to 3 times (total dose not to exceed 60 mg).
- Pruritus induced by epidural opioid administration: 15 mg IV.
- Dosage requirements may be greater in smokers.

## COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules between 20-25°C. Protect from light; do not freeze.

## MISCELLANEOUS
- Behaves qualitatively as an opioid, but also has weak opioid antagonist properties.
- Onset of action: 2-3 minutes after IV injection or 15-20 minutes after IM/SC injections.

## REFERENCES
1, 4, 5, 40, 95, 135, 215.
INDICATIONS
- Treatment of hairy cell leukemia, chronic lymphocytic leukemia (CLL) and cutaneous T-cell lymphoma in adults.

ADMINISTRATION
- Reconstitute 10 mg vial with 5 mL of SWFI (concentration 2 mg/mL). Shake the vial until dissolution.
- IV direct: physician or RN; undiluted; inject over 5 minutes.
- Intermittent IV infusion: dilute with 25-50 mL of NS or D5W; infuse over 20-30 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, pruritus, anaphylactoid reaction.
- GI: nausea, vomiting, diarrhea, abdominal pain, anorexia, stomatitis.
- CNS: headache, seizures.
- Hematologic: leukopenia, anemia, thrombocytopenia.
- Respiratory: cough, respiratory tract infection, dyspnea, rhinitis.
- Renal: increased serum creatinine. Can be avoided with proper hydration (see Miscellaneous section).
- Fatigue, lethargy, malaise, asthenia, myalgia, chills.
- Local reactions: inflammation and bleeding at injection site.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Hairy cell leukemia: 4 mg/m² IV every other week.
- CLL: 2-4 mg/m² IV every 3 weeks.
- Cutaneous T-cell lymphoma: 4 mg/m² IV once weekly for 3 weeks, then every other week for 6 weeks, then once monthly for 6 months.
- Dosage in renal impairment: there is insufficient data on appropriate dosage reductions in patients with CrCl less than 60 mL/min.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C.
- Reconstituted solution is stable for 8 hours at room temp.
- Compatible with D5W, NS and RL.
- Stable for 48 hours at room temp or 96 hours in the fridge in NS at a concentration of 0.02 mg/mL.
- Stable for 24 hours at room temp or 96 hours in the fridge in D5W at a concentration of 0.02 mg/mL.
- Stable for 48 hours at room temp in RL at a concentration of 0.02 mg/mL.

MISCELLANEOUS
- Patients should receive hydration with 500-1000 mL of D5-1/2NS before administration and 500 mL of D5W after administration of pentostatin to minimize risk of adverse renal effects.

REFERENCES
1, 4, 95, 135. * Available via Health Canada’s Special Access Programme

* Available via Health Canada’s Special Access Programme
PERTUZUMAB
Monoclonal antibody 2C4, Perjeta ®
Antineoplastic, Monoclonal antibody

INDICATIONS
- Treatment of HER2-positive metastatic breast cancer in patients who have not received prior anti-HER2 therapy or chemotherapy for metastatic disease (in combination with trastuzumab and docetaxel).
- Treatment of HER2-positive early breast cancer in patients with lymph node positive and/or hormone receptor negative disease (in combination with trastuzumab and chemotherapy).

ADMINISTRATION
- Ensure premedication has been administered if patient experienced an infusion reaction with a prior pertuzumab infusion.
- Intermittent IV infusion (mandatory): dilute dose in a 250 mL PVC or non-PVC polyolefin bag of NS. Do NOT use D5W (refer to Compatibility, Stability section). Invert the bag gently to ensure mixing without foaming. Do NOT shake. Infuse over 60 minutes for an 840 mg dose and over 30 to 60 minutes for a 420 mg dose.
- If trastuzumab and docetaxel are administered on the same day, ensure they are administered 30 to 60 minutes after the end of the pertuzumab infusion.
- Close observation of the patient during the infusion, as well as for 60 minutes after first infusion and for 30 minutes after subsequent infusions.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, anaphylaxis, acute respiratory distress syndrome.
- Infusion-related reactions: fever, chills, fatigue, headache, asthena, dysgeusia, myalgia, hypersensitivity and vomiting. If a reaction occurs, infusion rate should be decreased or stopped depending on reaction severity. Monitor patient and administer beta-agonists, antipyretics, antihistamines and corticosteroids if needed. Consider premedication (with antipyretics, antihistamines, corticosteroids) for subsequent infusions.
- Cardiovascular: edema, left ventricular dysfunction (patients who have received prior anthracyclines or prior radiotherapy to the chest area may be at higher risk).
- GI: nausea, vomiting, diarrhea (may be severe), anorexia, mucositis, dyspepsia, dysguesia.
- CNS: headache, peripheral neuropathy, insomnia, dizziness.
- Hematologic: neutropenia, febrile neutropenia (more frequent in Asian patients), leukopenia, bleeding.
- Respiratory: cough, dyspnea.

DOSEAGE
- 840 mg IV loading dose on day 1 of the first cycle, followed by a maintenance dose of 420 mg IV on day 1 of each subsequent 3-week cycle.
- If treatment has been interrupted for 6 weeks or more, repeat the loading dose of 840 mg followed by the 420 mg maintenance dose every 3 weeks.
- Dosages adjustment for toxicity: hold or discontinue drug; dose reductions are not recommended.
- Dosage in renal impairment: no dosage adjustment for mild to moderate renal impairment. No data available for CrCl of less than 30 mL/min.
- Dosage in hepatic impairment: no data available.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C; protect from light; do not shake; do not freeze.
- The diluted solution is stable for 24 hours in the fridge in NS in a PVC or non-PVC polyolefin infusion bag.
- Compatible with polyethylene bags.
- Not stable in D5W.
### MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable for corticosteroids) and emergency resuscitation equipment must be available for the treatment of hypersensitivity and infusion-related reactions.
- Patients should have a thorough cardiac assessment before starting therapy, every 3 months during therapy and every 6 months during the 24-month period following treatment discontinuation.

### REFERENCES

5, 40, 129, 135, 165.
**INDICATIONS**
- Treatment of status epilepticus and other acute seizure states.
- Maintenance anticonvulsant therapy.
- To alleviate preoperative anxiety and produce sedation.
- For terminal agitation and sedation in the palliative setting.
- To control intracranial hypertension.

**ADMINISTRATION**
- IV direct: physician or RN; **blood pressure monitoring; respiratory support**. Inject slowly over at least 1 minute not to exceed 60 mg/min in adults and 1 mg/kg/min up to 30 mg/min in children and infants, unless for status epilepticus (50-100 mg/min).
- Intermittent IV infusion: **respiratory support**. Dilute in 50-100 mL of compatible solution; infuse over 20-30 minutes.
- Continuous IV infusion: for intracranial hypertension; at TOH, dilute in NS to obtain a final concentration of 10 mg/mL.
- IM, deep in a large muscle.
- SC, continuous SC infusion (palliative care).

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, exfoliative dermatitis, Stevens-Johnson syndrome, toxic epidermal necrolysis.
- Cardiovascular: hypotension with rapid IV administration, circulatory collapse.
- CNS: drowsiness, lethargy, headache, dizziness; paradoxical agitation (especially in children).
- Respiratory: respiratory depression especially with rapid IV administration, laryngospasm.
- Local reactions: thrombophlebitis, pain at injection site; irritation, redness, tenderness or necrosis with SC administration.

**DOSAGE**
- **Adults:**
  - Status epilepticus: loading dose of 20 mg/kg IV; may give an additional 5-10 mg/kg IV, if necessary, 10-15 minutes later up to a total of 30 mg/kg.
  - Maintenance anticonvulsant therapy: 100-600 mg/day IV/IM/SC in 1-2 divided doses OR 1-3 mg/kg/day IV in divided doses.
  - Preoperative: 100-200 mg IV/IM given 60-90 minutes prior to surgery.
  - Hypnotic: 100-320 mg IV/IM.
  - Terminal agitation: 100-200 mg IV/IM. Can repeat dose every 30-60 minutes prn (maximum 1600 mg/24 hours) OR start a continuous SC infusion at 800 mg/24 hours which can gradually be increased up to 3800 mg/24 hours.
  - Sedation in palliative care: 15-60 mg IV/SC q4-6h (up to 1600 mg/day).
  - Intracranial hypertension: (TOH use) loading dose (optional) of 10 mg/kg IV followed by an IV infusion of 0.5-3 mg/kg/hr; adjust dose according to intracranial pressure and hemodynamics.
- **Pediatrics:**
  - Status epilepticus: loading dose of 15-20 mg/kg IV (maximum 1000 mg/dose); may give an additional 5-20 mg/kg, if necessary, every 15-20 minutes up to a total of 40 mg/kg.
  - Maintenance anticonvulsant therapy: 1-8 mg/kg/day IV/IM in 1-2 divided doses.
DOSAGE (Cont.)

- Preoperative: 1-3 mg/kg IV/IM, given 60-90 minutes prior to surgery.
- Hypnotic: 2-5 mg/kg IV/IM.

Dosage in renal impairment: if CrCl is less than 10 mL/min, adjust dosing interval to every 12 to 16 hours OR reduce dosage by 25-50%.

Dosage in hepatic impairment: contraindicated in patients with marked liver impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules between 15-25°C; protect from light. Do not freeze.
- Stable for 28 days in the fridge in NS at a concentration of 10 mg/mL in glass vials.
- Compatible in NS, D5W, Ringer’s, RL, sodium lactate 1/6 M solutions.
- Incompatible with acidic solutions.

MISCELLANEOUS

- Contraindicated in patients with porphyria.
- When used as an anticonvulsant, it may take 2-4 weeks to reach adequate serum concentrations; desired serum concentration: 43-172 mcmol/L (10-40 mg/L).

REFERENCES
1, 4, 5, 40, 82, 95, 102, 135, 156, 256, 312, 457.
PHENTOLAMINE
Rogitine ®
Alpha-blocker

INDICATIONS
- Diagnostic agent for pheochromocytoma.
- Prevention and treatment of hypertensive episodes prior to or during surgery for removal of pheochromocytoma.
- As an antagonist to catecholamines in other acute forms of hypertension.
- Treatment of alpha-adrenergic drug extravasation (e.g., dobutamine, dopamine, epinephrine, norepinephrine, phenylephrine).
- Treatment of left ventricular failure secondary to acute myocardial infarction (AMI).

ADMINISTRATION
- IV direct: physician only; blood pressure monitoring; norepinephrine (Levophed ®) must be available; inject over 1 minute.
- Continuous IV infusion: blood pressure monitoring, cardiac monitoring. Dilute 5-10 mg in 500 mL NS; infusion rate as per Dosage section.
- IM: blood pressure monitoring.
- SC (for infiltration of area where alpha-adrenergic drug extravasated): dilute 5-10 mg in 10-15 mL of NS; use a fine hypodermic needle.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: tachycardia, flushing, cardiac arrhythmias, anginal pain; hypotension, can be severe or prolonged and can lead to myocardial infarction and cerebrovascular spasm or occlusion.
- GI: abdominal pain, nausea, vomiting, diarrhea.
- CNS: dizziness, headache.
- Weakness, nasal congestion.

Antidote: norepinephrine for treatment of hypotension. Refer also to the Miscellaneous section.

DOSAGE

Adults:
- Diagnostic: 5 mg IV/IM.
- Prevention or control of hypertensive episodes prior to or during surgical excision for pheochromocytoma: 2-5 mg IV/IM given 1-2 hours prior to surgery. Repeat as needed via IV route during surgery.
- For management of hypertensive crisis due to catecholamine release: 1-5 mg IV direct, maximum dose of 20 mg IV. May continue with 1 mg/hr as a continuous IV infusion; titrate to response (maximum 40 mg/hr).
- Treatment of alpha-adrenergic drug extravasation: 5-10 mg SC to be infiltrated in the area as soon as possible and within 12 hours of the extravasation, otherwise treatment is ineffective.
- Left ventricular failure secondary to AMI: continuous IV infusion of 0.17-0.4 mg/min OR 10-24 mg/hr.

Pediatrics:
- Diagnostic: 1 mg IV or 0.05-0.1 mg/kg (maximum: 5 mg/dose) IV or 3 mg/m² IV or 3 mg IM.
- Prevention or control of hypertensive episodes prior to or during surgical excision for pheochromocytoma: 1 mg or 0.05-0.1 mg/kg (maximum: 5 mg/dose) or 3 mg/m² IV/IM given 1-2 hours prior to surgery. Repeat as needed via IV route during surgery.
- Treatment of alpha-adrenergic drug extravasation: local SC infiltration of small amounts in 0.2 mL aliquots of a 0.5-1 mg/mL solution as soon as possible and within 12 hours of the extravasation. Total volume depends on extravasation area size.

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules and vials between 2-8°C; protect from light and heat. Do not freeze.
- Compatible with NS.

MISCELLANEOUS

- Do not use epinephrine if hypotension occurs as it may cause a paradoxical fall in BP.
- Maximum effect on blood pressure is 2 minutes following IV administration and 20 minutes with IM dosing.
- Contains sulfites.

REFERENCES

1, 5, 40, 82, 95, 135.
PHENYLEPHRINE Neo

**INDICATIONS**
- Prevention and treatment of acute hypotension during spinal anesthesia (including in obstetric patients).
- Treatment of acute hypotension due to peripheral circulatory collapse.
- Treatment of paroxysmal supraventricular tachycardia.

**ADMINISTRATION**
- **IV direct:** physician only; **blood pressure monitoring.** Use prefilled syringes (50 mcg/mL) OR use vials (10 mg/mL) by mixing 10 mg (1 mL) in 9 mL of NS, D5W or SWFI, discard 9 mL, and dilute the remaining 1 mL with 9 mL NS, for a final concentration of 100 mcg/mL; inject over 20-30 seconds.
- **Continuous IV infusion:** **continuous BP monitoring.** Dilute in NS or D5W to obtain a final concentration of 20 mcg/mL (10 mg/500 mL) or 40 mcg/mL (10 mg/250 mL). More concentrated solutions may be prepared depending on dosage and fluid requirement of each patient (e.g., 100 mcg/mL, 200 mcg/mL and 400 mcg/mL). At TOH, add 10 mg (1 mL from phenylephrine 10 mg/mL vial) in 100 mL of D5W or NS to obtain a final concentration of 100 mcg/mL (0.1 mg/mL) OR add 100 mg (10 mL from phenylephrine 10 mg/mL vials) in 250 mL of NS to obtain a final concentration of 400 mcg/mL (0.4 mg/mL) OR add 200 mg (20 mL from phenylephrine 10 mg/mL vials) in 250 mL of NS to obtain a final concentration of 800 mcg/mL (0.8 mg/mL). A central line is preferred. Must be administered by an infusion pump.
- IM, SC.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Cardiovascular: ventricular extrasystoles, ventricular tachycardia, reflex bradycardia (Antidote: atropine for bradycardia), hypertension.
- GI: nausea, vomiting.
- CNS: restlessness, nervousness, anxiety, excitability, dizziness, headache, paresthesia, sensation of fullness in head.
- Dermatologic: peripheral vasoconstriction, pallor.
- Local reactions: blanching; sloughing or necrosis with SC administration.

**DOSAGE**
- **Treatment of hypotension during anesthesia:**
  - **IV direct:** 40-200 mcg every 1 to 2 minutes prn; titrate to effect. Do not exceed 500 mcg for subsequent dose.
  - **Continuous IV infusion:** if initial IV direct dose was not sufficient, initiate infusion at an initial rate of 10-35 mcg/min OR 0.5-1.4 mcg/kg/min; titrate to effect. Do not exceed 200 mcg/min.
- **Prevention of hypotension during anesthesia:** 2-3 mg IM/SC given 3-4 minutes before injection of spinal anesthetic.
- **Treatment of hypotension in other acute states:**
  - Mild to moderate hypotension: usual initial dose of 200 mcg (range from 100 mcg to a maximum of 500 mcg) IV direct can be given prn. Do not give more frequently than every 10-15 minutes OR 2-5 mg SC/IM (range 1-10 mg; initial dose not to exceed 5 mg).
  - Severe hypotension or shock: continuous IV infusion at starting rate of 100-180 mcg/min OR 0.5-6 mcg/kg/min. Maintenance rate of 40-60 mcg/min. Titrate to maintain BP.
  - Paroxysmal supraventricular tachycardia: up to 500 mcg rapid IV direct initially. Subsequent doses may be increased in increments of 100-200 mcg (not exceeding 1 mg per dose).
  - Dosage in hepatic impairment: patients with liver cirrhosis may require doses in the upper end of the dosing range.

.../Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and prefilled syringes between 15-30°C. Protect from light.
- Do not use if the solution darkens or becomes cloudy.
- Stable for 14 days at room temp (25°C) in NS at a concentration of 100 mcg/mL in PVC bags.
- Stable for 60 days at room temp (between 23-25°C) exposed to light in NS at concentrations of 200 mcg/mL and 400 mcg/mL in PVC bags.

MISCELLANEOUS
- Use with extreme caution in patients on monoamine oxidase inhibitors or tricyclic antidepressants.
- Vials contain sulfites.

REFERENCES
1, 4, 5, 40, 95, 135, 208, 366, 367.
Do NOT confuse phenytoin with fosphenytoin. 
This monograph is specific to PHENYTOIN.

INDICATIONS
- Treatment of status epilepticus.
- Prophylaxis of seizures during neurosurgery.
- Treatment of digitalis-induced arrhythmias and of ventricular tachycardia or paroxysmal atrial tachycardia particularly in persons refractory to (or unable to tolerate) conventional antiarrhythmic agents or cardioversion.

ADMINISTRATION
- IV direct: physician or RN; cardiac monitoring, blood pressure monitoring, respiratory support; undiluted; rate should not exceed 50 mg/min in adults, 25 mg/min in the elderly or in patients with cardiovascular disease, 1-3 mg/kg/min (maximum of 50 mg/min) in infants and children, and 0.5-3 mg/kg/min in neonates.
- Intermittent IV infusion: preferred for loading dose; blood pressure monitoring, respiratory support; doses may be diluted in NS at a concentration of 5 mg/mL or greater. (At TOH, loading doses less than 500 mg are diluted in 50 ml of NS and loading doses of 500 mg to 2000 mg in 100 mL of NS). Rate should not exceed 50 mg/min in adults, 25 mg/min in the elderly or in patients with cardiovascular disease, 1-3 mg/kg/min (maximum of 50 mg/min) in infants and children, and 0.5-3 mg/kg/min in neonates. For all doses diluted in a bag, use of an in-line filter of 0.22 micron is suggested to remove any crystalline phenytoin which forms when phenytoin is diluted. Administration of the drug should be completed within 1 to 4 hours after preparation of the diluted solution.
- Administer IV doses via a large peripheral vein through a large gauge needle or via a large gauge central line. At TOH, phenytoin should NOT be administered through a PICC line (re: risk of precipitation with catheter blockage).
- Always flush IV line before and after with NS to decrease risk of incompatibility and to reduce venous irritation; flush line SLOWLY after administration as some residual phenytoin may still sit in the line.
- The preferred method of administration for the loading dose is with an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash; can be resumed if rash is not severe and has completely resolved. Toxic epidermal necrolysis, Stevens-Johnson syndrome. Drug reactions with eosinophilia and systemic symptoms (DRESS). Anaphylaxis.
- Cardiovascular: hypotension, cardiovascular collapse, bradycardia, heart block, ventricular tachycardia, ventricular fibrillation. Minimize by administering at a rate not exceeding the rates above.
- CNS: confusion, nystagmus, ataxia, slurred speech, somnolence; may be signs of toxicity. Suicidal ideation.
- Respiratory: respiratory depression, especially if exceeding the rates above.
- Hyperglycemia, lymphadenopathy.
- Local reactions: tenderness, irritation, inflammation, necrosis, sloughing, purple glove syndrome (distal pain, edema and discolouration).

DOSAGE
Adults:
- Status epilepticus: loading dose: 15-20 mg/kg IV (may give an additional dose of 5-10 mg/kg IV 10 minutes later prn). maintenance: 100 mg IV q6-8h. Refer to Miscellaneous section for therapeutic serum levels.
- Prophylaxis during neurosurgery: 100-200 mg IV q4h during surgery and the immediate postoperative period.
- Antiarrhythmic: 100 mg IV direct, repeated at 5 minute intervals prn until arrhythmias stop or undesirable side effects occur or up to a total dose of 1 g.
DOSAGE (Cont.)

Pediatrics:
- Status epilepticus: loading dose: 15-20 mg/kg IV (maximum 1000 mg); may give an additional dose of 5-10 mg/kg IV 10 minutes later prn.
  maintenance: 4-10 mg/kg/day IV (maximum 300 mg/day) in 2-3 divided doses.

- Weight-based doses should be calculated using ideal body weight.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and ampoules between 15-30°C. Protect from light. Do not freeze. Solution should be colourless to light yellow and clear.
- Incompatible with dextrose-containing solutions.
- Stable for a maximum of 4 hours at room temp in NS; do not refrigerate the diluted solution.

MISCELLANEOUS

- When switching from IV to oral phenytoin or vice versa, use the same total daily dose. The IV formulation should be administered every 6-8 hours as opposed to the oral extended-release capsules that can be administered once or twice daily. Monitor serum levels after the switch for the following reasons: 1) bioavailability of oral preparations vs. the IV formulation is 90%; 2) there is an 8% increase in the drug content with the free acid form (50 mg tablets, oral suspension) over that of the sodium salt (IV formulation, 100 mg extended-release capsules).
- Therapeutic serum levels: 40-80 mcmol/L (10-20 mcg/mL). Correct levels in patients with low albumin levels or renal failure.
- Rule out hypoglycemia before giving phenytoin for convulsions.
- Undiluted product contains 10% ethyl alcohol.

REFERENCES

1, 4, 5, 40, 82, 95, 135, 208, 257, 319, 366, 367, 513.
INDICATIONS
- Prevention or treatment of hypophosphatemia, when oral therapy is not feasible.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in NS or D5W and infuse as per chart below*:

<table>
<thead>
<tr>
<th>Access</th>
<th>Phosphate dose</th>
<th>To dilute in at least</th>
<th>To infuse over at least**</th>
<th>Maximum phosphate infusion rate**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral</td>
<td>7.5 mmol</td>
<td>100 mL</td>
<td>60 minutes</td>
<td>7.5 mmol/hr</td>
</tr>
<tr>
<td></td>
<td>15 mmol</td>
<td>250 mL</td>
<td>2 hours</td>
<td>7.5 mmol/hr</td>
</tr>
<tr>
<td></td>
<td>30 mmol</td>
<td>500 mL</td>
<td>4 hours</td>
<td>7.5 mmol/hr</td>
</tr>
<tr>
<td>Central</td>
<td>Less than 30 mmol</td>
<td>100 mL</td>
<td>-</td>
<td>7.5 mmol/hr</td>
</tr>
<tr>
<td></td>
<td>30 to 60 mmol</td>
<td>250 mL</td>
<td>-</td>
<td>7.5 mmol/hr</td>
</tr>
</tbody>
</table>

* More diluted solutions, especially for peripheral administration, and slower infusion rates than above would be better tolerated.

** This is of particular importance for potassium phosphate.
- Continuous IV infusion (in parenteral nutrition solutions).

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypocalcemia: occurs when phosphate is infused too rapidly or at doses that lead to hyperphosphatemia; may lead to convulsions, tetany and cardiac arrhythmias.
- Hyperkalemia (with potassium phosphate): characterised by paresthesia of extremities, flaccid paralysis, listlessness, confusion; may precipitate cardiac standstill especially from rapid IV infusion (Antidote: calcium gluconate 1000 mg IV given as 10 mL of 10% solution over 5 minutes, repeat in 5 minutes as required. NB: calcium is given only in the setting of ECG changes. Insulin/glucose: 5-10 units of regular insulin IV direct followed immediately by 25-50 g of dextrose (50-100 mL of 50% solution) administered IV over 5 minutes).
- Hypernatremia, edema (with sodium phosphate).
- Local reactions (with potassium phosphate): phlebitis and pain with injection of concentrated solutions.

DOSAGE
- Adult maintenance dose in parenteral nutrition: 10-15 mmol/L of solution or 20-40 mmol/day.
- Mild hypophosphatemia (0.6-0.89 mmol/L): 0.08-0.16 mmol/kg phosphate, up to 15-30 mmol/dose.
- Moderate hypophosphatemia (0.4-0.59 mmol/L): 0.16-0.32 mmol/kg phosphate, up to 15-45 mmol/dose.
- Severe symptomatic hypophosphatemia (less than 0.4 mmol/L): 0.24-0.64 mmol/kg phosphate, up to 30-60 mmol/dose.
- Weight-based dosing: use actual body weight (ABW). If ABW is greater than 130% of ideal body weight (IBW), the adjusted body weight is calculated as follows: IBW + 0.25 (ABW-IBW).
- Maximum dose: 80 mmol/24 hours.
- Dosage in renal impairment: use lower end of the dosage range or decrease dose by at least 50% and administer over a longer period (e.g., 4 to 6 hours).
PHOSPHATE (as sodium or potassium salt)

<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electrolyte</td>
</tr>
</tbody>
</table>

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Protect from light.
- Stable for 24 hours at room temp in D5W, NS, D5-NS.
- Variable compatibility with calcium-containing solutions, including parenteral nutrition.

MISCELLANEOUS

- Use potassium phosphate if serum K less than 4 mmol/L and sodium phosphate if serum K greater than 4 mmol/L.
- 1 mmol phosphate or phosphorous contains 31 mg elemental phosphorus.
- Each mL of potassium phosphate solution contains 4.4 mmol of potassium and 3 mmol of phosphate.
- Each mL of sodium phosphate solution contains 4 mmol of sodium and 3 mmol of phosphate.
- Obtain a phosphorous level 2 to 4 hours after administering a dose.

REFERENCES

4, 5, 40, 90, 95, 135, 208, 328, 366, 367, 388, 474.
**INDICATIONS**

- To reverse severe CNS effects caused by atropine or other anticholinergic agents.

**ADMINISTRATION**

- IV direct: physician only; undiluted; inject slowly, not to exceed 1 mg/min in adults and 0.5 mg/min in pediatrics.
- IM.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: anaphylaxis, bronchoconstriction (mostly due to presence of sulfites).
- Cardiovascular: bradycardia (minimized by slow IV injection), hypotension or hypertension.
- GI: excessive salivation (can lead to respiratory distress, minimized by slow IV injection), nausea, vomiting, diarrhea, epigastric pain.
- CNS: confusion, seizures (minimized by slow IV injection), coma.
- Sweating, miosis, severe muscle weakness, paralysis, lacrimation.

Antidote: for cholinergic crisis, atropine 2-4 mg IV every 3-10 minutes in adults and 1 mg IV doses in children; IV pralidoxime may be useful to reverse respiratory paralysis.

**DOSAGE**

Adults:
- 0.5-2 mg IV or IM. May be repeated every 10-30 minutes. May be necessary to use additional doses of 1-4 mg given every 30-60 minutes as life-threatening signs (arrhythmias, seizures, coma) recur.

Pediatrics
- 0.02 mg/kg IV or IM repeated at 5-10 minute intervals as needed up to a total dose of 2 mg.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules between 20-25°C.

**MISCELLANEOUS**

- In contrast to neostigmine and pyridostigmine, physostigmine readily penetrates the blood-brain barrier.
- Onset: 3-8 minutes with IV administration, 20-30 minutes with IM administration. Duration: 30-60 minutes.
- Contraindicated in patients with asthma, gangrene, diabetes, cardiovascular disease, mechanical obstruction of the intestinal or urogenital tracts, or any vagotonic state and in patients receiving choline esters or depolarizing neuromuscular blocking agents.
- Caution in patients with epilepsy, parkinsonism or bradycardia.
- Contain sulfites.

**REFERENCES**

1, 5, 40, 82, 95, 135.

* Available via Health Canada’s Special Access Programme

Full revision 2017
INDICATIONS
- Treatment of infections due to non-penicillinase producing susceptible strains of bacteria including *Pseudomonas aeruginosa*, *E. coli*, *Enterobacter*, *Proteus*, *Klebsiella*, streptococci, enterococci in the following conditions: intra-abdominal infections, skin and skin structure infections, gynecological infections, lower respiratory tract infections, septicemia, urinary tract infections, uncomplicated urethritis (caused by *N. gonorrhoeae*) and bone and joint infections.

ADMINISTRATION
- **CHECK ALLERGY STATUS OF PATIENT.**
- For IV use: reconstitute 2, 3, and 4 g vials with 10, 15, and 20 mL of SWFI, respectively, for an approximate concentration of 0.18 g/mL. Shake well until dissolved.
- IV direct: physician or RN; undiluted; inject over 3-5 minutes.
- Intermittent IV infusion (preferred): dilute in at least 50 mL of a compatible solution; infuse over 20-30 minutes.
- For IM use: reconstitute 2, 3, and 4 g vials with 4, 6, or 8 mL of SWFI or 0.5-1% lidocaine (without epinephrine), respectively, for an approximate concentration of 0.4 g/mL. Shake well until dissolved.
- IM: reserved for uncomplicated UTIs and gonorrhea or follow-up to IV therapy; give no more than 2 g per injection site. Inject into the gluteus muscle (preferred); use deltoid area only if well developed.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, urticaria, anaphylactic/anaphylactoid reaction, erythema multiforme, Stevens-Johnson syndrome.
- GI: diarrhea, nausea, vomiting.
- CNS: headache, dizziness; convulsions with very high doses, particularly in patients with renal insufficiency.
- Hematologic: leukopenia, thrombocytopenia, eosinophilia, neutropenia.
- Local reactions: phlebitis, pain, erythema, induration.

DOSAGE
- Urinary tract infections:
  - uncomplicated: 6-8 g (100-125 mg/kg) IM/IV daily in 2 to 4 divided doses
  - complicated: 8-16 g (125-200 mg/kg) IV daily in 3 to 4 divided doses
- Serious infections (e.g., septicemia, pneumonia): 12-18 g (200-300 mg/kg) IV daily in 4 to 6 divided doses.
- Uncomplicated gonorrhea: 2 g IM as a single dose (probenecid 1 g is given orally 30 minutes prior to injection).
- Maximum daily dose is 24 g; however higher doses have been used.
- Dosage in renal impairment:
  - CrCl (mL/min) greater than 40 40-20 less than 20 hemodialysis *
  - Dose (g) usual 3 to 4 3 to 4 2
  - Interval (hr) usual 8 12 8

* Give an additional 1 g IV after each dialysis session or give scheduled dose right after dialysis, as 30 to 50% is removed after a 4-hour hemodialysis session.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C. Protect from light.
- Reconstituted solutions are stable for 24 hours at room temp, 7 days when refrigerated and 1 month when frozen at -20°C.
COMPATIBILITY, STABILITY (Cont.)

- Stable for 24 hours at room temp and for 72 hours in the fridge in NS, D5W, D5-NS, RL in plastic containers (manufacturer data).
- Stable for 24 hours at room temp, one week in the fridge and one month when frozen at -20°C in D5W, D5-NS, NS or RL at a concentration of 120 mg/mL in glass or PVC containers.

MISCELLANEOUS

- Cross-allergenicity with other beta-lactam antibiotics.
- Sodium content: 1.85 mmol/g.
- Since piperacillin can inactivate the activity of aminoglycosides, they should be administered at least 60 minutes apart.

REFERENCES

5, 40, 95, 135, 208.
**INDICATIONS**

- Treatment of infections due to susceptible strains, including beta-lactamase producing bacteria, in the following conditions: intraabdominal infections, skin and skin structure infections, gynecological infections, respiratory tract infections, septicemia and urinary tract infections.

**ADMINISTRATION**

- **CHECK ALLERGY STATUS OF PATIENT.**
- For IV use: reconstitute with NS, D5W or SWFI as follows: the 2/0.25 g vial with 10 mL, the 3/0.375 g vial with 15 mL and the 4/0.5 g vial with 20 mL; shake vial until dissolved.
- Intermittent IV infusion: further dilute with 50-150 mL of compatible solution and administer over at least 30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, pruritus, anaphylactic/anaphylactoid reaction, Stevens-Johnson syndrome, toxic epidermal necrolysis, drug reactions with eosinophilia and systemic symptoms (DRESS).
- GI: diarrhea, nausea, vomiting, constipation.
- CNS: headache, insomnia; convulsions with very high doses particularly in patients with renal insufficiency.
- Hematologic: leukopenia, thrombocytopenia, eosinophilia, neutropenia.
- Local reactions: phlebitis, pain, inflammation, edema.

**DOSEAGE**

- **Usual dosage:** 3 g/0.375 g piperacillin/tazobactam IV q6h.
- **Higher dosage:** for nosocomial pneumonia and febrile neutropenia: 4 g/0.5 g IV q6h. At TOH, the most commonly used dose for nosocomial pneumonia is 3 g/0.375 g IV q6h although 4 g/0.5 g IV q6h may be used in select cases.
- **Dosage in renal impairment:**

```plaintext
<table>
<thead>
<tr>
<th>CrCl greater than 40 mL/min</th>
<th>Usual dose</th>
<th>Higher dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 g/0.375 g IV q6h</td>
<td>4 g/0.5 g IV q6h</td>
<td></td>
</tr>
<tr>
<td>2 g/0.25 g IV q6h</td>
<td>3 g/0.375 g IV q6h</td>
<td></td>
</tr>
<tr>
<td>2 g/0.25 g IV q8h</td>
<td>2 g/0.25 g IV q6h</td>
<td></td>
</tr>
<tr>
<td>2 g/0.25 g IV q12h</td>
<td>2 g/0.25 g IV q8h</td>
<td></td>
</tr>
</tbody>
</table>
```

* As hemodialysis removes 30-40% of the dose in 4 hours, give an additional 0.67/0.08 g after each hemodialysis or give scheduled dose right after dialysis.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp.
- Once reconstituted, solutions are stable for 24 hours at room temp and 48 hours in the fridge (72 hours in the fridge for Alveda brand).
- All brands: diluted solution is stable for 24 hours at room temp and 72 hours in the fridge in NS or D5W.
- Alveda, Sandoz and Sterimax brands only: diluted solution is stable for 24 hours at room temp and 72 hours in the fridge in RL.
- Sandoz brand only: compatible with amikacin (1.75-7.5 mg/mL in D5W or NS) or gentamicin (0.7-3.32 mg/mL in NS) through Y-site connection; not compatible with tobramycin.
- Sandoz brand only: diluted solution is stable for 30 days in the fridge in D5W or NS at concentrations ranging from 18 mg piperacillin/2.3 mg tazobactam/mL to 67 mg piperacillin/8.3 mg tazobactam/mL in PVC bags.
- Sterimax brand only: diluted solution is stable for 32 days in the fridge in D5W or NS at a concentration ranging from 20 mg piperacillin/2.5 mg tazobactam/mL to 60 mg piperacillin/7.5 mg tazobactam/mL in PVC bags.
MISCELLANEOUS

- Vials contain:
  - Piperacillin 2 g and tazobactam 0.25 g: usually ordered as 2.25 g. Also contains 108-207 mg of sodium.
  - Piperacillin 3 g and tazobactam 0.375 g: usually ordered as 3.375 g. Also contains 162-312 mg of sodium.
  - Piperacillin 4 g and tazobactam 0.5 g: usually ordered as 4.5 g. Also contains 216-415 mg of sodium.
- Tazobactam is included as a beta-lactamase inhibitor, which extends piperacillin’s spectrum of coverage to include certain beta lactamase producing bacteria (e.g., *H. influenzae*, *S. aureus*).
- Cross-allergenicity with other beta-lactam antibiotics.

REFERENCES

1, 5, 135, 177, 179, 193, 194, 422, 478.
PLERIXAFOR
Mozobil ®

Hematopoietic

INDICATIONS

- Peripheral stem cell collection and transplantation: to be used in combination with filgrastim (granulocyte-colony stimulating factor [G-CSF]) for harvesting of peripheral blood stem cells in patients with non-Hodgkin’s lymphoma and multiple myeloma.

