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LEUKEMIA, LYMPHOMA & MULTIPLE MYELOMA

A Treatment and Facilities Guide for Patients and their Families

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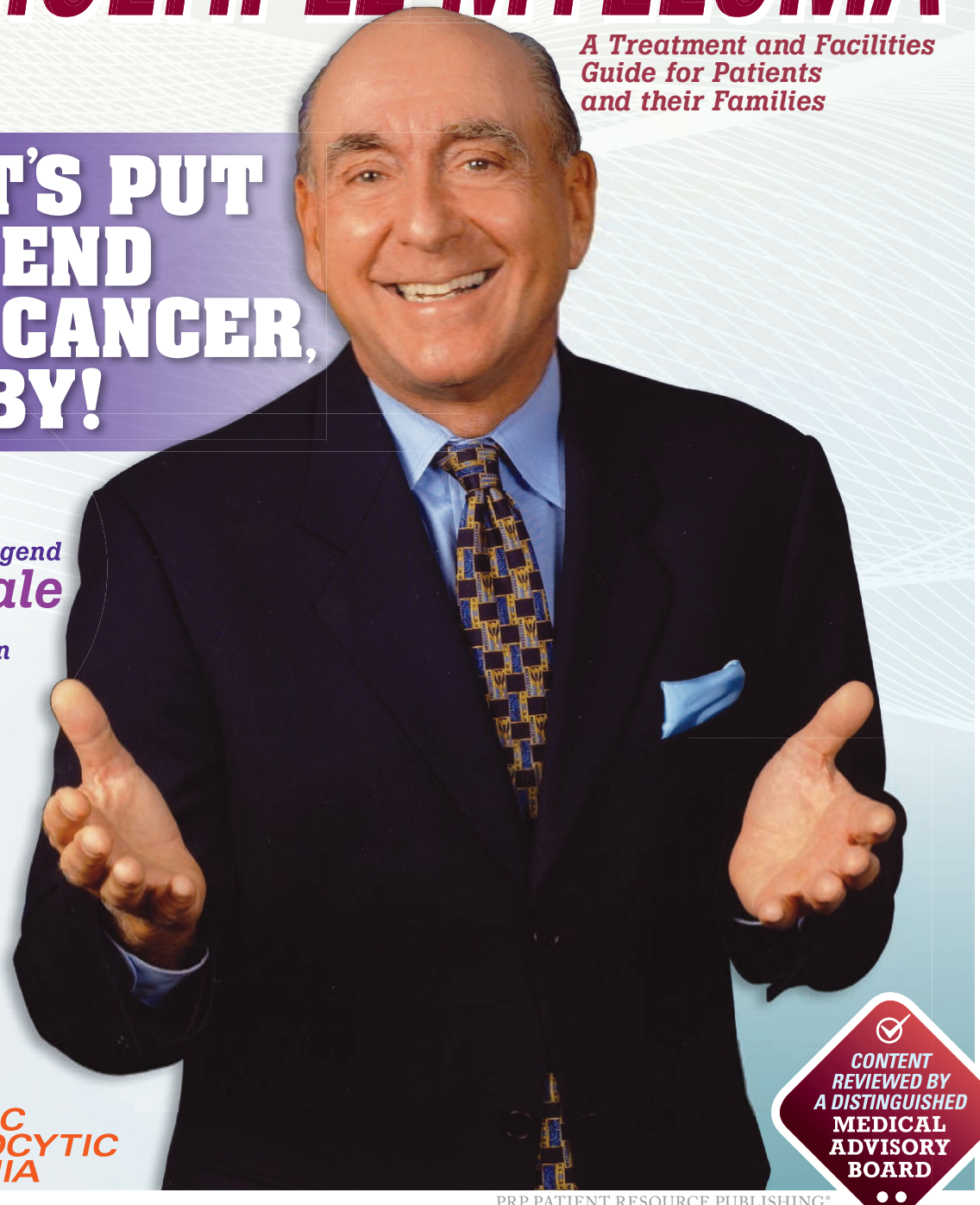

Basketball broadcasting legend **Dick Vitale** *is cancer-free and on a mission*

For guide to CHRONIC LYMPHOCYTIC LEUKEMIA

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13th Edition

LEUKEMIA, LYMPHOMA & MULTIPLE MYELOMA

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Education is the first step

As you begin treatment planning, learn as much as possible about your type of blood cancer so that you are prepared to ask questions and make decisions about your care. You and your doctor will work together to develop a treatment plan that maximizes your quality of life.

You are encouraged to seek out accredited hospitals, cancer centers and doctors with expertise in treating the type of blood cancer you have. Looking for a second opinion may prove valuable because doctors may suggest different treatment plans and have unique expertise. Your doctor might be the best resource for finding a second opinion.

Blood cancers may affect many cells and tissues within the blood and bone marrow. The three main types are as follows:

- **Leukemia** typically starts in the blood-forming tissue, such as the bone marrow, and causes large numbers of abnormal blood cells to be produced. It only rarely forms solid tumors.
- **Lymphoma** begins in lymphocytes (a type of white blood cell that is a component of the immune system). Lymphoma may or may not form solid tumors.
- **Multiple myeloma** begins in plasma cells, which are produced in the bone marrow and are a part of the immune system. This type may form a solid tumor called a plasmacytoma.

With few exceptions, the diagnosis of a blood cancer is made by a biopsy. A variety of other diagnostics may be conducted, including blood and urine tests, imaging, a bone marrow aspiration and biopsy combined, and biomarker testing for finding specific genes, proteins and other factors unique to the disease.

Some of the terms your medical team uses may be confusing. These definitions may help you feel more informed as you make the important decisions ahead:

- **First-line therapy** is the first treatment used.
- **Second-line therapy** is given when the first-line therapy does not work or is no longer effective.
- **Standard of care** refers to widely recommended treatments known for your type and stage of cancer. It can apply to first-line therapy or later lines of treatment.
- **Neoadjuvant therapy** is given to shrink a tumor before the primary treatment (usually surgery).
- **Adjuvant therapy** is additional cancer treatment given after the primary treatment (usually surgery or radiation therapy) to destroy remaining cancer cells and lower the risk that the cancer will come back.
- **Systemic treatments** travel throughout the body and are typically drug therapies, such as chemotherapy, molecular therapy, targeted therapy and immunotherapy. ■

Significant progress is being made as treatment options evolve

Multiple myeloma is a type of hematologic (blood) cancer that is sometimes referred to as a plasma cell neoplasm. It begins in the blood's plasma cells, a type of white blood cell produced in the bone marrow. Healthy plasma cells create antibodies that fight germs and viruses, stop infection and are an important part of the immune system.

This blood cancer begins when abnormal plasma cells grow out of control, which weakens the immune system. The 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. These antibodies are called M-proteins. They accumulate in the blood and urine and can lead to damage of 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.

The following are the only two known precursors to multiple myeloma.

- Monoclonal gammopathy of undetermined significance (MGUS) occurs when abnormal plasma cells produce too 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.

DIAGNOSING MULTIPLE MYELOMA

If multiple myeloma is suspected, your doctor may order blood and urine tests as well as a bone marrow biopsy and imaging tests. Imaging tests may include magnetic resonance imaging (MRI) and positron emission tomography combined with computed tomography (PET/CT) and X-rays.

Molecular testing may be performed to check for certain abnormalities. These may include the following:

- Cytogenetics, which is the study of evaluating cells for chromosome abnormalities
- 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, which are increasingly being utilized

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.

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 that make 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 (a protein made by plasma cells) to a level 100 times that of the others

Once your diagnosis is confirmed, you will work with a multidisciplinary team that includes a variety of health care professionals who will be involved in your care.

Because diagnosing and treating multiple myeloma can be challenging, you may want to seek a second opinion or advice from a hematologist or doctor who specializes in treating multiple myeloma. This can happen either before or after diagnosis and even after you begin treatment.

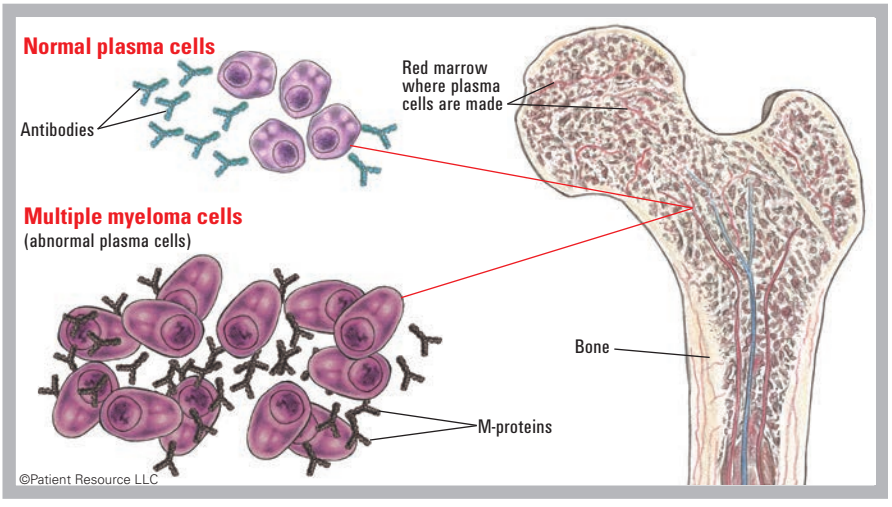
EXPLAINING STAGING

Staging provides your doctor with essential information to understand the extent of the myeloma, determine the best treatment options for you and predict the prognosis (outcome). It can be complex and confusing. Learn all you can about your diagnosis, including your type and stage of multiple myeloma and what your test results and any genetic findings mean.

Two staging systems are used (see Tables 1 and 2, page 3). 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

FIGURE 1

MULTIPLE MYELOMA



may be detected in the myeloma cells. It is commonly used to determine prognosis.

The Durie-Salmon Staging System uses results of blood tests, urine tests and imaging 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, with Stage III representing the largest amount. Once the stage is determined, it is subcategorized to signify the level of kidney damage: "A" indicates little or no change in function, and "B" indicates significant kidney damage.

TREATMENT OPTIONS

The goal of treating multiple myeloma is to reach remission, which means no longer having any signs or symptoms of the disease. Your treatment plan will be based on the stage of the disease and your age, overall health, symptoms, previous treatments and preferences for quality of life.

The treatment strategy you begin with may change. Your doctor will continually monitor your condition and make adjustments for a number of reasons. One or more of the following therapies may be recommended.

Watchful waiting may be a strategy for people with MGUS, smoldering myeloma or 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. You should keep regular checkups because treatment should begin as soon as the disease progresses or you notice symptoms.

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.

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.

Chemotherapy is systemic treatment given to most people with multiple myeloma. It uses drugs to destroy cancer cells by preventing them from growing and dividing. 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. Chemotherapy may also be given in high doses to destroy myeloma cells before a stem cell transplant.

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 infuses healthy blood stem cells into the patient, typically after high-dose chemotherapy, to restore the body's ability to produce enough healthy new blood cells (see page 16). It may be recommended for some multiple myeloma patients.

The type typically used is an autologous transplant. It uses the patient's own stem cells, which are collected, filtered, processed and frozen. High-dose chemotherapy and sometimes full-body radiation therapy (conditioning) are given to destroy cancer cells. Then the reserved stem cells are thawed and infused back into the patient's body.

