

**AUSTRALIAN PRODUCT INFORMATION**  
**NovoSeven<sup>®</sup> RT (eptacog alfa (activated) (bhk))**  
**powder and solvent for solution for injection**

## **1 NAME OF THE MEDICINE**

Eptacog alfa (activated) (bhk)

## **2 QUALITATIVE AND QUANTITATIVE COMPOSITION**

NovoSeven<sup>®</sup> RT contains activated recombinant coagulation Factor VII of approximate molecular mass 50K Daltons produced by genetic engineering from baby hamster kidney cells (BHK cells). The recombinant coagulation Factor VIIa (rFVIIa) in NovoSeven RT is structurally very similar to human plasma-derived activated Factor VIIa.

After reconstitution with solvent, each vial contains rFVIIa 1.0 mg/mL (50,000 IU/mL), sodium chloride 2.3 mg/mL, calcium chloride dihydrate 1.5 mg/mL, glycylglycine 1.3 mg/mL, polysorbate 80 0.1 mg/mL and mannitol 25 mg/mL, sucrose 10 mg/mL, methionine 0.5 mg/mL and histidine 1.6 mg/mL.

The units of rFVIIa are international units measured with reference to the first international standard of FVIIa 89/688. These units should not be mistaken for units of other coagulation factors including FVII.

## **3 PHARMACEUTICAL FORM**

NovoSeven RT (eptacog alfa (activated) (bhk)) is supplied as a stable, sterile, freeze-dried white powder in single-use vials, and solvent, for solution for injection.

## **4 CLINICAL PARTICULARS**

### **4.1 THERAPEUTIC INDICATIONS**

NovoSeven RT is indicated for the control of bleeding and surgical prophylaxis in patients:

- with inhibitors to coagulation Factors VIII or IX;
- with congenital FVII deficiency;
- with Glanzmann's Thrombasthenia, who have antibodies to GPIIb-IIIa and/or HLA, and with past or present refractoriness to platelet transfusions.

### **4.2 DOSE AND METHOD OF ADMINISTRATION**

NovoSeven RT must be reconstituted with the sterile solvent provided and then administered by intravenous bolus injection over a period of 2-5 minutes.

Coagulation parameters should not be used to evaluate NovoSeven RT effectiveness.

#### **Dosing in children**

Current clinical experience does not warrant a general differentiation in dosing between children and adults, although children have faster clearance than adults. Therefore, higher doses of rFVIIa may be needed in paediatric patients to achieve similar plasma concentrations as in adult patients.

**Table 1: Dosage Recommendations**

Indication	Bolus Injection
<i>Inhibitors to coagulation Factors VIII or IX</i>	<p><b>Control of Bleeding:</b> 35-120µg/kg every 2-3 hours until control is achieved, then every 3-12 hours if continued treatment is necessary.</p> <p><b>Mild to Moderate Bleeding episodes:</b> Early intervention in patients with Haemophilia A or B with inhibitors has been shown to be efficacious in the treatment of mild to moderate joint, muscle and mucocutaneous bleeds. Based on clinical data two dosing regimens can be recommended:</p> <p>1) Two to three injections of 90µg/kg body weight administered at three-hour intervals.</p> <p>2) One single injection of 270µg/kg body weight.</p> <p>The duration of the self-administered treatment should not exceed 24 hours. The available data does not support the use of single dose (270µg/kg) in children &lt; 18 years of age.</p> <p><b>Prophylaxis:</b> Patients with Haemophilia A or B with inhibitors and a high bleeding frequency defined as 4 or more bleeding episodes per month can be treated with NovoSeven RT administered as a once daily dose of 90µg/kg body weight for up to three months to reduce the frequency of bleeding.</p> <p><b>Surgical Prophylaxis:</b> 35-120µg/kg every 2-3 hours for 1-2 days, then every 2-6 hours if continued treatment is necessary.</p>
<i>Factor VII deficiency</i>	15-30µg/kg body weight every 4-6 hours until haemostasis is achieved. Dose and frequency of injections should be individually titrated.
<i>Glanzmann's thrombasthenia</i>	80-120µg/kg body weight at maximum intervals of 2.5 hours. At least three doses are recommended to secure effective haemostasis. The prophylaxis of invasive/surgical procedures may require a more prolonged use of NovoSeven RT depending on the extent of the procedures.

For patients with Factor IX inhibitors or acquired antibodies to Factor VIII there is no experience of the use of rFVIIa in major surgery.

### **Reconstitution**

Always use aseptic technique. Reconstitute each vial of NovoSeven RT with the specified volume of solvent; avoid forceful impact of solvent on the powder and avoid foaming of the solution by mixing gently. The reconstituted volume contains 1.0 mg/mL rFVIIa (50,000 IU/mL) and appears as a clear colourless solution. The specified volume of solvent required for each corresponding vial of NovoSeven RT is as follows: 1.0 mg vial + 1.1 mL Histidine solvent, 2.0 mg vial + 2.1 mL Histidine solvent, 5.0 mg vial + 5.2 mL Histidine solvent, 8.0 mg vial + 8.1 mL Histidine solvent.

### **Administration**

NovoSeven RT is administered by intravenous bolus injection over a period of 2-5 minutes and should not be mixed with infusion solutions or be given in a drip. Do not use NovoSeven RT exhibiting particulates or discoloration. Each vial of NovoSeven RT contains no antimicrobial preservative and is intended for use in one patient on one occasion only. Discard any residue.

### **Instructions For Use**

#### **Introduction**

#### **READ THESE INSTRUCTIONS CAREFULLY BEFORE USING NOVOSEVEN® RT**

NovoSeven® RT is supplied as a powder. Before injection (administration) it must be reconstituted with the solvent supplied in the syringe. The solvent is a histidine solution. The reconstituted NovoSeven® RT must be injected into your vein (intravenous injection). The equipment in this package is designed to reconstitute and inject NovoSeven® RT.

