Hodgkin Lymphoma

Learning that you have cancer can be overwhelming. The goal of this book is to help you get the best cancer treatment. It explains which cancer tests and treatments are recommended by experts of Hodgkin lymphoma.

The National Comprehensive Cancer Network® (NCCN®) is a not-for-profit alliance of 26 of the world’s leading cancer centers. Experts from NCCN® have written treatment guidelines for doctors who treat Hodgkin lymphoma. These treatment guidelines suggest what the best practice is for cancer care. The information in this patient book is based on the guidelines written for doctors.

NCCN aims to improve the care given to patients with cancer. NCCN staff work with experts to create helpful programs and resources for many stakeholders. Stakeholders include health providers, patients, businesses, and others. One resource is the series of books for patients called the NCCN Guidelines for Patients®. Each book presents the best practice for a type of cancer. The patient books are based on clinical practice guidelines written for cancer doctors. These guidelines are called the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). Clinical practice guidelines list the best health care options for groups of patients. Many doctors use them to help plan cancer treatment for their patients. Panels of experts create the NCCN Guidelines®. Most of the experts are from NCCN Member Institutions. Panelists may include surgeons, radiation oncologists, medical oncologists, and patient advocates. Recommendations in the NCCN Guidelines are based on clinical trials and the experience of the panelists. The NCCN Guidelines are updated at least once a year. When funded, the patient books are updated to reflect the most recent version of the NCCN Guidelines for doctors.

For more information about the NCCN Guidelines, visit NCCN.org/clinical.asp.

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LLS is dedicated to developing better outcomes for blood cancer patients through research, education and patient services and is happy to have this comprehensive resource available to patients with Hodgkin lymphoma.

www.LLS.org/informationspecialists

**Supported by NCCN Foundation®**

The NCCN Foundation supports the mission of the National Comprehensive Cancer Network® (NCCN®) to improve the care of patients with cancer. One of its aims is to raise funds to create a library of books for patients. Learn more about the NCCN Foundation at NCCN.org/foundation.

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Hodgkin Lymphoma

4 How to use this book

5 Part 1
Hodgkin lymphoma basics
Explains how this cancer starts and how it spreads.

13 Part 2
Treatment planning
Describes how doctors plan your treatment.

23 Part 3
Overview of cancer treatments
Describes the treatments used to cure or control Hodgkin lymphoma.

35 Part 4
Treatment guide: Classical Hodgkin lymphoma
Presents treatment options for the more common types of Hodgkin lymphoma.

55 Part 5
Treatment guide: Nodular lymphocyte-predominant Hodgkin lymphoma
Presents treatment options for a very uncommon type of Hodgkin lymphoma.

69 Part 6
Making treatment decisions
Offers tips for choosing the best treatment.

79 Glossary:
80 Dictionary
84 Acronyms

87 NCCN Panel Members
88 NCCN Member Institutions
90 Index
How to use this book

Who should read this book?

The information in this book is about treatment of Hodgkin lymphoma among young, middle-aged, and older adults up to age 80. It does not address treatment for children, teenagers, and adults 80 years old or older. Patients and those who support them—caregivers, family, and friends—may find this book helpful. It may help you discuss and decide with doctors what care is best.

Where should I start reading?

Starting with Part 1 may be helpful. It explains what Hodgkin lymphoma is. Knowing more about this cancer may help you better understand its treatment.

Part 2 lists which health tests and other steps of care are needed before treatment. Parts 3 through 5 address treatment. Part 3 briefly describes the types of treatments. Parts 4 and 5 are guides to treatment options for the different types of Hodgkin lymphoma. Tips for making treatment decisions are presented in Part 6.

Does the whole book apply to me?

This book includes information for many situations. Your treatment team can help. They can point out what information applies to you. They can also give you more information. As you read through this book, you may find it helpful to make a list of questions to ask your doctors.

The recommendations in this book are based on science and the experience of NCCN experts. However, these recommendations may not be right for you. Your doctors may suggest other tests and treatments based on your health and other factors. If other suggestions are given, feel free to ask your treatment team questions.

Making sense of medical terms

In this book, many medical words are included. These are words that you will likely hear from your treatment team. Most of these words may be new to you, and it may be a lot to learn.

Don’t be discouraged as you read. Keep reading and review the information. Don’t be shy to ask your treatment team to explain a word or phrase that you do not understand.

Words that you may not know are defined in the text or in the Dictionary. Words in the Dictionary are underlined when first used on a page.

Acronyms are also defined when first used and in the Glossary. Acronyms are short words formed from the first letters of several words. One example is CBC for complete blood count.
Hodgkin lymphoma basics
You’ve learned that you have or may have Hodgkin lymphoma. It’s common to feel shocked and confused. Part 1 reviews some basics about Hodgkin lymphoma that may help you start to cope. These basics may also help you start planning for treatment.

What is the lymphatic system?

The lymphatic system is one of 13 systems of the human body. It transports fluids to the bloodstream and fights germs. As such, it supports your blood-flowing (cardiovascular) and disease-fighting (immune) systems.

Cells are the building blocks of tissue in the body. The spaces between cells are filled with fluid. This fluid is called tissue (or interstitial) fluid. Most tissue fluid comes from parts of blood plasma that have passed out of blood vessels. Cells also release waste and other products into tissue fluid.

When tissue fluid increases, it drains into vessels. Almost all of tissue fluid drains back into blood vessels. The rest of it drains into lymph vessels. Once inside of lymph vessels, tissue fluid is called lymph. Lymph travels in lymph vessels back to the bloodstream.

The lymphatic system also collects fat and some vitamins from your gut. After you eat, your stomach
turns food into a liquid. Then, the liquid drains into your small intestine, fat and some vitamins are absorbed into lymph vessels. This fatty lymph, called chyle, travels in lymph vessels to the bloodstream.

As lymph travels, it will pass through and be filtered by lymph nodes. Lymph nodes are organized masses of lymphoid tissue. There are hundreds of lymph nodes throughout your body. See Figure 1.1. High numbers of lymph nodes exist in the middle of your chest, neck, armpit, groin, pelvis, and along your gut.

Lymph nodes and other lymphoid tissue are defined by high numbers of white blood cells called lymphocytes. Lymph also has lymphocytes. Lymphocytes help fight germs. The three types of lymphocytes are NK (natural killer) cells, B-cells, and T-cells. Lymphocytes are made in bone marrow then are moved by blood to the lymphatic system.

Other parts of your body that have many lymphocytes are included in the lymphatic system. In children, the thymus stores T-cells until they are able to fight germs. Germs in blood are filtered and destroyed by lymphocytes within your spleen. Your tonsils kill germs in lymph that enter through your mouth and nose. There are also small clumps of lymphatic tissue in your gut, thyroid, breasts, lungs, eyes, and skin.

Figure 1.1
Lymphatic system

The lymphatic system kills germs in the body and collects and transports a fluid called lymph to the bloodstream.
How does Hodgkin lymphoma start?

Cancer is a disease of cells. Lymphomas are cancers that start in lymphocytes within the lymphatic system. Most often these cancers first form in lymph nodes.

There are two main types of lymphomas. Hodgkin lymphoma is defined by the presence of Reed-Sternberg or related cells. Reed-Sternberg cells are large, abnormal lymphocytes that have an “owl-eye” look. Non-Hodgkin lymphoma includes all the other types of lymphoma. Hodgkin lymphoma is the focus of this book.

There are classical and rare types of Hodgkin lymphoma. The classical types consist of Reed-Sternberg cells and Hodgkin cells. Hodgkin cells are larger than normal lymphocytes but smaller than Reed-Sternberg cells. Classical types include nodular sclerosis, mixed cellularity, lymphocyte-depleted, and lymphocyte-rich disease.

Nodular lymphocyte-predominant Hodgkin lymphoma is the rare type of this cancer. Lymphocyte-predominant cells are a variant of Reed-Sternberg cells. They have a unique popcorn shape. Thus, they are called “popcorn cells.”

Lymphocytes become cancer cells due to changes within cells. Inside of cells are coded instructions for building new cells and controlling how cells behave. These instructions are called genes. Genes are a part of DNA (deoxyribonucleic acid), which is grouped together into bundles called chromosomes. See Figure 1.2. Changes in genes cause normal cells to become cancer cells. Researchers are still trying to learn what causes genes to change and cause cancer.

Figure 1.2  Genetic material in cells

Most human cells contain the “blueprint of life”—the plan by which our bodies are made and work. The plan is found inside of chromosomes, which are long strands of DNA that are tightly wrapped around proteins. Genes are small pieces of DNA that contain instructions for building new cells and controlling how cells behave. Humans have about 24,000 genes.

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How does Hodgkin lymphoma spread?

Cancer cells don’t behave like normal cells in three key ways. First, the changes in genes cause cancer cells to grow more quickly and live longer. Normally, cells grow and then divide to form new cells when needed. They also die when old or damaged as shown in Figure 1.3. In contrast, cancer cells make new cells that aren’t needed and don’t die quickly when old or damaged. Over time, cancer cells form a mass called the primary tumor.

The second way cancer cells differ from normal cells is that they can grow into (invade) other tissues. If not treated, the primary tumor can grow large and invade other tissue. Cancer cells can replace so many normal cells that organs don’t work like they should.

Third, unlike normal cells, cancer cells can break away from the primary tumor and form new tumors. This process is called metastasis. Hodgkin lymphoma often spreads from one group of lymph nodes to the next and so on. Over time, it will spread to tissue and organs outside the lymphatic system.

There is good news about Hodgkin lymphoma. In the past 30 years, its treatment has improved. Now, more than 80 out of 100 people with Hodgkin lymphoma can be cured of the cancer. More people survive Hodgkin lymphoma than any other cancer.

Figure 1.3 Normal cell growth vs cancer cell growth

Normal cells increase in number when they are needed and die when old or damaged. In contrast, cancer cells quickly make new cells and live longer.

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Do I have Hodgkin lymphoma?

Tissue or fluid must be removed from your body and be tested to confirm (diagnose) cancer. A biopsy removes samples of fluid or tissue. To diagnose Hodgkin lymphoma, an excisional biopsy is recommended. This biopsy removes the tumor that might be cancer and not much else. The methods used to do an excisional biopsy depend on where the tumor is in your body.

FNA (fine-needle aspiration) is a type of biopsy that removes samples with a thin needle. It should not be used to diagnosis Hodgkin lymphoma. You may have cancer even if FNA finds no cancer.

The biopsy samples will be sent to a pathologist. A pathologist is a doctor who’s an expert in testing cells to find disease. He or she will examine the samples using a microscope.

If cancer cells are found, more tests will be done. All of the test results will be recorded in a pathology report. It’s a good idea to get a copy of your pathology report. It’s used to plan treatment.

The pathologist will study the parts of the cancer cells to classify the disease. This is called histologic typing. The pathology report will state if the cancer is Hodgkin lymphoma or another cancer. If the cancer is Hodgkin lymphoma, which type it is will be listed.

The pathologist should also perform an IHC (immunohistochemistry) test. This test looks for proteins, called antigens, on the surface of cells. Test results will help your doctors plan treatment.
Review

- The lymphatic system consists of lymph and a network of vessels and organs. It helps kill germs in the body and transports fluids to the bloodstream.

- Lymphomas are cancers that start in lymphocytes within the lymphatic system. Hodgkin lymphoma starts in abnormal lymphocytes called Reed-Sternberg cells or lymphocyte-predominant cells.

- Hodgkin lymphoma often spreads from one group of lymph nodes to the next. Over time, it will spread to tissue and organs outside the lymphatic system.

- An excisional biopsy removes the whole tumor so that it can be tested for cancer.
Treatment planning
Doctors plan treatment with many sources of information. One of these sources is tests of your health and the cancer. Part 2 describes who should receive which tests before treatment. Some of these tests are used to stage the cancer and others to know which treatments would work the best. Besides tests, Part 2 describes other types of care that are important to receive before cancer treatment.

Medical history

Your medical history includes any health events and medicines you’ve taken in your life. You will be asked about illnesses, injuries, health conditions, and more. Some health problems run in families. Thus, your doctor may also ask about the health of your blood relatives.

Hodgkin lymphoma may cause symptoms. It’s important that your doctor knows if you have them. These symptoms include high fevers, heavy night sweats, and fast weight loss without dieting. Besides those, tell your doctor if you recently have had a strong reaction to alcohol, itchy skin (pruritus), and extreme tiredness despite sleep (fatigue).

A medical history is needed for treatment planning. Read Chart 2.1 for a complete list of care that is recommended prior to treatment. Some types of care are for anyone with Hodgkin lymphoma while others may be useful for some people.
Physical exam

Doctors often give a **physical exam** along with taking a **medical history**. A physical exam is a review of your body for signs of disease. During this exam, your doctor will listen to your lungs, heart, and gut. Parts of your body will likely be felt to see if organs are of normal size, are soft or hard, or cause pain when touched. Your body parts that should be checked include dense areas of lymphoid tissue, your **spleen**, and **liver**.

