

## **Your Health Care Team – Autologous Transplant**

**Your Blood and Marrow Transplant Team includes the following professionals:**

### **Doctors**

While undergoing your transplant, medical care is provided by a transplant doctor. They see you on a daily basis to answer questions you may have and keep you informed of your progress. Responsibilities of the transplant doctors change every 2 weeks. This means that you will have the opportunity to receive care from a few doctors during your hospital stay and recovery period. Weekly meetings between the doctors and other team members keep everyone up-to-date on the status of every patient.

### **Nurse Practitioners and Physician Assistants:**

These providers have advanced training in transplant patient care and have day-to-day responsibility for your care while you are in the hospital or in the clinic. They work in close collaboration with the doctors in both the inpatient and outpatient setting.

### **Pre-Transplant Nurse Coordinators**

Your pre-transplant nurse coordinator tracks your treatment before your transplant admission and plans the necessary testing and treatment you will need to get ready for transplant. The BMT nurse coordinator is your primary contact as you work your way toward transplant.

### **Inpatient Nurses**

These nurses are experienced in the care and specific needs of transplant patients. Your inpatient staff nurses organize your care from the time you are admitted until you are discharged from the hospital. Once admitted, your nurse will discuss the transplant process and what will be expected of you during your hospital stay. They also will be available to help you and your family with

physical or emotional problems as they arise. Throughout your hospital stay, they will provide ongoing education about the transplant process in preparation for discharge.

### **Care Management**

Your case manager is a nurse that will partner with you, your family, and your healthcare team to coordinate a safe discharge. The team will begin working on your transition for a safe discharge as soon as you are admitted to the hospital. They help coordinate home care needs, which could include a visiting nurse coming to your residence as well as home care supplies.

### **BMT Clinic Nurses**

Once you are discharged, the outpatient clinic nurses will help develop your plan of care in the outpatient setting. These nurses are also experienced in the care and specific needs of transplant patients. Your clinic nurse will assist you and your caregiver through the recovery process.

### **Social Workers**

Part of your required pre-transplant preparation is an initial psychosocial assessment with a social worker that will give you the opportunity to discuss non-medical needs and other concerns you may have. Social work is available to provide as needed mental health support services, including counseling, therapy and support groups to help patients, families and caregivers adjust to the transplant process. Social workers are available to providing assistance for coping with the stress of hospitalization or post-transplant complications. They are available to address practical matters as well, including education regarding Social Security Disability, caregiver planning, community and Michigan Medicine resources, financial stress, and referrals to insurance specialists.

**Dietitians**

The transplant dietitian will meet with you while you are inpatient to explain any diet considerations during your hospital stay and when you go home. They also work with you to set nutritional goals to prevent weight loss, follow your nutrition intake and offer suggestions on how to achieve your nutrition requirements. The dietitian is available to you after you are discharged and during your recovery as your appetite returns to normal.

**Clinical Pharmacists**

A clinical pharmacist participates in the planning of your chemotherapy and other medications you receive while outpatient or inpatient. They are available to answer questions you may have about the medications you receive.

**Cell Therapy Technologists**

This team is involved in apheresis procedures and processes the stem cell products after harvesting. A cell therapy tech will bring your cells to the bedside on the day of transplant.

**Physical/Occupational Therapists**

A physical and occupational therapist may see and assist you while you are in the hospital, to help you maintain your strength and endurance during and after transplant. A physical therapy tech will also be available to encourage you to be active throughout your stay.

**Inpatient Spiritual Care**

A spiritual care counselor is a supportive care resource for coping with the stress of transplant. They are available to provide you with spiritual and religious resources.

**Medical Assistants and Patient Care Techs**

Medical Assistants in the clinic will check you in and obtain your vital signs before seeing the doctor. On the inpatient unit, they will assist you with daily activities including hygiene and mouth care, assess your vital signs, draw blood, and check blood sugars.

**Clerical Staff**

Clerical Staff will check you in at clinic appointments and when you are admitted to the inpatient unit. They coordinate communication between other departments or units in the hospital.

**Research Coordinators**

Research Coordinators ensure that protocol requirements such as diagnostic tests and lab samples are completed. They also ensure that study medications are dispensed and tracked for any clinical trials you may be enrolled in.