You will also need an infusion set (tubing and butterfly needle), sterile alcohol swabs, gauze pads and plasters. These devices are not included in the NovoSeven® RT package.

Do not use the equipment without proper training from your doctor or nurse.

Always wash your hands and ensure that the area around you is clean.

When you prepare and inject medication directly into the vein, it is important **to use a clean and germ free (aseptic) technique**. Improper technique can introduce germs that can infect the blood.

Do not open the equipment until you are ready to use it.

**Do not use the equipment if it has been dropped, or if it is damaged.** Use a new package instead.

**Do not use the equipment if it is expired.** Use a new package instead. The expiry date is printed after 'EXP' on the outer carton, on the vial, on the vial adapter and on the pre-filled syringe.

**Do not use the equipment if you suspect it is contaminated.** Use a new package instead.

**Do not dispose of any of the items until after you have injected the reconstituted solution.**

The equipment is for single use only.

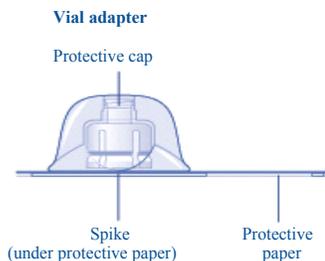
**Contents:**

The package contains:

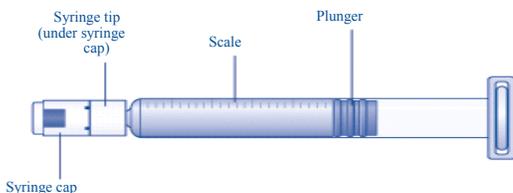
- 1 vial with NovoSeven<sup>®</sup> RT powder
- 1 vial adapter
- 1 pre-filled syringe with solvent
- 1 plunger rod (placed under the syringe)

**Overview**

**Vial with Novo Seven<sup>®</sup> powder**



**Pre-filled syringe with solvent**



**Plunger rod**



## 1. Prepare the vial and the syringe

Take out the number of NovoSeven<sup>®</sup> RT packages you need.

Check the expiry date.

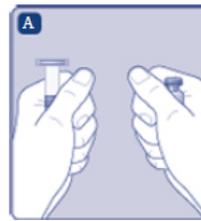
Check the name, strength and colour of the package, to make sure it contains the correct product.

Wash your hands and dry them properly using a clean towel or air dry.

Take the vial, the vial adapter and the pre-filled syringe out of the carton. Leave the plunger rod untouched in the carton.

Bring the vial and the pre-filled syringe to room temperature. You can do this by holding them in your hands until they feel as warm as your hands.

Do not use any other way to warm the vial and pre-filled syringe.



Remove the plastic cap from the vial. If the plastic cap is loose or missing, do not use the vial.

Wipe the rubber stopper with a sterile alcohol swab and allow it to air dry for a few seconds before use to ensure that it is as germ free as possible.

Do not touch the rubber stopper with your fingers as this can transfer germs.



## 2. Attach the vial adapter

Remove the protective paper from the vial adapter.

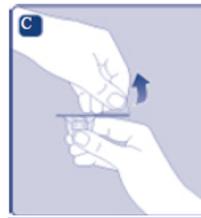
If the protective paper is not fully sealed or if it is broken, do not use the vial adapter.

Do not take the vial adapter out of the protective cap with your fingers. If you touch the spike on the vial adapter germs from your fingers can be transferred.

Place the vial on a flat and solid surface.

Turn over the protective cap, and snap the vial adapter onto the vial.

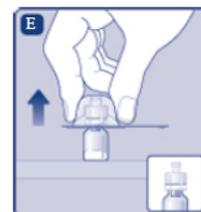
Once attached, do not remove the vial adapter from the vial.



Lightly squeeze the protective cap with your thumb and index finger as shown.

Remove the protective cap from the vial adapter.

Do not lift the vial adapter from the vial when removing the protective cap.



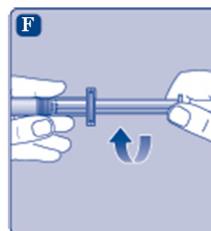
## 3. Attach the plunger rod and the syringe

Grasp the plunger rod by the wide top-end and take it out of the carton.

Do not touch the sides or the thread of the plunger rod. If you touch

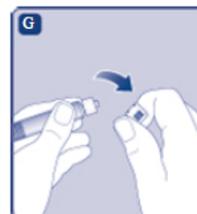
the sides or the thread, germs from your fingers can be transferred.

**Immediately** connect the plunger rod to the syringe by turning it clockwise into the plunger inside the pre-filled syringe until resistance is felt.



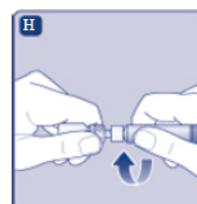
**Remove the syringe cap** from the pre-filled syringe by bending it down until the perforation breaks.

**Do not touch the syringe tip under the syringe cap.** If you touch the syringe tip, germs from your fingers can be transferred.



**If the syringe cap is loose or missing, do not use the pre-filled syringe.**

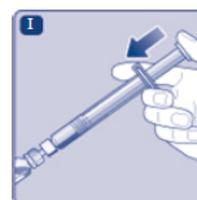
**Screw the pre-filled syringe securely** onto the vial adapter until resistance is felt.



#### 4. Reconstitute the powder with the solvent

**Hold the pre-filled syringe slightly tilted** with the vial pointing downwards.

**Push the plunger rod** to inject all the solvent into the vial.



**Keep the plunger rod pressed down and swirl** the vial gently until all the powder is dissolved.

**Do not shake the vial as this will cause foaming.**

If NovoSeven<sup>®</sup> RT is reconstituted and stored in a polypropylene syringe, it is recommended to use an in-line filter with a pore size of 25 micrometers upon administration.

