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SURVIVOR—AFRICA & LYMPHOMA
ETHAN ZOHN
Personal Perspective

12th Edition

LEUKEMIA, LYMPHOMA & MULTIPLE MYELOMA

A TREATMENT AND FACILITIES GUIDE FOR PATIENTS AND THEIR FAMILIES

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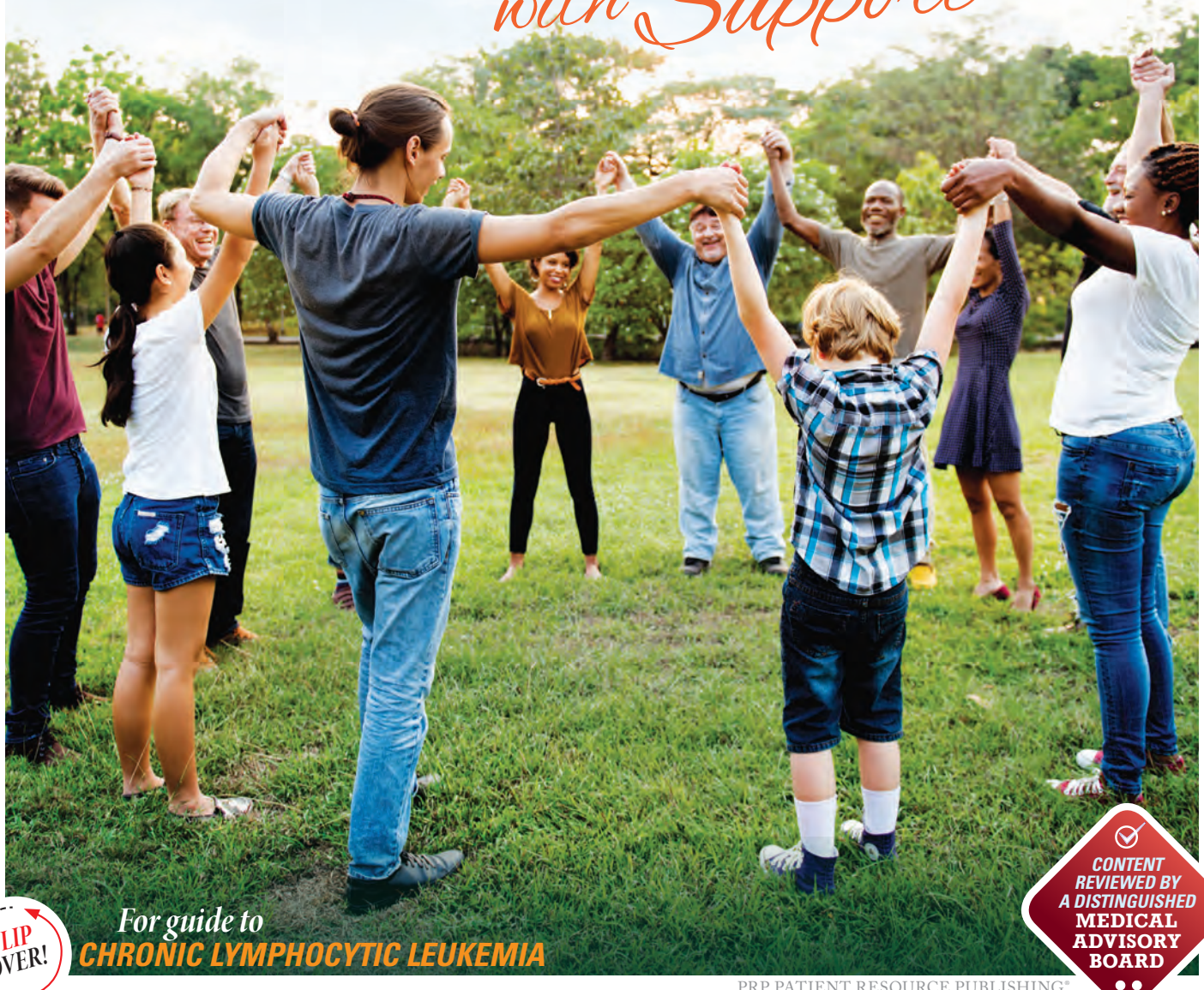

For guide to
CHRONIC LYMPHOCYTIC LEUKEMIA

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12th Edition

LEUKEMIA, LYMPHOMA & MULTIPLE MYELOMA

IN THIS GUIDE

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Empower yourself to make decisions about your care

Hearing you have a blood (hematologic) cancer can feel overwhelming. It can be easy to feel lost in the complicated medical terms, new doctors and a changed vision of your life. You are not alone. You will be surrounded by a multidisciplinary team of skilled health care professionals. They know it is difficult to process a cancer diagnosis, and they are prepared to support and guide you.

Remember that you are more than your diagnosis. The cancer is as individual as you are. How your body responds to treatments and side effects, and the emotions you feel, may not be like anyone else's, even if you have the same type of cancer or treatments. Although there are many variables, one thing is certain: You are uniquely equipped to be your own best advocate.

You may want to seek out accredited hospitals, cancer centers and doctors with expertise in treating the type of blood cancer you have. Blood cancers can be difficult to diagnose and treat, so contacting a specialist to provide care and for a second opinion may prove valuable. This does not mean you doubt your doctor. Your doctor might be the best resource for finding a second opinion. Doctors may have different opinions and expertise, and you deserve to gather as much information as possible about your diagnosis and treatment options.

Learn as much about your type of blood cancer as possible so that you are better prepared to make decisions about your care. You will partner with your doctor and other medical professionals.

You will have a close working relationship with your doctor. Together you will discuss the goals of treatment and what quality of life means to you. Keep these ideas in mind as you discuss treatment.

- A variety of treatment options may be available. Doctors, and especially specialists, are always learning which cancers respond best to certain therapies.
- Cancer treatment is continuing to evolve through clinical trials. Every day, research is looking for more options beyond surgery, chemotherapy and radiation therapy to offer more options based on the cancer type.

You can also use the resources in this guide to help you make informed decisions.

HEMATOLOGIC CANCERS

The three main types of blood cancer are leukemia, lymphoma and multiple myeloma, and they each affect different parts of the blood. This guide explains them in more detail, including common subtypes and available treatment options.

Blood cancers begin in different parts of the blood and affect the way blood cells develop and function. Some affect the immune system, which helps the body fight infections and other diseases.

Leukemia typically starts in blood-forming tissue, such as the bone marrow, and causes large numbers of abnormal blood cells to be produced and enter the bloodstream. Lymphomas begin in lymphocytes. Multiple myeloma begins in plasma cells. Each type may include subtypes of the disease that may require a different treatment.

BLOOD AND BONE MARROW BASICS

Hematologic cancers affect many cells and tissues within blood and bone marrow. Understanding these components may help.

- Blood is composed of red blood cells, white blood cells, platelets and other substances suspended in fluid called plasma.
- Red blood cells carry oxygen from the lungs to other parts of the body.
- White blood cells help the body fight infection.
- Platelets are blood cells that gather around wounds to form clots and stop bleeding. They also play a part in repairing wounds and creating new blood vessels.
- Plasma is the liquid component of blood that carries water, nutrients, hormones, proteins and enzymes to many parts of the body.
- Plasma cells produce antibodies to help fight germs and viruses, and stop infection and disease. They are primarily found in bone marrow.
- Blood stem cells are immature cells that can develop into all types of blood cells, including white blood cells, red blood cells and platelets. They may also be called hematopoietic (pronounced hee-MA-toh-poy-EH-tik) stem cells.
- Bone marrow is the soft, spongy center of some bones, where blood is created. ■

Telehealth visits provide more access to health care

Patients may now receive some medical care from a distance through technology such as computers, cameras, video conferencing, the internet, satellite and wireless communications. You may hear it referred to as "telehealth," "telemedicine" or "virtual appointments."

Telehealth may be a welcome option for blood cancer patients, especially those who are in remission, taking oral-based therapies or receiving maintenance therapy.

Other benefits include:

- **Reduces travel for patients who live far from a center**
- **Eliminates the need to find transportation and/or child care**
- **Adds another layer of safety by limiting potential exposure to infections in clinics and hospitals**
- **Allows access to more cancer specialists**
- **Makes it easier to obtain a second opinion**
- **Enables you to stay home if you feel unwell or find it physically challenging to go to a center**
- **Reduces disruption to your daily life**
- **Offers an easy way to report symptoms or complications between follow-up visits**
- **Allows caregivers to join and ask questions during visits**

Many hospitals and cancer centers offer telehealth, and more insurance companies cover the visits, including Medicare and Medicaid. Contact your insurance provider to find out if telehealth is covered in your plan.

Understanding options boosts confidence in decision-making

Some types of blood cancer are curable. Others are managed, with the goal of maintaining a certain quality of life. You will work closely with your doctor to determine the types of treatment that will help achieve your goal. Your doctor will consider many factors, including the stage or classification, type and location of your disease, and your age and general health. You will share your expectations for life during treatment. Together, you will make a plan to move forward.

Following are descriptions of the treatment options that are commonly used. They may be used alone or in combination.

Active surveillance, also called watchful waiting, may be used for slow-growing disease. Regular checkups are necessary for monitoring, and treatment does not begin until test results show the disease is progressing or symptoms appear. This option offers the possibility of avoiding the side effects of treatment for as long as possible and, hopefully, without affecting the outcome.

DRUG THERAPY

A variety of drugs, alone or in combination, may be used to slow or stop the growth of cancer cells. Ongoing research has resulted in many new drugs and combination therapies that offer the promise of longer and healthier lives for people with blood cancer.

Chemotherapy travels through the bloodstream, affecting cells all over the body. It may be given intravenously (IV) or taken orally as a pill and is typically delivered in cycles, with treatment periods followed by rest periods to give your body time to recover. Strategies may consist of a single chemotherapy drug, a combination given at the same time, or drugs given one after another. Chemotherapy may be used alone or with other forms of treatment, such as stem cell transplantation or chimeric antigen receptor (CAR) T-cell therapy, which is a type of immunotherapy.

Immunotherapy harnesses the potential of the body's own immune system to recognize and destroy cancer cells. By training the immune system to respond to cancer, this strategy has the potential for a response that can extend beyond the end of treatment. Various types of immunotherapy may be available depending on the diagnosis, such as immune checkpoint inhibitors, cytokines, monoclonal antibodies, personalized vaccines and chimeric antigen receptor (CAR) T-cell therapy. Immunotherapy may be given intravenously (IV) or subcutaneously and may be given in combination with other therapies.

Targeted therapy is a personalized strategy that enables your doctor to use the results from genetic (molecular) testing to target specific genes, proteins, mutations or abnormalities that are causing cancer cells to grow and multiply. Researchers continue to explore the important role these targets play in the growth and survival of cancer cells. New drugs designed to attack these targets have recently been approved, and clinical trials are currently testing others. Unlike chemotherapy, which attacks healthy cells as well as cancer cells, targeted therapy is designed to affect only cancer cells. Targeted therapy drugs may be given orally, subcutaneously or intravenously (IV), and some may be given in combination with other drug therapies.

Corticosteroids are drugs used to treat some blood cancers and can ease nausea and vomiting. They can be used alone or in combination with other types of drug therapy and are given orally or through an IV.

Growth factors help the body make white blood cells and are given because white blood cells are often damaged by treatment, which can increase the risk of infection.

Bone-modifying drugs are given by IV to treat bone problems as well as prevent or slow further bone damage. Pain medications are sometimes added to control bone pain.

STEM CELL TRANSPLANTATION

Also known as bone marrow transplantation, a stem cell transplant involves an infusion of healthy stem cells into the body, typically after chemotherapy (see *Stem Cell Transplantation*, page 4).

RADIATION THERAPY

Radiation therapy is designed to destroy cancer cells and shrink tumors with high-energy radiation. Localized blood cancer or bone pain that does not lessen with chemotherapy may be treated with radiation therapy targeted to specific parts of the body. External-beam radiation therapy (EBRT), which aims high-energy rays at the cancer from outside of the body, is commonly used. EBRT may be given to the entire body before stem cell transplantation to make space to allow for the new cells (graft) to replace the diseased blood system.

SURGERY

Surgical procedures may be done to take a biopsy sample or, in cases of weakened bone, to place metal plates or rods that provide support or prevent fractures. Though surgery is not common for treating blood cancers, it may be used to remove a single plasmacytoma (malignant plasma cell tumor), which can occur with multiple myeloma, or to remove the spleen or other organs for certain subtypes of non-Hodgkin lymphoma.

CLINICAL TRIALS

These medical research studies are important to consider when discussing treatment options with your doctor. Treatment trials evaluate whether a new treatment, such as a drug or vaccine, drug combination, surgical procedure, type of radiation therapy or a combination of therapies, is more effective or better in some way than the current standard of care. Depending on your diagnosis and other factors, the therapy used in a clinical trial may be suitable as a first-line treatment (before any other treatment is given) or at another time during care (See *Resources* below). ■

CLINICAL TRIALS RESOURCES

- **Be the Match | Jason Carter Clinical Trials Program** www.ctsearchsupport.org, 888-814-8610
- **Cancer Support Community** www.cancersupportcommunity.org/find-clinical-trial, 888-793-9355
- **Center for Information & Study on Clinical Research Participation** www.searchclinicaltrials.org
- **CenterWatch** www.centerwatch.com, 866-219-3440
- **ClinicalTrials.gov** www.clinicaltrials.gov
- **Lazarex Cancer Foundation** www.lazarex.org, 877-866-9523, 925-820-4517
- **The Leukemia & Lymphoma Society** www.lls.org/treatment/types-of-treatment/clinical-trials/finding-a-clinical-trial
- **National Cancer Institute** www.cancer.gov/clinicaltrials, 800-422-6237
- **NCI Cancer Information Service** 800-422-6237

Take the right dose at the right time — every time

As a result of the advances made in treatments for many types of blood cancer, an oral therapy (pill) may be an option for you. Though oral therapies offer great convenience, it is critical to understand the importance of taking them exactly the way your doctor instructs. To be fully effective, every dose must be taken with the same kind of accuracy, precise timing and safety precautions as infusions and injections for as long as prescribed. This is known as medication adherence.

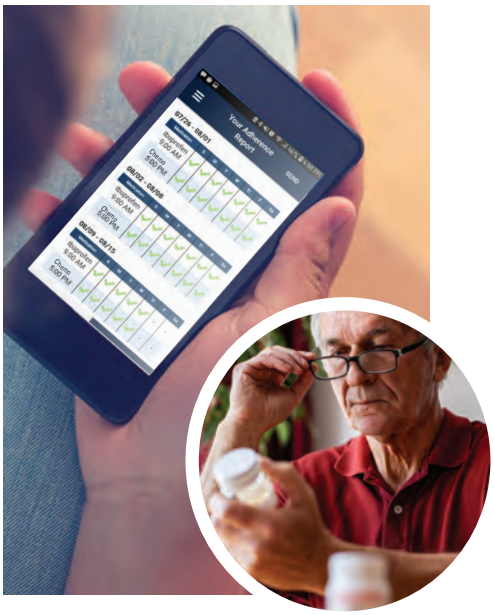
Medication adherence is important because most cancer therapies are designed to maintain a specific level of drugs in your system for a certain time based on your cancer type and stage, your overall health, previous therapies and other factors. If your medications are not taken exactly as prescribed, or if you miss appointments for your IV infusions or injections, the consequences can be serious, even life-threatening.

Even small changes to a treatment regimen can be disruptive. Getting off schedule, missing doses, taking an incorrect dosage or not following the instructions can lead to increased side effects, treatment delays or hospitalization. The most serious consequence is a poor outcome, such as cancer progression or recurrence.

These suggestions can help make it easier for you to stick to your medication schedule:

- Make sure you fully understand the instructions for how and when to take your medications. Your doctor, nurse and pharmacist are excellent resources to ask.
- Track each dose, including missed doses.
- Detail any side effects.
- Set up medications in a pill organizer.
- Use a medication reminder, such as an alarm on your clock or phone, or download a free smartphone app.

Keep the importance of medication adherence top of mind. And, remember, by taking the right dose at the right time, every time, you are taking control of a key part of your cancer treatment. ■



Familiarize yourself with the stem cell transplant process

Stem cell transplantation helps restore the body's ability to produce blood cells. It may be used to treat or manage many types of blood cancer. The soft spongy tissue inside your bones (bone marrow) produces billions of young, blood-forming (hematopoietic) stem cells. They make white blood cells that fight infection and illness, red blood cells that deliver oxygen to and remove waste from your body's cells, and platelets that help your blood clot to stop bleeding.

Also called a hematopoietic cell transplant, a stem cell transplant can involve different sources of stem cells:

- A **bone marrow transplant** (BMT) uses stem cells inside bones. The hip (pelvic) bones have the most marrow, as doctors commonly approach bone marrow through the hip.
- A **peripheral blood stem cell transplant** (PBSCT) uses stem cells in the bloodstream.
- A **cord blood transplant** uses stem cells in blood vessels of a discarded placenta or newborn's umbilical cord.

Your doctor may consider one of the following types of transplant:

An **autologous ("auto") transplant**, which uses your own stem cells. If needed, you will receive another transplant within six months, which is called a tandem stem cell transplant.

An **allogeneic ("allo") transplant**, which uses stem cells donated by a family member or someone not related to you. These stem cells are often found through a national or international registry (see *Develop a plan for before and after a transplant*). Along with replacing stem cells, the donated cells may also attack and kill cancer cells remaining after high-dose conditioning. This is called the graft-versus-tumor effect (also called graft-versus-leukemia or graft-versus-cancer-cell).

If you are using stem cells from a family donor, it may help you to know the following:

- A sibling has a 1 in 4 chance of being a donor match.
- A syngeneic stem cell transplant uses stem cells from an identical twin.
- Half-matched (haploidentical) transplants create a bigger pool of potential donors. It might include a parent or child — or even an aunt, uncle or grandparent.

Donor tissue must match yours as closely as possible. A close match reduces the chance of a rare but serious condition called Graft-versus-Host Disease (GvHD), in which transplanted donor immune cells attack the patient's skin, liver and gastrointestinal tract. Symptoms of GvHD include a skin rash or stomach, lung or muscle problems.

THE TRANSPLANT PROCESS

Stem cell transplants generally occur as follows:

1. **Stem cell collection.** Stem cells from you or a donor are collected, filtered and processed. In some cases, the cells are frozen and stored, and later thawed.
2. **Conditioning.** You receive high-dose chemotherapy or full-body radiation therapy to destroy the cancer cells.
3. **Stem cell transfusion.** A doctor infuses the harvested stem cells into your body through a vein.
4. **Recovery and engraftment.** Within about 30 days, healthy cells begin to grow (engraft). While your weakened immune system recovers, you will be at risk for infection. This process may take multiple years and will require ongoing use of prophylactic anti-viral and anti-bacterial medications as well as repeat inoculations with childhood vaccines. The number of red cells, white cells and platelets will continue to be monitored until they are back to safe levels. Transplant recipients also remain at risk for chronic Graft-versus-Host Disease and may require lifelong treatment for this condition.

SEEK THE SUPPORT OF A CAREGIVER

Once you're home, you may need help. If a family member or friend is not available, you may consider hiring a temporary caregiver. Among other things, a caregiver can:

- Keep your home safe and help protect you from infection
- Track your appointments and take you to the clinic
- Make sure you take your medications on schedule
- Care for your dressings or central venous catheter and deliver medicines through the catheter, if applicable
- Check for any signs of infection or other problems
- Make healthy meals and encourage you to eat well
- Report changes to your medical team

You are encouraged to learn as much as you can about stem cell transplantation. Talk with your doctor about the benefits and risks so you know what to expect. This includes potential short-term or long-term side effects, as well as the type of assistance you will need from a caregiver. ■

Develop a plan for before and after a transplant

Preparing for a stem cell transplant requires planning, especially if you will need a donor. Finding a donor can take time, so ask your doctor whether a transplant will be a potential treatment option at some point during your care. Though your doctor will start the search for a donor, you can help, too.

Organizations such as *Be The Match* (operated by the *National Marrow Donor Program*) have created registries of millions of potential donors. At the Be The Match website (www.bethematch.com), searching for a donor is free. It also offers many resources, such as explaining the donor search process, helping you find a transplant center if you don't already have one and connecting you to others who have been through the process.

Taking extra precautions to prevent infections is important. A transplant is designed to replace diseased cells with healthy stem cells. During the process, your immune system will be weakened. Consider social distancing and wearing masks. It may also be helpful for your caregiver to do a deep cleaning of the home before you return home. Other suggestions include avoiding public salad bars and uncooked foods as well as taking advantage of telehealth for the appointments that do not require in-person visits. Ask your doctor about infection prevention including immunization strategies.