## **Common Pre-Transplant Tests and Procedures**

**Blood tests-** The most common test (called a “Complete Blood Count” or CBC) measures the number of red blood cells, white blood cells, and platelets in the blood. In addition to blood cell counts, tests to measure the values of many chemicals in the blood (such as a “metabolic panel”) can indicate how other parts of the body are functioning, including your liver, kidneys, heart and lungs. A metabolic panel is one test within a chemistry panel which are groups of tests that are ordered to determine a person’s general health status.

**Bone marrow tests-** Blood cells (white blood cells, red blood cells, and platelets) are made in the marrow. Bone marrow tests allow doctors to look at the fluid (inner liquid part of the marrow also known as the spongy part of the bone) and tissue in the marrow to determine whether cancer or another disease is affecting blood cell production or the structure of the marrow. Marrow tests can help determine the type and extent of the disease. Certain changes to blood cells can be detected in marrow samples before they can be detected in blood samples.

**Imaging tests-** Imaging or radiology tests create pictures of the chest, abdomen (belly), head, neck, and other parts of the body. Examples of imaging tests include X-rays, ultrasound, CT scans, MRI, and PET scans. Imaging tests are generally used to look for signs of disease or to check if the cancer (tumors or masses of cells) has spread to other areas.

**Some of the tests below may be ordered for you before your transplant admission:**

- **Echocardiogram-** An echocardiogram (echo) is a test that uses high frequency sound waves to make pictures of your heart. This tests helps your doctor to find out the size and shape of your heart, how your heart moves and the heart’s pumping strength.

- **EKG (Electrocardiogram)**-An EKG records the electrical signals in your heart. It's a common test used to detect heart problems and monitor the heart's status in many situations.
- **Pulmonary Function Tests (PFTs)**- PFTs are a group of tests that measure how well your lungs work. This includes how well you're able to breathe and how effective your lungs are at being able to bring oxygen to the rest of your body.
- **Chest X-Ray (CXR)**- A chest x ray produces images of the lungs, heart, airway, blood vessels and the bones of the spine and chest.
- **Positron Emission Tomography (PET) Scan** – A PET scan is an imaging test that measures blood flow, oxygen use, glucose metabolism and other body processes. It is commonly used to detect and monitor cancers because it shows tissue abnormalities at the cellular level.
- **Computed Tomography (CT or Cat) Scans**- A CT scan is an imaging test that combines a series of X-ray images taken from different angles around your body and uses computer processing to create cross-sectional images (slices) of the bones, blood vessels and soft tissues inside your body. CT scan images provide more-detailed information than plain X-rays do.
- **Magnetic Resonance Imaging (MRI)**- Is a medical imaging technique used in radiology to form pictures of the anatomy and the physiological processes of the body. MRI scanners use strong magnetic fields and radio waves to generate images of the organs of the body.
- **Skeletal Survey**- (also called a bone survey) is a series of x-rays of all the bones in the body.
- **Bone Marrow Biopsy and Aspiration**- Samples of fluid, tissue and cells are examined under a microscope to look for chromosomal changes and other changes in the cells. This test is used to evaluate the response to cancer treatment and to further identify the type of abnormality in the bone marrow.

- **Lumbar Puncture (LP)** - is a medical procedure in which a needle is inserted into the spinal canal, most commonly to collect cerebrospinal fluid (CSF) for diagnostic testing.
- **24 Hour Urine Collection**- A 24-hour urine test is used to check kidney function and measures certain proteins present in the urine.

# The Tunneled Catheter

## What is a tunneled catheter?

A tunneled catheter is a small tube made of a material called silicone. It is called “tunneled” because it is inserted into a large vein and tunneled under the skin to a place where it exits your body. In this handout, we will simply refer to it as a catheter.