**Check the reconstituted solution.** It must be colourless. **If you notice visible particles or discoloration, do not use it.** Use a new package instead.



**Use the reconstituted NovoSeven<sup>®</sup> RT at once** to avoid infections.

If you cannot use it immediately after it has been reconstituted, you should store it in the vial with the vial adapter and syringe still attached in a refrigerator at 2°C to 8°C for no longer than 24 hours. Do not freeze the reconstituted NovoSeven<sup>®</sup> RT solution and keep it protected from light. Do not store the reconstituted solution without advice from your doctor or nurse.

**i** If your dose requires more than one vial, repeat steps **A** to **J** with additional vials, vial adapters and pre-filled syringes until you have reached your required dose.

**Keep the plunger rod pushed completely in.**

**Turn the syringe** with the vial upside down.

**Stop pushing the plunger rod and let it move back on its own** while the reconstituted solution fills the syringe.

**Pull the plunger rod slightly downwards** to draw the reconstituted solution into the syringe.

In case you only need part of the reconstituted solution, use the scale on the syringe to see how much of the solution you withdraw, as instructed by your doctor or nurse.

If, at any point, there is too much air in the syringe, inject the air back into the vial.

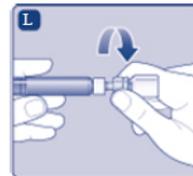
While holding the vial upside down, **tap the syringe gently** to let any air bubbles rise to the top.

**Push the plunger rod** slowly until all air bubbles are gone.



**Unscrew the vial adapter** with the vial.

**Do not touch the syringe tip.** If you touch the syringe tip, germs from your fingers can be transferred.



**Injecting NovoSeven<sup>®</sup> with pre-filled syringe via needleless connectors for intravenous (IV) catheters**

**Caution:** The pre-filled syringe is made of glass and is designed to be compatible with standard luer-lock connections. Some needleless connectors with an internal spike are incompatible with the pre-filled syringe. This incompatibility may prevent administration of the drug and/or result in damage to the needleless connector.

Follow the instructions for use for the needleless connector. Administration through a needleless connector may require withdrawal of the reconstituted solution into a standard 10 mL sterile luer-lock plastic syringe. This should be done right after step J.

### **5. Inject the reconstituted solution**

NovoSeven<sup>®</sup> RT is now ready to inject into your vein.

Inject the reconstituted solution as instructed by your doctor or nurse.

Inject slowly over 2 to 5 minutes.

Injecting the solution via a central venous access device (CVAD) such as a central venous catheter or a subcutaneous port:

Use a clean and germ free (aseptic) technique. Follow the instructions for proper use for your connector and CVAD in consultation with your doctor or nurse.

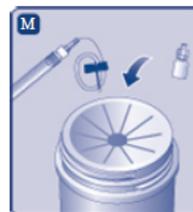
Injecting into a CVAD may require using a sterile 10 mL plastic syringe for withdrawal of the reconstituted solution.

If the CVAD line needs to be flushed before or after NovoSeven<sup>®</sup> RT injection, use sodium chloride 9 mg/mL solution for injection.

## **Disposal**

**After injection, safely dispose** of the syringe with the infusion set, the vial with the vial adapter, any unused NovoSeven<sup>®</sup> RT and other waste materials as instructed by your doctor or nurse.

Do not throw it out with the ordinary household waste.



**Do not disassemble the equipment before disposal.**

**Do not reuse the equipment.**

## **4.3 CONTRAINDICATIONS**

NovoSeven RT is contraindicated in patients with:

- hypersensitivity to rFVIIa or any of the components of NovoSeven RT.
- hypersensitivity to mouse, hamster or bovine proteins.

## **4.4 SPECIAL WARNINGS AND PRECAUTIONS FOR USE**

### **General**

Patients who receive NovoSeven RT should be kept under close observation in case they develop signs and symptoms of untoward activation of the coagulation system or thrombosis. Any findings of this nature indicate that the dosage should be reduced or treatment stopped, depending on the patient's symptoms.

In pathological conditions in which tissue factor may be expressed more extensively than considered normal, there may be a potential risk of development of thrombotic events or induction of disseminated intravascular coagulation (DIC) in association with rFVIIa treatment. Such situations may include patients with advanced atherosclerotic disease, crush injury, septicaemia or DIC.

Because of the risk of thromboembolic complications, caution should be exercised when administering NovoSeven RT to patients with a history of coronary heart disease, to patients with liver disease, to patients undergoing and following major surgery, to neonates, or to patients at risk of thromboembolic phenomena or disseminated intravascular coagulation. In each of these situations, the potential benefit of treatment with NovoSeven RT should be weighed against the risk of these complications.

Caution should be exercised in prescribing NovoSeven RT for patients who have significant hypersensitivity to platelets and/or blood products.

As recombinant coagulation factor VIIa contains trace amounts of mouse IgG protein (maximum of 1.2 ng/mg rFVIIa), bovine IgG protein (maximum of 30 ng/mg rFVIIa) and hamster and other bovine proteins (maximum of 19 ng BHK protein/mg rFVIIa), there is a remote possibility that patients treated with NovoSeven RT may develop hypersensitivity to these proteins. In such cases, standard medical treatment should be considered.

If allergic or anaphylactic-type reactions occur, the administration should be discontinued immediately. In case of anaphylactic shock, standard medical treatment for shock should be implemented.

Patients should be informed of the early signs of hypersensitivity reactions. If such symptoms occur, the patient should be advised to discontinue use of the product immediately and contact their physician.

NovoSeven RT should only be administered after guidance from the prescribing physician.

In case of severe bleeds, the product should be administered in hospitals preferably specialised in treatment of haemophilia patients with coagulation factor VIII or IX inhibitors, or if not possible in close collaboration with a physician specialised in haemophilia treatment.

