



# My Infusion Kit

A Home Infusion to Self-infusion Overview



# Welcome

You've had the conversations with your doctor and you're ready to start home infusion or self-infusion.

This resource is intended to reinforce what you've learned and help you feel confident for when you or your child make the transition to home or self-infusions. With more control over when and where to perform infusions, you can ease the burden of that part of living with a bleeding disorder.

While there are many types of bleeding disorders, the focus of this resource is on three that can be treated by infusing factor replacement: hemophilia A, hemophilia B, and von Willebrand disease (VWD).



## More Options for Treatment

Today, bleeding disorders are generally manageable conditions. Through multiple treatment options and an increased focus on comprehensive care, people with bleeding disorders have choices on how to manage their treatment.

## Trusted Guidance From the Experts

This content was developed in consultation with nurses with the belief that learning about different methods of infusion will help you make informed choices. This resource provides an overview of venous access options, as well as information and insights on transitioning to home and self-infusion. It includes:

- Step-by-step infusion overview
- Printable treatment journal
- Worksheet for notes and questions
- List of additional resources

**By using this material, you acknowledge that Takeda is providing the material for informational purposes only, and that neither Takeda nor others who have contributed information for this resource are providing the materials to you for the purpose of medical advice. You should not rely on the materials in deciding on a treatment plan, drug usage, or any other medical advice. Takeda strongly urges that you consult with your healthcare provider in connection with any treatment options that may be available to you.**

## Important to Remember

**This infusion resource does not replace your *hemophilia treatment center (HTC) or your doctor.*** These professionals will help you choose the infusion method appropriate for your stage in life and assist you with self-infusion training. They are a crucial part of your support system and will be there each step of the way as you move toward infusing on your own. In this resource, we will use the term “healthcare provider” to refer to your HTC or doctor.

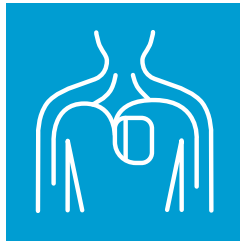
## Committed to Education

We believe the more you know, the more you can actively participate in your treatment. We hope this resource will be a valuable tool for you today and in the future.

# Chapters



1  
Factor Basics >



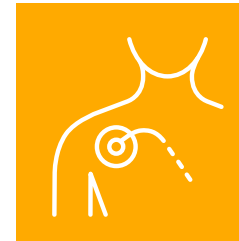
2  
Venous Access  
Options >



3  
Home  
Infusion to  
Self-Infusion >



4  
Self-Infusion  
Steps >



5  
Ports:  
Additional  
Information >



6  
Support >

Glossary >

Things You Need to Know >

References >



1

# Factor Basics



# What Is Factor Replacement?<sup>1</sup>

People with hemophilia do not have enough clotting factor, which is a protein that makes your blood **clot**.

In **hemophilia A**,  
the clotting factor is called  
**factor VIII (FVIII)**<sup>1</sup>

In **hemophilia B**,  
the clotting factor is called  
**factor IX (FIX)**<sup>2</sup>



Hemophilia and VWD can be treated with

## **factor replacement.**

Factor replacement is the process of infusing clotting factor through your veins.

In **von Willebrand disease (VWD)**, the clotting factor is called  
**von Willebrand factor (VWF)**.<sup>3</sup>

People with VWD may not have enough factor or it may not work correctly to make their blood clot.

## Types of Treatment

Together, you, your caregiver, and your healthcare provider will make a lot of decisions about your treatment, from the type of factor you use to the appropriate treatment approach for you.

For some people with hemophilia, regular infusion of factor (**prophylaxis**) may be the most effective way of preventing bleeds.<sup>4</sup> There are no FDA approved prophylaxis treatment options for patients with VWD.

Others choose to treat **on demand**, which means that factor is infused immediately after the beginning of a bleed. People with VWD may treat bleeding with on-demand factor replacement.<sup>1-3</sup>

Prior to a procedure such as dental work or surgery, your healthcare provider will be able to advise you on treatment approach.



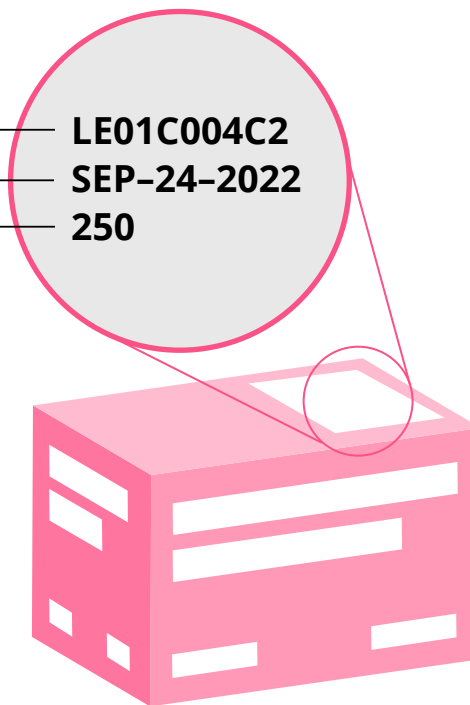
# Understanding the Label on Your Factor

The numbers and letters printed on your factor box or **vial** are important. Based on the number of units in each box or vial of factor, you may need to add several boxes or vials together to get the right amount. These include:

**Lot number**— Keeping track of the lot numbers from the vials you infuse is important. Your doctor may get information about a batch of factor and need to know if you used that specific lot.

**Expiration date**—This tells you the last date the factor should be used. When you receive new factor, use the factor that will expire first.

**International units (IUs)**—This is how factor is measured for an infusion. Your doctor will tell you how many IUs or “units” you need to receive for each bleeding episode.



## Things That Influence Your Factor Dose<sup>4,5</sup>

The amount of factor your healthcare provider prescribes for you is based on:

- Factor deficiency
- Body weight
- Type, site, and severity of bleed
- How quickly the bleed is treated
- Individual response to factor
- Individual goals and lifestyle

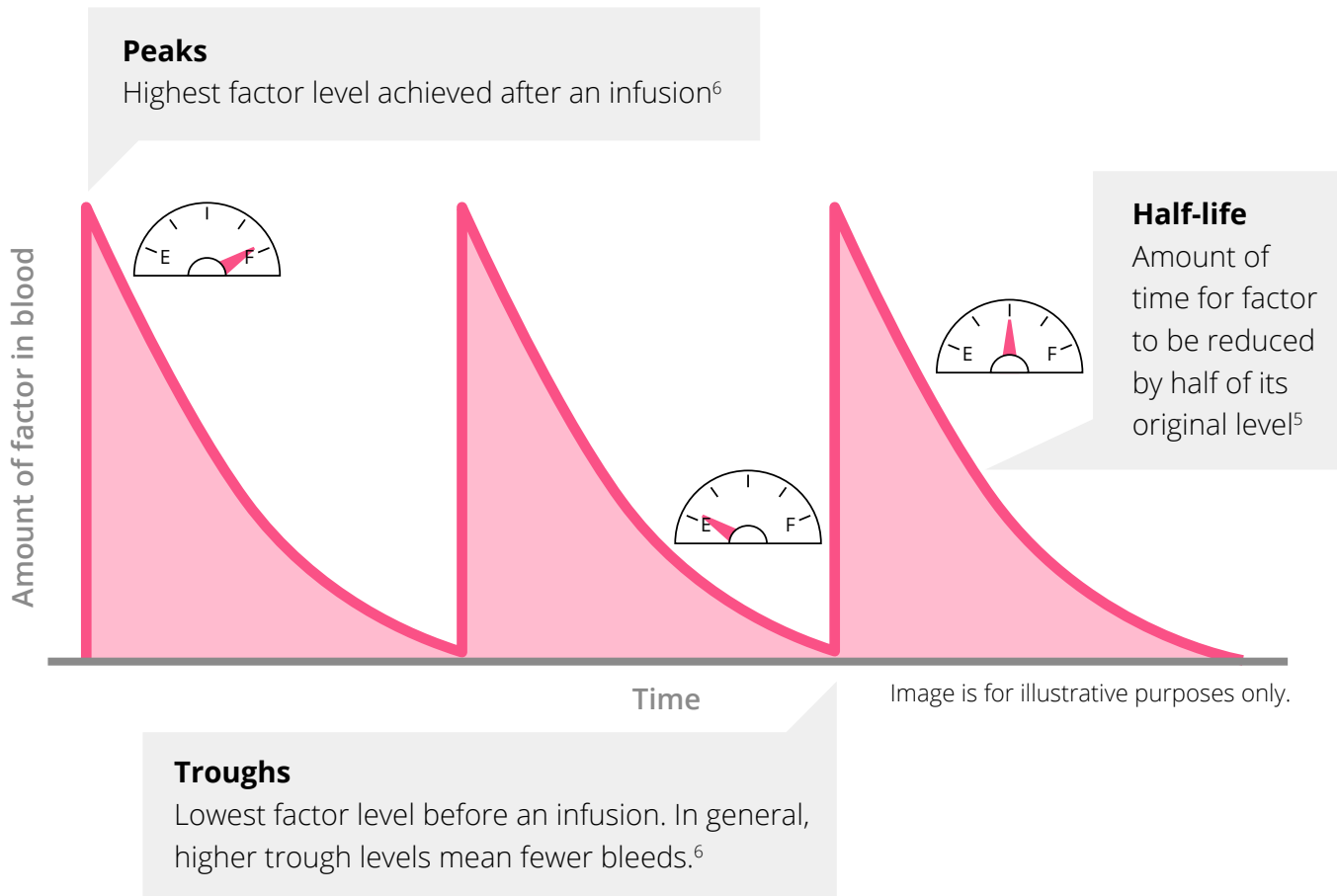
## Manufacturer's Information

You should also know the brand of factor you use and its manufacturer. Always read and follow your product's storage and usage instructions.