An allogeneic transplant may be used for patients with a high risk of relapse, those who are not responding fully to other treatments or those who have relapsed disease. It uses stem cells donated by a family member or an unrelated donor identified through a registry.

Targeted therapy drugs are used to slow 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 and include:

- Angiogenesis inhibitors block new blood vessel growth that feeds myeloma cells.
- Histone deacetylase (HDAC) inhibitors affect gene expression inside myeloma cells.
- Immunomodulators may stimulate or slow down the immune system in indirect ways. 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 attach to specific proteins and attack myeloma cells.
- Proteasome inhibitors target enzymes to slow or stop myeloma cell growth and development.
- Selective inhibitors of nuclear export (SINE) enhance the anti-cancer 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 by IV or subcutaneously (by injection under the skin). The following types of immunotherapy are approved:

- Monoclonal antibodies (mAbs), as noted above, are made to target specific antigens — in this case, ones found on myeloma cells. The mAbs can be made to recognize and attach to proteins and

Continued on page 4

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.

other substances on multiple myeloma and other cells or deliver other therapeutic agents to slow their growth and/or kill them. They might also enable your immune system to learn to identify and destroy multiple myeloma cells.
- Chimeric antigen receptor (CAR) T-cell therapy takes a patient's T-cells and modifies them to recognize and kill multiple myeloma cells.

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

Surgery may be used to treat a plasmacytoma (malignant plasma cell tumor) but it 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 it is 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 as well as to 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 medical research studies that may offer access to leading-edge therapies and newer medicines not yet widely available.

Many promising trials are underway, such as those involving chimeric antigen receptor (CAR) T-cell therapies and bispecific T-cell engagers (BiTEs), which enable a cancer-fighting T-cell to bind to a cancer cell and kill it. Research is also investigating a variety of drug combinations and new drugs.

DRUG THERAPIES FOR MULTIPLE MYELOMA

These therapies may be used alone or in combination.

- belantamab mafodotin-blmf (Blenrep)
- bortezomib (Velcade)
- carfilzomib (Kyprolis)
- carmustine (BiCNU)
- ciltacabtagene autoleucel (Carvykti)
- 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 daratumumab and hyaluronidase-fihj (Darzalex Faspro) and dexamethasone
- carfilzomib (Kyprolis) with isatuximab-irfc (Sarclisa) and 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 carfilzomib (Kyprolis) 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

As of 10/7/22

RELAPSED OR REFRACTORY MULTIPLE MYELOMA

Even with complete remission, 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.

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. ■

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	**R**enal (kidney) function	**A**nemia	**B**one lesions
The disease may cause elevated calcium levels in the blood.	Kidney failure may result from damage to the kidneys caused by the multiple myeloma protein.	Low red blood cell counts may be caused by cancer cells slowing the growth of healthy bone marrow cells.	Multiple myeloma cells can cause bone damage (lytic lesions), thinning of the bones (osteoporosis) or a compression fracture of the spine.

When Valarie Traynham was diagnosed with multiple myeloma at 42, she had no idea raising awareness for a disease she had not heard of would become her life's passion. Today, she channels that drive into educating others, leading a myeloma support group and community chapter for African Americans, moderating a myeloma Facebook group, speaking at health fairs and coaching others with this disease.

Inspiring hope became her passion

When I was diagnosed, I didn't know anything about multiple myeloma. I've made it my mission to educate and support others with this disease, so they won't feel alone. I don't want anyone to feel the same way I did.

My experience started innocently as just a nose bleed one night while I was on my computer. It happened again a few more times, but it wasn't something I thought I needed to see a doctor for. I also developed frequent urinary tract infections and other infections around the same time. The final symptom that sent me to the doctor was when I thought I was having a bout with the flu. When it went on for three weeks, I knew it had to be more than the flu.

My primary care doctor ordered blood work, and it showed I had a high protein level. She referred me to a hematologist right away. I wasn't concerned because I'd had anemia before. I met with the hematologist, expecting to receive some iron supplements, but I walked out with a cancer diagnosis. I had never heard of multiple myeloma.

Out of fear, I rushed into treatment. I had one cycle of a combination chemotherapy regimen. My friends encouraged me to get a second opinion because I knew very little about this disease. I am so glad I did, and I realized how important it is to find a specialist. The specialist made me feel at ease from the moment we met because he told me things I needed to know. He explained that he felt a newer regimen with the possibility of doing a stem cell transplant in the future would be a better treatment plan. I started the new therapy and had the transplant a year later.

When I was first diagnosed, doctors said the average life expectancy of someone with multiple myeloma was 3 to 5 years. I was frightened and dismayed. I knew I couldn't go through this alone, so I found a myeloma support group through the International Myeloma Foundation and it felt like home. I also met a 26-year survivor at a patient summit meeting. He was so inspiring and optimistic. He offered so much hope that it changed the course of my life.

Almost a year after joining the group, I was asked to take over the leadership of the support group because the young lady who had been running it had to step down when her myeloma returned. I accepted the position and discovered that patient education was my passion, and it kept my mind off my disease. Helping others brings me so much joy. I enjoy talking about it and removing the stigma from the disease.

My whole journey shifted once I became an advocate for others. In addition to leading the support group, I later became a Myeloma Coach for the HealthTree Foundation, a non-profit organization dedicated to supporting patients with blood cancers. I lead the Black Myeloma Health Chapter within HealthTree. I also volunteer as a Mentor Angel with Imerman Angels, another non-profit organization, and with Cancer Fighters. I moderate a multiple myeloma Facebook group for African Americans. Part of my newfound mission is to help educate the African American community about what this disease is and to provide them with support.

A few years after my diagnosis, a routine mammogram showed I had Stage I breast cancer. I didn't need radiation therapy because there was no lymph node involvement, but I did have a mastectomy and four rounds of chemotherapy. The doctor believes this was a secondary cancer that developed as a result of my multiple myeloma treatment. Today, I am on maintenance therapy for my myeloma and continue to be monitored.

My goal is to prevent others from feeling alone or having no hope like I did when I was first diagnosed. Today, so many more treatments are available to help manage multiple myeloma like a chronic disease. I believe there will be a cure in my lifetime. There is hope! ■

Valarie's Advice

- **Learn how to be your own best advocate. Speak up for yourself. Make your needs known.**
- **Become an educated patient. Knowledge is power.**
- **Know that you are not alone.**
- **Connect with other multiple myeloma patients. Finding that community improves the situation so much.**
- **Join a good support group that will listen to you, answer your questions and be there for you. They aren't all doom and gloom. Find one that is uplifting and hopeful.**

Partner with your doctor to explore all treatment options

Lymphoma is the most common blood cancer in the United States. It develops in the lymphatic system, which is a critical part of the immune system that helps to protect your body from infection and disease. It consists of lymph, lymphoid tissue, lymph nodes and lymph vessels (see Figure 1). The following information will help you learn more about your condition so you can make informed and confident decisions.

These are the components of the lymphatic system:

- Lymph is fluid that carries cells and travels through lymph vessels.
- Lymphoid tissue is mostly made up of white blood cells (lymphocytes).
- Lymph nodes filter substances that travel through the lymphatic fluid.
- Lymph vessels connect hundreds of lymph nodes.

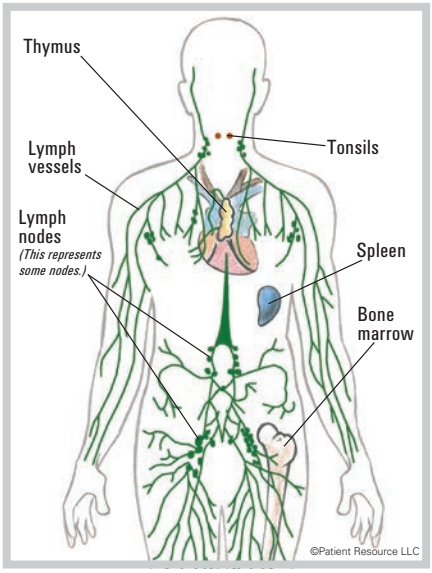
Lymphoma develops when normal lymphocytes (a type of white blood cell) transform into abnormal cancer cells. These cancer cells reproduce uncontrollably and collect in bone marrow, lymph nodes and other parts of the lymphatic system. They begin to outnumber normal cells, which can cause the lymph nodes, spleen or other organs to enlarge.

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

Lymphomas are divided into Hodgkin lymphoma and non-Hodgkin lymphoma (NHL). Both can arise in any lymphoid tissue, including lymphocytes in other organs.

FIGURE 1

POSSIBLE AREAS AFFECTED BY LYMPHOMA



CLASSIFYING AND STAGING LYMPHOMA

The following systems are used to classify and stage lymphoma, and other tools are 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 7). These stages can be divided into two groups: limited stage (Stage I or II) and advanced stage (Stage III or IV). A higher stage number means the cancer is more advanced.

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

- The type of white blood cell where the lymphoma starts
- 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

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

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.

HODGKIN LYMPHOMA

Hodgkin lymphoma is less common than non-Hodgkin lymphoma and frequently 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.

The two main categories of Hodgkin lymphoma are classical Hodgkin lymphoma and nodular lymphocyte-predominant Hodgkin lymphoma.

- **Classical Hodgkin lymphoma,** which is by far the most frequent, 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.

TREATING HODGKIN LYMPHOMA

Many factors are considered when determining the best treatment option for your type, including the stage of the disease, the extent of the lymphoma, the disease subtype, presence of symptoms, and your age, gender and overall health. A variety of options are available.

Chemotherapy is the main treatment for Hodgkin lymphoma. These are drugs that stop the growth of cancer cells. It 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 (first treatment used) 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 (EBRT) 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 are drugs or other substances that interfere with the specific molecules involved in the development of tumor cells. Monoclonal antibodies (mAbs — pronounced "mabs") may be an option for both types of Hodgkin lymphoma. 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, called an antibody drug conjugate, may be used as a first-line treatment of later-stage classical Hodgkin lymphoma along with chemotherapy.

Immunotherapy is drug therapy that helps your immune system identify and destroy lymphoma cells. Immune checkpoint inhibitors are approved to treat some cases of classical Hodgkin lymphoma. Immune checkpoint inhibitors block checkpoints that cancer cells take advantage of to keep from being attacked by the immune system. Those approved are for classical Hodgkin lymphoma that has progressed after previous lines of therapy.

Stem cell transplantation may be used if other treatment options are not effective (see *Stem Cell Transplantation*, page 16). Doctors most often use stem cells from the patient's own body (an autologous stem cell transplant). These are harvested, frozen and returned to the patient after high-dose chemotherapy.

Watchful waiting is an option for people with nodular lymphocyte-predominant Hodgkin lymphoma who do not have symptoms or sometimes for women who are pregnant.

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.

UNDERSTANDING REFRACTORY AND RELAPSED HODGKIN LYMPHOMA

The goal of treatment is remission, which is when you do not have cancer symptoms and your doctor cannot detect any lymphoma in your body. Remission may be temporary or 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.

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

A cancer of the lymph system, non-Hodgkin lymphoma (NHL) most often begins in the lymph nodes, liver, spleen or bone marrow. It can also involve the stomach, intestines, skin, thyroid, brain or any part of the body that contains lymphoid tissue.

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. Not all treatments are effective for all subtypes.

The subtypes also grow and spread at different rates. Slow-growing types are indolent lymphomas. Fast-growing types are aggressive lymphomas. The subtype of NHL affects the outcome.

