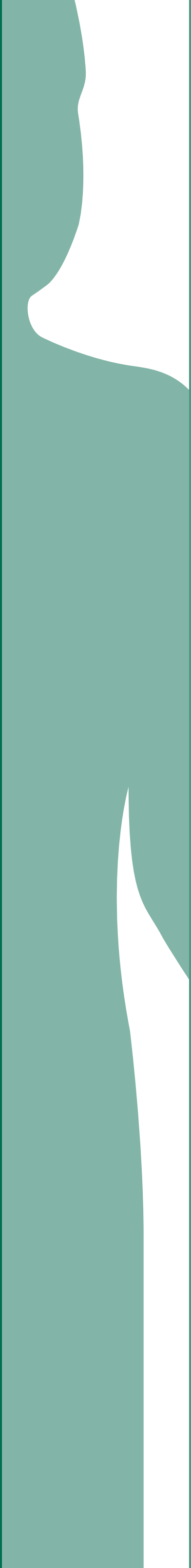
National Cancer Institute



What You Need To Know About™

Hodgkin Lymphoma

**U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES**

National Institutes of Health

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About This Booklet

This National Cancer Institute (NCI) booklet is about *Hodgkin lymphoma*,* a *cancer* that starts in the *immune system*. This type of cancer is also called Hodgkin disease. Every year in the United States, more than 8,000 people learn they have this disease.

Cancer research has led to real progress against Hodgkin lymphoma. Most people diagnosed with Hodgkin lymphoma can now be cured, or their disease can be controlled for many years. Continuing research offers hope that, in the future, even more people with this disease will be treated successfully.

This booklet is only about Hodgkin lymphoma. It is not about *non-Hodgkin lymphoma* (also called NHL).

People with non-Hodgkin lymphoma have different treatment options. Instead of this booklet, they may want to read *What You Need To Know About™ Non-Hodgkin Lymphoma*. Page 36 tells how to get NCI booklets.

This booklet tells about diagnosis, staging, treatment, and follow-up care. Learning about the medical care for Hodgkin lymphoma can help you take an active part in making choices about your own care.

This booklet has lists of questions to ask your doctor. Many people find it helpful to take a list of questions to a doctor visit. To help remember what

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*Words in *italics* are in the Dictionary on page 25. The Dictionary explains these terms. It also shows how to pronounce them.

your doctor says, you can take notes or ask whether you may use a tape recorder. You may also want to have a family member or friend go with you when you talk with the doctor—to take part in the discussion, to take notes, or just to listen.

For the latest information about Hodgkin lymphoma, please visit our Web site at **http://www.cancer.gov/cancertopics/types/hodgkin**. We have materials on Hodgkin lymphoma in adults and children. Or, contact our Cancer Information Service. We can answer your questions about cancer. We can send you NCI booklets and fact sheets. Call **1–800–4–CANCER** (1–800–422–6237) or instant message us through the **LiveHelp** service at **http://www.cancer.gov/help**.

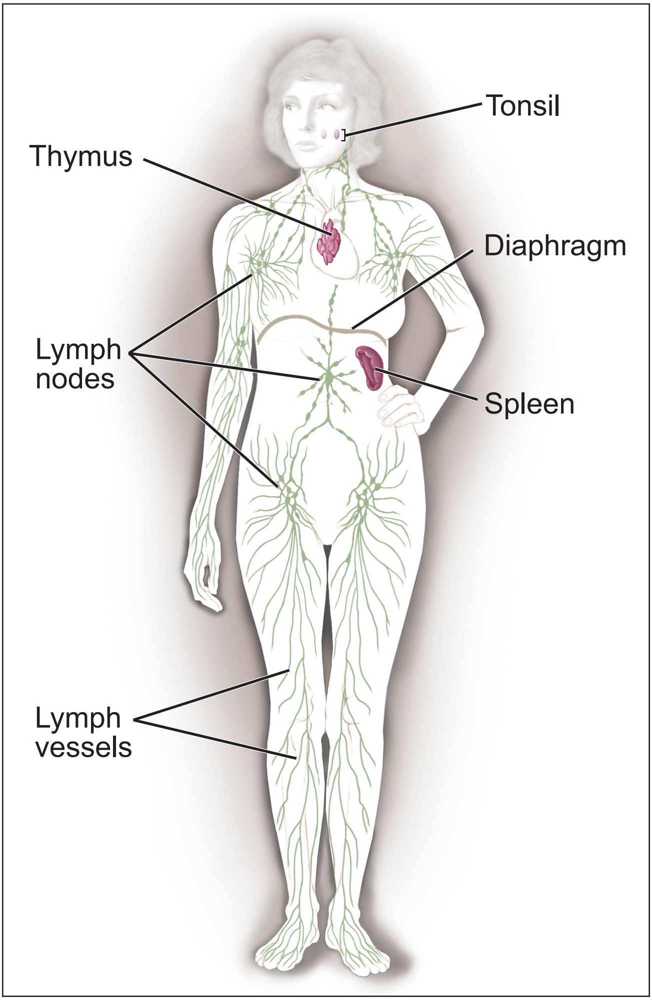
What Is Hodgkin Lymphoma?

Hodgkin lymphoma is a cancer that begins in *cells* of the immune system. The immune system fights *infections* and other diseases.

The *lymphatic system* is part of the immune system. The lymphatic system includes the following:

- ***Lymph vessels***: The lymphatic system has a network of lymph vessels. Lymph vessels branch into all the *tissues* of the body.
- ***Lymph***: The lymph vessels carry clear fluid called lymph. Lymph contains *white blood cells*, especially *lymphocytes* such as *B cells* and *T cells*.
- ***Lymph nodes***: Lymph vessels are connected to small, round masses of tissue called lymph nodes. Groups of lymph nodes are found in the neck, underarms, chest, *abdomen*, and *groin*. Lymph nodes store white blood cells. They trap and remove *bacteria* or other harmful substances that may be in the lymph.

