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Important Phone Numbers

Samuel Oschin Cancer Center
24-hour phone line for clinical problems (fever >100.4F, vomiting, rash, etc.)
(310) 423-0626

4SW Transplant Leadership Team
4SW Manager........................................................................................................(310) 423-4249
Sandra Rome, RN, MN, AOCN, CNS........................................................................(310) 423-4236

4SW Unit................................................................................................................(310) 423-4415

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Mona Homeidan ....................................................................................................(310) 423-2107

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Appointments ........................................................................................................(310) 423-0650
About This Book

If you are reading this book, either you or a loved one is having an autologous blood and marrow transplant, or “BMT”, at Cedars-Sinai Medical Center.

Your transplant doctor and nurses have already spent a lot of time teaching you about your transplant. Book #1 covered everything you needed to know up until your admission for transplant.

This is Book #2. It covers what to expect during and after transplant. It will tell you how to actively participate in your own recovery. Please bring it with you when you are admitted. The inpatient staff will be referring to it. Continue to bring it to the hospital even after you have been discharged. There is a section at the back where you can save important paperwork like lab and imaging reports.

Like Book #1, there are quizzes at the end of each chapter. These quizzes are to help you remember key points about BMT. Remember, you can repeat quizzes until you are comfortable with the information. We encourage your main caregiver (spouse, partner, etc.) to read these books and complete the quizzes with you.

There is a “treasure hunt” that must be completed before you go home. You can get started on it as soon as you arrive on 4SW.

Words that are written in bold italics are defined in the GLOSSARY at the end of the book.
Campus Map & Parking

Parking is validated on your day of admission and day of discharge. Reduced-rate weekly and monthly parking permits are available for Lots #1, #2 and #4.

Please call (310) 423-5535 (or ext. 35535 from a hospital house phone) for more information.
Welcome to 4SW

We know that you have already been through a lot of treatment and stem cell collection. Now you may be feeling very nervous about your hospital stay.

Our team of professionals is committed to providing you with excellent service every step of the way through your transplant.

We are very proud of our inpatient blood & marrow transplant patient care team on 4SW. If at any time we do not meet your expectations, please let us know right away.

Our team includes:

Attending physicians. Your transplant doctor works as part of a team. They rotate coverage of patients admitted for transplant. You will be seen by a member of this team every day that you are in the hospital. They will be in constant communication with your transplant doctor about your progress.

Fellows and residents. Cedars-Sinai Medical Center is a teaching hospital, so you will have several different doctors involved in your daily care. Fellows have completed their residency and are now specializing in oncology and BMT. Both fellows and residents are supervised by the attending physicians.
Registered nurses. Your nurse is a highly trained professional with years of experience with patients undergoing blood & marrow transplant.

Clinical partners. Nurses’ aides are called clinical partners at Cedars-Sinai. They are also specially trained in the care of patients undergoing BMT.

Clinical dietitian. A dietitian will meet with you at least once and then as needed during your hospitalization to assess your nutritional status.

Medical social worker. The medical social worker can assist you and your family with needs such as:

• Housing and transportation
• Financial concerns and discharge planning
• Emotional support services

If needed, the psychiatric care team is available to help with issues of anxiety, depression or mental health.

Clinical nurse specialist. This nurse is an expert in BMT and available to answer any additional questions about your transplant.

Clinical pharmacists. The clinical pharmacy works closely with the team and is available to answer any additional questions regarding your medications.

Rehabilitation medicine specialists. Physical therapy is an important part of the recovery process. You will have an exercise program to follow during your transplant admission.

Palliative care specialists. Every BMT patient has a palliative care consult once admitted to 4SW. This team specializes in pain control, reducing severity of symptoms and promoting quality of life.

Dentist. Oral hygiene is an important part of post-transplant care. All BMT patients will have a dental consult prior to starting conditioning therapy.
Visitor Guidelines for 4SW

Check with the patient’s nurse to see if the patient may have visitors. No children under 12 may visit 4SW.

Visitors should not bring fresh or silk flowers, plants, or fruit baskets.

Wash your hands thoroughly; it is the key to infection prevention. Use soap and water, then dry your hands or use Purell® before entering the room. Repeat when you leave the room. Rewash your hands in the room sink prior to touching the patient if you have been in the room for longer than five minutes.

Visiting hours are generally 10 a.m. to 9 p.m. unless you are staying overnight with the patient. You will need to have a visitor's badge. You can get one in the lobby of the South Tower, Street Level.

One support person (spouse, parent) may sleep in the room on a cot. Please fold up the cot during the day.

Any family member spending the night must be able to take care of his or her own needs and expect that sleep will be interrupted by the necessary nursing activities. Visitors may not use the patient’s bathroom or shower.

Visitors should be free of illness with no recent exposure to infections or immunizations.

Visiting a 4SW patient? Follow these important rules to protect your loved one’s health:

- Do not visit unless you are free of illness with no recent exposure to infections or immunizations
- No children under 12 may visit 4SW
- Wash hands thoroughly before entering a patient’s room
- Do not bring fresh or silk flowers, plants or fruit baskets
- Do not sit on the patient’s bed or put your shoes on the bed
- Do not use the toilet in the patient’s bathroom
- Do not turn off the IV pump alarm in the patient’s room

You may assist the patient with care only after you have checked with the nurse.

Do not sit on the bed or put your shoes on the bed. Do not use the patient’s restroom for toileting activities or eat in the patient’s room.
If the intravenous pump alarm goes off, please call the nurse. Do not turn off the alarm. Turning off the alarm could potentially harm the patient.

### Phones

The phone number of the 4SW Nursing Station is (310) 423-4415.

You can only receive incoming calls on the room phone between the hours of 8 a.m. and 9 p.m.

If you are not feeling well, the phone can be turned off for four hours minimum and phone calls will be directed to the nursing station.

If you bring your personal cell phone, please note that the staff cannot be responsible for it. Never leave you cell phone on the bed or meal tray.

Please identify one family member to the nursing staff as a “caller” if your family wants to receive information over the phone. We ask that you limit this call to once a day so that the nurses are not taken away from your direct care.

---

**Daily Routines**

Temperature, pulse, respirations and blood pressure are taken every four hours or more frequently if necessary.

You will be awakened at night for **vital signs** and other procedures; this is part of keeping you safe.

Blood will be drawn daily between 4am and 7am. Sometimes blood will have to be drawn directly from a vein and not from your **PICC** line.

You will be weighed daily early in the morning. This is to measure your fluid balance.

The team will be keeping a careful record of your fluid balance. This includes all **intake**: IV fluids and liquids by mouth and all **output**: urine, stool and vomit. Do not dispose of any specimen before the nurse or clinical partner sees it.

Hygiene: You will be required to take a shower every day using an antibacterial soap. The nurses will cover your PICC dressing before you shower.

Mouth care should be done four times a day. Personal hygiene is important in preventing infection.

**PICC** dressing changes are done once a week. If it becomes loose or wet, let the nurse know right away.
While you are **neutropenic**, you may leave your room only with the permission of your doctor or nurse. You **must** wear a mask and only walk in the 4 South Unit Area.

Sometimes these routines can be irritating. Please remember that they are designed to maximize your safety and enhance your recovery.

**Timeline for Admission**

The average **autologous transplant** admission is **two to four weeks in the hospital**. However, your doctor will decide when it is safe for you to go home.

**Full recovery after discharge usually takes about two months.** During this time you will be followed closely by your transplant doctor.