TREATING NHL

To develop a treatment plan for you, your doctor will consider the stage, type and location of the disease, your age and your general health. You may receive one or more types of treatment. In most cases of B-cell NHL, you will 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 is used to treat 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 are designed to target only cancer cells, causing less harm to normal cells. The types of targeted therapy that may be used include the following:

- Monoclonal antibodies (mAbs — pronounced "mabs") are the primary type of

Continued on page 10

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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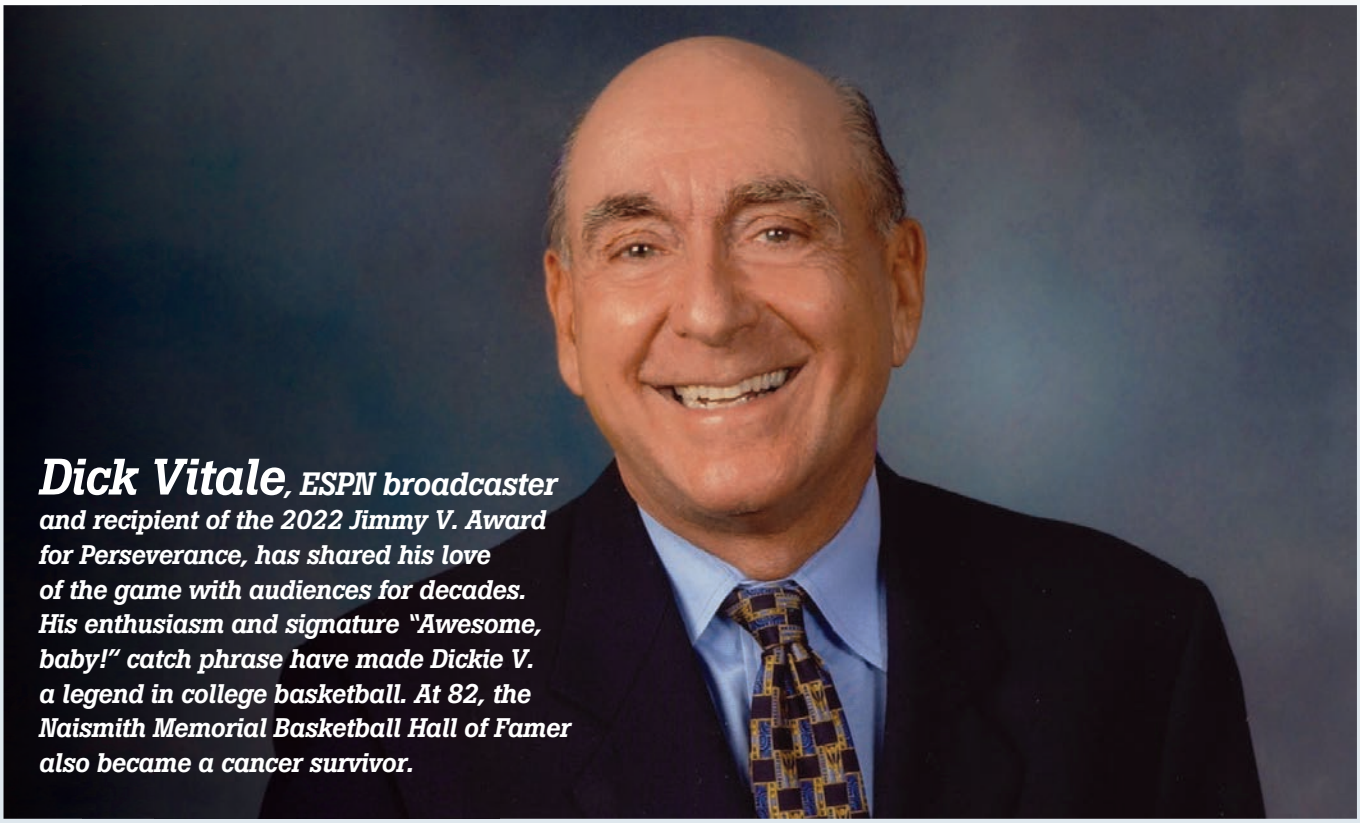


***Dick Vitale**, ESPN broadcaster and recipient of the 2022 Jimmy V. Award for Perseverance, has shared his love of the game with audiences for decades. His enthusiasm and signature "Awesome, baby!" catch phrase have made Dickie V. a legend in college basketball. At 82, the Naismith Memorial Basketball Hall of Famer also became a cancer survivor.*

BEATING CANCER IS AWESOME, BABY!

"For 81 years, I was so healthy. All of a sudden, I'm faced with two cancer diagnoses."

After returning from an idyllic family vacation in Maui to celebrate his 50th wedding anniversary with his wife Lorraine, Dick had his annual dermatology visit.

"My doctor burned a little something off my nose," Dick said, "and that was that until the biopsy he sent off turned out to be melanoma. I had surgery to remove it and then several plastic surgeries to repair the area. After frequent follow-up visits, all was well."

Three months later, after undergoing tests as a result of symptoms he was experiencing, Dick was diagnosed with lymphoma. It was a second cancer, unrelated to the melanoma. His oncology team in Sarasota, Fla., felt the cancer was not only treatable, but curable, with six months of chemotherapy and steroids.

Although for years Dick has supported the V Foundation for Cancer Research, an organization founded by ESPN and the late North Carolina State basketball coach Jim Valvano as he valiantly fought cancer, this experience opened his eyes. He strives to be transparent so people can see what cancer patients really go through.

"The journey to get healthy is a real journey, not just for patients but their loved ones, too. And it's not just the treatment," he emphasized, "it's the blood work and the needles. I was black and blue until I got a port put in for the chemotherapy. Then there are the scans. If the scans are clear, then I'm done. If they aren't, then I go through this all over again. I know whatever the man upstairs wants to happen will happen, so I pray."

He also relies on his family to help him stay calm in the face of that uncertainty.

"Lorraine is the Hall of Famer in our family. She goes to every appointment with me and is always by my side. I also have tremendous support from our daughters, Terri and Sherri, and their families."

Often he has been moved to tears by the beautiful messages, cards and gifts from his family, his ESPN family and the fans.

Fortunately, he only experienced minor side effects from the chemotherapy.

"I had some fatigue and constipation, but I can handle that. I also had a hard time sleeping, but my doctor assured me that is normal."

Following each chemotherapy treatment was an injection of a bone marrow stimulant designed to help his body make more white blood cells and reduce his risk of infection.

"For me, these injections were intense," he said. "I had severe bone pain. Taking acetaminophen with an antihistamine is the only thing that gave me relief."

Friends who'd had chemotherapy offered advice, such as staying active.

"Walking certainly helped," he said, and being physically active pleased his doctor.

Not long after beginning treatment, Dick's battle with lymphoma was compounded by a throat inflammation. He sought the advice of a renowned vocal cord surgeon in Boston who gave Dick strict orders: No talking for three months.

This was heartbreaking for the man known to many as the voice of college basketball.

"It affected my whole career, but I was lucky enough to work with a doctor who had treated some of the most famous voices around – Adele, Cher, Bono. So, I did what I was told. I put my health first."

Though he couldn't be courtside or in front of a microphone for the 2021-2022 college basketball season, he stayed involved via social media, posting daily motivational tips and tweeting predictions and opinions in typical Dickie V. fashion. Even without hearing that unmistakable voice, his followers felt his passion.

The diagnosis was dysplasia, a condition causing ulcerated lesions on Dick's vocal cords. Though it was pre-cancerous, it was not related to the lymphoma diagnosis.

Even in the face of cancer and his other health issues, Dick is forever an optimist. He credits his endless supply of infectious positivity to his parents.

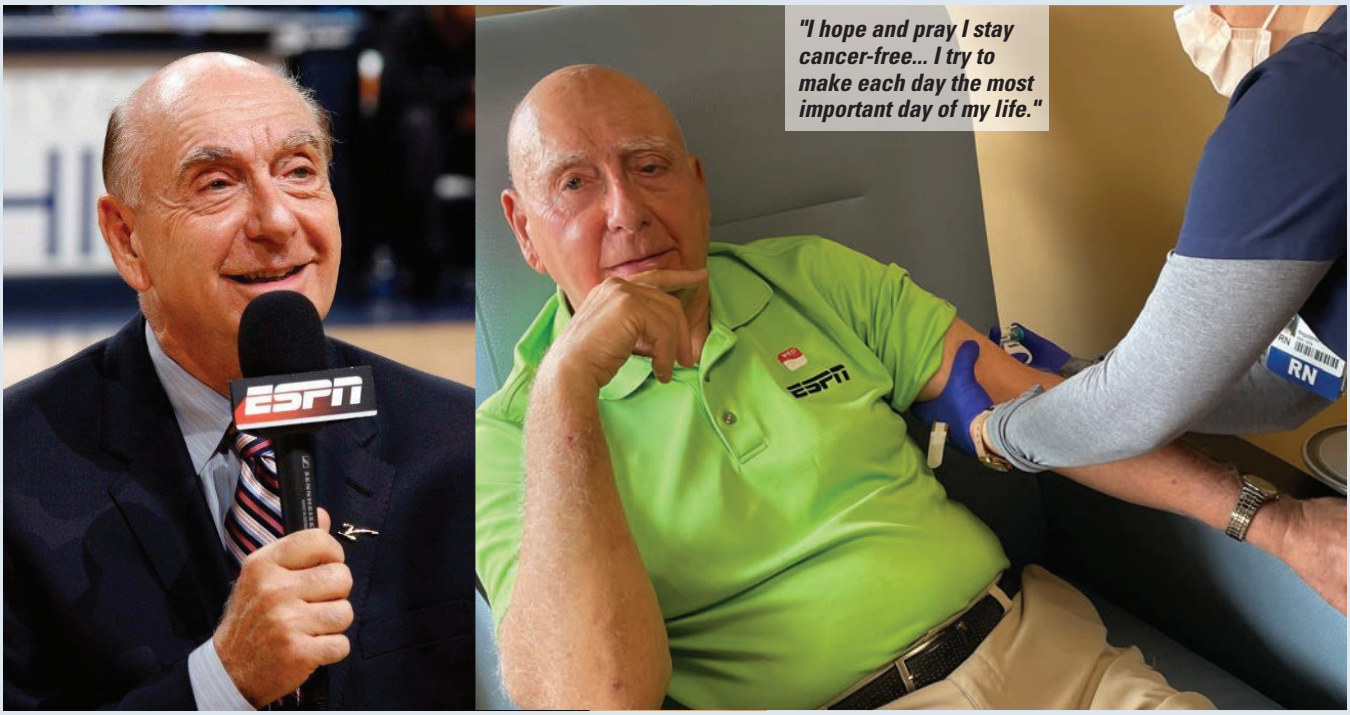
"When I was four years old, I lost an eye in an accident with a pencil. I thought it was the end of the world, but I received so much love from my mom and dad that I soon realized it wasn't. They used to tell me, "Richie, don't ever believe in 'can't.'"

Dick's parents also told him that if he gave 110 percent all the time, beautiful things would happen. He's taken that approach with his family and his career, as well as in his quest to defeat cancer.

"My doctors tell me I'm in total remission. I was so proud to ring the bell when I finished my last chemotherapy treatment. I hope and pray I stay cancer-free. I live each day. I treat others as I'd like to be treated, and I try to make each day the most important day of my life."