Your doctor will also rate your **performance status**. Performance status is your ability to do daily activities. It is used by doctors to assess if you can undergo certain treatments.

<table>
<thead>
<tr>
<th>Chart 2.1 Care before treatment</th>
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<tr>
<td><strong>Must haves</strong></td>
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<tr>
<td>Medical history</td>
</tr>
<tr>
<td>Physical exam</td>
</tr>
<tr>
<td>Complete blood count with differential</td>
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<tr>
<td>Erythrocyte sedimentation rate</td>
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<tr>
<td>Comprehensive metabolic panel</td>
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<tr>
<td>Lactate dehydrogenase test</td>
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<tr>
<td>Liver function test</td>
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<tr>
<td>Diagnostic CT with contrast</td>
</tr>
<tr>
<td>PET/CT</td>
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<tr>
<td>Pregnancy test if you can have babies</td>
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<tr>
<td>Help for smoking and distress if needed</td>
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</table>
Blood tests

Blood tests are done to look for blood diseases and signs of other diseases. Blood is often removed from a vein in the inside of the elbow with a needle. The needle may bruise your skin and you may feel dizzy from the blood draw. Your blood will be sent to a lab for testing. Blood tests for Hodgkin lymphoma are:

**Complete blood count with differential**
A CBC (complete blood count) measures the number of blood cells in a blood sample. It includes numbers of white blood cells, red blood cells, and platelets. Your blood counts may be low or high because of cancer or another health problem.

There are five types of white blood cells. A differential counts the number of each type. It also checks if the counts are in balance with each other. Your doctor can learn from this test what the cause of an abnormal white blood count is.

**Erythrocyte sedimentation rate**
ESR (erythrocyte sedimentation rate) is the amount of clear fluid at the top of a tube after one hour. It is used to decide if you have inflammation. Inflammation is your body’s attempt to heal itself. A large amount of clear fluid (a high ESR) may be caused by inflammation or something else, so other tests may be given.

**Comprehensive metabolic panel**
Chemicals in your blood come from your bone, liver, and other organs. A comprehensive metabolic panel often includes tests for 14 chemicals. The tests show if the level of chemicals is too low or high. Abnormal levels can be caused by cancer or other health problems.

**Lactate dehydrogenase test**
Lactate dehydrogenase is a protein that is in most cells. It gets into your blood when a cell is damaged. Thus, a high level of lactate dehydrogenase is a sign of cell damage. High levels can be caused by cancer or other health problems.

**Liver function test**
Your liver is an organ in the upper right side of your abdomen. It does many important jobs, such as remove toxins from your blood. A liver function test assesses for chemicals that are made or processed by the liver. Levels that are too high or low may signal that the cancer has spread to the liver.

**HIV testing**
If you have HIV, treating it is an important part of treating Hodgkin lymphoma. HIV treatment will improve how well cancer treatment works. Thus, tell your treatment team if you have HIV and about your treatment. For others, ask your treatment team if you should get tested.

**Hepatitis B testing**
Like HIV, hepatitis B can affect how well some cancer treatments work. Thus, tell your treatment team if you have hepatitis B. For others, ask your treatment team if you should get tested.
Imaging tests

Imaging tests make pictures (images) of the insides of your body. They can show where cancer is. Depending on the test, you may need to stop taking some medicines, stop eating and drinking for a few hours, and remove metal objects from your body. If you are nervous, you may be given a drug, called a sedative, to help you relax.

Imaging machines are large. You will likely be lying down during testing. At least part of your body will be in the machine. Figure 2.1 shows a CT machine, which is described next.

After the test, you will likely be able to resume your activities right away. If you took a sedative, you will have a waiting period. You may not learn of the results for a few days since a radiologist needs to see the pictures. A radiologist is a doctor who’s an expert in reading the images.

Diagnostic CT

Diagnostic CT (computed tomography) may be needed before treatment. It isn’t needed if you receive an integrated PET/CT. Integrated PET/CT is described next.

CT takes many pictures of a body part from different angles using x-rays. A computer combines the x-rays to make detailed pictures. A contrast dye is used for diagnostic CT. It makes the pictures clearer. The dye will be injected into your vein and mixed with a liquid you drink. The dye may cause you to feel flushed or get hives. Rarely, serious allergic reactions occur. Tell your doctor and the technicians if you have had bad reactions in the past.

What part of your body will be imaged depends on where the cancer might be. Often, CT of the neck, chest, belly area, and between the hip bones is done. CT of your neck is needed if your neck may be treated with radiation. Also, the areas that look abnormal on PET/CT should be imaged.

PET/CT

PET/CT (positron emission tomography/computed tomography) is the use of two tests. These tests are PET and CT. Some cancer centers have one machine that does both tests at the same time. This is called an integrated PET/CT. At other centers, the scans are done with two machines. If you’re able, you should lie on a flat table with your hands above your head during the test.

Figure 2.1  Computed tomography (CT) machine

A CT machine is large and has a tunnel in the middle. During the test, you will lie on a table that moves slowly through the tunnel.
While x-rays and contrast are used for CT, a sugar radiotracer is used for PET. The radiotracer is often FDG (fluorodeoxyglucose). Before PET, you must fast for 4 hours or more. There may be other limits to your diet. About an hour before the scan, you will be injected with the radiotracer.

The radiotracer emits a small amount of energy. The energy is detected by the imaging machine. Cancer appears brighter (“hotter”) in pictures because cancer cells use sugar more quickly than normal cells. PET hot spots can be caused by health problems other than cancer. Thus, you may receive more tests if results aren’t a match with Hodgkin lymphoma.

**Chest x-ray**

Cancer can spread to lymph nodes. If it does, lymph nodes will grow larger over time. Doctors can see lymph nodes on an x-ray and note if they look large. Since Hodgkin lymphoma often spreads to lymph nodes within the chest, a chest x-ray can be helpful. A chest x-ray is advised if a large mass in the middle of your chest is seen with other imaging tests.

**Bone marrow biopsy**

Cancer can spread into bone marrow. PET is one of the tests used to assess for cancer in marrow. PET results may clearly show that cancer is in bone marrow. When PET shows cancer in three or more areas of bone, it can be assumed that cancer is in the marrow, too.

Low numbers of blood cells may be a sign of cancer in bone marrow. You may have low numbers despite normal PET results. In this case, a biopsy of your bone marrow can be useful. This biopsy will remove a small piece of bone and some bone marrow likely from your hip bone. You may receive a light sedative before the test.

During this test, you will likely lie on your side as shown in Figure 2.2. Your doctor will clean your skin then give local anesthesia to numb the site. Once numb, a needle will be inserted through your skin and pushed into the bone. The needle will be rotated to remove the samples. This biopsy may cause pain and can bruise your skin.

**Figure 2.2 Bone marrow biopsy**

Doctors use a bone marrow biopsy to remove a sample of bone and marrow for testing.
Heart and lung tests

Some cancer treatments can damage your heart and lungs. Thus, your doctors will test how well your heart and lungs work to plan treatment. If they aren’t working well, you may receive other treatment.

Ejection fraction
An echocardiogram is an imaging test of your heart. It uses sound waves (ultrasound) to make pictures. During this test, you will be lying down. Small patches will be placed on your chest to track your heartbeat. Next, a probe with gel on its tip will be slid across part of your bare chest. A picture of your beating heart will be seen at once on a screen. The pictures will be recorded for future viewing.

An echocardiogram shows how much blood is pumped out of the left side of your heart. The amount of pumped blood is called the ejection fraction. It is a measure of heart failure. A normal amount of pumped blood is between 55 and 70 percent. High or low ejection fraction may prevent you from receiving some types of chemotherapy.

Pulmonary function tests
Pulmonary function tests reveal how well your lungs work. Three tests are often used. A common side effect of these tests is shortness of breath.

- **Spirometry** involves blowing into a tube to measure how much air and how fast you breathe.
- A **gas diffusion test** involves breathing in a harmless gas and measuring how much you breathe out. It tells how much oxygen travels from your lungs into your blood.
- **Body plethysmograph** involves sitting in a small room and breathing into a tube. This test measures how much air your lungs can hold and how much air is left in your lungs after you exhale.

Vaccines
Your spleen is part of your lymphatic system. Your chances of getting an infection are high if your spleen is treated with radiation. In this case, get vaccinated before treatment for H-flu (Haemophilus influenzae), pneumococcal, and meningococcal infections. H-flu does not cause the common flu. It causes other diseases like bacterial meningitis. Not all vaccines are safe for people with cancer. Talk with your doctor about other vaccinations before getting them.
Fertility and pregnancy

Some cancer treatments can limit your ability to have a baby. If you want the choice of having babies after treatment or are unsure, tell your doctors. It may also help to talk with a fertility specialist before you begin cancer treatment. A fertility specialist is an expert in helping people have babies.

A fertility specialist can discuss with you how to have a baby after treatment. Some methods of fertility preservation are discussed next. If you are a woman of childbearing age, important information on pregnancy is also addressed.

Sperm banking

Men who want to father children after cancer treatment can use sperm banking. Sperm banking stores semen for later use. This is done by freezing semen with sperm in liquid nitrogen. Talk to your treatment team about the costs of and how well sperm banking works.

Egg freezing and more

Like sperm banking, a woman’s eggs can be removed, frozen, and stored for later use. Your frozen eggs can be fertilized with sperm beforehand. Also, a part of your ovary that contains eggs can be frozen and stored. Another fertility method for women who will be treated with radiation is a surgery called oophoropexy. This surgery will move your ovary out of range of the radiation beam to protect it.

Pregnancy test

Some cancer treatments can harm an unborn baby. Get a pregnancy test before treatment if you may be pregnant now. Your treatment options will depend on the results. During treatment, take steps to avoid getting pregnant. Your doctors can tell you which birth control methods are best to use while on treatment.

Smoking and distress

If you smoke, it is important to quit. Nicotine addiction is one of the hardest addictions to stop. The stress of having cancer may make it harder to quit. Quitting is important since smoking can limit how well cancer treatment works. If you smoke, ask your doctor about counseling and drugs to help you quit.

Distress is an unpleasant emotional state that may affect how you feel, think, and act. It can include feelings of unease, sadness, worry, anger, helplessness, guilt, and so forth. Everyone with cancer has some distress at some point in time. It is normal to feel sad, fearful, and helpless.

Feeling distressed may be a minor problem or it may be more serious. You may be so distressed that you can’t do the things you used to do. Serious or not, it is important that your treatment team knows how you feel. Your team can get you the help you need.
Review

- A medical history, physical exam, and blood tests can reveal signs of cancer. Blood tests are also used to see if you have an illness other than cancer.

- Imaging tests allow doctors to see inside your body without cutting into it. Imaging tests that are used for Hodgkin lymphoma are CT, PET/CT, and chest x-ray.

- A bone marrow biopsy removes a piece of bone and marrow to test for cancer cells. You may have this biopsy if blood tests show low blood cell counts.

- You may undergo heart and lung tests to see if you are healthy enough to have certain cancer treatments.

- You may need to receive vaccinations to protect you from illness during cancer treatment. Ask your treatment team which vaccines are safe to get.

- Talk to a fertility specialist to learn about ways to help you have babies after cancer treatment. If you may be pregnant now, get a pregnancy test since some cancer treatments can harm unborn babies.

- Seek help to quit smoking and feel less distressed.
Overview of cancer treatments
In Part 3, the main treatment types that are recommended by NCCN experts are briefly described. Knowing what a treatment is will help you understand your treatment options as listed in Part 4. There is more than one treatment for Hodgkin lymphoma. Not every person will receive every treatment described in this chapter.

Chemotherapy

Chemotherapy, or “chemo,” is drugs that disrupt the life cycle of cancer cells so they can’t increase in number. Some chemotherapy drugs kill cancer cells by damaging their DNA or by disrupting the making of DNA. Other drugs interfere with cell parts that are needed for making new cells. Thus, no new cells are made to replace dying cells. Chemotherapy is often used to treat Hodgkin lymphoma.

Many chemotherapy drugs work when cells are in an active growth phase. During the active growth phase, cells grow and divide to form a new cell. Chemotherapy drugs that disrupt the growth phase work well for cancer cells that are growing and dividing quickly. Other chemotherapy drugs work whether cells are in a growth or resting phase. Chemotherapy can kill both cancer and normal cells.

