

A Guide to Home Parenteral Nutrition (HPN)

HomeMed



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Your Home Parenteral Nutrition Team

HomeMed

- HomeMed is the home infusion service of Michigan Medicine. We will provide your home parenteral nutrition (HPN) solutions, supplies, equipment, and training before discharge. We will also monitor your progress once you are home.
- The HomeMed training team is based in the hospital and is responsible for your training before you go home. Once you're discharged, HomeMed pharmacists and nurses will continue to monitor your progress on HPN with you and your doctor. This is done by assessing your labs, checking on your progress over the phone, and coordinating care with your doctor and home care nurse.
- HomeMed pharmacy technicians organize the delivery of your supplies and will contact you weekly for your supply needs. Contact a pharmacy technician any time you need additional supplies.
- HomeMed patient account representatives are available if you have questions or concerns about your insurance billing.

How do I contact my care team?

- HomeMed is available during regular business hours at (800) 862-2731.
- **Outside of business hours, a provider is available 24 hours a day, 7 days a week, including holidays.** A Michigan Medicine hospital operator will page the HomeMed provider on call for you. They will ask for your name, date of birth, telephone number, and a brief explanation of your medical concern. A HomeMed provider (pharmacist or registered nurse) will call back as soon as possible. **If you do not receive a call back within 15 minutes, call again.**

Visiting nurse agency

A visiting nurse will help you with your HPN therapy once you are home. A nurse from Care Management arranges this before you leave the hospital and will provide the name and telephone number of the visiting nurse agency.

Home nutrition support and advocacy group

The Oley Foundation is a non-profit, independent, national group that has been serving patients on home tube feedings or HPN. They provide up-to-date information, outreach services, conference activities and emotional support for patients, their families, caregivers, and professionals. Oley programs include a twice-monthly newsletter, regional adult support groups, and a support network for children on home nutrition therapy. All services and educational materials are free to patients and their caregivers. We encourage you to learn more about their services and to join this very important organization. For more information, contact:

The Oley Foundation
Albany Medical Center, MC-28
43 New Scotland Ave.
Albany, NY 12208
Phone: (518) 262-5079
Web page: oley.org

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The Basics

What is home parenteral nutrition (HPN)?

The purpose of this manual is to help you safely give parenteral nutrition (PN) at home. **Parenteral nutrition** means nutrition provided by vein through a small, flexible tube called an **intravenous (IV) catheter**. Parenteral nutrition has the same nutrients the body would normally get from eating a well-balanced diet.

We need nutrients from each of the following sources:

- Protein to build and repair body tissues
- Carbohydrates to provide energy
- Fat to provide a stored energy source and promote healthy skin
- Vitamins to help the body properly use fat, carbohydrate, and protein
- Minerals to help with different bodily functions, such as muscle contraction, blood clotting, and bone repair
- Water to control body temperature, transport nutrients, and rid the body of waste

The goal of the HPN program is to safely provide nutritional support for good health and improve your quality of life by decreasing your number of hospital stays. As you read this manual, write down any questions you have. We will answer them during the training period. We recommend you watch HomeMed's video, "Giving Total Parenteral Nutrition at Home," at: bit.ly/MM-TPNVideo. You may also wish to turn to Appendix A at the end of this manual to read some of the most frequently asked questions by patients and their caregivers.

We want you to return to as normal a lifestyle as possible. With advance notice, we can help you return to work or take a vacation, but some changes in your lifestyle will likely be necessary. We are interested in addressing all your questions and concerns and understanding your own specific goals.

How will I learn about HPN?

- Learning about HPN will require time, attention to detail, and a lot of practice. We are prepared to help you and your caregiver. The training period will allow you to learn how to safely infuse your HPN. The training time is different from person to person. It is important to listen and be involved in learning your care.
- Practicing and reading this manual between lessons will help you remember all the important steps. Even when you become familiar with HPN, always be careful to take your time so you do not miss any of the steps. Becoming forgetful or careless may lead to problems such as an infection, which can be very serious and result in coming back to the hospital.
- One of the most important parts of a successful HPN program is your commitment. Support from a family member or friend is also very important. If possible, this person should go through training with you so they can support you if you are sick or need help.

How long does it take to infuse my HPN solutions?

Your health status and nutritional needs will determine your infusion time.

- Try to infuse your HPN solutions at the same time every day.
- Do not skip a day of HPN unless directed to do so by your doctor or HomeMed.
- You may become dehydrated if you do not infuse your HPN.

Parenteral nutrition is usually infused at night with an infusion pump. This allows you to be free of the pump and tubing during the day, and it is commonly called **cycling**. We will program the pump to give you the amount of nutrition and fluids over the time period ordered by your doctor. Once started, the pump slowly increases the rate of your HPN solution at the beginning of the infusion and slowly decreases it at the end. This is referred to as the **taper**

period, which will give your body time to adjust to the amount of sugar in your HPN solution.

Supplies

What are parenteral nutrition solutions?

The pharmacist at HomeMed prepares your HPN solution based on an order from your doctor. The solution contains the appropriate amounts of amino acids (protein), dextrose (carbohydrates), lipids (fats), fluids, and other nutrients to meet your body's needs. These solutions are like parenteral nutrition solutions you received in the hospital. Home solutions usually have lipids in the same bag as the other nutrients. Lipids in your HPN bags give them a milky white color.

How do I get my HPN supplies?

You will get a packing slip in each of your deliveries so you can keep track of your orders (see Figure 3.1).

- Count your supplies when each delivery arrives.
- Make sure each item is sterile (free of bacteria) by checking for visible signs of contamination, such as an open package or cloudy fluid.
- Make sure the bags don't have an oily appearance, which would be a sign of lipid separation. **When in doubt, throw it out!**

If you have any concerns or questions about the use of these products, contact HomeMed at (800) 862-2731. Report any differences between delivery slips (see Figure 1) and the contents of your delivery to HomeMed.

Delivery Ticket #: 12345



HomeMed Home Infusion and Specialty Pharmacy
2850 South Industrial Highway, Ann Arbor, MI 48104, (800) 862-2731
<http://homecare.umich.edu/HomeMed>

Created By: RPH 1/5/2024 12:48:51 PM

Patient: First Name Last Name		Check your information.	Ship Date: 1/18/2024
Date of Birth: 03/20/1945			Delivery Date:
Address: First Name Last Name 222 Signature Villa Canton, MI 48188 Wayne		(H) (000) 000-0000 (C)	Therapy: TPN Prescriber: DOCTOR TEST Payer(s): PATIENT Dispatch Route: C NDA Shipping Method:
Delivery Instructions		Check the items sent.	Check the number of each item sent.
Compounded Drugs Rx #: 0000893-0 06X01C		Sodium Chloride 0.9% 1000 mL 1	
Supplies			
MDS129CS-MEDL	00IVPOLE	IV Pole Foldable (2 Hook)	1
T2LITERU-TRI	03X01D	Carrying Case Large (Infusion Pump)	1
T1000-TRI	03X01G	Carrying Case Extra Large (>3L) (Infusion Pump)	1
1640201-QCO	03X03B	Sapphire External Battery Pack	1
1631401-QCO	03X05F	Sapphire Mini Cradle with Pole Clamp	1
AP40301-QCO	06X01A	Sapphire Microbore Inf Set w/o Filter	1
352601-BRA	07X01A-F	IV Gravity Set Primary 85" (15 drop) non-DEHP	1
5110-COV	07X02B	Alcohol Prep Pads Large (200/Box)	200
305490-B&D	07X05A-F	Sharps Collector 8.2 Quart (Red)	1
EN91-ENER	13X03D	Battery AA 4/Box	1
B6013-ICU	13X04C	Anti-Siphon Valve	1
US5300-BRA	15X04C	Rate Flow Regulator 18" Ext Set w/Y-site	1
470117-BRA	PTS	Ext Set w/1.2 Micron Filter 16" (Non-DEHP)	1
808001-HMED	TEAMTECH	Pump Programming Sheet (Informational)	1
824501-HMED	X131	Total Parenteral Nutrition Patient Ed. Monograph	
Picked By: Supplies _____ Date: ____/____/____; Pre-Checked By: _____		Sign here after checking.	
Setup By: _____ Date: ____/____/____; Checked By (RPh): _____ Date: ____/____/____			
If you have any concerns or questions about the use of these products, please contact HomeMed Pharmacy at 800-862-2731. Any discrepancy between this delivery slip and the contents of your delivery should be reported to HomeMed within 14 days of delivery.			
*** PLEASE COMPLETE ALL FIELDS BELOW AND RETURN TO HOMEMED AS SOON AS POSSIBLE. THANK YOU! ***			
Signature: _____		Date: my signature here attests that this delivery was received on the delivery date indicated above.	
Printed Name: _____		Relationship to Beneficiary: [] Self or _____	
ATTENTION There is a 3-5 day wait for NON-scheduled DELIVERIES.			
SAFETY Please put away PETS and LOCK-up WEAPONS before NURSE Visits and DELIVERIES.			
\$\$\$PLEASE\$\$\$ Notify HomeMed promptly of insurance changes. Failure to do so may result in insurance denials and patient financial responsibility.			
The products and/or services provided to you by (supplier legal business name or DBA) are subject to the supplier standards contained in the Federal regulations shown at 42 Code of Federal Regulations Section 424.57(c). These standards concern business professional and operational matters (e.g., honoring warranties and hours of operation). The full text of these standards can be obtained at http://ecfr.gpoaccess.gov . Upon request we will furnish you another written copy of the standards.			

