Leukemia, Lymphoma & Multiple Myeloma
A TREATMENT GUIDE FOR PATIENTS AND THEIR FAMILIES
Sixth Edition
Learn more about your treatment options.

Talk to your healthcare provider about KYPROLIS.
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When most people think of cancer, they think of solid cancer that involves a tumor that grows and sometimes spreads to other places in the body. Lymphomas, however, fall into a different category of cancers called hematological (blood) cancers. Blood cancers primarily affect the blood, bone marrow and lymph nodes and may or may not create an actual tumor.

Lymphoma is the most common blood cancer in the United States, with an estimated 761,659 people living with or in remission from the disease and nearly 81,000 new diagnoses estimated in the United States for 2015. This disease specifically affects the lymphatic system and lymphocytes, which are part of the immune system, and it can occur in adults and children of any age. Lymphoma can be classified into two main categories: Hodgkin lymphoma (see page 7) and non-Hodgkin lymphoma (see page 8).

Development of Lymphoma

To fully understand lymphoma, it’s important to first gain a general knowledge of the lymphatic system. This network of tissues and vessels carries fluid, called lymph, throughout the body (see Figure 1). Lymph contains lymphocytes that attack infectious agents. Lymphocytes are concentrated in lymph nodes located along the course of lymphatic vessels.

The two main types of lymphocytes that can develop into lymphomas are B lymphocytes (B cells) and T lymphocytes (T cells). B cells produce protein antibodies that attach to infectious organisms, such as bacteria and viruses, marking them for destruction. T cells attack infectious organisms directly and play a part in controlling the immune system. Both B cells and T cells can transform into lymphoma cells, however, in the United States, B cell lymphomas are much more common.

Lymphoma develops when normal lymphocytes (a type of white blood cell) transform into abnormal, cancerous cells that reproduce uncontrollably. As they multiply, they collect in the lymph nodes, bone marrow, spleen, tonsils or other organs, where they can form tumors. These cells eventually begin to outnumber normal cells, causing an enlargement at one of these sites.

Risk Factors for Lymphoma

While the exact cause of lymphoma is unknown, mutations in DNA (the hereditary genetic material found in cells) lead to the development of the disease. What triggers these mutations is also largely unknown, but research suggests that certain risk factors may play a role, including:

- exposure to high levels of radiation
- long-term exposure to certain chemicals
- exposure to certain hair dyes, particularly those made before 1980
- inherited and acquired immune system disorders
- certain infections, such as the Epstein-Barr virus and Helicobacter pylori infection

Symptoms of Lymphoma

Symptoms of lymphoma vary among patients and depend on the type of lymphoma and the area of the body where the lymphocytes collect. The most common symptom of lymphoma is swelling in one or more lymph nodes in the neck, armpits, chest, abdomen or groin.

While swollen nodes are generally tender and often hurt to some degree in people with infections, they tend to be firm and painless in people with lymphoma. Other common symptoms of lymphoma include fever, chills, night sweats, chest pain, lower back pain, unexplained weight loss, rashes, itchy skin, skin lesions and fatigue.

Treatment of Lymphoma

Advancements in lymphoma treatment have been steadily improving patient outcomes over the last few decades, and recent clinical trials for new types of treatments and drug combinations have shown high survival rates. The treatment options available for each patient depend on the stage of the disease, including the extent of the lymphoma, the disease subtype, presence of symptoms and other general factors, such as the patient’s age, gender and overall health. Some of the most common treatment options include the following:

- Watchful waiting is a common treatment option for patients with lymphoma who do not currently have symptoms.
- Patients with lymphoma who do have symptoms are typically treated with chemotherapy, radiation therapy or a combination of both. Immunotherapy and targeted therapy drugs may also be used.
- Stem cell transplantation may be an option for some patients, often after high-dose chemotherapy or radiation therapy.

See pages 4 and 5 (Common Forms of Lymphoma chart) for a more detailed breakdown of common treatment options by specific type of lymphoma.

Additional Resources

- American Cancer Society: www.cancer.org
- Lymphoma
- Leukemia & Lymphoma Society: www.lls.org Disease Information
- Lymphoma Information Network: www.lymphomainfo.net
Diagnosing and staging

Many patients do not experience obvious symptoms that indicate lymphoma. Some people may visit their doctor because of swollen lymph nodes, bumps near lymph nodes that won’t go away or because they’re experiencing general symptoms such as shortness of breath, fever, fatigue, or loss of appetite. Other times, they simply might not feel well.

Even if your doctor suspects lymphoma, a series of diagnostic tests are often necessary to confirm the presence of disease, determine the type and assign a stage. These tests and procedures may include:

- **Biopsy:** Doctors remove and examine lymph nodes or other tissues to check for lymphoma cells. The examination of the biopsy may include immunohistochemistry and immunophenotyping to distinguish different cell types.
- **Bone marrow aspiration and biopsy:** These procedures remove and evaluate bone marrow tissue samples.
- **Blood tests:** Blood will be drawn and examined to check for abnormal amounts of chemicals, and to determine levels of red and white blood cells and platelets in the blood (complete blood cell count). Specific blood testing may include erythrocyte sedimentation rate (ESR) and serum lactate dehydrogenase (LDH) testing.
- **Chest X-rays:** An X-ray machine is used to generate an image of the chest to check for cancerous cells.
- **Ultrasound:** High-energy sound waves bounce off internal tissues and organs to create an image called a sonogram.
- **Positron emission tomography (PET) scan:** Positron emission tomography (PET) scans and integrated PET/CT scans are diagnostic tests used to create images of bones, organs and tissues for the evaluation of metabolic activity and function in different areas of the body. This scan can help identify areas of the body affected by lymphoma.
- **Computerized tomography (CT) scan:** A computer attached to an X-ray machine will obtain detailed pictures of certain areas inside the body, such as the abdomen, chest and pelvis.
- **Magnetic resonance imaging (MRI):** Computer imaging is used along with a powerful magnet and radio waves to create a series of pictures inside the body.

**STAGES OF LYMPHOMA**

Once you have received a lymphoma diagnosis, your doctor will determine the stage of your disease and assign an appropriate treatment plan. The Ann Arbor staging system is the most commonly used system for staging non-Hodgkin lymphoma, and a modification of this system, called the Cotswold system, is used for staging Hodgkin lymphoma. A patient will receive a diagnosis of stage I, II, III or IV. In both of these classification systems, a higher stage number indicates a more advanced disease. In addition to the staging systems, oncologists also use the International Prognostic Index (IPI) to predict the risk of disease recurrence and overall survival in patients with non-Hodgkin lymphoma. The IPI accounts for the age and general health of the patient, the stage of the disease, whether organs outside the lymph system are involved, and the presence or absence of elevated levels of an enzyme called lactate dehydrogenase in the blood.

The IPI assigns one point for each of the following risk factors:

- **Age:** greater than 60 years
- **Performance status:** poor general health
- **Lactate dehydrogenase in the blood:** higher than normal levels
- **Extranodal sites:** involvement of more than one organ outside the lymph nodes
- **Stage:** III or IV

Each point will contribute to the overall IPI score. The lower the score from zero to five, the better the prognosis (predicted outcome from treatment). A person’s risk is considered low if the score is a zero or one, and high if the score is greater than three.

The Follicular Lymphoma International Prognostic Index (FLIPI) is similar to the IPI, but it uses slightly different prognostic factors, including levels of hemoglobin and the amount of lymph nodes affected by the disease. The FLIPI is sometimes used to predict outcomes in people with follicular lymphomas, which tend to grow more slowly.

**DEFINITIONS OF STAGES**

- **Stage I** / The disease is in only one lymph node area or lymphoid organ.
- **Stage IE** / The disease is in only one area of a single organ outside the lymph system.
- **Stage II** / The disease is in two or more lymph node areas on the same side (above or below) of the diaphragm.
- **Stage IIE** / The disease is in two or more lymph node areas on the same side (above or below) of the diaphragm.
- **Stage II** / The disease is in two or more lymph node areas on both sides (above and below) of the diaphragm.
- **Stage III** / The disease is in lymph node areas above and below the diaphragm and has spread to an organ outside the lymph system.
- **Stage IV Non-Hodgkin** / The disease has spread outside the lymph system to an organ that is not directly next to the involved lymph node area(s); or it has spread to the bone marrow, lungs, cerebrospinal fluid or liver.
- **Stage IV Hodgkin** / The disease has spread widely in one or more organs outside the lymph system; or it has spread to organs in two distant parts of the body; or it has spread to the bone marrow, lungs, cerebrospinal fluid or liver.

Various letters are added to the stage to signify different factors:

- **A** Fever, night sweats and weight loss are not present.
- **B** Fever, night sweats and weight loss are present.
- **E** The cancer affects an organ or tissue outside the lymph system.
- **S** The cancer affects the spleen.
- **X** Bulky disease is present (defined as disease in the chest that is one-third as wide as the chest or tumors in other places are at least 4 inches across).
Included in the table below and on the following pages are many of the most commonly diagnosed variations of lymphoma, organized into groups based on how they look under a microscope, the chromosomal makeup of the cells and whether specific proteins are present. Many of the possible treatments are also listed, but be sure to talk with your health care team about all of your treatment options.

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Description</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Hodgkin lymphoma (NHL)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diffuse large B cell lymphoma (DLBCL), not otherwise specified</td>
<td>• Most common type of NHL in adults, accounting for 30 to 40 percent of cases • Average age at diagnosis is approximately 65</td>
<td>• Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos), methotrexate (Trexall), cytarabine (Cytosar-U), dexamethasone, etoposide (Etopophos, Toposar) • Monoclonal antibody: rituximab (Rituxan) • Radiation therapy • Stem cell transplantation</td>
</tr>
<tr>
<td>Follicular lymphoma</td>
<td>• Slow-growing • Second most common NHL subtype, accounting for about 20-30 percent of all lymphomas • Average age of people diagnosed is 60 or older • Found in lymph node sites and bone marrow</td>
<td>• Watchful waiting • Chemotherapy: cyclophosphamide, vincristine sulfate, prednisone (Rayos), bendamustine (Treanda), chlorambucil (Leukeran), doxorubicin • Targeted therapy: ibrutinib (Imbruvica), idelalisib (Zydelig) • Monoclonal antibody: rituximab (Rituxan), ibritumomab tiuxetan (Zevalin) • Radiation therapy • Stem cell transplantation</td>
</tr>
<tr>
<td>Chronic lymphocytic leukemia/small lymphocytic lymphoma</td>
<td>• Slow-growing • Accounts for 5 to 10 percent of all lymphomas</td>
<td>• Watchful waiting • Chemotherapy: bendamustine (Treanda), cyclophosphamide, chlorambucil (Leukeran), doxorubicin (Adriamycin), fludarabine (Fludara), prednisone (Rayos), vincristine sulfate, methotrexate (Trexall), mechlorethamine hydrochloride (Mustargen) • Targeted Therapy: ibrutinib (Imbruvica), idelalisib (Zydelig) • Monoclonal antibody: rituximab (Rituxan), ofatumumab (Arzerra), obinutuzumab (Gazyva), alemtuzumab (Campath)</td>
</tr>
<tr>
<td>Extranodal marginal zone B cell lymphoma, or mucosa-associated lymphoid tissue (MALT lymphoma)</td>
<td>• Accounts for approximately 7.5-8 percent of all lymphomas • Linked with H. pylori (a type of bacteria) in gastric MALT lymphomas</td>
<td>• Antibiotics • Surgery • Radiotherapy • Monoclonal antibody: rituximab (Rituxan) • Chemotherapy</td>
</tr>
<tr>
<td>Primary cutaneous follicle center lymphoma</td>
<td>• Slow-growing • Mostly affects adults • Average age at diagnosis is 51</td>
<td>• Radiation • Surgery • Topical steroids • Topical chemotherapy</td>
</tr>
<tr>
<td>Mantle cell lymphoma</td>
<td>• Accounts for about 5 percent of all lymphomas • Can involve many organs, particularly the colon, as well as bone marrow, lymph nodes and the spleen</td>
<td>• Watchful waiting • Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos), dexamethasone, cytarabine (Cytosar-U), methotrexate (Trexall), bortezomib (Velcade), bendamustine (Treanda) • Targeted therapy: ibrutinib (Imbruvica) • Monoclonal antibody: rituximab (Rituxan) • Stem cell transplantation</td>
</tr>
<tr>
<td><strong>T cell/histiocyte-rich large B cell lymphoma</strong></td>
<td>• Aggressive • Can be confused with peripheral T cell lymphoma</td>
<td>• Multiagent chemotherapy in combination with the monoclonal antibody rituximab (Rituxan) • Stem cell transplantation</td>
</tr>
<tr>
<td>Primary mediastinal (thymic) large B cell lymphoma</td>
<td>• Aggressive • Accounts for 2.5 percent of all NHL cases • Found mostly in women ages 30 – 40 years</td>
<td>• Anthracycline-based chemotherapy in combination with the monoclonal antibody rituximab (Rituxan) with or without radiation to the chest</td>
</tr>
<tr>
<td>Intravascular large B cell lymphoma</td>
<td>• Aggressive • Average age at diagnosis is 67 • Found inside the blood vessels</td>
<td>• Same as for diffuse large B cell lymphoma (not otherwise specified)</td>
</tr>
<tr>
<td>B cell lymphoma, unclassifiable, with features intermediate between diffuse large B cell lymphoma and Burkitt lymphoma</td>
<td>• Aggressive • Most common in Caucasians and young men ages 20 to 40</td>
<td>• No consensus on best treatment</td>
</tr>
<tr>
<td><strong>Mature T cell and natural killer (NK) cell neoplasms</strong></td>
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<tr>
<td>Adult T cell leukemia/lymphoma</td>
<td>• Aggressive • Often has four subtypes (acute includes elevated calcium levels) • Linked to HTLV-1 virus</td>
<td>• Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos) • Immunotherapy: interferon alfa (numerous brand names) • Stem cell transplantation</td>
</tr>
<tr>
<td>Effusion-related large B cell lymphoma</td>
<td>• Aggressive • Often related to other NHLs</td>
<td>• Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos) • Radiation therapy • Stem cell transplantation</td>
</tr>
<tr>
<td>Cancer type</td>
<td>Description</td>
<td>Treatment</td>
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<tr>
<td>Subcutaneous panniculitis-like T cell lymphoma</td>
<td>• Aggressive or indolent based on sub-type</td>
<td>• Steroids or other immune-suppressing drugs</td>
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<tr>
<td></td>
<td>• Involves tissue under the skin</td>
<td>• Radiotherapy</td>
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<tr>
<td></td>
<td></td>
<td>• Chemotherapy</td>
</tr>
<tr>
<td>Mycosis fungoides</td>
<td>• Most common cutaneous T cell lymphoma</td>
<td>• Skin/other treatments: ultraviolet light, photopheresis, topical steroids, topical chemotherapies,</td>
</tr>
<tr>
<td></td>
<td>• Presents as patches, plaques or tumors</td>
<td>• topical retinoids, topical corticosteroids, topical corticosteroids, topical retinoids (topical)</td>
</tr>
<tr>
<td></td>
<td>• Found mostly in adults and the elderly</td>
<td>• topically applied corticosteroids, topical retinoids, topical corticosteroids, topical retinoids</td>
</tr>
<tr>
<td></td>
<td>• Affects more males than females</td>
<td>• topically applied corticosteroids, topical retinoids, topical corticosteroids, topical retinoids</td>
</tr>
<tr>
<td>Sézary syndrome</td>
<td>• Advanced and variant form of mycosis fungoides</td>
<td>• Skin/other treatments: ultraviolet light, photopheresis, topical steroids, topical chemotherapies,</td>
</tr>
<tr>
<td></td>
<td>• Causes thin, red, itchy rash over most of the body</td>
<td>• topically applied corticosteroids, topical retinoids, topical corticosteroids, topical retinoids</td>
</tr>
<tr>
<td></td>
<td>• Involves skin and lymph nodes</td>
<td>• topically applied corticosteroids, topical retinoids, topical corticosteroids, topical retinoids</td>
</tr>
<tr>
<td>Primary cutaneous CD30 positive T cell lymphoproliferative disorders</td>
<td>• Second most common group of the cutaneous T cell lymphomas</td>
<td>• Chemotherapy: doxorubicin (Adriamycin), cyclophosphamide, dacarbazine (Camptosar), vinblastine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Low-dose methotrexate (Trexall)</td>
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<tr>
<td></td>
<td></td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Surgery</td>
</tr>
<tr>
<td>Lymphomatoid papulosis</td>
<td>• Slow-growing</td>
<td>• Chemotherapy: Low-dose methotrexate (Trexall)</td>
</tr>
<tr>
<td></td>
<td>• Average age at diagnosis is 45</td>
<td>• Conservative management</td>
</tr>
<tr>
<td></td>
<td>• Affects men more often than women</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Mostly affects the trunk and extremities</td>
<td></td>
</tr>
<tr>
<td>Primary cutaneous anaplastic large cell lymphoma</td>
<td>• Often slow-growing</td>
<td>• Chemotherapy: doxorubicin (Adriamycin)</td>
</tr>
<tr>
<td></td>
<td>• Average age at diagnosis is 60</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Involves only the skin</td>
<td>• Surgery</td>
</tr>
<tr>
<td>Peripheral T cell lymphoma, not otherwise specified</td>
<td>• Aggressive</td>
<td>• Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos),</td>
</tr>
<tr>
<td></td>
<td>• Most common form of PTCL</td>
<td>• romidepsin (Istodax), belinostat (Beleodaq), pralatrexate (Folotyn)</td>
</tr>
<tr>
<td></td>
<td>• Includes several subtypes</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Most commonly affects people age 60 or older</td>
<td>• Stem cell transplantation</td>
</tr>
<tr>
<td>Angioimmunoblastic T cell lymphoma</td>
<td>• Aggressive</td>
<td></td>
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<tr>
<td></td>
<td>• Symptoms include swollen lymph nodes, fever, rash and high levels of antibodies called gamma globulin in the blood</td>
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<tr>
<td>Anaplastic large cell lymphoma, ALK-positive</td>
<td>• Makes up 10 to 20 percent of all childhood lymphomas</td>
<td>• Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate, prednisone (Rayos),</td>
</tr>
<tr>
<td></td>
<td>• Mostly affects patients age 30 or younger</td>
<td>• romidepsin (Istodax), belinostat (Beleodaq), pralatrexate (Folotyn)</td>
</tr>
<tr>
<td></td>
<td>• Found mostly in males</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td>Anaplastic large cell lymphoma, ALK-negative</td>
<td>• Found mostly in adults ages 40 to 65</td>
<td>• Stem cell transplantation</td>
</tr>
<tr>
<td>Hodgkin lymphoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classical Hodgkin lymphoma (CHL)</td>
<td>• Third most common type of lymphoma</td>
<td>• Chemotherapy: doxorubicin (Adriamycin), bleomycin (BLENDIXANE), chlorambucil (Leukeran), vinblastine,</td>
</tr>
<tr>
<td></td>
<td>• Reed-Sternberg cells are present</td>
<td>• dacarbazine, cyclophosphamide, procarbazine (Matulane), vincristine sulfate, prednisone (Rayos),</td>
</tr>
<tr>
<td></td>
<td>• Classified as a B cell lymphoma</td>
<td>• mechlorethamine (Mustargen), brentuximab vedotin (Adcetris)</td>
</tr>
<tr>
<td>Mixed cellularity classical Hodgkin lymphoma</td>
<td>• Most common type of CHL, accounting for 60 to 80 percent of all cases</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Most often occurs in young adults ages 15 to 34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lymph nodes often contain scar tissue</td>
<td></td>
</tr>
<tr>
<td>Lymphocyte-rich classical Hodgkin lymphoma</td>
<td>• Accounts for less than 5 percent of CHL cases</td>
<td>• Chemotherapy</td>
</tr>
<tr>
<td></td>
<td>• Features many normal lymphocytes with very few abnormal cells and classical Reed-Sternberg cells</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td>Lymphocyte-depleted classical Hodgkin lymphoma</td>
<td>• Accounts for around 4 percent of all Hodgkin patients</td>
<td>• Chemotherapy</td>
</tr>
<tr>
<td></td>
<td>• Features few normal lymphocytes and several R-S cells</td>
<td>• Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Characteristics similar to non-Hodgkin lymphoma</td>
<td></td>
</tr>
<tr>
<td>Nodular lymphocyte predominant Hodgkin lymphoma</td>
<td>• Slow-growing</td>
<td>• Watchful waiting</td>
</tr>
<tr>
<td></td>
<td>• Accounts for 5 to 10 percent of HL cases</td>
<td>• Chemotherapy as used in classical Hodgkin lymphoma</td>
</tr>
<tr>
<td></td>
<td>• Occurs mostly in young men</td>
<td>• Radiation therapy</td>
</tr>
</tbody>
</table>
A nagging cough prompted me to see the doctor who after looking at my chest X-ray said, “I hope it’s just pneumonia”. Despite sharing the same hope, I was unfortunately diagnosed with Stage I lymphoma at the age of 34.

