

**PRODUCT MONOGRAPH**  
**INCLUDING PATIENT MEDICATION INFORMATION**

**ADVATE®**

Antihemophilic Factor (Recombinant),  
Plasma/Albumin Free Method (rAHF-PFM)

Lyophilized Powder for Solution  
250, 500, 1000, 1500, 2000 and 3000 International Units (IU) per vial, Intravenous  
Coagulant

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## RECENT MAJOR LABEL CHANGES

Not applicable.

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Sections or subsections that are not applicable at the time of authorization are not listed.

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## PART I: HEALTH PROFESSIONAL INFORMATION

### 1 INDICATIONS

ADVATE [Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF-PFM)] is indicated for:

- routine prophylaxis to prevent or reduce frequency of bleeding episodes in adults and children with hemophilia A (classical hemophilia).
- prevention and control of bleeding episodes, in hemophilia A.
- perioperative management of patients with hemophilia A.

ADVATE can be of therapeutic value in patients with Factor VIII inhibitors not exceeding 10 Bethesda Units (BU) per mL. However, in patients with a known or suspected inhibitor to Factor VIII, the plasma Factor VIII level should be monitored frequently and the dose of ADVATE should be adjusted accordingly. (See 7 WARNINGS AND PRECAUTIONS)

ADVATE is not indicated for treatment of von Willebrand's disease.

#### 1.1 Pediatrics ( $\geq 1$ to $< 16$ years of age)

Based on the data submitted and reviewed by Health Canada, the safety and efficacy of ADVATE in pediatric patients has been established; therefore, Health Canada has authorized an indication for pediatric use. The safety and efficacy of ADVATE in pediatric patients are similar to that of adult patients. (See 4 DOSAGE AND ADMINISTRATION and 14 CLINICAL TRIALS)

#### 1.2 Geriatrics ( $> 65$ years of age)

Insufficient data are available to Health Canada; therefore, Health Canada has not authorized an indication for geriatric use.

### 2 CONTRAINDICATIONS

Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF-PFM) is contraindicated in patients who are hypersensitive, including anaphylaxis, to this drug, or to any ingredient in the formulation, including any non-medicinal ingredient, or component of the container. For a complete listing, see 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING.

- Mouse proteins
- Hamster proteins

### 4 DOSAGE AND ADMINISTRATION

#### 4.1 Dosing Considerations

Each vial of ADVATE is labeled with the rAHF activity expressed in IU per vial. This potency assignment employs a Factor VIII concentrate standard that is referenced to a WHO International Standard for Factor VIII Concentrates and is evaluated by appropriate methodology to ensure accuracy of the results.

The dosage and duration depend on the severity of Factor VIII deficiency, the location and extent of bleeding, and the patient's clinical condition. Careful control of replacement therapy is especially important in cases of major surgery or life-threatening hemorrhages.

The expected *in vivo* peak increase in Factor VIII level expressed as IU/dL of plasma or percent of normal can be estimated by multiplying the dose administered per kg body weight (IU/kg) by two. This calculation is based on the findings of several pharmacokinetic studies of rAHF concentrates, and is supported by the data generated by 223 pharmacokinetic determinations with ADVATE in 107 Phase 2/3 pivotal study subjects. These pharmacokinetic data demonstrated a peak post-infusion recovery of approximately 2 IU/dL per IU/kg above the pre-infusion baseline.

Examples (assuming patient's baseline Factor VIII level is < 1% of normal):

1. A dose of 1,750 IU ADVATE administered to a 70 kg patient, i.e. 25 IU/kg (1,750/70), should be expected to cause a peak post-infusion Factor VIII increase of 25 x 2 or 50 IU/dL (50% of normal).
2. A peak level of 70% is required in a 40 kg child. In this situation, the dose would be  $70/2 \times 40 = 1,400$  IU.

Although the dose can be estimated by the calculations above, it is highly recommended that, whenever possible, appropriate laboratory tests including serial Factor VIII activity assays be performed on the patient's plasma at suitable intervals to assure that adequate Factor VIII levels have been reached and are maintained. The amount and frequency of administration should be adapted to the clinical response in the patient. Individual patients may vary in their response to Factor VIII, demonstrating different levels of Factor VIII *in vivo* recovery, half-life as well as clinical response to treatment.

Under certain circumstances (e.g., presence of a low titre inhibitor) doses larger than those recommended may be necessary.

If bleeding is not controlled with the recommended dose, the plasma level of Factor VIII should be determined and a sufficient dose of ADVATE should be administered to achieve a satisfactory clinical response.

### **Patients with Inhibitors**

Patients should be evaluated for the development of Factor VIII inhibitors, if the expected plasma Factor VIII activity levels are not attained, or if bleeding is not controlled with an appropriate dose.

## **4.2 Recommended Dose and Dosage Adjustment**

### **Routine Prophylaxis**

For prevention of bleeding episodes, in patients between 6 to 65 years of age, doses between 20 to 40 IU of Factor VIII per kg body weight every other day (3 to 4 times weekly) may be utilized. Alternatively, an every third day dosing regimen targeted to maintain FVIII trough levels

≥ 1% may be employed. The exact dose should be adjusted based on the patient’s clinical response.

In patients under the age of 6 years, doses of 25 to 50 IU of Factor VIII per kg body weight 3 to 4 times weekly are recommended. The exact dose should be defined by the patient’s clinical status and demonstrated Factor VIII *in vivo* recovery and half-life.

### Prevention and Control of Bleeding Episodes

Physician supervision of the treatment regimen is required. A guide for dosing in the treatment of hemorrhages is provided in Table 1.

**Table 1 Guide to ADVATE Dosing for Treatment & Control of Bleeding Episodes**

Degree of hemorrhage	Required peak post-infusion Factor VIII activity in the blood (as % of normal or IU/dL)	Frequency of Infusion <sup>1</sup>
Early hemarthrosis, muscle bleeding episode, or oral bleeding episode	20-40	Begin infusions every 12 to 24 hours (8 to 24 hours for patients under the age of 6 years) <sup>1</sup> for one to three days until the bleeding episode is resolved (as indicated by relief of pain) or healing is achieved.
More extensive hemarthrosis, muscle bleeding episode, or hematoma	30-60	Repeat infusions every 12 to 24 hours (8 to 24 hours for patients under the age of 6 years) <sup>1</sup> for (usually) three days or more until pain and disability are resolved.
Life-threatening bleeding episodes such as head injury, throat bleeding episode, or severe abdominal pain	60-100	Repeat infusions every 8 to 24 hours (6 to 12 hours for patients under the age of 6 years) <sup>1</sup> until resolution of the bleeding episode has occurred.

<sup>1</sup> The frequency of infusion should be adjusted for pediatric patients to compensate for the fact that the observed adjusted recovery and half-life were generally higher in adolescents and adults compared to infants and children (Table 7).

### Peri-operative Management

A guide for dosing in perioperative management is provided in Table 2. Careful monitoring and control of replacement therapy is especially important in cases of major surgery or life-threatening hemorrhages.

**Table 2 Guide to ADVATE Dosing for Perioperative Management**

Type of Procedure	Required peak post-infusion Factor VIII activity in the blood (as % of normal or IU/dL)	Frequency of Infusion <sup>1</sup>
Minor surgery, including tooth extraction	60-100	A single bolus infusion plus 5-7 days of oral antifibrinolytic therapy (for dental extractions), beginning within one hour of the operation, is sufficient in most cases.
Major surgery	80-120 (pre- and post-operative)	For bolus infusion replacement, repeat infusions every 8 to 24 hours (6 to 24 hours for patients under the age of 6 years <sup>1</sup> ), depending on the desired level of Factor VIII and state of wound healing. For continuous infusion replacement, begin infusion at 4-5 IU/kg/h after a loading dose, monitor levels of Factor VIII at least once per day, and modify the infusion rate according to the desired level of Factor VIII and the state of wound healing (see Administration of ADVATE reconstituted with supplied sWFI by continuous infusion).

<sup>1</sup> The frequency of infusion should be adjusted for pediatric patients to compensate for the fact that the observed adjusted recovery and half-life were generally higher in adolescents and adults compared to infants and children (Table 7).

### 4.3 Reconstitution

**Table 3 Reconstitution**

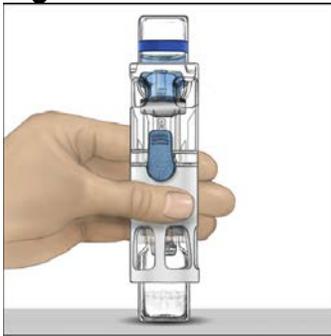
Vial Size	Volume of Diluent to be Added to Vial	Approximate Available Volume	Nominal Concentration
2 mL (250IU)	2 mL	2 mL	125 IU/mL
2 mL (500IU)	2 mL	2 mL	250 IU/mL
2 mL (1000IU)	2 mL	2 mL	500 IU/mL
2 mL (1500IU)	2 mL	2 mL	750 IU/mL
5 mL (1000IU)	5 mL	5 mL	200 IU/mL
5 mL (1500IU)	5 mL	5 mL	300 IU/mL
5 mL (2000IU)	5 mL	5 mL	400 IU/mL
5 mL (3000IU)	5 mL	5 mL	600 IU/mL

## Reconstitution using the BAXJECT III System\*: Use Aseptic Technique

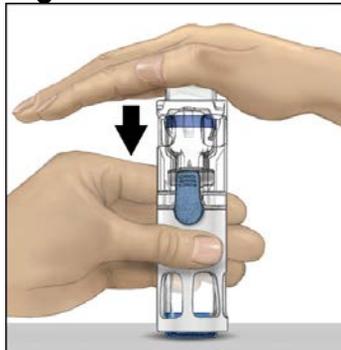
The procedures below are provided as general guidelines for the preparation and reconstitution of ADVATE.

1. Allow the ADVATE to reach room temperature.
2. Open the ADVATE package by peeling away the lid
3. Remove ADVATE in the BAXJECT III system from the package.
4. Place the ADVATE on a flat surface with the diluent vial on top (Figure A). (The diluent vial has a blue stripe). *Do not remove the blue cap until instructed in a later step.*
5. Hold the ADVATE in the BAXJECT III system with one hand.
6. With the other hand, press down firmly on the diluent vial until the system is fully collapsed and the diluent flows down into the ADVATE vial (Figure B). Do not tilt the system until the transfer is complete.
7. Verify that diluent transfer is complete. Swirl gently until ADVATE is completely dissolved (Figure C). **Do not shake.** Inspect parenteral drug products for particulate matter and discoloration prior to administration. The solution should be clear and colorless in appearance. If not, do not use the solution and notify Takeda immediately.

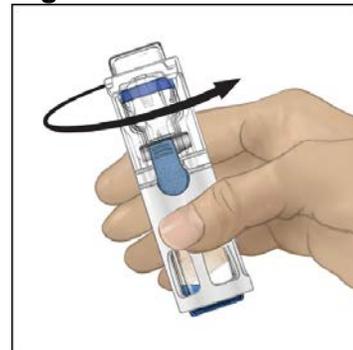
**Figure A**



**Figure B**

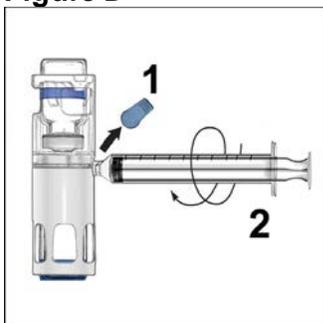


**Figure C**

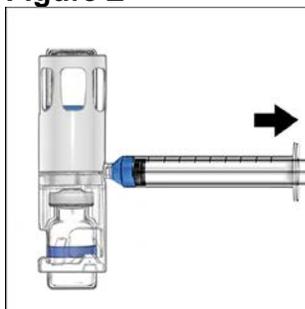


8. Remove the blue cap from the BAXJECT III system. Connect the syringe to the system (Figure D). *Do not inject air into the BAXJECT III system.*
9. Turn the system upside down (factor concentrate vial now on top). Draw the factor concentrate into the syringe by pulling the plunger back slowly (Figure E).
10. Disconnect the syringe; attach a suitable needle and inject intravenously as instructed under *Administration by Bolus Infusion.*
11. If a patient is to receive more than one ADVATE in a BAXJECT III system or a combination of ADVATE with BAXJECT II and ADVATE in a BAXJECT III system, the contents may be drawn into the same syringe.

**Figure D**



**Figure E**



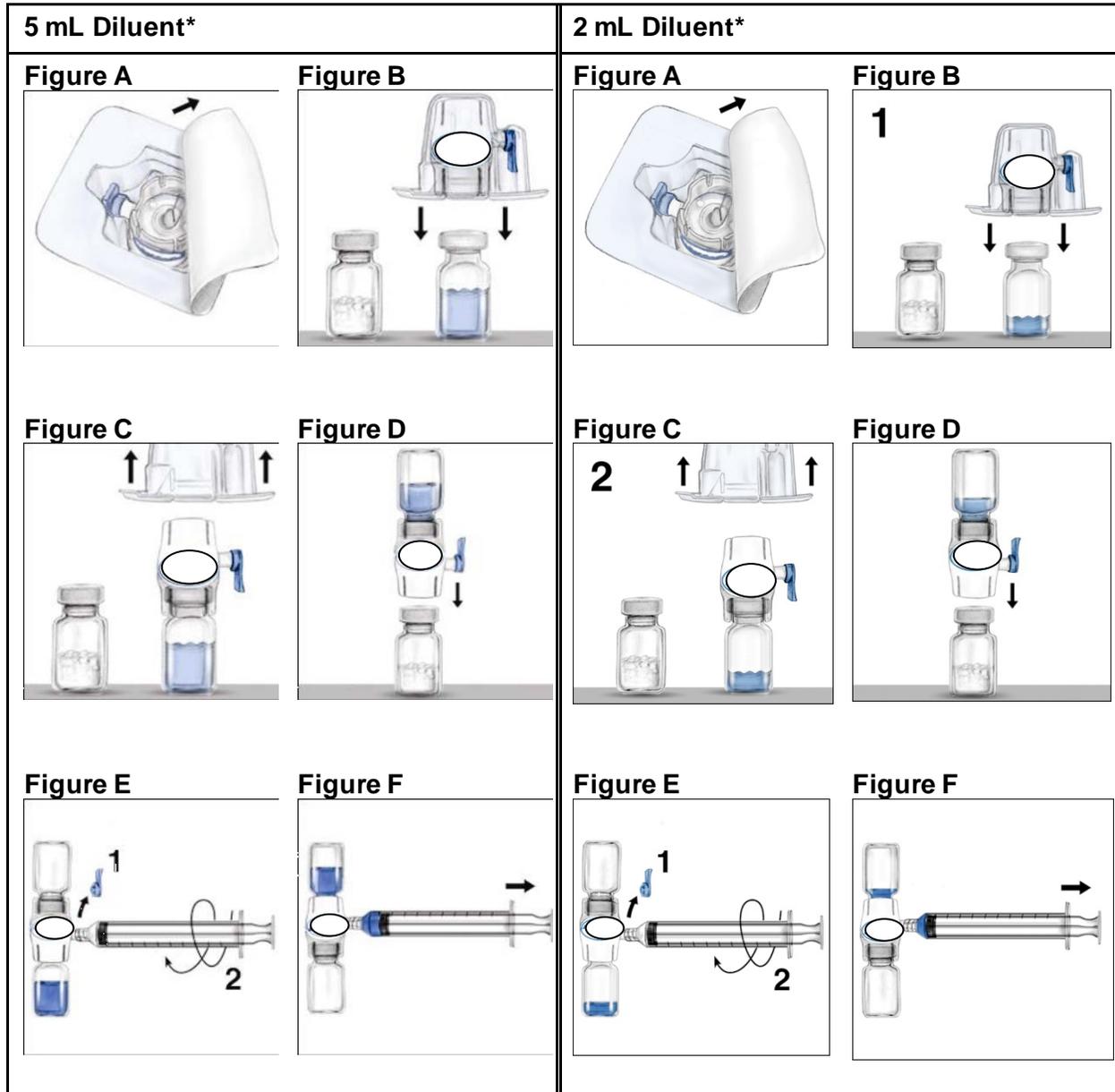
**NOTE:** Do not refrigerate after reconstitution. If ADVATE is being prepared for administration by continuous infusion (see 4.4 Administration/Administration of ADVATE reconstituted with supplied sWFI by continuous infusion), it should be reconstituted and pooled in a laminar airflow environment in order to optimize the maintenance of sterility during infusion. A fresh supply of reconstituted ADVATE for continuous infusion should be replaced at the bedside at intervals of  $\leq 12$  hours.