ADMINISTRATION

- SC: in the abdomen. Observe the patient for 60 minutes after each dose.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylaxis/anaphylactic shock, urticaria, periorbital swelling, dyspnea, hypoxia.
- Cardiovascular: vasovagal reaction: orthostatic hypotension and/or syncope within 60 minutes of administration (uncommon).
- GI: diarrhea, nausea, vomiting, flatulence.
- CNS: headache, dizziness, insomnia, anxiety.
- Hematologic: leukocytosis, thrombocytopenia.
- Fatigue, arthralgia.
- Local reactions: erythema, hematoma, hemorrhage, induration, inflammation, irritation, pain, paresthesia, pruritus, rash, urticaria.

DOSAGE

- On the evening of the 4th day of filgrastim treatment, 10-11 hours prior to initiation of apheresis, start plerixafor 0.24 mg/kg (actual body weight) SC daily until achieved target collection, up to a maximum of 4 consecutive days. Give the dose at the same time each day. Maximum dose: 40 mg/day SC.
- Dosage in renal impairment: if CrCl is less than 50 mL/min, decrease dose to 0.16 mg/kg SC once daily; maximum dose of 27 mg/day SC.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials of ready-to-use solution at room temp.
- Stable for 7 days at room temp (25°C) and 40°C at a concentration of 20 mg/mL in plastic syringes.

MISCELLANEOUS

- There is a potential for tumour cell mobilization from the bone marrow.

REFERENCES

1, 5, 95, 135, 219.

Full revision 2017
## PNEUMOCOCCAL VACCINE

### OTHER NAMES
- Pneumovax ® 23 (23-valent)
- Prevnar ® 13 (13-valent), Synflorix ® (10-valent)

### INDICATIONS
- Active immunization against pneumonia and invasive diseases, including sepsis, meningitis, pleural empyema and bacteriemia, caused by covered serotypes of *Streptococcus pneumoniae* in specific age groups (Pneumovax ® 23: 2 years of age and older; Prevnar ® 13: 6 weeks of age and older; Synflorix ®: 6 weeks up to 5 years of age).
- Active immunization against active otitis media caused by covered serotypes of *Streptococcus pneumoniae* in patients 6 weeks up to 5 years of age.

### ADMINISTRATION
- Pneumovax ® 23: SC, IM (deltoid muscle or lateral midthigh).
- Prevnar ® 13 and Synflorix ®: IM only in the anterolateral aspect of the thigh in infants or the deltoid muscle in older children and adults. Shake well to obtain a uniform white suspension.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylactoid reaction, serum sickness, angioneurotic edema, erythema multiforme.
- GI: diarrhea, vomiting, decreased appetite.
- CNS: headache, irritability, drowsiness.
- Fever, arthralgia, myalgia, malaise, fatigue.
- Local reactions: erythema, warmth, swelling, soreness, induration at injection site.

### DOSAGE
- Pneumovax ® 23: 0.5 mL SC/IM.
- Prevnar ® 13 and Synflorix ®: 0.5 mL IM. Refer to manufacturer’s monograph for full schedule, depending on age of patient.
- Revaccination or booster doses may be indicated depending on patient age and comorbidities. Refer to manufacturer’s monograph and the Canadian Immunization Guide for schedule recommendations.
- Administration of Pneumovax ® 23, and Prevnar ® 13 or Synflorix ® should be spaced by at least 8 weeks if Prevnar ® 13 or Synflorix ® is used for the first dose, and by at least one year if Pneumovax ® 23 is used for the first dose.

### COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials and prefilled syringes between 2-8°C. Protect Synflorix ® from light. Do not freeze Prevnar ® 13 and Synflorix ®.
- Prevnar ® 13: potency not affected if exposed to temperatures up to 25°C for cumulative period of 4 days.
- Synflorix ®: potency not affected if exposed to temperatures between 8-25°C for 3 days.
- Pneumovax ® 23: potency not affected if exposed at temperatures between -15°C and 0°C on 2 occasions for a total maximum period of 14 days.

.../Cont.
PNEUMOCOCCAL VACCINE

NAME OF MEDICATION
PNEUMOCOCCAL VACCINE

OTHER NAMES
Pneumovax ® 23 (23-valent)
Prevnar ® 13 (13-valent), Synflorix ® (10-valent)

CLASSIFICATION
Vaccine

.../Cont.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- The pneumococcal vaccine is an inactivated vaccine; Pneumovax ® 23 is a polysaccharide vaccine while Prevnar ® 13 and Synflorix ® are conjugate vaccines.
- Administration of pneumococcal vaccine should be delayed, if possible, during an acute febrile illness or active infection of moderate to severe intensity.
- Pneumovax ® 23: may be administered concomitantly with influenza, shingles, Haemophilus influenza type b conjugate and meningococcal vaccines, providing separate syringes and different sites are used.
- Prevnar ® 13 and Synflorix ®: may be administered concomitantly with diphtheria, tetanus, acellular pertussis, Haemophilus influenza type B conjugate, inactivated polyomyelitis, hepatitis B, measles, mumps, rubella, meningococcal serogroup C conjugate, rotavirus and varicella virus vaccines, providing separate syringes and different sites are used.

REFERENCES

1, 5, 31, 135, 201.
### INDICATIONS
- Treatment of recurring superficial papillary bladder cancer.
- Reduction of obstruction and palliation of dysphagia in patients with completely or partially obstructing esophageal cancer.
- Reduction of obstruction and palliation of symptoms in patients with completely or partially obstructing endobronchial non-small cell lung cancer and treatment of superficial endobronchial non-small cell lung cancer in patients for whom surgery and radiotherapy are not indicated.
- Ablation of high-grade dysplasia associated with Barrett’s Esophagus in patients who refuse esophagectomy and are in overall good health.

### ADMINISTRATION
- Reconstitute the 75 mg and 15 mg vials with 31.8 mL and 6.6 mL of D5W, respectively, to obtain a final concentration of 2.5 mg/mL. Shake well until dissolved.
- IV direct: physician or RN; undiluted, inject over 3-5 minutes.

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare.
- Cardiovascular: atrial fibrillation, peripheral edema, cerebrovascular accident (rare), thromboembolism (rare).
- GI (mainly when used for GI lesions): nausea, vomiting, constipation, diarrhea, esophageal stenosis, abdominal pain, dehydration, dysphagia, hiccups.
- CNS: anxiety, insomnia, headache.
- Hematologic: anemia.
- Respiratory (mainly when used to treat lung cancer): dyspnea, hemoptysis, chest pain (also when used to treat esophageal lesions), cough, pleural effusion, respiratory failure, pneumonia.
- Dermatologic: photosensitivity lasting for at least 4-6 weeks, skin discoloration and fragility, hair growth, skin nodules, wrinkles.
- Urogenital (mainly when used to treat bladder cancer): dysuria, hematuria, urinary frequency, urgency, strangury, genital edema, suprapubic pain, urinary incontinence, nocturia, urinary tract infection.
- Fever, pain, photophobia.
- Extravasation hazard: irritant after exposure to light. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal). If extravasation occurs, protect the area from light for a minimum of 30 days.

### DOSAGE
- 2 mg/kg IV administered 40-50 hours prior to laser light. Light therapy may be repeated 96-120 hours after porfimer administration for patients with lung or esophageal cancer only. Further courses are permitted, except for bladder cancer.
- Consult specific protocol.

### COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solutions are opaque and are stable for 24 hours in the fridge, when protected from light.
- Porfimer sodium is not compatible with NS.

### MISCELLANEOUS
- Patients should protect eyes and skin from exposure to direct or indirect sunlight or bright focused indoor light for a period of at least 30 days; use full-length clothing, hat, gloves, dark sunglasses; use of sunscreens does not provide adequate protection from sunlight; sunblock (e.g., zinc oxide or titanium dioxide) should be applied to exposed skin when outdoors.
- Patients should be advised to avoid total darkness as exposure of skin to normal ambient lighting is important to aid in the clearance of porfimer from the skin through the process of photobleaching.

### REFERENCES
5, 40, 129, 165.
POSACONAZOLE

INDICATIONS
- Prophylaxis of *Aspergillus* and *Candida* infections in adult patients at high risk of developing these infections.
- Treatment of invasive aspergillosis in patients resistant or intolerant to amphotericin B or itraconazole.

ADMINISTRATION
- Intermittent IV infusion: allow vial to reach room temp. Dilute the 300 mg dose (16.7 mL) in NS, 1/2NS, D5W, D5-1/2NS or D5-NS to obtain a final concentration of 1-2 mg/mL. Administer through a central IV line over 90 minutes; a single dose can be administered only once through a peripheral line over 30 minutes (as vein irritation will occur). Infuse with an in-line filter of 5 microns or less.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, anaphylaxis.
- Cardiovascular: peripheral edema, hypertension, arrhythmias, QT interval prolongation.
- GI: diarrhea, nausea, vomiting, abdominal pain, decreased appetite, mucositis.
- CNS: headache.
- Hepatic: elevated LFT.
- Hypokalemia, hypomagnesemia, hypocalcemia.
- Fever, chills.
- Epistaxis.
- Local reactions: thrombophlebitis with multiple doses administered peripherally.

DOSEAGE
- Prophylaxis and treatment of fungal infections: 300 mg IV twice daily for the first day followed by 300 mg IV once daily. When instituting prophylaxis in patients with acute myelogenous leukemia or myelodysplastic syndromes, start a few days before estimated onset of neutropenia and continue for 7 days after neutrophil count rises above 500 cells/mm.³
- Patients weighing over 120 kg may have lower posaconazole levels; closely monitor for breakthrough fungal infections.
- Dosage in renal impairment: no dosage adjustment required if CrCl is 50 mL/min or greater. Should be avoided in patients with a CrCl below 50 mL/min as the vehicle (Betadex Sulfobutyl Ether Sodium) may accumulate; if administration in such cases, monitor serum creatinine level and consider changing to oral posaconazole if creatinine increases.
- Dosage in hepatic impairment: no dosage adjustment required for mild to severe disease but use with caution in severe liver disease.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C.
- Once diluted, solution should be colourless to pale yellow.
- Stable for 24 hours in the fridge once product is diluted.

MISCELLANEOUS
- CYP3A4 substrates that prolong QTc interval (e.g., quinidine, pimozide), statins that are primarily metabolized by CYP3A4 (e.g., simvastatin, lovastatin, atorvastatin), ergot alkaloids (e.g., dihydroergotamine) and sirolimus are contraindicated with posaconazole IV.
- No information regarding cross-hypersensitivity with other azole antifungal agents; caution should be used.

REFERENCES
1, 4, 5, 6, 40, 135, 208.

Full revision 2017
POTASSIUM CHLORIDE

INDICATIONS
- Prevention or treatment of hypokalemia.
- For treatment of severe hypokalemic-hypochloremic alkalosis.

ADMINISTRATION
- Intermittent IV infusion, Continuous IV infusion: use premixed bag; see table below for rate and concentration.

<table>
<thead>
<tr>
<th>Location</th>
<th>For Peripheral Access</th>
<th>Maximum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small volume infusion</td>
<td>Infusion</td>
</tr>
<tr>
<td>Regular Wards</td>
<td>60 mmol/L</td>
<td>10 mmol/50 mL</td>
</tr>
<tr>
<td></td>
<td>60 mmol/L</td>
<td>20 mmol/50 mL</td>
</tr>
<tr>
<td>Critical Care Areas</td>
<td>60 mmol/L</td>
<td>10 mmol/50 mL</td>
</tr>
<tr>
<td></td>
<td>60 mmol/L</td>
<td>20 mmol/50 mL</td>
</tr>
</tbody>
</table>

- The preferred method of infusion is with an infusion pump; if rate is greater than 10 mmol/hr or concentration greater than 40 mmol/L, an infusion pump is then mandatory.
- Consult TOH policy 00627 (Intravenous administration of potassium chloride (KCL)) if more information is needed.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, angioedema, anaphylaxis.
- GI: nausea, vomiting.
- Hyperkalemia: especially from rapid IV infusion. Signs and symptoms include numbness and tingling in the extremities, confusion, flaccid paralysis, cold skin, ECG changes. (Antidote: calcium gluconate 1000 mg IV given as 10 mL of 10% solution over 5 minutes, repeat in 5 minutes as required. NB: calcium is given only in the setting of ECG changes. Insulin/glucose: 5-10 units of regular insulin IV direct followed immediately by 25-50 g of dextrose (50-100 mL 50% solution) administered IV over 5 minutes.
- Because of slow shifts between extracellular and intracellular compartments, it is impossible to replace a substantial potassium deficit quickly; attempts to quickly replace large potassium deficits will result in derangement of transcellular potassium balance and potentially dangerous neuromuscular and cardiac complications.
- Local reactions: phlebitis, vesicles, swelling, erythema and pain at site of injection with concentrated solutions.

DOSAGE
- Usual dose: 20-60 mmol (at a slow rate as above) per 24 hours. Dose depends on requirements.
- Usual maximum daily dosage: 200 mmol. However, up to 400 mmol/24 hours have been given in selected situations with extreme caution.
- Dosage in renal impairment: reduce dose in renally impaired patients as potassium is mainly eliminated by kidney; monitor frequently.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and bags at room temp. Avoid excessive heat. Do not freeze.
- Stable 24 hours at room temp when mixed with NS or D5W.
- Compatible with all commonly used IV solutions.

.../Cont.
### POTASSIUM CHLORIDE

**Electrolyte**

.../Cont.

**MISCELLANEOUS**

- Refer to the phosphate monograph for information on potassium phosphate.
- Oral route is usually preferable.
- Monitor serum potassium and chloride concentrations.
- 1 mmol KCl = 1 mEq KCl.
- When hypokalemia and hypomagnesemia coexist, magnesium deficiency should be corrected to facilitate the correction of hypokalemia.

**REFERENCES**

1, 2, 4, 5, 6, 40, 95, 135, 272, 328, 366, 367, 431.
**PRALIDOXIME * 2-PAM, Protopam ® chloride, 2-Pyridine aldoxime methochloride**

**INDICATIONS**
- Treatment of poisoning due to organophosphate anticholinesterase pesticides and chemicals (including nerve agents).
- Control of overdose of carbamate anticholinesterase agents used in the treatment of myasthenia gravis (e.g., neostigmine, pyridostigmine).

**ADMINISTRATION**
- For IV use: reconstitute each 1 g vial with 20 mL of SWFI for a concentration of 50 mg/mL.
- IV direct: physician only; undiluted; inject over at least 5 minutes, not to exceed a rate of 200 mg/min.
- Intermittent IV infusion: (preferred): dilute in 100 mL of NS; infuse over 15-30 minutes, not to exceed a rate of 200 mg/min.
- Continuous IV infusion: dilute 2 g in 250 mL of NS.
- IM, SC (when IV administration is not feasible): reconstitute each 1 g vial with 3.3 mL of SWFI for a final concentration of approximately 300 mg/mL. For children, administer in the anterolateral aspect of the thigh.
- Except in emergency situations, should only be used in hospitalized patients when respiratory and other supportive measures are available.

**POTENTIAL ADMINISTRATION HAZARDS**
- Cardiovascular: tachycardia with rapid IV administration; hypertension.
- GI: nausea, vomiting.
- CNS: dizziness, drowsiness, headache.
- Hepatic: transient ALT/AST elevation.
- Ophthalmic: blurred vision, diplopia, impaired accommodation.
- Respiratory: laryngospasm and apnea with rapid IV administration.
- Muscle rigidity and transient neuromuscular blockade with rapid IV administration. May precipitate myasthenic crisis when use in patients treated for myasthenia gravis.
- Local reactions: mild pain at injection site with IM administration.

**DOSAGE**

**Adults:**
- Organophosphate poisoning:
  - IV: 1-2 g or 30 mg/kg IV. May repeat dose 60 minutes later prn then every 10-12 hours prn OR follow initial dose with a continuous IV infusion of 8 mg/kg/hr (maximum of 12 g in 24 hours).
  - IM/SC: for mild symptoms, 600 mg IM/SC and repeat every 15 minutes prn for a maximum total dose of 1800 mg; for severe symptoms, 1800 mg IM/SC administered as 3 divided doses of 600 mg given in rapid succession. May repeat 60 minutes after the last dose prn.
- In anticholinesterase overdose: 1-2 g IV followed by 250 mg IV every 5 minutes as needed.

**Pediatrics:**
- Organophosphorus poisoning:
  - IV: 20-50 mg/kg IV (maximum 2 g/dose). May repeat 60 minutes later prn then every 10-12 hours prn OR follow initial dose with a continuous IV infusion of 10-20 mg/kg/hr.
  - IM/SC: for children weighing 40 kg or more, refer to adult dosing. For children weighing less than 40 kg: for mild symptoms, 15 mg/kg IM/SC and repeat every 15 minutes prn for a maximum total dose of 45 mg/kg; for severe symptoms, 45 mg/kg IM/SC administered as 3 divided doses given in rapid succession. May repeat 60 minutes after the last dose prn.
- Reduce dose in patients with renal dysfunction. Use with caution.

.../Cont.
PRALIDOXIME *

OTHER NAMES
2-PAM, Protopam ® chloride,
2-Pyridine aldoxime methochloride

CLASSIFICATION
Antidote

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Stable for 28 days between -20 and 50°C in NS at concentrations of 8 and 10 mg/mL in PVC plastic bags.

MISCELLANEOUS
- Treatment will be most effective if given within a few hours after poisoning.
- In most cases of organophosphate anticholinesterase poisoning, administer atropine before pralidoxime.
- Pralidoxime has only limited value as an antagonist to carbamate anticholinesterases (neostigmine, pyridostigmine, physostigmine).

REFERENCES
1, 3, 4, 5, 6, 40, 82, 95, 208. * Available via Health Canada’s Special Access Programme

* Available via Health Canada’s Special Access Programme

Full revision 2017; limited revision 2019
INDICATIONS
- Treatment of supraventricular arrhythmias: atrial fibrillation and paroxysmal atrial tachycardia uncontrolled by other antiarrhythmic agents.
- Treatment of ventricular arrhythmias.

ADMINISTRATION
- IV direct: physician or RN; cardiac monitoring, blood pressure monitoring. Dilute each mL (100 mg) with 5-10 mL of D5W; usual rate is 20 mg/min; up to a maximum of 50 mg/min.
- Intermittent IV infusion: cardiac monitoring, blood pressure monitoring. For loading dose only. Dilute dose with NS or D5W to a maximal concentration of 20 mg/mL (e.g., 1 g in 50 mL) and administer at a rate of 20-50 mg/min.
- Continuous IV infusion: cardiac monitoring, blood pressure monitoring. Dilute 0.5-1 g in 250 mL of NS or D5W or 1-2 g in 500 mL of NS or D5W to obtain a final concentration of 2 or 4 mg/mL. At TOH, add 1 g (10 mL from a procainamide 100 mg/mL vial) to 250 mL of NS to obtain a final concentration of 4 mg/mL.
- IM.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: angioedema, urticaria, pruritus, rash.
- Cardiovascular: conduction defects (widening of QRS complex, QT interval prolongation, PR interval prolongation), ventricular tachycardia, bradycardia, ventricular asystole or fibrillation; hypotension especially with rapid IV administration (Antidote: IV phenylephrine or norepinephrine).
- GI: nausea, vomiting, diarrhea.
- CNS: dizziness, depression, confusion, hallucinations, convulsions.
- Hematologic: blood dyscrasias (e.g., thrombocytopenia, agranulocytosis, leukopenia, hypoplastic anemia, hemolytic anemia).

DOSAGE
- A number of loading dosing regimens have been suggested:
  • 100 mg IV direct every 5 minutes until arrhythmia is suppressed or a total of 1 g has been given.
  or
  • loading dose IV infusion at a rate of 20-50 mg/min until arrhythmia is suppressed, side effects develop, or a total of 17 mg/kg has been given.
  or
  • loading dose of 500-600 mg IV over 25-30 minutes.
- Maintenance continuous IV infusion of 1-6 mg/min OR 0.02-0.08 mg/kg/min.
- IM: 50 mg/kg/day in divided doses q3-6h. For cardiac arrhythmias associated with anesthesia or surgery: 100-500 mg IM.
- Dosage in renal impairment: if CrCl is between 10-50 mL/min, reduce continuous infusion rate by 25-50%; if CrCl is less than 10 mL/min, reduce continuous infusion rate by 50-75%.
- Dosage in hepatic impairment: if Child-Pugh score is between 8-10, reduce continuous infusion rate by 25%; if Child-Pugh score is greater than 10, reduce continuous infusion rate by 50%.

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Do not freeze.
- Solutions darker than light amber should not be used.
- Stable for 24 hours at room temp and 7 days if refrigerated when diluted in NS at a concentration of 2-4 mg/mL.
- Stable for 6 hours at room temp in D5W at a concentration of 2-4 mg/mL.
- Stable for 193 days at room temp (23°C, exposed to light) and in the fridge (5°C, protected from light) at a concentration of 100 mg/mL (original solution with no dilution) in clear glass vials.
- Stable for 193 days at room temp (23°C, exposed to light) and in the fridge (5°C, protected from light) in NS at a concentration of 3 mg/mL in PVC bags.

MISCELLANEOUS

- Do not administer in patients with: 1) torsades de pointes; 2) complete AV heart block or with second or third degree AV nodal block unless an electrical pacemaker is operative; 3) myasthenia gravis; 4) systemic lupus erythematosus; 5) hypersensitivity to ester-type local anesthetics (e.g., tetracaine, benzocaine, cocaine).
- Potentiates neuromuscular blocking agents.

REFERENCES

1, 4, 5, 6, 40, 135, 383.
<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>Phenergan ®</th>
</tr>
</thead>
</table>

| CLASSIFICATION | Antihistamine, Antiemetic, Analgesic |

**INDICATIONS**
- For the control of nausea and vomiting.
- Adjunctive use when immediate sedation is required (preoperative, postoperative, labour).
- Adjunctive analgesic for the control of preoperative and postoperative pain.
- Treatment of allergic disorders (low efficacy).

**ADMINISTRATION**
- IV administration: NOT preferred; use only large-bore vein, preferably via a free-flowing IV line at a port farthest from the vein or a central venous access site, but absolutely no hand or wrist vein; check patency of the access site before administration. Before IV administration of the drug, tell patients to report immediately any burning or pain that occurs during or after the injection.
- IV direct: physician or RN; **blood pressure monitoring**. Dilute with 10-20 mL NS; inject into the tubing of a freely running IV solution over 10-15 minutes.
- Intermittent IV infusion: dilute in 50-100 mL of NS and infuse over 10-15 minutes.
- Deep IM (preferred).

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, angioedema, urticaria.
- Cardiovascular: hypotension, hypertension, tachycardia, bradycardia.
- CNS: drowsiness, seizures, extrapyramidal symptoms, confusion.
- Dry mouth, blurred vision.

**DOSAGE**
- Consider limiting initial dose to 6.25-12.5 mg to prevent tissue damage.

**Adults:**
- Nausea and vomiting: 12.5-25 mg IV/IM q4-6h as needed.
- Pre/postoperative sedation or analgesia: 25-50 mg IV/IM.
- Sedation during labour: 50 mg IV/IM in early labour or 25-75 mg IV/IM in established labour q4h prn. Maximum of 100 mg/24 hours during labour.
- Allergic disorders: 25 mg IV/IM, dose may be repeated in 2 hours prn.

**Pediatrics (only if 2 years old or older):**
- For sedation, analgesia and treatment of nausea/vomiting: 0.25-1.1 mg/kg/dose (not to exceed 25 mg) IV/IM q4-6h as needed. Use the lowest effective dose.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules between 15-30°C. Protect from light.
- Do not use solutions if discolouration (darker than slightly yellow) or if a precipitate is present.
- Compatible with NS, D5W, Ringer’s, RL and sodium lactate 1/6 M solutions.

**MISCELLANEOUS**
- Use in children younger than 2 years of age has been associated with potentially fatal risk of respiratory depression; do not use in this patient population.
- In children 2 years of age and older: avoid combining with other drugs that may also slow breathing.
- Contains sulfites.

**REFERENCES**
1, 4, 5, 40, 82, 95, 135, 366, 367.
INDICATIONS
- For induction and maintenance of general anesthesia.
- For sedation in critically ill, mechanically ventilated patients.
- For conscious sedation for surgical and diagnostic procedures.

ADMINISTRATION
- Shake gently before use.
- IV direct: physician only. RN may administer in patients on ventilator support.
- Continuous IV infusion: physician or RN. **Ventilator support.** Infuse undiluted or dilute only with D5W to a final concentration greater than 2 mg/mL. At TOH, use the ready-to-use vials of 10 mg/mL with no further dilution.
- Do NOT use filters with a pore size less than 5 microns as it may restrict the administration and/or cause the breakdown of the emulsion.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rare; anaphylactic/anaphylactoid reaction, rash, pruritus, erythema, angiodema.
- Cardiovascular: bradycardia; hypotension (10-30%) more frequent in elderly patients and those with pre-existing cardiovascular disease; flushing (especially in children).
- GI: nausea, vomiting.
- CNS: headache.
- Respiratory: apnea with large induction doses (2.5 mg/kg or greater), respiratory depression, cough, hypoxia.
- Renal: urine may turn green in some patients.
- Excitatory effects (e.g., spontaneous movements, twitching).
- Propofol infusion syndrome: may be fatal, includes metabolic acidosis, hyperkalemia, lipemia, rhabdomyolysis, hepatomegaly, cardiac failure, renal failure, especially with doses above 5 mg/kg/hr for longer than 48 hours.
- Local reactions: burning/stinging and pain occurs in 30% of cases when hand veins are used for injection and 5% when larger veins are used.

DOSAGE
Adults:
- Induction dose for general anesthesia:
  - In adults younger than 55 years of age, approximately 40 mg IV every 10 seconds until induction onset (usual adult dose 2-2.5 mg/kg IV).
  - In adults 55 years of age and older, debilitated or ASA class III or IV patients (American Society of Anesthesiology physical status classification of surgical patients), the total dose required is likely to be 1-1.5 mg/kg IV and should be given at a rate of approximately 20 mg IV every 10 seconds.
  - For cardiac anesthesia: approximately 20 mg IV every 10 seconds until induction onset (0.5-1.5 mg/kg IV).
  - For neurosurgical anesthesia: approximately 20 mg IV every 10 seconds until induction onset (1-2 mg/kg IV).
- Maintenance dose for general anesthesia:
  - In adults younger than 55 years of age: infusion of 6-12 mg/kg/hr IV (0.1-0.2 mg/kg/min IV) titrated to desired effect AND/OR intermittent bolus in increments of 25-50 mg IV as required.
  - In adults 55 years of age and older, debilitated or ASA class III or IV patients: infusion of 3-6 mg/kg/hr IV (0.05-0.1 mg/kg/min IV).

…/Cont.
### DOSAGE (Cont.)

- **ICU Sedation**: Initiate at 0.3 mg/kg/hr IV (0.005 mg/kg/min IV) and increase by increments of 0.3-0.6 mg/kg/hr IV (0.005-0.01 mg/kg/min IV) every 5-10 minutes. Most patients require IV infusions of 0.3-3 mg/kg/hr (0.005-0.05 mg/kg/min). Intermittent bolus doses of 10-20 mg IV prn if hypotension is not likely.

- **Conscious Sedation**:
  - In adults younger than 55 years of age, administer initial dose of 0.5-1 mg/kg IV over 3-5 minutes OR 6-9 mg/kg/hr IV (0.1-0.15 mg/kg/min IV) for 3-5 minutes; follow by maintenance IV infusion at 1.5-4.5 mg/kg/hr (0.025-0.075 mg/kg/min) titrated to desired effect OR give intermittent bolus doses of 10-15 mg IV prn.
  - In adults 55 years of age and older, debilitated, hypovolemic or ASA class III or IV patients, reduce initial dose by 20-30% then follow by maintenance IV infusion at 4-6 mg/kg/hr (0.066-0.1 mg/kg/min) titrated to desired effect.

**Pediatrics (3-18 years of age):**
- **General anesthesia**: Induction dose of 2.5 mg-3.5 mg/kg IV over 20-30 seconds (reduced dosage for patients of ASA class III or IV), followed by a maintenance IV infusion at 6-15 mg/kg/hr (0.1-0.25 mg/kg/min) titrated to desired effect.

### COMPATIBILITY, STABILITY

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Available as a white, oil in water emulsion. Store between 2-25°C; do not freeze.
- Use strict aseptic technique when handling propofol as the solution is susceptible to microbial contamination.
- Compatible with the following IV solutions when administered into a running line (Y-site compatibility): D5W, NS, RL, D5-RL, D5-1/2NS, D5-1/4NS.
- Infusion of propofol straight from the vial (with no further dilution) is stable for 12 hours after spiking; discard infusion and tubing after this time.
- Infusion of diluted propofol transferred from the original container is stable for 6 hours after dilution; discard infusion and tubing after this time.
- When diluted in D5W, more stable in a glass container than plastic (95% potency after 2 hours of running infusion in plastic).

### MISCELLANEOUS

- Recovery time is usually 10-30 minutes when discontinued, even after prolonged infusion.
- Contraindicated in patients with known hypersensitivity to egg or egg components.

### REFERENCES

1, 4, 5, 40, 82, 95, 135, 198, 366.
**INDICATIONS**

- In cardiac arrhythmias: supraventricular tachyarrhythmias, ventricular tachyarrhythmias, tachyarrhythmias associated with digitalis intoxication.
- Prevention of beta blockade withdrawal symptoms.
- Used in combination with alpha-blocking agents in the management of tachycardia induced by pheochromocytoma.
- In cardiac disturbances associated with thyrotoxicosis.
- In idiopathic hypertrophic subaortic stenosis.
- In hypertension and angina when oral route not feasible.

**ADMINISTRATION**

- IV direct: physician only for first dose, RN may administer subsequent doses; **cardiac monitoring; continuous BP monitoring**. Undiluted but preferably dilute each 1 mg in 10 mL of D5W or NS; inject at a maximum rate of 1 mg/min.
- Intermittent IV infusion: **cardiac monitoring; continuous BP monitoring**. Dilute in 50 mL of a compatible solution and administer over 10-30 minutes.
- Continuous IV infusion: **cardiac monitoring; continuous BP monitoring**. Dilute 15 mg in 250-500 mL of D5W; initial infusion rate of 2-3 mg/hr.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; rash, anaphylactic/anaphylactoid reactions, Stevens-Johnson syndrome, toxic epidermal necrolysis, exfoliative dermatitis, erythema multiforme, urticaria. Response to epinephrine may be greatly diminished.
- Cardiovascular: hypotension, syncope, shock, bradycardia, partial heart block, heart failure. (Antidote for severe bradycardia: atropine 0.25-1 mg IV).
- CNS: lightheadedness, dizziness, giddiness, confusion, drowsiness.
- Respiratory: bronchospasm, dyspnea, wheezing.
- Hyperglycemia and hypoglycemia; may also mask the signs and symptoms of hypoglycemia and of hypothyroidism.

**DOSAGE**

**Adults:**

- Arrhythmias - IV Direct: 1-3 mg IV, may repeat in 2-5 minutes, if necessary (total of 5 mg) OR 0.5-1 mg IV, may repeat prn, maximum of 0.1 mg/kg. Once response or maximum dose is achieved, additional doses may be given at intervals of no less than 4 hours.
- IV Infusion: 2-5 mg/hr IV have been used.
- For beta-blockade therapy when oral route is not feasible: IV infusion: 3 mg/hr (range 2-5 mg/hr).
- Thyrotoxicosis: 0.5-1 mg IV over 10 minutes; repeat q3h prn OR give subsequent doses of up to 3 mg IV over 15 minutes every several hours prn.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Protect from light and excessive heat. Do not freeze.
- Stable 24 hours at room temp in D5W, NS, dextrose-saline combinations and RL at concentrations of 0.5 and 20 mg/L in PVC and polyolefin containers.

.../Cont.
MISCELLANEOUS

- No standard conversion from PO to IV because of wide variance of bioavailability with oral route (16-60%) and first-pass metabolism by the liver.
- Contraindicated in patients with sinus bradycardia, uncompensated heart failure, cardiogenic shock, bronchial asthma and bronchospasm.
- Concomitant use of IV propranolol with IV diltiazem or with IV verapamil may cause significant cardiac depression; therefore, co-administration (within a few hours) is contra-indicated.

REFERENCES

1, 4, 5, 6, 40, 95, 135, 234, 235.
INDICATIONS
- To neutralize the anticoagulant activity of heparin in severe heparin overdosage, during extracorporeal circulation or dialysis procedures.
- To partially neutralize the anticoagulant activity of low molecular weight heparins (LMWH: dalteparin, enoxaparin, nadroparin, tinzaparin) in overdose situations.

ADMINISTRATION
- IV direct: physician or RN may give direct to a maximum dose of 50 mg; undiluted; inject at a maximum rate of 5 mg/min.
- Intermittent IV infusion: dilute with NS or D5W (at TOH, suggest 50 mL) and infuse at a maximum rate of 5 mg/min.
- Continuous IV infusion: dilute with NS or D5W (at TOH, suggest 250 mL) and infuse over 8-16 hours.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: urticaria, angioedema, anaphylaxis and anaphylactoid reactions.
- If too rapid injection or use of high doses of protamine: severe hypotension, bradycardia, dyspnea, pulmonary edema, pulmonary hypertension, transitory flushing and a feeling of warmth (may minimize these by administering drug slowly).
- Heparin "rebound" usually within 8-9 hours after protamine administration, may occur as heparin is released from the protamine-heparin complex or from extravascular compartments; additional protamine may be required.

DOSAGE
Heparin neutralization:
- Dose of protamine to administer depends on heparin dose, route of administration, time elapsed since heparin was given and blood coagulation results.
- No more than 50 mg should be administered in any 10 minute period.
- For heparin continuous IV infusion neutralization: after stopping the heparin IV infusion, administer 25-50 mg IV of protamine immediately.
- For heparin IV injection neutralization: because heparin disappears rapidly from circulation, the dose of protamine required also decreases rapidly with the time elapsed following the IV injection of heparin.

<table>
<thead>
<tr>
<th>Time elapsed since heparin injection</th>
<th>A few minutes</th>
<th>30-60 minutes</th>
<th>60-120 minutes</th>
<th>Greater than 120 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose of protamine to neutralize 100 units of heparin</td>
<td>1 mg IV</td>
<td>0.5-0.75 mg IV</td>
<td>0.375 mg-0.5 mg IV</td>
<td>0.25-0.375 mg IV</td>
</tr>
</tbody>
</table>

- For heparin SC injection neutralization: based on the ratio of 1-1.5 mg of protamine IV to neutralize 100 units of SC heparin, administer protamine 25-50 mg IV slowly over 10 minutes followed by the remainder of the calculated dose as an IV infusion over 8-16 hours (the expected absorption time of the SC heparin dose).
- For heparin neutralization during extracorporeal circulation: administer 1.5 mg IV of protamine for each 100 units of heparin administered; may also determine dose of protamine according to coagulation studies.

LMWH neutralization:
- Protamine partially neutralizes LMWH anti-Xa activity (to a maximum of 60-75%). Excess protamine administered may contribute to bleeding.
- Dose of protamine to administer depends on LMWH dose, time elapsed since the LMWH was given and blood coagulation results.
- No more than 50 mg as a single dose.
- Refer to the following tables for more specific recommendations (on next page).
DOSAGE (Cont.)

- **For enoxaparin:**

<table>
<thead>
<tr>
<th>Time elapsed since enoxaparin injection</th>
<th>8 hours or less</th>
<th>8-12 hours</th>
<th>Greater than 12 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose of protamine to neutralize 1 mg of enoxaparin</td>
<td>1 mg IV</td>
<td>0.5 mg IV</td>
<td>May not be required</td>
</tr>
</tbody>
</table>

Note: a second dose of protamine at an equivalent of 0.5 mg per 1 mg of enoxaparin may be administered IV if aPTT is still prolonged 2-4 hours after the first protamine dose or if bleeding continues.

- **For dalteparin, nadroparin and tinzaparin:**

<table>
<thead>
<tr>
<th>Time elapsed since LMWH injection</th>
<th>8 hours or less</th>
<th>Over 8 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose of protamine to neutralize 100 anti-Xa units of LMWH</td>
<td>1 mg IV</td>
<td>0.5 mg IV</td>
</tr>
</tbody>
</table>

Note: a second dose of protamine at an equivalent of 0.5 mg per 100 anti-Xa units of LMWH may be administered IV if aPTT is still prolonged 2-4 hours after the first protamine dose or if bleeding continues.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Do not freeze.
- Compatible with NS and D5W.

MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be available in case of acute hypersensitivity reaction.
- Onset of action - within 5 minutes.
- Use with caution in patients allergic to fish, if previous exposure to protamine (including exposure to protamine-containing insulin) and in infertile or vasectomized men (may have antiprotamine antibodies); pretreat with corticosteroids and antihistamines if there is a concern about a potential protamine allergy.

REFERENCES
1, 4, 5, 40, 135.
INDICATIONS

- To treat pyridoxine deficiency when the oral route is not feasible (generally preferable to give all B components instead of a single one).
- In the treatment of isoniazid, cycloserine, or hydrazine intoxication.
- For the treatment of poisoning from mushrooms of the genus Gyromitra.
- For treatment of pyridoxine-dependent seizures in neonates or infants.

ADMINISTRATION

- IV direct: physician only; undiluted; inject at a rate not exceeding 50 mg/min.
- Intermittent IV infusion: dilute in a compatible solution; rate as per Dosage section.
- IM.
- SC.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity.
- CNS: seizures (if IV administration of very large doses), headache, ataxia, somnolence, sensory neuropathy (after chronic administration of large doses).
- Folate deficiency.
- Local reactions: burning and stinging at injection site with IM and SC administration.

DOSAGE

- Pyridoxine deficiency: 10-20 mg IV/IM/SC daily for 3 weeks. Doses up to 600 mg per day may be needed for pyridoxine dependency syndrome.
- For isoniazid overdose (greater than 10 g): pyridoxine dose equal to amount of isoniazid ingested. Generally, 1-4 g is given by IV at a rate of 0.5-1 g/min; may repeat every 5-10 minutes prn OR follow by 1 g IM every 30 minutes until entire dose is given.
- For cycloserine overdose: 300 mg/day IV. Higher doses may be required.
- For hydrazine overdose: 25 mg/kg; give 1/3 of the dose IM and rest by IV infusion over 3 hours.
- For Gyromitra mushrooms poisoning: 25 mg/kg IV infused over 15-30 minutes, repeated as needed to a maximal dose of 15-20 g daily.
- Treatment of pyridoxine-dependent seizures in neonates or infants: 10-100 mg IV/IM.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Protect from light. Do not freeze.
- Compatible with D5W, NS, RL, sodium lactate 1/6 M.
- Incompatible with alkaline solutions, iron salts and oxidizing agents.

MISCELLANEOUS

REFERENCES
1, 4, 5, 40, 82, 95, 135.

Full revision 2017
**INDICATIONS**

- Treatment of severe and complicated malaria due to *Plasmodium falciparum*.
- Treatment of non-complicated malaria in patients unable to take oral therapy.

**ADMINISTRATION**

- Intermittent IV infusion (preferred): for loading dose: dilute dose in 100 mL of D5W or NS (at TOH, dilute in D5W) and infuse over 30 minutes. For maintenance dose: dilute dose in 10 mL/kg of D5W or NS (at TOH, dilute in 500 mL of D5W) and administer over 2-4 hours. Must be administered by an infusion pump.
- IM: only if IV administration is not possible.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash.
- Cardiovascular: cardiac conduction disturbances, hypotension.
- GI: nausea, vomiting, abdominal pain, diarrhea.
- Cinchonism: tinnitus, nausea, vertigo, headache, disturbed vision.
- Hemolysis (rare), hypoprothrombinemia, hypoglycemia.
- Local reactions: with IM use: pain, local irritation at injection site.

**DOSAGE**

**Note:** Loading dose not recommended if patient received quinine or quinidine within the preceding 24 hours, mefloquine within the preceding 2 weeks, or IV quinine for non-severe malaria in a patient who cannot tolerate oral therapy.

- Loading dose: quinine dihydrochloride 7 mg/kg (quinine base 5.8 mg/kg) IV, immediately followed by maintenance dose.
- Maintenance dose: quinine dihydrochloride 10 mg/kg (quinine base 8.3 mg/kg) IV, repeated q8h until the patient can swallow and no longer meets criteria for severe malaria. Reduce quinine maintenance dose by one-third to one-half in patients requiring more than 48 hours of IV therapy.
- IM: (only if IV route is not possible) quinine dihydrochloride 10 mg/kg (quinine base 8.3 mg/kg) IM q8h.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules at room temp. Protect from light.
- Compatible with D5W and NS.

**MISCELLANEOUS**

- Switch to oral therapy as soon as possible; minimum of 24 hours of IV quinine if treating severe malaria.
- Quinine dihydrochloride 20 mg = quinine base 16.7 mg.

**REFERENCES**

5, 97, 134, 208

* Available via Health Canada’s Special Access Programme through the Canadian Malaria Network
INDICATIONS
- Treatment of vancomycin-resistant Enterococcus faecium (VREF) infections refractory to other antiinfectives.
- Treatment of complicated skin and skin structure infections in adults caused by Staphylococcus aureus (methicillin sensitive) and Streptococcus pyogenes.

ADMINISTRATION
- Reconstitute immediately before use. Reconstitute by slowly injecting 5 mL of D5W or SWFI to prepare a solution of 100 mg/mL; gently swirl to mix; do NOT shake. Allow to sit for a few minutes until all foam disappears. Resulting solution should be clear.
- Intermittent IV infusion: within 30 minutes of reconstitution, further dilute dose in 250 mL of D5W for peripheral administration or in 100 mL of D5W for central line administration. If peripheral vein irritation occurs, can increase infusion volume to 500 or 750 mL of D5W, change the infusion site or use a central/PICC line. In all cases, infuse over 60 minutes. Flush infusion line with D5W before and after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus, angioedema, anaphylaxis.
- GI: diarrhea, vomiting, nausea.
- CNS: headache.
- Musculoskeletal: arthralgia, myalgia (may be alleviated by reducing dose frequency to q12h).
- Hepatic: elevated alkaline phosphatase, total and conjugated bilirubin, AST, ALT, gamma glutamyl transferase.
- Metabolic: elevated lactate dehydrogenase (LDH).
- Local reactions: venous irritation, pain, burning, inflammation, edema, thrombophlebitis, thrombosis.

DOSAGE
- VREF infections: 7.5 mg/kg IV q8h.
- Skin/skin structure infections: 7.5 mg/kg IV q12h.
- Dosage in renal impairment: no dosage adjustment is necessary.
- Dosage in hepatic impairment: dosage reduction may be required for patients with hepatic cirrhosis, but exact recommendations are not available.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store unreconstituted vial in the fridge; stable for 7 days at room temp.
- Reconstituted solution is stable for only 30 minutes.
- Diluted infusion solution stable for 5 hours at room temp or 54 hours in the fridge. Do not freeze.
- Compatible with D5W.
- Incompatible with NS and heparin.

MISCELLANEOUS
- Vial contains 500 mg of freeze-dried powder composed of quinupristin 150 mg/dalfopristin 350 mg.
- Quinupristin/dalfopristin is a strong inhibitor of cytochrome P450 3A4; monitor for any drug interaction with concomitant medications.

REFERENCES
1, 4, 40, 95,135. * Available via Health Canada’s Special Access Programme

Full revision 2018
RABIES VACCINE

**INDICATIONS**
- Pre-exposure and post-exposure vaccinations against rabies in all age groups.

**ADMINISTRATION**
- Reconstitute vaccine with 1 mL of the diluent provided (SWFI). Mix gently to avoid foaming. RabAvert ® vaccine is prepared under negative pressure; after reconstitution, disconnect syringe from the needle to allow vacuum to exhaust. Do NOT create positive pressure (e.g., by injecting air into the vial) as this may interfere with withdrawal of the reconstituted solution.
- IM: into the deltoid muscle (never the gluteal area); for small children and infants, administer into the anterolateral upper thigh.
- Do NOT administer the rabies vaccine in the same syringe or at the same site as the rabies immune globulin.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis.
- GI: nausea, abdominal pain.
- CNS: headache, dizziness.
- Myalgia, malaise.
- Lymphadenopathy.
- Local reactions: erythema, swelling, induration, pain, itching.

**DOSAGE**
- Pre-exposure vaccination: a) primary immunization: a total of 3 doses – 1 mL IM on days 0, 7 and 21 (or anytime between days 21 to 28). b) booster immunization: if high risk of exposure continues, 1 mL IM every 2-5 years depending on serological test.
- Post-exposure vaccination: a) previously unvaccinated individuals: a total of 5 doses – 1 mL IM on days 0, 3, 7, 14 and 28; to begin as soon as possible after exposure; to administer after and at a distant site from the rabies immune globulin. b) previously immunized individuals: a total of 2 doses – 1 mL IM on days 0 and 3; rabies immune globulin should not be given in this case.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 2-8°C. Protect from light. Imovax ® Rabies: do not use if frozen.
- The reconstituted vaccine should be used immediately.
- Reconstituted Imovax ® Rabies is clear or slightly opalescent, red to purplish red suspension.
- Reconstituted RabAvert ® is a clear to slightly opalescent, colourless to slightly pink solution.

**MISCELLANEOUS**
- Epinephrine must be available in case of acute hypersensitivity reaction.
- The rabies vaccine is an inactivated vaccine.
- Imovax ® Rabies: contains trace amounts of neomycin.
- RabAvert ®: contains trace amounts of neomycin, chlortetracycline, amphotericin B, chicken proteins and bovine gelatin.

**REFERENCES**
1, 5, 31, 135.
INDICATIONS
- Treatment of advanced colorectal cancer.

ADMINISTRATION
- Reconstitute each 2 mg vial with 4 mL SWFI to obtain a 0.5 mg/mL solution.
- Intermittent IV infusion: dilute in 50-250 mL of NS or D5W; infuse over 15 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- GI: nausea, vomiting, diarrhea.
- Hematologic: leukopenia.
- Hepatic: increased LFTs.
- Flu-like symptoms: fever, chills, cramps, arthralgia, myalgia.
- Dermatologic: rash.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Antidote: leucovorin 25 mg/m² IV q6h until resolution of symptoms.

DOSAGE
- 3 mg/m² IV repeated every 3 weeks.
- Dose reductions are recommended for subsequent treatment based on toxicity observed on previous treatment. WHO Grade 3 hematological toxicity or WHO Grade 2 GI toxicity: hold until complete recovery then continue at a dose reduced by 25%.
- WHO Grade 4 hematological toxicity or WHO Grade 3 GI toxicity: hold until complete recovery then continue at a dose reduced by 50%.
- WHO Grade 4 GI toxicity: discontinue treatment.
- WHO Grade 4 hematological toxicity with WHO Grade 3 GI toxicity: discontinue treatment.
- Once a dose reduction has been made, all subsequent doses should be given at the reduced dose level.
- Dosage in renal impairment:
  - CrCl (mL/min): Greater than 65 65-55 54-25 less than 25
  - Dose: 100% 75% % equivalent to CrCl in mL/min (e.g., if 30 mL/min, give 30% of the dose) discontinue
  - Interval: 3 weeks 4 weeks 4 weeks ---
- Dosage in hepatic impairment: 100% of the dose if WHO grade 1 or 2 liver impairment; use with extreme caution if WHO grade 3 (no data) and do not use if grade 4 liver impairment.
- Consult specific protocol.
OTHER NAMES
Tomudex ®

CLASSIFICATION
Antineoplastic

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-25°C. Protect from light.
- Reconstituted solution is stable for 24 hours at room temp but it is recommended to store it in the fridge to avoid bacterial contamination.
- Diluted solution is stable for 24 hours at room temp.

MISCELLANEOUS

- Concomitant folic acid, leucovorin (folinic acid) or vitamin preparations containing these agents may reduce the efficacy of raltitrexed; avoid immediately before or during raltitrexed administration.

REFERENCES

5, 129, 165.
INDICATIONS

- As monotherapy or in combination with paclitaxel for the treatment of advanced or metastatic gastric cancer or gastro-esophageal junction adenocarcinoma with disease progression on or after prior platinum and fluoropyrimidine chemotherapy.
- In combination with irinotecan, leucovorin and fluorouracil for the treatment of metastatic colorectal cancer with disease progression on or after prior therapy with bevacizumab, oxaliplatin and a fluoropyrimidine.
- In combination with docetaxel for the treatment of metastatic non-small cell lung cancer (NSCLC) with disease progression on or after platinum-based chemotherapy.

ADMINISTRATION

- Ensure premedication has been administered as recommended; refer to Dosage section.
- Intermittent IV infusion (mandatory): dilute total dose in NS to obtain a final volume of 250 mL using one of the following 2 methods:
  1) withdraw from a 250 mL NS bag a volume equal to the drug volume required for the patient’s dose, then add the patient's dose (from the 10 mg/mL vials) to the NS bag; OR
  2) transfer the required amount of drug volume to an empty IV container and add NS to obtain a final volume of 250 mL.

Gently invert container to mix; do NOT shake. Administer over approximately 60 minutes at a maximum rate of 25 mg/min with an in-line protein-sparing 0.2-0.22 micron filter. Flush line with NS after administration. When given on the same day as other agents for chemotherapy, infuse ramucirumab first.

POTENTIAL ADMINISTRATION HAZARDS

- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus.
- Infusion-related reactions: chills, rigors, tremor, back pain/spasms, chest pain/tightness, dyspnea, wheezing, hypoxia, bronchospasm, paresthesia, flushing, supraventricular tachycardia, hypotension; usually with first or second infusion. If mild to moderate reaction, treat with dexamethasone and reduce ramucirumab infusion rate by 50% (as well as for subsequent infusions). If reaction is severe, discontinue treatment.
- Cardiovascular: hypertension: can be severe, in such case temporarily withhold product until BP is controlled, otherwise discontinue treatment; peripheral edema, CHF, arterial thromboembolism (including myocardial infarction, cardiac arrest, cerebrovascular accident/ischemia).
- GI: diarrhea, stomatitis, abdominal pain, GI hemorrhage, GI perforation (rare), fistula formation, intestinal obstruction.
- CNS: headache, reversible posterior leukoencephalopathy syndrome (rare).
- Hematologic: neutropenia, leukopenia, thrombocytopenia.
- Hepatic: deterioration of patients with cirrhosis (e.g., encephalopathy, ascites, hepatorenal syndrome).
- Renal: proteinuria, nephrotic syndrome. Consult manufacturer’s recommendations as may require dose adjustment or treatment discontinuation.
- Impairment of wound healing, hypothyroidism, fatigue, asthenia, epistaxis, hypoalbuminemia, hyponatremia.

DOSAGE

- Premedication with IV diphenhydramine prior to each ramucirumab administration. If previous mild to moderate infusion-related reaction, also premedicate with dexamethasone (or equivalent) and acetaminophen.
- Gastric cancer: monotherapy: 8 mg/kg IV every 2 weeks; in combination with paclitaxel: 8 mg/kg IV on days 1 and 15 of each 28-day cycle, to administer before paclitaxel infusion.
- Colorectal cancer: 8 mg/kg IV every 2 weeks.
- NSCLC: 10 mg/kg IV on day 1 of each 21-day cycle.

.../Cont.
RAMUCIRUMAB

Cyramza ®

Antineoplastic, Monoclonal antibody

DOSAGE (Cont.)

- Dosage in renal impairment: no adjustment required when CrCl is 15 mL/min or greater; no data available below 15 mL/min.
- Dosage in hepatic impairment: no adjustment in patients with mild or moderate impairment (abnormal AST or total bilirubin up to 3 x ULN); no data in case of severe impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light. Do not freeze. Do not shake. Solution in vials should be clear to slightly opalescent and colourless to slightly yellow.
- Diluted solution is stable for 24 hours in the fridge and 4 hours at room temp in NS. Do not freeze. Do not shake.
- Compatible with NS; do not mix with other IV solutions.
- Incompatible with D5W.

MISCELLANEOUS

- Medications for the treatment of infusion-related reactions (e.g., acetaminophen, antihistamines, corticosteroids) should be available for immediate use in the event of a reaction.
- Monitor for proteinuria at baseline and before each cycle, and thyroid function at baseline and every 2-3 cycles.
- As the product interferes with the wound healing process, hold ramucirumab prior to scheduled surgery until the wound is fully healed. Discontinue if wound healing complications occur.

REFERENCES

1, 5, 129, 135, 165, 208.
### RaNIITidine

**INDICATIONS**

- Treatment of intractable duodenal ulcers.
- Prevention of upper GI hemorrhage and stress ulcers.
- Treatment of Zollinger-Ellison syndrome and other hypersecretory states.
- Prevention of acid aspiration syndrome during general anesthesia (Mendelson’s syndrome).
- Adjunct therapy for anaphylaxis (not as monotherapy, not as first-line treatment).
- In TPN solutions to decrease volume and chloride content of gastric secretions.
- When oral therapy is not possible.

**ADMINISTRATION**

- **IV direct:** physician or RN. Dilute each 50 mg dose to 20 mL with NS or D5W and inject over at least 5 minutes. Concentration should not exceed 2.5 mg/mL. At TOH: 50 mg dose can be mixed to 10 mL with NS or D5W and be given over 3 minutes.
- **Intermittent IV infusion:** dilute 50 mg in 50-100 mL of NS or D5W and give over at least 15-20 minutes.
- **Continuous IV infusion:** dilute 150 mg in 250 mL of NS or D5W or use a more concentrated solution no greater than 2.5 mg/mL. Infuse as directed (refer to Dosage section).
- **IM.**
- **SC (palliative care).**

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, angioedema, bronchospasm, fever, eosinophilia, anaphylaxis.
- Cardiovascular: bradycardia with rapid IV injection.
- GI: abdominal pain, constipation, diarrhea, nausea, vomiting.
- CNS: headache.
- Local reactions: burning, itching.

**DOSAGE**

**Adults:**

- **Usual dose:** 50 mg IM/IV q6-8h. Usual maximum: 400 mg/day.
- **Prevention of upper GI hemorrhage and stress ulcers:** initial dose of 50 mg IV followed by a continuous IV infusion of 0.125-0.25 mg/kg/hr OR a continuous IV infusion of 6.25 mg/hr; OR 50 mg IV q6-8h.
- **Zollinger-Ellison syndrome or other hypersecretory conditions:** initiate continuous IV infusion at 1 mg/kg/hr. After 4 hours if gastric acid output is greater than 10 mEq/hr or if patient is still symptomatic, titrate dose upwards in increments of 0.5 mg/kg/hr to a maximum of 2.5 mg/kg/hr. Infusion rates as high as 220 mg/hr have been used.
- **Acid aspiration syndrome (Mendelson's syndrome):** 50 mg IM/IV 45 to 60 minutes before general anesthesia.
- **Adjunct therapy for anaphylaxis:** 50 mg IV.
- **TPN:** 70-100% of an average daily dose equally distributed over 24 hours and added to TPN solutions.
- **Dosage in renal impairment:** if CrCl less than 50 mL/min, reduce dose to 50 mg q12-24h.

**Pediatrics:**

- **Usual dose:** 2-4 mg/kg/day IV, divided q6-8h. Do not exceed 50 mg/dose. Usual maximum: 200 mg/day.
- **Adolescents 16 years of age and older can receive the dose IM or IV.**
- **Prevention of upper GI hemorrhage and stress ulcers:** 0.15-0.5 mg/kg/dose IV for 1 dose followed by 0.08-0.2 mg/kg/hr as a continuous IV infusion OR 2-6 mg/kg/day IV divided in 3-4 doses (maximum of 300 mg/day).
DOSE (Cont.)

- Zollinger-Ellison and other hypersecretory states: adolescents older than 16 years of age: 1 mg/kg/hr IV. After 4 hours, if gastric acid output is greater than 10 mEq/hr or if patient is still symptomatic, titrate dose upwards in increments of 0.5 mg/kg/hr to a maximum of 2.5 mg/kg/hr. Infusion rates as high as 220 mg/hr have been used.
- Adjunct therapy for anaphylaxis: 1 mg/kg/dose IV, maximum 50 mg/dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge or at room temp. Protect from light.
- Compatible with dextrose, saline and RL.
- Stable for 6 months at room temp (exposed to or protected from light) and in the fridge (protected from light) undiluted (25 mg/mL) when repackaged in glass vials.
- Stable for 28 days at room temp in NS and D5W at concentrations of 0.5 mg/mL, 1 mg/mL and 2 mg/mL in PVC bags.
- Stable for 92 days in the fridge in NS or D5W at a concentration of 1 mg/mL in PVC bags.
- Stable for 91 days in the fridge and 72 hours at room temp in bacteriostatic water for injection at a concentration of 2.5 mg/mL in polypropylene syringes.
- Stable for 91 days at room temp (exposed to or protected from light) and in the fridge (protected from light) in NS at a concentration of 5 mg/mL in polypropylene syringes.

MISCELLANEOUS

- Caution in patients with history of acute porphyria as it may precipitate attacks.

REFERENCES

1, 4, 5, 9, 40, 82, 95, 135, 143, 216, 284, 457.
RASBURICASE

**INDICATIONS**
- Prophylaxis and treatment of hyperuricemia in cancer patients.

**ADMINISTRATION**
- Reconstitute vials of 1.5 mg and 7.5 mg with 1 mL and 5 mL, respectively, of the provided diluent to obtain a concentration of 1.5 mg/mL. Gently swirl to mix. Do NOT shake.
- Intermittent IV infusion (mandatory): dilute further in 50 mL of NS; infuse over 30 minutes.
- Do NOT use a filter for infusion.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: rash, severe allergic reactions (bronchospasm, hypotension, urticaria), including anaphylaxis.
- GI: nausea, vomiting, diarrhea, constipation, mucositis, abdominal pain.
- CNS: headache.
- Hematologic: hemolysis, methemoglobinemia (rare).
- Fever.

**DOSAGE**
- Weight-based dosing (adults and pediatrics over the age of 1 month): 0.2 mg/kg IV once daily for up to 7 days.
- Fixed-dosing (adults only): 3 mg, 4.5 mg, 6 mg or 7.5 mg IV once; to repeat q24h once or twice if needed.
- Chemotherapy may be initiated as soon as 4 hours after the first dose.
- Dosing exceeding 7 days or greater than one course of treatment is not recommended.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge. Do not freeze. Protect from light.
- Reconstituted solution and solution further diluted in NS are stable for 24 hours in the fridge.
- Do not mix with any other solutions.

**MISCELLANEOUS**
- When collecting blood for uric acid analysis, use a pre-chilled tube containing heparin anticoagulant. Immerse immediately in an ice water bath. A pre-cooled centrifuge (4°C) should be used to prepare the plasma samples; the samples should be maintained in the ice water bath and analysed for uric acid within 4 hours. This is to avoid rapid breakdown of uric acid in blood sample and falsely lowered level results.
- Contraindicated in patients with Glucose-6-phosphate dehydrogenase (G6PD) deficiency.
- Standard medical practice for the management of plasma uric acid in patients at risk for tumour lysis syndrome should be followed.

**REFERENCES**
1, 4, 5, 40, 95, 377, 378.
INDICATIONS
- As an analgesic during the induction and maintenance of general anesthesia.

ADMINISTRATION
- Reconstitute vial with 1 mL of a compatible diluent per 1 mg of remifentanil to obtain a concentration of 1 mg/mL. Shake well.
- IV direct: physician only; dilute to a final concentration of 20, 25, 50 or 250 mcg/mL; inject over 30-60 seconds.
- Continuous IV infusion: dilute to a final concentration of 20, 25, 50 or 250 mcg/mL; infusion rate as per Dosage section.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cardiovascular: hypotension, bradycardia.
- GI: nausea, vomiting.
- CNS: headache.
- Dermatologic: pruritus.
- Respiratory: respiratory depression, apnea.
- Muscle rigidity.

DOSAGE
- Induction of anesthesia: 0.5-1 mcg/kg/min IV. If patient is to be intubated within 8 minutes of the start of remifentanil infusion, an initial dose of 1 mcg/kg IV may be given over 30-60 seconds.
- Maintenance of anesthesia when combined with other agents: 0.05-2 mcg/kg/min IV. Infusion rate may be titrated upward in 25% to 100% increments or downward in 25% to 50% decrements every 2-5 minutes. Supplemental IV boluses of 0.5-1 mcg/kg may be given every 2-5 minutes if needed. For infusion rates greater than 1 mcg/kg/min, consider increasing doses of concomitant anesthetics to increase the depth of anesthesia.
- Dosage in renal impairment: no dosage adjustment is necessary.
- Dosage in hepatic impairment: no dosage adjustment is necessary.
- Dosage in obese patients: calculate dose based on ideal body weight.
- Dosage in geriatric patients: reduce starting dose by 50% then titrate to effect.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp or in the fridge.
- Reconstituted solution is stable for 24 hours at room temp. Compatible with SWFI.
- Stable for 24 hours at room temp in D5W, NS, 1/2NS, D5-NS and D5-RL at a concentration of 20-250 mcg/mL.
- Stable for 4 hours at room temp in RL at a concentration of 20-250 mcg/mL.

MISCELLANEOUS
- Analgesic effect stops within 5 to 10 minutes of discontinuation of remifentanil but respiratory depression can continue for up to 30 minutes due to residual effects of concomitant anesthetics.
- Risk of intraoperative awareness when used with propofol at infusion rates of less than 75 mcg/kg/min in patients under 55 years of age.

REFERENCES
4, 5, 40, 95.
INDICATIONS
- To prevent the formation of antibodies to Rh\(_{(D)}\) factor in unsensitized Rh\(_{(D)}\)-negative women with an Rh-incompatible pregnancy: 1) fetus/baby is Rh\(_{(D)}\) positive or unknown or 2) father is Rh\(_{(D)}\) positive or unknown.
- To prevent alloimmunization in Rh\(_{(D)}\)-negative female child or female of childbearing age transfused with Rh\(_{(D)}\)-positive red blood cells or blood components with Rh\(_{(D)}\) red blood cells.
- To increase the platelet count and to control bleeding in Rh\(_{(D)}\)-positive patients with immune thrombocytopenic purpura (ITP).

DO NOT administer the product in ITP patients:
1) with ITP secondary to other conditions including leukemia, lymphoma, or active viral infections with EBV (Epstein-Barr virus) or HCV (hepatitis C); 2) who are elderly with co-morbidities predisposing them to complications of acute hemolytic reaction (AHR); 3) with evidence of autoimmune hemolytic anemia (Evans Syndrome), systemic lupus erythematosus (SLE) or antiphospholipid antibody syndrome (APS); 4) who are IgA deficient; 5) who have antibodies to IgA or a history of IgA hypersensitivity; 6) who are Rh\(_{(D)}\) negative; 7) who are splenectomised.

ADMINISTRATION
- Allow vials to reach body or room temp prior to use.
- IV direct: physician or RN; undiluted; inject at a rate of 300 mcg (1500 international units) per 5-15 seconds. Can also dilute dose to 10 mL with NS and administer at the slower rate of 300 mcg (1500 international units) per minute.
- IM: into the deltoid, anterolateral aspect of the upper thigh; gluteral region NOT preferred.
- When used for the prevention of Rh immunization, observe patient for at least 20 minutes for the development of any adverse events.
- When used for ITP treatment, observe patient in a healthcare setting for a period of 8 hours for signs and symptoms of intravascular hemolysis. Urine dipstick testing for blood should be conducted before dosing and at 2, 4 and 8 hours after receiving the dose.
- Consult TOH Nursing policy 00045 (Blood and blood products – Administration of) for more information.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, anaphylactoid reaction.
- CNS: headache.
- Fever, chills.
- Risk of transmission of infectious agents, including viruses, and theoretically the Creutzfeldt-Jakob disease agent, cannot be completely eliminated as product is made from pooled human plasma.
- Local reactions: discomfort, swelling, induration, pruritus.

DOSAGE
Pregnancy and obstetric conditions:
- 300 mcg (1500 international units) IV/IM at 28-30 weeks gestation predelivery.
- 120 mcg (600 international units) IV/IM given within 72 hours of delivery (only if baby is Rh\(_{(D)}\) positive or unknown). If more than 72 hours has elapsed, dose should not be held; give as soon as possible, up to 28 days after delivery.
- 300 mcg (1500 international units) IV/IM within 72 hours of invasive procedures during pregnancy (e.g., amniocentesis or chorionic villus sampling); repeat every 12 weeks during pregnancy.
- 300 mcg (1500 international units) IV/IM within 72 hours of obstetric complications (e.g., miscarriage, abortion, threatened abortion, ectopic pregnancy or hydatidiform mole, transplacental hemorrhage).
DOSAGE (Cont.)

Transfusion: to administer within 72 hours after exposure of incompatible blood transfusion.
- IV administration: 9 mcg (45 international units)/mL of whole blood or 18 mcg (90 international units)/mL of red blood cells as per following schedule: administer 600 mcg (3000 international units) IV q8h until total dose is given.
- IM administration: 12 mcg (60 international units)/mL of blood or 24 mcg (120 international units)/mL of red blood cells as per following schedule: administer 1200 mcg (6000 international units) IM q12h until total dose is given.

ITP (IV treatment only):
- Initial dose: 50 mcg/kg (250 international units/kg) IV. If patient has a hemoglobin level between 80-100 g/L, use a dose of 25-40 mcg/kg (125-200 international units/kg). Initial dose may be divided in two and administered on separate days.
- Subsequent dose: 25-60 mcg/kg (125-300 international units/kg) IV. Frequency of dosing based on clinical response.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge. Do not freeze.
- Do not mix with other drugs.
- Compatible with NS.
- Not compatible with D5W.

MISCELLANEOUS

- Conversion: 1 mcg = 5 international units.
- For prophylaxis of Rh immunization, do not administer to: 1) the infant; 2) Rh(D)-positive individual; 3) Rh(D)-negative females who are Rh-immunized; 4) IgA-deficient patients; 5) patient with antibodies to IgA or history of IgA hypersensitivity.
- ITP: platelet count usually increases within 1-2 days with peak effect at 7 to 14 days. Response usually lasts for 30 days.
- Contains maltose; may give false elevated glucose readings with glucometers using glucose dehydrogenase pyrroloquinoline-quinone (GDH-PQQ) or glucose-dye-oxidoreductase methods for testing.

REFERENCES
1, 2, 5, 40, 95, 135, 136.
**INDICATIONS**

- Treatment of tuberculosis when oral route is not possible.
- Treatment of leprosy, brucellosis, *Mycobacterium avium* complex and staphylococcal infections.
- Treatment of asymptomatic carriers of *Neisseria meningitidis* when oral route is not possible.

**ADMINISTRATION**

- Reconstitute each 600 mg vial with 10 mL of SWFI. Swirl gently until dissolved.
- Intermittent IV infusion (mandatory): dilute in 500 mL of D5W or NS and infuse over 3 hours (preferred). Can also dilute in 100 mL of D5W or NS; infuse over 30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: flu-like syndrome, pruritus, urticaria, rash, Stevens-Johnson syndrome, toxic epidermal necrolysis, anaphylaxis (rare).
- GI: nausea, vomiting, diarrhea, abdominal cramps.
- Hematologic: thrombocytopenia, purpura, hemolytic anemia, leukopenia.
- Hepatic: increased LFTs.
- Metabolic: elevations of serum urea and uric acid.
- Body fluids and excrements may be coloured red-orange. May permanently stain soft contact lenses.
- Local reactions: irritation and inflammation if extravasation.

**DOSAGE**

Dose depends on type of infection. Refer to specialized infectious diseases references. Oral and intravenous doses are the same. Switch to oral therapy as soon as possible.

**Adults:**
- Usual dose: 600 mg IV daily given in one or divided doses.
- Severe acute infections: 900-1200 mg IV daily. Higher doses are usually divided in 2-3 doses.

**Pediatrics:**
- 10-20 mg/kg/day IV in 1-2 divided doses, up to a maximum of 600 mg daily.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Reconstituted solution is stable for 24 hours at room temp.
- Stable for 24 hours at room temp diluted in 250-500 mL of D5W and in 500 mL of NS. Note that this stability is specific to the product from France; recommendations for products from other countries may be different.

**MISCELLANEOUS**

- Resistance to rifampin monotherapy develops rapidly; therefore, it should be used in combination with other agents for most infections.

**REFERENCES**

1, 4, 5, 6, 40, 95, 135, 271. *Available via Health Canada’s Special Access Programme*
INDICATIONS

- Treatment of schizophrenia and related psychotic disorders.

ADMINISTRATION

- Prepare the dose immediately prior to administration as described in the manufacturer’s directions. Allow kit to reach room temp for at least 30 minutes prior to reconstitution. Use only the diluent, syringe and needles provided in the kit for reconstitution and administration.
- Just before injection, resuspend by vigorous shaking of the syringe.
- IM: in the gluteal muscle using the 2-inch needle, alternating between the 2 buttocks OR in the deltoid muscle using the 1-inch needle, alternating between the 2 arms. The two sites are bioequivalent and therefore interchangeable.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rare; anaphylaxis, angioedema, rash, hives, dyspnea, hypotension.
- Cardiovascular: hypotension.
- GI: dyspepsia, constipation, dry mouth.
- CNS: somnolence, headache, dizziness, extrapyramidal symptoms.
- Fatigue, weight gain, pain in the extremities.
- Local reactions: redness, swelling, induration.

DOSAGE

- 25 to 50 mg IM every 2 weeks.
- Initial dose may be reduced to 12.5 mg IM in patients with hepatic or renal impairment, or to minimize drug interactions.
- Before starting IM risperidone, it is recommended to initiate therapy with oral risperidone to assess tolerability.
- Oral risperidone should be continued for the first 3 weeks following the first injection of IM risperidone which will then take effect.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store kit in the fridge. Protect from light.
- Kit can be stored for no more than 7 days at room temp not exceeding 25°C.
- Reconstituted dose is stable for 6 hours at temperatures below 25°C.

MISCELLANEOUS

- Extended-release suspension.

REFERENCES

1, 5, 95.
**INDICATIONS**
- Treatment of low-grade or follicular, CD20 positive, B-cell non-Hodgkin’s lymphoma (NHL).
- Treatment of CD20 positive, diffuse large B-cell NHL.
- Treatment of patients with previously untreated or previously treated B-cell chronic lymphocytic leukemia (CLL), Binet Stage B or C, in combination with fludarabine and cyclophosphamide.
- In combination with methotrexate to reduce signs and symptoms in adult patients with moderately to severely active rheumatoid arthritis who have had an inadequate response or intolerance to one or more tumour necrosis factor inhibitor therapies.
- In combination with corticosteroids for the induction of remission in adult patients with severely active anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis, including, granulomatosis with polyangiitis (GPA, also known as Wegener’s granulomatosis) and microscopic polyangiitis (MPA).

**ADMINISTRATION**
- **Ensure premedication has been administered prior to each IV infusion or SC injection. Refer to Dosage section.**
- **Ensure that the appropriate formulation (IV or SC) will be administered to the patient as prescribed.**
- **Consider holding antihypertensive agents for 12 hours prior to and during rituximab administration as rituximab may cause transient hypotension.**
- Intermittent IV infusion (mandatory): dilute dose in NS or D5W to a final concentration of 1 to 4 mg/mL. To avoid foaming, invert the bag gently to mix solution.
- At TOH, follow specific infusion rates from physician’s medication orders (rates ordered in mL/hr).
  - **First infusion:** start IV infusion at 50 mg/hr. If no hypersensitivity or infusion-related events occur then increase rate in 50 mg/hr increments every 30 minutes, to a maximum of 400 mg/hr. If reactions occur, stop or slow down the infusion temporarily and notify physician. Once patient improves, restart at half the previous infusion rate.
  - **Subsequent Infusions:** If patient tolerated the first infusion without adverse effects, start IV infusion at 100 mg/hr. Increase rate in 100 mg/hr increments every 30 minutes, to a maximum of 400 mg/hr as tolerated.
  - **Subsequent infusions – Alternative for rheumatoid patients only:** if patient did not experience a serious reaction from the previous infusion and has no significant cardiovascular disease, 250 mL of a 4 mg/mL solution can be administered as follows: 125 mg IV in the first 30 minutes (62.5 mL/hr) and 875 mg IV over the next 90 minutes (150 mL/hr), for a total infusion time of 120 minutes. If well tolerated, this method can be used for the subsequent infusions.
  - **Subsequent infusions – Alternative for NHL only:** In patients who had no reactions to the first dose, with steroid-containing chemotherapy and have no significant cardiovascular disease, more rapid infusions have been used safely as follows: mix dose in 250 mL NS and administer over a total infusion time of 90 minutes, giving 20% of the dose in the first 30 minutes then the remaining 80% over 60 minutes.
  - **For patients with NHL or CLL:** infusion rate may be decreased or dose split over 2 days for any cycle in patients with bulky disease or over 25 x 10⁹ circulating malignant cells.
  - **SC injection (using the SC formulation):** for non-Hodgkin’s lymphoma and CLL, for second or subsequent cycles if patient was able to receive the full rituximab IV infusion dose during first cycle. Inject SC into the abdominal wall over approximately 5 minutes for a 1400 mg dose (NHL) and over approximately 7 minutes for a 1600 mg dose (CLL). Rotate injection sites. Observe patient for at least 15 minutes (or longer in patients with an increased risk of hypersensitivity reactions) following SC injection.
  - Consult specific protocol.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis; usually with the second or subsequent doses.
POTENTIAL ADMINISTRATION HAZARDS (Cont.)