They found a fist-sized tumor next to my heart, so after invasive surgery, I began aggressive treatment and was lucky to be declared cancer-free five months after diagnosis.

The doctors and I agreed to hit the cancer hard rather than taking it slow, but I really don’t feel like I was properly prepared for the physical and emotional pain that still lingers today.

For two months I received a chemotherapy combination of ABVD (Adriamycin, Bleomycin, Vinblastine and Dacarbazine) every other week, which was pretty hard to handle.

The pain in my bones and joints was like nothing I’d ever experienced before. It hurt to sit, stand and even lie down, so I would just curl up on the floor on a blanket and cry because I was in so much pain.

I also lost my hair, my immune system was shot and I was constantly exhausted. I had mouth sores that even made drinking water a painful experience, but believe it or not, I eventually got used to feeling sick and tired. After a month of daily radiation therapy Monday through Friday, treatment was officially over.

I found the emotional aspects of this disease completely draining, and they continue to resurface from time to time. I buried a lot of my feelings because I felt like I needed to be strong at the time, so I’m pretty sure that’s why I’m dealing with a lot of them now.

Whenever I was asked how I was doing, I almost always said “fine,” no matter how bad I felt because I didn’t want to burden anyone with my true feelings. Don’t let this happen to you – it’s OK to have bad days and to let others know how you really feel.

My amazing friends and coworkers did their very best to keep my spirits up, and were there for me on the rare occasions where I would cry and say, “this really sucks” or “I don’t want to do this anymore.”

I struggled with the idea that I should be brave and stay positive but I needed to allow myself moments to be sad and angry and terrified — because all of those feelings were there all along. It helps to keep it real, or these emotions will creep up on you later in life.

Fear is an unavoidable emotion for all cancer patients, but the Leukemia and Lymphoma Society (LLS) personally set me up with a cancer survivor who called me directly to offer support. The group also offers information about treatment options, side effects and financial assistance, as well as connecting cancer patients with survivors from around the country. Even though it’s a large organization, LLS is great at connecting with each individual and helping them with their specific needs. I appreciated this so very much.

I continue to struggle with chemo brain, joint pain, and while I was a picky eater before, my digestive system will never be the same because my stomach is so sensitive. I found that guided imagery and meditation helped me the most, and I continue to practice them today to help me get through the bumps in the road.

Some very important people in my life provided me with amazing support and managed to keep my spirits up whenever they could. I’m eternally grateful for everyone who was there for me during this difficult time.

I know how lucky I was and continue to be for having such thoughtful co-workers and helpful friends surrounding me, and can only hope that other patients seek out and find the same kind of support.
Hodgkin lymphoma, also known as Hodgkin disease, is a cancer of the lymphatic system. It's far less common than non-Hodgkin lymphoma, accounting for only 10 percent of lymphoma diagnoses and an estimated 9,050 expected new cases in the United States in 2015.

DEVELOPMENT AND CLASSIFICATION
Hodgkin lymphoma is characterized by the presence of large, abnormal B cells (called Reed-Sternberg [R-S] cells), possibly in addition to other abnormal cell types. Hodgkin lymphoma typically starts in the lymph nodes and may spread from one lymph node to another. It can also spread to other organs.

Hodgkin lymphoma has been divided into two main classifications: classical Hodgkin lymphoma and nodular lymphocyte predominant Hodgkin lymphoma. Classical Hodgkin lymphoma has several subtypes that account for 95 percent of all cases of Hodgkin lymphoma. Nodular lymphocyte predominant Hodgkin lymphoma accounts for the remaining five percent. See Table 1 for more information.

RISK FACTORS FOR HODGKIN LYMPHOMA
While the exact cause is unknown, risk for developing Hodgkin lymphoma has been linked to several factors:
- **Age:** Although it can develop in children and adults of all ages, Hodgkin lymphoma is most common in young adults between the ages of 15 and 40 and adults age 55 or older.
- **Family history:** People who have close relatives with Hodgkin lymphoma are at a slightly increased risk for developing the disease.
- **Organ transplantation:** Treatment with certain drugs used after an organ transplant can increase the risk of developing Hodgkin lymphoma.
- **Certain viruses:** Those infected with viruses such as mononucleosis, the Epstein-Barr virus, and HIV/AIDS are at a higher risk for developing the disease.

**SYMPTOMS OF HODGKIN LYMPHOMA**
Some people with Hodgkin lymphoma do not experience any symptoms, but when symptoms do occur, they generally include swelling of the lymph nodes (often painless), fever, night sweats, unexplained weight loss, unexplained itchiness and lack of energy. Hodgkin lymphoma located in the chest may cause additional symptoms, including chest discomfort, coughing and shortness of breath.

**DIAGNOSING HODGKIN LYMPHOMA**
In addition to a physical exam and reviewing your medical history, your doctor may perform the following diagnostic tests and procedures to diagnose Hodgkin lymphoma:
- **Biopsy:** Doctors remove and examine lymph nodes and other tissues to check for lymphoma cells.
- **Immunohistochemistry:** This process is used during a biopsy evaluation to distinguish between different cells; this helps to determine the exact type of Hodgkin lymphoma.

**TREATMENT OF HODGKIN LYMPHOMA**
Advancements in both the diagnosis and treatment of Hodgkin lymphoma have helped contribute to the cure rate of more than 80 percent of patients. Most patients will receive some form of chemotherapy, sometimes followed by radiation therapy, in the treatment of classical Hodgkin lymphoma. Stem cell transplantation may be an option for some patients with Hodgkin lymphoma that has relapsed (returns after treatment) or becomes refractory (doesn’t respond to treatment). Surgery may also be considered under special circumstances but is used primarily to obtain a biopsy for diagnostic purposes.

Many promising therapies for Hodgkin lymphoma are currently being studied in clinical trials, and although the cure rate for HL is already high, researchers continue to look for ways to treat patients who are resistant to treatment or who relapse.

<table>
<thead>
<tr>
<th>Type</th>
<th>Subtype (if applicable)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classical Hodgkin lymphoma</strong></td>
<td>Nodular sclerosis</td>
<td>This is the most common subtype, accounting for 60 to 80 percent of all Hodgkin lymphomas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Involved lymph nodes contain areas composed of R-S cells mixed with normal white blood cells.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lymph nodes often contain prominent scar tissue.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This subtype is most common in young adults age 15 to 34 and in females.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nodular sclerosis is considered highly curable.</td>
</tr>
<tr>
<td></td>
<td>Mixed cellularity</td>
<td>This subtype accounts for approximately 15 to 30 percent of all Hodgkin lymphomas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Involved lymph nodes contain several R-S cells in addition to many other cell types.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This subtype is more common in older adults age 55 to 74, children age 0 to 14 and patients with autoimmune disorders.</td>
</tr>
<tr>
<td></td>
<td>Lymphocyte-rich</td>
<td>This subtype accounts for less than 5 percent of all Hodgkin lymphomas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Several normal lymphocytes and few R-S cells are present.</td>
</tr>
<tr>
<td></td>
<td>Lymphocyte-depleted</td>
<td>This subtype occurs in around 4 percent of all Hodgkin lymphoma patients.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are few normal lymphocytes and several R-S cells, which have characteristics similar to non-Hodgkin lymphoma.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This subtype is aggressive and usually diagnosed after the disease is widespread.</td>
</tr>
<tr>
<td><strong>Nodular lymphocyte predominant Hodgkin lymphoma</strong></td>
<td></td>
<td>This type accounts for 5 to 10 percent of all Hodgkin lymphomas and is most common in men younger than 35.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Most lymphocytes are normal (not cancerous), and typical R-S cells are usually not found. Large, abnormal B cells (popcorn cells) can be seen in addition to small B cells, which may be nodular (knot-like) in form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NLPHL is slow-growing and typically diagnosed early, resulting in a high survival rate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This type of Hodgkin lymphoma may develop into non-Hodgkin lymphoma.</td>
</tr>
</tbody>
</table>
There are approximately 584,133 people in the United States living with non-Hodgkin lymphoma (NHL), either with active disease or in remission, and nearly 72,000 new cases are diagnosed annually. As the most common cancer of the lymphatic system, NHL accounts for approximately 90 percent of all lymphoma diagnoses.

DEVELOPMENT AND CLASSIFICATION OF NHL

NHL is not a single disease but instead represents a group of several closely related cancers. The World Health Organization estimates there are more than 60 subtypes of NHL, some of which are more common than others. Although the various types of NHL share some common features, they differ in their microscopic appearance, molecular features, how they grow, their impact on the body, and treatment options.

NHLs are divided into two major groups: B cell lymphomas, developing from abnormal B lymphocytes, and T cell lymphomas, developing from abnormal T lymphocytes. B cell lymphomas account for 85 to 90 percent of all NHLs, and T cell lymphomas comprise the remaining 10 to 15 percent. NHLs can be further classified as indolent (slow-growing) or aggressive (fast-growing).

RISK FACTORS FOR NHL

While the exact cause is unknown, the risk for developing NHL has been linked to a number of factors:

- **Age**: NHL is most common in people age 60 or older, although it can develop in children and adults of all ages.
- **Sex**: NHL is more common in men than in women.
- **Race**: Caucasians are more likely to develop NHL than African-Americans and Asian-Americans.
- **Chemical exposure**: Long-term exposure to certain chemicals, such as pesticides, fertilizers or organic solvents, raises the risk of developing NHL.
- **Family history**: The children and siblings of people with NHL may be at an increased risk for developing the disease.
- **Previous cancer treatment**: Prior treatment with some chemotherapy drugs and/or radiation therapy can raise the risk of developing NHL.
- **Organ transplantation**: Treatment with certain drugs used after an organ transplant can increase the risk.
- **Autoimmune diseases**: Anyone affected with an autoimmune disease, such as Crohn’s disease, rheumatoid arthritis or psoriasis, has a greater risk of developing NHL.
- **Certain viruses**: Those infected with certain viruses, such as Epstein-Barr, human T-lymphotropic virus type 1 (HTLV-1), HIV/AIDS or hepatitis C – or certain bacteria such as H. pylori – are at a higher risk for developing NHL.

SYMPTOMS OF NHL

Some people with NHL do not experience any symptoms. When symptoms do occur, however, they generally include swelling of the lymph nodes (which may be painful), fever, night sweats, unexplained weight loss, easy bruising or bleeding, severe or frequent infections, headaches, blurry vision, and lack of energy. Other symptoms, such as abdominal pain, chest pain, difficulty breathing, facial numbness and trouble speaking, may also be present depending on the location of the tumor.

DIAGNOSING NHL

In addition to a physical exam and medical history, your doctor may perform the following diagnostic tests and procedures:

- **Biopsy**: Using a number of different techniques, doctors remove and examine various lymph nodes, tissues and fluids to check for lymphoma cells.

- **Immunophenotyping**: This process is used during a biopsy evaluation to distinguish among different cells and determine the exact type of NHL.
- **Other genetic tests**: Various genetic tests look for gene and chromosome changes in the DNA of lymphoma cells.
- **Bone marrow aspiration and biopsy**: These procedures remove and evaluate bone marrow tissue samples.
- **Complete blood count**: This blood test counts the number of white blood cells, red blood cells and platelets in your blood.
- **Serum lactate dehydrogenase (LDH)**: This blood test measures your body’s level of LDH, an enzyme related to energy. Elevated levels may be associated with a poor prognosis.

TREATMENT OF NHL

Many treatment options exist for NHL patients, including watchful waiting, chemotherapy, radiation therapy, targeted therapy, immunotherapy and stem cell transplantation. The treatment plan depends on the type of lymphoma and the stage of disease as well as other factors, including age, prior therapies received, and your overall health.

After initial successful therapy, some patients may relapse (disease returns) or the disease may become refractory (unresponsive to treatment). Numerous treatment options, often called secondary therapies, are available for these patients. Many of the recently FDA-approved therapeutic agents, as well as several currently being studied in clinical trials, focus specifically on patients with relapsed or refractory disease. Be sure to discuss all of your treatment options with your doctor before beginning treatment, and ask about available clinical trials for which you may be eligible.
Follicular lymphoma is the second most common form of non-Hodgkin lymphoma, accounting for approximately 20—30 percent of all NHL diagnoses in the United States. Follicular lymphoma occurs most commonly in adults over the age of 60, with equal rates of occurrence in males and females; this specific disease is rare in young people.

Follicular lymphoma affects B cell lymphocytes and is usually slow-growing, or indolent. It usually begins in the lymph nodes. The cells can spread into the blood and bone marrow. Other internal organs, including the liver and spleen, may also be affected.

**SYMPTOMS OF FOLLICULAR LYMPHOMA**

Some people with follicular lymphoma do not experience any symptoms. When symptoms do occur, they generally include swelling or enlargement of the lymph nodes (which is often, but not always, painless), fatigue, fever, night sweats, unexplained weight loss, easy bruising or bleeding, and frequent infections.

Other symptoms, such as abdominal pain, chest pain and difficulty breathing, may also be present depending on the area of the body in which the lymphocytes collect.

**STAGING FOLLICULAR LYMPHOMA**

To stage follicular lymphoma, doctors will run a series of tests to find out how far the disease has spread and which areas of the body it’s affecting. Based on the results, the doctor will assign a stage to the disease. The Ann Arbor staging system for follicular lymphoma is the most commonly used system and the higher the stage number, the more advanced the disease.

In addition to this staging system, oncologists also use the Follicular Lymphoma International Prognostic Index (FLIPI) to predict the risk of disease recurrence and overall survival. The FLIPI takes into account the age and general health of the patient, the stage of the disease, the hemoglobin levels, how many lymph nodes are involved, and the presence or absence of elevated levels of an enzyme called lactate dehydrogenase in the blood. Points are assigned for each of these factors and the lower the score the better the prognosis (predicted outcome from treatment).

Lastly, the World Health Organization recommends that follicular cancer also receives a histological grade, which is determined by the appearance of cells under a microscope. The grade defines how aggressive or slow growing the cancer cells are likely to be and helps doctors make various treatment decisions, including when treatment should start. The higher the grade, the more likely the disease is to progress.

**TREATMENT**

Because follicular lymphoma grows so slowly, doctors may decide to not treat it right away and instead suggest a “watchful waiting” approach. Several treatment options are available, though, if the disease begins to progress. Your specific treatment plan will be selected according to several factors, including your overall health and the stage of your disease. Some of the most common options to treat follicular lymphoma include chemotherapy, targeted therapy, immunotherapy, radiation therapy and stem cell transplantation. Combination therapy is often used in the treatment of follicular lymphoma and frequently includes a targeted therapy drug combined with one or more chemotherapy drugs (see Table 1).

Over time, some follicular lymphomas transform into an aggressive (fast-growing) diffuse B-cell type of lymphoma, so it’s important to regularly monitor the disease.

**RISK FACTORS FOR FOLLICULAR LYMPHOMA**

While the exact cause of follicular lymphoma is unknown, mutations in DNA (the hereditary genetic material found in cells) lead to the development of the disease. Although the cause of these mutations is largely unknown, research suggests that certain risk factors may play a role in the development of follicular lymphoma, including having or being treated for certain autoimmune or immune deficiency disorders; long-term exposure to chemicals, such as pesticides and fertilizers; taking drugs to lower immune system function, such as when receiving an organ transplant; certain cancer treatments; having chronic infections and exposure to radiation. Those with a family history of disease and individuals who are overweight or who consume a high-fat diet may also be at an increased risk. The likelihood of developing the disease increases with age, with most cases occurring in people 60 or older. In the United States, more Caucasians are affected than African or Asian Americans.

**TAKE CONTROL**

If you have follicular lymphoma, you can help yourself feel more in control by learning as much as you can about the specific characteristics of your disease, your treatment options and ways you can help make yourself healthier, both physically and emotionally. Survivors often credit a balance of regular exercise and plenty of rest to feeling better during and after follicular lymphoma treatment. Healthy eating habits also help, as they can help people achieve – and maintain – a healthy weight.

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**TABLE 1**

<table>
<thead>
<tr>
<th>Treatment type</th>
<th>Drugs that may be used to treat follicular lymphoma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemotherapy</strong></td>
<td>cyclophosphamide, vincristine sulfate, prednisone (Rayos), benda mustine (Treanda), chlorambucil (Leukeran), doxorubicin</td>
</tr>
<tr>
<td><strong>Targeted therapy</strong></td>
<td>idelalisib (Zydelig)</td>
</tr>
<tr>
<td><strong>Immunotherapy</strong></td>
<td>rituximab (Rituxan), ibritumomab tiuxetan (Zevalin)</td>
</tr>
<tr>
<td><strong>Combination therapy regimens</strong></td>
<td>R-CVP: rituximab combined with cyclophosphamide, vincristine sulfate (Marquibo) and prednisone (Rayos)</td>
</tr>
<tr>
<td></td>
<td>R-CHOP: rituximab combined with cyclophosphamide, doxorubicin (Doxil), vincristine sulfate (Marquibo) and prednisone (Rayos)</td>
</tr>
<tr>
<td></td>
<td>R-Bendamustine: rituximab combined with bendamustine (Treanda)</td>
</tr>
<tr>
<td><strong>Clinical Trial</strong></td>
<td>Revlimid(R): lenalidomide (Revlimid) combined with rituximab</td>
</tr>
</tbody>
</table>

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**ADDITIONAL RESOURCES**

- **American Cancer Society**: [www.cancer.org](http://www.cancer.org)
  - Treating B-cell non-Hodgkin lymphoma
- **Lymphoma Research Foundation**: [www.lymphoma.org](http://www.lymphoma.org)
  - Follicular Lymphoma
- **Leukemia & Lymphoma Society**: [www.lls.org](http://www.lls.org)
  - NHL Staging
- **Lymphoma Information Network**: [www.lymphomainfo.net](http://www.lymphomainfo.net)
  - Follicular lymphoma
I'm living with Relapsed FL.

P.S.

Brought our grandkids here last weekend. Bought more tickets on Wednesday. Guess where tonight’s date night was?

Ask your doctor about ZYDELIG, an oral treatment option for people with relapsed Follicular Lymphoma (FL) who have received at least 2 prior medicines.

ZYDELIG is first in a new class of drugs for patients with returning or relapsed FL who have received at least 2 prior medicines. In a clinical trial of 72 patients with relapsed FL, 54% responded to treatment with ZYDELIG, with 8% experiencing remission and 46% experiencing a partial response. ZYDELIG was approved based on response rates. Continued approval of ZYDELIG for FL is based on additional studies to determine if it improves symptoms or survival.

IMPORTANT SAFETY INFORMATION

What is the most important information I should know about ZYDELIG?

ZYDELIG can cause serious side effects that can lead to death, including:

- **Liver problems.** Your doctor will do blood tests before and during your treatment with ZYDELIG to check for liver problems. Tell your doctor right away if you get yellowing of your skin or the white part of your eyes (jaundice), dark or brown (tea colored) urine, pain in the upper right side of your stomach area (abdomen), or bleeding or bruising more easily than normal.

- **Severe diarrhea.** Diarrhea is common with ZYDELIG and can sometimes be severe. Tell your doctor right away if the number of bowel movements you have in a day increases by 6 or more. Ask your doctor about medicines you can take to treat your diarrhea.

- **Lung or breathing problems.** Your doctor may do tests to check your lungs if you have breathing problems during treatment with ZYDELIG. Tell your doctor right away if you get new or worsening cough, shortness of breath, difficulty breathing, or wheezing.

(continued on next page)
Important Safety Information for ZYDELIG (cont’d)

- **Tear in intestinal wall (perforation).** Tell your doctor or get medical help right away if you get new or worsening stomach area (abdomen) pain, chills, fever, nausea, or vomiting.

If you have any of the above serious side effects during treatment with ZYDELIG, your doctor may completely stop your treatment, stop your treatment for a period of time, or change your dose of ZYDELIG.

**Who should not take ZYDELIG?**

- If your doctor determines you have a history of serious allergic or skin reactions.

**What are the other possible side effects of ZYDELIG?**

ZYDELIG can cause serious side effects, including:

- **Severe skin reactions.** Tell your doctor if you get painful sores or ulcers on your skin, lips, or in your mouth, or severe rash with blisters or peeling skin.

- **Serious allergic reactions (anaphylaxis).** Tell your doctor or get medical help right away if you have a serious allergic reaction.

- **Low white blood cell count (neutropenia).** Your doctor will check your blood counts regularly during treatment with ZYDELIG. Tell your doctor right away if you have a fever or any signs of an infection.

The most common side effects of ZYDELIG include fever, feeling tired, nausea, cough, stomach area (abdomen) pain, and chills.

**What should I tell my doctor before taking ZYDELIG?**

- All of your medical conditions, including if you have liver, lung, or breathing problems.

- **If you are pregnant or plan to become pregnant.** ZYDELIG may harm your unborn baby. Women who are able to become pregnant should use effective birth control (contraception) during treatment with ZYDELIG and for 1 month after stopping treatment. Talk to your doctor about birth control methods. Tell your doctor right away if you become pregnant during treatment with ZYDELIG.

