

# The Nova Scotia Home Parenteral Nutrition Program for Adults

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# The Nova Scotia Home Parenteral Nutrition Program for Adults

The Nova Scotia Home Parenteral Nutrition Program is located at the QEII Health Sciences Centre in Halifax. The program provides parenteral nutrition for inpatients of Nova Scotia Health and IWK Health facilities.

To take part in the program (if accepted):

- Adult patients must be transferred to the QEII as inpatients to participate in 2 to 3 weeks of teaching.
- Pediatric patients must be transferred to the IWK.

The Home Parenteral Nutrition (HPN) team will decide if the program is right for you.

If you are accepted into the program, you must:

- › be medically stable.
- › be able to do all activities of daily living (ADL) on your own.
- › have a tunneled central venous catheter (like a single lumen Hickman/central line). A Hickman/central line is a special intravenous (IV) catheter made of silicone, that is tunneled in your chest to go into a large vein near your heart.

You will be discharged early to mid-week. Arrangements will be made for ongoing follow-up by the HPN team.

Your PN and lipids will be sent to your home each week by courier. The HPN team will review your blood work, weight, and any concerns you have about your health and/or your PN each month before ordering your PN. The HPN team will make changes to your formula, if needed.

## **Your Home PN team**

Program nurse coordinator

› Phone: 902-473-2873

Program PN dietitian

› Phone: 902-473-3969

Program PN pharmacist

› Phone: 902-473-7802

Supply order line

› Phone: 902-473-2957

Home Parenteral Program:

› Fax: 902-473-3966

## **What is parenteral nutrition?**

- In normal digestion, food is broken down in your stomach and small bowel, then absorbed in your large bowel (large intestine or colon). Then your blood carries these nutrients to all parts of your body.
- If a person is not able to meet their nutritional needs through food (by eating food by mouth or through a feeding tube), they can use PN.
- PN is not digested in the usual way in your stomach and bowel. It is a special formula (liquid food mixture) given directly into the blood through an IV catheter (Hickman/central line).
- The formula has all of the nutrients you would normally get by eating food. This includes proteins, carbohydrates (sugars), lipids (fats), vitamins, and minerals (like calcium).

## **Who can get PN?**

You can get PN at any age. It is generally well tolerated (are able to handle) for as long as it is needed.

## **How is PN given?**

- PN is given through a single port Hickman/central line. The catheter can stay in place for as long as it is needed (unless it gets dislodged or infected).
- The nurse will show you how to care for your catheter. Proper care is needed to avoid infection and blockage.

## **What are the benefits of home PN?**

Poor nutrition can affect your health and well-being. Usually, people with a gastrointestinal (GI) tract that does not work well, or work at all, need some form of PN. The benefit of the Home PN Program is that you are able to administer (give) PN to yourself at home. This:

- › gives you more control over your own nutrition.
- › keeps you more involved in your care plan and health changes.
- › means you do not need to be admitted to the hospital for PN.

## What does my body need to stay healthy?

<b>Macronutrients</b>	
Macro (large) nutrients are the basic parts of nutrition. They include water, sugar, and protein. Your body needs large amounts of macronutrients each day.	
<b>Water</b>	<ul style="list-style-type: none"><li>• Your body needs water to work well. Your health care team will closely monitor the water levels in your PN.<ul style="list-style-type: none"><li>› Not having enough water can lead to dehydration, which can cause weakness and fatigue (tiredness).</li><li>› Having too much water can lead to swelling in your hands, feet, and/or legs. Extra water can cause fluid to settle on your lungs, causing shortness of breath. If this happens, you will need to see a doctor.</li></ul></li></ul>
<b>Dextrose</b>	<ul style="list-style-type: none"><li>• Dextrose is a carbohydrate. It is the body's main source of energy.</li></ul>
<b>Amino acids</b>	<ul style="list-style-type: none"><li>• Amino acids are used to make the body's proteins.</li><li>• Protein is needed for muscle growth, immune function (the making and acting of cells that fight disease or infection), and helping the body recover from injury or illness.</li></ul>
<b>Lipids</b>	<ul style="list-style-type: none"><li>• Lipids are needed for your body to make normal, healthy cells.</li></ul>

## Micronutrients

Your body needs micro (small) nutrients to stay healthy. Micronutrients include vitamins, minerals, and trace elements. The amount of micronutrients in your PN formula will depend on:

- › the amount of nutrients in your body.
- › your recommended daily nutrient needs.
- › if you are still eating some food orally (by mouth).

These amounts may change over time. You will need to have blood tests about every 2 to 4 weeks to check your micronutrient levels. Your PN formula will be changed as needed.

<b>Sodium (salt)</b>	Sodium is an electrolyte that helps to: <ul style="list-style-type: none"><li>› balance water in your body.</li><li>› keep your blood pressure normal.</li><li>› keep your muscles and nerves working well.</li></ul>
<b>Potassium</b>	Your body needs potassium to keep your nerves and muscles (including your heart) working well.
<b>Calcium</b>	Calcium is important for: <ul style="list-style-type: none"><li>› bone health, growth, and development.</li><li>› keeping your muscles working well.</li></ul>
<b>Magnesium</b>	Magnesium is needed for: <ul style="list-style-type: none"><li>› keeping your muscles and nerves working well.</li><li>› brain development.</li></ul>
<b>Phosphorus</b>	Phosphorus plays an important role in making energy in your cells.
<b>Vitamins</b>	Vitamins are needed to keep your body working well. These include vitamins A, B, C, D, and E.
<b>Trace elements</b>	Trace elements are vitamins and minerals (like copper, zinc, manganese, chromium, and selenium) that your body needs in very small amounts. Trace elements may be added to your PN formula depending on the amounts in your blood and how much you get from the foods you eat.



## Additives

Sometimes, you may need things added to your PN formula. These may be added to your PN bag by you at home.

Insulin	<ul style="list-style-type: none"><li>• Insulin is a hormone made by your body to control the amount of sugar in your blood. Sugar is the main source of energy for your body. Since PN gives a large amount of sugar directly into your blood, you may need to add insulin to your PN bag to help your body control it.</li><li>• <b>You may need to add insulin to your PN even if you do not have diabetes.</b> Usually, you will no longer need insulin if/when you stop using PN.</li></ul>
Vitamin K	Vitamin K is a vitamin that is needed for healthy blood clotting. Vitamin K will be added to the PN bag once a week unless there is a reason not to do so (for example, you are taking warfarin).
H2 (histamine) blocker	H2 blockers (like famotidine [Pepcid <sup>®</sup> ]) are a type of medication that helps to lower how much acid your stomach makes. Sometimes this is ordered to help lower heartburn and/or indigestion, and to help prevent stomach ulcers.

## How will I learn to do PN at home?

We want to make sure you understand how to do your PN and take care of yourself. We will:

- › make a teaching plan that suits your needs based on how you like to learn.
- › give you one-on-one lessons with the PN Program nurse.
- › make sure we answer all of your questions.
- › make sure you feel confident and safe before going home.
- › give you this pamphlet to use in the hospital and at home.
- › make sure you know when and how to reach the HPN team and when to go to an Emergency Department.

## How long will I be on PN? Will I always be connected to a pump?

- How long you will be on PN will depend on why you need it and your current health. You may still be able to eat by mouth while on PN. Your doctor will talk about this with you.
- When you start PN, it is usually given continuously (without stopping) at a slow rate 24 hours a day. This is called a **continuous PN infusion**. If you are able to handle the infusion, the rate may slowly be increased. This means you will be able to have the infusion over less than 24 hours (1 day) and have some time disconnected from the IV.
- The amount of time you are on the PN may be lowered over time to 20, 16, or even 12 hours a day. This is called a **cyclic PN infusion**. A cyclic infusion means you do not have to be connected to the PN at all times.
- People doing cyclic PN infusions at home are usually able to infuse their PN at night while they are sleeping. This will let you be disconnected from the IV during the day.

