About Hodgkin Lymphoma

Overview and Types

If you have been diagnosed with Hodgkin lymphoma or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

What Is Hodgkin Lymphoma?

- What Is Hodgkin Lymphoma?

Research and Statistics

See the latest estimates for new cases of Hodgkin lymphoma and deaths in the US and what research is currently being done.

- Key Statistics for Hodgkin Lymphoma
- What’s New in Hodgkin Lymphoma Research and Treatment?

What Is Hodgkin Lymphoma?

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer, and can then spread to other areas of the body. To learn more about how cancers start and spread, see What Is Cancer?

Lymphomas are cancers that start in white blood cells called lymphocytes. There are 2 main types of lymphoma. Hodgkin lymphoma (HL) and non-Hodgkin lymphoma (NHL). They behave, spread, and respond to treatment differently, so it’s important for you to know which one you have.

This information focuses on Hodgkin Lymphoma. For information on the other type, see Non-Hodgkin Lymphoma.
The lymph system

To understand what Hodgkin lymphoma is, it helps to know about the lymph system (also known as the lymphatic system). The lymph system is part of the immune system, which helps fight infections and some other diseases. It also helps the flow of fluids in the body.

The lymph system is made up mainly of cells called lymphocytes, a type of white blood cell. There are 2 main types of lymphocytes:

- **B lymphocytes (B cells):** B cells make proteins called antibodies to help protect the body from germs (bacteria and viruses).
- **T lymphocytes (T cells):** There are several types of T cells. Some T cells destroy germs or abnormal cells in the body. Other T cells help boost or slow the activity of other immune system cells.

Hodgkin lymphoma usually starts in B lymphocytes.

Start and spread of Hodgkin lymphoma

Lymph tissue is in many parts of your body, so Hodgkin lymphoma can start almost anywhere.
The major sites of lymphoid tissue are:

**Lymph nodes:** Lymph nodes are bean-sized collections of lymphocytes and other immune system cells throughout the body, including inside the chest, abdomen, and pelvis. They are connected to each other by a system of lymphatic vessels.

**Spleen:** The spleen is an organ under the lower ribs on your left side. The spleen makes lymphocytes and other immune system cells. It also stores healthy blood cells and filters out damaged blood cells, bacteria, and cell waste.

**Bone marrow:** The bone marrow is the spongy tissue inside certain bones. New blood cells (including some lymphocytes) are made there.
**Thymus:** The thymus is a small organ behind the upper part of the breastbone and in front of the heart. It is important for T lymphocyte development.

**Adenoids and tonsils:** These are collections of lymphoid tissue in the back of your throat. They help make antibodies against germs that are breathed in or swallowed.

**Digestive tract:** The stomach, intestines, and many other organs also have lymph tissue.

Although Hodgkin lymphoma can start almost anywhere, most often it starts in lymph nodes in the upper part of the body. The most common sites are in the chest, neck, or under the arms.

Hodgkin lymphoma most often spreads through the lymph vessels from lymph node to lymph node. Rarely, late in the disease, it can invade the bloodstream and spread to other parts of the body, such as the liver, lungs, and/or bone marrow.

**Types of Hodgkin lymphoma**

Different types of Hodgkin lymphoma can grow and spread differently and may be treated differently.

**Classic Hodgkin lymphoma**

Classic Hodgkin lymphoma (cHL) accounts for about 95% of all cases of Hodgkin lymphomas in developed countries.

The cancer cells in cHL are called *Reed-Sternberg cells*. These cells are usually an abnormal type of B lymphocyte. Enlarged lymph nodes in people with cHL usually have a small number of Reed-Sternberg cells and a large number of surrounding normal immune cells. These other immune cells make up most of the enlarged lymph nodes.

Classic HL has 4 subtypes:

**Nodular sclerosis Hodgkin lymphoma:** This is the most common type of Hodgkin disease in developed countries. It is most common in teens and young adults, but it can occur in people of any age. It tends to start in lymph nodes in the neck or chest.

**Mixed cellularity Hodgkin lymphoma:** This is the second most common type and is seen mostly in older adults (although it can occur at any age). It can start in any lymph
node but most often occurs in the upper half of the body.

**Lymphocyte-rich Hodgkin lymphoma:** This subtype usually occurs in the upper half of the body and is rarely found in more than a few lymph nodes.

**Lymphocyte-depleted Hodgkin lymphoma:** This is the least common form of Hodgkin disease. It is seen mainly in older people. It is more likely to be advanced when first found, in lymph nodes in the abdomen as well as in the spleen, liver, and bone marrow.