- **Other parts of the lymphatic system**: Other parts of the lymphatic system include the *tonsils*, *thymus,* and *spleen*. Lymphatic tissue is also found in other parts of the body including the stomach, skin, and small intestine.



This picture shows lymph nodes above and below the diaphragm. It also shows the lymph vessels, tonsils, thymus, and spleen.

Because lymphatic tissue is in many parts of the body, Hodgkin lymphoma can start almost anywhere. Usually, it's first found in a lymph node above the *diaphragm*, the thin muscle that separates the chest from the abdomen. But Hodgkin lymphoma also may be found in a group of lymph nodes. Sometimes it starts in other parts of the lymphatic system.

Hodgkin Lymphoma Cells

Hodgkin lymphoma begins when a lymphocyte (usually a B cell) becomes abnormal. The abnormal cell divides to make copies of itself.

Hodgkin lymphoma cells are called *Reed-Sternberg cells*. (See photo below.) They don't protect the body from infections or other diseases. They also don't die when they should.

The lymph node that contains Reed-Sternberg cells becomes enlarged, and the abnormal cells can spread throughout the body. See the Staging section on page 9 for information about Hodgkin lymphoma that has spread.

Reed-Sternberg cells are much larger than normal cells.

Risk Factors

Doctors seldom know why one person develops Hodgkin lymphoma and another does not. But research shows that certain *risk factors* increase the chance that a person will develop this disease.

The risk factors for Hodgkin lymphoma include the following:

- **Certain *viruses***: Having an infection with the *Epstein-Barr virus* (EBV) or the *human immunodeficiency virus* (HIV) may increase the risk of developing Hodgkin lymphoma. However, lymphoma is not contagious. You can't catch lymphoma from another person.
- **Weakened immune system**: The risk of developing Hodgkin lymphoma may be increased by having a weakened immune system (such as from an *inherited* condition or certain drugs used after an organ transplant).
- **Age**: Hodgkin lymphoma is most common among teens and adults aged 15 to 35 years and adults aged 55 years and older. (For information about this disease in children, call the NCI's Cancer Information Service at **1–800–4–CANCER**.)
- **Family history**: Family members, especially brothers and sisters, of a person with Hodgkin lymphoma or other lymphomas may have an increased chance of developing this disease.

Having one or more risk factors does not mean that a person will develop Hodgkin lymphoma. Most people who have risk factors never develop cancer.

Symptoms

Hodgkin lymphoma can cause many symptoms:

- Swollen lymph nodes (that do not hurt) in the neck, underarms, or groin
- Becoming more sensitive to the effects of alcohol or having painful lymph nodes after drinking alcohol
- Weight loss for no known reason
- Fever that does not go away
- Soaking night sweats
- Itchy skin
- Coughing, trouble breathing, or chest pain
- Weakness and tiredness that don't go away

Most often, these symptoms are not due to cancer. Infections or other health problems may also cause these symptoms. Anyone with symptoms that last more than 2 weeks should see a doctor so that problems can be diagnosed and treated.

Diagnosis

If you have swollen lymph nodes or another symptom that suggests Hodgkin lymphoma, your doctor will try to find out what's causing the problem. Your doctor may ask about your personal and family medical history.

You may have some of the following exams and tests:

- **Physical exam**: Your doctor checks for swollen lymph nodes in your neck, underarms, and groin. Your doctor also checks for a swollen spleen or liver.

- **Blood tests**: The lab does a *complete blood count* to check the number of white blood cells and other cells and substances.
- **Chest *x-rays***: X-ray pictures may show swollen lymph nodes or other signs of disease in your chest.
- ***Biopsy***: A biopsy is the only sure way to diagnose Hodgkin lymphoma. Your doctor may remove an entire lymph node (*excisional biopsy*) or only part of a lymph node (*incisional biopsy*). A thin needle (*fine needle aspiration*) usually cannot remove a large enough sample for the *pathologist* to diagnose Hodgkin lymphoma. Removing an entire lymph node is best.

  The pathologist uses a microscope to check the tissue for Hodgkin lymphoma cells. A person with Hodgkin lymphoma usually has large, abnormal cells known as Reed-Sternberg cells. They are not found in people with non-Hodgkin lymphoma. See page 4 for a photo of a Reed-Sternberg cell.

You may want to ask your doctor these questions before having a biopsy:

- How will the biopsy be done?
- Will I have to stay in the hospital?
- Will I have to do anything to prepare for it?
- How long will it take? Will I be awake? Will it hurt?
- Are there any risks? What are the chances of swelling, infection, or bleeding after the procedure?
- How long will it take me to recover?
- How soon will I know the results? Who will explain them to me?
- If I do have cancer, who will talk to me about next steps? When?

Types of Hodgkin Lymphoma

When Hodgkin lymphoma is found, the pathologist reports the type. There are two major types of Hodgkin lymphoma:

- ***Classical Hodgkin lymphoma***: Most people with Hodgkin lymphoma have the classical type. The Reed-Sternberg cell looks like the photo on page 4.
- ***Nodular lymphocyte-predominant Hodgkin lymphoma***: This is a rare type of Hodgkin lymphoma. The abnormal cell is called a popcorn cell. It may be treated differently from the classical type.

Staging

Your doctor needs to know the extent (stage) of Hodgkin lymphoma to plan the best treatment. Staging is a careful attempt to find out what parts of the body are affected by the disease.