- **If you are breastfeeding or plan to breastfeed.** You and your doctor should decide if you will take ZYDELIG or breastfeed. You should not do both.

- **All the medicines you take,** including prescription and over-the-counter medicines, vitamins, and herbal supplements. ZYDELIG and certain other medicines may affect each other.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

For more information please see the Brief Summary of full Prescribing Information with important warnings on the next pages.
What is the most important information I should know about ZYDELIG?

ZYDELIG can cause serious side effects that can lead to death, including:

- **Liver problems.** Your doctor will do blood tests before and during your treatment with ZYDELIG to check for liver problems. Tell your doctor right away if you get any of the following symptoms of liver problems:
  - Yellowing of your skin or the white part of your eyes (jaundice)
  - Dark or brown (tea colored) urine
  - Pain in the upper right side of your stomach area (abdomen)
  - Bleeding or bruising more easily than normal
- **Severe diarrhea.** Diarrhea is common with ZYDELIG and can sometimes be severe. Tell your doctor right away if the number of bowel movements you have in a day increases by six or more. Ask your doctor about medicines you can take to treat your diarrhea.
- **Lung or breathing problems.** Your doctor may do tests to check your lungs if you have breathing problems during treatment with ZYDELIG. Tell your doctor right away if you get new or worsening cough, shortness of breath, difficulty breathing, or wheezing.
- **Tear in intestinal wall (perforation).** Tell your doctor or get medical help right away if you get new or worsening stomach area (abdomen) pain, chills, fever, nausea, or vomiting.

If you have any of the above serious side effects during treatment with ZYDELIG, your doctor may completely stop your treatment, stop your treatment for a period of time, or change your dose of ZYDELIG.

See “What are the possible side effects of ZYDELIG?” for more information about side effects.

What should I tell my doctor before taking ZYDELIG?

Before taking ZYDELIG, tell your doctor about all of your medical conditions, including if you:

- Have liver problems.
- Have lung or breathing problems.
- Are pregnant or plan to become pregnant. ZYDELIG may harm your unborn baby. Females who are able to become pregnant should use effective birth control (contraception) during treatment with ZYDELIG and for 1 month after stopping treatment. Talk to your doctor about birth control methods that may be right for you. Tell your doctor right away if you become pregnant during treatment with ZYDELIG.
- Are breastfeeding or plan to breastfeed. It is not known if ZYDELIG passes into your breast milk. You and your doctor should decide if you will take ZYDELIG or breastfeed. You should not do both.

Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements. ZYDELIG and certain other medicines may affect each other. Know the medicines you take. Keep a list of your medicines and show it to your doctor and pharmacist when you get a new medicine.
What is ZYDELIG?
ZYDELIG is a prescription medicine used to treat people with:
- Follicular B-cell non-Hodgkin Lymphoma (FL) when the disease has come back after treatment with at least two prior medicines. ZYDELIG was approved based on response rates. Continued approval of ZYDELIG for FL is based on additional studies to determine if it improves symptoms or survival. It is not known if ZYDELIG is safe and effective in children less than 18 years of age.

Who should not take ZYDELIG?
- If your doctor determines you have a history of serious allergic or skin reactions.

How should I take ZYDELIG?
- Take ZYDELIG exactly as your doctor tells you to take it.
- Your doctor may change your dose of ZYDELIG or tell you to stop taking ZYDELIG. Do not change your dose or stop taking ZYDELIG without first talking to your doctor.
- Take ZYDELIG 2 times a day.
- You may take ZYDELIG with or without food.
- Take ZYDELIG tablets whole.
- Do not miss a dose of ZYDELIG. If you miss a dose of ZYDELIG by less than 6 hours, take the missed dose right away. Then take your next dose as usual. If you miss a dose of ZYDELIG by more than 6 hours, wait and take the next dose of ZYDELIG at your usual time.

What are the possible side effects of ZYDELIG?
ZYDELIG can cause serious side effects, including:
- See “What is the most important information I should know about ZYDELIG?”
- Severe skin reactions. Tell your doctor if you get any of the following symptoms during treatment with ZYDELIG:
  - Painful sores or ulcers on your skin, lips, or in your mouth.
  - Severe rash with blisters or peeling skin.
- Anaphylaxis. Tell your doctor or get medical help right away if you have a serious allergic reaction while taking ZYDELIG.
- Low white blood cell count (neutropenia). Your doctor will check your blood counts regularly during treatment with ZYDELIG. Tell your doctor right away if you have a fever or any signs of an infection while taking ZYDELIG.

The most common side effects of ZYDELIG include fever, feeling tired, nausea, cough, stomach area (abdomen) pain, and chills.
Tell your doctor if you have any side effect that bothers you or that does not go away. These are not all the possible side effects of ZYDELIG. Call your doctor for medical advice about side effects.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.
There is no denying it’s been difficult on all of us, including myself. In the beginning, I focused so whole-heartedly on my husband that I never paid attention to my own needs. As a result, three years after he was diagnosed, I started to have panic attacks and anxiety. My doctor diagnosed them as Post Traumatic Stress Disorder (PTSD) from the cumulative stress I was enduring. Finally knowing something needed to change, I began taking walks and exercising regularly. I started progressive muscle relaxation techniques and incorporated calming music. I realized that I couldn’t take care of anyone else if I didn’t take care of myself first. I’m proud to say now that it’s been two years since my last panic attack.

This journey has taught me that I am a lot stronger than I gave myself credit for. I’ve learned to enjoy the simplest pleasures and to treat every day like a holiday. It was hard for me to accept that I can’t do everything by myself, but now I know that it’s okay, it’s important to ask others for help. That is what your support system is for.

Some time ago his parents told us that we needed to take things one day at a time. From that advice came the awareness that each day is a new beginning that comes with renewed strength. Don’t be afraid to ask for help or to admit you are struggling; cancer is hard on everyone and all journeys are different. And know that it’s not always about saying the right thing, but that just by being present for your loved one can sometimes say more to them than any words.
Generally, cancers fall into one of two categories. They are either solid tumor or hematological (blood) cancers. Leukemia is a type of blood cancer that starts in the blood and bone marrow and can be categorized into four major types: acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML). These are described further below and in the following pages. Leukemias can also involve lymph nodes or the liver and spleen. An estimated 54,270 new cases of leukemia are expected to be diagnosed in the United States in 2015.

Leukemia is the abnormal growth and accumulation of blood cells in the body. The type of blood cells and how rapidly they grow denotes what type of leukemia a patient has. Unlike normal blood cells, these abnormal cells aren’t able to fight infections well and can inhibit normal body functions, including the ability to produce healthy blood cells. Patients usually have markedly low healthy white cells, red blood cells and platelets. Consequently they are at high risk of infection and need frequent red blood cell and platelet transfusions.

ABOUT BLOOD AND BONE MARROW

To fully understand leukemia, it’s important to first gain a general understanding of the components of blood and bone marrow (see Figure 1).

- **Bone marrow**: The soft, spongy center of some bones that contains immature blood stem cells, mature blood-forming cells, fat cells, and tissues that support cell growth. This is the site where all blood cells are formed and mature before being released into the blood.
- **Platelets**: A component of blood that groups around wounds to form clots and stop bleeding.
- **Red blood cells (erythrocytes)**: A component of blood responsible for delivering oxygen to the body.
- **White blood cells (leukocytes)**: A component of blood that helps the body defend against infection.

While there are several types of white blood cells, they can be divided into two main categories for the purpose of understanding leukemia:

- **Granulocytes** are cells with enzyme-containing granules visible under a microscope. They develop from myeloblasts (immature cells found in bone marrow) into mature, infection-fighting cells. Subtypes of these cells include basophils, eosinophils and neutrophils.
- **Lymphocytes** are the primary cells in lymphoid tissue, which is a major part of the immune system. They develop from lymphoblasts (immature cells found in bone marrow) into mature, infection-fighting cells. Subtypes of these cells include B lymphocytes and T lymphocytes.

TYPES OF LEUKEMIA

The four major types of leukemia (ALL, AML, CLL, CML) can be divided into acute and chronic leukemia:

- **Acute leukemia** grows quickly and occurs when immature white blood cells increase rapidly, preventing bone marrow from making normal blood cells. Treatment should be immediate because these fast-growing cells can quickly become life-threatening.
- **Chronic leukemia** grows more slowly and occurs when white blood cells mature partly but not completely. These abnormal cells don’t fight infection as well as normal cells, and because they survive longer, they accumulate and crowd out normal cells. Progression is variable – some patients progress within weeks or months and some can be monitored safely for years.

Leukemias that begin in lymphoid stem cells are called lymphoid, lymphocytic or lymphoblastic leukemias; leukemias that start in myeloid cells are called myeloid, myelogenous, myelocytic or myeloblastic leukemias. See pages 18 to 34 for a full description of each of these types of leukemia.

In addition to these main types, a rare type of chronic leukemia, called hairy cell leukemia, affects lymphocytes in the bone marrow, blood and spleen. Under a microscope, these cells look like they’re covered with tiny hairs.

RISK FACTORS FOR LEUKEMIA

While the exact cause of leukemia is unknown, certain factors can raise your risk, including exposure to high levels of radiation; exposure to high levels of certain chemicals; certain chemotherapy drugs; and some medical conditions, including inherited disorders involving chromosomal and blood abnormalities.

SYMPTOMS OF LEUKEMIA

Symptoms of leukemia vary among patients and depend on the number of leukemia cells in the bloodstream, the type of leukemia, and the area of the body where leukemia cells collect. People with chronic leukemia may have no symptoms or mild symptoms, while people with acute leukemia often feel sick.

If the brain is affected, symptoms may include vomiting, confusion, headaches, seizures or loss of muscle control. Leukemia may also affect the digestive tract, heart, lungs, kidneys or testes. Some other common symptoms of both acute and chronic leukemia include fever, chills, night sweats, swollen or tender lymph nodes, frequent and recurrent infections, weakness, fatigue, easy bruising and bleeding, unexplained weight loss, loss of appetite, discomfort or swelling in the stomach area, and bone or joint pain.
Recent medical advances have had significant impact on the treatment of leukemia, as new drugs and therapies have been approved for both newly diagnosed leukemia and relapsed or treatment resistant leukemia. These approvals are increasing once-limited options for certain groups of patients, which is important because just as the symptoms of leukemia differ from person to person, so do treatment needs.

To determine the treatment most likely to work for your leukemia diagnosis, your doctor will consider the stage at the time of diagnosis. Stage is most commonly determined using the results of diagnostic testing, such as blood cell counts and the chromosome count inside the leukemia cells. This is different from staging for most other cancer types, which are typically staged based on the size of the tumor, whether lymph nodes contain cancer, and whether the cancer has spread beyond the original site. Leukemia staging uses a different system because it involves all of the bone marrow in a person’s body, and in many cases, it has already spread to other organs before diagnosis and this involvement does not necessarily mean a poor prognosis.

Other factors that affect treatment choices include the type of leukemia, your age and symptoms, whether leukemia cells are found in cerebrospinal fluid (the fluid in and around the spinal cord and brain), whether your leukemia was previously treated, and the disease progression. Treatment options for leukemia currently include watchful waiting, chemotherapy, targeted therapy, radiation therapy, stem cell transplantation and immunotherapy (also called biological therapy).

**WATCHFUL WAITING**
People with certain chronic forms of leukemia with no symptoms may not need immediate treatment. Waiting to start treatment until after symptoms emerge is called watchful waiting. It allows patients to avoid the side effects of treatment as long as possible.

You should still have regular checkups, perhaps every two or three months, to keep an eye on your health and look for symptoms. These appointments are important because you’ll need to start treatment as soon as the disease progresses.

**CHEMOTHERAPY**
Chemotherapy drugs are used to stop the growth of cancer either by killing cancer cells or by preventing them from dividing and growing. Chemotherapy is sometimes referred to as conventional chemotherapy to help distinguish it from targeted therapy.

Many leukemia patients receive some form of chemotherapy as a part of their treatment plan. It may consist of a single drug or multiple drugs given in combination. Chemotherapy drugs are either taken by mouth, administered into a vein, or injected under the scalp or through the back into the cerebrospinal fluid. Oral drugs are taken by mouth and can be taken at home; other types of chemotherapy are often administered in a doctor’s office, clinic or hospital.

Chemotherapy is usually given in cycles that consist of a treatment period followed by a break to allow normal cells to recover. The goal of chemotherapy treatment is complete remission of the disease, which occurs when all signs and symptoms of leukemia are gone and only normal cells can be detected in the blood and bone marrow.

**TARGETED THERAPY**
Targeted therapy uses drugs to block the growth of leukemia cells by targeting specific components of the cell. For example, tyrosine kinase inhibitors target the proteins created by a specific type of chromosomal abnormality found in leukemia cells. These proteins stimulate the growth of the leukemia cells and by targeting this protein, these drugs interfere with its function, which helps stop the growth of the leukemia cells.

The type of targeted therapy most likely to be effective depends on the specific type of leukemia. Treatment with targeted therapy is most commonly used for chronic myeloid leukemia (CML), chronic lymphocytic leukemia (CLL), and some forms of acute lymphocytic leukemia (ALL).

**RADIATION THERAPY**
Radiation therapy uses high-energy beams or particles to destroy cancer cells. Some patients may receive radiation to specific areas of the body where leukemia cells have accumulated, such as the spleen, brain or other organs, while others may receive radiation to

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**BY THE NUMBERS | LEUKEMIA**

**316,210**

Number of leukemia survivors living in the United States as of January 1, 2014.

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**Marrow Registry**

**Be the Match**
The National Marrow Donor Program operates Be the Match (https://bethematch.org), the largest marrow registry in the world. For patients diagnosed with blood cancers and diseases, stem cell transplantation may be the best option for treatment and cure. The first option in finding a match is to seek someone in a person’s family, with the best chance being a sibling. However, 70 percent of patients in need of a stem cell transplant do not have a familial match donor available, leaving many people in need of an unrelated donor. Because of this, organizations such as Be the Match have created registries with millions of potential donors willing to donate bone marrow to someone in need. Marrow and stem cell donations can be collected from blood through a peripheral blood stem cell (PBSC) donation, bone marrow or umbilical cord blood.

For more information on becoming a donor for someone in need, visit → https://bethematch.org
the entire body, called total-body irradiation, before a stem cell transplant.

**STEM CELL TRANSPLANTATION**

A stem cell transplant (also known as a bone marrow transplant) is an infusion of healthy stem cells into the body. The healthy cells can be collected from blood, bone marrow or umbilical cord blood, and they can come from the patient, a family member or another donor. Autologous stem cell transplantation is the term for transplants of the patient’s own stem cells, and allogeneic stem cell transplantation refers to transplants from a donor whose tissue matches the patient’s (see Figure 1).

Allogeneic transplants are the most common type of transplant used to treat certain forms of leukemia. The best chance for the closest match is often a sibling. Unfortunately, there is only a 25-percent chance of a sibling match. Often, there are no family members that match the patient, and in these cases, a matched unrelated donor (MUD) may be necessary. To find a volunteer MUD, your doctor will most likely reach out to a marrow registry, such as Be the Match (see sidebar). Umbilical cord stem cells may also be an option in some cases.

Before a stem cell transplant, most patients receive high-dose chemotherapy. A reduced-intensity transplant may be an option for patients unable to tolerate high-dose chemotherapy. Lower doses of chemo and radiation are used to reduce the number of cancer cells in the bone marrow prior to receiving donor stem cells. The infusion of healthy stem cells is then given through a catheter in a large vein in the neck or chest area, much like a blood transfusion. The infused stem cells allow healthy new blood cells to develop in the bone marrow.

**IMMUNOTHERAPY**

Immunotherapy uses the body’s own immune system to fight cancer. It can be used in combination with other treatments, as a maintenance therapy or by itself. Immunotherapy treatments currently being used or studied in the fight against blood cancers include donor lymphocyte infusions; interferons and interleukins; monoclonal antibodies, including radioimmunotherapy (radiation particles attached to monoclonal antibodies); reduced-intensity allogeneic stem cell transplant; and therapeutic cancer vaccinations. There are FDA-approved immunotherapy drugs for blood cancers; however, several types are still only available through clinical trials. Talk to your doctor about any clinical trials that may be appropriate for you.

The treatment options mentioned for leukemia all have the potential to cause side effects, so talk to your doctor before beginning treatment to better understand what to expect.

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**ADDITIONAL RESOURCES**

- Cancer Research Institute: [www.cancerresearch.org](http://www.cancerresearch.org)
- Cancer Immunotherapy, Leukemia
- CancerCare: [www.cancercare.org](http://www.cancercare.org)
- Leukemia

---

**FIGURE 1**

| FINDING A DONOR MATCH FOR STEM CELL TRANSPLANTATION |

- **70%** DO NOT FIND A FAMILIAL MATCH
- **76-97%** of patients find a match on a donor registry
- **25%** chance
- Siblings = ideal match
- Other family members such as parents or children
- Donor registry

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**HOPE**

If you know people who have cancer, have them call the Bloch Cancer Hotline. It may save their life!

800-433-0464  A program of the R.A. Bloch Cancer Foundation  blochcancer.org

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The most common types and subtypes of leukemia (as well as some rare forms) are included in the table below. Many of the possible treatments are also listed, but be sure to talk with your health care team about all of your treatment options.

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Description</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute lymphocytic (lymphoblastic) leukemia (ALL)</td>
<td>Abnormal lymphoblasts develop quickly and block normal bone marrow cell production</td>
<td>Chemotherapy: cyclophosphamide, vincristine sulfate (Marqibo), doxorubicin (Adriamycin), prednisone (Rayos), L-asparaginase (Elspar), pegaspargase ( Oncaspar), daunorubicin (Cerubidine, DaunoXome), mercaptopurine (Purixan), methotrexate (Trexall), cytarabine (Cytosar-U), clofarabine (Clolar), mepesuccinate (Synribo), mechlorethamine hydrochloride (Mustargen)</td>
</tr>
<tr>
<td>Acute precursor B cell (pre-B cell) lymphoblastic leukemia</td>
<td>Most common ALL subtype</td>
<td>Chemotherapy: cyclophosphamide, vincristine sulfate (Marqibo), doxorubicin (Adriamycin), prednisone (Rayos), L-asparaginase (Elspar), pegaspargase ( Oncaspar), daunorubicin</td>
</tr>
<tr>
<td>Acute precursor T cell (lymphoblastic) leukemia (T cell ALL)</td>
<td>Fast-growing</td>
<td>Chemotherapy: cyclophosphamide, vincristine sulfate (Marqibo), doxorubicin (Adriamycin), prednisone (Rayos), daunorubicin, L-asparaginase (Elspar), pegaspargase ( Oncaspar), nelarabine (Aranon)</td>
</tr>
<tr>
<td>Burkitt acute lymphoblastic leukemia (B-ALL)</td>
<td>Rare</td>
<td>Chemotherapy: cyclophosphamide, doxorubicin (Adriamycin), vincristine sulfate (Marqibo), methotrexate (Trexall), dexamethasone, etoposide (Etopophos)</td>
</tr>
<tr>
<td>Ph-positive (Philadelphia-positive) ALL</td>
<td>Affects one in four to five adults and 2 percent of children with ALL</td>
<td>Targeted therapy: imatinib (Gleevec), dasatinib (Sprycel), ponatinib (Iclusig)</td>
</tr>
<tr>
<td>Natural killer cell leukemia</td>
<td>Rare</td>
<td>Chemotherapy: cyclophosphamide, daunorubicin, doxorubicin (Adriamycin), dexmethylthasone, methotrexate (Trexall), L-asparaginase (Elspar), prednisone (Rayos)</td>
</tr>
<tr>
<td>Acute Myeloid Leukemia (AML)</td>
<td>Abnormal myeloblasts develop quickly and block normal bone marrow cell production</td>
<td>Chemotherapy: cyclophosphamide, cytarabine (Cytosar-U), daunorubicin, mitoxantrone hydrochloride, vincristine sulfate (Marqibo), idarubicin hydrochloride (Idamycin)</td>
</tr>
<tr>
<td>Chronic lymphocytic leukemia (CLL)</td>
<td>Slow-growing</td>
<td>Watchful waiting</td>
</tr>
<tr>
<td>B cell chronic lymphocytic leukemia (B-CLL)</td>
<td>Most common CLL subtype</td>
<td>Chemotherapy: bendamustine (Treanda), cyclophosphamide, fludarabine (Fludara)</td>
</tr>
<tr>
<td>Prolymphocytic leukemia (PLL)</td>
<td>Affects B or T cells</td>
<td>Chemotherapy: fludarabine (Fludara), chlorambucil (Leukeran), cyclophosphamide, doxorubicin (Adriamycin), arsine trioxide (Trisenox)</td>
</tr>
<tr>
<td>Hairy cell leukemia (HCL)</td>
<td>Rare, usually slow-growing</td>
<td>Watchful waiting</td>
</tr>
<tr>
<td>Large granular lymphocytic leukemia (LGLL)</td>
<td>Affects T cells or natural killer cells</td>
<td>Chemotherapy: methotrexate (Trexall), cyclophosphamide, doxorubicin (Adriamycin), prednisone (Rayos)</td>
</tr>
<tr>
<td>Adult T cell leukemia/lymphoma (ATLL)</td>
<td>4 subtypes: smoldering, chronic, acute, lymphomatous</td>
<td>Chemotherapy: cyclophosphamide, vincristine sulfate (Marqibo), doxorubicin (Adriamycin), prednisone (Rayos)</td>
</tr>
<tr>
<td>Chronic myeloid leukemia (CML)</td>
<td>Grows slowly at first</td>
<td>Targeted therapy: imatinib (Gleevec), dasatinib (Sprycel), nilotinib (Tasigna), bosutinib (Bosulif), ponatinib (Iclusig)</td>
</tr>
<tr>
<td>Chronic myelomonocytic leukemia (CMML)</td>
<td>Elevated number of monocytes</td>
<td>Chemotherapy: standard-dose or low-dose cytarabine (Cytosar-U), azacitidine (Vidaza), decitabine</td>
</tr>
</tbody>
</table>
My first thought when I learned that I had CML was — I don’t want to die! We decided to go to MD Anderson Cancer Center in Texas for my treatment. After a day of tests, the doctor came into my room, sat down, and visited like he didn’t have another thing in the world to do. “If I can keep you alive five years,” he said, “I think there will be a cure out there that will save your life.”