**Nodular lymphocyte predominant Hodgkin lymphoma**

Nodular lymphocyte predominant Hodgkin lymphoma (NLPHL) accounts for about 5% of cases. The cancer cells in NLPHL are large cells called *popcorn cells* (because they look like popcorn), which are variants of Reed-Sternberg cells.

NLPHL usually starts in lymph nodes in the neck and under the arm. It can occur in people of any age, and is more common in men than in women. This type of HL is treated differently from the classic types.

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**Key Statistics for Hodgkin Lymphoma**

The American Cancer Society’s estimates for Hodgkin disease in the United States for 2018 are:
• About 8,500 new cases (3,660 in females and 4,840 in males)
• About 1,050 deaths (430 females, 620 males) from this cancer

Both children and adults can develop Hodgkin lymphoma, but it is most common in early adulthood (especially in a person’s 20s). The risk of Hodgkin lymphoma rises again in late adulthood (after age 55). Overall, the average age at the time of diagnosis is 39.

Hodgkin lymphoma is rare in children younger than 5 years of age. About 10% to 15% of cases are diagnosed in children and teenagers.

Survival rates have improved in the past few decades, largely due to advances in treatment. The 5-year relative survival rate for all patients diagnosed with Hodgkin lymphoma is now about 86%. Certain factors such as the stage (extent) of Hodgkin lymphoma and a person’s age affect these rates. For more on survival rates, see Survival Rates for Hodgkin Disease by Stage.

Visit the American Cancer Society’s Cancer Statistics Center for more key statistics.

• References


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What's New In Hodgkin Lymphoma Research and Treatment?

Important research into Hodgkin lymphoma is going on in many university hospitals, medical centers, and other institutions around the world. Scientists are getting closer to finding out what causes the disease and how to improve treatment.

Imaging tests

In recent years, PET/CT scans have been found to be very helpful in determining the extent of Hodgkin disease in the body and in assessing how well treatment is working. PET/CT scans are now commonly used early in the course of treatment to help doctors decide how much treatment needs to be given.

Tailoring treatment

In general, cure rates for Hodgkin lymphoma are high, but long-term side effects of treatment are an important issue. A very active area of research is directed at learning which patients can be treated with gentler therapy and which patients need stronger treatment.

A related area of research is finding less-toxic treatments that have fewer serious long-term side effects, yet still cure as many patients as possible. New chemotherapy (chemo) combinations of as many as 10 different drugs are being studied. The reasoning behind this approach is that even though more drugs are needed, using less of each drug might lead to fewer side effects. Another approach is using newer drugs that better target Hodgkin lymphoma cells, as opposed to chemo drugs. Some of these are described below.

The same is true for radiation therapy. Doctors are looking to see which patients (especially children) might do just as well with lower doses of radiation, or even no radiation. Doctors are also studying whether newer forms of radiation therapy, such as intensity-modulated radiation therapy (IMRT) and proton therapy, might be useful for Hodgkin lymphoma. These approaches focus radiation more precisely on tumors, which limits the doses reaching nearby normal tissues.
Chemotherapy

New chemo drugs and drug combinations are being studied in patients with Hodgkin disease. Some drugs, such as vinorelbine, idarubicin, bendamustine, and gemcitabine, are already used to treat other cancers, and have shown promise against Hodgkin disease that has relapsed after other chemo treatments. Studies are in progress to see if these drugs could be more effective than the ones now in use.

Targeted therapy

Newer drugs that work differently from standard chemo drugs are now being studied as well. These are known as targeted therapy drugs. Some of the types of targeted drugs that have shown promise against Hodgkin lymphoma in early studies include:

- **Phosphatidyl-inositide 3 kinase (PI3K) inhibitors**, such as idelalisib and INCB040093
- **Janus kinase (JAK) inhibitors**, such as ruxolitinib
- **mTOR inhibitors**, such as sirolimus, temsirolimus, and everolimus
- **Histone deacetylase (HDAC) inhibitors**, such as panobinostat and vorinostat

Some of these targeted drugs are being studied in combinations, in the hope that they might be more effective when given together. Many other targeted drugs are being studied as well.

Immunotherapy (including monoclonal antibodies)

**Immunotherapy** is treatment that helps the body’s immune system attack cancer cells more effectively. Newer forms of immunotherapy have shown to be helpful against several types of cancer in recent years, including Hodgkin lymphoma.

**Immune checkpoint inhibitors**

Immune system cells normally have substances that act as checkpoints to keep them from attacking other healthy cells in the body. Cancer cells sometimes take advantage of these checkpoints to avoid being attacked by the immune system.