If bleeding is not kept under control, hospital care is mandatory. Patients/carers should inform the physician/supervising hospital at the earliest possible opportunity about all usage of NovoSeven RT.

Factor VII deficient patients should be monitored for prothrombin time and factor VII coagulant activity before and after administration of NovoSeven RT. In case the factor VIIa activity fails to reach the expected level or bleeding is not controlled after treatment with the recommended doses, antibody formation may be suspected and analysis for antibodies should be performed. Thrombosis has been reported in FVII deficient patients receiving rFVIIa during surgery but the risk of thrombosis in factor VII deficient patients treated with rFVIIa is not well characterised [See Pharmacodynamic Properties, , Adverse Effects-Post Marketing Surveillance].

Patients with rare hereditary problems of fructose intolerance, glucose malabsorption or sucrose-isomaltase insufficiency should not take this medicine.

#### **Concomitant use with other formulations**

Concomitant use of NovoSeven RT with other formulations of NovoSeven is not recommended due to potential dosing errors based on different concentrations.

#### **Use in the elderly**

Clinical experience with administration of a single dose of 270µg/kg body weight is limited. Patients with vascular disease may be at increased risk of thrombotic adverse events.

#### **Paediatric use**

Evidence for the safety and effectiveness of rFVIIa has been obtained in the age groups up to adolescence (up to 16 years of age). When dosed on a body weight basis, the efficacy and safety of rFVIIa appear to be comparable in adult and paediatric patients.

No long term studies of the effects of regular use of rFVIIa in children have been performed. The effect of rFVIIa on growth and growth spurts has not been clearly identified.

#### **Effects on laboratory tests**

The relationship between the prothrombin time (PT), activated partial thromboplastin time (aPTT) and levels of the plasma FVII clotting activity (FVII:C) has been investigated in one core laboratory. *The therapeutic range has not been identified for any of the assays.* Therefore coagulation parameters should be used only as an adjunct to the evaluation of clinical haemostasis to monitor the effectiveness and treatment schedule of NovoSeven RT in patients.

FVII:C was measured in a one step coagulation system containing FVII-deficient plasma (immunodepleted, Novo Nordisk A/S) and rabbit brain thromboplastin (type C, Manchester Comparative Reagents Ltd., UK). Coagulation was started by adding thromboplastin and Ca<sup>++</sup>. Pooled citrated plasma from healthy normal subjects was used as calibrator and was assigned an arbitrary potency of 1 U/mL.

The prothrombin time (PT) shortens to 7 seconds and seems to reach a plateau at plasma FVII:C levels of approximately 5 U/mL. Data indicate that a clinical improvement is associated with a shortening of the PT of 3 - 4 seconds from baseline, and that this shortening is maintained throughout the treatment with therapeutic doses. The PT cannot be used to differentiate plasma FVII:C levels > 5 U/mL. The PT assay is performed according to the instructions given in the kit "IL Test™ PT-Fibrinogen: Calcium thromboplastin for the simultaneous in vitro determination of Prothrombin Time (PT) and Fibrinogen in plasma" from Instrumentation Laboratory. Note that penicillins cause a reduction in prothrombin time.

Although administration of rFVIIa shortens the aPTT, normalisation is usually not observed in doses shown to induce clinical improvement. Experience so far indicates that a shortening of 15 - 20 seconds was associated with clinical improvement. It is not known if aPTT is helpful in the monitoring of treatment. The aPTT assay is performed according to the instructions given in the kit "IL Test™ APTT-Micronized Silica: Cephalin with micronized silica for the in vitro determination of activated partial thromboplastin time (APTT) in plasma" from Instrumentation Laboratory.

For all the assays different thromboplastins may give different results.

In patients with a severe FVII-deficiency, replacement therapy with rFVIIa in doses of 15 to 30 µg/kg at 4-6 hour intervals has been shown to significantly shorten or normalise prothrombin time.

#### **4.5 INTERACTIONS WITH OTHER MEDICINES AND OTHER FORMS OF INTERACTIONS**

The risk of a potential interaction between NovoSeven RT and coagulation Factor concentrates is unknown. Simultaneous use of prothrombin complex concentrates, activated or not, should be avoided.

Anti-fibrinolytics have been reported to reduce blood loss in association with surgery in haemophilia patients, especially in orthopaedic surgery and surgery in regions rich in fibrinolytic activity, such as the oral cavity. Experience with concomitant administration of anti-fibrinolytics and rFVIIa treatment is, however, limited.

There are no clinical data available on interaction between rFVIIa and rFXIII. Based on a non-clinical study it is not recommended to combine rFVIIa and rFXIII. A potential synergistic effect of combined treatment with rFXIII and rFVIIa in an advanced cardiovascular model in the cynomolgus monkey resulted in exaggerated pharmacology (thrombosis and death) at a lower dose level than when administering the individual compounds.

#### **4.6 FERTILITY, PREGNANCY AND LACTATION**

##### **Effects on fertility**

A reproduction study in male and female rats concluded that intravenous administration of rFVIIa at dose levels up to 3.0 mg/kg body weight/day (150,000 IU/kg body weight/day) had no effect upon mating performance, fertility or litter parameters.

##### **Use in pregnancy – Pregnancy category B1**

Teratology studies in rats and rabbits at rFVIIa doses up to 6 and 5 mg/kg/day IV, respectively, showed no adverse effects on litter parameters and fetuses. The rat and rabbit doses of 6 and 5 mg/kg/day, respectively, corresponds to approximately 2.5 and 1.8 times the estimated human exposure at the maximum recommended therapeutic dose, based on AUC.