\*ADVATE supplied with BAXJECT III System is currently not marketed in Canada (see 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING)

Reconstitution using the BAXJECT II device: Use Aseptic Technique

1. Bring the ADVATE (dry factor concentrate) and Sterile Water for Injection USP (diluent) to room temperature.
2. Remove caps from the factor concentrate and diluent vials.
3. Cleanse stoppers with germicidal solution and allow to dry prior to use. Place the vials on a flat surface.
4. Open the BAXJECT II device package by peeling away the lid, without touching the inside (Figure A). **Do not remove the device from the package.**
5. Turn the package over. Press straight down to fully insert the clear plastic spike through the diluent vial stopper (Figure B).
6. Grip the BAXJECT II package at its edge and pull the package off the device (Figure C). **Do not remove the colored luer cap from the BAXJECT II device.** Do not touch the exposed white plastic spike.
7. Turn the system over, so that the diluent vial is on top. Quickly insert the white plastic spike fully into the ADVATE vial stopper by pushing straight down (Figure D). The vacuum will draw the diluent into the ADVATE vial.
8. Swirl gently until ADVATE is completely dissolved.
9. Remove the colored luer cap from the BAXJECT II device. Connect the syringe to the BAXJECT II device (Figure E). **DO NOT INJECT AIR.**
10. Turn the system upside down (factor concentrate vial now on top). Draw the factor concentrate into the syringe by pulling the plunger back slowly (Figure F).
11. Disconnect the syringe; attach a suitable needle and inject intravenously as instructed under 4.4 Administration.
12. If a patient is to receive more than one vial of ADVATE, the contents of multiple vials may be drawn into the same syringe. **Please note that the BAXJECT II reconstitution device is intended for use with a single vial of ADVATE and Sterile Water for Injection USP only, therefore reconstituting and withdrawing a second vial into the**

syringe requires a second BAXJECT II device.



\*Diagrams are representational and may not be drawn exactly to scale

**NOTE:** Do not refrigerate after reconstitution. If ADVATE is being prepared for administration by continuous infusion (see 4.4 Administration/Administration of ADVATE reconstituted with supplied sWFI by continuous infusion), it should be reconstituted and pooled in a laminar airflow environment in order to optimize the maintenance of sterility during infusion. A fresh supply of reconstituted ADVATE for continuous infusion should be replaced at the bedside at intervals of  $\leq 12$  hours.

ADVATE should be administered at room temperature not more than 3 hours after reconstitution. See 12 SPECIAL HANDLING INSTRUCTIONS for further information.

## 4.4 Administration

### Administration by bolus infusion

Parenteral drug products should be inspected for particulate matter and discoloration prior to administration, whenever solution and container permit. A colorless appearance is acceptable for ADVATE. ADVATE should be administered at room temperature not more than 3 hours after reconstitution. Plastic syringes must be used with this product, since proteins such as ADVATE tend to stick to the surface of glass syringes. A dose of ADVATE should be administered over a period of  $\leq 5$  minutes (maximum infusion rate, 10 mL/min). The pulse rate should be determined before and during administration of ADVATE. Should a significant increase in pulse rate occur, reducing the rate of administration or temporarily halting the injection usually allows the symptoms to disappear promptly.

### Administration of ADVATE reconstituted with supplied sWFI by continuous infusion

**There are limited safety and efficacy data to support the administration of ADVATE by continuous infusion (see 14 CLINICAL TRIALS).**

The 3000, 2000, 1500, 1000, and 500 IU/vial nominal potencies of ADVATE are suitable for use in a continuous infusion mode of administration. Continuous infusion of ADVATE must employ either a syringe pump running at a rate of  $\geq 0.4$  mL/h, or a CADD-1 type infusion pump running at a rate of  $\geq 1.5$  mL/h. *In vitro* studies employing a syringe pump or a CADD-1 pump have demonstrated  $>80\%$  recovery of the Hour 0 potency of ADVATE for up to 48 hours of continuous infusion. For sterility assurance purposes, a fresh supply of reconstituted ADVATE for continuous infusion should be replaced at bedside no less frequently than every 12 hours. Either polyvinylchloride or polyethylene infusion tubing (microbore) may be used, and 2-5 IU heparin/mL reconstituted product can be added as a means to prevent thrombophlebitis at the infusion site. ADVATE reconstituted with supplied Sterile Water for Injection USP should never be further diluted. However, one of three “piggy-backed” intravenous solutions (normal saline, 0.45% saline, or 0.45% saline in 5% dextrose) may be infused concurrently with ADVATE through a “Y” connector. The post-reconstitution photostability of ADVATE is acceptable under the conditions of visible and ultra-violet light exposure anticipated in a clinical setting.

After administration of a loading dose to correct the plasma Factor VIII level to 80-120 IU/dL, begin infusion of ADVATE at a rate of 4 IU/kg/h for patients  $>12$  years of age and 5 IU/kg/h for children between 5 and 12 years of age. The use of ADVATE by continuous infusion has not been evaluated in children under 5 years of age. Based on experience with other Factor VIII products, administration of ADVATE by continuous infusion, in a small number of subjects, was preceded by a loading bolus dose. After administration of a loading dose to correct the plasma Factor VIII level to 80-120 IU/dL, begin infusion of Factor VIII at a rate of 4 IU/kg/h for patients  $>12$  years of age and 5 IU/kg/h for children between 5 and 12 years of age. It is highly recommended that plasma Factor VIII levels be checked within 3 to 6 hours after the initiation of continuous infusion in order to document that the desired Factor VIII levels are being maintained. Rates of infusion should be modified based on the levels of plasma Factor VIII activity measured at least once per day thereafter, and based on the desired level of Factor VIII.

It is strongly recommended that every time ADVATE is administered, the patient name and batch number of the product are recorded to maintain a link between the patient and batch of the product.

#### 4.5 Missed Dose

- Double doses are generally not required to compensate for forgotten individual doses.
- Patients should be advised to proceed immediately with a regular administration of ADVATE and to continue treatment at regular intervals as required.

### 5 OVERDOSAGE

Of all infusions administered during clinical studies, 0.9% of infusions were >100 IU/kg. No safety concerns were identified in association with these infusions. No subject received a dose > 208 IU/kg in these studies.

For management of a suspected drug overdose, contact your regional poison control centre.

### 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING

To help ensure the traceability of biologic products, including biosimilars, health professionals should recognize the importance of recording both the brand name and the non-proprietary (active ingredient) name as well as other product-specific identifiers such as the Drug Identification Number (DIN) and the batch/lot number of the product supplied.

**Table 4 Dosage Forms, Strengths, Composition and Packaging**

Route of Administration	Dosage Form / Strength/Composition	Non-medicinal Ingredients
Intravenous	Powder for Intravenous injection / 1000, 1500, 2000 and 3000 International Units (IU) per vial reconstituted in 5 mL of water for injection  and  Powder for Intravenous injection / 250, 500, 1000 and 1500 International Units (IU) per vial reconstituted in 2 mL of water for injection.	$\alpha$ , $\alpha$ -Trehalose Calcium Chloride Histidine Mannitol Polysorbate 80 Reduced Glutathione Sodium Chloride Tris(hydroxymethyl) aminomethane

ADVATE is a sterile, non-pyrogenic, white to off-white powder. After reconstitution, the solution should be clear, colourless, and free from foreign particles.

**ADVATE and Sterile Water for Injection preassembled in a BAXJECT III System\*:**

ADVATE with 2 mL Sterile Water for Injection, USP is available as a lyophilized powder in a single-use BAXJECT III system containing nominally 250, 500, 1000, 1500 IU per vial. ADVATE 2mL in a BAXJECT III system is packaged with a microbore infusion set, 10 mL sterile syringe, sterile alcohol swab, bandage, and one package insert.

ADVATE with 5 mL Sterile Water for Injection, USP is available as a lyophilized powder in a single-use BAXJECT III system containing nominally 1000, 1500, 2000, and 3000 IU per vial. ADVATE 5mL in a BAXJECT III system is packaged with an infusion set, 10 mL sterile syringe, sterile alcohol swab, bandage, and one package insert.

\*ADVATE supplied with BAXJECT III System is currently not marketed in Canada

**ADVATE for reconstitution using a BAXJECT II device:**

ADVATE with 2 mL Sterile Water for Injection is available as single dose vials that contain nominally 250, 500, 1000, 1500 IU per vial. ADVATE 2mL for reconstitution using the BAXJECT II device is packaged with Sterile Water for Injection, USP, a BAXJECT II device, a microbore infusion set, 10 mL sterile syringe, sterile alcohol swab, bandage, and one package insert. ADVATE with 5 mL Sterile Water for Injection, USP is available as single dose vials that contain nominally 1000, 1500, 2000, and 3000 IU per vial. ADVATE 5mL for reconstitution using the BAXJECT II device is packaged with Sterile Water for Injection, USP, a BAXJECT II device, an infusion set, 10 mL sterile syringe, sterile alcohol swab, bandage, and one package insert.

ADVATE is to be reconstituted with the provided Sterile Water for Injection (sWFI). When reconstituted with the appropriate volume of diluent, ADVATE contains the following stabilizers, nonmedicinal ingredients, or excipients in target amounts:

	<b>5 mL Reconstitution Volume</b>	<b>2 mL Reconstitution Volume</b>
Mannitol	3.2% (w/v)	8% (w/v)
$\alpha$ , $\alpha$ -Trehalose	0.8% (w/v)	2% (w/v)
Sodium Chloride	90 mM	225 mM
Histidine	10 mM	25 mM
Tris(hydroxymethyl) aminomethane	10 mM	25 mM
Calcium Chloride	1.7 mM	4.2 mM
Polysorbate 80	0.01% (w/v)	0.025% (w/v)
Reduced Glutathione	0.08 mg/mL	0.2 mg/mL

Recombinant von Willebrand Factor (rVWF) is co-expressed with recombinant Factor VIII, and helps to stabilize it in culture. The final product contains no more than 2 ng rVWF/IU rAHF, which will not have any clinically relevant effect in patients with von Willebrand's Disease. The product contains no preservative.

ADVATE is labelled with the AHF activity expressed in IU per vial. Biological potency is determined by an *in vitro* assay, which employs a Factor VIII concentrate standard that is referenced to a World Health Organization (WHO) International Standard for Factor VIII: C concentrates. The specific activity of ADVATE is 4,000 to 10,000 IU per milligram of protein.

## 7 WARNINGS AND PRECAUTIONS

### General

**Identification of the clotting defect as Factor VIII deficiency is essential before the administration of ADVATE.** No benefit may be expected from this product in treating other coagulation factor deficiencies.

As with all Factor VIII products, the clinical response to ADVATE may vary. If bleeding is not controlled with the recommended dose, the plasma level of Factor VIII should be determined and a sufficient dose of ADVATE should be administered to achieve a satisfactory clinical response. If the patient's plasma Factor VIII level fails to increase as expected or if bleeding is not controlled after adequate dosing, the presence of an inhibitor (neutralizing antibodies) should be suspected and appropriate testing performed.

### Carcinogenesis and Mutagenesis

No studies were conducted with the active ingredient in ADVATE to assess its mutagenic or carcinogenic potential. The CHO cell line employed in the production of ADVATE is derived from that used in the biosynthesis of RECOMBINATE rAHF. ADVATE has been shown to be comparable to RECOMBINATE rAHF with respect to its biochemical and physicochemical properties, as well as its non-clinical *in vivo* pharmacology and toxicology. By inference, RECOMBINATE rAHF and ADVATE would be expected to have equivalent mutagenic and carcinogenic potential.

RECOMBINATE rAHF was tested for mutagenicity at doses considerably exceeding plasma concentrations *in vitro*, and at doses up to ten times the expected maximal clinical dose *in vivo*. At that concentration, it did not cause reverse mutations, chromosomal aberrations, or an increase in micronuclei formation in bone marrow polychromatic erythrocytes. Studies in animals have not been performed to evaluate carcinogenic potential.

### Immune

#### Hypersensitivity Reactions

Allergic-type hypersensitivity reactions, including anaphylaxis, have been reported with ADVATE and have been manifested by dizziness, paresthesia, rash, flushing, face-swelling, urticaria, and pruritis. Patients should be informed of the early signs of hypersensitivity reactions including hives, generalized urticaria, and tightness of the chest, wheezing, hypotension, and anaphylaxis. Patients should be advised to discontinue use of the product and contact their physician if these symptoms occur.

#### Formation of Antibodies to Mouse or Hamster Protein

ADVATE contains trace amounts of mouse immunoglobulin G (MuIgG; maximum of 0.1 ng/IU ADVATE rAHF PFM) and hamster (CHO) proteins (maximum of 1.5 ng/IU ADVATE rAHF PFM). As such, there exists a remote possibility that patients treated with this product may develop

hypersensitivity to these non-human mammalian proteins.

## **Monitoring and Laboratory Tests**

Although the dose can be estimated using calculations (see 4 DOSAGE AND ADMINISTRATION), it is highly recommended that, whenever possible, appropriate laboratory tests be performed on the patient's plasma at suitable intervals to assure that adequate Factor VIII levels have been reached and are maintained.

If the patient's plasma Factor VIII level fails to increase as expected or if bleeding is not controlled after adequate dosing, the presence of an inhibitor should be suspected. By performing the appropriate laboratory procedures, the presence of an inhibitor can be demonstrated and quantified in terms of the number of BU per mL (i.e., the amount of Factor VIII activity neutralized by one mL of patient plasma). If the inhibitor is present at levels less than 10 BU per mL, the administration of additional AHF concentrate may neutralize the inhibitor. Thereafter, the administration of additional AHF concentrate should elicit the predicted response. The close monitoring of plasma Factor VIII levels by laboratory assays is necessary in this situation.

Inhibitor titers above 10 BU per mL may make control of hemostasis with AHF concentrates either impossible or impractical because of the very large dose required. In addition, the inhibitor titer may rise following AHF infusion as a result of an anamnestic response to Factor VIII. The treatment or prevention of bleeding in such patients requires the use of alternative therapeutic approaches and agents.

## **Peri-Operative Considerations**

ADVATE is also indicated in the perioperative management of patients with hemophilia A. Careful control of replacement therapy is important, especially in cases of major surgery or life-threatening hemorrhages.

## **Sensitivity/Resistance**

### Formation of Inhibitors to Factor VIII

The formation of neutralizing antibodies, which are inhibitors of Factor VIII, is a known complication in the management of individuals with hemophilia A. Among previously untreated patients receiving rAHF products inhibitors occur in 15-32% of the population. The incidence among patients who have previously experienced >50 exposure days to rAHF is approximately 2 per 1000 patient-years. These inhibitors are invariably of the immunoglobulin G (IgG) isotype, and the Factor VIII inhibitory activity is expressed as BU per mL of plasma or serum. Patients treated with AHF products should be carefully monitored for the development of Factor VIII inhibitors by appropriate clinical observations and laboratory tests.

The risk of inhibitor development depends on a number of factors relating to the characteristics of the patient (e.g., type of the Factor VIII gene mutation, family history, ethnicity), which are believed to represent the most significant risk factors for inhibitor formation.

Inhibitors have predominately been reported in previously untreated patients. In general, all patients treated with coagulation factor VIII products should be carefully monitored for the development of inhibitors by appropriate clinical observations and laboratory tests.

## **7.1 Special Populations**

### **7.1.1 Pregnant Women**

The safety of ADVATE for use in pregnant or lactating women has not been established. Animal reproduction studies have not been conducted with ADVATE. It is not known whether ADVATE can cause fetal harm when administered to a pregnant woman, or whether it can affect reproductive capacity. Physicians should carefully consider the potential risks and benefits for each specific patient before prescribing ADVATE. ADVATE should be given to a pregnant woman only if clearly needed.

### **7.1.2 Breast-feeding**

It is unknown if the drug is excreted in human milk. Because many drugs are excreted in human milk precaution should be exercised.

### **7.1.3 Pediatrics (≥1 to <16 years of age)**

More frequent or larger doses should be considered for pediatric patients to account for the observed difference in adjusted recovery and terminal half-life between adult and pediatric patients (Table 7). Separate dosing guidelines have also been established for pediatric patients < 6 years old (see 4 DOSAGE AND ADMINISTRATION)

### **7.1.4 Geriatrics (>65 years of age)**

Insufficient data are available.

## **8 ADVERSE REACTIONS**

### **8.1 Adverse Reaction Overview**

The majority of the Adverse Events in the clinical trials appear to have been related to trauma, intercurrent mild respiratory or gastrointestinal disease, or well-described complications of hemophilia (see 7 WARNINGS AND PRECAUTIONS).

### **8.2 Clinical Trial Adverse Reactions**

*Clinical trials are conducted under very specific conditions. The adverse reaction rates observed in the clinical trials; therefore, may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse reaction information from clinical trials may be useful for identifying and approximating rates of adverse drug reactions in real-world use.*

Clinical Studies with ADVATE enrolled 450 unique subjects. The safety analysis set included 418 subjects with at least one exposure to ADVATE from 12 clinical studies: 069901, 060102, BLB-200-01, 060101, 060401, 069902, 060201, 060103, 060403, 060702, 060601, and 060801.