- Infusion-related reactions: occur in most patients during the first dose of rituximab and tend to decrease with subsequent infusions. Caution, as some of these reactions have been fatal. Reactions generally occur within 30 minutes to 2 hours but could be delayed until 24 hours after the start of infusion and include: fever, rigors, chills, urticaria, rash, pruritus, angioedema, hypotension, flushing. Severe respiratory reactions can occur within 1-2 hours of starting the first infusion and include: dyspnea, bronchospasm, hypoxia, pulmonary infiltrates or edema, acute respiratory failure. If any severe reaction occurs, the infusion should be stopped and a physician notified immediately. Premedication (acetaminophen, diphenhydramine, corticosteroids) may reduce frequency and severity of infusion-related reactions; refer to Dosage section.
- Cardiovascular: hypertension, hypotension, arrhythmia.
- GI: nausea, vomiting, constipation, diarrhea, abdominal pain. Complaints of abdominal pain require investigation.
- Respiratory: rhinitis, cough, wheezing, pneumonitis. Refer also to infusion-related reactions.
- Tumour lysis syndrome (hyperuricemia, hyperkalemia, hypocalcemia, hyperphosphatemia, acute renal failure, elevated lactate dehydrogenase, fever) occurs rarely and usually within 1-2 hours after the first dose, but may be delayed until 12-24 hours after the infusion.
- Headache, myalgia, arthralgia, pain at disease site, fatigue, flu-like symptoms.
- Increase in serum IgM which can lead to hyperviscosity of blood in patients with Waldenstrom’s macroglobulinemia.
- Progressive multifocal leukoencephalopathy (PML) (rare).
- Possible reactivation of tuberculosis or hepatitis B virus in seropositive patients.
- Dermatologic: rash, rare but severe mucocutaneous reactions including Stevens-Johnson syndrome, lichenoid dermatitis, vesiculobullous dermatitis, toxic epidermal necrolysis and paraneoplastic pemphigus.
- Local reactions (with SC administration): pain, swelling, induration, hemorrhage, erythema, pruritus, rash at injection site. Can occur more than 24 hours after SC administration. Usually resolve within 1-2 days without treatment.

DOSAGE

- Premedication with acetaminophen and diphenhydramine is mandatory. In rheumatoid arthritis patients, methylprednisolone 100 mg IV 30 minutes before the administration of rituximab is also recommended to decrease rate and severity of acute infusion reactions. In lymphoma and leukemic patients, premedication with corticosteroids should also be considered, particularly if rituximab is not given in combination with steroid-containing chemotherapy.

Non-Hodgkin’s lymphoma:
- Low grade or follicular NHL:
  - Induction treatment: as a single agent: 375 mg/m² IV infusion once weekly for 4 doses. In combination with CVP (cyclophosphamide, vincristine, prednisolone) or CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone) chemotherapy: 375 mg/m² IV infusion every 3 weeks for 6-8 cycles administered as an IV infusion on day 1 of each chemotherapy cycle after IV administration of the corticosteroid component of CVP or CHOP. If patient was able to receive the first full IV infusion dose, may use for subsequent cycles 1400 mg SC injection on day 1 of each cycle after administration of the corticosteroid component of the chemotherapy for a total of 8 cycles, including the IV infusion cycle.
  - Maintenance treatment: in previously untreated patients with advanced high-tumour burden follicular lymphoma after complete or partial response to induction treatment: 375 mg/m² IV infusion every 8 weeks for a maximum of 12 doses or 1400 mg SC injection once every 2 months until disease progression or for a maximum period of 2 years. For relapsed or refractory patients after response to induction treatment: 375 mg/m² IV infusion every 3 months or 1400 mg SC injection once every 3 months until disease progression or for a maximum period of 2 years.

.../Cont.
### DOSAGE (Cont.)

- **Diffuse large B-cell NHL:** in combination with CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone): 375 mg/m² IV infusion every 3 weeks for 6-8 cycles, administered on day 1 of each chemotherapy cycle after IV administration of the corticosteroid component of CHOP. The other components of CHOP should be given after rituximab. If patient tolerated the IV infusion on day 1 of first cycle, may give 1400 mg SC injection on day 1 of each chemotherapy cycle, after administration of the corticosteroid component of the chemotherapy if applicable. Total of 8 cycles.

- **CLL in combination with fludarabine and cyclophosphamide:**
  - Cycle 1: 375 mg/m² IV infusion on day 1.
  - Cycles 2-6: 500 mg/m² IV infusion on day 1 OR if patient tolerated the IV infusion on day 1 of first cycle, may give 1600 mg SC on day 1 of each chemotherapy cycle after administration of the corticosteroid component of the chemotherapy, if applicable.

- **Rheumatoid arthritis:**
  - Usual dose: 1000 mg IV infusion on days 1 and 15, for a total of 2 doses.
  - Retreatment: not well established; patients may receive other courses of treatment (2 infusions per course), with an interval of 16-24 weeks between courses.

- **ANCA-associated vasculitis (GPA and MPA):**
  - 375 mg/m² IV infusion once a week for 4 weeks in combination with methylprednisolone 1000 mg IV for 1-3 days followed by daily oral prednisone 1 mg/kg/day (maximum of 80 mg/day).

- Consult specific protocol.

### COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

#### IV formulation:
- Store vials in the fridge. Protect from light.
- Stable for 24 hours in the fridge and for an additional 24 hours at room temp in D5W at a concentration of 1-4 mg/mL in PVC and polyethylene bags.
- Stable for 30 days in the fridge and for an additional 24 hours at room temp (30°C or lower) in NS at a concentration of 1-4 mg/mL in PVC and polyethylene bags.

#### SC formulation:
- Store vials in the fridge. Protect from light. Do not freeze.
- Stable for 48 hours in the fridge and subsequent 8 hours at 30°C in diffused daylight once SC solution is transferred from the vial into the syringe.

### MISCELLANEOUS

- Epinephrine, antihistamines, corticosteroids and salbutamol nebulizers should be available for the treatment of hypersensitivity reactions for both IV and SC administration.
- Do not administer live viral vaccines while on rituximab; may administer inactivated vaccines but response rate to vaccination may be reduced.

### REFERENCES

1, 4, 5, 40, 95, 129, 135, 143, 165.
**INDICATIONS**

- Adjunct to general anesthesia to facilitate both rapid sequence and routine endotracheal intubation, and to provide skeletal muscle relaxation during surgery or mechanical ventilation.

**ADMINISTRATION**

- **IV direct:** physician trained in anesthesiology. RN may administer subsequent doses; **ventilator support, cardiac monitoring.** Undiluted or diluted in SWFI; given as a rapid injection over 5-15 seconds.
- **Continuous IV infusion:** **ventilator support, cardiac monitoring.** Dilute in a compatible solution at concentrations up to 5 mg/mL; refer to Dosage section for administration rate.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: angioedema, urticaria, rash, anaphylactic/anaphylactoid reactions.
- Cardiovascular: arrhythmia, abnormal ECG, tachycardia, hypertension, hypotension.
- Respiratory: prolonged respiratory insufficiency and apnea lasting beyond the required time period.
- Histamine release not clinically significant following usual doses.
- Local reactions: pain, edema.

Antidote: anticholinesterase agents such as neostigmine or edrophonium, in conjunction with an anticholinergic agent such as atropine.

**DOSAGE**

- **Rapid sequence intubation:** 0.6-1.2 mg/kg IV.
- **Routine endotracheal intubation:**
  - Initial dose: 0.6 mg/kg IV (range 0.45-2 mg/kg).
  - Maintenance dose: 0.1-0.2 mg/kg/dose IV (usually required 15-85 minutes after a 0.6 mg/kg dose). Repeat doses based on neuromuscular activity or use a continuous IV infusion of 0.01-0.012 mg/kg/min and titrate dose to desired effect (usual maintenance rate: 0.004-0.016 mg/kg/min).
- Obese patients: calculate dose using actual body weight if body mass index is 40 kg/m² or less; if body mass index is greater than 40 kg/m², may use ideal body weight.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge. Do not freeze. Unopened vials may be stored for 18 months at room temp (15-30°C).
- Punctured vials must be used within 30 days.
- Stable 24 hours at room temp in D5W, NS, D5-NS, RL and SWFI at concentrations up to 5 mg/mL in plastic bags and glass bottles.
- Incompatible with alkaline solutions.

**MISCELLANEOUS**

- Effect is dependent on dose.
- After a 0.6 mg/kg dose:
  - Onset: 1 minute (range: 0.4-6 minutes).
  - Duration: 31 minutes (range 15-85 minutes).

**REFERENCES**

1, 5, 6, 40, 95, 135, 208, 511.
**INDICATIONS**
- Treatment of relapsed/refractory peripheral T-cell lymphoma in patients who are not eligible for transplant and have received at least one prior systemic therapy.

**ADMINISTRATION**
- Reconstitute each 10 mg vial by injecting slowly 2.2 mL of the supplied diluent (note that each diluent vial contains 2.4 mL i.e., 0.2 mL overfill) into the vial to obtain a solution of 5 mg/mL. Swirl the vial until there are no more visible particles. The reconstituted solution will be slightly viscous.
- Intermittent IV infusion: withdraw from the vial the exact dose needed and inject into a 500 mL bag of NS. Infuse over 4 hours.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rare; rash.
- Cardiovascular: hypotension, tachycardia, edema, QT interval prolongation, venous thromboembolism.
- GI: nausea, vomiting, abdominal pain, diarrhea, constipation, anorexia, dysgeusia, dyspepsia, mucositis.
- CNS: headache, dizziness.
- Electrolyte disturbances: especially hypokalemia and hypomagnesemia.
- Hematologic: anemia, neutropenia (leading to infections), thrombocytopenia, bleeding.
- Hepatic: elevation of liver enzymes, hyperbilirubinemia.
- Respiratory: cough, dyspnea.
- Asthenia, fatigue, pyrexia, musculoskeletal pain.
- Hyperuricemia, tumour lysis syndrome.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- 14 mg/m² IV on days 1, 8, 15 of a 28-day cycle.
- Dosage may be reduced to 10 mg/m² IV if patient experiences some toxicity; refer to manufacturer’s instructions for more details.
- Dosage in renal impairment: no dosage adjustment; caution in patients with end-stage renal disease as no data.
- Dosage in liver impairment: use with caution as there is no data if total bilirubin is above 1.5 times the ULN.
- Missed dose: administer as soon as possible, except when within 5 days of next scheduled dose.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Stores vials at room temp.
- The reconstituted solution (5 mg/mL) is stable for 8 hours at room temp.
- The diluted solution is stable for 24 hours at room temp in NS when stored in PVC, polyethylene, ethylene vinyl acetate or glass containers.

**MISCELLANEOUS**
- Monitor potassium and magnesium levels at baseline and before each cycle.
- Avoid concurrent use with strong CYP3A4 inhibitors or inducers; use with caution with other drugs that can prolong QT interval.

**REFERENCES**
5, 129, 165.
INDICATIONS
- To increase platelet counts in adults with chronic immune thrombocytopenic purpura who have not responded adequately to corticosteroids, immunoglobulins, or surgical splenectomy and are at risk of bleeding.

ADMINISTRATION
- Reconstitute vials of 250 mcg and 500 mcg with 0.72 mL and 1.2 mL, respectively, of SWFI to obtain a final concentration of 500 mcg/mL. Gently swirl to mix. Do NOT shake.
- SC.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: angioedema, rash.
- GI: dyspepsia, diarrhea, nausea, abdominal pain.
- CNS: headache, dizziness, insomnia, paresthesia, confusion.
- Hematologic: bruising, epistaxis, bleeding, increased bone marrow reticulin (risk for bone marrow fibrosis), thrombosis (with excessive increase in platelet count). Thrombocytopenia and serious bleeding have occurred upon termination of treatment.
- Respiratory: nasopharyngitis, upper respiratory infection.
- Fatigue, arthralgia, myalgia, pain in shoulder and extremities.
- Antibody production to romiplostim.

DOSAGE
- 1 mcg/kg (actual body weight) SC once weekly. Adjust dose using actual body weight at start of treatment to maintain a platelet count greater or equal to 50 X 10^9/L:
  - Platelet count less than 50 X 10^9/L: increase dose by 1 mcg/kg every 1-2 weeks.
  - Platelet count greater than 200 X 10^9/L for 2 consecutive weeks: decrease dose by 1 mcg/kg every 2 weeks.
  - Platelet count greater than 400 X 10^9/L: hold therapy. Once platelet count is less than 200 X 10^9/L, resume romiplostim with a dose reduction of 1 mcg/kg.
- Maximum dose: 10 mcg/kg/week.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials in the fridge. Protect from light. Do not freeze.
- Reconstituted solution is stable for 24 hours at room temp or in the fridge, protected from light.

MISCELLANEOUS
- Complete blood counts including platelet counts should be monitored: prior to start of therapy, weekly during dose adjustment, monthly after stable platelet count (greater or equal to 50 X 10^9/L) for at least 4 weeks without dose adjustment, and weekly for at least 2 weeks upon discontinuation.
- Peripheral blood smears should be evaluated prior to start therapy then monthly for morphological changes once a stable dose has been established.

REFERENCES
1, 5, 95.

Full revision 2018; limited revision 2019
INDICATIONS
- Local or regional anesthesia and analgesia.

ADMINISTRATION
- Local infiltration, major nerve block (e.g., brachial plexus block), epidural block.
- Epidural (for analgesia): continuous infusion and intermittent bolus administration; nurses may not administer epidural boluses unless using an infusion pump and following Unit policy.

POTENTIAL ADMINISTRATION HAZARDS
- Cardiovascular: hypotension, bradycardia, fetal bradycardia.
- GI: nausea, vomiting.
- CNS: headache, paresthesia.
- Backache.
- Pruritus.

DOSAGE
- Surgical anesthesia: major nerve block: 35-50 mL of the 5 mg/mL solution. Local infiltration: 1-40 mL of the 5 mg/mL solution.
- Analgesia: epidural using the 2 mg/mL solution: 6-14 mL/hr as a continuous infusion or 10-15 mL as intermittent boluses. Up to 770 mg ropivacaine administered over 24 hours and up to 28 mg/hr for 72 hours have been well tolerated in adults when used for postoperative pain.
- Refer to manufacturer’s monograph for more specific dosing information.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store at room temp. Do not freeze.
- Stable for 30 days at 30°C in the dark in NS at a concentration of 1-2 mg/mL when mixed with fentanyl (1-10 mcg/mL), sufentanil (0.4-4 mcg/mL), morphine (20-100 mcg/mL) or clonidine (5-50 mcg/mL) in polypropylene infusion bags.
- Compatible with NS.
- Incompatible with alkaline solutions.

MISCELLANEOUS
- Amide-type anesthetic.
- Contraindicated for IV regional anesthesia (Bier block) and in obstetric paracervical block anesthesia.
- Do not use for the production of retrobulbar block or spinal anesthesia (subarachnoid block) due to insufficient data to support such use.

REFERENCES
4, 5, 95, 135, 143.
SALBUTAMOL  
Albuterol, Ventolin®  
Bronchodilator

### INDICATIONS
- Treatment of severe bronchospasm associated with chronic bronchitis and bronchial asthma.
- Treatment of status asthmaticus.

### ADMINISTRATION

**Adults:**
- Continuous IV infusion (mandatory): **cardiac monitoring**; withdraw 5 mL (5 mg) from the ampoule and dilute in 500 mL of D5W, NS or dextrose-saline to obtain a final concentration of 10 mcg/mL (0.01 mg/mL).

**Pediatrics:**
- Intermittent IV infusion (loading dose): **cardiac monitoring**; dilute in a convenient volume and infuse over 5 to 10 minutes.
- Continuous IV infusion (maintenance dose): **cardiac monitoring**; dilute to get a final concentration of 200 mcg/mL (0.2 mg/mL).

### POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, angioedema, oropharyngeal edema, bronchospasm, hypotension, collapse, anaphylaxis.
- Cardiovascular: palpitations, tachycardia.
- CNS: headache.
- Fine muscle tremor, muscle cramps.
- Hypokalemia (can be severe).
- Hyperglycemia in patients with diabetes mellitus; NS admixture may be preferable.

### DOSAGE

**Adults:**
- Continuous IV infusion: 5 mcg/min initially, increase prn to 10 mcg/min and 20 mcg/min at 15-30 minutes intervals. Usual range: 3-20 mcg/min, though higher doses have been used.

**Pediatrics:**
- Loading dose: child 1 month-1 year: 5 mcg/kg IV, followed by maintenance dose.  
  child 2-17 years: 15 mcg/kg (maximum 250 mcg), followed by maintenance dose.  
- Maintenance dose: 1 month-17 years: 1-2 mcg/kg/min, adjust dose according to response and heart rate; can increase rate up to 5 mcg/kg/min.

### COMPATIBILITY, STABILITY
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store ampoules at room temp. Protect from light.
- The solution in ampoules is clear and the colour can vary from colourless to pale straw.
- Stable for 24 hours at room temp and in the fridge in NS, D5W and RL at a concentration of 10 mcg/mL.
- Stable for 24 hours at room temp in dextrose-saline solutions at a concentration of 10 mgc/mL.

### MISCELLANEOUS
- Monitor serum potassium and glucose during therapy.

### REFERENCES
4, 5, 95, 109, 113, 170, 208.

Full revision 2018
SCOPOLAMINE HYDROBROMIDE

INDICATIONS
- Adjunct to anesthesia to produce sedation and amnesia, to reduce salivary and respiratory secretions, and to prevent other cholinergic effects during surgery.
- For relief of nausea and vomiting.
- To reduce upper airway secretions, including “death rattle”, or for sedation in palliative care patients.

ADMINISTRATION
- IV direct: physician or RN. Dilute with an equal volume or 10 mL of SWFI. Give over 2-3 minutes.
- IM, SC.
- SC infusion (palliative care). Dilute with SWFI, NS or D5W.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, angioedema, anaphylaxis.
- Cardiovascular: tachyarrhythmia, tachycardia, palpitations. Paradoxical bradycardia with low doses (less than 0.5 mg).
- GI: dry mouth, constipation.
- CNS: sedation, amnesia. Agitation, confusion and delirium with higher doses and in the elderly.
- Ophthalmic: blurred vision, mydriasis, increased intraocular pressure.
- Renal: urinary retention.

DOSAGE
Adults:
- Perioperative use: 0.3-0.65 mg IV/IM/SC. May repeat 3-4 times daily.
- Antiemetic: 0.6-1 mg SC.
- In palliative care patients:
  • To reduce upper airways secretions: 0.2-0.8 mg SC q2-4h prn.
  • Death rattle caused by excessive secretions: 0.3-0.8 mg IV/SC q2-8h prn OR 0.4 mg SC, followed with 1.2 mg/24 hours continuous SC infusion with repeat 0.4 mg SC prn.
  • Sedation: 0.3-0.8 mg IV/SC q2-4h.

Pediatrics:
- 0.006 mg/kg (6 mcg/kg) or 0.2 mg/m² IV/IM/SC repeated q6-8h prn. Maximum of 0.3 mg/dose.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules and vials at room temp. Protect from light. Do not freeze.
- Incompatible with alkaline solutions.

MISCELLANEOUS

REFERENCES
1, 2, 4, 5, 82, 95, 135, 256, 318, 457.

Full revision 2018; limited revision 2019
# Selenium

## Indications
- Prevention or treatment of selenium deficiency in patients receiving total parenteral nutrition (TPN).

## Administration
- Continuous IV infusion: must be added to IV TPN solution.

## Potential Administration Hazards
- Unlikely to occur at recommended dosages and dilution.
- Local reactions: irritation and phlebitis when administered undiluted.

## Dosage
- **Prevention of deficiency:**
  - Adults: 60-100 mcg/day IV.
  - Pediatrics: 2 mcg/kg/day IV.
- **Treatment of deficiency:** higher doses may be required.
- Dosage in renal impairment: use with caution as selenium retention may occur.
- Dosage in GI malfunction: use with caution as selenium retention may occur.

## Compatibility, Stability
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp. Do not freeze.
- Stable 24 hours in TPN.

## Miscellaneous
- Various components of TPN may be contaminated with multiple trace elements, including selenium, which can significantly add to total intake.
- Routine monitoring of selenium blood levels is suggested as a guideline for administration. Range for plasma levels: 78-157 ng/mL, whole blood levels: 70-229 ng/mL.

## References
1, 5, 82, 135, 512.

Full revision 2018
INDICATIONS

- Treatment of patients with multicentric Castleman’s disease who are human immunodeficiency virus (HIV)-negative and human herpes virus-8 (HHV-8)-negative.

ADMINISTRATION

- Consider premedication if patient previously experienced an infusion-related reaction.
- Bring vials to room temp for approximately 30 minutes. Using a syringe with a 21-gauge 1-1/2 inch needle, reconstitute 100 mg and 400 mg vials with 5.2 mL and 20 mL of SWFI, respectively, to obtain a concentration of 20 mg/mL. Gently swirl (do NOT shake) until complete dissolution (should take less than 60 minutes). Do NOT use if foreign particles and/or solution is discoloured or visibly opaque.
- Intermittent IV infusion: withdraw from a 250 mL D5W bag (PVC, polyethylene, polypropylene or polyolefin) a volume equal to the volume of reconstituted drug required for the patient’s dose, then slowly add the required volume of reconstituted drug into this bag. Gently mix. Administer over 60 minutes using infusion sets lined with PVC, polyurethane or polyethylene containing a 0.2-micron in-line polyethersulfone (PES) filter.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, pruritus, anaphylaxis.
- Infusion-related reactions: pruritus, erythema, chest pain, nausea, vomiting, flushing, palpitations, back pain.
- Upon resolution of mild to moderate reactions, restart at a slower infusion rate and **consider premedication** with antihistamines, acetaminophen and/or corticosteroids; if infusion is still not tolerated, discontinue.
- Cardiovascular: hypertension, peripheral edema, hot flashes.
- GI: nausea, vomiting, abdominal pain, diarrhea, constipation, GI perforation (rare).
- CNS: headache, peripheral neuropathy.
- Endocrine and metabolic: elevation of triglycerides, cholesterol, uric acid; decrease of electrolytes: K, Na, Ca, Mg.
- Hematologic: myelosuppression, elevated hemoglobin.
- Hepatic: elevation of LFTs.
- Renal: elevation of creatinine.
- Fever, musculoskeletal pain, fatigue.

DOSAGE

- 11 mg/kg IV every 3 weeks until treatment failure.
- Dose administration may be delayed based on results from hematology lab tests done on a regular basis (absolute neutrophil count, platelet count and hemoglobin); refer to manufacturer’s monograph for specific retreatment criteria. Consider delaying treatment until retreatment criteria are met; dose reduction is not recommended.
- Dosage in renal impairment: CrCl 15 mL/min and greater: no dosage adjustment required; if CrCl less than 15 mL/min: not studied.
- Dosage in hepatic impairment: mild to moderate impairment (Child Pugh class A or B): no dosage adjustment required; severe impairment (Child Pugh class C): not studied.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge; protect from light. Do not freeze.
- Reconstituted solution with SWFI is stable for 2 hours at room temp. Do not refrigerate.
- Diluted solution is stable for 6 hours at room temp in D5W in PVC, polyethylene, polypropylene or polyolefin bags. Do not refrigerate.

MISCELLANEOUS

- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be kept near the patient when drug is administered.
- Live attenuated vaccines should not be given concurrently with siltuximab or within the 4 weeks prior to initiating siltuximab as clinical safety has not been established.

REFERENCES

1, 5, 40, 95, 129, 135, 165.
SINCALIDE
Cholecystokinin C-terminal octapeptide, Kinevac™

**INDICATIONS**
- To stimulate gallbladder contraction for diagnostic imaging or for bile sampling.
- To stimulate pancreatic secretion for duodenal aspirate sampling.
- To stimulate intestinal motility for the relief of postoperative ileus or to accelerate the transit of a barium meal during examination of the intestinal tract.

**ADMINISTRATION**
- Reconstitute 5 mcg vial with 5 mL of SWFI to obtain a 1 mcg/mL solution.
- IV direct: physician or RN; undiluted; inject over 30-60 seconds.
- Intermittent IV infusion:
  - for 0.12 mcg/kg dose: dilute with 100 mL NS.
  - for 0.02 mcg/kg/dose: dilute with 30 mL NS.
- IM.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity.
- GI: nausea, abdominal pain or discomfort, urge to defecate. More common with rapid IV administration.
- Decreasing the infusion rate can lessen the incidence of adverse reactions.
- Local reactions: pain at injection site (rare).

**DOSAGE**

**Gallbladder stimulation:**
- 0.02 mcg/kg IV direct; if satisfactory contractions do not occur within 15 minutes, a dose of 0.04 mcg/kg IV direct may be administered OR 0.12 mcg/kg IV infusion over 50 minutes OR 0.1 mcg/kg IM.

**Pancreas stimulation:**
- 0.02 mcg/kg IV infusion over 30 minutes; when used in combination with secretin, start sincalide administration 30 minutes after the initiation of the secretin infusion.

**Intestinal stimulation:**
- For postoperative ileus: 0.04 mcg/kg IV direct; additional dose of 0.04 or 0.08 mcg/kg q4h may be administered prn (maximum of 5 doses).
- For the acceleration of a barium meal: when the barium meal is beyond the proximal jejunum, administer sincalide 0.04 mcg/kg IV direct; if satisfactory contractions do not occur within 30 minutes, administer another 0.04 mcg/kg dose IV direct; OR 0.12 mcg/kg IV infusion over 30 minutes.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Reconstituted solution is stable for 8 hours at room temp or 24 hours in the fridge.
- Diluted solutions should be used within 60 minutes of mixing.

**MISCELLANEOUS**
- Caution in pregnancy; may induce premature labour.

**REFERENCES**
1, 5, 95, 135, 208.
SODIUM BICARBONATE

INDICATIONS

- Treatment of metabolic acidosis.
- Advanced cardiac life support during cardiac arrest in certain circumstances (e.g., pre-existing metabolic acidosis, hyperkalemia, tricyclic antidepressant overdose, prolonged cardiac arrest).
- Adjunct in the treatment of hyperkalemia-induced cardiotoxicity.
- Treatment of cardiotoxic effects from drug overdoses involving sodium channel blockade.
- Alkalization of urine in cases of drug overdoses (e.g., salicylates) or to prevent nephrotoxicity caused by contrast media, chemotherapy (e.g., methotrexate) or by heme pigments.

ADMINISTRATION

- IV direct: physician or RN in emergency situations only; use the 8.4% solution in adults and children 2 years of age and older, and the 4.2% solution in children less than 2 years old; inject over 1-5 minutes. Do not use if solution is unclear or contains a precipitate.
- Intermittent IV infusion (preferred): dilute in NS or D5W. Flush IV tubing before and after administration. Do not use if solution is unclear or contains a precipitate.
- SC: if IV route is not available. Must be diluted with a compatible solution to obtain an isotonic 1.5% solution (e.g., dilute each mL of the 8.4% solution with 4.6 mL of NS).

POTENTIAL ADMINISTRATION HAZARDS

- Alkalosis (hyperirritability, tetany) if injected too quickly, with high doses or in patients with renal impairment (Antidote: calcium gluconate or ammonium chloride).
- Electrolyte disturbances: hypokalemia, hypocalcemia, hyperosmolality and hypernatremia if injected too quickly or with high doses.
- Cardiovascular: peripheral edema, CHF exacerbation due to sodium and water retention.
- CNS: decreased cerebrospinal fluid pressure and intracranial haemorrhage with the rapid administration (above 0.33 mmol/kg/hr) of the 8.4% solution in children less than 2 years of age.
- Respiratory: pulmonary edema.
- Local reactions: pain, irritation, phlebitis.

DOSAGE

Adult:

- Metabolic acidosis: usual initial dose of 2-5 mmol/kg IV infused over 4 to 8 hours. Do not exceed 50 mmol/hr. Administer subsequent doses prn. Full correction should not be attempted during the first 24 hours because of the risk of delayed compensation and alkalosis.
- Cardiac arrest: 1 mmol/kg initially (1 mL of 8.4% solution per kg of body weight) IV direct over 5 minutes, then 0.5 mmol/kg IV direct at 10 minute intervals prn.
- Hyperkalemia-induced cardiotoxicity: 50-100 mmol IV direct over 5 minutes, repeat as needed.
- Overdose cardiotoxic effects: 1-2 mmol/kg IV direct over 1-2 minutes, repeat dose prn depending on patient’s acid-base status.
SODIUM BICARBONATE

Baking soda, NaHCO₃, Sodium acid carbonate, Sodium hydrogen carbonate

CLASSIFICATION
Alkalinizing agent

DOSAGE (Cont.)

- Alkalinization of urine:
  - Usual: 100-150 mmol mixed in 1000 mL of D5W administered at an IV infusion rate of 150-200 mL/hr (urinary pH target of 7-8).
  - Prevention of renal dysfunction associated with contrast media:
    - Remove 150 mL from a 1000 mL bag of D5W then add 150 mL from vials of 8.4% solution (150 mmol) to the bag to obtain a concentration of 150 mmol/1000 mL; administer IV at a rate of 3 mL/kg/hr for 60 minutes prior to the contrast injection, at 1 mL/kg/hr during the contrast exposure and for 6 hours post procedure.
    - At TOH: add 150 mmol in 1000 mL D5W and infuse IV at a rate of 3 mL/kg/hr for 60 minutes prior to the procedure followed by 1.5 mL/kg/hr (maximum 150 mL/hr) for 4 hours post procedure.

Pediatrics:
- Metabolic acidosis: Full correction should not be attempted during the first 24 hours because of the risk of delayed compensation and alkalosis.
  - Children less than 2 years old: initial dose of 1-2 mmol/kg IV direct over at least 2 minutes; maximum of 8 mmol/kg/day and maximum rate 10 mmol/min.
  - Children 2 years of age and older: initial dose of 2-5 mmol/kg IV infused over 4 to 8 hours, not exceeding 1 mmol/kg/hr. Administer subsequent doses prn.
- Cardiac arrest: initial dose of 1 mmol/kg IV direct over at least 2 minutes (maximum rate of 10 mmol/min); may administer additional doses of 0.5 mmol/kg IV every 10 minutes prn.
- Dosage in renal impairment: use with caution as sodium content may induce sodium and water retention.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Do not freeze. Protect from excessive heat.
- Compatible with NS and dextrose solutions.
- Incompatible with acids, acidic salts, many alkaloidal salts and RL.
- Sodium bicarbonate inactivates catecholamines (e.g., epinephrine, norepinephrine, dobutamine) and precipitates when mixed with calcium.
- Stable for 7 days at room temp (exposed to light) or 21 days in the fridge (unexposed to light) or frozen (-20°C, unexposed to light) in D5W at concentrations of 0.1 mmol/mL or 0.15 mmol/mL in polyolefin bags.

MISCELLANEOUS

- 8.4% sodium bicarbonate = 84 mg/mL of sodium bicarbonate = 1 mmol (1 mEq) of sodium bicarbonate per mL = 1 mmol (1 mEq) each of sodium and bicarbonate ions per mL.

REFERENCES
1, 2, 4, 5, 40, 95, 102, 135, 159, 220, 321, 328, 366, 367.

Full revision 2018
SODIUM CHLORIDE, HYPERTONIC 3%

INDICATIONS
- Treatment of acute or symptomatic hypotonic hyponatremia or when high sodium and/or chloride content without large amounts of fluid is/are required (e.g., electrolyte and fluid loss replaced with sodium-free fluids, excessive water intake resulting in drastic dilution of body water, emergency treatment of severe salt depletion, Addisonian crisis, diabetic coma).
- Treatment of intracranial hypertension (intracranial pressure greater than 20 mmHg) after traumatic brain injury.

ADMINISTRATION
- Intermittent IV infusion: see Dosage section for details.
- Continuous IV infusion: administer half of calculated dose over 8 hours. Infuse at a rate that corrects the serum sodium concentration by approximately 1 mmol/L/hr, with a maximum correction of serum sodium concentration of 8-10 mmol/L/24 hours and to less than 18 mmol/L in 48 hours (see Dosage section for calculations). Do not exceed a maximum of 100 mL/hr. Must be administered via an infusion pump.
- Infuse in a large vein.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Due to sodium excess: edema, pulmonary edema, hypertension, hyperchloremic acidosis, deep respiration, disorientation, nausea, weakness, potassium loss.
- A too rapid correction of sodium deficit can result in osmotic demyelination syndrome with resultant severe brain injury and potentially death.
- Local reactions: phlebitis. Local pain and venous irritation with too-rapid infusion; decrease rate for tolerance.

DOSAGE
- Hyponatremia with severe symptoms:
  - Intermittent IV infusion using one of the following 2 methods: 1) give 150 mL or 2 mL/kg IV over 20 minutes, then check serum sodium concentration (SSC) after 20 minutes and repeat dose 2-3 times prn until SSC increase of 5 mmol/L; OR 2) give 100 mL IV over 10 minutes; repeat twice prn at 30 minute intervals until SSC increases by 4-6 mmol/L. Note: 100 mL should increase SSC by about 2 mmol/L.
  - If symptoms have not improved despite an increased SSC of 5 mmol/L in the first hour, start a continuous IV infusion aiming for a SSC increase of 1 mmol/L/hr; check SSC every 4 hours and stop infusion when the first of the following occurs: 1) symptoms improve, 2) the SSC increases by 10 mmol/L, or 3) SSC reaches 130 mmol/L.
- Hyponatremia with moderately severe symptoms: single intermittent IV infusion of 150 mL over 20 minutes. Target of a SSC increase of 5 mmol/L/24 hr. Check SSC after 1, 6 and 12 hours.
- Hyponatremia with mild to moderate symptoms and a low risk of brain herniation:
  - If acute decrease in SSC greater than 10 mmol/L: give 150 mL intermittent IV infusion over 20 minutes and check SSC after 4 hours.
  - Otherwise, give a continuous IV infusion at a rate of 0.5-2 mL/kg/hr.
DOSAGE (Cont.)

- May also use the following equations in hyponatremia:
  - To determine the total amount of sodium required (mmol) to be administered:
    \[
    \text{[desired serum sodium concentration (mmol/L) – actual serum sodium concentration (mmol/L)] x weight (kg) x BWF*.}
    \]
  - To determine the rate of continuous IV infusion, the following is to estimate the effect of 1 litre of NaCl 3% administered to a patient:
    \[
    \text{[weight in kg x BWF* + 1]}
    \]
  * BWF = bodyweight fraction = 0.6 for nonelderly males; 0.5 for elderly males; 0.5 for nonelderly females; 0.45 for elderly females.

- For intracranial hypertension after brain injury:
  - Intermittent IV infusion: 250-300 mL IV over 20 minutes; to repeat dose until intracranial pressure is controlled or a serum sodium level of 155 mmol/L is achieved.
  - Continuous IV infusion: initial rate of 1-2 mL/kg/hr.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp.