So they put me in a clinical trial, giving me daily interferon and cytarabine (araC) for five years. To be honest, I felt terrible the entire time. Food didn’t taste good, so I lost about 40 pounds. I ran a constant temperature, spiking to about 104 degrees when the treatment was injected. I lived on Tylenol for those five years.

I was lucky to have a supportive family, but watching my distress and not being able to do anything about it was hard on my wife, Linda, and our two kids. I know I sometimes had a temper and was less than nice during that time, and I feel bad for that. It’s the way we humans often are — when we feel the worst, we strike out at those closest to us. We shouldn’t, but we do.

I just took life day by day, and I didn’t quit working. I knew I could feel lousy at home or feel lousy at work, but if I sat at home I’d feel sorry for myself. It’s better to do something productive if at all possible.

When I couldn’t tolerate the side effects any longer, they took me off interferon and araC. Then the CML came back full blown. Fortunately, by then a clinical trial was able to offer me the experimental drug Gleevec, so I started taking it. Gleevec has side effects — but they’re minor compared to those of interferon and araC!

I’ve now been on Gleevec for 14-1/2 years. I currently take 400 mg daily and return to MD Anderson once a year for a checkup. I just got back from my latest appointment, which was great — no clinical signs of CML for the second year in a row. If that happens again next year, I might be able to stop taking Gleevec. In that case, I’d need blood tests every two months, and if the CML returned, I’d probably go back on Gleevec for the rest of my life.

I am so fortunate. In the 19 years since my diagnosis, I’ve had the joy of five grandchildren, the oldest soon turning 15. And I have a new attitude: Things that would have upset me in the past just roll off me like water off a duck’s back. If it’s not life or death, it’s not that important.

In my opinion, people facing a cancer diagnosis need the best medical care possible, a good attitude, support at home and a belief in something higher than themselves. I have those, and they’ve helped me stay alive.

I volunteer with the Bloch Cancer Hotline, which matches me with people diagnosed with CML. I encourage them, telling them they can win the fight with this disease and have a productive and fun life. I also tell them that a good attitude is extremely important.

I urge them to learn all they can about CML. When I was diagnosed 19 years ago, we found a lot of CML information in the library at MD Anderson. My doctor had written some of those publications, and I always kept an extra copy of one to send to anyone I met who had been diagnosed with CML.

Now, you can get information online at websites like PatientResource.com, which makes becoming informed so much easier. Armed with good information, a good attitude, good support, and strong faith, a person with CML can win against this disease.
Chronic myeloid leukemia (CML) is a type of leukemia that affects immune cells normally responsible for fighting infection. Considered rare, an estimated 6,660 new cases will be diagnosed in the United States in 2015, accounting for around 10 percent of all leukemia diagnoses. Advances in treatment, though, have resulted in a greater number of survivors, with approximately 1.2 to 1.5 million people currently living with CML worldwide. CML may also be referred to as chronic myelocytic, chronic myelogenous or chronic granulocytic leukemia.

DEVELOPMENT OF CML
CML is a slow-developing form of leukemia that affects certain white blood cells called granulocytes, which develop in bone marrow from immature cells called myeloblasts. CML starts when a genetic change (mutation) alters the normal development of granulocytes. In about 95 percent of people with CML, the genetic change involves a piece of one chromosome moving to another chromosome. This newly formed chromosome is called the Philadelphia chromosome (see Figure 1), which causes bone marrow to make too much of a protein called tyrosine kinase. The tyrosine kinase then causes too many stem cells to mature into abnormal granulocytes, leaving less room for healthy white blood cells, red blood cells and platelets.

RISK FACTORS FOR CML
Exposure to high-dose radiation is the only known environmental risk factor for CML. Aging also increases the risk of developing CML, as the average age at diagnosis is 65.

SYMPTOMS OF CML
Symptoms of CML develop slowly, and some people in the early phases don’t have any symptoms at the time of diagnosis. As the disease progresses, symptoms generally do occur. Because people with CML do not have enough red blood cells, they may develop anemia with symptoms of fatigue, weakness and shortness of breath. Other symptoms may include weight loss for no known reason, night sweats, fever, and bone or joint pain. If the cancer cells spread to the spleen, the spleen may become enlarged and cause pain below the ribs on the left side of the body.

DIAGNOSING CML
In addition to a physical exam and medical history, blood, bone marrow and lymph node tests may be used to diagnose CML. These diagnostic tests include:
- Complete blood count (CBC): This test counts the number of white blood cells, red blood cells and platelets in the blood.
- Blood chemistry tests: These tests measure the amount of certain chemicals in the blood.
- Bone marrow aspiration (BMA) and biopsy (BMB): These procedures remove and evaluate bone marrow tissue samples.
- Cytogenetic Test or Karyotyping: These tests look for the Philadelphia chromosome.
- Molecular Test: Looks for BCR-ABL gene fusion.
- Lumbar puncture (spinal tap): This test examines cerebrospinal fluid for leukemia cells, blood and other markers of disease.

Imaging tests, such as computerized tomography (CT) scans, magnetic resonance imaging (MRI) scans, ultrasounds and chest X-rays, may also be used to help determine the extent of the disease.

PHASES OF CML
CML develops in three phases based on the number of abnormal white blood cells in the blood or bone marrow: chronic phase, accelerated phase and blast phase (see Table 1).

TREATMENT OF CML
Standard treatments for CML include targeted therapy, immunotherapy, chemotherapy and stem cell transplantation. The treatment goal for patients with chronic phase CML is to return blood counts to normal, to reduce or eliminate the number of CML cells in the blood and bone marrow, and to preserve quality of life.

For patients in the accelerated phase and blast phase, the goal is also to eliminate CML cells in the blood and bone marrow (leading to remission), but if this isn’t possible, the goal is to return the CML to the chronic phase.

Tyrosine kinase inhibitors (TKIs) are targeted therapy drugs that serve as first-line treatments for people with CML. They block
A stem cell transplant is considered the only potentially curative treatment option for CML, but unfortunately, it’s not an option for all patients with CML. Your doctor will determine if the benefit of a transplant outweighs the risk. Typically, one of two types of transplant are used:

- **Allogeneic transplant:** Often preceded by high-dose chemotherapy, this transplant replaces the abnormal cells in the patient’s bone marrow with healthy stem cells from a donor.

- **Reduced-intensity transplant:** Although not a standard treatment for CML, this type may be an option for patients unable to tolerate high-dose chemotherapy. Lower doses of chemo and radiation are given prior to receiving donor stem cells.

Researchers are currently studying certain changes in DNA that may be responsible for CML. Based on this research, additional treatment options are currently being studied in clinical trials, including new treatment drugs, combination targeted therapy regimens and cancer vaccines.

### MEASURING CML TREATMENT RESPONSE

Monitoring treatment response is very important for your doctor to determine whether drugs or dosages should be changed to increase effectiveness or manage side effects. Your blood and bone marrow are usually checked within months of starting treatment, periodically throughout, and after treatment for a number of different responses. In addition to the diagnostic testing mentioned previously, tests used to monitor treatment response may include:

- **Karyotyping:** testing of a small sample of cells to identify chromosome abnormalities that may have caused the disease.

- **Florescence in situ hybridization (FISH):** testing specifically for the BCR-ABL gene associated with Ph+ leukemia cells.

### TABLE 1

<table>
<thead>
<tr>
<th>PHASES OF CML</th>
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<tbody>
<tr>
<td><strong>Stage</strong></td>
</tr>
<tr>
<td>Chronic phase</td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td>Accelerated phase</td>
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<tr>
<td>Blast phase</td>
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### TABLE 2

<table>
<thead>
<tr>
<th>LOG REDUCTION FOR PEOPLE WITH CML</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Log</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
</tr>
</tbody>
</table>

The abnormal protein created by the Philadelphia chromosome and regulate blood cell production. Three TKIs are available for the initial treatment of adults with newly diagnosed Philadelphia-positive CML in the chronic phase: dasatinib (Sprycel), imatinib (Gleevec) and nilotinib (Tasigna). In addition, bosutinib (Bosulif) and ponatinib (Iclusig) can be used for patients who are unable to tolerate or are resistant to other TKIs, and the immunotherapy drug interferon alfa (Roferon-A, Intron-A) may be another option. For patients who no longer respond to TKIs, traditional chemotherapy drugs, including omacetaxine (Synribo), may be given. Chemotherapy may also be used to help shrink an enlarged spleen or as part of treatment with a stem cell transplant.

### FIGURE 1

**Philadelphia Chromosome**

- **Normal chromosome 9**
- **Normal chromosome 22**
- **Altered chromosome 9**
- **Philadelphia chromosome (altered chromosome 22)**

©Patient Resource LLC
For adults with Philadelphia chromosome-positive chronic myeloid leukemia (CML),

I’VE GOT CML, I’VE GOT SUPPORT.

SPRYCEL® Assist

SPRYCEL ASSIST is a comprehensive patient support program for patients taking SPRYCEL. Designed around your needs, SPRYCEL ASSIST is there for you along your journey.

- Dedicated patient support coordinators
- $0 co-pay offer for eligible commercially insured patients*
- 1-month free for new, eligible Medicare, Medicaid, or cash patients*
- Information, support, and resources every step of the way

Speak to your healthcare professional or call 1-855-SPRYCEL to get enrolled today

INDICATIONS AND USAGE
SPRYCEL® (dasatinib) is a prescription medicine used to treat adults who have:

- newly diagnosed Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia (CML) in chronic phase.
- Ph+ CML who are no longer benefitting from, or did not tolerate, other treatment including Gleevec® (imatinib mesylate)

SELECT IMPORTANT SAFETY INFORMATION
SPRYCEL may cause serious side effects, including low blood cell counts, bleeding problems, fluid retention, heart problems, pulmonary arterial hypertension, severe skin reactions, and tumor lysis syndrome. Side effects of SPRYCEL which are considered common include: diarrhea, headache, tiredness, nausea, shortness of breath, skin rash, muscle pain, and fever. This is not a complete list of all side effects with SPRYCEL.

Tell your healthcare provider if you have any side effects while taking SPRYCEL.

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, antacids, and herbal supplements. Talk to your doctor about how these medicines or other products may interact with SPRYCEL.

If you take an antacid medicine, take it 2 hours before or 2 hours after your dose of SPRYCEL.

You should not drink grapefruit juice during treatment with SPRYCEL.

You are encouraged to report negative side effects of prescription drugs to FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

Please read the Important Safety Information on the following pages, including additional information on potential side effects with SPRYCEL and how other medications may interact with SPRYCEL.

*Subject to eligibility. Terms and conditions of the program are available at SPRYCELASSIST.com
SPRYCEL® (dasatinib)
IMPORTANT SAFETY INFORMATION FOR PATIENTS

It is not known if SPRYCEL is safe and effective in children younger than 18 years old.

Before taking SPRYCEL, tell your healthcare provider about all of your medical conditions, including if you:

- have problems with your immune system
- have liver problems
- have heart problems, including a condition called congenital long QT syndrome
- have low potassium or low magnesium levels in your blood
- are lactose (milk sugar) intolerant
- are pregnant or plan to become pregnant. SPRYCEL can harm your unborn baby. If you are able to become pregnant, you should use effective birth control during treatment and for 30 days after your final dose of SPRYCEL. Talk to your healthcare provider right away if you become pregnant during treatment with SPRYCEL
- are breastfeeding or plan to breastfeed. It is not known if SPRYCEL passes into your breast milk. You should not breastfeed during treatment and for 2 weeks after your final dose of SPRYCEL

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, antacids, and herbal supplements. If you take an antacid medicine, take it 2 hours before or 2 hours after your dose of SPRYCEL.

Take SPRYCEL exactly as your healthcare provider tells you to take it

- Your healthcare provider may change your dose of SPRYCEL or temporarily stop treatment with SPRYCEL. Do not change your dose or stop taking SPRYCEL without first talking to your healthcare provider
- Take SPRYCEL one (1) time a day
- Take SPRYCEL with or without food, either in the morning or in the evening
- Swallow SPRYCEL tablets whole with water. Do not cut or crush the tablets
- You should not drink grapefruit juice during treatment with SPRYCEL
- If you miss a dose of SPRYCEL, take your next scheduled dose at your regular time. Do not take two doses at the same time
- If you take too much SPRYCEL, call your healthcare provider or go to the nearest hospital emergency room right away

SPRYCEL may cause serious side effects, including:

- Low Blood Cell Counts: Low blood cell counts are common with SPRYCEL and can be severe, including low red blood cell counts (anemia), low white blood cell counts (neutropenia), and low platelet counts (thrombocytopenia). Your healthcare provider will do blood tests to check your blood cell counts regularly during your treatment with SPRYCEL. Call your healthcare provider right away if you have a fever or any signs of an infection during treatment with SPRYCEL
- Bleeding problems: SPRYCEL may cause severe bleeding that can lead to death. Call your healthcare provider right away if you have:
  - unusual bleeding or bruising of your skin
  - bright red or dark tar-like stools
  - decreased alertness, headache, or change in speech
• **Your body may hold too much fluid (fluid retention):** Fluid retention is common with SPRYCEL and can sometimes be severe. In severe cases, fluid may build up in the lining of your lungs, the sac around your heart, or your stomach cavity. Call your healthcare provider right away if you get any of these symptoms during treatment with SPRYCEL:
  - swelling all over your body
  - weight gain
  - shortness of breath and cough, especially if this happens with low levels of physical activity or at rest
  - chest pain when taking a deep breath
• **Heart problems:** SPRYCEL may cause an abnormal heart rate, heart problems, or a heart attack that can lead to death. Your healthcare provider will monitor the potassium and magnesium levels in your blood, and your heart function
• **Pulmonary Arterial Hypertension (PAH):** SPRYCEL may cause high blood pressure in the vessels of your lungs. PAH may happen at any time during your treatment with SPRYCEL. Your healthcare provider should check your heart and lungs before and during your treatment with SPRYCEL. Call your healthcare provider right away if you have shortness of breath, tiredness, or swelling all over your body (fluid retention)
• **Severe skin reactions:** SPRYCEL may cause skin reactions that can sometimes be severe. Get medical help right away if you get a skin reaction with fever, sore mouth or throat, or blistering or peeling of your skin or in the mouth
• **Tumor Lysis Syndrome (TLS):** TLS is caused by a fast breakdown of cancer cells. TLS can cause kidney failure and an abnormal heart beat. Kidney failure may require the need for dialysis treatment. Your healthcare provider may do blood tests to check you for TLS

Side effects of SPRYCEL which are considered common include: diarrhea, headache, tiredness, nausea, shortness of breath, skin rash, muscle pain, and fever.
Tell your healthcare provider if you have any side effect that bothers you or that does not go away. These are not all of the possible side effects of SPRYCEL.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

Please read the Brief Summary of the full Prescribing Information on the next page.

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Offering financial support*, educational information, and resources. See SPRYCELASSIST.com for more information.

*Subject to eligibility. Terms and conditions available at SPRYCELASSIST.com.
SPRYCEL® (Spry-sell) 
(dasatinib) 
Tablets

What is SPRYCEL (dasatinib)?
SPRYCEL® is a prescription medicine used to treat adults who have:
• newly diagnosed Philadelphia chromosome-positive (Ph+) chronic myeloid leukemia (CML) in chronic phase.
• Ph+ CML who no longer benefit from, or did not tolerate, other treatment, including Gleevec® (imatinib mesylate).
• Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ ALL) who no longer benefit from, or did not tolerate, other treatment.
It is not known if SPRYCEL is safe and effective in children younger than 18 years old.

Before taking SPRYCEL, tell your healthcare provider about all of your medical conditions, including if you:
• have problems with your immune system
• have liver problems
• have heart problems, including a condition called congenital long QT syndrome
• have low potassium or low magnesium levels in your blood
• are lactose intolerant
• are pregnant or plan to become pregnant. SPRYCEL can harm your unborn baby. If you are able to become pregnant, you should use effective birth control during treatment and for 30 days after your final dose of SPRYCEL.
• Talk to your healthcare provider right away if you become pregnant during treatment with SPRYCEL.
• are breastfeeding or plan to breastfeed. It is not known if SPRYCEL passes into your breast milk. You should not breastfeed during treatment and for 2 weeks after your final dose of SPRYCEL.

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, antacids, and herbal supplements. If you take an antacid medicine, take it 2 hours before or 2 hours after your dose of SPRYCEL.

How should I take SPRYCEL?
• Take SPRYCEL exactly as your healthcare provider tells you to take it.
• Your healthcare provider may change your dose of SPRYCEL or temporarily stop treatment with SPRYCEL. Do not change your dose or stop taking SPRYCEL without first talking to your healthcare provider.
• Take SPRYCEL one (1) time a day.
• Take SPRYCEL with or without food, either in the morning or in the evening.
• Swallow SPRYCEL tablets whole. Do not cut or crush the tablets.
• You should not drink grapefruit juice during treatment with SPRYCEL.
• If you miss a dose of SPRYCEL, take your next scheduled dose at your regular time. Do not take two doses at the same time.
• If you take too much SPRYCEL, call your healthcare provider or go to the nearest hospital emergency room right away.

What are the possible side effects of SPRYCEL?
SPRYCEL may cause serious side effects, including:
• Low Blood Cell Counts. Low blood cell counts are common with SPRYCEL and can be severe, including low red blood cell counts (anemia), low white blood cell counts (neutropenia), and low platelet counts (thrombocytopenia). Your healthcare provider will do blood tests to check your blood cell counts regularly during your treatment with SPRYCEL. Call your healthcare provider right away if you have a fever or any signs of an infection during treatment with SPRYCEL.
• Bleeding problems. SPRYCEL may cause severe bleeding that can lead to death. Call your healthcare provider right away if you have:
  o unusual bleeding or bruising of your skin
  o bright red or dark tar-like stools
  o decreased alertness, headache, or change in speech
• Your body may hold too much fluid (fluid retention). Fluid retention is common with SPRYCEL and can sometimes be severe. In severe cases, fluid may build up in the lining of your lungs, the sac around your heart, or your stomach cavity. Call your healthcare provider right away if you get any of these symptoms during treatment with SPRYCEL:
  o swelling all over your body
  o weight gain
  o shortness of breath and cough, especially if this happens with low levels of physical activity or at rest
  o chest pain when taking a deep breath
• Heart problems. SPRYCEL may cause an abnormal heart rate, heart problems or a heart attack that can lead to death. Your healthcare provider will monitor the potassium and magnesium levels in your blood, and your heart function.
• Pulmonary Arterial Hypertension (PAH). SPRYCEL may cause high blood pressure in the vessels of your lungs. PAH may happen at any time during your treatment with SPRYCEL. Your healthcare provider should check your heart and lungs before and during treatment with SPRYCEL. Call your healthcare provider right away if you have shortness of breath, tiredness, or swelling all over your body (fluid retention).
• Severe skin reactions. SPRYCEL may cause skin reactions that can sometimes be severe. Get medical help right away if you get a skin reaction with fever, sore mouth or throat, blistering or peeling of your skin or in the mouth.
• Tumor Lysis Syndrome (TLS). TLS is caused by a fast breakdown of cancer cells. TLS can cause you to have kidney failure and the need for dialysis treatment, and an abnormal heart beat. Your healthcare provider may do blood tests to check you for TLS.

Side effects of SPRYCEL which are considered common include:
• diarrhea
• shortness of breath
• headache
• skin rash
• tiredness
• muscle pain
• nausea
• fever
• Tell your healthcare provider if you have any side effect that bothers you or that does not go away. These are not all of the possible side effects of SPRYCEL. Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

How should I store SPRYCEL?
• Store SPRYCEL at room temperature between 68°F to 77°F (20°C to 25°C).
• Ask your healthcare provider or pharmacist about the right way to throw away outdated or unused SPRYCEL.
• Females who are pregnant should not handle crushed or broken SPRYCEL tablets.