Most chemotherapy drugs for Hodgkin lymphoma are liquids that are slowly injected into a vein. Some are a pill that is swallowed. Very rarely these drugs can be injected under the skin. By any method, the drugs travel in your bloodstream to treat cancer throughout your body. Chemotherapy and other drugs used to treat Hodgkin lymphoma are listed in Chart 3.1.
### Chart 3.1 Drug treatment for Hodgkin lymphoma

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<th>Brand name (sold as)</th>
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<tr>
<td>Mesna</td>
<td>Mesnex® Injection</td>
<td>Chemoprotectant</td>
</tr>
<tr>
<td>Methylprednisolone; Methylprednisolone sodium succinate</td>
<td>A-Methpred®, Depo-Medrol®, Medrol®, Solu-Medrol®</td>
<td>Steroid</td>
</tr>
<tr>
<td>Mitoxantrone hydrochloride</td>
<td>Novantrone®</td>
<td>Chemotherapy</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Rituxan®</td>
<td>Targeted therapy</td>
</tr>
<tr>
<td>Prednisone</td>
<td>—</td>
<td>Steroid</td>
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<tr>
<td>Procarbazine hydrochloride</td>
<td>Matulane®</td>
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<tr>
<td>Vinblastine sulfate</td>
<td>—</td>
<td>Chemotherapy</td>
</tr>
<tr>
<td>Vincristine sulfate</td>
<td>—</td>
<td>Chemotherapy</td>
</tr>
<tr>
<td>Vinorelbine tartrate</td>
<td>Navelbine®</td>
<td>Chemotherapy</td>
</tr>
</tbody>
</table>
Chemotherapy is given in cycles of treatment days followed by days of rest. This allows the body to recover before the next cycle. Cycles vary in length depending on which drugs are used. Often, a cycle is 3 or 4 weeks long.

Chemotherapy may consist of one or more drugs. When only one drug is used, it is called a single agent. However, not all drugs work the same way, so often more than one drug is used. A combination regimen is the use of two or more chemotherapy drugs. Most often, Hodgkin lymphoma is treated with combination regimens.

Parts 4 and 5 are guides that explain who should receive which treatments. You will learn which regimens and how many cycles may be part of your treatment. Chemotherapy is sometimes given in high doses and followed by stem cell transplant. Read on to learn more about this treatment.

**Side effects of chemotherapy**

Side effects are unhealthy or unpleasant physical or emotional responses to treatment. The reactions to chemotherapy differ between people. Some people have many side effects. Others have few. Some side effects can be very serious while others can be unpleasant but not serious. Most side effects appear shortly after treatment starts and will stop after treatment. However, other side effects are long-term or may appear years later.

Side effects of chemotherapy depend on many factors. These factors include the drug type, amount taken, length of treatment, and the person. In general, most side effects are caused by the death of fast-growing cells. These cells are found in the blood, gut, hair follicles, and mouth. Thus, common side effects of chemotherapy include low blood cell counts, not feeling hungry, nausea, vomiting, diarrhea, hair loss, and mouth sores. Lung damage may also occur at the time of treatment. Late side effects include another type of cancer, heart disease, low levels of thyroid hormones (hypothyroidism), and problems having babies (infertility).

Not all side effects of chemotherapy are listed here. Please ask your treatment team for a complete list of common and rare side effects. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better. There are also ways to prevent some side effects.

**Steroids**

Steroids are a type of drug that is often used to relieve inflammation. However, some steroids have anti-cancer effects. Steroids used to treat Hodgkin lymphoma are listed in Chart 3.1 on page 25.

Steroids are a part of some chemotherapy regimens. They are given on the same days as chemotherapy but only for a few days or a week. All are pills but dexamethasone can also be injected.

Most side effects of steroids fade away once the drugs are stopped. Common side effects include feeling hungry, trouble sleeping, slow wound healing, upset stomach, and swelling in the ankles, feet, and hands.
Radiation therapy

Radiation therapy is often used with other treatments but sometimes is used alone to treat Hodgkin lymphoma. It consists of high-energy rays that damage DNA. This either kills the cancer cells or stops new cancer cells from being made. Radiation can also harm normal cells. As a result, treatment methods are always being improved to target the tumor more precisely.

Involved-site radiation therapy

ISRT (involved-site radiation therapy) is recommended to treat Hodgkin lymphoma. It treats the lymph nodes in which the cancer first started and cancer near to these nodes. It is given with a method called EBRT (external beam radiation therapy). This method delivers radiation with a machine that is outside your body.

Most times, treatment planning with a simulation session is needed. During simulation, pictures of the tumor will be taken after your body is moved into the position needed for treatment. CT with contrast is used. PET/CT and MRI (magnetic resonance imaging) often enhance treatment planning. For tumors near your breastbone, 4D-CT (four-dimensional computed tomography) can account for tumor movement from breathing. If your breathing causes large movements, motion control methods during the scans may be used.

Using the scans, your treatment team will plan the best radiation dose, number and shape of radiation beams, and number of treatment sessions. Beams are shaped with computer software and hardware added to the radiation machine. Radiation beams are aimed at the tumor with help from ink marks on your skin.

During treatment, you will lie on a table in the same position as done for simulation. Devices may be used to keep you from moving. These may include a mesh mask and body mold. You will be alone while the therapists operate the machine from the nearby control room.

The therapists will be able to see, hear, and speak with you. As treatment is given, you may hear noises. One session takes less than 10 minutes. The types of EBRT include:

- **3D-CRT** (three-dimensional conformal radiation therapy) – Treatment is completed in about 6 weeks and uses photon beams that match the shape of the tumor,
- **IMRT** (intensity-modulated radiation therapy) – Treatment is completed in about 6 weeks and uses photon beams of different strengths based on the thickness of the tumor,
- **Hadron** (or proton) therapy – Treatment is completed in about 6 weeks and uses proton beams that deliver radiation mostly within the tumor,

IGRT (image-guided radiation therapy) can improve how well the radiation beam targets some tumors. IGRT uses a machine that delivers radiation and also takes images of the tumor and normal body structures. Images can be seen right before or during treatment. These images are compared to the ones taken during simulation. If needed, changes will be made to your body position or the radiation beams.

Side effects of radiation

Most side effects of radiation depend on where the treatment was given. However, many people feel fatigue. Changes in skin are also common right after treatment. Your treated skin may look and feel as if it has a mild sunburn. It may also become dry, sore,
and feel painful when touched. You may also have short-term hair loss, but only where treated.

Treatment to the head and neck can cause mouth sores, dry mouth, changes in taste, and a sore throat. Chest radiation can cause a dry cough or a sensation of a lump when you swallow. Radiation near your belly can cause nausea and maybe vomiting, and when given between your hip bones, diarrhea and cramps.

Late side effects of radiation may also occur. Again, the effects depend on the treatment site. Examples include dry mouth, dental cavities, hypothyroidism; lung scarring, heart disease, infertility, and second cancers.

Not all side effects of radiation are listed here. Please ask your treatment team for a complete list of common and rare side effects. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better. There are also ways to prevent some side effects.

Stem cell transplant

Blood stem cells are cells that develop into mature blood cells. Stem cells and mature blood cells are made in bone marrow. The goal of a stem cell transplant is to cure cancer by replacing unhealthy blood stem cells with healthy ones. This is done by destroying bone marrow with high doses of chemotherapy then transplanting healthy blood stem cells. The healthy blood stem cells form new marrow and blood cells.

A stem cell transplant is not first used to treat Hodgkin lymphoma. It is an option if you need more treatment after first-time treatment. Autologous stem cell transplant is almost always used for Hodgkin lymphoma. This type of transplant uses your own stem cells. This treatment is also called HDT/ASCR (high-dose therapy with autologous stem cell rescue).

Using stem cells from a donor is called an allogeneic stem cell transplant. This method may be an option for some people but more research is needed. The steps of treatment with autologous stem cell transplant are described next.

Collecting stem cells

The first step of a stem cell transplant is to collect, or harvest, your blood stem cells. Blood stem cells can be collected from either your blood or bone marrow. If collected from your blood, a process called apheresis will be done.

For apheresis, you first may be given medicine to increase the number of stem cells in blood. Then, your blood will be removed from a large vein most likely in your arm. It will flow through a tube and into a machine that removes stem cells. The rest of your blood will be returned to you in your other arm.
Apheresis typically takes 4 to 6 hours and does not require anesthesia. It may take two or more sessions to obtain enough stem cells. During the procedure, you may have lightheadedness, chills, numbness around the lips, and cramping in the hands.

Bone marrow aspiration is used to remove bone marrow. For this procedure, you will be given either regional anesthesia or general anesthesia. Next, a needle will be inserted through your skin into your hip bone to draw out the bone marrow. Rarely, marrow is removed from the breastbone. The needle must be inserted many times into one or more spots to collect enough marrow. The marrow will then be processed to collect the stem cells.

Collection of the bone marrow takes about 1 hour. Your entire hospital stay will likely be 6 to 8 hours which, includes recovery time. The aspiration will likely cause some pain and soreness for a few days. Anesthesia may cause nausea, headache, and tiredness.

After apheresis or aspiration, your harvested cells will be combined with a preservative. Then, they will be frozen and stored to keep them alive until the transplant. This process is called cryopreservation.

High-dose chemotherapy
After your stem cells have been harvested, you will receive high doses of chemotherapy. High doses are given so that your body can’t make stem cells. High-dose chemotherapy also destroys normal cells in the bone marrow. This greatly weakens your immune system so that your body doesn’t kill the transplanted stem cells. Not every person can tolerate high-dose chemotherapy before the transplant. Side effects of chemotherapy are described in the prior section.

Transplanting stem cells
When chemotherapy is completed, your harvested stem cells will be put back into your body. A transfusion will be used. A transfusion is a slow injection of blood products through a central line into a large vein. A central line (or central venous catheter) is a thin tube. The tube will be inserted into your skin through one cut then into your vein through a second cut. Local anesthesia will be used. This process can take several hours to complete.

The transplanted stem cells will travel to your bone marrow and grow. New, healthy blood cells will form. This is called engraftment. It usually takes about 2 to 4 weeks.

Until then, you will have little or no immune defense. You will need to stay in a very clean room at the hospital. You may be given an antibiotic to prevent or treat infection. You may also be given a blood transfusion to prevent bleeding and to treat low red blood counts (anemia). While waiting for the cells to engraft, you will likely feel tired and weak.
Immunomodulators

The immune system is your body’s natural defense against infection and disease. Immunomodulators are drugs that modify different parts of the immune system. Lenalidomide is an immunomodulator used to treat classical Hodgkin lymphoma that was not cured by first-time treatment.

Lenalidomide is made in pill form. It is given in cycles of treatment days followed by days of rest. A cycle may consist of 3 weeks of treatment and 1 week of rest. Cycles may repeat until the cancer grows or side effects become severe.

Lenalidomide treats cancer in more than one way. As an immunomodulator, it boosts the immune system. It also helps stop cancer cells from increasing in number. Third, it also works like a type of targeted therapy called angiogenesis inhibitors. These drugs stop the growth of new blood vessels that would provide food (nutrients) to the cancer.

Common side effects include low blood counts, diarrhea, itching, rash, and fatigue. Serious but less common side effects include blood clots, bleeding disorders, loss of vision, and skin cancer. Ask your treatment team for a full list of side effects.

Supportive care

Supportive care doesn’t aim to treat cancer but aims to improve quality of life. It is also called palliative care. It can address many needs. One example is treatment for physical and emotional symptoms. As such, you may receive Mesna to protect against the side effects of chemotherapy. Ask your treatment team for other ways to treat symptoms.

Supportive care can also help with treatment decisions as you may have more than one option. It can also help with coordination of care between health providers. Talk with your treatment team to plan the best supportive care for you.
Targeted therapy

Targeted therapy is a class of drugs that stops the action of molecules that help cancer cells grow. It is less likely to harm normal cells than chemotherapy. At this time, targeted therapy is not widely used to treat Hodgkin lymphoma. The drugs approved for certain people are:

Brentuximab vedotin
Brentuximab vedotin is a targeted therapy that delivers cell-specific chemotherapy. On the surface of Hodgkin lymphoma cells are proteins called CD30. Brentuximab attaches to CD30 and enters cancer cells. Once inside, it releases the chemotherapy. By targeting only cells with CD30 receptors, fewer normal cells are harmed.

Brentuximab vedotin is a treatment option for classical Hodgkin lymphoma that didn’t respond well to first-time treatment or that has relapsed. It is also sometimes given after stem cell transplant. Read Parts 4.3 and 4.4 for more information. It is slowly injected into a vein for about 30 minutes. It is often given every 3 weeks.

The most common side effects include fatigue, low blood counts, tingling in hands and feet, nausea, diarrhea, fever, rash, and lung infections. Rare but severe effects include brain infection, serious disorder of skin and mucous membranes, and kidney problems.

Everolimus
Inside of cells are protein kinases, called mTor. Protein kinases are molecules that move chemicals, called phosphates, from one molecule to another. The phosphate “turns on” the second molecule.

Everolimus stops mTor from transferring the phosphate. This action stops the cell from receiving signals to grow. Everolimus is only an option for classical Hodgkin lymphoma that was not cured by first-time treatment. It is made in pill form. It is taken around the same time every day.

Common side effects include diarrhea, tiredness, mouth sores, skin rash, cough, and low blood counts. Serious side effects include other cancers, lung problems, infections, and kidney failure. Ask your treatment team for a full list of side effects.

Rituximab
Nodular lymphocyte-predominant Hodgkin lymphoma is a B-cell lymphoma. On the surface of B-cells are proteins called CD20. Rituximab attaches to CD20 causing the immune system to attack and kill the B-cells.