## When can I go home?

Planning for being discharged from the hospital starts when you are admitted. To make sure you are ready to go home, you must be able to show that you:

- › understand what PN is, why you need it, and how it will help you.
- › can do all of the steps to use PN safely at home, including aseptic technique (see page 22).
- › know what to do if you have a problem.
- › are emotionally ready to cope with your new way of life.

You and your PN nurse will set a discharge date during your learning phase. This date will depend on:

- › Your progress
- › Your medical condition
- › Your confidence in your ability to do PN at home
- › When your PN and supplies will be ready
- › If your home is ready for the change (for example, has a fridge, a working area, and a storage space for supplies)

## Emotions

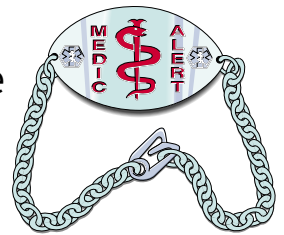
- Meals and eating are a big part of life, culture, and religion. As your GI (gastrointestinal) problems get worse and you are less able to eat orally, this can affect you emotionally. Each person's experience and recovery are different. This is normal.
- It can be hard to get used to home PN. Over time, you will learn how to care for yourself, get used to your new way of living, and learn to better take charge of your life. You may adjust faster if you are able to go home sooner.
- People who have had a severe (very bad) chronic (ongoing) illness (like Crohn's disease) tend to adjust easier than people who suffer an acute (sudden) illness. People with a chronic illness may find that what they must sacrifice is worth it to have better health and more energy for activities of daily living.
- It may help to talk about your feelings. If you do not talk about your feelings, any anger, denial, or depression you are feeling may affect how you accept your new way of life.

- There are resources available to help you cope. Your health care team is available to talk with you, answer any questions you may have, and give you information and support. You can also visit:
  - › <https://oley.org/>
- Having home PN can also affect your loved ones. They may feel overwhelmed or wonder how things will change. It is important to talk with your loved ones and address any concerns they may have.
- Your health care team is also available to talk with you and your loved ones, as needed. **They can help you understand and cope with your feelings, and can connect you with another person who has been on PN for a while.**

## How will home PN affect my lifestyle?

### Safety

- We recommend wearing a medical alert bracelet. It should state that you have a Hickman/central line and are on home PN. For more information, visit:
  - › [www.medicalert.ca/](http://www.medicalert.ca/)
- Tell your local service providers (like water, electricity, oil and/or propane) that you have life-supporting medical equipment at home.



### Meals

- Mealtimes give each day a routine. Eating is a normal function and a time to socialize. At first, not being able to eat may make you feel depressed. This will hopefully lessen over time.
- Make sure you talk about your feelings and/or concerns about eating with your friends, family, and/or support person(s). Your doctor and HPN team can also offer support for this major change in your life.

### Bathing

- You may shower and bathe as usual. When you have a shower or bath, keep the dressing over your catheter dry. You can cover the catheter site with plastic wrap held in place with tape for more protection.
- When showering, stand with your back to the spray. This will prevent a stream of water from hitting the dressing and catheter.

## Sleep

- Since IV feeding is done mostly at night, it may disturb your sleep. Because you will be getting a lot of fluids, you may need to get up 1 to 3 times a night to urinate (pee). If you are getting up to urinate more than 3 times a night, tell a member of your health care team.
- At first, you may worry about the equipment working properly. When you wake up, check that the drip rate of the solution is the correct rate for the current hour your PN is infusing. For example, if you are at hour 4 of your infusion, look at the pump's infusing rate number and check they are the correct rates for that hour.

## Exercise

We encourage you to exercise as usual. Exercise will help your body use protein to make muscle instead of fat. You may do any sports, **except swimming and contact sports (like football)**. Slowly increase your exercise and activities over time.

## Work

One of the goals of the Home PN program is to help people go back to work when they are ready. If you work 8 hours a day, your feedings must be scheduled around your work hours. If you are self-employed or work part-time, your schedule may be more flexible. **Shift work is not advised.**

## Body image and sex

- Many people on home PN have had a lot of surgeries. This can affect your body image (how you feel about your body). You may have trouble accepting your scars and your permanent catheter. You may feel unattractive, which can affect your self-esteem. These feelings can also affect your sex life.
- You may worry that having sex will cause the catheter to come out, or that you have to schedule sex around your feedings. We encourage you to go back to having sex as you are able. Try different ways to include your catheter when you are not connected to the pump. Find what works best for you.

## **Socializing**

When you feel well enough, you may wish to visit with loved ones. Your feeding schedule can be changed as needed. Talk with your HPN team members about how to make changes that will not cause side effects (like low blood sugar [hypoglycemia])

## **Travel**

- When you feel comfortable with your home PN, it may be possible for you to go back to travelling. You will need to organize a lot of things. Talk with the HPN team about challenges when planning a trip.
- When you are planning a vacation, tell your health care team and your doctor (family doctor or nurse practitioner) and/or your GI specialist. You will need to ask for a letter to approve your travel.
- Ask the program coordinator to make sure that your supplies will be available. Pack your supplies carefully to avoid breakage.
- Tell the company that you are travelling with (airline, railway, etc.) that you need home PN.
- You may wish to contact another person who does home PN (with their consent) to ask about their experience. Ask the HPN team if they know someone you can contact.

## **How do I get PN?**

### **What is a Hickman/central line?**

- A Hickman/central line is a type of central venous access device (CVAD). A CVAD is a special type of IV catheter that can be used short-term or long-term. To be eligible for the Home PN Program, you must have a Hickman/central line. These catheters are very strong and can last for years with good care.
- A Hickman/central line is a thin, hollow, flexible tube that is inserted (put in) in your chest by a radiologist (a doctor who specializes in diagnosing and treating injuries and diseases using medical imaging [like X-rays]). It is designed to be in place for a long time. Your PN formula is given through your Hickman/central line into your blood.
- To insert the Hickman/central line, a small incision (cut) is made just above your collarbone. The catheter will be tunneled under your skin. This separates where the catheter enters your vein from where it enters your skin. This lowers the chance of infection.

- The catheter will then be inserted into a vein. The catheter tip rests in a large vein just outside of your heart (called the superior vena cava).
  - Your catheter may have a single, double, or triple lumen. A lumen is the open space inside the catheter. Your Hickman/central line will likely have a single lumen.
  - There is a cap at the end of the catheter where your PN tubing will connect. The catheter will need to be flushed **before and after** each time PN is given. This is to prevent clogs.
  - You must change the adapter cap and the dressing once a week. There is a cuff that holds the catheter to the tissue under your skin. The cuff helps to keep the catheter in place and to prevent infection.
- \*\* You will be shown how to care for your Hickman/central line. You will also be given a pamphlet to help with this.\*\***

## **What are the possible complications of PN?**

### **Infection**

**Infection is one the most common problems with home PN.** Infections are often caused by not using an aseptic technique (see page 22) when accessing the Hickman/central line. This can cause germs to get in or around the line. **Infections can become a serious problem if they are not treated quickly.**

**There are 2 types of infections:**

#### **1. Local infection**

A local infection happens in a specific area (like your bladder, throat, or ear). A local infection can happen at your catheter exit site or the tunneled area.