Hodgkin lymphoma tends to spread from one group of lymph nodes to the next group. For example, Hodgkin lymphoma that starts in the lymph nodes in the neck may spread first to the lymph nodes above the collarbones, and then to the lymph nodes under the arms and within the chest.

In time, the Hodgkin lymphoma cells can invade blood vessels and spread to almost any other part of the body. For example, it can spread to the liver, lungs, bone, and *bone marrow*.

Staging may involve one or more of the following tests:

- ***CT scan***: An x-ray machine linked to a computer takes a series of detailed pictures of your chest, abdomen, and *pelvis*. You may receive an injection of *contrast material*. Also, you may be asked to drink another type of contrast material. The contrast material makes it easier for the doctor to see swollen lymph nodes and other abnormal areas on the x-ray.
- ***MRI***: A powerful magnet linked to a computer is used to make detailed pictures of your bones, brain, or other tissues. Your doctor can view these pictures on a monitor and can print them on film.
- ***PET scan***: You receive an injection of a small amount of *radioactive* sugar. A machine makes computerized pictures of the sugar being used by cells in your body. Lymphoma cells use sugar faster than normal cells, and areas with lymphoma look brighter on the pictures.

- ***Bone marrow biopsy***: The doctor uses a thick needle to remove a small sample of bone and bone marrow from your hipbone or another large bone. *Local anesthesia* can help control pain. A pathologist looks for Hodgkin lymphoma cells in the sample.

Other staging procedures may include biopsies of other lymph nodes, the liver, or other tissue.

The doctor considers the following to determine the stage of Hodgkin lymphoma:

- The number of lymph nodes that have Hodgkin lymphoma cells
- Whether these lymph nodes are on one or both sides of the diaphragm (see picture on page 3)
- Whether the disease has spread to the bone marrow, spleen, liver, or lung.

The stages of Hodgkin lymphoma are as follows:

- **Stage I**: The lymphoma cells are in one lymph node group (such as in the neck or underarm). Or, if the lymphoma cells are not in the lymph nodes, they are in only one part of a tissue or an organ (such as the lung).
- **Stage II**: The lymphoma cells are in at least two lymph node groups on the same side of (either above or below) the diaphragm. Or, the lymphoma cells are in one part of a tissue or an organ and the lymph nodes near that organ (on the same side of the diaphragm). There may be lymphoma cells in other lymph node groups on the same side of the diaphragm.
- **Stage III**: The lymphoma cells are in lymph nodes above and below the diaphragm. Lymphoma also may be found in one part of a tissue or an organ (such as the liver, lung, or bone) near these lymph node groups. It may also be found in the spleen.

- **Stage IV**: Lymphoma cells are found in several parts of one or more organs or tissues. Or, the lymphoma is in an organ (such as the liver, lung, or bone) and in distant lymph nodes.
- **Recurrent**: The disease returns after treatment.

In addition to these stage numbers, your doctor may also describe the stage as A or B:

- **A**: You have not had weight loss, drenching night sweats, or fevers.
- **B**: You have had weight loss, drenching night sweats, or fevers.

Treatment

Your doctor can describe your treatment choices and the expected results. You and your doctor can work together to develop a treatment plan that meets your needs.

Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat Hodgkin lymphoma include *hematologists*, *medical oncologists*, and *radiation oncologists*. Your doctor may suggest that you choose an oncologist who specializes in the treatment of Hodgkin lymphoma. Often, such doctors are associated with major academic centers. Your health care team may also include an *oncology nurse* and a *registered dietitian*.

The choice of treatment depends mainly on the following:

- The type of your Hodgkin lymphoma (most people have classical Hodgkin lymphoma)
- Its stage (where the lymphoma is found)
- Whether you have a mass or *tumor* that is more than 4 inches (10 centimeters) wide

- Your age
- Whether you've had weight loss, drenching night sweats, or fevers.

People with Hodgkin lymphoma may be treated with *chemotherapy*, *radiation therapy*, or both.

If Hodgkin lymphoma comes back after treatment, doctors call this a *relapse* or *recurrence*. People with Hodgkin lymphoma that comes back after treatment may receive high doses of chemotherapy, radiation therapy, or both, followed by *stem cell transplantation*.

You may want to know about *side effects* and how treatment may change your normal activities. Because chemotherapy and radiation therapy often damage healthy cells and tissues, side effects are common. Side effects may not be the same for each person, and they may change from one treatment session to the next. Before treatment starts, your health care team will explain possible side effects and suggest ways to help you manage them. The younger a person is, the easier it may be to cope with treatment and its side effects.

At any stage of the disease, you can have *supportive care*. Supportive care is treatment to prevent or fight infections, to control pain and other symptoms, to relieve the side effects of therapy, and to help you cope with the feelings that a diagnosis of cancer can bring. You can get information about coping on NCI's Web site at **http://www.cancer.gov/cancertopics/coping** and from NCI's Cancer Information Service at **1–800–4–CANCER** or **LiveHelp (http://www.cancer.gov/help)**.

You may want to talk to your doctor about taking part in a *clinical trial*, a research study of new treatment methods. See the Taking Part in Cancer Research section on page 23.

You may want to ask your doctor these questions before you begin treatment:

- What type of Hodgkin lymphoma do I have? May I have a copy of the report from the pathologist?
- What is the stage of my disease? Where are the tumors?
- What are my treatment choices? Which do you recommend for me? Why?
- Will I have more than one kind of treatment?
- What are the expected benefits of each kind of treatment?
- What are the risks and possible side effects of each treatment? What can we do to control the side effects?
- How long will the treatment last?
- What can I do to prepare for treatment?
- Will I need to stay in the hospital? If so, for how long?
- What is the treatment likely to cost? Will my insurance cover the cost?
- How will treatment affect my normal activities?
- Would a clinical trial be right for me?
- How often should I have checkups after treatment?