A total of 93 adverse reactions (ADR) were reported in 45 of the 418 unique treated subjects. The most common adverse reaction included FVIII inhibition, pyrexia, and headache. Of these, 17 ADRs for FVIII inhibition were considered serious. Factor VIII inhibition was the most frequent ADR that was reported in 4.1% of treated subjects (n=17). Of the 93 ADRs, none were reported in neonates (0 to < 1 month of age), 30 ADRs were reported in 20/60 infants (1 month to <2 years of age), 7 ADRs were reported in 3/68 children (2 to <12 years of age), 10 ADRs were reported in 5/38 adolescents (12 to <16 years of age), and 46 ADRs were reported in 17/147 adults (16 years of age and older).

<b>Table 5 Summary of adverse drug reactions from the ADVATE Clinical Program (n=418)<sup>a</sup></b>				
<b>System Organ Class (SOC)</b>	<b>Preferred MedDRA Term</b>	<b>Number of Unique Subjects</b>	<b>ADR Rate (% of subjects)<sup>b</sup></b>	<b>Frequency Category</b>
<b>Blood and lymphatic system disorders</b>	Factor VIII inhibition <sup>c</sup>	1 (PTP) <sup>d</sup>	0.28	Uncommon
		16 (PUPs) <sup>d</sup>	29.09	Very Common
	Lymphangitis	1	0.24	Uncommon
<b>Cardiac disorders</b>	Palpitations	1	0.24	Uncommon
<b>Eye disorders</b>	Eye inflammation	1	0.24	Uncommon
<b>Gastrointestinal disorders</b>	Abdominal pain upper	2	0.48	Uncommon
	Diarrhea	2	0.48	Uncommon
	Nausea	1	0.24	Uncommon
	Vomiting	1	0.24	Uncommon
<b>General disorders and administrative site conditions</b>	Pyrexia	6	1.44	Common
	Chest discomfort	1	0.24	Uncommon
	Chest pain	1	0.24	Uncommon
	Chills	1	0.24	Uncommon
	Feeling abnormal	1	0.24	Uncommon
	Peripheral edema	1	0.24	Uncommon
	Vessel puncture site hematoma	1	0.24	Uncommon
<b>Infections and infestations</b>	Influenza	1	0.24	Uncommon
	Laryngitis	1	0.24	Uncommon
<b>Injury, poisoning and procedural complications</b>	Post procedural complication	1	0.24	Uncommon
	Post procedural hemorrhage	1	0.24	Uncommon
	Procedural site reaction	1	0.24	Uncommon

<b>Investigations</b>	Coagulation factor VIII level decreased	1	0.24	Uncommon
	Hematocrit decreased			
	Laboratory test abnormal	1	0.24	Uncommon
	Monocyte count increased	1	0.24	Uncommon
<b>Nervous system disorders</b>	Headache	7	1.67	Common
	Dizziness	4	0.96	Uncommon
	Dysgeusia	1	0.24	Uncommon
	Memory impairment	1	0.24	Uncommon
	Migraine	1	0.24	Uncommon
	Syncope	1	0.24	Uncommon
	Tremor	1	0.24	Uncommon
<b>Respiratory, thoracic and mediastinal disorders</b>	Dyspnea	2	0.48	Uncommon
<b>Skin and subcutaneous tissue disorders</b>	Hyperhidrosis	2	0.48	Uncommon
	Pruritus	2	0.48	Uncommon
	Rash	4	0.96	Uncommon
	Urticaria	1	0.24	Uncommon
<b>Vascular disorders</b>	Hematoma	1	0.24	Uncommon
	Hot flush	2	0.48	Uncommon
	Pallor	1	0.24	Uncommon

Legend: ADR frequency is based upon the following scale: Very Common ( $\geq 1/10$ ); Common ( $\geq 1/100 - < 1/10$ ), Uncommon ( $\geq 1/1,000 - < 1/100$ ), Rare ( $\geq 1/10,000 - < 1/1,000$ ), Very Rare ( $< 1/10,000$ )

PTP: Previously treated patients

PUP: Previously untreated patients

a ADRs include only adverse events considered to be related to the investigational product.: 93.

b Percent is based on total number of subjects who received ADVATE: 418.

c In study 060103 (PUP), 16 subjects reported an ADR for inhibitor development. In study 060201, one subject reported an ADR for inhibitor development that was not confirmed. In study 069901, one subject had an inhibitor that was not reported as an ADR. In total, there were 17 confirmed inhibitors reported in 17 subjects.

d Of the 418 unique subjects, 363 are PTPs and 55 are PUPs.

A total of 276 patients, diagnosed with severe to moderately severe hemophilia A (FVIII  $\leq 2\%$ ), entered studies that required a minimum of 150 exposure days in adults and older children and 50 exposure days in children < 6 years of age to Factor VIII concentrates prior to participation. Among these patients, one displayed evidence of a Factor VIII inhibitor. This subject manifested a low titer inhibitor (2.0 BU by the Bethesda assay) after 26 exposure days. Follow-up inhibitor tests in this subject after withdrawal from the study were negative. Across all studies, median exposure to ADVATE was 97.0 exposure days per subject (range 1 to 709) for previously treated patients. The overall incidence of any FVIII inhibitor development (low or high) was 0.36% (1 of 276), the 95% CIs: 0.009 to 2.002% based on 276 previously treated patients. The incident results for low titer and overall titer (low and high) were the same.

In addition, 16 out of 55 previously untreated patients (PUPs) developed FVIII inhibitors: 7 subjects developed high-titer inhibitors and 9 subjects developed low-titer inhibitors, 1 of which was also classified as a transient inhibitor.

#### 8.4 Abnormal Laboratory Findings: Hematologic, Clinical Chemistry and Other Quantitative Data

The abnormal hematologic and clinical chemistry findings that were observed in a single case each are; decrease in FVIII level, decrease in hematocrit and an abnormal laboratory test (see table above). Examination of the changes in laboratory parameters indicated no evidence of toxicity with ADVATE.

#### 8.5 Post-Market Adverse Reactions

In addition to the adverse reactions noted in clinical trials, the following adverse reactions have been reported in the post-marketing experience. These adverse reactions are listed by preferred MedDRA term.

Adverse reactions identified during post-approval use of ADVATE can be found in Table 6. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure. For further details, see 7 WARNINGS AND PRECAUTIONS.

***Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.***

**Table 6 Summary of Adverse Drug Reactions from ADVATE Post-Marketing Experience**

MedDRA Standard System Organ Class (SOC)	MedDRA Preferred Term (PT)
Blood and the lymphatic system disorders	Factor VIII inhibition
Immune system disorders	Hypersensitivity Anaphylactic reaction
Nervous system disorders	Headache Dizziness Paraesthesia Cerebral haemorrhage
Vascular disorders	Flushing
Respiratory, thoracic and mediastinal disorders	Dyspnoea Wheezing Bronchospasm Throat tightness

**Table 6 Summary of Adverse Drug Reactions from ADVATE Post-Marketing Experience**

MedDRA Standard System Organ Class (SOC)	MedDRA Preferred Term (PT)
Gastrointestinal disorders	Abdominal pain Nausea
Skin and subcutaneous disorders	Urticaria (generalized) Erythema Pruritus Rash (macular) Prurigo
General disorders and administration site conditions	Drug effect decreased Less than expected effect Pyrexia Chest discomfort Chest pain Chills Infusion site pain Asthenia Malaise Fatigue Injection site reaction

A small cluster of lack of effect events were noted from Germany. More than 90% of these reports of decreased efficacy were received from one Haemophilia Center in Bonn, Germany. The age of the patients ranged between 5 and 52 years (median: 36 yrs). The majority of patients received prophylactic treatment. Period of factor VIII treatment documented prior to ADVATE ranged between 125 to 477 days (median 372 days) and after change to ADVATE between 11 to 340 days (median 133 days).

One third of these patients did not suffer from any bleeding events during ADVATE treatment, however, felt better protected with the previous Factor VIII concentrate. One third suffered from only 1 bleed (primarily spontaneous bleeding) under ADVATE and the remaining patients experienced between 2 and 5 bleeds under ADVATE. However, comparing the pre-ADVATE period with the period of ADVATE therapy, in none of the patients could a clearly increased bleeding incidence be demonstrated.

In three-quarters of the cases, no relevant results on inhibitor testing were available. In one-quarter of the reports, sporadic inhibitor tests were performed during ADVATE treatment; however, results were negative in all instances. No formal pharmacokinetic investigations (recovery, half-life testing) to exclude low factor VIII inhibitors were performed.

However, none of the patients reported a lack of efficacy or increased bleeding frequency with their previous product, observations that are consistent with the absence of inhibitor formation.

## **9 DRUG INTERACTIONS**

### **9.2 Drug Interactions Overview**

No potential interactions are known at this time

### **9.3 Drug-Behavioural Interactions**

This information is not available for this drug product.

### **9.4 Drug-Drug Interactions**

No interaction of ADVATE with other medicinal products is known or has been established.

### **9.5 Drug-Food Interactions**

Interactions with food have not been established.

### **9.6 Drug-Herb Interactions**

Interactions with herbal products have not been established.

### **9.7 Drug-Laboratory Test Interactions**

Interactions with laboratory tests have not been established.

## **10 CLINICAL PHARMACOLOGY**

### **10.1 Mechanism of Action**

ADVATE contains recombinant coagulation Factor VIII, a glycoprotein that has an amino acid sequence comparable to human Factor VIII, and post-translational modifications that are similar to those of the plasma-derived molecule. Activated Factor VIII acts as a cofactor for activated Factor IX, accelerating the conversion of Factor X to activated Factor X. Activated Factor X converts prothrombin to thrombin. Thrombin then converts fibrinogen into fibrin and a fibrin clot is formed.

### **10.2 Pharmacodynamics**

Hemophilia A is a sex-linked hereditary disorder of blood coagulation due to decreased levels of Factor VIII activity and results in profuse bleeding into joints, muscles or internal organs, either spontaneously or as a result of accidental or surgical trauma. The plasma levels of Factor VIII are increased by replacement therapy, thereby enabling a temporary correction of the factor deficiency and correction of the bleeding tendency. The level required to achieve adequate hemostasis varies depending on anatomic location and severity of traumatic insult if present.

### 10.3 Pharmacokinetics

All pharmacokinetic (PK) studies with ADVATE were conducted in patients with severe to moderately severe hemophilia A (baseline Factor VIII  $\leq$ 2%).

A total of 260 subjects provided PK parameters that were included in the full PK analysis set. From this analysis set, 208 subjects provided PK parameters included in the per protocol PK analysis set. Categories of these analyses for infants (1 month to <2 years of age), children (2 to <12 years of age), adolescents (12 to <16 years of age), and adults (16 years of age and older) were used to summarize PK parameters, where age was defined as age at time of PK infusion.

<b>Table 7 Summary of rAHF-PFM Pharmacokinetic Parameters per Age Group</b>				
Parameter (Mean $\pm$ Standard Deviation)	Infants (n=7) (1 month to < 2 years)	Children (n=56) (2 to < 12 years)	Adolescents (n=35) (12 to < 16 years)	Adults <sup>a</sup> (n=162) ( $\geq$ 16 years)
Total AUC (IU $\cdot$ hr/dL)	1240 $\pm$ 330	1263.40 $\pm$ 470.90	1300 $\pm$ 469	1554.88 $\pm$ 507.92
Adjusted Incremental Recovery at C <sub>max</sub> (IU/dL per IU/kg) <sup>b</sup>	2.07 $\pm$ 0.54	1.91 $\pm$ 0.50	2.05 $\pm$ 0.49	2.23 $\pm$ 0.61
Half-life (hr)	8.67 $\pm$ 1.43	10.22 $\pm$ 2.72	12.00 $\pm$ 2.92	12.96 $\pm$ 4.02
Maximum Plasma Concentration Post Infusion (IU/dL)	104 $\pm$ 27	97.16 $\pm$ 27.13	103 $\pm$ 25	112.35 $\pm$ 30.27
Mean Residence Time (hr)	10.42 $\pm$ 2.54	12.87 $\pm$ 3.70	14.89 $\pm$ 4.61	16.37 $\pm$ 5.80
Volume of Distribution at Steady State (dL/kg)	0.43 $\pm$ 0.10	0.55 $\pm$ 0.15	0.60 $\pm$ 0.14	0.55 $\pm$ 0.17
Clearance (mL/kg $\cdot$ hr)	4.26 $\pm$ 1.00	4.53 $\pm$ 1.51	4.21 $\pm$ 1.16	3.56 $\pm$ 1.21

a 162 subjects provided PK assessments.

b Calculated as (C<sub>max</sub> – baseline Factor VIII) divided by the dose in IU/kg, where C<sub>max</sub> is the maximal post-infusion Factor VIII measurement.

**Absorption:** Refer to Table 7 for a summary of the adjusted recovery, AUC, and V<sub>ss</sub> in the infant, child, adolescent and adult populations.

**Distribution:** When infused into a hemophilia patient, ADVATE binds to endogenous von Willebrand factor in the patient's circulation. The Factor VIII/von Willebrand factor complex is

distributed primarily in the intravascular space.

**Metabolism:** Not applicable

**Elimination:** It is currently believed that Factor VIII clearance is mediated by vascular receptors, including low-density lipoprotein receptor-related protein (LPR) and heparin sulphate proteoglycans (HSPGs), by mechanisms that have not been fully elucidated.

### **Special Populations and Conditions**

**Pediatrics:** A total of 184 pediatric patients ( $\leq 16$  years old) diagnosed with severe to moderately severe hemophilia A (Factor VIII  $\leq 2\%$ ) participated in a number of clinical studies. The safety and hemostatic efficacy of ADVATE in this population are similar to that of adult patients. (See 14 CLINICAL TRIALS) The safety and hemostatic efficacy of ADVATE in this population are similar to that of adult patients. Adjusted recovery and terminal half-life was approximately 20% lower in children than in adults. (See 10.3 Pharmacokinetics, Table 7)

## **11 STORAGE, STABILITY AND DISPOSAL**

- ADVATE should be refrigerated (2°C- 8°C [36°F – 46°F]). Avoid freezing to prevent damage to the diluent vial.
- ADVATE may be stored at room temperature (up to 30°C [86°F]) for a period of up to six months not to exceed the expiration date.
- Do not place back in the refrigerator once removed from refrigerated storage.
- Do not use beyond the expiration date printed on the vial or six months after date noted on the carton, whichever is the earliest.

## **12 SPECIAL HANDLING INSTRUCTIONS**

- ADVATE reconstituted with 2 mL or 5 mL Sterile Water for Injection USP should never be further diluted.
- Do not refrigerate preparation after reconstitution.
- ADVATE should be administered at room temperature not more than 3 hours after reconstitution.
- Parenteral drug products should be inspected for particulate matter and discoloration prior to administration, whenever solution and container permit.
- Plastic syringes must be used with this product, since proteins such as ADVATE tend stick to the surface of glass syringes.

## PART II: SCIENTIFIC INFORMATION

### 13 PHARMACEUTICAL INFORMATION

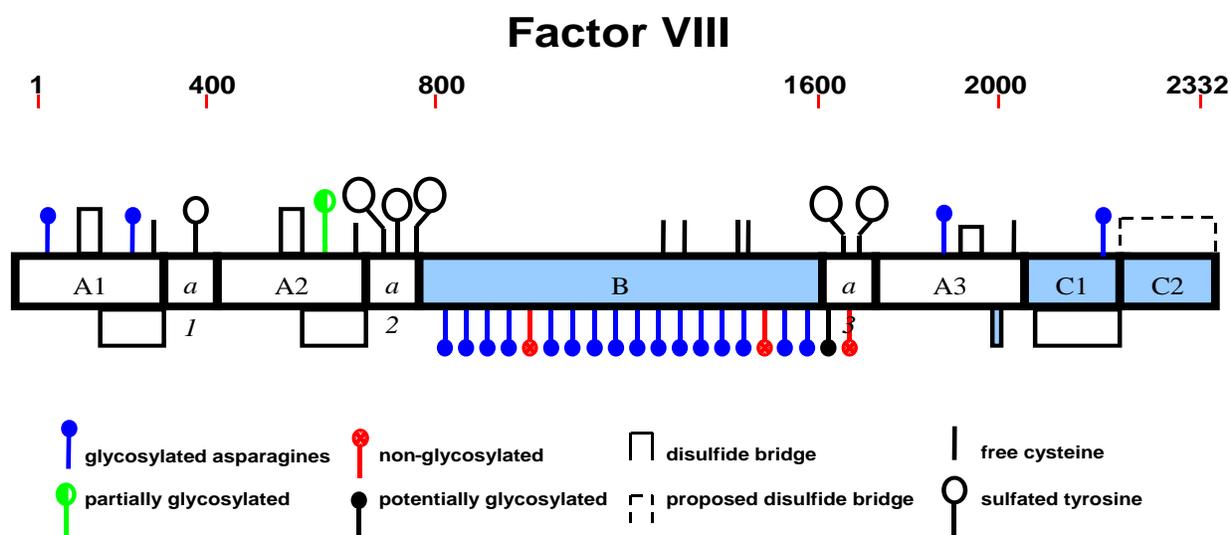
#### Drug Substance

Proper name: Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method

Chemical name: Octocog alfa

Molecular formula and molecular mass: 2,332 amino acids with an approximate molecular mass of 280 kDa.