# Factor Half-life, Peaks, and Troughs

Factor **half-life** and peak and trough levels can help your healthcare provider and you know when it is time to take another dose.<sup>5</sup> The image below shows how these terms relate to the factor in your blood.



Your peak, trough, and half-life are part of your **pharmacokinetics (PK)**, and each person's PK is unique. Understanding your PK can help you and your provider individualize your factor treatment and dose based on your lifestyle and goals.



# Keeping Track of Your Treatment

An accurate record of your treatments and your bleeding episodes is a necessary part of successfully managing your bleeding disorder. Keeping good records can help your healthcare provider develop a plan that continues to work best for you. In addition, your dose may change over time if your weight or lifestyle changes. This information should be shared with your healthcare provider.

See next few pages for printable examples of treatment and bleeding journal pages.

**It is recommended that you keep a treatment and infusion journal to log the following information<sup>4</sup>:**



**All factor infusions**



**Any bleed** (minor, major, or life threatening), including date and time



**Location of bleed** (such as right elbow or blood in urine)



**Factor information**, including lot numbers (in case of recall)\*



**Absences** from school, work, or activities



**Other** (HTC visit, ER admission) as determined by your healthcare provider

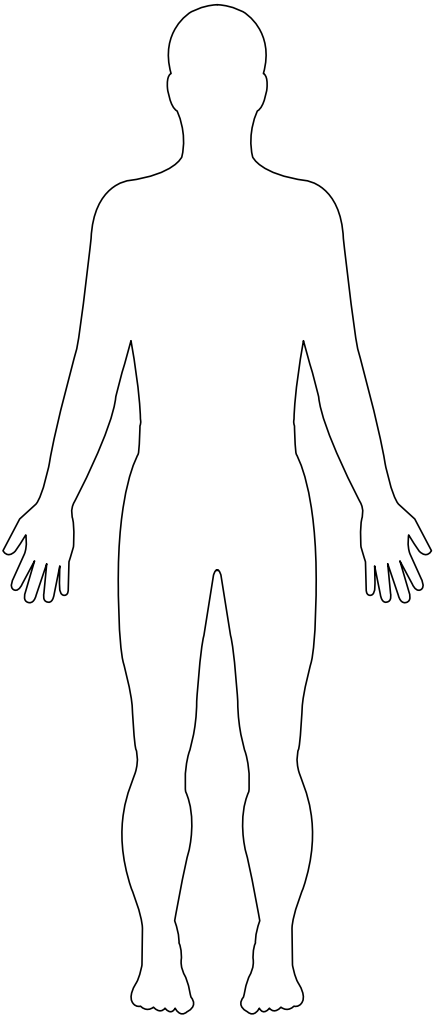
\*Removing the peel-off label if available and adding it to your treatment journal is an easy way to note the vial information.

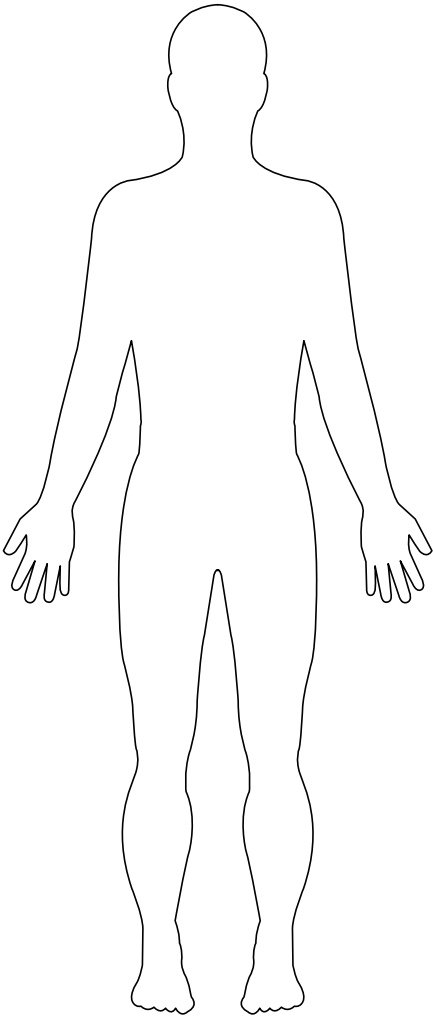
# My Treatment Journal

Infusion (Combine all vials used)	Vial Information (Or use peel-off labels from vials)
Date: <u>   </u> / <u>   </u> / <u>   </u>	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Time: <u>                    </u> AM    PM	Lot number: <u>                    </u>
Total units: <u>                    </u> IU	Units: <u>                    </u> IU
Reason: Spontaneous	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Injury	Lot number: <u>                    </u>
Surgery/Dental	Units: <u>                    </u> IU
Prophylaxis (for hemophilia patients)	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Other <u>                    </u>	Lot number: <u>                    </u>
	Units: <u>                    </u> IU

Infusion (Combine all vials used)	Vial Information (Or use peel-off labels from vials)
Date: <u>   </u> / <u>   </u> / <u>   </u>	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Time: <u>                    </u> AM    PM	Lot number: <u>                    </u>
Total units: <u>                    </u> IU	Units: <u>                    </u> IU
Reason: Spontaneous	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Injury	Lot number: <u>                    </u>
Surgery/Dental	Units: <u>                    </u> IU
Prophylaxis (for hemophilia patients)	Expiration date: <u>   </u> / <u>   </u> / <u>   </u>
Other <u>                    </u>	Lot number: <u>                    </u>
	Units: <u>                    </u> IU

# My Bleed Assessment Journal

Bleed	Location on Body
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	

Bleed	Location on Body
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	
Date: <u>   </u> / <u>   </u> / <u>   </u> Joint    Muscle    Other <hr/> Pain: 😞 😓 😐 😊 😄 Total units: <u>      </u> IU	




# My Menstrual Bleed Journal

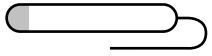


## Heavy menstrual bleeding

Some symptoms include<sup>4</sup>:

- Bleeding that soaks through a pad or tampon in less than 2 hours
- Your clothes are often stained from leaking menstrual blood
- Your bleeding gets in the way of doing daily activities
- You pass large blood clots (larger than 1 inch)

Use these forms to track your symptoms.

Pad	1	2	3	4	5	6	7	8
								
								
								
Clots (yes/no)								
Numbers 1-8 represent the consecutive days of your menstrual period. Please record for each day the number of pads you used that match each illustration.								

Tampon	1	2	3	4	5	6	7	8
								
								
								
Clots (yes/no)								
Numbers 1-8 represent the consecutive days of your menstrual period. Please record for each day the number of tampons you used that match each illustration.								

# When to Call for Help<sup>4</sup>

It is important to work with your healthcare provider to create a treatment plan for bleeding episodes. If you have a bleed that is not responding to treatment, call your provider. Some bleeds can be life threatening or lead to serious complications. You should contact your provider or seek immediate medical attention if there is an injury to the areas of the body illustrated here.

## Eyes

Some symptoms include<sup>4</sup>:

- Pain around the eye
- Swelling
- Change in color in or around the eye
- Double or blurred vision
- Any other change in your vision

## Neck or throat

Some symptoms include<sup>4</sup>:

- Swelling in the neck
- Choking
- Trouble swallowing
- Trouble breathing
- A change in skin color over your neck or throat
- Coughing or throwing up blood without a nosebleed or mouth bleed
- A change in the tone of your voice

## Head

Some symptoms include<sup>7</sup>:

- Drowsiness (or change in sleep pattern)
- Irritability/confusion
- Lethargy/fatigue
- Dizziness
- Nausea and/or vomiting
- Seizures
- Dilated or unequal pupils
- Stiff neck and/or back
- Headache
- Double vision
- Change in behavior

## Stomach

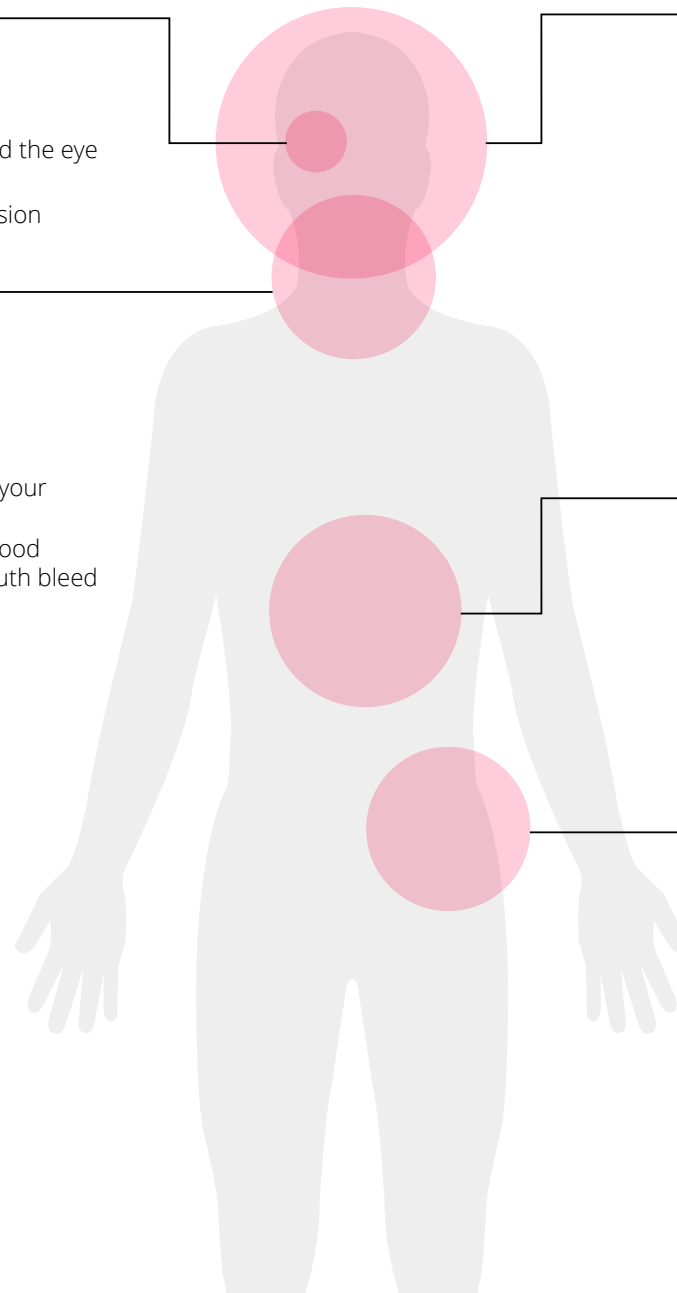
Some symptoms include<sup>4</sup>:

