ALBERTA PRECISION LABORATORIES
Leaders in Laboratory Medicine

BeneFIX®

APPLICABILITY: This document applies to all APL, AHS, Covenant Health, and all other health care professionals involved in the transfusion of blood components and products in Alberta.	***Other Names:*** *recombinant Factor IX, nonacog alfa* ***Company:*** *Pfizer Canada Inc.* ***Class:*** *Manufactured recombinant product*

In the event of discrepancy between APL Monograph and Manufacturer's documentation or patient resources, the APL Monograph will take precedence.

	INTRAVENOUS			OTHER		
ROUTES	**DIRECT IV**	**IV Infusion**	**Continuous Infusion**	**SC**	**IM**	**OTHER**
Acceptable Routes*	Yes**	Yes	No	NO	No	N/A

* Administration of blood components and blood products is a restricted activity. For specific conditions that apply to a profession's authorization to administer blood components and blood products, consult the applicable discipline-specific regulation under the Health Professions Act (Alberta). Health care professionals with this authorization require the applicable education, training and competency.

** Direct IV administration of blood products may be performed by health care professionals that have authorization of administration of blood products within their scope of practice.

DESCRIPTION:

- BeneFIX® is a sterile, nonpyrogenic, lyophilized powder of recombinant Factor IX.
- Available in vial sizes of 500 IU, 1000 IU, 2000 IU, and 3000IU. The reconstituted product contains approximately 100 IU/mL, 200 IU/mL, 400 IU/mL, and 600UL/mL respectively.
- Not derived from human blood and contains no preservatives.
- Also contains glycine, sucrose, L-histidine, polysorbate 80, and sodium chloride.
- BeneFIX ® is a clear, colorless solution after reconstitution.
- Latex-free

AVAILABILITY

- Supplied by Canadian Blood Services.
- Contact your local laboratory/transfusion service regarding stock availability on site.

INDICATIONS FOR USE:

- BeneFIX ® is indicated in adults and children with hemophilia B (congenital factor IX deficiency or Christmas disease) for:
  - routine prophylaxis to prevent or reduce the frequency of bleeding episodes.
  - control and prevention of bleeding episodes.
  - control and prevention of bleeding in the perioperative setting

CONTRAINDICATIONS:

- Patients with known a known hypersensitivity to the product or any ingredient in the formulation or component of the container, including hamster proteins.
- BeneFIX® is not indicated in the treatment of other factor deficiencies, treatment of hemophilia A, the reversal of coumarin-induced anticoagulation, or the treatment of bleeding due to low levels of liver-dependent coagulation factors.

WARNINGS:

- Caution should be exercised when administering this product to patients with liver disease, post-operative patients, neonates, and to patients at risk of thromboembolic phenomena or DIC due to the potential risk of thromboembolic complications.
- The formation of neutralizing antibodies (inhibitors) is a known complication in the management of patients receiving factor IX-containing products. Patients using BeneFIX® should be carefully monitored for the development of factor IX inhibitors by appropriate clinical observations and laboratory tests.
- Nephrotic syndrome has been reported following immune tolerance induction with Factor IX containing products in hemophilia B patients with Factor IX inhibitors and a history of allergic reaction to Factor IX.

DOSE (Refer to Product insert):

- Dose to be determined by the most responsible health practitioner (MHRP) only after consult with hematologist or bleeding disorders clinic.
- Refer to patient's care plan or Factor First card, if available.
- If neither are available, consult with bleeding disorders clinic or transfusion medicine physician.
- 1 IU or BeneFIX® per kg of body weight is expected to increase the circulating level of factor IX by:
  - 0.8 ± 0.2 (range 0.4 to 1.4) IU/dL in patients ≥ 15 years of age
  - 0.7 ± 0.3 (range 0.2-2.1) IU/dL in patients <15 years of age

Manufacturer Recommended Dosing:

Indication	Situation	Target (% of normal FIX)	Recommended dosing interval*
Prophylaxis		N/A	40 IU/kg every 3-4 days *In younger patients, shorter dosage intervals or higher doses may be necessary*
On-Demand	Minor Bleeding	20-30	Dose every 12-24 hours for 1-2 days
	Moderate Bleeding	25-50	Dose every 12-24 until bleeding stops and healing begins, about 2-7 days
	Major Bleeding	50-100	Dose every 12-24 hours for 7-10 days
Perioperative Management	Minor Surgery	25-50	Dose every 12-24 until bleeding stops and healing begins, about 2-7 days
	Major Surgery	50-100	Dose every 12-24 hours for 7-10 days
*In patients ≥15 years: Dose Required (IU)= Body Weight (kg) × Desired Factor IX increase (% or IU/dL) × 1.2 (IU/kg per IU/dL)			
*In patients <15 years: Dose Required (IU)= Body Weight (kg) × Desired Factor IX increase (% or IU/dL) × 1.4 (IU/kg per IU/dL)			

ADMINISTRATION:

Confirm signed consent has been obtained and documented prior to requesting blood components or products (human-source) from lab/transfusion service where possible.