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1. **Admission** - Hospital unit 4SW

2. **Conditioning** - Chemo +/- Radiation
   2-10 days

3. **Transplant**
   2-4 week hospital stay

4. **Engraftment** - Requirement for discharge home
Quiz: Chapter 1

Question 1
Children under 12 may visit you in the hospital during your transplant.

a) True
b) False

Question 2
Visitors may use the patient's bathroom.

a) True
b) False

Question 3
If the IV pump is beeping, it is okay to turn it off as long as you call the nurse at the same time.

a) True
b) False

Question 4
It is very important to keep track of everything you drink and save all output (urine, stool and vomit) for the nurse or clinical partner to measure.

a) True
b) False

Question 5
What is the minimum number of times per day for mouth care?

a) 1
b) 2
c) 3
d) 4

Question 6
When going for a walk in the hallway, always wear a:

a) costume
b) hat
c) mask
Recall that the high-dose chemotherapy (with or without radiation) given before a blood & marrow transplant is called *conditioning*. Conditioning will begin soon after you are admitted to the hospital.

**Chemotherapy**

Conditioning chemotherapy is given in high doses to reduce the amount of *cancer* in your body. The drugs given are specific for your disease. In the process, your bone marrow will be damaged beyond its ability to recover. Your previously collected stem cells will be given back to you so that your bone marrow will function again.

Conditioning chemotherapy will be given to you as an intravenous infusion and/or in pill form.

Each chemotherapy drug has its own side effects. Your doctors and nurses will make every effort to minimize the side effects you experience. Medications to prevent and treat side effects will be given to you on a regular basis.

**Total Body Irradiation (TBI)**

You will be alone in the room lying on a gurney while the treatments are given. However, the radiation therapist will be monitoring you on a screen just outside the room. You will be able to talk to each other through a speaker.

Usually the treatments will be given twice a day for five treatments. In some cases, extra doses of radiation may be required. Each treatment lasts 30 minutes.

On the first treatment, small clips will be taped to your skin at different levels; they are there to measure exact doses to different parts of the body.

*TBI* is painless and the radiation cannot be seen. Side effects of radiation are similar to chemotherapy. Pre-medications will be given prior to therapy to help prevent side effects.

**Key Fact:** Chemotherapy drugs and radiation cause side effects. You will receive medications to prevent, reduce and/or treat these side effects.
**Quiz: Chapter 2**

**Question 1**

Conditioning chemotherapy will begin:

a) Soon after admission to the hospital  
b) After the stem cells are infused  
c) On transplant day

**Question 2**

Medications to prevent side effects from conditioning will be given on a regular basis.

a) True  
b) False

**Question 3**

Radiation is required for all patients as part of their conditioning regimen.

a) True  
b) False
Congratulations, your big day has arrived! Your conditioning regimen has been completed, and it is time to receive your stem cells back.

Here is what you can expect on transplant day, also called “day zero.”

The Infusion

- The cells will be delivered to your room just after they are thawed
- Your nurse will give you medications such as Benadryl® and Tylenol® before the infusion. This is to prevent allergic reactions from the preservative used during the storage process. Steroids may also be used.
- Your nurse will be present throughout the transplant infusion
- A transplant doctor will be present on 4SW throughout the infusion
- The stem cells are infused into your PICC line
- Your nurse will infuse the cells at the bedside, take frequent vital signs and watch for potential side effects. This will include measuring the amount of oxygen in your blood with a pulse oximeter.
- The number of bags and amount of stem cells varies for each patient
- Each bag is infused one at a time over 20 minutes to an hour
- The stem cell preservative has an odor that will be present in the room for 24 hours after the infusion. You will stop noticing the odor shortly after the cells are infused. Any visitor within that 24-hour period will notice the odor when they first arrive to your room.

Most patients do not experience discomfort during their stem cell infusion. You will most likely feel tired from the pre-medications and sleep through much of your transplant day.

Side Effects from the Stem Cell Infusion

<table>
<thead>
<tr>
<th>Potential Side-Effect</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic reaction: hives, itching, fever, sweating, rapid pulse, shortness of breath, anxiety, stomach cramping, dizziness, general swelling</td>
<td>The nurse will slow down or briefly stop the infusion to administer medications that will help relieve these symptoms. The doctor will let the nurse know when the infusion can be restarted.</td>
</tr>
<tr>
<td>Red urine</td>
<td>This will go away on its own within 24 hours of the infusion. It is from broken red blood cells present in the stem cell product (red blood cells do not survive the freezing process).</td>
</tr>
<tr>
<td>Nausea or taste changes from the smell and taste of the stem cell preservative</td>
<td>This is also temporary as the preservative will be out of the body within 24 hours. Medications can alleviate this side effect. Sucking on hard candies may also help.</td>
</tr>
</tbody>
</table>
After the Infusion

Your blood counts will be checked every day. You can expect your blood cell counts will drop. Even after they recover it is VERY important to follow the post-transplant instructions.

The transplant team keeps track of how many days it has been since the infusion. The day after transplant is “Day +1”, a week after the transplant is “Day +7”, etc. You will be closely monitored until Day +100.
Quiz: Chapter 3

Question 1
Who will infuse your stem cells on transplant day?

a) Transplant doctor  
b) Primary caregiver  
c) Your nurse for the day

Question 2
Premedications are given before the transplant to:

a) Prevent rejection of the cells  
b) Prevent allergic reaction to the stem cell preservative  
c) Help you sleep through the procedure

Question 3
What is another word for transplant day?

a) Engraftment day  
b) Day zero  
c) Rest day

Question 4
Red urine is common after the infusion and should resolve on its own within 24 hours.

a) True  
b) False
The reason you are kept in the hospital for recovery after your transplant is so the transplant team can prevent and manage side effects. Remember, your safety and comfort is our top priority. The risks and complications of an autologous transplant are caused by:

- Side effects of high dose chemotherapy and/or radiation therapy
- The period of lowered blood cell counts (neutropenia, anemia and thrombocytopenia)

**Review: Complete Blood Count (CBC)**

Recall from Book #1: white blood cells, red blood cells and platelets make up a complete blood count or CBC. It is very important that you understand what your CBC is and why we check it all the time.

**White Blood Cell Count (WBC)**

- Number of all of the white blood cells that fight and prevent infection
- Normal values are 4-11 (thousand)

**Absolute Neutrophil Count (ANC)**

- Number of specific type of white cell, the neutrophil, that is most important in fighting bacterial infection
- Normal values are 1.8 to 8.0 (thousand)
- Neutropenic precautions implemented when ANC is less than 1 (thousand)

**Hemoglobin**

- Measure of red blood cell’s ability to carry oxygen, which helps give you energy
- Normal values are 13-17 G/dL
- When your hemoglobin is low, it is called anemia
- Packed red blood cells are generally transfused when hemoglobin is less than 8 G/dL

**Platelets**

- Platelets help prevent bleeding
- Normal values are 150 to 450 (thousand)
- Platelets are generally transfused when the platelet count falls below 10 (thousand)
- When platelets are low, it is called thrombocytopenia
We know that after receiving *conditioning*, your CBC numbers will all drop below normal. For each type of blood cell, there are specific risks and safety measures to be aware of.

**Neutropenia:**

**White Blood Cell Count Below 1 (Thousand)**

*Neutropenia* is a condition that requires extreme caution. Imagine that your immune system is an army that protects your body from invaders like bacteria. Neutropenia is like the whole army taking a vacation at the same time!