Chemotherapy

Chemotherapy for Hodgkin lymphoma uses drugs to kill lymphoma cells. It is called *systemic therapy* because the drugs travel through the bloodstream. The drugs can reach lymphoma cells in almost all parts of the body.

Usually, more than one drug is given. Most drugs for Hodgkin lymphoma are given through a vein (*intravenous*), but some are taken by mouth.

Chemotherapy is given in cycles. You have a treatment period followed by a rest period. The length of the rest period and the number of treatment cycles depend on the stage of your disease and on the anticancer drugs used.

You may have your treatment in a clinic, at the doctor's office, or at home. Some people may need to stay in the hospital for treatment.

The side effects depend mainly on which drugs are given and how much. The drugs can harm normal cells that divide rapidly:

- **Blood cells**: When chemotherapy lowers the levels of healthy blood cells, you are more likely to get infections, bruise or bleed easily, and feel very weak and tired. Your health care team gives you blood tests to check for low levels of blood cells. If levels are low, there are medicines that can help your body make new blood cells.
- **Cells in hair roots**: Chemotherapy may cause hair loss. If you lose your hair, it will grow back, but it may be somewhat different in color and texture.
- **Cells that line the *digestive tract***: Chemotherapy can cause poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores. Ask your health care team about medicines and other ways to help you cope with these problems.

Some types of chemotherapy can cause *infertility*:

- **Men**: Chemotherapy may damage sperm cells. Because these changes to sperm may be permanent, some men have their sperm frozen and stored before treatment (*sperm banking*).
- **Women**: Chemotherapy may damage the ovaries. Women who may want to get pregnant in the future should ask their health care team about ways to preserve their eggs before treatment starts.

Some of the drugs used for Hodgkin lymphoma may cause heart disease or cancer later on. See the Follow-up Care section on page 21 for information about checkups after treatment.

You may find it helpful to read NCI's booklet *Chemotherapy and You*. Page 36 tells how to get NCI booklets.

You may want to ask your doctor these questions before having chemotherapy:

- Which drugs will I have? What are the expected benefits?
- When will treatment start? When will it end? How often will I have treatments?
- Where will I go for treatment? Will I be able to drive home afterward?
- What can I do to take care of myself during treatment?
- How will we know the treatment is working?
- What side effects should I tell you about? Can I prevent or treat any of these side effects?
- Will there be lasting side effects?

Radiation Therapy

Radiation therapy (also called radiotherapy) for Hodgkin lymphoma uses high-energy rays to kill lymphoma cells. It can shrink tumors and help control pain.

A large machine aims the rays at the lymph node areas affected by lymphoma. This is *local therapy* because it affects cells in the treated area only. Most people go to a hospital or clinic for treatment 5 days a week for several weeks.

The side effects of radiation therapy depend mainly on the dose of radiation and the part of the body that is treated. For example, radiation to your abdomen can cause nausea, vomiting, and diarrhea. When your chest and neck are treated, you may have a dry, sore throat and some trouble swallowing.

In addition, your skin in the area being treated may become red, dry, and tender. You also may lose your hair in the treated area.

Many people become very tired during radiation therapy, especially in the later weeks of treatment. Resting is important, but doctors usually advise people to try to stay as active as they can.

Although the side effects of radiation therapy can be distressing, they can usually be treated or controlled. You can talk with your doctor about ways to ease these problems.

It may also help to know that, in most cases, the side effects are not permanent. However, you may want to discuss with your doctor the possible long-term effects of radiation treatment. After treatment is over, you may have an increased chance of developing a second cancer. Also, radiation therapy aimed at the chest may cause heart disease or lung damage.

Radiation therapy aimed at the pelvis can cause infertility. Loss of fertility may be temporary or permanent, depending on your age:

- **Men**: If radiation therapy is aimed at the pelvic area, the *testes* may be harmed. Sperm banking before treatment may be a choice.
- **Women**: Radiation aimed at the pelvic area can harm the ovaries. Menstrual periods may stop, and women may have hot flashes and vaginal dryness. Menstrual periods are more likely to return for younger women. Women who may want to get pregnant after radiation therapy should ask their health care team about ways to preserve their eggs before treatment starts.

You may find it helpful to read NCI's booklet *Radiation Therapy and You*. Page 36 tells how to get NCI booklets.

You may want to ask your doctor these questions before having radiation therapy:

- Why do I need this treatment?
- When will the treatments begin? When will they end?
- How will I feel during treatment?
- How will we know if the radiation treatment is working?
- Are there any lasting side effects?

Stem Cell Transplantation

If Hodgkin lymphoma returns after treatment, you may receive stem cell transplantation. A transplant of your own blood-forming *stem cells* (*autologous stem cell transplantation*) allows you to receive high doses of chemotherapy, radiation therapy, or both. The high doses destroy both Hodgkin lymphoma cells and healthy blood cells in the bone marrow.

Stem cell transplants take place in the hospital. Before you receive high-dose treatment, your stem cells are removed and may be treated to kill lymphoma cells that may be present. Your stem cells are frozen and stored. After you receive high-dose treatment to kill Hodgkin lymphoma cells, your stored stem cells are thawed and given back to you through a flexible tube placed in a large vein in your neck or chest area. New blood cells develop from the transplanted stem cells.