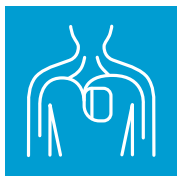
- Coughing up or vomiting fresh or old blood
- Passing bloody or black, tar-like stools
- Pain in your stomach area
- Feeling weak
- Looking pale

## Hip/Thigh/Groin

Some symptoms include<sup>7</sup>:

- Difficult or painful to straighten leg
- Groin pain
- Numbness or tingling in the thigh
- Lower back or thigh pain
- Sudden change in walking pattern (toe walking, frog leg position with hip flexed outward)





2

# Venous Access Options



# Venous Access

You and your healthcare provider have discussed what **venous access** is. Based on this discussion, you have decided on an option that works best for you. The following information is meant for review at home following this conversation.

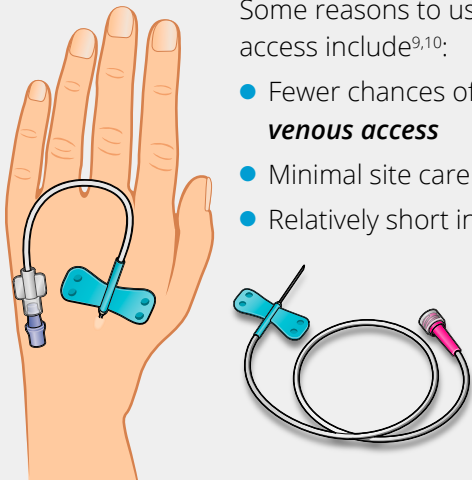
## Review of venous access options

### Peripheral Venous Access

**Intravenous (IV)** factor or other medications are injected through veins usually located in the **hand or arm, and sometimes in the foot or ankle.**<sup>8</sup>

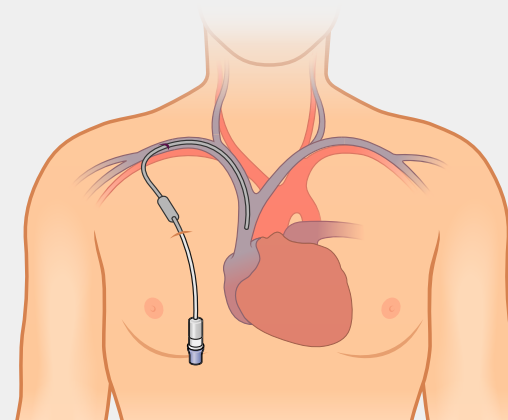
Some reasons to use peripheral venous access include<sup>9,10</sup>:

- Fewer chances of **infection** than **central venous access**
- Minimal site care before and after infusions
- Relatively short infusion time



### Central Venous Access

IV solutions go through a **catheter**, which ends in a **large vein near the heart**. While a **port** is the most common type of **central venous access device (CVAD)**, several other devices can be used for factor replacement treatment.<sup>10</sup>



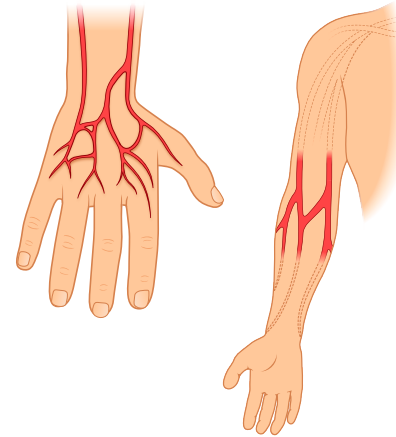
# Types of Peripheral Venous Access

**Work with your healthcare provider to determine the best injection site for you.**

## Common peripheral IV locations<sup>8</sup>

**Peripheral veins** for **venipuncture** are usually located in the hand or arm. Sites for the foot or ankle are rare, but possible. To keep skin healthy and eliminate overuse, rotate the infusion site. Work with your provider to determine the best injection site for you.

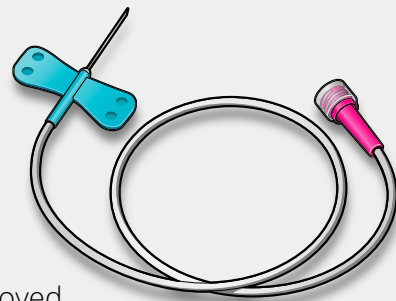
Sites in hands      Sites in arms



**Two tools to enable peripheral venous access are<sup>11,12</sup>:**

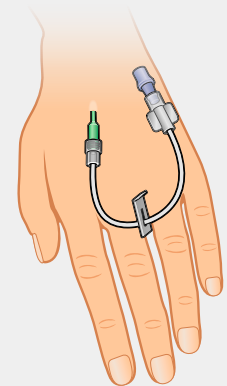
### Butterfly needle

A small needle attached to tubing that uses a winged device to help grip the needle for insertion. Factor is infused into the bloodstream once the needle has been inserted into a vein. The butterfly needle is removed when the infusion is complete.



### Peripheral venous catheter

Also called a **saline or heparin lock**, this is a method of accessing the vein for several days at a time. The catheter, which is a flexible tube, is inserted into the vein, and a special cap is placed on the end to lock it. The catheter is usually inserted by a nurse, and it is easily removed when treatment is completed.





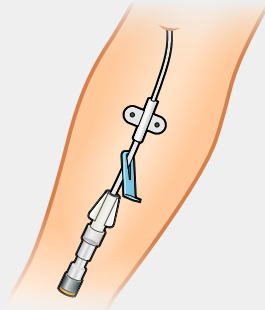
# Types of Central Venous Access

Your healthcare provider may decide central venous access is right for you.

## Nonimplanted CVADs

### PICC line<sup>8</sup>

A **peripherally inserted central catheter**, or **PICC line**, is inserted into a smaller vein, typically in the upper arm. The tip of the catheter is advanced through the vein until it rests in a large vein near the heart. Factor is then infused through the catheter. There are many reasons for choosing a PICC line, including:

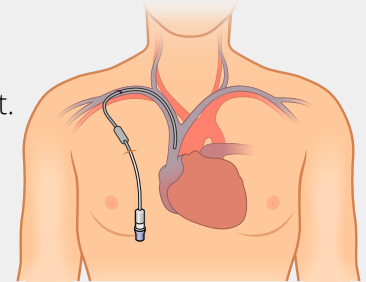


- It is for short-term treatment (from a week to a few months)
- It does not require surgery to insert or replace
- No additional needle stick into the skin is needed to infuse the factor

## Implanted CVADs

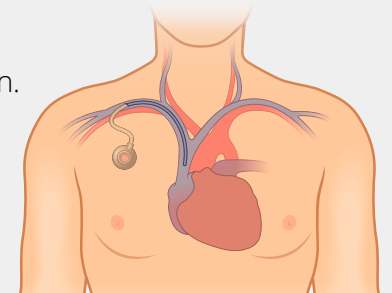
### Tunneled catheter (Hickman or Broviac)<sup>13</sup>

A **tunneled catheter** is surgically inserted into a vein near the heart through a small incision in the chest. The other end of the catheter comes out through the skin, usually on the chest wall, extending a few inches outside the body. A cap is placed on the end of the catheter. Factor can then be infused through the catheter.