In order to remain safe until you recover from neutropenia:

- **Wash your hands** frequently with either Purell® or soap and water. This means after going to the bathroom, before and after meals, after walking in the hallway or handling magazines and other items that may have been touched by several people. Make sure others wash their hands before touching or assisting you!

- Do your mouth care at least four times a day. If you have dentures, these need to be removed and cleaned too.

- Cleanse and dry rectal area after each bowel movement. If you have diarrhea, let your nurse know because it can cause skin irritation. Do not use suppositories or tampons.

- Shower and look at your skin daily. Any rashes, sores, redness or cuts you see or feel, tell your nurse or doctor. Use the clorhexidine soap provided and apply antifungal powder to skin folds after towel drying.

**Key Fact:** Follow these rules to protect yourself from infections while your white blood cell count is low:

- Frequent hand washing
- Mouth care 4 times per day
- Wash and dry rectal area after each bowel movement
- Shower every day with clorhexidine soap
- Apply antifungal powder to skin folds after drying
- Check your skin daily for rashes, sores, redness and cuts

Your CBC will be checked daily. Following *transplant*, your *white blood cell* count will continue to drop, and may reach zero for several days.

If you get a **fever** (temperature 100.4°F or higher), your nurse will obtain blood and urine cultures right away. IV antibiotics will be started.

Keep in mind that almost all transplant patients get fevers. However, attention to strict personal hygiene is the BEST way to prevent infections!

Symptoms of infection include:

- Shaking chills with or without fever (temperature 100.4°F or higher)
- Cough or sore throat
- Redness, swelling or pain in any body area
- Sore or blister in any body area, including the mouth
- Difficulty urinating; cloudy or bad smelling urine

These symptoms could mean that an infection is present and should be reported to your nurse right away.
**Anemia: Hemoglobin Less than 8 G/dL**

Recall that hemoglobin is a vehicle that drives oxygen around your body. It is what gives you rosy cheeks and pink nail beds.

When hemoglobin levels are low, it is called anemia.

Anemia may cause:

- Dizziness
- Shortness of breath
- Headache
- Pounding heartbeat
- Fatigue

Please let your nurse know if you experience these symptoms. A transfusion of packed red blood cells may correct anemia. In general, we transfuse when hemoglobin drops below 8 G/dL.

Fatigue often contributes to “feeling down” or depressed. As your red blood cell count recovers, so will your mood and energy level. However, if you feel you need additional emotional support during this time, let us know so we can help you.

Try to get out of bed and do light exercise every day, even if you don’t feel like it. Challenge yourself. It will improve the quality of restful periods and help you sleep better at night.

**Caution:** A shower that is too hot or too long may cause you to become dizzy, weak and fatigued. We do not want you to fall! Shower chairs are available; please ask for assistance.

**Thrombocytopenia: Platelets Less than 20 (Thousand)**

Recall that platelets are involved in blood clotting. When you cut yourself, platelets plug the injury and stop the bleeding. The conditioning regimen will cause your platelets to drop way below the normal level.

When platelets are low, it is called thrombocytopenia. This condition carries a risk of spontaneous bleeding. The bleeding could occur on the outside (example: a nose bleed) or on the inside (example: in the brain).

Platelet transfusions can correct low platelets. In general, platelets will be infused through your PICC line when your platelet count is below 10 (thousand).

Most patients do not have any serious problems with bleeding after their blood & marrow transplant. However, it is a good idea to exercise caution when your platelets are low.
Here are some important safety tips to follow when your platelets are low:

- Call your doctor or nurse immediately if you notice any of the following:
  - Bleeding from anywhere on the body
  - Headache, confusion or changes in how well you can see, walk or move
  - Black or bloody bowel movements
  - Bruising or red spots under the skin

- Use a soft toothbrush for all oral care; floss regularly

- Dab your nose instead of blowing or picking it.

- Try not to strain during bowel movements. Stool softeners are available if needed.

- Do not bend over so that your head is lower than your heart.

- Do not use nail clippers. Electric razors are okay.

- When your platelet count is very low (less than 20 thousand), check with your nurse before you get out of bed, shower or walk in the hallway.

- Do not take any over-the-counter medications without your doctor’s approval.

- If you are a menstruating woman, you will be given medication that prevents you from getting your period. If your period starts, sanitary pads should be used instead of tampons.

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**Platelet transfusions can correct low platelets. In general, a platelet transfusion will be infused through your PICC line when your platelet count is below 10 thousand.**

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**Important Tip:** Call your doctor or nurse immediately if you see signs of bleeding:

- Bleeding from anywhere on the body
- Headache, confusion or changes in how well you can see, walk or move
- Black or bloody bowel movements
- Bruising or red spots under the skin
Quiz: Chapter 4

Question 1
Neutropenic precautions begin when the ANC is less than 1 (thousand)

a) True
b) False

Question 2
The BEST way to prevent the spread of infection is:

a) Handwashing
b) Stay inside your hospital room at all times
c) Do not eat fresh fruit or vegetables

Question 3
Daily showers, mouthcare 4 times per day, and careful cleansing after bowel movements will help prevent infections while you are neutropenic.

a) True
b) False

Question 4
A fever is a temperature of:

a) 98.6° F or higher
b) 100.4° F or higher
c) 104° F or higher

Question 5
Avoid taking long, hot showers because they may cause you to feel weak and dizzy.

a) True
b) False

Question 6
Three good ways to prevent bleeding when platelets are low are:

a) Good handwashing, sit in a chair for meals, wear a mask in the hallway
b) Stay in bed all day, use brand new razors only, take over the counter vitamins
c) Use a soft toothbrush, do not strain during bowel movements, do not use nail clippers
Cancer and its treatment can cause weakness and fatigue. Exercise can actually help combat cancer-related fatigue and weakness.

How do you know if you have cancer-related fatigue? You may be feeling any of the following symptoms:

- Weakness
- Drowsiness
- Tired as if you have the flu
- Difficulty concentrating
- Difficulty performing your everyday activities

Exercise is one of the most effective tools we have to prevent and combat cancer-related fatigue.

It is normal to want to rest and avoid exercise when you feel so tired. Even though it may seem counter-intuitive, research has shown that even light exercise may help lessen the symptoms of fatigue. Your physician and therapist will help you determine the type and intensity of exercise that is appropriate for you.

Your muscles can become very weak from medications that fight cancer. Your physician or therapist can help teach you exercises that may prevent or minimize muscle atrophy.

Other benefits of exercise:

- Maintains physical function
- Combats fatigue
- Maintains muscle strength
- Enhances mood
- Diminishes the consequences of cancer treatment, such as the increased risk of osteoporosis
- Helps prevent pneumonia
- Stimulates natural endorphins that give a sense of well-being
- Fights depression and the feeling that one has lost control over his or her life

How to exercise safely in the hospital:

Walk in the hallway at least twice a day unless otherwise directed. Be sure to stay on the oncology floor. Nursing staff are available to help with walking as needed.

Sit up in a chair for meals and activities as much as possible. Even if you are just watching television, try to stay out of bed.

Perform simple exercises as instructed by your physical therapist. They will consider your ability as well as your platelet count, blood pressure, etc.