Keep SPRYCEL and all medicines out of the reach of children.

General information about the safe and effective use of SPRYCEL.
Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. Do not use SPRYCEL for a condition for which it is not prescribed. Do not give SPRYCEL to other people even if they have the same symptoms you have. It may harm them. You can ask your healthcare provider or pharmacist for information about SPRYCEL that is written for health professionals.

What are the ingredients in SPRYCEL?
Active ingredient: dasatinib
inactive ingredients: lactose monohydrate, microcrystalline cellulose, croscarmellose sodium, hydroxypropyl cellulose, and magnesium stearate. The tablet coating consists of hypromellose, titanium dioxide, and polyethylene glycol.

Manufactured by:
Bristol-Myers Squibb Company
Princeton, NJ 08543 USA
Product of Ireland
For more information, go to www.sprycel.com or call 1-800-332-2056.

Rev Aug 2015
729US1501626-02-01
During your CML treatment, your health care team will perform various tests at different intervals to monitor your response. Keeping track of your results will help you make more informed decisions when you discuss treatment milestones with your doctor.

### CML TREATMENT RESPONSE CHART

*Write down your lab results below each test date*

For additional copies go to: [www.PatientResource.com/CMLTestTracker.pdf](http://www.PatientResource.com/CMLTestTracker.pdf)

<table>
<thead>
<tr>
<th>TIME FRAME</th>
<th>RESULTS</th>
<th>TREATMENT MILESTONE RECOMMENDATION</th>
<th>ACHIEVED RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 MONTHS AFTER STARTING TREATMENT</td>
<td>Date: _______ / _______ / _______</td>
<td>Complete hematologic response (CHR) with partial cytogenetic response or polymerase chain reaction (PCR) level less than 10% using the International Scale (IS)</td>
<td>☐ CHR achieved within 3 months ☐ Partial hematologic response, CHR in progress ☐ No hematologic response</td>
</tr>
<tr>
<td></td>
<td>WBC:</td>
<td>Blood cell counts have returned to normal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Platelets:</td>
<td>• WBC and platelet counts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ph+ cells (%):</td>
<td>• No detectable blast cells</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCR:</td>
<td>• Spleen has returned to normal size</td>
<td></td>
</tr>
<tr>
<td>6 MONTHS AFTER STARTING TREATMENT</td>
<td>Date: _______ / _______ / _______</td>
<td>Continued complete hematologic response with partial cytogenetic response (PCyR) or PCR level less than 10% using the IS</td>
<td>☐ PCyR achieved within 6 months ☐ PCyR in progress ☐ No cytogenetic response ☐ CHR achieved or in progress</td>
</tr>
<tr>
<td></td>
<td>WBC:</td>
<td>• Blood cell counts have returned to normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Platelets:</td>
<td>• Percentage of Ph+ chromosomes is below 35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ph+ cells (%):</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 MONTHS AFTER STARTING TREATMENT</td>
<td>Date: _______ / _______ / _______</td>
<td>Complete cytogenetic response (CCyR)</td>
<td>☐ CCyR achieved within 12 months ☐ CCyR in progress ☐ PCyR in progress</td>
</tr>
<tr>
<td></td>
<td>WBC:</td>
<td>• No detectable cells with Ph+ chromosome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Platelets:</td>
<td>• Few to no detectable cells with the BCR-ABL gene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ph+ cells (%):</td>
<td>• A 2-log reduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 MONTHS AFTER STARTING TREATMENT</td>
<td>Date: _______ / _______ / _______</td>
<td>Complete cytogenetic response with major molecular response (MMR)</td>
<td>☐ MMR achieved within 18 months ☐ CCyR in progress</td>
</tr>
<tr>
<td></td>
<td>WBC:</td>
<td>• No detectable cells with BCR-ABL gene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Platelets:</td>
<td>• A 3-log reduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ph+ cells (%):</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCR:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Understanding ALL

**This year, an estimated 6,250 people in the United States are expected to be diagnosed with acute lymphocytic leukemia (ALL). ALL is a type of fast-growing cancer of the blood and bone marrow (the spongy tissue inside certain bones that produces blood cells).**

## DEVELOPMENT OF ALL

ALL affects white blood cells called lymphocytes. Lymphocytes develop in bone marrow from immature cells called lymphoblasts, and become one of three types: B lymphocytes, T lymphocytes or natural killer cells. In people with ALL, lymphoblasts fail to develop to mature lymphocytes, turning into cancer cells.

ALL starts when a genetic change (mutation) occurs in the DNA of lymphocytes. For about 85 percent of people with ALL, the mutation occurs in B lymphocytes.

As the ALL cells multiply over time and spread throughout the lymphatic system, they replace the healthy lymphocytes in the bone marrow and lymph nodes. ALL can quickly move into the bloodstream and spread to other parts of the body, such as the lymph nodes, spleen, liver, cerebrospinal fluid and testicles.

## RISK FACTORS FOR ALL

The risk for developing ALL has been linked to a number of factors:

- **Age:** ALL most often occurs in children younger than five and adults older than 50.
- **Sex:** Men are more likely to develop ALL than women.
- **Race:** Caucasians are more likely to develop ALL than people of other races.
- **Radiation and chemical exposure:** High levels of radiation exposure increase the risk of developing the disease, as does exposure to certain chemicals.
- **Viral infections:** Certain viral infections, such as the Epstein-Barr virus, can raise the risk of developing ALL.
- **Inherited syndromes:** ALL itself does not appear to be an inherited disease, but other inherited diseases, such as Down syndrome, Klinefelter syndrome, Fanconi syndrome, Bloom syndrome, neurofibromatosis and ataxia telangiectasia, can increase the risk of developing ALL.

## SYMPTOMS OF ALL

People with ALL do not make enough red blood cells, so they may develop anemia with symptoms of fatigue, weakness and shortness of breath. They also do not make enough platelets, so they may bruise and bleed easily. And because their healthy white blood cell (neutrophil) count is low as well, they may be prone to infections.

If the abnormal lymphocytes produced in people with ALL collect in lymph nodes, the nodes may be swollen. These lymphocytes may also spread to the liver or spleen, which may cause swelling and abdominal pain. Other, more general symptoms of ALL include fever, night sweats, loss of appetite and weight loss.

## DIAGNOSING ALL

In addition to a physical exam and medical history, blood, bone marrow and lymph node tests are all used to diagnose ALL. These diagnostic tests include:

- **Complete blood count:** This test counts the number of white blood cells, red blood cells and platelets in the blood.
- **Flow cytometry:** This test helps determine whether an increase in the number of lymphocytes in the blood is caused by ALL, some other blood disorder, or a reaction to another condition such as an infection.
- **Genetic tests:** These tests look for chromosome changes in lymphocytes.
- **Bone marrow aspiration and biopsy:** These procedures remove and evaluate bone marrow tissue samples.
- **Lumbar puncture (spinal tap):** This test examines cerebrospinal fluid for leukemia cells, blood and other markers of disease.

## CLASSIFICATION OF ALL

ALL is classified into several groups by considering the type of lymphocyte the leukemia cells come from and how mature they appear.

## TREATMENT OF ALL

Standard treatments for ALL in adults include traditional chemotherapy, immunotherapy monoclonal antibodies, targeted therapy and stem cell transplantation. In special circumstances, radiation therapy and surgery may also be used.

Adult ALL patients are typically treated in three phases: induction, consolidation and maintenance.

**Induction** is designed to kill leukemia cells and put the cancer into remission (absence of disease activity). This phase involves intensive chemotherapy and usually lasts for about a month. A combination of drugs is often given and most commonly includes vincristine sulfate (Marqibo), daunorubicin (or other anthracycline drug) and dexamethasone or prednisone. Patients with Philadelphia positive ALL may also receive targeted therapy. (For a list of additional drug therapies for ALL see page 18.)

**Consolidation,** also called intensification or post-remission therapy, is designed to destroy any leftover, inactive leukemia cells that might regrow and cause a relapse. For many patients, this phase involves high-dose chemotherapy using the same or similar drugs from the induction phase. For a smaller number of patients, certain targeted therapies such as dasatinib (Sprycel), imatinib (Gleevec) or ponatinib (Iclusig) may be given, or a stem cell transplant may be recommended.

**Maintenance** is designed to prevent any new leukemia cells from growing. This phase lasts for approximately two years and typically involves a lower-dose chemotherapy regimen, likely with methotrexate (Trexall) and mercaptopurine (Purixan), possibly combined with vincristine and prednisone. Some patients may also receive targeted therapy.

In addition, because standard chemotherapy may not reach the brain and spinal cord to kill any leukemia lymphocytes located in those areas, ALL patients often receive central nervous system (CNS) prophylaxis. This type of treatment involves drug injections into the cerebrospinal fluid, high-dose chemotherapy, or radiation therapy directed at the brain and spinal cord to reach the CNS.
**About the most common type of chronic leukemia**

**Chronic lymphocytic leukemia (CLL)** is the most common form of leukemia in adults with an estimated 14,620 new cases expected to be diagnosed in the United States in 2015 and approximately 126,000 people living with or in remission from CLL (as of 2011).

**DEVELOPMENT OF CLL**

CLL is a slow-developing leukemia that affects white blood cells called lymphocytes, which are part of the body’s immune system. Lymphocytes develop in the bone marrow or lymph nodes from immature cells called lymphoblasts. These lymphoblasts mature into one of three types of lymphocytes: B lymphocytes, T lymphocytes or natural killer cells.

In people with CLL, lymphocytes that should normally stop dividing and die continue to multiply and live longer than normal cells. This leads to a massive accumulation of these lymphocytes in the blood, which is called leukemia. As the CLL cells expand uncontrollably, they interfere with the normal production of healthy white blood cells, red blood cells and platelets.

CLL starts when a genetic change (mutation) occurs in the DNA of lymphocytes—sometimes in a single lymphocyte. In 95 percent of people with CLL, the mutation occurs in B lymphocytes.

**RISK FACTORS FOR CLL**

While the cause of CLL is unknown, risk for the disease has been linked to many factors:

- **Age:** CLL most often occurs in people 60 years old or older, but risk begins to rise after age 50.
- **Sex:** Men are more likely to develop CLL than women.
- **Race:** Caucasians are more likely to develop CLL than people of other races.
- **Herbicides:** CLL has been linked to herbicides such as Agent Orange, which was used in the Vietnam War.
- **Family history:** A family history of CLL may also increase the risk of developing this disease.

People with CLL also have an increased risk of developing other cancers, including melanoma, Kaposi sarcoma, and cancers of the lung, bladder, stomach and throat.

**SYMPTOMS OF CLL**

Symptoms of CLL develop slowly, and many patients do not experience recognizable symptoms at the time they are initially diagnosed. When symptoms are present, they may include enlarged but painless lymph nodes, fatigue, unexplained weight loss, shortness of breath, fevers without evidence of infection, night sweats and frequent infections.

**DIAGNOSING CLL**

In addition to a physical exam and medical history, blood, bone marrow and lymph node tests may be used to diagnose CLL. These diagnostic tests can include:

- **Complete blood count:** This test counts the number of white blood cells, red blood cells and platelets in the blood.
- **Flow cytometry:** This test helps determine whether an increase in the number of lymphocytes in the blood is caused by CLL, some other blood disorder, or a reaction to another condition, such as an infection.
- **Genetic tests:** These look for chromosomal changes, as well as other genes important for cell growth and survival, in CLL cells.

**TREATMENT OF CLL**

Because current standard treatments for CLL are not believed to cure the disease, patients who have normal levels of red blood cells and platelets (Stages 0, I and II) may be monitored without treatment (watchful waiting). Once symptoms appear or blood counts worsen, treatment usually begins immediately.

Standard treatments for advanced stage and/or symptomatic CLL include chemotherapy, targeted therapy and immunotherapy. Several chemotherapies may be used to treat CLL, including fludarabine (Fludara), chlorambucil (Leukeran) and bendamustine (Treanda). Immunotherapy treatments include therapy with monoclonal antibodies such as rituximab (Rituxan), obinutuzumab (Gazyva), alemtuzumab (Campath), and ofatumumab (Arzerra). Targeted therapy used to treat CLL most commonly includes ibrutinib (Imbruvica) and idelalisib (Zydelig). Additional drug therapies that may be used to treat CLL are listed on page 18. For certain patients with high-risk disease or disease that has relapsed after multiple treatments, treatment may include stem cell transplant.

Although uncommon, radiation therapy may be used to relieve symptoms or shrink an enlarged spleen or lymph nodes. Surgery may be an option to remove the spleen (splenectomy) when it’s enlarged due to CLL.

The best treatment option for your diagnosis will depend on a variety of factors, including your treatment history and overall health.

---

**TABLE 1 | STAGES OF CLL**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>The blood contains too many lymphocytes but with normal red blood cell and platelet counts and no evidence of enlarged lymph nodes, spleen or liver.</td>
</tr>
<tr>
<td>I</td>
<td>The blood contains too many lymphocytes and lymph nodes are enlarged.</td>
</tr>
<tr>
<td>II</td>
<td>The blood contains too many lymphocytes, and the liver and/or spleen is enlarged; lymph nodes may be enlarged.</td>
</tr>
<tr>
<td>III</td>
<td>The blood contains too many lymphocytes and too few red blood cells. Lymph nodes, spleen and liver may be enlarged.</td>
</tr>
<tr>
<td>IV</td>
<td>The blood contains too many lymphocytes, too few platelets and may have too few red blood cells. Lymph nodes, spleen and liver may be enlarged.</td>
</tr>
</tbody>
</table>

**| CLL RISK LEVELS**

**Stage 0 = low risk / Stage I and II = intermediate risk / Stage III and IV = high risk**
Ask your doctor about ZYDELIG, an oral treatment option for people with relapsed Chronic Lymphocytic Leukemia (CLL) who have received prior cancer treatment when Rituxan® treatment alone may be used due to other health problems.

ZYDELIG is first of a new class of drugs for patients with relapsed CLL who have received prior cancer treatment when Rituxan® treatment alone may be used due to other health problems. In a clinical trial of 220 relapsed CLL patients, 66% of patients treated with ZYDELIG plus Rituxan® experienced no disease progression at one year, compared to 13% of patients treated with Rituxan® alone. The main purpose, or ‘primary endpoint’, of this study was progression-free survival; meaning how long patients would live without their cancer getting worse. In this study, patients on ZYDELIG plus Rituxan® had longer progression-free survival than those taking Rituxan® alone.

IMPORTANT SAFETY INFORMATION

What is the most important information I should know about ZYDELIG?

ZYDELIG can cause serious side effects that can lead to death, including:

• **Liver problems.** Your doctor will do blood tests before and during your treatment with ZYDELIG to check for liver problems. Tell your doctor right away if you get yellowing of your skin or the white part of your eyes (jaundice), dark or brown (tea colored) urine, pain in the upper right side of your stomach area (abdomen), or bleeding or bruising more easily than normal.

• **Severe diarrhea.** Diarrhea is common with ZYDELIG and can sometimes be severe. Tell your doctor right away if the number of bowel movements you have in a day increases by 6 or more. Ask your doctor about medicines you can take to treat your diarrhea.

• **Lung or breathing problems.** Your doctor may do tests to check your lungs if you have breathing problems during treatment with ZYDELIG. Tell your doctor right away if you get new or worsening cough, shortness of breath, difficulty breathing, or wheezing.

(continued on next page)
Important Safety Information for ZYDELIG (cont’d)

- **Tear in intestinal wall (perforation).** Tell your doctor or get medical help right away if you get new or worsening stomach area (abdomen) pain, chills, fever, nausea, or vomiting.

If you have any of the above serious side effects during treatment with ZYDELIG, your doctor may completely stop your treatment, stop your treatment for a period of time, or change your dose of ZYDELIG.

**Who should not take ZYDELIG?**

- **If your doctor determines you have a history of serious allergic or skin reactions.**

**What are the other possible side effects of ZYDELIG?**

ZYDELIG can cause serious side effects, including:

- **Severe skin reactions.** Tell your doctor if you get painful sores or ulcers on your skin, lips, or in your mouth, or severe rash with blisters or peeling skin.

- **Serious allergic reactions (anaphylaxis).** Tell your doctor or get medical help right away if you have a serious allergic reaction.

- **Low white blood cell count (neutropenia).** Your doctor will check your blood counts regularly during treatment with ZYDELIG. Tell your doctor right away if you have a fever or any signs of an infection.

The most common side effects of ZYDELIG include fever, feeling tired, nausea, cough, stomach area (abdomen) pain, and chills.

**What should I tell my doctor before taking ZYDELIG?**

- **All of your medical conditions,** including if you have liver, lung, or breathing problems.

- **If you are pregnant or plan to become pregnant.** ZYDELIG may harm your unborn baby. Women who are able to become pregnant should use effective birth control (contraception) during treatment with ZYDELIG and for 1 month after stopping treatment. Talk to your doctor about birth control methods. Tell your doctor right away if you become pregnant during treatment with ZYDELIG.

- **If you are breastfeeding or plan to breastfeed.** You and your doctor should decide if you will take ZYDELIG or breastfeed. You should not do both.

- **All the medicines you take,** including prescription and over-the-counter medicines, vitamins, and herbal supplements. ZYDELIG and certain other medicines may affect each other.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

For more information please see the Brief Summary of full Prescribing Information with important warnings on the next pages.
What is the most important information I should know about ZYDELIG?

ZYDELIG can cause serious side effects that can lead to death, including:

- **Liver problems.** Your doctor will do blood tests before and during your treatment with ZYDELIG to check for liver problems. Tell your doctor right away if you get any of the following symptoms of liver problems:
  - Yellowing of your skin or the white part of your eyes (jaundice)
  - Dark or brown (tea colored) urine
  - Pain in the upper right side of your stomach area (abdomen)
  - Bleeding or bruising more easily than normal
- **Severe diarrhea.** Diarrhea is common with ZYDELIG and can sometimes be severe. Tell your doctor right away if the number of bowel movements you have in a day increases by six or more. Ask your doctor about medicines you can take to treat your diarrhea.
- **Lung or breathing problems.** Your doctor may do tests to check your lungs if you have breathing problems during treatment with ZYDELIG. Tell your doctor right away if you get new or worsening cough, shortness of breath, difficulty breathing, or wheezing.
- **Tear in intestinal wall (perforation).** Tell your doctor or get medical help right away if you get new or worsening stomach area (abdomen) pain, chills, fever, nausea, or vomiting.

If you have any of the above serious side effects during treatment with ZYDELIG, your doctor may completely stop your treatment, stop your treatment for a period of time, or change your dose of ZYDELIG.

See “What are the possible side effects of ZYDELIG?” for more information about side effects.

What should I tell my doctor before taking ZYDELIG?

Before taking ZYDELIG, tell your doctor about all of your medical conditions, including if you:

- Have liver problems.
- Have lung or breathing problems.
- Are pregnant or plan to become pregnant. ZYDELIG may harm your unborn baby. Females who are able to become pregnant should use effective birth control (contraception) during treatment with ZYDELIG and for 1 month after stopping treatment. Talk to your doctor about birth control methods that may be right for you. Tell your doctor right away if you become pregnant during treatment with ZYDELIG.
- Are breastfeeding or plan to breastfeed. It is not known if ZYDELIG passes into your breast milk. You and your doctor should decide if you will take ZYDELIG or breastfeed. You should not do both.

Tell your doctor about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements. ZYDELIG and certain other medicines may affect each other. Know the medicines you take. Keep a list of your medicines and show it to your doctor and pharmacist when you get a new medicine.
What is ZYDELIG?
ZYDELIG is a prescription medicine used to treat people with
- Chronic Lymphocytic Lymphoma (CLL) in combination with rituximab when CLL comes back after prior cancer treatment when rituximab treatment alone may be used due to other health problems.

It is not known if ZYDELIG is safe and effective in children less than 18 years of age.

Who should not take ZYDELIG?
- If your doctor determines you have a history of serious allergic or skin reactions.

How should I take ZYDELIG?
- Take ZYDELIG exactly as your doctor tells you to take it.
- Your doctor may change your dose of ZYDELIG or tell you to stop taking ZYDELIG. Do not change your dose or stop taking ZYDELIG without first talking to your doctor.
- Take ZYDELIG 2 times a day.
- You may take ZYDELIG with or without food.
- Take ZYDELIG tablets whole.
- Do not miss a dose of ZYDELIG. If you miss a dose of ZYDELIG by less than 6 hours, take the missed dose right away. Then take your next dose as usual. If you miss a dose of ZYDELIG by more than 6 hours, wait and take the next dose of ZYDELIG at your usual time.

What are the possible side effects of ZYDELIG?
ZYDELIG can cause serious side effects, including:
- See “What is the most important information I should know about ZYDELIG?”
- **Severe skin reactions.** Tell your doctor if you get any of the following symptoms during treatment with ZYDELIG:
  - Painful sores or ulcers on your skin, lips, or in your mouth.
  - Severe rash with blisters or peeling skin.
- **Anaphylaxis.** Tell your doctor or get medical help right away if you have a serious allergic reaction while taking ZYDELIG.
- **Low white blood cell count (neutropenia).** Your doctor will check your blood counts regularly during treatment with ZYDELIG. Tell your doctor right away if you have a fever or any signs of an infection while taking ZYDELIG.