You may find it helpful to read NCI's fact sheet *Bone Marrow Transplantation and Peripheral Blood Stem Cell Transplantation: Questions and Answers*. Page 36 tells how to get NCI fact sheets.

You may want to ask your doctor these questions before having a stem cell transplant:

- What are the possible benefits and risks of a stem cell transplant?
- How long will I need to be in the hospital? Will I need special care? How will I be protected from germs?
- What can we do about side effects?
- How will having a stem cell transplant affect my normal activities?
- What is my chance of a full recovery?

Second Opinion

Before starting treatment, you might want a second opinion about your diagnosis and your treatment plan. Many insurance companies cover a second opinion if you or your doctor requests it.

It may take some time and effort to gather your medical records and see another doctor. In most cases, a brief delay in starting treatment will not make treatment less effective. To make sure, you should discuss this delay with your doctor. Sometimes people with Hodgkin lymphoma need treatment right away.

There are many ways to find a doctor for a second opinion. You can ask your doctor, a local or state medical society, a nearby hospital, or a medical school for names of specialists. Other sources can be found in the NCI fact sheet *How To Find a Doctor or Treatment Facility If You Have Cancer*.

Nonprofit groups with an interest in lymphoma may be of help. Many such groups are listed in the NCI fact sheet *National Organizations That Offer Services to People With Cancer and Their Families*. Page 36 tells how to get NCI fact sheets.

Nutrition and Physical Activity

It's important for you to take care of yourself by eating well and staying as active as you can.

You need the right amount of calories to maintain a good weight. You also need enough protein to keep up your strength. Eating well may help you feel better and have more energy.

Sometimes, especially during or soon after treatment, you may not feel like eating. You may be uncomfortable or tired. You may find that foods do not taste as good as they used to. In addition, the side effects of treatment (such as poor appetite, nausea, vomiting, or mouth sores) can make it hard to eat well. Your doctor, a registered dietitian, or another health care provider can suggest ways to deal with these problems. Also, the NCI booklet *Eating Hints for Cancer Patients* has many useful ideas and recipes. Page 36 tells how to get NCI booklets.

Many people find they feel better when they stay active. Walking, yoga, swimming, and other activities can keep you strong and increase your energy. Exercise may reduce nausea and pain and make treatment easier to handle. It also can help relieve stress. Whatever physical activity you choose, be sure to talk to your doctor before you start. Also, if your activity causes you pain or other problems, be sure to let your doctor or nurse know about it.

Follow-up Care

You'll need regular checkups after treatment for Hodgkin lymphoma. Even when there are no longer any signs of cancer, the disease sometimes returns because undetected lymphoma cells may remain somewhere in your body after treatment.

Also, checkups help detect health problems that can result from cancer treatment. People treated for Hodgkin lymphoma have an increased chance of developing heart disease; *leukemia*; *melanoma*; non-Hodgkin lymphoma; and cancers of the bone, breast, lung, stomach, and thyroid. Checkups help ensure that any changes in your health are noted and treated if needed. Checkups may include a physical exam, blood tests, chest x-rays, CT scans, and other tests.

After treatment, people with Hodgkin lymphoma may receive the flu vaccine and other vaccines. You may want to talk with your health care team about when to get certain vaccines.

If you have any health problems between checkups, you should contact your doctor.

You may wish to get the NCI booklet *Facing Forward: Life After Cancer Treatment*. It answers questions about follow-up care and other concerns. Page 36 tells how to get NCI booklets.

You may want to ask your doctor these questions after you have finished treatment:

- How often will I need checkups?
- Which follow-up tests do you suggest for me?
- Between checkups, what health problems or symptoms should I tell you about?

Sources of Support

Learning you have Hodgkin lymphoma can change your life and the lives of those close to you. These changes can be hard to handle. It’s normal for you, your family, and your friends to have many different and sometimes confusing feelings.

Concerns about treatments and managing side effects, hospital stays, and medical bills are common. You may also worry about caring for your family, keeping your job, or continuing daily activities.

Here’s where you can go for support:

- Doctors, nurses, and other members of your health care team can answer many of your questions about treatment, working, or other activities.
- Social workers, counselors, or members of the clergy can be helpful if you want to talk about your feelings or concerns. Often, social workers can suggest resources for financial aid, transportation, home care, or emotional support.
- Support groups can also help. In these groups, patients or their family members meet with other patients or their families to share what they have learned about coping with the disease and the effects of treatment. Groups may offer support in person, over the telephone, or on the Internet. You may want to talk with a member of your health care team about finding a support group.
- Information specialists at **1–800–4–CANCER** and at **LiveHelp** (**http://www.cancer.gov/help**) can help you locate programs, services, and publications. They can give you names of national organizations that offer services to people with cancer and their families.

For tips on coping, you may want to read the NCI booklet *Taking Time: Support for People With Cancer.* Page 36 tells how to get NCI booklets.

Taking Part in Cancer Research

Doctors all over the country are conducting many types of clinical trials (research studies in which people volunteer to take part). Clinical trials are designed to answer important questions and to find out whether new approaches are safe and effective.

Research already has led to advances, and doctors continue to search for more effective methods for treating Hodgkin lymphoma. Doctors are studying methods of new and better ways to treat it, and ways to improve quality of life.

People who join clinical trials may be among the first to benefit if a new approach is effective. And even if people in a trial do not benefit directly, they still make an important contribution by helping doctors learn more about Hodgkin lymphoma and how to control it. Although clinical trials may pose some risks, doctors do all they can to protect their patients.

If you are interested in being part of a clinical trial, talk with your doctor. You may want to read the NCI booklet *Taking Part in Cancer Treatment Research Studies*. This booklet describes how treatment studies are carried out and explains their possible benefits and risks. Page 36 tells how to get NCI booklets.