Report any of the following to your nurse or doctor immediately:

- Shortness of breath
- Chest pain
- Coughing or wheezing
- Weakness or dizziness

Important Tip:
Wear a mask and athletic shoes when walking. Wash or Purell® your hands when you get back to your room.
Quiz: Chapter 5

Question 1
Light exercise every day will improve both fatigue and your mood.

a) True
b) False

Question 2
It is normal to want to avoid exercise when you are not feeling well.

a) True
b) False

Question 3
Walking and performing exercises the physical therapist recommends should be done every day.

a) True
b) False
Some foods naturally contain increased amounts of bacteria, including fresh fruits and vegetables. This is typically not a problem for healthy individuals. However, when your white blood cell (WBC) count is low, you are at higher risk for infection.

When you are admitted, your doctor will order a low-microbial diet for you. It is important to follow these guidelines.

**Cooked Foods**

- Avoid all raw or undercooked meats, fish, poultry, tofu, eggs and egg substitutes
- After preparation, food should be eaten as soon as possible
- Do not eat potentially perishable foods that have been left at room temperature for more than one hour
- Avoid salads containing mayonnaise unless they are eaten immediately after preparation. Do not save to eat later.

**Dairy Products**

- Use dairy products that are packaged individually. After opening, consume at one meal and never save for later.
- Do not use products that are near or past the expiration date
- Use commercial milkshakes or supplements in sealed individual cartons. Do not use if there is a break in the container.
- Use fresh, pasteurized dairy products only
- Avoid soft cheeses or cheeses that contain mold, including brie, bleu, Roquefort and gorgonzola

**Fresh Fruits and Vegetables**

- Thoroughly wash raw fruits and vegetables (rinse three times with warm water). Discard those with mold that you can see.

- Avoid all vegetable sprouts, such as alfalfa and mung bean
- Do not drink unpasteurized commercial fruit and vegetable juices
- Avoid foods from delicatessens

**Leftovers**

- Seal and wrap leftovers
- Label with the date and time of preparation
- Store in refrigerator or freezer immediately
- Do not eat if stored in the refrigerator for more than 24 hours
- Consume frozen food as soon as possible
- Avoid thawing at room temperature

Follow the diet during your transplant admission. For the first 100 days after transplant, use common sense when making food choices. Please remember, outside food is not allowed to be brought in during your hospitalization without your transplant doctor’s approval.

**Diet Modifications**

If you are experiencing mouth sores, discomfort when eating or pain when swallowing, a soft, soft-chopped, pureed or full liquid diet may be ordered. We will still provide you with a low-microbial diet, but will modify it based on your chewing and swallowing ability at that time.

If you are experiencing diarrhea, we can modify your diet, such as limiting fiber, dairy, caffeine and other foods that may worsen diarrhea. The nurse and/or dietitian can discuss these options with you.

Vitamin or herbal supplements should not be taken unless approved by your doctor. For more information, the dietitian is available both inpatient and outpatient.
Quiz: Chapter 6

Question 1
All meat, eggs and tofu should be thoroughly cooked.

a) True  
b) False

Question 2
Which food should not be eaten while on a low microbial diet?

a) Fresh fruit and vegetables  
b) Bleu cheese and deli meat  
c) Fully cooked filet of fish

Question 3
All fruit juices and dairy drinks should be:

a) Served ice cold  
b) Avoided  
c) Pasteurized

Question 4
Outside food is not allowed while you are in the hospital unless you have a doctor’s order.

a) True  
b) False

Question 5
A low-microbial diet should be followed for your entire transplant admission.

a) True  
b) False
CHAPTER 7. OTHER POTENTIAL SIDE EFFECTS

The following information may seem frightening, but we want you to be prepared.

Chemotherapy and radiation given in high doses can affect any organ in your body. Side effects vary greatly. Most patients do not experience all of the side effects listed. Many side effects can be prevented or relieved with medications.

Drug Information Table - Chemotherapy

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Also known as:</th>
<th>Regimen Name</th>
<th>Potential Side Effects</th>
<th>Long-Term Potential Side Effects</th>
</tr>
</thead>
</table>
| Ara-C®    | Cytarabine     | BEAM         | • Fever  
• Coordination/balance problems  
• Eye infection  
• Rash on hands/feet  
        |                |              | • Coordination/balance problems |
| BCNU®     | Carmustine     | BEAM         | • Nausea/vomiting  
• Facial flushing  
• Hair loss  
        |                |              | • Lung damage |
| Busulfan  | Busulfex®      | Bu+Cy+VP16   | • Nausea/vomiting  
• Mouth sores  
• Seizures  
        |                |              | • Lung or liver toxicities  
• Infertility |
| Cytoxan®  | Cyclophosphamide | Cytoxan® for mobilization or TBI+Cy+VP16 Bu+Cy+VP16 | • Nausea/vomiting  
• Bladder toxicity  
• Hair loss  
• Mouth sores  
        |                |              | • Heart toxicity  
• Infertility  
• Secondary leukemia |
| Etoposide | VP16®          | BEAM or TBI+Cy+VP16 Bu+Cy+VP16 | • Nausea/vomiting  
• Low blood pressure  
• Allergic reaction  
        |                |              | • Secondary leukemia  
• Infertility |
| Melphalan | Alkeran®       | BEAM or high-dose Melphalan | • Nausea/vomiting diarhhea  
• Mouth sores  
        |                |              | • Secondary leukemia |
| Rituxan®  | Rituximab      | R+ BEAM R+TBI+CY+VP16 | • Fever/chills  
• Allergic reaction  
• Body aches  
        |                |              | • Infection |
Nausea, Vomiting and Loss of Appetite

These are the most common gastrointestinal side effects experienced after transplant. These problems usually get better as your blood counts recover.

Fortunately, we have strong anti-nausea drugs that can prevent or decrease nausea and vomiting in most patients. Different drugs work for different people. Let your doctor or nurse know the minute you are nauseated so they can treat you.

Food choices to improve your appetite and manage nausea may be discussed with the clinical dietitian at any time.

Mouth Sores & Swallowing Problems

Mucositis refers to swelling of the lining of the gastrointestinal tract.

Stomatitis refers to swelling of the mouth.

These problems result from chemotherapy destroying the rapidly dividing cells inside your mouth and gut. To simplify, we call them “mouth sores” and they are common following conditioning.

As your white blood cells recover, your mouth sores will begin to heal.

Management of Mouth Sores

This side effect is very distressing for patients. Healing and pain medications such as Caphosol® and/or MMX (a combination of Mylanta®, Mycostatin and Xylocaine) will be given so you are able to carefully clean your mouth.

Occasionally, patients require strong IV pain medication. Please keep your nurse informed about any mouth pain and if the medicine is working or not.

Important Tip: Do not worry if you cannot eat or drink much. You will be receiving intravenous fluids to replace water and electrolytes. Don’t force yourself to eat your favorite foods, or you may not like to eat them later when you are well.

Following these guidelines will help you prevent and cope with mouth sores:

- Brush your teeth and tongue with toothpaste after every meal and at bedtime. A soft-bristle toothbrush should be used carefully to avoid injury to the gums.
- Notify your nurse or doctor if you have pain or bleeding; you may need to use a spongy “toothette” instead of a toothbrush.
- Use salt rinses or other measures as instructed by your nurse. Do not use commercial mouthwashes containing alcohol.
- Floss your teeth regularly as long as it does not cause excessive bleeding
- If you are snacking off and on, you may want to do your oral care more frequently
- Keep lips moist with lip balm
- If you have dentures, soak them in your usual cleaning solution as long as it doesn’t contain alcohol. Do not re-use the solution. Remember to clean your dentures after each meal and at bedtime.