Structural formula:



Physicochemical properties:

ADVATE is a dimeric glycoprotein that is produced using CHO cells with an amino acid sequence that is identical to the licensed Recombinate anti-hemophilic factor currently manufactured by Takeda. The post-translational modifications of ADVATE are similar to plasma-derived Factor VIII.

ADVATE drug substance is a clear, colourless solution free from foreign particles.

#### Product Characteristics

ADVATE (Octocog Alfa) is a dimeric glycoprotein with a molecular mass of 280 kDa that is produced using CHO cells. The product is activated *in vivo* after cleavage by thrombin protease activity, which converts the Factor VIII product to its active heterotrimeric form (FVIIIa). In its active form, FVIIIa functions as a co-factor for the enzymatic activity of activated Factor IX (FIXa), which activates Factor X (FXa). The activated Factor X (FXa) converts prothrombin to the active thrombin enzyme. Thrombin protease activity cleaves fibrinogen into fibrin monomers, which polymerize to form the blood clot. The clot is ultimately stabilized by the cross-linking

activity of Factor XIII.

Factor VIII (FVIII) is co-expressed with von Willebrand Factor (vWF) in CHO cells to facilitate the secretion of the FVIII into the culture media. Von Willebrand Factor also stabilizes FVIII in vivo. The heavily glycosylated B-domain is cleaved and released when activated by Thrombin. The activated FVIII, consisting of the A1, A2, A3, C1, and C2 domains, acts as a co-factor to FIXa. Activated protein C inactivates Factor VIIIa. The half-life of FVIII is approximately 12 hours in patients with hemophilia. The solution stability of ADVATE is optimal in the 5.5 – 7.5 pH range.

## 14 CLINICAL TRIALS

### 14.1 Trial Design and Study Demographics

**Table 8 Summary of patient demographics for clinical trials in Hemophilia**

Study #	Trial design	Dosage, route of administration and duration	Study subjects (n) enrolled (treated) <sup>a</sup>	Mean age (Range)	Sex
060201	Multi-center, open-label, prospective, randomized, controlled Phase 4 clinical study of relative efficacy of ADVATE use in 2 prophylactic treatment regimens compared to that of an on-demand treatment	On-demand regimen (determined by investigator): 6 months  Prophylactic regimen: Post 6 month of on-demand treatment subjects randomized to 12 months of a standard prophylaxis regimen (20-40 IU/kg every 48 hours) or PK – driven prophylaxis regimen (20-80 IU/kg every 72 hours).	73 (53) <sup>c</sup>	On-demand: Median age: 26 (7-59)  PK-driven prophylaxis: Median age: 24.5 (7-59)  Standard prophylaxis: Median age: 33 (10-55)	Not available

069901	<p>Part 1: Randomized, double-blind, crossover pharmacokinetic comparison of ADVATE and RECOMBINATE</p> <p>Part 2: Open-label, multi-center, non-controlled, prophylaxis study</p> <p>Part 3: Randomized, double-blind, crossover pharmacokinetic comparison pilot and commercial product</p>	<p>Part 1 Pharmacokinetic: Single Infusion: 50 ± 5 IU/kg</p> <p>Part 2 Prophylaxis: 25-40 IU/kg, 3-4 times/wk</p> <p>Part 3 Pharmacokinetic: Single Infusion: 50 ± 5 IU/kg</p>	111 (106)	≥ 10 years	111 M
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069902	Multicenter, prospective, open-label, uncontrolled surgical prophylaxis study (perioperative hemostatic control during surgery, dental extractions and invasive diagnostic procedures)	<p>Perioperative Management</p> <p>Preoperative: Dental procedure loading dose to raise FVIII level to 60% to 100% of normal; Major/Minor procedure loading dose to raise FVIII level to 80% to 120% of normal</p> <p>Intra- and Post-Operative BI or CI regimens, or a combination: BI: as clinically indicated; CI: initial rate of 4 IU·kg<sup>-1</sup>·h<sup>-1</sup> for subjects &gt; 12 years and 5 IU·kg<sup>-1</sup>·h<sup>-1</sup> for subjects 5-12 years, then investigator-determined</p> <p>Home Replacement Therapy Prescribed by investigator for up to 6 weeks for major orthopedic procedures and up to 2 weeks for all other procedures</p>	59 (58)	≥ 5 years 7 - 65 years	59 M
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Study #	Trial design	Dosage, route of administration and duration	Study subjects (n)	Mean age (Range)	Sex
060101	<p>Part 1: Determination of pharmacokinetic parameters in pediatric patients with severe to moderately severe hemophilia</p> <p>Part 2: Multicenter, open label, uncontrolled, prophylaxis study in pediatric patients with severe to moderately severe hemophilia</p>	<p>Part 1 Pharmacokinetic: Single Infusion: 50 ± 5 IU/kg</p> <p>Part 2 Therapeutic Regimen (determined by investigator):</p> <ol style="list-style-type: none"> <li>1. Standard prophylaxis (25-50 IU/kg, 3-4 times/wk),</li> <li>2. Modified prophylaxis (investigator determined dose and frequency),</li> <li>3. On demand (investigator-determined dose and frequency)</li> </ol>	53 (53)	1 – 5 years	52 M 1 F

060102	<p>Part 1: single-arm, open-label evaluation of the pharmacokinetics and safety of ADVATE</p> <p>Part 2: Multicenter, open label, randomized, two arm, parallel, pivotal continuation study to collect additional efficacy and safety.</p>	<p>Part 1 Pharmacokinetic: Single Infusion: 50 ± 5 IU/kg</p> <p>Part 2 Therapeutic Regimen (determined by investigator):</p> <ol style="list-style-type: none"> <li>1. Standard prophylaxis (25-40 IU/kg, 3-4 times/wk)</li> <li>2. Modified prophylaxis (investigator determined dose and frequency),</li> <li>3. On demand (investigator-determined dose and frequency)</li> </ol>	82 (82)	≥ 10 years 11 – 67 years	82 M
BLB-200-01	<p>Part 1: Randomized, double-blind, crossover pharmacokinetic comparison of ADVATE and RECOMBINATE</p> <p>Part 2: Open-label, multi-center, non-controlled, prophylaxis study</p>	<p>Part 1 Pharmacokinetic: Single Infusion: 50 ± 5 IU/kg</p> <p>Part 2 Bleeding Episode: 10-50 IU/kg Prophylaxis: 25-40 IU/kg (frequency determined by investigator) Last visit: 50 ± 5 IU/kg</p>	15 (15)	10 – 72 years	15 M

060103	Multicenter, open-label, uncontrolled clinical study of the immunogenicity, efficacy, and safety of rAHF-PFM in conjunction with an on-demand or prophylactic therapy regimen in previously untreated patients (PUPs)	Therapeutic Regimen (determined by investigator): <ol style="list-style-type: none"> <li>1. Standard prophylaxis: (25-50 IU/kg, 3-4 times/wk),</li> <li>2. Modified prophylaxis (investigator determined dose and frequency),</li> <li>3. On demand (investigator-determined dose and frequency)</li> </ol> Perioperative Management (determined by investigator) Immune Tolerance Therapy (if needed, established regimen approved by the sponsor)	29 <sup>b</sup> (26)	N/A (ongoing)	29 M <sup>b</sup> (ongoing)
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M = Male, F = Female

N/A = Not applicable as the study is still ongoing

- a The number of treated patients indicates the number of patients listed as treated for each individual clinical study. The number of unique patients treated in the ADVATE clinical development program, totalling 234 patients, were as follows: 069901 (106), 069902 (34), 060101 (53), 060102 (0), 060103 (26), BLB-B200-01 (15).
- b Clinical study 060103 is still ongoing. The database snapshot taken was as of 27 March 2006
- c 53 PTPs (Previously Treated Patients) with severe to moderately severe hemophilia A (FVIII level <2 IU/dL) were analyzed in the per protocol analysis set. All subjects had a history of at least 8 joint hemorrhages per year upon entering the study. Each subject in the per protocol analysis set was adherent to >90% of the prescribed number of prophylactic infusions; no subject in the study surpassed the upper boundary of 110% of prescribed infusions.

Of the 234 unique patients treated in the clinical development program, 193 (82.5%) subjects were Caucasian, 15 (6.4%) were Black, 17 (7.3%) were Asian, 7 (3%) were from other racial categories, and for 2 subjects (0.9%) the race category data were missing. Of the 234 subjects with available data, 21 (9.0%) were ethnically Hispanic.

## 14.2 Study Results

### Prophylaxis and Reduction of Bleeding Episodes in Adults and Children (Clinical Study Report 060201)

The annualized bleed rate (ABR) was calculated as follows:

{number of bleeding episodes ÷ observed treatment period in days} x 365.25.

This algorithm was implemented across all subjects in the Intent-to-Treat and Per-Protocol analysis sets. The median annual bleed rate for on-demand was 44.0 compared to 1.0 while on either prophylaxis regimen. Twenty-two (22) of 53 (42%) patients experienced no bleeding episodes while on either prophylaxis regimen for one year.

The median ABR during the on-demand treatment period was 44 bleeds per subject per year, compared to 1 bleed per subject per year while on either prophylactic regimen, which was a statistically significant difference ( $p < 0.0001$ ).

**Table 9 Annual Bleed Rate of Prophylaxis Compared to On-Demand Treatment**

Clinical Parameters	On-Demand (n=53)	Standard Prophylaxis (n=30)	PK-driven Prophylaxis (n=23)	Any Prophylaxis (n=53)
Number of Total Treated Bleeding Episodes	1351	77	75	152
Median (IQR) ABR <sup>1</sup>	44.0 (20.8)	1.0 (2.14)	1.0 (4.1)	1.0 (4.1)
Median (IQR) Joint ABR	38.7 (24.8)	0.5 (1.96)	1.0 (4.1)	1.0 (2.1)
Median (IQR) Non-Joint ABR	4.0 (11.9)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Median (IQR) Spontaneous ABR	32.0 (26.9)	0.0 (1.9)	0.0 (2.0)	0.0 (1.9)
Median (IQR) Traumatic ABR	11.5 (17.2)	0.0 (1.0)	1.0 (1.0)	0.0 (1.0)

<sup>1</sup> Statistically significant difference ( $p < 0.0001$ ) in median ABR between patients on any prophylaxis versus on-demand therapy using the Wilcoxon Signed-Rank test.

IQR= Interquartile Range

The annualized bleed rates by age category during on-demand and either standard or PK-driven prophylaxis regimens are shown in Table 10.

**Table 10 Annualized Bleed Rate by Age category and Any Prophylaxis vs On-Demand (Per Protocol)**

Age category	Any Prophylaxis					On-Demand				
	N	Min	Median	Max	Percentage of Subjects With Zero Bleeds	N	Min	Median	Max	Percentage of Subjects With Zero Bleeds
Children (≥7 to <12 years old)	3	0.0	5.2	8.7	33%	3	38.6	44.0	120.5	All subjects bleed during On-Demand
Adolescents (≥12 to <16 years old)	4	0.0	5.0	10.0	25%	4	37.9	58.0	81.4	
Adults (≥16 years old and older)	46	0.0	1.0	17.4	43%	46	22.7	44.7	117.8	
All Subjects	53	0.0	1.0	17.4	42%	53	22.7	44.0	120.5	

Results of a post hoc analysis performed for prophylaxis patients showed the median ABRs for non-adherent subjects were 20.9 compared to median ABRs for adherent subjects 3.0, with “adherent” subject defined as one who received ≥ 90% of prescribed number of infusions.

#### Hemostatic Efficacy:

A secondary objective of study 060201 was to evaluate the hemostatic efficacy of the treatment of bleeding episodes. The hemostatic efficacy was assessed by the number of infusions used to treat each bleeding episode and an efficacy rating provided based on the subject (or caregiver) based on a 4-point ordinal scale.

**Table 11 Number of Bleeding Episodes by Treatment Regimen Efficacy Rating (Study 060201: Hemostatic Efficacy Rating Analysis Set)**

Treatment Regimen	Efficacy Rating	Number of Subjects	Number of Bleeding Episodes <sup>a</sup>	Percentage of Bleeding Episodes
On-Demand	Excellent	50	547	32.70
	Good	68	943	56.37
	Fair	35	167	9.98
	None	3	3	0.18
	Unknown	2	13	0.78
	All Ratings	70	1673	100.00
Standard Prophylaxis	Excellent	10	39	41.94
	Good	11	38	40.86
	Fair	6	16	17.20
	None	0	0	0.00

Treatment Regimen	Efficacy Rating	Number of Subjects	Number of Bleeding Episodes <sup>a</sup>	Percentage of Bleeding Episodes
	Unknown	0	0	0.00
	All Ratings	18	93	100.00
PK-Driven Prophylaxis	Excellent	10	33	23.74
	Good	21	75	53.96
	Fair	9	11	7.91
	None	2	20	14.39
	Unknown	0	0	0.00
	All Ratings	25	139	100.00
Any Prophylaxis	Excellent	20	72	31.03
	Good	32	113	48.71
	Fair	15	27	11.64
	None	2	20	8.62
	Unknown	0	0	0.00
	All Ratings	43	232	100.00
All Treatments Regimens	Excellent	53	619	32.49
	Good	69	1056	55.43
	Fair	36	194	10.18
	None	4	23	1.21
	Unknown	2	13	0.68
	All Ratings	70	1905	100.00

a There were 37 bleeding episodes (14 unique subjects) which were not included in this table because these events did not occur during a treatment regimen. One bleeding episode has a missing date, so the treatment regimen was not identified.

### Health-Related Quality of Life:

Another secondary objective of study 060201 was to evaluate differences in Health-Related Quality of Life (HRQoL) in subjects  $\geq 14$  year of age between the on-demand and any prophylactic treatments.

**Table 12 Mean and Median Change in SF-36v1 Health Domain Scores at End of Treatment Regimens (Any Prophylaxis Treatment minus On-Demand) <sup>a</sup>**

SF-36 Health Domain	N	Mean (SD)	Median (IQR)
Physical Functioning (PF)	57	0.89 (7.23)	2.10 (7.74)
Role-Physical (RP)	57	3.56 (12.20)	0.00 (9.44)
Bodily pain (BP)	57	4.13 (9.40)	0.00 (9.42)
General Health (GH)	57	1.36 (7.87)	2.34 (7.03)
Vitality (VT)	57	0.21 (9.14)	0.00 (9.47)
Social Functioning (SF)	57	1.72 (8.59)	0.00 (5.43)
Role-Emotional (RE)	57	-1.29 (9.35)	0.00 (0.00)
Mental Health (MH)	57	-0.20 (10.14)	0.00 (9.09)
Physical Component Score	57	3.56 (7.54)	2.76 (7.38)
Mental Component Score	57	-1.22 (9.22)	-1.30 (8.19)

<sup>a</sup> Only subjects who completed the SF-36 at the end of each treatment period were included in the analysis. Changes in each SF-36 health domains were calculated by subtracting the on-demand score from the any prophylaxis score. Positive change scores reflect HRQOL improvement from the end of any prophylaxis to the end of on-demand.

There are currently no clinical studies undertaken for 2000 IU/vial or 3000 IU/vial. However, Takeda continues to maintain post market surveillance (See 8 ADVERSE REACTIONS)

Phase 2/3 Pivotal Study (Clinical Study Report 069901)

**Table 13 Hemostatic Efficacy Results from Pivotal Clinical Study 069901**

Primary Endpoints	Results in 510 new bleeding episodes treated with ADVATE 162 (32%) spontaneous, 228 (45%) antecedent trauma, 120 (24%) unknown etiology
Quality of hemostasis	Excellent or good response 439 (86%) Fair response: 61 (12 %) No response: 1 (0.2 %) Unknown response: 9 (2 %)
Number of infusion required	Single infusion (1): 411 (81 %) Two (2) infusions: 62 (12 %) Three (3) infusions: 15 (3 %) Four (4) or more infusions: 22 (4 %)

The rate of new bleeding episodes during the protocol-mandated 75 exposure-day prophylactic regimen ( $\geq 25$  IU/kg body weight 3-4 times per week) was calculated as a function of the etiology of bleeding episodes for 107 evaluable subjects (n = 274 new bleeding episodes). These rates are presented in Table 14.