As he looks toward the future, Dick continues enjoying his family, his career and his commitment to eradicating cancer. He is devoted to raising money for pediatric cancer research through the Dick Vitale Fund for Pediatric Cancer.

"Every year, Lorraine and I host the Dick Vitale Gala. We showcase Dickie V's All-Courageous Kids, a group of kids with incredible stories who are fighting cancer, along with some outstanding individuals in the community who support cancer research. Our most recent goal was to raise $7 million in one evening. We exceeded it, bringing the total we've raised to more than $50 million. We hope that number continues to rise through more donations at v.org/vitale and DickVitale.com." ■



"I hope and pray I stay cancer-free... I try to make each day the most important day of my life."

targeted therapy used for NHL. The FDA has approved a type of mAb that carries a toxin to the cancer (called an antibody drug conjugate) 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 (BTK) 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 it 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:
- 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. A type of mAb uses antibodies to deliver radiation to the cancer cells.
- Immune checkpoint inhibitors block checkpoints that cancer cells take advantage of to keep from being attacked by the immune system.

DRUG THERAPIES FOR HODGKIN LYMPHOMA

These therapies may be used alone or in combination. For some possible combination therapies, see PatientResource.com/Lymphoma_Hodgkin_Lymphoma

- 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)

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- Chimeric antigen receptor (CAR) T-cell therapy takes a patient's T-cells and changes them so they recognize and kill lymphoma cells. Doctors may use CAR T-cell therapy after two other types of treatment have failed. It may be used for certain NHL diagnoses. This new treatment is one of the first options that can be personalized.

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. Your doctor may suggest it for certain subtypes of NHL. The goal is to create healthy bone marrow.

If it is a potential part of your treatment plan, learn as much as you can about the risks and benefits from a specialist at an experienced transplant center (see *Stem Cell Transplantation*, page 16). 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) lymphoma. 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 is not a standard treatment for most lymphomas. It may be needed if bacteria have caused the lymphoma. This may apply to some patients with MALT lymphoma.

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 exploring new treatment options and combinations for NHL. Trials may offer access to new therapies that are not yet approved. Talk with your doctor about whether you are a good candidate for a trial, especially if you have a recurrent, refractory, rare or aggressive type of NHL.

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

DRUG THERAPIES FOR NON-HODGKIN LYMPHOMA

These therapies may be used alone or in combination. For some possible combination therapies, go to PatientResource.com/Lymphoma_NonHodgkin_Lymphoma

- 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)
- 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)
- selinexor (Xpovio)
- tazemetostat (Tazverik)
- tisagenlecleucel (Kymriah)
- venetoclax (Venclexta)
- vinblastine (Velban)
- vincristine (Oncovin)
- zanubrutinib (Brukinsa)

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RECURRENT AND REFRACTORY NHL

Throughout treatment, the goal will be for you to reach remission. This occurs when you do not have cancer symptoms and your doctor cannot detect any lymphoma in your body. Remission may be temporary or 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.

NHL is considered recurrent when your lymphoma returns after a period of remission.

Consider getting a second opinion. Your oncologist should be both pleased to and capable of helping you arrange for a second opinion. This is part of a physician's obligation to you and a request that physicians commonly receive. ■

Learning the specifics of your diagnosis is essential

Leukemia is a form of blood cancer that starts in the blood and bone marrow and occurs when white blood cells transform into leukemia cells and grow uncontrollably. It is categorized into four major types based on how fast it progresses and the type of white blood cell it affects. This differentiation is critical because it helps your doctor understand how your disease may behave and identify the treatments that will be most effective. If you are unsure about the details of your diagnosis, ask your doctor to explain.

ABOUT LEUKEMIA

Although it occurs mostly in adults who are 55 and older, leukemia can affect any age group and is the most common cancer affecting children and young teens.

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. However, large numbers of the leukemic cells accumulate in the bone marrow and/or the blood and may slow down or prevent normal body functions, including the bone marrow's normal production of healthy blood cells (see Figure 1). People with leukemia often have low numbers of healthy white blood cells, red blood cells and platelets, increasing the risk for infection, anemia and bleeding.

Leukemia is characterized as acute or chronic and lymphocytic or myeloid, with four major types: acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML).

Acute leukemia cells look similar to healthy immature white blood cells and are also called "blasts." The number of blasts increases rapidly, preventing the bone marrow from making normal blood cells. Consult a leukemia expert and begin treatment as soon as possible because these fast-growing cells can quickly become life-threatening.

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

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.

DIAGNOSTIC TESTS

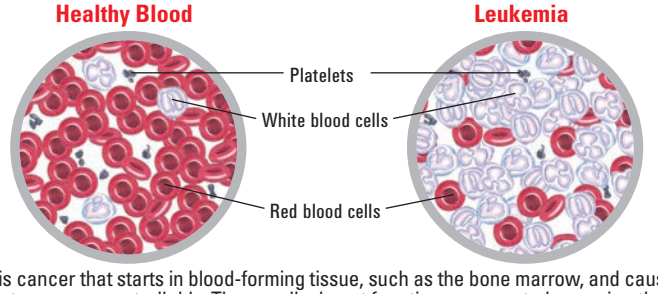
One or more of the following tests will be used to determine your form of leukemia:

- Physical examination
- Blood tests, including a complete blood count and a peripheral blood smear
- Bone marrow aspiration and biopsy (often done at the same time)
- Lumbar puncture (spinal tap) in some cases
- Specialized tests, such as flow cytometry, cytogenetics and fluorescence in situ hybridization (FISH) and molecular profiling, help to classify the subtype and often to select treatment
- Imaging tests (CT, PET, MRI and X-rays) to help determine the extent of disease outside the bone marrow

Following are descriptions of ALL, AML and CML and the approved treatment options for each. Turn over this guide for detailed information about CLL. As you discuss your treatment plan with your doctor, you may consider a clinical trial. It may be a first-line treatment (meaning the first treatment given) or one to consider at another time.

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.

ACUTE LYMPHOCYTIC LEUKEMIA

Acute lymphocytic leukemia (ALL) starts in the cells that are destined to 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 bone marrow and blood to other parts and be life-threatening. ALL is also called acute lymphoblastic leukemia.

CLASSIFYING ALL

Your doctor may use the World Health Organization (WHO) classification system, which considers the results of morph-ology (shape and size of the cancer cells), flow cytometry (the process of identifying markers/proteins on or in 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 information about genes and, in turn, the subtype of ALL.

Your doctor will also consider the type of lymphocyte (B-cell or T-cell, which are the two main types of lymphocyte) from which the leukemia develops, and how mature the 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)

Continued on page 12

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 the *BCR* and *ABL* genes, which produce the *BCR-ABL* protein. It helps B-ALL cells grow and multiply at a much faster rate than normal white blood cells. Identifying the Philadelphia chromosome, or the *BCR-ABL1* gene fusion, is critical as some treatments are more likely to be effective against them.

TREATING ALL

Because ALL progresses quickly, consulting with a leukemia expert physician is recommended right away because treatment should begin soon after diagnosis. The following treatments may be used alone or in combination.

Chemotherapy, given in three phases for approximately three years, is typically the main treatment for ALL. The induction phase is designed to eliminate as many ALL cells as possible. The goal of the consolidation phase is 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 helps destroy the leukemia cells and reduces 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. 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 for 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.
- Monoclonal antibodies (mAbs), which are artificial antibodies (proteins) designed to attack specific targets such as proteins found on cancer cells.

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 16).

DRUG THERAPIES FOR ALL

These therapies may be used alone or in combination.

- asparaginase (Elspar)
- 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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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 given to the brain or spinal cord, it is known as central nervous system (CNS) sanctuary therapy or CNS prophylaxis. The goal is to help reach leukemia cells that may be hiding in areas that are typically hard for chemotherapy to reach.

REFRACTORY OR RECURRENT ALL

Treatment may not always result in complete remission. This is known as refractory ALL. If it returns after going into remission, it is considered recurrent or relapsed. Your doctor will re-evaluate your diagnosis and may choose a different therapy including a clinical trial.

ACUTE MYELOID LEUKEMIA

AML is a relatively rare type of leukemia that 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 grow uncontrollably, creating an excess of abnormal myeloid cells that are also called blasts. They 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.

AML is sometimes referred to as acute myeloid, myelocytic or myeloblastic leukemia.

DIAGNOSING AML

Your doctor will order tests to diagnose your condition and recommend the best treatment plan for you. You may have blood tests, bone marrow aspiration and biopsy, a lumbar puncture and/or imaging tests. Specialized tests, such as flow cytometry, fluorescence in situ hybridization (FISH), reverse transcription-polymerase chain reaction (RT-PCR) and next-generation sequencing (NSG) will likely be used to identify the proteins, chromosomes, genes and other factors involved as well as determine the subtype of AML and often select treatment.

AML is classified by the cytogenetic (chromosome) and gene changes found in the leukemia cells. Your doctor will also refer to the World Health Organization (WHO) classification system. It classifies AML into subtypes based on the appearance of the leukemia cells and the presence or absence of certain chromosome abnormalities and/or molecular (gene) mutations in the leukemia cells (see Table 1, page 13). This distinction is important because each subtype has specific symptoms and can behave differently after treatment.

These abnormalities can be numerical or structural. A numerical abnormality occurs when more or fewer chromosomes are in the cells than is normal. For example, instead of 46 chromosomes in each cell of the body, there may be 45 or fewer or 47 or more chromosomes. A structural abnormality means the chromosome's structure has been altered, such as part of a chromosome being missing, deleted or attached in the wrong place.

Possible molecular (genetic) changes (also called mutations) linked to AML include *ASXL1, CEBP alpha, FLT3, IDH1, IDH2, NPM1, RUNX1* and *TP53* among others. Some targeted therapies are approved to treat AML with certain genetic mutations. Not all genetic mutations are always present during diagnostic testing, so your doctor will likely retest if the disease relapses (returns) to determine their presence and select treatment accordingly.

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.

PHASES OF TREATMENT

Advances in AML treatment are leading to an improved quality of life and longer survival times. Many of these treatments target the unique chromosome and gene abnormalities found in AML. After you learn your subtype, ask your doctor about available treatment options.

Though every diagnosis is unique, AML treatment generally begins quickly with two phases of chemotherapy: remission induction therapy and post-remission therapy.

The goal of remission induction therapy 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 after specialized testing, the elimination of leukemia cells in blood and bone marrow samples that are examined under a microscope, and no signs or symptoms of the disease.

Post-remission therapy, also called consolidation therapy, is then started to kill any remaining leukemia cells that could cause a relapse. This often involves stem cell transplantation.

Maintenance therapy may be used in certain situations for patients who achieve complete remission after intensive induction therapy.

After examining additional test results, your doctor will consider them along with your age, general health, ability to manage certain therapies and your preferences for daily living. The following options, used alone or in combination, may then become part of your treatment plan.

Chemotherapy is systemic therapy that kills cancer cells as well as some healthy cells. It may be used alone as post-remission therapy or be followed by stem cell transplantation. Several factors contribute to the choice of chemotherapy drug that will be most effective for you, including your age (whether you are younger or older than 60), risk factors, prognosis (predicted outcome after treatment) and the presence of predictive markers that may indicate a response to molecular-targeting drugs. When AML has spread to the brain and spinal cord, intrathecal chemotherapy may be injected into the fluid-filled space between the thin layers of tissue that cover the brain and the spinal cord.