Figure 3.1 Sample delivery slip

How do I store HPN solutions and supplies?

- Store all HPN solutions in your refrigerator. Try to keep the bags in a separate area, such as a top shelf, to avoid direct contact with food and drinks.
- Check the label for storage of other medications that you will add to the HPN bags, such as vitamins.
- Store all HPN supplies away from household items and other medical supplies, such as urine test kits, ostomy supplies, or similar items.
- **Keep all HPN supplies, especially needles, syringes, and medications, out of the reach of children and pets.**

How do I check my HPN prescription?

A copy of your HPN prescription will be delivered to your home with your supplies.

- Check your HPN prescription (see Figure 3.2) and bag labels (see Figure 3.3) when you get them to make sure that they match.
- **Always read your label and prescription carefully.** If they do not match or if you have any questions, call HomeMed.
- Remember to also check the “Start By” date on the label of the HPN solution before infusing it.
- At home, you will add vitamins and occasionally other medications to the HPN solution based on the prescription. These additives are not stable for long periods of time, and they cannot be added by HomeMed. The HPN mixing protocol sheet provides step-by-step directions for adding medications to your HPN solution. We will review this in your teaching sessions.
- If for any reason your prescription changes, HomeMed will contact you. If necessary, we will send you a new HPN prescription and a new HPN mixing protocol sheet or pump program sheet.

- If your new pump program is different, HomeMed will call to help you reprogram your Sapphire™ pump over the phone.
- Throw away your old HPN prescription and pump program sheet as changes are made.

Home Parenteral Nutrition Summary

HomeMed Home Infusion - University of Michigan Health
2850 S. Industrial Hwy, Suite 50
Ann Arbor, MI 48104
(800) 862-2731

Name	FirstName LastName	Age	79	y
MRN	123456789	Wt	70	kg
Gender	Male	Ht	66	in
Rx Start Date	10/16/2023	IBW	63.8	kg

Macronutrients

Amino Acids 15%:	100	g	TrophAmine 10%:	0	g
Dextrose 70%:	225	g			
IntraLIPID	50	g			

Micronutrients

Potassium Phosphate:	0	mM	Sodium	56.65	mEq/Day	0.81	mEq/kg/Day
Sodium Phosphate:	5	mM	Potassium	15	mEq/Day	0.21	mEq/kg/Day
Potassium Chloride:	10	mEq	Chloride	30	mEq/Day	0.43	mEq/kg/Day
Sodium Chloride:	20	mEq	Acetate	133	mEq/Day	1.9	mEq/kg/Day
Sodium Acetate:	30	mEq	Cl:Acetate Ratio	0.23	:1		
Potassium Acetate:	5	mEq	Phosphate	5	mM/Day	0.07	mM/kg/Day
Magnesium Sulfate:	5	mEq	Magnesium	5	mEq/Day	0.07	mEq/kg/Day
Calcium Gluconate:	10	mEq	Calcium	10	mEq/Day	0.14	mEq/Day
Tralement-4 (Trace Elements)^:	1	mL	Calories	1165	kcal/Day	16.64	kcal/kg/Day
Selenium:	0	mcg	(with Lipids)	1665	kcal/Day	23.79	kcal/kg/Day
Zinc Sulfate:	0	mg	Protein	1.43	gm/kg/ABW		
Copper:	0	mg	Fat Calories	30.03	%		
Chromium:	0	mcg					
Manganese:	0	mcg					
Levocarnitine:	0	mg					

Infusion

Infusion Volume:	2000	mL	Infusion Method:	Cycled	
Overfill Volume:	100	mL	Rate:		mL/hr
Infusion Duration:	12	hours	Taper up:	2	hour(s)
			Taper Down:	2	hour(s)

Frequency

3:1 Administration on:	Daily
2:1 Administration on:	None
SMOF-Y Infusion Administration on:	None

Back-up IV Fluids*

Sodium Chloride 0.9%:	1000	mL as directed
-----------------------	------	----------------

Notes/Comments

Verbal order Doctor Test to HomeMed RPh

Additions (added to bag just before use)*

Adult Multivitamins:	10	mL/bag	7	per week
Pediatric Multivitamins:		mL/bag		per week
Famotidine:		mg/bag		per week
Regular Human Insulin:		units/bag		per week

*See pharmacy label for details

* Per each mL : Zinc 3.0 mcg Copper 0.3 mcg Manganese 55 mcg Selenium 60 mcg

Figure 3.2 Sample HPN prescription

HomeMed Home Infusion and Specialty Pharmacy
2850 South Industrial Highway, Suite 50
Ann Arbor, MI 48104-5756
(800) 862-2731

Check your information. → **FOR PARENTERAL USE ONLY**

First Name Last Name DOB:03/20/1945 MRN:
 222 Signature Villa Canton, MI 48188
Rx #: 0000577-0 **Ordering DOCTOR TEST,**

Start By: 10/22/2023 **Do not start after this date.**

Compare directions with your pump program. → **Infuse 2000 mL with lipids intravenously 7 days per week. Administer over 12 hours via infusion pump. Pump Setting: Taper Up 2 hours and Taper Down 2 hours. **Use 1.2 micron filter tubing** Bag Contains Overfill for Priming.**

Patient Adds (Add Within 1 Hour of Use): Multi-Vitamins. See individual labels for directions.

Check your information. → **Check what you need to add to the bag.**

Name: First Name Last Name	Dosing Weight: 154.32
Rx #: 0000577	Use By: 10/22/2023
Base Formula	Ordered Amount
Dextrose	225 Gm /Day
Amino Acid 15%	100 Gm /Day
Intralipid	250 mL /Day
Electrolytes	
Sodium Phosphate	5 mM /Day
Potassium Chloride	10
Sodium Chloride	20
Sodium Acetate	30
Potassium Acetate	5 mEq /Day
Magnesium Sulfate	5 mEq /Day
Calcium Gluconate	10 mEq /Day
Vitamins, trace elements and medications	
Tralement	1 mL /Day
Sterile Water for In	708.99 ml /Day
Admixture Contains 2000mls plus 100mls overfill	

Storage: Refrigerate

Compare bag contents with your prescription.

Figure 3.3 Sample HPN bag label

Daily Monitoring

You will need to keep a daily record of your weight, your temperature, and your intake and output. Below is information about how to monitor and keep track of these measurements with your HomeMed Daily Monitoring Forms in Appendix C at the end of this manual. Refer to the section “When should I call HomeMed or my doctor?” for concerns.

How do I measure my intake and output?

We may ask you to measure your intake and output every day. This will help HomeMed and your doctor estimate the fluid balance within your body.

- **Intake** includes all fluids taken into the body, both IV and oral (by mouth).
- **Output** includes urine (pee), diarrhea, vomit, and any other measurable drainage (leaking fluid), such as from a wound, ostomy, or fistula.

Steps to measure your intake and output:

1. Measure all fluid intake, both IV and oral (by mouth), each day. Use the following table to help you convert fluid amounts from ounces (oz) to milliliters (mL). Record intake on the Daily Monitoring Forms.

Ounces (oz)		Millileters (mL)
1 oz	=	30 mL
Popsicle (whole)	=	100 mL
Small juice (4 oz)	=	120 mL
Coffee cup (8 oz)	=	240 mL
Water glass (8 oz)	=	240 mL
Can of soda (12 oz)	=	360 mL

2. Measure all fluid output, such as urine, diarrhea, vomit, and drainage from wounds, ostomy, and fistula. Record output on the Daily Monitoring Forms.

3. Write the intake and output totals in their individual columns on your Daily Monitoring Forms (see Figure 4.1). Your total intake should be close to the total output.
4. **Bring all records of intake and output with you each time you come for a clinic visit.**

How do I record my daily weights?

Daily weights will help HomeMed and your doctor decide if you are receiving too much or too little fluid and calories.

- Weigh yourself at the same time each day, wearing similar clothing.
- Weigh babies without clothes on an infant scale. Be sure your baby is weighed at every clinic visit.
- Record your weights on your Daily Monitoring Forms.
- **Bring this information each time you come into the clinic so your doctor can review your progress.**

What do I need to know about growth charts?

If your child is on HPN, it is important to record their weight, length, and head circumference (if they are less than 1 year of age) on a growth curve. These measurements are usually done at your clinic appointment. This will help your doctor and HomeMed provide the nutrients needed for your child to grow appropriately.

How do I check urine fractionals?

You may need to check a sample of your urine (a fraction from the entire amount urinated during a day) for sugar. If there is more sugar in the bloodstream than your body can handle, your kidneys will get rid of the extra sugar into the urine. You may also be asked to check your urine if you are experiencing signs or symptoms of high blood sugar (see Appendix B).