**Table 14 Rate of New Bleeding Episodes During Prophylaxis**

Bleeding Episode Etiology	Mean (Range) New Bleeding Episodes/Subject/Month
Spontaneous	0.41 (0.09 – 2.17)
Post-traumatic	0.45 (0.13 – 2.11)
Unknown <sup>a</sup>	0.41 (0.11 – 1.51)
Overall	0.52 (0.0 – 3.88)

a Etiology was indeterminate

The overall rate of bleeding was influenced by the degree of compliance with the prescribed prophylactic regimen. Subjects who infused less than 25 IU ADVATE per kg per dose for more than 20% of prophylactic infusions or administered less than 3 infusions per week for more than 20% of study weeks (n = 37) experienced a 2.3-fold higher rate of bleeding in comparison with subjects who complied with the prescribed prophylactic regimen at least 80% of the time and for ≥ 80% of doses (n = 70).

Phase 2/3 Continuation Study (Clinical Study Report 060102)

**Table 15 Hemostatic Efficacy Results from Pivotal Clinical Study 060102**

Primary Endpoints	Results in 837 new bleeding episodes treated with ADVATE 232 (28%) spontaneous, 379 (45%) trauma, 226 (27%) unknown etiology
Quality of hemostasis	Excellent or good response: 673 (80.4%) Fair response: 140 (16.7%) No response: 1 (0.1%) Unknown response: 23 (2.7%) <sup>a</sup>
Number of infusion required	Single infusion (1): 521 (62.2 %) Two (2) infusions: 216 (25.8 %) Three (3) infusions: 23 (2.7%) Four (4) or more infusions: 75 (9%) No treatment: 2 (0.3%)

a Of the 23 bleeding episodes in the “Unknown” category, 20 of 23 had no treatment record provided or the need for treatment could not be discerned, 2 of 23 in 2 subjects did not require treatment, and 1 of 23 was treated in part with non-study factor VIII product (grouped as “unknown”).

The Phase 2/3 continuation study involved subjects previously treated on the pivotal Phase 2/3 study and provided additional efficacy data on ADVATE. An analysis of efficacy was conducted for 82 enrolled subjects who self-administered ADVATE produced in Neuchâtel on a routine prophylactic regimen during a minimum period of 75 exposure days to ADVATE. Of the 82 subjects enrolled in this study, 81 had at least 1 infusion of study product and are included in the total hemostatic efficacy data set. As in the pivotal Phase 2/3 study, new bleeding episodes were treated with ADVATE and the outcome of treatment was rated as excellent, good, fair, or none, based on the quality of hemostasis achieved. A total of 837 new bleeding episodes occurred in 70 of the 81 subjects being treated with ADVATE. By etiology, 45% of these bleeding events resulted from trauma and 28% occurred spontaneously; the other 27% had an undetermined etiology. The response to treatment with ADVATE for the majority (80.4%) of all new bleeding episodes was rated as excellent or good. In addition, 62.2% of the bleeding episodes resolved with only 1 infusion and an additional 25.8% were resolved by a second infusion. Thus, 88% of all bleeding episodes required 1 or 2 infusions of study product.

Phase 2/3 Pediatric PTP Study (Clinical Study Report 060101)

**Table 16 Hemostatic Efficacy Results from Pivotal Clinical Study 060101**

Primary Endpoints	Of the 409 total bleeding episodes recorded in the clinical study, 354 bleeding episodes in 44 subjects were treated with ADVATE. Nine (9) subjects experienced no bleeding episodes. 73 (17.8%) spontaneous, 198 (48.4%) trauma, 136 (33.3%) unknown etiology, 2 (0.5%) post-operative Results from the quality of hemostasis determination and number of infusions required to treat a bleed were calculated from the 354 bleeds treated using ADVATE.
Quality of hemostasis	Excellent or good response: 332 (93.8 %) Fair response: 17 (4.8 %) Unknown response: 5 (1.4%)
Number of infusion required	One (1) or two (2) infusions: 319 (90.1 %) Three (3) infusions: 19 (5.4%) Four (4) or more infusions: 16 (4.5%)

This was a multi-center, open-label, prospective, uncontrolled clinical study of 53 pediatric PTPs under 6 years of age with severe or moderately severe hemophilia A (baseline factor VIII  $\leq$  2%). The overall study consisted of 2 parts. Part 1 was an open-label evaluation of the pharmacokinetics and short-term safety of ADVATE following a single dose of  $50 \pm 5$  IU/kg body weight. Part 2 was an open-label determination of the immunogenicity, hemostatic efficacy, and safety of ADVATE. Subjects continued to receive ADVATE for at least 50 exposure days or a total treatment time of 6 months, whichever came first.

The median dose per infusion for bleeding episodes was  $42.9 \pm 19.38$  IU/kg. The median rate of joint bleeding episodes per year for each treatment regimen was 0.00 for subjects on the standard prophylactic regimen (n=21), 0.00 for subjects on a modified prophylactic regimen (n=37), and 14.18 for subjects receiving on demand treatment (n=5).

Phase 2/3 Surgical Study (Clinical Study Report 069902)

**Table 17 Hemostatic Efficacy Results from Pivotal Clinical Study 069902**

Primary Endpoints	Results in 58 subjects who underwent 65 surgical procedures while receiving ADVATE (57 subjects completed the study) (22 major, 35 minor, 8 dental) 24 assessments performed at the time of drain removal
Intra and post-operative quality of hemostasis	Intra operative assessment: Excellent or good: 61 of 65 (94%) Post operative assessment: Excellent or good: 62 of 65 (95%)
Control of hemorrhage from site of surgical drain at the time of removal	Excellent or good: 20 of 24 (83 %) Fair: 2 (8.3%) Unknown: 1 None: 1

All study subjects received pre-operative bolus infusions of ADVATE at doses intended to increase 10-30 minute post-infusion plasma Factor VIII levels to 60-100% for dental procedures and 80-120% for all other surgeries. In 59 of 63 surgeries, the target Factor VIII level was met or exceeded following a single loading dose ranging from 29.3 IU/kg to 104.6 IU/kg. Two surgeries were missing post-infusion Factor VIII levels and preoperative Factor VIII target levels were not achieved in 4 surgeries. Nevertheless, no supplemental preoperative bolus loading doses were given in any subject. Eighteen study subjects received ADVATE by continuous infusion. Four patients were treated for major surgery by continuous infusion following a loading bolus dose. The mean weight-adjusted dose administered per infusion in these 4 patients was 43 IU/kg, resulting in mean daily Factor VIII levels of 97%. For minor surgeries, the mean weight-adjusted dose administered per infusion was 46 IU/kg, resulting in mean daily Factor VIII levels of 86%. ADVATE was not administered by continuous infusion for any dental procedures.

A brief description of procedure classifications, along with study drug exposure, are presented in Table 18.

**Table 18 Procedure Classifications and Study Drug Exposure**

Procedure Classifications	Number of Procedures	Number of Infusions Mean ± SD	Dose (IU/kg)	
			Median	Range
Major	22	51.1 ± 18.9	1,490	724.9 - 2,415.0
Minor	35	22.3 ± 14.0	691.4	107.8 - 2,404.2
Dental	8	6.3 ± 5.6	174.4	40.8 - 317.0

Overall, the perioperative hemostatic efficacy assessments were highly comparable by type of infusion (bolus versus continuous infusion). In addition, the actual estimated blood loss (EBL) was below the predicted maximal EBL for 55 of 58 procedures. The EBL values were missing for 7 procedures and the actual EBL was greater than the predicted maximal EBL in 3 procedures.

A total of 23 bleeding events were reported: 16 bleeding episodes and 7 hematomas. Two (2) bleeding episodes occurred at the surgical site within 14 days of surgery and thus were regarded as postoperative bleeding episodes. Ten (10) of these bleeding episodes not regarded as post-operative bleeding episodes were treated with ADVATE; the treatments were rated as excellent or good for 8, fair for 1, and none for 1. For those treatments rated as fair and none, the investigator commented that the events were probably related to preexisting arthritis and not to bleeding. The remaining 4 bleeding episodes were not connected to the surgery. Seven (7) hematomas were also noted. Four of the 7 hematomas were surgically evacuated. Eleven subjects exhibited Factor VIII clearance rates < 5 mL/kg/h. Three subjects exhibited clearance rates between 5 and 9 mL/kg/h. One subject had clearance rates ranging from 6.8 to 20.8 mL/kg/h, coincident with a central venous catheter-related infection. Hemostasis was maintained at all times in all cases.

### 14.3 Comparative Bioavailability Studies

#### Phase 2/3 Pivotal Study (Clinical Study Report 069901)

A randomized, crossover pharmacokinetic comparison of ADVATE (the test article) and the licensed product, RECOMBINATE rAHF (the control article) was conducted. Study subjects were initially infused with one of the two preparations at a dose of 50 ± 5 IU/kg body weight

while in a non-bleeding state. The second study preparation was infused in a non-bleeding state at  $50 \pm 5$  IU/kg after a washout period of 72 hours to 4 weeks following the first study infusion. The order in which each study preparation was administered was determined randomly. Pharmacokinetic parameters (area under the Factor VIII plasma concentration versus time curve [AUC], maximal post-infusion Factor VIII level [ $C_{max}$ ], *in vivo* recovery, half-life, clearance [CL], mean residence time [MRT], and volume of distribution in steady-state [ $V_{ss}$ ]) were calculated from Factor VIII activity measurements in blood samples obtained immediately before and at standardized time intervals up to 48 hours following each infusion.

A total of 56 study subjects were enrolled and randomized in this study. Of these, 52 (intent-to-treat population) received at least one infusion of study medication and had pharmacokinetic data available for analysis. Thirty subjects (per-protocol population) met the requirements for study eligibility and had complete pharmacokinetic data. The mean values (ranges) of pharmacokinetic parameters for each study preparation are presented in Table 19. For the pharmacokinetic parameters  $AUC_{0-48h}$  and *in vivo* recovery, the 90% confidence intervals for the ratios of the mean values for the test and control articles were within the bioequivalence limits of 0.80 and 1.25 for both the per- protocol (n = 30) and intent-to-treat (n = 52) study populations.

**Table 19 Pharmacokinetic Parameters for RECOMBINATE rAHF and ADVATE**

Parameter	RECOMBINATE rAHF (n = 30)	ADVATE (n = 30)	Mean Difference Ln( $AUC_{0-48h}$ ) Per-protocol	90% Confidence Interval about Mean Difference Per-protocol
$AUC_{0-48h}$ (IU·h/dL) <sup>a</sup>	1515 (970-2205)	1533 (876-2642)	-0.001	-0.040 to 0.038
$C_{max}$ (IU/dL)	127 (73-199)	119 (77-195)	---	---
<i>In vivo</i> recovery (IU/dL/IU/kg) <sup>b</sup>	2.55 (1.47-3.89)	2.40 (1.54-3.88)	-0.057	-0.089 to -0.024
Half-life (h)	11.39 (7.89-18.12)	11.98 (6.74-24.70)	---	---
MRT (h)	14.67(9.41-25.36)	15.69(8.63-34.25)	---	---
$V_{ss}$ (dL/kg)	0.46(0.31-0.68)	0.47(0.29-0.67)	---	---
CL (dL/kg/h)	0.03 (0.02-0.05)	0.03 (0.02-0.06)	---	---

a Area under the plasma Factor VIII concentration x time curve from 0 to 48 hours post-infusion.

b Calculated as ( $C_{max}$  – baseline Factor VIII) divided by the dose in IU/kg, where  $C_{max}$  is the maximal post-infusion Factor VIII measurement.

The determination of equivalence of RECOMBINATE rAHF and ADVATE was based on the mean natural log-transformed  $AUC_{0-48h}$  for the per-protocol and the mean transformed total AUC ( $AUC_{0-\infty}$ ) values for the intent-to-treat data sets. These Confidence Intervals (CIs) fell within the equivalence limits of -0.223 to 0.223 (corresponding to CIs of 80-125%), demonstrating equivalence in terms of AUC and incremental recovery for ADVATE and RECOMBINATE rAHF in both the per-protocol and intent-to-treat analyses.

In addition, 70 study subjects were evaluated for *in vivo* recovery in a steady, non-bleeding state at 30 minutes, 1 hour, and 3 hours post-infusion of ADVATE at a dose of  $50 \pm 5$  IU/kg body weight, either as the first exposure to study medication (n = 53) or after a minimum of 75 ADVATE exposure-days (n = 17). The means (ranges) of these recovery results are presented

in Table 20.

Table 20 <i>In Vivo</i> Recovery <sup>a</sup> of ADVATE at the First Exposure and after ≥ 75 Exposure-Days		
Time Point	First Exposure (n = 53)	≥ 75 Exposure-Days (n = 17)
30 minutes post-infusion	2.24 (1.25-3.65)	2.35 (1.71-3.18)
1 hour post-infusion	2.05 (1.23-3.77)	2.18 (1.04-3.05)
3 hours post-infusion	1.67 (0.89-3.45)	1.71 (1.34-2.57)

<sup>a</sup> All recovery measurements are expressed as IU/dL divided by the dose in IU/kg.

#### Phase 2/3 Continuation Study (Clinical Study Report 060102)

The Phase 2/3 continuation study provided a means for comparing the pharmacokinetics of ADVATE (parameters as described above) at the onset of treatment with those of ADVATE obtained after a period of 75 exposure days. This comparison utilized data from a subset of subjects from the pivotal Phase 2/3 study who also participated in the Phase 2/3 continuation study. Study subjects were treated with ADVATE at a dose of  $50 \pm 5$  IU/kg body weight while in a non-bleeding state and Factor VIII activity was determined in blood samples obtained immediately before and at standardized time intervals up to 48 hours following each infusion.

A total of 22 subjects were included in a per-protocol analysis. The mean values (ranges) of pharmacokinetic parameters before and after a minimum of 75 exposure days are presented in Table 21. Total AUC and *in vivo* recovery were compared using 95% confidence intervals calculated for mean differences in natural logs of these parameters at the onset of treatment and after a period of ≥ 75 exposure days. The 95% confidence for both total AUC (-0.108 to 0.022) and *in vivo* recovery (-0.065 to 0.195) included zero, indicating no evidence of a difference in these parameters.

**Table 21 Summary of Pharmacokinetic Parameters with ADVATE**

Parameter	Parameters at the Onset of Treatment <sup>a</sup>					Parameters after ≥ 75 Exposure Days <sup>b</sup>				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Total AUC (IU·h/dL)	22	1409 (1441) <sup>c</sup>	465	892	2696	22	1368 (1372) <sup>c</sup>	517	850	3012
C <sub>max</sub> (IU/dL)	22	114 (112) <sup>c</sup>	20	77	151	22	119 (116) <sup>c</sup>	26	73	177
Adjusted Recovery (IU/dL/IU/kg)	22	2.31 (2.27) <sup>c</sup>	0.42	1.54	3.02	22	2.38 (2.32) <sup>c</sup>	0.54	1.46	3.56
Half-life (h)	22	11.30	3.05	6.74	17.96	22	11.14	2.06	7.67	16.06
Clearance (dL/(kg·h))	22	0.04	0.01	0.02	0.06	22	0.04	0.01	0.02	0.06
Mean residence time (h)	22	14.53	4.28	8.63	23.38	22	13.83	3.44	8.04	21.19
V <sub>ss</sub> (dL/kg)	22	0.49	0.09	0.32	0.67	22	0.50	0.11	0.31	0.73

- a ADVATE clinical study 069901
- b ADVATE clinical study 060102
- c Geometric mean

**Phase 1 Study of Reconstitution in 2 mL versus 5 mL Diluent (Clinical Study Report 060702)**

An open label, randomized, crossover study to compare the pharmacokinetics and safety of ADVATE reconstituted in 2 mL versus 5 mL sterile water for injection (SWFI) was conducted in subjects with severe hemophilia A (factor VIII [FVIII] activity  $\leq 1\%$  of normal). The study consisted of an adolescent/adult cohort (age 13 to 52 years) and a pediatric cohort (age 2 to 12 years). In the adolescent/adult cohort, complete pharmacokinetic parameters (area under the curve [AUC<sub>0-48h</sub>], total area under the curve [AUC<sub>0-∞</sub>], incremental recovery, half-life [T<sub>1/2</sub>], clearance [CL], mean residence time [MRT], apparent volume of distribution [V<sub>ss</sub>] and maximum concentration [C<sub>max</sub>]) were determined and compared for a single dose (50 IU/kg  $\pm$  100 IU) of ADVATE reconstituted in 2 mL and 5 mL SWFI. In the pediatric cohort, incremental recovery was determined and compared for a single dose (50 IU/kg) of ADVATE reconstituted in 2 mL and 5 mL SWFI. A washout period of at least 72 hours but not more than 30 days between the last blood draw and the next infusion was to be observed in both cohorts.