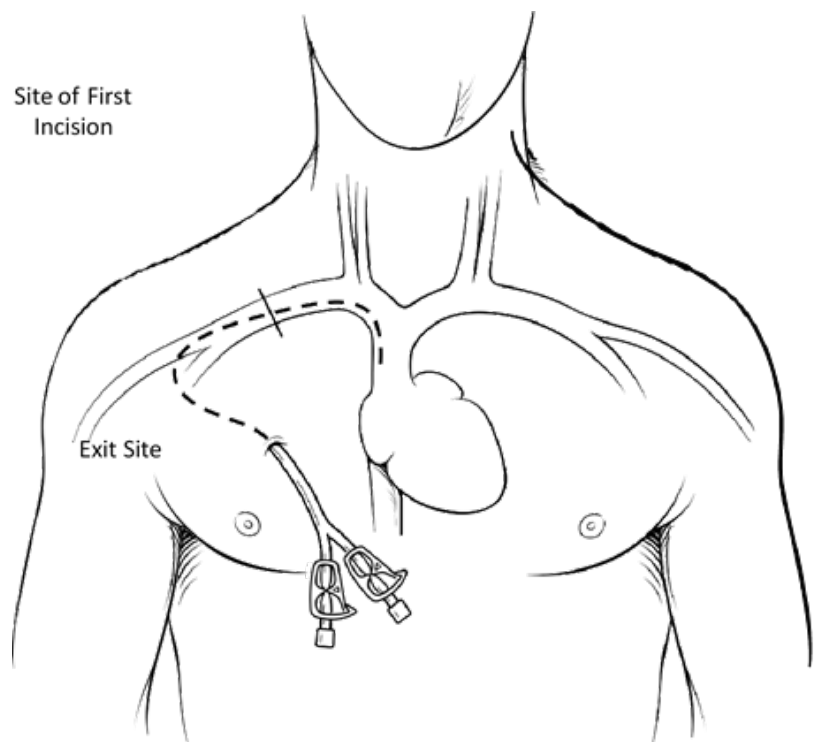


## Why are tunneled catheters used?

A catheter is used to give medications, fluids, blood products, chemotherapy, stem cells, or nutrition through a vein. It may also be used for drawing blood or for apheresis.

## How is the catheter inserted?

The catheter is inserted in an operating room or radiology department and should take about 30-60 minutes. The practitioner makes a small opening in the mid-chest area. Another opening is made where the catheter enters the vein. A tunnel is formed under the skin between the two openings. The catheter is passed through this tunnel and then gently threaded until the tip is near your heart in the large vein called the superior vena cava. After placement, the catheter will be checked to confirm it is in the right position.





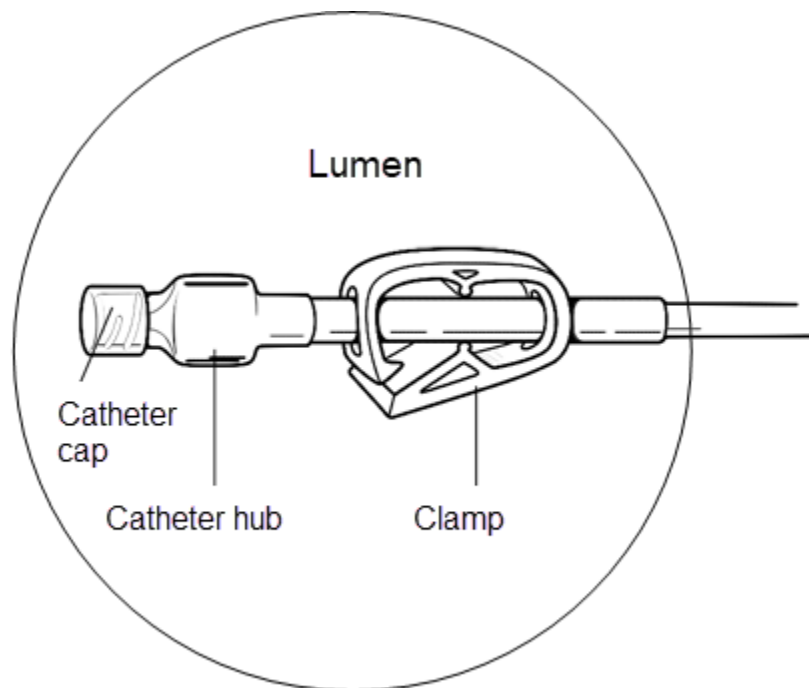
## What is a cuff?

Most catheters have a small cuff that lies beneath the skin about one to four inches from the exit site. The cuff serves two main purposes:

1. The cuff holds the catheter in place by forming scar tissue. Scar tissue will grow around the cuff after 1-2 weeks, making it difficult to pull the catheter out.
2. The cuff helps protect against infection by blocking bacteria from entering the exit site.