If you are asked to check your urine, do the following:

- **Check your urine at least 3-4 hours after you have started your HPN infusion.**
- Follow the directions printed on the bottle or package insert.
- Record your urine fractional (fx) test results and the time you checked your urine on your Daily Monitoring Forms.
- If a test result is not negative for sugar, contact HomeMed or your doctor.
- **Bring this information each time you come into the clinic.**

How do I record my blood sugars?

We may ask you to monitor your blood sugars. If so, ask your doctor for your specific instructions, such as when to check them and what your blood sugar range should be.

- Record your blood sugar results and the time you checked on your Daily Monitoring Forms.
- If a blood sugar result is not within your specific range (too high or too low), contact HomeMed or your doctor.
- **Bring this information each time you come into the clinic.**

When should I call HomeMed or my doctor?

- For adults, call if your weight increases or decreases by 3 pounds or more for 2 days in a row.
- For adults, call if your urine output is less than 800 mL a day for 2 days in a row.
- For babies, call if there has been no urine output for more than 8 hours, if they have puffy eyes or no tears, or if they have a bulging or sunken soft spot.
- Call if you have an increase in vomiting, diarrhea, ostomy, or fistula output.
- Call if your urine test strip is not negative for sugar.

- Call if your blood sugar is not within your range (too high or too low).

[illegible]

Figure 4.1 Sample Daily Monitoring Form

Infusion Pump Guide

Many features are built into the pump to protect you during the delivery of your HPN solution.

- The display screen provides you with information.
- You may hear an occasional beep coming from the pump. This beep lets you know that you may need a correction. You can read the display screen to see what is causing the alarm.
- You will also receive a pump manual, which gives you more detail about the pump.

How do I maintain and take care of my infusion pump?

- Do not place the pump in any fluids or cleaning solutions.
- Avoid dropping or hitting the pump. If the pump is dropped or hit, always recheck the program.
- HomeMed will check your pump once a year. Call if you believe it has been longer than a year without it being checked.
- If the pump needs cleaning, use a soft cloth dampened with 70% isopropyl alcohol. Make sure the pump is disconnected from the person and power supply, and turned off before and during cleaning. Never use sharp objects to clean the pump.
- You may wash the backpack in regular detergent in your washing machine. After washing, dry under low heat in your dryer.
- Never use the pump around flammable or explosive vapors, such as gasoline or propane.
- Always avoid having the pump around sources of high intensity electromagnetic radiation, such as large electric motors or MRI machines.
- Avoid showering or bathing in the tub when infusing your HPN with the pump.

How do I charge the battery?

The pump can operate while it is being charged. To save battery life, connect the pump to an electrical outlet using the supply cord whenever possible.

Steps to charge the battery:

1. With the white arrows (Figure 5.1) or red dot (Figure 5.2) facing up, push the end of the power supply cord straight into the Sapphire™ pump power socket.



Figure 5.1

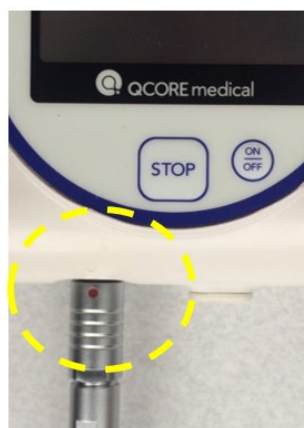


Figure 5.2

- If you were supplied with a pump cradle, plug the cord into the bottom of the cradle.
 - Do not twist the supply cord when plugging or unplugging it from the pump or pump cradle.
2. Plug the other end of the power supply cord into an electrical outlet.
 3. On the front of the pump, check that the charge LED status indicator is on (there should be a blinking yellow light). The yellow LED will stay lit (on without blinking) when battery is fully charged.
 - An alarm will sound when there are 30 minutes left until the battery is out of power. If the “battery depletion” alarm sounds, immediately connect the pump to an electrical outlet using the power supply cord.

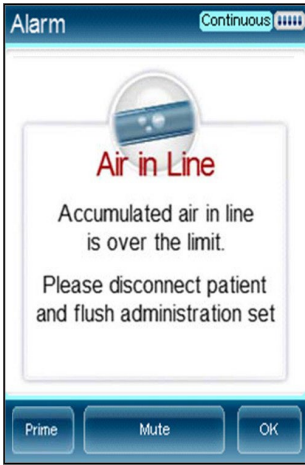
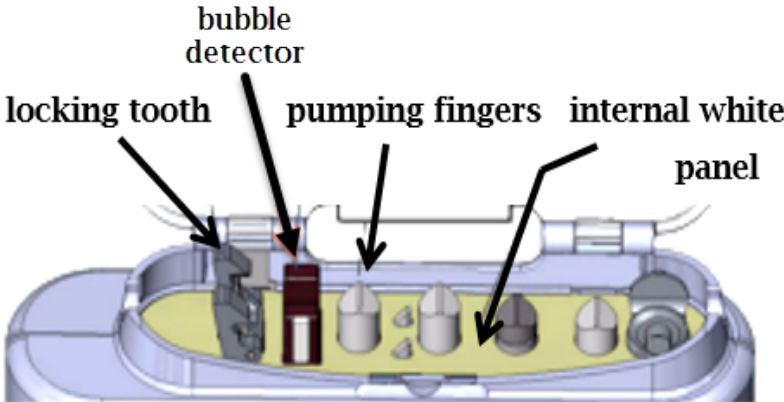
How do I deal with alerts and alarms?

Steps for what to do if the pump alarm sounds:

1. When an alarm sounds, the pump will immediately provide a message with the error and a suggested solution.
2. Press **[Mute]**.
3. Follow the suggested solutions and then press **[OK]**.
4. Press **[Press to unlock patient]** on the screen.
5. The keypad will appear. Enter the password **8880**.
6. Press **[OK]** on the screen.
7. Authorization level medium: press **[OK]**.
8. Press **[Request Continue]** then **[OK]** to restart the infusion.
9. Press **[Lock]** then **[Patient Lockout]**.
10. If you are not able to resolve the alarm, call HomeMed.

Troubleshooting guide

Error message	Solution
Cassette misplaced	The cassette on the IV tubing is not loaded correctly. Open the safety door, remove the cassette, and reload the cassette.
Check for occlusion	Make sure all catheter clamps are open and IV tubing is not kinked.
Downstream occlusion, upstream occlusion, or occlusion	To clear occlusions (blocks), check to make sure that: <ul style="list-style-type: none">• All clamps are open• The cassette on the IV tubing is inserted correctly• IV tubing is not kinked• There is no occlusion at the connection to your IV catheter Once all occlusions are cleared, press [OK] key to continue.

Error message	Solution
Flow error	Check that the cassette on the IV tubing is inserted correctly. Check if battery is sufficiently charged. If not, connect the power supply cord to the pump and charge. If the alarm happens again, contact HomeMed.
Internal error	The pump will automatically shut down in 3 minutes. Contact HomeMed to replace the pump.
Mechanism error or pump fault	A pump fault has occurred. Contact HomeMed to replace the pump.
Air in line 	<ul style="list-style-type: none"> • Press [Mute]. This silences the alarm for 2 minutes. • Check to make sure all IV tubing connections are tight. • Check the IV tubing for air bubbles. If there is air, disconnect the IV tubing from the person and press the [Prime] key to remove the air from IV tubing. • Reconnect the IV tubing to the person's IV catheter. • Clean the bubble detector with a damp cotton swab (use water only). See below:  <ul style="list-style-type: none"> • Press [OK] key to continue the infusion.
Insufficient battery	Low battery voltage for the current rate. Connect the power supply cord to the pump and charge.

Error message	Solution
Battery depleted	The pump will automatically shut down in 3 minutes. Connect the power supply cord to the pump and charge.
Battery reminder	End of battery life. Contact HomeMed to replace the pump.

Giving HPN

Step 1: Prepare to give HPN

Set up your work area

- Pick a work area with good lighting, free of dust and drafts, and away from household traffic. Keep this area free of dust, lint, and clutter. Pets should not be allowed in these areas. Your HPN work area should only be used for HPN procedures. You can use a stable tray (made of Formica® or a similar product like metal, glass, or plastic) placed over a dresser or end table.
 - **Do not use bathrooms for your work area.** They are likely to have a large number of germs.
- Clean your work surface with a household cleaner (such as bleach, alcohol, or dish soap), or you may place a clean paper towel on your work surface. Try not to touch the surface more than you need to after you have cleaned it.

Practice good hand washing

- Use soap and **always wash your hands thoroughly for 15 seconds before starting any procedure** to decrease the risk of infection.
- You may use a hand sanitizer to wash your hands if they are not visibly dirty. Always check the label to make sure the gel contains alcohol in concentrations between 60% to 90%.
- **You must do any wound, ostomy, or fistula care separately from HPN procedures.** Germs normally live in your intestinal tract and in ostomy or fistula fluids. If these germs enter your bloodstream through the IV catheter or HPN solution, they could cause a severe blood infection (called bacteremia).
- Washing your hands will clean them but not sterilize them, so you must still be careful when gathering and handling your IV catheter or supplies.