Rituximab is not used alone to treat nodular lymphocyte-predominant Hodgkin lymphoma. It is added to chemotherapy. It is a liquid that is injected into a vein.
Clinical trials

New tests and treatments aren’t offered to the public as soon as they’re made. They first need to be studied. A clinical trial is a type of research that studies a test or treatment.

Clinical trials study how safe and helpful tests and treatments are. When found to be safe and helpful, they may become tomorrow’s standard of care. Because of clinical trials, the tests and treatments in this book are now widely used to help people with Hodgkin lymphoma. Future tests and treatments that may have better results than today’s treatments depend on clinical trials.

New tests and treatments go through a series of clinical trials to make sure they’re safe and work. Without clinical trials, there is no way to know if a test or treatment is safe or helpful. Clinical trials have four phases. Some examples of the four phases of treatment are:

- Phase I trials – aim to find the best dose of a new drug with the fewest side effects.
- Phase II trials – assess if a drug works for a specific type of cancer.
- Phase III trials – compare a new drug to the standard treatment.
- Phase IV trials – test new drugs approved by the U.S. FDA (Food and Drug Administration) in many patients with different types of cancer.

Joining a clinical trial has benefits. First, you’ll have access to the most current cancer care. Second, you will receive the best management of care. Third, the results of your treatment—both good and bad—will be carefully tracked. Fourth, you may help other people who will have cancer in the future.

Clinical trials have risks, too. Like any test or treatment, there may be side effects. Also, new tests or treatments may not help. Another downside may be that paperwork or more trips to the hospital are needed.

To join a clinical trial, you must meet the conditions of the study. Patients in a clinical trial are often alike in terms of their cancer and general health. This is to know that any progress is because of the treatment and not because of differences between patients.

To join, you’ll need to review and sign a paper called an informed consent form. This form describes the study in detail. The study’s risks and benefits should be described and may include others than those described earlier.

Ask your treatment team if there is an open clinical trial that you can join. There may be clinical trials where you’re getting treatment or at other treatment centers nearby. You can also find clinical trials through the websites listed in Part 6.
Complementary and alternative medicine

CAM (complementary and alternative medicine) is a group of treatments that aren’t often given by doctors. Doctors don’t use these treatments often because they haven’t been shown to be effective by clinical trials. There is much interest today in CAM for cancer. Many CAMs are being studied to see if they are truly helpful.

Complementary medicines are treatments given along with usual medical treatments. While CAMs aren’t known to kill cancer cells, they may improve your comfort and well-being. Two examples are acupuncture for pain management and yoga for relaxation.

Alternative medicine is used in place of usual medicine. Some alternative medicines are sold as cures even though they haven’t been proven to work in clinical trials. If there was good proof that CAMs or other treatments cured cancer, they would be included in this book.

It is important to tell your treatment team if you are using any CAMs. They can tell you which CAMs may be helpful and which CAMs may limit how well medical treatments work.
Review

- Chemotherapy stops the life cycle of cancer cells so they can’t increase in number. It is often used for Hodgkin lymphoma.
- Some steroids have anti-cancer effects and may be used with chemotherapy.
- Radiation damages DNA which either kills cancer cells or stops new cancer cells from being made. It is often given after chemotherapy but sometimes is used alone to treat Hodgkin lymphoma.
- A stem cell transplant destroys bone marrow then replaces it by adding healthy stem cells into your body. It is an option if chemotherapy with or without radiation therapy fails.
- Lenalidomide treats Hodgkin lymphoma by modifying your immune system and by other means. It is a treatment option for classical Hodgkin lymphoma that doesn’t respond well to or returns after first-time treatment.
- Brentuximab vedotin attaches to Hodgkin lymphoma cells then releases chemotherapy inside. It is a treatment option for classical Hodgkin lymphoma that did not respond to stem cell transplant or two combination regimens of chemotherapy.
- Everolimus stops cancer cells from receiving signals to grow. It is a treatment used for classical Hodgkin lymphoma if first-time treatment fails.
- Rituximab allows the immune system to attack and kill cancer cells. It is used for nodular lymphocyte-predominant Hodgkin lymphoma.
- Clinical trials give people access to new tests and treatments that otherwise aren’t usually received.
4

Treatment guide:
Classical Hodgkin lymphoma
4 Treatment guide: Classical Hodgkin lymphoma

38 4.1 Stages I and II treatment
First-time treatment options for cancers that are on one side of your diaphragm.

44 4.2 Stages III and IV treatment
First-time treatment options for cancers that are on both sides of your diaphragm or have widely spread outside the lymphatic system.

46 4.3 Treatment for refractory cancer
Treatment options for cancer that grows or isn’t cured during first-time treatment.

48 4.4 Treatment for cancer relapse
Treatment options for cancer that reappears after a cancer-free period.

50 4.5 Follow-up care
The care you need when the cancer appears to be cured.

54 Review
Part 4 is a guide to the treatment options for people with classical Hodgkin lymphoma. Classical types include nodular sclerosis, mixed cellularity, lymphocyte-depleted, and lymphocyte-rich.

First-time treatment is listed in Parts 4.1 and 4.2 by cancer stage.* If unknown, ask your treatment team what the cancer stage is. Parts 4.4 and 4.5 list treatment options for if first-time treatment fails. Follow-up care is addressed in Part 4.5.

This information is taken from the treatment guidelines written by NCCN experts of Hodgkin lymphoma. These treatment guidelines list options for people with Hodgkin lymphoma in general. Thus, your doctors may suggest other treatment for you based on your health and personal wishes.

**Treatment path**

You will receive rounds of treatment and testing until the cancer is gone. First-time treatment starts with chemotherapy. You may receive ABVD, Stanford V, or escalated BEACOPP. These combination regimens consist of:

- **ABVD** is doxorubicin, bleomycin, vinblastine, and dacarbazine.
- **Stanford V** is doxorubicin, vinblastine, mechlorethamine, etoposide, vincristine, bleomycin, and prednisone. Cyclophosphamide may be used instead of mechlorethamine.
- **BEACOPP** is bleomycin, etoposide, doxorubicin, cyclophosphamide, vincristine, procarbazine, and prednisone.

How well the treatment is working will be assessed. PET/CT completed by one machine or PET with a diagnostic CT is recommended. However, the value of using PET in the middle of treatment is unclear in some cases. Thus, other tests may be used.

Test results are used to decide the next steps of care. Your doctors may decide that treatment appears to be working. In this case, your treatment plan will stay the same. You may start follow-up care or finish the planned treatment. You may undergo pulmonary function testing before receiving more than 4 ABVD cycles. This is to check your lung health.

If the treatment appears to be working poorly, your treatment plan may change. First, a biopsy is needed to confirm that cancer is present since imaging tests can be wrong. If cancer is found, treatment for refractory cancer is advised.

The same routine of treatment and testing is used for refractory and relapsed cancers. However, the treatment for these cancers differs from first-time treatment. Second-line and other treatments are listed in Parts 4.3 and 4.4.

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### 4.1 Stages I and II treatment

**Easier-to-treat cancers**

#### Chart 4.1.1 Option 1

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<thead>
<tr>
<th>Treatment</th>
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<th>Treatment</th>
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<tbody>
<tr>
<td>• 4 cycles of ABVD, • 2 cycles of ABVD, or • 8 weeks of Stanford V</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
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</table>

#### Chart 4.1.2 Option 2

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</tr>
</thead>
<tbody>
<tr>
<td>2 cycles of ABVD</td>
<td>No signs of cancer</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td>Signs of cancer</td>
<td>2 cycles of ABVD</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>4 cycles of ABVD</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working well</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
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#### Chart 4.1.3 Option 3

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<td>Treatment appears to be working well</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>1 cycle of ABVD + radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>

NCCN Guidelines for Patients®
Hodgkin Lymphoma, Version 1.2015
Part 4.1 has three sections: *Easier-to-treat cancers*, *Small harder-to-treat cancers*, and *Large harder-to-treat cancers*. If harder to treat, more intense treatment is used to try to cure the cancer. Many of these cancers can be cured. It is harder to treat Hodgkin lymphoma when:

- The cancer is large ("bulky"),
- There are B symptoms (fevers, night sweats, weight loss),
- ESR is 50 or higher, or
- There are 4 or more sites with cancer.

There are two types of bulky cancers. The first type occurs between the lungs and has an MMR (mediastinal mass ratio) greater than 0.33. The second group is large tumors in lymph nodes. These tumors are large when they are 10 cm or greater in width.

**Chart 4.1.1** maps one of the treatment paths for stage I or II that is easier to treat. *Chemotherapy* with *radiation therapy* is the preferred treatment choice. Treatment begins with chemotherapy.

ABVD or Stanford V regimens can be used. Stanford V should be given for 8 weeks. ABVD can be given for either 4 or 2 cycles. Two cycles are used for cancers that are very easy to treat. These cancers haven’t spread beyond the lymph nodes, are in fewer than 3 sites, produce an ESR lower than 30, or produce an ESR lower than 50 and haven’t caused B symptoms.

After chemotherapy, cancer sites can be treated with radiation if tests suggest that treatment is working. If tests suggest that treatment is working poorly, a biopsy is needed. If no cancer is found, you can receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

**Chart 4.1.2** maps a second treatment path for stage I or II that is easier to treat. The goal is to use chemotherapy only. At first, 2 cycles of ABVD should be given. Then, tests to assess treatment results should be received. If there are no signs of cancer, you can receive 2 more cycles of ABVD. If there are signs of cancer, 4 cycles are needed.

After chemotherapy, treatment results should be tested. If chemotherapy appears to be working well, you can start follow-up care. Read Part 4.5 for more information. If chemotherapy appears to be working less well, the cancer sites can be treated with radiation.

When treatment results appear to be poor, a biopsy is needed. If no cancer is found, you can receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

**Chart 4.1.3** maps a third treatment path for stage I or II that is easier to treat. The goal is to use chemotherapy only. Treatment consists of 3 cycles of ABVD.

After chemotherapy, treatment results should be tested. If chemotherapy appears to be working well, you can start follow-up care. Read Part 4.5 for more information. If chemotherapy appears to be working less well, you can receive one more cycle of ABVD with radiation therapy.

When treatment results appear to be poor, a biopsy is needed. If no cancer is found, you can receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.
### Chart 4.1.4 Option 1

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<th>Test results</th>
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</thead>
<tbody>
<tr>
<td>4 cycles of ABVD</td>
<td>Treatment appears to be working well</td>
<td>2 cycles of ABVD</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>2 cycles of ABVD + radiation therapy</td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>More cancer drugs</td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
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</table>

### Chart 4.1.5 Option 2

<table>
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<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 weeks of Stanford V</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>
Chart 4.1.4 maps one of the treatment paths for small harder-to-treat stage I or II. Treatment begins with 4 cycles of ABVD. After 4 cycles, treatment results should be tested.

If 4 ABVD cycles appear to be working well, there are two treatment options. The first option is 2 more cycles of ABVD. The second option is radiation therapy only.

If 4 ABVD cycles appear to be working less well, the cancer can be treated with 2 more ABVD cycles and tested again. After 6 ABVD cycles, radiation therapy can be received if treatment results are good. After 6 cycles, if results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

If 4 ABVD cycles appear to be working poorly, a biopsy is needed. If no cancer is found after 4 cycles, you can receive 2 more cycles of ABVD and radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

Chart 4.1.5 maps a second treatment path for small harder-to-treat stage I or II. Treatment begins with 12 weeks of Stanford V. Next, radiation therapy can be received if treatment results are good. If results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

Chart 4.1.6 maps a third treatment path for some small harder-to-treat stage I or II cancers. This path includes intense treatment that is likely to be hard on your body. Thus, you should be younger than 60 years old.

Treatment starts with 2 cycles of BEACOPP and 2 cycles of ABVD. Next, radiation therapy can be received if treatment results are good. If results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

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Chart 4.1.6 Option 3 if younger than 60 years

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 cycles of BEACOPP with 2 cycles of ABVD</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>
Large harder-to-treat cancers

**Chart 4.1.7 Option 1**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 cycles of ABVD</td>
<td>Treatment appears to be working well</td>
<td>2 cycles of ABVD + radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>2 cycles of ABVD + radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>

**Chart 4.1.8 Option 2**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 weeks of Stanford V</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>

**Chart 4.1.7** maps one of the treatment paths for large harder-to-treat stage I or II cancers. *Chemotherapy with radiation therapy* is the preferred choice. At first, 4 cycles of ABVD can be given.

If 4 ABVD cycles appear to be working well, there are two treatment options. The first option is 2 more cycles of ABVD. The second option is radiation therapy only. If 4 ABVD cycles appear to be working less well, the cancer can be treated with 2 more ABVD cycles and radiation therapy.

