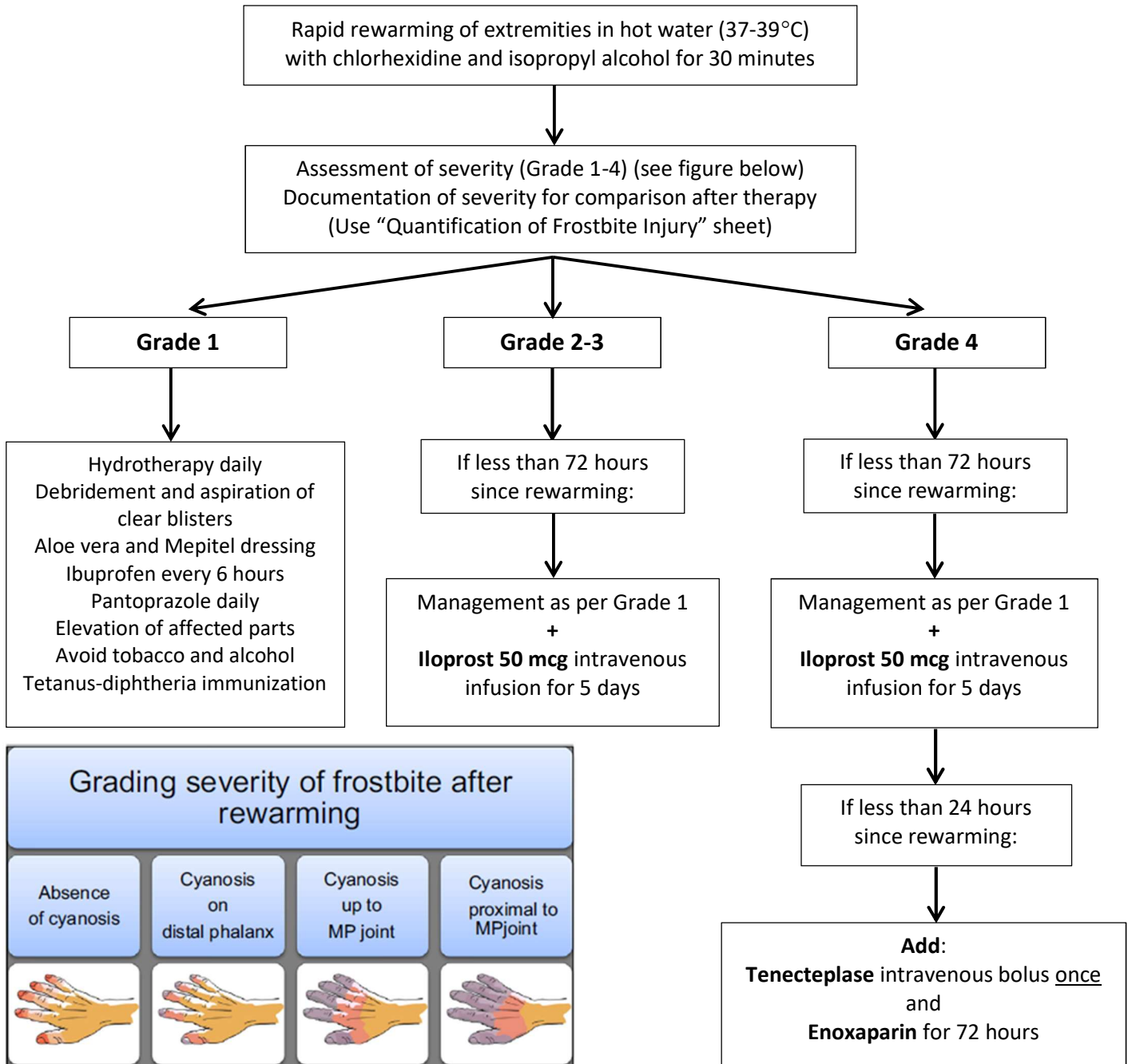










### FROSTBITE PROTOCOL



Grading severity of frostbite after rewarming			
Absence of cyanosis	Cyanosis on distal phalanx	Cyanosis up to MP joint	Cyanosis proximal to MP joint
			
			
Grade 1 No amputation of bone	Grade 2 Moderate risk of amputation	Grade 3 High risk of amputation	Grade 4 Risk of amputation 100%

*You may consult Dr. Alex Poole and Clinical Pharmacist Josianne Gauthier for guidance*

**FROSTBITE PROTOCOL  
PHYSICIAN'S PRE-PRINTED ORDERS**

\*\*\* PATIENT'S ACTUAL WEIGHT: \_\_\_\_\_ \*\*\*

**\* This is a protocol using a Special Access Program drug and off-label indication. For Adults only.  
Review medications precautions, contraindications and administration instructions.\***