Fifty-two subjects were enrolled and 42 subjects received at least 1 infusion (27 adult/adolescent and 15 pediatric subjects). Of the 27 adult/adolescent subjects, 8 were excluded from the per-protocol analysis and the per-protocol dataset comprised of 19 adult/adolescent subjects. The intent-to-treat (ITT) dataset comprised 27 adult/adolescent subjects and 15 pediatric subjects. Pharmacokinetic parameters for the adult/adolescent cohort based on the per-protocol dataset are given in Table 22.

The mean ( $\pm$ SD) AUC<sub>0-48h</sub> values for the per-protocol dataset were 1298.67  $\pm$  380.60 IU·h/dL for the 2 mL infusion and 1363.56  $\pm$  487.57 IU·h/dL for the 5 mL infusion. The per-protocol determination of bioequivalence was based on natural log transformed mean AUC<sub>0-48h</sub> values for the 2 mL and 5 mL infusions of ADVATE. The difference of the least-squares means (2 mL to 5 mL) was -0.052 and the 90% confidence interval (90% CI) for this difference was -0.117 to 0.012. This 90% CI was within the bioequivalence limits of -0.223 to 0.223 (corresponding to a CI of 80% to 125%), demonstrating equivalence in terms of AUC<sub>0-48h</sub>.

**Table 22 Pharmacokinetic Parameters for ADVATE (rAHF-PFM) Reconstituted in 5 mL sterile Water for Injection (sWFI) and ADVATE Reconstituted in 2 mL sWFI (Study 060702: Per-Protocol)**

Parameter	rAHF-PFM Reconstituted in 5 mL sWFI (n = 19) Mean ( $\pm$ Standard Deviation)	rAHF-PFM Reconstituted in 2 mL sWFI (n = 19) Mean ( $\pm$ Standard Deviation)	Mean Difference Per-protocol	90% Confidence Interval about Mean Difference Per-protocol
AUC <sub>0-48h</sub> (IU·h/dL) <sup>a</sup>	1363.56 (487.57)	1298.67 (380.60)	-0.052 <sup>b</sup>	-0.117, 0.012
C <sub>max</sub> (IU/dL)	107.89 (17.95)	104.42 (19.35)	---	---
<i>In vivo</i> recovery (IU/dL/IU/kg) <sup>c</sup>	2.00 (0.36)	1.93 (0.35)	-0.064 <sup>d</sup>	-0.111, -0.018

Half-life (h)	12.50 (2.89)	12.54 (3.80)	---	---
MRT (h)	14.34 (4.27)	14.79 (5.24)	---	---
V <sub>ss</sub> (dL/kg)	0.51 (0.13)	0.54 (0.13)	---	---
CL (mL/(kg·h))	3.81 (1.20)	3.85 (0.95)	---	---

a Area under the plasma Factor VIII concentration x time curve from 0 to 48 hours post-infusion.

b Least-Squares Mean of Differences of Ln(AUC<sub>0-48h</sub>).

c Calculated as (C<sub>max</sub> – baseline Factor VIII) divided by the dose in IU/kg, where C<sub>max</sub> is the maximal post-infusion Factor VIII measurement.

d Least-Squares Mean of Differences of Ln(*In vivo* recovery).

The determination of bioequivalence of ADVATE reconstituted in 5 mL sterile water for injection (sWFI) and ADVATE reconstituted in 2 mL sWFI was based on the mean natural log-transformed AUC<sub>0-48h</sub> and mean natural log-transformed of *in vivo* adjusted incremental recovery for the per-protocol, primary analysis set for bioequivalence. For both of these parameters the 90% Confidence Intervals (CIs) fell within the equivalence limits of -0.223 to 0.223 (corresponding to CIs of 80-125%), demonstrating bioequivalence in terms of AUC<sub>0-48h</sub> and *in vivo* adjusted incremental recovery. Consistent results were obtained when employing the intent-to-treat dataset which supports the per-protocol results.

Fifteen pediatric subjects (Study 060702: Pediatric Intent-to-Treat) were evaluated for *in vivo* incremental recovery at 30 minutes post-infusion of ADVATE reconstituted in 2 mL and 5 mL at a dose of 50 IU/kg. The mean (±SD) *in vivo* recovery was 1.43 (0.36) IU/dL/IU/kg for ADVATE reconstituted in 2 mL sWFI (n=14) and 1.67 (0.25) IU/dL/IU/kg for ADVATE reconstituted in 5 mL sWFI (n=15). Of note, one subject in the 2 mL sWFI group did receive only one PK infusion.

The safety assessments demonstrated that ADVATE reconstituted in 2 mL and 5 mL sWFI were both safe and well-tolerated in adults.

Two infusion site reactions considered related to the infusion process by the investigators, induration/swelling and bruising were mild in severity and observed in 2 pediatric patients after the administration of the 2 mL infusion.

## 15 MICROBIOLOGY

No microbiological information is required for this drug product.

## 16 NON-CLINICAL TOXICOLOGY

### General Toxicology

Toxicology studies have been conducted with both the candidate and the selected ADVATE formulations (or their respective formulation vehicles) to compare the safety profile of ADVATE with that of Antihemophilic Factor (Recombinant), RECOMBINATE. For the selected ADVATE formulation, there were four acute toxicity studies and two tissue irritation studies of ADVATE. In addition, two 30-day, repeat dose studies to characterize the toxicity profiles of the selected formulation vehicles in the absence of active drug ingredient were performed. ADVATE in the candidate formulations and the candidate formulation vehicles were tested in acute toxicity, repeat-dose toxicity of candidate formulations in the absence of rAHF and tissue irritation studies. These studies showed that ADVATE and RECOMBINATE rAHF possessed similar toxicity profiles.

Extensive literature reviews were conducted to further evaluate the toxicity and safety of the major excipients used in the formulation vehicle for the selected ADVATE formulation. These included trehalose, mannitol, reduced glutathione (GSH), Tris and histidine. These reviews raised no safety concerns regarding the intended use of these compounds in persons with hemophilia A.

In acute toxicity studies, single intravenous infusions of the selected ADVATE formulation at doses up to 4750 IU/kg showed no toxicity in both rats and rabbits. No venous irritation was detected at the site of ADVATE injection at a dose of 3800 IU/kg and no perivenous irritation was observed at a dose of 38 IU/kg, both in rabbits. Acute toxicity and tissue irritation studies of the earlier, candidate ADVATE formulations were also evaluated as part of this non-clinical development program for ADVATE and the results of these studies are included in this submission to further support the safety of certain ADVATE formulation excipients.

Neither the candidate nor the selected ADVATE formulations (i.e., including the active drug ingredient) were evaluated in repeat dose toxicity studies as part of this non-clinical development program for ADVATE. Rather, thirty-day, repeat-dose toxicity studies at the maximal, technically feasible dose equivalent volume (up to 40 mL/kg) were carried out in rats and rabbits for the selected ADVATE formulation vehicle. Three candidate formulation vehicles were also tested in a 30-day, repeat-dose toxicity study in male rats at dose equivalent volumes up to 25 mL/kg. None of these studies showed significant and treatment-related effects associated with either the candidate or the selected formulation vehicles.

The justification for not conducting repeat dose toxicity studies of the selected ADVATE formulation (including the active drug ingredient) is based upon the high level of comparability demonstrated between ADVATE and RECOMBINATE bulk drug substances in extensive physicochemical, pharmacologic and acute toxicity comparison studies. Furthermore, previous 28-day, repeat dose toxicity studies of RECOMBINATE rAHF were conducted in rats and monkeys as part of its development program (see below).

## Genotoxicity

As part of its development program, the toxicity profile of RECOMBINATE rAHF was previously evaluated both *in vitro* and *in vivo*. These studies, characterized the general toxicity, genotoxicity, immunogenicity and tissue irritation of RECOMBINATE rAHF. RECOMBINATE rAHF acute toxicity was evaluated in rats, ferrets and dogs. No toxicity was observed in rats after a single intravenous dose up to 5000 IU/kg. Transient restlessness and skin redness were observed at doses of 2500 IU/kg or greater in dogs. Repeat-dose toxicity of RECOMBINATE rAHF was evaluated in rats and monkeys. Rats and monkeys treated with RECOMBINATE rAHF at intravenous doses up to 1000 IU/kg/day for 28 days showed little toxicity. The only treatment-related finding was a slight prolongation of the activated partial thromboplastin time (aPTT) at high doses in both species. The RECOMBINATE bulk drug substance was non-genotoxic in the following test systems: an *in vitro* bacterial reverse mutation assay, the Chinese Hamster Ovary (CHO) cell chromosomal aberration assay and the *in vivo* micronucleus induction assay in mice.

## Carcinogenicity and Reproductive Toxicology

Carcinogenicity and reproductive toxicity studies were not conducted for ADVATE.

In summary, results of comparison studies showed that ADVATE and Antihemophilic Factor (Recombinant), RECOMBINATE (or their respective formulation vehicles) had comparable toxicity and tissue compatibility profiles in rats and rabbits and are predicted to have comparable safety profiles in human subjects.

Toxicology studies in rats and rabbits have demonstrated that ADVATE produced no significant treatment-related effects in doses substantially higher than the maximum expected clinical dose. ADVATE was non-irritating when administered perivenously or intravenously to rabbits. As extensive clinical experience with recombinant Factor VIII provides no evidence for tumorigenic and mutagenic effects, long-term studies in animals to evaluate carcinogenic potential have not been performed.

## PATIENT MEDICATION INFORMATION

### READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

**ADVATE®**  
**Antihemophilic Factor (Recombinant),**  
**Plasma/Albumin Free Method (rAHF-PFM)**

**For Reconstitution with 5 mL Diluent in BAXJECT II System**

Read this carefully before you start taking **ADVATE** and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about **ADVATE**.

#### **What is ADVATE used for?**

- routine prophylaxis to prevent or reduce frequency of bleeding episodes in adults and children with hemophilia A
- ADVATE can temporarily correct the blood clotting process, so it helps prevent and control bleeding in people with Hemophilia A (Factor VIII deficiency).
- for treatment or prevention of Hemophilia A-related bleeding.

#### **How does ADVATE work?**

ADVATE temporarily raises the level of Factor VIII in the blood to a more normal level, allowing your body's blood clotting process to function properly.

#### **What are the ingredients in ADVATE?**

##### Medicinal ingredients:

- Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF PFM)

##### Non-medicinal ingredients:

- Calcium Chloride
- Glutathione
- Histidine
- Mannitol
- Polysorbate-80
- Trehalose
- Sodium Chloride
- Tris (hydroxymethyl) aminomethane

#### **ADVATE comes in the following dosage forms:**

Dried Powder for Intravenous Injection in single-dose vials that contain nominally 1000, 1500, 2000 and 3000 International Units (IU) per vial reconstituted in 5 mL of sterile Water for Injection (USP, Ph. Eur.).

### **Do not use ADVATE if you:**

Do not have a diagnosis of Hemophilia A. Patients with known allergic-type reactions to mouse or hamster proteins should talk to their doctor before using this product. ADVATE is not indicated for the treatment of von Willebrands Disease.

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take ADVATE. Talk about any health conditions or problems you may have, including if you have known allergies to:**

- to mouse or hamster proteins.
- to this drug or to any ingredient in the formulation or component of the product.

### **Other warnings you should know about:**

Your body may form inhibitors to Factor VIII. The formations of inhibitors is part of your body's normal immune defense system that forms in response to infusions of Factor VIII. These inhibitors can lead to a reduced response, or to no response to Factor VIII therapy. This is not an uncommon complication in the treatment of people with Hemophilia A. Consult with your healthcare professional to make sure you are carefully monitored with blood tests for the development of inhibitors to Factor VIII. Contact your healthcare professional if you are not able to prevent or control bleeding episodes with your regular doses of prescribed Factor VIII therapy. (see **What are possible side effects from using ADVATE**)

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

### **The following may interact with ADVATE:**

There are no known interactions of ADVATE with other medications.

### **How to take ADVATE:**

You may infuse ADVATE at a hemophilia centre, at your healthcare professional's office or in your home. **Do not attempt to self-infuse unless you have been taught how by your healthcare professional or hemophilia center.**

**IMPORTANT:** Contact your healthcare professional or local Hemophilia Treatment Centre if you experience any problems with this procedure. These instructions are intended only as a visual aid for those patients who have been instructed by their healthcare professional or hemophilia center on the proper way to self-infuse the product (diagrams are representational and may not be drawn exactly to scale).

In a quiet place, prepare a clean surface and gather all the materials you will need for the infusion. Check the expiration date on the ADVATE concentrate vial or package, and let the vial with the ADVATE concentrate and the Sterile Water for Injection USP (diluent) warm up to room temperature. Wash your hands and put on clean exam gloves. If self-infusing at home, the use of gloves is optional.



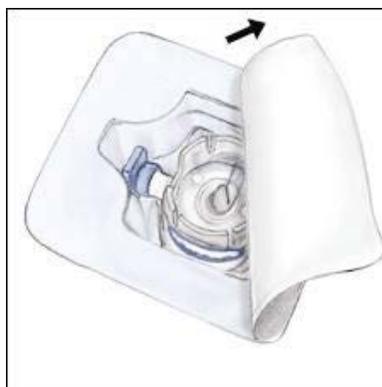
1. After washing your hands and putting on gloves, remove caps from the factor concentrate and diluent vials to expose the centers of the rubber stoppers.



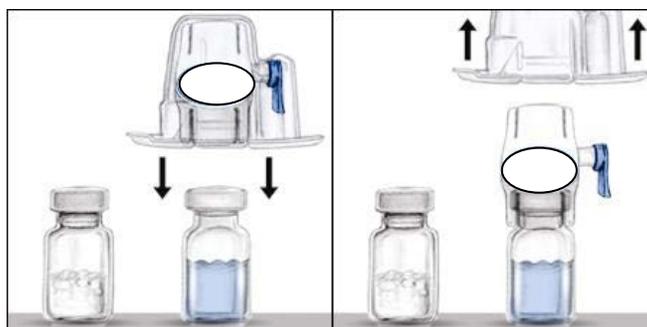
2. Disinfect the stoppers with a sterile alcohol swab (or other suitable solution suggested by your healthcare professional or hemophilia center) by rubbing the stoppers firmly for several seconds, and allow to dry prior to use. Place the vials on a flat surface.



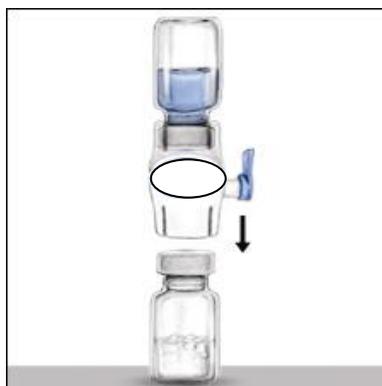
3. Open the BAXJECT II device package by peeling away the lid, without touching the inside of the package. The BAXJECT II device remains in the package at this time. **Do not remove the device from the package.**



4. Turn the package with the device upside down, and place it over the top of the diluent vial. Fully insert the clear plastic spike of the BAXJECT II device into the center of the diluent vial's stopper by pushing straight down. Grip the package at its edge and pull it off the device. After removing the packaging, be careful not to touch the white plastic exposed spike. **Do not remove the blue luer cap from BAXJECT II device. Please note that the connection of the two vials should be done quickly to close the open fluid pathway created by the first insertion of the spike to the diluent vial.**



5. Quickly turn over the diluent vial with the BAXJECT II device, place on top of the vial containing the factor concentrate, and fully insert the white plastic spike into the factor concentrate vial's stopper by pushing straight down. The vacuum will draw the diluent into the factor concentrate vial.

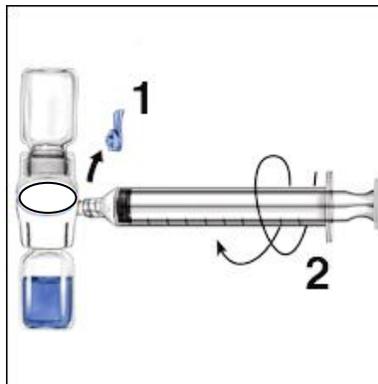


6. Swirl the factor concentrate gently and continuously with the BAXJECT II device attached until it is completely dissolved. **Do not shake.** Check to make sure the factor concentrate is

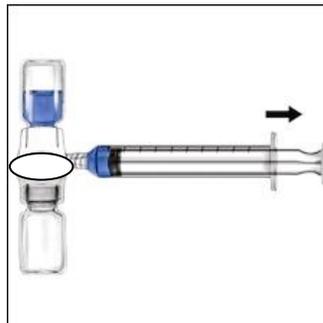
completely dissolved. The solution should be clear and colourless in appearance. If not, do not use the solution and notify Takeda immediately.