**Symptoms to watch for:**

- › Redness
- › Tenderness
- › Warm to the touch
- › Drainage (yellowish liquid that smells bad)
- › Swelling/inflammation at the exit site or tunnel area

**What to do:**

**If you have any of the symptoms above, go to the nearest Emergency Department right away.**

## 2. Systemic infection

A systemic infection happens when germs get into your blood. A systemic infection can happen if a local infection spreads or if germs get into your catheter.

### Symptoms to watch for:

- › Fever (temperature above 38° C/100.4° F)
- › Chills
- › Weakness
- › Tired, achy feeling
- › Signs of local infection (see page 12), since a systemic infection may be caused by a local infection.

### What to do:

If you have any of the above symptoms, go to the nearest Emergency Department right away.

**Important: If you have any signs of infection, go to the nearest Emergency Department right away. If you do not see a doctor right away, the infection may get into your blood and cause your organs to stop working (called septic shock).**

### How will my health care team treat the infection?

Your health care team may do tests on:

- › Blood samples taken from a vein in your arm
- › Blood samples taken from your catheter
- › Swabs taken from your catheter exit site, throat, and/or nose
- › Urine samples

You may need antibiotics (medications to help with infection) or your Hickman/central line may need to be removed (if you have a line infection).



## Other signs of an infection

- › Redness
- › Pain, swelling, or drainage at the insertion site (where the catheter enters your body), sometimes (but not always) with fever
- › Chills
- › Sweating
- › Back pain
- › Nausea (feeling sick to your stomach) and vomiting (throwing up)
- › Headache
- › Pain in your shoulder and neck on the same side as your Hickman/central line
- › Not feeling well

## Cause:

- › Poor hand hygiene
- › Poor aseptic technique (see page 22)
- › Loose Hickman/central line dressing
- › Dirty tubing or saline (salt water with a similar saltiness as blood) flushes
- › Contaminated IV solution
- › Exposure to other sources of illness (like colds, the flu)
- › Other infection in your body (like a urinary tract infection, dental abscess or cavity, fistulae, or ostomy)
- › Routine dental work without prophylactic antibiotics (antibiotics given to prevent infections)

## Action:

- **Go to the nearest Emergency Department (ED) right away. Tell the ED staff you have a Hickman/central line. Take your PN/IV solution with you to the hospital to be tested as it could be contaminated.**
- Always use proper handwashing and aseptic technique (see page 22).

## Prevention:

- **Always wash your hands well before and after each feeding.** Handwashing is the most important way to prevent infection.
- **Check all solutions before use for cloudiness, discolouration (change in colour), and floating bits. Do not use the solution if you see any of these things.**
- Avoid people who are sick.
- Tell your dentist you have a Hickman/central line. Your dentist and/or doctor may give you antibiotics before having dental work to prevent an infection.

## Air embolus

### Symptoms:

- › Shortness of breath
- › Coughing
- › Pain in your neck, shoulder, or back on the same side as your Hickman/central line
- › Loss of consciousness
- › Cardiac arrest (your heart stops beating)

### Cause:

- › Air enters your bloodstream through the syringe or tubing
- › Tubing is loose or not connected to the PN or the Hickman/central line
- › Hickman/central line is damaged

### Action:

- Clamp the catheter. Lie down fully on your left side with your head flat. **Call 911 and have an ambulance take you to the nearest Emergency Department right away. Do not drive yourself to the hospital.**

### Prevention:

- Remove air from syringes and tubing before use.
- Clamp the Hickman/central line when it is not being used. You can do this by using the clamp that is already attached to the line (as shown in your training).
- Make sure all connections and caps are tight. Tape them down to make sure they do not move.
- Inspect your Hickman/central line for cracks, holes, or tears each day.
- Protect your Hickman/central line from sharp objects, children, and pets.

## Blocked and/or clogged line

### Symptoms:

- › Hickman/central line is hard or impossible to flush
- › New pain or swelling in your head, neck, chest, or arm on either side of your body, but especially on the side of your Hickman/central line
- › IV fluid leaking from the Hickman/central line exit site

### Cause:

- › Hickman/central line clamp is closed
- › A blood clot in the catheter tip or lumen
- › Hickman/central line was not flushed right
- › Tip of Hickman/central line has moved and is blocked

### Action:

- Make sure the clamp is open when flushing and during infusions.
- Try changing position, coughing, and taking deep breaths. Then try flushing the line again with saline.
- **If you are still not able to flush the line, go to the nearest Emergency Department right away. Never force a flush.**

### Prevention:

- When flushing the line, use the turbulent method (using a stop and start motion when pushing the syringe plunger) and clamp the line while injecting the last 0.5 ml of flush, as shown in your training. This method helps to flush all sides of the line.
- Always check for blood return (gently pull back, about 1 ml, on the attached flushing syringe before flushing the solution, to see that blood comes back into the syringe from the line).
  - › Flush the line before use with 10 ml of saline.
  - › Flush the line right after use with 20 ml (two 10 ml normal saline **and** 5 ml heparin).

## Line complications

### Symptoms:

- › Hickman/central line is pulled out partway (as a guide, use your first measurement of the line when it was inserted. This measurement is from where it comes out of your skin to the tip of the line furthest from you).
- › Hickman/central line cuff is outside of your body
- › Trouble infusing
- › PN fluid is leaking
- › New swelling in your neck, chest, or arm on either side of your body
- › Pain or burning when you flush or infuse

### Cause:

- › Hickman/central line was pulled
- › Stitches were taken out too soon
- › Dressing and securing device are not secure

### Action:

- **Stop the infusion right away. Flush the line with saline. Secure the dressing to stop it from moving. Go to the nearest Emergency Department right away.**

### Prevention:

- Make sure the line is secure.
- **Do not** let anything pull on the line.
- Change the dressing if it becomes loose.

## Liver damage

- Being on PN for a long time can affect your liver. You will need regular blood tests to check your liver enzymes (to check how healthy your liver is). This will make sure any problems are found and treated early.
- A small number of people that have been on PN for a long time may get advanced liver disease. **This is rare, but it can be serious.**

## High blood sugar (hyperglycemia)

### Symptoms:

- › Nausea
- › Weakness
- › More thirsty than usual
- › Headache
- › Urine test shows glucose
- › Nightmares

### Cause:

- › PN infused too fast
- › Not enough insulin in the solution (if you need insulin)
- › Infection
- › Wrong PN solution
- › Medication (like steroids and chemotherapy drugs)

### Action:

- **Call your doctor right away. If you cannot reach your doctor, go to the nearest Emergency Department right away.**

### Prevention:

- Always infuse your PN at the prescribed rate.
- Always use aseptic technique (see page 22).
- Check the labels on your PN formula to make sure your name is on the label.
- Contact the program coordinator or your PN pharmacist if you have any questions about your PN formula.
- Keep the PN bag that you used before the problem happened. Your health care team may want to check it.
- Tell your home PN coordinator if you have started taking any new medications prescribed by another doctor.

## Low blood sugar (hypoglycemia)

### Symptoms:

- › Sweating
- › Face is pale (light colour)
- › Heart palpitations (irregular or more noticeable heartbeats)
- › Nausea
- › Headache or feeling light-headed
- › Shakes and/or chills
- › Blurred vision
- › Hunger

### Cause:

- › PN infusion was stopped suddenly without tapering
- › PN bag finished too early because pump was not working properly or the bag was not full enough
- › Too much insulin in bag (if you need insulin)

**Note:** Low blood sugar may happen during an infusion, but it is more likely to happen within 15 to 30 minutes after an infusion is stopped.