How to pronounce the types of transplants

Hematopoietic *(hee-MA-toh-poy-EH-tik)*
Syngeneic *(SIN-jeh-NAY-ik)*
Haploidentical *(ha-ploy-DEN-ti-kuhl)*
Autologous *(aw-TAH-luh-gus)*
Allogeneic *(al-oh-jeh-NAY-ik)*

Personalizing therapy for your type of lymphoma

Lymphoma is a blood (hematologic) cancer. It starts in the lymph system, which is a major part of your immune system. The lymph system helps to protect your body from infection and disease. It consists of lymph, lymphoid tissue, lymph nodes and lymph vessels (see Figure 1).

Lymph is fluid that carries cells and travels through lymph vessels. Lymphoid tissue is mostly made up of white blood cells (lymphocytes). It is in many parts of your body such as the lymph nodes, bone marrow, thymus, digestive tract, and adenoids and tonsils. Lymph vessels connect hundreds of lymph nodes, which are structures in your neck, underarm, chest, abdomen and groin that help filter substances through lymph, the clear fluid that travels through the lymphatic system and carries cells that help fight infections.

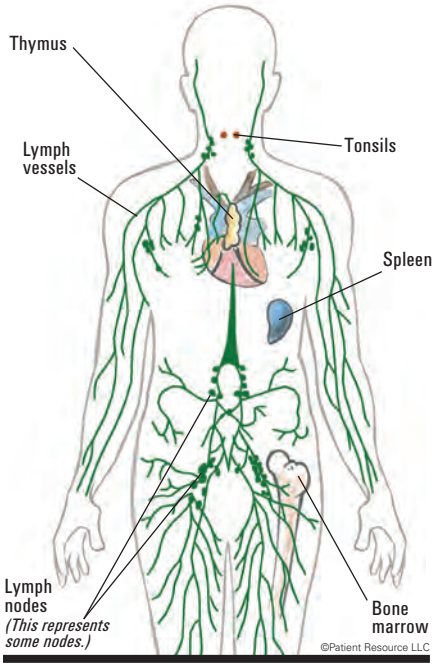
HOW LYMPHOMA OCCURS

Lymphoma develops when lymphocytes change into cancer cells. They multiply and collect in parts of the lymph system. Lymphoma cells can cause the lymph nodes, spleen or other organs to get bigger.

Two main types of lymphocytes can transform into lymphoma. They are B-lymphocytes (B-cells) and T-lymphocytes (T-cells). B-cells and T-cells work in different ways to defend your body against infection.

Lymphomas are frequently divided into Hodgkin lymphoma and non-Hodgkin lymphoma. Both can arise in any lymphoid tissue.

FIGURE 1
POSSIBLE AREAS AFFECTED BY LYMPHOMA



- **Hodgkin lymphoma** most often begins in lymph nodes found in the upper half of the body, such as the neck, chest and underarms. Hodgkin lymphoma often spreads from one group of lymph nodes to others in a predictable way. It can often be cured.
- **Non-Hodgkin lymphoma** (NHL) is more common than Hodgkin lymphoma. NHL occurs when T-cells, B-cells or natural killer (NK) cells grow uncontrollably. It spreads in a less orderly way than Hodgkin lymphoma. More than 60 subtypes of NHL exist. They look different under a microscope and have distinct molecular features. They affect the body in a variety of ways and may require different types of treatment. The subtypes also grow and spread at diverse rates. Slow-growing types are indolent lymphomas. Fast-growing types are aggressive lymphomas. The subtype of NHL you have affects your outcome.

DIAGNOSING LYMPHOMA

A complete history and physical exam will help your doctor know more about your signs and symptoms, risk factors and medical conditions. You will also have tests to help diagnose lymphoma, rule out other problems or see how fast the cancer is growing:

- **Blood tests** may include a complete blood count (CBC). Other blood tests can check for infection or rule out other problems.
- A **biopsy** confirms the diagnosis, helps tell the subtype of Hodgkin lymphoma or NHL, or helps see the extent of disease. Your doctor removes a tissue sample and looks at the cells under a microscope. He or she may also perform other tests on this sample. There are many types of biopsy. The surgeon may:
  - o Cut through skin to remove and examine a lymph node.
  - o Use a needle to remove cells from a lymph node, tumor, bone marrow or fluid around the brain and spinal cord or in the abdomen or chest. Sometimes a larger needle can be used to obtain a piece of lymphoma.
- **Special tests** may be needed to further examine blood and biopsy samples. Immunophenotyping by flow cytometry may help determine whether your signs and symptoms are due to lymphoma, another cancer or something else. Additionally, chromosome tests may help identify the type of lymphoma. These may include cytogenetics, fluorescence in situ hybridization (FISH) or polymerase chain reaction (PCR).
- **Imaging tests** help determine the extent of disease. They might include magnetic resonance imaging (MRI), positron emission tomography/computed tomography (PET/CT), ultrasound or X-rays.

STAGING AND CLASSIFYING LYMPHOMA

Experts typically classify lymphomas by:

- The type and subtype
- The appearance of the lymphoma cells under a microscope
- Results of blood tests
- Chromosome abnormalities or the results of molecular testing
- The specific sites involved

The following systems are used to stage and classify lymphoma, and other tools are also available to assess the potential outcome for a certain type of lymphoma.

Lugano classification system. Most doctors stage Hodgkin lymphomas and NHLs using this system. It assigns the lymphoma a stage of I, II, III or IV — with or without other factors (see Table 1, page 8). These stages can be divided into two groups: limited stage and advanced stage. A higher stage number means the cancer is more advanced.

International Prognostic Index (IPI). Some doctors also use the IPI to help predict whether the disease will recur and the overall survival. The IPI assigns one point for each of these risk factors:

- Age 60 or older
- Inability to perform normal activities
- Late-stage disease (Stage III or IV)
- Two or more extranodal sites (areas outside the lymph system) affected
- High level of lactate dehydrogenase (LDH), which may be a sign of tissue damage, lymphoma or another disease

(continued on page 8)

To win the reality television show Survivor: Africa in 2002, Ethan Zohn showed incredible physical, mental and spiritual endurance. The former professional soccer player drew on those assets seven years later when he was faced with his biggest challenge of all: surviving Hodgkin lymphoma. Today, Ethan continues to help other patients and their loved ones by sharing his story and inspiring hope.

Meet Ethan Zohn

A survivor in every sense of the word

Really itchy skin was Ethan Zohn's first indication that something was not right. After pills, creams and lotions didn't make a difference, his doctor performed tests that revealed a 6 cm by 12 cm mass in his chest. Biopsy results determined the mass and a lymph node by his left clavicle were caused by a type of Hodgkin lymphoma.

Though the prognosis was good, Ethan was shaken by the diagnosis.

"I was 35, and I felt as if the rug was pulled out from under me," he said. "I lost my dad to colorectal cancer when I was 14, and that was my only experience with cancer. In my mind, cancer equaled death."

Ethan was no stranger to pushing his body to the limits. His career as a professional soccer player, along with literally surviving in the desert during *Survivor: Africa*, helped prepare him for the battle ahead. However, he couldn't have gotten through it without the support of others.

"My family is incredible. I remembered their support when my dad was sick, and I knew I could count on them. They have always surrounded me with so much love," he explained.

He soon realized he needed support from someone who knew exactly what he was going through. At first, it was difficult for him to be vulnerable and ask for help, but he decided to reach out to a peer-to-peer cancer group called Imerman's Angels. He was matched with his own "angel," a mentor he could talk to one-on-one. It was so helpful that he later became an angel as well to help others.

Ethan lived in New York City and sought treatment from a well-known cancer center there. The maximum dose of chemotherapy, 22 radiation therapy treatments and an autologous stem cell transplant combined to put him in remission. Though treatment was successful,

he had to be careful for a period following the transplant because of the risk of infection, which left him feeling extremely isolated and lonely. He mostly stayed in his apartment while his friends were moving on with their lives, getting married and having kids.

"I had to press pause on my life, and it was scary. It probably didn't help that I was recuperating in a 640-square-foot apartment," he said.

Anxiety that he might relapse plagued Ethan. Then, in 2011, his worst fear came true. He relapsed.

"When I got the news, I felt deflated. The first time I was diagnosed, everyone rallied, including me. I had no doubt I'd crush cancer, but it's harder to get that revved up the second time," he admitted. "It is difficult to articulate how I felt. It was definitely more panic and anger than confidence."

Because it was such a rare type of lymphoma, Ethan didn't have many treatment options available until a new targeted therapy was approved for exactly his situation: someone who'd already had an autologous stem cell transplant who had to get into remission to qualify for an allogeneic stem cell transplant.

He sought a second opinion and then another from doctors at cancer centers across the country. When all three cancer centers agreed that this new drug offered the best path, he was satisfied. He began taking the new targeted therapy in preparation for the transplant. His brother Lee was approved to be his transplant donor.

"Taking this targeted therapy was a world of difference compared to chemotherapy. I felt like myself. I didn't lose my hair and only had minor gastrointestinal issues and neuropathy."

Ethan set a goal of getting into shape before the transplant.

"I adjusted my expectations for how I trained. Even though it was less rigorous than I was used to, I still managed to run the NYC marathon while I was taking the targeted therapy. Was it hard? Definitely, but I did it."

The transplant was successful and, seemingly, life went on. Ethan was back in the public eye and appeared to have resumed his pre-cancer life. In reality, that wasn't the case.

"I wanted to appear strong because I thought that was the persona I should take. I should be able to handle everything, right?"

After watching him give an interview, Ethan's mom offered some valuable advice.

"She could see through the façade, and she encouraged me to be my authentic self — to face my emotions and deal with them."

Since then, Ethan has worked hard at taking care of his emotional well-being and encouraging other survivors to pay attention to the feelings that accompany a cancer diagnosis.

"I didn't want to accept that cancer was trying to destroy me but, once I did, I was able to imagine myself in my new reality and focus on being present. The truth is empowering. Once you know what you're facing, you can move forward. I trusted my medical team and the science behind their recommendations, then I took control of what I could."

For his physical health, he started by developing a new exercise plan.

"I worked with specialists to figure out how I could feel my best physically and emotionally after the second transplant. I find a lot of hope in the studies that show being active before, during and after cancer treatment can make a big difference in how you feel, how effective treatment is and even your chance for survival.

"I also focused on nutrition and kept an open mind about alternative therapies. I tried meditation, music and art therapy, Reiki, massage, CBD and even laughing yoga. Some of those options offered a great deal of relief and comfort."

He got creative to help overcome his anxiety.

"Cancer comes with a lot of 'what ifs' that can really take over your mind. Sometimes I'd have them 40 or 50 times a day. I couldn't ignore them, so I came up with a solution that worked for me. When I had a 'what if,' I literally wrote down a plan for how I'd handle it:

What if I relapse?

First - Call my mother.

Second - Start treatment.

And so on….

"Then, I'd file that note in a shoebox. When that same 'what if' crossed my mind again, I'd remind myself that I already had a plan — there was no reason to waste my energy on it. Sometimes I even pulled out the shoebox to prove it to myself. Over time, I didn't have that 'what if' as often."

Today, Ethan is healthy and moving forward in many positive directions. The prize for winning *Survivor: Africa* was $1 million. He used that money to co-found Grassroot Soccer, an adolescent health charity that uses the power of soccer to help kids make healthier choices in life.

"I co-founded Grassroot Soccer before I had cancer. Now that I've been on the giving AND receiving end of charity and community support, it reaffirms my faith in people. Complete strangers participate in events to raise money for research and new drugs, and one of those drugs saved my life.

In treatment.

On the Survivor set.

To everyone out there who does that, don't ever lose sight of what you're doing because I'm living proof that it works. Thank you. I will be forever grateful."

He married interior designer Lisa Heywood in 2016, and they left New York City for a more secluded life in New Hampshire, growing their own food and enjoying nature and each other.

In February 2020, Ethan returned to the hit reality show's 40th season in *Survivor: Winners at War*.

He also continues to share his story.

"I hope to inspire others facing the challenges that accompany cancer. We all have something to draw from that gives us strength. Find what gives you strength, and then add to it with support from others. You never have to be alone." ■

The overall IPI score is the total number of points assigned to a patient. The lower the score, the better the prognosis, meaning the outcome from treatment is more likely to be promising.

World Health Organization (WHO) System. This is a newer system used to classify types of NHL. It groups lymphomas based on:

- The type of white blood cell the lymphoma starts in
- How the cancer cells look under a microscope
- The chromosome features of the lymphoma cells
- The presence of certain proteins on the surface of the cancer cells

HODGKIN LYMPHOMA

Hodgkin lymphoma most often starts in the lymph nodes in the chest, neck or underarm. It may spread to other lymph nodes or organs, such as the liver or lungs.

Most Hodgkin lymphoma cases are classical Hodgkin lymphoma and nodular lymphocyte-predominant Hodgkin lymphoma. The cancer cells are large, abnormal B-cells with more than one nucleus (Reed-Sternberg cells). Classical Hodgkin lymphoma has four main subtypes: nodular sclerosis, mixed cellularity, lymphocyte-rich and lymphocyte-depleted. Nodular lymphocyte-predominant Hodgkin lymphoma accounts for the rest of the Hodgkin lymphoma diagnoses. It has large cells that are variants of Reed-Sternberg cells.

TREATING HODGKIN LYMPHOMA

Several treatment options are available to choose from. Doctors weigh many factors before they decide on the best treatment plan, including:

- Stage of disease
- Extent of lymphoma
- Disease subtype
- Presence of symptoms
- Age, gender and overall health

Chemotherapy is the main treatment for Hodgkin lymphoma. These are drugs that stop the growth of cancer cells. Chemotherapy may be a first-line therapy, which means you receive it before other types of treatment. Usually, people will receive multiple drugs for a certain amount of time.

If a first-line therapy does not work — or stops working — you may receive second-line therapy. Several chemotherapy combinations for both may be considered.

You may also receive chemotherapy along with radiation therapy or before a stem cell transplant.

Radiation therapy may be given after chemotherapy for classical Hodgkin lymphoma. This is more likely for a large or bulky tumor. Doctors may use it alone to treat early-stage nodular lymphocyte-predominant Hodgkin lymphomas. Or they may combine it with other types of treatment for a later stage of this type of Hodgkin lymphoma.

- External beam radiation therapy is the most common type of radiation therapy used. It delivers a beam of radiation from a machine outside of the body.
- Total body irradiation is a type of EBRT given to the entire body. You may receive this before stem cell transplantation.

Targeted therapies have been specifically developed to attack a specific molecule in cancer cells — often with less harm to normal cells than chemotherapy or radiation therapy. Monoclonal antibodies (mAbs — pronounced "mabs") may be an option for both classical and nodular lymphocyte-predominant Hodgkin lymphomas. It may work if the lymphoma cells have a certain protein on their surfaces. The mAbs are laboratory-made versions of immune system proteins designed to attack cancer cells. A mAb that carries a toxin to the cancer cell may be used as a first-line treatment of later-stage classical Hodgkin lymphoma combined with chemotherapy.

Immunotherapy uses the immune system to fight cancer. It offers new hope for people with relapsed Hodgkin lymphoma or with cancer that is harder to treat. Immune checkpoint inhibitors are approved to treat some cases of classical Hodgkin lymphoma.

- One immune checkpoint inhibitor was approved in 2016 for classical Hodgkin lymphoma. This is for cases where the cancer has recurred or progressed after a certain type of stem cell transplant and post-transplant drug therapy (see *Treatment Planning*, page 2).
- Another immune checkpoint inhibitor was approved in 2017 for children and adults with classical Hodgkin lymphoma that has stopped responding to treatment or returned after three or more therapies.

Stem cell transplantation may be used if other treatment options are not effective (see *Stem Cell Transplantation*, page 4). Doctors most often use stem cells from the patient's own body (an autologous stem cell transplant). These are

TABLE 1
LUGANO CLASSIFICATION FOR HODGKIN AND NON-HODGKIN LYMPHOMA

Stage	Description
Limited stage	
Stage I	Involvement of a single lymphatic site (i.e., nodal region, Waldeyer's ring, thymus or spleen).
Stage IE	Single extralymphatic* site in the absence of nodal involvement (rare in Hodgkin lymphoma).
Stage II	Involvement of two or more lymph node regions on the same side of the diaphragm.
Stage IIE	Contiguous (touching or near) extralymphatic* extension from a nodal site with or without involvement of other lymph node regions on the same side of the diaphragm.
Stage II bulky**	Stage II with disease bulk. (Bulk is defined as a mass greater than one third of the thoracic diameter on CT of the chest or a mass more than 10 cm.)
Advanced stage	
Stage III	Involvement of lymph node regions on both sides of the diaphragm; nodes above the diaphragm with spleen involvement.
Stage IV	Diffuse or disseminated involvement of one or more extralymphatic* organs, with or without associated lymph node involvement; or noncontiguous (not touching or near) extralymphatic organ involvement in conjunction with nodal Stage II disease or any extralymphatic organ involvement in nodal Stage III disease. Stage IV includes any involvement of the CSF (cerebrospinal fluid), bone marrow, liver or multiple lung lesions (other than by direct extension in Stage IIE disease).

*Extralymphatic sites are areas outside of the lymphatic system and include the adrenal glands, blood, bone, bone marrow, central nervous system (CNS; leptomeningeal and parenchymal brain disease), gastrointestinal (GI) tract, gonads, kidneys, liver, lungs, skin, ocular adnexae (conjunctiva, lacrimal glands, and orbital soft tissue), uterus and others.
**Stage II bulky may be considered either early or advanced stage based on lymphoma histology and prognostic factors.

Each stage may be accompanied by a letter(s) to indicate whether additional factors are present:
A: Fever, night sweats and weight loss are not present.
B: Fever, night sweats and weight loss are present.
Note: Hodgkin lymphoma uses A or B designation with stage group. A/B is no longer used in non-Hodgkin lymphoma.

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harvested, frozen and returned to the patient after high-dose chemotherapy.

Surgery is not used for most lymphomas but may be used to remove a tumor or the spleen.

Corticosteroids may be combined with chemotherapy to help it work better.

Clinical trials may offer you access to new therapies not otherwise available.

COMMON DRUG THERAPIES FOR HODGKIN LYMPHOMA

These therapies may be used alone or in combination. Possible combination therapies are listed below.

- bleomycin (Blenoxane)
- brentuximab vedotin (Adcetris)
- chlorambucil (Leukeran)
- cyclophosphamide
- dacarbazine (DTIC-Dome)
- doxorubicin hydrochloride (Adriamycin)
- mechlorethamine (Mustargen)
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)
- prednisone
- procarbazine (Matulane)
- vinblastine (Velban)
- vincristine (Oncovin)

SOME POSSIBLE COMBINATION THERAPIES

- AAVD: doxorubicin (Adriamycin), brentuximab vedotin (Adcetris), vinblastine (Velban) and dacarbazine (DTIC-Dome)
- ABVD: doxorubicin (Adriamycin), bleomycin (Blenoxane), vinblastine (Velban) and dacarbazine (DTIC-Dome)
- ABVD + R: doxorubicin (Adriamycin), bleomycin (Blenoxane), vinblastine (Velban), dacarbazine (DTIC-Dome) and rituximab (Rituxan)
- BEACOPP: bleomycin (Blenoxane), etoposide (Etopophos), doxorubicin (Adriamycin), cyclophosphamide, vincristine (Oncovin), procarbazine (Matulane) and prednisone
- ChlVPP: chlorambucil (Leukeran), vinblastine (Velban), procarbazine (Matulane) and prednisone
- DHAP: dexamethasone, high-dose cytarabine and cisplatin
- ESHAP: etoposide (Etopophos), methylprednisolone, high-dose cytarabine and cisplatin
- GDP: gemcitabine (Gemzar), dexamethasone and cisplatin
- Gem-Ox: gemcitabine (Gemzar) and oxaliplatin (Eloxatin)
- GVD: gemcitabine (Gemzar), vinorelbine (Navelbine) and doxorubicin
- ICE: ifosfamide, carboplatin and etoposide (Etopophos)
- Stanford V: doxorubicin (Adriamycin), mechlorethamine (Mustargen), vincristine (Oncovin), bleomycin (Blenoxane), etoposide (Etopophos) and prednisone

As of 10/13/21

REFRACTORY OR RELAPSED HODGKIN LYMPHOMA

The goal of treatment is remission. This occurs when you do not have cancer symptoms and your doctor cannot detect any lymphoma in your body. Remission may last for a while or be permanent.

If initial treatment does not result in complete remission, the disease is known as primary refractory Hodgkin lymphoma. Your doctor may suggest different drug therapies.