Diarrhea or Constipation

Swelling of the intestines from your treatment may cause diarrhea or constipation. Antibiotics and other medications may also cause these problems.
Diarrhea can result in dehydration and/or irritated skin around the anus. Constipation may result in tears or bleeding.

Any irritation or open area around the anus has a high risk for infection and needs to be reported to your nurse right away.

**Management of Diarrhea**

Keep your rectal area clean and dry. Special wipes or creams may be given. Ask your nurse for assistance if needed.

Let the nurse and doctor know if you have more than two bowel movements a day and they are watery or difficult to control. The nurse may need to collect samples for testing and measure the amount.

Let the nurse or doctor know if your rectal area becomes tender, or if you have bloating, cramping or pain in your stomach or abdomen.

**Management of Constipation**

- Drink lots of fluids and get out of bed to walk as frequently as you are able.
- Do not use suppositories or any home remedy without approval from your doctor
- If you notice that you are straining to have a bowel movement, medications may be given. Let your nurse know as soon as possible.

**Liver Problems, Such as Veno-occlusive Disease or “VOD”**

Although rare, some chemotherapy medications can cause the veins in your liver to become narrowed. This is called veno-occlusive disease (VOD).

VOD results in a decrease of blood flow from the liver. As a result, fluid may build up around the liver and stomach area (called ascites) and throughout your body (called edema). Also, it may cause your skin to turn yellow (jaundice).

Your doctor will monitor your liver function enzymes closely and provide treatment if needed. If you are at high risk for liver complications you will be given a preventive medication called ursodiol (Actigall®).

**Kidney Problems**

Your doctor will watch your kidney function through your blood lab work, how much fluid you take in, how much urine you make and what your weight is every day.

It is important that you help the nurses and clinical partners keep track of your intake (everything you drink) and output (all urine, bowel movements and vomit). Do not throw it away!

**Skin Problems**

Skin reactions to dressings, adhesive tapes and medications are very common. Your transplant team will determine the cause of the problem and how to treat it.

Daily showers are the best way for you to monitor your skin. Let your nurse know if you notice any redness, itching, rashes or lesions.

**Important Tip:** Your PICC line is very susceptible to infection and must be kept covered by a sterile dressing. If the dressing becomes wet or loose, it needs to be changed right away. Pain, redness or drainage at your PICC site are signs of infection and should be reported immediately.
Hair Loss

Hair loss is an expected side effect after *conditioning* therapy. ALL hair on the body may be affected, not just the hair on your head. Fortunately, hair lost from *chemotherapy* always grows back.

If you don’t have them already, we can provide you with wig and head covering resources.
Quiz: Chapter 7

Question 1
It is a good idea to try to eat all of your favorite foods after your transplant.

a) True
b) False

Question 2
Mouth care does not need to be performed if mouth sores are present.

a) True
b) False

Question 3
It is not safe to get any medication as a rectal suppository after transplant.

a) True
b) False

Question 4
What should be reported to the nurse right away?

a) PICC dressing is wet and loose
b) You notice a rash on your chest
c) There is a small amount of blood in your stool
d) Any of the above
This is often a time of mixed emotions for patients. Feelings that you and your family may have range from anxiety to hope.

Length of hospital stay and medications used in the transplant procedure may cause feelings of depression and irritability.

Feelings of loss due to your body's changes (hair loss, changes in skin color) are common during this time.

Share medical questions with your doctor. Talk over your fears and concerns with your doctor, social worker, chaplain, psychiatrist, nurse, family or friends.

The Cedars-Sinai palliative care team can also help improve your quality of life. The team includes medical and nursing specialists as well as chaplains. They work closely with your cancer specialist team (nurses, social work, physical therapy) to make sure your pain and other uncomfortable symptoms are controlled. They will provide emotional and spiritual support for you and your caregivers and family.

Understand what the plan is for each day and stay involved.

If necessary, medications can be prescribed by your physician to help you cope with feelings of distress.
Engraftment is a cause for celebration. You are almost ready to go home!

Imagine a planted seed, buried deep in the soil. It takes a certain number of days before you see the plant begin to grow. In the setting of BMT, this is called engraftment.

Engraftment occurs when the infused stem cells move to the bone marrow and begin to grow and divide. Your complete blood count (CBC) tells us when engraftment is occurring.

Neutrophils (a type of white blood cell) are the first to engraft.

When the absolute neutrophil count (ANC) is greater than 500, you are considered engrafted. This usually takes two to three weeks to occur.

Platelets are usually the last to engraft.

You will be discharged from the hospital when:

1. Your blood counts have returned to a level the doctor feels is safe
2. You do not have a fever or need for IV antibiotics
3. You are able to drink fluids; nausea/vomiting or diarrhea are controlled by oral medications

After discharge from hospital, you still might need blood or platelet transfusions for a little while until full engraftment occurs.

You will be closely monitored until Day +100.

Before you go home, make sure:

- You have a family member or caregiver at home
- The house is clean and pets have been groomed
- You have an accurate thermometer so you can take your temperature at home. Remember, a fever is 100.4°F or higher and you must call (310) 423-0626.
- You always have transportation available to get you to the Samuel Oschin Cancer Center and Cedars-Sinai Medical Center
- You have an alternate caregiver for your children when they are sick

Common Problems After Discharge

- Fatigue
- Feeling good one day and sick the next day
- Mood swings
- Anxiety
- Loss of appetite and taste

Important Tip: a fever is 100.4°F or higher and you must call (310) 423-0626 to speak with an oncology nurse.
Infection

You are still at risk for infections even after engraftment occurs. Your immune system is working, but it is very fragile.

You need to be cautious and try not to expose yourself to illness for the first 100 days (three months) after your transplant.

You have three enemies after transplant:
1. Bacterial infections
2. Viral infections (colds and flu, reactivation of previous viruses)
3. Fungal infections

Infection prevention tips:

- Washing your hands and having others wash theirs is absolutely the BEST way to prevent infection!

- Take your temperature every day after discharge. Call your doctor immediately if your temperature is 100.4°F or higher. Do not ignore colds or flu.

- Bathe or shower daily and wear clean clothes. If your skin is dry, use a mild lotion or baby oil.

- Do not share cups, glasses, utensils, etc., with others

- If you have PICC line, keep the dressing clean and dry. Cover it when showering. Do not place it under water.

- Brush your teeth with a soft toothbrush after every meal and before bedtime. Floss daily.

Activity Recommendations: Getting Back to Normal

The following list provides details about things you should avoid during the first three months after your transplant.

Be patient with yourself. You have been through a very difficult experience and your body needs time to recover.

Your doctor will let you know when it is safe to resume these activities. If you have specific concerns about any activity, feel free to discuss them with your doctor.

- Take it easy. Allow yourself time to rest and get enough sleep. Daily light exercise (example: walking) will dramatically improve feelings of fatigue.

- Start back to work only with your doctor's approval. Returning to work is based on your endurance and the type of the work you do.

- Avoid large crowds, such as grocery stores, churches and movie theatres until your doctor tells you it is safe. Avoid people with cold or flu symptoms.

- Avoid being near small children other than your own. Small children often have viral infections. If anyone in your home has been exposed to or has symptoms of a cold or the flu, it is important that you isolate yourself from them.

- Limit your exposure to the sun. Wear a sunscreen with a minimum SPF of 30. Always wear a hat, long sleeves, pants and sunglasses.
• Do not go to the dentist unless approved by your transplant doctor

• If you have to use a public restroom, wash your hands thoroughly using a paper towel as the final step in turning off the faucet.