Gather and check your supplies

- Take your HPN solution out of the refrigerator at least 8 hours before you start infusing it to let it warm up to room temperature. If you forget to remove your HPN bag from the refrigerator, call HomeMed for instructions. **Do not microwave your HPN solution or place the bag in warm water.** You must complete your infusion within 24 hours after the HPN bag reaches room temperature.
- Check the bags and syringes for expired dates, color changes, leaks, and floating materials. **Never use damaged supplies**, such as broken protective coverings on medication vials or needle caps. If you see these, do not use the item and contact HomeMed.

How do I handle sterile supplies?

Some pieces of the supplies are sterile. **Sterile** means that all germs and bacteria have been removed by a special cleaning process. Parts of the supplies that must be kept sterile are protected with a cover.

- Never touch sterile parts with your hands or let a sterile item touch a non-sterile surface.
- If you are inserting a sterile needle through a non-sterile surface, always use an alcohol pad to clean the surface. Never touch this area after cleaning it.

What supplies do I need?

- 1 HPN bag with patient additives, such as multivitamins (refer to the separate “HomeMed Parenteral Nutrition Mixing Protocol” handout)
- 1 Sapphire™ IV tubing set (remove it from the package)
- One (1) 1.2 micron filtered extension set (remove it from the package)
- 1 back check valve
- 1 prefilled heparin flush syringe (remove it from the package)
- 2 prefilled saline flush syringes (remove them from the packages)

- 1 alcohol cap
- Alcohol pads
- Sapphire™ pump
- Household disinfectant (cleaner) or alcohol
- Soap
- Paper towel



Step 2: Start HPN

Prepare your work area

1. Place a trash can next to your work area.
2. Clean your work surface or laminate mat with household disinfectant. Let the area air dry.

3. **Wash your hands** like this:

- Wet your hands and wrists under running water.
- Scrub well with soap for 15 seconds.
- Work the soap lather between your fingers, under your nails, over your palms, and on the back of your hands.
- Rinse your hands well by keeping your hands up with your fingers pointing up toward the ceiling (so that the dirty water runs toward your elbows).
- Dry your hands with a clean paper towel from the tips of your fingers down.
- Turn off the faucet with the paper towel.



4. Gather your supplies and place them on your work area.
5. **Wash your hands again.**

Prepare the tubing

1. **Turn the pump on** by pressing the [ON/OFF] hard key in the lower right corner.
2. Press [**PreSet Programs**] on the pump screen (see Figure 6.1).
3. Select the desired preset program (**TPN**) on the screen and review the pump program with the medication label (see Figure 6.2).
4. Press [OK].



Figure 6.1



Figure 6.2

5. Attach the filtered extension set to the Sapphire™ pump tubing as follows:
 - Remove the end caps from the Sapphire™ pump tubing and the shorter end of the filtered extension set tubing, then twist them together at the luer lock (white cap) connection and secure the cuff (Figure 6.3).

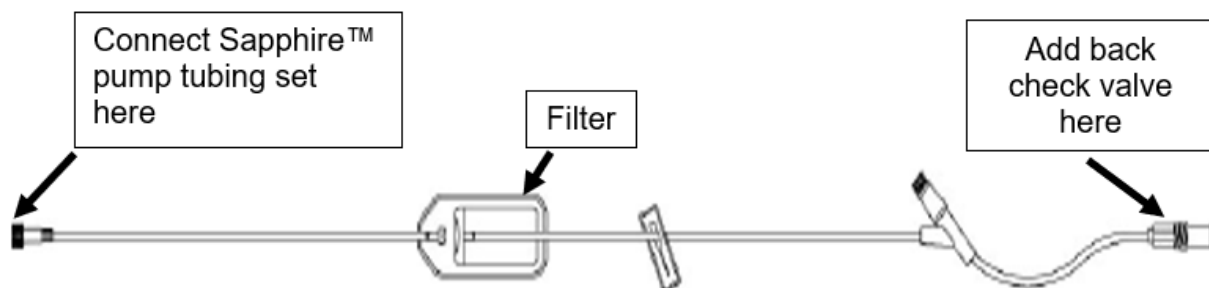


Figure 6.3

6. Attach the back check valve to the end of the filtered extension set as follows:

- Remove the back check valve from the package by holding the clear center piece (see Figure 6.4).
- Take the cap off the end of the filtered extension set.

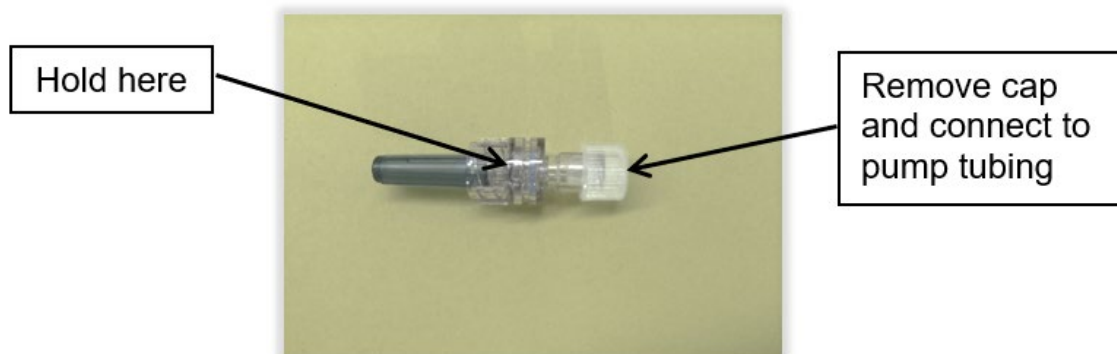


Figure 6.4

- Remove the short, round cap on the end of the back check valve and connect it to the open end of the filtered extension set (see Figure 6.5).



Figure 6.5

- Twist the cuff from the filtered extension tubing onto the back check valve.
7. Open the safety door on the Sapphire™ pump. Using your thumb, press the safety door outward (see Figure 6.6).



Figure 6.6

8. Insert the IV tubing cassette into the pump by placing the saddle on the round metal anchor (see Figure 6.7) and clipping the upper end of the cassette into the metal lock (see Figure 6.8).



Figure 6.7



Figure 6.8

9. Close the safety door and make sure that it clicks when you close it.
10. Spike the HPN bag with the pump tubing as follows:
- Remove the tab on the HPN bag (see Figure 6.9).

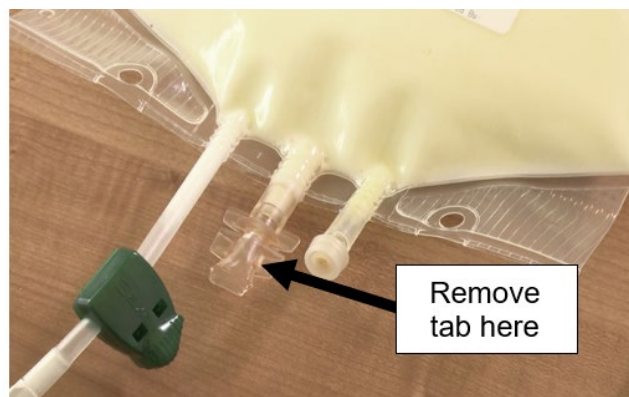


Figure 6.9

- Keeping the spike sterile, remove the spike cover from the HPN tubing. **Do not touch the spike.**
- Hold the port of the HPN bag straight and insert the spike by pushing and twisting at the same time (see Figure 6.10).



Figure 6.10

11. Prime (fill with fluid) and remove the air from the IV tubing as follows:

- Loosen the cap (being careful not to remove it) at the end of the back check valve.
- Press [**Prime**] in the lower left corner of the screen (see Figure 6.11). The pump will prompt you to make sure that the tubing is not connected to your IV catheter (see Figure 6.12).



Figure 6.11

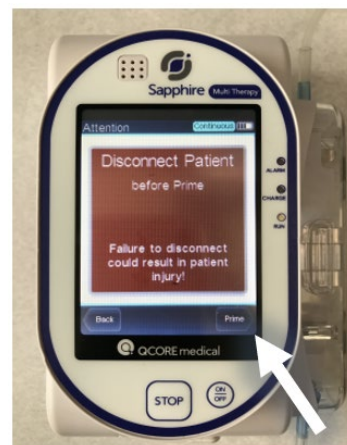


Figure 6.12

- Press **[Prime]** again and the pump will begin to prime (fill the tubing) with IV solution. Hold the filter in an upward direction while priming until it is fully filled with fluid (see Figure 6.13).



Figure 6.13

- Once the pump has stopped priming, check to be sure that the IV set is filled with fluid and no air remains. If air remains, repeat the priming steps.
12. Once you stop priming, the pump screen will prompt you to “Connect set to patient after prime.” Press **[OK]**.

Give the HPN

1. Check your IV catheter cap to make sure it is on securely.
 - Valved IV catheter caps may be clear or blue (Figure 6.14).