If 4 ABVD cycles appear to be working poorly, a biopsy is needed. If no cancer is found, you can receive 2 more cycles of ABVD and radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

**Chart 4.1.8** maps a second treatment path for large harder-to-treat stage I or II cancers. Treatment starts with 12 weeks of Stanford V. Next, radiation therapy can be received if treatment results are good. If results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.
Chart 4.1.9 maps a third treatment path for some large harder-to-treat stage I or II cancers. This path includes intense treatment that is likely to be hard on your body. Thus, you should be younger than 60 years old.

There are two pathways in this chart. The top pathway is for cancers without B symptoms and E tumors. The bottom pathway is for cancers with B symptoms or E tumors. B symptoms include fevers, night sweats, and weight loss. E tumors are found in tissue other than lymph nodes (extranodal).

Treatment in the top pathway starts with 2 cycles of BEACOPP and 2 cycles of ABVD for cancers without B symptoms and E tumors. Next, radiation therapy can be received if treatment results are good. If results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

Treatment in the bottom pathway starts with 6 cycles of BEACOPP. After chemotherapy, treatment results should be tested. If chemotherapy appears to have cured the cancer, you can start follow-up care. Read Part 4.5 for more information. If chemotherapy appears to be working less well, you can receive radiation therapy.

When treatment results appear to be poor, a biopsy is needed. If no cancer is found, you can either start follow-up care or receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.
4.2 Stages III and IV treatment

**Chart 4.2.1 Option 1**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 cycles of ABVD</td>
<td>Treatment appears to be working</td>
<td>4 cycles of ABVD</td>
<td>Treatment appears to be working</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td></td>
<td>Treatment appears to be working</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 cycles of BEACOPP</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>

**Chart 4.2.2 Option 2**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 weeks of Stanford V</td>
<td>Treatment appears to be working</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>
Chart 4.2.1 maps one of the treatment paths for stage III and IV cancers. Treatment begins with 2 cycles of ABVD. If treatment results look good, 4 more ABVD cycles are advised. Radiation therapy may follow. If ABVD results appear less than wanted, there are two options. The first option is 4 more ABVD cycles followed by testing. Follow-up care or radiation therapy can be received if ABVD results are good. If results are less than wanted, radiation therapy is advised. If results look poor but no cancer is found by biopsy, you may start follow-up care or receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

The second option after 2 ABVD cycles is 4 BEACOPP cycles. This is an intense treatment that is likely to be hard on your body. Read Chart 4.2.3 to learn your treatment options after BEACOPP.

Chart 4.2.2 maps a second treatment path for stage III and IV cancers. Treatment starts with 12 weeks of Stanford V. Next, radiation therapy can be received if treatment results are good. If results look poor but no cancer is found by biopsy, radiation therapy is advised. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

Chart 4.2.3 maps a third treatment pathway for some stage III or IV cancers. This path includes intense treatment that is likely to be hard on your body. Thus, you should be younger than 60 years old. Also, your IPS (International Prognostic Score) should be 4 or greater. IPS is based on seven factors, such as blood test results. If unknown, ask your doctor what your IPS is.

Treatment starts with 6 cycles of BEACOPP. If treatment results look good, you can start follow-up care. If ABVD results appear less than wanted, radiation therapy is advised. If results look poor but no cancer is found by biopsy, you may start follow-up care or receive radiation therapy. If cancer is found, read Part 4.3 to learn which treatments you can receive next.

---

**Chart 4.2.3 Option 3 if younger than 60 years, ≥ 4 IPS**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 cycles of BEACOPP</td>
<td>Treatment appears to be working well</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>Radiation therapy</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; No cancer is found with biopsy</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly; Cancer is found with biopsy</td>
<td>Radiation therapy</td>
</tr>
</tbody>
</table>
# Chart 4.3 Treatment path

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Test results</th>
<th>Treatment</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy or brentuximab vedotin</td>
<td>Treatment appears to be working well</td>
<td>Stem cell transplant ± radiation therapy</td>
<td>Brentuximab vedotin for 1 year if primary refractory disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment appears to be working less than wanted</td>
<td>Stem cell transplant ± radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More cancer drugs ± radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment may be working poorly</td>
<td>Radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More cancer drugs ± radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stem cell transplant ± radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radiation therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More cancer drugs ± radiation therapy</td>
<td></td>
</tr>
</tbody>
</table>

NCCN Guidelines for Patients
Hodgkin Lymphoma, Version 1.2015
46
Chart 4.3 maps the treatment path for refractory cancer. A biopsy is needed before treatment to confirm refractory disease. Which second-line treatment you will have partly depends on your prior treatment. Options include:

- **C-MOPP**  
  (cyclophosphamide, vincristine, procarbazine, prednisone),
- **DHAP**  
  (dexamethasone, cisplatin, high-dose cytarabine),
- **ESHAP**  
  (etoposide, methylprednisolone, high-dose cytarabine and cisplatin),
- **GCD**  
  (gemcitabine, carboplatin, dexamethasone),
- **GVD**  
  (gemcitabine, vinorelbine, liposomal doxorubicin),
- **ICE**  
  (ifosfamide, carboplatin, etoposide),
- **GEV**  
  (ifosfamide, gemcitabine, vinorelbine),
- **Mini-BEAM**  
  (carmustine, cytarabine, etoposide, melphalan),
- **MINE**  
  (etoposide, ifosfamide, mesna, mitoxantrone),
  and
- **Brentuximab vedotin.**

You will receive tests to check how well treatment is working. Treatment may appear to be working well, less than wanted, or working poorly.

If second-line treatment appears to be working well, you have three options. The first option is a stem cell transplant. If you can't have a transplant, radiation therapy or observation are options. Observation or "watch-and-wait" is a period of testing to see if the cancer grows.

If you'll receive a transplant, do not take chemotherapy with mechlorethamine, procarbazine, carmustine, or melphalan. These drugs may result in a poor collection of stem cells. With the transplant, you may receive radiation therapy if not received before. TLI (total lymphoid irradiation) is radiation given to all lymphatic tissue. It is used with chemotherapy to kill cancer cells so that the stem cell transplant is more likely to cure the cancer.

If the transplant fails, you may receive brentuximab vedotin if you have primary refractory disease. Primary refractory disease is cancer growth during first-time treatment or cancer that somewhat responds but is not cured by first-time treatment. Brentuximab is given for one year.

There are three treatment options if second-line treatment is working less than wanted. A transplant with or without radiation therapy is an option. Radiation therapy alone is a second option. The third option is a chemotherapy regimen not used before, brentuximab vedotin, bendamustine, lenalidomide, or everolimus. Radiation therapy may be added.

If second-line treatment appears to be working poorly, there are two options. Radiation therapy is one option. The other is a chemotherapy regimen not used before, brentuximab vedotin, bendamustine, lenalidomide, or everolimus. Radiation therapy may be added.
### Chart 4.4 Options by cancer stage and prior treatment

<table>
<thead>
<tr>
<th>Cancer stage and prior treatment</th>
<th>Treatment options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage IA or IIA without prior radiation therapy</td>
<td>• Chemotherapy or brentuximab vedotin ± stem cell transplant ± radiation therapy</td>
</tr>
<tr>
<td></td>
<td>• Radiation therapy only in some cases</td>
</tr>
<tr>
<td>All other stages including IA and IIA treated with radiation</td>
<td>• Chemotherapy or brentuximab vedotin</td>
</tr>
</tbody>
</table>
Chart 4.4 lists the treatment options for cancer that has relapsed. Before treatment is started, a biopsy is needed to confirm relapse. Treatment options in the chart are grouped by cancer stage and prior treatment. For any relapse, treatment options include the following cancer drugs:

- **C-MOPP**
  (cyclophosphamide, vincristine, procarbazine, prednisone),
- **DHAP**
  (dexamethasone, cisplatin, high-dose cytarabine),
- **ESHAP**
  (etoposide, methylprednisolone, high-dose cytarabine and cisplatin),
- **GCD**
  (gemcitabine, carboplatin, dexamethasone),
- **GVD**
  (gemcitabine, vinorelbine, liposomal doxorubicin),
- **ICE**
  (ifosfamide, carboplatin, etoposide),
- **GEV**
  (ifosfamide, gemcitabine, vinorelbine),
- **Mini-BEAM**
  (carmustine, cytarabine, etoposide, melphalan),
- **MINE**
  (etoposide, ifosfamide, mesna, mitoxantrone), and
- **Brentuximab vedotin.**

A stem cell transplant, radiation therapy, or both may be added to drug treatment if stage IA or IIA with no prior radiation therapy. Some people with these cancers may have a second option of radiation therapy alone.

If you’ll receive a transplant, do not take chemotherapy with mechlorethamine, procarbazine, carmustine, or melphalan. These drugs may result in a poor collection of stem cells. With the transplant, you may receive radiation therapy if not received before. **TLI** (total lymphoid irradiation) is radiation given to all lymphatic tissue. It is used with chemotherapy to kill cancer cells so that the stem cell transplant is more likely to cure the cancer.
# 4.5 Follow-up care

## Chart 4.5.1 First 5 years

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Schedule of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical history and physical exam</td>
<td>• Every 3–6 months for 1–2 years</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat 6–12 months up to year 3</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat once during years 4 and 5</td>
</tr>
<tr>
<td>CBC</td>
<td>• As needed</td>
</tr>
<tr>
<td>ESR if it was high before treatment</td>
<td>• As needed</td>
</tr>
<tr>
<td>Blood chemistry profile</td>
<td>• As needed</td>
</tr>
<tr>
<td>Thyroid-stimulating hormone test if you had radiation therapy to your neck</td>
<td>• At least every year</td>
</tr>
<tr>
<td>CT scan</td>
<td>• Once during first 12 months</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat as needed</td>
</tr>
<tr>
<td>Care to prevent other diseases eg, cancer screening</td>
<td>• As needed</td>
</tr>
<tr>
<td>Flu shot</td>
<td>• Every year</td>
</tr>
<tr>
<td>Help to have a healthy lifestyle eg, exercise, no smoking</td>
<td>• As needed</td>
</tr>
<tr>
<td>Fertility counseling</td>
<td>• As needed</td>
</tr>
</tbody>
</table>
Follow-up care starts when there are no signs of cancer after treatment. Care should address your whole health and well-being. Talk with your doctor about the care you want and need so you get the best plan.

See a cancer doctor (oncologist) who knows Hodgkin lymphoma well. He or she will know to check for side effects that might appear some time after treatment. Your doctor will also check for if the cancer has reappeared and for new cancers. Finding cancer early can help with getting the best treatment results.

Chart 4.5.1 lists follow-up care during the first 5 years after treatment. A medical history and physical exam are recommended every 3 to 6 months for 1 to 2 years. If results are normal, you may have these tests every 6 to 12 months during the third year after treatment. If results are normal during year 3, repeat these tests once during year 4 and again in year 5.

Blood tests are also recommended. A CBC, ESR, and blood chemistry profile should be received when needed. A chemistry profile is like a comprehensive metabolic panel but with fewer tests. You may also receive a TSH (thyroid-stimulating hormone) test at least once a year if your neck was radiated.

Your doctor may want you to get a CT scan during the first 12 months after treatment. Scans of your chest and abdomen and the cancer sites are advised. If results are normal, repeat CT only when needed. For example, repeat when blood tests suggest the cancer may have returned. PET/CT should only be received if your last test results suggested a poor response to cancer treatment. Getting PET/CT can confirm that there are no signs of cancer.

It’s important to take care of other health issues besides Hodgkin lymphoma. Take steps to prevent or detect other diseases. Such steps can include getting immunization shots. You should get the flu shot every year. Learn how to do a breast self-exam and get a skin cancer exam.

Likewise, start or keep a healthy lifestyle. Limit your alcohol use. Quit smoking. Protect yourself from the sun. Be at a healthy weight. Eat healthfully. Healthy eating includes eating a balanced diet, eating the right amount of food, and drinking enough fluids.

Many people benefit from some exercise. Exercise tones muscles, lowers stress, and improves health. Exercise programs differ between people based on their needs. Talk with your treatment team about which exercises would be best for you.