NCI's Web site includes a section on clinical trials at **http://www.cancer.gov/clinicaltrials**. It has general information about clinical trials as well as detailed information about specific ongoing studies of Hodgkin lymphoma. Information specialists at **1–800–4–CANCER** or at **LiveHelp** at **http://www.cancer.gov/help** can answer questions and provide information about clinical trials.

Dictionary

Definitions of thousands of terms are on the NCI Web site in the NCI Dictionary of Cancer Terms. You can access it at **http://www.cancer.gov/dictionary**.

Abdomen (AB-doh-men): The area of the body that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs.

Autologous stem cell transplantation (aw-TAH-luh-gus stem sel tranz-plan-TAY-shun): A procedure in which blood-forming stem cells (cells from which all blood cells develop) are removed, stored, and later given back to the same person.

B cell: A white blood cell that comes from bone marrow. As part of the immune system, B cells make antibodies and help fight infections. Also called B lymphocyte.

Bacteria (bak-TEER-ee-uh): A large group of single-cell microorganisms. Some cause infections and disease in animals and humans. The singular of bacteria is bacterium.

Biopsy (BY-op-see): The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue. When only a sample of tissue is removed, the procedure is called an incisional biopsy. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. When a sample of tissue or fluid is removed with a needle, the procedure is called a needle biopsy, core biopsy, or fine-needle aspiration.

Bone marrow (MAYR-oh): The soft, sponge-like tissue in the center of most bones. It produces white blood cells, red blood cells, and platelets.

Bone marrow biopsy (MAYR-oh BY-op-see): The removal of a sample of tissue from the bone marrow with a needle for examination under a microscope.

Cancer (KAN-ser): A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread to other parts of the body through the blood and lymph systems.

Cell (sel): The individual unit that makes up the tissues of the body. All living things are made up of one or more cells.

Chemotherapy (KEE-moh-THAYR-uh-pee): Treatment with drugs that kill cancer cells.

Classical Hodgkin lymphoma (KLA-sih-kul HOJ-kin lim-FOH-muh): The most common type of Hodgkin lymphoma, which is a cancer of the immune system. Classical Hodgkin lymphoma is marked by the presence of a type of cell called the Reed-Sternberg cell.

Clinical trial: A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called a clinical study.

Complete blood count: CBC. A test to check the number of red blood cells, white blood cells, and platelets in a sample of blood. Also called blood cell count.

Contrast material: A dye or other substance that helps show abnormal areas inside the body. It is given by injection into a vein, by enema, or by mouth. Contrast material may be used with x-rays, CT scans, MRI, or other imaging tests.

CT scan: Computed tomography scan (kum-PYOO-ted tuh-MAH-gruh-fee skan). A series of detailed pictures of areas inside the body taken from different angles;

the pictures are created by a computer linked to an x-ray machine. Also called computerized tomography and computerized axial tomography (CAT) scan.

Diaphragm (DY-uh-fram): The thin muscle below the lungs and heart that separates the chest from the abdomen.

Digestive tract (dy-JES-tiv): The organs through which food and liquids pass when they are swallowed, digested, and eliminated. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum and anus.

Epstein-Barr virus (ep-stine-BAR VY-rus): EBV. A common virus that remains dormant in most people. It causes infectious mononucleosis and has been associated with certain cancers, including Burkitt lymphoma, immunoblastic lymphoma, and nasopharyngeal carcinoma.

Excisional biopsy (ek-SIH-zhun-al BY-op-see): A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

Fine needle aspiration (as-per-AY-shun): The removal of tissue or fluid with a needle for examination under a microscope. Also called needle biopsy.

Groin: The area where the thigh meets the abdomen.

Hematologist (HEE-muh-TAH-loh-jist): A doctor who specializes in treating blood disorders.

Hodgkin lymphoma (HOJ-kin lim-FOH-muh): A cancer of the immune system that is marked by the presence of a type of cell called the Reed-Sternberg cell. Symptoms include the painless enlargement of lymph nodes, spleen, or other immune tissue. Other symptoms include fever, weight loss, fatigue, or night sweats. Also called Hodgkin disease.

Human immunodeficiency virus (HYOO-mun ih-MYOO-noh-dih-FIH-shun-see VY-rus): HIV. The cause of acquired immunodeficiency syndrome (AIDS).

Immune system (ih-MYOON SIS-tem): The complex group of organs and cells that defends the body against infections and other diseases.

Incisional biopsy (in-SIH-zhun-al BY-op-see): A surgical procedure in which a portion of a lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

Infection: Invasion and multiplication of germs in the body. Infections can occur in any part of the body and can spread throughout the body. The germs may be bacteria, viruses, yeast, or fungi. They can cause a fever and other problems, depending on where the infection occurs. When the body's natural defense system is strong, it can often fight the germs and prevent infection. Some cancer treatments can weaken the natural defense system.

Infertility (IN-fer-TIH-lih-tee): The inability to produce children.

Inherited (in-HAYR-it-ed): Transmitted through genes that have been passed from parents to their offspring (children).

Intravenous (IN-truh-VEE-nus): IV. Within a blood vessel.

Leukemia (loo-KEE-mee-uh): Cancer that starts in blood-forming tissue such as the bone marrow and causes large numbers of blood cells to be produced and enter the bloodstream.

Local anesthesia (A-nes-THEE-zhuh): Drugs that cause a temporary loss of feeling in one part of the body. The patient remains awake but has no feeling in the part of the body treated with the anesthetic.

Local therapy (THAYR-uh-pee): Treatment that affects cells in the tumor and the area close to it.