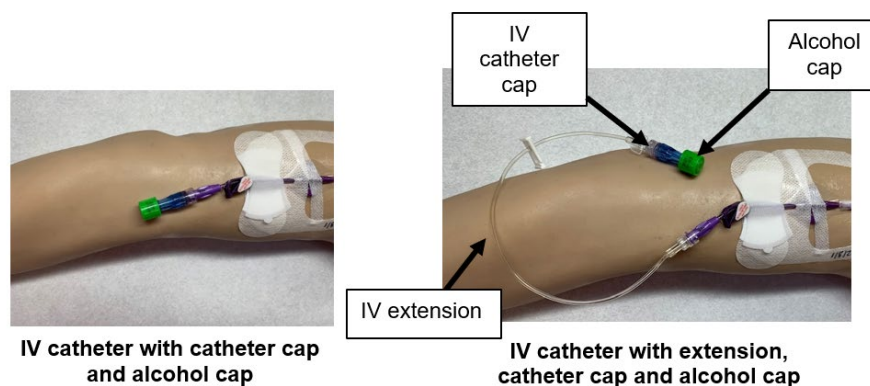


Figure 6.14

2. Unclamp your catheter and remove the alcohol cap.
3. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds (see Figure 6.15).
4. Flush your IV catheter with saline as follows:
 - Hold the prefilled saline syringe upright.
 - **Do not remove the cap.** Press forward on the plunger to break the seal. **Do not pull back on the plunger.**
 - Gently tap the sides of the syringe so the air bubbles rise to the top.
 - Remove the cap and push the plunger to remove all the air (see Figure 6.16).
 - Push and twist the saline syringe into your catheter cap to the right until it is secure.
 - Inject the saline solution (see Figure 6.17).

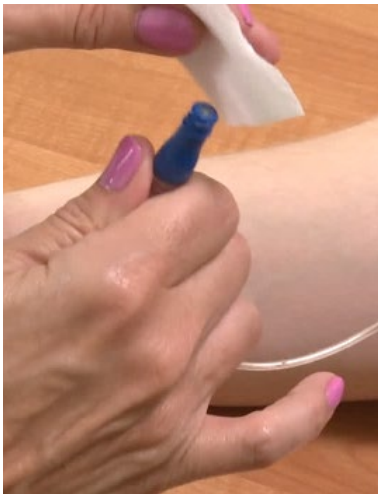


Figure 6.15



Figure 6.16



Figure 6.17

5. Remove and throw away the syringe in your trash.
 - Always hold your catheter cap while disconnecting syringes and IV tubing to prevent accidental removal from your IV catheter.

6. Remove and discard the protective cap from the end of the back check valve, which is attached to the filtered extension tubing (see Figure 6.18).
7. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds (see Figure 6.19).
8. Push the end of the IV tubing into your catheter cap (see Figure 6.20).



Figure 6.18



Figure 6.19



Figure 6.20

9. Make sure all clamps on your catheter (see Figure 6.21) and IV tubing are open.

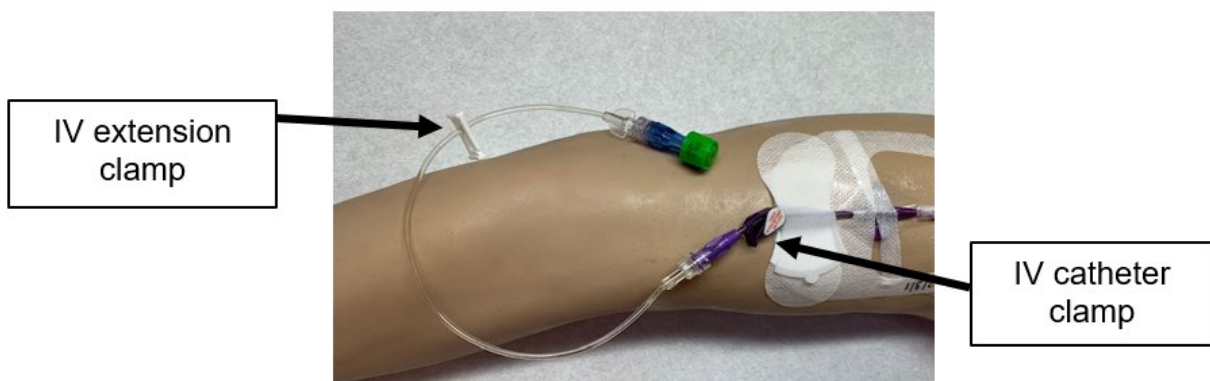


Figure 6.21

10. Press **[Start]** on the screen to begin the infusion (see Figure 6.22).



Figure 6.22



Figure 6.23

11. Press **[Lock]** then **[Patient Lockout]** on the screen (see Figure 6.23).

- The screen will darken after 30 seconds.
- The run light will continue to flash green.
- To “wake up” the screen, press the **[ON/OFF]** button once, and after a brief pause the screen will light up.

12. Place the bag and pump into the backpack or waist bag (see Figure 6.24), or use the IV pole.



Figure 6.24

Step 3: Complete the HPN infusion

1. The pump screen will display “Infusion Complete.” Press [**Mute**] then [**OK**] on the screen.
2. Press [**Press to unlock patient**] on the screen.
3. The keypad will appear. Enter the password **8880** (see Figure 6.25).

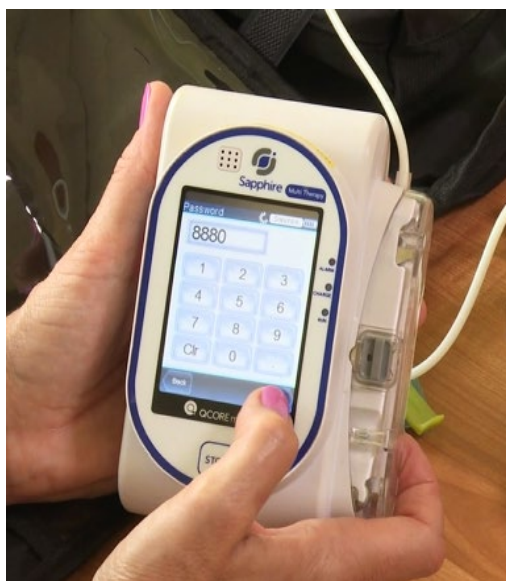


Figure 6.25

4. Press [**OK**] on the screen.
5. The screen will display “Authorization level Medium.” Press [**OK**] again.
6. Turn the pump off by pressing the hard [**ON/OFF**] key.
7. Screen will read “Press OFF to turn off the pump.” Press [**OFF**].
8. Wash your hands.
9. Disconnect the pump tubing from your IV catheter cap.
10. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.
11. Flush your IV catheter with saline (see Step 4 from the “Give the HPN” section before).
12. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.

13. Flush your IV catheter with heparin as follows:
- Hold the prefilled heparin syringe upright, press forward on the plunger, remove the cap, and push out the air.
 - Push and twist the heparin syringe into your catheter cap to the right until secure.
 - Inject the heparin (leaving a small amount of solution in the syringe), clamp your catheter before removing the syringe, then discard the syringe in your trash (see Figure 6.26).
13. Attach the alcohol cap onto the end of your IV catheter cap.
14. Remove the pump, the empty HPN bag, and tubing from the backpack.
15. Open the safety door on the pump.
16. Remove the tubing cassette by raising the metal lock that secures it to the pump (see Figure 6.27).
17. Throw away the bag and pump tubing.
18. Plug your pump into an electrical outlet to charge the battery.
19. Remove a new bag of HPN from the refrigerator.



Figure 6.26



Figure 6.27

Summary of HPN Steps

Starting HPN

1. Measure your daily weight and temperature to record on the Daily Monitoring Form.
2. Clean your work area.
3. Wash your hands.
4. Open your supplies and place them on your work area.
5. Check and compare your HPN prescription and the bag label.
6. Mix additives in your HPN bag (refer to your HPN mixing instruction sheets).
7. Attach the filtered extension set and then the back check valve to the pump tubing.
8. Turn the pump on.
9. Press **[Preset Programs]**
10. Select **TPN** (review pump program with the programming sheet).
11. Press **[OK]**.
12. Place pump tubing into the pump.
13. Spike the HPN bag with pump tubing.
14. Prime the pump tubing.
15. Remove the alcohol cap from the end of your IV catheter cap.
16. Scrub your IV catheter cap with alcohol.
17. Flush your IV catheter with saline.
18. Scrub your IV catheter cap with alcohol.
19. Connect the pump tubing to your catheter.
20. Press **[Start]** on the pump screen to begin your infusion.
21. Press **[Lock]** then **[Patient lockout]** on the screen.
22. Place the IV bag and pump into the backpack or on the IV pole.

Stopping HPN

1. Clean your work area.
2. Wash your hands.
3. Press **[Press to unlock patient]** key on the infusion pump.
4. Enter **8880**.
5. Press the hard **[ON/OFF]** key, then **[OFF]** on the screen.
6. Disconnect the pump tubing from your IV catheter.
7. Scrub your IV catheter cap with alcohol.
8. Flush your IV catheter with saline.
9. Scrub your IV catheter cap with alcohol.
10. Flush your IV catheter with heparin.
11. Attach the alcohol cap onto the end of your IV catheter cap.
12. Remove pump tubing and HPN bag from the pump and discard.
13. Remove a new HPN bag from the refrigerator.
14. Plug your pump into an electrical outlet to charge.