## What is a lumen?

The word lumen means the opening or path that is inside the catheter. It is through this opening that you give medications or blood can be drawn. We also use this word to describe the ends of the catheter that are outside your body. You will notice that your catheter has 1, 2, or 3 lumens (see image below).



Adapted from "Care of the Tunneled Catheter" Manual, 2016

# Before You Get Your Peripherally Inserted Central Catheter (PICC)

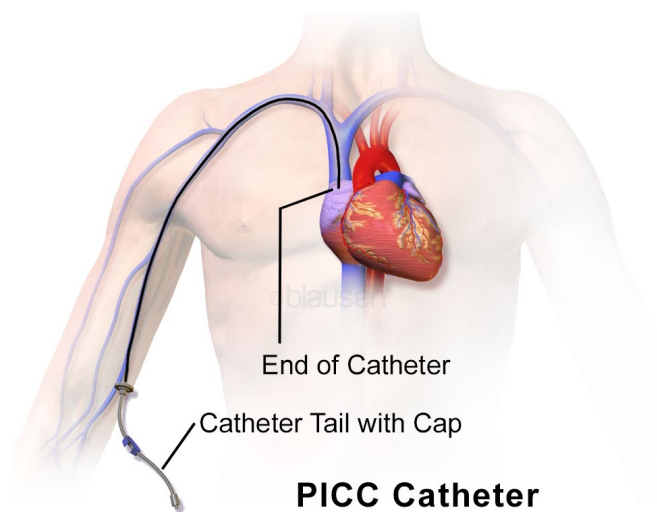
## What is a PICC?

A PICC is a type of intravenous (IV) device. It is a very long, thin, soft flexible catheter. In adults, we insert PICCs through a vein in your arm to provide intravenous medications or draw blood.

Depending on the duration of your treatment, a PICC can remain in place for weeks to months at the discretion of your doctor.

## Where in my body is a PICC located?

- We insert a PICC into a vein in your arm, usually just above the elbow.
- We thread the PICC through a vein in the arm so the end (called the tip) rests in one of the larger veins in your chest (near your heart). This position helps ensure that the PICC is safe to use.



By Blausen Medical Communications,  
Inc. CC BY 3.0, via Wikimedia  
Commons.

## Why do I need a PICC?

We often consider PICCs for patients who need one or more of the following:

- IV medications that can cause damage to the smaller veins in the arm
- IV treatment over a prolonged period of time such as weeks or months (example: antibiotics, chemotherapy, blood transfusions)
- Blood draws or infusions for people whose veins are difficult to access
- IV fluids for hydration or nutrition that can't be provided by mouth or absorbed by the stomach

## **How is a PICC inserted?**

A specially trained healthcare professional will insert the PICC. The procedure can be done in your hospital room or in a special procedure room, often the interventional radiology suite.

- Most patients feel little or no discomfort during the insertion. We may use a local numbing medication to minimize the pain associated with the needle stick.
- After the PICC is in place, it will be checked to make sure the end of the catheter is in the right location in your body. After this is verified, your PICC can be used to draw blood or receive treatments.

## **What are the risks of a PICC?**

The risks involved with inserting a PICC include:

- Accidental puncture of a blood vessel, nerve or tendon near the insertion site
- Bleeding
- Infection either at the site of PICC placement or in the bloodstream
- Blood clots in veins where the PICC is placed
- Incorrect positioning of the end (or tip) of the catheter requiring either an adjustment or removal of the PICC
- Breakage of the catheter
- Blockage of the PICC requiring medication to open the blockage or removal of the PICC

## **What precautions should I know about living with a PICC?**

You will be able to bend and use your arm as normal while the PICC is in place, but you will need to follow some precautions to ensure your PICC stays in place and functions well.

- Do not carry heavy weights (more than 5lbs).
- Do not exercise vigorously with your arm while the PICC is in place.
- Avoid contact with water when you have a PICC. You can shower with your PICC in place with a waterproof covering (plastic wrapping or commercially available products).
- Do not swim or take a tub bath (submerge) while the PICC is in place.

## **How will I care for my PICC?**

- Change the clear covering (bandage) on your PICC at least once a week or sooner if loose, wet, or soiled.
- You, a family member, nurse, home care agency, doctor's office, or infusion clinic will need to flush the PICC periodically to keep the line open

## **What are the other options instead of a PICC?**

There are other types of catheters that administer medications, nutrition or blood.