As a precautionary measure it is preferable to avoid the use of rFVIIa during pregnancy. Data on a limited number of exposed pregnancies within approved indications indicate no adverse effects of rFVIIa on pregnancy or on the health of the foetus/new-born child. To date, no other relevant epidemiological data are available and there are no adequate or well-controlled studies in pregnant women. rFVIIa should only be given in pregnancy if clearly needed.

##### **Use in lactation.**

It is not known whether rFVIIa is excreted in human breast milk, but since many drugs are, caution should be exercised when rFVIIa is administered to lactating women.

The excretion of rFVIIa in milk has not been studied in animals. A decision on whether to continue/discontinue breast-feeding or to continue/discontinue therapy with rFVIIa should be made taking into account the benefit of breast-feeding to the child and the benefit of rFVIIa therapy to the mother.

#### 4.7 EFFECTS ON ABILITY TO DRIVE AND USE MACHINES

No studies on the effect on the ability to drive and use machines have been performed.

#### 4.8 ADVERSE EFFECTS (UNDESIRABLE EFFECTS)

rFVIIa has been generally well tolerated in clinical studies. Table 2 provides the frequencies of serious and non-serious adverse drug reactions, listed by system organ class, from clinical trials conducted in 484 patients (including 4297 treatment episodes) with haemophilia A and B, acquired haemophilia, factor VII deficiency and Glanzmann's thrombasthenia.

**Table 2: Frequency of adverse drug reactions by system organ class.**

The frequency is calculated based on treatment episodes.

<b><i>Blood and the lymphatic system disorders</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Disseminated intravascular coagulation and related laboratory findings including elevated levels of D-dimer and decreased levels of anti-thrombin (AT) - Coagulopathy
<b><i>Gastrointestinal disorders</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Nausea
<b><i>General disorders and administration site conditions</i></b>	
Uncommon ( $\geq 1/1,000$ , $< 1/100$ )	-Therapeutic response decreased. It is important that the dosage regimen of NovoSeven RT is compliant with the recommended dosage as described under 'Dosage and Administration'. -Pyrexia
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	-Injection site reaction including injection site pain
<b><i>Immune system disorders</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Hypersensitivity
<b><i>Investigations</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Increased fibrin degradation products - Increase of alanine aminotransferase, alkaline phosphatase, lactate dehydrogenase and prothrombin
<b><i>Nervous system disorders</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Headache
<b><i>Skin and subcutaneous tissue disorders</i></b>	
Uncommon ( $\geq 1/1,000$ , $< 1/100$ )	- Rash (including allergic dermatitis and rash erythematous) - Pruritus and urticaria
<b><i>Vascular disorders</i></b>	
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Arterial thromboembolic events (myocardial infarction, cerebral infarction, cerebral ischaemia, cerebral artery occlusion, cerebrovascular accident, renal artery thrombosis, peripheral ischaemia, peripheral arterial thrombosis and intestinal ischaemia)

Uncommon ( $\geq 1/1,000$ , $< 1/100$ )	- Venous thromboembolic events (deep vein thrombosis, thrombosis at i.v. site, pulmonary embolism, thromboembolic events of the liver including portal vein thrombosis, renal vein thrombosis, thrombophlebitis, superficial thrombophlebitis and intestinal ischaemia)
Rare ( $\geq 1/10,000$ , $< 1/1,000$ )	- Angina pectoris
Within each frequency grouping, undesirable effects are presented in order of decreasing seriousness.	

Anaphylaxis, flushing, angioedema and intracardiac thrombus have been reported post-marketing only (i.e. not in clinical trials) but with an unknown frequency.

#### **Patients with acquired haemophilia**

During clinical trials conducted in 61 patients with acquired haemophilia with a total of 100 treatment episodes, the following adverse drug reactions were reported with a frequency of common ( $\geq 1/100$  to  $< 1/10$ ): Specific arterial thromboembolic events (cerebral artery occlusion, cerebrovascular accident), specific venous thromboembolic events (pulmonary embolism and deep vein thrombosis), angina pectoris, nausea, pyrexia, erythematous rash and investigation of increased levels of fibrin degradation products.

#### **Inhibitory antibody formation**

In post-marketing and clinical experience, there have been no confirmed reports of inhibitory antibodies against NovoSeven RT or FVII in patients with haemophilia A or B. Development of inhibitory antibodies to NovoSeven has been reported in a post-marketing observational registry of patients with congenital FVII deficiency.

In clinical trials of patients with factor VII deficiency, formation of antibodies against NovoSeven RT and FVII is the only adverse drug reaction reported (frequency: common ( $\geq 1/100$  to  $< 1/10$ )). In some cases, the antibodies showed inhibitory effect *in vitro*. Risk factors that may have contributed to antibody development including previous treatment with human plasma and/or plasma-derived factor VII, severe mutation of FVII gene, and overdose of NovoSeven RT, were present. Patients with factor VII deficiency treated with NovoSeven RT should be monitored for factor VII antibodies (see Special Warnings and Precautions For Use).

#### **Thromboembolic events outside approved indications**

When NovoSeven RT is administered to patients outside approved indications, arterial thromboembolic events are common ( $\geq 1/100$  to  $< 1/10$ ). A higher risk of arterial thromboembolic adverse events (see Table 2 – ‘Vascular disorders’)(5.3% in patients treated with NovoSeven RT versus 2.8% in placebo-treated patients) has been shown in a meta-analysis of pooled data from placebo-controlled trials conducted outside current approved indications in various clinical settings, each of these having distinct patient characteristics and hence different underlying risk profiles.

Thromboembolic events may lead to cardiac arrest.

Safety and efficacy of NovoSeven RT have not been established outside the approved indications and therefore NovoSeven RT is not recommended.

#### **Post marketing Surveillance**

In an observational registry (F7HAEM-3578) covering subjects with congenital FVII deficiency, 3 out of 91 surgical patients experienced thromboembolic events.