### Action:

- Drink a glass of orange juice (if you are allowed to take food by mouth) or take a dextrose tablet.
- **If you do not feel any better and/or your blood sugar has not improved within 15 minutes of drinking juice and/or taking a dextrose tablet, go to the nearest Emergency Department or call 911 right away.**
- Contact your doctor and your PN health care team. You may need to adjust your infusion rate or, if your infusion is finished, use a new bag.

### Prevention:

- Your blood sugar will be closely monitored during the tapering process before you are discharged.
- If there is insulin in your solution, the amount may need to be lowered. Contact the program coordinator or your PN pharmacist.
- Your doctor may monitor your blood sugar levels monthly, or more often, or have you monitor them at home on a regular basis.

## Damaged line

### Symptoms:

- › Clothing or Hickman/central line dressing is wet
- › Leaking from Hickman/central line or exit site during infusion or flushing
- › Blood leaking from Hickman/central line
- › Swelling of your chest on the same side as your Hickman/central line
- › Pain or burning during infusion
- › Shortness of breath
- › Fast heartbeat

### Cause:

- › Hickman/central line touched a sharp object (like scissors, a safety pin, or jewelry)
- › Hickman/central line is damaged during insertion
- › Hickman/central line is defective (does not work right) or has been used for a long time
- › Too much pressure applied on Hickman/central line (for example, by forcing a flush or by using a syringe smaller than 10 ml). **Do not use a syringe smaller than 10 ml. Never force a flush.**
- › Needle used to access line

### Action:

- Stop infusion or flush.
- Look for damaged area.
- Close clamp above damaged area.
- Wrap damaged area in sterile (clean), 4 x 4 gauze. Secure with tape.
- **Go to the nearest Emergency Department right away.**

## Kidney damage

### Symptoms:

- › Gaining or losing weight quickly
- › Thirstier than usual
- › Weakness
- › Swelling in your hands, legs, or feet
- › Shaking
- › Fine tremor (spontaneous movements in your hands, arms, legs, feet that may come and go)
- › Muscle cramping
- › Numbness and/or tingling of your hands or around your mouth
- › Heart palpitations
- › Not feeling well
- › Loss of taste
- › Skin changes (like new dryness, itching, blisters, or dark areas)

### Cause:

- › Dehydration (not having enough fluids)
- › Loss of electrolytes or minerals because of vomiting, diarrhea (loose, watery poop), fistula, or ostomy output
- › Not peeing as much and kidneys not working well because you are not taking PN or extra fluids as prescribed
- › Low or high levels of potassium, sodium, calcium, magnesium, phosphate, or zinc in your blood
- › PN solution not mixed properly

### Action:

- **Go to the nearest Emergency Department right away.**

### Prevention:

- Always infuse the whole bag of PN or fluids as prescribed.
- Be aware of how much you pee each day. Note any big changes and tell your doctor.
- Follow the guidelines you were given during training and when you were discharged.
- Weigh yourself once a week. Tell your doctor and HPN team if you gain a lot of weight all of a sudden.
- **If there are any differences in your PN solution that you were not told about, tell your doctor and program coordinator or PN pharmacist right away.**



## Learning about home PN

Total PN can cause infection. This may be caused by:

- › Having a Hickman/central line for a long time
- › Infusion of nutrients
- › Infection from another part of the body (like a fistula, ileostomy, colostomy, G-tube, etc.)

**You must use aseptic technique to prevent complications.** Asepsis means there are no organisms (germs). Your Home HPN team will teach you about aseptic technique and why it is important.

### Rules of aseptic technique:

- A sterile object becomes contaminated (dirty) when it touches an unsterile object. For example, if a sterile needle touches an unsterile object, you can no longer use it.
- **Do not walk away from or turn your back on a sterile area.** This will lower the chance of the area becoming contaminated while you cannot see it.
- Hold sterile objects above the level of your waist. This will make sure you can see them and avoid contaminating them by accident.
- Avoid talking, coughing, sneezing, or reaching over a sterile area or object. This prevents contamination by droplets from your nose, mouth, or arm. If you have a cold, wear a mask when working with your Hickman/central line and PN.
- Contaminated hands are the most common cause of infections. You must wash your hands well with soap and water as a part of aseptic technique.

**Remember:** Anything that is sterile (does not have germs) will get contaminated if it touches something that is not sterile.

## Teaching the back-up person

- It is helpful to have someone you live with learn how to do home PN, too. This way, they can help you, if needed.
- When you have finished your training and feel confident, you will teach the back-up person the basics of home PN before you are discharged. This lets the HPN team check how well you have learned and makes you feel more confident in what you have learned.
- **You are responsible for your home PN care.** Your back-up person is available to give encouragement and help, only when needed.

## Getting your PN and supplies

- You will be given PN solutions and supplies when you are discharged.
- The PN nurse will then set up a weekly **PN delivery schedule** with you and the courier. **Medical supplies** (like lines, syringes, needles, and dressing supplies) **and some pharmacy supplies** (like multi-vitamins, vitamin K, normal saline, and heparin flushes) **are sent to your home once a month.**
- If you have questions about your supplies, call 902-473-2957 or contact the program coordinator. If you have questions about your PN, contact the program coordinator, your PN pharmacist, or PN dietitian. The pharmacy provides your:
  - › PN and lipids
  - › Normal saline and heparin flushes
  - › Multi-vitamins and vitamin K
  - › Insulin (if needed)
- If you need more or less supplies, or if you are missing supplies:
  - › Phone: 902-473-2957
  - › Leave a message. Messages are checked each day.
- **It is important to use only sterile supplies when setting up your PN and caring for your Hickman/central line.**
- All supplies used for your home PN should be in sealed packages. This will prevent them from getting contaminated. Needles and the ends of tubing will have protective covers. This will keep them sterile when you are handling your supplies. When possible, devices without needles are used to lower the chance of passing germs through the blood from used needles.

## Storing your PN and supplies

- Store all of your solutions and supplies:
    - › away from other household items.
    - › out of reach of children and pets.
  - Stores supplies:
    - › close to your home PN work area, if possible.
    - › where they cannot get wet.
    - › **where they are not exposed to direct sunlight.**
  - Supplies that need to be kept in the fridge should be placed:
    - › in their own fridge.
- OR**
- › in a special area of your fridge (like a clean shelf or drawer).
- **It is important to have a fridge with space that you only use for your PN.**
  - **You must keep your PN and multi-vitamin vials in a fridge at a temperature between 2 to 8<sup>o</sup> C.** Lipids and vitamin K **do not** need to be refrigerated.
  - Make sure to rotate your PN bags on delivery day. If you have any bags left from your last delivery, make sure to use them first.
  - You will receive about 7 PN bags on your delivery day. This may be more or less, depending on how many times a week you will be giving your PN. Usually, 1 or 2 extra bags are sent in case a bag gets poked (has a hole) or your delivery is delayed because of weather.

## Throwing away used supplies

- Use a yellow sharps bin to get rid of used needles and syringes.
- When the container is full, you can exchange it at your pharmacy for a new one.
- Throw out PN, lipid bags, and tubing in your household garbage.

## Medical and/or surgical supplies

You will receive the following supplies each month:

- › Alcohol swabs (200 per box every 2 months)
- › PN and lipid filter line sets with 1.2-micron filter
- › 70% alcohol for cleaning your work area. **Please ask for more, when needed.**
- › Needles: 18 gauge x 1.5-inch filter (red with filter, for removing vitamin K from glass vial)
- › Needles: 18 gauge x 1.5-inch (no filter, for multi-vitamins and to switch needles after vitamin K is drawn from glass vial before inserting into PN bag)
- › 10 ml syringes
- › 3 ml syringes (used for vitamin K)
- › Clave connectors
- › 3M™ SoluPrep™ swabs (for Hickman/central line dressing)
- › Opsite or 3M™ Tegaderm™ dressings
- › Extra hydration (if ordered)

## PN solution bags

You will get these PN solution bags each week:

- › Bags of PN (about 7) **\*\*These must be stored in the fridge.\*\***

Always keep 1 to 2 extra bags on hand as a back-up. On delivery days, use these up first. Always check your PN bags for your name and expiry dates before using.