The most common side effects of ZYDELIG include fever, feeling tired, nausea, cough, stomach area (abdomen) pain, and chills.

Tell your doctor if you have any side effect that bothers you or that does not go away. These are not all the possible side effects of ZYDELIG. Call your doctor for medical advice about side effects.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.
Explaining AML

Acute myeloid leukemia (AML), also known as acute myelogenous leukemia, is a fast-developing cancer of the blood and bone marrow (the spongy tissue inside certain bones that produces blood cells). AML is the most prevalent type of acute leukemia, with an estimated 20,830 new diagnoses expected in the United States this year.

Development of AML

In a healthy person, the bone marrow has a very orderly process of making white blood cells, which are part of the body’s immune system, red blood cells, which carry oxygen, and platelets, which help to stop bleeding. White blood cells, also called granulocytes and monocytes, develop in the bone marrow from immature cells called myeloblasts. They are particularly important to the immune system as these cells increase in response to a bacterial infection, and decrease in number once the infection is under control. In someone with AML, genetic mutations cause the body to continue to make large amounts of myeloblasts. These cells do not function normally and accumulate in massive amounts within the bone marrow, thereby interfering with the production of healthy white blood cells, red blood cells and platelets. AML can quickly move into the bloodstream and spread to other parts of the body, such as the lymph nodes, spleen, liver, cerebrospinal fluid, skin, gums and testicles.

Risk Factors for AML

The risk for developing AML has been linked to a number of factors:
- **Age:** AML most often occurs in adults age 65 or older.
- **Sex:** Men are more likely to develop AML than women.
- **Smoking:** Smoking increases the risk of developing AML.
- **Radiation and chemical exposure:** High levels of radiation exposure increase the risk of developing the disease, as does exposure to some chemicals (such as benzene).
- **Chemotherapy drugs:** People who receive treatment with certain chemotherapy drugs have a higher risk of developing AML.

Blood Disorders: People with certain blood disorders have a greater risk of developing AML.

Inherited Syndromes: Some inherited diseases, such as Bloom syndrome and neurofibromatosis, can increase the risk of developing AML.

Family History: People with an identical twin who had AML in the first year of life or a close relative with AML have an increased risk of developing it themselves.

Symptoms of AML

People with AML do not make enough red blood cells, so they may develop anemia with symptoms of fatigue, weakness and shortness of breath. They also do not make enough platelets, so they may bruise and bleed easily. And because their healthy white blood cell (neutrophil) count is low as well, they may be prone to infections.

AML cancer cells are bigger than healthy white blood cells, which makes it harder for them to fit and travel through blood vessels. When the white blood cell count drastically increases, they can get stuck, and symptoms such as headache, weakness, слurred speech, drowsiness, confusion and vision problems may result.

Other symptoms of AML include bone or joint pain, abdominal and/or lymph node swelling, fever, night sweats, loss of appetite and weight loss.

Diagnosing AML

In addition to a physical exam and medical history, blood, bone marrow and lymph node tests may be used to diagnose AML. These diagnostic tests can include:
- **Complete blood count:** This test counts the number of white blood cells, red blood cells and platelets in the blood.
- **Blood chemistry tests:** These measure the amount of certain chemicals in the blood.
- **Bone marrow aspiration and biopsy:** These procedures remove and evaluate bone marrow tissue samples.
- **Cytogenetic and genetic tests:** These look for chromosomal and genetic changes that have occurred in myeloblasts.
- **Lumbar puncture (spinal tap):** This examines cerebrospinal fluid for leukemia cells, blood and other markers of disease.

Imaging tests, such as computerized tomography (CT) scans, magnetic resonance imaging (MRI) scans, ultrasounds and chest X-rays, may also be used to help determine the extent of the disease.

Classification of AML

Two different systems are commonly used to classify AML. The French-American-British (FAB) system classifies AML based largely on the appearance of the leukemia cells under a microscope. Subtypes M0 through M5 all begin in immature white blood cells. M6 begins in immature red blood cells, and M7 begins in immature platelets. The World Health Organization (WHO) system takes into account several prognostic factors to help better classify AML based on a patient’s outlook.

Treatment of AML

The treatment plan for AML largely depends on many different factors including the patient’s age, other medical problems, the subtype of the disease and the results of the diagnostic tests. The most common type of treatment is chemotherapy, which may be followed by stem cell transplantation. Surgery and radiation therapy are rarely used.

AML patients are typically treated in two phases. The induction phase is designed to kill leukemia cells and put the cancer into remission (absence of disease activity). This phase typically, but not always, involves intensive chemotherapy and usually lasts for about a month. Drugs used during this phase commonly include cytarabine (Cytosar-U) in combination with an anthracycline drug, such as daunorubicin or idarubicin hydrochloride (Idamycin).

The consolidation phase, also called intensification or post-remission therapy, is designed to destroy any leftover, inactive leukemia cells that might regrow and cause a relapse. This phase typically involves a higher dose of chemotherapy, most often with cytarabine, or, for some patients may include stem cell transplant.

Patients with a certain type of AML, called acute promyelocytic leukemia, require a low dose of chemotherapy and/or All-Trans-Retinoic Acid (ATRA) and arsenic trioxide (Trisenox) for months or years after the conclusion of induction.
An estimated 26,850 people are expected to be diagnosed with multiple myeloma in 2015 in the United States and more than 77,000 people are living with the disease today. As a type of blood cancer, multiple myeloma primarily affects the blood, bone marrow and lymph nodes and may or may not create an actual tumor. It develops when abnormal plasma cells transform and grow uncontrollably, preventing healthy cells from growing in the bone marrow (see Figure 1).

ABOUT BONE MARROW, LYMPHOCYTES AND PLASMA CELLS
To fully understand multiple myeloma, it’s important to first gain an understanding of bone marrow, lymphocytes and plasma cells. 

Bone marrow is the soft, spongy center of the bone that contains immature blood stem cells, more mature blood-forming cells, fat cells and tissues that support cell growth.

Lymphocytes are the primary cells in lymphoid tissue, which is a major part of the immune system. They develop from lymphoblasts (immature cells found in bone marrow) into mature, infection-fighting cells. Subtypes of these cells include B lymphocytes and T lymphocytes.

Plasma cells develop from B lymphocytes. They produce antibodies to help fight infection and are mainly found in the bone marrow.

Each plasma cell in your body makes antibodies to one specific substance. Because your body has many types of plasma cells, it can protect itself against many types of bacteria and disease.

Abnormal, cancerous plasma cells are called myeloma cells. Like normal plasma cells, myeloma cells also make antibodies. But because myeloma cells are all identical to one another, they produce too much of the same antibody, which accumulates in the blood and urine.

In people with multiple myeloma, the myeloma cells multiply uncontrollably. In time, the myeloma cells accumulate in bone marrow, solid parts of bone and occasionally in other organs. When the cells collect in bone marrow, they suppress the growth of healthy white blood cells, red blood cells and blood platelets. When they collect in solid bone, they cause holes called lytic lesions. The majority of people with multiple myeloma have these lesions when they’re diagnosed with the disease.

RISK FACTORS FOR MULTIPLE MYELOMA
While the exact cause of multiple myeloma is unknown, certain factors can raise your risk, including a family history of multiple myeloma, exposure to radiation, obesity, and other plasma cell diseases such as monoclonal gammopathy of undetermined significance. Age, race and gender also play a role. Multiple myeloma is more common in older adults than in youths, in men than in women, and in African-Americans than in Caucasians.

Studies have also found that most people with multiple myeloma have identifiable genetic mutations in their plasma cells. For example, in about half of those with multiple myeloma, part of one chromosome in the myeloma cells has switched with part of another chromosome. Another common finding reveals that certain parts of chromosome 13 are missing from these cells. Research is ongoing to determine the precise role these changes in DNA play in the cause of multiple myeloma.

SYMPTOMS OF MULTIPLE MYELOMA
Symptoms of the disease vary among patients and depend on the number of myeloma cells in the body and the area of the body where they collect. Some people with multiple myeloma may not have symptoms early in the course of the disease, and doctors may simply monitor the condition until specific symptoms appear. However, the most common symptoms include bone and calcium problems, low blood counts and infections.

Multiple myeloma cells tend to interfere with bone growth, causing the bones to break down quickly without replenishing themselves. This causes bone weakness and can contribute to an increased amount of calcium in the blood, known as hypercalcemia. The overproduction of abnormal plasma cells also crowds out healthy blood-forming cells and may cause low platelet levels. This can lead to problems such as anemia (shortage of red blood cells), leucopenia (shortage of normal white blood cells) and thrombocytopenia (low platelets). These can all result in side effects such as fatigue, increased bleeding and bruising, and an inability to properly fight infections.

The crowding of normal cells also leads to interruption of normal antibody production. Normal plasma cells create antibodies in response to harmful infections; however, multiple myeloma cells create a useless antibody, called the M protein, which continues to reproduce and accumulate. This buildup not only affects the body’s ability to fight infections but also commonly causes harm to the kidneys, leading to damage and even kidney failure.
Development, diagnosis and staging

To develop an effective treatment plan for multiple myeloma, doctors must first properly diagnose the disease and assign it a stage. Diagnosing multiple myeloma can be difficult, however, because it often causes few or no symptoms until it has reached an advanced stage.

MGUS AND THE DEVELOPMENT OF MULTIPLE MYELOMA

Multiple myeloma almost always begins as a condition known as monoclonal gammopathy of undetermined significance (MGUS). MGUS begins in the bone marrow, the area of the body responsible for regulating the production of cells. People with MGUS have an abnormal protein antibody in the bone marrow known as a monoclonal immunoglobulin (M protein). The presence of the M protein indicates a small amount of abnormal plasma cells in the bone marrow. However, these abnormal cells do not form tumors or cell masses. People with MGUS do not have any other signs of myeloma, such as low red blood cell counts or bone damage.

People with MGUS have a 1 percent chance per year of progressing to multiple myeloma or lymphoma. The higher the number of abnormal plasma cells in the bone marrow means a higher level of the M protein, indicating an increased risk that MGUS will progress to multiple myeloma. Although most cases of multiple myeloma are preceded by MGUS, it’s unknown whether MGUS is always present before diagnosis. Unfortunately, there are currently no treatments for MGUS and no preventive treatments to keep MGUS from progressing to myeloma.

So far, only a few known precursors to multiple myeloma exist, including MGUS and indolent (or smoldering) myeloma. Indolent myeloma is a form of myeloma with higher levels of the M protein and more abnormal plasma cells than with MGUS and no other signs or symptoms of multiple myeloma.

DIAGNOSING MULTIPLE MYELOMA

If symptoms suggest a patient may have multiple myeloma, testing to diagnose the disease typically includes blood and urine lab tests, X-rays and a bone marrow biopsy or bone marrow aspiration, in which a small amount of bone marrow is removed through a needle. A pathologist (a doctor who specializes in medical diagnosis) then examines the marrow under a microscope. Special testing may be done on the sample to check for chromosomal changes. Additionally, your doctor may order a biopsy of fat from around your stomach to check for amyloidosis, a condition related to multiple myeloma, in which abnormal proteins are present in organs and tissues.

A conclusive diagnosis of multiple myeloma requires either 60 percent or more abnormal plasma cells in the bone marrow; a biopsy indicating a plasma cell tumor; or 10 percent abnormal plasma cells in addition to one of the following conditions:

- Anemia (low red blood cell count)
- Hypercalcemia (increased blood calcium level)
- Poor kidney function
- Abnormalities or holes in the bones found on an imaging test
- An increase in one light chain (antibody protein) to a level 100 times that of the other light chains (antibody proteins)

Individuals with 10 to 60 percent plasma cells in the bone marrow, high levels of the M protein in the blood and high levels of light chains in the urine, but with normal blood cell counts, calcium levels and normal kidney and organ functioning may be diagnosed with indolent myeloma.

Imaging tests are also used to check for damage caused by multiple myeloma and to help determine extent and spread of disease, including:

- X-rays to look for bone damage
- Magnetic resonance imaging (MRI) scans to look for myeloma cells and plasma cell tumors (plasmacytomas)
- Computerized tomography (CT) scans to look for tumors or abnormalities in soft tissues
- Positron emission tomography (PET) scans or integrated PET/CT scans to create images of bones, organs and tissues for evaluation

STAGES OF MULTIPLE MYELOMA

After your diagnosis, doctors will classify your multiple myeloma into stages. The results of your diagnostic testing will be used to determine the extent of the cancer and predict treatment outcomes. Staging is important in determining the treatment plan most likely to be effective for your specific multiple myeloma diagnosis. It is also used in the classification of multiple myeloma into three categories: MGUS, asymptomatic myeloma and symptomatic myeloma.

The staging system most commonly used for multiple myeloma is the International Staging System, which classifies multiple myeloma into three stages (see Table 1) based on the blood levels of two proteins:

- Beta-2-microglobulin is a protein in the immune system, and high levels may indicate the presence of a large number of myeloma cells and the possibility of kidney damage. The level of this protein goes up as myeloma becomes more advanced.
- Albumin is a protein made in the liver, and low amounts of serum albumin (blood albumin) may indicate a poorer outlook.

Although less frequently, multiple myeloma may also be staged using the Durie-Salmon staging system, which focuses on four main factors of multiple myeloma: the M protein, calcium levels in the blood, severity of bone damage, and hemoglobin levels in the blood.

### TABLE 1

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Stage I</td>
<td>Beta-2-microglobulin levels are in the normal range (less than 3.5 milligrams per liter of blood), and albumin levels are normal (equal to or greater than 3.5 grams per deciliter of blood).</td>
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<tr>
<td>Stage II</td>
<td>Beta-2-microglobulin levels are above normal (between 3.5 and 5.5 mg per liter of blood), or albumin levels are below normal (less than 3.5 g per deciliter of blood) with normal beta-2-microglobulin levels (less than 3.5 mg per liter of blood).</td>
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<tr>
<td>Stage III</td>
<td>Beta-2-microglobulin levels are high (greater than 5.5 mg per liter of blood).</td>
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ADDITIONAL RESOURCES

- American Cancer Society: [www.cancer.org](http://www.cancer.org)
- American Society of Clinical Oncology: [www.cancer.net](http://www.cancer.net)
- National Cancer Institute: [www.cancer.gov](http://www.cancer.gov)

What You Need To Know About Multiple Myeloma
Your single source for personal support

Celgene Patient Support® is a free service that will help you get the Celgene medicine your doctor has prescribed. You will speak with the same Specialist every time you call.

Do you need help paying for a Celgene medicine? Co-pays for Celgene medicines are $25 or less for patients who qualify.

To enroll or for more information:

Call 1-800-931-8691
Monday – Friday, 8 AM – 7 PM ET

Enroll online in Celgene Patient Support® now at www.celgenepatientsupport.com

E-mail us at patientsupport@celgene.com
Advances in research and treatment for multiple myeloma continue to make an impact on the disease and those living with it as a chronic condition. As new drugs and therapies are studied and approved to treat multiple myeloma, many patients are living longer and have more options when it comes to improving overall quality of life while managing their diagnosis.

Treatment options for multiple myeloma include watchful waiting, chemotherapy, targeted therapy, radiation therapy and stem cell transplantation. Treatment regimens usually include a combination of these therapies. Standard treatments for multiple myeloma include chemotherapy in combination with targeted therapy drugs, corticosteroids, autologous stem cell transplant and occasionally radiation (usually used to treat symptoms). Just as the symptoms of multiple myeloma differ from person to person, however, so do the treatment options. Factors that affect treatment choices include the stage of the disease as well as your age, overall health and symptoms.

WATCHFUL WAITING
People diagnosed with MGUS and those with early-stage myeloma who don’t have any symptoms may not need immediate treatment. Waiting to start treatment until after symptoms emerge is called watchful waiting. It allows patients to avoid the side effects of treatment as long as possible without affecting the outcome.

You should still have regular checkups, perhaps every two or three months, to keep an eye on your health and look for symptoms. These appointments are important because you’ll need to start treatment as soon as the disease progresses.

CHEMOTHERAPY
Chemotherapy drugs, also called cytotoxic drugs, are used to stop the growth of cancer either by killing cancer cells or by preventing them from dividing and growing. Chemotherapy is considered a “systemic” treatment because the drugs travel throughout the body through the bloodstream. Chemotherapy is sometimes referred to as conventional chemotherapy to distinguish it from targeted therapy, which also involves the use of drugs that travel throughout the body.

Most multiple myeloma patients receive some form of chemotherapy, which may consist of a single drug or multiple drugs given in combination. The drugs are either taken by mouth or administered into a vein through a needle or catheter (a thin, flexible tube). Oral drugs may be taken at home, and others may be given in a doctor’s office, clinic or hospital.

Chemotherapy is usually given in cycles that consist of a treatment period followed by a break to allow your normal cells to recover. The goal of chemotherapy treatment is complete remission of the disease. Remission occurs when all signs and symptoms of multiple myeloma are gone.

TARGETED THERAPY
Like chemotherapy, targeted therapy is considered a systemic treatment because the drugs travel throughout the body through the bloodstream. Targeted therapy drugs seek out myeloma cells’ specific genes, proteins and tissue environments to block cancer growth and spread. These new drug therapies help your cancer care team better control the disease while limiting damage to normal cells.

<table>
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<th>DRUG TREATMENTS FOR MULTIPLE MYELOMA</th>
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<td><strong>Drug Combinations</strong></td>
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<td><strong>Supportive Therapy</strong></td>
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| | • Immunoglobulin replacement therapy can boost the immune system to help fight infections.
Two types of targeted therapy drugs often used to treat myeloma include angiogenesis inhibitors and proteasome inhibitors. Angiogenesis inhibitors prevent the formation of new blood vessels that feed the growth of cancer cells and tumors. Proteasome inhibitors target enzymes called proteasomes that digest proteins in cells, helping to slow or stop myeloma cell growth and development.

RADIATION THERAPY
Radiation therapy uses high-energy beams or particles to destroy cancer cells. Some patients with localized myeloma or bone pain that does not lessen with chemotherapy may receive radiation to specific areas of the body. The most commonly used type is external beam radiation, in which radiation is directed at the cancer cells from an external source.

STEM CELL TRANSPLANTATION
A stem cell transplant (also known as a bone marrow transplant) is an infusion of healthy stem cells into the body. The healthy cells can be collected from blood, bone marrow or umbilical cord blood, and they can come from the patient, a family member or another donor. Autologous stem cell transplantation is the term for transplants of the patient’s own stem cells, and allogeneic stem cell transplantation refers to transplants from a donor whose tissue matches the patient’s.

Autologous transplants are the most common type of transplant used to treat multiple myeloma; however, an allogeneic transplant may be used in patients with a high risk of relapse, those who aren’t responding fully to other treatments, or patients who have relapsed after prior successful therapy. Allogeneic transplants may also be available as a treatment option for multiple myeloma through clinical trials.

Before a stem cell transplant, most patients receive high-dose chemotherapy. The infusion of healthy stem cells is then given through a catheter in a large vein in the neck or chest area, much like a blood transfusion. The stem cells allow healthy new blood cells to develop in the bone marrow.

CLINICAL TRIALS
Clinical trials are the controlled studies of investigational drugs. The main goal of clinical trials is to validate a drug’s safety and effectiveness, but they also help determine a variety of other factors, including the drug’s associated side effects and recommended dosages. In some cases, patients may want to participate in a clinical trial to gain access to certain medications before they’re officially approved by the FDA.

Patients who participate in clinical trials are offered many benefits, including early access to potentially revolutionary new medications, playing an important role in advancing medical research, and receiving the very best standard of care with close monitoring by experts in the field. Talk to your doctor about any clinical trials you may qualify for so that you know all of your treatment options.

The goals of each type of treatment are to reduce the number of myeloma cells in the body, end symptoms such as bone pain or fatigue, and induce disease remission. All of the treatment options mentioned for multiple myeloma have the potential for side effects, so talk to your doctor before treatment starts to better understand what you can expect.

SUPPORTIVE THERAPIES
To help reduce the symptoms and complications that result from multiple myeloma, doctors often recommend various supportive therapies:

- **Bisphosphonate drugs** can help prevent bone lesions and reduce the pain and risk of fractures.
- **Erythropoietin and darbepoietin** can help treat anemia.
- **Immunoglobulin replacement therapy** can boost the immune system to help fight infections.
- **Plasmapheresis** can be used to remove myeloma protein from the blood.
- **Drinking more water** or other fluids can help flush out the kidneys and improve their ability to filter impurities from the blood, thereby preventing kidney problems or failure.
In 2007, Rogelio Romero went from working the hardest job he’d ever had to fighting the toughest battle he’d ever faced. Employed at the time as a chicken catcher, Rogelio was familiar with aches and pains from bending, lifting and moving quickly at a Tyson Foods plant. But when his lower back pain became too much to bear, he visited a doctor. First, he was diagnosed with a pulled muscle, then maybe a kidney stone. After that, Rogelio was treated for what his doctor thought was a fungal infection in his lungs. But his journey was just beginning.