### Port<sup>10</sup>

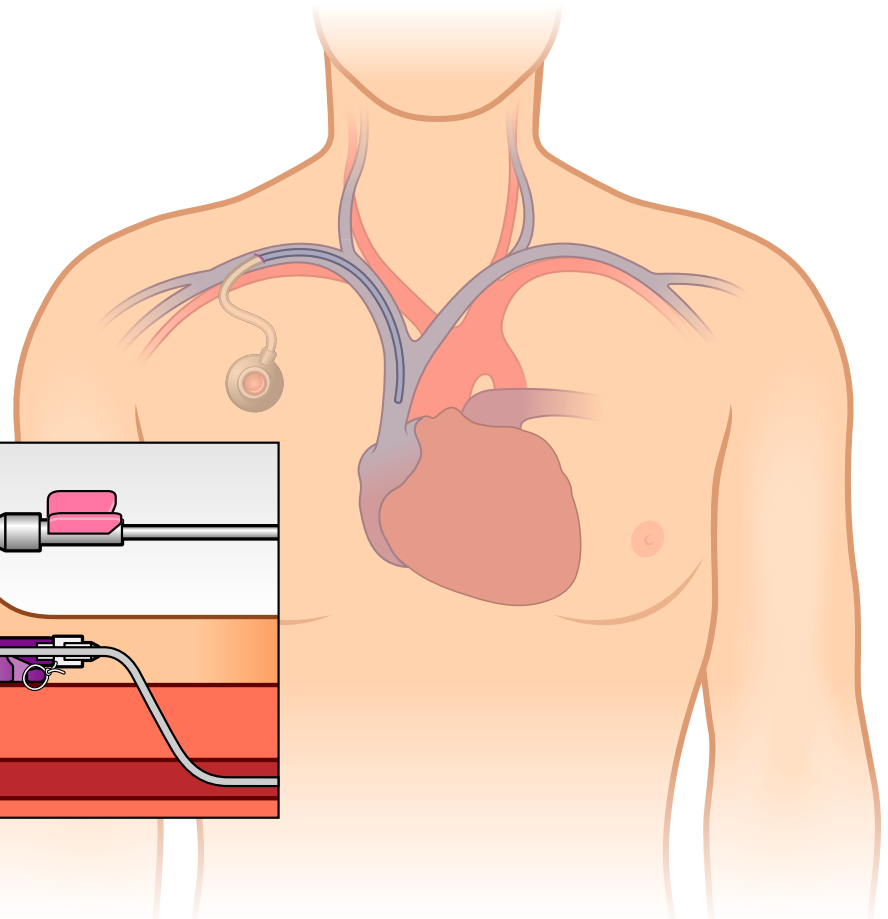
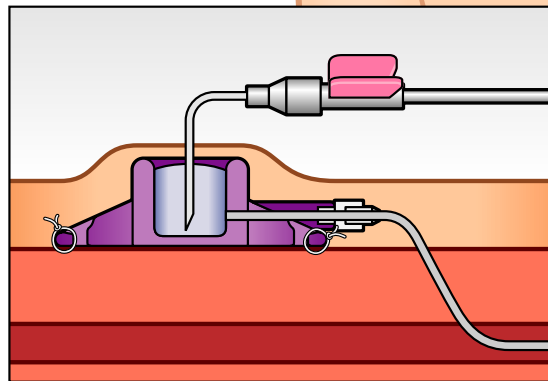
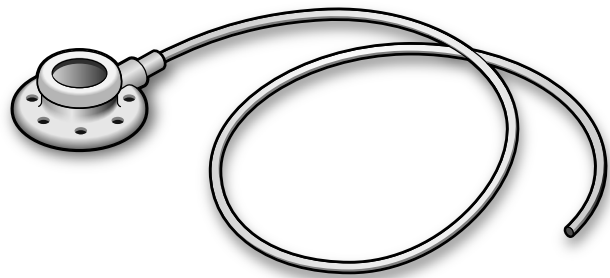
A port is completely under the skin. A healthcare professional may recommend a port if veins are small, hard to locate, and/or if the patient does not tolerate repeated sticks. A port is made up of different parts: the **reservoir** sits underneath the skin, with a catheter attached. A layer of material called the **septum** covers the top. Factor is infused through a needle inserted into the skin, which passes through the septum into the reservoir.



## How Is a Port Implanted?

A port is surgically inserted under the skin, usually in the chest, and may be able to stay in place for months, or years, if needed.<sup>10,13\*</sup>

Port insertion is done at the hospital by a surgeon or interventional radiologist in the operating room or in a special area of the radiology department.



\*The Consensus Recommendations for Use of Central Venous Access Devices state that a port should remain in place only as long as medically necessary.<sup>10</sup>

# Additional Information About IV Access

You and your healthcare provider will choose the best venous access option for you. You may have discussed the following with your provider when you were going over your options. This is intended as a review at home after your discussion.

## Age of patient

If you are a parent of an infant or toddler, infusion can be more challenging, with issues such as getting a child to cooperate for IV infusion, smaller veins, and more fat under the skin that makes both feeling and seeing the veins more difficult.<sup>15</sup> When considering the type of venous access to use, realize that young children may outgrow an implanted port before it needs to be removed for medical reasons.

While children have certain needs, adults may have other specific issues to consider such as the condition of their veins.<sup>14</sup>



## Tolerance of treatment<sup>14,16</sup>

At first, infusion treatment can be hard. As you learn more about infusion, treatment usually becomes easier. If you are infusing a child, it is important to consider how cooperative the child is and how involved they want to be with infusions. Acceptance grows over time, so work with your healthcare provider on the best treatment plan for all.

## Frequency of bleeds and clotting factor infusions<sup>13,16</sup>

Some people with hemophilia or VWD do not bleed that often, while others have more bleeding episodes. How often you need to treat will influence the venous access option that is chosen.

## Additional Information About IV Access (continued)

### Types of bleeding patterns<sup>4</sup>

Patterns of bleeding can vary and affect infusion treatment. For example, one person may have soft tissue bleeds and occasional mouth bleeds while another has bleeding into their joints. If there are more frequent bleeds, your treatment team will help determine the best treatment plan. Guidelines developed by the National Hemophilia Foundation's Medical and Scientific Advisory Council recommend prophylaxis for people with severe hemophilia.<sup>17</sup>

### Comfort level

You may be eager or nervous to learn how to infuse, or a little bit of both. Don't feel bad if you are not comfortable with the infusion process right away. Learn other things first such as identifying bleeding episodes and mixing the factor. Take small steps. Learn a little at a time.

### Lifestyle

It is important to talk with your healthcare provider regarding your lifestyle, activities, and goals. This can affect which treatment and IV access is best. Work with your provider to determine the right method.

### Distance from the healthcare provider

How far you live from your provider may affect which type of IV access you choose. Consider the following:

- If you live far from your healthcare provider, can you get an infusion at a local doctor's office or emergency department?
- Do other responsibilities (work or school) make it difficult to get to your healthcare provider during business hours?
- Do you have reliable transportation?



# Advantages and Disadvantages of Peripheral and Central Venous Access<sup>4,8-10,13,14</sup>

Your healthcare provider will choose the best venous option for you.

Advantages	Peripheral	Port	Tunneled Catheter	PICC
Easier option if you can see or feel the vein	●			
Option if veins are difficult to access or do not tolerate repeated sticks		●	●	●
Little care required before or after infusion	●			
Usually able to swim, bathe, or shower without limits if needle is removed (except if peripheral venous catheter is in place)	●	●		
May be used if access is needed for more than a few days		●	●	●
All parts are under skin; difficult for young children to tamper with		●		

Disadvantages	Peripheral	Port	Tunneled Catheter	PICC
Surgery required for placement		●	●	
Increased possibility of infection		●	●	●
Possible formation of blood clots/blockages due to device		●	●	●
Mechanical malfunctions may occur		●	●	●
Extra care required, including <i>sterile techniques</i>		●	●	●
Limited duration (possibly up to 1 year)				●
Has limits for swimming, bathing, or showering while the device is in place			●	●
More likely to be displaced or pulled out by young children	●		●	●



3

# Home Infusion to Self-Infusion



# Home Infusion and Self-Infusion<sup>4,18</sup>

**You and your healthcare provider will choose whether home infusion or self-infusion is right for you. Use this information as a reminder at home following your discussion with your healthcare provider.**



When factor replacement is done in a home setting by a caregiver, it is called home infusion. While home infusion may seem challenging at first, you will eventually master the necessary skills with the help of your treatment team. To help in the transition, a home health nurse could give the infusion in your home for a period of time until the caregiver is comfortable. Home infusion is a big step toward easing the burden of living with a bleeding disorder. Remember: the goal is to help you gain more independence to live the life you choose.



Self-infusion is when you give the factor to yourself instead of a caregiver, home health nurse, or other healthcare provider giving you the infusion. This is the goal to aim for, and it is a big step toward being more independent with taking care of your factor treatments. You may feel nervous, but that's normal.

## What are the benefits of home and self-infusion?<sup>4,18</sup>

### Access to faster treatment

It's quicker to infuse at home than to wait in the emergency department or doctor's office. Early and proper treatment may have the potential to reduce complications from bleeding.

### Flexibility and convenience

If you require regular infusions, infusing at home may give you the opportunity to treat in the comfort of your own home. You may also save on the added expense of travel. And you can infuse around your daily schedule and activities.

### Makes infusing while you travel possible

When away from home, you can carry your factor and supplies with you and infuse when needed. You should still be aware of the HTC's or hospitals in the area where you are traveling in case you need assistance.

### Increases sense of independence and self-confidence<sup>4,19</sup>

Home or self-infusion can help you and your family gain more confidence and a feeling of control over your life. This often happens when you take more responsibility for your own care.



## How Do You Start Home Infusion?<sup>4,18</sup>

You should be trained on how to do infusions by your HTC or healthcare provider. Whether you're a caregiver or a person with a bleeding disorder, your treatment team will give you guidance and support as you learn the skills to infuse at home. In the beginning, you may practice infusing with a nurse and then slowly move to infusing at home. Or you may receive assistance through a nurse who comes to your home.

Even after you've learned to infuse at home, your healthcare provider will still be an important partner in your care.



**The following are some considerations that you may have discussed with your healthcare provider when deciding to start home infusion:**

- Am I willing to take on the responsibility and commitment to infuse at home?
- Is there a good place at home to set up for infusions?
- Is our family ready to accept this next step of responsibility?
- If I have trouble accessing a vein, how far is my healthcare provider, the emergency department, or other resources to help me?





## Knowing When to Start Self-Infusion

The transition to self-infusion can begin at a young age. Each person and situation is different. No matter how old you are when you learn to self-infuse, your HTC, healthcare provider, home care nurse, or family members can help you reach this important goal.

It is a big decision to begin self-infusion, but you and your healthcare provider have decided that you or your child is ready to start self-infusion.

### **You may have discussed the following with your healthcare provider when deciding to start self-infusion<sup>4</sup>:**

- Am I ready to learn the new skills necessary to self-infuse?
- Are my veins easy to access?
- Can I stick myself with a needle?
- Do I understand when and how much factor to infuse?
- Do I feel ready to do my own infusions?
- Is there a comfortable and well-lit place I can infuse at home?
- Is there another adult who can be available when I am infusing?

## For Caregivers: Steps to Helping With Home Infusion<sup>4,14,20</sup>

If you are a caregiver, be aware of your behaviors and attitudes about this new step in treatment. If you are a parent, your child is greatly influenced by what you think and what you do. Your child will respond to home infusion in much the same way as you do.