Stem cell transplantation may be curative (see *Stem Cell Transplantation*, page 16). Its use is based on the AML subtype and whether the AML relapsed after being treated with chemotherapy alone or in combination with molecular-targeted therapies. An allogeneic transplant is most commonly used for AML. It involves stem cells donated by a family member or an unrelated donor. To reduce the risk of Graft-versus-Host Disease (GvHD), a serious condition in which transplanted donor immune cells attack one of the patient's organs (e.g., gut, liver, skin), it is important that the patient's and donor's tissues match as closely as possible.

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 or reduced-intensity conditioning treatments. The graft-versus-leukemia effect can be key to a successful outcome.

Targeted therapy uses drugs or other substances to identify and attack specific cancer cells. Targets include gene mutations, chromosome alterations and proteins on the cell surface. Unlike chemotherapy, which attacks healthy cells as well as cancer cells, 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 targeted therapies are approved to treat the *CD33* protein and the *FLT3* (pronounced "flit-three"), *IDH1* and *IDH2* gene mutations.

Radiation therapy uses high-energy radiation to destroy cancer cells. 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. Some people with localized disease (disease in a specific area of the body) or bone pain that does not lessen with chemotherapy may receive radiation therapy to specific parts of the body. Total body irradiation may be given before stem cell transplantation to make space to allow for the new cells (graft) to replace the diseased blood system and to suppress the host's immune system.

Leukapheresis may be used temporarily to help immediately lower white blood cell counts when leukostasis occurs. Leukostasis is a very high number of leukemia cells present in the blood that can cause problems with normal blood circulation. During leukapheresis, blood is removed to collect leukemia cells and then the remaining blood is returned to the body.

Growth factors are sometimes given to in-

Continued on page 14

TABLE 1

WHO CLASSIFICATION SYSTEM (AML)

AML with recurrent genetic abnormalities

Subtypes:

- Acute promyelocytic leukemia with *PML::RARA* fusion
- Acute myeloid leukemia with *RUNX1::RUNX1T1* fusion
- Acute myeloid leukemia with *CBFB::MYH11* fusion
- Acute myeloid leukemia with *DEK::NUP214* fusion
- Acute myeloid leukemia with *RBM15::MRTFA* fusion
- Acute myeloid leukemia with *BCR::ABL1* fusion
- Acute myeloid leukemia with *KMT2A* rearrangement
- Acute myeloid leukemia with *MECOM* rearrangement
- Acute myeloid leukemia with *NUP98* rearrangement
- Acute myeloid leukemia with *NPM1* mutation
- Acute myeloid leukemia with *CEBPA* mutation
- Acute myeloid leukemia with other defined genetic alterations

AML with myelodysplasia-related changes

Therapy-related myeloid neoplasms

AML not otherwise specified
(includes cases that do not fall into any other group; similar to the FAB classification system)

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.

DRUG THERAPIES FOR AML

These therapies may be used alone or in combination.

- azacitidine (oral) (Onureg)
- azacitidine (Vidaza)
- cytarabine
- daunorubicin hydrochloride
- daunorubicin/cytarabine liposomal (Vyxeos)
- decitabine (Dacogen)
- doxorubicin hydrochloride (Adriamycin)
- enasidenib (Idhifa)
- etoposide phosphate (Etopophos)
- gemtuzumab ozogamicin (Mylotarg)
- gilteritinib (Xospata)
- glasdegib (Daurismo)
- idarubicin (Idamycin, Idamycin PFS)
- ivosidenib (Tibsovo)
- midostaurin (Rydapt)
- venetoclax (Venclexta)

As of 10/7/22

crease the number of white blood cells that is otherwise decreased by treatment, which can increase the risk of infection. Growth factors may be given before stem cells are collected or after chemotherapy once remission is reached.

REFRACTORY AND RELAPSED AML

AML can become resistant at the beginning of treatment or later in the treatment process. This is called refractory AML. When AML returns, it is called relapsed AML. In these cases, your doctor may perform new tests and recommend a new treatment plan or a clinical trial.

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.

An abnormal chromosome called the Philadelphia chromosome is commonly found in the blood or bone marrow of most people who have CML. It results from an abnormal fusion of two genes, *BCR* and *ABL*, which then produces the leukemic *BCR-ABL* protein. Testing for the Philadelphia chromosome, or the *BCR-ABL1* gene fusion, is important as some treatments are likely to be more effective.

CLASSIFYING CML

Your doctor will look for leukemic cells, chromosome abnormalities (which may indicate the Philadelphia chromosome), molecular markers and an enlarged spleen. Tests may include a complete blood count (CBC) with differential; blood chemistry study; bone marrow aspiration and biopsy; cytogenetic analysis; and molecular tests, including karyotyping, fluorescence in situ hybridization (FISH) and polymerase chain reaction (PCR). Imaging tests, including computed tomography (CT), magnetic resonance imaging (MRI) and ultrasound, are also used.

The World Health Organization (WHO) classification system is used to classify CML into chronic phase, accelerated phase and blast crisis phase (see Table 2). 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 and gene mutations 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.

The classification, along with the diagnostic testing results, helps doctors determine the best treatment and prognosis (predicted outcome after treatment).

TABLE 2

WHO CLASSIFICATION SYSTEM (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 and is almost always given orally (in pill form). At this stage, some patients can receive targeted therapy and remain in remission for many years. The more advanced stages of CML will usually respond temporarily but quickly require additional treatment.

Tyrosine kinase inhibitor (TKI) therapy is standard for the chronic phase. The *BCR-ABL1* gene is a tyrosine kinase protein that helps CML cells grow, and it can be blocked by a TKI. Resistance to this type of targeted therapy can develop. In that case, 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, a trial period off of the TKI targeted therapy may be possible. This requires very close blood monitoring to look for signs of relapse of the leukemia.

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

DRUG THERAPIES FOR CML

These therapies may be used alone or in combination.

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

As of 10/7/22

Stem cell transplantation in the form of an allogeneic stem cell transplant may be an option (see *Stem Cell Transplantation*, page 16). In some situations, 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 and 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 but may be an option in certain situations.

RELAPSED OR RESISTANT CML

Remission occurs when leukemia is not detected in the body and there are no symptoms. It may be temporary or permanent. CML that returns is called relapsed CML. Sometimes, the leukemia does not respond to treatment or stops responding. This is called resistant (or refractory) CML. ■

Garrison Wollam is a husband, father, author and third grade teacher who is managing acute lymphoblastic leukemia (ALL). After intense treatments and maintenance therapy, he is thankful for his positive prognosis and focuses on giving back.

Having purpose and finding focus can guide you through

Acute lymphoblastic leukemia affects kids more than adults, so it seems fitting that I'd have that type of cancer. I'm basically a big kid. I goof around and can be myself with the eight- and nine-year olds I teach. That's how I've made it through a cancer diagnosis and treatment. That, along with my wife Chrissy, an amazing support system and enough chemotherapy to take down an elephant.

By the time I was diagnosed, I hadn't felt well for a while. I was extremely tired and had swollen lymph nodes. It was even hard to breathe. After three visits in one month to my general practitioner, inconsistencies were found in my blood work. I was referred to a hematologist who, after running more tests, called me at home one evening.

The phrase "you need to sit down for this" is no exaggeration. When he said I had either acute lymphoma or acute leukemia and needed to get to a nearby cancer center that evening, I felt weak. I called my parents to stay with our kids and my school to let them know I'd need a substitute for the next day, and Chrissy and I drove an hour to the cancer center.

Five days later, I learned I had ALL. From the beginning, my prognosis was good because I had certain factors on my side. I was young – 37 – and relatively healthy. I was at a very good cancer center, and I had a positive attitude.

I didn't know much about ALL, and I made the mistake of looking it up online. Don't ever do that. Ask your doctor or nurse for legit resources.

It's difficult to bring your kids into a big hospital that says "cancer" on the side without telling them something. Our seven-year-old daughter immediately looked at my wife and asked, "Is Daddy going to die?" It was heartbreaking. We told her I wasn't, of course, but we didn't know. That's when we decided we wouldn't give them the exact diagnosis. Our nine-year-old son was pretty savvy. We didn't want him researching it on his own.

Treatment began the day I was diagnosed. I had a port placed. I call it my alien button because that's what it looks like. Induction chemotherapy kept me in the hospital for about a month. Apparently, ALL likes to hide in the spinal fluid, so lumbar injections and radiation therapy to my head were also included.

I continued the chemotherapy regimen after coming home. Not teaching and not being around people made me feel as if I were losing purpose, but my kids motivated me to stay positive. Every morning, I helped Chrissy make their lunches and get them off to school.

I also took the opportunity to cross something off my bucket list. I'd always wanted to write children's books. My main character, Buster Sluggless, had been floating around in my head for years. Suddenly, everything that prevented me from writing before vanished. So far, Buster Sluggless has had two adventures. I've also published a children's poetry book, *Boogers, Bugs and Hugs from Slugs* and *Daddy's Orange Bracelet*, a book about my cancer from my daughter's perspective. It's heavy, and not for everyone, but hopefully helpful to the small audience that needs it. Our son illustrated it, which makes it even more special.

I went into remission fairly quickly. I'm still on maintenance therapy. It's a clinical trial that tests the regimen usually used on kids but in an adult dose. So far, my numbers are where they should be.

In some ways, I think this was harder on Chrissy than on me. She's also an elementary school teacher, and she had to continue working, taking care of the kids, running the house, visiting me in the hospital and then taking care of me once I came home. I would have missed appointments and medications if she hadn't managed everything. She is incredible.

Chrissy and I often said, "Cancer is dumb. So dumb. It's the dumbest." Those simple phrases just seemed to capture the whole terrible situation and wearing an "F cancer" shirt didn't fit with my life as an elementary school teacher or parent. So, I trademarked the phrase "Cancer is dumb" and put it on T-shirts. I sell them at Cancerisdumb91.com and out of our home, and we donate 20 percent of the proceeds to St. Jude Children's Research Hospital. I've always been a supporter, but now that I've experienced cancer treatment, I can't imagine a child having to go through what I have. To help my students understand the benefits of giving back, we call St. Jude's from the classroom when I make my monthly donations.

Cancer has given me a new perspective. I found there is more good out there than we sometimes see. People are far more compassionate and generous than I ever gave them credit for. While I was in the hospital, my bank account, car, house and sports memorabilia collection didn't visit me once, but my family and friends did. That meant so much. It's the best thing you can do for someone who is sick. ■

When replacing stem cells is your best option

A stem cell transplant is a procedure in which a person receives healthy stem cells (blood-forming cells) to replace their own stem cells that were destroyed by treatment with radiation or chemotherapy. The goal is to create a new immune system by helping restore the body's ability to produce blood cells.

The soft, spongy tissue inside your bones that is bone marrow produces blood-forming (hematopoietic) stem cells. They make billions of 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 obtained from inside bones. The hip (pelvic) bones have the most marrow, so doctors commonly access bone marrow through the hip.
- A **peripheral blood stem cell transplant** (PBSCT) uses stem cells obtained from the bloodstream.
- A **cord blood transplant** uses stem cells in blood vessels of a discarded placenta or newborn's umbilical cord.

Your doctor may recommend an autologous or allogeneic transplant.

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

An **allogeneic ("allo") transplant** 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. 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, gastrointestinal tract and other organs.