Even with remission, Hodgkin lymphoma sometimes returns (relapses). If this happens, your doctor will review your diagnosis and may choose a different treatment option. This often involves using a second-line combination chemotherapy treatment. It may include radiation therapy and a stem cell transplant. Your doctor may suggest a clinical trial.

NON-HODGKIN LYMPHOMA

Non-Hodgkin lymphoma (NHL) starts in the lymph system, most often in the lymph nodes, liver, spleen or bone marrow. It can also show up in your stomach, intestines, skin, thyroid, brain or any part of the body that contains lymphoid tissue.

NHL may be slow growing (indolent) or fast growing (aggressive). With more than 60 different subtypes of NHL, it can be hard to classify. However, it helps to know the subtype because not all treatments are effective for them all.

TREATING NHL

Your treatment plan will depend on the stage, type and location of the disease, as well as your age and general health. You may receive one or more types of treatment. In most cases of B-cell NHL, you receive treatment with chemotherapy, targeted therapy, immunotherapy, and/or radiation therapy. Your doctor may consider surgery and a stem cell transplant, if needed. Not all NHL subtypes, however, will require these options.

Chemotherapy treats many subtypes of NHL. You may have a combination of chemotherapy drugs. You may then have radiation therapy, targeted therapy or immunotherapy. Your doctor might also prescribe a corticosteroid.

Targeted therapy drugs target their attack on cancer cells, causing less harm to normal cells. The doctor may combine them with other drug therapies. Targeted therapies include:

- Monoclonal antibodies (mAbs — pronounced "mabs") are the main type of targeted therapy used for NHL. The FDA has approved a type of mAb, which carries a toxin to the cancer, for some types of NHL.
- Inhibitors work by stopping signals that allow lymphoma cells to multiply. They work in a variety of ways. These include a BCL-2 inhibitor, a histone methyltransferase inhibitor, a proteasome inhibitor, a selective inhibitor of nuclear export (SINE), and inhibitors that target the PI3K and Bruton's tyrosine kinase pathways.
- Immunomodulators help control the function of the immune system. They can slow the rate at which cancer cells grow and multiply.

Radiation therapy is sometimes given after chemotherapy depending on the NHL subtype. If you have advanced disease with local symptoms, you may receive it to treat pain.

- External-beam radiation therapy (EBRT) is the most common radiation therapy used for NHL. It delivers a beam of radiation from a machine outside of the body.
- Total body irradiation is a type of EBRT given to the entire body. You may receive this before stem cell transplantation.

Immunotherapy uses the body's immune system to attack cancer. It is an option for some subtypes of NHL and may include these types of immunotherapy:

- Monoclonal antibodies (mAbs — pronounced "mabs") target a special protein on the surface of lymphoma cells. The mAbs are laboratory-made versions of immune system proteins designed to attack cancer cells. The first successful immunotherapy introduced for lymphoma was a mAb available for all B-cell lymphomas. Some therapies approved target the CD19, CD20, CD30 and CD52 antigens.
- Immune checkpoint inhibitors block checkpoints that cancer cells take advantage of to keep from being attacked by the immune system. These may be used to treat primary mediastinal large B-cell lymphoma (PMBCL).
- Chimeric antigen receptor (CAR) T-cell therapy involves taking a patient's T-cells and changing them so they recognize and kill lymphoma cells. Doctors may use

CAR-T cell therapy after two other kinds of treatment have failed. It may be used for certain types of NHL, including follicular lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma (DLBCL), primary mediastinal large B-cell lymphoma, high-grade B-cell lymphoma and DLBCL that develops from follicular lymphoma. This new treatment is bringing hope to people with specific types of NHL because it is one of the first treatment options that can be personalized to each patient and the cancer's unique traits.

Your doctor may combine immunotherapy with other drug therapies.

Stem cell transplantation is mostly used for people who have NHL that is advancing or has returned. The goal is to create healthy bone marrow.

Your doctor may suggest it for certain subtypes of NHL, such as B-cell, mantle cell and some T-cell lymphomas. If so, learn as much as you can about the risks and benefits from a specialist at an experienced transplant center (see *Stem Cell Transplantation*, page 4). Transplants may use stem cells from a donor (allogeneic) or from your own body (autologous).

Surgery is sometimes used to treat mucosa-associated lymphoid tissue (MALT) lympho-ma. It may be needed for certain subtypes to remove the spleen or other organs. Your doctor may also use surgery to remove and examine a sample of tissue.

Watchful waiting is an option for people who do not have symptoms or sometimes for women who are pregnant.

Antibiotic therapy may be needed if bacteria have caused the lymphoma. This may apply to some patients with MALT lymphoma. Antibiotic therapy, though, is not a standard treatment for most lymphomas.

Plasmapheresis is not a treatment for lymphoma but may be used if extra antibody proteins make the blood thick. In this procedure, a machine filters plasma out of the blood.

Clinical trials are underway to explore new treatment options and combinations for NHL. Ask your doctor if you should consider a clinical trial. Trials may offer you access to new therapies that are not yet approved. Give this some thought, and talk with your doctor about it, especially if you have a recurrent, refractory, rare or aggressive type of NHL.

Bispecific T-cell engagers (BiTEs) are a new treatment approach being studied in lymphoma patients. These bispecific molecules harness the body's immune system, enabling a cancer-fighting T-cell to bind to a cancer cell and kill it.

COMMON DRUG THERAPIES FOR NON-HODGKIN LYMPHOMA

These therapies may be used alone or in combination. Possible combination therapies are listed below.

- acalabrutinib (Calquence)
- asparaginase erwinia chrysanthemi (recombinant)-rywn (Rylaze)
- axicabtagene ciloleucel (Yescarta)
- bendamustine (Bendeka)
- bleomycin (Blenoxane)
- bortezomib (Velcade)
- brentuximab vedotin (Adcetris)
- brexucabtagene autoleucel (Tecartus)
- carboplatin
- chlorambucil (Leukeran)
- cisplatin
- copanlisib (Aliqopa)
- crizotinib (Xalkori)
- cyclophosphamide
- dexamethasone
- doxorubicin hydrochloride (Adriamycin)
- duvelisib (Copiktra)
- ibritumomab (Zevalin)
- ibrutinib (Imbruvica)
- idelalisib (Zydelig)
- lenalidomide (Revlimid)
- lisocabtagene maraleucel (Breyanzi)
- loncastuximab tesirine-lpyl (Zynlonta)
- mechlorethamine (Mustargen)
- methotrexate
- methylprednisolone
- mogamulizumab-kpkc (Poteligeo)
- obinutuzumab (Gazyva)
- pembrolizumab (Keytruda)
- prednisone
- procarbazine (Matulane)
- rituximab (Rituxan)
- rituximab and hyaluronidase human (Rituxan Hycela)
- rituximab-abbs (Truxima)
- rituximab-pvvr (Ruxience)
- selinexor (Xpovio)
- tazemetostat (Tazverik)
- tisagenlecleucel (Kymriah)
- umbralisib (Ukoniq)
- venetoclax (Venclexta)
- vinblastine (Velban)
- vincristine (Oncovin)
- zanubrutinib (Brukinsa)

SOME POSSIBLE COMBINATION THERAPIES

- BR: bendamustine (Bendeka) and rituximab (Rituxan)
- CHOP: cyclophosphamide, doxorubicin (Adriamycin), vincristine (Oncovin) and prednisone
- CODOX-M/IVAC: cyclophosphamide, vincristine (Oncovin), doxorubicin (Adriamycin) and intrathecal methotrexate, and cytarabine followed by high-dose systemic methotrexate and rituximab (Rituxan)
- CVP: cyclophosphamide, vincristine (Oncovin) and prednisone
- EPOCH-R: etoposide (Etopophos), prednisone, vincristine (Oncovin), cyclophosphamide and doxorubicin (Adriamycin) and rituximab (Rituxan)
- Hyper-CVAD: cyclophosphamide, vincristine (Oncovin), doxorubicin (Adriamycin) and dexamethasone, alternating with high-dose methotrexate plus cytarabine and rituximab (Rituxan)
- lenalidomide (Revlimid) with rituximab product
- P+BR: polatuzumab (Polivy), bendamustine (Bendeka) and rituximab (Rituxan)
- polatuzumab vedotin-piiq (Polivy) with bendamustine (Bendeka) and a rituximab product
- R-CHOP: rituximab (Rituxan), cyclophosphamide, doxorubicin (Adriamycin), vincristine (Oncovin) and prednisone
- R-CVP: rituximab (Rituxan), cyclophosphamide, vincristine (Oncovin) and prednisone
- rituximab and hyaluronidase human (Rituxan Hycela) with first-line chemotherapy
- tafasitamab-cxix (Monjuvi) with lenalidomide (Revlimid)

As of 10/13/21

RECURRENT AND REFRACTORY NHL

The goal of treatment is remission. This occurs when you do not have cancer symptoms and your doctor cannot detect any lymphoma in your body. Remission may last only for a while or be permanent. The disease is refractory if treatment does not result in complete remission or if the cancer returns within six months of treatment.

Treatment for some subtypes of refractory NHL includes new types of immunotherapy, such as CAR T-cell therapy. Other treatment options include chemotherapy, stem cell transplants and clinical trials. Your doctor will choose the best treatment for you based on:

- The location of your cancer
- Your subtype of lymphoma
- The previous types of treatment you had
- Your overall health

If your NHL recurs or is refractory, it may help to get a second opinion about treatment options. You can ask your oncologist to help arrange this — most expect this kind of request. Do not worry that this might reflect poorly on you. It simply helps you make a more informed decision. ■

New treatment options offer hope for long-term remission

Significant improvements in treating multiple myeloma over the past few years are allowing patients to live longer with better outcomes as scientists learn more about the cause of this disease and how it develops. Continuing research in clinical trials holds the promise for even more new therapies to come, which is giving hope to many people whose lives are touched by multiple myeloma.

Multiple myeloma is a type of blood (hematologic) cancer. Also referred to as a plasma cell neoplasm, it begins when the blood's plasma cells multiply uncontrollably. Plasma cells are produced in the bone marrow and are a part of the immune system.

When plasma cells become abnormal and grow out of control, they can weaken the immune system by preventing healthy plasma cells from producing antibodies. These abnormal, cancerous plasma cells are called myeloma cells, and like normal plasma cells, myeloma cells make antibodies. But myeloma cells produce too much of the same antibody, called the M-protein. The M-proteins accumulate in the blood and urine and can damage the kidneys or other organs (see Figure 1).

Myeloma cells multiply uncontrollably in bone marrow, solid parts of bone and, occasionally, in other organs. Myeloma cells usually occur in multiple areas in the body, giving the disease its name, "multiple myeloma."

When the cells collect in bone marrow, they slow down the growth of healthy white blood cells, red blood cells and platelets. These cells collect in solid bone, causing holes called lytic lesions. The majority of people with multiple myeloma have these lesions when their disease is diagnosed.

Two known precursors to multiple myeloma are monoclonal gammopathy of undetermined significance (MGUS) and smoldering myeloma. MGUS occurs when abnormal plasma cells produce many copies of an identical antibody. Most cases of multiple myeloma are preceded by MGUS, but it is unknown whether MGUS is always present before diagnosis. Smoldering myeloma, also called asymptomatic multiple myeloma, is an early stage of myeloma. Preventive treatments to delay smoldering myeloma from progressing to multiple myeloma are being studied in clinical trials.

DIAGNOSTIC TESTING

Determining you have multiple myeloma may take time because there is not one telltale symptom that signals you or your medical team about your illness. As a result, multiple myeloma may be at an advanced stage when it is diagnosed.

Your doctor will likely use a combination of blood and urine tests and a bone marrow biopsy. Some of these tests may be repeated after diagnosis to monitor disease progression and determine the effectiveness of treatment.

A definitive diagnosis must include at least one of the following:

1. A very high proportion of plasma cells in the bone marrow
2. Biopsy results indicating a plasma cell tumor
3. Abnormal plasma cells making up 10 percent of the cells in the bone marrow, plus at least one of the following conditions:
   - Abnormally high level of M-proteins
   - Anemia (low red blood cell count)
   - Hypercalcemia (increased blood calcium level)
   - Poor renal (kidney) function
   - Abnormalities or holes in the bones or bone marrow found on an imaging test
   - An increase in one light chain (antibody protein) to a level 100 times that of the others

After diagnosis, imaging tests including magnetic resonance imaging (MRI) and positron emission tomography/computed tomography (PET/CT) may be used to help determine the extent and spread and to check for bone damage caused by the disease.

Your doctor may order special tests. Cytogenetics is the study of evaluating cells for chromosome abnormalities. Doctors may use fluorescence in situ hybridization (FISH), a test used to look for genetic abnormalities known to be associated with myeloma. Gene-expression profiling and next-generation sequencing are increasingly being utilized.

UNDERSTANDING STAGING

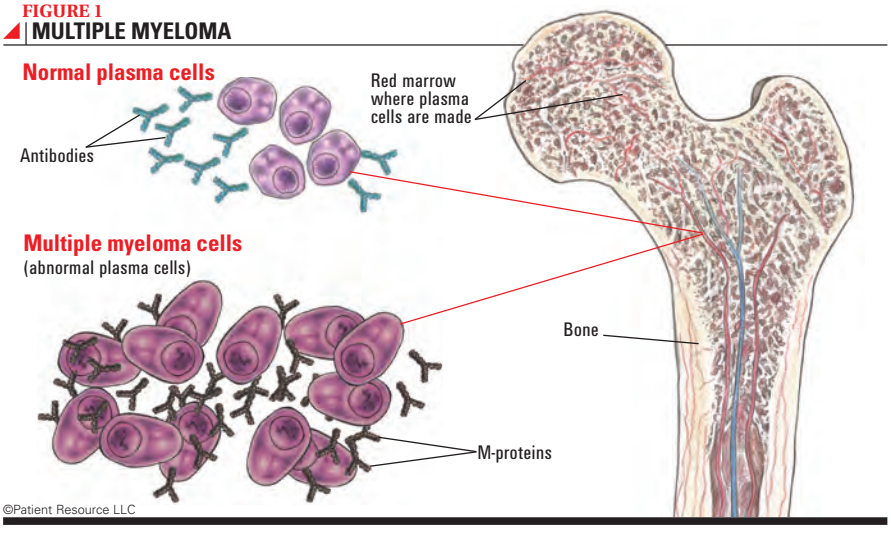
Your doctor will use the results of your diagnostic tests for staging. Staging describes the extent of the multiple myeloma, predicts treatment outcomes and helps guide the treatment plan. Two staging systems are used (see Tables 1 and 2, page 16).

The Revised International Staging System (RISS), which is commonly used, distinguishes between Stages I, II and III with four factors: the level of three predictive proteins – albumin, beta-2-microglobulin and lactate dehydrogenase (LDH) – measured in the blood, and chromosome (genetic) abnormalities that may be detected in the myeloma cells. It is commonly used to determine prognosis.

The Durie-Salmon Staging System uses results of blood, urine and imaging tests to measure the amount of abnormal plasma cells present and determine tumor size and/or extent of cancer in the body. This system considers four main factors: M-protein, calcium, hemoglobin and bone damage.

Stage I indicates the smallest amount of tumor cells present, and Stage III represents the largest amount. Once the stage is determined, it is subcategorized to signify the current level of kidney damage: "A" indicates

FIGURE 1
MULTIPLE MYELOMA



little or no change in function, and "B" indicates significant kidney damage.

TREATMENT OPTIONS

The primary goal of treating multiple myeloma is to reach and maintain remission, which means no longer having any signs or symptoms of the disease. As a result, multiple myeloma is often treated as a chronic condition, and each person's myeloma is managed uniquely.

Once your diagnosis is confirmed, consider working closely with a hematologist or oncologist who specializes in treating people with multiple myeloma. Your doctor will work with you to create a treatment plan and review all your options, including weighing the risks and benefits of each option.

Your treatment plan will be based on many factors: whether you are newly diagnosed or are experiencing a recurrence; the presence of symptoms; your overall health; the aggressiveness of the myeloma; and your goals of treatment, which often include eliminating myeloma cells, controlling tumor growth and pain, and improving your quality of life.

For patients with symptoms, a treatment plan may include these phases:

- Induction therapy, which is designed to control the myeloma and relieve symptoms. It may also be referred to as your primary therapy.
- Consolidation, which uses more chemotherapy or a bone marrow/stem cell transplant.
- Maintenance therapy, which is given to prevent cancer recurrence over a prolonged period of time.

In general, treatment may be considered first line or second line. First-line therapy is the first treatment given. Second-line therapy is given when the first-line therapy doesn't work or is no longer effective. It is common for multiple myeloma patients to have third- and fourth-line therapies due to the disease coming back or treatment that stops working.

One or more of the following approaches may be recommended.

Watchful waiting may be recommended for people with MGUS or smoldering myeloma (both precursors to multiple myeloma), early-stage disease and when symptoms are not present. It offers the possibility of avoiding the side effects of treatment as long as possible and, hopefully, without affecting the outcome. Keep regular checkups because treatment should begin as soon as the disease progresses or symptoms appear.

Chemotherapy uses drugs to destroy cancer cells by preventing them from growing and dividing. It is commonly used for multiple myeloma, and most people receive some form of it. It may consist of a single drug or multiple drugs given in combination. It may also be combined with other types of treatment. Some oral chemotherapy drugs may be taken at home. Intravenous (IV) drugs are given in a doctor's office, clinic or hospital.

Corticosteroids are myeloma cell-fighting drugs that may ease chemotherapy side effects, particularly nausea and vomiting. They can be used alone or in combination with chemotherapy. Corticosteroids also help reduce inflammation and may offer other benefits.

Stem cell transplantation may be recommended. An autologous transplant uses the patient's own stem cells, which are collected, filtered, processed and frozen. High-dose chemotherapy and sometimes full-body radiation (conditioning) are given to destroy cancer cells. Then the reserved stem cells are thawed and infused back into the patient's body (see *Stem Cell Transplantation*, page 4).

An allogeneic transplant may be used for patients with a high risk of relapse, those who aren't responding fully to other treat-ments or those who have relapsed disease. It uses stem cells donated by a family member or an unrelated donor.

Targeted therapy drugs are used to eliminate the cancer or stop the progression of disease. These drugs may be given orally, subcutaneously (by injection under the skin) or intravenously (IV). They travel throughout the body via the bloodstream looking for specific proteins and tissue environments of myeloma cells. The following types of drugs may be used alone or in combination with other therapies:

- Angiogenesis inhibitors block new blood vessel growth that feeds myeloma cells.
- Histone deacetylase (HDAC) inhibitors affect gene expression inside myeloma cells.

(continued on page 14)

[CRAB] The Common Signs of Multiple Myeloma

The most common signs of multiple myeloma, which are attributed to the same factors used to stage multiple myeloma, can be described with the CRAB acronym:

Calcium level – The disease may cause elevated calcium levels in the blood.

Renal (kidney) function – Kidney failure may result from damage to the kidneys caused by the multiple myeloma protein.

Anemia – Low red blood cell counts may be caused by cancer cells slowing the growth of healthy bone marrow cells.

Bone lesions – Multiple myeloma cells can cause bone damage (lytic lesions), thinning of the bones (osteoporosis) or a compression fracture of the spine.

TABLE 1
REVISED INTERNATIONAL STAGING SYSTEM (RISS)

Stage	Description
Stage I	Serum Beta-2-microglobulin, less than 3.5 mg/L and serum albumin, 3.5 g/dL or more and no high-risk cytogenetics* and normal LDH.
Stage II	Not Stage I nor Stage III.
Stage III	Serum Beta-2-microglobulin, 5.5 mg/L or more and high-risk cytogenetics* or high LDH.

*Cytogenetics is the field of study that analyzes the number and structure of human chromosomes. Researchers have identified certain high-risk cytogenetics that may be present in some people with multiple myeloma.

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TABLE 2
DURIE-SALMON STAGING SYSTEM

Stage	Description
Stage I	Hemoglobin levels are slightly below normal (but above 10 grams per deciliter of blood). Calcium levels are in the normal range (12 milligrams per deciliter of blood or less). M-protein levels are relatively low (less than 5 grams per deciliter for IgG; less than 3 grams per deciliter for IgA; less than 4 grams per 24-hour for urinary light chain). Bone X-rays are normal or show only one area of bone damage.
Stage II	Neither Stage I nor Stage III.
Stage III	Hemoglobin levels are very low (less than 8.5 grams per deciliter of blood). Calcium levels are high (more than 12 milligrams per deciliter of blood). M-protein levels are high (more than 7 grams per deciliter for IgG; more than 5 grams per deciliter for IgA; more than 12 grams per 24-hour for urinary light chain). Bone X-rays show at least three areas of bone damage.