Helping the person who is being infused feel more comfortable will help avoid vein constriction.

### Here are some helpful hints that can make the process go more smoothly:

- Stay calm before and during infusion time
- Avoid hectic or rushed times for infusion
- Find a place in your home that is comfortable and well-lit to infuse
- Set expectations and stick to a routine so there will be no surprises
- Make sure the person who will be treated drinks plenty of fluids daily, and especially before infusing. This can make veins easier to find and access

### If a child is being infused:

- Let them have things around that help them feel safe (like a favorite toy)
- Distract them during the process with a fun video or ask them to sing a song



## Encouraging Partnership in the Process<sup>4</sup>

Make infusion time something you do as a team, not something you are doing to the person being treated. This will make infusion time easier, build trust, and foster a partnership. With children, it's important to start slowly.

### Encourage them to learn how to:

- Gather supplies together
- Mix the factor
- Put on the ***tourniquet***
- Take off the tourniquet
- Push the factor
- Pull out the needle
- Put on the bandage
- Log the treatment in treatment journal

Treatment at home will help prepare those being infused for the transition to self-infusion. As a caregiver, the things you do now will build upon each other and help the person being infused learn how to manage treatment on their own.



### Knowing When Your Child Is Ready to Learn to Self-Infuse<sup>21</sup>:

- Is currently involved in infusions
- Can name the supplies needed for infusion
- Has a chore at home that he or she manages without help
- Understands the treatment product's label
- Knows the name and severity of their disease
- Can mix the factor correctly on their own
- Can generally find a vein easily
- Stays calm during the entire infusion
- Can use a calendar or other tracking tool
- Can troubleshoot if something goes wrong
- Likes to set goals and tackle new challenges

## Talking With Others About Self-Infusion

The people close to you care about you. It's a big step for parents, caregivers, or spouses to let go and allow you to be responsible for your own infusions. What if something goes wrong? What if you don't get the needle in the vein?

These feelings and concerns are normal. Maybe they have been doing your infusions up until now. It was one way they felt they could really help you, so they may feel a little anxious when you start to do your own infusions.

Let them know that you appreciate their concern but that you are now trained to infuse yourself. Share the self-infusion step-by-step overview with them, and tell them if you need help, you know that they are there.

---

## When You Are Ready

When you are ready to learn to self-infuse, your healthcare provider will guide and support you. Your provider can answer any questions, and your nurse will show you the step-by-step process of infusing on your own, either at your HTC or at home.

If you are younger, hemophilia camp is also a great place to learn how to self-infuse. By talking with others who are already infusing on their own, you'll begin to understand what will work for you.



## Preparing for Self-Infusion<sup>4,14</sup>

As you prepare to learn how to infuse on your own, there are some points you should keep in mind.

### Practice

It's important to work with your HTC or provider to set up a regular practice schedule. You may be able to use a lifelike practice arm that can help you get comfortable inserting a needle. When practicing on yourself, it's probably best to start out slowly and to practice infusing when time is not an issue, for example, on weekends or during school breaks.

### Factor supply

Remember to always have enough factor at home to follow your prescribed regimen. Discuss with your provider the amount of factor you should keep at home including any additional factor for emergencies.

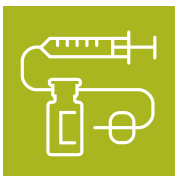
**Your healthcare provider will help you develop a successful transition plan based on your individual needs.**



### Helpful Hints for Self-Infusion<sup>4,14,20</sup>

The complete process of self-infusion is covered in the step-by-step overview, Self-Infusion (Chapter 4). Some basic tips include:

- Make infusion time as relaxing as possible
- Drink plenty of fluids daily, and especially on infusion days. This can make your veins easier to find and access
- Use the tourniquet correctly
- Typically you would choose a vein on the back of your hand, back of the forearm, or inside your arm at the bend of the elbow. However, there are other veins that could be used. Work with your provider to identify the best veins for you
- Gently tap or massage the area around the vein. You can also slowly open and close your fist to bring more blood to the vein
- Use a warm, wet towel for a few minutes on the area where the needle will be inserted



4

# Self-Infusion Steps



# Peripheral Venous Access: Steps to Infuse

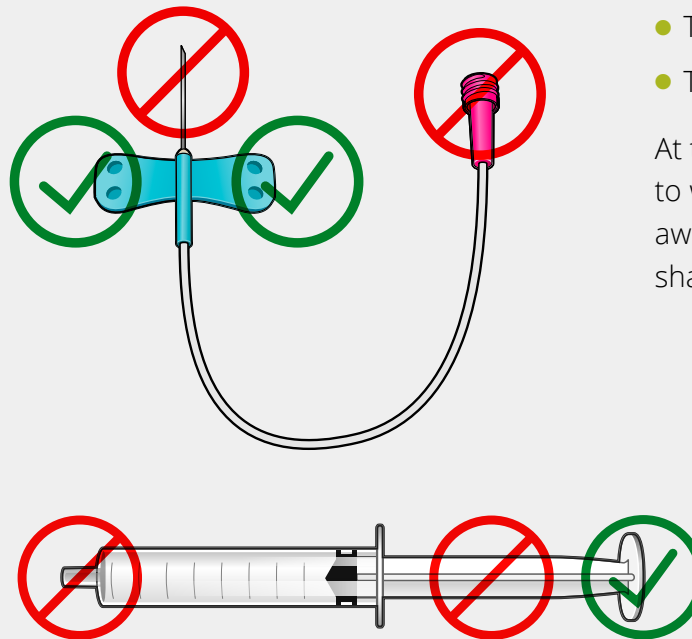
## Maintaining a clean environment<sup>14</sup>

Before preparing your factor, it's important to keep your work area, supplies, and hands as clean as possible. Wash your hands before doing the infusion.

### You should not touch:

- The infusion site once you clean it with alcohol
- The needle
- The open end of the butterfly tubing or tip of the **syringe**
- The long part of the **plunger** that moves inside the syringe. Your healthcare provider can provide more details on how to handle the plunger

If you touch the infusion site after it has been cleaned with alcohol, clean the area again. Then follow the infusion preparation steps outlined by your healthcare provider.



### You can touch:

- The wings of the butterfly needle
- The end of the plunger

At the end of your infusion, remember to wash your hands again and throw away used or unsterile needles in a sharps container.

## Preparing Your Factor<sup>4</sup>

Follow the instructions provided with your factor as well as your healthcare provider's recommendations for mixing the factor. Below are some points you should consider about storing and using factor. For more details about factor replacement treatment, see Chapter 1: Factor Basics.

- Do not refrigerate factor after you mix it, and never freeze it
- If you need to use more than one vial, you can draw the contents of the vials into one or more syringes. For patients with VWD, please discuss combining vials with your healthcare provider
- If your factor vials are cool, warm them up by gently rolling them between your hands
- Add **diluent** to the factor vial and gently swirl or rotate between your hands until there are no solid pieces or white clumps left. The liquid in the vial should be clear. It may take 5 to 20 minutes to mix the factor

## Selecting an Infusion Site<sup>14,20</sup>

With peripheral access, it's up to you to select the vein for infusion. Here are some ways to make veins easier to see and access:

- Drink plenty of fluids daily, but especially before infusing
- If using the arm as the infusion site, let the arm hang down by your side, and slowly open and close your fist
- Apply a **tourniquet**
- Squeeze a small rubberlike ball to make the veins in your arm more visible
- Gently tap or massage but avoid slapping the skin around the vein
- Use a warm, wet towel for a few minutes on the area where the needle will be inserted

You should keep the skin around the infusion site clean. Do not infuse in an area that has any sign of infection, such as a rash. If possible, do not stick yourself in the same spot for every infusion. Rotating the infusion site gives your skin a chance to heal.

From infusion to infusion, a routine can contribute to success. In addition to advice from your treatment team, see the step-by-step overview on the following pages for more helpful details.



# Self-Infusion: A Step-by-Step Overview to Peripheral Venous Access<sup>4</sup>

This information is intended for review at home after receiving training from your healthcare provider.



1 Choose a well-lit work area.



2 Clean and disinfect the work area with recommended cleaner.



3 Gather and organize supplies.



4 Wash hands and forearms thoroughly with soap and water. Let air dry.



5 Check label on factor vial(s) to make sure you have the right dose and right factor. Make sure factor has not expired.



6 Inspect factor and **sterile water** (diluent) vials. Water should be clear and factor should be a dry powder or lumps of powder.

**Mix the Factor<sup>4</sup>:** Follow instructions provided with your product.

- Find a Vein<sup>4</sup>:**
- Use a vein on your hand or arm.
  - If necessary, use the veins in your ankles or feet
  - Choose veins that are straight
  - Rotate the use of your veins so that they have time to heal



**1** Fasten tourniquet firmly, but not too tightly (you should be able to put two fingers under the tourniquet).

**2** Choose vein on back of hand or inside arm at bend of elbow below the tourniquet.

### Important<sup>4,20</sup>

Relax and get as comfortable as possible.