Infusing Extra IV Fluids

Occasionally HomeMed or your doctor may instruct you to infuse IV fluid other than the HPN solution. You will receive a small supply of 1 or 2 IV bags of sodium chloride 0.9% in your first delivery. This fluid may be used if there is a pump failure, as it can be given by gravity (see the instructions below).

What are some key points for IV fluid infusion?

- Check the IV bags and syringes for expired dates, color changes, leaks, and floating materials. If noted, do not use the item and contact HomeMed.
- IV solutions do not usually need to be refrigerated. HomeMed will instruct you on whether or not your IV solutions need to be kept in the refrigerator. This information will also be included on the label.
- IV tubing used for IV fluids may be used for 3 days (72 hours), as long as you put a new sterile cap on the end of the tubing after using it.
- If you are using an infusion pump and the backpack (and not using an IV pole), you must remove the air from the bag.
- **Only use the IV fluid bag if HomeMed or your doctor instructs you to.**

What supplies do I need?

- 1 IV medication bag
- 1 gravity IV tubing
- 1 flow controller extension set
- 1 luer lock cap (a white cap to keep IV tubing sterile for reuse)
- 1 prefilled heparin flush syringe (remove it from the package)
- 2 prefilled saline flush syringes (remove them from the packages)
- 4 alcohol pads
- 1 alcohol cap
- Household disinfectant or alcohol

- Soap and paper towel

Step 1: Prepare for the IV fluid infusion

1. Place a trash can next to your work area.
2. Clean your work surface or laminate mat with household disinfectant.
Let the area air dry.
3. **Wash your hands.**
4. Gather your supplies and place them onto your work area.
5. **Wash your hands again.**

How do I prepare the tubing?

1. Attach the gravity IV tubing to the flow controller extension set.
 - Remove the cap from the end of the gravity IV tubing.
 - Remove the cap on the shorter end of the flow controller tubing and attach it to the gravity IV set by screwing them together (see Figure 7.1).

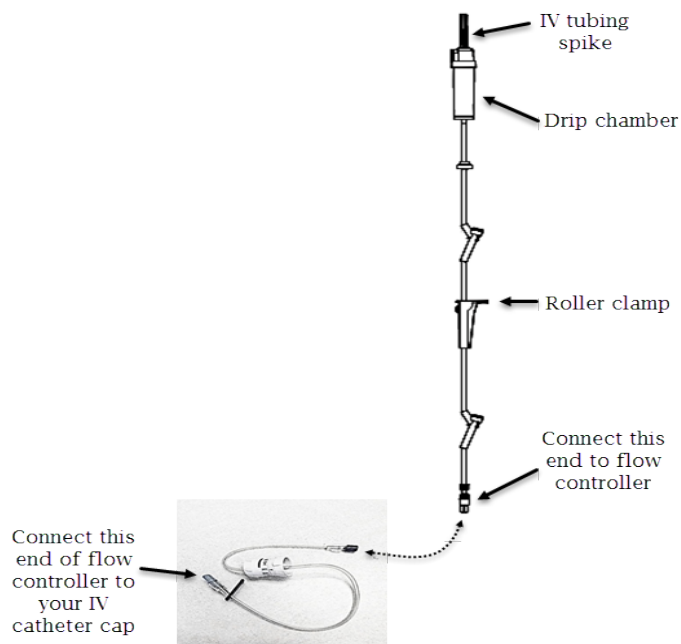


Figure 7.1

2. Turn the flow controller to the “off” position.
3. Remove the tab from the IV bag.
4. Remove the spike cover from the IV tubing. Do not touch the spike.
5. Hold the port of the IV bag straight and insert the spike by pushing and twisting at the same time.
6. Hang the IV bag with the attached tubing on the IV pole.
7. Squeeze and release the drip chamber on the IV tubing until it is half full of fluid.
8. Turn arrow on flow controller to “open” to fill the IV tubing with fluid.
9. When the fluid is at the end of the IV tubing, turn the arrow on the flow controller to “off.”
10. Hang the IV bag on the IV pole. Do not let the tubing fall on the floor.
11. Place the expiration label on the IV tubing to remind you to change it in 72 hours (3 days).

Step 2: Start giving the IV fluid infusion

1. Check your IV catheter cap to make sure it is on securely.
2. Unclamp your catheter and remove the alcohol cap.
3. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.
4. Flush your IV catheter with saline.
5. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.
6. Remove the protective cap from the flow controller extension set.
7. Push and twist the end of the IV tubing extension set into your catheter cap to the right until secure. Then “lock down” the spin collar to make sure you have a tight connection.
8. Turn the arrow on the flow controller to the rate noted on the bag label to infuse over the correct amount of time.

Step 3: Complete the IV fluid infusion

1. When the infusion is done, roll down the roller clamp on the IV tubing to close it.
2. **Wash your hands.**
3. If the tubing has been used for fewer than 3 days, disconnect the IV tubing from the cap on your IV catheter and place the white cap onto the end of the flow controller tubing (this will keep the IV tubing sterile for reuse). Keep the empty bag attached to the tubing (see the next section to learn how to reuse tubing).
4. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.
5. Flush your IV catheter with saline.
6. Scrub the end of the cap on your catheter hard with an alcohol pad for 15 seconds.
7. Flush your IV catheter with heparin.
8. Attach the alcohol cap onto the end of your IV catheter cap.

How do I reuse the tubing for the next dose?

Change your IV tubing every 3 days. You will receive labels to help you keep track. If the tubing has been used for 3 days, throw it away and use new tubing for the next dose. If you have used your tubing fewer than 3 days, do the following:

1. Remove the empty medication bag by twisting and pulling out the spike. Keep the spike on the IV tubing sterile.
2. Replace the old empty medication bag with a new one.

Summary of IV fluid infusion steps:

These are the steps to follow when you give your IV fluids using a flow controller extension set:

1. Wash your hands.
2. Attach the flow controller to gravity IV tubing.
3. Spike the bag and prime the tubing with fluid.
4. Remove the alcohol cap.
5. Scrub your IV catheter cap with alcohol.
6. Flush your IV catheter with saline.
7. Scrub your IV catheter cap with alcohol.
8. Connect the gravity IV tubing to your IV catheter.
9. Start your infusion (set the flow regulator to the rate noted on the bag label).
10. Stop your infusion by rolling down the roller clamp.
11. Disconnect the gravity IV tubing and apply white cap for 3 days of reuse.
12. Scrub your IV catheter cap with alcohol.
13. Flush your IV catheter with saline.
14. Scrub your IV catheter cap with alcohol.
15. Flush your IV catheter with heparin.
16. Attach the alcohol cap onto the end of your IV catheter cap.

Possible Complications of HPN Therapy

Complications (medical issues) can occur with HPN therapy. By following the instructions in this manual, you can prevent complications. The complications of HPN are grouped into mechanical, infectious, and metabolic complications. Refer to Appendix B for a list of signs and symptoms of fluid, glucose, and electrolyte imbalances.

What are mechanical complications of HPN therapy?

Clotting is when blood changes from a liquid to a gel.

Signs of clotting	<ul style="list-style-type: none">• You are unable to flush your catheter.• Your catheter is sluggish when you flush it.• You have multiple pump occlusion alarms and you are not able to continue your infusion.
What could be the cause?	<ul style="list-style-type: none">• Kinks in the tubing or catheter• Not dealing with pump alarms• Interruptions during HPN infusions• Not clamping your catheter when the infusion stops• Not flushing your catheter after the infusion is complete
How do I prevent it?	<ul style="list-style-type: none">• Avoid kinks in your catheter when taping it to your arm or chest.• Always flush your catheter whenever your HPN solution is completed or interrupted, after blood is drawn, or if blood backs up into the tubing.• Clamp your catheter when the infusion stops.• Flush your catheter after your infusion is complete.

What do I do?	<ul style="list-style-type: none"> • Re-tape your tubing or catheter. • Contact HomeMed or your doctor if your catheter becomes difficult to flush or you are not able to flush it. • Do not use force when flushing your catheter. • Contact HomeMed if you are unable to troubleshoot pump alarms.
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Catheter displacement is when the tip of the IV catheter moves from its correct position in the vein.

Signs of catheter displacement	<ul style="list-style-type: none"> • Pain in the neck or shoulder when infusing HPN • Swelling or puffiness at the catheter site when infusing HPN • Increase in the IV catheter's external length
What could be the cause?	<ul style="list-style-type: none"> • Catheter flexibility can lead to a change in tip position • Pulling or tugging on the catheter • Loose dressing
How do I prevent it?	<ul style="list-style-type: none"> • Avoid pulling or tugging on catheter. • Change the dressing if it's loose or wet. • Use catheter securement devices like Grip-Lok®.
What do I do?	<ul style="list-style-type: none"> • Stop the HPN infusion, flush your catheter, and call your doctor immediately. • You may need a chest x-ray to check the catheter tip location.