These letters may be added to the Durie-Salmon stage to indicate additional factors:
A: Mostly normal kidney function. **B:** Abnormal kidney function.

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- Immunomodulators may indirectly stimulate or slow down the immune system. They may boost the immune system and the effects of other therapies on the myeloma cells. They may be effective in treating newly diagnosed multiple myeloma and relapsed or refractory disease.
- Monoclonal antibodies (mAbs) are commonly used. Antibodies (proteins) are made by the immune system to help fight infection. Laboratory-made mAbs called anti-drug conjugates attach to specific proteins and attack myeloma cells. A newly approved antibody-drug conjugate targets the B-cell maturation antigen (BCMA).
- Proteasome inhibitors target enzymes to kill myeloma cells.
- Selective inhibitors of nuclear export (SINE) enhance the anticancer activity of certain proteins in a cell.

Immunotherapy is drug therapy that works with your immune system to help identify and then destroy multiple myeloma cells. It may be given intravenously (IV) or subcutaneously (by injection under the skin). Monoclonal antibodies (mAbs), SLAM7 regulators and chimeric antigen receptor (CAR) T-cell therapy are types of immunotherapy approved for multiple myeloma. CAR T-cell therapy involves taking a patient's T-cells and modifying them to recognize and kill multiple myeloma cells.

COMMON DRUG THERAPIES FOR MULTIPLE MYELOMA

These therapies may be used alone or in combination.

- belantamab mafodotin-blmf (Blenrep)
- bortezomib (Velcade)
- carfilzomib (Kyprolis)
- carmustine (BiCNU)
- cyclophosphamide
- daratumumab (Darzalex)
- daratumumab and hyaluronidase-fihj (Darzalex Faspro)
- dexamethasone
- doxorubicin hydrochloride (Adriamycin)
- doxorubicin liposomal (Doxil)
- elotuzumab (Empliciti)
- idecabtagene vicleucel (Abecma)
- isatuximab-irfc (Sarclisa)
- ixazomib (Ninlaro)
- lenalidomide (Revlimid)
- melphalan (Alkeran)
- panobinostat (Farydak)
- pomalidomide (Pomalyst)
- prednisone
- selinexor (Xpovio)
- thalidomide (Thalomid)

SOME POSSIBLE COMBINATIONS

- carfilzomib (Kyprolis) with daratumumab (Darzalex) and dexamethasone
- carfilzomib (Kyprolis) with dexamethasone
- carfilzomib (Kyprolis) with lenalidomide (Revlimid) and dexamethasone
- carmustine (BiCNU) with prednisone
- D-Rd: daratumumab and hyaluronidase-fihj (Darzalex Faspro), lenalidomide (Revlimid) and dexamethasone
- D-VMP: daratumumab and hyaluronidase-fihj (Darzalex Faspro), bortezomib (Velcade), melphalan (Alkeran) and prednisone
- daratumumab and hyaluronidase-fihj (Darzalex Faspro) with bortezomib (Velcade) and dexamethasone
- daratumumab and hyaluronidase-fihj (Darzalex Faspro) with bortezomib (Velcade), thalidomide (Thalomid) and dexamethasone
- daratumumab and hyaluronidase-fihj (Darzalex Faspro) with pomalidomide (Pomalyst) and dexamethasone
- daratumumab (Darzalex) with bortezomib (Velcade) and dexamethasone
- daratumumab (Darzalex) with bortezomib (Velcade), melphalan (Alkeran) and prednisone
- daratumumab (Darzalex) with bortezomib (Velcade), thalidomide (Thalomid) and dexamethasone
- daratumumab (Darzalex) with carfilzomib (Kyprolis) and dexamethasone
- daratumumab (Darzalex) with lenalidomide (Revlimid) and dexamethasone
- daratumumab (Darzalex) with pomalidomide (Pomalyst) and dexamethasone
- doxorubicin liposomal (Doxil) with bortezomib (Velcade)
- elotuzumab (Empliciti) with lenalidomide (Revlimid) and dexamethasone
- elotuzumab (Empliciti) with pomalidomide (Pomalyst) and dexamethasone
- isatuximab-irfc (Sarclisa) with carfilzomib (Kyprolis) and dexamethasone
- isatuximab-irfc (Sarclisa) with pomalidomide (Pomalyst) and dexamethasone
- ixazomib (Ninlaro) with lenalidomide (Revlimid) and dexamethasone
- lenalidomide (Revlimid) with dexamethasone
- panobinostat (Farydak) with bortezomib (Velcade) and dexamethasone
- pomalidomide (Pomalyst) with dexamethasone
- selinexor (Xpovio) with bortezomib (Velcade) and dexamethasone
- selinexor (Xpovio) with dexamethasone
- thalidomide (Thalomid) with dexamethasone

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Radiation therapy may be used for some people with localized myeloma or bone pain that does not lessen with chemotherapy.

Surgery may be used to treat a plasmacytoma (malignant plasma cell tumor) but is rarely a treatment option. In cases of weakened bone, metal plates or rods may be placed to provide support or to prevent fractures.

Plasmapheresis uses a machine to filter plasma out of the blood. Though not a treatment for multiple myeloma, it may be used if large amounts of M-proteins make the blood thick.

Bone-modifying (strengthening) drugs can treat bone problems caused by multiple myeloma and prevent further bone damage from occurring. Myeloma cells in the bone marrow can lead to bone lesions and the destruction of bone. Contact your doctor as soon as you begin to feel any pain. Warning signs of bone loss include joint and back pain, arthritis-like symptoms, slouched posture, shorter stature and broken/fractured bones.

Clinical trials are research studies that may offer access to leading-edge therapies not yet widely available. Many trials are underway, such as those involving CAR T-cell therapy (see Immunotherapy) and bispecific T-cell engagers (BiTEs), which enable a cancer-fighting T-cell to bind to a cancer cell and kill it.

RELAPSED OR REFRACTORY MULTIPLE MYELOMA

The goal of treating multiple myeloma is complete remission, which is when cancer can no longer be found after multiple tests. Even with complete remission, small numbers of cancer cells may still be in the body. A partial remission occurs when some but not all signs and symptoms have decreased or disappeared.

Relapsed multiple myeloma occurs when the disease comes back after treatment. A relapse can happen weeks, months or even years after initial treatment has ended.

Refractory myeloma is disease that is no longer responding to treatment. If this happens, your doctor may request additional tests that could be used for restaging.

Multiple types of drug therapy are approved to treat relapsed and refractory multiple myeloma. Additional drugs are being researched in late-stage clinical trials.

Resistance to multi-drug therapy and genetic abnormalities in myeloma cells are common causes of refractory myeloma. A treatment plan for refractory myeloma may combine therapies designed to prevent or slow the development of drug resistance.

Another option may be a clinical trial. Recent advances in research have resulted in improved treatment regimens for people with refractory or relapsed multiple myeloma. Ask your doctor if a clinical trial may be an option for you. ■

Celisa Alston received a Stage IV multiple myeloma diagnosis at the same time her husband was diagnosed with prostate cancer. Persistence and determination helped her get multiple opinions and choose the best treatment options. Today, she is considered to be in remission and is enjoying life with her husband, who is also recovered, and two children.

Address the cancer and then focus on living an intentional life

When my children caught the flu one spring, I thought I had it, too. I went to a nearby urgent care center where they prescribed flu medication and ran some blood tests. My creatinine levels were off, which indicated my kidneys were not functioning properly. I wanted a second opinion from a more robust urgent care. That doctor did a chest X-ray and more bloodwork, but in the end, it was recommended I see my primary care physician.

Not long after, while I was picking up some medication at the pharmacy, on a hunch, I asked the pharmacist to take my blood pressure. It was 220 over 125. He looked alarmed and said I needed to go to the ER immediately.

The ER doctor ran more tests, which also showed problems with my kidneys. He called the nephrologist on duty who looked at my lab results and said, "Call your husband. You're not leaving."

I was admitted to the hospital and had a full multiple myeloma panel done along with a bone marrow biopsy. The next day the doctor told me I had Stage IV multiple myeloma and Stage IV chronic kidney disease. He explained myeloma and showed me that I had it in 90 percent of my bone marrow. The myeloma had been attacking my kidneys. He recommended that I go to a larger facility with more experience treating multiple myeloma.

While I was still absorbing the news of my surprising diagnosis, my husband called to say he had been diagnosed with prostate cancer. This was a lot of information to process on the same day. Our children were 14 and 16, and we didn't want to tell them that both of their parents had been diagnosed with cancer. One is traumatic enough. So we told them about my diagnosis but delayed giving them my husband's news for a little while.

Once I understood my diagnosis, my attitude was to fight. I never wallowed. I created a communication plan for my friends and family because keeping them informed was going to be a big job. I set up conference calls with each side of the family. I was able to handle telling everyone the news, but when they got emotional, I would also.

After transferring to a larger hospital, my treatment began with four rounds of plasmapheresis followed by immediate chemotherapy. The oncologist consulted with my nephrologist and because I was in such good shape physically, they wanted me to consider a stem cell transplant. I reached out to a well-known cancer center and spoke with the financial person to make sure the procedure would be covered by insurance. Once all of the details were settled, they prepared me for an autologous transplant.

Knowing I would have to spend at least 30 days in the hospital, I took a leave of absence from my job. After the 30 days, I moved to a corporate apartment where the fee was partially reimbursed by my insurance provider.

I never cried about my diagnosis until my hair started falling out. I shaved it all off because it was easier than waiting for it to come out.

The transplant was successful, and I'm considered to be in remission. I remain on maintenance therapy and take a chemotherapy pill once a week. Fortunately, the kidney damage was temporary and my kidneys have healed.

My husband had surgery for his prostate cancer and recovered within three weeks. He now goes once a year for checkups.

The support from our friends and family was invaluable, especially during my treatment. They donated money for restaurant gift cards so my husband didn't have to cook every day while I was gone. Others helped with picking up my daughter from her ballet company. People also sent flowers and words of encouragement.

After returning to work, I found that sharing what happened with others was helpful. One day after a work meeting, a colleague told me she had been diagnosed with breast cancer. She asked how I managed the cancer and still worked. I shared my experience and suggestions, which brought her comfort. Always tell your story because you never know who needs to hear it.

Multiple myeloma can return, so keeping and attending all follow-up appointments and blood work is important. I get bloodwork once a month and follow it with a telehealth appointment, and I see my nephrologist twice a year. My oncologist said it is likely I may need another stem cell transplant in the future.

Be prepared for follow-up visits by knowing what you want to talk about before you go. Writing down questions in advance can help streamline the conversation with the doctor, who may have limited time. And, bring a list of the medications you take. I always have a list of meds in my pocket.

Remember to live an intentional life. Don't take anything for granted. Don't wait for tomorrow. Do it now. ■

Each leukemia diagnosis is as unique as the person it affects

Leukemia is a cancer that starts in the blood and bone marrow. It is categorized by how fast the disease progresses and by the type of white blood cell it affects. The four major types of leukemia are acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML). Knowing your type, subtype and the treatment options available will help you make the important decisions ahead.

UNDERSTANDING LEUKEMIA

Though leukemia occurs mostly in adults older than 55, it can affect any age group and is the most common cancer affecting children and young teens. It starts in the blood and bone marrow and occurs when white blood cells transform into leukemia cells and grow uncontrollably.

Normal white blood cells help the body fight infections, and when they become old or damaged, they die and are replaced by new, healthy cells. Leukemic cells cannot fight infections properly and do not die when they should. Large numbers of the leukemic cells accumulate in the bone marrow and/or the blood, which may slow down or prevent normal body functions, including the bone marrow's normal production of healthy blood cells (see Figure 1).

Lymphocytic leukemia begins in cells that become lymphocytes. Lymphocytic leukemia is also called lymphoid or lymphoblastic leukemia.

Myeloid leukemia begins in early myeloid cells, which become white blood cells (with the exception of lymphocytes), red blood cells or cells that make platelets. Myeloid leukemia is sometimes called myelogenous, myelocytic or myeloblastic leukemia.

Acute leukemia cells look similar to immature white blood cells. The number of immature cells increases rapidly, preventing the bone marrow from making normal blood cells. Treatment should begin as soon as possible once a leukemia expert physician has been consulted. These fast-growing cells can quickly be life-threatening.

Chronic leukemia cells look similar to healthy, mature white blood cells, but the cells are unable to mature fully. The leukemia cells grow slowly, and the progression of chronic leukemia varies. Like acute leukemia, chronic leukemia is also classified as lymphocytic or myelogenous (myeloid) based on the type of cells in the bone marrow that become abnormal.

DIAGNOSING LEUKEMIA

People with leukemia often have low numbers of healthy white blood cells, red blood cells and platelets that increase the risk for infection, anemia and bleeding.

To diagnose which form of leukemia you may have, your doctor may perform a physical exam in addition to any of the following tests.

- Blood tests, including a complete blood count and a peripheral blood smear.
- Bone marrow aspiration and biopsy (often done at the same time) to remove bone marrow samples for examination.
- Lumbar puncture (spinal tap) to see if leukemia cells are in the cerebrospinal fluid, which surrounds the brain and spinal cord.
- Specialized genetic tests, such as flow cytometry, cytogenetics with fluorescence in situ hybridization (FISH) and polymerase chain reaction (PCR). Also called molecular profiling, these tests help classify the subtype of leukemia. Some doctors are now ordering "sequencing," where a great number of genes in the leukemic cells' DNA are studied.
- Imaging tests (CT, PET, MRI and X-rays) to help determine the extent of disease.

The following pages explain ALL, AML and CML. For a guide to CLL, start at the back of this publication. As you learn about treatments, you may also want to consider clinical trials. Ask your doctor if participating in a clinical trial is a potential treatment option for you.

ACUTE LYMPHOCYTIC LEUKEMIA

Acute lymphocytic leukemia (ALL), also referred to as acute lymphoblastic leukemia, starts in the cells that become lymphocytes, which are white blood cells that normally help protect people from infections. In ALL, the abnormal cells grow quickly and, if untreated, can spread rapidly from the blood and bone to other parts of the body and be life-threatening.

CLASSIFYING ALL

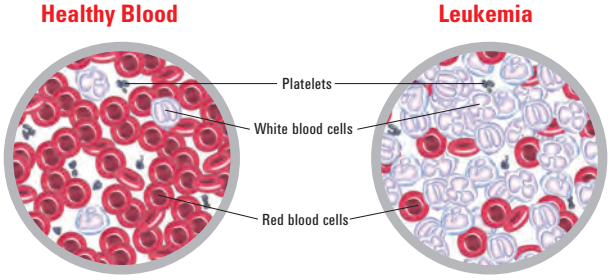
To classify ALL, your doctor may use the World Health Organization (WHO) classification system, which considers the results of morphology (shape and size of the cancer cells), flow cytometry (the process of identifying markers/proteins on a cell), cytogenetic tests (a process that looks at the number and structure of chromosomes that make up the cancer cells), and other molecular lab tests that provide detailed information about the subtype of ALL.

Also considered are the type of lymphocyte (B-cell or T-cell, which are the two main types of lymphocyte) the leukemia comes from, and how mature these leukemia cells are.

The subtypes of ALL include the following:

- Acute precursor B-cell (pre-B-cell) lymphoblastic leukemia
- Acute T-cell (lymphoblastic) leukemia (T-cell ALL)
- Burkitt acute lymphoblastic leukemia (B-ALL)
- Ph-positive (Philadelphia positive) ALL

FIGURE 1
LEUKEMIA BLOOD CELLS



Leukemia is cancer that starts in blood-forming tissue, such as the bone marrow, and causes white blood cells to grow uncontrollably. These cells do not function as expected, meaning they do not fight infection or die as they should. They also overcrowd healthy white blood cells, red blood cells and platelets in the bone marrow, preventing them from functioning properly.

In about 4 of every 10 cases of B-cell ALL (B-ALL), an abnormal chromosome, known as the Philadelphia chromosome, is present. It results from an abnormal fusion of two genes, *BCR* and *ABL*, which produces the *BCR-ABL* protein, which then helps B-ALL cells grow and multiply at a much faster rate than normal white blood cells. It is important to test for the Philadelphia chromosome or the *BCR-ABL* gene fusion, as some treatments are more likely to be effective for this type of ALL.

TREATING ALL

Because ALL progresses quickly, treatment is recommended soon after you have been diagnosed and consulted with a leukemia expert physician. The following types of treatment may be used alone or in combination.

Chemotherapy is typically the main treatment for ALL. Treatment is given in three phases, spanning approximately three years. The goal of the induction phase is to eliminate as many ALL cells as possible. The consolidation phase aims to destroy any remaining leukemia cells. The maintenance phase involves lower-dose treatments to prevent new leukemia cells from growing. Your doctor may prescribe a corticosteroid, which will also help to destroy the leukemia cells and reduce inflammation.

Targeted therapy is drug therapy that works against specific abnormal proteins inside the leukemia cells and includes tyrosine kinase inhibitors (TKIs). TKIs are used primarily to treat ALL that is Philadelphia chromosome-positive. Targeted therapy is often given in combination with chemotherapy. Resistance to targeted therapy is common in B-ALL, but more targeted therapies are being developed to target the *BCR-ABL* gene fusion in B-ALL.

Immunotherapy is approved in these forms:

- Chimeric antigen receptor (CAR) T-cell therapy is the first gene therapy approved in the U.S. to treat children and young adults with B-ALL. Though serious side effects can occur from CAR T-cell therapy, it can induce a complete remission when other treatments have failed. (To learn more, flip this guide over and see page 8.)
- Monoclonal antibodies (mAbs) are artificial antibodies (proteins) designed to attack specific targets, such as proteins found on cancer cells.

DRUG THERAPIES FOR ALL

These therapies may be used alone or in combination.

- asparaginase (Elspar)
- asparaginase erwinia chrysanthemi (Erwinaze)
- asparaginase erwinia chrysanthemi (recombinant)-rywn (Rylaze)
- blinatumomab (Blincyto)
- brexucabtagene autoleucel (Tecartus)
- calaspargase pegol – mknl (Asparlas)
- clofarabine (Clolar)
- cyclosphosphamide
- cytarabine
- dasatinib (Sprycel)
- daunorubicin
- dexamethasone
- doxorubicin hydrochloride (Adriamycin)
- imatinib mesylate (Gleevec)
- inotuzumab ozogamicin (Besponsa)
- mercaptopurine (Purinethol, Purixan)
- methotrexate
- nelarabine (Arranon)
- pegaspargase (Oncaspar)
- ponatinib (Iclusig)
- prednisone
- tisagenlecleucel (Kymriah)
- vincristine (Oncovin)

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Stem cell transplantation in the form of an allogeneic transplant may be an option to treat poor-prognosis, relapsed or refractory ALL (see *Stem Cell Transplantation*, page 4).

Radiation therapy may be used to treat leukemia cells that have metastasized (spread) to other areas of the body, such as the fluid surrounding the brain and spine or to the testicles. When it is given to the brain or spinal cord, it is known as central nervous system (CNS) sanctuary therapy or CNS prophylaxis.

REFRACTORY OR RECURRENT ALL

Treatment may not always result in complete remission. In that case, the ALL is known as refractory. Immunotherapy, such as CAR T-cell therapy or monoclonal antibodies, targeted therapy, chemotherapy and stem cell transplantation, may be treatment options. If ALL returns after going into remission, it is considered recurrent or relapsed. Your doctor will re-evaluate your diagnosis and may choose a different therapy.

ACUTE MYELOID LEUKEMIA

AML begins in early myeloid cells, which normally mature to become white blood cells (with the exception of lymphocytes), red blood cells or platelets. Instead of developing into these normal blood elements, they multiply rapidly, creating an excess of abnormal myeloid cells that crowd out healthy blood-forming cells in the bone marrow. The few healthy blood-forming cells cannot keep up, resulting in low numbers of healthy white blood cells, red blood cells and platelets. This increases the risk for infection, anemia and excessive bruising and/or bleeding issues.

CLASSIFYING AML

Your doctor may recommend blood tests, bone marrow aspiration and biopsy, a lumbar puncture and imaging tests to determine the specific subtype of leukemia. A pathologist looks at how developed the leukemia cells are and how different they look from normal cells.

Next, genetic and molecular testing should be performed to look for genetic mutations, or alterations, in the genes within the leukemic cells. Specialized tests, such as flow cytometry, fluorescence in situ hybridization (FISH) and reverse transcription-polymerase chain reaction (RT-PCR), will likely be used to identify subtypes of AML, proteins, chromosomes, genes and other factors involved in leukemia. Next-generation sequencing may be ordered.