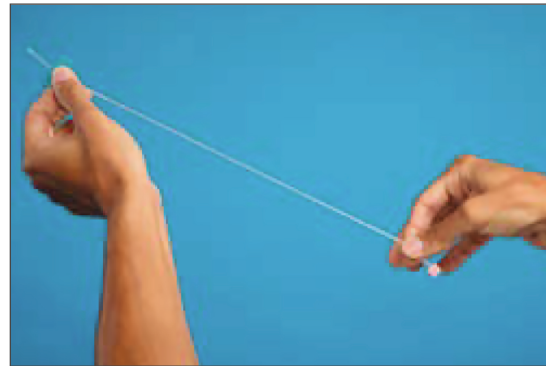
To help make veins easier to see or feel:

- Drink plenty of fluids daily, and especially before infusing
- Use a tourniquet
- Gently tap or massage area around vein
- Hang arm at side, then slowly open and close fist
- Cover hand or arm with a warm, wet towel for a few minutes

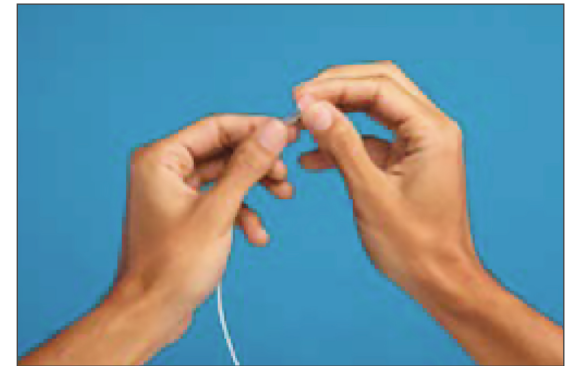
# Infuse the Factor<sup>4</sup>



1 Clean area where needle will be inserted with a new alcohol swab. Let air dry. **Do not blow on area.**



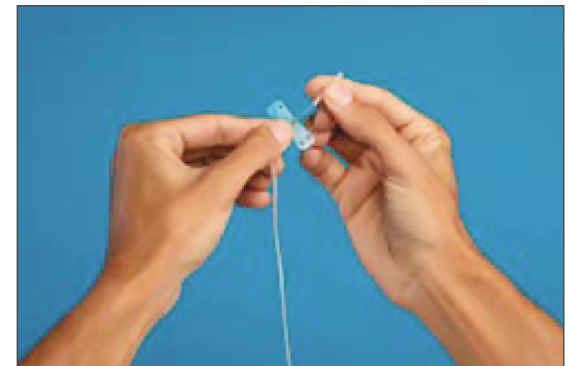
2 Straighten tubing connected to **butterfly needle.**



3 Remove cap on end of tubing.

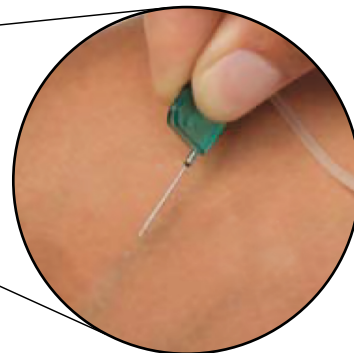
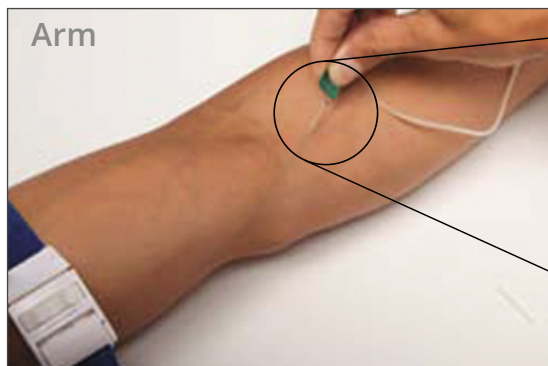
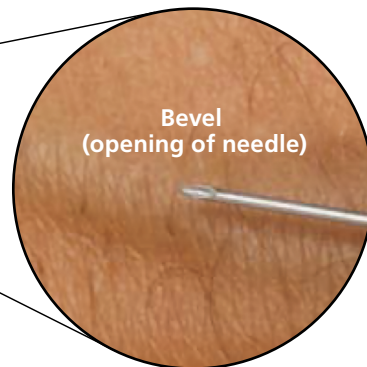
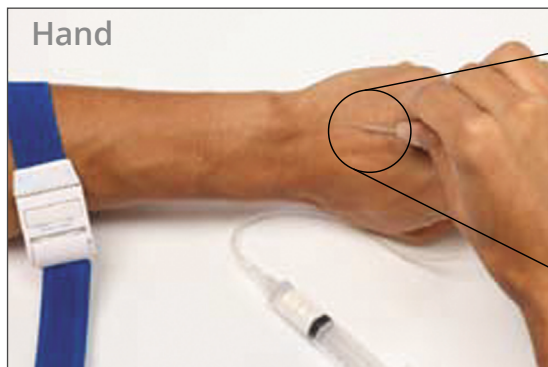


4 Attach factor filled syringe.



5 Remove cover of butterfly needle. Point the needle up and remove any air bubbles by gently tapping the syringe and slowly pushing air out of the syringe and needle.

## Infuse the Factor<sup>4</sup> (continued)



- 6 Make sure the **bevel** (opening of the needle, as shown) is face up for infusion and towards the heart. Insert needle at a 30° to 45° angle. Reduce angle and “thread” needle into vein. You should be able to see a small amount of blood in the tubing.

- 7 If desired, tape the tubing just below the butterfly wings to secure the needle in place. Do not move or twist the needle. If angle changes, access may be lost.

### Tips for inserting the needle<sup>14</sup>

- Pull the skin tight
- Make sure the bevel side of the needle is up
- Insert the needle into the vein with a quick, sure **stick** and watch for blood return

### Do not infuse factor if<sup>14</sup>:

- **There is no blood return**
- **There is very little blood return.** You may have gone through the vein or nicked an edge. Gently move the needle to check for better blood return in tubing
- **The site gets puffy, or the infusion hurts more than usual.** The needle is probably not in the vein

## Infuse the Factor<sup>4</sup> (continued)



8 Check for blood return by pulling plunger back slightly.

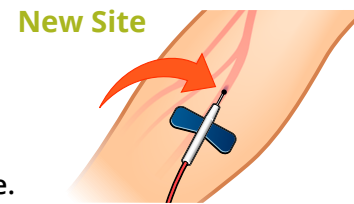
9 Remove tourniquet.

10 Slowly start to push factor into vein while watching for signs of swelling. Infusion should not be painful. Follow the instructions provided with your factor as well as your healthcare provider's recommendations regarding pace of the infusion.

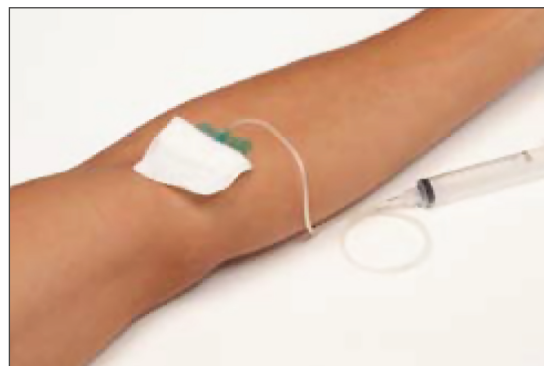
### Troubleshooting<sup>14</sup>

- If your first needle stick doesn't work, use a new butterfly needle and alcohol swab and try again
- You can also try another vein or use the same vein but stick higher up

Call your healthcare provider if you do not succeed in inserting the needle.



## Infuse the Factor<sup>4</sup> (continued)



- 11 When syringe is empty, **flush** tubing according to your treatment center's recommendations to ensure that you have received all the factor. Remove the tape.

- 12 Lay gauze pad over needle.

- 13 Remove needle at same angle it was inserted.

## Infuse the Factor<sup>4</sup> (continued)




14 Firmly press down with gauze pad **after** needle is removed.



15 Put bandage on site.



16 Do not recap needle. Immediately put needle in sharps container. Disinfect work area with recommended cleaner.

17  Record the infusion on your treatment calendar.

## Important Points to Remember<sup>4</sup>



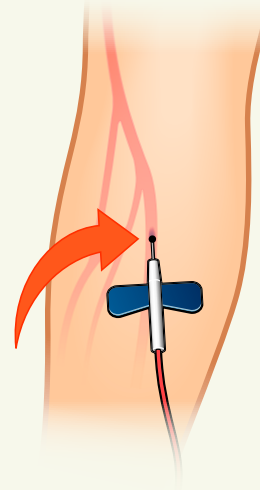
### Do not touch:

- The infusion site once you clean it with alcohol
- The needle
- The open end of the butterfly tubing or tip of the syringe
- The long part of the plunger that moves inside the syringe



### Do not infuse factor if:

- There is no blood return.
- There is very little blood return. You may have entered the vein and gone through it completely



If your first stick doesn't work, try another vein or use the same vein but stick up higher. **Always remember to use a new butterfly needle and alcohol swab and repeat steps.**

Stop infusion if site gets puffy or if injection hurts more than usual.

Call your treatment center if you do not succeed in inserting the needle after 2 or 3 sticks.

Fill out your treatment journal.



# Supplies



Alcohol swabs



Bandages



Butterfly needle with plastic tubing



Cleaning solution



Disposable syringe



Factor vial



Sharps container



Sterile gauze pads



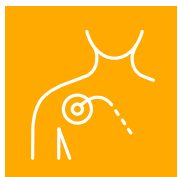
Sterile water (diluent) vial



Tape



Tourniquet



5

# Ports: Additional Information



# Ports





A healthcare professional may recommend a port if veins are small, hard to locate, and/or if the patient does not tolerate repeated sticks. Ports are usually accessed by healthcare providers or caregivers. Ports can require additional care and have additional risks compared to other venous access options. This chapter has details about how to use and care for your or your child's port.



## Entering and Exiting a Port<sup>10</sup>

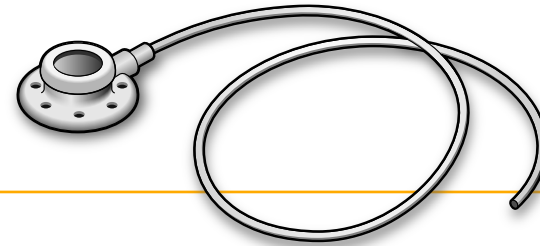
Entry into a port means you are inserting the needle into the port. When you exit the port, you are taking the needle out of the port. Your HTC or homecare provider will teach you how to do this.