## Pharmacy supplies

You will receive the following supplies each month:

- › Bags of lipids: about 28 (these **do not** need to be stored in the fridge)
- › Heparin prefilled syringes: about 28 (these **do not** need to be stored in the fridge)
- › 0.9% sodium chloride (no preservative), 10 ml prefilled syringes: about 90 (these **do not** need to be stored in the fridge)
- › 10 ml vitamin K: 4 **one-ml** vials (one each week, to add every Monday to your PN solution), multi-vitamins #1 vial, #2 vial: 28 of each vial (for a total of 56) **\*\*These must be stored in the fridge.\*\***

## Handwashing

Harmful germs can be easily removed by washing your hands well with soap and water. **You must wash your hands before touching your Hickman/central line supplies.**

1. Before starting, remove any jewelry (watches, bracelets, rings, etc.)
2. Make sure your Hickman/central line is outside of your clothing.
3. Turn on the tap(s) and make sure the water is at a comfortable temperature.
4. Rinse your hands and forearms (up to your elbows) under the running water.
5. Place 1 or 2 pumps of liquid soap in your hand. Rub to cover all surfaces of your hands, fingers, nails, thumbs, and wrists for 1 to 2 minutes. This will make bubbles on your hands and forearms.
6. Rinse your hands and forearms under the running water. Hold your hands up after rinsing so the water does not run down to your hands.
7. Pat your hands and forearms dry with a single-use paper towel, or a clean towel. Use the paper towel or towel to turn off the tap(s).

**It is helpful to have alcohol-based hand rub available, but you must still wash your hands with soap and water for 1 to 2 minutes first.**

## Choosing your work area

- Choose an area that is close to your supplies.
- Make sure the area **does not** have:
  - › Drafts (turn off any fans in the area)
  - › Dirt that you can see
  - › Dust
  - › Clutter
- Make sure the area has enough space and good lighting.
- You will need a smooth table, countertop, or tray that can be cleaned with 70% alcohol. **Do not use wooden surfaces.** They have tiny holes that can hide germs.
- It is best to work at waist height.
- **Do not let children or pets in your work area.**

## Cleaning your work area

- **Wash your hands well (see page 26).**
- Use a single-use paper towel or a clean towel to wipe down your work area with 70% alcohol. Start wiping at the point farthest away from you, and work towards yourself. Rub the surface while wiping to clean it well.
- Let the surface air dry before using.
- **Wash your hands again for 1 to 2 minutes.**

## Adding a multi-vitamin to your home PN solution

Each night, you will add a multi-vitamin to your PN solution. The multi-vitamin gives you:

- › Vitamins A, B, C, D, and E
- › Niacinamide
- › Biotin
- › Folic acid

### Gather your supplies:

- › 2 vials of multi-vitamins (vial 1, vial 2)
- › One 10 ml syringe
- › One 18 gauge x 1.5-inch needle (no filter)
- › 2 to 3 alcohol swabs
- › **Mask, if you have a cough or a cold**

### To add a multi-vitamin to your PN:

- **Put on a mask, if you have a cough or a cold.**
- **Wash your hands well for 2 minutes (see page 26).**
- Clean the surface of your work area with 70% alcohol (see page 27).
- Open the supplies you have gathered on one side of your work area.
- Remove the covers from the vials.
- Firmly wipe the tops of the vials with an alcohol swab using a juicing (twisting in place) motion. Let the vials air dry.
- Attach an 18 gauge x 1.5-inch needle to a 10 ml syringe.
- Pull the plunger back to draw 3 to 4 ml of air into the syringe.
- Remove the protective cap from the needle.
- Insert (put in) the needle in the centre of the first vial. Push down slowly on the plunger to put 3 to 4 ml of air into the vial.
- Withdraw 5 ml of multi-vitamin from the vial and take the needle out of vial.
- Draw back another 2 to 4 ml of air into the syringe.
- Insert the needle into the centre of the second vial. Slowly push in 2 to 3 ml of air.
- Withdraw 5 ml of multi-vitamin from the second vial (for a total of 10 ml).
- Remove the needle from the vial.
- Push out the air that is left over.
- Remove any air bubbles from the syringe by flicking the syringe with your fingers. You may need to pull back on the syringe again to flick the bubbles then push the air back out.

- Carefully put the cap back on the needle and place it on your work surface.
- Remove the sterile protector from the rubber injection site on the PN bag. Wipe the injection site with an alcohol swab. Let it air dry.
- Inject the multi-vitamin into the centre of the injection site. **Be careful not to puncture (prick) the bag with the needle.**
- Remove the needle and place it in the yellow sharps bin (**do not** recap the needle).
- Wipe the rubber injection site on the PN bag with an alcohol swab.
- Mix the solution in the bag well, using a gentle, rocking back and forth movement.

## Adding vitamin K to your home PN solution

You will add vitamin K to your PN solution once a week, on Mondays. Vitamin K helps your blood clot.

**If you are taking a blood thinner (like Warfarin), you do not need to add vitamin K to your PN.**

Contact your PN Team if you have any questions or if you are prescribed blood thinners by another doctor.

### Gather your supplies:

- › Alcohol swabs
- › One 18 gauge x 1.5-inch **red** needle with filter (used to **withdraw** vitamin K from the vial)
- › One 18 gauge x 1.5-inch needle with no filter (used to **inject** vitamin K into the PN bag)
- › One 3 ml syringe
- › 1 ampoule of vitamin K
- › Mask

**To add vitamin K to your PN (can be added the same time as your multi-vitamins are added on Monday, to save preparing your surface and supplies twice the same evening):**

- **Wash your hands well (see page 26).**
- Clean the surface of your work area with 70% alcohol.
- Open the supplies you have gathered on one side of your work area.
- **Put on a mask, if you have a cough or cold, and wash your hands well (see page 26).**



- Wrap an alcohol swab around the neck of the ampoule (as shown in your training).
- With your thumb and index (pointer) finger, snap the ampoule away from you.
- Attach the **red needle with the filter** to a 3 ml syringe. Insert the needle in the centre of the ampoule.
- Withdraw 1 ml of vitamin K from the ampoule. Remove the needle from the ampoule.
- Draw a small amount of air into the syringe to remove the vitamin K from the needle. **Then remove the needle from the syringe and attach the needle with no filter.** Slowly push on the plunger to remove air from the syringe.
- Remove the sterile protector from the rubber injection site on the PN bag. Wipe the injection site with an alcohol swab. Let it air dry.
- Insert the needle into the centre of the PN bag injection site and inject the vitamin K into the bag. **Be careful not to puncture the bag with the needle.**
- Remove the needle and place it in the yellow sharps bin (**do not** recap the needle).
- Wipe the rubber injection site on the PN bag with an alcohol swab.
- Mix the solution in the bag well using a gentle, rocking back and forth movement.

## Adding insulin to your home PN solution

- You will only add insulin to your PN solution, if needed. **Not all patients need to add insulin.** If you need insulin, you will add it each day.

**Check the expiry date on the vial and the date the vial was opened before using it.** Always write the date the vial was opened on the vial. It is only good for 28 days once it is opened.