MISCELLANEOUS

- A litre of NaCl 3% contains 513 mmol of sodium and of chloride.

REFERENCES

1, 5, 40, 95, 135, 325, 332, 341, 343, 349, 367.
INDICATIONS
- For maintenance of catheter patency of vascular access devices (VAD), as an alternative to heparin.

ADMINISTRATION
- IV direct: fill up the VAD catheter with sodium citrate 4% slowly over 5-10 seconds.

POTENTIAL ADMINISTRATION HAZARDS
- No adverse reactions have been reported when used as indicated.

DOSAGE
- Dose according to size of catheter lumen; range from 1 to 5.5 mL.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store between 15 and 30°C. Protect from direct light.
- The solution should be colourless and clear.

MISCELLANEOUS
- Monitor serum levels of ionized calcium, magnesium and arterial pH.
- Do not use the hemodialysis catheter as a conduit for sampling blood as sodium citrate can contaminate blood samples.

REFERENCES
5, 43, 361, 372.

Full revision 2018
SODIUM STIBOGLUCONATE *

**INDICATIONS**
- Treatment for visceral, cutaneous, and mucocutaneous leishmaniasis.

**ADMINISTRATION**
- **IV direct**: physician or RN. Undiluted, slowly at a rate of 2-3 mL/min, over at least 5 minutes. Discontinue immediately if cough, vomiting or substernal pain occurs.
- **Intermittent IV infusion**: dilute in 50-100 mL of D5W and infuse over 10-30 minutes.
- **Continuous IV infusion**: dilute in 1000 mL of D5W; infuse over 24 hours.
- Solution must be filtered with a sterile filter of 5 microns or less immediately before use, such as using an in-line filter.
- **IM**: when IV administration is not possible.

**POTENTIAL ADMINISTRATION HAZARDS**
- **Hypersensitivity**: rash, anaphylactic shock.
- **Cardiovascular**: QT interval prolongation, T-wave flattening or inversion, arrhythmia (dose and duration dependent effect; can be fatal).
- **GI**: nausea, vomiting, anorexia, diarrhea, abdominal pain.
- **CNS**: headache, lethargy.
- **Hematologic**: reduction in platelets, white blood cells and hemoglobin.
- **Hepatic**: increase in liver enzymes; discontinue if hepatotoxicity.
- **Respiratory**: cough.
- **Severe inflammation around mucocutaneous lesions**: corticosteroids may be used in life threatening pharyngeal or tracheal involvement.
- **Arthralgia, myalgia, malaise**.
- **Increase in amylase, lipase**: pancreatitis.
- **Local reactions**: pain with or without abscess-like swelling at site of IM injection; pain and thrombophlebitis with IV administration; minimize by administration through a fine needle.

Antidote: In case of overdose, dimercaprol 200 mg IM q6h until recovery, can be used.

**DOSAGE**
- **Cutaneous leishmaniasis**: 20 mg/kg/day IV/IM for 20 days (varies from 10 to 28 days).
- **Visceral or mucocutaneous leishmaniasis**: 20 mg/kg/day IV/IM for at least 28 days.
- **Dosage in renal impairment**: avoid use if CrCl is less than 50 mL/min.
- **Dosage in hepatic impairment**: use with caution.

**COMPATIBILITY, STABILITY**
*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*
- Store vials at room temp up to 25°C. Do not freeze. Protect from light.
- Stable 1 month after first puncture.

**MISCELLANEOUS**
- Sodium stibogluconate injection contains the equivalent of 100 mg/mL pentavalent antimony.
- Cardiac monitoring recommended before and during therapy.

**REFERENCES**
3, 5, 95, 135, 200, 373.

* Available via Health Canada’s Special Access Programme

Full revision 2018
INDICATIONS
- Treatment of acute and severe cyanide poisoning.
- Prevention of nitroprusside-induced cyanide toxicity.
- Treatment of calciphylaxis also called “calcific uremic arteriolopathy” (systemic medial calcification of the arterioles).
- Treatment of mechlorethamine extravasation.

ADMINISTRATION
- IV direct (preferred) (for cyanide poisoning): physician only; **blood pressure monitoring**; administer undiluted slowly over at least 10 minutes. Administer immediately after sodium nitrate injection in the same IV line.
- Intermittent IV infusion (for cyanide poisoning): **blood pressure monitoring**; dose may be diluted in D5W and administered over 10-30 minutes. Administer immediately after sodium nitrate injection in the same IV line.
- IV direct/SC (for mechlorethamine extravasation): prepare a 4% (1/6M) solution by mixing 1.6 mL of a 25% solution with 8.4 mL SWFI; either 1) inject dose of 2.5 mL into existing IV line immediately after extravasation and preferably through the same needle to ensure injection is in the extravasated area OR 2) inject 2 mL SC into the extravasated area for each mg of mechlorethamine suspected to have extravasated.
- Intermittent IV infusion (for calciphylaxis): administer undiluted over 30-60 minutes; may dilute in 100 mL of NS and administer over 30-60 minutes (note that the sodium content needs to be taken into consideration, e.g., a 25 g dose diluted in 100 mL of NS will yield 4.8 g of sodium). (Note: at TOH, administer undiluted and infuse through the hemodialysis catheter, only when the patient is in the dialysis unit; infuse initial doses over 3-4 hours to minimize nausea and vomiting; may infuse subsequent doses at a higher rate based on patient’s tolerance).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity.
- Cardiovascular:  hypotension; reduce administration rate if significant.
- GI:  nausea, vomiting; reduce administration rate if significant. Salty taste.
- CNS:  headache, disorientation.
- Electrolyte disturbances:  hypernatremia with large doses.
- Hematologic:  prolonged bleeding time.
- Renal:  diuresis, hypovolemia.
- Metabolic acidosis.
- Muscle cramps.

DOSAGE
- Adults:
  - Cyanide poisoning: 12.5 g IV (50 mL of a 25% solution): sodium thiosulfate may be repeated prn at half the original dose.
  - Prevention of nitroprusside-induced cyanide toxicity: administer IV concurrently with nitroprusside at a dose 5-10 times that of nitroprusside.
  - Calciphylaxis: 25 g (100 mL of a 25% solution) IV 3 times a week; if patient on hemodialysis, administer during the last hour or after the dialysis session.
  - Mechlorethamine extravasation: 2.5 mL of a 4% solution (1/6M) through the existing IV line OR 2 mL of a 4% solution SC into the extravasated area per mg of extravasated mechlorethamine.

.../Cont.
DOSAGE (Cont.)

- Pediatrics:
  - Cyanide poisoning: 250-500 mg/kg IV or 7.5-10 g/m² IV. Maximum dose of 12.5 g; sodium thiosulfate may be repeated prn at half the original dose.

- Dosage in renal impairment: caution as patients may be at increased risk of adverse effects.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from direct light. Do not freeze.
- Stable for 24 hours in NS, D5W and D5-1/2NS at concentrations of 1.5% and 9.76%.
- Incompatible with hydroxocobalamine.
- Compatible with sodium nitrate.

MISCELLANEOUS

- Observe patient for 24-48 hours for reoccurrence of symptoms of poisoning.

REFERENCES

4, 5, 40, 82, 95, 129, 135, 339, 374.
INDICATIONS

- Treatment of tuberculosis in conjunction with other antituberculosis agents, when the infecting organisms are susceptible.
- Treatment and post-exposure prophylaxis of tularemia and plague (including in the context of bioterrorism).
- Treatment of brucellosis and severe *M. avium* complex, when the infecting organisms are susceptible.

ADMINISTRATION

- Reconstitute the 1 g vial with 1.8, 3.2 or 4.2 mL of SWFI to obtain a solution of 400, 250 or 200 mg/mL, respectively.
- Intermittent IV infusion: not an officially approved route of administration but documented in the literature for patients who cannot tolerate IM injections. Dilute to a concentration of 5-10 mg/mL (usually with 100 mL of NS or D5W); infuse over 30-60 minutes.
- IM (preferred): deep into large muscle mass; for adults, into the buttocks or the mid-lateral thigh (deltoid only if well developed); in children, preferably in the mid-lateral thigh. Rotate injection site.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylaxis, rash, urticaria, angioneurotic edema, exfoliative dermatitis.
- CNS: facial and peripheral paresthesia; tingling or dizziness during the infusion (increase infusion time to 60 minutes to alleviate this problem).
- Hematologic: eosinophilia.
- Ototoxicity (may be irreversible): vestibular (nausea, vomiting, vertigo) and cochlear (tinnitus, hearing loss) toxicity (related to dose and duration of therapy).
- Renal: nephrotoxicity; alkalinization of the urine may minimize renal irritation with long-term treatment.
- Potential for neuromuscular blockade (rare).
- Fever.

DOSAGE

Adults:
- Tuberculosis: 15 mg/kg (up to 1 g) IM/IV once daily OR 25-30 mg/kg (up to 1.5 g) IM/IV 2-3 times weekly in patients younger than 60 years old; 10 mg/kg (up to 750 mg) IM/IV once daily in patients of 60 years of age and older. Daily dosing can be reduced to 2-3 times a week after 2 to 4 months or culture conversion.

- Tularemia:
  • naturally occurring: 1-2 g IM daily in 2 divided doses for 7-14 days, until the patient is afebrile for 5-7 days.
  • in the context of bioterrorism: 1 g IM q12h for at least 10-14 days.

- Plague: in the context of bioterrorism: 15 mg/kg (up to 1 g) IM q12h for at least 10-14 days and patient afebrile for at least 2-3 days.

- Brucellosis: in patients up to 60 years of age: 15 mg/kg (up to 1 g) IM daily in 2 to 4 divided doses for 14-21 days in combination with doxycycline regimen; for patients older than 60 years of age, streptomycin dose is reduced to 1 g IM every other day.

- Severe *M. avium* complex: 15 mg/kg IM (range from 8-25 mg/kg; up to 1 g in patients up to 50 years old and 500 mg in patients older than 50 years of age) three times weekly for the first 2-3 months in combination with a macrolide, rifampin and ethambutol.

.../Cont.
DOSAGE (Cont.)

- Dosage in renal impairment: daily dosage intervals should be adjusted as follows and as per serum drug levels:

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>greater than 50</th>
<th>50-10</th>
<th>less than 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval (hr)</td>
<td>24</td>
<td>24-72</td>
<td>72-96</td>
</tr>
</tbody>
</table>

Pediatrics:
- Tuberculosis:
  - Children younger than 15 years old and weighing 40 kg or less: 15-20 mg/kg/day (may go up to 40 mg/kg/day; maximum of 1 g/day) IM/IV given once daily or in 2 divided doses OR 25-30 mg/kg (up to 1 g) IM/IV twice weekly.
  - Children younger than 15 years old and weighing more than 40 kg, or children 15 years old and greater: 15 mg/kg (up to 1 g) IM/IV once daily OR 25 mg/kg (up to 1 g) IM/IV 3 times per week.

- Tularemia and plague: in the context of bioterrorism: 15 mg/kg IM twice daily (maximum 2 g daily) for at least 10-14 days.

- Brucellosis: 15 mg/kg (up to 1 g) IM once daily OR 20-40 mg/kg/day IM in 2 to 4 divided doses, in combination with other anti-infectives, such as doxycycline.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp. Protect from light.
- Reconstituted solution is stable for 7 days at room temp, when protected from light.
- Stable for 24 hours at room temp in NS or D5W.
- Exposure to light causes darkening of solution without apparent loss of potency.

MISCELLANEOUS

- Monitoring of serum concentrations is suggested in patients with renal disease; peak (60 minutes after IM injection) should be 20-30 mcg/mL for most indications (tuberculosis: 35-45 mcg/mL with daily administration and 65-80 mcg/mL with twice weekly administration); trough (just before administration) should be below 5 mcg/mL.
- Audiography tests are recommended before treatment and at least monthly during treatment.

REFERENCES

1, 2, 4, 5, 40, 82, 95, 135, 208, 233, 537.
**Streptozotocin, Zanosar®**

**INDICATIONS**
- Symptomatic or progressive metastatic pancreatic islet cell carcinoma.
- Can also be used for other neoplasms including carcinoid tumour and syndrome, adrenal carcinoma, renal cell carcinoma, and pancreatic non islet cell carcinoma.

**ADMINISTRATION**
- Reconstitute each 1 g vial with 9.5 mL of D5W, NS or SWFI to obtain a 100 mg/mL pale-gold solution.
- IV direct: physician or RN; undiluted; inject rapidly into the tubing of a freely running IV solution of NS or D5W.
- Intermittent IV infusion (preferred), Continuous IV infusion: dilute with 50-250 mL of D5W or NS; infuse over 15 minutes to 6 hours or as per protocol.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: fever, chills.
- GI: severe nausea and vomiting (less severe with continuous infusion); diarrhea.
- CNS: with continuous infusion only: confusion, lethargy, depression.
- Renal: nephrotoxicity: dose-related, cumulative; may be irreversible and fatal. Monitor renal function before and at least weekly during treatment and for 4 weeks after treatment.
- Endocrine: hyperglycemia; insulin shock with severe hypoglycemia within 24 hours of dose administration. (Antidote: dextrose IV).
- Nail changes.
- Local reactions: burning, pain.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- 500 mg/m²/day IV for 5 days every 6 weeks.
- 1000 mg/m²/week IV initially for the first 2 weeks. Subsequent doses may be increased to a maximum of 1500 mg/m²/week.
- May also be given by continuous IV infusion over 5 days. However this mode of administration is generally not recommended due to increased risk of CNS toxicity.
- Dosage in renal impairment:
  - CrCl (mL/min): 50-10
  - Dose (mg): 75%
  - CrCl (mL/min): less than 10
  - Dose (mg): 50%
- Dosage in hepatic impairment: consider dose reduction or discontinuation of therapy.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light.
- Reconstituted solution is stable 48 hours at room temp or 96 hours in the fridge.
- Stable for 48 hours at room temp or for 96 hours in the fridge in D5W or NS at a concentration of 2 mg/mL.

**REFERENCES**
1, 4, 5, 6, 40, 95, 129, 135, 165.
**INDICATIONS**

- As an adjunct to general anesthesia, to facilitate endotracheal intubation, endoscopy and short manipulative procedures, and to produce muscle relaxation during surgery or mechanical ventilation.

**ADMINISTRATION**

- IV direct: physician trained in anesthesiology; RN may administer subsequent doses; **ventilator support, cardiac monitoring.** Undiluted; inject over 30 seconds.
- Intermittent IV infusion, Continuous IV infusion: **ventilator support, cardiac monitoring.** Dilute to 1-2 mg/mL in D5W or NS (500 mg in 250-500 mL or 1 g in 500-1000 mL); do not exceed 10 mg/min or 500 mg/hr.
- Deep IM (not preferred): **ventilator support, cardiac monitoring.** Use this route only when IV administration is not possible.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: circulatory collapse, flushing, skin rash, urticaria, bronchospasm, anaphylactoid/anaphylactic reaction.
- Cardiovascular: transient arrhythmias, bradycardia with repeated doses in adults and single doses in children. Pre-treatment with atropine is recommended in children. Cardiac arrest from acute rhabdomyolysis with hyperkalemia in children (rare).
- GI: excessive salivation.
- Ophthalmic: increase in intraocular pressure.
- Respiratory: respiratory depression, apnea.
- Transient muscle fasciculation, especially if infused rapidly; myalgia.
- Malignant hyperthermia.
- Hyperkalemia.

**DOSAGE**

**Adults:**
- A test dose of 5-10 mg (or 0.1 mg/kg) IV or a slow infusion of a 1 mg/mL solution may be given to patients suspected of having an atypical plasma pseudocholinesterase activity or to assess individual patient response.
- For short procedures/intubation: 0.6 mg/kg (range 0.3-1.1 mg/kg) IV direct, repeated as required.
- For rapid sequence intubation: 1-1.5 mg/kg IV.
- For maintenance of neuromuscular blockade during prolonged procedures:
  - Continuous IV infusion: usually 2.5-4.3 mg/min (range of 0.5-10 mg/min).
  - IV direct or intermittent IV infusion: after initial dose of 0.3-1.1 mg/kg, followed by 0.04-0.07 mg/kg as required.
- IM: up to 3-4 mg/kg. Total dose should not exceed 150 mg.

**Pediatrics:**
- IV direct or intermittent IV infusion: 1-2 mg/kg IV; maintenance: 0.3-0.6 mg/kg every 5-10 minutes if required.
- Continuous IV infusion is not recommended in children.
- IM: up to 3-4 mg/kg. Total dose should not exceed 150 mg.
SUCCINYLCHOLINE
Quelicin®, Suxamethonium chloride
Neuromuscular blocker

...

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C.
- Unopened vials are stable for 6 months at room temp.
- Stable for 24 hours at 5°C in D5W or NS at concentrations of 1 and 2 mg/mL.
- Compatible with NS, D5W, dextrose-saline combinations and RL.
- Incompatible with alkaline solutions (e.g., barbiturates); also decomposes in solutions with pH of greater than 4.5.

MISCELLANEOUS

- Onset of muscle relaxation is observed within 1 minute after IV administration and 2-3 minutes after IM administration in healthy adults.
- Use is contraindicated in patients with skeletal muscle myopathy, severe burns, multiple trauma, extensive denervation of skeletal muscle, angle-closure glaucoma, upper motor neuron lesions (recent) and other unstable neurological diseases, and malignant hyperthermic susceptibility.
- Use with caution in patients with glaucoma or with reduced plasma cholinesterase activity (e.g., severe renal or liver disease, anemia, organophosphate insecticide poisoning).
- Succinycholine effects are not necessarily reversed by anticholinesterase agents.

REFERENCES

1, 3, 4, 5, 40, 82, 95, 135, 204, 208, 375.
**INDICATIONS**
- For the induction and maintenance of anesthesia (with 100% oxygen).
- As an analgesic adjunct in the maintenance of balanced general anesthesia.

**ADMINISTRATION**
- IV direct (preferred): physician only; **respiratory support**. Undiluted; inject over 2-10 minutes.
- Continuous IV infusion: dilute dose in D5W or NS. Administer at a rate of 250-300 mcg/min.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: pruritus, anaphylaxis.
- Cardiovascular: hypotension/hypertension, tachycardia, arrhythmias, bradycardia.
- GI: nausea, vomiting.
- Respiratory: apnea, respiratory depression, bronchospasm (Antidote: epinephrine).
- Skeletal muscle and chest wall rigidity (Antidote: neuromuscular blocker).
- Antidote: naloxone.

**DOSAGE**
- Must be individualized to each patient, and titrated to clinical response.
- Reduce dose in elderly and debilitated patients.
- Dosage should be based on lean body weight in those patients weighing more than 20% above ideal body weight.

**Adults:**
- Primary anesthetic agent (with oxygen only): initial dose is individualized; for maintenance increments:
  25-50 mcg; usual total dose 8-30 mcg/kg.
- Adjunct to surgery (balanced anesthesia, i.e., with nitrous oxide and oxygen):

<table>
<thead>
<tr>
<th>Expected duration of surgery</th>
<th>Total Dose*</th>
<th>Initial Dose</th>
<th>Maintenance Dose</th>
<th>Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Incremental</td>
<td>OR Continuous</td>
<td>Infusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 2 hours</td>
<td>0.5 -2 mcg/kg</td>
<td>75% or more of total dose</td>
<td>10-25 mcg OR 0.1-0.25 mcg/kg</td>
<td>0.3-1.5 mcg/kg/hr</td>
</tr>
<tr>
<td>2-8 hours</td>
<td>2-8 mcg/kg</td>
<td>75% or less of total dose</td>
<td>10-50 mcg</td>
<td>0.3-1.5 mcg/kg/hr</td>
</tr>
</tbody>
</table>

*Dosages above 1 mcg/kg per hour of surgery are frequently associated with respiratory depression.

**Pediatrics (less than 12 years of age):**
- Anesthetic initial dose of 10-25 mcg/kg. Supplemental doses up to 25-50 mcg OR 1-2 mcg/kg may be given as required.

**COMPATIBILITY, STABILITY**
(*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*)
- Store ampoules and vials at room temp. Protect from light.
- Compatible with D5W and NS.
- Undergoes hydrolysis in acidic solution.

**MISCELLANEOUS**
- Sufentanil is 5-7 times more potent than fentanyl.

**REFERENCES**
1, 4, 5, 82, 135.
INDICATIONS
- For reversal of moderate to deep neuromuscular blockade induced by rocuronium or vecuronium in adults undergoing surgery.

ADMINISTRATION
- IV direct: physician trained in anesthesiology; ventilator support: administer dose rapidly over 10 seconds with flushing the IV line with a compatible solution (e.g., NS) before and after administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, flushing, urticaria, anaphylactoid and anaphylactic reactions (hypotension, tachycardia, bronchospasm, swelling of the tongue and throat). Increased risk with doses greater than 4 mg/kg.
- Cardiovascular: bradycardia within a few minutes after the injection (Antidote: atropine), hypotension.
- GI: nausea, vomiting.
- CNS: headache.
- Hematologic: transient increase of aPTT and INR within an hour of administration.
- Local reactions: pain at injection site.

DOSAGE
- Moderate rocuronium or vecuronium blockade reversal: 2 mg/kg IV when spontaneous recovery has reached the reappearance of the second twitch (T2) in response to train-of-four (TOF) stimulation.
- Deep rocuronium or vecuronium blockade reversal: 4 mg/kg IV when spontaneous recovery has reached 1-2 post-tetanic counts (PTC), and there are no twitch responses to TOF stimulation.
- Urgent reversal of rocuronium blockade: 16 mg/kg IV when urgent need to reverse neuromuscular blockade soon (approximately 3 minutes) after administration of a single dose of 1.2 mg/kg of rocuronium.
- Dosage in renal impairment: CrCl 30-80 mL/min: no dosage adjustment required; CrCl less than 30 mL/min, including dialysis: do not use.
- Dosage in hepatic impairment: no dosage adjustment required but use with caution if coagulopathy or severe edema.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C. Protect from light; stable for 5 days when left unprotected from light.
- Solution in the vial should be clear and colourless to slightly yellow-brown.
- Compatible with NS, D5W, D5-NS, D2.5-1/2NS, RL, Ringer’s.

MISCELLANEOUS
- Emergency drugs (epinephrine, diphenhydramine and injectable corticosteroids) and emergency resuscitation equipment must be kept near the patient when drug is administered.
- Waiting time before readministration of rocuronium or vecuronium after using sugammadex varies between 5 minutes to 24 hours, depending on agent, dose and renal function. If neuromuscular blockade is required before the recommended waiting time has elapsed, use a nonsteroidal neuromuscular blocking agent (e.g., atracurium, cisatracurium).
- Can decrease progestogen exposure by 1/3 in patients taking a hormonal contraceptive, considered equivalent to a missed dose of the hormonal contraceptive. In childbearing female patients taking hormonal contraception, counsel patient on taking a non-hormonal contraceptive method (back-up method of contraception such as condoms and spermicides) for the 7 days following sugammadex administration.

REFERENCES
1, 5, 40, 95, 135, 208.
TACROLIMUS
Prograf ®
Immunosuppressant

INDICATIONS
- Prophylaxis of organ rejection and treatment of refractory rejection for patients receiving allogenic heart, liver or renal transplants in conjunction with other immunosupressants, including corticosteroids, when oral administration is not possible.

ADMINISTRATION
- Continuous IV infusion (mandatory): dilute with NS or D5W to a concentration of 0.004-0.02 mg/mL in glass or non-PVC containers; do NOT use PVC containers or administration sets; give as a continuous 24-hour infusion.
- Observe the patient for hypersensitivity reactions for the first 30 minutes following the start of the infusion and at frequent intervals thereafter.

POTENTIAL ADMINISTRATION HAZARDS
- Non-cytotoxic hazardous drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis.
- Cardiovascular: hypertension, chest pain, edema.
- GI: nausea, vomiting, constipation, diarrhea, anorexia, abdominal pain.
- CNS: headache, insomnia, paresthesia, tremor, dizziness.
- Dermatologic: alopecia, erythema, pruritus.
- Endocrine and metabolic: hyperkalemia, hypomagnesemia, hypophosphatemia, hyperglycemia, hyperlipidemia.
- Hematologic: anemia, leukocytosis, thrombocytopenia.
- Renal: nephrotoxicity.

DOSAGE
- Adults & pediatrics: liver and kidney transplants: initial dose of 0.03-0.05 mg/kg/day IV; heart transplant: 0.01 mg/kg/day IV. The first dose should be given no sooner than 6 hours post liver or heart transplantation; administer within 24 hours of renal transplantation (may need to be delayed until renal function has improved).
- Dosage in renal or hepatic impairment: use the lowest recommended dose (further reductions may be required).
- If switching from cyclosporin to tacrolimus or vice versa, allow at least 24 hours prior to initiating the new medication to avoid excess nephrotoxicity.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules between 15-25°C. Protect from light.
- Stable for 24 hours at room temp in D5W or NS at a concentration of 0.004-0.02 mg/mL in glass or polyethylene containers.
- Stable for 48 hours at room temp in D5W or NS at a concentration of 0.01 mg/mL in polyolefin containers.
- Stable for 20 hours in the fridge followed by 28 hours at room temp in D5W or NS at a concentration of 0.01 mg/mL in polyolefin containers.
- PVC containers and administration sets should not be used due to decreased stability and the potential for extraction of phthalates.
- Incompatible with alkaline solutions with a pH of 9 or greater.

MISCELLANEOUS
- Emergency drugs and equipment (epinephrine, oxygen) must be available for the treatment of hypersensitivity reactions.
- Tacrolimus IV contains castor oil derivatives.
- Conversion from IV to PO immediate release: use a 1:4 ratio, i.e., total daily IV dose X 4 = total daily PO dose; administer total PO dose as 2 divided doses per day, 12 hours apart. The first oral dose should be given 8-12 hours post discontinuation of the IV infusion.

REFERENCES
1, 4, 5, 40, 95, 135, 208.
INDICATIONS
- Treatment of complicated skin and skin structure infections (cSSSI) caused by susceptible strains of the following gram-positive microorganisms: *Staphylococcus aureus* (methicillin-resistant and -susceptible strains), *Streptococcus pyogenes, Streptococcus agalactiae, Streptococcus anginosus* group (including *S. anginosus, S. intermedius* and *S. constellatus*), and *Enterococcus faecalis* (vancomycin-susceptible isolates only).
- Treatment of hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP) caused by susceptible strains of *Staphylococcus aureus* (methicillin-resistant and -susceptible strains).

ADMINISTRATION
- Reconstitute 250 mg and 750 mg vials with 15 and 45 mL, respectively, of SWFI, D5W or NS to get a concentration of approximately 15 mg/mL. To minimize foaming, allow the vacuum of the vial to pull the diluent from the syringe into the vial. Mix well but do NOT shake forcefully. Reconstitution time is generally under 2 minutes but can take up to 20 minutes in rare occasions.
- Intermittent IV infusion: dilute in 100 to 250 mL of D5W, NS or RL to obtain a final concentration of 0.6 to 8 mg/mL. Do NOT shake the final infusion. Administer over a period of at least 60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, anaphylaxis.
- Infusion-related reactions: red-man syndrome like reactions (hypotension, flushing of the upper body, urticaria, pruritus or rash) if administered in less than 60 minutes. If this occurs, stop or slow the infusion.
- Cardiovascular: QTc interval prolongation.
- GI: nausea, vomiting, diarrhea, altered taste (metallic or soapy taste).
- CNS: dizziness, headache, insomnia.
- Renal: increase in serum creatinine, foamy urine.
- Local reactions: erythema, pain, pruritus.

DOSEAGE
- 10 mg/kg IV q24h for 7 to 14 days if cSSSI, and for 7 to 21 days if HAP/VAP.
- Dosage in renal impairment:
  | CrCl (mL/min) | 50-30 | 29-10 | less than 10 |
  | Dose (mg/kg) | 7.5 | 10 | no data * |
  | Interval (hr) | 24 | 48 |
  * Not significantly removed by hemodialysis.
- Dosage in hepatic impairment: no dosage adjustment necessary for patients with mild to moderate hepatic impairment; not evaluated in severe hepatic impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C.
- Reconstituted or diluted solution is stable for 12 hours at room temp or 7 days in the fridge. However, the total time in the vial plus the time in the IV bag should not exceed 12 hours at room temp or 7 days in the fridge.

MISCELLANEOUS
- Contraindicated in patients with known hypersensitivity to other glycopeptides (e.g., vancomycin).
- Monitor renal function (e.g., serum creatinine) in all patients: at baseline, during treatment (every 2-3 days or more frequently if clinically indicated) and at the end of therapy.
- Use with caution in patients taking medications that could be implicated in QTc interval prolongation or torsades de pointes; avoid use in patients with congenital long QT syndrome.
- May interfere with the following coagulation tests when blood samples are drawn within 18 hours of telavancin administration: prothrombin time, INR, aPTT, activated clotting time and coagulation based factor Xa tests.

REFERENCES
5, 95, 103, 135.
INDICATIONS
- Treatment of metastatic renal cell carcinoma.
- Treatment of Mantle cell lymphoma.

ADMINISTRATION
- Ensure premedication has been administered; refer to Dosage section.
- Intermittent IV infusion: two-step dilution process: 1) dilute 30 mg vial (1.2 mL of drug concentrate) with 1.8 mL of the supplied diluent to obtain 3 mL of a 10 mg/mL solution. Allow sufficient time for air bubbles to subside; 2) withdraw exact dose required for the patient and further dilute in 250 mL NS. Use non-PVC bags (i.e., glass, polypropylene, polyolefin or polyethylene) for dilution. Mix by inverting the bag; avoid excessive shaking. Infuse over 30 to 60 minutes using an administration set consisting of non-DEHP, non PVC material with an in-line polyethersulfone filter of no greater than 5 microns.
- Must be administered by an infusion pump.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity/infusion reactions: dyspnea, apnea, flushing, chest pain, hypotension and/or loss of consciousness. If a hypersensitivity reaction occurs, stop the infusion and give appropriate medical care. Observe the patient for at least 30-60 minutes. A risk-benefit assessment should be performed before continuing therapy. Administer an IV histamine H₁-receptor antagonist such as diphenhydramine 25-50 mg (if not given already) and/or an IV histamine H₂-receptor antagonist such as famotidine 20 mg or ranitidine 50 mg, 30 minutes before restarting the infusion at a slower rate (length of temsirolimus infusion of up to 60 minutes).
- Cardiovascular: edema, QTc interval prolongation.
- GI: mucositis, stomatitis, nausea, anorexia, vomiting, diarrhea, constipation, dysgeusia, abdominal pain.
- Dermatologic: rash, pruritus.
- Endocrine and metabolic: hyperglycemia, hyperlipidemia, hypophosphatemia, hypokalemia.
- Hematologic: bleeding, anemia, neutopenia, leukopenia, lymphopenia, thrombocytopenia.
- Hepatic: increased liver enzymes.
- Renal: increased serum creatinine, renal failure.
- Respiratory: cough, dyspnea, interstitial lung disease.
- Fatigue.
- Abnormal wound healing may occur with use in the perioperative period.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Premedicate with an antihistamine (e.g., IV diphenhydramine 25-50 mg) 30 minutes before the infusion.
- Renal cell carcinoma: 25 mg IV once weekly.
- Mantle cell lymphoma: 175 mg IV once weekly for 3 weeks then 75 mg IV once weekly.
- Dose may be reduced depending on the severity of toxicity.
- Consult specific protocol.
COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials in the fridge. Protect from light. Do not freeze.
- Vial diluted with supplied diluent is stable for 24 hours at room temp protected from light.
- Diluted solution is stable for 6 hours at room temp. Admixtures should be protected from excessive room light and sunlight.

MISCELLANEOUS

- As the drug has immunosuppressant effect, avoid live vaccination and contact with those who have recently received live vaccines.
- Temsirolimus is metabolized primarily by CYP3A4; if possible, avoid co-administration with drugs which are CYP3A4 inducers or inhibitors, otherwise temsirolimus dose may have to be modified.

REFERENCES

1, 5, 40, 95, 129, 165.
INDICATIONS
- Lysis of coronary artery thrombi associated with acute myocardial infarction (AMI).

ADMINISTRATION
- Follow the manufacturer’s instructions on the correct use of the cannula device during reconstitution and administration.
- Reconstitute each 50 mg vial with 10 mL of the provided SWFI diluent using the red hub cannula syringe filling device; inject diluent, directing stream into the powder. Slight foaming is not unusual; large bubbles will dissipate if allowed to stand for several minutes. Gently swirl contents until dissolved; do NOT shake.
- IV direct: physician or RN; undiluted. Administer dose over 5 seconds; flush dextrose-containing IV lines with a saline solution before and after tenecteplase administration (risk of precipitation when tenecteplase comes into contact with a dextrose solution).

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rare; anaphylaxis, angioedema, laryngeal edema, rash, urticaria.
- Cardiovascular: reperfusion arrhythmia, hypotension.
- GI: nausea, vomiting.
- Hematologic: superficial bleeding (at vascular sites, arterial punctures) and internal bleeding (intracranial, retroperitoneal, GI, genitourinary or respiratory tract).
- Fever.

DOSAGE
- Single IV dose according to patient weight. Dose not to exceed 50 mg.

<table>
<thead>
<tr>
<th>Patient weight (kg)</th>
<th>Tenecteplase dose (mg)</th>
<th>* Volume of drug to be administered (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>60 to less than 70</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>70 to less than 80</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>80 to less than 90</td>
<td>45</td>
<td>9</td>
</tr>
<tr>
<td>90 or more</td>
<td>50</td>
<td>10</td>
</tr>
</tbody>
</table>

* From one vial reconstituted with 10 mL of SWFI.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp or in the fridge.
- Reconstituted solution is stable for 8 hours in the fridge.
- Incompatible with dextrose.

MISCELLANEOUS
- Intramuscular injections and nonessential handling of the patient should be avoided for the first few hours following treatment with tenecteplase.
- If an arterial puncture is necessary during the first few hours following tenecteplase administration, it is preferable to use an upper extremity vessel that is accessible to manual compression; pressure should be applied for at least 30 minutes.

REFERENCES
1, 5, 40, 95.

Full revision 2019
TERIPARATIDE

Other Names
- Forteo ®

Classification
- Parathyroid hormone

INDICATIONS
- Treatment of severe osteoporosis in postmenopausal women and men.
- Treatment of glucocorticoid-induced osteoporosis in women and men.

ADMINISTRATION
- To prime the pen and prepare a dose, consult the manufacturer’s directions.
- SC: into abdomen or thigh.
- The patient should remain either seated or lying down for the first several doses due to the risk of orthostatic hypotension.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, angioedema, anaphylaxis.
- Cardiovascular: transient orthostatic hypotension (onset within 4 hours of administration of first several doses).
- GI: nausea.
- CNS: dizziness, headache.
- Leg cramps, joint pain.
- Local reactions: erythema.

DOSAGE
- 20 mcg SC once daily.
- Dosage in renal impairment: no dosage adjustment needed in mild to moderate renal impairment; not recommended in severe renal impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store the pen between 2-8°C. Do not freeze.
- The pen may be used for up to 28 days after the first injection. The in-use pen should be stored in the fridge at all times. A warming period is not required prior to dose administration.

MISCELLANEOUS
- Supplemental calcium and vitamin D may be necessary if dietary intake is not adequate.

REFERENCES
1, 5, 95, 135.
INDICATIONS

- Prevention of tetanus and diphtheria in persons 7 years of age and older.
- Tetanus prophylaxis in wound management.

ADMINISTRATION

- Shake well to obtain a uniform suspension.
- IM: in the deltoid.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: rash, urticaria, angioedema, anaphylaxis.
- CNS: brachial neuritis.
- Influenza-like symptoms (myalgia, arthralgia, chills, malaise, fever).
- Local reactions: pain, induration, swelling, discomfort, redness at injection site; severe arthus-type reaction (rare).

DOSAGE

- Primary immunization: 3 injections of 0.5 mL, with the first 2 doses given 4-8 weeks apart and the third dose given 6 to 12 months after the second dose.
- Booster dose (for individuals previously immunized): 0.5 mL every 10 years.
- Tetanus wound prophylaxis: 0.5 mL with or without tetanus immune globulin, depending on immunization history and the likelihood of contamination with tetanus bacilli. See manufacturer’s monograph for further details.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Do not freeze.

MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- This vaccine is an inactivated vaccine.
- Administration should be delayed, if possible, during an acute febrile illness or active infection of moderate to severe intensity.
- Tetanus toxoid and tetanus immune globulin should be administered in separate syringes at different sites.
- A fixed-combination preparation containing tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine adsorbed (Tdap) is preferred in some situations.

REFERENCES

1, 5, 31.
THIAMINE
Vitamin B₁

INDICATIONS
- Treatment and prevention of acute thiamine deficiencies including beriberi, Wernicke's encephalopathy, alcohol withdrawal syndrome, and peripheral neuritis associated with pregnancy or pellagra.

ADMINISTRATION
- IV direct: physician or RN; dilute 100 mg with 10 mL of NS; inject over at least 5 minutes.
- Intermittent IV infusion: dilute dose in 50-100 mL of NS, D5W, or RL; infuse over 30 minutes.
- IM: provides rapid and complete absorption.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, angioedema; usually after multiple large doses.
- GI: nausea.
- Dermatologic: sweating, pruritus, urticaria.
- Feeling of warmth, weakness.
- Local reactions: pain and burning with IV administration; tenderness, induration and skin sclerosis with IM administration.

DOSAGE
- Critically ill thiamine-deficient patient or with malabsorption syndrome: 5-100 mg IV/IM three times daily.
- Beriberi: 5-30 mg IV/IM three times daily for 2 weeks followed by oral therapy.
- Wernicke encephalopathy:
  - Standard dosing regimen: 100 mg IV initially followed by 50-100 mg IV/IM daily until patient is eating well.
  - High dosing regimen: 500 mg IV three times daily for 2-3 days, followed by 250 mg IV/IM once daily for 3-5 days followed by oral thiamine.
- Alcohol withdrawal syndrome: 100-250 mg IV/IM once daily for 3-5 days, followed by oral thiamine.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules and vials between 15-30°C. Protect from light. Do not freeze.
- Compatible with D5W, NS, RL.
- Stable in acidic solutions; unstable in neutral or alkaline solutions.
- Rapidly inactivated in solutions containing sulfites or bisulfites.

MISCELLANEOUS
- In thiamine deficiency, administer thiamine prior to IV dextrose to prevent sudden onset of Wernicke's encephalopathy.

REFERENCES
1, 4, 5, 40, 95, 135, 328.
INDICATIONS
- Myeloablation prior to allogeneic or autologous stem cell transplant.
- Treatment of ovarian and breast cancer in combination with other chemotherapy agents.

ADMINISTRATION
- Reconstitute each 15 mg and 100 mg vial with 1.5 mL and 10 mL, respectively, of SWFI to obtain a concentration of 10 mg/mL. Gently mix until dissolution.
- IV direct (only for low doses such as those used for the treatment of ovarian and breast cancer): physician or RN. Filter reconstituted solution with a 0.22 micron filter. Do NOT use if the filtered solution is not clear or contains particulate matter. Dilute dose in NS to obtain a final concentration between 0.5 and 1 mg/mL; inject over 1-2 minutes.
- Intermittent IV infusion (mandatory for high doses such as those used for myeloablation): dilute dose in NS to obtain a final concentration between 0.5 and 1 mg/mL (e.g., dilute doses less than 500 mg in 500 mL and doses between 500 mg and 1000 mg in 1000 mL). Infuse through a 0.2 micron polyethersulfone in-line filter over 2-4 hours via a central line. Flush line with NS before and after infusion.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis, wheezing, urticaria, pruritus, rash.
- Cardiovascular: hypertension, arrhythmia.
- GI: nausea, vomiting, diarrhea, abdominal pain, anorexia, stomatitis.
- CNS: confusion, somnolence, dizziness, headache, encephalopathy, convulsion, paresthesia, tinnitus.
- Dermatologic: skin toxicity at high doses since the product is excreted in sweat to an appreciable amount. Wash (bath or shower) the patient at least twice daily for 48 hours after thiotepa administration when used for myeloablation.
- Hematologic: myelosuppression, febrile neutropenia, anemia, thrombocytopenia, epistaxis.
- Hepatic: veno-occlusive disease, hepatomegaly, jaundice.
- Ophthalmic: conjunctivitis, blurred vision.
- Renal: urinary retention, hemorrhagic cystitis.
- Myalgia, back pain, fever, fatigue, asthenia.
- Local reactions: inflammation and pain at injection site.
- Extravasation hazard: non-vesicant/non-irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Myeloablation: can vary from 125 to 481 mg/m²/day IV starting within the week prior to transplantation.
- Oncology: 0.2 mg/kg (6-8 mg/m²) IV once daily from day 1 to day 4-5, every 2-4 weeks OR 0.3-0.4 mg/kg IV on day 1, every 1-4 weeks.
- Dosage in renal impairment: no dosage reduction necessary in mild to moderate impairment, though use with caution.
- Dosage in hepatic impairment: use with caution.
- Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze.
- The reconstituted solution is colourless or slightly opalescent.
- Reconstituted solution is stable for 8 hours in the fridge.
- Diluted solution is stable for 24 hours in the fridge and for 4 hours at 25°C in NS.

MISCELLANEOUS
- Do not administer live vaccines concurrently with thiotepa.

REFERENCES
1, 5, 40, 95, 129, 135, 363.

Full revision 2019
INDICATIONS
- Treatment of complicated intra-abdominal infections and complicated skin and skin structure infections caused by susceptible organisms (includes gram-positive, gram-negative and anaerobes).
- Treatment of mild to moderate community-acquired pneumonia caused by susceptible organisms.

ADMINISTRATION
- Reconstitute each 50 mg vial with 5.3 mL of NS, D5W or RL to obtain a concentration of 10 mg/mL (note: there is an overfill). Gently swirl to dissolve. The reconstituted solution should be yellow-orange in colour; if not, discard.
- Intermittent IV infusion: dilute in 100 mL of NS, D5W or RL to a maximum concentration of 1 mg/mL; flush the line with NS, D5W or RL before and after administration. Inspect prior to administration; do NOT administer in presence of particulate matter or discoloration (green or black). Administer over 30-60 minutes.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, anaphylactic/anaphylactoid reactions, Stevens-Johnson syndrome.
- GI: nausea, vomiting, diarrhea, abdominal pain.
- CNS: headache.
- Hepatic: increased transaminases and alkaline phosphatase; hyperbilirubinemia.
- Pancreatitis.
- Local reactions: edema, inflammation, pain, phlebitis (infrequent).

DOSAGE
- 100 mg IV as initial dose, then 50 mg IV q12h for 5 to 14 days.
- Dosage in renal impairment: no dosage adjustment required, including in hemodialysis.
- Dosage in hepatic impairment: no dosage adjustment required in mild to moderate impairment. In severe impairment: 100 mg IV as initial dose then 25 mg IV q12h.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C.
- Stable for 24 hours at room temp (for 6 hours as a reconstituted solution in the vial and the remaining time, diluted in an IV bag).
- Diluted solution is stable for 48 hours in the fridge in NS or D5W not exceeding the maximal concentration of 1 mg/mL if transferred immediately in a plastic minibag after reconstitution.
- Compatible with NS, D5W, and RL.

MISCELLANEOUS

REFERENCES
1, 4, 5, 40, 95, 135.
INDICATIONS
- Prophylaxis of thrombosis related to surgery.
- Treatment of acute deep vein thrombosis (DVT) and pulmonary embolism (PE).
- Prevention of clotting of indwelling IV lines for hemodialysis and extracorporeal circulation.

ADMINISTRATION
- IV: (or into the arterial line of the dialyser) at the beginning of the dialysis.
- SC: lower abdomen; as an alternative, can also inject into the side of the thigh, in the lower back or the upper arm; always inject in the fat tissue, NOT in the muscle. With the thickness of skin held between the operator’s thumb and finger, introduce the entire length of the needle vertically into the skin. To minimize bruising, injection sites should NOT be massaged after injection. Rotate site of injection daily.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: rash, allergic reactions.
- Hematologic: bleeding, thrombocytopenia.
- Risk of spinal or epidural hematomas that can result in permanent paralysis when epidural or spinal anesthesia or spinal puncture is used in conjunction with tinzaparin.
- Hepatic: transient increase of liver transaminases (AST, ALT); reversible within 2-4 weeks of the last dose of tinzaparin.
- Local reactions: ecchymosis, erythema, irritation, pain.

Antidote: The anticoagulant effect of tinzaparin can be partially neutralized by protamine. Refer to protamine in this manual for more details.

DOSAGE
- Prophylaxis of thrombosis related to surgery:
  - Hip surgery: 50 anti-Xa international units/kg SC once daily for 7-10 days, starting 2 hours before surgery OR 75 anti-Xa international units/kg SC once daily for 7-10 days, starting postoperatively.
  - Knee surgery: 75 anti-Xa international units/kg SC once daily for 7-10 days, starting postoperatively.
  - General surgery: 3500 anti-Xa international units SC once daily for 7-10 days, starting 2 hours before surgery.
  - Obese patients may need a higher prophylactic dose; use actual body weight.

- Treatment of DVT and PE:
  - 175 anti-Xa international units/kg SC once daily until adequately anticoagulated with an oral anticoagulant.
  - Dosage in obese patients is based on actual body weight.

- Anticoagulation during extracorporeal circulation and hemodialysis:
  - No risk of hemorrhage: bolus dose of 4500 anti-Xa international units via arterial line of the dialyser or IV at the beginning of dialysis. If hemodialysis lasts longer than 4 hours, a larger dose may be given.
  - Patients at higher risk of hemorrhage: use half of the dose. If hemodialysis lasts longer than 4 hours, an additional smaller dose may be given.

- Dosage in renal impairment: no accumulation in patients with a CrCl of 20 mL/min and higher. For more severe renal impairment, consider dosage adjustment and/or monitoring of anti-Xa levels.

…/Cont.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials and prefilled syringes between 15-25°C.
- Multi-dose vials are stable for up to 6 punctures over a 28-day period at room temp.
- Solution from multi-dose vials is stable for 10 days at room temp or in the fridge in tuberculin syringes. Upon storage, needle should be changed prior to administration.

MISCELLANEOUS

- Tinzaparin should not be given to patients with a history of heparin-induced thrombocytopenia (risk of cross-reactivity), unless an in vitro platelet aggregation test is negative.
- For laboratory monitoring of effect, anti-Xa methods are recommended (although not routinely done, monitoring is recommended in special cases such as extremes of weight, pregnancy and renal failure).
- Monitor closely the elderly patients with low body weight (less than 45 kg) or with decreased renal function.
- As the multi-dose vial contains benzyl alcohol, it is not recommended for use during pregnancy or in neonates.
- Derived from porcine tissue.

REFERENCES

5, 87, 95, 119, 135, 218, 275.
<table>
<thead>
<tr>
<th>INDICATIONS</th>
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<tbody>
<tr>
<td>- Management of patients with non-ST-elevation acute coronary syndrome, including those subsequently undergoing percutaneous coronary interventions (PCI). Use in conjunction with antiplatelet therapies (e.g., ASA with a P2Y12 platelet ADP-receptor antagonist such as clopidogrel, prasugrel and ticagrelor) and anticoagulants (e.g., heparin or a low molecular weight heparin).</td>
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<tr>
<th>ADMINISTRATION</th>
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<tr>
<td>- Continuous IV infusion: use premixed bags of 250 mL (50 mcg/mL in NS) for all IV administration.</td>
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<tr>
<td>- For patients who undergo PCI after 4 hours of diagnosis: administer an initial loading dose over 30 minutes followed by a continuous maintenance IV infusion. See Dosage section for rate.</td>
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<tr>
<td>- For patients who undergo PCI within 4 hours of diagnosis: administer an initial bolus dose over 3 minutes followed by a continuous maintenance IV infusion. See Dosage section for rate.</td>
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<tr>
<th>POTENTIAL ADMINISTRATION HAZARDS</th>
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<tbody>
<tr>
<td>- High alert medication: consult Corporate policy 01636 (High alert medications).</td>
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<tr>
<td>- Hypersensitivity: rash, urticaria, anaphylactic reactions.</td>
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<tr>
<td>- Cardiovascular: edema, bradycardia, dissection of the coronary artery.</td>
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<td>- GI: nausea.</td>
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<td>- CNS: headache, dizziness.</td>
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<td>- Hematologic: bleeding, thrombocytopenia (reversible within 4-6 days after stopping therapy).</td>
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<td>- Pelvic and leg pain.</td>
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<td>- Fever.</td>
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<tr>
<th>DOSAGE</th>
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<tr>
<td>- Patients not planned to undergo angiography for at least 4 hours after diagnosis:</td>
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<tr>
<td>- IV loading dose at an initial rate of 0.4 mcg/kg/min for 30 minutes, followed by a maintenance IV infusion at a rate of 0.1 mcg/kg/min.</td>
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<td>- In patients without signs of refractory ischemic symptoms and who do not proceed into angiography and angioplasty, continue infusion for at least 48 hours.</td>
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<tr>
<td>- For patients proceeding into angiography and angioplasty, continue infusion throughout both procedures and for at least 12 hours, to a maximum of 24 hours after angioplasty; discontinue the infusion once patient is stable and no more coronary intervention is planned.</td>
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<tr>
<td>- High risk patients who undergo PCI within 4 hours of diagnosis: at the start of PCI, IV bolus dose of 25 mcg/kg over 3 minutes, followed by a maintenance IV infusion at a rate of 0.15 mcg/kg/min for 12-24 hours.</td>
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<tr>
<td>- Dosage in renal impairment: decrease dose by 50% if CrCl is less than 30 mL/min.</td>
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<tr>
<td>- Dosage in hepatic impairment: no dosage adjustment is necessary in mild to moderate disease; unknown in severe hepatic impairment.</td>
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<tr>
<th>COMPATIBILITY, STABILITY</th>
<th>(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)</th>
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<tbody>
<tr>
<td>- Store premixed bags between 15-30°C. Protect from light during storage. Do not freeze.</td>
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<tr>
<td>- Compatible with D5W and NS.</td>
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<tr>
<td>- May be co-administered with heparin through the same line.</td>
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<tr>
<th>MISCELLANEOUS</th>
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<tr>
<td>- Monitor for potential bleeding; caution when used with other drugs that affect hemostasis. When bleeding cannot be controlled with pressure, infusion of tirofiban and heparin should be discontinued. Transfusions may be given if required.</td>
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<tr>
<td>- Monitor platelet counts, hemoglobin and hematocrit prior to treatment, within 6 hours following the bolus or loading infusion and then daily during therapy.</td>
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<table>
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<th>REFERENCES</th>
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<tr>
<td>1, 4, 5, 40, 95.</td>
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</table>
**INDICATIONS**

- Treatment of serious infections caused by gram-negative organisms such as *Pseudomonas aeruginosa, Proteus, Klebsiella, E. coli, Enterobacter, Acinetobacter, Citrobacter* and *Serratia* species.

**ADMINISTRATION**

- Reconstitute the 1.2 g vial with 30 mL of SWFI to obtain a concentration of 40 mg/mL. Also available in solutions of 10 and 40 mg/mL.
- Intermittent IV infusion: dilute in 50-100 mL of D5W or NS (for children, volume of diluent should be proportionally less than for adults). Administer over 20-60 minutes.
- IM.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, pruritus, urticaria.
- GI: nausea, vomiting, diarrhea.
- CNS: headache, lethargy.
- Renal: nephrotoxicity (risk factor: trough serum levels greater than 2 mg/L).
- Vestibular and auditory toxicity (risk factor: peak serum levels greater than 12 mg/L with traditional dosing).
- Neuromuscular blockade (rare).
- Fever.
- Local reactions: pain.

**DOSAGE**

- **Traditional dosing:** 1-2 mg/kg/dose IV or IM with dosing interval according to creatinine clearance:
  - CrCl (mL/min) greater than 60
  - 60-40
  - 39-20
  - less than 20 or hemodialysis
  - Interval (hr) 8
  - 12
  - 24
  - Frequency as per serum concentrations
  - Refer to Miscellaneous section for monitoring serum levels.
- **Extended interval dosing:** 4-7 mg/kg/dose (10 mg/kg/dose for cystic fibrosis patients) IV or IM once daily in selected patients. Refer to Miscellaneous section for monitoring serum levels.
- Non-obese patients: doses should be calculated using actual body weight.
- Obese patients (20-30% above ideal body weight [IBW]): doses should be calculated using dosing body weight (DBW) = IBW (kg) + 0.4 X (actual body weight - IBW).

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store between 15-30°C. Protect from light.
- Compatible with D5W, NS and RL.
- Reconstituted solution is stable for 24 hours at room temp or 96 hours in the fridge.
- Stable for 48 hours at room temp in D5W, NS, D5-NS at concentrations of 0.2 mg/mL and 1 mg/mL in PVC containers.
- Incompatible with heparin.
MISCELLANEOUS

- Monitoring serum levels:
  - Traditional dosing: serum levels pre-dose: taken 5 minutes before next dose; should be less than 2 mg/L. serum levels post-dose: taken 30 minutes after the end of IV infusion or 60 minutes after the IM injection; should be less than 12 mg/L.
  - Extended interval dosing: serum levels pre-dose: taken 5 minutes before next dose; should be undetectable (i.e., less than 0.3 mg/L). serum levels post-dose: no need to monitor.

REFERENCES

1, 5, 6, 40, 95, 135, 208, 303, 370, 371, 399.
INDICATIONS
- To reduce signs and symptoms in adult patients with moderate to severe active rheumatoid arthritis. To be used in combination with methotrexate or other nonbiologic DMARDs (e.g., hydroxychloroquine, leflunomide, sulfasalazine) or as monotherapy if methotrexate is not tolerated or is inappropriate (IV and SC formulations).
- Treatment of giant cell arteritis (GCA) in adults (SC formulation only).
- Treatment of active systemic juvenile idiopathic arthritis (SJIA) in children 2 years of age and older, who had an inadequate response to nonsteroidal anti-inflammatory agents and systemic corticosteroids (IV formulation only).
- Treatment of polyarticular juvenile idiopathic arthritis (PJIA) in children 2 years of age and older who had an inadequate response to previous therapy with DMARDs (IV formulation only).
- Treatment of severe cytokine release syndrome (CRS) secondary to treatment of acute leukemia using biological therapy (e.g., blinatumomab) or secondary to treatment with chimeric antigen receptor (CAR) T-cell therapy (e.g., tisagenlecleucel).

ADMINISTRATION
- There are 2 formulations: one for IV use (vial) and one for SC use (prefilled syringe). Ensure using the correct one.
- Intermittent IV infusion (adults and pediatrics): from a 100 mL NS solution bag (50 mL NS if patient weighs less than 30 kg), withdraw and discard the exact same volume of solution as the volume of tocilizumab to be added to the bag. Using the IV formulation, add tocilizumab slowly into the bag to get a final volume of exactly 100 mL (50 mL if patient weighs less than 30 kg). Gently mix by inverting the bag slowly to avoid foaming. Administer over 60 minutes.
- SC (adults only): using the SC formulation, inject SC the full amount in the syringe (162 mg/0.9 mL) into abdomen, thigh or upper arm; rotate injection sites. Ensure site of injection is free of moles, scars and open sores and is not tender, bruised, red or hard.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylactoid reactions, anaphylaxis.
- Infusion-related reactions: occur during or within 24 hours of infusion; hypertension, headache, dizziness, skin reactions (rash, pruritus, urticaria).
- GI: nausea, vomiting, diarrhea, dyspepsia, abdominal pain, mouth ulceration; gastrointestinal perforation, especially in patients with prior ulcers or diverticulitis.
- Hematologic: reduction in neutrophil count and platelet count.
- Hepatic: elevation of liver enzymes (AST, ALT).
- Metabolic: elevation of lipids (total cholesterol, triglycerides, Low-Density-Lipoprotein cholesterol).
- Immunosuppression with increased risk of infections (bacterial, viral, fungal); more frequent in the elderly.
- Local reactions: erythema, pruritus, pain and hematoma at SC injection sites.

DOSAGE
- Adults to receive IV tocilizumab for rheumatoid arthritis (to use IV formulation):
  - Initial dose: 4mg/kg IV every 4 weeks; may increase to 8 mg/kg based on clinical response.
  - For patients weighing more than 100 kg, do not exceed 800 mg/dose.
- Adults to receive SC tocilizumab for rheumatoid arthritis (to use SC formulation):
  - If patient weighs less than 100 kg: 162 mg SC every other week, followed by an increase to every week based on clinical response.
  - If patient weighs 100 kg or more: 162 mg SC every week.
- Adults to receive SC tocilizumab for GCA (to use SC formulation): 162 mg SC every week (with a tapering course of corticosteroids); may be decreased to 162 mg SC every other week (with a tapering course of corticosteroids) based on clinical considerations.
DOSAGE (Cont.)

- Adults to receive IV tocilizumab for CRS (to use IV formulation): 8mg/kg (maximum of 800 mg/dose) IV; may administer up to 3 additional doses at least 8 hours apart.
- Adult dosage adjustment (IV and SC):
  - Adjust subsequent doses or discontinue therapy depending on laboratory values of liver enzymes (AST, ALT), absolute neutrophil count (ANC) and platelet count. Refer to manufacturer’s monograph for more details.
  - If patient transfers from IV to SC administration, give the first SC dose at the time of the next scheduled IV dose.
- Pediatrics:
  - For SJIA (to use IV formulation): 12 mg/kg IV every 2 weeks for patients weighing less than 30 kg and 8 mg/kg IV every 2 weeks for patients weighing 30 kg or more.
  - For PJIA (to use IV formulation): 10 mg/kg IV every 4 weeks for patients weighing less than 30 kg and 8 mg/kg IV every 4 weeks for patients weighing 30 kg or more.
  - For CRS (to use IV formulation): for patients weighing less than 30 kg, 12 mg/kg IV; for patients weighing 30 kg or more, 8 mg/kg (maximum of 800 mg/dose) IV. May administer up to 3 additional doses at least 8 hours apart.
  - Refer to manufacturer’s monograph for more details.
- Dosage in renal impairment: no dosage adjustment needed in mild renal impairment; has not been studied in patients with moderate to severe renal impairment.
- Dosage in hepatic impairment: not recommended.

COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials, prefilled syringes and autoinjectors between 2-8°C. Protect from light and freezing.
- Diluted IV solution is colourless to a pale yellow.
- The diluted IV solution is stable for 24 hours in the fridge and at room temp (up to 30°C) in NS in a PVC, polyethylene, polypropylene or glass container.
- The prefilled syringe and the autoinjector for SC administration are stable for 8 hours at room temp (below 30°C).

MISCELLANEOUS

- Tocilizumab should not be used with other biologic DMARDs (e.g., abatacept, adalimumab, anakinra, etanercept, infliximab, rituximab) because of possible increased risk of immunosuppression and infections.
- It would be prudent not to use tocilizumab in patients on azathioprine or cyclophosphamide.
- Use with caution if ANC is less than 2 x 10^9/L, platelet count less than 100 x10^9/L, or AST or ALT exceeds 1.5 times the upper limit of normal.
- Live and live attenuated vaccines should not be given concurrently with tocilizumab.
- Patients should be evaluated for tuberculosis risk factors and tested for latent and active infection before initiating therapy.

REFERENCES

1, 5, 12, 40, 95, 135, 401, 403, 404.
**INDICATIONS**
- Treatment of metastatic carcinoma of the ovary after failure of initial or subsequent therapy.
- Treatment of sensitive small cell lung cancer after failure of first-line chemotherapy.
- Treatment of other cancers.

**ADMINISTRATION**
- Reconstitute the 4 mg vial with 4 mL of SWFI to obtain a 1 mg/mL solution.
- Intermittent IV infusion: dilute in 50 to 100 mL of NS or D5W to a concentration of 0.02-0.5 mg/mL; infuse over 30 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: angioedema, anaphylactic/anaphylactoid reactions.
- GI: nausea, vomiting, anorexia.
- Dermatologic: rash.
- Hematologic: anemia, neutropenia, thrombocytopenia.
- Respiratory: dyspnea, cough, pneumonia.
- Fever.
- Extravasation hazard: irritant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

**DOSAGE**
- Usual: 1.5 mg/m² IV daily on days 1 to 5 of a 21 day cycle.
- Dose adjustment according to toxicity:
  - Grade 4 neutropenia for 7 days or longer, or febrile neutropenia, or cycle delay for hematologic toxicity: reduce subsequent dose by 0.25 mg/m² or add filgrastim (G-CSF) with next cycle.
  - Platelets of 25 X 10⁹/L or less, or Grade 3 GI or organ toxicity: reduce subsequent dose by 0.25 mg/m².
  - Grade 4 GI or organ toxicity: discontinue treatment.
  - Do not retreat until toxicity of Grade 2 or less and absolute neutrophil count is at least 1 X 10⁹/L, platelet count is at least 100 X 10⁹/L, and hemoglobin is at least 90 g/L (after transfusion if necessary).
- Dose in renal impairment:
  - CrCl (mL/min)  
    | Dose (mg/m²) | 60-40 | 39-20 | less than 20 |
  - 1.5 mg/m² | 0.75 mg/m² | contraindicated |
- Dose in hepatic impairment: no dosage adjustment if bilirubin is less than 171 mc mol/L.
- Consult specific protocol.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C. Protect from light.
- Reconstituted solution is stable for 28 days in the fridge or at room temp at a concentration of 1 mg/mL.
- Stable for 24 hours at room temp or 7 days in the fridge in NS or D5W at a concentration of 0.025 mg/mL in PVC containers and at a concentration of 0.05 mg/mL in PVC, polyolefin and glass containers.
- Stable for 28 days in the fridge or at room temp, protected from light in NS or D5W at concentrations of 0.01-0.05 mg/mL in PVC containers.
- Stable for 17 days at room temp, exposed to light, in NS at a concentration of 0.01 mg/mL in PVC containers.

**REFERENCES**
1, 4, 5, 6, 40, 95, 129, 135, 165.
**INDICATIONS**
- Nutritional supplement to intravenous solutions given for total parenteral nutrition (TPN) to prevent depletion of endogenous stores of trace metals and development of subsequent deficiency symptoms.

**ADMINISTRATION**
- Intermittent IV infusion, Continuous IV infusion: dilute in TPN solutions and administer at prescribed rate.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: from iodine: urticaria, angioedema, anaphylaxis.
- Local reactions: phlebitis if not diluted.

**DOSAGE**
- Dose as required (in clinical practice, usually 1 mL daily).

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C. Protect from light. Do not freeze.
- Compatible in standard solutions used to manufacture TPN solutions.
- Compatible with electrolytes and vitamins that are commonly added to TPN solutions.

**MISCELLANEOUS**
- Each mL of Micro+6 ® concentrate from Sandoz contains: zinc 5 mg/77 mcmol, copper 1 mg/16 mcmol, manganese 0.5 mg/9 mcmol, chromium 10 mcg/0.2 mcmol, selenium 60 mcg/0.76 mcmol and iodine 75 mcg/0.6 mcmol.
- Each mL of Micro+6 Pediatric from Sandoz contains: zinc 3 mg/46 mcmol, copper 0.4 mg/6.4 mcmol, manganese 0.1 mg/1.8 mcmol, chromium 4 mcg/0.08 mcmol, selenium 20 mcg/0.25 mcmol and iodine 60 mcg/0.5 mcmol.
- Available as single elements and selected combined elements in various strengths.

**REFERENCES**
5, 40, 208.
**TRANEXAMIC ACID**

**Cyklokapron ®**

**Hemostatic**

**INDICATIONS**
- Treatment or prophylaxis of systemic or local hyperfibrinolysis when oral therapy is not possible.

**ADMINISTRATION**
- IV direct: physician only; undiluted; administration at a maximum rate of 100 mg/min.
- Intermittent IV infusion: dilute with at least 50 mL of a compatible solution and infuse at a maximum rate of 100 mg/min.
- Continuous IV infusion: dilute in a large volume of compatible solution (at TOH: dilute 1000 mg in 500 mL of D5W or NS to get a concentration of 2 mg/mL); refer to Dosage section for infusion rate.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis, dyspnea, throat tightening, facial flushing, dermatitis.
- Cardiovascular: hypotension, especially when administered too rapidly.
- GI: nausea, vomiting, diarrhea.
- CNS: dizziness, seizures.
- Thrombosis.

**DOSAGE**
- Usual dose range is 500-1000 mg IV q8h OR 25-50 mg/kg IV daily (administered in divided doses or as a continuous IV infusion).
- Dental surgery in patients with coagulopathies: 10 mg/kg IV immediately or 2 hours before surgery and q6-8h postoperatively for 2-8 days.
  - Dosage in renal impairment:
    | Serum creatinine (mcmol/L) | Dosage in dental surgery |
    |---------------------------|--------------------------|
    | 120-250                   | 10 mg/kg twice daily     |
    | 250-500                   | 10 mg/kg q24h            |
    | greater than 500          | 10 mg/kg q48h or 5 mg/kg q24h |
- Cardiac surgery (prophylaxis): Various protocols exist; for example: 100 mg/kg IV preoperatively with an additional 50 mg/kg IV postoperatively OR 15 mg/kg IV followed by 1 mg/kg/hr by continuous IV infusion for 5-6 hours OR 30 mg/kg IV followed by 16 mg/kg/hr by continuous IV infusion until sternal closure with an additional 2 mg/kg to cardiopulmonary bypass circuit OR 10-15 mg/kg IV followed by 1-1.5 mg/kg/hr by continuous IV infusion with an additional 2-2.5 mg/kg to cardiopulmonary bypass circuit.
  - Dosage in renal impairment:
    | Serum creatinine (mcmol/L) | Maintenance infusion during cardiac surgery (based on an infusion of 2 mg/kg/hr for normal renal function) |
    |---------------------------|-----------------------------------------------------------------------------------------------|
    | 140-290                   | 1.5 mg/kg/hr (25% reduction)                                                                   |
    | 290-580                   | 1 mg/kg/hr (50% reduction)                                                                    |
    | greater than 580          | 0.5 mg/kg/hr (75% reduction)                                                                   |
- Total knee replacement, blood loss reduction: various protocols exist; for example: 10 mg/kg IV given 10-30 minutes before tourniquet deflation followed by either 10 mg/kg IV given 3 hours later or 1 mg/kg/hr by continuous IV infusion beginning postoperatively and continued for 6 hours.
- Postpartum hemorrhage (treatment): 1000 mg IV or 10 mg/kg/dose given within 3 hours of birth. May give a second dose if bleeding continues after 30 minutes or if bleeding stops and restarts within 24 hours of the first dose.
- Traumatic hemorrhage: 1000 mg IV followed by a continuous IV infusion of 1000 mg over 8 hours.

.../Cont.
COMPATIBILITY, STABILITY

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules and vials at room temp. Protect from light.
- Compatible with D5W and NS.
- Stable for 24 hours at room temp in D5W or NS at a concentration of 2 mg/mL in PVC bags.
- Stable for 24 hours at room temp or in the fridge in D5W at concentrations of 10 mg/mL and 20 mg/mL in PVC, polyethylene and polypropylene bags.
- Stable for 7 days at room temp or in fridge in NS at concentrations of 10 mg/mL and 20 mg/mL in PVC, polyethylene and polypropylene bags.
- Stable for 90 days at room temp or in the fridge, protected from light, in NS at a concentration of 15.4 mg/mL in ethylene/propylene copolymer plastic containers.
- Do not mix with solutions containing penicillin.

MISCELLANEOUS

- The preparation should not be given to patients with acquired disturbances of colour vision, active thromboembolic disease, a history or risk of thrombosis or subarachnoid hemorrhage.
- Tranexamic acid is 10 times more potent in vitro than aminocaproic acid.

REFERENCES

2, 3, 4, 5, 40, 95, 96, 135, 200, 208, 232, 395, 396.
TRASTUZUMAB

Herceptin ®, Herceptin ® SC, HER2 monoclonal antibody

Antineoplastic, Monoclonal antibody

Do NOT confuse trastuzumab (Herceptin ®) with Kadcyla ® trastuzumab emtansine. Trastuzumab does not contain a cytotoxic component, unlike Kadcyla ® trastuzumab emtansine. These products have different uses, toxicities, administration and dosages. This monograph is specific to TRASTUZUMAB.

INDICATIONS
- Treatment of patients with early or metastatic breast cancer whose tumours overexpress the HER2 protein (IV and SC formulations).
- Treatment of patients with metastatic gastric cancer whose tumours overexpress the HER2 protein (IV formulation only).

ADMINISTRATION
- There are 2 formulations: one for IV use and one for SC use. Both are available as vials. Ensure using the correct vial.
  - For IV use: using the IV formulation, reconstitute each 440 mg vial by slowly injecting 20 mL of bacteriostatic water for injection; for patients with known hypersensitivity to benzyl alcohol, reconstitute with SWFI. Final concentration: 21 mg/mL. Do NOT shake the vial; swirl gently. Allow the vial to stand for 5 minutes before withdrawing dose.
  - Intermittent IV Infusion (mandatory): further dilute dose in 250 mL NS. Gently invert the bag to mix solution. Do NOT shake to avoid foaming. Refer to Dosage section for administration rate. Observe patient closely during infusion, for 60 minutes after the first infusion and 30 minutes after subsequent infusions.
  - SC: using the SC formulation, withdraw the dose into a syringe. If the dose is not administered immediately, replace transfer needle by a syringe closing cap to avoid drying of the solution. Inject into thigh over 2-5 minutes. Alternate between right and left thigh, giving new injections at least 2.5 cm from previous site; do not administer into areas where skin is red, bruised, tender or hard.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: infrequent with IV use; may occur with SC administration; anaphylaxis, urticaria, erythema, rash, pruritus, angioedema, bronchospasm, dyspnea, wheezing, hypoxia, acute respiratory distress, hypotension, and tachycardia; reactions may be fatal; more common with initial IV infusion and generally occur during or immediately after IV infusion but may be delayed more than 6 hours post-infusion; rarely, symptoms may improve initially but then worsen up to one week post-infusion. Consider permanently discontinuing therapy in cases of severe reactions; however, some patients have been successfully re-treated with administration of premedication (antihistamines +/- corticosteroids); others have experienced a second severe reaction. Patients with dyspnea at rest due to advanced cancer and/or cormorbidities are at increased risk of a fatal infusion reaction; use with extreme caution.
- Infusion-related reactions (IV administration): serious reactions are less frequent and may manifest as hypersensitivity (see above). Mild to moderate reactions are more common and involve chills, fever, rigors, nausea, vomiting, pain, headache, cough, dizziness, dyspnea, rash and asthenia; more common with first infusion; management includes interrupting and/or reducing infusion rate and controlling symptoms with diphenhydramine, acetaminophen, meperidine, beta-agonists, and corticosteroids, prn; infusion may be restarted once symptoms have resolved. Patient should be observed for 24 hours for infusion-related reactions. Consider premedication with antihistamines +/- corticosteroids and reducing infusion rate for subsequent infusions.
  - Cardiovascular: arrhythmia, tachycardia, hypertension, hypotension; may be serious.
- GI: nausea, vomiting, diarrhea.
- Respiratory: cough, dyspnea, pneumonia, acute respiratory distress; may be serious.
- Local reactions: pain, erythema, edema, hemorrhage, inflammation.
### TRASTUZUMAB

**Other Names:** Herceptin®, Herceptin® SC, HER2 monoclonal antibody  
**Classification:** Antineoplastic, Monoclonal antibody

.../Cont.

### DOSAGE

- **Early breast cancer:**
  - Using the IV formulation: loading dose of 4 mg/kg IV over 90 minutes followed by weekly infusions of 2 mg/kg over 30 minutes if the loading dose was well tolerated, otherwise give over 90 minutes, OR
  - Using the IV formulation: loading dose of 8 mg/kg IV over 90 minutes followed by 6 mg/kg every 3 weeks over 30 minutes if the loading dose was well tolerated, otherwise give over 90 minutes, OR
  - Using the SC formulation: 600 mg SC every 3 weeks.