Pre-Infusion:

- Ensure recent patient weight and height is on file.
- Ensure pertinent labs are available as required.
- Ensure any ordered pre-medications have been given.
- Perform pre-transfusion checks per AHS Transfusion of Blood Components and Blood Products Policy.
- Report any new onset acute illness to the authorized prescriber prior to commencing infusion.

Access:

- BeneFIX® can be given via peripheral or central venous access site.

Reconstitution Supplies:

- BeneFIX® Product (Lyophilized powder)
- 0.234% sodium chloride solution (pre-filled syringe included with product)
- Vial adapter (included with product)
- Plunger rod (included with product)
- Antiseptic swab (included with product)

Reconstitution:

- Bring the product and diluent to room temperature before reconstitution.
- Refer to Prefilled Syringe with Vial Adapter (albertahealthservices.ca)

Compatible IV Solutions:

- N/A
- Do not mix with other products, medications, or solutions.

Administration Supplies:

- Sterile infusion set (included with product)
- Sterile plastic luer-lock syringe (large enough to contain dose
- Antiseptic swab (included with product)
- Plaster (included with product)
- Gauze pad (included with product)

*Note: The pre-filled glass syringe with diluent used to reconstitute and administer product may not be compatible with all needleless connectors for intravenous catheters (e.g. ICU Medical MicroClave® Neutral Connector). You may need to withdraw reconstituted product into a sterile plastic syringe with a standard luer-lock connector. Ensure the vial adapter is used when withdrawing the solution from the vial into the syringe.

Administration:

- BeneFIX® should be administered immediately and no later than 3 hours after reconstitution.
- If product cannot be administered immediately, refer to storage and stability section below.
- Visually inspect the product for particulate matter and discoloration prior to administration. Do not use solutions that are visibly cloudy, discolored or have deposits.
- Blood should not enter the syringe, as there is a possibility of red blood cell agglutination. If red cell agglutination is observed in the tubing or syringe, discard all material and resume administration with a new BeneFIX®.

NURSING IMPLICATIONS:

Patient Monitoring:

- Vital Signs: Pre-administration**,** on completion of dose, and as patient condition requires.
- If the patient has experienced previous adverse reaction to product transfusion, or this is the first transfusion of product for patient, monitor for 30-60 minutes post-dose.

Patients receiving blood product transfusions must be observed closely for signs of any unexpected or untoward reactions. These reactions may occur during or after the infusion of blood or blood products. For follow up to a transfusion reaction see Transfusion Reactions | Alberta Health Services. Notify the transfusion service as soon as possible that an adverse reaction has occurred.

Documentation:

- Ensure documentation is completed as per the AHS Transfusion of Blood Components and Products Policy
- Start and stop time of infusion and assessment of patient tolerability should be documented in appropriate flow chart or clinical record (electronic or paper).
- Document vital signs as required in the appropriate flow chart or clinical record (electronic or paper).
- Provide patient notification of transfusion documentation where required.

Laboratory Monitoring:

- Regular determinations of the patient's factor IX plasma level are necessary for monitoring the course of therapy and calculation of appropriate maintenance doses.
- Patient should be monitored for the development of factor IX inhibitors. If the expected factor IX activity plasma levels are not attained, or if bleeding is not controlled with an appropriate dose, an assay should be performed to determine if a factor IX inhibitor is present.

POTENTIAL HAZARDS WITH PARENTERAL ADMINISTRATION:

Adverse Events

- Potential adverse events related to a blood product transfusion range in severity from minor with no sequelae to life-threatening.
- All adverse events occurring during a transfusion should be evaluated to determine whether or not the transfusion can be safely continued/restarted.
- All adverse events suspected to be related to a product transfusion (whether during or after a transfusion) must be reported to your local transfusion service.
- The most common adverse reactions observed are joint inflammation, hematoma, arthralgia, hypersensitivity, rash, pruritis, erythema, headache, pyrexia, elevated thrombin-antithrombin levels and increased blood lactate dehydrogenase.

Side Effects - Flushing - Headache - Nausea - Itching and redness at the venipuncture site	→	**Action** Slow rate of infusion
Potential Allergic Reaction - Stuffy nose - Hives/severe itching - Cough - Chest pain - Wheezing - Facial swelling - Fainting	→	**Action** **STOP** infusion **IMMEDIATELY** and contact physician

STORAGE & STABILITY:

- Store at 2-30°C until expiry.
- Reconstituted BeneFIX® must be used as soon as possible or within 3 hours of reconstitution.
- Do Not Freeze

Contact Information

Approved By: APL Transfusion Medicine Discipline Council

For questions or comments regarding this document please contact: Transfusion.SafetyTeam@aplabs.ca

REFERENCES:

Benefix ® manufacturer monograph. Available from BENEFIX (coagulation factor IX [recombinant]) | Pfizer Canada