Lymph (limf): The clear fluid that travels through the lymphatic system and carries cells that help fight infections and other diseases. Also called lymphatic fluid.

Lymph node (limf): A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also called a lymph gland.

Lymph vessel (limf): A thin tube that carries lymph (lymphatic fluid) and white blood cells through the lymphatic system. Also called lymphatic vessel.

Lymphatic system (lim-FA-tik SIS-tem): The tissues and organs that produce, store, and carry white blood cells that fight infections and other diseases. This system includes the spleen, thymus, lymph nodes, and lymphatic vessels (a network of thin tubes that carry lymph and white blood cells). Lymphatic vessels branch, like blood vessels, into all the tissues of the body.

Lymphocyte (LIM-foh-site): A type of white blood cell. Lymphocytes have a number of roles in the immune system, including the production of antibodies and other substances that fight infections and other diseases.

Lymphoma (lim-FOH-muh): Cancer that begins in cells of the immune system. There are two basic categories of lymphomas. One kind is Hodgkin lymphoma, which is marked by the presence of a type of cell called the Reed-Sternberg cell. The other category is non-Hodgkin lymphomas, which includes a large, diverse group of cancers of immune system cells. Non-Hodgkin lymphomas can be further divided into cancers that have an indolent (slow-growing) course and those that have an aggressive (fast-growing) course. These subtypes behave and respond to treatment differently. Both Hodgkin and non-Hodgkin lymphomas can occur in children and adults, and prognosis and treatment depend on the stage and the type of cancer.

Medical oncologist (MEH-dih-kul on-KAH-loh-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often is the main health care provider for someone who has cancer. A medical oncologist also gives supportive care and may coordinate treatment given by other specialists.

Melanoma (MEH-luh-NOH-muh): A form of skin cancer that begins in melanocytes (the cells that make the pigment melanin). Melanoma usually begins in a mole.

MRI: Magnetic resonance imaging (mag-NEH-tik REH-zuh-nunts IH-muh-jing). A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes better images of organs and soft tissue than other scanning techniques, such as computed tomography (CT) or x-ray. MRI is especially useful for imaging the brain, the spine, the soft tissue of joints, and the inside of bones. Also called nuclear magnetic resonance imaging (NMRI).

Nodular lymphocyte-predominant Hodgkin lymphoma (NAH-juh-ler LIM-foh-site preh-DAH-mih-nunt HOJ-kin lim-FOH-muh): A rare type of Hodgkin lymphoma, which is a cancer of the immune system. It is marked by the presence of a type of cell called a popcorn cell, which is different from the typical Reed-Sternberg cell found in classical Hodgkin lymphoma.

This type of Hodgkin lymphoma may change into diffuse large B-cell lymphoma. Also called NLPHL.

Non-Hodgkin lymphoma (non-HOJ-kin lim-FOH-muh): NHL. Any of a large group of cancers of the immune system. NHLs can occur at any age and are often marked by enlarged lymph nodes, fever, and weight loss. There are many different types of NHL, which can be divided into aggressive (fast-growing) and indolent (slow-growing) types and can be classified as either B-cell or T-cell NHL. Prognosis and treatment depend on the stage and type of disease.

Oncology nurse (on-KAH-loh-jee): A nurse who specializes in treating and caring for people who have cancer.

Pathologist (puh-THAH-loh-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

Pelvis: The lower part of the abdomen, located between the hip bones.

PET scan: Positron emission tomography scan (PAH-zih-tron ee-MIH-shun toh-MAH-gruh-fee skan). A procedure in which a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body.

Radiation oncologist (RAY-dee-AY-shun on-KAH-loh-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy and irradiation.

Radioactive (RAY-dee-oh-AK-tiv): Giving off radiation.

Recurrence: Cancer that has returned after a period of time during which the cancer could not be detected. The cancer may come back to the same place as the original (primary) tumor or to another place in the body. Also called recurrent cancer.

Reed-Sternberg cell: A type of cell that appears in people with Hodgkin disease. The number of these cells increases as the disease advances.

Registered dietitian (dy-eh-TIH-shun): A health professional with special training in the use of diet and nutrition to keep the body healthy. A registered dietitian may help the medical team improve the nutritional health of a patient.

Relapse: The return of signs and symptoms of cancer after a period of improvement.

Risk factor: Something that may increase the chance of developing a disease. Some examples of risk factors for cancer include age, a family history of certain cancers, use of tobacco products, certain eating habits, obesity, lack of exercise, exposure to radiation or other cancer-causing agents, and certain genetic changes.

Side effect: A problem that occurs when treatment affects healthy tissues or organs. Some common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Sperm banking: Freezing sperm for use in the future. This procedure can allow men to father children after loss of fertility.

Spleen: An organ that is part of the lymphatic system. The spleen produces lymphocytes, filters the blood, stores blood cells, and destroys old blood cells. It is located on the left side of the abdomen near the stomach.

Stem cell: A cell from which other types of cells develop. Blood cells develop from blood-forming stem cells.

Stem cell transplantation: A method of replacing immature blood-forming cells that were destroyed by cancer treatment. The stem cells are given to the person after treatment to help the bone marrow recover and continue producing healthy blood cells.

Supportive care: Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of the disease, side effects caused by treatment of the disease, and psychological, social, and spiritual problems related to the disease or its treatment. Also called palliative care, comfort care, and symptom management.

Systemic therapy (sis-TEH-mik THAYR-uh-pee): Treatment using substances that travel through the bloodstream, reaching and affecting cells all over the body.

T cell: One type of white blood cell that attacks virus-infected cells, foreign cells, and cancer cells. T cells also produce a number of substances that regulate the immune response. Also called T lymphocyte.