- **Metastatic breast cancer:**
  - Using the IV formulation: loading dose of 4 mg/kg IV over 90 minutes followed by weekly infusions of 2 mg/kg over 30 minutes if the loading dose was well tolerated; otherwise give over 90 minutes, OR
  - Using the SC formulation: 600 mg SC every 3 weeks.

- **Metastatic gastric cancer:** using the IV formulation: loading dose of 8 mg/kg IV over 90 minutes followed by 6 mg/kg every 3 weeks over 30 minutes if the loading dose was well tolerated; otherwise give over 90 minutes.

- If IV treatment is stopped for more than one week, the loading dose should be readministered.

- Dose interruption or permanent discontinuation is required depending on the severity of cardiotoxicity; consult manufacturer’s monograph.

- Consult specific protocol.

### COMPATIBILITY, STABILITY

*Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility*

**IV formulation:**
- Store vials between 2-8°C.
- Reconstituted vial with bacteriostatic water for injection is stable for 28 days in the fridge; if reconstituted with SWFI, use immediately and discard the vial.
- Diluted solution is stable for 24 hours in the fridge, at room temp, or at 30°C in NS in PVC, polyethylene, polyolefin, or polypropylene bags.
- Stable for 28 days at room temp and in the fridge (both with or without protection from light) in NS at concentrations of 0.4 mg/mL and 4 mg/mL in polypropylene bags.
- Stable for 180 days at room temp and in the fridge protected from light in NS at concentrations of 0.8 mg/mL and 2.4 mg/mL in polyolefin bags.
- Not compatible with D5W.

**SC formulation:**
- Store vials between 2-8°C. Protect from light. Do not freeze.
- The solution in the vial should be colourless to yellowish, clear to opalescent.
- Stable for 48 hours in the fridge in polypropylene syringes and then stable for a single excursion of 6 hours at room temp (up to 30°C) in diffused daylight.

### MISCELLANEOUS

- Baseline cardiac assessment and monitoring of cardiac function during treatment should be done for all patients.

### REFERENCES

1, 5, 40, 95, 129, 135, 165, 208.

Full revision 2019
INDICATIONS

- Long-term treatment of pulmonary arterial hypertension (PAH) in New York Heart Association Class II to IV patients who did not respond adequately to conventional therapy.

ADMINISTRATION

- Continuous IV infusion: **continuous BP monitoring, cardiac monitoring, while patient is in critical care areas.** Dilute the appropriate amount of drug in a 50 or 100 mL size reservoir (in PVC, polypropylene or glass) with a sufficient volume of SWFI or NS to achieve the desired total volume of the reservoir and concentrations as low as 0.004 mg/mL. Refer to Dosage section and to manufacturer’s product monograph to get the equations for calculation of the concentration to prepare and selection of appropriate vial. The IV infusion should be administered through a central venous catheter; a temporary peripheral IV cannula, placed in a large vein, may be used for short term administration. Using a peripheral access for more than a few hours may be associated with an increased risk of thrombophlebitis. Use an infusion set with a 0.2 or 0.22 micron in-line filter and an anti-siphon valve.

- SC infusion (preferred): **continuous BP monitoring, cardiac monitoring, while patient is in critical care areas.** Transfer solution from vial into a syringe reservoir (in PVC, polypropylene or glass) without any dilution. Refer to Dosage section and to manufacturer’s product monograph to get the equation for calculation of the SC infusion rate. Rotate site in case of continued local reactions.

- Must be administered by an infusion pump (SC and IV).

- Avoid abrupt cessation or sudden large rate reductions as symptoms of PAH can recur promptly.

POTENTIAL ADMINISTRATION HAZARDS

- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: pruritus, rash, angioedema.
- Cardiovascular: hypotension, vasodilation, edema.
- GI: nausea, diarrhea.
- CNS: headache.
- Hematologic: increased risk of bleeding, due to antiplatelet effect.
- Jaw pain.
- Local reactions: very frequent, can be severe: pain, erythema, induration, rash; thrombophlebitis with peripheral IV access.

DOSEAGE

- Initial IV or SC infusion rate: 1.25 ng/kg/min; if not tolerated initially, reduce rate to 0.625 ng/kg/min.
- Adjust rate slowly to achieve improvement of PAH symptoms with an acceptable side effect profile. Titrato in increments of no more than 1.25 ng/kg/min at weekly intervals for the first 4 weeks and then no more than 2.5 ng/kg/min at weekly intervals. Limited experience with rates greater than 40 ng/kg/min.
- If infusion is interrupted then restarted within a few hours, may resume infusion at the same rate; interruptions for longer periods may require retitration.
- Dosage in renal impairment: no dosage adjustment necessary; titrate rate slowly.
- Dosage in hepatic impairment: for patients with mild to moderate impairment, initial rate of 0.625 ng/kg/min (calculate rate by using ideal body weight) and titrate cautiously; not studied in patients with severe hepatic impairment.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 15-30°C. Excursions are permitted between 2-30°C.
- Do not use a vial for more than 30 days after initial puncture.
- Undiluted solution is stable for 72 hours at 37°C in PVC, glass or polypropylene syringes.
- Undiluted solution is stable for 60 days at 4°C, 23°C, and 37°C in plastic syringe pump reservoirs.
- Prior to administration, diluted solution is stable for 4 hours at room temp or 24 hours in the fridge in NS or SWFI at concentrations as low as 0.004 mg/mL in PVC, polypropylene or glass containers. Administration time limit for the diluted solution is 48 hours at 40°C.

MISCELLANEOUS

REFERENCES

1, 4, 5, 40, 95, 135, 143, 208.
INDICATIONS

- Treatment of adults with chronic moderate to severe plaque psoriasis who are candidates for phototherapy or systemic therapy.
- Treatment of adolescents (12 years of age and older) with chronic moderate to severe plaque psoriasis who are not controlled by or are intolerant to phototherapy or other systemic therapy.
- Treatment of adults with active psoriatic arthritis, as monotherapy or in combination with methotrexate.
- Treatment of adults with moderate to severe Crohn’s disease who had an inadequate response or are intolerant to other therapies.

ADMINISTRATION

- Do NOT shake. Inspect solution before administration; do NOT use if cloudy or discoloured.
- Intermittent IV infusion: from a 250 mL NS or 1/2 NS bag, withdraw a volume equal to the drug volume for the patient’s dose, then add the drug dose to the bag. Gently mix. Administer through a 0.2 micron in-line low protein-binding filter over at least 60 minutes.
- SC: upper arm, buttock, top of the thigh or abdomen. Rotate injection site.

POTENTIAL ADMINISTRATION HAZARDS

- Hypersensitivity: anaphylaxis, angioedema, rash, urticaria.
- GI: nausea, vomiting, diarrhea.
- CNS: headache.
- Dermatologic: pruritus; exfoliative dermatitis and erythrodermic psoriasis within a few days of administration (rare but can be severe).
- Respiratory: nasopharyngitis, upper respiratory tract infection, oropharyngeal pain.
- Infection (may be severe), arthralgia, back pain, fatigue.
- Local reactions: pain, swelling, erythema, pruritus, induration, irritation, hemorrhage, hematoma.

DOSAGE

Adults:
- Plaque psoriasis:
  - Patients weighing 100 kg or less: 45 mg SC at weeks 0, 4, and then every 12 weeks.
  - Patients weighing over 100 kg: 45 mg or 90 mg SC at weeks 0, 4, and then every 12 weeks.
  - Patients who inadequately respond to dosing every 12 weeks may be treated as often as every 8 weeks.
  - In case of an interruption in therapy, retreatment may be initiated at the initial dosing interval.
- Psoriatic arthritis:
  - Patients weighing 100 kg or less: 45 mg SC at weeks 0, 4, and then every 12 weeks.
  - Patients weighing over 100 kg: 90 mg SC at weeks 0, 4, and then every 12 weeks.
- Crohn’s disease:
  - Induction dose:
    - Patients weighing 55 kg or less: 260 mg IV.
    - Patients weighing over 55 kg up to 85 kg: 390 mg IV.
    - Patients weighing over 85 kg: 520 mg IV.
  - Maintenance: 90 mg SC, starting 8 weeks after IV induction dose, then every 8-12 weeks.
  - In case of an interruption in therapy, resume SC treatment every 8 weeks.

Pediatrics (12-17 years of age):
- Plaque psoriasis: administer the weight-appropriate dose at weeks 0, 4, and then every 12 weeks.
  - Patients weighing less than 60 kg: 0.75 mg/kg SC.
  - Patients weighing 60-100 kg: 45 mg SC.
  - Patients weighing over 100 kg: 90 mg SC.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and prefilled syringes between 2-8°C; protect from light; do not freeze. Do not shake.
- The ready-to-use solution for SC administration is colourless to light yellow and may contain a few small translucent or white particles of protein.
- The solution in the vial for IV administration is clear, colourless to light yellow.
- The diluted IV solution is stable for 8 hours at room temp in NS or 1/2NS.

MISCELLANEOUS
- The needle covers for the prefilled syringes contain latex.
- Patients should be tested for tuberculosis prior to initiating therapy.
- Do not administer in case of clinically important active infection.
- Do not administer live vaccines during the treatment with ustekinumab.

REFERENCES
1, 5, 95, 135.
INDICATIONS
- Treatment of various seizure disorders in patients for whom oral administration is temporarily not feasible.

ADMINISTRATION
- Intermittent IV infusion: dilute dose in at least 50 mL of D5W, NS or RL; infuse over at least 60 minutes, at a rate not exceeding 20 mg/min.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, drug reaction with eosinophilia and systemic symptoms (DRESS).
- GI: nausea.
- CNS: dizziness, headache, somnolence.
- Endocrine and metabolic: elevated amylase, pancreatitis (can be fatal).
- Hematologic: thrombocytopenia (dose-related).
- Hepatic: hepatic failure.
- Weakness, tremors.
- Local reactions: pain, inflammation.

DOSAGE
- Conversion from oral to IV route: total IV daily dose should be equivalent to total oral daily dose of valproic acid or divalproex, given in divided doses at the same frequency or q6h.
- Initial dose of 10-15 mg/kg/day IV; may be increased by 5-10 mg/kg/day at weekly intervals until desired clinical response. Total daily dose exceeding 250 mg should be divided into 2-4 doses.
- Maximum recommended dosage is 60 mg/kg/day IV.
- Use of IV valproic acid for greater than 14 days has not been studied.
- Dosage in renal impairment: no dosage adjustment necessary; may need to monitor free valproate serum levels due to decreased protein binding.
- Dosage in hepatic impairment: not recommended in patients with hepatic disease or significant hepatic dysfunction.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials at room temp.
- Stable 6 days at room temp in D5W, NS, or RL at a concentration of 1.6 mg/mL in glass, polyethylene, polyolefin, and PVC containers.

MISCELLANEOUS
- Switch to oral therapy as soon as possible.
- Monitor serum levels when converting from oral to IV or from IV to oral therapy.
- Not recommended in patients with acute head trauma and for prophylaxis of post-traumatic seizures.

REFERENCES
1, 4, 5, 40, 95, 135. * Available via Health Canada’s Special Access Programme

* Available via Health Canada’s Special Access Programme
VANCOMYCIN

Vancocin ®
Antibiotic - glycopeptide

INDICATIONS
- Treatment of severe gram-positive infections that are resistant to other antibiotics.
- Perioperative prophylaxis in patients undergoing surgical procedures when first-line beta-lactam antibiotics (e.g., cefazolin, cefuroxime) cannot be used because of severe beta-lactam hypersensitivity.
- Prevention of neonatal Group B streptococcal (GBS) disease in penicillin-allergic patients at high risk of anaphylaxis, when bacteria is resistant to clindamycin or susceptibility is unknown.

ADMINISTRATION
- Reconstitute each vial of 500 mg, 1 g and 5 g with 10 mL, 20 mL and 100 mL of SWFI, respectively, to obtain a concentration of 50 mg/mL. The 10 g vial should be reconstituted with 95 mL of SWFI to obtain a 100 mg/mL solution.
- Intermittent IV infusion (preferred): dilute in 100-500 mL of NS or D5W to a maximum concentration of 5 mg/mL (10 mg/mL in fluid-restricted patients); maximum recommended infusion rates vary from 10 mg/min to 500 mg/30 min. At TOH, follow the following infusion guide, depending on the dose to be administered:

<table>
<thead>
<tr>
<th>Dose</th>
<th>1000 mg or less</th>
<th>1001-1500 mg</th>
<th>1501-2000 mg</th>
<th>2001-2500 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration time</td>
<td>60 min.</td>
<td>90 min.</td>
<td>120 min.</td>
<td>150 min.</td>
</tr>
</tbody>
</table>

- Continuous IV infusion: may dilute daily dosage in sufficient quantity of NS, D5W or RL to run by continuous drip over 24 hours.
- Must be administered by an infusion pump.
- Consult TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis) for specific dosing regimens and infusion time.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: anaphylaxis, rash, urticaria, exfoliative dermatitis, angioedema, Stevens-Johnson syndrome, toxic epidermal necrolysis, vasculitis, drug reaction with eosinophilia and systemic symptoms (DRESS).
- Infusion-related reactions: usually with rapid administration; hypotension (can be severe), throbbing pain in the back and neck, red-neck or red-man syndrome, nausea, chills, fever, wheezing, dyspnea, pruritus, urticaria and macular rashes. Slower administration may minimize or avoid these effects.
- To reduce risk of red-neck or red-man syndrome, vancomycin should be infused as per recommendations in the Administration section. Pre-treatment with antihistamines may attenuate (but not eliminate) this reaction.
- Renal and auditory toxicity with repeated dosage.
- Local reactions: pain, inflammation, induration, erythema. Thrombophlebitis (can be severe); can be minimized by increasing dilution and by alternating the injection site.

DOSAGE
- Adults:
  - Treatment: 15-20 mg/kg/dose IV q8-12h (usually 1000 mg q12h), based on actual body weight rounded to the nearest 250 mg. For complicated infections in seriously ill patients, may consider a loading dose of 25-30 mg/kg IV to achieve target level rapidly. For obese patients, use actual body weight for initial dosing and adjust according to serum levels.

.../Cont.
DOSAGE (Cont.)

- Perioperative prophylaxis: 15 mg/kg/dose IV, based on actual body weight, rounded to the nearest 250 mg; infusion to be started 1-2.5 hours (depending on dose administered) before skin incision. At TOH, follow this dosing guide for preoperative prophylaxis, depending on patient’s weight, as per TOH policy 00611 (Administration of preoperative antibiotics for surgical prophylaxis):

<table>
<thead>
<tr>
<th>Weight</th>
<th>Less than 90 kg</th>
<th>90-129 kg</th>
<th>130-149 kg</th>
<th>150 kg and greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td>1000 mg IV</td>
<td>1500 mg IV</td>
<td>2000 mg IV</td>
<td>2500 mg IV</td>
</tr>
</tbody>
</table>

- Prevention of neonatal GBS disease: 1000 mg IV q12h intrapartum.

- Pediatrics (infants and children): 40-60 mg/kg/day IV in divided doses q6-8h. Adjust dose according to levels; maximum of 1000 mg/dose; usual maximum daily dose of 4000 mg.

- Dosage in renal impairment: at TOH, 15-20 mg/kg/dose IV (usually 1000 mg) with dosing interval according to creatinine clearance:
  
<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>greater than 60</th>
<th>60-40</th>
<th>39-30</th>
<th>29-15</th>
<th>less than 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval (hr)</td>
<td>8-12</td>
<td>12-24</td>
<td>24-36</td>
<td>48</td>
<td>72</td>
</tr>
</tbody>
</table>

- Hemodialysis patients: vancomycin is usually dosed after or during the last 60-90 minutes of each hemodialysis session; consult specialized references for dosage adjustment and monitoring of serum levels.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials at room temp.
- Reconstituted solution is stable for 2 weeks at room temp and in the fridge.
- Stable for 24 days at room temp and 30 days in the fridge in NS at concentrations of 4 and 5 mg/mL in PVC containers.
- Stable for 17 days at room temp and 30 days in the fridge in D5W at a concentration of 4 mg/mL in PVC containers.
- Stable for 17 days at room temp and 58 days in the fridge in D5W at a concentration of 5 mg/mL in PVC containers.
- Stable for 57 days in the fridge in D5W at a concentration of 10 mg/mL in PVC containers.
- Stable for 24 hours at room temp and 96 hours in the fridge in RL at concentrations up to 5 mg/mL.
- Incompatible with alkaline solutions.

MISCELLANEOUS

- A target range of 10-20 mg/L for trough levels is recommended to decrease risk of resistance and to improve clinical outcomes; the upper end of the range (15-20 mg/mL) is recommended for complicated infections.

REFERENCES

INDICATIONS
- For the immunization against varicella in individuals 12 months of age and older.
- For preventing or reducing the severity of varicella if given within 3 to 5 days after exposure to varicella to healthy, previously unvaccinated individuals 12 months of age and older.

ADMINISTRATION
- Reconstitute with provided diluent; mix well until complete dissolution (by shaking Varilrix™, by gently mixing Varivax ® III).
- SC: Varilrix™: outer aspect of the upper arm (deltoid region); Varivax ® III: outer aspect of the upper arm (preferably) or the anterolateral aspect of the thigh.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, pruritus, Stevens-Johnson syndrome, erythema multiforme, urticaria, anaphylaxis.
- Fever.
- Varicella-like rash (generalized or at injection site), appearing within 5 to 30 days after immunization.
- Local reactions: pain, swelling, erythema, induration, pruritus, stiffness, hematoma, rash, numbness.

DOSAGE
- 0.5 mL SC per dose.
- For healthy patients of all age groups: administer two doses within a minimum interval of 4 weeks between doses.
- For patients with chronic conditions, intervals between the doses may be longer. Consult the Canadian Immunization Guide for specific recommendations.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Varilrix™:
- Store vials containing the vaccine between 2-8°C; may also be kept in the freezer. Diluent may be stored between 2-8°C or at room temp.
- Reconstituted solution is stable for 90 minutes at room temp and 8 hours in the fridge; the solution may vary from clear peach to pink.

Varivax ® III:
- Store vials containing the vaccine between 2-8°C and protect from light; may also be kept in the freezer; multiple temperature excursions up to 25°C are allowed for a cumulative period not exceeding 6 hours. Diluent may be stored between 2-8°C or at room temp.
- Reconstituted solution is stable for 90 minutes at room temp; the solution should be clear, colourless to pale yellow.
### MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- The varicella virus vaccine is a live attenuated vaccine.
- Administration should be delayed during an acute febrile illness or active infection; immunization of immunocompromised individuals should be evaluated on a case-by-case basis, based on the type of immunodeficiency and degree of immunosuppression.
- Contains trace amounts of neomycin (Varilrix™, Varivax ® III) and gelatin (Varivax ® III).
- Do not use salicylates for 6 weeks following vaccination.
- Varicella virus vaccine is contraindicated in pregnant women. Pregnancy should be avoided for one month after vaccination.
- Interchangeability between Varilrix™ and Varivax ® III has not been studied.
- Inadvertent IM administration would provide similar seroconversion to that observed with SC administration.

### REFERENCES

1, 5, 31, 95, 135.
**INDICATIONS**

- For the control of GI bleeding, including from esophageal varices.
- For the treatment of vasodilatory shock.
- Symptomatic control of diabetes insipidus.
- Prevention and control of abdominal distension.
- To dispel interfering gas shadows in abdominal radiographic procedures.
- As an alternative to epinephrine in the setting of cardiac arrest.

**ADMINISTRATION**

- IV direct: physician only in setting of cardiac arrest; administer undiluted; at TOH, may dilute dose in 10 mL NS.
- Continuous IV infusion: physician to be present for initiation of therapy; dilute in D5W or NS to a concentration of 0.1 to 1 unit/mL; at TOH, withdraw 50 mL from a 250 mL bag of D5W or NS and discard, then add 20 units to the bag to obtain a 0.1 unit/mL concentration. Infuse as indicated in Dosage section.
- Continuous intra-arterial infusion: physician only.
- IM, SC.

**POTENTIAL ADMINISTRATION HAZARDS**

- **High alert medication**: consult Corporate policy 01636 (High alert medications).
- Hypersensitivity: anaphylaxis, urticaria, bronchoconstriction, angioedema, fever, rash.
- Cardiovascular: vasoconstriction, decrease in blood flow, cardiac arrest, cardiac dysrhythmia, reduced cardiac output and coronary vasoconstriction which could lead to anginal attacks and cardiac ischemia.
- GI: nausea, vomiting, flatulence, abdominal cramps.
- CNS: throbbing headache, tremor, vertigo.
- Dermatologic: sweating, pallor, gangrene.
- Hematologic: thrombosis.
- Water intoxication syndrome: somnolence, listlessness, headache, seizures, coma, hyponatremia, confusion, anuria, weight gain.

**DOSE**

- GI bleed, including from esophageal varices: initial continuous IV infusion of 0.2-0.4 units/min (12-24 units/hr); if bleeding is uncontrolled, may progressively increase to a suggested maximum of 1 unit/min (60 units/hr). A bolus dose of 20 units IV over 20-30 minutes may be given, but is probably not necessary. After the bleeding has been controlled for 12 hours, the vasopressin dose may be decreased by 50% and then the infusion discontinued within the next 12-24 hours. Vasopressin has been infused into the superior or inferior mesenteric artery at a rate of 0.1-0.5 units/min (6-30 units/hr) to control bleeding.
- Vasodilatory shock: continuous IV infusion of 0.01-0.1 units/min (0.6-6 units/hr) has been used.
- Diabetes insipidus: 5-10 units IM/SC 2-4 times daily as needed. Range of 5-60 units daily.
- Abdominal distension: 5 units IM/SC initially, repeated q3-4h. Dose may be increased to 10 units if needed.
- Radiographic procedures: 5-10 units IM/SC at 2 hours and at 30 minutes prior to exam.
- Cardiac arrest: 40 units IV as a single dose.

.../Cont.
VASOPRESSIN
Pressyn ® AR
Antidiuretic hormone, Vasopressor

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store at room temp. Protect from light and heat. Do not freeze.
- Stable for 18 hours at room temp and 24 hours in the fridge in NS or D5W at concentrations between 0.1-1 unit/mL.

MISCELLANEOUS

REFERENCES
1, 5, 6, 40, 95, 135, 208, 331, 366, 367.
INDICATIONS
- For the rapid conversion of paroxysmal supraventricular tachycardia to sinus rhythm.
- For temporary control of rapid ventricular rate in atrial flutter or atrial fibrillation not associated with accessory bypass tracts.

ADMINISTRATION
- IV direct: physician for first dose only; RN may administer subsequent doses; cardiac monitoring, blood pressure monitoring. Undiluted; inject over at least 2 minutes (over at least 3 minutes in the elderly).

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: broncholaryngeal spasm, urticaria, pruritus, anaphylaxis, angioedema, Stevens-Johnson syndrome, erythema multiforme.
- Cardiovascular: hypotension, bradycardia, asystole, tachycardia, worsening of heart failure and rhythm disturbances. Verapamil-induced hypotension, bradycardia and asystole may be controlled with IV calcium or vasoconstrictors.
- GI: nausea, abdominal discomfort.
- CNS: headache, dizziness, seizures (rare).
- Hepatic: increase in LFTs.

DOSAGE
Adults:
- Initial dose of 2.5-10 mg OR 0.075-0.15 mg/kg IV.
- Repeat dose of 5-10 mg (0.075-0.15 mg/kg) IV 15-30 minutes after the first dose if the initial response is not adequate, up to a maximum total dosage of 20 to 30 mg.

Pediatrics:
- Less than 1 year of age: initial dose of 0.1-0.2 mg/kg (usually 0.75 to 2 mg) IV; maximum dose of 0.2 mg/kg and 2 mg. Repeat same dose 30 minutes after the first dose if response is not adequate.
- 1 to 15 years of age: 0.1-0.3 mg/kg (usually 2 to 5 mg) IV; maximum 5 mg. Repeat dose (up to a maximum of 10 mg) 30 minutes after the first dose if response is not adequate.
- Adolescents older than 15 years of age: 5-10 mg (range of 0.075-0.3 mg/kg) IV. Repeat dose (up to a maximum of 10 mg) 15-30 minutes after the first dose if the response is not adequate.
- Dosage in renal impairment: monitor carefully as the effect of single doses may be prolonged; if repeat doses are required, smaller doses should be given.
- Dosage in hepatic impairment: reduce dose by 50% in patients with cirrhosis and monitor closely. Otherwise, monitor carefully as the effect of single doses may be prolonged; if repeat doses are required, smaller doses should be given.

COMPARATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules and vials at room temp. Protect from light. Do not freeze.
- Compatible with NS, D5W, Ringer’s, RL.
- Incompatible with solutions with a pH of greater than 6.

MISCELLANEOUS
- Concomitant use of IV verapamil with IV beta-blockers (propranolol, metoprolol, etc.) may cause significant cardiac depression. Therefore, co-administration (within a few hours) is contraindicated.

REFERENCES
1, 2, 4, 5, 40, 102, 135, 200.

Full revision 2019
INDICATIONS
- Treatment of predominantly classic subfoveal choroidal neovascularization in patients with age-related macular degeneration, pathologic myopia or presumed ocular histoplasmosis.

ADMINISTRATION
- Reconstitute the 15 mg vial with 7 mL of SWFI. Final concentration is 2 mg/mL. Protect solution from light.
- Intermittent IV infusion: dilute dose with D5W to obtain a final volume of 30 mL. A free-flowing IV line should be established before starting verteporfin. It is recommended that the largest arm vein possible, preferably the antecubital vein, be used for the infusion; avoid small veins in the back of the hand. Infuse over 10 minutes (3 mL/min) using an appropriate syringe pump and in-line filter of 1.2 microns. Protect from light during administration. Monitor the infusion line carefully during administration.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: rash, urticaria, pruritus, dyspnea, flushing, sweating, dizziness, syncope, headache.
- Cardiovascular: chest pain, vasovagal reactions, blood pressure and heart rate changes.
- Dermatologic: photosensitivity.
- Ophthalmic: blurred vision, flashes of light, decreased visual acuity, visual field defects, eye pain.
- Back pain during administration.
- Local reactions: pain, edema, inflammation, rash, hemorrhage, discoloration. In case of extravasation, severe pain, inflammation, swelling, discoloration at the injection site or necrosis can occur, especially if affected area is exposed to light. In this case, stop the infusion immediately, protect the site from direct light until swelling and discoloration dissipate and apply cold compresses.

DOSAGE
- 6 mg/m² IV. If bilateral treatment is required, initial treatment to the second eye is performed 1 week after treatment of the first eye, if treatment to first eye was well tolerated. Subsequent unilateral or concurrent bilateral treatments can be repeated every 3 months prn, up to 2 years’ duration.
- In order to activate the drug, light therapy from a nonthermal diode laser is to be initiated 15 minutes after the start of the verteporfin infusion.
- Dosage in hepatic impairment: use with caution in patients with moderate impairment or biliary obstruction as it has not been studied in these populations; contraindicated in patients with severe hepatic impairment.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 20-25°C.
- Reconstituted solution is stable for 4 hours between 20-25°C, protected from light; the solution is opaque dark green.
- Stable for 4 hours between 20-25°C, protected from light, in D5W.
- Incompatible with saline solutions; do not use parenteral solutions other than D5W.

MISCELLANEOUS
- Contraindicated in patients with porphyria.
- Care should be taken to avoid exposure of skin or eyes to direct sunlight, bright indoor light, or prolonged exposure to light from light-emitting medical devices for 2 days.
- If outdoor activity is essential during the first 2 days, protective clothing completely covering the whole body and dark sunglasses must be worn. Sunscreens are not effective protection.
- Patients should not stay in the dark and should be encouraged to expose their skin to ambient indoor light, as it will help inactivate the drug in the skin through a process called photobleaching.
- If emergency surgery is required with 48 hours of administration, internal tissues should be protected from intense light as much as possible.

REFERENCES
1, 5, 40, 95, 135.
INDICATIONS

ADMINISTRATION
- Intermittent IV infusion: dilute in 25-50 mL of NS or D5W; infuse over 5-30 minutes. Avoid using larger volumes of diluent and longer infusion times as these can increase risk of vein irritation and extravasation.
- FOR IV USE ONLY. Fatal if given by intrathecal route.

POTENTIAL ADMINISTRATION HAZARDS
- High alert medication: consult Corporate policy 01636 (High alert medications).
- Cytotoxic drug: consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: rash, toxic epidermal necrolysis.
- Cardiovascular: hypertension, arterial thromboembolism.
- GI: nausea, vomiting.
- CNS: parotid gland pain, jaw pain, tumour pain, malaise, paresthesia.
- Hematologic: leukopenia, thrombocytopenia.
- Respiratory: shortness of breath, bronchospasm.
- Tumour lysis syndrome: hyperuricemia; can be minimized with allopurinol, hydration and alkalinization of urine.
- Local reactions: phlebitis, irritation.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Range of 3-18.5 mg/m² IV every 1-4 weeks. Dosage adjustments may be required, depending on toxicity.
- Maximal weekly recommended dose: 18.5 mg/m² IV.
- Dosage in hepatic impairment:
  - Bilirubin 25-50 mcmol/L or up to 2.5 x ULN
  - greater than 50 mcmol/L or greater than 2.5 x ULN
  - Consult specific protocol.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 2-8°C. Protect from light. Do not freeze.
- Stable for 7 days in the fridge protected from light in D5W or NS at a concentration of 0.1 mg/mL in PVC containers.

REFERENCES
1, 2, 4, 5, 95, 129, 135, 165, 208, 320.

Full revision 2019
INDICATIONS

ADMINISTRATION
- Intermittent IV infusion: dilute with 25-50 mL of NS or D5W; infuse over 5-15 minutes. During administration, it is suggested to observe the IV site for extravasation.
- FOR IV USE ONLY. Fatal if given by intrathecal route.

POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- Hypersensitivity: anaphylaxis, rash, edema.
- Cardiovascular: myocardial infarction (rare), hypertension, hypotension.
- GI: nausea, vomiting, constipation, abdominal pain, paralytic ileus.
- CNS: seizures (rare), hallucinations, peripheral neuropathy, jaw pain, joint pain, insomnia, agitation, headache, ataxia.
- Renal: urinary retention.
- Respiratory: shortness of breath, bronchospasm (acute and severe).
- Tumour lysis syndrome: hyperuricemia; can be minimized with allopurinol, hydration and alkalization of urine.
- Fever, sweating.
- Local reactions: chemical phlebitis; pain, redness at injection site.
- Extravasation hazard: vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

DOSAGE
- Adults: 0.8-1.4 mg/m² OR 2 mg IV every 1 to 7 weeks.
- Pediatrics: weighing over 10 kg: 1-2 mg/m² IV every 1-3 weeks.
  - weighing 10 kg or less: 0.03-0.05 mg/kg IV every 1-3 weeks.
- Some regimens may cap dose at 2 mg IV.
- Combination with L-asparaginase: administer vincristine 12-24 hours prior to L-asparaginase.
- Dosage in hepatic impairment:
  - Bilirubin 25-50 mcmol/L or up to 2.5 x ULN: 50% of usual dose
  - greater than 50 mcmol/L or greater than 2.5 x ULN: 25% of usual dose
- Dosage adjustment may be required, depending on toxicity.
- Consult specific protocol.
COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store vials between 2-8°C. Protect from light. Do not freeze.
- Stable for 7 days in the fridge followed by 2 days at room temp in NS at a concentration between 0.01-0.12 mg/mL in PVC containers.
- Stable 7 days in the fridge protected from light in D5W at a concentration of 0.02 mg/mL in PVC containers.
- Stable for 84 days at room temp and in the fridge protected from light in NS at concentrations of 0.01, 0.025, and 0.05 mg/mL in polyolefin containers.
- Stable for 24 hours at room temp exposed to light in D5W at a concentration of 0.02 mg/mL in polyolefin containers.
- Stable for 7 days at room temp in NS or D5W at concentrations of 0.001 and 0.02 mg/mL in polyethylene or glass containers.

MISCELLANEOUS
- Contains mannitol.

REFERENCES
1, 2, 4, 5, 129, 135, 165, 320.
### VINORELBINE

**Navelbine ®**

**Antineoplastic**

## INDICATIONS
- Treatment of other cancers such as cervical, small cell lung and ovarian cancers.

## ADMINISTRATION
- **Intermittent IV infusion:** dilute with 50 mL of D5W, NS, 1/2NS, D5-1/2NS, Ringer’s, RL to obtain a concentration of 0.5-2 mg/mL; infuse over 6-10 minutes into the tubing of a freely running IV solution of D5W or NS and then flush line with at least 75-125 mL of D5W or NS.
- **Continuous IV infusion:** dilution and infusion time as per protocol.
- **FOR IV USE ONLY.** Fatal if given by intrathecal route.

## POTENTIAL ADMINISTRATION HAZARDS
- **High alert medication:** consult Corporate policy 01636 (High alert medications).
- **Cytotoxic drug:** consult Corporate policy 00230 (Cytotoxic and hazardous drug waste and spills) AND Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).
- **Hypersensitivity:** anaphylaxis, rash, pruritus, urticaria, angioedema.
- **Cardiovascular:** chest pain.
- **GI:** nausea, vomiting, constipation, diarrhea, abdominal pain, anorexia, mucositis.
- **CNS:** peripheral neuropathy.
- **Hematologic:** anemia, leukopenia, neutropenia, granulocytopenia.
- **Hepatic:** elevated AST and bilirubin.
- **Renal:** elevated serum creatinine.
- **Respiratory:** acute shortness of breath, severe bronchospasm.
- **Myalgia, arthralgia, asthenia, fatigue, fever.**
- **Local reactions:** pain, erythema, vein discolouration, phlebitis. May be minimized by administering over 6-10 minutes and by flushing the vein with 100 mL of fluid before administration followed with at least 75-125 mL (up to 400 mL) of fluid after its completion.
- **Extravasation hazard:** vesicant. Consult the extravasation section of the Nursing policy 01651 (Cytotoxic agents and hazardous drugs: safe handling, administration and disposal).

## DOSAGE
- 8 to 35 mg/m² IV (most common is 25 to 30 mg/m² IV) every 1-3 weeks.
- **Dosage in hepatic impairment:**
<table>
<thead>
<tr>
<th>Bilirubin (mcmol/L)</th>
<th>% of usual dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-50</td>
<td>50%</td>
</tr>
<tr>
<td>greater than 50</td>
<td>25%</td>
</tr>
</tbody>
</table>
- **Dose adjustments may be required, depending on toxicity.**
- Consult specific protocol.

## COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- **Store vials between 2-8°C.** Protect from light. Do not freeze. Colour change from colourless to dark yellow or light amber should not prevent its use.
- **Unopened vials are stable for 72 hours at 25°C.**
- **Stable for 24 hours between 5-30°C in D5W, NS, 1/2NS, D5-1/2NS, Ringer’s, RL at concentrations between 0.5-2 mg/mL in PVC bags.**
- **Stable for 7 days in the fridge protected from light in D5W at a concentration of 0.5 mg/mL in PVC containers.**
- **Stable for 3 days in the fridge protected from light in NS at a concentration of 0.5 mg/mL in PVC containers.**
- **Stable for 5 days at 24°C exposed to fluorescent light in D5W or NS at a concentration of 0.5 mg/mL or 2 mg/mL in PVC containers.**

## MISCELLANEOUS

## REFERENCES
1, 4, 5, 6, 95, 129, 135, 165, 208, 320.

Full revision 2019
INDICATIONS
- Treatment of pernicious anemia and other macrocytic, megaloblastic anemias resulting from vitamin B₁₂ deficiency when GI absorption is impaired or oral therapy is not possible.
- Used in conjunction with an oral radiolabelled dose of vitamin B₁₂ in the Schilling test to study vitamin B₁₂ absorption and diagnose pernicious anemia.

ADMINISTRATION
- IM.
- SC (deep): avoid dermis or upper SC tissue.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity: pruritus, urticaria, anaphylaxis.
- GI: mild transient diarrhea.
- Electrolyte disturbances: hypokalemia, occurs early in therapy in patients with megaloblastic anemia.
- Usually non toxic, even in large doses.