Some newer drugs, such as nivolumab (Opdivo) and pembrolizumab (Keytruda), work by blocking these checkpoints, which can boost the immune response against cancer cells in the body. These drugs have shown promising results against Hodgkin
lymphoma, even in people who have already had several other treatments. They are now approved for use against Hodgkin lymphoma after other treatments have been tried, and several other checkpoint inhibitors are now being studied as well.

**Chimeric antigen receptor (CAR) T-cell therapy**

In this treatment, immune cells called *T cells* are removed from the patient's blood and altered in the lab to have specific receptors (called *chimeric antigen receptors*, or CARs) on their surface. These receptors can attach to proteins on the surface of lymphoma cells. The T cells are then multiplied in the lab and given back into the patient's blood, where they can seek out the lymphoma cells and launch a precise immune attack against them.

This technique has shown encouraging results in early clinical trials against some hard-to-treat Hodgkin lymphomas. Doctors are still improving how they make the T cells and are learning the best ways to use them. CAR T-cell therapy is only available in *clinical trials* at this time.

**Monoclonal antibodies**

*Monoclonal antibodies* (mAbs) are man-made versions of immune system proteins. Some can kill cancer cells by themselves. Others have radioactive molecules or cell poisons attached to them, which help kill cancer cells. An advantage of these drugs is that they seem to target lymphoma cells while having fewer side effects than standard chemo drugs. They may be used alone or combined with chemo.

Some mAbs, such as brentuximab vedotin (Adcetris) and rituximab (Rituxan), are already being used to treat Hodgkin lymphoma in some situations. Researchers are now studying if these drugs might be useful in other situations. For example, brentuximab is now being studied to see if it might be helpful earlier in the course of the disease. And studies are now being done to see if rituximab can help treat classic forms of Hodgkin lymphoma as well as the nodular lymphocyte predominant type.

Many newer mAbs are now being studied as well.

- References
Hodgkin Lymphoma Causes, Risk Factors, and Prevention

Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for Hodgkin lymphoma.

- Hodgkin Lymphoma Risk Factors
- What Causes Hodgkin Lymphoma?

Prevention

There is no way to completely prevent cancer. But there are things you can do that might lower your risk. Learn more.

- Can Hodgkin Lymphoma Be Prevented?

Hodgkin Lymphoma Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. Some cancer risk factors, like smoking, can be changed. Others, like a person’s age or family history, can’t be changed.

A few risk factors make a person more likely to develop Hodgkin lymphoma (although it’s not always clear why these factors increase risk). But having a risk factor, or even several, does not mean that you will definitely get the disease. And many people who get the disease may have few or no known risk factors.

Epstein-Barr virus infection/mononucleosis
People who have had infectious mononucleosis (sometimes called mono for short), an infection caused by the Epstein-Barr virus (EBV), have an increased risk of Hodgkin lymphoma. Although the risk is higher than for people who have not had mono, the overall risk is still very small.

The exact role of EBV in the development of Hodgkin lymphoma is not clear. Many people are infected with EBV, but very few develop Hodgkin lymphoma. Parts of the virus are found in Reed-Sternberg cells in about 1 out of 3 people with Hodgkin lymphoma. But most people with Hodgkin lymphoma have no signs of EBV in their cancer cells.

**Age**

People can be diagnosed with Hodgkin lymphoma at any age, but it is most common in early adulthood (especially in a person’s 20s) and in late adulthood (after age 55).

**Gender**

Hodgkin lymphoma occurs slightly more often in males than in females.

**Geography**

Hodgkin lymphoma is most common in the United States, Canada, and Europe, and is least common in African and Asian countries.

**Family history**

Brothers and sisters of young people with this disease have a higher risk for Hodgkin lymphoma. The risk is very high for an identical twin of a person with Hodgkin lymphoma. But a family link is still uncommon – most people with Hodgkin lymphoma do not have a family history of it.

It’s not clear why family history might increase risk. It might be because family members have similar childhood exposures to certain infections (such as Epstein-Barr virus), because they share inherited gene changes that make them more likely to get Hodgkin lymphoma, or some combination of these factors.

**Socioeconomic status**

The risk of Hodgkin disease is greater in people with a higher socioeconomic
background. The reason for this is not clear. One theory is that children from more affluent families might be exposed to some type of infection (such as Epstein-Barr virus) later in life than children from less affluent families, which might somehow increase their risk.

**HIV infection**

The risk of Hodgkin disease is increased in people infected with HIV, the virus that causes AIDS.