Certain genetic mutations are associated with a better prognosis than others. Some mutations respond better to certain types and dosages of drug therapy. Still others may influence the timing of or need for a stem cell transplant. Some targeted therapies are approved to treat certain AML genetic mutations, such as *FLT3* (pronounced "flit-three"), *IDH1* and *IDH2*. Not all genetic mutations are always present during diagnostic testing, so your doctor will likely retest if the disease relapses (returns) to determine treatment.

Your doctor uses the test results to determine your outlook for recovery (prognosis) by categorizing the disease as low risk, intermediate risk or high risk. This risk is related to how quickly the leukemia cells may grow and the likelihood the leukemia will come back in the future, and if so, the potential long-term prognosis.

Your AML is then classified. The subtype of AML and whether it has spread outside the blood and bone marrow to other parts of the body are used to plan treatment. The World Health Organization (WHO) classifies AML into subtypes based on the appearance of the leukemia cells, as well as the presence or absence of certain chromosomal changes and/or genetic mutations in the leukemia cells (see Table 1 on page 18).

TREATING AML

Your treatment plan involves many factors, including your AML subtype, diagnostic, genetic and molecular test results, age, other medical problems you might have and your preferences for quality of life.

Treatment generally consists of two phases: remission induction therapy and post-remission therapy. During remission induction therapy, the goal is to destroy the leukemia cells in the blood and bone marrow, putting the AML into complete remission. Complete remission is defined as having blood counts that are back to normal, the elimination of leukemia cells in blood samples that are examined under a microscope, and no signs or symptoms of the disease. The goal of post-remission therapy, also called consolidation therapy, is to kill any remaining leukemia cells that could cause a relapse.

The following options may be used alone or in combination.

Chemotherapy kills cancer cells, along with some healthy cells, throughout the body. Chemotherapy may be used alone or followed by stem cell transplantation. The choice of chemotherapy drug depends on several factors, including your age (whether you are younger or older than 75), risk factors and prognosis (predicted outcome after treatment). The use of high-dose chemotherapy typically requires a lengthy hospital stay so the patient's blood counts can be closely managed. When AML has spread to the brain and spinal cord, chemotherapy may be injected into the fluid-filled space between the thin layers of tissue that cover the brain and the spinal cord (intrathecal chemotherapy).

Stem cell transplantation may be used depending on the AML subtype and whether the AML is refractory. An allogeneic transplant is most commonly used for AML. That involves donated stem cells. Other less-matched donor options are under investigation and in clinical trials now to provide access for patients who have no available matched donor.

An allogeneic transplant can work directly against the cancer through the graft-versus-tumor effect (also called graft-versus-leukemia or graft-versus-cancer-cell). This may occur when the donor's white blood cells (the graft) attack any cancer cells (the tumor) remaining after high-dose conditioning treatments, and the effect can be key to a successful outcome.

You will benefit from the help of a caregiver post-transplant. Among other things, a caregiver will help recognize and manage the potential short- and long-term effects of a transplant. Ask your doctor what to watch for and how long you may need assistance.

Targeted therapy uses drugs or other substances to identify and attack specific cancer cells. Targets include gene mutations, alterations and proteins. Targeted therapy is intended to affect only cancer cells.

It may be given alone or in combination with chemotherapy, depending on the presence of certain gene mutations (alterations) or specific proteins on the surface of the leukemia cells. Some AML genetic mutations treated with targeted therapy include *FLT3, IDH1* and *IDH2*.

TABLE 1
WHO CLASSIFICATION SYSTEM FOR AML

Broad group
AML with recurrent genetic abnormalities Subtypes: • AML with a translocation between chromosomes 8 and 21 • AML with a translocation or inversion in chromosome 16 • AML with a translocation between chromosomes 9 and 11 • APL (M3 subtype) with a translocation between chromosomes 15 and 17 • AML with a translocation between chromosomes 6 and 9 • AML with a translocation or inversion in chromosome 3 • AML (megakaryoblastic) with a translocation between chromosomes 1 and 22
AML with myelodysplasia-related changes
Therapy-related myeloid neoplasms
AML not otherwise specified (includes cases that do not fall into any other group) Subtypes: • AML with minimal differentiation (M0) • AML without maturation (M1) • AML with maturation (M2) • Acute myelomonocytic leukemia (M4) • Acute monoblastic/monocytic leukemia (M5) • Pure erythroid leukemia (M6) • Acute megakaryoblastic leukemia (M7) • Acute basophilic leukemia • Acute panmyelosis with myelofibrosis
Myeloid sarcoma
Undifferentiated or biphenotypic acute leukemias (leukemias that have both lymphocytic and myeloid features; also called ALL with myeloid markers, AML with lymphoid markers, or mixed lineage leukemia)

Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original and primary source for this information is the AJCC Cancer Staging Manual, Eighth Edition (2017) published by Springer Science+Business Media.

Radiation therapy is the use of high-energy radiation to destroy cancer cells. It is rarely used to treat AML, but it may be used if the cancer has spread to the brain, spinal fluid or testicles. It may also be used to shrink a collection of leukemia cells that has formed a mass somewhere. Some people with localized disease or bone pain that does not lessen with chemotherapy may receive radiation therapy to specific parts of the body. It may also be given to the entire body (total body irradiation) before stem cell transplantation.

Leukapheresis is not a treatment for AML but may be used to treat leukostasis, which occurs when a very high number of leukemia cells are present in the blood. This condition can cause problems with normal blood circulation. During leukapheresis, blood is removed to collect specific blood cells and then the remaining blood is returned to the body. It is used to lower white blood cell counts immediately but only works temporarily.

Growth factors are sometimes given during post-remission chemotherapy to increase the number of white blood cells that are available to fight infection. Normally, the number of white blood cells is decreased by the chemotherapy and growth factors can help the number to increase back to normal faster. Also, growth factors may be given to collect stem cells before a bone marrow transplant.

RELAPSED AND REFRACTORY AML

When AML returns, it is called relapsed AML. AML that is resistant at the beginning of treatment or that becomes resistant after being treated for a length of time is called refractory AML. Drug therapy, an allogeneic stem cell transplant or a clinical trial may be available treatment options.

DRUG THERAPIES FOR AML

These therapies may be used alone or in combination.

- azacitidine (Onureg)
- cytarabine (Ara-C)
- daunorubicin
- daunorubicin/cytarabine liposomal (Vyxeos)
- doxorubicin hydrochloride (Adriamycin)
- enasidenib (Idhifa)
- gemtuzumab ozogamicin (Mylotarg)
- gilteritinib (Xospata)
- glasdegib (Daurismo)
- idarubicin (Idamycin, Idamycin PFS)
- ivosidenib (Tibsovo)
- midostaurin (Rydapt)
- venetoclax (Venclexta)

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CHRONIC MYELOID LEUKEMIA

CML is a slow-growing cancer of the bone marrow and blood that begins when a genetic change mutates or damages early (immature) myeloid cells, which are the cells that become white blood cells (other than lymphocytes), red blood cells or cells that make platelets. Most people who have CML have an abnormal chromosome called the Philadelphia chromosome. It results from an abnormal fusion of two genes, *BCR* and *ABL*, which then produces the *BCR-ABL* protein. It is important to test for the Philadelphia chromosome or the *BCR-ABL* gene fusion, as some treatments are likely to be more effective.

Other chromosomes may begin to mutate in the accelerated and blast phases. Almost all people with CML will have the *BCR-ABL* gene detected in their blood or bone marrow.

CLASSIFYING CML

Your doctor will use a variety of tests to look for leukemic cells, chromosome abnormalities (which may indicate the Philadelphia chromosome), molecular markers and an enlarged spleen. Those tests may include a complete blood count (CBC) with differential, blood chemistry study, a hepatitis panel (to look for hepatitis B, which can occur with CML), bone marrow aspiration and biopsy, molecular tests, cytogenetic analysis, including karyotyping and fluorescence in situ hybridization (FISH), and imaging tests, including computed tomography (CT), magnetic resonance imaging (MRI) and ultrasound.

The World Health Organization (WHO) classification system is used to classify CML into chronic phase, accelerated phase and blast crisis phase (see Table 2). This helps doctors determine the best treatment and prognosis (predicted outcome after treatment). The phases primarily describe the differences in the number of immature white blood cells (myeloblasts or blasts). Other blood cell count levels and chromosome changes are also considered.

The progression of CML in the chronic phase is generally slow, and it may be several months or years before the next phase is reached. Response to treatment is typically better when treatment begins in this phase. The most advanced and aggressive phase is the blast crisis phase.

It is normal for bone marrow to contain 5 percent blasts. In a person diagnosed with CML, the blasts are usually higher than 5 percent and indicates a more advanced CML.

TABLE 2
WHO CLASSIFICATION SYSTEM FOR CML

Phase	Description
Chronic phase	• Immature (blast) cells make up less than 10% of the cells in bone marrow or blood.
Accelerated phase	This phase is determined by any of the following features: • Blast cells make up 10% to 19% of cells in the bone marrow or blood OR • Basophils make up at least 20% of the blood OR • Very low platelet count not related to treatment OR • Very high platelet count that does not decrease with treatment OR • Increased size of the spleen OR • Increased white blood cell count that does not decrease with treatment
Blast crisis phase	• Blast cells make up at least 20% of cells in the bone marrow or blood. • Blast cells rapidly increase outside of the bone marrow. • Large groups of blast cells found in bone marrow biopsy.

Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original and primary source for this information is the AJCC Cancer Staging Manual, Eighth Edition (2017) published by Springer Science+Business Media.

TREATING CML

The following options may be used alone or in combination.

Targeted therapy is the main treatment for chronic phase CML. Targeted therapy that is taken orally (in pill form) is almost always the first line of treatment (meaning the first treatment given) for chronic phase CML. The more advanced stages of CML will usually respond temporarily but quickly require additional treatment; however, when caught in the chronic phase, some patients can receive targeted therapy and remain in remission for many years.

The *BCR-ABL* gene is a tyrosine kinase protein that helps CML cells grow, and it can be blocked by a tyrosine kinase inhibitor (TKI). Resistance to this type of targeted therapy can develop in patients; when that happens, several other TKIs are available that may work where others have failed. The response to the TKI therapy (complete response, partial response or no response) can be monitored by a blood test.

For some patients who remain in remission long enough, your doctor may consider a trial period off of the TKI targeted therapy. This requires very close blood monitoring to look for signs of relapse of the leukemia, but it can allow some patients to stop taking chemotherapy permanently.

Chemotherapy may be used for CML that does not respond to targeted therapy or has not improved after treatment with TKIs.

Stem cell transplantation may be an option, especially when disease is in the accelerated or blast phase (see *Stem Cell Transplantation*, page 4). Allogeneic stem cell recipients may also receive a donor lymphocyte infusion from the original allogeneic blood stem cell donor to boost the attack on leukemia cells. A donor lymphocyte infusion is used to kill the remaining CML cells that have not gone away completely or have come back following the stem cell transplant.

Immunotherapy is not typically used as the first treatment for this disease. Cytokine immunotherapy works by introducing large amounts of the laboratory-made cytokines to the immune system to promote specific immune responses.

DRUG THERAPIES FOR CML

These therapies may be used alone or in combination.

- bosutinib (Bosulif)
- busulfan (Busulfex, Myleran)
- cyclophosphamide
- cytarabine
- dasatinib (Sprycel)
- hydroxyurea (Hydrea)
- imatinib mesylate (Gleevec)
- nilotinib (Tasigna)
- omacetaxine mepesuccinate (Synribo)
- ponatinib (Iclusig)

As of 10/13/21

RELAPSED OR RESISTANT CML

The goal of CML treatment is to reach remission, which occurs when leukemia is not detected in the body and there are no symptoms. However, remission may be temporary or permanent. When CML returns, it is called relapsed CML. Sometimes, the leukemia does not respond to treatment or stops responding. This is called resistant CML. ■

A parent's roadmap

Learning your child has cancer is shocking, and you may not know what to do first. Start by learning more about your child's exact diagnosis and meet with a nurse navigator or patient educator at your cancer center. Feeling informed will help you be more prepared to assist and advocate for your child and may offer some clarity during this uncertain time.

If your child's pediatrician diagnosed the condition, a priority should be to find a pediatric cancer treatment team with extensive experience treating your child's type of cancer. Ask your pediatrician to provide a referral, or contact local and national advocacy groups.

Seeking a second opinion is extremely valuable. Different doctors bring unique perspectives based on their own expertise. Understanding all your options can help you make more confident treatment decisions. Depending on your child's diagnosis, it may be necessary to begin treatment right away. However, you can still pursue a second opinion. Treatment may be modified as new information is introduced or as the disease changes.

It is common to meet with many health care professionals at once. Though this can be overwhelming, remember that everyone is there to help your child. You are also a valuable part of your child's health care team. Your goal is to make sure your child has the best care possible, and you have a voice in the treatment plan. It is key to build a good relationship with the team. Trust and transparency are very important and will help you feel more comfortable.

Clinical trials are often a treatment choice for children. Ask your doctor if a trial may benefit your child.

MAINTAINING LIFE AT HOME

While your medical team moves forward with the treatment plan, you can focus on parenting. Continuing to parent "like normal" may seem impossible, but staying in a routine is extremely valuable for everyone in the family. These suggestions may help.

- If your child is school age, arrange for tutors and remote studies. When your child can return to school, talk with the school administration and request additional resources, including emotional and social support, to ease the transition. Be sure to address learning or classroom difficulties early.
- Encourage your child to keep up with friendships. If the risk of infection is too great to see friends in person, kids can still stay connected through video games as well as phones and video chats. That may be how they prefer to hang out anyway!
- Explaining to your other kids that their sibling has cancer can be difficult. Be there to listen to their feelings. Set aside time for each of them to be with you and to do what they enjoy.
- Teens still need to feel like teens. Let them know you are there to talk or listen, but realize that it may mean giving them their own space to work out emotions with their friends or trusted adults. ■

Talking to your child about their diagnosis

Being open and honest helps build trust with your child. Children who are not well-informed about cancer can use their thoughts and imagination to fill in gaps. Often, these thoughts are centered around the idea that the diagnosis was their fault. This may cause your child anxiety or fear. These age-appropriate suggestions may help you inform and soothe your child.

Ages 0-5

- May be afraid of medical staff
- Are afraid of certain medical tests
- Need reassurance that their parents won't leave them
- May be scared of the hospital becoming their home
- Are afraid of pain

It is rare for most toddlers and infants to understand cancer. Explain to your child that it is okay to trust the medical team. Offer assurance that you will be there. Details such as how long your child will be in the hospital and basic information about certain tests can be shared with them.

Ages 5-7

- May understand cancer in simple terms
- Need reassurance that they did not cause cancer
- Need some honesty

At this age, you may be able to share some details with your child. Most children are afraid of pain. Though there is no way to change this, try to be up front with your child that some treatments may hurt but that you and the doctors and nurses will do everything possible to make it not be too bad.

Ages 7-12

- Can understand many specifics of cancer
- Are more likely to basically understand how treatments work
- May be more trusting of the medical team
- Will hear outside information about the disease through media

Be upfront with your child about treatments, and try to answer questions about medical procedures and any outside information.

Teens

- Can understand medical information
- Are likely to think about how the diagnosis will affect day-to-day life
- May want to make decisions about treatment
- May be concerned about fitting in or how their physical appearance may change

Allow them to do some of their own research using trustworthy sites, and let them know they have a say in what happens on the road ahead. Remind them of the things they still can do instead of things they can't. Seek support for your child, yourself and other family members. Your health care team can recommend advocacy groups, counselors, clergy and other forms of support.

No matter the age, let your child know you are there for questions, concerns or just a hug. You may need the help of the medical team to provide answers, and that's okay — no one expects you to know everything.

When life changes, find your new path

As a two-time survivor of childhood acute lymphoblastic leukemia, Juanita Prada would tell you that the experience shaped her life. Passionate about sharing the lessons she learned, she is dedicated to making the journey easier for other pediatric cancer survivors and their loved ones.

Being diagnosed with cancer at 10 years old comes with its own set of challenges. I share my story because I am passionate about helping children and adolescents with cancer understand that they're not alone.

My parents and the school nurse assumed that my constant complaints about leg pain and fatigue were growing pains. Once I began to have high fevers and easy bruising, we went to a local clinic where I was diagnosed with pre B-cell acute lymphoblastic leukemia (ALL).

My parents acted fast. We went to a nearby cancer center where there were doctors who specialized in treating childhood ALL, and we trusted that they would take good care of me.

The doctors spoke mostly to my dad. His native language is Spanish, and the medical terms were difficult to understand. My stepmom and other family members and friends helped translate the conversations to English. A few days later, the doctor and the Child Life Specialist explained cancer to me. At 10, I was old enough to understand the seriousness of cancer, and it was scary. My parents explained my illness to my brothers, who were 13, 5 and 4, using age-appropriate language. They began to include me in discussions about my treatment plan.

Although my treatment, which consisted mostly of chemotherapy and radiation therapy was successful, I developed a severe complication. A stroke during my cancer treatment required me to re-learn everything, even how to walk and talk. As my language skills started to come back, it was amazing how my brain worked. When I saw my dad and mom, I associated them with Spanish words. When I saw my stepmom and brothers, I associated them with English. Physical therapists and teachers came to the hospital and then to my home to help me regain what I lost. It was a difficult road, but I had a lot of encouragement. What helped my family and me most was not getting ahead of ourselves. We focused on the minute, the hour and the day.

Once the cancer treatment ended, I returned to middle school. Because of my cognitive delays, I was enrolled in special education classes and stayed after school frequently for additional help. That was hard because I didn't feel like I belonged in those classes, but I made friends and began to value the extra help. It taught me to have compassion for other children and their situations. I think challenges like these make most childhood cancer patients mature quicker than they would have otherwise.

Although I wasn't in class with my old friends, they included me in other ways. When I couldn't go trick or treating, they held a Halloween sleepover, complete with shirts that said "Juanita's Pajama Party." Instead of playing sports, I became the manager for the soccer and volleyball teams. Being involved went a long way toward helping me feel normal.

Five months after treatment ended, I had a Central Nervous System Relapse. I was frustrated and annoyed but I felt less scared because I knew the people and the routine. I was confident I'd beat it again, and I did.

Focusing almost solely on getting better for five years placed me behind in many aspects of life. I had braces after my friends had theirs off, and I didn't get to drive when they did. When they left for four-year colleges, I struggled to get into community college. A vocational counselor helped me with my education path, and I realized that everyone is on their own timeline, whether it is due to cancer or something else.

My life got back to normal until I began to have epileptic seizures, a late effect of one of my cancer treatments. I have since come to recognize that late effects are really common, but I don't remember ever hearing about them. At the time, our goal was to focus on each day as it came.

Today, I'm focusing on my future. I earned my associate's degree in Early Childhood Development and my bachelor's degree in Human Development. I want to be a Certified Child Life Specialist and help other children and families cope with the challenges, uncertainties and anxieties that come with hospitalization. It is a work in progress, and I am determined to accomplish this career goal. I also do volunteer work related to my future career and with various childhood cancer organizations.

I created BeholdBeGold.org to help childhood cancer survivors know they are not alone and to raise awareness about the need for more support for childhood cancer and its late effects. It offers patients and survivors a way to connect with each other and provides resources to help with life's challenges during or after cancer treatment.

Speaking from experience, side effects and late effects can be physical and psychosocial. Although we can see most physical side effects, psychological and social aspects can be invisible to others. Survivors who appear healthy on the outside may be dealing with a lot on the inside, so it's important to be surrounded by supportive people you trust. And remember, you are not alone. ■

Supportive care helps you improve your quality of life

Many people diagnosed with cancer are concerned about how treatment will make them feel. Though you may be anxious about possible side effects, it may help to know your multidisciplinary health care team will help you manage any that occur from the cancer or its treatments. You do not have to go through this alone.

Supportive care includes a range of services that address the physical, emotional, practical, spiritual, financial and family-related challenges of people diagnosed with cancer and their loved ones. This includes assisting your children, family members, caregivers and others close to you. Some of the resources your team may offer include pain management; counseling about nutrition, fitness, mental health or spirituality; physical therapy; occupational therapy; speech therapy; complementary medicine and others.

To most effectively manage your symptoms, your health care team will rely on you to communicate openly about how you feel.

POTENTIALLY SEVERE SIDE EFFECTS

Though serious side effects are rare, they can occur with certain treatments. Ask your doctor whether you are at risk from the therapies in your treatment plan, how to identify the symptoms and when to seek emergency care. Report symptoms immediately so they can be treated rapidly.