DOSAGE
Adults:
- Pernicious anemia: 100 mcg IM/SC once daily for 6-7 days followed by either 1) 100 mcg IM/SC every 2 days for 6-7 days, then 100 mcg IM/SC every 3-4 days for 2-3 weeks or 2) 200 mcg IM/SC once weekly. When blood components have normalized, the maintenance dose is 100 mcg IM/SC once monthly. Alternate dosing: 1000 mcg IM/SC once daily for 3-7 days followed by 1000 mcg IM/SC once weekly for 3-4 weeks followed by a maintenance dose of 1000 mcg IM/SC once monthly.
- Vitamin B₁₂ deficiency: 30-100 mcg IM/SC once daily for 5-10 days. When clinical symptoms have improved and blood components have normalized, the maintenance dose is 100-200 mcg IM/SC once monthly.
- Schilling test: 1000 mcg IM as a single dose.

Pediatrics:
- Pernicious anemia: 30-50 mcg IM/SC once daily for at least 2 weeks, until a total dose of 1000-5000 mcg has been administered. Maintenance dose of 100 mcg IM/SC once monthly.
- Vitamin B₁₂ deficiency: 0.2 mcg/kg/day IM/SC for 2 days, followed by 1000 mcg IM/SC once daily for 2-7 days, then 100 mcg IM/SC once weekly for 4 weeks. Maintenance dose of 100 mcg IM/SC once monthly. Alternate dosing: 1000 mcg IM/SC once daily for 10-15 days, followed by a maintenance dose of at least 60 mcg IM/SC once monthly.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and ampoules between 15-30°C. Protect from light.

MISCELLANEOUS
- High oral doses (1000-2000 mcg/day) may be more cost effective than parenteral administration for maintenance therapy of pernicious anemia.

REFERENCES
1, 2, 5, 82, 95, 137, 328.
**INDICATIONS**
- Prevention and treatment of ascorbic acid deficiency, including scurvy, and treatment of surgical wounds and severe burns, when oral administration is not possible or when malabsorption is suspected.

**ADMINISTRATION**
- Manipulate ampoules and vials carefully as increased pressure may develop during storage, especially if stored at room temp.
- Intermittent IV infusion: dilute in 50-100 mL of NS or D5W to obtain a final concentration between 1 and 25 mg/mL; infuse slowly at a rate of 33 mg/min for patients 11 years of age and older, 3.3 mg/min for those between 1 and less than 11 years of age, and 1.3 mg/min for those between 5 and less than 12 months old.
- IM (preferred).
- SC.

**POTENTIAL ADMINISTRATION HAZARDS**
- GI: diarrhea with large doses.
- CNS: dizziness or faintness with too rapid IV administration.
- Renal: renal calculi with large doses or with doses greater than 100 mg administered in hemodialysis patients.
- May precipitate gouty arthritis in susceptible patients when large doses are used.
- Local reactions: pain and swelling at site of injection.

**DOSEAGE**
**Adults:**
- Prevention of deficiency: 70-150 mg IM/IV/SC daily.
- Prevention of deficiency in hemodialysis patients: 60-100 mg IV once daily.
- Scurvy: 100-250 mg IM/IV/SC 1 to 2 times daily for several days up to 3 weeks OR 300-1000 mg IM/IV/SC daily.
- Wound healing: usual dose of 300-500 mg IM/IV/SC daily for 7-10 days pre- and post-operatively.
- Severe burns: 200-2000 mg IM/IV/SC daily; dose may be determined by extent of tissue injury.

**Pediatrics:**
- Scurvy: 100-300 mg IM/IV per day, in divided doses for several days OR initial dose of 100 mg IM/IV/SC 3 times daily for 7 days followed by 100 mg IM/IV/SC once daily, usually for 1-3 months.
- Dosage in renal impairment: use with caution due to increased risk of acute or chronic oxalate nephropathy.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store ampoules between 15-30°C and vials between 2-8°C. Protect from light. Do not freeze.
- Sensitive to air and alkaline pH.
- Stable for 24 hours at room temp protected from light in NS and D5W at concentrations of 1.25 and 10 mg/mL.
- Stable for 24 hours at room temp in D10W, D5-1/2NS, Ringer’s and RL at a concentration of 1.25 mg/mL.

**MISCELLANEOUS**
- Ampoules contain sulphites.
- Each 1000 mg of injectable ascorbic acid contains approximately 5 mmol of sodium.
- May interfere with laboratory tests based on oxidation-reduction reaction (e.g., blood and urine glucose testing, nitrite and bilirubin levels, leukocyte count). Delay test until 24 hours after last dose.
- May interfere with stool occult blood tests. Delay test 48-72 hours after last dose.

**REFERENCES**
1, 4, 5, 82, 95, 135, 208.
**INDICATIONS**

- In hemorrhagic situations due to overdose of vitamin K antagonists (VKA) such as warfarin.
- For rapid reversal of warfarin or other VKA activity prior to surgery.
- Prevention and treatment of hemorrhagic disease of the newborn.
- Treatment and prevention of hypoprothrombinemia secondary to factors limiting absorption, synthesis or activity of vitamin K.

**ADMINISTRATION**

- IV direct (not preferred): physician or RN; in adults, dilute with at least 10 mL of NS, D5W or D5-NS; in neonates, administer undiluted; do not exceed rate of 1 mg/min (to avoid severe reactions).
- Intermittent IV infusion: in adults, dilute in at least 50 mL of NS, D5W or D5-NS and administer over at least 20 minutes; maximum rate of 1 mg/min. In the newborn, dilute in D5W to obtain a final concentration of 1 mg/mL and administer over at least 15 minutes.
- Continuous IV infusion: dilute in up to 1000 mL of a compatible solution (usually a total parenteral nutrition (TPN) solution); rate as per solution.
- IM: erratic absorption; increased risk of hematoma. Adult and older children: inject in the buttocks; infants and young children: inject in the thigh (vastus lateralis) or deltoid region; in neonates: inject in the thigh (vastus lateralis).
- SC: erratic and unpredictable absorption.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: with IV and IM routes. Rare; rash, urticaria, anaphylactoid reactions. It seems that both vitamin K\textsubscript{1} and its solubilizer/vehicle may be responsible for the anaphylactoid reactions.
- Cardiovascular: flushing, chest pain, rapid and weak pulse, hypotension, cyanosis.
- CNS: dizziness.
- Respiratory: dyspnea.
- Hyperbilirubinemia and severe hemolytic anemia in infants following excessive doses.
- Local reactions: pain, swelling, tenderness at injection site (rare).

**DOSAGE**

**Adults:**
- Treatment of VKA-induced prothrombin deficiency: usual dose of 2.5-10 mg IV (preferred if active bleed)/SC (preferred if no bleed)/IM; rarely, doses up to 50 mg may be given. Repeat q6-12h prn. The lowest dose should be used to minimize resistance to further VKA therapy.
- Rapid reversal of VKA activity prior to urgent surgery (time prior to operating room within the next 12 hours): 5-10 mg IV. May repeat the dose prn if major surgery or if surgery within the next 6 hours.
- Treatment of hypoprothrombinemia from other causes: 2-25 mg IV/IM/SC, up to 50 mg may be given. IV route preferred if bleed, SC route is preferred if no bleed.

**Pediatrics:**
- Prophylaxis of hemorrhagic disease of the newborn: 0.5-1 mg IM (preferred)/SC within 6 hours of birth.
- Treatment of hemorrhagic disease of the newborn: 1 mg/day IV/IM; higher doses may be required if mother took anticonvulsants or VKA during pregnancy.

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<table>
<thead>
<tr>
<th>OTHER NAMES</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phylloquinone, Phytomenadione, Phytonadione, Vitamin K</td>
<td>Antidote, Vitamin</td>
</tr>
</tbody>
</table>

.../Cont.

**COMPATIBILITY, STABILITY**

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store ampoules between 15-30°C. Protect from light.
- Compatible with D5W, NS, dextrose-saline solutions, Ringer's, RL and TPN solutions.
- Use as soon as possible after mixing since very sensitive to light.

**MISCELLANEOUS**

- The injectable solution can be administered orally, undiluted or diluted in a convenient volume of water or juice. May be repeated 12-48 hours after first dose.
- The oral route offers a more predictable and quicker absorption than the SC route when used for reversal of warfarin or other VKA.
- The IV route allows a predictable and rapid reduction of the INR in 4 to 6 hours.

**REFERENCES**

1, 2, 4, 5, 40, 82, 95, 102, 135, 251, 319, 379, 384, 392, 393.
VORICONAZOLE

**INDICATIONS**
- Treatment of acute invasive aspergillosis.
- Treatment of *Candida* infections.

**ADMINISTRATION**
- Reconstitute each 200 mg vial with 19 mL of SWFI to obtain a concentration of 10 mg/mL.
- Intermittent IV infusion: dilute in 100-250 mL of a compatible IV solution to obtain a concentration of 0.5-5 mg/mL; infuse over 1-2 hours at a maximum rate of 3 mg/kg/hr.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: serious cutaneous reactions (e.g., Stevens-Johnson syndrome, erythema multiforme, toxic epidermal necrolysis).
- Infusion-related reactions: flushing, fever, sweating, tachycardia, chest tightness, dyspnea, faintness, nausea, pruritus, rash. Consider stopping the infusion if these reactions occur.
- Cardiovascular: QTc interval prolongation, arrhythmias.
- Hepatic: increase in LFTs, jaundice, hepatitis, cholestasis, fulminant hepatic failure.
- Ophthalmic: blurred vision, colour vision change, photophobia.

**DOSAGE**
- Adults and pediatrics (12 years of age and older):
  - Invasive aspergillosis: 6 mg/kg IV q12h for 2 doses followed by 4 mg/kg IV q12h; switch to oral therapy when feasible. The maintenance dose may be decreased to 3 mg/kg q12h if the drug is poorly tolerated.
  - *Candida* infections: 6 mg/kg IV q12h for 2 doses followed by 3-4 mg/kg IV q12h; switch to oral therapy when feasible. Treat for a minimum of 14 days following resolution of symptoms or following last positive culture, whichever is longer.
- Dosage in renal impairment: in patients with CrCl less than 50 mL/min, accumulation of the IV vehicle sulfobutyl ether beta-cyclodextrin (SBECD) occurs. In these patients, use of the oral formulation is preferred.
- Dosage in hepatic impairment: in patients with mild to moderate hepatic cirrhosis, use standard loading dose and reduce maintenance dose by 50%. Not studied in patients with severe hepatic cirrhosis.

**COMPATIBILITY, STABILITY**
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials between 15-30°C.
- Reconstituted solution is stable for 24 hours in the fridge as per manufacturer’s recommendation.
- Reconstituted solution is stable for 30 days at room temp.
- Stable for 15 days in the fridge in D5W at a concentration of 4 mg/mL in PVC bags.
- Stable for 11 days in the fridge, protected from light, in NS at a concentration of 0.5 mg/mL in PVC bags.
- Stable for 9 days in the fridge, protected from light, in D5W at a concentration of 0.5 mg/mL in PVC bags.
- Stable for 6 days in the fridge and 4 days at room temp, protected from light, in D5W at a concentration of 2 mg/mL in polyolefin bags.
- Stable for 8 days in the fridge or at room temp, protected from light, in NS at a concentration of 2 mg/mL in polyolefin bags.
- Compatible with NS, 1/2NS, D5W, dextrose-saline solutions, RL, D5-RL.

**REFERENCES**
1, 2, 5, 6, 40, 95, 208, 550.
ZIDOVUDINE

Azidothymidine, Retrovir ™

**INDICATIONS**
- Treatment of human immunodeficiency virus (HIV) infection when oral administration is not possible.
- Prevention of maternal-fetal HIV transmission.

**ADMINISTRATION**
- Intermittent IV infusion: must be diluted to a concentration no greater than 4 mg/mL in NS, D5-1/2NS, D5W, D5-RL or RL; infuse over 60 minutes in adults and children; infuse over 30 minutes in neonates and infants younger than 6 weeks of age for the prevention of maternal-fetal HIV transmission.
- Continuous IV infusion: dilute in compatible solution to no greater than 4 mg/mL; infuse as per Dosage section.

**POTENTIAL ADMINISTRATION HAZARDS**
- Hypersensitivity: anaphylaxis, rash.
- GI: nausea, vomiting, anorexia.
- CNS: headache, malaise, dizziness.
- Hematologic: anemia, granulocytopenia, neutropenia, macrocytosis (dose reduction or interruption may be required).
- Hepatic: lactic acidosis, severe hepatomegaly with steatosis (rare).
- Respiratory: cough.
- Fatigue, fever, myalgia.
- Local reactions: phlebitis, irritation, pain at injection site.

**DOSAGE**

**Adults and adolescents weighing 30 kg and above:**
- Treatment of HIV infection:
  - Usual dose of 1-2 mg/kg IV q4h.
  - Dosage in renal impairment: if CrCl is below 15 mL/min or hemodialysis or peritoneal dialysis, administer 1 mg/kg IV q6-8h.
  - Dosage in hepatic impairment: data are lacking; use with caution in patients with severe impairment and monitor for hematologic toxicity.
- Prevention of maternal-fetal HIV transmission: during labour and delivery, loading dose of 2 mg/kg IV administered over 60 minutes followed by a continuous IV infusion of 1 mg/kg/hr until clamping of the umbilical cord. For elective cesarean delivery, begin IV treatment 3 hours before surgery. For urgent cesarean delivery, administer loading dose then proceed to delivery.

**Pediatrics weighing less than 30 kg:**
- Treatment of HIV infection:
  - Neonates to less than 4 weeks of age: 3 mg/kg IV q12h. Premature neonates require dosage adjustment in the first 6-10 weeks of life.
  - 4 weeks to less than 3 months of age: 9 mg/kg IV q12h.
  - 3 months of age and older: 120 mg/m² IV (maximum 160 mg/dose) IV q6h OR, for those who are at least 6 months old, a continuous IV infusion of 15-42 mg/m²/hr OR 0.5-1.4 mg/kg/hr can be considered.
  - Neonatal dosing for prevention of maternal-fetal HIV transmission: 1.5 mg/kg IV q6h OR 3 mg/kg IV q12h. Premature neonates may require a dosage adjustment. Begin infusion as soon as possible after birth, preferably within 2-12 hours of birth and continue until 4-6 weeks of age.
  - Dosage in renal impairment: in severe impairment (CrCl below 10 mL/min), administer 50% of the normal dose q8h.
  - Dosage in hepatic impairment: data are lacking; use with caution in patients with severe impairment and monitor for hematologic toxicity.

.../Cont.
## Compatibility, Stability

*(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)*

- Store vials between 15-25°C. Protect from light. Do not freeze.
- Stable for 48 hours at room temp or in the fridge in D5W at a concentration of 2 mg/mL.
- Stable for 8 days at room temp or in the fridge in D5W or NS at a concentration of 4 mg/mL in PVC containers.

## Miscellaneous

- In adults, the IV dosing regimen of 1 mg/kg IV q4h is approximatively equivalent to the oral administration of 100 mg q4h. In children, the oral dose is one-third greater than the IV dose. In neonates, the IV dose is 75% of the oral dose.
- The rubber stopper of the vial contains latex.

## References

1, 5, 6, 40, 82, 102, 135, 208, 319.
Zoledronic Acid

**Aclasta ®, Zometa ®**

**INDICATIONS**

- Treatment of tumour-induced hypercalcemia following adequate saline rehydration to restore urine output (Zometa ®).
- Treatment of bone metastases of solid tumours (including prostate cancer, breast cancer, lung cancer and renal cell carcinoma) and osteolytic lesions of multiple myeloma (Zometa ®).
- Treatment of Paget’s disease (Aclasta ®).
- Treatment of osteoporosis in men and postmenopausal women (Aclasta ®).
- Treatment and prevention of glucocorticoid-induced osteoporosis (Aclasta ®).
- Prevention of postmenopausal osteoporosis in women with osteopenia (Aclasta ®).

**ADMINISTRATION**

- Available as a concentrate of 4 mg/5 mL vial (Zometa ®) and as a ready-to-use solution of 5 mg/100 mL (Aclasta ®).
- Intermittent IV infusion: for Zometa ®, dilute dose in 100 mL of D5W or NS. For Aclasta ®, use the ready-to-use solution. Administer over at least 15 minutes.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: bronchoconstriction, urticaria, angioedema, anaphylaxis.
- GI: nausea, diarrhea, constipation.
- Electrolyte disturbances: hypocalcemia.
- Ophthalmic: eye redness, itching, pain.
- Renal: renal dysfunction, acute renal failure; risk factors include renal impairment, advanced age, concomitant nephrotoxic drugs, diuretics and dehydration.
- Flu-like symptoms (e.g., fever, chills, arthralgia, myalgia, bone pain, fatigue, headache); usually mild to moderate; occur within 3 days and normally subside within 3 days of onset. Consider premedication with acetaminophen or ibuprofen.
- Local reactions: infrequent; redness, pain, itching and swelling at infusion site.

**DOSAGE**

**Zometa ®:**

- Hypercalcemia of malignancy:
  - 4 mg IV as a single dose in conjunction with adequate hydration.
  - At least 1 week must elapse before retreatment to allow for a full response to the initial dose.
  - Dosage in renal impairment: no dosage adjustment for mild to moderate impairment; not recommended for severe impairment (CrCl less than 30 mL/min).

- Bone metastases and osteolytic lesions of multiple myeloma:
  - 4 mg IV every 3 to 4 weeks.
  - Dosage in renal impairment:

<table>
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- Treatment interruption may be required for increases in baseline serum creatinine. Treatment may be restarted when creatinine returns to within 10% of baseline value.

.../Cont.
Zoledronic Acid
Aclasta®, Zometa®
Bisphosphonate

DOSAGE

Aclasta®:
- Paget’s disease: 5 mg IV as a single dose. Treatment may be repeated once after at least 1 year in patients who relapse.
- Treatment of osteoporosis in men and postmenopausal women: 5 mg IV once a year.
- Treatment and prevention of glucocorticoid-induced osteoporosis: 5 mg IV once a year.
- Prevention of postmenopausal osteoporosis: 5 mg IV as a single dose or every 2 years.
- Dosage in renal impairment: no dosage adjustment required for mild to moderate impairment; not recommended for severe impairment (CrCl less than 35 mL/min).

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)
- Store vials and ready-to-use solution between 15-30°C.
- Stable for 14 days at room temp or in the fridge in D5W or NS at a concentration of 0.04 mg/mL in PVC bags.
- Refrigerated diluted solutions should be brought to room temp before administration.
- Incompatible with calcium-containing infusion solutions (e.g., RL).

MISCELLANEOUS
- Do not confuse Zometa® with Aclasta®. Both contain zoledronic acid; however, they have different concentrations, doses and uses and are therefore not interchangeable.
- Pre-existing hypocalcemia must be treated before initiating treatment with zoledronic acid.
- Serum creatinine, electrolytes, calcium, magnesium and phosphate should be monitored.
- Calcium and vitamin D supplementation are recommended for patients being treated for multiple myeloma, bone metastases, Paget’s disease or osteoporosis.
- When administering Aclasta®, it is recommended that patients (especially elderly patients and those receiving diuretics) drink 500 mL of fluid (such as water) before and after the administration of the drug to reduce the risk of renal toxicity.

REFERENCES
1, 5, 40, 95, 165, 515.
ZOSTER VACCINE

Do NOT confuse the zoster vaccine with the varicella virus vaccine for the prevention of chickenpox. The zoster vaccine is approximately 14 times more potent than the varicella virus vaccine. This monograph is specific to the ZOSTER vaccine.

INDICATIONS
- Prevention of herpes zoster (shingles) in immunocompetent adults aged 50 years and older.

ADMINISTRATION
- Reconstitute immediately upon removal of the refrigerator. Withdraw the entire content of the supplied diluent vial (Zostavax ® II) or adjuvant vial (Shingrix ™). Slowly inject all the diluent or adjuvant into their respective vial of lyophilized vaccine to avoid excessive foaming; gently mix.
- Zostavax ® II: SC; preferred site of injection is the deltoid area.
- Shingrix ™: IM; preferred site of injection is the deltoid area.

POTENTIAL ADMINISTRATION HAZARDS
- Hypersensitivity, including anaphylaxis.
- GI (Shingrix ™): nausea, vomiting, diarrhea, abdominal pain.
- CNS: headache.
- Zostavax ® II: pain in the extremities.
- Shingrix ™: myalgia, fatigue, shivering, fever.
- Local reactions: pain or tenderness, erythema, swelling, pruritus.

DOSAGE
- Zostavax ® II: single dose of the entire contents of the reconstituted vial (approximately 0.65 mL) SC.
- Shingrix ™: 0.5 mL IM for 2 doses: initial dose at month 0 and second dose between 2-6 months later.

COMPATIBILITY, STABILITY
(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

Zostavax ® II:
- Store Zostavax ® II vaccine vial in the fridge (between 2-8°C) until reconstitution. Store its diluent at room temp or in the fridge. Protect from light until reconstitution.
- Reconstituted vaccine solution is semi-hazy to translucent, off-white to pale yellow.
- Do not freeze the reconstituted vaccine.
- Reconstituted vaccine is stable for 30 minutes at room temp; discard if not administered within this timeframe.

Shingrix ™:
- Store Shingrix ™ vaccine and its adjuvant in the fridge (between 2-8°C) until reconstitution. Protect from light until reconstitution. Do not freeze.
- Prior to reconstitution, Shingrix ™ vaccine and its adjuvant may be stored between 8-25°C for a maximum cumulative time of 72 hours.
- Reconstituted vaccine solution is opalescent, colourless to pale brownish.
- Reconstituted vaccine is stable for 6 hours in the fridge (between 2-8°C).
## MISCELLANEOUS

- Epinephrine must be available in case of acute hypersensitivity reaction.
- Administration should be delayed if possible during an acute febrile illness or active infection of moderate to severe intensity.
- Persons with a reported history of herpes zoster can be vaccinated, if at least one year has elapsed since the episode. However, this recommendation does not include those with prior herpes zoster ophthalmicus.

**Zostavax ® II:**
- Zostavax ® II is a live attenuated vaccine.
- Contains trace amounts of neomycin and porcine gelatin.
- Contraindicated in pregnant women. Although manufacturer recommends avoiding pregnancy for 3 months following vaccination, health authorities consider that a one-month waiting period is sufficient and safe.

**Shingrix ™:**
- Shingrix ™ is an inactivated recombinant vaccine.
- Best to delay vaccination during pregnancy because of the lack of data.

## REFERENCES

1, 5, 30, 31, 112, 135, 213.
ZUCLOPENTHIXOL

Clopixol - Acuphase®, Clopixol® Depot

**INDICATIONS**

- Initial treatment of acute psychosis or for exacerbation of psychosis associated with schizophrenia (acetate salt i.e., Acuphase).
- Long term management of schizophrenia in patients who have been stabilized on oral or other short-acting antipsychotic therapy (decanoate salt i.e., Depot).

**ADMINISTRATION**

- IM: deep into the gluteal muscle; if a volume of more than 2 mL is to be injected, divide dose between 2 injection sites.

**POTENTIAL ADMINISTRATION HAZARDS**

- Hypersensitivity: rash, anaphylaxis.
- Cardiovascular: tachycardia, QT interval prolongation.
- GI: dry mouth.
- CNS: drowsiness, dizziness, extrapyramidal symptoms (e.g., akathisia, dystonia, Parkinson-like reaction).
- Endocrine and metabolic: hyperprolactinemia, galactorrhea, hyperglycemia, diabetic ketoacidosis.
- Neuroleptic malignant syndrome.
- Fatigue.
- Local reactions: skin reactions, pain.

**DOSAGE**

- Acetate (Acuphase): 50-150 mg IM; may be repeated prn at intervals of 2-3 days (some patients may need a second dose 1-2 days following the first injection), for a maximum cumulative dose of 400 mg or 4 injections. Duration of treatment with the acetate salt should not exceed 2 weeks. If treatment needs to be continued, switch to the long acting decanoate salt (Depot) or to oral tablets; refer to manufacturer’s instructions for dosage conversion tables.
- Decanoate (Depot): usual dose of 150-300 mg IM every 2-4 weeks. Some patients may require higher or lower doses and/or a more frequent administration. Refer to manufacturer’s instructions to determine the decanoate (Depot) dose when converting from oral tablets or the acetate (Acuphase). Maximum dose of 400 mg every 2 weeks.
- Dosage in renal impairment: no dosage adjustment necessary; use with caution.
- Dosage in hepatic impairment: use with caution as the drug undergoes extensive hepatic metabolism.

**COMPATIBILITY, STABILITY**

(Consult NAPRA compounding standards; information provided below refers to physical/chemical stability and not to sterility)

- Store ampoules between 15-25°C. Protect from light.
- The acetate and decanoate doses can be mixed in the same syringe and given as a single injection.

**MISCELLANEOUS**

- Peak levels occur 24-48 hours post-injection with the acetate formulation (Acuphase) and 3-7 days post-injection with the decanoate formulation (Depot).

**REFERENCES**

5, 51, 95, 135, 414.

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See Antithymocyte Globulin, Equine
Eraxis
See Anidulafungin
Erbitux
See Cetuximab
Erlzi
See Etanercept
Ergometrine
See Ergonovine
Ergonovine
EriBULin
Ertapenem
Erwinia
See Asparaginase (Erwinia)
Erythrocin
See Erythromycin
Erythromycin
Erythropoietin
Eserine Salicylate
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Esmolol
Estrogens, Conjugated
Etanercept
Ethacrynic Acid
Etanidate
Etomidate
Etomidate-Lipuro
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Etoposide
Exenatide
Extavia
See Interferon Beta

F
Fabrazyme
See Agalsidase Beta
Factor VIIA (Recombinant)
Factor VIII (Recombinant)
Factor VIII/Von Willebrand Factor Complex (Human)
Factor IX Concentrate (Human & Recombinant)
Famotidine
Faslodex See Fulvestrant
Fasturtec See Rasburicase
Fat Emulsions
Fatty Acids See Fat Emulsions
FD & C Blue No. 2 See Indigotindisulfonate Sodium
Feiba NF See Anti-Inhibitor Coagulant Complex
FentaNYL
Ferric Gluconate Complex
Ferrlecit Ferric Gluconate Complex
Fiasp See Insulin Aspart
Fibrinogen Concentrate (Human)
Filgrastim
Firazyr See Icatibant
Flagyl See MetroNIDAZOLE
Flolan See Epoprostenol
Fludarabine
Fludara See Fludarabine
Fludarabine
Flumazenil
Fluorescein
Flurorescine See Fluorescein
Fluorescite See Fluorescein
2-Fluoro-Ara-A Monophosphate See Fludarabine
Flurophuracil
5-Fluorouracil See Fluorouracil
Flupenthixol Decanoate See Flupenthixol Decanoate
Flupentixol Decanoate
Fluphenazine Decanoate
Fluviral S/F See Influenza Virus Vaccine
Fluzone See Influenza Virus Vaccine
Folate See Folic Acid
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Folinic Acid See Leucovorin Calcium
Fomepizole
Fondaparinux
Fortaz See CefTAZidime
Forteo See Teriparatide
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Goserelin
Granisetron
Grastofil See Filgrastim
Gravol See Dimenhydrinate

H
Haemophilus B Conjugate Vaccine
Halaven See EriBulIn
Haldol See Haloperidol
Haldol L.A. See Haloperidol Decanoate (Long Acting)
Haloperidol
Haloperidol Decanoate (Long Acting)
Havrix 720 Junior See Hepatitis A Vaccine
Havrix 1440 See Hepatitis A Vaccine
Helixate FS See Factor VIII (Recombinant)
Hemabate See Carboprost
Heparin
Hepatitis A Vaccine
Hepatitis B Vaccine
Herceptin See Trastuzumab
Herceptin SC See Trastuzumab
HER2 Monoclonal Antibody See Trastuzumab
Herpes Zoster Vaccine See Zoster Vaccine
Hiberix See Haemophilus B Conjugate Vaccine
Hizentra See Immune Globulin, Human (Subcutaneous)
Humalog See Insulin Lispro
Human CD52 Antibody See Alemtuzumab
Human Papillomavirus Vaccine
Human Prothrombin Complex
Humate-P See Factor VIII/Von Willebrand Factor Complex (Human)
HuMax-CD38 See Daratumumab
Humira See Adalimumab
Humulin N See Insulin NPH
Humulin R See Insulin Regular
Hycamtin See Topotecan
Hydralazine
Hydrocortisone
HYDROMORPHINE
Hydroxocobalamin
Hydroxyethyl Starch 130/0.4
HydrOXYzine
Hyoscine Butylbromide
Hyoscine Hydrobromide
Hypertonic Saline
Hypticin NPH
Hypticin Regular

I
Ibuprofen (with Arginine)
Ibuprofen (with Tromethamine)
Ibuprofen Lysine
Ibutilide
Icatilant
IC-Green
Idamycin PFS
IduRUbicIN
IdarUBICIN
IdarUCIZUmab
Ifex
Ifofsamide
IGIVnex
Imiglucerase
Imipenem
Imipenem-Cilastatin
Immune Globulin Human (Intravenous)
Immunine VH
Immune Globulin Human (Subcutaneous)
Influenza Virus Vaccine
Influvac
Innohep
Inotuzumab Ozogamicin
Insulin Aspart
Insulin Degludec
Insulin Detemir
Insulin Glargine
Insulin Glulisine
Insulin Lispro
Insulin NPH
Insulin Regular
Integri
See Eptifibatide
Interferon Alpha-2B
Interferon Beta
Interleukin II
See Aldesleukin
Intralipid
See Fat Emulsions
Intron A
See Interferon Alpha-2B
Invanz
See Ertapenem
Invega Sustenna
See Paliperidone
Invega Trinza
See Paliperidone
Ipilimumab
Irinotecan
Irinotecan (Liposomal)
Irinotecan liposome
See Irinotecan (Liposomal)
Iron Dextran Complex
Iron Isomaltoside 1000
Iron Saccharate
See Iron Sucrose
Iron Sucrose
Isoniazid
Isophosphamide
See Ifosfamide
Isoprenaline
See Isoproterenol
Isopropylnoradrenaline
See Isoproterenol
Isopropylarterenol
See Isoproterenol
Isoproterenol
Isoptin
See Verapamil
Istodax
See RomiDEPs
Isuprel
See Isoproterenol
Itraconazole

J
Jevtana
See Cabazitaxel

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**L**

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Lidocaine
Lignocaine
Lincocin
Lincomycin
Linezolid
Lipid Emulsions
Liposyn
Liraglutide
Lixisenatide
LMD-10%
Lopresor
LORazepam
Lovenox
Low Molecular Weight Dextran
Loxapac
Loxapine
Lupron
Lupron Depot
Lutrepulse

M
MabCampath
Magnesium Sulphate, Aqueous
m-AMSA
Mannitol
Marcaine
Mar-Cidofovir
Maxeran
Maxipime
Measles, Mumps and Rubella Vaccine
MedroxyPROGESTERone
Mefoxin
Melphalan
Menactra
Meningitec
Meningococcal Vaccine, Group B
Meningococcal Vaccine, Group C
Meningococcal Vaccine, Groups A, C, Y, W-135
Menjugate
Menomunue
Menveo
See Meningococcal Vaccine, Groups A, C, Y

Meperidine

Meropenem

Mesna

Methotrexate

Methotrimoprazine

Methylene Blue

Methylnaltrexone

MethylPREDNISolone (Sodium Succinate)

Metoclopramide

Metoject
See Methotrexate

Metoprolol

MetroNIDAZOLE

MgSO4
See Magnesium Sulphate, Aqueous

Micafungin

Micro+6
See Trace Metals

Midazolam

Milrinone

MitoMYcin

MitoMYcin C
See MitoMYcin

MitoXANTRONE

Mitozantrone
See MitoXANTRONE

MMR
See Measles, Mumps and Rubella Vaccine

MMR-II
See Measles, Mumps and Rubella Vaccine

Modecate
See Fluphenazine Decanoate

Monoclonal Antibody 2C4
See Pertuzumab

Monoferric
See Iron Isomaltoside 1000

Monomethyl Auristatin E
See Brentuximab Vedotin

Morphine

Movapo
See Apomorphine

Moxifloxacin

Mozobil
See Plerixafor

Mucomyst
See N-Acetylcysteine

Multivitamins

Mutamycin
See MitoMYcin

MVI-12
See Multivitamins

MVI-1000
See Multivitamins

Mycamine
See Micafungin
Mycophenolate Mofetil
Myelosan
Myleran
Myocet
Myochrysine
Myozyme

See Busulfan
See Busulfan
See DOXOrubicin (Liposomal)
See Aurothiomalate
See Alglucosidase Alfa

N
Nab-paclitaxel
Nadroparin
NAHCO$_3$
Nalbuphine
Naloxone
Nanolisosomal irinotecan
Narcan
Naropin
Natalizumab
Natrecor
Navelbine
Nebcin
NeisVAc-C
Nelarabine
NeoProfen
Neoral
Neostigmine
Neo-Synephrine
Nesiritide
Neulasta
Neupogen
Niacinamide
NiaStase RT
Nicotinamide
Nimbex
Nimenrix
Nipent
Nipride
NitroGLYCERIN
Nitroject
NitroPRUSSIDE
Nivolumab

See PACLitaxel (nanoparticle, albumin-bound)
See Sodium Bicarbonate
See Naloxone
See Ropivacaine
See Nesiritide
See Vinorelbine
See Tobramycin
See Meningococcal Vaccine, Group C
See Ibuprofen Lysine
See CycloSPORINE
See Phenylephrine
See Pegfilgrastim
See Filgrastim
See Factor Vlla (Recombinant)
See Niacinamide
See Cisatracurium
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See Pentostatin
See NitroPRUSSIDE
See NitroGLYCERIN
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PACLitaxel
PACLitaxel, Nanoparticle, Albumin-Bound
Paliperidone

PAM
2-PAM

Pamidronate
Pancreatic Polypeptide
Pancreatic Polypeptide

Pancuronium

Panitumumab

Panto IV

Pantoprazole

Panzyga

Papaverine

Paraplatin-AQ

Paricalcitol

Parvolex

Pedea

PEG Filgrastim

Pegfilgrastim

Pegylated Filgrastim

Pegylated Liposomal Irinotecan

Pembrolizumab

PEMetrexed

Penicill G

Penicillin G Benzathine

Pentacarinat

Pentamidine Isetionate

Pentamidine Isetionate

Pentavalent Antimony Compound

Pentazocine

Pentostam

Pentostatin

Pepcid

Perjeta

Persantine

Pertuzumab

Pethidine

Pharmorubicin

Phenergan
PHENobarbital
Phenobarbitone Sodium See PHENobarbital
Phentolamine
L-Phenylalanine Mustard See Melphalan
Phenylephrine
Phenytoin
Phosphate (as sodium or potassium salt)
Photofrin See Porfimer
Phyloquinone See Vitamin K₁
Physostigmine
Phytomenadione See Vitamin K₁
Phytonadione See Vitamin K₁
Piperacillin
Piperacillin/Tazobactam
Pipracil See Piperacillin
Pitocin See Oxytocin, Synthetic
Plasbumin See Albumin, Normal Human Serum
Platinol See CISplatin
Platinol-AQ See CISplatin
Plerixafor
Pneumococcal Vaccine
Pneumovax 23 (23-valent) See Pneumococcal Vaccine
Porfimer
Posanol See Posaconazole
Posaconazole
Potassium Chloride
Potassium Phosphate See Phosphate
Pralidoxime
Praxbind See IdaruCIZUmab
Precedex See Dexmedetomidine
Premarin See Estrogens, Conjugated
Pressyn AR See Vasopressin
Prevnar 13 (13-valent) See Pneumococcal Vaccine
Primacor See Milrinone
Primaxin See Imipenem
Priorix See Measles, Mumps and Rubella Vaccine
Privigen See Immune Globulin, Human (Intravenous)
Prolastin
Procytox See Cyclophosphamide
Prograf See Tacrolimus
Prolastin-C See Alpha 1-Proteinase Inhibitor
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WinRho SDF  See Rho(D) Immune Globulin (Human)
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