**GRADE 1 - 4**

- Treatment of hypothermia and/or severe trauma takes priority

	Time	Initials
Remove jewelry or other extraneous material from the body part		
As soon as possible, initiate rapid re-warming of frostbite parts in water 37-39°C with chlorhexidine gluconate 2%/isopropyl alcohol 4% (Stanhexidine) (30 mL in portable whirlpool) until area becomes soft and pliable (30 minutes)		
Let skin air dry, do not rub. Protect from direct trauma		
Consult surgery for aspiration of clear blisters and for further wound care during hospital admission		
Elevate affected parts and avoid ambulation on thawed lower extremity (unless only distal toes affected)		
Encourage oral hydration or start warm IV normal saline boluses _____ mL/hour		
Tetanus-diphtheria (Td) adsorbed 0.5 mL intraMUSCULAR once		
Consult OT/PT for thermal injury assessment (Grade 2-4)		

- Avoid tobacco and alcohol
- Apply Mepitel dressing on each affected digit, cover with gauze, wrap with Kling and secure with tube dressing Daily (after rewarming/hydrotherapy and physician/surgeon assessment completed)
- Starting the day after rewarming (if applicable), immerse affected digits in warm tap water once daily for 30 minutes using the hydrotherapy portable whirlpool if available for 5 days (use basin or tub if not available) (no chlorhexidine required)

**MEDICATIONS**

- Aloe Vera Pure Gel (Aloex Aloe Vera Pure Gel) Apply topically on frostbitten parts Daily
- Ibuprofen 600 mg oral every 6 hours for 5 days (**Do NOT give if tenecteplase and enoxaparin ordered**)
- Morphine 5 – 10 mg oral every 4 hours as needed for pain
- Morphine 2 – 5 mg intraVENOUS every 2 hours as needed for pain
- Fentanyl 25 – 50 mcg every 5 minutes as needed for pain (maximum 150 mcg/hour)
- Pantoprazole 40 mg oral or intravenous once daily for 5 days

**GRADE 2 – 4**

- CBC, Electrolytes, BUN/Creat, PTT, INR
- Ensure staffing available to monitor patient every 15 minutes for 2 hours then every 30 minutes until end of the infusion
- ILOPROST intraVENOUS INFUSION (refer to “Iloprost Administration Instructions” sheet)**
- Obtain 1 ampoule of iloprost 50 mcg (0.5 mL) from pharmacy or Night cupboard
- Dilute 50 mcg (0.5 mL) in Dextrose 5% (D5W) 250 mL bag for a **final concentration of 0.2 mcg/mL**  
\*Requires an independent double-check \_\_\_\_/\_\_\_\_\*
- Start intraVENOUS infusion at 10 mL/hour and increase infusion rate by 10 mL/hour every 30 minutes **to a maximum of**
  - 30 mL/hour for patients 40-50 kg
  - 40 mL/hour for patients 51-74 kg
  - 50 mL/hour for patients 75 kg or more
- Continue infusion until 1 bag (50 mcg) is given**
- Repeat infusion daily for a total of 5 days. Consult pharmacist for administration times
- Measure blood pressure and heart rate every 15 minutes for 2 hours then every 30 minutes
- If headaches, tachycardia (heart rate > 100 beats/minute), palpitations, hypotension (systolic blood pressure < 90 mmHg), nausea, vomiting or facial flushing, **decrease the infusion rate by 10 mL/hour and re-assess 30 minutes later** (these are dose-related side effects; usually quickly disappear with dose reduction)
- If patient tolerates infusion well on Day 1 and 2, may initiate infusion at maximum infusion rate on Day 3, 4 and 5
- This is a Special Access Program drug requiring documentation on SAP form (Notify pharmacist)

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

PHYSICIAN'S NAME: \_\_\_\_\_ PHYSICIAN'S SIGNATURE: \_\_\_\_\_

**FROSTBITE PROTOCOL  
PHYSICIAN'S PRE-PRINTED ORDERS**

**GRADE 4 (IF LESS THAN 24 HOURS SINCE REWARMING)**

- Initiate tenecteplase **as soon as possible** within 24 hours of rewarming

	Time	Initials
<input type="checkbox"/> <b>TENECTEPLASE</b> _____ mg (recommended 0.25 mg/kg; maximum 25 mg) intraVENOUS over 5 to 10 seconds ( <b>*requires independent double-check*</b> )		/

- See contraindications below
- **Give enoxaparin within 30 minutes of giving tenecteplase**
- **Blood type and screen**