- **Infection** can occur as a result of a low white blood cell count (neutropenia) or other factors. Contact your doctor immediately – do not wait until the next day – if you have any of these symptoms: oral temperature over 100.4° F, chills or sweating; body aches, chills and fatigue with or without fever; coughing, shortness of breath or painful breathing; abdominal pain; sore throat; mouth sores; painful, swollen or reddened skin; pus or drainage from an open cut or sore; pain or burning during urination; pain or sores around the anus; or vaginal discharge or itching. If you cannot reach your doctor, go to the emergency room.
- **Immune-related adverse events** (irAEs) may occur with certain immunotherapy drugs if the immune system becomes overstimulated by treatment and causes inflammation in one or more organs or systems in the body. Some irAEs can develop rapidly, becoming severe and even life-threatening without immediate medical attention.
- **Cytokine release syndrome** can occur if immune cells affected by treatment rapidly release large amounts of cytokines into the bloodstream. Symptoms may include headache, fever, nausea, rash, low blood pressure, rapid heartbeat and difficulty breathing.
- **Infusion-related reactions** most frequently occur with treatment given intravenously (IV) through a vein in your arm, usually soon after exposure to the drug. Reactions are generally mild, such as itching, rash or fever. More serious symptoms, such as shaking, chills, low blood pressure, dizziness, breathing difficulties or irregular heartbeat, can be serious or even fatal without medical intervention.
- **Tumor lysis syndrome** (TLS) may occur after the treatment of a fast-growing cancer, especially certain blood cancers. Symptoms may include vomiting, diarrhea, muscle cramps or twitches, neuropathy and decreased urination. TLS can potentially cause damage to the kidneys, heart, liver or other organs. There may also be worsening of your kidney function or increases in the level of potassium in the blood.

TABLE 1
SOME COMMON SIDE EFFECTS OF CANCER TREATMENT

Side Effects	Symptoms
Anemia	Abnormally low red blood cell count
Bleeding problems	Hemorrhaging and bruising
Bone loss	Weakened bone caused by the cancer or treatment
Breathing difficulty	Shortness of breath, with or without coughing
Chemo brain	Brain fog, confusion and/or memory problems
Constipation	Difficulty passing stools or less frequent bowel movements compared to your usual bowel habits
Diarrhea	Frequent loose or watery bowel movements that are commonly an inconvenience but can become serious if left untreated
Fatigue	Tiredness that is much stronger and harder to relieve than the fatigue an otherwise healthy person has
Graft-versus-Host Disease (GvHD)	White blood cells from your donor (the graft) recognize healthy cells in your body (the host) as foreign and attack them
Hair loss (alopecia)	Hair loss on the head, face and body
Infertility	The inability to become or stay pregnant or to father a child
Lymphedema	Fluid buildup from lymph node removal that causes swelling
Mouth sores	Small cuts or ulcers that can affect the gums, tongue, roof of the mouth or lips
Nausea and vomiting	Stomach upset that may be prevented by antiemetic (anti-nausea) medications
Neuropathy	Numbness, pain, burning sensations and tingling, usually in the hands or feet at first
Neutropenia	Low white blood cell count that increases the risk of infection
Pain	Musculoskeletal pain and aches that occur in the muscles, bones, tendons, ligaments or nerves
Skin reactions	Rash, redness and irritation or dry, flaky or peeling skin that may itch
Thrombocytopenia	Low number of platelets in the blood, which can lead to bruising, bleeding and clotting problems

COMMON SIDE EFFECTS

Cancer treatment can result in different side effects. Some of the most common are shown in Table 1. Symptoms may be more intense when treatments are given in combination. Additionally, be alert for late effects. They are side effects that can occur long after treatment begins. Let your health care team know as soon as they occur. ■

Bone Marrow Transplant Centers

Disclaimer: A comprehensive list of bone marrow transplant centers in the U.S. can be found on pages 23-31, and is current as of August 3, 2021. The information found in yellow boxes on these pages is a description of services – expanded listings – which are paid for by the facilities themselves as advertisements. Full-page advertisements are allowed in this section as well. The publication of advertisements, where paid or not, is not an endorsement. If medical or other expert assistance is required, the services of a competent professional person should be sought.

ALABAMA

Birmingham – Children's of Alabama; 205-638-9285; childrensal.org/blood-marrow-transplant P

Birmingham – The University of Alabama at Birmingham; 205-934-1911; uab.edu/medicine/bonemarrow A

ARIZONA

Gilbert – Banner MD Anderson Stem Cell Transplantation & Cellular Therapy Program; 480-256-6444; bannerhealth.com/services/cancer/programs-care/stem-cells A

Phoenix – Mayo Clinic Bone Marrow Transplant Program; 480-342-4800; mayoclinic.org/bone-marrow-transplan A P

Phoenix – Phoenix Children's Hospital Blood & Marrow Transplant Program; 602-966-0920; phoenixchildrens.org P

Scottsdale – HonorHealth Cancer Transplant Institute; 480-323-1573; honorhealth.com/cancer A

Tucson – University of Arizona Cancer Center — North Campus; 520-694-2873; cancercenter.arizona.edu A P

ARKANSAS

Little Rock – Arkansas Children's Hospital; 501-364-1494; archildrens.org P

Little Rock – UAMS Myeloma Center; 501-686-7105; cancer.uams.edu/myeloma A

CALIFORNIA

Duarte – City of Hope Comprehensive Cancer Center; 800-826-4673; cityofhope.org/hct A P
(See our ad on page 25)

La Jolla – Scripps MD Anderson Cancer Center; 858-554-8414; scripps.org A

La Jolla – UC San Diego Moores Cancer Center; 858-822-6600; cancer.ucsd.edu A

Loma Linda – Loma Linda University Cancer Center; 800-782-2623; llucc.org A P

Loma Linda
Loma Linda University Cancer Center
Location: 11234 Anderson St., Loma Linda, CA 92354
Phone: toll free 800-782-2623; fax 909-651-5939
Website: LLUCC.org
Nearest Airport: Ontario International Airport
Accreditation/Designation: 2017 Innovator award by the Association of Community Cancer Centers. Designated a High Performing Site (HPS) by the National Cancer Institute because of significant accrual of NCI cancer trials. Quality Accredited Cancer Program by the American College of Surgeons.
Cancer Specialties/Special Services: As a dedicated cancer center in the region and first hospital-based proton treatment center, we are committed to cancer prevention, treatment and research.

A Adult BMT Center P Pediatric BMT Center

Los Angeles – Children's Hospital Los Angeles; 323-361-4100; chla.org/bmt P

Los Angeles – Oschin Cancer Center Blood & Marrow Transplant Program; 310-423-1160; www.cedars-sinai.org A

Los Angeles – UCLA Jonsson Comprehensive Cancer Center; 310-825-5268; www.uclahealth.org/transplants/bmt A P

Los Angeles – UCLA Mattel Children's Hospital; 310-825-0867; www.uclahealth.org/mattel P

Los Angeles – USC Norris Comprehensive Cancer Center; 800-872-2273; cancer.keckmedicine.org A

Orange
CHOC Hospital
Location: 1201 W LaVeta, Orange, CA 92868
Phone: 714-509-8636
Website: www.choc.org/cancer
Nearest Airport: John Wayne Airport
Accreditation/Designation: Children's Oncology Group and Pediatric Early Phase-Clinical Trial Network (PEP-CTN) / COG Phase 1
Cancer Specialties/Special Services: Sarcoma; solid/rare tumor; histiocytosis; neuro-oncology; adolescent and young adult (AYA) treatment; lymphoma; leukemia; recurrent and refractory; after cancer treatment survivorship; blood and marrow transplant; CAR T-cell therapy

P Pediatric BMT Center

Oakland – Alta Bates Summit Medical Center; 510-655-4000; sutterhealth.org/absmc/services/cancer A

Oakland – UCSF Benioff Children's Hospital; 510-428-3000; ucsfbenioffchildrens.org P

Orange – CHOC Children's Hospital; 714-509-8636; choc.org/cancer P (See our ad bottom left)

Palo Alto – Lucile Packard Children's Hospital at Stanford; 650-497-8000; stanfordchildrens.org P

Sacramento – Sutter Cancer Center; 916-453-3300; checksutterfirst.org/cancer A P

Sacramento – UC Davis Comprehensive Cancer Center; 916-734-4384; health.ucdavis.edu/cancer A

San Diego – Rady Children's Hospital Peckham Center for Cancer & Blood Disorders; 858-966-5811; www.rchsd.org/programs-services/cancer-blood-disorders P

San Francisco – UCSF Benioff Children's Hospital; 415-476-2188; ucsfbenioffchildrens.org P

San Francisco – UCSF Hematology, Blood and Marrow Transplant, and Cellular Therapy Program; 415-353-2051; ucsfhealth.org A

Stanford – Stanford Blood and Marrow Transplant Program; 650-498-6000; stanfordhealthcare.org A

COLORADO

Aurora – Children's Hospital Colorado; 720-777-6892; childrenscolorado.org P

Aurora

Children's Hospital Colorado
Location: 13123 E. 16th Avenue, Aurora, CO 80045
Phone: 720-777-1234; toll free 800-624-6553
Website: www.childrenscolorado.org
Nearest Airport: Denver International Airport
Accreditation/Designation: U.S. News & World Report Top-Ranked Children's Hospital for Cancer; FAHCT; COG Phase I Consortium; PBMTC; Novartis CAR-T Center of Excellence
Cancer Specialties/Special Services: Children's Hospital Colorado offers a multidisciplinary care program across the region, including a wide variety of clinical trials and experimental therapeutics, CAR-T cells, immunotherapy, and cellular therapeutics. We are the region's most experienced pediatric BMT program with more than 25 years of experience and more than 1,200 autologous, allogeneic, haploidentical, and cord blood transplants performed.

P Pediatric BMT Center

Aurora – University of Colorado Cancer Center; 720-848-0300; uchealth.org/services/cancer-care A

Denver – Colorado Blood Cancer Institute; 720-754-4835; bloodcancerinstitute.com A

Denver – Rocky Mountain Hospital for Children; 877-752-2737; rockymountainhospitalforchildren.com P

CONNECTICUT

New Haven – Smilow Cancer Hospital; 203-200-4363; ynhh.org/smilow A P

DELAWARE

Newark – ChristianaCare Helen F. Graham Cancer Center & Research Institute; 302-623-4500; christianacare.org/cancer A

Wilmington – Nemours Alfred I. duPont Hospital for Children; 800-416-4441; nemours.org P

DISTRICT OF COLUMBIA

Washington – Children's National Hospital; 202-476-5456; childrensnational.org P

Washington – GW Cancer Center; 202-741-2210; cancercenter.gwu.edu A

Washington – MedStar Georgetown University Hospital/Lombardi Comprehensive Cancer Center; 202-444-3736; www.medstargeorgetown.org A

FLORIDA

Gainesville – UF Health Shands Cancer Hospital; 352-733-0972; ufhealth.org/bone-marrow-transplant A

Gainesville – UF Health Shands Children's Hospital; 352-273-9120; ufhealth.org/uf-health-shands-children-s-hospital P

Hollywood – Memorial Cancer Institute; 954-265-4325; mhs.net/moffitt A (See our ad top right on page 24)

Jacksonville – Baptist MD Anderson Cancer Center; 844-632-2278; www.baptistmdanderson.com A (See our ad top left on page 24)

Jacksonville – Mayo Clinic; 904-953-7223; mayoclinic.org/bone-marrow-transplant A P

Jacksonville

Baptist MD Anderson Cancer Center
Location: 1301 Palm Avenue, Jacksonville, FL 32207
Phone: 904-202-7300; toll free 844-632-2278; fax 904-202-2754
Website: https://www.baptistmdanderson.com/
Nearest Airport: 16 miles from Jacksonville International Airport
Accreditation/Designation: Accredited by the American College of Surgeons, National Accreditation Program for Breast Centers.
Cancer Specialties/Special Services: Baptist MD Anderson Cancer Center patients are diagnosed, treated and cared for by a multidisciplinary team that specializes in their specific cancer. Baptist MD Anderson treats leukemia, lymphoma, multiple myeloma, myelodysplastic syndromes, myeloproliferative neoplasms and other blood cancers and disorders. Clinical trials are available for patients who are seeking research options. A bone marrow transplant program will open in 2022.

A Adult BMT Center

Jacksonville – Nemours Children's Clinic & Wolfson Children's Hospital; 904-697-3600; wolfsonchildrens.com P
Miami – Holtz Children's Hospital; 305-585-7334; pediatrics.jacksonhealth.org P
Miami – Miami Cancer Institute at Baptist Health South Florida; 786-596-2000; cancer.baptisthealth.net A
Miami – Nicklaus Children's Hospital; 305-663-6851; nicklauschildrens.org P
Miami – Sylvester Comprehensive Cancer Center; 844-324-4673; sylvester.org A P

Miami

Sylvester Comprehensive Cancer Center
Location: 1475 NW 12th Avenue, Miami, FL 33136
Phone: 1-844-324-HOPE (4673) • **Website:** Sylvester.org
Nearest Airport: Miami International Airport, Fort Lauderdale–Hollywood International Airport
Accreditation/Designation: NCI-Designated Cancer Center, FDOH Cancer Center of Excellence, ACoS Commission on Cancer, ASCO Quality Oncology Practice Initiative, American College of Radiology, Commission on Laboratory Accreditation of the College of American Pathologists, FACT Accredited
Cancer Specialties/Special Services: Sylvester specializes in the care of patients with disorders of the blood and bone marrow, including leukemia, myelodysplastic syndromes, myeloproliferative neoplasms, Hodgkin and non-Hodgkin lymphoma, and multiple myeloma. At any given time, over 150 clinical therapeutic trials are available to patients.

A Adult BMT Center P Pediatric BMT Center

Orlando – AdventHealth Cancer Institute; 407-303-2070; www.adventhealthcancerinstitute.com A
Orlando – AdventHealth Medical Group Pediatric Cellular Therapy at Orlando; 407-303-1300; www.adventhealthchildren.com P
Orlando – Orlando Health Cancer Institute; 321-841-8650; www.orlandohealthcancer.com A
Pembroke Pines – Moffitt Malignant Hematology & Cellular Therapy at Memorial Healthcare System; 954-265-4325; mhs.net/moffitt A

Pembroke Pines

Memorial Healthcare System/Memorial Cancer Institute
Location: 801 N. Flamingo Road, Pembroke Pines, FL 33028
Phone: 954-265-4325 **Website:** MHS.net/Moffitt
Nearest Airport: Fort Lauderdale-Hollywood International Airport
Accreditation/Designation: FACT accredited Blood and Marrow Transplant Program, Joint Commission, American College of Surgeon's Commission on Cancer, NMDP Transplant Center
Cancer Specialties/Special Services: Moffitt Malignant Hematology & Cellular Therapy at Memorial Healthcare System is a clinical partnership providing enhanced leukemia, lymphoma and myeloma care and research through a comprehensive blood and marrow transplant cellular therapy program. The combined strength of these respected leaders in cancer care provides residents of South Florida and beyond with highly specialized, world-class treatments in a patient- and family-centered care environment.

A Adult BMT Center

St. Petersburg – Johns Hopkins All Children's Hospital; 727-767-4176; hopkinsallchildrens.org P
Tampa – Moffitt Cancer Center; 888-663-3488; moffitt.org A

GEORGIA

Atlanta – Children's Healthcare of Atlanta; 404-785-1112; choa.org/cancer P
Atlanta – Emory Winship Cancer Institute; 404-778-0519; winshipcancer.emory.edu A
Atlanta – Northside Hospital Cancer Institute; 404-255-1930; northside.com/bmtprogram A
Augusta – Georgia Cancer Center at Augusta University; 706-721-6744; www.augustahealth.org/cancer-care A
Brunswick – Southeast Georgia Health System; 855-275-7447; sghs.org/cyberknife A
(See our ad at bottom on page 26)

HAWAII

Honolulu – Kapi'olani Medical Center For Women & Children; 808-983-8551; www.hawaiipacifichealth.org/cancer-centers P

IDAHO

Boise – St. Luke's Children's Cancer Institute; 208-381-2782; stlukesonline.org P
Boise – St. Luke's Mountain States Tumor Institute; 208-381-2711; stlukesonline.org A

ILLINOIS

Chicago – Ann & Robert H. Lurie Children's Hospital of Chicago; 800-543-7362; luriechildrens.org P
Chicago – Northwestern Memorial Hospital; 312-695-0990; hsct.nm.org A
Chicago – Rush University Cancer Center; 312-942-5904; rush.edu/services/cancer-center A
Chicago – UChicago Medicine Comprehensive Cancer Center; 855-702-8222; www.uchicagomedicine.org/cancer A
Chicago – UI Health; 312-413-1715; hospital.uillinois.edu A
Chicago – University of Chicago Medicine Comer Children's Hospital; 773-702-6169; uchicagokidshospital.org/specialties/cancer P
Maywood – Loyola University Medical Center; 888-584-7888; loyolamedicine.org/cancer A P
Park Ridge – Advocate Lutheran General Center for Advanced Care; 847-723-4400; advocatehealth.com/luth A
Peoria – UnityPoint Health — Methodist; 309-672-4224; unitypoint.org/peoria/services-cancer A
Zion – CTCA Chicago; 855-519-0220; cancercenter.com/chicago A

INDIANA

Indianapolis – Franciscan Health Indiana Blood & Marrow Transplantation; 317-528-5500; franciscanhealth.org A
Indianapolis – IU Health Simon Cancer Center; 888-600-4822; iuhealth.org/simon-cancer-center A
Indianapolis – Riley Hospital for Children at IU Health; 317-944-2143; rileychildrens.org P


CITY OF
WHAT MATTERS MOST
Through pioneering research that powers hundreds of clinical trials each year, City of Hope continues to discover new and innovative ways to triumph over cancer, including using your genetic and molecular profile to identify the best treatment for you. And delivering leading-edge treatments to your community is at the heart of everything we do—with more than 35 locations in our clinical network, unparalleled cancer care is never too far away. We focus on bringing you lifesaving therapies, so that you can focus on the people who make life worth living.
Discover more at CityofHope.org
City of Hope®
BEST HOSPITALS
U.S.News & WORLD REPORT
CANCER
2021-22
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Westwood, Kansas

The University of Kansas Cancer Center
Location: 2650 Shawnee Mission Pkwy., Westwood, KS 66205
Phone: 913-588-1227; toll free 844-323-1227; fax 913-588-5785
Website: www.kucancercenter.org
Nearest Airport: Kansas City International-MCI
Accreditation/Designation: NCI-designated Cancer Center, U.S. News & World Report Top 50 cancer program, ACS Commission on Cancer, ANCC Magnet Hospital, FACT, NMDP, BMT-CTN Core Center, Myeloproliferative Disorders Research Consortium, SWOG
Cancer Specialties/Special Services: Kansas' largest, most experienced BMT program has performed over 3,700 transplants, averaging 300 per year. We provide autologous, allogeneic, haploidentical and cord blood transplantation. A multidisciplinary team, including nurse navigators, provides personalized care in our 20-bed inpatient unit and outpatient Cancer and Therapeutic Blood Treatment Center.

A Adult BMT Center

IOWA

Iowa City – University of Iowa Hospitals & Clinics; 319-384-8828; uihc.org/blood-and-marrow-transplant-program A

Iowa City – University of Iowa Stead Family Children's Hospital; 888-573-5437; uichildrens.org P

KANSAS

Westwood – The University of Kansas Cancer Center; 913-588-1227; kucancercenter.org A (See our ad at left)

Wichita – Cancer Center of Kansas; 316-262-4467; cancercenterofkansas.com A

KENTUCKY

Lexington – UK Markey Cancer Center; 859-257-4488; ukhealthcare.uky.edu/markey-cancer-center A

Louisville – Norton Cancer Institute; 502-629-4673; nortoncancerinstitute.com A (See our ad top left on page 27)

Louisville – Norton Children's Cancer Institute; 502-629-7725; nortonchildrens.com P

Louisville – UofL Health — Brown Cancer Center; 502-562-4673; uoflbrowncancercenter.org/bmt A (See our ad bottom left on page 27)

LOUISIANA

New Orleans – Children's Hospital New Orleans; 504-896-9740; www.chnola.org/oncology P

New Orleans – Tulane Blood Cancer Program; 504-988-6300; tulanehealthcare.com/service/blood-cancer-program A

Shreveport – Ochsner LSU Health Shreveport — Feist-Weiller Cancer Center; 318-675-7096; ochsnerlsuhs.org A (See our ad top right on page 27)

MARYLAND

Baltimore – The Sidney Kimmel Comprehensive Cancer Center; 410-955-8964; www.hopkinskimmelcancercenter.org A P

Baltimore – University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center; 410-328-1229; umgccc.org A

Bethesda – John P. Murtha Cancer Center at Walter Reed Bethesda; 301-400-2766; walterreed.tricare.mil A P

Bethesda – National Institutes of Health Clinical Center; 301-496-4000; clinicalcenter.nih.gov A P

Rockville – Shady Grove Adventist Aquilino Cancer Center; 240-826-6297; aquilinocancercenter.com A (See our ad bottom right on page 27)

MASSACHUSETTS

Boston – Beth Israel Deaconess Medical Center; 617-667-9920; bidmc.org/cancer A

Boston – Boston Medical Center; 617-638-6428; bmc.org/hematology A

Boston – Dana-Farber Cancer Institute; 877-442-3324; dana-farber.org A P

Louisville, Kentucky

Norton Cancer Institute
Location: 676 S. Floyd St. Louisville, KY 40202
Phone: 502-629-HOPE
Website: NortonCancerInstitute.com
Nearest Airport: Louisville Muhammad Ali International Airport
Accreditation/Designation: Accredited by American College of Surgeons Commission on Cancer; American College of Radiology Accredited Facility
Cancer Specialties/Special Services: Norton Cancer Institute is a leading provider of care for leukemia, multiple myeloma and Hodgkin lymphoma and non-Hodgkin lymphoma in Louisville and Southern Indiana. We provide a comprehensive range of treatment options, including access to innovative clinical trials featuring promising new therapies, as well as extensive cancer support services and resources to empower patients wherever they are in their journey.