Catheter breakage is when the IV catheter leaks or breaks.

Signs of catheter breakage	<ul style="list-style-type: none">• Leaking of HPN fluid or blood
What could be the cause?	<ul style="list-style-type: none">• A cut or tear in the catheter from scissors, pins, or other sharp objects• Using a clamp on the catheter with teeth or rough edges• Clamping the catheter in the same spot repeatedly.
How do I prevent it?	<ul style="list-style-type: none">• Never use sharp objects near the catheter.• Always use a catheter clamp for clamping.• Rotate the sites where you clamp your catheter.
What do I do?	<ul style="list-style-type: none">• Clamp the catheter as close to your body as possible.• Call your doctor immediately. Your catheter will most likely need to be replaced.

Thrombosis is when a blood clot forms.

Signs of thrombosis	<ul style="list-style-type: none">• Your arm (on the same side as your catheter) becomes painful, swollen, or cool to the touch• Possibly pain or swelling in your neck or chest
What could be the cause?	<ul style="list-style-type: none">• The catheter may block blood flow around the catheter.
How do I prevent it?	<ul style="list-style-type: none">• Follow catheter care instructions.
What do I do?	<ul style="list-style-type: none">• Stop the HPN infusion, flush the catheter, and call your doctor immediately.

Air embolism is when a large amount of air enters the bloodstream.

Signs of air embolism	<ul style="list-style-type: none">• Shortness of breath and coughing• Chest pain• Loss of consciousness <p>Babies may have:</p> <ul style="list-style-type: none">• A higher than usual breathing rate• A bluish coloring to their lips or skin• Loss of consciousness• Nasal (nose) flaring
What could be the cause?	<ul style="list-style-type: none">• The catheter is not clamped when the cap is removed.• The IV tubing becomes separated at a connection or the cap falls off the end of the catheter.• The IV tubing or filter is not correctly filled with fluid.
How do I prevent it?	<ul style="list-style-type: none">• Always clamp the catheter whenever the catheter is opened to air.• Tighten all tubing, connections, and caps.• Fill the IV tubing carefully so air is not left in the tubing or filter.
What do I do?	<ul style="list-style-type: none">• If you see large amounts of air in the tubing, clamp the catheter, stop the infusion, clear the tubing of air and restart the infusion.• If you have symptoms of an air embolism, clamp the catheter, call 911, and do the following:<ol style="list-style-type: none">1. Take small breaths only.

	<ol style="list-style-type: none"> 2. Lie on your left side with your feet and legs elevated (raised) and your chest and head slightly lower than your feet. 3. Attach a syringe to your catheter and withdraw any air until you get blood in the syringe. Then flush with heparin.
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What are infectious complications of HPN therapy?

Infection is when there are germs at the IV catheter exit site (called a **local infection**) or within the bloodstream (called a **systemic infection**). Systemic symptoms may be caused by another source of infection, such as a flu virus, bladder infection, or pneumonia.

Signs of local infection	<ul style="list-style-type: none"> • Fever • Chills • Redness, tenderness, or drainage at the IV catheter exit site
What could be the cause?	<ul style="list-style-type: none"> • Not having your IV catheter dressing changed regularly (every 7 days) and when loose, soiled, or wet.
How do I prevent it?	<ul style="list-style-type: none"> • Keep your IV catheter dressing clean, dry and intact. • Have your dressing changed regularly and when loose, soiled, or wet.
What do I do?	<ul style="list-style-type: none"> • Call HomeMed or your doctor as soon as possible.

Signs of systemic infection	<ul style="list-style-type: none"> • Fever • Chills • Sweating • Weakness
What could be the cause?	<ul style="list-style-type: none"> • Not washing your hands. • Not using sterile techniques such as alcohol swabbing your end cap before flushing or connecting IV tubing. • Using contaminated supplies or HPN solution.
How do I prevent it?	<ul style="list-style-type: none"> • Take your time. Do not rush through steps. • Follow the steps shown to you during training. • Wash your hands with soap before sterile procedures. • Do not use expired supplies. • If you think you contaminated any supplies or solutions, throw them out.
What do I do?	<ul style="list-style-type: none"> • Take your temperature. If your temperature is greater than 100.4° F, call HomeMed or your doctor as soon as possible. • If you are infusing your HPN and begin to experience a fever or shaking chills, save your bag and tubing and call HomeMed. We may need to check it for contamination.

What are metabolic complications of HPN therapy?

Hyperglycemia is when you have a higher-than-normal level of sugar in the blood.

Signs of hyperglycemia	<ul style="list-style-type: none">• Weakness• Feeling tired and thirsty• Dry mouth• Headache• Increase in urine output (peeing more)
What could be the cause?	<ul style="list-style-type: none">• Your HPN has infused too fast.• Your body is unable to process the amount of sugar in your HPN solution.• You have an infection.
How do I prevent it?	<ul style="list-style-type: none">• Always use an infusion pump to cycle your HPN, to slowly increase the rate at the start and decrease the rate at the end.• Do not press the [Prime] key when your pump tubing is connected to your catheter.
What do I do?	<ul style="list-style-type: none">• Check your urine fractional. Call HomeMed if your urine fractional is not negative for sugar.• Check your blood sugar if you are instructed to and call HomeMed or your doctor if it is too high.• Take your temperature. If you have a temperature greater than 100.4° F, call HomeMed or your doctor as soon as possible.

Hypoglycemia is when you have a lower-than-normal level of sugar in your blood.

Signs of hypoglycemia	<ul style="list-style-type: none">• Feeling nervous or irritable• Headache• Dizziness or cold sweats <p>Babies may be:</p> <ul style="list-style-type: none">• Lethargic (very tired and slow-moving)• Damp (wet) to the touch• Pale
What could be the cause?	<ul style="list-style-type: none">• Your HPN is suddenly stopped.• Your body is not tolerating the HPN cycle or taper time.
How do I prevent it?	<ul style="list-style-type: none">• Do not stop your HPN infusion in the middle of a cycle unless HomeMed or your doctor instructs you to.• Always taper your HPN solution.
What do I do?	<ul style="list-style-type: none">• Check your blood sugar if you are instructed to and call HomeMed or your doctor if it is too low.• Drink something with sugar in it (such as orange juice) or suck on a hard candy.• Call your doctor if these symptoms continue.

Fluid imbalance and fluid balance will be affected by your nutritional and health status.

Signs of fluid imbalance	<p>For adults:</p> <ul style="list-style-type: none">• Weight loss or gain of 3 pounds or more for 2 days in a row• New or increased swelling• Decreased or concentrated urine output <p>For babies:</p> <ul style="list-style-type: none">• Sunken or puffy eyes• Bulging or sunken “soft spot” on top of the head• Fast and difficult breathing
What could be the cause?	<ul style="list-style-type: none">• The amount of HPN solution may be too little or too much.• Your total intake is greater or less than your total output.• You are not infusing HPN as instructed.
How do I prevent it?	<ul style="list-style-type: none">• Infuse your HPN as instructed.• Try to infuse HPN at the same time every day.• Keep accurate records of your intake and output.• Check your weights at the same time every day and record them.
What do I do?	<ul style="list-style-type: none">• Contact HomeMed or your doctor if you have symptoms of fluid imbalance, if your total intake is a lot more or less than your total output, or if you missed HPN.

When to Contact Your Doctor, Visiting Nurse, or HomeMed



Call 911 if:

- You experience symptoms of air embolism (shortness of breath, coughing, and chest pain).
- Your baby is lethargic (very tired and slow-moving), or if they are less responsive or have difficult, fast, or labored breathing.



Contact your doctor immediately if:

- You have a hole or break in your catheter.
- You have pain in your neck or shoulder when infusing the HPN solution.
- You experience symptoms of systemic (body-wide) infection, such as fevers, chills, sweats, and weakness.
- Your arm on the same side of your catheter becomes swollen, cool, or painful.



Call your doctor and/or HomeMed as soon as possible if:

- You are not able to infuse any HPN solution, or if you're only able to infuse part of the HPN solution.
- You are having difficulties flushing your catheter.
- You see redness, swelling, tenderness, or drainage at the catheter exit site.
- You experience symptoms of low blood sugar (hypoglycemia) or high blood sugar (hyperglycemia).
- Your blood sugar results are too high or too low.
- Your urine test results for sugar are not negative.

- For adults: your urine output is less than 800 mL per day for 2 days in a row.
- For children: there is no urine output for more than 8-12 hours.
- For babies: they have puffy eyes, a full or sunken “soft spot,” or a decrease in wet diapers.
- There is new or increased swelling in your feet, ankles, or fingers.
- You have vomiting, diarrhea, or a sudden increase in fistula drainage.
- For adults: you have a weight loss or gain of 3 pounds or more for 2 days in a row.