**THROMBOLYTIC THERAPY**

<b>ABSOLUTE CONTRAINDICATIONS</b> (Do <b>not</b> use if any of the following are present)	<b>RELATIVE CONTRAINDICATIONS</b>
<ul style="list-style-type: none"> <li>➤ Hypersensitivity to tenecteplase or any component of the formulation</li> <li>• Any prior intracranial hemorrhage</li> <li>• Active bleeding or bleeding diathesis (excluding menses), intracranial neoplasm / malignancy, AV malformation, aneurysm</li> <li>• Ischemic stroke within 3 months</li> <li>• Significant closed-head or facial trauma within 3 months</li> <li>• Intracranial or intraspinal surgery within 2 months</li> <li>• Severe uncontrolled hypertension (unresponsive to emergency therapy)</li> </ul>	<ul style="list-style-type: none"> <li>• History of chronic, severe, poorly controlled hypertension</li> <li>• Severe, uncontrolled hypertension (systolic BP greater than 185 and/or diastolic BP greater than 110 mmHg)</li> <li>• History of prior ischemic stroke over 3 months ago</li> <li>• Dementia, traumatic or prolonged (greater than 10 min) CPR, major surgery within 3 weeks</li> <li>• Recent (within 2 to 4 weeks) internal bleeding; non-compressible vascular punctures, active peptic ulcer</li> </ul>

Source: Tenecteplase Monograph. Vancouver Island Health Authority (VIHA) Parenteral Drug Manual. Last revised Jan 2024

**MONITORING**

- Visual assessment for signs and symptoms of bleeding, including neurological changes (e.g. headache, visual changes) every 1 hour x 24
- Baseline BP, RR and HR, then at 15 minutes post dose, then every 1 hour x 4, then every 4 hours x 24 hours
- Baseline neuro-vital signs then every hour x 4
- Assess for frank or occult blood in stool, emesis, sputum and urine for at least 72 hours after initiation of therapy

**DATE:** \_\_\_\_\_ **TIME:** \_\_\_\_\_

**PHYSICIAN'S NAME:** \_\_\_\_\_ **PHYSICIAN'S SIGNATURE:** \_\_\_\_\_

**FROSTBITE PROTOCOL  
PHYSICIAN'S PRE-PRINTED ORDERS****GRADE 4 (IF TENECTEPLASE GIVEN)**

- **Within 30 minutes of tenecteplase administration, initiate enoxaparin:**

eGFR 30 mL/min OR GREATER:

LESS THAN 75 years of age:

- Enoxaparin 30 mg intraVENOUS bolus ONCE AND
  - Enoxaparin \_\_\_\_\_ (1 mg/kg; max 100 mg) subCUTANEOUS ONCE (Administer the first subcutaneous dose with the intravenous bolus)
- THEN
- Enoxaparin \_\_\_\_\_ (1 mg/kg) every 12 hours for 5 doses

GREATER OR EQUAL TO 75 years of age:

- Enoxaparin \_\_\_\_\_ (0.75 mg/kg) subCUTANEOUS every 12 hours for 72 hours

eGFR LESS THAN 30 mL/min:

LESS THAN 75 years of age:

- Enoxaparin 30 mg intraVENOUS bolus ONCE AND
  - Enoxaparin \_\_\_\_\_ (1 mg/kg; max 100 mg) subCUTANEOUS ONCE (Administer the first subcutaneous dose with the intravenous bolus)
- THEN
- Enoxaparin \_\_\_\_\_ (1 mg/kg) every 24 hours for 2 doses

GREATER OR EQUAL TO 75 years of age:

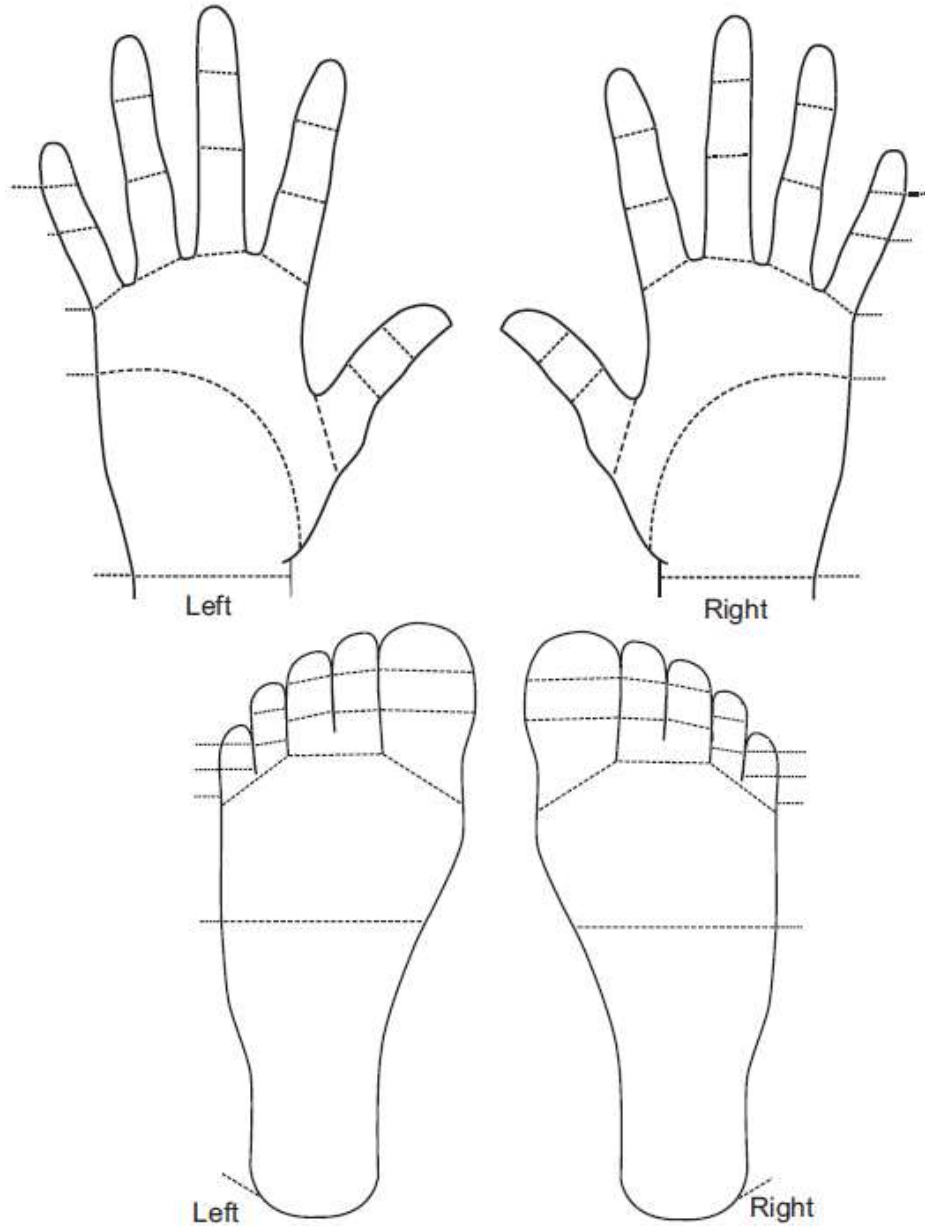
- Enoxaparin \_\_\_\_\_ (1 mg/kg) subCUTANEOUS every 24 hours for 72 hours.

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

PHYSICIAN'S NAME: \_\_\_\_\_ PHYSICIAN'S SIGNATURE: \_\_\_\_\_

**FROSTBITE PROTOCOL  
QUANTIFICATION OF FROSTBITE INJURY**

- Mark with a dark pen the extent of the injury after rewarming. Note skin changes and indicate any evidence of cyanosis and hemorrhagic blisters.
- This sheet can also be used to monitor progress and change



DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

PHYSICIAN'S NAME: \_\_\_\_\_ PHYSICIAN'S SIGNATURE: \_\_\_\_\_

## FROSTBITE PROTOCOL

### SUPPLEMENTAL INFORMATION

#### Iloprost contraindications

- Pregnancy, lactation
- Conditions where the effect of iloprost on platelets might increase risk of hemorrhage (e.g. active peptic ulcers, trauma, intracranial hemorrhage)
- Severe coronary heart disease or unstable angina
- Myocardial infarction within the last 6 months
- Acute or chronic congestive heart failure (NYHA II-IV)
- Severe arrhythmias

#### Iloprost special precautions

- Surgery should not be delayed in patients requiring urgent amputation (e.g. in infected gangrene)
- Iloprost elimination is reduced in patients with hepatic dysfunction and in patients with renal failure requiring dialysis
- In patients with low blood pressure care should be taken to avoid further hypotension and patients with significant heart disease should be closely monitored
- Monitor for possible orthostatic hypotension in patients getting up from the lying to an upright position after the end of administration
- For patients with a cerebrovascular event (e.g. transient ischemic attack, stroke) within the last 3 months a careful benefit-risk evaluation should be undertaken
- Currently only sporadic reports of use in children and adolescents are available
- The paravascular infusion of undiluted iloprost can lead to local changes at the injection site
- Oral ingestion and contact with mucous membranes must be avoided. On contact with the skin, iloprost may provoke long-lasting erythema