• Avoid swimming in pools, spas, jacuzzis, lakes or ocean water unless approved by your transplant doctor.

• Do not smoke or expose yourself to cigarette, pipe or marijuana smoke. If family members smoke, ask that they do so outdoors and away from you.

• Avoid contact with pesticides, solvents, fertilizers, chicken coops, caves, construction sites and areas where soil is being moved.

• Avoid zoos, parks, animals, animal areas and areas heavily populated with birds.

• Avoid gardening until your doctor tells you that it is safe to do so.

• If you own pets, have someone else pick up after them. If you own a reptile, fish, ducklings or chicks, avoid contact with them and ask that others wash their hands thoroughly and immediately after touching them.

**Important Tip:** You will be prescribed Acyclovir® to prevent zoster, otherwise known as shingles. It is very important that you remember to take your Acyclovir for three months after your transplant.

**Follow-up Appointments**

After you go home from the hospital, you will need to see your transplant doctor within a couple of days. If everything is going well, appointments may be weekly for two to three weeks, bi-weekly for about a month, and then at Day +100 and at one year.

When appropriate, your transplant doctor will refer you back to your local oncologist for follow-up. We will want to know how you are doing on an annual basis.

We also hope to see you at our annual Celebration of Life in October. It is a wonderful opportunity to meet other transplant survivors and see your transplant team again.
Immunizations

Immunizations may be dangerous to your weakened immune system right after transplant. Your doctor will let you know if you need to repeat your childhood immunizations one year after your transplant.

A flu shot is highly recommended for your family members and close contacts. Your transplant doctor may recommend a flu shot for you six months after transplant.

Avoid contact with infants or children who have been recently immunized for measles, mumps, rubella, polio, small pox, chicken pox or yellow fever (live viruses).

Post-Discharge Diet

Many patients have difficulty eating well after transplant. The taste of food will be altered from the high-dose chemotherapy. Fortunately, this will improve over time and eventually return to normal.

You are not required to follow the low-microbial diet after discharge. However, use common sense when making food choices for the first 100 days after transplant.

It is important to drink lots of fluids, minimum two pints (or one liter) per day, unless otherwise instructed by your nurse, doctor, or dietitian.

Try to eat a variety of nutritious foods and snacks. The outpatient dietitian is available to assist you with healthy food choices after discharge.

Emotional and Intimacy Concerns

You may find yourself feeling sad or depressed in the months following a blood & marrow transplant. There are many potential causes, such as medication, fatigue or anxiety about the future. These feelings are normal. Be sure to discuss them with your caregiver at home as well as with your doctor.

Many patients find it comforting to speak with someone who has been through transplant. Let your nurse know if you are interested.

Rely on family and friends for support and assistance. If they are offering to help you, let them!

Intimacy can be difficult for patients after transplant. Your body has been through a lot of stress and your physical appearance has changed. The good news is that it is okay to have sex! Talk to your partner about your feelings and go at your own pace.

If your platelets are low, ask your doctor before having sexual intercourse.

Many transplant conditioning regimens will result in infertility for patients, male or female. However, there is always a possibility of pregnancy, even after transplant. Consult your doctor about options for contraception.

Key Fact: When you are ready, it is okay to have sex after you go home from the hospital. If your platelets are low, talk to your doctor before having sexual intercourse.
Quiz: Chapter 9

Question 1
Engraftment happens when the white cells (mainly neutrophils) begin to grow and the number increases.

a) True
b) False

Question 2
Before going home you should arrange to have:

a) A caregiver
b) A clean home and transportation to the hospital
c) Good nutrition
d) All of the above

Question 3
What are the common problems that you might experience after getting discharged from the hospital?

a) Fatigue
b) Loss of appetite
c) Mood swings
d) All of the above

Question 4
What is the best exercise and activity to start post transplant?

a) Walking
b) Martial arts
c) Swimming
d) Weight lifting

Question 5
Hand washing is the best way to prevent infections.

a) True
b) False

Question 6
You will call your transplant nurse or physician when you have:

a) Cough
b) Fever, chills
c) Bleeding, rash
d) Cold or flu symptoms
e) Nausea, vomiting, diarrhea
f) Any of the above

Question 7
What antiviral medication will prevent the disease called zoster?

a) Bactrim
b) Acyclovir
c) Fluconazole
d) Prevacid

Question 8
You are advised to drink plenty of fluids and make healthy food choices after discharge from the hospital.

a) True
b) False

Question 9
I can’t get pregnant or impregnate my partner post transplant.

a) True
b) False

Question 10
If I have any questions or concerns about my health, I will call my transplant nurse or physician instead of asking my neighbors or friends.

a) True
b) False
The 24-hour Samuel Oschin Cancer Center phone number is (310) 423-0626. The Samuel Oschin Cancer Center is always open: 24 hours a day, 7 days a week, 365 days per year.

If you are feeling unwell, it is always safest to call right away and speak with a clinic nurse.

Examples of reasons to call:

- FEVER: temperature 100.4°F (38°C) or higher
- Chills/sweating
- Cough
- Rash
- Unable to eat or drink fluids
- Rash
- Redness or pain at **PICC/IV site**
- Vomiting
- Mouth sores
- Diarrhea/constipation
- Bleeding
- Pain
- Painful or frequent urination
- Unable to urinate
- Generally feeling unwell or that “something is wrong”

A **fever** or infection after your **transplant** is an EMERGENCY. You MUST call RIGHT AWAY if you have a fever at home. A fever can be fatal if you wait to call! Please take this instruction very seriously. We want to keep you SAFE and HEALTHY.

Use common sense! If you are wondering “if” you should call, the answer is: YES, you should call. **Help us to help you!**
**Quiz: Chapter 10**

**Question 1**

A fever of 100.4°F or higher is an emergency after transplant and requires an immediate phone call to (310) 423-0626.

a) True  
b) False

**Question 2**

The Samuel Oschin Cancer Center is open 7 days a week, 24 hours a day, 365 days per year.

a) True  
b) False

**Question 3**

If you are not feeling well at home, it is always safer to call the Samuel Oschin Cancer Center 24-hour number and speak to a nurse. I will never hesitate to call this number: (310) 423-0626.