#### **Reporting suspected adverse effects**

Reporting suspected adverse reactions after registration of the medicinal product is important. It allows continued monitoring of the benefit-risk balance of the medicinal product. Healthcare

professionals are asked to report any suspected adverse reactions at [www.tga.gov.au/reporting-problems](http://www.tga.gov.au/reporting-problems).

## 4.9 OVERDOSE

Dose limiting toxicities of NovoSeven RT have not been investigated in clinical trials.

A few cases of overdose have been reported in patients with haemophilia. The only complication reported in connection with an overdose was a slight transient increase in blood pressure in a 16 year-old patient receiving 24 mg rFVIIa instead of 5.5 mg.

No cases of overdose have been reported in patients with acquired haemophilia or Glanzmann's thrombasthenia.

In patients with factor VII deficiency, where the recommended dose is 15-30 µg/kg rFVIIa, one episode of overdose has been associated with a thrombotic event (occipital stroke) in an elderly (>80 years) male patient treated with 10-20 times the recommended dose. In addition, the development of antibodies against NovoSeven and FVII has been associated with overdose in one patient with factor VII deficiency.

The dose schedule should not be intentionally increased above the recommended doses due to the absence of information on the additional risk that may be incurred.

For information on the management of overdose, contact the Poisons Information Centre on 13 11 26 (Australia).

## 5 PHARMACOLOGICAL PROPERTIES

### 5.1 PHARMACODYNAMIC PROPERTIES

#### Mechanism of action

The role of FVIIa in the induction of haemostasis includes the direct activation of FIX into FIXa and FX into FXa following the binding of FVIIa to exposed Tissue Factor, initiating the conversion of prothrombin into thrombin. Thrombin leads to the activation of platelets and Factors V and VIII at the site of injury and the formation of a haemostatic plug by converting fibrinogen into fibrin.

Pharmacological doses of NovoSeven RT activates FX directly on the surface of activated platelets at the local site of injury, independently of Tissue Factor. This results in the conversion of prothrombin into large amounts of thrombin, independent of Tissue Factor. Accordingly, the pharmacodynamic effect of FVIIa gives rise to an increased local formation of FXa, thrombin, and fibrin.

A theoretical risk for the development of systemic activation of the coagulation system in patients suffering from underlying diseases predisposing them to disseminated intravascular coagulation (DIC) cannot be totally excluded.

#### Clinical trials

##### **Inhibitors to coagulation Factors VIII or IX**

Data from five clinical studies of rFVIIa for control of bleeding in patients with inhibitors to coagulation Factors VIII and IX are listed in Table 3. None of the studies used an active or placebo control. All patients were male, with an age range of 1-81 years. Eighty six percent of patients had inhibitors.

**Table 3: Clinical trials of rFVIIa  
Control of bleeding in patients with inhibitors to coagulation Factors VIII and IX**

Study	Bleeding indication	No. Pts (bleeds)	Dose µg/kg	Schedule	No. Treatments	Effectiveness % bleeds controlled		
01	Surgery	10 (10)	35-90	q2h 0-48h then q2-6h	24-196 (3-20 days)	70		
03	Limb/life threat	9 (11)	90-120	q2h until improved, then q3-12h	(5-33 days)	91		
							<i>Joint</i>	<i>Muscle</i>
02	Joint or muscle	44 (96)	90	q3h (≤4 doses)	2.0 (av)	91	94	
04	Joint or muscle	35 (82)	35	q2.5h	2.8 (av)	71	53	
		43 (109)	70	(6 doses)	3.2 (av)	71	71	
05	Joint or muscle	6 (13)	35	q3-4h	6.5 (av)	55	-	
		10 (20)	70		4.7 (av)	47	50	

Studies 04 and 05 were randomised dose comparisons of 35 and 70µg/kg. Neither study found a statistically significant difference between dose levels.

Efficacy and Safety of Single-dose Regimen of rFVIIa in mild to moderate bleeding

The efficacy and safety of a single 270 µg/kg dose of rFVIIa for the treatment of bleeding episodes in haemophilia patients with inhibitors was studied in two randomised, double blind trials (F7HAEM-1510 and F7HAEM-2068) which compared the 270 µg/kg regimen with a standard regimen of 3 doses of 90 µg/kg at 3-hourly intervals. Subjects assessed the efficacy of treatment according to changes in joint pain and mobility over the 9 hours from initiation of treatment. The global response was assessed as either a success or failure. Results are summarised in the following table:

**Table 4: Summary of Results by Age Groups for studies F7HAEM-1510 and F7HAEM-2068**

	F7HAEM-1510		F7HAEM-2068		Combined	
<b>rFVIIa(µg/kg)</b>	270	3 × 90	270	3 × 90	270	3 × 90
<b>Total Patients treated, n</b>	20	20	22	21	42	41
<b>Response, n (%)</b>						
Global Response success <sup>(A)</sup>	13(65)	14(70)	8(36)	12(57)	21(50)	26(63)
Need for additional haemostatic agents	2(10) <sup>(B)</sup>	3(15) <sup>(B)</sup>	10(45) <sup>(C)</sup>	10(48) <sup>(C)</sup>	12(29)	13(32)
<b>Adult patients treated (≥ 18 yrs), n</b>	16	16	9	8	25	24
<b>Response, n(%)</b>						
Global response success <sup>(A)</sup>	10(63)	10(63)	5(56)	5(63)	15(60)	15(63)
Need for additional haemostatic agents	2(13)	3(19)	1(11)	3(38)	3(12)	6(25)
<b>Child/adolescent patients treated (&lt; 18 years), n</b>	4	4	13	13	17	17
<b>Response n (%)</b>						
Global Response success <sup>(A)</sup>	3(75)	4(100)	3(23)	7(54)	6(35)	11(65)
Need for additional haemostatic agents	0(0)	0(0)	9(69)	7(54)	9(53)	7(41)
<i>(A) as defined by the Global Treatment Response, (B) within 48 hours, (C) within 2 days</i>						

The 270 µg/kg dose was shown to have comparable efficacy to the standard dose regimen in adults. However, in children comparable efficacy could not be concluded. The single dose regimen was not

associated with any increase in toxicity.