How to prepare for emergencies:

- Keep the supplies that are necessary to flush your IV catheter with you at all times.
- If your pump doesn’t charge or you are not able to charge your pump, call HomeMed.
- You may want to buy a medical alert bracelet at your local pharmacy with information about your medical condition and your IV catheter.
- Keep your HPN manual, infusion pump manual, and telephone numbers in a place where you can find them easily if you have problems.
- If you are infusing your HPN solution and you need to leave your home immediately, do not stop the infusion. Put the HPN solution and prescription in the backpack and take it with you.
- If you need to temporarily relocate from your home, contact our office with your temporary address and phone number.
- If you lose power to your refrigerator, remove your HPN solution and additives and store them in a portable cooler with ice. This

will keep your HPN and medications stored safely for at least 24 hours. Call HomeMed for further instructions.



Non-emergency health changes and reminders:

- Contact your doctor before you have any dental work or minor surgery. You may need to take antibiotics.
- Brush and floss your teeth, and use mouthwash 2-3 times a day.
- If you have a cold or get sick, wear a mask when starting, stopping, or mixing your HPN solution, or when your catheter dressing is changed.
- Contact HomeMed if you are admitted to a hospital or if you start any new medications.

Appendix A: Frequently Asked Questions

How will I get the supplies I need for my HPN?

HomeMed will deliver all the supplies you will need at first to your home or hospital room, on the same day or evening of your discharge. A team technician from HomeMed will contact you before discharge so they can arrange a delivery time. The team technician will also talk with you about the weekly schedule for delivering more supplies to your home.

What types of things will HomeMed provide?

HomeMed will provide you with HPN bags, pump tubing, extension tubing, an infusion pump, a backpack, empty syringes, needles, heparin and saline flush syringes, medication to be added to the HPN solution, alcohol pads, IV dressing change kits, tape, a sharps container, an IV pole, and an extra IV fluid bag for backup use.

How will I learn how to give HPN with all the supplies listed above?

The HomeMed training team will teach you in the hospital. We will bring equipment and supplies to your room to practice with, and we will also give you written material to read. Once you are home, a visiting nurse will go over what you have learned in the hospital.

When will the visiting nurse come to my home?

Care Management will arrange a visiting nurse agency with you before your discharge. The visiting nurse will call you to set up a visit time. Generally, the visit time will be around 7:00 or 8:00 PM on the evening of your discharge. This is because most people are cycled on their HPN and scheduled to be connected in the evening.

What is cycling?

In the hospital, HPN is connected to your IV catheter 24 hours a day. At home, many adult patients are on HPN only 12 hours a day, and they generally infuse at night while they are sleeping. Before discharge, HomeMed works with your doctor toward cycling your HPN down. Each patient is different (because of their age and medical status) in terms of how quickly the HPN cycle can be lowered. If you are not on the desired cycle at discharge, you may continue to be “cycled down” with the help of HomeMed once you are at home.

Who are my HomeMed providers?

The team of HomeMed providers who will care for you include a pharmacist and a nurse. They will be in contact with you frequently once you are home. They will monitor your labs and HPN progress, along with your doctor.

Who do I contact if I’m missing supplies?

During your first visit with your visiting nurse, it’s a good idea to go through your supplies with them to make sure you have all the items necessary to start your HPN therapy. The team technician at HomeMed is the person to contact if something is missing. Wait until morning to contact them if it’s not urgent. If it’s necessary to have the item that night, call HomeMed at (800) 862-2731 to reach a provider.

How often is the IV pump tubing changed?

The IV pump tubing is changed every day because of the sugar and lipid content in the HPN.

There is some other clear IV fluid in my box. What is this used for?

Some patients may need extra hydration while on HPN. This may be because of increased vomiting, diarrhea, ostomy output, etc. HomeMed will tell you if extra hydration becomes necessary and you need to infuse this IV fluid. You may

also need to use this IV hydration if your pump fails. Generally, IV hydration fluids do not need to be refrigerated unless the label tells you to.

I see a different type of tubing with a dial on it in my box. What is this used for?

This tubing is used if it is necessary to infuse extra hydration fluids. If required, HomeMed will talk about this with you. This type of tubing can be used for 3 days, since the sugar content is lower in hydration fluids.

Who do I call when my sharps container is full?

Contact your team technician at HomeMed to send you an empty one to use. To dispose of a sharps container, seal and secure the lid, double-bag it in opaque (non-clear) bags, and place it into your regular household trash.

I have the urine test strips in my box to check for sugar. Why is this so important to do this test at least 3-4 hours into my cycle?

- Your HPN solution contains a large amount of dextrose (sugar). You will be receiving the greatest amount of dextrose after the taper up period of your infusion. We want you to be at this peak infusion rate for a couple hours before checking your urine, so we can get an accurate test result to see if that dextrose is going into your urine. If you check earlier than 3-4 hours into your cycle, you may get a negative test result that is not accurate.
- If your urine results show a large amount of sugar, we will need to make changes in your HPN solution because you can easily become dehydrated (see “Possible Complications of HPN Therapy” section for symptoms).

They check blood glucose levels in the hospital. Do I need to check these at home too?

We ask some people, such as people with diabetes, to monitor their blood glucose levels. If blood glucose checks are needed, a member of your medical team will tell you about this.

If I feel hypoglycemic, hyperglycemic, dehydrated, etc., who do I contact?

You can contact HomeMed or your doctor.

I'm feeling great on HPN. I'm gaining weight and have lots of energy. Can I just skip a day of HPN?

No! When you are ready to come off HPN, this is done slowly and only under the supervision of your doctor and HomeMed.

I'm feeling so good, and I'd like to travel a little bit. Is this possible while on I'm on HPN?

Yes, you can travel if your doctor says it's okay. Contact HomeMed to help you with organizing this. Contact HomeMed as far ahead of time as possible so that your supplies can be shipped directly to your travel destination (if possible).

Appendix B: Signs and Symptoms of Fluid, Glucose, and Electrolyte Imbalances

Fluid imbalances	
Fluid overload (water excess)	Dehydration (water loss)
<ul style="list-style-type: none"> • Confusion • Poor coordination • Nausea • Muscle cramps or weakness • Headache • Weight gain • Moist skin • Swelling in legs • Fluid intake greater than output • Shortness of breath • Light-colored urine or large amounts of urine output 	<ul style="list-style-type: none"> • Dizziness or weakness • Thirst • Dry skin and mucous membranes • Swollen and dry tongue with deep grooves • Weight loss • Decreased urine output • Dark-colored, concentrated urine • Bad-smelling urine

Glucose imbalances	
Hyperglycemia (high blood sugar)	Hypoglycemia (low blood sugar)
<ul style="list-style-type: none"> • Weakness • Tiredness • Thirst • Headache • Dry mouth • Increased urine output • Irritability or confusion 	<ul style="list-style-type: none"> • Nervousness • Headache • Cold sweats • Dizziness • Irritability or confusion

Electrolyte imbalances	
Sodium: Important for fluid balance and many vital functions.	Hypernatremia (high sodium) <ul style="list-style-type: none"> • Thirsty • Rough, dry tongue • Decreased urine output • Decreased weight
	Hyponatremia (low sodium) <ul style="list-style-type: none"> • Weakness • Apathy • Weight gain • Swelling in the hands and feet • Headaches • Shortness of breath
	Hyperkalemia (high potassium) <ul style="list-style-type: none"> • Weakness • General tiredness • Muscle cramping or twitching
	Hypokalemia (low potassium) <ul style="list-style-type: none"> • Decreased reflexes • Muscle cramping or twitching • Muscle weakness • Fast, weak pulse
Potassium: Involved in many important actions, including heart function.	Hypercalcemia (high calcium) <ul style="list-style-type: none"> • Drowsiness or tiredness • Loss of appetite • Nausea or vomiting • Muscle weakness • Deep bone pain
Calcium: Necessary for bone growth, blood clotting, and muscle, nerve, and heart function.	

	Hypocalcemia (low calcium)
	<ul style="list-style-type: none"> • Twitching • Seizures • Tingling around the mouth • Spasms of the feet or hands • Numbness or tingling of the hands or feet • Stomach cramping • Nausea, vomiting, or diarrhea
Magnesium: A mineral found in soft tissue, muscle, and bones.	Hypermagnesemia (high magnesium)
	<ul style="list-style-type: none"> • Drowsiness or tiredness • Flushing (skin gets warm and red) • Muscle weakness
	Hypomagnesemia (low magnesium)
	<ul style="list-style-type: none"> • Not being able to sleep • Leg or foot cramps • Muscle weakness, twitching, or tremors
Phosphorus: An element needed for normal metabolism of carbohydrates, protein, and fat. Needed for normal muscle contraction and heart function.	Hyperphosphatemia (high phosphorus)
	<ul style="list-style-type: none"> • Numbness or tingling in extremities • Muscle cramps • Nausea, vomiting, or diarrhea • Dry skin • Brittle nails • Tingling around the mouth
	Hypophosphatemia (low phosphorus)
	<ul style="list-style-type: none"> • Tiredness • Muscle weakness • Loss of appetite • Mild bone pain

Appendix C: Daily Monitoring Forms

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Daily Monitoring Form

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Daily Monitoring Form

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