A Adult BMT Center

Louisville, Kentucky

UofL Health - Brown Cancer Center
Location: 529 S. Jackson St., Louisville, KY 40202
Phone: 502-562-4673
Website: UofLBrownCancerCenter.org
Nearest Airport: SDF - Louisville Muhammad Ali International Airport
Accreditation/Designation: Accredited by American College of Surgeons Commission on Cancer; American College of Radiology; Foundation for the Accreditation of Cellular Therapy (FACT); Blue Distinction® Center+ for Transplants (Adult Bone Marrow/Stem Cell)
Cancer Specialties/Special Services: UofL Health – Brown Cancer Center's Blood Cancers, Cellular Therapeutics and Transplant Program offers the latest treatments and clinical trials for leukemia, lymphomas and multiple myeloma. The program is one of two adult cancer centers in the state to offer a stem cell transplant program.

A Adult BMT Center

Boston – Mass General Cancer Center; 877-726-5130; massgeneral.org/cancer A P

Boston – Tufts Medical Center Cancer Center; 617-636-6227; tuftsmedicalcenter.org/cancer A P

Burlington – Sophia Gordon Cancer Center, Lahey Hospital & Medical Center; 781-744-8410; lahey.org/cancer A

Worcester – UMass Memorial Medical Center; 866-597-4673; umassmemorial.org/cancer A

MICHIGAN

Ann Arbor – University of Michigan C.S. Mott Children's Hospital; 734-763-6336; mottchildren.org/ped-blood-disorder P

Ann Arbor – University of Michigan Rogel Cancer Center; 734-647-8902; www.rogelcancercenter.org/bone-marrow-transplant A P

Battle Creek – Bronson Cancer Center; 269-245-8660; bronsonhealth.com/cancer A
(See our ad top left on page 28)

Detroit – Children's Hospital of Michigan; 313-745-5437; childrensdmc.org P

Detroit – The Henry Ford Cancer Institute; 888-777-4167; henryford.com/services/cancer A

Detroit – Karmanos Cancer Institute Bone Marrow Transplantation Program; 800-527-6266; karmanos.org/bmt A P (See our ad bottom left on page 28)

Grand Rapids – Helen DeVos Children's Hospital; 616-267-1925; helendevoschildrens.org P

Grand Rapids – Spectrum Health Cancer Center at Lemmen-Holton Cancer Pavilion; 616-486-5933; spectrumhealth.org/blood-marrow-transplant A

Kalamazoo – Bronson Cancer Center; 269-286-7170; bronsonhealth.com/cancer A
(See our ad top left on page 28)

Shreveport, Louisiana

Ochsner LSU Health Shreveport – Feist-Weiller Cancer Center
Location: 1501 Kings Highway, Shreveport, LA 71103
Phone: 318-675-7096
Website: ochsnerlsuhs.org
Nearest Airport: SHV Shreveport Regional Airport
Accreditation/Designation: FACT/AABB & Accreditation
Cancer Specialties/Special Services: Auto-transplant for lymphoma & myeloma. Acute leukemia induction. Clinical trials available.

A Adult BMT Center

Rockville, Maryland

Shady Grove Adventist Aquilino Cancer Center
Location: 9905 Medical Center Drive, Rockville, MD 20850
Phone: 240-826-6297
Website: AquilinoCancerCenter.com
Nearest Airport: Ronald Reagan Washington National Airport (DCA)
Cancer Specialties/Special Services: Leukemia, breast, ovarian, colon, thyroid, lung, bladder, blood, pancreatic, prostate, skin, brain, head & neck, bone, myeloma, neuroendocrine and stomach cancer. Services include screening, diagnosis, radiation, infusion, interventional radiology, surgery, clinical trials, nutrition, palliative care, lymphedema and cancer rehabilitation care, and wellness programs in one convenient location.

A Adult BMT Center

MINNESOTA

Minneapolis – M Health Fairview; 612-273-2800; mhealthfairview.org A P

Minneapolis – University of Minnesota Masonic Children's Hospital; 612-273-2800; mhealth.org/childrens/care/treatments/blood-and-marrow-transplant-pediatrics P

Rochester – Mayo Clinic; 507-284-5253; mayoclinic.org/bone-marrow-transplant A P

Battle Creek/Kalamazoo, Michigan

Bronson Cancer Center
Location: 300 North Ave. Battle Creek, MI 49017
805 John St., Kalamazoo, MI 49001
Phone: 269-245-8660 (Battle Creek) • 269-286-7170 (Kalamazoo)
Website: bronsonhealth.com/cancer
Nearest Airport: Kalamazoo/Battle Creek International Airport
Accreditation/Designation: Battle Creek: Comprehensive Community Cancer Program from American College of Surgeon's Commission on Cancer; ASTRO APEX Accreditation of Excellence; Joint Commission Gold Seal of Approval™
Cancer Specialties/Special Services: Nurse navigators & survivorship program; tumor boards & clinical trials; Position Emission Tomography (PET) imaging system. Battle Creek: Image Guided Radiation Therapy (IGRT); Stereotactic Body Radiation Therapy (SBRT)

A Adult BMT Center

Detroit, Michigan
Barbara Ann Karmanos Cancer Institute
Location: 4100 John R, Detroit, MI 48201
Toll free: 800-527-6266
Website: www.karmanos.org
Nearest Airport: Detroit Metropolitan Wayne County Airport
Accreditation/Designation: NCI-Designated Comprehensive Cancer Center
Cancer Specialties/Special Services: At Karmanos, we are doing things to fight cancer that did not exist as far back as yesterday. With 15 locations throughout Michigan, we are committed to delivering market-leading cancer care and clinical trials conveniently to the communities we serve. Bone Marrow & Stem Cell Transplant, Breast, Gastrointestinal, Genitourinary, Gynecologic, Head and Neck, Hematology, Sarcoma, Supportive and Thoracic Oncology; Melanoma, Multiple Myeloma and Amyloidosis, Neuro-Oncology, Phase I Clinical-Pharmacology

A Adult BMT Center

MISSISSIPPI

Jackson – Cancer Center and Research Institute at the University of Mississippi Medical Center; 888-815-2005; umc.edu/cancer A

Jackson – Children's of Mississippi; 601-984-2700; umc.edu/childrens P

MISSOURI

Kansas City – Children's Mercy; 816-302-6808; childrensmercy.org/bone-marrow-transplant P

St. Louis – Siteman Cancer Center; 800-600-3606; siteman.wustl.edu A (See our ad top right)

St. Louis – SSM Health Cardinal Glennon Children's Hospital; 314-268-4000; cardinalglennon.com P

St. Louis – SSM Health Saint Louis University Hospital; 314-268-7707; www.ssmhealth.com/transplant-services/blood-and-bone-marrow A P

St. Louis – St. Louis Children's Hospital; 800-678-5437; stlouischildrens.org P

MONTANA

Billings – Billings Clinic Cancer Center; 406-435-4450; billingsclinic.com/cancer A

NEBRASKA

Omaha – CHI Health Henry Lynch Cancer Center at Immanuel; 402-572-2265; chihealth.com/cancer A

Omaha – Fred & Pamela Buffett Cancer Center; 402-559-5600; nebraskamed.com/cancer A P

Omaha – Nebraska Methodist Hospital; 402-354-5144; bestcare.org/specialties/cancer-treatment A

NEW HAMPSHIRE

Lebanon – Norris Cotton Cancer Center; 603-650-4628; cancer.dartmouth.edu/blood-marrow A

St. Louis, Missouri

Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine
Location: 660 South Euclid Avenue, Campus Box 8100, St. Louis, MO 63110
Phone: 314-747-7222; toll free 800-600-3606; fax 314-454-8051
Website: siteman.wustl.edu
Nearest Airport: St. Louis Lambert Airport
Accreditation/Designation: NCI-designated Comprehensive Cancer Center, Transplant Program Accredited by Foundation of Accreditation of Cellular Therapies (FACT)
Cancer Specialties/Special Services: The Stem Cell Transplant and Cellular Therapies Center at Siteman is among the top five in the country performing nearly 500 transplants per year. We are leading members of several cooperative groups including the National Marrow Donor Program (NMDP), the Cancer and Leukemia Group B (CALGB), the BMT Clinical Trials Network (CTN) and the Multiple Myeloma Research Consortium (MMRC).

A Adult BMT Center

NEW JERSEY

Hackensack – John Theurer Cancer Center; 551-996-5855; jtcancercenter.org A

Hackensack – Joseph M Sanzari Children's Hospital at Hackensack UMC; 551-996-5600; www.hackensackmeridianhealth.org/services/pediatrics P

New Brunswick – Rutgers Cancer Institute of New Jersey; 732-235-2465; cinj.org A P

NEW MEXICO

Albuquerque – UNM Comprehensive Cancer Center; 505-272-4946; cancer.unm.edu A

Albuquerque – Lovelace Cancer Center; 505-727-7000; lovelacecancercenter.com
(See our ad bottom right on page 28)

NEW YORK

Albany – New York Oncology Hematology; 518-262-6696; newyorkoncology.com A

Bronx – Children's Hospital at Montefiore; 718-741-2426; www.cham.org P

Bronx – Montefiore Einstein Center for Cancer Care; 718-862-8840; montefiore.org/stem-cell-transplant A P

Buffalo – Roswell Park Comprehensive Cancer Center; 800-767-9355; roswellpark.org A P

Hawthorne – The Cancer Center at Westchester Medical Center; 914-246-6600; wcmc.com A P

Manhasset – Northwell Health North Shore University Hospital; 516-734-8973; nsuh.northwell.edu A

New Hyde Park – Northwell Health Cohen Children's Medical Center; 718-470-3611; childrenshospital.northwell.edu P

New York – Hassenfeld Children's Hospital at NYU Langone; 646-929-7970; nyulangone.org/hassenfeld P

New York – Memorial Sloan Kettering Cancer Center; 877-836-2268; mskcc.org A P

New York – Mount Sinai Bone Marrow and Stem Cell Transplantation Program; 212-241-6021; mountsinai.org/care/cancer/services/bone-marrow A P

New York – NewYork-Presbyterian Columbia University Herbert Irving Comprehensive Cancer Center; 212-305-5098; cancer.columbia.edu/bone-marrowstem-cell-transplantation A

New York – NewYork-Presbyterian Morgan Stanley Children's Hospital; 212-305-5808; nyp.org/morganstanley P

New York – NewYork-Presbyterian/Weill Cornell Medical Center; 646-962-7950; weillcornell.org/stemcells A

New York – Perlmutter Cancer Center at NYU Langone Health; 646-501-4848; nyulangone.org/cancer A P

Rochester – Wilmot Cancer Institute; 585-275-5830; urmc.rochester.edu/cancer-institute A P

Stony Brook – Stony Brook Cancer Center; 631-722-2623; cancer.stonybrookmedicine.edu A

Syracuse – Upstate Cancer Center; 315-464-8214; upstate.edu/hemonc/healthcare A

Valhalla – Maria Fareri Children's Hospital at Westchester Medical Center; 914-493-7997; www.mariafarerichildrens.org P

NORTH CAROLINA

Chapel Hill – UNC Lineberger Comprehensive Cancer Center; 866-869-1856; unclineberger.org/bmt A P

Charlotte – Atrium Health Levine Cancer Institute; 980-442-6400; atriumhealth.org A

Charlotte – Atrium Health Levine Children's; 704-381-9900; atriumhealth.org P

Durham – Duke Cancer Institute; 919-684-8964; dukecancerinstitute.org A

Durham – Duke Children's Hospital; 919-613-7800; dukechildrens.org P

Winston-Salem – Wake Forest Baptist Comprehensive Cancer Center; 336-716-9253; wakehealth.edu/comprehensive-cancer-center A P

OHIO

Akron – Akron Children's Hospital; 330-543-8580; akronchildrens.org P

Cincinnati – Cincinnati Children's Hospital; 513-636-1371; cincinnatichildrens.org/service/b/bone-marrow P

Cincinnati – The Jewish Hospital — Mercy Health Cincinnati Cancer and Cellular Therapy Center; 513-686-5250; mercy.com A

Cincinnati – UC Hematologic Malignancies & Bone Marrow Transplant Center; 513-584-4268; www.uchealth.com A

Cleveland – Taussig Cancer Institute; 216-445-5600; clevelandclinic.org/cancer A P

Cleveland – University Hospitals Rainbow Babies & Children's Hospital; 844-710-6928; uhhospitals.org/rainbow P

Cleveland – University Hospitals Seidman Cancer Center; 844-319-7424; uhhospitals.org/seidman A P

Columbus – Nationwide Children's Hospital; 614-722-8860; nationwidechildrens.org/blood-marrow-transplantation P

Columbus – The Ohio State University Comprehensive Cancer Center — Arthur G. James Cancer Hospital and Richard J. Solove Research Institute; 800-293-5066; cancer.osu.edu A

Columbus

The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute
Location: 460 W. 10th Ave., Columbus, OH 43210
Phone: 614-293-5066; toll free 800-293-5066
Website: cancer.osu.edu
Nearest Airport: John Glenn Columbus International Airport
Accreditation/Designation: NCI-designated Comprehensive Cancer Center, founding member NCCN, Magnet-designated, accredited by FACT & Joint Commission
Cancer Specialties/Special Services: A fully dedicated cancer hospital and research institute, OSUCCC-James is one of the nation's premier cancer centers for the prevention, detection and treatment of cancer. We are home to one of the world's leading hematologic malignancy programs with a transdisciplinary team of hematologists, researchers and other cancer experts who specialize in distinct hematologic malignancies including leukemia, lymphoma and multiple myeloma.

A Adult BMT Center

OKLAHOMA

Oklahoma City – Stephenson Cancer Center; 855-750-2273; stephensoncancercenter.org A P

OREGON

Portland – Doernbecher Children's Hospital; 503-346-0640; ohsudoernbecher.com P

Portland – Legacy Cancer Institute; 503-415-5600; legacyhealth.org/cancer A P

Portland – OHSU Knight Cancer Institute; 503-494-7999; ohsu.edu/cancer A

Portland – Providence Cancer Institute; 503-215-6014; oregon.providence.org A

PENNSYLVANIA

Danville – Geisinger Medical Center; 800-275-6401; geisinger.org A

Hershey – Penn State Cancer Institute; 888-531-6585; www.pennstatehealth.org/services-treatments/cancer-care A P

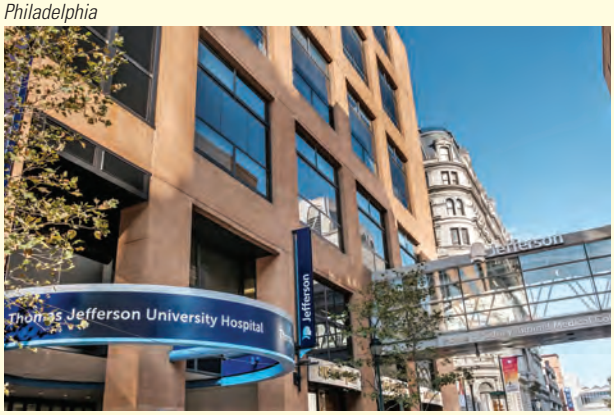
Philadelphia – Abramson Cancer Center; 800-789-7366; pennmedicine.org/cancer A

Philadelphia – Children's Hospital of Philadelphia; 215-590-2820; chop.edu P

Philadelphia – Fox Chase–Temple University Hospital Bone Marrow Transplant Program; 215-214-3122; bmt.templehealth.org A

Philadelphia – Sidney Kimmel Cancer Center — Jefferson Health; 800-533-3669; jeffersonhealth.org A

Philadelphia



Sidney Kimmel Cancer Center – Jefferson Health
Location: 925 Chestnut St., Philadelphia, PA 19107
Phone: 800-533-3669
Website: JeffersonHealth.org
Nearest Airport: Philadelphia International Airport
Accreditation/Designation: National Cancer Institute (NCI) Designated; American College of Surgeons Commission on Cancer, Aetna Institute of Excellence Transplant Facility
Cancer Specialties/Special Services: The Bone Marrow Transplant and Cellular Therapy Program of Thomas Jefferson University Hospital is a state-of-the-art center focused on patient care and satisfaction. Our outpatient transplant program allows many patients to stay in the comfort of their homes, while our CAR-T program is expanding in depth and focus.

A Adult BMT Center

Philadelphia – St. Christopher's Hospital for Children; 215-427-5000; stchristophershospital.com P

Pittsburgh – Allegheny Health Network Cancer Institute; 412-687-7348; ahn.org/cancer A

Pittsburgh – UPMC Children's Hospital of Pittsburgh; 412-692-6740; chp.edu/our-services/transplant P

Pittsburgh – UPMC Hillman Cancer Center; 412-864-6600; hillman.upmc.com/mario-lemieux-center A

RHODE ISLAND

Providence – Roger Williams Cancer Center; 401-456-2077; weknowcancer.org A

SOUTH CAROLINA

Charleston – Hollings Cancer Center; 843-792-0709; hollingscancercenter.org A

Charleston – MUSC Children's Health; 843-876-0444; musckids.org/cancer P

Sioux Falls, South Dakota

Avera McKenna Hospital and University Health Center
Location: 1000 E. 23rd St., Sioux Falls, SD 57105
Phone: 605-322-3035
Website: www.avera.org/transplant
Nearest Airport: Sioux Falls Regional
Accreditation/Designation: Nationally Accredited Cancer Specialists, Avera cancer specialists including medical oncologists, hematologists, transplant physicians, gynecologic oncologists, genomic physicians, radiation oncologists, surgeons, genetic counselor and oncology trained nurses work together to address your particular needs.
Cancer Specialties/Special Services: Avera's leadership in genomic medicine is a precise scientific based approach to cancer care. It identifies genetic mutations so treatment can be designed specifically to you. Our highly skilled, physicians collaborate using evidence-based methods, like bone marrow transplant, to deliver the best possible outcomes.