#### Efficacy and Safety of Prophylactic Use of rFVIIa

The efficacy and safety of a secondary prophylaxis regimen of rFVIIa was demonstrated in a single, double blind, uncontrolled trial (study F7HAEM-1505). The study enrolled subjects with a history of frequent bleeds (>4 episodes per month). Subjects were followed for an initial 3-month treatment period to establish frequency of bleeding, and were then treated with rFVIIa daily for the next 3-month period. Treatment with rFVIIa 90 µg/kg once daily resulted in a 45% reduction in bleeding frequency. Median frequency of bleeding decreased from 5.4 per month during the initial observation period to 2.8 per month for the treatment period (p<0.001). In a further 3-month follow-up period without treatment the median bleeding frequency (3.9 per month) was 27% lower (p<0.01) than during the initial observation period. The safety and efficacy of prophylactic treatment for periods longer than 3 months have not been established.

#### **Factor VII deficiency**

To January 2005, there were efficacy and safety data published on 60 patients with FVII deficiency treated with rFVIIa for 106 treatment episodes. The major part of the clinical experience is derived from 3 compassionate and 1 emergency use programs conducted by Novo Nordisk between 1988 and 1999 on 30 patients with congenital FVII deficiency and 2 patients with acquired FVII deficiency (baseline level of FVII:C<5%) for a total of 69 treatment episodes. The primary endpoint of treatment was the effective haemostatic control of bleeds and prophylaxis in invasive and surgical procedures.

#### Summary of Efficacy and Safety of rFVIIa

The treatment with rFVIIa was rated as effective/excellent in 86% of serious bleeding episodes and in 96% of the surgical procedures. rFVIIa appeared to be equally effective in children and adults.

Two patients developed antibodies, in one of these cases the antibody was transient and both patients had received prior treatment with products containing plasma FVII.

#### Efficacy and Dose of rFVIIa

The clinical data shows a good efficacy-to-safety ratio when rFVIIa is used in a bolus injection treatment regimen of 15-30µg/kg at dosing intervals of 4-6 hours until haemostasis is secured. Smaller and greater doses of rFVIIa were used with effective outcome.

#### **Glanzmann's Thrombasthenia**

To November 2004, there were efficacy and safety data published on 89 patients with Glanzmann's Thrombasthenia treated with rFVIIa for 151 bleeds and 57 surgical procedures. The major part of the clinical experience is derived from the International Registry on Recombinant Factor VIIa and Congenital Platelet Disorders which reported data on the use of rFVIIa in Glanzmann's Thrombasthenia between November 1995 and June 2001. The age of the patients ranged from 0.8 to 72 years. Disease severity based on the percentage of platelet GPIIb/IIIa complexes was known in 55 patients: 80% type I (GPIIb/IIIa <5% of normal), 13% type II (5-15%), and 7% variant-type (dysfunctional GPIIb/IIIa). A number of patients had a history of anti-GPIIb/IIIa or anti-HLA antibodies, or a history of refractoriness to platelet transfusion.

Amongst the 151 bleeding episodes treated with rFVIIa, nosebleeds were the most common (47%), followed by oropharyngeal (22.5%), miscellaneous (18.5%) and gastrointestinal bleeds (12%). rFVIIa was used in 57 invasive/surgical procedures: 10 major procedures, 26 minor procedures, and 21 dental extractions. The primary endpoint of treatment was the effective haemostatic control of bleeds and prophylaxis in invasive and surgical procedures. Treatment efficacy was considered for bleeds where no platelets were transfused during rFVIIa therapy (evaluable bleeds) with therapy considered effective where bleeding ceased within 48 hours of commencement of treatment with rFVIIa.

#### Summary of Efficacy and Safety of rFVIIa

Overall, the efficacy of rFVIIa in 147 evaluable bleeds ranged from 55%-79% with haemostasis secured in 61% of cases within 6 hours of the first injection. As prophylaxis for a wide variety of invasive and surgical procedures, rFVIIa was shown to provide effective coverage in 95.5% of the 45 evaluable

procedures. The safety results support the safety profile observed to date with rFVIIa in the treatment of bleeding in haemophilia with inhibitors, with three serious adverse events possibly related to rFVIIa treatment reported. Of these three events, two were associated with continuous infusion.

#### Efficacy of NovoSeven and the Presence of Anti-Platelet Antibodies or Platelet Refractoriness

Of the 57 evaluable bleeds in patients with platelet antibodies or platelet refractoriness recorded in the International Registry on Recombinant Factor VIIa and Congenital Platelet Disorders, 74% were successfully treated and 7% recurred and treatment failed in 19%. Among the remaining 40 evaluable bleeding episodes in patients without platelet refractoriness and antibodies, 70% were successfully treated, 7% recurred and treatment failed in 23%. Thus, no significant difference in efficacy was observed between patients with and without anti-platelet antibodies or platelet refractoriness.

#### Efficacy and Dose of rFVIIa

The clinical data shows a good efficacy-to-safety ratio when rFVIIa is used in a treatment regimen of bolus injection of 80-120 µg/kg per injection at dosing intervals ≤ 2.5 hours with a minimum of 3 doses to secure effective haemostasis. The prophylaxis of invasive/surgical procedures may require a more prolonged use of rFVIIa depending on the extent of the procedures.