a) True  
b) False
TREASURE HUNT

This is a project for you to work on during your hospital stay for BMT. You must complete this and give it to your nurse before you are discharged.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver Name and Phone Number</td>
<td></td>
</tr>
<tr>
<td>Pharmacy Name and Phone Number</td>
<td></td>
</tr>
<tr>
<td>BMT Doctor’s Name</td>
<td></td>
</tr>
<tr>
<td>Phone Number for Scheduling BMT Doctor Appointments</td>
<td>(310) 423-0650</td>
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<tr>
<td>Phone Number for Clinic Nurses</td>
<td>(310) 423-0624</td>
</tr>
<tr>
<td>24-Hour Samuel Oschin Cancer Center Phone Number</td>
<td>(310) 423-0626</td>
</tr>
<tr>
<td>Teaching</td>
<td>Answer/Date</td>
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<td>----------------------------------</td>
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<tr>
<td><strong>Infection Precautions:</strong></td>
<td></td>
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<tr>
<td>Fever, when to call the doctor</td>
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<tr>
<td><strong>Bleeding Precautions:</strong></td>
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<td>Injury prevention, signs of bleeding</td>
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<td><strong>Home Environment:</strong></td>
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<tr>
<td>Cleaning, pets, plants</td>
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<tr>
<td><strong>Physical Activity:</strong></td>
<td></td>
</tr>
<tr>
<td>Exercise, travel, rest, swimming</td>
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<tr>
<td><strong>Oral Care:</strong></td>
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</tr>
<tr>
<td>Twice daily, dental visits every six months</td>
<td></td>
</tr>
<tr>
<td><strong>Skin Care:</strong></td>
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<tr>
<td>Hygiene, sun exposure</td>
<td></td>
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<tr>
<td><strong>Nutrition:</strong></td>
<td></td>
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<tr>
<td>Taste changes, nausea/vomiting, supplements, food choices</td>
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<tr>
<td><strong>Sexuality:</strong></td>
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<tr>
<td>Infertility, birth control</td>
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<td><strong>Central Line Care:</strong></td>
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<td>Dressing changes, flushing</td>
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<td><strong>Immunizations:</strong></td>
<td></td>
</tr>
<tr>
<td>Flu shots, re-immunization schedule</td>
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</table>
If you have any questions regarding these terms or anything about the written information given to you, please ask us. Some of the words in this glossary are not mentioned in the book, but you may hear them while going through your transplant.

**ABO:** the type of (or absence) of an antigen, or “marker” on the surfaces of the red blood cells of a person. Blood group “A” have A antigen only, “B” have B antigen only, “AB” has both A and B antigen, and blood group “O” has no antigens. These help determine blood transfusion compatibilities.

**Absolute neutrophil count (ANC):** the number of one type (neutrophils) of white blood cells in the blood that fight infection.

**Advance Directive for Health Care:** a document that specifies who you want to make medical decisions for you if you cannot speak for yourself.

**Allogeneic transplant:** a type of bone marrow transplant where transplanted bone marrow comes from a compatible donor other than the patient. The donor could be a sibling, an unrelated person, or an unrelated umbilical cord.

**Anemia:** a condition in which a person has too few red blood cells. As red blood cells carry oxygen from the lungs to all other cells, the lack of oxygen due to anemia results in a person feeling “run down” and possibly short of breath.

**Anesthesia:** the absence of normal sensation and pain due to medications, such as those used during surgery.

**Antiemetic:** a general term used to describe medications that prevent or decrease nausea and vomiting.

**Apheresis:** A method of obtaining blood stem cells for transplantation. The donor’s blood is circulated through a machine, a little at a time, to collect the stem cells. The patient’s total blood volume circulates through the machine several times to collect as many stem cells as possible. All the other blood components are returned to the donor.

**Apheresis catheter or “IJ”:** an intravenous line that is surgically placed for the purpose of apheresis. It is placed in the upper right or left chest area, where it is tunneled under the skin and into a large vein, the superior vena cava, above the heart. It has two “lumens” or “tubes” so that blood can flow out from one lumen and return by the other lumen. It can be also be used to give IV fluids, chemotherapy, blood products, as well as to reinfuse the stem cells. A temporary apheresis catheter (only used for a few days) can also be placed near the neck area.

**Ascites:** build-up of free fluid in the abdominal cavity (around the outside of the intestines, stomach, liver, etc).

**Autologous stem cell transplant:** a type of stem cell/bone marrow transplant in which the transplanted stem cells are taken from the patient and then reinfused at a later time.

**Bilirubin:** an orange-red pigment formed from hemoglobin during the break-down of used red cells.

**Blood and marrow transplant (BMT):** a treatment used for cancer and certain other diseases. The patient receives very high doses of chemotherapy, with or without radiation therapy, in order to destroy the disease. The patient’s own bone marrow, which is destroyed during the therapy, is replaced by a transfusion of stem cells collected from either the patient or from a compatible donor. The stem cells are infused to help the patient’s body make blood cells and grow a healthy immune system.
**Blood cultures:** a blood test done to look for infection in the blood.

**Blood donor facility:** A clinic that specializes in blood donation and apheresis.

**Blood type:** the description of a person’s blood based on the presence or absence of “antigens” on the cell surfaces of the red blood cells; these are A, B, AB, O and Rh negative or Rh positive.

**Bone marrow:** the inner, spongy tissue of bones where red blood cells, white blood cells, and platelets are made.

**Bone marrow biopsy:** a procedure in which a sample of bone marrow is removed and examined by placing a needle through the skin into the inner space of the hip bone.

**Bone marrow harvesting:** the collection of marrow from the posterior iliac crests of the pelvis via multiple punctures with a large needle and aspiration of bone marrow. This is normally done with the donor under general anesthesia in the operating room.

**Bone marrow transplant:** see “blood and marrow transplant.”

**Cancer:** any malignant (abnormal, spreading) cellular tumor or growth.

**Central venous catheter:** a narrow, soft catheter (plastic tube) placed into a large vein that leads to the heart. The procedure is usually done under local anesthesia and the line is generally placed in the upper chest. Once inserted, the line allows chemotherapy, blood and blood products, drugs, antibiotics, fluids and nutrition to be given. It can also be used for obtaining blood samples.

**Chemotherapy:** treatment of disease, usually cancer, by chemicals/medications; not all chemotherapy drugs are derived from true “chemicals”, but are originally derived from natural substances. An example is Taxol®, which was originally derived from the bark of the yew tree.

**Chemistry panel:** a blood test to determine the function of various organs such as your liver and kidneys; it looks at your electrolytes, minerals and other values.

**Chest X-ray:** an X-ray to evaluate chest structures such as the heart and lungs.

**Clinical trial:** see “research protocol.”

**Clotting (also known as coagulation factors):** proteins in the blood that help blood to clot.

**CMV (cytomegalovirus):** a common virus that does not hurt healthy people, but can cause serious lung and other infections in people with lowered immune systems.

**Complete blood count (CBC):** a blood test to count the red blood cells, white blood cells and platelets.

**Conditioning regimen:** a term used for the high dose chemotherapy, with or without radiation therapy, given to prepare the patient’s body for transplant. The regimen generally lasts 2 to 10 days prior to the transplant.

**Cryopreservation:** those methods used to prepare either bone marrow or peripheral blood stem cell products for freezing and long-term storage and prevent cell destruction during either the freezing or thawing process. The addition of 10% DMSO (dimethyl sulfoxide) to the product is the most common approach. The product is then stored in liquid nitrogen.
**CT scan:** a series of X-ray pictures taken of the body from different angles to search for abnormalities. This test is often done at the same time as a PET scan to confirm findings.

**Dehydrated:** a condition of the body where there is a decrease in body fluid due to decrease in fluid intake.

**DMSO:** dimethyl sulfoxide, a chemical that prevents stem cell destruction during either the freezing or thawing process.

**Edema:** swelling of any part of the body due to a collection of fluid in the tissue.

**EKG (electrocardiogram):** A test to evaluate the electrical conduction of your heart.

**Electrolytes:** chemical elements in the blood that help the body to perform many of its functions. Potassium, and sodium are examples of electrolytes. If certain electrolytes are low, they can be replaced in the form of foods, intravenous medications and/or fluids, or pills.

**Engraft (engraftment):** the point at which there are >1000 white blood cells per microliter or an ANC >500; >20,000 platelets (or platelet independence).

**Epidural:** an infusion of local pain medication into the space outside the spinal column.

**Fever:** the rising of a person’s temperature above normal, which is generally 98.6°F. A fever is usually a symptom of an infection or an allergic reaction. If you are neutropenic, even a “low grade” fever (such as 100.4°F) is significant.