### Gather your supplies:

- › Insulin syringe
- › Vial of Humulin® R insulin
- › Alcohol swabs
- › **Mask, if you have a cough or a cold**

## To add insulin to your PN:

- **Wash your hands well (see page 26).**
- **Put on a mask, if you have a cough or a cold. Wash your hands again.**
- Clean the surface of your work area with 70% alcohol (see page 27).
- Remove the cover from the vial, if needed.
- Firmly wipe the top of the vial with an alcohol swab using a juicing motion. Let it air dry.
- Wipe the rubber injection site on the PN bag with an alcohol swab. Let it air dry.
- Remove the cap from the insulin syringe. Place cap on clean work surface. Draw back air into the syringe to match the number of units of insulin you will be drawing up.
- Insert the syringe needle into the vial.
- Turn the vial upside down and withdraw the amount of insulin you need.
- Remove the needle from the vial. Check that you have the correct amount of insulin in the syringe.
- Insert the needle into the PN bag injection site and inject the insulin.
- Remove the needle and place it in the yellow sharps bin.
- Wipe the rubber injection site on the PN bag with an alcohol swab.
- Mix the solution in the bag well, using a gentle, rocking back and forth movement.

## Overnight infusion of PN and lipids

### Gather your supplies:

- › PN tubing (1 line with 1.2-micron filter)
- › Lipid tubing (1 line with 1.2-micron filter, same line used for PN)
- › **Mask, if you have a cough or a cold**
- › Tape
- › Alcohol swabs
- › PN solution bag
- › Lipid bag (white solution)
- › 2 ampoules of multi-vitamins (vial 1, vial 2)
- › 1 to 2 normal saline flushes

### To infuse your PN and lipids overnight:

1. Add the multi-vitamins, and any other additives to your PN solution.
  - › Make sure your Hickman/central line is outside of your clothing.
  - › **Wash your hands well (see page 26).**
  - › Clean the surface of your work area with 70% alcohol (see page 27).
  - › **Put on a mask, if you have a cough or a cold.** Wash your hands again.
  - › Follow the steps to add multi-vitamins, vitamin K, and insulin (if needed) to PN solution (see pages 28 to 30)

### Getting ready:

- **Wash your hands well (see page 26).**
- Clean the surface of your work area with 70% alcohol (see page 27). Let it air dry.
- Open 2 packages of **filtered** IV lines.
  - › Check for the marked corner of the package.
  - › Peel open the package starting from that corner.
  - › Gently drop the IV lines onto your work area. Try to touch them as little as possible.
- Make sure that the main roller clamp on each line is closed.
- Place the PN bag and the lipid bag on your work area. Remove the bungs (rubber plugs) from both bags. There is a thin membrane (skin) behind the bungs. This prevents fluids from spilling until the membrane is punctured.
- Keep the PN bag and the lipid bag on a flat surface while inserting the tubing.
- **Wash your hands again.**

### To prime your PN line:

- Remove the cap from the spike on the **filtered** primary line.
- Make sure the cap at the end of the line is secure and the roller clamp is closed.
- Insert the spike into the PN solution bag using a twisting motion. **If you accidentally touch the spike against anything other than the inside of the PN port, throw out the tubing and start again.**
- Hang the bag on the pole.

- Squeeze the soft chamber directly below the PN bag to let fluid enter the line. Fill the chamber with fluid to the line, about halfway.
- Slowly open the roller clamp to start priming the line. Let the fluid go all the way to the end of the line. **Important: You must invert (turn upside down) each Y-port (port on the IV line that you can add another line on, if needed) to also prime the connector sites.**
- Once the line is primed to the end, close the roller clamp.
- Carefully check the primed line for air bubbles. **If you notice air bubbles:**
  - › Remove the cap at the end of the IV line.
  - › Let air out by slowly opening the roller clamp to open the line.
  - › **Do not touch the end of the line, or let it touch anything.**
  - › As soon as all of the air has been removed, close the roller clamp. This will stop the flow of fluid.
  - › Replace the cap at the far end of the IV line without touching the tip of the IV line.

#### **To prime your lipids (fat emulsion) line:**

- Use a new **filtered** line. Remove the cap from the spike.
- Make sure the cap at the far end of the line is secure and the roller clamp is closed.
- Insert the spike into the lipid bag using a twisting motion. **If you accidentally touch the white spike against anything other than the inside of the lipid port, throw out the tubing and start again.**
- Hang the bag on the pole.
- Squeeze the soft chamber directly below the lipid bag to fill the chamber half full.
- Lipids prime the line more quickly than PN. Slowly open the roller clamp to start priming the line. Let the fluid go all the way to the end of the line. **Important: You must invert each Y-port to also prime the connector sites.**
- Once the line is primed to the end, close the roller clamp.

- Carefully check the primed line for air bubbles. **If you notice air bubbles:**
  - › Remove the cap at the end of the IV line.
  - › Let air out by slowly opening the roller clamp to open the line.
  - › **Do not touch the end of the line or let it touch anything.**
  - › As soon as all of the air has been removed, close the roller clamp. This will stop the flow of fluid.
  - › Replace the cap at the far end of the IV line without touching the tip of the IV line.
- Wipe the lowest port on the PN line with an alcohol swab. Then piggyback (add to) the lipid line into that port. You now may connect your line to your Hickman as you have been shown.

## Programming your pump for PN and lipids

### Parenteral Nutrition (PN)

1. Open #1 pump door.
2. Insert PN line (**make sure the line has a 1.2-micron filter**).
  - › Line up the green and blue tubing areas with the matching coloured areas on the pump.
  - › Gently push the round blue hinge of the tubing into the colour-coded area on the pump. You will feel it click into place.
3. Close the pump door.
4. Turn the pump on and let it move through the Wi-Fi, data, and maintenance screens.
5. When it gets to **Select profile**, press the down arrow to **Ambulatory**. Then press **OK**. You should see 5 smiley faces. This means the tubing is loaded correctly.
6. Open the roller clamp on the line.
7. Select **drug A>C** for **Cyclic PN**. Scroll down and select **3-step** (or 2-step, if needed) cyclic PN. Then press **OK**.
8. You should see **SEQ** (sequential mode) in the top left of the pump screen.

## Step #1

- #1 will be highlighted. Press **OK**.
- **Total volume to be infused in the first hour:** Use the up and down arrows to adjust the volume to be infused in the first hour. Then press **OK**.
- **ml/hr (millilitres per hour):** Use the up and down arrows to adjust the rate. Then press **OK**.
  - › “t” (time) will show **1 hour**.
  - › The alarm icon will be highlighted.
- **Alarm:** The alarm will tell you when each step is done. With the alarm icon highlighted, press any arrow button. This will turn the alarm on. The line through the alarm icon will be gone. This means the alarm is on. Press **OK**. #1 will be highlighted again.

## Step #2

- Press the down arrow to move from step #1 to step #2. #2 will be highlighted. Press **OK**.
- **Total volume to be infused in 10 hours:** Use the up and down arrows to adjust the volume to be infused in 10 hours. This is your hourly rate for 10 hours x 10.
  - › For example, if your rate is usually 165 ml an hour for 10 hours, your total volume would be  $165 \times 10 = 1650$  ml.
  - › Then press **OK**.
- **Hourly rate for 10 hours:** Use the up and down arrows to adjust the rate for 10 hours. Then press **OK**.
  - › “t” should now show **10 hours**.
  - › The alarm icon will be highlighted.
- **Alarm:** Press any arrow button. This will turn the alarm on. The line through the alarm icon will be gone. This means the alarm is on. Press **OK**. #2 will be highlighted again.