- **Regular Peripheral IV-** placed in your arm or hand for medications that you can receive through this route. Keep in mind you must change this every 3 to 5 days.
- **Midline-** placed in your arm by a physician or nurse. Remains in place for 2 to 3 weeks. Only certain medications can be given through this device.
- **Non-Tunneled-** inserted by a doctor into your neck, upper chest or groin. Often placed in an operating room. With this catheter in place you must typically remain in the hospital.
- **Tunneled Catheter-** placed in your neck or chest and anchored under your skin so that it does not come out as easily as a central line. These devices tend to be more difficult to insert and remove and are often used for chemotherapy.
- **Port-** implanted under your skin for long term use. This requires going to the operating room for insertion. A port may remain in place for many years and be used repeatedly. This is often used for chemotherapy.

## Donor Neupogen/G-CSF Instructions

Name: \_\_\_\_\_ MRN: \_\_\_\_\_

### What is my Neupogen / Granix / Zarxio / Nivestym dose?

Inject \_\_\_\_\_ 300 mcg Pre-filled syringes at \_\_\_\_\_, and

Inject \_\_\_\_\_ 480 mcg pre-filled syringes at \_\_\_\_\_

beginning on: \_\_\_\_\_

**Total dose per day = \_\_\_\_\_mcg.**

### What is a Cytokine?

Your new medication is a natural protein produced in the human body. It stimulates the bone marrow to make blood stem cells which then circulate through the blood stream.

### Are there any side effects?

Some people may experience bone pain (especially in the hips and lower back), fatigue, insomnia, headaches, nausea, vomiting, fever, allergic reactions, or skin rash. There may be pain, swelling or redness at the injection site.

### What should I do if I experience any of these side effects?

If you experience any of the above listed effects or other symptoms which are new while taking this medication you must:

1. Contact your Nurse Coordinator during office hours: (M-F 8 am - 5 pm).
2. Your coordinator is: \_\_\_\_\_
  - Telephone number: \_\_\_\_\_
3. After hours, weekends, and holidays contact the BMT doctor on-call through the paging operator at (734) 936-6267. Ask to have the on-call BMT Attending Physician paged.

**Are there any medicines I should not take?**

There are medications that can interfere with the stem cell collection procedure. You must tell your doctor and nurse coordinator about any medications you may be taking including over the counter medications.

**Are there any medications I can take for bone pain?**

You may take Tylenol or Extra Strength Tylenol. If Tylenol is not effective, you may take a non-steroidal medication. These include Ibuprofen, Motrin, and Aleve. Follow the package directions. Again, please call if you are experiencing any side effects or if these medications are not helping your pain.

**Where should I keep my new medication?**

You should store your medication in the refrigerator at a temperature of 36 -46 degrees Fahrenheit. Do not freeze. You may let the medicine warm up to room temperature before you inject it. The medicine can stay out of the refrigerator safely for up to 24 hours, but only if necessary.

**What do I do with the syringes I've used?**

Place needles and syringes in a hard, closed container, such as a coffee can or empty laundry container that the needles cannot poke through. These containers should be marked and kept away from children and pets. Needles and syringes in a hard closed container may be placed in your trash.

**What if I forget to take my shot?**

Generally, you should try to take your shots at the same time each day. If you miss your regularly scheduled dose by a few hours, you should take your regular dose as soon as you can. If you are more than a few hours late, contact your doctor/nurse coordinator at the numbers listed on the front of this page.

## **Mozobil (Plerixafor) Information**

### **What is Mozobil?**

Mozobil (plerixafor) works in combination with granulocyte-colony stimulating factor (G-CSF) Neupogen to help move the stem cells out of the bone marrow and into the bloodstream. The stem cells can then be collected, stored, and given back to the patient during apheresis. This drug may or may not be added to your treatment plan.

### **What are the side effects?**

Diarrhea is a common side effect.

### **How do I prevent Diarrhea?**

Take 2 tablets of Imodium (Loperamide) approximately 30 minutes to one hour before the first dose of Mozobil. You will receive further instructions as needed.