**Gastro-intestinal tract:** a term used to describe all of the organs from the mouth, esophagus, stomach and intestines to the rectum.

**Genetically:** pertaining to reproduction or to birth or origin; inherited.

**Graft versus host disease (GVHD):** a condition that occurs when the new (graft) bone marrow and immune system from a donor recognize the patient’s (host) tissues as being “foreign” in an allogeneic transplant. Tissues that are affected the most are skin, gastrointestinal tract and the liver.

**Growth factors:** a medication that stimulates the growth and development of certain cells. GM-CSF and G-CSF are growth factors that stimulate certain white blood cells, including neutrophils.

**Harvested:** see “bone marrow harvesting”.

**Hematocrit:** the percentage of red blood cells that are in whole blood.

**Hemoglobin:** a molecule on the red blood cell that holds the oxygen on the cell. The measure of hemoglobin on a blood test shows how much oxygen our blood can carry.

**Hepatitis panel:** a blood test to determine if a person has been exposed to hepatitis viruses.

**High-dose chemotherapy:** chemotherapy that is given in higher doses than standard cancer treatment. Standard and high doses depend on the type of cancer being treated and the type of chemotherapy.

**Human leukocyte antigen (HLA typing):** a test that determines the type of markers you have on certain tissues and cells, including platelets, that allow your body to know “self” from “non-self”.

**IJ or internal jugular catheter:** see “apheresis catheter”.
**Immunosuppression:** the act of “holding down” or decreasing the activity of the immune system. This can occur in the body because of disease, or be done on purpose through medications to prevent graft rejection or graft versus host disease.

**Immunosuppressive medications:** medications that cause suppression of your immune system.

**Implanted port (and needle):** a type of central venous catheter that is completely under the skin—usually located on your chest or arm. Medications and fluid can be given into your vein with a simple injection through the skin into the portal.

**Induction:** a term used to describe the first treatment of a cancer. The purpose is usually to provide and measure an initial response to the treatment.

**Infection control precautions:** precautions, such as careful and frequent handwashing, that are designed to protect the patient with a lowered immune system from developing infection.

**Informed consent:** the written or verbal approval for a treatment that has been fully described, including risks and benefits.

**Jaundice:** yellow coloring of the skin and/or whites of the eyes caused by high levels of a bilirubin (a by-product of red cells) in the blood.

**Lab work:** blood sample tests.

**Mahurkar:** a temporary large venous line that has two tubes used for apheresis. It is usually placed directly into the jugular vein in the lower neck area.

**Malignant:** a tumor that has the ability to spread, cancer. Non-malignant tumors are called “benign” tumors and are not considered cancerous.

**Matched unrelated transplant (MUD):** an allogeneic blood & marrow transplant from someone besides a family member.

**Minerals:** elements, such as magnesium, that are provided by foods and important for the function of our cells.

**“Mini” allogeneic transplant:** an allogeneic transplant in which the conditioning treatment does not fully cause bone marrow suppression.

**Mobilize (mobilization):** the process of stimulating stem cell growth and movement from the bone marrow to the peripheral blood. This can be done by growth factors with or without chemotherapy.

**Mucositis:** inflammation of mucous membranes; it can extend from mouth to the anus and include the vagina.

**Muga scan:** a test that evaluates the pumping action of your heart; the measure is reported as an “ejection fraction.”

**Nadir:** literally, “the lowest point.” In blood & marrow transplant, it refers to the lowest number a patient’s white blood cell count reaches after high-dose chemotherapy. This usually occurs five to ten days after stem cell infusion.

**Neutropenia:** a condition which occurs when the number of neutrophils (a type of white blood cell produced in the bone marrow) are low. Neutrophils are usually the front line of defense in preventing and treating infection in our bodies. Thus, this condition can be serious; if neutropenia occurs, a patient is at increased risk of developing an infection.

**Neutropenic precautions:** special care activities that help reduce the risk of infection during neutropenia.
**Neutrophil:** a type of white blood cell that is usually the front line of defense in preventing and treating infection in our bodies. They are normally the highest in number of all of the white blood cells.

**Outpatient:** a term used for an area outside the hospital where treatment is provided, such as a clinic or doctor’s office.

**Packed red blood cells (PRBCs):** a unit of concentrated red blood cells in which most of the other blood components has been removed.

**Peripheral blood stem cells:** see “stem cells.”

**PICC (peripherally inserted central catheter):** a catheter that is inserted into a large vein in your arm. It is threaded so that the tip of the catheter is in a large vein near your shoulder, close to the upper right chamber of your heart. Medications, blood products and IV fluids can be given through the catheter.

**Platelet(s):** blood cells that prevent and stop bleeding.

**Protocol(s):** a standard treatment for a specific disease or a research protocol; both are an outline of a treatment plan.

**PT/PTT:** blood tests to measure coagulation factors that work with your platelets to help blood to clot.

**Pulmonary function test:** a test to determine the ability of the lungs to deliver oxygen to the blood stream.

**Radiation** or **radiation therapy:** treatment of disease by means of ionizing radiation. Ionizing radiation is high intensity X-rays.

**Red blood cells:** cells that carry the oxygen we breathe in through our lungs to the body’s tissues. The cells pick up the oxygen as the blood circulates through the lung tissue. These cells are produced by the bone marrow.

**Research protocol:** this is a treatment intervention or questionnaire that is not a standard part of the usual care.

**Rh:** another major blood antigen system, like the ABO, that indicates the absence or presence of the Rh (rhesus) system on the surface of blood cells. Individuals are either Rh negative or Rh positive.

**Scan(s):** a general term for a diagnostic test, such as a CT scan.

**Stem cells:** the cells from which all blood cells develop. Most are in the bone marrow. However, there are very small amounts in the blood of normal individuals.

**Stem cell collection (stem cell harvesting or stem cell apheresis):** see “apheresis”.

**Stem cell transplant:** see “BMT”.

**Stomatitis:** inflammation of the mouth (mouth sores).

**Subcutaneous injection:** an injection, or shot, of medication that is given by a very thin needle just under the skin. The medication is absorbed into the blood stream over a short amount of time.

**TBI (total body irradiation):** the total body is treated with radiation.

**Thrombocytopenia:** a condition in which the number of platelets is too low and the patient is at risk for bleeding.

**Transplant:** to transfer an organ or tissue from one donor to another. See “allogeneic transplant” and “autologous transplant”.

**Umbilical cord blood:** blood that is taken from the umbilical cord after birth.

**Unrelated allogeneic transplant:** an allogeneic transplant in which the donor is not related to the patient.
Veno-occlusive disease (VOD): a condition in which the veins in the liver become narrowed, causing a decrease in blood flow to the liver and liver malfunction. This may result from some chemotherapy medications.

Vital signs: measures that help indicate adequate functioning of organs (such as the heart, brain, lungs, etc.) that are essential to life. These measures include a person’s blood pressure, pulse, respiration rate and temperature. The word “vital” means essential to life.

Vitamin K: a vitamin found in green leafy vegetables, pork liver, yogurt, egg yolk, kelp, alfalfa, fish liver oils and black strap molasses. It is synthesized by the bacterial flora of the intestines and is essential for the synthesis of clotting factors.

White blood cells (WBC): cells that fight infection. There are several types of white cells, such as neutrophils, lymphocytes and monocytes (neutrophils are the greatest in number). These cells are produced by the bone marrow.