### Step # 3

- Press the down arrow to move from step #2 to step #3. #3 will be highlighted. Press **OK**.
  - **Total volume to be infused in the last hour:** Use the up and down arrows to adjust the volume to be infused in the last hour. This should be the same volume and rate as in step #1. Then press **OK**.
    - › “t” should show **1 hour**.
    - › The alarm icon will be highlighted.
  - **Alarm:** Press any arrow button. This will turn the alarm on. The line through the alarm icon will be gone. This means the alarm is on. Press **OK**. #3 will be highlighted again.
  - Press the down arrow to move from step #3 to step #4. #4 will be highlighted. Press **OK**.
    - › **END** will be highlighted. Press **OK** again. Then press **START**.
- \*Always check that each step has the correct rate and time before pressing START.\*** To review the settings:
- › Press “C” in the bottom-left corner of the screen. You can review and change the steps, if needed.

#### Important

- **Check that SEQ and 1/3 (if cyclic 3-step) are in the top-left corner.** This tells you the pump is in sequential (cyclic) mode and programmed for 3 steps.
- Check the settings for each step.
- Under the last step, you will see a solid line with the total volume to be infused below it. Compare this to the total volume on your PN bag and make sure they match.
- **If you hear an alarm, always press Silent first.** Then try to fix the problem.

## Lipids (fat emulsion)

1. Open #2 pump door.
  2. Insert lipid line (**make sure the line has a 1.2-micron filter**).
    - › Line up the green and blue tubing areas with the matching colored areas in the pump.
    - › Gently push the round blue hinge of the tubing into the blue area (sphere shaped that fits the blue hinge inside it) on the pump. You will feel it click into place.
    - › Close the pump door.
  3. Turn the pump on and let it move through the Wi-Fi, data, and maintenance screens.
  4. When it gets to **Select profile**, press the down arrow to **Ambulatory**. Then press **OK**. You should see 5 smiley faces. This means the tubing is loaded correctly. Open the roller clamp on the line.
  5. Select **drug D>F**. Then press **OK**.
  6. Press the down arrow to move to **Fat emulsion**. Then press **OK**.
  7. Select the **total volume to be infused in 12 hours**:
    - › Use the up and down arrows to adjust the volume to be infused in 12 hours. This is your hourly lipid rate for 12 hours x 12. For example, if your rate is 18 ml an hour for 12 hours, your total volume would be:  
 $18 \text{ ml} \times 12 \text{ hours} = 216 \text{ ml}$
  8. Set the **duration (hours to infuse)** to 12 hours. Then press **OK**.
  9. The **rate per hour** should be highlighted. This should be correct after setting the total volume to be infused and duration. Press **OK**.
  10. **START** should be flashing. Check the settings. **If they are correct** (total volume to be infused, duration, rate each hour), press **START**.
- \*\*The pump can be pre-programmed without the lines inserted.** Press **PROG** to select the settings. Then press **EXIT**.



## Morning routine

### Gather your supplies:

- › Bottle of 70% alcohol
- › Paper towel
- › 2 pre-filled sodium chloride (N/S) syringes
- › One 5 ml pre-filled heparin syringe (this syringe has the same pressure as a 10 ml syringe, so it is safe to use for flushing)
- › 2 to 3 alcohol swabs
- › **Mask, if you have a cough or a cold**

### Getting ready:

- **Wash your hands well (see page 26).**
- **Put on a mask, if you have a cough or a cold.**
- Wash your hands again.
- Make sure your Hickman/central line is outside of your clothing.
- Clean the surface of your work area with 70% alcohol (see page 27).
- Wash your hands again.

### To flush your Hickman/central line:

1. Check the expiry dates of the saline and heparin flushes. Open the packages and place them within reach.
2. Open the packages of alcohol swabs.
3. Stop both pumps and turn the power off.
4. Clamp all of the tubing (PN tubing, lipid tubing, and Hickman/central line).
5. Make sure the Hickman/central line is clamped. Then disconnect it from the PN tubing.
6. **Wash your hands well (see page 26).**

7. One at a time, remove the caps from the saline and heparin syringes. Hold them upright away from your sterile field.
  - › Gently pull back on the plungers. Then push up to get rid of any air.
  - › Put the caps back on and place the syringes on your work area.
8. Wipe the end of your Hickman/central line connector with an alcohol swab using a juicing motion for 30 seconds. Let it air dry.
9. Attach the saline syringe to your Hickman/central line. Push in the end of the clave connector and turn.
10. Open the Hickman/central line clamp. Then pull back on the syringe plunger 1 ml to check for blood return.
11. Inject both 10 ml syringes of saline using the turbulent flush method.  
**\*\*To keep positive pressure in the line, always close the clamp on your Hickman/central line as you are flushing the last 1/2 to 1 ml of saline.** Then disconnect the syringe.
12. Attach the heparin syringe to the clave connector. Do this the same way you attached the saline syringe.
13. Open the clamp on the Hickman/central line and inject the heparin solution using the turbulent flush method. **\*\* To keep positive pressure in the line, always close the clamp on your Hickman/central line as you are flushing the last 1/2 to 1 ml of saline. \*\*** This will create positive pressure and prevent fluids or blood from flowing back into the line. Then disconnect the syringe.
14. Wipe the connection site with an alcohol swab.
15. Make sure:
  - › the Hickman/central line is clamped.
  - › the clave connector is securely attached and taped.

**\*\*Never flush your Hickman/central line using a syringe smaller than 10 ml.\*\*  
This is too much pressure for the line.**

**\*\*Never force a flush if it seems like the lumen is blocked.\*\***

**You must change your Hickman/central line dressing once a week to help prevent infection. Try to change your Hickman/central line dressing and your clave connector at the same time each week.**

**To change your Hickman/central line dressing:**

- **You must wear a mask while changing your dressing.**
- Use SoluPrep™ (chlorhexidine gluconate 2% with isopropyl alcohol 70%) swabs to clean the area. **Do not use SoluPrep™ on broken skin.**
- **You must use aseptic technique (see page 22).**

**It may help to use a mirror to assess the site while changing the dressing.**

**Gather your supplies:**

- › 3 to 4 SoluPrep™ swab sticks
- › 4 x 4-inch transparent (clear) Tegaderm™ dressing
- › Mask
- › Sterile gloves
- › Plastic bag for garbage

**Getting ready:**

- **Wash your hands well (see page 26).**
- **Put on a mask.**
- Clean the surface of your work area with 70% alcohol (see page 27).
- Wash your hands again.

**To change your Hickman/central line dressing:**

1. Loosen the edges of your old dressing on all 4 sides. Remove the old dressing by gently pulling up toward the exit site.
  - › **Be careful not to tug or pull on the catheter.**
  - › **Do not touch the exit site with your hands.**
2. Place the old dressing in a plastic garbage bag.
3. **Wash your hands again.**

4. Check for signs of infection:
  - › Redness
  - › Pain
  - › Drainage or swelling at the exit site or over the catheter.