A Adult BMT Center

Charleston – Roper St. Francis Cancer Care; 843-724-2000; rsfh.com/cancer-care A
Greenville – Bon Secours St. Francis Cancer Center; 864-603-6200; stfranciscancercenter.org A
Greenville – Prisma Health Cancer Institute; 864-455-7070; prismahealth.org A

SOUTH DAKOTA

Sioux Falls – Avera Cancer Institute; 605-322-3035; avera.org/transplant A
(See our ad bottom right on page 29)

TENNESSEE

Memphis – Baptist Cancer Center; 901-226-5151; baptistcancercenter.com A
Memphis – Methodist Blood and Marrow Transplant Center; 901-478-2400; www.methodisthealth.org A
Memphis – St. Jude Children's Research Hospital; 866-278-5833; stjude.org P
Nashville – Tennessee Oncology; 877-836-6662; www.tnoncology.com A

Nashville

Tennessee Oncology
Location: Over 33 locations headquartered in Nashville, Tennessee
Phone: 877-836-6662 • **Website:** www.tnoncology.com
Nearest Airport: Nashville International
Cancer Specialties/Special Services: Tennessee Oncology, PLLC with over 110 physicians in over 33 locations is one of the nation's largest physician-owned practices with leading teams of cancer care specialists, nationally recognized for improving patient outcomes and driving quality of life innovation. We are specialists in blood cancers as well as most adult cancers. Our comprehensive range of cancer care services includes specialized oncology nursing care, laboratory services, pharmacy, outpatient chemotherapy, PET/CT services, palliative care, patient and family education and financial support services. Founded in 1976, our unique vision, introducing patient-driven care with a clinical trial focus, has made us one of the most influential community oncology advocates delivering cancer care close to home. For a complete list of physicians, locations and services please visit: www.tnoncology.com

A Adult BMT Center

Nashville – Tennessee Valley Healthcare System; 615-873-6373; www.tennesseevalley.va.gov/services/stem_cell_transplant.asp A
Nashville – Vanderbilt-Ingram Cancer Center; 615-936-8422; vicc.org A P

TEXAS

Austin – St. David's South Austin Medical Center; 512-447-2211; stdavids.com A
Dallas – Baylor Scott & White Health; 844-279-3627; bswhealth.com/cancer A
Dallas – Children's Health Stem Cell Transplant Program; 214-456-2978; childrens.com P
Dallas – Medical City Dallas; 972-566-7000; medicalcityhealthcare.com/specialties/blood-and-marrow-transplant A P
Dallas – Texas Oncology—Baylor Charles A. Sammons Cancer Center Blood and Marrow Transplant; 214-370-1500; texasoncology.com A (See our ad top right)
Dallas – Texas Oncology—Medical City Dallas Blood & Marrow Transplant; 972-566-7790; texasoncology.com A P (See our ad bottom right)
Dallas – UT Southwestern Harold C. Simmons Comprehensive Cancer Center; 214-645-4673; utswmedicine.org/cancer/programs/bmt A P
Fort Sam Houston – Brooke Army Medical Center; 210-916-4808; bamc.tricare.mil A
Fort Worth – Cook Children's Medical Center; 682-885-4007; cookchildrens.org P
Houston – Center for Cell & Gene Therapy Houston Methodist Hospital; 713-441-1450; houstonmethodist.org/cancer A P
Houston – Houston Methodist Willowbrook Hospital; 281-737-2500; houstonmethodist.org/cancer A P
Houston – Texas Children's Cancer and Hematology Center; 800-226-2379; txch.org P
Houston – The University of Texas MD Anderson Cancer Center; 855-767-4757; mdanderson.org A P
San Antonio – The Children's Hospital of San Antonio; 210-704-2160; www.christushealth.org/childrens P
San Antonio – Sarah Cannon Transplant and Cellular Therapy Program at Methodist Hospital; 210-575-3817; sahealth.com/specialties/bone-marrow-transplant A P
San Antonio – South Texas Veterans Health Care System; 210-617-5268; www.southtexas.va.gov A

UTAH

Salt Lake City – Huntsman Cancer Institute; 801-587-7000; www.huntsmancancer.org/bmt A

Dallas, Texas

Texas Oncology–Baylor Charles A. Sammons Cancer Center Blood and Marrow Transplant
Location: 3410 Worth St., Suite 300, Dallas, TX 75246
Phone: 214-370-1500; toll free 888-864-4226; fax 214-370-1886
Website: www.TexasOncology.com **Nearest Airport:** Dallas Love Field
Accreditation/Designation: Foundation for the Accreditation of Cellular Therapy
Cancer Specialties/Special Services: Texas Oncology–Baylor Charles A. Sammons Cancer Center Blood and Marrow Transplant has performed more than 6,000 transplants since the program's inception in 1983. The center provides services in hematology, oncology, blood & marrow transplant, and Chimeric Antigen Receptor – T cell (CAR-T) therapy. Texas Oncology offers clinical trials for both hematology and post BMT patients. Additionally, our physicians are experienced in treating HIV-related malignancies. The American Cancer Society Hope Lodge will open in early 2021 and will offer free housing for cancer patients who must travel to Dallas for cancer treatment.

A Adult BMT Center

Dallas, Texas

Texas Oncology–Medical City Dallas Blood and Marrow Transplant
Location: 7777 Forest Lane, Suite D-220, Dallas, TX 75230
Phone: 972-566-7790; toll free 888-864-4226; fax 972-566-6553
Website: www.TexasOncology.com
Nearest Airport: Dallas-Fort Worth International Airport
Accreditation/Designation: Foundation for the Accreditation of Cellular Therapy – adult and pediatric; American Association of Blood Banks (A.A.B.B.)
Cancer Specialties/Special Services: Texas Oncology–Medical City Dallas Blood and Marrow Transplant is a comprehensive program performing more than 300 transplants per year. The center specializes in complex cases including umbilical cord and haplo transplants. According to the CIBMTR Registry, the center consistently ranks in the highest percentile for transplant patient survival. The center also offers both inpatient and outpatient CAR-T therapy.

A Adult BMT Center P Pediatric BMT Center

Salt Lake City – Intermountain LDS Hospital; 801-408-1262; intermountainhealthcare.org/locations/lds-hospital A
Salt Lake City – Intermountain Primary Children's Hospital; 801-662-4700; intermountainhealthcare.org/primary-childrens P

VERMONT

Burlington – University of Vermont Cancer Center; 802-847-8400; www.uvmhealth.org/medcenter A

VIRGINIA

Charlottesville – UVA Cancer Center; 434-924-9333; cancer.uvahealth.com A

Fairfax – Inova Schar Cancer Institute; 571-472-4724; inova.org/cancer A

Norfolk – Virginia Oncology Associates; 757-466-8683; virginiacancer.com A

Richmond – VCU Massey Cancer Center; 804-828-7999; www.masseycancercenter.org A P

WASHINGTON

Seattle – Fred Hutch Bone Marrow Transplant Program at Seattle Cancer Care Alliance; 800-804-8824; seattlecca.org A P

Seattle – Swedish Cancer Institute; 206-991-2040; swedish.org/hematology A (See our ad at right)

Seattle – VA Puget Sound Health Care System; 206-764-2199; www.pugetsound.va.gov/marrowtransplant A

Spokane – Cancer Care Northwest; 509-228-1000; cancercarenorthwest.com A

WEST VIRGINIA

Morgantown – WVU Cancer Institute; 877-427-2894; wvumedicine.org/cancer A

WISCONSIN

Madison – UW Carbone Cancer Center; 608-265-1700; uwhealth.org/cancer A P

Marshfield – Marshfield Medical Center; 866-520-2510; www.marshfieldclinic.org A

Milwaukee – Aurora St. Luke's Medical Center; 414-649-7032; aurorahealthcare.org/services/cancer A

Milwaukee – Children's Wisconsin; 414-266-2000; childrenswi.org P

Milwaukee – Froedtert & Medical College of Wisconsin; 414-805-0505; froedtert.com/bone-marrow-transplant A

Seattle

Swedish Cancer Institute
The Center for Blood Disorders and Stem Cell Transplantation
Location: 1221 Madison, Seattle, WA 98104
Phone: 206-991-2040; toll free 855-922-6237; fax 206-991-2041
Website: www.Swedish.org/hematology
Nearest Airport: Seattle Tacoma International Airport
Accreditation/Designation: Accredited by the American College of Surgeons Commission on Cancer with Commendation, and the Foundation for the Accreditation of Cellular Therapy (FACT).
Cancer Specialties/Special Services: The Swedish Cancer Institute (SCI) is a research based cancer practice with a multidisciplinary team of expert physicians and researchers dedicated to hematologic malignancies, including leukemia, lymphoma and myeloma. The program includes stem cell transplantation, immunotherapy such as Chimeric Antigen Receptor T-Cell (CAR-T) therapy, and personalized translational medicine utilizing state-of-the-art molecular tumor profiling. SCI actively participates in comprehensive clinical trials.

A Adult BMT Center

ASSISTANCE

Patient assistance resources

BLOOD CANCER

Alex's Lemonade Stand ..... www.alexslemonade.org
American Society of Hematology ..... www.hematology.org
The Angiogenesis Foundation ..... www.angio.org/learn/treatments
Asian American Donor Program ..... www.aadp.org
Be the Match ..... www.bethematch.org
Blood & Marrow Transplant Information Network ..... www.bmtinfonet.org
Cancer Support Community ..... www.cancersupportcommunity.org
Center for International Blood and Marrow Transplant Research (CIBMTR) ..... www.cibmtr.org, 414-805-0700
CLL Advocates Network (CLLAN) ..... www.clladvocates.net
CLL Society ..... www.cllsociety.org
Cutaneous Lymphoma Foundation ..... www.clfoundation.org
Delete Blood Cancer DKMS ..... www.dkms.org
Hairy Cell Leukemia Foundation ..... www.hairycellleukemia.org
HEADstrong Foundation ..... www.headstrong.org
International Myeloma Foundation ..... www.myeloma.org
International Waldenstrom's Macroglobulinemia Foundation ..... www.iwmf.com
The Leukemia & Lymphoma Society ..... www.lls.org
Lymphoma Coalition ..... www.lymphomacoalition.org
Lymphoma Foundation of America ..... www.lymphomahelp.org
Lymphoma Research Foundation ..... www.lymphoma.org
The Max Foundation ..... www.themaxfoundation.org
MPN Education Foundation ..... www.mpninfo.org, 480-443-1975
MPN Research Foundation ..... www.mpnresearchfoundation.org, 773-977-7216
Multiple Myeloma Research Foundation ..... www.themmrf.org
Myeloma Central ..... www.myelomacentral.com
National Bone Marrow Transplant Link ..... www.nbmtlink.org
National CML Society ..... www.nationalcmlsociety.org
National Comprehensive Cancer Network ..... www.nccn.org/patientguidelines
Patients Against Lymphoma ..... www.lymphomation.org

CAREGIVERS & SUPPORT

4th Angel Patient & Caregiver Mentoring Program www.4thangel.org
BeholdBeGold ..... www.beholdbegold.org
Cactus Cancer Society ..... www.cactuscancer.org
CanCare ..... www.cancare.org
CANCER101 ..... www.cancer101.org
Cancer*Care* ..... www.cancercare.org
Cancer Connection ..... www.cancer-connection.org
Cancer Hope Network ..... www.cancerhopenetwork.org
Cancer Support Community ... www.cancersupportcommunity.org, 888-793-9355
Cancer Survivors Network ..... csn.cancer.org
Caregiver Action Network ..... www.caregiveraction.org
CaringBridge ..... www.caringbridge.org
Center to Advance Palliative Care ..... www.capc.org
Chemo Angels ..... www.chemoangels.com
Children's Oncology Group ..... www.childrensoncologygroup.org
The Children's Treehouse Foundation ..... www.childrenstreehousefdn.org
Cleaning for a Reason ..... www.cleaningforareason.org
Connect Thru Cancer ..... www.connectthrucancer.org
Family Caregiver Alliance ..... www.caregiver.org
Friend for Life Cancer Support Network www.friend4life.org
The Gathering Place ..... www.touchedbycancer.org
Imerman Angels ..... www.imermanangels.org
LivingWell Cancer Resource Center ..... www.livingwellcrc.org
Lotsa Helping Hands ..... www.lotsahelpinghands.com
National LGBT Cancer Project ..... www.lgbtcancer.org
SHARE Caregiver Circle ..... www.sharecancersupport.org/caregivers-support
Triage Cancer ..... www.triagecancer.org
Well Spouse Association ..... www.wellspouse.org
weSPARK Cancer Support Center ..... www.wespark.org

REIMBURSEMENT & PATIENT ASSISTANCE PROGRAMS

myAbbVie Assist ... www.abbvie.com/patients/patient-assistance, 800-222-6885
Adcetris Support ..... www.seagensecure.com/patient/adcetris, 855-473-2873
Aliqopa Resource Connections ... aliqopa-us.com/financial-access, 833-254-7672
Amgen Assist 360 ..... amgenassist360.com/patient, 888-427-7478
Aredia Reimbursement Hotline 800-282-7630
Arzerra Patient Assistance ..... patient.novartisoncology.com, 800-282-7630
Astellas Pharma Support Solutions ..... astellaspharmasupportsolutions.com/patient, 800-477-6472
AstraZeneca Access 360 ..... myaccess360.com/patient, 844-275-2360
AstraZeneca Prescription Program (AZ&ME) .... azandmeapp.com, 800-292-6363
Bayer US Patient Assistance Foundation ..... patientassistance.bayer.us, 866-228-7723

Beleodaq Reimbursement and Patient Access ..... beleodaq.com/reimbursement-and-patient-access-information, 888-537-8277

Bendeka CORE..... www.bendeka.com/support/assistance, 888-587-3263

Besponsa Support & Resources ...www.besponsa.com/resources, 877-744-5675

Blenrep Patient Assistance..... togetherwithgskoncology.com/patient-information/blenrep, 844-447-5662

Blincyto Assist 360 ..... amgenassist360.com/patient/blincyto-cost-assistance, 888-427-7478

Bosulif Support & Financial Assistance ..... www.bosulif.com/support-and-financial-assistance, 877-744-5675

Bristol-Myers Squibb .....bms.com/patient-and-caregivers/ get-help-paying-for-your-medicines.html, 800-721-5072

Bristol-Myers Squibb Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Bristol-Myers Squibb Patient Assistance Foundation...bmspaf.org, 800-736-0003

Brukinsa myBeiGene Patient Support..... www.brukinsa.com/mybeigene-patient-support, 833-234-4363

CALQUENCE Cares..... www.calquence.com/mcl/patients-support-resources, 800-236-9933

Copiktra Patient & Caregiver Support..... copiktra.com/patient-assistance, 844-973-2872

Darzalex Faspro Janssen CarePath..... www.janssencarepath.com/ patient/darzalex-faspro/patient-support, 844-553-2792

Darzalex Janssen CarePath ..... www.janssencarepath.com/patient/darzalex/patient-support, 844-553-2792

Darzalex Patient Support ..... www.darzalex.com/patient-financial-support, 844-553-2792

Daurismo Financial Assistance ..... pfizeroncologytogether.com/patient/financial-assistance, 877-744-5675

Empliciti Patient Support ...www.empliciti.com/financial-resources, 844-367-5424

EpizymeNOW Patient & Product Support Enrollment Form..... www.tazverik.com/Content/pdf/patient-support-form.pdf, 833-437-4669

Erwinaze Patient Assistance ..... www.jazzpharma.com/responsibility/patient-assistance, 833-533-5299

Farydak Secura Care Patient Support .....farydak.com, 844-973-2872

Folotyn Patient Resource Center.....acrotechpatientaccess.com, 888-537-8277

Gazyva Access Solutions ..... genentech-access.com/patient/brands/gazyva, 877-436-3683

Genentech Access Solutions .....genentech-access.com/patient, 877-436-3683

Genentech BioOncology Co-pay Assistance Program ..... copayassistancenow.com, 855-692-6729

Gilead's Advancing Access .... www.gileadadvancingaccess.com, 800-226-2056

Gleevec Patient Support Program..... www.us.gleevec.com/patient-support/financial-resources, 800-282-7630

GSK Oncology...togetherwithgskoncology.com/patient-information, 844-447-5662

Helsinn Cares ..... helsinnreimbursement.com, 844-357-4668, select prompt 2

Iclusig Financial Support..... here2assist.com, 844-817-6468, option 2

Idhifa Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Imbruvica By Your Side Patient Support..... imbruvica.com/imbruvica-by-your-side, 888-968-7743

IncyteCARES for Jakafi.....www.incytecares.com/jakafi/, 855-452-5234

InnateCares ..... www.lumoxiti.com/patient/patient-resources/innate-cares, 844-694-6628

Inrebic Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Istodax Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Janssen CarePath.....www.janssencarepath.com/patient, 877-227-3728

JazzCares.....jazzcares.com, 833-533-5299

Johnson & Johnson Patient Assistance Foundation, Inc. ..... www.jjpaf.org, 800-652-6227

Keytruda KEY+YOU ..... www.keytruda.com/key-you-sign-up, 855-398-7832,

Keytruda Patient Assistance ..... merckaccessprogram-keytruda.com/hcc/, 855-257-3932

Kymriah Cares..... www.us.kymriah.com/acute-lymphoblastic-leukemia-children/ patient-support/support-resources-for-kymriah, 844-459-6742

Kyprolis Patient Support Program ... kyprolis.com/patient-resources, 888-427-7478

Lumoxiti Patient Savings Program ..... www.lumoxiti.com/patient/patient-resources/lumoxiti-savings, 844-694-6628

Marqibo Patient Assistance.....acrotechpatientaccess.com, 888-537-8277

Merck Access Program..... merckaccessprogram.com

Merck Helps .....merckhelps.com, 800-727-5400

Monjuvi Patient Support & Resources..... www.monjuvi.com/patient-support-and-resources, 855-421-6172

Mylotarg Financial Assistance ..... www.pfizeroncologytogether.com/patient/financial-assistance, 877-744-5675

Ninlaro Financial Support..... ninlaro.com/financial-resources, 844-817-6468, option 2

Novartis Patient Assistance Now Oncology (PANO)..... www.patient.novartisoncology.com/financial-assistance/pano, 800-282-7630

Onureg Patient Assistance ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Opdivo with You .....patientsupport.bmscustomerconnect.com/ opdivo-with-you-registration, 855-673-4861

Pfizer Oncology Together .....pfizeroncologytogether.com/patient, 877-744-5675

Pfizer RxPathways .....pfizerrxpathways.com, 844-989-7284

Polivy Patient Assistance Tool..... polivy.com/patient/support-and-resources/financial-support.html, 888-249-4918

Pomalyst Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Poteligeo Access and Reimbursement..... kyowakirincares.com/poteligeo-patients, 833-552-2737

Revlimid Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Rituxan Hycela Access Solutions..... genentech-access.com/patient/brands/rituxanhycela, 877-436-3683

Rituxan Patient Assistance Program..... www.rituxan.com/nhl-cll/financial-assistance, 877-436-3683

Ruxience Financial Support & Resources..... www.ruxience.com/patient-resources, 877-744-5675

Rydapt NOW Access .....us.rydapt.com/acute-myeloid-leukemia/ patient-support/financial-resources, 800-282-7630

Sancuso Patient RxSolutions..... sancuso.com/patient/patient-resources, 800-726-2876

Sandoz One Source ... www.zarxio.com/resources/patient-support, 844-726-3691

Sanofi Genzyme CareASSIST ..... www.sanoficareassist.com, 833-930-2273

Sarclisa CareASSIST .....www.sarclisa.com/paying-for-sarclisa, 833-930-2273

SeaGen Secure..... seagensecure.com, 855-473-2873

Secura Care Patient Support Program ..... securabio.com/patient-support-programs, 844-973-2872

Sprycel Assist ..... www.sprycel.com/financial-support, 800-861-0048

Synribo SYNCare Support...www.tevacore.com/patient-assistance, 888-587-3263

Takeda Oncology Here2Assist...www.here2assist.com, 844-817-6468, option 2

Tasigna Financial Resources ..... www.us.tasigna.com/patient-support/cost-copay-card, 877-577-7756

Tazverik Patient Support Form ..... www.epizymenow.com/Content/pdf/ epizymenow-enrollment-form.pdf, 833-437-4669

Tecartus Patient Support.....www.tecartus.com/patient-support, 844-454-5483

Teva Cares Foundation Patient Assistance Programs ... tevacares.org, 877-237-4881

Thalomid Patient Support ..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Tibsovo Financial Assistance ..... myagios.com/patient/paying-for-tibsovo.html, 844-409-1141

Treanda Teva CORE..... www.tevacore.com/patient-assistance, 888-587-3263

Trisenox Teva CORE ..... www.tevacore.com/patient-assistance, 888-587-3263

Truxima Support.....truxima.com/nhl-cll/resources-and-support, 888-587-3263

Velcade Reimbursement Assistance Program..... www.velcade.com/paying-for-treatment, 844-817-6468, option 2

Venclexta Access Solutions..... genentech-access.com/patient/brands/venclexta, 877-436-3638

Vidaza Patient Support..... www.bmsaccesssupport.bmscustomerconnect.com/patient, 800-721-8909

Vyxeos Patient Support ..... vyxeospro.com/support-materials/patient-reimbursement, 833-533-5299

Xgeva Financial Resources ..... www.xgeva.com/xgeva-cost, 888-427-7478

Xospata Support Solutions ..... astellaspharmasupportsolutions.com/products/ xospata/patient_assistance, 844-632-9272

Xpovio Support .....www.karyforward.com, 877-527-9493

Yescarta Patient Support...www.yescarta.com/lbcl/patient-support, 844-454-5483

Zevalin Reimbursement Support & Patient Assistance..... www.zevalin.com/support-resources-and-downloads/reimbursement-support-and-patient-assistance, 888-537-8277

Zydelig AccessConnect...www.zydeligaccessconnect.com/patient, 844-622-2377

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