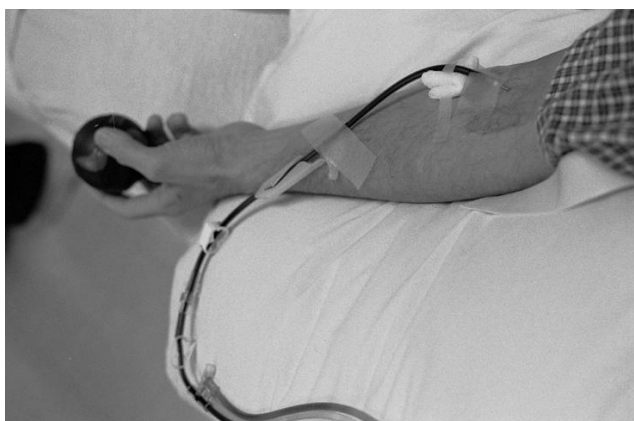
This drug is administered as a subcutaneous (under the skin) injection in one of two places:

- Outpatient infusion area in Mott Hospital (7<sup>th</sup> floor, Reception B)
- or
- Cancer Center Infusion Area in University Hospital on Level B-1 Reception A.

## Apheresis Instructions

Apheresis is performed as an outpatient procedure and usually takes 5 hours per procedure. The patients or their donor will have 1 to 4 procedures done to collect the required number of stem cells. For several days prior to the procedure, a drug called Neupogen®, which is a growth-factor, is taken in injection form to produce a greater number of stem cells, which are released into the blood.

Apheresis is done by inserting a needle into one arm and connecting the IV tubing to a machine where the peripheral stem cells are separated and collected. The remaining blood components (white cells, red cells and platelets) are returned to you through another IV in your other arm. The only discomfort you may feel is when the IV needles are inserted. In some cases, an IV catheter is inserted in the chest, neck or groin if the veins in the arms are not large enough or strong enough for the procedure.



You will need to report to the Apheresis Unit early in the morning for your apheresis procedure. If you are traveling a great distance, arrangements can be made for lodging by calling the bone marrow transplant social worker or Patient & Visitor Accommodation Program. Someone should accompany you to this appointment in case you need to be driven home.



**Before your apheresis:**

- ☐ Eat a normal breakfast
- ☐ Drink a full 8-oz. glass of milk: you need the calcium for the procedure
- ☐ Take the prescription medication you usually take, unless you were told otherwise. (Notify the apheresis nurse of all medication taken)
- ☐ If you are on an **ace inhibitor** for your blood pressure, **do not take it the morning before your procedure.**
- ☐ Do not take over-the-counter medications unless approved by a transplant doctor. (You may take Tylenol, Motrin or Advil and Claritin)

You should not lift anything heavy for several hours after apheresis to allow the needle sites to heal.

**Location:** The apheresis procedure is done in the University Hospital-Apheresis Procedure Unit room. This is located on level 2 of the University of Michigan Hospital, near the hospital cafeteria.

**Questions?** If you have questions regarding your appointment, contact the Transfusion & Apheresis Procedure Unit at (734) 936-6900.

## Preparing to Collect Stem Cells: When to Call the Doctor

Everyone is different and may have slightly different complications after treatment. In order to help you, we need you to be aware of what is abnormal or unusual for you. Be alert for anything that is different and report it to us right away. This will help us respond more quickly as we work together as partners to meet your needs.

### When should I call my doctor or nurse?

- You have a temperature of 100.5° F (38.1° C) or higher by mouth
  - **Do not** take Tylenol® or aspirin until you speak with your doctor or nurse
- You have signs and symptoms of an infection. These include shaking and/or chills, a burning feeling when passing urine, a cough, sore throat, a general feeling of tiredness or “flu-like” symptoms, or fever.
- You are feeling confused, dizzy, overly tired or weak.
- You notice yellowing of your eyes or skin
- You have redness, pain or sores in your mouth
- Your heartbeat feels unusual or irregular
- You have been unable to eat or drink in the past 24 hours
- You have been nauseated or vomiting for more than 24 hours
- You do not have a bowel movement for 2-3 days
- You have diarrhea (loose, watery stool) for more than 24 hours
- You have blood in your urine or in your stools (either bright red or black bowel movements)
- You have any vaginal bleeding which is unusual for you
- You have a nose bleed that does not stop after 20 minutes

- You notice any other bleeding or bruising which is unusual for you
- You have pain that is not controlled by your current medication
- You notice any changes in your catheter, including a change in the appearance of the line, redness, drainage, swelling or pain. If you are unable to flush catheter ports, the catheter becomes dislodged or leaks