Fertility problems can appear years after treatment for Hodgkin lymphoma. If you want to have kids or are unsure, it is best to see a fertility specialist before treatment. However, a fertility specialist can still be helpful if your treatment has ended.
## Chart 4.5.2 Year 6 and on

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Schedule of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical history and physical exam</td>
<td>• Every year</td>
</tr>
<tr>
<td>CBC</td>
<td>• Every year</td>
</tr>
<tr>
<td>Blood chemistry profile</td>
<td>• Every year</td>
</tr>
<tr>
<td>Thyroid-stimulating hormone test if you had radiation therapy to your neck</td>
<td>• At least every year</td>
</tr>
<tr>
<td>Lipid test</td>
<td>• Twice a year</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>• Every year</td>
</tr>
<tr>
<td>Maybe heart stress tests and echocardiogram</td>
<td>• Every 10 years</td>
</tr>
<tr>
<td>Maybe carotid ultrasound if you had radiation therapy to your neck</td>
<td>• Every 10 years</td>
</tr>
<tr>
<td>High blood pressure and blood glucose medicine</td>
<td>• As needed</td>
</tr>
<tr>
<td>Help to have a healthy lifestyle eg, exercise, no smoking</td>
<td>• As needed</td>
</tr>
<tr>
<td>Breast cancer screening if you had radiation therapy to the chest or armpit</td>
<td>• Every year starting 8–10 years after treatment or at age 40, whichever comes first</td>
</tr>
<tr>
<td>Low-dose CT scan of your chest if you are at high risk for lung cancer due to cancer treatment or smoking habits</td>
<td>• As needed</td>
</tr>
<tr>
<td>Colonoscopy if 50 years old or older or if age 40 and likely to get colon cancer</td>
<td>• Every 10 ten years</td>
</tr>
<tr>
<td>Pneumococcal, meningococcal, and H-flu re-vaccinations</td>
<td>• Between 5 to 7 years after first vaccine</td>
</tr>
<tr>
<td>Flu shot</td>
<td>• Every year</td>
</tr>
<tr>
<td>Fertility counseling</td>
<td>• As needed</td>
</tr>
</tbody>
</table>
Chart 4.5.2 lists follow-up care starting 6 years after treatment has ended. Some of the tests are the same as before. Healthy living, flu shots, and fertility counseling are also still included.

Heart (cardiovascular) disease is more likely as time passes. Thus, your blood lipids (includes fat) should be measured twice a year and your blood pressure, yearly. Your doctor may decide a stress test or echocardiogram would be helpful. These tests may be done every 10 years. Likewise, a carotid ultrasound may be helpful if your neck was radiated. Carotid arteries are in your neck and supply blood to your brain. Medicines to help control diabetes and high blood pressure are also needed to prevent heart disease.

Breast cancer is one of the most common cancers after having Hodgkin lymphoma. If your chest or armpit (axillary) area was radiated, mammography should start 8 to 10 years after treatment or when you turn 40, whichever comes first. If you are already 40 or older, keep getting mammography tests. MRI of your breasts is also needed if your chest was radiated.

Screening for lung cancer is recommended. Low-dose CT of your chest can detect lung cancer early. It is recommended if you 1) received radiation therapy to your chest, 2) had chemotherapy with alkylating agents (eg, bendamustine), or 3) have smoked at least a pack of cigarettes a day for 30 or more years.

Also get screened for colon cancer. To detect colon cancer early, get a colonoscopy every 10 years if you are 50 years old or older. Start at age 40 if you are very likely to get colon cancer.
Review

• First-time treatment for classic Hodgkin lymphoma almost always consists of chemotherapy and radiation therapy. Sometimes, chemotherapy alone is given if it works really well. More chemotherapy is given to cancers that are larger or more widespread.

• Refractory cancer is cancer that isn’t cured during first-time treatment. Chemotherapy is often first used for treatment. If the cancer responds well, you may have a stem cell transplant with or without radiation therapy. If the cancer responds less well, you may receive other drug treatments with or without radiation therapy. Radiation therapy alone is also an option to treat refractory disease following chemotherapy.

• A relapse is cancer that re-appears on tests after a cancer-free period. Treatment options for stage IA or IIA depend on whether you had radiation therapy before. If not, chemotherapy with or without stem cell transplant, radiation therapy, or both is often first used. For some people, radiation therapy alone may be first used. Treatment for all other relapsed cancers is like treatment for refractory disease.

• Follow-up care is given when there are no signs of cancer after treatment. Follow-up care includes tests that check for signs of cancer and side effects of cancer treatment. It also includes treatment that prevents disease.
Treatment guide: Nodular lymphocyte-predominant Hodgkin lymphoma
5 Treatment guide: Nodular lymphocyte-predominant Hodgkin lymphoma

5.1 Stages I and II treatment
First-time treatment options for cancers that are on one side of your diaphragm.

5.2 Stages III and IV treatment
First-time treatment options for cancers that are on both sides of your diaphragm or have widely spread outside the lymphatic system.

5.3 Treatment for refractory or relapsed cancer
Treatment options for cancer that grows or isn’t cured during first-time treatment. The same options apply to cancer that re-appears after a cancer-free period.

5.4 Follow-up care
The care you need when treatment has ended.

Review
Part 5 is a guide to the treatment options for people with nodular lymphocyte-predominant Hodgkin lymphoma. This cancer is a very rare type of Hodgkin lymphoma.

First-time treatment is listed in Parts 5.1 and 5.2 by cancer stage.* If unknown, ask your treatment team what is the cancer stage. Part 5.3 lists treatment options for if first-time treatment fails. Follow-up care is addressed in Part 5.4.

This information is taken from the treatment guidelines written by NCCN experts of Hodgkin lymphoma. These treatment guidelines list options for people with this cancer in general. Thus, your doctors may suggest other treatment based on your health and personal wishes.

# 5.1 Stages I and II treatment

## Chart 5.1.1 Options for stages IA and IIA (non-bulky)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PET/CT results</th>
<th>Biopsy results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Radiation therapy</td>
<td></td>
<td>No signs of cancer</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signs of cancer</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td>• If stage IA, starting follow-up care may be</td>
<td>No cancer found</td>
<td>Cancer is found</td>
<td>More cancer drugs</td>
</tr>
<tr>
<td>an option</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Chart 5.1.2 Options for stages IA and IIA (bulky), IB, and IIB

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PET/CT results</th>
<th>Biopsy results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy + radiation therapy ± rituximab</td>
<td>No signs of cancer</td>
<td>No cancer found</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Signs of cancer</td>
<td>Cancer is found</td>
<td>Start follow-up care</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More cancer drugs</td>
</tr>
</tbody>
</table>
Stage I and II cancers have grown either above or below your diaphragm. The cancer is not on both sides. Stage IA and IIA cancers haven’t caused B symptoms (fevers, night sweats, weight loss).

Treatment options for stage IA and IIA are based on whether the cancer is large (“bulky.”) There are two groups of bulky cancers. The first group is large tumors that occur between the lungs. Large tumors are those that have an MMR (mediastinal mass ratio) greater than 0.33. The second group is large tumors in lymph nodes. These tumors are large when they are 10 cm or greater in width.

Chart 5.1.1 maps the treatment path for non-bulky stage IA or IIA cancers. Radiation therapy is the preferred treatment choice. If you have stage IA, starting follow-up care is an option if the tumor was fully removed during biopsy. Read Part 5.4 for more information on follow-up care.

After radiation therapy, follow-up care can be started if there are no signs of cancer. If there are signs of cancer, a biopsy is needed. If no cancer is found, you can start follow-up care. If cancer is found, read Part 5.3 to learn which treatments you can receive next.

Chart 5.1.2 maps a treatment path for all other stage I and II cancers. Treatment begins with chemotherapy and radiation therapy. Rituximab may be added. Chemotherapy may be ABVD, CHOP, or CVP. These combination regimens consist of:

- **ABVD** is doxorubicin, bleomycin, vinblastine, dacarbazine.
- **CHOP** is cyclophosphamide, doxorubicin, vincristine, prednisone.
- **CVP** is cyclophosphamide, vincristine, prednisone.

After treatment, follow-up care can be started if there are no signs of cancer. If there are signs of cancer, a biopsy is needed. If no cancer is found, you can start follow-up care. If cancer is found, read Part 5.3 to learn which treatments you can receive next.
5.2 Stages III and IV treatment

**Chart 5.2.1 Stage IIA and IVA cancers**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PET/CT results</th>
<th>Biopsy results</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| - Chemotherapy ± rituximab ± radiation therapy,  
- Radiation therapy, or  
- Rituximab | Cancer is smaller  
Cancer is the same or larger | No cancer found  
Cancer is found | Start follow-up care  
Radiation therapy  
Start follow-up care  
More cancer drugs |

**Chart 5.2.2 Stage IIIB and IVB cancers**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PET/CT results</th>
<th>Biopsy results</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| Chemotherapy ± rituximab ± radiation therapy | Cancer is smaller  
Cancer is the same or larger | No cancer found  
Cancer is found | Start follow-up care  
Radiation therapy  
Start follow-up care  
More cancer drugs |
Chemotherapy is often used to treat stages III and IV. Chemotherapy may be ABVD, CHOP, or CVP. These combination regimens consist of:

- **ABVD** is doxorubicin, bleomycin, vinblastine, dacarbazine.
- **CHOP** is cyclophosphamide, doxorubicin, vincristine, prednisone.
- **CVP** is cyclophosphamide, vincristine, prednisone.

**Chart 5.2.1** maps a treatment path for stage IIIA or IVA cancers. These cancers haven’t caused **B symptoms** (fevers, night sweats, weight loss). There are three options to first-time treatment. Chemotherapy is one option. Radiation therapy, rituximab, or both may be added. The second option is radiation therapy to the cancer site to relieve symptoms. The goal is not to cure the cancer. The third option is to take rituximab.

If the cancer responds to these treatments, follow-up care can be started or you may have radiation therapy. Radiation therapy is only an option if you haven’t had it before.

If the cancer is the same or a larger size, a **biopsy** is needed. If no cancer is found, you can start follow-up care. Read Part 5.4 for more information. If cancer is found, read Part 5.3 to learn which treatments you can receive next.

**Chart 5.2.2** maps a treatment path for stage IIIB or IVB cancers. Treatment begins with chemotherapy. Radiation therapy, rituximab, or both may be added.

If the cancer shrinks, follow-up care can be started. A second option is radiation therapy. It is only an option if you haven’t had it before.

If the cancer is the same or a larger size, a biopsy is needed. If no cancer is found, you can start follow-up care. Read Part 5.4 for more information. If cancer is found, read Part 5.3 to learn which treatments you can receive next.
## 5.3 Treatment for refractory or relapsed cancer

### Chart 5.3  Cancer with symptoms

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PET/CT results</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rituximab ± chemotherapy ± radiation therapy</td>
<td>Cancer is shrinking</td>
<td>If no symptoms, start follow-up care</td>
</tr>
<tr>
<td></td>
<td>Cancer is growing</td>
<td>Biopsy</td>
</tr>
</tbody>
</table>
Treatments for Hodgkin lymphomas don’t always work the first time. Cancer may also re-appear after a cancer-free time period. In both cases, a biopsy is needed to confirm that cancer is present. If it is, the type of cancer will also be assessed.

If no cancer is found, ongoing follow-up care is advised. Read Part 5.4 for more information. Likewise, if cancer is found but not causing symptoms, follow-up care is advised. Some cancers do not grow fast and will not need treatment.

Sometimes Hodgkin lymphoma transforms into a fast-growing non-Hodgkin’s lymphoma. There are NCCN Guidelines for Patients® for specific types of non-Hodgkin lymphoma. If available, read the one that pertains to the new type of cancer you have.

Chart 5.3 maps a treatment path for refractory or relapsed cancer that is causing symptoms. Treatment begins with rituximab. Chemotherapy, radiation therapy, or both may be added. Approved chemotherapy regimens include:

- **C-MOPP**
  (cyclophosphamide, vincristine, procarbazine, prednisone),
- **DHAP**
  (dexamethasone, cisplatin, high-dose cytarabine),
- **ESHAP**
  (etoposide, methylprednisolone, high-dose cytarabine and cisplatin),
- **GCD**
  (gemcitabine, carboplatin, dexamethasone),
- **GVD**
  (gemcitabine, vinorelbine, liposomal doxorubicin),
- **ICE**
  (ifosfamide, carboplatin, etoposide),
- **GEV**
  (ifosfamide, gemcitabine, vinorelbine),
- **Mini-BEAM**
  (carmustine, cytarabine, etoposide, melphalan), and
- **MINE**
  (etoposide, ifosfamide, mesna, mitoxantrone).

If treatment shrinks the cancer, follow-up care can be started when cancer symptoms stop. Read Part 5.4 for more information. If the cancer is the same or a larger size, a biopsy is needed.
## 5.4 Follow-up care

### Chart 5.4.1 First 5 years

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Schedule of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical history and physical exam</td>
<td>• Every 3–6 months for 1–2 years</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat 6–12 months up to year 3</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat once during year 4 and 5</td>
</tr>
<tr>
<td>CBC</td>
<td>• As needed</td>
</tr>
<tr>
<td>ESR if it was high before treatment</td>
<td>• As needed</td>
</tr>
<tr>
<td>Blood chemistry profile</td>
<td>• As needed</td>
</tr>
<tr>
<td>Thyroid-stimulating hormone test if you had radiation therapy to your neck</td>
<td>• At least every year</td>
</tr>
<tr>
<td>CT scan</td>
<td>• Once during first 12 months</td>
</tr>
<tr>
<td></td>
<td>◦ If normal results, then repeat as needed</td>
</tr>
<tr>
<td>Care to prevent other diseases eg, cancer screening</td>
<td>• As needed</td>
</tr>
<tr>
<td>Flu shot</td>
<td>• Every year</td>
</tr>
<tr>
<td>Help to have a healthy lifestyle eg, exercise, no smoking</td>
<td>• As needed</td>
</tr>
<tr>
<td>Fertility counseling</td>
<td>• As needed</td>
</tr>
</tbody>
</table>
Follow-up care starts when there are no signs of cancer after treatment. Care should address your whole health and well-being. Talk with your doctor about the care you want and need so you get the best plan.