### Here are some general guidelines to follow:

-  **Do** insert the needle into a new place for each stick, which can help keep the septum in working order longer
-  **Do** stabilize the port with two fingers, then slowly remove the needle straight up
-  **Do not** rock or tilt the needle once it is in place. This can damage the septum over the port reservoir
-  **Do not** access a port if there is bruising, burning, aching, swelling, or stinging at the port site. Call your healthcare provider for more directions

# Preparing for Port Infusion<sup>4,10</sup>

Your healthcare provider will give you detailed guidelines on how to properly set up for infusion, but the following are a few things to consider.



## Maintaining a clean environment

- Choose a well-lit, comfortable area
- Clear surface of all unnecessary materials
- Clean and disinfect your work area
- Place your supplies on the clean surface
- After infusing, wipe up any spills with disinfecting solution

## Hand washing

It is important to wash your hands before and after touching the port site. Use warm water and soap to wash your hands and arms up to your elbows. Anyone who helps you should also wash their hands.

## Numbing cream

To help ease the discomfort of a needle stick, a topical numbing cream can be applied to the port site. You may be able to stop using this cream over time.

## Cleansing agents

Just before you are ready to infuse, rinse off the numbing cream with soap and water. Then prepare the skin with a cleansing agent such as:

- Alcohol
- **Povidone-iodine** or **chlorhexidine** (do not use chlorhexidine on children younger than 2 months)<sup>22</sup>

Your healthcare provider can suggest which of these cleansing agents is right for you and will instruct you on their proper use.

# Port Care<sup>10,13</sup>

## Keeping the port in working order

Even if you are not infusing factor every day, it is important to regularly inspect the port. This checkup will alert you to certain changes that need immediate attention. Talk to your healthcare provider immediately if you notice:

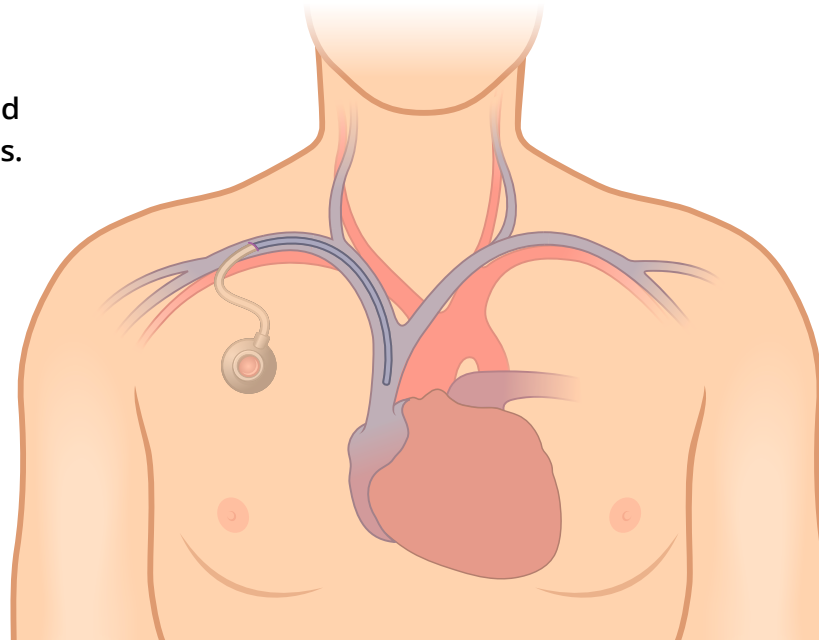
- Swelling or redness around the port
- Drainage around the port (such as bleeding or pus)
- Difference in skin color or temperature at the port site or anywhere in the arm
- Breakdown in skin over the port
- Pain at the port site
- Fever, chills, or shaking
- Any other port-related changes

**Do not touch the area over or around the port without washing your hands.**

## Flushing the port

Your healthcare provider will teach you how to properly flush a port, but here are some general guidelines:

- Ports must be flushed after each use with either heparin or saline
- After each use, apply and maintain **positive pressure** at the end of each flush until the tubing is clamped. This helps clear the port of any remaining factor and keeps the line open until the next infusion
- Never use excessive force to flush a port. This could damage the port



# Potential Port Complications<sup>10,13</sup>

A port may stay in place for months, or years, if needed. Over time, a complication may develop, even if you have gone to great lengths to prevent one. Because it is easier to treat a complication early, it is important to know what the symptoms are and when you should contact your healthcare provider.

## Symptoms of infection

When a germ enters the body, it can cause symptoms of an infection, such as:

- Fever, chills, or shaking
- Swelling or redness around the port
- Drainage around the port (such as bleeding or pus)
- Skin breakdown

Infections may be local (at the entry or exit site of the port), regional (in the reservoir or catheter), or systemic (throughout the body).

## Preventing infection

To help prevent infection, wash your hands (even if you are going to wear gloves) before you begin the infusion. If the port remains accessed, check with your healthcare provider on the proper use of a sterile technique.

Your healthcare provider will help provide more details on preventing infection, including:

- Checking for any changes, such as redness, drainage, or skin breakdown at the infusion site
- Regularly flushing the port to keep it clear and open
- Whether or not to take an antibiotic before surgery or dental work



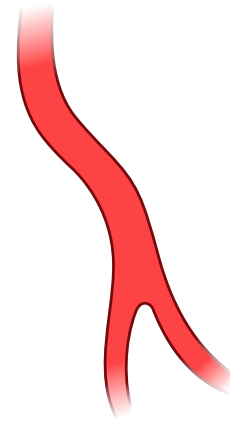
## Catheter Clotting (Thrombosis)<sup>10,13,23</sup>

**Thrombosis** is the formation or presence of a blood clot (thrombus) found in a blood vessel.<sup>23</sup> Most clots that develop in the vein are at a point where the catheter enters the vein or at any point where the catheter consistently rubs up against the vein wall.

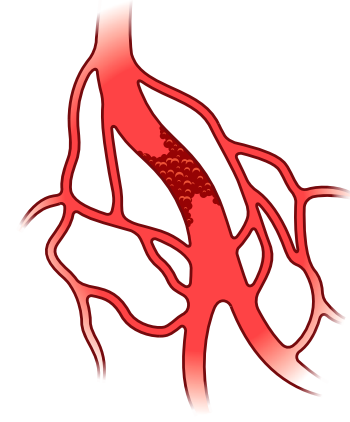
A clot that occurs at the tip of the catheter is called a **fibrin sheath**. This develops as a result of the catheter's contact with blood. If you can infuse into the catheter but cannot pull back blood, a fibrin sheath or **fibrin tail** may have formed.

Sometimes, the vein can become completely blocked by a clot, causing swelling, redness, or shoulder/chest pain on one side of the body. At other times, a clot may form in the vein, but you may not be able to see or feel any symptoms. When this happens, the vein may develop "branches" surrounding the clot, referred to as **collateral circulation**. Because of these and other possible complications, the Consensus Recommendations for Use of Central Venous Access Devices suggest that a CVAD be used as a short-term option.

**Normal circulation**



**Collateral circulation**



# Symptoms of Catheter Clotting<sup>10</sup>

Contact your healthcare provider if any of the following occurs:

- Difficulty pushing the factor into the port
- Chest wall veins become visible
- Difference in skin color or temperature in any of the arms or the legs
- Rapid onset of pain or swelling in the arm or at the base of the neck

If a blood clot is suspected, your doctor may order a **venogram**. Your healthcare provider may recommend having a routine venogram and/or **ultrasound** every 1 to 2 years, especially if a port has been in place for 4 years.

## Mechanical complications

Possible malfunctions may occur, including:

- Breaking or cracking of the catheter
- Catheter migration, which is when the tip of the catheter moves
- Pinching of the catheter, which can weaken the catheter wall
- Floating or flipping of the port upside down from its normal position

If you think you are experiencing any mechanical complications or symptoms of catheter clotting, call your healthcare provider immediately.







6

# Support

# Support

## Takeda's Bleeding Disorders Website

[www.BleedingDisorders.com](http://www.BleedingDisorders.com)

Dedicated to helping you understand blood clotting disorders such as hemophilia and von Willebrand Disease, as well as finding support and offering tips and resources for patients, caregivers, and families affected by these diseases.

## Hemophilia Federation of America (HFA)

[www.hemophiliafed.org](http://www.hemophiliafed.org)

HFA is a nonprofit organization that assists and advocates for the bleeding disorders community.

## National Hemophilia Foundation (NHF)

[www.hemophilia.org](http://www.hemophilia.org)

NHF is a comprehensive source of information for people with hemophilia and their families. NHF can also put you in touch with your local HTC and hemophilia chapter.

## World Federation of Hemophilia

[www.wfh.org](http://www.wfh.org)

A nonprofit organization that promotes and advances services and care worldwide to people with hemophilia.



# Glossary

**Bevel:** The slanted part of a needle tip that helps the needle enter the vein.

**Butterfly needle:** A small needle attached to tubing that uses a winged device to help grip the needle for insertion; used for peripheral venous access.

**Catheter:** A flexible tube, inserted beneath the skin into a vein by a clinician, to withdraw blood or give IV solutions.

**Central venous access:** The ability to give IV solutions through a catheter, which ends up in a large vein near the heart, for faster and easier flow.

**Central venous access device (CVAD):** A device inserted into a person's body to deliver IV solutions or to take blood samples. There are two kinds: implanted and nonimplanted.

**Chlorhexidine:** A cleansing agent used to disinfect the skin (not to be used on children younger than 2 months).

**Clot:** A semisolid thickened mass of blood that consists of different types of blood cells trapped in fibrin (a protein formed during normal blood clotting).

**Collateral circulation:** Blood flow through small blood vessels near a main blood vessel in response to blockage of the main blood vessel.