**If you see any of these signs, place a gauze dressing over the exit site and call your doctor or go to the nearest Emergency Department.**

5. Open the SoluPrep™ swab packages, so each swab is easy to pull out when you need it.
6. Use one hand to hold the end of your Hickman/central line. Lift the catheter away from your skin. Keep it away from your skin until you are finished cleaning your skin and the catheter.
7. Use one side of a SoluPrep™ swab to start cleaning the site from side to side with a gentle rubbing motion. Clean an area about 4 inches by 4 inches around the exit site.
8. Use the other side of the swab to clean the **same** area with an up and down rubbing motion. Then throw the swab in the garbage.
9. Take a new swab from an open package. Start at the exit site and clean your skin, moving outward in a circular motion to cover an area about 4 inches by 4 inches. **Always rub in the same direction.**
10. Use the other side of the swab to clean the **same** area, but moving in the opposite direction. Then throw the swab in the garbage.
11. Take a new swab from an open package. Start at the exit site and clean your catheter, moving outward to cover an area about 4 inches by 4 inches.
12. Use the other side of the swab to clean the underside of the catheter in the same way. Then throw the swab in the garbage.
13. Make sure you have cleaned all sides of the catheter.
14. Set the catheter down on your skin. Let your skin air dry fully.
15. Pick up the new Tegaderm™ dressing, **only touching the outer edges.**
16. Peel the backing away from the dressing.
17. Place the dressing over your catheter by centering it over the exit site. **Do not** cover your nipple area. This area can be more sensitive when you remove the dressing.

18. Peel the paper edge off the dressing.
19. Gently press along the edges of the dressing so it sticks well to your skin.
20. Throw away all used dressings and swabs in the plastic garbage bag.
21. **Wash your hands well (see page 26).**

### **To change your clave connector:**

#### **Gather your supplies:**

- › Two 10 ml saline syringes
- › 2 to 3 alcohol swabs
- › Waterproof tape
- › Adapter
- › **Mask**

### **To change your clave connector:**

1. **Wash your hands well (see page 26).**
2. **Put on a mask.**
3. Make sure the clamp is closed.
4. Remove the tape from your Hickman/central line.
5. Then attach the tip of the saline syringe to the new adapter. Flush the adapter with a small amount of saline (0.5 ml) before connecting it to the lumen. Leave syringe attached to the new adapter.
6. Clean the adapter connection of the Hickman/central line with an alcohol swab. **Do not put the line down once it has been cleaned.**
7. Remove the old adapter. **Then attach the new adapter securely right away with the syringe still attached.**
8. Open the clave connector clamp. Then pull back on the syringe plunger 1 ml to check for blood return.

9. Flush the new adapter (that is attached to the Hickman/central line) with two 10 ml syringes of normal saline. Then flush with heparin **if you are not hooking up to PN right away.\*\*During the last 1/2 to 1 ml of flushing, keep pushing gently on the syringe plunger while closing the clamp on your Hickman/central line.\*\*** This will create positive pressure and prevent fluids or blood from flowing back into the line. Then disconnect the syringe.
10. Tape the adapter connection with waterproof tape.

## Caring for your Hickman/central line

### How often should I flush my Hickman/central line?

- If you are not using your Hickman/central line:
  - › Check for blood return.
  - › **Flush once a week** with 20 ml (2 x 10 ml) of normal saline using the turbulent flush method.
  - › Then flush with 5 ml of heparin.

### When should I flush my Hickman/central line?

- Flush your Hickman/central line before and after giving PN, lipids, or hydration fluids.
  - › Check for blood return.
  - › Flush before use with 10 ml of saline using the turbulent method.
  - › Flush after use with 20 ml (2 x 10 ml) of saline using the turbulent flush method. Then flush with 5 ml of heparin.

### Why is it important to flush my Hickman/central line?

- You must flush your Hickman/central line to:
  - › make sure it stays patent (not blocked). If the line is not flushed enough or flushed poorly, the line can become blocked.
  - › lower the risk of clotting and infection.

## What should I use to flush my Hickman/central line?

- After a PN infusion, use:
  - › 2 pre-filled, sterile 10 ml syringes of saline.
  - › 1 pre-filled heparin syringe.

## Common questions about PN tubing and solutions

### How often should I change the PN tubing?

You must change the PN tubing every 24 hours (1day).

### What do I need to check on the PN bag or label?

- Check that the PN bag or label has the correct name, ingredients, expiry date, and total ml.
  - › If anything is wrong, contact your HPN team or PN pharmacy at the Victoria General (VG) Hospital.
  - › Check the bag before use for leaking, cloudiness, discolouration (change in colour), and floating bits. **Do not use the solution if you see any of these things.**

## Common questions about Hickman/central lines

### How often should I change the Hickman/central line dressing?

Change your Hickman/central line dressing once a week, or sooner if it is wet, dirty, or loose.

### What signs of infection should I check for when changing my dressing?

- Check for:
  - › Redness
  - › Pain
  - › Drainage or swelling at the exit site

### **What should I do if my Hickman/central line is hard to flush?**

- Change position, cough, and take deep breaths. Then try flushing again.
- **If the line is still hard to flush, or does not flush at all, go to the nearest Emergency Department right away.**

### **What should I do if there is a tear or a crack in my Hickman/central line?**

- Clamp the line closer to your body than to the damage. Wrap the damaged area in sterile gauze and secure it with tape. **Then go to the nearest Emergency Department right away.**

## **Common questions about checking for complications**

### **How often should I check my temperature?**

Check your temperature if:

- › you are not feeling well.
- › you feel hot.
- › your skin looks red.

### **What is a normal temperature?**

A normal temperature is 36.5 to 37.5° C/97.7 to 99.5° F

### **What does a high temperature mean?**

A high temperature could be a sign that you have an infection.

### **What should I do if my temperature is high?**

- **Go to the nearest Emergency Department right away** if your temperature is:
  - › Above 38° C/100.4° F**OR**
  - › Above 37.6° C/99.7° F for 2 to 3 days

### **What is the most important step in preventing infection?**

Handwashing and good aseptic technique (see page 22) are the most important way to prevent infection.



## **What are the symptoms of an air embolus?**

Symptoms of an air embolus include:

- › Pain in the neck, shoulder, or back on the same side as your Hickman/central line
- › Loss of consciousness
- › Cardiac arrest (your heart stops beating)

## **What should I do if I have these symptoms?**

- Clamp your Hickman/central line as close to your body as possible.
- Lie down fully on your left side with your head flat.
- **Call 911. Do not drive yourself to the hospital.**

## **What are the symptoms of an electrolyte imbalance?**

Symptoms of an electrolyte imbalance include:

- › Shaking
- › Muscle cramps
- › Tingling in your hands and/or mouth

## **What should I do if I have these symptoms?**

- Make sure you are taking all of your PN and fluids as prescribed.
- Check your blood sugar, if you have a machine at home.
- **Go to the nearest Emergency Department right away to be assessed (checked).**

## What are the symptoms of hypoglycemia (low blood sugar)?

If your PN infusion had to be stopped early, you may have:

- › Sweating
- › Heart palpitations
- › Nausea
- › Shakiness
- › Hunger
- › Blurred vision

## What should I do if I have these symptoms?

- Check your blood sugar, if you have a machine at home. Drink some orange juice or take a dextrose tablet, if you are able to.
- Restart your PN infusion, if your blood sugar is low (below 3.5 to 4), and you have symptoms listed above.
- **If you still have symptoms listed above, go to the nearest Emergency Department right away.**

### **Important**

#### **If you are admitted to the hospital:**

- Tell the staff treating you that you are on home PN. Give them the contact information for your home PN team.
- Tell your home PN team that you have been admitted to the hospital.

# Notes:

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### Looking for more health information?

Find this pamphlet and all our patient resources here: <https://library.nshealth.ca/PatientEducation>

Contact your local public library for books, videos, magazines, and other resources.

For more information, go to <http://library.novascotia.ca>

Connect with a registered nurse in Nova Scotia any time: call 811 or visit <https://811.novascotia.ca>

Learn about other programs and services in your community: call 211 or visit <http://ns.211.ca>

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*Prepared by: The Nova Scotia Home Parenteral Nutrition Program for Adults*

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