## **5.2 PHARMACOKINETIC PROPERTIES**

### Healthy subjects

The pharmacokinetics of rFVIIa was investigated in 35 healthy Caucasian and Japanese subjects in a dose-escalation study. Subjects were stratified according to gender and ethnic group and dosed with 40, 80 and 160 µg rFVIIa per kg bodyweight and/or placebo (three doses each). The pharmacokinetic profiles indicated dose proportionality. Pharmacokinetics were similar across gender and across ethnic groups. Mean steady state volume of distribution ranged from 130 to 165 mL/kg, mean values of clearance ranged from 33.3 to 37.2 mL/h x kg, and mean terminal half-life ranged from 3.9 to 6.0 hours.

### Inhibitors to coagulation Factors VIII or IX

After a single intravenous injection of eptacog alfa (activated) 35-70µg/kg to haemophiliac A and B patients with inhibitors (n=13), mean peak coagulant activity occurred at 10 minutes and returned to normal at 8-12 hours. The mean Factor VII coagulant half-life was 2.6±0.5 hours.

Using the activated factor VII (FVIIa) activity assay, the pharmacokinetic properties of rFVIIa were studied in 12 paediatric (2-12 years) and five adult patients. Dose proportionality was established in children for the investigated doses of 90 and 180 µg per kg body weight, which is in accordance with previous findings at lower doses (17.5 – 70 µg/kg rFVIIa). Mean clearance was approximately 50% higher in paediatric patients relative to adults (78 versus 53 ml/h x kg), whereas the mean terminal half life was determined as 2.3 hours in both groups. Mean volume of distribution at steady state was 196 ml/kg in paediatric patients versus 159 ml/kg in adults. Clearance appears related to age and bodyweight, therefore in younger patients clearance may be increased by up to 50%.

### Factor VII deficiency

Single dose pharmacokinetics of rFVIIa 15 and 30 µg/kg, showed no significant difference between the two doses with regard to dose-independent parameters: total body clearance (70.8 and 79.1 mL/h x kg), volume of distribution at steady state (280-290 mL/kg), mean residence time (3.75-3.80 h), and half-life (2.82-3.11 h). The mean *in vivo* plasma recovery was approximately 20%. Clearance and volume of distribution parameters were increased in Factor VII Deficiency patients compared with other patient populations.

### Glanzmann's Thrombasthenia

The pharmacokinetics of rFVIIa in patients with Glanzmann's Thrombasthenia have not been investigated, but is expected to be similar to the pharmacokinetics in haemophilia A and B patients.

### 5.3 PRECLINICAL SAFETY DATA

#### Genotoxicity

The clastogenic activity of rFVIIa was evaluated in both *in vitro* studies (cultured human lymphocytes) and *in vivo* studies (mouse micronucleus test). Neither of these studies indicated clastogenic activity of rFVIIa. Gene mutation studies (e.g., Ames test) have not been performed with rFVIIa.

#### Carcinogenicity

No chronic carcinogenicity studies have been conducted with rFVIIa.

## 6 PHARMACEUTICAL PARTICULARS

### 6.1 LIST OF EXCIPIENTS

Refer to Section 2 - Qualitative and quantitative composition.

### 6.2 INCOMPATIBILITIES

NovoSeven RT is intended for intravenous bolus injection only and should not be mixed with infusion solutions or be given in a drip.

### 6.3 SHELF LIFE

The shelf life for the product packed for sale is 3 years when the product is stored below 25°C.

#### In Vial

To reduce microbiological hazard, use as soon as practicable after reconstitution. If storage is necessary, hold at 2°C - 8°C for not more than 24 hours. Except where described under 'Use of Polypropylene Syringe in Hospital Settings,' below, do not store reconstituted NovoSeven RT in syringes - the reconstituted solution should be stored in the vial.

#### Use of Polypropylene Syringe in Hospital Settings

After reconstitution, chemical and physical stability has been demonstrated for 24 hours at 25°C when stored in a polypropylene syringe. The product should only be stored in a polypropylene syringe if reconstitution has taken place in controlled and validated aseptic conditions.

### 6.4 SPECIAL PRECAUTIONS FOR STORAGE

Store below 25°C. Protect from light. Do not freeze. Do not use after the expiry date.

### 6.5 NATURE AND CONTENTS OF CONTAINER

The NovoSeven RT pack contains a single use glass vial of 1.0 mg (50,000 IU), or 2.0 mg (100,000 IU), or 5.0 mg (250,000 IU), or 8.0 mg (400,000 IU), white, lyophilised powder (NovoSeven RT), and the following:

- a pre-filled syringe containing solvent, and
- a plunger rod, and
- a vial adapter.

The powder vials are closed with a latex-free, chlorobutyl rubber stopper, and sealed with an aluminium cap. The vials are equipped with a snap-off polypropylene cap.

The diluent for reconstitution of NovoSeven RT is a 10 mmol solution of histidine in water for injection, is supplied as a clear colourless solution in the pre-filled syringe. The pre-filled syringe is made of a type I glass barrel with a polypropylene backstop and bromobutyl rubber plunger. The syringe cap consists of a bromobutyl rubber and polypropylene tamper evident seal. The plunger rod is made of polypropylene.

## 6.6 SPECIAL PRECAUTIONS FOR DISPOSAL

In Australia, any unused medicine or waste material should be disposed of in accordance with local requirements.

## 6.7 PHYSICOCHEMICAL PROPERTIES

### Chemical structure

Not applicable.

### CAS number

CAS number: 102786-61-8

## 7 MEDICINE SCHEDULE (POISONS STANDARD)

Unscheduled.

## 8 SPONSOR

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## 9 DATE OF FIRST APPROVAL

1 May 2013

## 10 DATE OF REVISION

24 September 2018

### SUMMARY TABLE OF CHANGES

Section Changed	Summary of new information
4.2	Addition of 24 hr/25 deg C in-use storage for reconstituted medicine in polypropylene syringe in a hospital setting.

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