Organizations such as Be The Match (operated by the National Marrow Donor Program) have created registries of millions of potential donors (www.bethematch.com).

THE TRANSPLANT PROCESS

Stem cell transplants generally occur as follows:

1. **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 might receive high-dose chemotherapy or full-body radiation therapy to destroy the cancer cells. You might be given a reduced-intensity conditioning treatment that uses milder does of chemotherapy and radiation therapy. The potential success of this approach depends entirely on the anti-cancer effect of the new immune system transplanted into the patient.
3. **Transfusion.** A doctor infuses the harvested stem cells into your body through a vein.
4. **Recovery and engraftment.** Within about 2 to 4 weeks, 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 antiviral and antibacterial medications as well as repeat inoculations with childhood vaccines. The number of red blood cells, white blood cells and platelets will continue to be monitored until they are back to safe levels. Allogeneic transplant recipients also remain at risk for chronic GvHD and may require lifelong treatment for this condition.

SUPPORT IS KEY

It is important to arrange the help of a caregiver pre-transplant. If a loved one or friend is not available, consider hiring a temporary caregiver to help with these and other tasks:

- Deep clean the home before you return.
- Keep your home safe to help protect you from infection.
- Schedule and take you for appointments and immunizations.
- Ensure you stay on schedule with your medications.
- Care for your dressings or central venous catheter, and deliver medicines through the catheter, if applicable.
- Check for signs of infection or other problems.
- Make healthy meals and encourage you to eat well.
- Report changes to your medical team. ■

Graft-versus-Host Disease

Graft-versus-Host Disease (GvHD) is a condition that occurs when graft immune cells from a donor recognize the patient's own healthy cells, also called host cells, as foreign and attack them. It is common for patients receiving an allogeneic stem cell transplant as part of cancer treatment to develop at least a mild case of GvHD.

GvHD can be mild, moderate or severe. On average, chronic GvHD occurs about six months after a stem cell transplant. If it emerges within 100 days of the transplant, it is classified as acute.

Your doctor can take steps to minimize the risk of GvHD. This includes careful selection of a donor, as well as a thorough examination of the donor's tissues. Your doctor may prescribe certain drugs designed to suppress the donor's immune cells, causing them to have less of a chance to attack host cells.

If you experience any of these symptoms following transplantation, alert a member of your medical team right away:

- **Pain in the abdominal area, abdominal swelling or diarrhea**
- **Rashes, raised or discolored skin, skin thickening or tightening**
- **Yellow skin or eyes, dry eyes**
- **Taste changes or loss of appetite**
- **Frequent infections, unintentional weight loss**
- **Indigestion, abnormal gas or bloating**

Supportive care focuses on your overall well-being

Your multidisciplinary health care team is equipped to help you manage all aspects of your life affected by cancer. Supportive care consists of a range of services designed to help navigate a cancer diagnosis and treatment. These may also be referred to as palliative care or comfort care and symptom management.

Many people use supportive care to manage physical side effects, but it can also be used to help you manage the emotional, practical, spiritual, financial and family-related challenges associated with cancer.

Ask your team how to take advantage of the supportive care services available to you.

POTENTIALLY SEVERE SIDE EFFECTS

Serious side effects can occur with certain treatments. Ask your doctor whether you are at risk for them 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 promptly.

- **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; 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. Prompt treatment can be life-saving.
- **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. These reactions are most likely to occur with antibody treatments.
- **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.

COMMON SIDE EFFECTS

Most cancer treatments result in side effects (Table 1). Let your health care team know as soon as symptoms begin. The sooner they are addressed, the more comfortable you will be. ■

TABLE 1

SOME COMMON SIDE EFFECTS

Side Effects	Symptoms
Anemia	Abnormally low red blood cell count
Bruising and bleeding	May be caused by thrombocytopenia, a lower-than-normal number of platelets in the blood
Bone loss	Weakened bone caused by the cancer or treatment
Breathing difficulty	Shortness of breath, with or without coughing; upper respiratory infection
Chemo brain (cognitive dysfunction)	Brain fog, confusion and/or memory problems
Constipation	Difficulty passing stools or less frequent bowel movements compared to 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
Fever	Raised body temperature that could signal an infection
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	The feeling of needing to throw up and/or throwing up
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	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

Bone marrow transplant centers

Disclaimer: A comprehensive list of bone marrow transplant centers in the U.S. can be found on pages 18-23 and is current as of August 12, 2022. 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. 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 – UAB Bone Marrow Transplant Program; 205-934-1911; www.bonemarrow.uab.edu A

ARIZONA

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

Goodyear – CTCA Phoenix; 623-745-9632; www.cancercenter.com/phoenix A

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

Phoenix – Phoenix Children's Hospital Ottosen Family Blood and Marrow Transplant Program; 602-933-0920; phoenixchildrens.org P

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

Tucson – Banner Diamond Children's Medical Center; 520-694-5437; www.bannerhealth.com/locations/tucson/diamond-childrens-medical-center P

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

ARKANSAS

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

Little Rock – UAMS Cancer Institute; 501-296-1200; cancer.uams.edu/stem-cell-transplant A

CALIFORNIA

Berkeley – Alta Bates Summit Medical Center; 510-204-4444; sutterhealth.org A

Duarte – City of Hope Comprehensive Cancer Center; 800-826-4673; cityofhope.org/hct A P

La Jolla – Scripps Health Blood and Marrow Transplant Program; 858-554-8414; scripps.org A

La Jolla – UC San Diego Moores Cancer Center; 858-822-6600; moorescancercenter.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: Quality Accredited Cancer Program by the American College of Surgeons (ACS) Commission. Designated a High Performing Site (HPS) by the National Cancer Institute because of significant accrual of NCI cancer trials.
Cancer Specialties/Special Services: As the only 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 – Cedars Sinai Blood & Marrow Transplant Program; 310-423-1160; www.cedars-sinai.org A

Los Angeles – Children's Hospital Los Angeles Cancer and Blood Disease Institute; 323-361-4100; chla.org/bmt P

Los Angeles – UCLA Jonsson Comprehensive Cancer Center; 310-206-6909; www.uclahealth.org/transplants/bmt A P

Los Angeles – UCLA Mattel Children's Hospital; 310-825-6708; www.uclahealth.org/mattel P

Los Angeles – USC Norris Comprehensive Cancer Center; 800-872-2273; www.keckmedicine.org/treatments/stem-cell-transplantation A

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 – Hyundai Cancer Institute BMT Program at CHOC Children's Hospital; 714-509-8636; choc.org/cancer P (See our ad top right)

Orange – UCI Health Chao Family Comprehensive Cancer Center; 714-456-8000; www.ucihealth.org A

Palo Alto – Lucile Packard Children's Hospital Stanford; 650-910-7413; stanfordchildrens.org P

Palo Alto – Stanford Bone Marrow Transplant & Cellular Therapy Program; 650-498-6000; stanfordhealthcare.org A

Sacramento – Sutter Cancer Center; 916-453-3300; sutterhealth.org A P

Sacramento – UC Davis Comprehensive Cancer Center; 800-770-9261; health.ucdavis.edu/cancer A

San Bernardino – Loma Linda University Children's Hospital; 909-651-1939; lluh.org P (See our ad above)

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 Diego – Scripps Health Blood and Marrow Transplant Program; 858-554-8414; scripps.org A

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

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

COLORADO

Aurora – Children's Hospital Colorado; 720-777-1234; www.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 – UCHealth Cancer Care; 720-848-0300; uchealth.org/services/cancer-care A

Denver – Colorado Blood Cancer Institute at Presbyterian/St. Luke's Medical Center; 720-754-4800; bloodcancerinstitute.com A

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

Fort Collins – UCHealth Cancer Care and Hematology Clinic; 970-493-6337; uchealth.org/services/cancer-care A

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

New Haven – Smilow Cancer Hospital for Pediatric Hematology and Oncology; 203-785-4081; ynhh.org/smilow P

DELAWARE

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

Wilmington – Nemours Children's Hospital Blood and Bone Marrow Transplant Program; 800-416-4441; nemours.org P

DISTRICT OF COLUMBIA

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

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

Washington – MedStar Georgetown University Hospital; 240-290-5814; www.medstarhealth.org A

FLORIDA

Doral – Sylvester Comprehensive Cancer Center; 844-324-4673; sylvester.org A

Gainesville – UF Health Bone Marrow Transplant; 352-733-0972; ufhealth.org/bone-marrow-transplant A

Gainesville – UF Health Pediatric Blood & Marrow Transplantation Program – Shands Hospital; 352-273-9120; ufhealth.org/bone-marrow-transplant P

Hollywood – Memorial Cancer Institute; 954-265-4325; mhs.net/moffitt A (See our ad below)

Hollywood – Sylvester Comprehensive Cancer Center; 844-324-4673; sylvester.org A

Jacksonville – Baptist MD Anderson Cancer Center; 844-632-2278; www.baptistmdanderson.com A

Jacksonville – Blood and Marrow Transplantation Center at Wolfson Children's Hospital/Nemours Children's Health; 904-697-3600; wolfsonchildrens.com P

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

Miami – Holtz Children's Hospital; 305-585-5437; 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

Orlando – AdventHealth Cancer Institute; 407-303-2070; www.adventhealthcancerinstitute.com A

Orlando – AdventHealth for Children; 407-303-1300; www.adventhealth.com/hospital/adventhealth-children P

Orlando – Orlando Health Cancer Institute; 321-841-1893; 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: The Joint Commission, American College of Surgeons Commission on Cancer, Florida Cancer Center of Excellence, FACT-accredited Blood Marrow/ Stem Cell Transplant and Cellular Therapy, NMDP Transplant Center
Cancer Specialties/Special Services: Moffitt Malignant Hematology & Cellular Therapy at Memorial Healthcare System is a clinical partnership delivering highly specialized advanced treatments for blood cancers, including leukemia, lymphoma, multiple myeloma, myelodysplastic syndromes (MDS) and malignant anemias. The combined strength with Memorial Cancer Institute provides state-of-the-art care and innovative research with expert hematologists and a comprehensive stem cell transplant, CAR T and cellular therapies program. A Adult BMT Center

St. Petersburg – Johns Hopkins All Children's Hospital; 727-767-4176; hopkinsallchildrens.org P

Tampa – Johns Hopkins All Children's Outpatient Care; 727-767-4176; hopkinsallchildrens.org P

Tampa – Moffitt Cancer Center; 888-663-3488; moffitt.org A (See our ad above)

GEORGIA

Atlanta – Children's Healthcare of Atlanta; 404-785-1112; choa.org/cancer P

Atlanta – Emory Winship Bone Marrow and Stem Cell Transplant Center; 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

HAWAII

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

IDAHO

Boise – St. Luke's Cancer Institute Center for Blood Cancer Therapy; 208-381-2711; stlukesonline.org A

Boise – St. Luke's Children's Cancer Institute; 208-381-2782; stlukesonline.org P

ILLINOIS

Chicago – Ann & Robert H. Lurie Children's Hospital of Chicago; 800-543-7362; www.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/comer P

Lisle – Rush Hematology, Oncology and Cell Therapy; 312-226-2371; rush.edu/services/cancer-center A

Maywood – Loyola University Medical Center; 888-584-7888; loyolamedicine.org/cancer A P