See a cancer doctor (oncologist) who knows Hodgkin lymphoma well. He or she will know to check for side effects that might appear some time after treatment. Your doctor will also check for if the cancer has reappeared and for new cancers. Finding cancer early can help with getting the best treatment results.

Chart 5.4.1 lists follow-up care during the first 5 years after treatment. A medical history and physical exam are recommended every 3 to 6 months for 1 to 2 years. If results are normal, you may have these tests every 6 to 12 months during the third year after treatment. If results are normal during year 3, repeat these tests once during year 4 and again in year 5.

Blood tests are also recommended. A CBC, ESR, and blood chemistry profile should be received when needed. A chemistry profile is like a comprehensive metabolic panel but with fewer tests. You may also receive a TSH (thyroid-stimulating hormone) test at least once a year if your neck was radiated.

Your doctor may want you to get a CT scan during the first 12 months after treatment. Scans of your chest and abdomen and the cancer sites are advised. If results are normal, repeat CT only when needed. For example, repeat when blood tests suggest the cancer may have returned. PET/CT should only be received if your last test results suggested a poor response to cancer treatment. Getting PET/CT can confirm that there are no signs of cancer.

It’s important to take care of other health issues besides Hodgkin lymphoma. Take steps to prevent or detect other diseases. Such steps can include getting immunization shots. You should get the flu shot every year. Learn how to do a breast self-exam and get a skin cancer exam.

Likewise, start or keep a healthy lifestyle. Limit your alcohol use. Quit smoking. Protect yourself from the sun. Be at a healthy weight. Eat healthfully. Healthy eating includes eating a balanced diet, eating the right amount of food, and drinking enough fluids.

Many people benefit from some exercise. Exercise tones muscles, lowers stress, and improves health. Exercise programs differ between people based on their needs. Talk with your treatment team about which exercises would be best for you.

Fertility problems can appear years after treatment for Hodgkin lymphoma. If you want to have kids or are unsure, it is best to see a fertility specialist before treatment. However, a fertility specialist can still be helpful if your treatment has ended.
# Chart 5.4.2 Year 6 and on

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Schedule of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical history and physical exam</td>
<td>• Every year</td>
</tr>
<tr>
<td>CBC</td>
<td>• Every year</td>
</tr>
<tr>
<td>Blood chemistry profile</td>
<td>• Every year</td>
</tr>
<tr>
<td>Thyroid-stimulating hormone test if you had radiation therapy to your neck</td>
<td>• At least every year</td>
</tr>
<tr>
<td>Lipid test</td>
<td>• Twice a year</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>• Every year</td>
</tr>
<tr>
<td>Maybe heart stress tests and echocardiogram</td>
<td>• Every 10 years</td>
</tr>
<tr>
<td>Maybe carotid ultrasound if you had radiation therapy to your neck</td>
<td>• Every 10 years</td>
</tr>
<tr>
<td>High blood pressure and blood glucose medicine</td>
<td>• As needed</td>
</tr>
<tr>
<td>Help to have a healthy lifestyle eg, exercise, no smoking</td>
<td>• As needed</td>
</tr>
<tr>
<td>Breast cancer screening if you had radiation therapy to the chest or armpit</td>
<td>• Every year starting 8–10 years after treatment or at age 40, whichever comes first</td>
</tr>
<tr>
<td>Low-dose CT scan of your chest if you are at high risk for lung cancer due to cancer treatment or smoking habits</td>
<td>• As needed</td>
</tr>
<tr>
<td>Colonoscopy if 50 years old or older or if age 40 and likely to get colon cancer</td>
<td>• Every 10 ten years</td>
</tr>
<tr>
<td>Pneumococcal, meningococcal, and H-flu revaccinations</td>
<td>• Between 5 to 7 years after first vaccine</td>
</tr>
<tr>
<td>Flu shot</td>
<td>• Every year</td>
</tr>
<tr>
<td>Fertility counseling</td>
<td>• As needed</td>
</tr>
</tbody>
</table>
Chart 5.4.2 lists follow-up care starting 6 years after treatment has ended. Some of the tests are the same as before. Healthy living, flu shots, and fertility counseling are also still included.

Heart (cardiovascular) disease is more likely as time passes. Thus, your blood lipids (includes fat) should be measured twice a year and your blood pressure, yearly. Your doctor may decide a stress test or echocardiogram would be helpful. These tests may be done every 10 years. Likewise, a carotid ultrasound may be helpful if your neck was radiated. Carotid arteries are in your neck and supply blood to your brain. Medicines to help control diabetes and high blood pressure are also needed to prevent heart disease.

Breast cancer is one of the most common cancers after having Hodgkin lymphoma. If your chest or armpit (axillary) area was radiated, mammography should start 8 to 10 years after treatment or when you turn 40, whichever comes first. If you are already 40 or older, keep getting mammography tests. MRI of your breasts is also needed if your chest was radiated.

Screening for lung cancer is recommended. Low-dose CT of your chest can detect lung cancer early. It is recommended if you 1) received radiation therapy to your chest, 2) had chemotherapy with alkylating agents (eg, bendamustine), or 3) have smoked at least a pack of cigarettes a day for 30 or more years.

Also get screened for colon cancer. To detect colon cancer early, get a colonoscopy every 10 years if you are 50 years old or older. Start at age 40 if you are very likely to get colon cancer.
Review

- First-time treatment for stage IA or IIA cancers depends on if the cancer is large (bulky). Most small cancers are treated with radiation therapy. All other stage I and II cancers are treated with chemotherapy and radiation therapy. Rituximab may be added.

- Stage III and IV cancers are often treated with chemotherapy. Radiation therapy, rituximab, or both may be added. Stage IIIA and IVA may be treated with radiation therapy or rituximab alone.

- Refractory cancer is cancer that isn’t cured during first-time treatment. Relapse is cancer that re-appears on tests after a cancer-free period. Refractory or relapsed cancers that are causing symptoms may be treated with rituximab. Chemotherapy, radiation therapy, or both may be added.

- Follow-up care is given when there are no signs of cancer after treatment. Follow-up care includes tests that check for signs of cancer and side effects of cancer treatment. It also includes treatment that prevents disease.
Making treatment decisions
Having cancer is very stressful. While absorbing the fact that you have cancer, you have to learn about tests and treatments. In addition, the time you have to accept a treatment plan feels short. Parts 1 through 5 described the cancer and the test and treatment options recommended by NCCN experts. These options are based on science and agreement among NCCN experts. Part 6 aims to help you make decisions that are in line with your beliefs, wishes, and values.
It’s your choice

The role patients want in choosing their treatment differs. You may feel uneasy about making treatment decisions. This may be due to a high level of stress. It may be hard to hear or know what others are saying. Stress, pain, and drugs can limit your ability to make good decisions. You may feel uneasy because you don’t know much about cancer. You’ve never heard the words used to describe cancer, tests, or treatments. Likewise, you may think that your judgment isn’t any better than your doctors’. Letting others decide which option is best may make you feel more at ease. But, whom do you want to make the decisions? You may rely on your doctors alone to make the right decisions. However, your doctors may not tell you which to choose if you have multiple good options. You can also have loved ones help. They can gather information, speak on your behalf, and share in decision-making with your doctors. Even if others decide which treatment you will receive, you still have to agree by signing a consent form.

On the other hand, you may want to take the lead or share in decision-making. Most patients do. In shared decision-making, you and your doctors share information, weigh the options, and agree on a treatment plan. Your doctors know the science behind your plan but you know your concerns and goals. By working together, you are likely to get a higher quality of care and be more satisfied. You’ll likely get the treatment you want, at the place you want, and by the doctors you want.
Questions to ask your doctors

You will likely meet with experts from different fields of medicine. Strive to have helpful talks with each person. Prepare questions before your visit and ask questions if the person isn’t clear. You can also record your talks and get copies of your medical records. It may be helpful to have your spouse, partner, or a friend with you at these visits. A patient advocate or navigator might also be able to come. They can help to ask questions and remember what was said. Suggested questions to ask include:

What’s my diagnosis and prognosis?

It’s important to know that there are different types of cancer. Cancer can greatly differ even when people have a tumor in the same organ. Based on your test results, your doctor can tell you which type of cancer you have. He or she can also give a prognosis. A prognosis is a prediction of the pattern and outcome of a disease. Knowing the prognosis may affect what you decide about treatment.

1. Where did the cancer start? In what type of cell?
2. Is this cancer common?
3. What is the cancer stage? Does this stage mean the cancer has spread far?
4. Is this a fast- or slow-growing lymphoma?
5. What other tests results are important to know?
6. How often are these tests wrong?
7. Would you give me a copy of the pathology report and other test results?
8. Can the cancer be cured? If not, how well can treatment stop the cancer from growing?
What are my options?

There is no single treatment practice that is best for all patients. There is often more than one treatment option along with clinical trial options. Your doctor will review your test results and recommend treatment options.

1. What will happen if I do nothing?
2. Can I just carefully monitor the cancer?
3. Do you consult NCCN recommendations when considering options?
4. Are you suggesting options other than what NCCN recommends? If yes, why?
5. Do your suggested options include clinical trials? Please explain.
6. How do my age, health, and other factors affect my options?
7. Which option is proven to work best?
8. Which options lack scientific proof?
9. What are the benefits of each option? Does any option offer a cure? Are my chances any better for one option than another? Less time-consuming? Less expensive?
10. What are the risks of each option? What are possible complications? What are the rare and common side effects? Short-lived and long-lasting side effects? Serious or mild side effects? Other risks?
11. What can be done to prevent or relieve the side effects of treatment?
What does each option require of me?

Many patients consider how each option will practically affect their lives. This information may be important because you have family, jobs, and other duties to take care of. You also may be concerned about getting the help you need. If you have more than one option, choosing the option that is the least taxing may be important to you:

1. Do I have a choice of when to begin treatment? Can I choose the days and times of treatment?
2. Will I have to go to the hospital or elsewhere? How often? How long is each visit?
3. How do I prepare for treatment? Will I have to stop taking any of my medicines? Are there foods I will have to avoid?
4. Should I bring someone with me when I get treated?
5. Will the treatment hurt?
6. How much will the treatment cost me? What does my insurance cover?
7. Will I miss work or school? Will I be able to drive?
8. Is home care after treatment needed? If yes, what type?
9. How soon will I be able to manage my own health?
10. When will I be able to return to my normal activities?
What is your experience?

More and more research is finding that patients treated by more experienced doctors have better results. It is important to learn if a doctor is an expert in the cancer treatment he or she is offering.

1. Are you board certified? If yes, in what area?
2. How many patients like me have you treated?
3. How many procedures like the one you’re suggesting have you done?
4. Is this treatment a major part of your practice?
5. How many of your patients have had complications?
Weighing your options

Deciding which option is best can be hard. Doctors from different fields of medicine may have different opinions on which option is best for you. This can be very confusing. Your spouse or partner may disagree with which option you want. This can be stressful. In some cases, one option hasn’t been shown to work better than another, so science isn’t helpful. Some ways to decide on treatment are discussed next.

2nd opinion
The time around a cancer diagnosis is very stressful. People with cancer often want to get treated as soon as possible. They want to make their cancer go away before it spreads farther. While cancer can’t be ignored, there is time to think about and choose which option is best for you.

You may wish to have another doctor review your test results and suggest a treatment plan. This is called getting a 2nd opinion. You may completely trust your doctor, but a 2nd opinion on which option is best can help.

Copies of the pathology report, a DVD of the imaging tests, and other test results need to be sent to the doctor giving the 2nd opinion. Some people feel uneasy asking for copies from their doctors. However, a 2nd opinion is a normal part of cancer care.

When doctors have cancer, most will talk with more than one doctor before choosing their treatment. What’s more, some health plans require a 2nd opinion. If your health plan doesn’t cover the cost of a 2nd opinion, you have the choice of paying for it yourself.

If the two opinions are the same, you may feel more at peace about the treatment you accept to have. If the two opinions differ, think about getting a 3rd opinion. A 3rd opinion may help you decide between

your options. Choosing your cancer treatment is a very important decision. It can affect your length and quality of life.

Support groups
Besides talking to health experts, it may help to talk to patients who have walked in your shoes. Support groups often consist of people at different stages of treatment. Some may be in the process of deciding while others may be finished with treatment. At support groups, you can ask questions and hear about the experiences of other people with Hodgkin lymphoma.

Compare benefits and downsides
Every option has benefits and downsides. Consider these when deciding which option is best for you. Talking to others can help identify benefits and downsides you haven’t thought of. Scoring each factor from 0 to 10 can also help since some factors may be more important to you than others.
Websites

American Cancer Society
www.cancer.org/cancer/hodgkindisease/index

National Coalition for Cancer Survivorship
www.canceradvocacy.org/toolbox

National Cancer Institute

NCCN
www.nccn.org/patients

The Leukemia & Lymphoma Society (LLS)
www.LLS.org/informationspecialists

Review

• Shared decision-making is a process in which you and your doctors plan treatment together.