It took the doctors three months to figure out my symptoms, that they were actually caused by multiple myeloma. I was diagnosed in September, and I started chemotherapy just two months later in November. I don’t remember my doctor ever specifying my stage of cancer during the diagnosis, but some of the information may have been lost in translation because English is my second language.

At first, the doctor was more worried about me being paralyzed than he was worried about my cancer. I feel like I’m pretty lucky that I’m still walking because the pain in my lower back was that bad.

I was initially treated with chemotherapy before undergoing two vertebroplasty surgeries, where doctors injected a liquid cement-like material through a hollow needle into my affected vertebrae. After that came two autologous stem cell transplants using my own stem cells. The doctors were able to move stem cells from my bone marrow into my bloodstream for collection before giving me high-dose chemotherapy. My blood was drawn and run through a machine that separated out the stem cells before returning the blood to me. The stem cells were then frozen. After the chemotherapy, the thawed stem cells were returned to my blood in a process similar to a transfusion. The doctors told me that the stem cells then made their way to my bone marrow to help my body produce healthy new blood cells.

For the most part, the procedures have been successful, although I’ve had a few ups and downs during the process. A couple of years ago, for example, I developed shingles, which affected my sciatic nerve.

It was unreal how much pain the shingles caused. It was physically and emotionally taxing because I couldn’t sleep. But through time, I learned how to deal with the pain at some level. Personally, I tried to stay calm, relaxed and positive. The extreme physical pain forced me to focus on and deal with my emotional pain.

A lot of times, we don’t want to deal with physical, emotional or spiritual pain because we don’t know that it helps us grow as humans. But it teaches us how to decide among priorities, and to better compare one situation to another.

My friends and family have also helped me heal, especially my 11-year-old daughter. It was hard for me to let her know I had cancer because she was so young at the time. I knew it would break her heart, but by dealing with this, she’s been forced to learn and mature. She’s been a great support to me. I encouraged her to write a book about our experience. I told her, “You need to share your story with others because you would be surprised how many people you can help by sharing your feelings and your story. It can touch a lot of hearts and be helpful to a lot of people.”

Be honest, be real and tell the truth. That’s the best way to write.

The most important thing I’ve learned is to enjoy life as much as you can. When you have cancer, you automatically switch to a new level of your life. You see things differently than you did before you were diagnosed. Now I try to appreciate everything, I try to be conscious about what’s going on around me, and I try to put what I’ve learned into practice.
ALABAMA
Birmingham – University of Alabama at Birmingham; 205-934-1911; www.bone marrow.uab.edu

ARIZONA
Gilbert – Banner MD Anderson Stem Cell Transplantation & Cellular Therapy Program; 480-258-6444; www.bannerhealth.com/mdanderson
Phoenix – Mayo Clinic Hospital; 480-515-6290; www.mayoclinic.org/bone-marrow-transplant/scttreatment.html
Phoenix – Phoenix Children’s Hospital; 888-808-5437; www.phoenixchildrens.org
Scottsdale – Virginia G. Piper Cancer Center at HonorHealth; 480-882-4000; www.shc.org/cancer
Tucson – The University of Arizona Cancer Center—North Campus; 520-694-2873; www.azcc.arizona.edu/patients/clinic/bmt-leukemia

ARKANSAS
Little Rock – UAMS Myeloma Institute; 501-686-7195; www.myeloma.uams.edu

CALIFORNIA
Duarte – City of Hope National Medical Center; 800-826-4673; www.cityofhope.org/hct
La Jolla – Scripps Cancer Center; 858-554-8597; www.scripps.org/services/transplant-services_blood-and-marrow-transplant
La Jolla – UC San Diego Moores Cancer Center; 866-773-2703; http://cancer.ucsd.edu/care-centers/blood-and-marrow-transplant
Loma Linda – Loma Linda University Medical Center; 909-558-4000; www.lomailindahospital.org/medical-center/our-services/cancer-center
Los Angeles – Cedars-Sinai Medical Center; 800-233-2771; www.cedars-sinai.edu/patients/services_blood-and-marrow-transplant-program
Los Angeles – Children’s Hospital Los Angeles; 323-361-2546; www.chla.org/bmt

Los Angeles – UCSF Norris Comprehensive Cancer Center; 323-865-0816; www.cancer.keckmedicine.org/blood-diseases-center
Los Angeles – UCLA’s Jonsson Comprehensive Cancer Center; 310-206-6875; www.cancer.ucla.edu

Oakland – UCSF Comprehensive Cancer Center; 310-650-2600; www.ucsfhealth.org/cancer

Orange – Children’s Hospital of Orange County; 714-997-3000; www.choc.org
Palo Alto – Lucile Packard Children’s Hospital at Stanford; 650-725-9250; www.stanfordchildrens.org/en/service/cancer-blood-diseases
Pleasant Hill – Diablo Valley Oncology & Hematology Group—East Bay; 925-677-5041; www.dvohc.com
Sacramento – Sutter Cancer Center; 916-453-5830; www.checksutterfirst.org/cancer/forpatients/types/bmt
Sacramento – UC Davis Comprehensive Cancer Center; 916-703-5210; www.ucdmc.ucdavis.edu/cancer/Specialties_medicaloncology.html
San Diego – Rady Children’s Hospital San Diego; 858-966-5811; www.rchsd.org
San Francisco – UCSF Medical Center; 415-353-2051; www.ucsfhealth.org

COLORADO
Aurora – Children’s Hospital Colorado; 720-777-8892; www.childrenscolorado.org
Denver – Colorado Blood Cancer Institute; 720-754-4880; www.bloodcancerinstitute.com
Fort Collins – University of Colorado Cancer Center; 970-493-0822; www.ucdenver.edu

CONNECTICUT
New Haven – Smilow Cancer Hospital at Yale—New Haven; 203-688-4242; www.nthh.org/smilow-cancer-hospital

Disclaimer: A list of bone marrow transplant centers in the United States follows on pages 41–48. The information found in yellow boxes on these pages is considered expanded listings, which are paid for by the centers themselves as advertisements. Full-page advertisements are also allowed in this section. 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.

Faith Davies, M.D.
UAMS Myeloma Institute
UAMS Winthrop P. Rockefeller Cancer Institute
myeloma.uams.edu

we find new treatments that save lives

center stage in myeloma research, finding new treatments that save lives

Worldwide Recognition for Innovation and Cure. The UAMS Myeloma Institute is a leader in the treatment of multiple myeloma and related diseases, caring for patients from all 50 states and more than 50 countries.

World-Class Physicians and Scientists. Our multidisciplinary team of myeloma experts employs targeted, precision treatments for improved patient outcomes.

Caring Environment: We provide warmth, compassion and patient-and-family-centered care from the very beginning.

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UAMS Myeloma Institute  
Location: University of Arkansas for Medical Sciences, 4301 W. Markham St., #816, Little Rock, AR 72205  
Phone: 501-503-5017  
Website: www.myeloma.uams.edu  
Nearest Airport: Bill and Hillary Clinton National Airport  
Accreditation/Designation: Foundation for the Accreditation of Cellular Therapy (FACT); Joint Commission  
Cancer Specialties/Special Services: The Myeloma Institute is an international leader in the treatment and study of multiple myeloma and related diseases, such as Castleman Disease. Utilizing advanced diagnostics, we define each patient’s disease characteristics at the molecular level and personalize treatment for optimal outcomes. Our multi-discipline team provides comprehensive care that includes targeted, precision therapy approaches. We conduct robust clinical trials for newly diagnosed, relapsed and refractory disease. New patients can be seen within two weeks or less.

Nemours/Alfred I. duPont Hospital for Children  
Location: 1600 Rockland Rd., Wilmington, DE 19803  
Phone: 302-651-3500; toll free 800-344-5437; fax 302-651-0634  
Website: nemours.org  
Nearest Airport: Philadelphia International  
Accreditation/Designation: MAGNET Hospital; FACT Accreditation; Pending ACOS/CoC (On-site Review Oct. 2015)  
Cancer Specialties/Special Services: Hematology & Oncology Care; Bone Marrow Transplantation

Miami – Sylvester Comprehensive Cancer Center; 305-243-1000; www.sylvester.org  
Orlando – Florida Center for Cellular Therapy; 407-303-2070; www.bloodandmarrowtransplantcenter.com  
Panama City – Tommy Hamm Sr. Cancer Center; 850-914-3700; www.nwho.com  
St. Petersburg – All Children’s Hospital; 727-887-8451; www.allkids.org  
Tampa – Moffitt Cancer Center; 888-663-3488; www.moffitt.org  
West Palm Beach – Good Samaritan Medical Center; 561-655-5511; www.goodsamaritancare.com

La Jolla, California  
Scripps Green Hospital  
Location: 10666 N. Torrey Pines Rd., La Jolla, CA 92037  
Phone: 858-554-9100, toll free 800-727-4777; fax 858-554-2590  
Website: www.scripps.org/services/transplant-services__blood-and-marrow-transplant  
Nearest Airport: San Diego  
Cancer Specialties/Special Services: Expert Blood and Marrow Transplant Services. Established in 1980, Scripps Blood and Marrow Transplant (BMT) Program was the first in San Diego and one of the first in the nation to administer life-saving stem cell transplantation. The program is well-recognized for its expertise and innovation, facilitating bone marrow and stem cell transplants for people across the country.

Delaware

Newark – Helen F. Graham Cancer Center & Research Institute; 302-623-4500; www.christianacare.org/cancer  
Wilmington – Nemours/Alfred I. duPont Hospital for Children; 302-651-4200; www.nemours.org/service/medical/bloodandbonemarrowtransplant.html  
Atlanta – Emory Winship Cancer Institute; 404-778-1900; http://winshipcancer.emory.edu  
Augusta – Children’s Hospital of Georgia; 706-864-0585; www.georgiahealth.org/childrens-hospital-of-georgia/pediatric-specialties/cancer  
Augusta – Georgia Regents University Cancer Center; 706-721-8065; www.gru.edu/cancer

Florida

Boynton Beach – South Florida Bone Marrow/Stem Cell Institute; 561-752-5522; www.bmscti.org  
Gainesville – Shands Hospital; 352-733-0972; www.uflhealth.org/bone-marrow-transplant  
Jacksonville – Nemours Children’s Specialty Care, Jacksonville; 904-697-3789; www.nemours.org/service/medical/center-for-cancer-and-blood-disorders  
Miami – Nicklaus Children’s Hospital; 305-682-8380; www.mch.com/medical-services/cancer-center.aspx

Park Ridge

Advocate Lutheran General Hospital  
Location: 1775 Dempster St., Park Ridge, IL 60068  
Phone: 847-723-4400; toll free 800-322-8822; fax 847-723-4410  
Website: www.advocatehealth.com/luth  
Cancer Specialties/Special Services: Hematology & Oncology Care; Bone Marrow Transplantation

Park Ridge

Advocate Lutheran General Hospital  
Location: 1775 Dempster St., Park Ridge, IL 60068  
Phone: 847-723-4400; toll free 800-322-8822; fax 847-723-4410  
Website: www.advocatehealth.com/luth  
Cancer Specialties/Special Services: Hematology & Oncology Care; Bone Marrow Transplantation

Arkansas

Little Rock, Arkansas  
UAMS Myeloma Institute  
Location: University of Arkansas for Medical Sciences, 4301 W. Markham St., #816, Little Rock, AR 72205  
Phone: 501-503-9017  
Website: www.myeloma.uams.edu  
Cancer Specialties/Special Services: The Myeloma Institute is an international leader in the treatment and study of multiple myeloma and related diseases, such as Castleman Disease. Utilizing advanced diagnostics, we define each patient’s disease characteristics at the molecular level and personalize treatment for optimal outcomes. Our multi-discipline team provides comprehensive care that includes targeted, precision therapy approaches. We conduct robust clinical trials for newly diagnosed, relapsed and refractory disease. New patients can be seen within two weeks or less.

Wilmington, Delaware  
Nemours/Alfred I. duPont Hospital for Children  
Location: 1600 Rockland Rd., Wilmington, DE 19803  
Phone: 302-651-3500; toll free 800-344-5437; fax 302-651-0634  
Website: nemours.org  
Nearest Airport: Philadelphia International  
Accreditation/Designation: MAGNET Hospital; FACT Accreditation; Pending ACOS/CoC (On-site Review Oct. 2015)  
Cancer Specialties/Special Services: Hematology & Oncology Care; Bone Marrow Transplantation
ILLINOIS – LOUISIANA

Peoria – UnityPoint Health—Methodist Hospital; 309-672-4848; www.unitypoint.org/peoria/services-cancer

Zion – Cancer Treatment Centers of America at Midwestern Regional Medical Center; 815-675-3955; www.cancercenter.com/midwestern/medical-departments/hematology-oncology

INDIANA

Beech Grove – Indiana Blood & Marrow Transplantation in Indianapolis; 317-528-5500; www.ibmtindy.com

Indiana – Central Indiana Cancer Centers; 317-964-5200; www.iuhealth.org/cancer

Indianapolis – Indiana University Health Melvin and Bren Simon Cancer Center; 888-600-4822; www.iuhealth.org/simon-cancer-center/treatments

Indianapolis – Riley Hospital for Children at IU Health; 317-944-5000; www.iuhealth.org/riley

IOWA

Iowa City – University of Iowa Children’s Hospital; 319-356-2229; www.uichildrens.org/bone-and-marrow-transplantation

Iowa City – University of Iowa Hospitals & Clinics; 877-386-9108; www.uihealthcare.org/bonemarrowtransplant

KANSAS

Westwood – The University of Kansas Cancer Center; 913-588-1227; www.kucancercenter.org

West Wichita – Blood & Marrow Transplant Center of Kansas; 316-268-5628; www.waichristi.org/location/blood-and-marrow-transplant-center-kansas

KENTUCKY

Lexington – University of Kentucky Markey Cancer Center; 800-333-8874; http://markey.uky.edu

Louisville – James Graham Brown Cancer Center; 502-587-4011; www.kentuckyonehealth.org/browncancercenter

LOUISIANA

Baton Rouge – Mary Bird Perkins Our Lady of the Lake Cancer Center; 225-767-0847; www.marybird.org/olol

New Orleans – Children’s Hospital; 504-899-9511; www.chnola.org

The Blood & Marrow Transplant Program at Northside Hospital Cancer Institute is one of the largest Blood and Marrow Transplant and Acute Leukemia Programs in the United States. For five consecutive years it has ranked among the best in the nation for related and unrelated allogeneic transplant survival.

At Northside, we are committed to providing our patients with outstanding clinical care as demonstrated by our patient-centered, comprehensive quality management program.

When we say we offer a lifetime of care, we mean a long, long lifetime.
**University of Kentucky Markey Cancer Center**

Location: 800 Rose St., CC401, Lexington, KY 40536
Phone: 859-216-4300  •  Website: http://markey.uky.edu

Accreditation/Designation: NCI-designated cancer center, Accredited by the Joint Commission, American College of Surgeons (CoC), Foundation for Cellular Therapy (FACT), Be the Match national Marrow Donor Program registered site.

Cancer Specialties/Special Services: The UK Blood and Marrow Bone Marrow Transplant Program is one of two BMT sites in Kentucky and has treated more than 1,800 patients since being founded in 1982. Our multidisciplinary team is led by specialized physicians and staff who are experts in allogeneic and autologous transplants. We treat all blood related cancers and diseases including solid neoplastic disease, leukemias, lymphomas, aplastic anemia and other conditions that stem from bone marrow failure. We also offer novel clinical trials and robust research programs.

**New Orleans** – Tulane Comprehensive Cancer Clinic; 504-988-8300; http://tulane.edu/om/cancer/clinic/cancer-and-treatment/stem-cell-transplant

**Shreveport** – LSU Health Shreveport Feist-Weiller Cancer Center; 318-813-1200; www.fw.org

**MARYLAND**

Baltimore – The Sidney Kimmel Comprehensive Cancer Center; 410-444-7671; www.hopkinsmedicine.org/kimmel_cancer_center

Baltimore – Sinai Hospital of Baltimore; 410-661-4711; www.lifebridgehealth.org/sinai

Baltimore – UM Marlene & Stewart Greenebaum Cancer Center; 410-328-7904; www.ummc.org/programs/cancer/services/bloodmarrow

Baltimore – National Institutes of Health Clinical Center; 301-402-3595; http://clinicalcenter.nih.gov

Baltimore – Walter Reed National Military Medical Center; 301-319-2100; www.wrnmccapmed.mil/cancercenter

**BOSTON**

Boston – Beth Israel Deaconess Medical Center; 617-667-9920; www.bidmc.harvard.edu

Boston – Boston Medical Center; 617-838-6428; www.bmc.org/hematologyoncology

Boston – Dana-Farber Cancer Institute; 617-632-5110; www.dana-farber.org/pat/adult/stem-cell-bone-marrow-transplant

Boston – Massachusetts General Hospital; 617-272-1124; www.massgeneral.org/cancer

Boston – Tufts Medical Center; 617-636-5291; www.tuftsmedicalcenter.org/cancer

Burlington – Lahey Hospital & Medical Center; 781-744-7590; www.lahey.org/cancer

Worcester – UMass Memorial Medical Center; 508-334-1000; www.umassmemorial.org/cancer

**MICHIGAN**

Ann Arbor – University of Michigan Comprehensive Cancer Center; 734-232-8838; www.mcan.org/bone-marrow-transplant

Detroit – Barbara Ann Karmanos Cancer Institute; 800-527-6266; www.karmanos.org/bmt

Detroit – Josephine Ford Cancer Institute; 734-479-3317; www.jfc.org

Grand Rapids – Helen DeVos Children’s Hospital; 616-391-9127; www.devoschildrens.org

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

**MINNESOTA**

Minneapolis – University of Minnesota Medical Center; 612-273-2800; www.fairviewbmt.org

Minneapolis – Virginia Piper Cancer Institute; 612-863-4363; www.allinahealth.org/Abbott-Northwestern-Hospital/Services/virginia-piper-cancer-institute


**Worcester**

http://clinicalcenter.nih.gov

**BETHESDA**

– National Institutes of Health Clinical Center; 301-402-3595; http://clinicalcenter.nih.gov

**Baltimore**

– University of Maryland Greenebaum Comprehensive Cancer Center; 410-706-2000; www.umm.edu/programs/cancer/services/bloodmarrow

– UM Marlene & Stewart Greenebaum Cancer Center; 410-328-7904; www.umcm.edu/programs/cancer/services/bloodmarrow

– Sinai Hospital of Baltimore; 410-601-4710; www.lifebridgehealth.org/sinai

– Baltimore Cancer Center; 410-528-5300; www.baltimorecancercenter.org

– National Institutes of Health Clinical Center; 301-402-3595; http://clinicalcenter.nih.gov

– Walter Reed National Military Medical Center; 301-319-2100; www.wrnmccapmed.mil/cancercenter

– UMass Memorial Medical Center; 508-334-1000; www.umassmemorial.org/cancer

– Lahey Hospital & Medical Center; 781-744-7590; www.lahey.org/cancer

**St. Louis**

– 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: www.siteman.wustl.edu

Nearest Airport: St. Louis Lambert Airport

Accreditation/Designation: NCI-designated Comprehensive Cancer Center, Transplant Program Accredited by Foundation of Accreditation of Cellular Therapies (FACT)

Cancer Specialties/Special Services: The 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).

**MISSISSIPPI**

Jackson – University of Mississippi Medical Center; 888-815-2005; www.umchealth.com/cancer

**MISSOURI**

Kansas City – Children’s Mercy Hospital; 816-382-6888; www.childrensmercy.org

**KENTUCKY – MISSOURI**

**Lexington, Kentucky**

**Grand Rapids, Michigan**

Spectrum Health Cancer Center at LeMann-Holton Cancer Pavilion
Location: 145 Michigan St., Ste. 5200, Grand Rapids, MI 49503
Phone: 616-486-5933; toll free 855-742-2623, fax 616-486-6489
Website: www.spectrumhealth.org/blood-marrow-transplant

Nearest Airport: Gerald R. Ford International Airport (GRP)

Accreditation/Designation: Foundation for Accreditation of Cellular Therapy (FACT), American College of Surgeons Commission on Cancer

Cancer Specialties/Special Services: With over 150 cancer specialists, we specialize in treating the most complex types of cancers, so you have a full range of capabilities on your side. Our multispecialty teams bring a wealth of expertise and knowledge in various areas of medicine to offer a personalized approach based on your individual needs.

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

– University of Michigan Comprehensive Cancer Center; 734-232-8838; www.ummc.org/programs/cancer/services/bloodmarrow

– Virginia Piper Cancer Institute; 612-863-4363; www.allinahealth.org/Abbott-Northwestern-Hospital/Services/virginia-piper-cancer-institute

– Mayo Clinic—Rochester; 877-841-1391; www.fw.org
Montefiore Einstein Center for Cancer Care

Montefiore Einstein Center for Cancer Care is constantly pioneering cancer treatment—combining groundbreaking chemotherapy, radiotherapy and surgical techniques, including transplantation, with compassionate care.