7. Remove the blue luer cap from the BAXJECT II device. Connect the syringe to the BAXJECT II device. **DO NOT INJECT AIR.** IMPORTANT: Do NOT use a glass syringe. The plastic syringe provided with ADVATE should be used to administer this medication.

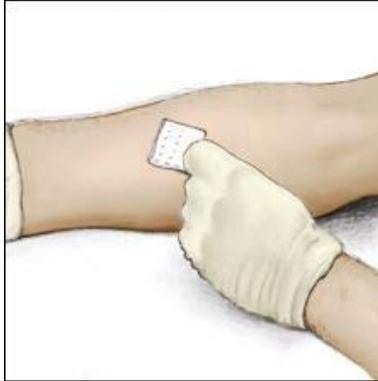


8. Turn the system over so that the factor concentrate solution vial is on top. Withdraw the factor concentrate solution into the syringe by pulling back the plunger slowly. Disconnect the syringe, leaving the BAXJECT II device connected. Attach the infusion needle to the syringe using a winged infusion set, if available. Point the needle up and remove any air bubbles by gently tapping the syringe with your finger and slowly and carefully pushing air out of the syringe. Dispose of the used BAXJECT II system in your hard-walled Sharps container, without taking it apart.

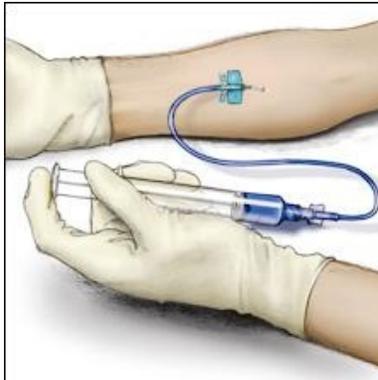


9. If receiving more than one vial of ADVATE, the contents of multiple vials may be drawn into the same syringe. **Please note that the BAXJECT II device is intended for use with a single vial of ADVATE and Sterile Water for Injection only, therefore reconstituting and withdrawing a second vial into the syringe requires a second BAXJECT II device.**

10. Apply a tourniquet, and prepare the injection site by wiping the skin well with a sterile alcohol swab (or other suitable solution suggested by your healthcare professional or hemophilia center).



11. Insert the needle into the vein, and remove the tourniquet. Infuse the factor concentrate. **Do not infuse any faster than 10mL per minute.** Remove the needle from the vein and apply pressure with sterile gauze to the infusion site for several minutes. **Do not recap the needle after the infusion, and do not dispose in ordinary household trash.** Place it with the used syringe in a hard-walled Sharps container for proper disposal.



12. After the infusion, remove the peel-off label from the factor concentrate vial and place it in your factor log book. Clean up any spilled blood with a freshly prepared mixture of 1 part bleach and 9 parts water, soap and water, or any household disinfecting solution.



### **Usual dose:**

Individual doses are usually between 20 – 50 IU Factor VIII/kg body weight, as determined by your physician. Physician supervision of the treatment regimen is required.

### **Overdose:**

The effects of higher than recommended doses of ADVATE have not been characterized.

If you think you have taken too much ADVATE, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

### **Missed Dose:**

- Double doses are generally not required to compensate for forgotten individual doses.
- Proceed immediately with a regular administration of ADVATE and to continue treatment at regular intervals as required.

### **What are possible side effects from using ADVATE?**

These are not all the possible side effects you may have when taking ADVATE. If you experience any side effects not listed here, tell your healthcare professional.

- Should a significant increase in pulse rate during administration of ADVATE occur, reducing the rate of administration or temporarily halting the injection usually allows the symptoms to disappear promptly.
- There is a possibility that you could have an allergic reaction to ADVATE. Allergic reactions to ADVATE may manifest with any of the following: rash, hives, itching, tightness of the chest, difficulty breathing, throat tightness, and/or low blood pressure (e.g. weak pulse, feeling lightheaded or dizzy when you stand, and possibly shortness of breath). If you experience any of these symptoms, stop the infusion and immediately phone your healthcare professional or go to the Emergency Department.
- As with all Factor VIII products, the clinical response to ADVATE may vary. If your bleeding is not controlled after infusing ADVATE, contact your healthcare professional immediately. Your Factor VIII level may need to be measured by your healthcare professional who may recommend another dose of ADVATE in order to achieve a satisfactory clinical response. If your plasma Factor VIII level fails to increase as expected or if bleeding is not controlled after adequate dosing, your physician may test for the presence of an inhibitor (neutralizing

antibodies).

### Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on [Adverse Reaction Reporting \(http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php\)](http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php) for information on how to report online, by mail or by fax; or
- Calling toll-free at 1-866-234-2345.

*NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.*

### Storage:

- Store at refrigerated temperature (2°C- 8°C [36°F - 46°F]). Do not freeze.
- May store at room temperature up to 30°C (86°F) for a period of up to 6 months not to exceed the expiration date.
- Do not place back in the refrigerator once removed from refrigerated storage.
- Do not refrigerate preparation after reconstitution.
- Do not use beyond the expiration date printed on the vial or 6 months after date noted on the carton, whichever is the earliest.

Keep out of reach and sight of children.

### If you want more information about ADVATE:

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the [Health Canada website \(https://www.canada.ca/en/health-canada.html\)](https://www.canada.ca/en/health-canada.html); the manufacturer's website (<https://www.takeda.com/en-ca>), or by calling 1-800- 268-2772.

This leaflet was prepared by

Takeda Canada Inc.  
22 Adelaide Street West, Suite 3800  
Toronto Ontario M5H 4E3

Last Revised: MAY-27-2021

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## PATIENT MEDICATION INFORMATION

### READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

**ADVATE®**  
**Antihemophilic Factor (Recombinant),**  
**Plasma/Albumin Free Method (rAHF-PFM)**

#### For Reconstitution with 2 mL Diluent in BAXJECT II System

Read this carefully before you start taking **ADVATE** and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about **ADVATE**.

#### What is **ADVATE** used for?

- routine prophylaxis to prevent or reduce frequency of bleeding episodes in adults and children with hemophilia A
- **ADVATE** can temporarily correct the blood clotting process, so it helps prevent and control bleeding in people with Hemophilia A (Factor VIII deficiency).
- for treatment or prevention of Hemophilia A-related bleeding.

#### How does **ADVATE** work?

**ADVATE** temporarily raises the level of Factor VIII in the blood to a more normal level, allowing your body's blood clotting process to function properly.

#### What are the ingredients in **ADVATE**?

##### Medicinal ingredients:

- Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF PFM)

##### Non-medicinal ingredients:

- Calcium Chloride
- Glutathione
- Histidine
- Mannitol
- Polysorbate-80
- Trehalose
- Sodium Chloride
- Tris (hydroxymethyl) aminomethane

#### **ADVATE** comes in the following dosage forms:

Dried Powder for Intravenous Injection in single-dose vials that contain nominally 250, 500, 1000 and 1500 International Units (IU) per vial reconstituted in 2 mL of sterile Water for Injection (USP, Ph. Eur.).

**Do not use ADVATE if you:**

Do not have a diagnosis of Hemophilia A. Patients with known allergic-type reactions to mouse or hamster proteins should talk to their doctor before using this product.

ADVATE is not indicated for the treatment of von Willebrands Disease.

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take ADVATE. Talk about any health conditions or problems you may have, including if you have known allergies to:**

- to mouse or hamster proteins.
- to this drug or to any ingredient in the formulation or component of the product.

**Other warnings you should know about:**

Your body may form inhibitors to Factor VIII. The formations of inhibitors is part of your body's normal immune defense system. that forms in response to infusions of Factor VIII. These inhibitors can lead to a reduced response, or to no response to Factor VIII therapy. This is not an uncommon complication in the treatment of people with Hemophilia A. Consult with your healthcare provider to make sure you are carefully monitored with blood tests for the development of inhibitors to Factor VIII. Contact your healthcare professional if you are not able to prevent or control bleeding episodes with your regular doses of prescribed Factor VIII therapy. (see **What are possible side effects from using ADVATE**)

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

**The following may interact with ADVATE:**

There are no known interactions of ADVATE with other medications.

**How to take ADVATE:**

You may infuse ADVATE at a hemophilia centre, at your healthcare professional's office or in your home. **Do not attempt to self-infuse unless you have been taught how by your healthcare professional or hemophilia center.**

**IMPORTANT:** Contact your healthcare professional or local Hemophilia Treatment Centre if you experience any problems with this procedure. These instructions are intended only as a visual aid for those patients who have been instructed by their healthcare professional or hemophilia center on the proper way to self-infuse the product (diagrams are representational and may not be drawn exactly to scale).

In a quiet place, prepare a clean surface and gather all the materials you will need for the infusion. Check the expiration date on the ADVATE concentrate vial or package, and let the vial with the ADVATE concentrate and the Sterile Water for Injection USP (diluent) warm up to room temperature. Wash your hands and put on clean exam gloves. If self-infusing at home, the use of gloves is optional.



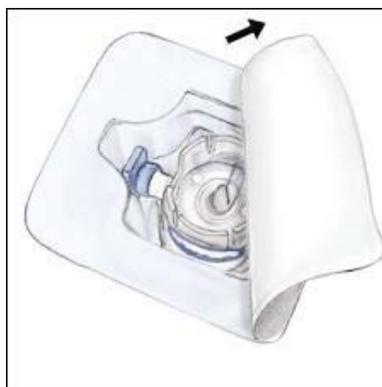
1. After washing your hands and putting on gloves, remove caps from the factor concentrate and diluent vials to expose the centers of the rubber stoppers.



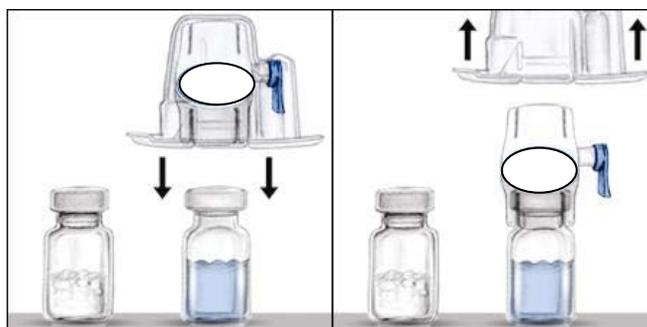
2. Disinfect the stoppers with a sterile alcohol swab (or other suitable solution suggested by your healthcare professional or hemophilia center) by rubbing the stoppers firmly for several seconds, and allow to dry prior to use. Place the vials on a flat surface.



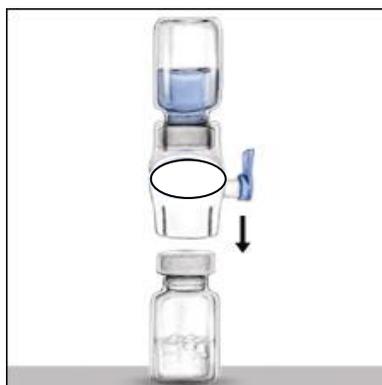
3. Open the BAXJECT II device package by peeling away the lid, without touching the inside of the package. The BAXJECT II device remains in the package at this time. **Do not remove the device from the package.**



4. Turn the package with the device upside down, and place it over the top of the diluent vial. Fully insert the clear plastic spike of the BAXJECT II device into the center of the diluent vial's stopper by pushing straight down. Grip the package at its edge and pull it off the device. After removing the packaging, be careful not to touch the white plastic exposed spike. **Do not remove the blue luer cap from BAXJECT II device. Please note that the connection of the two vials should be done quickly to close the open fluid pathway created by the first insertion of the spike to the diluent vial.**



5. Quickly turn over the diluent vial with the BAXJECT II device, place on top of the vial containing the factor concentrate, and fully insert the white plastic spike into the factor concentrate vial's stopper by pushing straight down. The vacuum will draw the diluent into the factor concentrate vial.

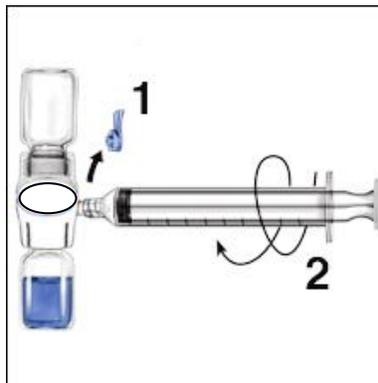


6. Swirl the factor concentrate gently and continuously with the BAXJECT II device attached until it is completely dissolved. **Do not shake.** Check to make sure the factor concentrate is completely dissolved. The solution should be clear and colourless in appearance. If not, do not

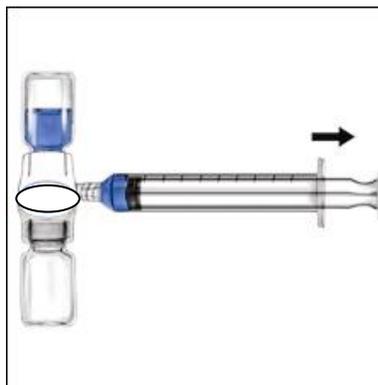
use the solution and notify Takeda immediately.



7. Remove the blue luer cap from the BAXJECT II device. Connect the syringe to the BAXJECT II device. **DO NOT INJECT AIR.**  
**IMPORTANT:** Do NOT use a glass syringe. The plastic syringe provided with ADVATE should be used to administer this medication.

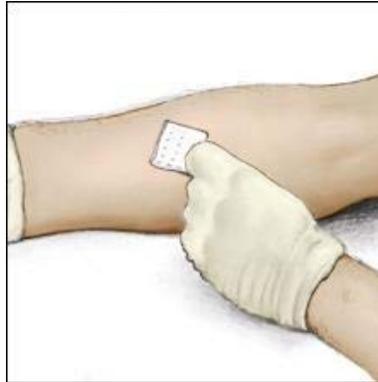


8. Turn the system over so that the factor concentrate solution vial is on top. Withdraw the factor concentrate solution into the syringe by pulling back the plunger slowly. Disconnect the syringe, leaving the BAXJECT II device connected. Attach the infusion needle to the syringe using a winged infusion set, if available. Point the needle up and remove any air bubbles by gently tapping the syringe with your finger and slowly and carefully pushing air out of the syringe. Dispose of the used BAXJECT II system in your hard-walled Sharps container, without taking it apart.

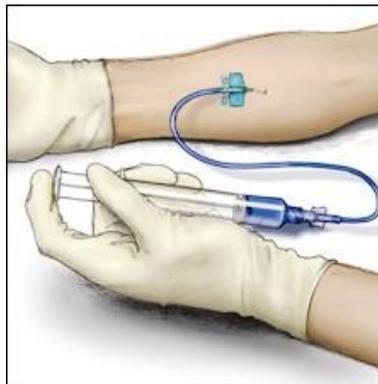


9. If receiving more than one vial of ADVATE, the contents of multiple vials may be drawn into the same syringe. **Please note that the BAXJECT II device is intended for use with a single vial of ADVATE and Sterile Water for Injection only, therefore reconstituting and withdrawing a second vial into the syringe requires a second BAXJECT II device.**

10. Apply a tourniquet, and prepare the injection site by wiping the skin well with a sterile alcohol swab (or other suitable solution suggested by your healthcare professional or hemophilia center).



11. Insert the needle into the vein, and remove the tourniquet. Infuse the factor concentrate. **Do not infuse any faster than 10mL per minute.** Remove the needle from the vein and apply pressure with sterile gauze to the infusion site for several minutes. **Do not recap the needle after the infusion, and do not dispose in ordinary household trash.** Place it with the used syringe in a hard-walled Sharps container for proper disposal.



12. After the infusion, remove the peel-off label from the factor concentrate vial and place it in your factor log book. Clean up any spilled blood with a freshly prepared mixture of 1 part bleach and 9 parts water, soap and water, or any household disinfecting solution.



### **Usual dose:**

Individual doses are usually between 20 – 50 IU Factor VIII/kg body weight, as determined by your physician. Physician supervision of the treatment regimen is required.

### **Overdose:**

The effects of higher than recommended doses of ADVATE have not been characterized.

If you think you have taken too much ADVATE, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

### **Missed Dose:**

- Double doses are generally not required to compensate for forgotten individual doses.
- Proceed immediately with a regular administration of ADVATE and to continue treatment at regular intervals as required.

### **What are possible side effects from using ADVATE?**

These are not all the possible side effects you may have when taking [Brand name]. If you experience any side effects not listed here, tell your healthcare professional.