Testis (TES-tis): One of two egg-shaped glands found inside the scrotum that produce sperm and male hormones. Also called a testicle.

Thymus: An organ that is part of the lymphatic system, in which T lymphocytes grow and multiply. The thymus is in the chest behind the breastbone.

Tissue (TISH-oo): A group or layer of cells that work together to perform a specific function.

Tonsil: One of two small masses of lymphoid tissue on either side of the throat.

Tumor (TOO-mer): An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancerous), or malignant (cancerous). Also called neoplasm.

Virus (VY-rus): A microorganism that can infect cells and cause disease.

White blood cell: WBC. Refers to a blood cell that does not contain hemoglobin. White blood cells include lymphocytes, neutrophils, eosinophils, macrophages, and mast cells. These cells are made by bone marrow and help the body fight infections and other diseases.

X-ray: A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.

National Cancer Institute Information Resources

You may want more information for yourself, your family, and your doctor. The following NCI services are available to help you.

Telephone

NCI's Cancer Information Service (CIS) provides accurate, up-to-date information about cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into plain language and respond in English or Spanish. Calls to the CIS are confidential and free.

Telephone: **1–800–4–CANCER** (1–800–422–6237)

TTY: 1–800–332–8615

Internet

NCI's Web site provides information from numerous NCI sources. It offers current information about cancer prevention, screening, diagnosis, treatment, genetics, supportive care, and ongoing clinical trials. It has information about NCI's research programs, funding opportunities, and cancer statistics.

Web site: **http://www.cancer.gov**

Spanish Web site: **http://www.cancer.gov/espanol**

If you're unable to find what you need on the Web site, contact NCI staff. Use the online contact form at **http://www.cancer.gov/contact** or send an email to **cancergovstaff@mail.nih.gov**.

Also, information specialists provide live, online assistance through **LiveHelp** at **http://www.cancer.gov/help**.

National Cancer Institute Publications

NCI provides publications about cancer, including the booklets and fact sheets mentioned in this booklet. Many are available in both English and Spanish.

You may order these publications by telephone, on the Internet, or by mail. You may also read them online and print your own copy.

- **By telephone**: People in the United States and its territories may order these and other NCI publications by calling the NCI's Cancer Information Service at **1–800–4–CANCER**.
- **On the Internet**: Many NCI publications may be viewed, downloaded, and ordered from **http://www.cancer.gov/publications** on the Internet. People in the United States and its territories may use this Web site to order printed copies. This Web site also explains how people outside the United States can mail or fax their requests for NCI booklets.
- **By mail**: NCI publications may be ordered by writing to the address below:

  Publications Ordering Service
  National Cancer Institute
  Suite 3035A
  6116 Executive Boulevard, MSC 8322
  Bethesda, MD 20892–8322

Cancer Treatment

- *Chemotherapy and You* (also available in Spanish: *La quimioterapia y usted*)
- *Radiation Therapy and You* (also available in Spanish: *La radioterapia y usted*)
- *Biological Therapy: Treatments That Use Your Immune System to Fight Cancer*

- *Bone Marrow Transplantation and Peripheral Blood Stem Cell Transplantation: Questions and Answers* (also available in Spanish: *El trasplante de médula ósea y el trasplante de células madre de sangre periférica: preguntas y respuestas)*
- *How To Find a Doctor or Treatment Facility If You Have Cancer* (also available in Spanish: *Cómo encontrar a un doctor o un establecimiento de tratamiento si usted tiene cáncer*)

Clinical Trials

- *Taking Part in Cancer Treatment Research Studies*

Living With Cancer

- *Eating Hints for Cancer Patients* (also available in Spanish: *Consejos de alimentación para pacientes con cáncer*: *Antes*, *durante y después del tratamiento*)
- *Pain Control* (also available in Spanish: *Control del dolor*)
- *Follow-up Care After Cancer Treatment: Questions and Answers*
- *Facing Forward*: *Life After Cancer Treatment* (also available in Spanish: *Siga adelante*: *la vida después del tratamiento del cáncer*)
- *Facing Forward*: *Ways You Can Make a Difference in Cancer*
- *Taking Time*: *Support for People with Cancer*
- *Cancer Support Groups: Questions and Answers*
- *National Organizations That Offer Services to People With Cancer and Their Families* (also available in Spanish: *Organizaciones nacionales que brindan servicios a las personas con cáncer y a sus familias*)

- *Coping With Advanced Cancer*
- *When Cancer Returns*

Complementary Medicine

- *Thinking about Complementary & Alternative Medicine: A guide for people with cancer*
- *Complementary and Alternative Medicine in Cancer Treatment: Questions and Answers* (also available in Spanish*: La medicina complementaria y alternativa en el tratamiento del cáncer: preguntas y respuestas)*

Caregivers

- *When Someone You Love Is Being Treated for Cancer: Support for Caregivers*
- *When Someone You Love Has Advanced Cancer: Support for Caregivers*
- *Facing Forward: When Someone You Love Has Completed Cancer Treatment*
- *Caring for the Caregiver: Support for Cancer Caregivers*

¿Necesita información en español?

Llame al Servicio de Información sobre el Cáncer y hable en español con un especialista en información de cáncer. El número es **1–800–422–6237**.

O visite el sitio de Internet del Instituto Nacional del Cáncer en **http://www.cancer.gov/espanol**.

The National Cancer Institute

The National Cancer Institute (NCI) is part of the National Institutes of Health. NCI conducts and supports basic and clinical research in the search for better ways to prevent, diagnose, and treat cancer. NCI also supports the training of scientists and is responsible for communicating its research findings to the medical community and the public.

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