**Source:** Schering Company Core Data Sheet (provided by Bayer December 2014)

## ILOPROST (ILOMEDIN) ADMINISTRATION INSTRUCTIONS

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**Classification:** Prostaglandin Analogue

**Alternate name(s):** Ilomedin

**Last Revised:** December 2025

### Indications/Ordering Restrictions (iloprost)

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- **Special Access Program Drug**
- Authorized for use by Dr. Alex Poole (or in consultation with Dr. Poole) for severe frostbite ONLY

### Reconstitution & Stability (iloprost)

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- Ampoules are stored at room temperature
- Each 0.5 mL ampoule contains 50 microgram of iloprost (as iloprost trometamol)
- Dilute 50 mcg (0.5 mL) in Dextrose 5% (D5W) 250 mL bag for a final concentration of 0.2 mcg/mL
- Reconstituted solution is stable at room temperature for 24 hours

### Compatibility (iloprost)

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- Compatible with sodium chloride 0.9% (Normal Saline) and D5W
- Do not mix with other drugs; compatibility unknown

### Administration (iloprost)

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- As per YHC policy, to be administered by Registered Nurse (RN)
- Anaphylaxis precautions: have diphenhydramine, epinephrine and hydrocortisone at the bedside
- Do not handle if pregnant or breastfeeding

### Dosage (iloprost)

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- Dose range: 0.5 to 2 nanogram/kg/min
- For severe frostbite, using diluted solution of 0.2 mcg/mL, start intraVENOUS infusion at 10 mL/hour and increase rate by 10 mL/hour every 30 minutes to a maximum of:
  - 30 mL/hour for patients 40-50 kg
  - 40 mL/hour for patients 51-74 kg
  - 50 mL/hour for patients 75 kg or more
- **Continue infusion until 1 bag (50 mcg) is given**
- Repeat infusion daily for a total of 5 days. Consult pharmacist for administration times
- Measure blood pressure and heart rate every 15 minutes for 2 hours then every 30 minutes
- If headaches, tachycardia (HR > 100 beats/minute), palpitations, hypotension (SBP < 90 mmHg), nausea, vomiting or facial flushing, **decrease the infusion rate by 10 mL/hour and re-assess 30 minutes later** (these are dose-related side effects; usually quickly disappear with dose reduction)
- If patient tolerates infusion well on Day 1 and 2, may initiate infusion at maximum infusion rate on Day 3, 4 and 5

### Potential Hazards of Parenteral Administration (iloprost)

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- LOCAL SITE REACTIONS: redness and pain at the injection site
- Oral ingestion and contact with mucous membrane must be avoided. On contact with the skin, iloprost may provoke long-lasting erythema
- OTHER: allergic reactions

### Important Implications (iloprost)

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#### Side Effects Include:

- MOST COMMON: headache, facial flushing, nausea and vomiting. These are dose related, often at the start of treatment during titration and usually disappear quickly with dose reduction
- OTHER: dizziness, tingling or burning sensation, bradycardia, hypotension, diarrhea, abdominal pain, myalgias or arthralgias
- See POTENTIAL HAZARDS OF PARENTERAL ADMINISTRATION

#### Monitoring Parameters Include:

- Baseline blood pressure and heart rate every 15 minutes for 2 hours then every 30 minutes
- The possibility of orthostatic hypotension should be borne in mind in patients getting up from the lying to an upright position after the end of administration

#### Contraindications/cautions Include:

- There is a potential for increased risk of bleeding when given to patients on warfarin, heparin or platelet inhibitors like ASA or non-steroidal anti-inflammatory agents
- There is a potential for increased risk of bleeding in patients at risk of hemorrhage (e.g. active peptic ulcers, trauma, intracranial hemorrhage)
- Contraindicated in pregnant or breastfeeding women, patients with unstable angina, severe coronary heart disease, myocardial infarction within the last 6 months, acute or chronic congestive heart failure (NYHA II-IV) or severe arrhythmias

#### Other:

- Dosage reduction is required in patients with severe liver or renal disease
- ELDERS ALERT: Cases of acute pulmonary edema or heart failure in the elderly with advanced arteriosclerosis have been reported

### References

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- 1) Winnipeg Regional Health Authority Iloprost trometamol Adult Parenteral Drug Monograph
- 2) Ilomedin Package Insert. Bayer HealthCare
- 3) Schering Ilomedin Company Core Data Sheet (obtained from Bayer HealthCare December 2014)