**Call if you have any other questions or concerns which are not listed above.**

### **Emergency Phone Numbers**

- M - F 8am to 5pm call: (734) 936-9814
- **After hours, weekends, holidays:** Call the paging operator and ask to have the on call BMT physician paged (734)-936-6267

## Preparing for Your Hospital Stay

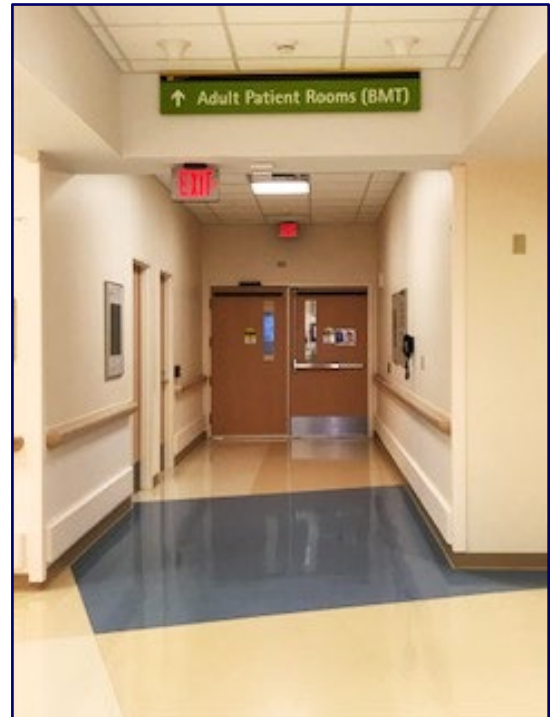
Being in the hospital can be difficult. The transplant team encourages you to bring personal items to make the hospital room feel more at home. Items from home can also provide distraction and often help decrease stress and boredom. The items listed below are offered as suggestions. Remember, your room size is limited. Check with your nurse coordinator or social worker if you have questions about items not on this list.

### Items you ***must*** bring:

- ☐ One copy of your Medical Durable Power of Attorney and Living Will
- ☐ Your transplant education binder
- ☐ Your current list of medications you take

### Items to ***consider*** bringing:

- ☐ Pajamas, sweats, or loose fitting, comfortable street clothing to change daily
- ☐ Clean underwear to change daily
- ☐ Slippers with non-skid bottoms or slip on shoes
- ☐ Shoes to walk the halls/ride exercise bikes
- ☐ Hangers for the closet
- ☐ Turbans, scarves, or hats (in case you feel chilly after losing your hair)
- ☐ Pillows, blankets, and stuffed animals may be brought in, however they should be machine washed before bringing into the room. They must be sanitary. Avoid feather pillows. New items do not need to be washed before bringing them into the room
- ☐ Electric razors only
- ☐ Soft toothbrush, toothpaste
- ☐ Nail file or emery board
- ☐ Make-up in new, unopened containers only (keep to a minimum)



- ☐ Menstrual pads (we only stock very large bulky ones), do not use tampons
- ☐ Night light
- ☐ Silk plants/silk flowers
- ☐ Favorite family photos or decorations
- ☐ Personal address/phone book
- ☐ Cell phones and chargers
- ☐ Electronic devices (cell phones, laptops, tablets, etc) and chargers
- ☐ Leisure activities such as magazines, books, puzzles, games, cards, or crafts
- ☐ A journal, stationary, stamps and envelopes (consider pre-addressing them)
- ☐ Snacks for your room
- ☐ 1-2 days quantity of perishable food items may be brought in and stored in the refrigerator in room.

**Items *not* to bring:**

- |  |   |
|--|---|
| • Contacts   | • Disposable razors   |
| • Dental floss                                     | • Finger nail-clippers  |
| • Tampons  | • Artificial nails  |
| • Cologne/perfume/body spray/lotion with fragrance | • Multiple dose eye drops   |
| • Refrigerators or other small appliances          | • Sources of standing water (humidifiers, vases of water with flowers, etc) |
| • Fans   | • Home medications (Actual) - Do bring a list of current medications        |
| • Live plants and flowers                          | • Bar soap or loofah  |
| • Valuables  | • Diffuser  |
| • Tight restrictive clothing                       |   |

\* Refer to Section 4 for information on what to expect during your hospital stay.

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