**Diluent:** A sterile liquid for injection that you mix with your factor powder to make the factor usable.

**Expiration date:** The date on each factor box that lets you know when it can no longer be used.

**Factor replacement:** An infusion that temporarily replaces the missing or deficient factor needed to form a clot.

**Fibrin sheath:** A clot that forms when fibrin (a clotting protein) adheres to the tip of an external catheter. It may also encase all or cover part of the catheter.

**Fibrin tail:** Fibrin fibers that stick to the end of the catheter and can cause partial blocking.

**Flush:** A flow of fluid to clean, clear, or rinse a catheter or needle.

**Half-life:** The time taken for half the infused factor activity to disappear from your bloodstream.

**Hemophilia A:** A lifelong, hereditary bleeding disorder in which bleeding lasts longer than normal. It is caused by a defect in a protein called factor VIII (eight) needed for blood clotting.

**Hemophilia B:** A lifelong, hereditary bleeding disorder in which bleeding lasts longer than normal. It is caused by a defect in a protein called factor IX (nine) needed for blood clotting.

## Glossary (continued)

**Hemophilia treatment center (HTC):** A specialty clinic that offers comprehensive medical care to people with bleeding/clotting disorders. Go to <https://dbdgateway.cdc.gov/HTCDirSearch.aspx> to find an HTC in your state.

**Implant:** To insert an object or a device into the body through surgery.

**Intravenous (IV):** Administered by injection into a vein.

**Infection:** An illness created in the body when germs enter it and are not destroyed.

**International unit (IU):** Unit of measurement that indicates the number of units in a vial. The number of IUs is printed on each factor box and vial.

**Lot number:** Printed on the outside of each factor box and vial, this information is assigned to each lot of factor made by the manufacturer.

**On-demand treatment:** The infusion of factor immediately after the beginning of a bleed. The goal is to stop the bleeding quickly to minimize damage.

**Peripherally inserted central catheter (PICC):** A line threaded through a vein, usually in the arm, to a large blood vessel near the heart.

**Peripheral veins:** Veins away from the central part of the body, usually in the hands, arms, feet, legs, or scalp. The scalp and feet are mainly used in babies.

**Peripheral venous access:** The ability to administer IV solutions into peripheral veins.

**Peripheral venous catheter:** A small plastic tube inserted into the vein for infusion treatment; flushed with saline (a solution that prevents clotting) or heparin to keep it free of blockages.

**Pharmacokinetics:** The study of how the body processes a substance. Sometimes abbreviated as PK. A substance's pharmacokinetics will determine how quickly the substance's effect will start, how long it will last, and how intense it will be.

**Plunger:** Inner sliding piece of the syringe. Pushing or pulling out the plunger moves fluid in and out of the syringe.

**Port:** Small device used to give factor or withdraw blood from a vein; inserted under the skin by a doctor in the operating room.

**Positive pressure:** To apply pressure at the end of an infusion, which helps prevent blood from flowing back into the catheter or port.

**Povidone-iodine:** A cleansing agent used to disinfect the skin.

**Prophylaxis treatment:** The infusion of factor one or more times a week to prevent bleeding. The goal is to keep the levels of factor VIII or IX in the blood high enough to help prevent bleeding from happening. This treatment is common with children with severe hemophilia.

## Glossary (continued)

**Reservoir:** Part of the port where IV solutions are infused.

**Saline or heparin lock:** See peripheral venous catheter.

**Septum:** Self-sealing layer of material over the top of the port reservoir.

**Sterile techniques:** Using methods, such as sterile gloves and sterile supplies, that are free of germs while working with IV access areas. Sterile techniques are essential when administering factor into a CVAD.

**Sterile water:** Water that has been prepared and packaged specifically for injection.

**Stick:** The insertion of a needle into a blood vessel.

**Syringe:** A device that is fitted with a sliding plunger used to inject fluid into or withdraw fluid from the body.

**Thrombosis:** The formation of a blood clot inside a blood vessel.

**Tourniquet:** A strap-like material, usually used on an arm to help veins become more visible for venous access.

**Tunneled catheter:** A flexible catheter that is put into a vein in your chest. It is tunneled under your skin and into a large vein near your heart.

**Ultrasound:** Noninvasive medical test that uses sound waves to provide doctors with a picture of what is inside the body.

**Vial:** A small glass container that holds the diluent or factor powder.

**Venipuncture:** Insertion of a sterile needle into a vein.

**Venogram:** A medical test in which dye is injected into a blood vessel, allowing X-ray-like pictures to be taken of the area of concern.

**Venous access:** Process used to infuse factor directly into the bloodstream.

**von Willebrand disease (VWD):** A lifelong, hereditary bleeding disorder in which your blood doesn't clot well. People with VWD may not have enough von Willebrand factor or it may not work correctly to make their blood clot.

# Things You Should Know and Discuss With Your Healthcare Provider

The name of your factor product:

Your recommended dosage:

It is important to keep a treatment and infusion log because:

When should you call for help?

What are the advantages of peripheral access versus ports?

What do you consider most important when choosing a venous access option?

What are some ways to make veins easier to access?

Is home infusion right for me or my child?

Is self-infusion right for me or my child?

If your first needle stick is unsuccessful, you can troubleshoot by:

Where should you dispose of a used butterfly needle?

What is the most important thing you can do to prevent infection?



## Committed to Education

We believe the more you know, the more you can actively participate in your treatment. We hope this resource will be a valuable tool for you today and in the future.

### References

1. National Hemophilia Foundation. Hemophilia A. <https://www.hemophilia.org/bleeding-disorders-a-z/types/hemophilia-a>. Accessed March 3, 2021.
2. National Hemophilia Foundation. Hemophilia B. <https://www.hemophilia.org/bleeding-disorders-a-z/types/hemophilia-b>. Accessed March 3, 2021.
3. National Hemophilia Foundation. Von Willebrand Disease. <https://www.hemophilia.org/bleeding-disorders-a-z/types/von-willebrand-disease>. Accessed March 3, 2021.
4. *The Hemophilia, von Willebrand Disease & Platelet Disorders Handbook*. Hemophilia of Georgia, Inc. <http://www.hog.org/handbook/>. Accessed March 3, 2021.
5. Clotting Factor Therapy. Chapter 5. In: *All About Hemophilia: A Guide for Families*. Montreal, Canada: Canadian Hemophilia Society; 2010. <http://www.hemophilia.ca/files/Chapter%2005.pdf>. Accessed March 3, 2021.
6. Hemophilia News Today. Life between peak and trough. <https://hemophilianewstoday.com/2019/09/17/peak-trough-treatment-factor-cost/?cn-reloaded=1>. Accessed March 8, 2021.
7. Children's Minnesota. Bleeding disorders: emergencies in hemophilia. <https://www.childrensmn.org/educationmaterials/childrensmn/article/15533/bleeding-disorders-emergencies-in-hemophilia/>. Accessed April 21, 2021.
8. Cheung E, Baerlocher MO, Asch M, Myers A. Venous access: a practical review for 2009. *Can Fam Physician*. 2009;55(5):494-496.
9. Santagostino E, Mancuso ME. Barriers to primary prophylaxis in haemophilic children: the issue of the venous access. *Blood Transfus*. 2008;6(suppl 2):s12-s16.
10. Ewenstein BM, Valentino LA, Journeycake JM, et al. Consensus recommendations for use of central venous access devices in haemophilia. *Haemophilia*. 2004;10:629-648.
11. Butterfly needle. <http://medical-dictionary.thefreedictionary.com/butterfly+needle>. Accessed March 3, 2021.
12. Heparin lock. <http://medical-dictionary.thefreedictionary.com/heparin+lock>. Accessed March 3, 2021.
13. Valentino LA, Kapoor M. Central venous access devices in patients with hemophilia. *Expert Rev Med Devices*. 2005;2:699-711.
14. Jones P. Looking after the veins. In: *Treatment of Hemophilia*. World Federation of Hemophilia; 2003.
15. Greene N, Bhananker S, Rmajah R. Vascular access, fluid resuscitation, and blood transfusion in pediatric trauma. *Int J Crit Illn Inj Sci*. 2012;2(3):135-142.
16. Srivastava A, Santgostino E, Dougall A, et al. WFH guidelines for the management of hemophilia, 3rd edition. *Haemophilia*. 2020;26(S6):1-158.
17. National Hemophilia Foundation. Medical and Scientific Advisory Council Recommendations, Document 241. 2016.
18. Home infusion. In: *All About Hemophilia: A Guide for Families*. Montreal, Canada: Canadian Hemophilia Society; 2010. <https://www.hemophilia.ca/files/Chapter%2007.pdf>. Accessed March 3, 2021.
19. Cornett J. Self-infusion as a life lesson. Hemophilia of Georgia website. <https://www.hog.org/blog/detail/self-infusion-as-a-life-lesson>. Accessed March 10, 2021.
20. Boerner H. Needle know-how: calming kids' anxiety over needles and infusions. HemAware website. <http://www.hemaware.org/life/needle-know-how>. Accessed March 3, 2021.
21. Landau I. 11 clues your child is ready for self-infusion. HemAware website. <https://hemaware.org/life/11-clues-your-child-ready-self-infusion>. Accessed March 10, 2021.
22. Tamma PD, Aucott SW, Milstone AM. Chlorhexidine use in the neonatal intensive care unit: results from a national survey. *Infect Control Hosp Epidemiol*. 2010;31(8):846-849.
23. Journeycake JM, Quinn CT, Miller KL, Zajac JL, Buchanan GR. Catheter-related deep venous thrombosis in children with hemophilia. *Blood*. 2001;98(6):1727-1731.

**For more than 70 years, Takeda has been an innovator in rare hematology, committed to the treatment of bleeding disorders, earlier diagnosis, and more personalized patient care.**