Melrose Park – Loyola Cancer Care & Research at the Marjorie G. Weinberg Cancer Center; 708-327-1500; loyolamedicine.org/cancer A

Oak Park – Rush Hematology, Oncology and Cell Therapy; 312-942-6300; rush.edu/services/cancer-center A

Park Ridge – Advocate Lutheran General Center for Advanced Care; 847-723-4400; www.advocatehealth.com A

Peoria – UnityPoint Health – Methodist; 309-672-4224; unitypoint.org/peoria/services-cancer A

Zion – CTCA Chicago; 847-440-5662; cancercenter.com/chicago A

INDIANA

Indianapolis – Franciscan Health Indiana Blood & Marrow Transplantation; 317-528-5500; franciscanhealth.org A

Indianapolis – IU Health Simon Cancer Center; 317-944-0920; iuhealth.org/simon-cancer-center A

Indianapolis – Riley Hospital for Children at IU Health; 317-944-2143; rileychildrens.org P

IOWA

Iowa City – University of Iowa Hospitals & Clinics; 319-384-8828; uihc.org/stem-cell-transplant-and-cellular-therapy-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

Westwood

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 comprehensive cancer center, U.S. News & World Report nation's top 50 program, ACS Commission on Cancer, ANCC Magnet Hospital, FACT, NMDP, BMT-CTN Steering Committee Center, Myeloproliferative Disorders Research Consortium, SWOG, U.S. CAR-T Consortium
Cancer Specialties/Special Services: Kansas' largest, most experienced BMT and CAR T programs, having performed more than 5,000 transplants, 200 CAR T-cell therapies and 350 cell therapies annually. We provide autologous, allogeneic, haploidentical and cord blood transplantation and have the region's largest CAR T/cellular therapeutics program. We provide personalized care in our 100-bed inpatient unit and outpatient cancer and therapeutic blood treatment center. We also have dedicated acute leukemia, lymphoma, myelodysplastic syndrome and multiple myeloma programs. A Adult BMT Center

Wichita – Cellular Therapy Center of Kansas/Ascension Via Christi Cancer; 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

Louisville

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

Louisville – UofL Health – Brown Cancer Center; 502-562-4673; uoflbrowncancercenter.org/bmt A

Louisville

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

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; 318-212-9440; ochsnerlsuhs.org A

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; 301-319-2100; 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

MASSACHUSETTS

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

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

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

Boston – Dana-Farber/Boston Children's Cancer and Blood Disorders Center; 617-632-3961; dana-farber.org P

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

Boston – Tufts Children's Hospital; 617-636-5535; pediatrics.tuftsmedicalcenter.org P

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

Burlington – Lahey Health Cancer Institute; 781-744-8410; www.lahey.org/cancer-institute 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

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

Detroit – 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

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

Grand Rapids – Spectrum Health Cancer Center; 616-486-5700; spectrumhealth.org/blood-marrow-transplant A

MINNESOTA

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

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

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

MISSISSIPPI

Jackson – Cancer Center and Research Institute at the University of Mississippi Medical Center; 601-984-5615; 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

Kansas City – Sarah Cannon Transplant & Cellular Therapy at Research Medical Center; 816-276-4000; hcamidwest.com/specialties/blood-cancer A

St. Louis – Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine; 314-747-7222; siteman.wustl.edu A

St. Louis

Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine
Location: 660 S. Euclid Ave., 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 International Airport
Accreditation/Designation: NCI-designated Comprehensive Cancer Center, Transplant Program Accredited by Foundation of Accreditation of Cellular Therapies (FACT)
Cancer Specialties/Special Services: The BMT program 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

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

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

MONTANA

Billings – Billings Clinic Cancer Center; 406-238-2500; billingsclinic.com/cancer A

NEBRASKA

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

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

Omaha – Nebraska Methodist Hospital; 402-354-4800; bestcare.org/specialties/cancer-treatment A

NEVADA

Las Vegas – MountainView Hospital; 702- 962-2100; mountainview-hospital.com/specialties/bone-marrow-transplant A

NEW HAMPSHIRE

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

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

Livingston – Cooperman Barnabas Medical Center; 844-226-2376; www.rwjbh.org A

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

NEW MEXICO

Albuquerque – UNM Comprehensive Cancer Center; 505-925-0062; cancer.unm.edu A

NEW YORK

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

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

Bronx – The Children's Hospital at Montefiore; 718-741-2342; www.cham.org P

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

Hawthorne – Westchester Medical Center Cancer Center; 914-246-6600; www.westchestermedicalcenter.org/cancer-institute A P

Manhasset – Northwell Health Cancer Institute; 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; 984-974-0000; 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/mylevinechildrens P

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

Durham – Duke Children's Hospital; 919-613-7800; www.dukehealth.org/hospitals/duke-childrens-hospital P

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

Winston-Salem – Novant Health Cancer Institute; 336-718- 5570; www.novanthealth.org/cancer A

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; 440-732-3693; uhhospitals.org/rainbow P

Cleveland – University Hospitals Seidman Cancer Center; 216-710-3406; uhhospitals.org/seidman A P

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

Columbus – OhioHealth Arthur G.H. Bing Cancer Center; 614-566-2500; www.ohiohealth.com A

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 (See our ad top right)

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: Port 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 – Oklahoma Children's Hospital; 405-271-4412; www.ouhealth.com/oklahoma-childrens-hospital P

Oklahoma City – OU Health 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; 503-413-7194; legacyhealth.org/cancer A P

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

Portland – Providence Cancer Institute; 503-216-6300; 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; www.foxchase.org/bmt A

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

Philadelphia – St. Christopher's Hospital for Children; 215-427-5000; towerhealth.org/locations/st-christophers-hospital-children 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 Shawn Jenkins Children's Hospital; 843-876-0444; musckids.org/cancer P

Charleston – Roper St. Francis Cancer Care; 843-724-2296; www.rsfh.com/BMT A

Charleston

Roper St. Francis Cancer Care; Blood and Marrow Transplant
Location: 316 Calhoun St., Charleston, SC 29401
Phone: 843-724-2296; fax 843-724-1977 **Website:** www.rsfh.com/BMT
Nearest Airport: Charleston International
Accreditation/Designation: American Association of Blood Banks (AABB) College of American Pathologist (CAP)
Cancer Specialties/Special Services: Autologous and Allogeneic (related HLA identical and haplo-identical) stem cell transplants. Diseases include: Acute myeloid leukemia (AML), Acute lymphoblastic leukemia (ALL), Chronic myeloid leukemia (CML), Non-Hodgkin's Lymphoma (NHL), Hodgkin's Lymphoma, Multiple Myeloma, Myelodysplastic Syndrome, Chronic lymphocytic leukemia (CLL), Testicular cancer, Waldenstrom's Macroglobulinemia, Paroxysmal Nocturnal Hemoglobinuria (PNH). Congenital blood disorders, including: sickle cell anemia, thalassemia Autoimmune diseases, Aplastic anemia. Other malignant and nonmalignant disorders.

A Adult BMT

Greenville – Bon Secours St. Francis Cancer Center; 843-724-2296; www.bonsecours.com A

Greenville – Prisma Health Cancer Institute; 864-987-7000; prismahealth.org A

SOUTH DAKOTA

Sioux Falls – Avera Cancer Institute; 866-686-1062; avera.org/transplant A
(See our ad top left on page 22)

Sioux Falls

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

TENNESSEE

Knoxville – Cancer Institute at The University of Tennessee Medical Center; 865-305-8780; www.utmedicalcenter.org A

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 – Sarah Cannon Transplant and Cellular Therapy Program at TriStar Centennial; 615-342-7440; tristarhealth.com A P

Nashville – VA Tennessee Valley Healthcare System; 615-327-4751; www.va.gov/tennessee-valley-health-care A

Nashville – Vanderbilt Children's Hematology-Oncology; 615-936-1762; www.childrenshospitalvanderbilt.org P

Nashville – Vanderbilt-Ingram Cancer Center; 615-936-8422; vicc.org/cancer-care A P

TEXAS

Austin – St. David's South Austin Medical Center; 512-447-2211; stdavids.com A

Dallas – Baylor Scott & White Health; 214-820-3535; bswhealth.com/cancer A

Dallas – Children's Health Stem Cell Transplant Program; 214-456-2978; childrens.com P

Dallas – Medical City Dallas Blood and Marrow Transplant; 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

Dallas

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 6,300 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. The American Cancer Society's Hope Lodge offers free/low-cost accommodations on the Baylor Dallas campus for patients who must travel to Dallas for treatment.

A Adult BMT Center

Dallas – Texas Oncology–Medical City Dallas Blood and Marrow Transplant; 972-566-7790; texasoncology.com A P

Dallas

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/Dallas Love Field
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 200 transplants each 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 CAR-T therapy.

A Adult BMT Center P Pediatric BMT Center

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; www.cookchildrens.org P

Houston – Center for Cell & Gene Therapy Houston Methodist Hospital; 713-441-1450; 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; 844-445-7458; mdanderson.org A P

San Antonio – Methodist Children's Hospital Cancer and Blood Center; 210-575-2222; sahealth.com/specialties/bone-marrow-transplant P

San Antonio – Sarah Cannon Transplant and Cellular Therapy Program at Methodist Hospital; 210-575-7800; sahealth.com/specialties/bone-marrow-transplant A P

San Antonio – The Children's Hospital of San Antonio; 210-704-2160; www.christushealth.org/childrens P

San Antonio – VA South Texas Health Care; 210-617-5300; www.va.gov/south-texas-health-care A

Temple – Baylor Scott & White Vasicek Cancer Treatment Center; 254-724-5918; bswhealth.com/cancer A

UTAH

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

Salt Lake City – Intermountain Cancer Center; 833-321-3332; intermountainhealthcare.org/medical-specialties/cancer-care 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; uvahealth.com/services/stem-cell-transplant A

Fairfax – Inova Schar Cancer Institute; 571-462-6538; inova.org/cancer A

Norfolk – Virginia Oncology Associates; 757-466-8683; www.virginiacancer.com/stem-cell-transplantation 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 – Seattle Children's Hospital; 800-804-8824; www.seattlechildrens.org P

Seattle – Swedish Cancer Institute The Center for Blood Disorders and Cellular Therapy; 206-991-2040; swedish.org/hematology A (See our ad on page 23)

Seattle – VA Puget Sound Health Care System; 206-764-2414; www.va.gov/puget-sound-health-care 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 – American Family Children's Hospital; 608-716-7372; uwhealth.org/cancer P
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; 414-266-2420; 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 Cellular Therapy
Location: 1221 Madison, Seattle, WA 98104
Phone: 206-991-2040; toll free 855-922-6237; fax 206-215-1656
Website: www.Swedish.org/hematology
Nearest Airport: Seattle Tacoma International
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 clinical 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 one of the largest hematology clinical trials programs in the Western US.

A Adult BMT Center

A Adult BMT Center P Pediatric BMT Center

ASSISTANCE & SUPPORT

Patient Assistance Resources

The groups listed here offer a variety of resources and financial assistance to help you navigate through a cancer diagnosis. Being informed will help as you make the important decisions ahead. Many of the organizations also sponsor support groups and peer-to-peer mentoring.