We treat a range of cancers including leukemia, multiple myeloma and both Hodgkin’s and non-Hodgkin’s lymphoma. Montefiore is one of only four medical centers in the New York metropolitan area that is accredited by the Foundation for the Accreditation of Cellular Therapy (FACT) for the full spectrum of stem cell transplant procedures.

Montefiore Einstein Center for Cancer Care—the cancer treatment choice for thousands of patients each year.

Montefiore Einstein Center for Cancer Care
www.montefiore.org/hematologic-malignancies
718-862-8840

MISSOURI – OHIO

St. Louis – Cardinal Glennon Children’s Medical Center; 314-577-5680; www.cardinalglennon.com
St. Louis – Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine; 314-747-7592; www.siteman.wustl.edu
(See our ad on page 44)
St. Louis – SLUCare Physician Group; 314-977-4440; www.slu.edu/slu-care-home/outpatient-blood-and-marrow-transplant
St. Louis – St. Louis Children’s Hospital; 314-454-5437; www.stlchildrens.org/services/hematology-oncology-services

NEBRASKA
Omaha – CHI Health Immanuel; 402-572-2121; www.chihealth.com/manuel-immanuel-center
Omaha – Nebraska Medical Center; 802-815-3281; www.nebraskamed.com/cancer/blood-marrow

NEW HAMPSHIRE
Lebanon – Norris Cotton Cancer Center; 603-650-4628; www.cancer.dartmouth.edu/bone-marrow

NEW JERSEY
Hackensack – Hackensack University Medical Center; 551-986-8297; www.hcmc.com
New Brunswick – Cancer Institute of New Jersey; 732-235-2465; www.cinj.org

NEW YORK
Albany – New York Oncology Hematology; 518-489-0044; www.nyoph.com/programs-cancer-treatments
Bronx – Montefiore Medical Center; 718-920-4321; www.montefiore.org/hematologic-malignancies
(See our ad at right)
Buffalo – Roswell Park Cancer Institute; 877-275-7724; www.roswellpark.org/bmt
Hawthorne – Westchester Medical Center; 914-493-1448; www.wcmc.org/bone-marrow-transplant
Lake Success – North Shore University Hospital; 888-321-3627; www.northshorelij.com/find-care/locations/hematologic-oncology-center
New Hyde Park – Steven and Alexandra Cohen Children’s Medical Center of New York; 718-470-3000; http://ccmc.northshorelij.com
New York – Children’s Hospital New York-Presbyterian; 212-305-5800; www.cpnyp.org/kids
New York – Memorial Sloan Kettering Cancer Center; 212-639-2000; www.mskcc.org
New York – Mount Sinai Medical Center; 212-241-8211; www.mountsinai.org/patient-care/practices/bone-marrow-transplant
New York – New York Presbyterian/Columbia University Medical Center; 212-305-2500; www.nyp.org/services/programs/oncology/bone-marrow-transplant
Rochester – Wilmot Cancer Institute—University of Rochester Medical Center; 585-275-5830; www.urmc.rochester.edu/cancer-institute
Stony Brook – Stony Brook University Hospital; 631-638-1000; www.cancer.stonybrookmedicine.edu
Syracuse – SUNY Upstate Medical University; 315-464-8214; www.upstate.edu/hemonc/healthcare/transplant

NORTH CAROLINA
Chapel Hill – UNC Lineberger Comprehensive Cancer Center; 919-966-0931; www Lineberger.org/patientcare/programs/bmt
Morehead City – Carteret General Hospital; 252-808-6177; www.carteretgeneral.com/services/cancer
Winston-Salem – Wake Forest University Baptist Medical Center; 336-716-9253; www.wakehealth.edu/comprehensive-cancer-center

OHIO
Akron – Akron Children’s Hospital; 330-543-8580; www.akronchildrens.org
Canton – Gabriell Cancer Center; 330-492-3345; www.gabriellcancercenter.com
Cincinnati – Cincinnati Children’s Hospital Medical Center; 513-636-3200; www.cincinnatichildrens.org
Cleveland – Cleveland Clinic; 216-444-7923; www.clevelandclinic.org/cancer
Cleveland – University Hospitals Seidman Cancer Center; 888-844-2273; www.uohospitals.org/seidman/services/hematologic-malignancies-care-team
Columbus – Nationwide Children’s Hospital; 614-722-8860; www.nationwidechildrens.org
Columbus – The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute; 614-293-5066; http://cancer.osu.edu
(See our ad on page 46)
**BMT CENTERS**

**OKLAHOMA**

- Oklahoma City – OU Medical Center; 405-271-8842; www.oumedicine.com/home/medical-services-centers-of-excellence

**OREGON**

- Portland – Doernbecher Children's Hospital; 503-345-6040; www.ohsu.doernbecher.com
- Portland – Legacy Cancer Institute; 503-413-7194; www.legacyhealth.org/cancer
- Portland – OHSU Knight Cancer Institute; 503-494-7999; www.ohsu.edu
- Portland – Providence Portland Medical Center; 503-215-6014; http://oregon.providence.org

**PENNSYLVANIA**

- Danville – Geisinger Medical Center; 800-275-6401; www.geisinger.org/cancer
- Hershey – Penn State Hershey Cancer Institute; 800-243-1455; www.pennstatehershey.com/cancer
- Philadelphia – The Children's Hospital of Philadelphia; 800-879-2487; www.chop.edu
- Philadelphia – Hahnemann University Hospital; 215-782-7080; www.hahnemannhospital.com
- Philadelphia – Temple University Hospital; 215-214-3122; www.bmt.templehealth.edu
- Philadelphia – University of Pennsylvania Medical Center; 800-789-7368; www.upennmedicine.org/hematology-oncology
- Pittsburgh – Allegheny Health Network Institute; 412-578-5000; www.anh.org/cancer
- Pittsburgh – Children’s Hospital of Pittsburgh of UPMC; 412-692-5055; www.chp.edu/hematology
- Pittsburgh – University of Pittsburgh Cancer Center; 412-235-1052; www.upmcancercenter.com

**RHODE ISLAND**

- Providence – Roger Williams Medical Center; 401-456-2077; www.rwmh.org

**SOUTH CAROLINA**

- Charleston – Children’s Hospital—Medical University of South Carolina; 843-792-1414; www.muskids.org/transportcenter/bmt
- Charleston – Hollings Cancer Center; 843-792-2200; www.mushealth.com/cancer/cancer_treatment_services/bone-marrow-transplant

**SOUTH DAKOTA**

- Sioux Falls – Avera Transplant Institute; 605-322-3000; www.averatransplant.org

**TEXAS**

- Amarillo – Texas Oncology—Amarillo Cancer Center; 888-884-4226; www.texasoncology.com/amarillo
- Baytown – Houston Methodist San Jacinto Hospital; 281-420-8600; www.sanjacintomethodist.com
- Dallas – Baylor Charles A. Sammons Cancer Center; 214-820-3535; www.baylorhealth.com/bmt
- Dallas – Children’s Medical City Dallas Hospital; 214-458-2382; www.childrens.com
- Dallas – Medical City Dallas Hospital; 972-566-5246; www.medicalcitydallas.com/service/bone-marrow-transplant
- Dallas – Texas Oncology—Medical City Dallas Blood & Marrow Transplant; 972-566-7080; www.texasoncology.com/cancer-treatment/stem-cell-transplantation
- Dallas – UT Southwestern Simmons Cancer Center; 214-645-8300; www.simmonscenter.org
- Fort Worth – Cook Children’s Medical Center; 817-202-4000; www.cookchildrens.org
- Houston – Baylor College of Medicine; 713-394-6250; www.bcm.edu/healthcare/care-centers/cell-gene-therapy
- Houston – Houston Methodist Hospital; 713-790-2700; www.houstonmethodist.org/cancer
- Houston – Texas Children's Cancer and Hematology Center; 800-226-2379; www.texasoncology.com/amarillo
- Houston – Texas Children’s Cancer Center; 888-884-4226; www.texasoncology.com/amarillo
- Houston – UT Southwestern Simmons Cancer Center; 214-645-8300; www.simmonscenter.org

**TEXAS**

- Amarillo – Texas Oncology—Amarillo Cancer Center; 888-884-4226; www.texasoncology.com/amarillo
- Baytown – Houston Methodist San Jacinto Hospital; 281-420-8600; www.sanjacintomethodist.com
- Dallas – Baylor Charles A. Sammons Cancer Center; 214-820-3535; www.baylorhealth.com/bmt
- Dallas – Children’s Medical City Dallas Hospital; 214-458-2382; www.childrens.com
- Dallas – Medical City Dallas Hospital; 972-566-5246; www.medicalcitydallas.com/service/bone-marrow-transplant
- Dallas – Texas Oncology—Medical City Dallas Blood & Marrow Transplant; 972-566-7080; www.texasoncology.com/cancer-treatment/stem-cell-transplantation
- Dallas – UT Southwestern Simmons Cancer Center; 214-645-8300; www.simmonscenter.org
- Fort Worth – Cook Children’s Medical Center; 817-202-4000; www.cookchildrens.org
- Houston – Baylor College of Medicine; 713-394-6250; www.bcm.edu/healthcare/care-centers/cell-gene-therapy
- Houston – Houston Methodist Hospital; 713-790-2700; www.houstonmethodist.org/cancer
- Houston – Texas Children's Cancer and Hematology Center; 800-226-2379; www.texasoncology.com/amarillo
- Houston – Texas Children’s Cancer Center; 888-884-4226; www.texasoncology.com/amarillo
- Houston – UT Southwestern Simmons Cancer Center; 214-645-8300; www.simmonscenter.org

**UTAH**

- Salt Lake City – Huntsman Cancer Institute; 888-424-2100; www.healthcare.utah.edu/huntsmancancerinstitute

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**South Dakota’s Only Bone Marrow Transplant Program**

Avera’s fully-accredited bone marrow transplant program features three dedicated hematologists who provide life-saving treatment for certain blood cancers and disorders. In addition to bone marrow transplant, Avera’s innovative cancer program includes research, clinical trials, targeted therapies and genomics.

**605-322-3000**

**AveraTransplant.org**

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**OHIO – UTAH**

- Charlston – Roper St. Francis Cancer Care; Blood and Marrow Transplant

**Charleston**

- Rooper 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.rsfc.com/BMT

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**KEY**

- Adult BMT Center
- Pediatric BMT Center

PatientResource.com
UNDEFEATED.

In the battle against cancer, we all have something important to fight for. And Baylor Charles A. Sammons Cancer Center is right at your side. Informing you about prevention, detection and treatment at the Cancer Care website. Empowering you with advanced screenings and genetic testing. And using the latest science, the most trusted procedures and unequaled compassion to help you defeat the disease—and get back to life. Because at Baylor Charles A. Sammons Cancer Center, we bring the fight to cancer.

Paola Gerber,
Baylor Patient
Salt Lake City — Intermountain LDS Hospital, 801-488-1100; www.intermountainhealthcare.org/locations/lds-hospital/medical-services

VERMONT

Burlington — University of Vermont Cancer Center, 802-847-0000; www.uvmhealth.org/medcenter/pages/departments-and-programs/cancer-center.aspx

VIRGINIA

Charlottesville

UVA Cancer Center
Location: 1240 Lee St., Charlottesville, VA 22908
Phone: 434-982-6408; toll free 800-223-9173; fax 434-243-0054
Website: http://cancer.uvahealth.com/limm

Adult BMT Center

Norfolk — Virginia Oncology Associates, 757-466-8683; www.virginiacancer.com

Richmond — Massey Cancer Center, 804-828-4360; www.vcuhealth.org/bmt

WEST VIRGINIA

Morgantown — Mary Babb Randolph Cancer Center, 304-598-4500; www.wvusumc.org/cancer

Morgantown — WVU Children’s Hospital at Ruby, 304-598-4385; www.wvukids.com

Washington, D.C.

Seattle — Seattle Cancer Care Alliance, 800-804-8824; www.seattlecca.org

Seattle — Swedish Cancer Institute, 855-922-6237; www.swedish.org/hematology

Fairfax — Inova Fairfax Medical Campus, 703-776-3120; www.inova.org/cancer/conditions-treatments/bone-marrow-transplant-overview

St. Louis

Adult BMT Center

WASHINGTON

Seattle — Seattle Cancer Care Alliance, 800-804-8824; www.seattlecca.org

Seattle — Swedish Cancer Institute, 855-922-6237; www.swedish.org/hematology

(See our ad top right)

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

Spokane — Cancer Care Northwest; 509-228-1000; www.cancercarenorthwest.com

Tacoma — Northwest Medical Specialties; 253-428-8700; www.nwmedicalspecialties.com

WASHINGTON, D.C.

Morgantown — WVU Children’s Hospital at Ruby, 304-598-4385; www.wvukids.com

WASHINGTON, D.C.

Seattle — Seattle Cancer Care Alliance, 800-804-8824; www.seattlecca.org

Seattle — Swedish Cancer Institute, 855-922-6237; www.swedish.org/hematology

(See our ad top right)

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

Spokane — Cancer Care Northwest; 509-228-1000; www.cancercarenorthwest.com

Tacoma — Northwest Medical Specialties; 253-428-8700; www.nwmedicalspecialties.com

WEST VIRGINIA

Morgantown — Mary Babb Randolph Cancer Center, 304-598-4500; www.wvusumc.org/cancer

Morgantown — WVU Children’s Hospital at Ruby, 304-598-4385; www.wvukids.com

Key

Adult BMT Center

FINANCIAL RESOURCES & PHARMACEUTICAL ASSISTANCE

American Cancer Society .................................................. www.cancer.org
CancerCare ................................................................. www.cancercare.org/financial
Hope Lodge ................................................................. www.cancer.org/treatment/supportprogramsservices/hopelodge
LIVESTRONG Foundation ............................................. www.livestrong.org
NeedyMeds ................................................................. www.needymeds.com
Partnership for Prescription Assistance .................................. www.pparx.org
Patient Advocate Foundation ........................................ www.patientadvocate.org

REIMBURSEMENT & PATIENT ASSISTANCE PROGRAMS

Amgen Assist ............................................................... www.amgenassist.com, 888-427-7478
Bayer Healthcare Pharmaceuticals ........................................ 866-575-6002
Bayer Healthcare Pharmaceuticals REACH
Co-Pay Assistance Program ........................................... www.reachpatientsupport.com, 866-639-2827
Bristol-Myers Squibb .................................................... www.bms.com/products/Pages/programs.aspx, 800-861-0048
Bristol-Myers Squibb Indigent Patient Assistance Program ........... 800-736-0003
Celgene Patient Support ................................................ www.celgenepatientsupport.com, 800-931-8691

FINANCIAL ASSISTANCE

American Cancer Society .................................................. www.cancer.org
CancerCare ................................................................. www.cancercare.org/financial
Hope Lodge ................................................................. www.cancer.org/treatment/supportprogramsservices/hopelodge
LIVESTRONG Foundation ............................................. www.livestrong.org
NeedyMeds ................................................................. www.needymeds.com
Partnership for Prescription Assistance .................................. www.pparx.org
Patient Advocate Foundation ........................................ www.patientadvocate.org

Eisai Reimbursement Resources ..................................... www.eisaireimbursement.com, 866-422-2377
Genentech Access Solutions ........................................ www.genentech-access.com/patients, 866-249-4918
Genzyme Patient Support Services .................................... www.genzyme.com/patients/patient-support-services, 800-345-4447
Gilead Patient Assistance ................................................ www.gilead.com/responsibility/us-patient-access
GSK Access ................................................................. www.gsk-access.com, 866-518-4357
Janssen Prescription Assistance .................................... www.janssenprescriptionassistance.com
Johnson & Johnson Patient Assistance, Inc. ...................... www.jjfa.com, 800-652-6227
Merk Patient Assistance Program .................................... www.merkhelps.com, 800-727-5400
Millennium Pharmaceuticals Inc. (Velcade Patient Assistance Program) ........................................ www.velcade.com/paying-for-treatment, 866-835-2333
Novartis Patient Assistance Now ..................................... www.patientassistance.com, 800-245-5356
Onyx 360 ................................................................. https://enrollment.onyx360.com, 855-669-9360
Pfizer RxPathways ..................................................... www.pfizerxpathways.com, 866-706-2400
Revlimid Co-pay Assistance ........................................ www.revlimid.com/mds-patient/resources
Sanofi Patient Connection ............................................ www.visitsponline.com, 888-847-4877
Spectrum Therapy Access Resources ................................ www.getasapinfo.com, 888-537-8277
Sprycel Assist ............................................................. www.sprycelassist.com, 855-777-9235
Teva Oncology Core Reimbursement Assistance & Support ........................................ www.tevacore.com, 888-587-3263
Zydelig AccessConnect ................................................ www.zydeligaccessconnect.com, 844-622-2377
**CAREGIVERS & SUPPORT**

4th Angel Mentoring Program ........................................ www.4thangel.org  
Bloch Cancer Hotline .................................................. 800-433-0464  
CancerCare ............................................................... www.cancercare.org  
Cancer Hope Network ................................................... www.cancerhopenetwork.org  
Cancer Information and Counseling Line........................... 800-525-3777  
Cancer Support Community ............................................. www.cancersupportcommunity.org  
Caregiver Action Network ............................................. www.caregiveraction.org  
CaringBridge ............................................................... www.caringbridge.org  
Cleaning For A Reason .................................................... www.cleaningforareason.org  
Cooking with Cancer ..................................................... www.cookingwithcancer.org  
Family Caregiver Alliance ............................................. www.caregiver.org  
The Gathering Place ....................................................... www.touchedbycancer.org  
The Hope Light Foundation ............................................. www.hopelightproject.com  
Imerman Angels ........................................................... www.imermanangels.org  
LIVESTRONG Foundation ................................................ www.livestrong.org  
LivingWell Cancer Resource Center ................................ www.livingwellcancer.org  
Lotsa Helping Hands ..................................................... www.lotsahelpinghands.com  
MyLifeLine.org Cancer Foundation ................................ www.mylifeline.org  
PearlPoint Cancer Support ............................................. www.pearlpoint.org  
Strike Out Cancer .......................................................... www.strikeoutcancer.com  
Well Spouse Association ................................................ www.wellspsouse.org  
Wellness Place .............................................................. www.wellnessplace.org  
weSPARK (Cancer Support Center) .................................... www.wespark.org  
Wonders & Worries ...................................................... www.wondersandworries.org

**CHILDHOOD CANCER**

Alliance for Childhood Cancer ....................................... www.allianceforchildhoodcancer.org  
American Childhood Cancer Organization ......................... www.acc.org

**LEUKEMIA & LYMPHOMA**

Be the Match ............................................................. www.bethematch.org  
Blood & Marrow Transplant Information Network ............... www.bmtinfonet.org  
Cutaneous Lymphoma Foundation .................................. www.clfoundation.org  
Hairy Cell Leukemia Foundation ..................................... www.hairycellleukemia.org  
HEADstrong Foundation ............................................... www.headstrong.org  
The Leukemia & Lymphoma Society .................................. www.lls.org  
Lymphoma Foundation of America ................................... www.lymphoma.org  
Lymphoma Information Network ..................................... www.lymphomainfo.net  
Lymphoma Research Foundation ...................................... www.lymphoma.org  
Lymphomatosis ........................................................... www.lymphomatosis.org  
Max Foundation ........................................................... www.themaxfoundation.org  
National Bone Marrow Transplant Link .............................. www.nbmtlink.org  
The National CML Society ............................................. www.nationalcmlsociety.org  
Online Nursing Degrees - Medical Resources:  
Understanding Leukemia .............................................. www.onlinenursingdegrees.org/nursingfacts/leukemia-resources.htm  
Patients Against Lymphoma ......................................... www.lymphomatosis.org

**MULTIPLE MYELOMA**

HEADstrong Foundation .............................................. www.headstrong.org  
International Myeloma Foundation ................................ www.myeloma.org  
The Multiple Myeloma Research Foundation ..................... www.themmrf.org

**ADVOCACY ASSISTANCE & EDUCATIONAL RESOURCES**

**ARCH National Respite Network & Resource Center** ............................... www.archrespite.org  
**CancerCare for Kids** .................................................... www.cancercareforkids.org  
**Candlelighters Childhood Cancer Family Alliance** ................ www.candle.org  
**Childhood Leukemia Foundation** .................................. www.clf4kids.org  
**Children’s Cancer & Blood Foundation** .......................... www.childrensbcf.org  
**Curing Kids Cancer** ..................................................... www.curingkidscancer.org  
Make A Wish Foundation .................................................. www.wish.org  
The National Children’s Cancer Society ............................ www.thenccs.org  
Pediatric Cancer Foundation .......................................... http://fastercure.org  
The Ulman Cancer Fund for Young Adults ......................... www.ulmanfund.org  
Wipe Out Kids’ Cancer .................................................... www.wokc.org

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