- Should a significant increase in pulse rate during administration of ADVATE occur, reducing the rate of administration or temporarily halting the injection usually allows the symptoms to disappear promptly.
- There is a possibility that you could have an allergic reaction to ADVATE. Allergic reactions to ADVATE may manifest with any of the following: rash, hives, itching, tightness of the chest, difficulty breathing, throat tightness, and/or low blood pressure (e.g. weak pulse, feeling lightheaded or dizzy when you stand, and possibly shortness of breath). If you experience any of these symptoms, stop the infusion and immediately phone your healthcare professional or go to the Emergency Department.
- As with all Factor VIII products, the clinical response to ADVATE may vary. If your bleeding is not controlled after infusing ADVATE, contact your healthcare professional immediately. Your Factor VIII level may need to be measured by your healthcare professional who may recommend another dose of ADVATE in order to achieve a satisfactory clinical response. If your plasma Factor VIII level fails to increase as expected or if bleeding is not controlled after

adequate dosing, your physician may test for the presence of an inhibitor (neutralizing antibodies).

### Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on [Adverse Reaction Reporting \(http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php\)](http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php) for information on how to report online, by mail or by fax; or
- Calling toll-free at 1-866-234-2345.

*NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.*

### Storage:

- Store at refrigerated temperature (2°C- 8°C [36°F - 46°F]). Do not freeze.
- May store at room temperature up to 30°C (86°F) for a period of up to 6 months not to exceed the expiration date.
- Do not place back in the refrigerator once removed from refrigerated storage.
- Do not refrigerate preparation after reconstitution.
- Do not use beyond the expiration date printed on the vial or 6 months after date noted on the carton, whichever is the earliest.

Keep out of reach and sight of children.

### If you want more information about ADVATE:

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the [Health Canada website \(https://www.canada.ca/en/health-canada.html\)](https://www.canada.ca/en/health-canada.html); the manufacturer's website (<https://www.takeda.com/en-ca>), or by calling 1-800- 268-2772.

This leaflet was prepared by

Takeda Canada Inc.  
22 Adelaide Street West, Suite 3800  
Toronto Ontario M5H 4E3

Last Revised: MAY-27-2021

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## PATIENT MEDICATION INFORMATION

### READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

**ADVATE<sup>®</sup>**  
**Antihemophilic Factor (Recombinant),**  
**Plasma/Albumin Free Method (rAHF-PFM)**

**For Reconstitution with 5 mL Diluent in BAXJECT III System\***

Read this carefully before you start taking **ADVATE** and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about **ADVATE**.

#### What is **ADVATE** used for?

- routine prophylaxis to prevent or reduce frequency of bleeding episodes in adults and children with hemophilia A
- **ADVATE** can temporarily correct the blood clotting process, so it helps prevent and control bleeding in people with Hemophilia A (Factor VIII deficiency).
- for treatment or prevention of Hemophilia A-related bleeding.

#### How does **ADVATE** work?

**ADVATE** temporarily raises the level of Factor VIII in the blood to a more normal level, allowing your body's blood clotting process to function properly.

#### What are the ingredients in **ADVATE**?

##### Medicinal ingredients:

- Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF PFM)

##### Non-medicinal ingredients:

- Calcium Chloride
- Glutathione
- Histidine
- Mannitol
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- Trehalose
- Sodium Chloride
- Tris (hydroxymethyl) aminomethane

#### **ADVATE** comes in the following dosage forms:

Dried Powder for Intravenous Injection in single-dose vials that contain nominally 1000, 1500, 2000, and 3000 International Units (IU) per vial reconstituted in 5 mL of sterile Water for Injection (USP, Ph. Eur.).

### **Do not use ADVATE if you:**

Do not have a diagnosis of Hemophilia A. Patients with known allergic-type reactions to mouse or hamster proteins should talk to their doctor before using this product. ADVATE is not indicated for the treatment of von Willebrands Disease.

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take ADVATE. Talk about any health conditions or problems you may have, including if you have known allergies to:**

- to mouse or hamster proteins.
- to this drug or to any ingredient in the formulation or component of the product.

### **Other warnings you should know about:**

Your body may form inhibitors to Factor VIII. The formations of inhibitors is part of your body's normal immune defense system. that forms in response to infusions of Factor VIII. These inhibitors can lead to a reduced response, or to no response to Factor VIII therapy. This is not an uncommon complication in the treatment of people with Hemophilia A. Consult with your healthcare professional to make sure you are carefully monitored with blood tests for the development of inhibitors to Factor VIII. Contact your healthcare professional if you are not able to prevent or control bleeding episodes with your regular doses of prescribed Factor VIII therapy. (see **What are possible side effects from using ADVATE**)

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

### **The following may interact with ADVATE:**

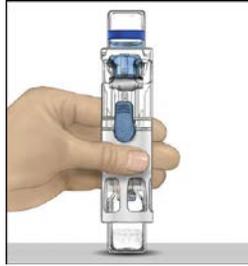
There are no known interactions of ADVATE with other medications.

### **How to take ADVATE:**

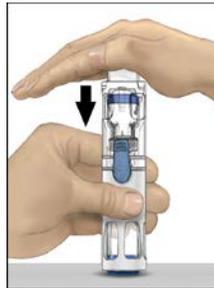
You may infuse ADVATE at a hemophilia centre, at your healthcare professional's office or in your home. **Do not attempt to self-infuse unless you have been taught how by your healthcare professional or hemophilia center.**

**IMPORTANT:** Contact your healthcare professional or local Hemophilia Treatment Centre if you experience any problems with this procedure. These instructions are intended only as a visual aid for those patients who have been instructed by their healthcare professional or hemophilia center on the proper way to self-infuse the product (diagrams are representational and may not be drawn exactly to scale).

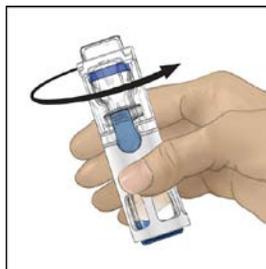
1. Allow the ADVATE to reach room temperature.
2. Open the ADVATE package by peeling away the lid
3. Remove ADVATE in the BAXJECT III system from the package.
4. Place the ADVATE on a flat surface with the diluent vial on top. The diluent vial has a blue stripe. *Do not remove the blue cap until instructed in a later step.*
5. Hold the ADVATE in the BAXJECT III system with one hand.



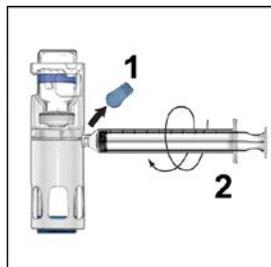
6. With the other hand, press down firmly on the diluent vial until the system is fully collapsed and the diluent flows down into the ADVATE vial. Do not tilt the system until the transfer is complete.



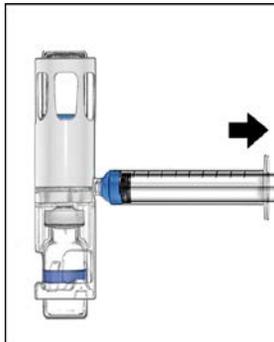
7. Verify that diluent transfer is complete. Swirl gently until ADVATE is completely dissolved. **Do not shake.** Inspect parenteral drug products for particulate matter and discoloration prior to administration. The solution should be clear and colorless in appearance. If not, do not use the solution and notify Takeda immediately.



8. Remove the blue cap from the BAXJECT III system. Connect the syringe to the system. *Do not inject air into the BAXJECT III system.* **IMPORTANT:** Do NOT use a glass syringe. The plastic syringe provided with ADVATE should be used to administer this medication.

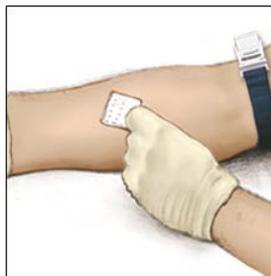


9. Turn the system upside down (factor concentrate vial now on top). Draw the factor concentrate into the syringe by pulling the plunger back slowly.

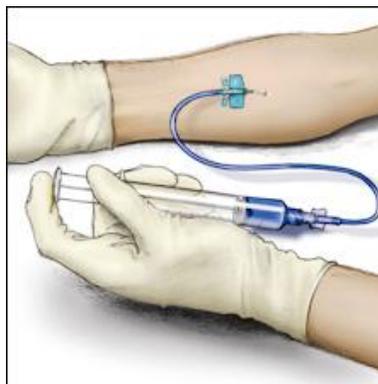


10. Disconnect the syringe from the system. Attach the infusion needle to the syringe using the infusion set. Point the needle up and remove any air bubbles by gently tapping the syringe with your finger and slowly and carefully pushing air out of the syringe and needle.

11. Apply a tourniquet and get the injection site ready by wiping the skin well with an alcohol swab (or other suitable solution suggested by your healthcare professional or hemophilia center).



12. Insert the needle into the vein and remove the tourniquet. Slowly infuse the ADVATE. **Do not infuse any faster than 10 mL per minute.**



13. Take the needle out of the vein and use sterile gauze to put pressure on the infusion site for several minutes.

14. **Do not recap the needle.** Place the needle, syringe and BAXJECT III system in a hard-walled Sharps container for proper disposal. Do not dispose of these supplies in ordinary household trash.

Remove the peel-off label from the BAXJECT III system and place it in your logbook. Clean any spilled blood with a freshly prepared mixture of 1 part bleach and 9 parts water, soap and water, or any household disinfecting solution.

#### **Usual dose:**

Individual doses are usually between 20 – 50 IU Factor VIII/kg body weight, as determined by your physician. Physician supervision of the treatment regimen is required.

#### **Overdose:**

The effects of higher than recommended doses of ADVATE have not been characterized.

If you think you have taken too much ADVATE, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

#### **Missed Dose:**

- Double doses are generally not required to compensate for forgotten individual doses.
- Proceed immediately with a regular administration of ADVATE and to continue treatment at regular intervals as required.

#### **What are possible side effects from using ADVATE?**

These are not all the possible side effects you may have when taking [Brand name]. If you experience any side effects not listed here, tell your healthcare professional.

- Should a significant increase in pulse rate during administration of ADVATE occur, reducing the rate of administration or temporarily halting the injection usually allows the symptoms to disappear promptly.
- There is a possibility that you could have an allergic reaction to ADVATE. Allergic reactions to ADVATE may manifest with any of the following: rash, hives, itching, tightness of the chest, difficulty breathing, throat tightness, and/or low blood pressure (e.g. weak pulse, feeling lightheaded or dizzy when you stand, and possibly shortness of breath). If you experience any of these symptoms, stop the infusion and immediately phone your healthcare professional or go to the Emergency Department.
- As with all Factor VIII products, the clinical response to ADVATE may vary. If your bleeding is not controlled after infusing ADVATE, contact your healthcare professional immediately. Your Factor VIII level may need to be measured by your healthcare professional who may recommend another dose of ADVATE in order to achieve a satisfactory clinical response. If your plasma Factor VIII level fails to increase as expected or if bleeding is not controlled after adequate dosing, your physician may test for the presence of an inhibitor (neutralizing antibodies).

## Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on [Adverse Reaction Reporting \(http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php\)](http://www.hc-sc.gc.ca/dhp-mps/medeff/report-declaration/index-eng.php) for information on how to report online, by mail or by fax; or
- Calling toll-free at 1-866-234-2345.

*NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.*

## Storage:

- Store at refrigerated temperature (2°C- 8°C [36°F - 46°F]). Do not freeze.
- May store at room temperature up to 30°C (86°F) for a period of up to 6 months not to exceed the expiration date.
- Do not place back in the refrigerator once removed from refrigerated storage.
- Do not refrigerate preparation after reconstitution.
- Do not use beyond the expiration date printed on the vial or 6 months after date noted on the carton, whichever is the earliest.

Keep out of reach and sight of children.

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## If you want more information about ADVATE:

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the [Health Canada website \(https://www.canada.ca/en/health-canada.html\)](https://www.canada.ca/en/health-canada.html); the manufacturer's website (<https://www.takeda.com/en-ca>), or by calling 1-800- 268-2772.

This leaflet was prepared by

Takeda Canada Inc.  
22 Adelaide Street West, Suite 3800  
Toronto Ontario M5H 4E3

Last Revised: MAY-27-2021

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## PATIENT MEDICATION INFORMATION

### READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

#### **ADVATE®** **Antihemophilic Factor (Recombinant),** **Plasma/Albumin Free Method (rAHF-PFM)**

#### **For Reconstitution with 2 mL Diluent in BAXJECT III System\***

Read this carefully before you start taking **ADVATE** and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about **ADVATE**.

#### **What is ADVATE used for?**

- routine prophylaxis to prevent or reduce frequency of bleeding episodes in adults and children with hemophilia A
- ADVATE can temporarily correct the blood clotting process, so it helps prevent and control bleeding in people with Hemophilia A (Factor VIII deficiency).
- for treatment or prevention of Hemophilia A-related bleeding.

#### **How does ADVATE work?**

ADVATE temporarily raises the level of Factor VIII in the blood to a more normal level, allowing your body's blood clotting process to function properly.

#### **What are the ingredients in ADVATE?**

##### Medicinal ingredients:

- Antihemophilic Factor (Recombinant), Plasma/Albumin-Free Method (rAHF PFM)

##### Non-medicinal ingredients:

- Calcium Chloride
- Glutathione
- Histidine
- Mannitol
- Polysorbate-80
- Trehalose
- Sodium Chloride
- Tris (hydroxymethyl) aminomethane

#### **ADVATE comes in the following dosage forms:**

Dried Powder for Intravenous Injection in single-dose vials that contain nominally 250, 500, 1000, 1500 International Units (IU) per vial reconstituted in 2 mL of sterile Water for Injection (USP, Ph. Eur.).

#### **Do not use ADVATE if you:**

Do not have a diagnosis of Hemophilia A. Patients with known allergic-type reactions to mouse or hamster proteins should talk to their doctor before using this product.

ADVATE is not indicated for the treatment of von Willebrands Disease.

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take ADVATE. Talk about any health conditions or problems you may have, including if you have known allergies to:**

- to mouse or hamster proteins.
- to this drug or to any ingredient in the formulation or component of the product.

#### **Other warnings you should know about:**

Your body may form inhibitors to Factor VIII. The formations of inhibitors is part of your body's normal immune defense system. that forms in response to infusions of Factor VIII. These inhibitors can lead to a reduced response, or to no response to Factor VIII therapy. This is not an uncommon complication in the treatment of people with Hemophilia A. Consult with your healthcare professional to make sure you are carefully monitored with blood tests for the development of inhibitors to Factor VIII. Contact your healthcare professional if you are not able to prevent or control bleeding episodes with your regular doses of prescribed Factor VIII therapy. (see **What are possible side effects from using ADVATE**)

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

#### **The following may interact with ADVATE:**

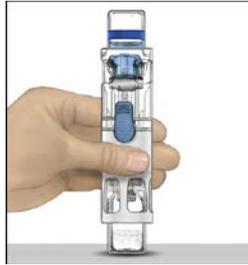
There are no known interactions of ADVATE with other medications.

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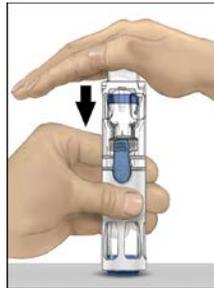
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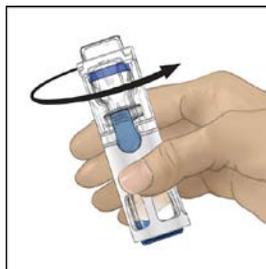
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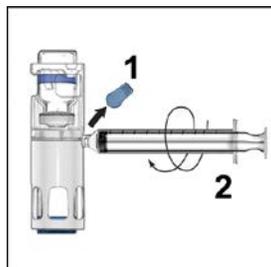


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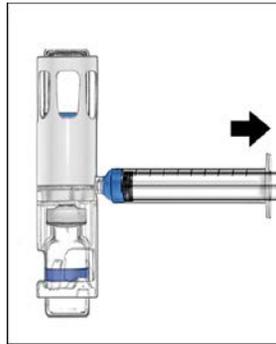
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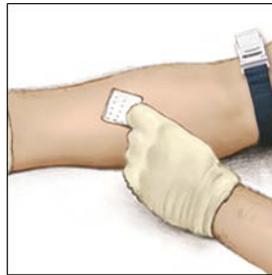
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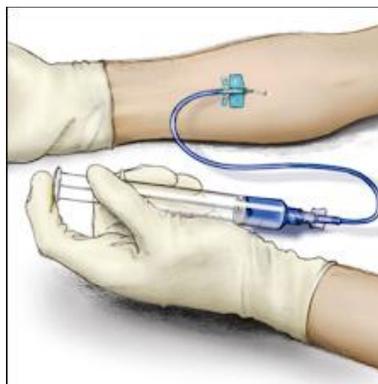


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This leaflet was prepared by

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