BLOOD CANCER

Alex's Lemonade Stand Foundation for Childhood Cancer.....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
BeholdBeGold.....www.beholdbegold.org
Blood & Marrow Transplant Information Network.....www.bmtinfonet.org
Cancer Support Community.....www.cancersupportcommunity.org, 888-793-9355
Center for International Blood and Marrow Transplant Research (CIMBTR).....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
HealthTree Foundation.....www.healthtree.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

BeholdBeGold.....www.beholdbegold.org
Cactus Cancer Society.....www.cactuscancer.org
CanCare.....www.cancare.org, 713-461-0028
CANCER101.....www.cancer101.org, 646-638-2202
Cancer and Careers.....www.cancerandcareers.org, 646-929-8032
Cancer*Care*.....www.cancercare.org, 800-813-4673
Cancer Connection.....www.cancer-connection.org, 413-586-1642
Cancer Hope Network.....www.cancerhopenetwork.org, 877-467-3638
Cancer Really Sucks!.....www.cancerreallysucks.org
Cancer Support Community.....www.cancersupportcommunity.org, 888-793-9355
Cancer Support Community Helpline.....888-793-9355
Cancer Survivors Network.....csn.cancer.org, 800-227-2345
Caregiver Action Network.....www.caregiveraction.org, 855-227-3640
CaringBridge.....www.caringbridge.org, 651-789-2300
Center to Advance Palliative Care.....www.capc.org, 347-835-0658
Chemo Angels.....www.chemoangels.com
The Children's Treehouse Foundation.....www.childrenstreehousefdn.org, 303-322-1202
Cleaning for a Reason.....www.cleaningforareason.org
Connect Thru Cancer.....www.connectthrucancer.org, 484-301-3047
Cooking with Cancer.....www.cookingwithcancer.org, 205-978-3570
Family Caregiver Alliance.....www.caregiver.org, 800-445-8106
Friend for Life Cancer Support Network.....www.friend4life.org, 866-374-3634
The Gathering Place.....www.touchedbycancer.org, 216-595-9546
Guide Posts of Strength, Inc......www.cancergps.org, 336-883-4483
Imerman Angels.....www.imermanangels.org, 866-463-7626
Livestrong Foundation.....www.livestrong.org, 855-220-7777
Living Hope Cancer Foundation.....www.getupandlive.org
LivingWell Cancer Resource Center.....www.livingwellcrc.org, 630-933-7860
Lotsa Helping Hands.....www.lotsahelpinghands.com
The Lydia Project.....www.thelydiaproject.org, 877-593-4212
MyLifeLine.....www.mylifeline.org, 888-793-9355
National LGBT Cancer Project.....www.lgbtcancer.org, 917-301-1913
Patient Empowerment Network.....www.powerfulpatients.org, 833-213-6657
SHARE Caregiver Circle.....www.sharecancersupport.org/caregivers-support, 844-275-7427
Stronghold Ministry.....www.mystronghold.org, 877-230-7674
Triage Cancer.....www.triagecancer.org, 424-258-4628
Walk With Sally.....www.walkwithsally.org, 310-322-3900

Well Spouse Association ..... www.wellspouse.org, 732-577-8899
weSPARK Cancer Support Center ..... www.wespark.org, 818-906-3022
Wigs & Wishes ..... www.wigsandwishes.org, 856-582-6600

REIMBURSEMENT & PATIENT ASSISTANCE PROGRAMS

myAbbVie Assist ..... abbvie.com/patients/patient-assistance, 800-222-6885
Adcetris Seagen Secure ..... 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
Amgen FIRST STEP Co-Pay Program ..... amgenassist.com/co-pay, 866-264-2778
Amgen Safety Net Foundation ..... amgensafetynetfoundation.com, 888-762-6436
Arzerra Novartis Financial Assistance ..... www.patient.novartisoncology.com/financial-assistance, 800-282-7630
Astellas Pharma Support Solutions ..... astellaspharmasupportsolutions.com/patient, 800-477-6472
AstraZeneca Access 360 ..... myaccess360.com/patient, 844-275-2360
AstraZeneca Patient Savings Programs For Specialty Products ..... astrazenecaspecialtysavings.com, 844-275-2360
AstraZeneca Prescription Savings Program (AZ&ME) .... azandmeapp.com, 800-292-6363
Avastin Access Solutions ...www.avastin.com/patient/financial-resources.html, 866-422-2377
Bayer US Patient Assistance Foundation ..... patientassistance.bayer.us, 866-228-7723
Beleodaq Acrotech STAR ..... acrotechpatientaccess.com, 888-537-8277
Bendeka Teva CORE ..... www.tevacore.com/patient-assistance, 888-587-3263
Besponsa Support & Resources ..... www.besponsa.com/resources, 877-744-5675
Blenrep Together with GSK Oncology ..... www.togetherwithgskoncology.com/patient-information/blenrep, 844-447-5662
Blincyto Amgen 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 Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient, 800-861-0048
Bristol-Myers Squibb Patient Assistance Foundation ..... bmspaf.org, 800-736-0003
Brukinsa myBeiGene Patient Support Program ..... www.brukinsa.com, 833-234-4363
Calquence Access 360 ..... www.myaccess360.com/patient/calquence-acalabrutinib, 844-275-2360
Copiktra Secura Care ..... copiktra.com/patient-assistance, 844-973-2872
Darzalex Faspro Janssen CarePath ..... www.janssencarepath.com/darzalex/faspro, 844-553-2792
Darzalex Janssen CarePath ..... www.janssencarepath.com/darzalex, 844-553-2792
Darzalex Patient and Cost Support ..... www.darzalex.com/iv/patient-cost-support, 844-553-2792
Empliciti BMS Access Support ..... www.empliciti.com/financial-resources, 844-367-5424
Faslodex Access 360 .... www.myaccess360.com/patient/faslodex-fulvestrant, 844-275-2360
Folotyn Acrotech STAR ..... 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 Oncology Co-pay Assistance Program ..... copayassistancenow.com/patients, 855-692-6729
Genentech Patient Foundation ..... gene.com/patients/patient-foundation, 888-941-3331
Gilead's Advancing Access ..... www.gileadadvancingaccess.com, 800-226-2056
Gleevec Patient Assistance Now Oncology ..... www.us.gleevec.com, 800-282-7630
GSK For You ..... www.gskforyou.com/programs/reimbursement-support, 888-825-5249
GSK Oncology (Together) ..... www.togetherwithgskoncology.com/patient-information, 844-447-5662
Iclusig Co-Pay Assistance ..... www.takedaoncologycopay.com, 844-817-6468, option 2
Idhifa BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Imbruvica By Your Side Patient Support ..... imbruvica.com/imbruvica-by-your-side, 888-968-7743
IncyteCARES ..... www.incytecares.com, 855-452-5234
IncyteCARES for Jakafi ..... www.incytecares.com/jakafi, 855-452-5234
IncyteCARES for Pemazyre ..... www.incytecares.com/pemazyre, 855-452-5234
Istodax BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Janssen CarePath ..... www.janssencarepath.com/patient, 877-227-3728
JazzCares ..... www.jazzcares.com, 833-533-5299
Johnson & Johnson Patient Assistance Foundation, Inc. ..... www.jjpaf.org, 800-652-6227
Keytruda KEY+YOU ..... www.keyplusyou.com, 855-398-7832, press 2
Keytruda Merck Access Program ... merckaccessprogram-keytruda.com/hcc/, 855-257-3932
Kymriah Cares ..... www.us.kymriah.com, 844-459-6742
Kyprolis Patient Support Program ..... www.kyprolis.com/patient-resources, 888-427-7478
Lumoxiti Access 360 ..... www.myaccess360.com/patient/lumoxiti-moxetumomab-pasudotox-tdfk, 844-694-6628
Merck Access Program ..... www.merckaccessprogram.com/hcc/
Merck Patient Assistance Program ..... merckhelps.com, 800-727-5400
Monjuvi My MISSION Support ..... www.monjuvi.com/support-and-resources, 855-421-6172
Ninlaro Co-Pay Assistance ..... www.takedaoncologycopay.com, 844-817-6468, option 2
Novartis Oncology Universal Co-pay Program ... copay.novartisoncology.com, 877-577-7756
Novartis Patient Assistance Foundation ..... www.novartis.us/our-products/patient-assistance/patient-assistance-foundation-enrollment, 800-277-2254
Novartis Patient Assistance NOW Oncology (PANO) ..... patient.novartisoncology.com/financial-assistance/pano, 800-282-7630
Onureg BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Opdivo BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Pfizer Oncology Together ..... www.pfizeroncologytogether.com/patient, 877-744-5675
Polivy Access Solutions ..... polivy.com/patient/support-and-resources/financial-support, 877-436-3683
Pomalyst BMS Access Support ..... www.pomalyst.com/cost, 800-861-0048
Poteligeo Kyowa Kirin Cares ..... www.kyowakirincares.com/poteligeo-patients, 833-552-2737
Revlimid BMS Access Support ..... www.revlimid.com/cost-access, 800-861-0048
Rituxan Access Solutions ..... genentech-access.com/patient/brands/rituxan-nhl-cll, 877-436-3683
Rituxan Hycela Access Solutions ..... genentech-access.com/patient/brands/rituxan-hycela, 877-436-3683
Rydapt Financial Resources ..... us.rydapt.com/acute-myeloid-leukemia/patient-support/financial-resources, 800-282-7630
Sanofi Genzyme CareASSIST ..... www.sanoficareassist.com, 833-930-2273
Sanofi Patient Connection ..... www.sanofipatientconnection.com, 888-847-4877
Sarclisa CareASSIST ..... www.sarclisa.com/paying-for-sarclisa, 833-930-2273
Scemblix Financial Resources ..... us.scemblix.com/patient-support/financial-resources, 800-282-7630
SeaGen Secure ..... www.seagensecure.com, 855-473-2873
Secura Care Patient Support Program ..... securabio.com/patient-support-programs, 844-973-2872
Sprycel BMS Access Support ..... www.sprycel.com/financial-support, 800-861-0048
Synribo Teva CORE ..... www.tevacore.com/patient-assistance, 888-587-3263
Takeda Oncology Co-Pay Assistance Program ..... www.takedaoncologycopay.com
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 EpizymeNOW ..... www.epizymenow.com/patient, 833-437-4669
Tecartus Kite Konnect ..... www.tecartus.com/patient-support, 844-454-5483
Teva Cares Foundation Patient Assistance Program ..... www.tevacares.org, 877-237-4881
Teva CORE ..... www.tevacore.com/patient-assistance, 888-587-3263
Thalomid BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Tibsovo Servier One ..... servierone.com/s/patient/tibsovo, 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 Teva CORE ..... www.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, 877-436-3683
Vidaza BMS Access Support ..... bmsaccesssupport.bmscustomerconnect.com/patient/financial-support, 800-861-0048
Vyxeos JazzCares ..... www.jazzcares.com/patients/vyxeos
Xgeva Amgen Assist 360 ..... www.amgenassist360.com/patient/xgeva-cost-assistance, 888-427-7478
Xospata Support Solutions ..... astellaspharmasupportsolutions.com/patient/xospata, 844-632-9272
Xpovio Karyforward ..... www.karyforward.com, 877-527-9493
Yescarta Patient Support ..... www.yescarta.com/lbcl/resources-and-support, 844-454-5483
Zevalin Acrotech STAR ..... zevalin.com/reimbursement-support-and-patient-assistance, 866-298-8433
Zydelig AccessConnect ..... www.zydeligaccessconnect.com/patient, 844-622-2377

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PATIENT
RESOURCE

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