• Asking your doctors questions is vital to getting the information you need to make informed decisions.

• Getting a 2nd opinion, attending support groups, and comparing benefits and downsides may help you decide which treatment is best for you.
abdomen
The belly area between the chest and pelvis.

allogeneic stem cell transplant
A cancer treatment that destroys bone marrow then replaces it by adding healthy blood stem cells from a donor.

anesthesia
Loss of feeling with or without loss of wakefulness that is caused by drugs.

angiogenesis inhibitor
A type of drug that prevents growth of new blood vessels into tumors.

autologous stem cell transplant
A cancer treatment that destroys bone marrow then replaces it by adding healthy blood stem cells from the patient.

B symptoms
High fevers, heavy night sweats, and fast weight loss without dieting caused by Hodgkin lymphoma.

B-cell
One of three main types of white blood cells called lymphocytes that help protect the body from illness. Also called B-lymphocyte.

biopsy
Removal of small amounts of tissue or fluid to be tested for disease.

blood chemistry profile
Measurement of the amount of chemicals in the blood.

body plethysmograph
A test done in a small room with a small tube to measure how much air is in your lungs after inhaling or exhaling.

bone marrow
Soft, sponge-like tissue in the center of most bones where blood cells are made.

bone marrow aspiration
Removal of a small amount of bone marrow that is liquid to test for disease.

bone marrow biopsy
Removal of a small amount of solid bone and bone marrow to test for disease.

cancer stage
Ratings of the growth and spread of tumors.

chemotherapy
Drugs that stop the growth process of cells in an active growth phase.

chyle
A fatty liquid absorbed from the gut into the lymphatic system.

classical Hodgkin lymphoma
The more common types of Hodgkin lymphoma.

clinical trial
Research on a test or treatment to assess its safety or how well it works.

complete blood count (CBC)
A test of the number of blood cells in a sample.

comprehensive metabolic panel
Tests of about 14 chemicals in your blood.

computed tomography (CT)
A test that uses x-rays to view body parts.

contrast
A dye put into your body to make clearer pictures during imaging tests.

Deauville scale
A rating by doctors of treatment response based on comparing the uptake of a radiotracer by cancer sites to two other sites.

deoxyribonucleic acid (DNA)
A chain of chemicals inside cells that contains coded instructions for making and controlling cells.

diagnose
To identify a disease.
diaphragm
A sheet of muscles below the ribs that helps a person to breathe.

differential
Measurement of the different types of white blood cells present in a blood sample.

E tumors
Cancer that has spread outside of lymph nodes to other tissue.

echocardiogram
A test that uses sound waves to make pictures of the heart.

ejection fraction
The amount of blood is pumped out of the left side of your heart.

erythrocyte sedimentation rate (ESR)
A test for inflammation based on how much clear liquid is at the top of a tube of blood after one hour.

excisional biopsy
Removal of a tumor but not too much healthy tissue.

external beam radiation therapy (EBRT)
Radiation therapy received from a machine outside the body.

fatigue
Severe tiredness despite getting enough sleep that limits one’s ability to function.

fertility specialist
An expert who helps men and women have babies.

fine-needle aspiration (FNA)
Use of a thin needle to remove fluid or tissue from the body to test for disease.

four-dimensional computed tomography (4D-CT)
A CT scan that can show the movement of organs.

gas diffusion test
A test that uses harmless gas to measure how much a person can breathe out.

gene
Instructions in cells for making and controlling cells.

general anesthesia
A controlled loss of wakefulness from drugs.

hadron therapy
Radiation therapy that uses protons to treat a disease. Also called proton therapy.

Hodgkin lymphoma
A cancer that starts in a type of white blood cell (lymphocyte). Reed-Sternberg cells are present.

image-guided radiation therapy (IGRT)
Radiation therapy that uses imaging tests during treatment to better target the tumor.

immune system
The body’s natural defense against illness.

immunohistochemistry (IHC)
A test of cancer cells to find specific cell traits involved in abnormal cell growth.

immunomodulator
A type of drug that modifies some parts of the body’s disease-fighting system.

intensity-modulated radiation therapy (IMRT)
Radiation therapy that uses small beams of different strengths based on the thickness of the tissue.

involved-site radiation therapy (ISRT)
Treatment with high-energy rays (radiation) that is delivered to lymph nodes and nearby sites with cancer.

lactate dehydrogenase
A protein that helps to make energy in cells.

liver
Organ that removes waste from the blood and helps to digest food.

liver function test
Test that measures chemicals in the blood that are made or processed by the liver.

local anesthesia
Medicine that causes a loss of feeling in a small part of the body.

lymph
A clear fluid containing white blood cells.

lymph node
Small groups of special disease-fighting cells located throughout the body.
**lymph vessel**
Tube-shaped ducts that carry lymph throughout the body.

**lymphatic system**
A network in the body that collects and transports a fluid (lymph) and fights germs.

**lymphocyte**
A type of white blood cell that helps protect the body from illness.

**lymphocyte-predominant cell**
A lymphoma cell that looks like popcorn.

**lymphoma**
Cancer that begins in white blood cells called lymphocytes that are within the lymphatic system.

**magnetic resonance imaging (MRI)**
A test that uses radio waves and powerful magnets to see the shape and function of body parts.

**medical history**
All health events and medications taken to date.

**metastasis**
The spread of cancer cells from the first tumor to another body part.

**natural killer (NK) cell**
One of three types of a white blood cell called a lymphocyte.

**nodular lymphocyte-predominant hodgkin lymphoma**
A rare type of Hodgkin lymphoma.

**observation**
A period of testing for cancer growth.

**pathologist**
A doctor who’s an expert in testing cells to find disease.

**performance status**
A rating of one’s ability to do daily activities.

**physical exam**
A review of the body by a health expert for signs of disease.

**positron emission tomography (PET)**
A test that uses radioactive material to see the shape and function of body parts.

**positron emission tomography/computed tomography (PET/CT)**
A test that uses radioactive material and x-rays to view the shape and function of organs and tissues.

**primary tumor**
The first mass of cancer cells of their kind.

**prognosis**
The expected pattern and outcome of a disease based on tests.

**pruritus**
Itchy skin.

**pulmonary function tests**
A set of breathing tests to test the strength of the lungs.

**radiation therapy**
The use of high-energy rays (radiation) to treat cancer.

**radiologist**
A doctor who’s an expert in reading imaging tests.

**Reed-Sternberg cell**
A Hodgkin lymphoma cell found in classical types of the cancer.

**refractory cancer**
Cancer that does not improve or go away in response to treatment.

**regional anesthesia**
A type of drug used for short-term loss of feeling or awareness in a part of the body without loss of wakefulness.

**relapse**
The return of cancer after a cancer-free period of time.

**sedative**
A drug that helps a person to relax or go to sleep.

**side effect**
An unplanned physical or emotional response to treatment.

**simulation**
The steps needed to prepare for radiation therapy.

**spirometry**
A test that uses a tube to measure how fast you breathe.

**spleen**
An organ to the left of the stomach that helps protect the body from disease.
stem cell transplant
A cancer treatment that destroys bone marrow then replaces it by adding healthy blood stem cells.

steroid
A drug used to reduce redness, swelling, and pain, but also to kill lymphoma cells.

targeted therapy
Drugs that stop the growth process that is specific to cancer cells.

T-cell
One of three main types of white blood cells called lymphocytes that help protect the body from infection and disease. Also called T-lymphocyte.

three-dimensional conformal radiation therapy (3D-CRT)
Radiation therapy that uses beams that match the shape of the tumor.

thymus
A gland located behind the breastbone.

tissue fluid
The liquid that surrounds cells. Also called interstitial fluid.

tonsil
A group of tissue within the throat that contains many white blood cells called lymphocytes and fights germs that enter the mouth and nose.

total lymphoid irradiation (TLi)
Treatment with high-energy rays (radiation) that is given to all lymphatic tissue in the body.

ultrasound
A test that uses sound waves to take pictures of the inside of the body.

vaccine
A biological agent inserted into the body to prevent a disease.
## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D-CRT</td>
<td>three-dimensional conformal radiation therapy</td>
</tr>
<tr>
<td>4D-CT</td>
<td>four-dimensional computed tomography</td>
</tr>
<tr>
<td>CAM</td>
<td>complimentary and alternative medicine</td>
</tr>
<tr>
<td>CBC</td>
<td>complete blood count</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>DNA</td>
<td>deoxyribonucleic acid</td>
</tr>
<tr>
<td>EBRT</td>
<td>external beam radiation therapy</td>
</tr>
<tr>
<td>ESR</td>
<td>erythrocyte sedimentation rate</td>
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<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
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<tr>
<td>FDG</td>
<td>fludeoxyglucose</td>
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<tr>
<td>FNA</td>
<td>fine-needle aspiration</td>
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<tr>
<td>H-flu</td>
<td>Haemophilus influenzae</td>
</tr>
<tr>
<td>HDT/ASCR</td>
<td>high-dose therapy with autologous stem cell rescue</td>
</tr>
<tr>
<td>IGRT</td>
<td>image-guided radiation therapy</td>
</tr>
<tr>
<td>IHC</td>
<td>immunohistochemistry</td>
</tr>
<tr>
<td>IMRT</td>
<td>intensity-modulated radiation therapy</td>
</tr>
<tr>
<td>INRT</td>
<td>involved-node radiation therapy</td>
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<tr>
<td>IPS</td>
<td>International Prognostic Score</td>
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<tr>
<td>ISRT</td>
<td>involved-site radiation therapy</td>
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<tr>
<td>MMR</td>
<td>mediastinal mass ratio</td>
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<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
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<tr>
<td>NK cells</td>
<td>natural killer cells</td>
</tr>
<tr>
<td>PET/CT</td>
<td>positron emission tomography/computed tomography</td>
</tr>
<tr>
<td>TLI</td>
<td>total lymphoid irradiation</td>
</tr>
<tr>
<td>TSH</td>
<td>thyroid-stimulating hormone</td>
</tr>
</tbody>
</table>

### NCCN Abbreviations and Acronyms

- **NCCN**
  - National Comprehensive Cancer Network®
- **NCCN Patient Guidelines**
  - NCCN Guidelines for Patients®
- **NCCN Guidelines®**
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<table>
<thead>
<tr>
<th>Acute Lymphoblastic Leukemia</th>
<th>Kidney Cancer</th>
<th>Pancreatic Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caring for Adolescents and Young Adults (AYA)*</td>
<td>Lung Cancer Screening</td>
<td>Prostate Cancer</td>
</tr>
<tr>
<td>Chronic Lymphocytic Leukemia</td>
<td>Malignant Pleural Mesothelioma</td>
<td>Soft Tissue Sarcoma</td>
</tr>
<tr>
<td>Chronic Myelogenous Leukemia</td>
<td>Melanoma</td>
<td>Stage 0 Breast Cancer</td>
</tr>
<tr>
<td>Colon Cancer</td>
<td>Multiple Myeloma</td>
<td>Stages I and II Breast Cancer</td>
</tr>
<tr>
<td>Esophageal Cancer</td>
<td>Non-Small Cell Lung Cancer</td>
<td>Stage III Breast Cancer</td>
</tr>
<tr>
<td>Follicular Lymphoma</td>
<td>Ovarian Cancer</td>
<td>Stage IV Breast Cancer</td>
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<tr>
<td>Hodgkin Lymphoma</td>
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</tr>
</tbody>
</table>

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Index

blood chemistry profile  50–51, 64–66
bone marrow aspiration  29
bone marrow biopsy  15, 18
chest x-ray  15, 18
classical Hodgkin lymphoma  8, 30–31, 36–54
clinical trial  32–33, 73
complementary and alternative medicine  33
complete blood count  15–16, 50–52, 64–66
comprehensive metabolic panel  15–16
computed tomography  15, 17–18, 27, 37, 50–53, 64–67
distress  15, 20
ejection fraction  15, 19
erythrocyte sedimentation rate  15–16
excisional biopsy  10
fertility  15, 20, 50–53, 64–67
immunohistochemistry  10
immunomodulator  25, 30
involved-site radiation therapy  27
liver function tests  15–16
lymphatic system  6–9
lymphocyte  7–8
lymphoma  8
magnetic resonance imaging  27, 53, 67
medical history  14–15, 50–52, 64–66
NCCN Member Institutions  88
NCCN Panel Members  87
nodular lymphocyte-predominant Hodgkin lymphoma  8, 31, 56–68
positron emission tomography/computed tomography  15, 17, 27, 37, 51, 58, 60, 62, 65
pulmonary function tests  15, 19, 37
Reed-Sternberg cells  8
smoking  15, 20, 50–53, 64–67
stem cell transplant  26, 28–30, 46–49
total lymphoid irradiation  47, 49