- **References**


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**What Causes Hodgkin Lymphoma?**

Scientists have found some [risk factors](#) that make a person more likely to get Hodgkin disease, but it’s not always clear exactly how these factors might increase risk.

For example, some researchers think that infection with the Epstein-Barr virus may sometimes cause DNA changes in B lymphocytes, leading to the development of Reed-Sternberg cells, which are the cancer cells in Hodgkin lymphoma.
DNA is the chemical in our cells that makes up our genes, which control how our cells function. We look like our parents because they are the source of our DNA. But DNA affects more than just how we look.

Some genes control when cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, and stay alive are called oncogenes.
- Genes that slow down cell division or cause cells to die at the right time are called tumor suppressor genes.

Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

Scientists have found many gene changes in Reed-Sternberg cells that help the cells grow and divide or live longer than they should. Reed-Sternberg cells also make substances called cytokines, which attract many other cells into the lymph node, enlarging it. In turn, these non-cancerous cells release substances that further help Reed-Sternberg cells grow.

Despite these advances, scientists do not yet know what sets off these processes. An abnormal reaction to infection with EBV or to other infections may be the trigger in some cases. But more research is needed to understand what causes Hodgkin lymphoma.

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- References


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Can Hodgkin Lymphoma Be Prevented?

Few of the known risk factors for Hodgkin lymphoma can be changed, so it is not possible to prevent most cases of the disease at this time.

Infection with HIV, the virus that causes AIDS, is known to increase risk, so one way to limit your risk is to avoid known risk factors for HIV, such as intravenous drug use or unprotected sex with many partners. You can read more about HIV infection in [HIV, AIDS, and Cancer](http://www.cancer.org).

Another risk factor for Hodgkin lymphoma is infection with the Epstein-Barr virus (the cause of infectious mononucleosis, or mono), but there is no known way to prevent this infection.

- **References**

For additional assistance please contact your American Cancer Society
1-800-227-2345 or www.cancer.org
Hodgkin Lymphoma Early Detection, Diagnosis, and Staging

Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- Can Hodgkin Lymphoma Be Found Early?
- Signs and Symptoms of Hodgkin Lymphoma
- Tests for Hodgkin Lymphoma

Stages and Outlook (Prognosis)

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- Hodgkin Lymphoma Stages
- Survival Rates for Hodgkin Lymphoma by Stage

Questions to Ask About Hodgkin Lymphoma

Here are some questions you can ask your cancer care team to help you better understand your cancer diagnosis and treatment options.

- What Should You Ask Your Doctor About Hodgkin Lymphoma?

Can Hodgkin Lymphoma Be Found Early?
Screening tests or exams are used to look for a disease in people who have no symptoms. At this time, there are no widely recommended screening tests for Hodgkin lymphoma. This is because no screening test has been shown to lower the risk of dying from this cancer. Still, in some cases Hodgkin lymphoma can be found early.

The best way to find Hodgkin disease early is to pay attention to possible symptoms. The most common symptom is **enlargement of one or more lymph nodes**, causing a lump or bump under the skin which is usually not painful. This is most often on the side of the neck, in the armpit, or in the groin. More often this is caused by something like an infection, rather than Hodgkin lymphoma, but it’s important to have such lumps checked by a doctor.

Other symptoms can include:

- Fever that doesn’t go away
- Drenching night sweats that often require changing bed sheets or night clothes
- Unexplained weight loss
- Severe and constant itching or pain in the lymph nodes after drinking alcohol

Careful, regular medical checkups may be helpful for people with known risk factors for Hodgkin lymphoma, such as a strong family history. These people do not often get Hodgkin lymphoma, but they (and their doctors) should know about any possible symptoms and signs they might have.

- References

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**Signs and Symptoms of Hodgkin Lymphoma**

You or your child can have Hodgkin lymphoma and feel perfectly well. But Hodgkin lymphoma can often cause symptoms.

**Lump(s) under the skin**
The most common symptom of Hodgkin lymphoma is a lump in the neck, under the arm, or in the groin, which is an enlarged lymph node. It doesn't usually hurt, but the area may become painful after drinking alcohol. The lump might grow larger over time, or new lumps might appear near it (or even in other parts of the body).

But Hodgkin lymphoma is not the most common cause of lymph node swelling. Most enlarged lymph nodes, especially in children, are caused by an infection. Lymph nodes that grow because of infection are called reactive or hyperplastic nodes. These often hurt when they are touched. If an infection is the cause, the node should return to its normal size within a few weeks after the infection goes away.

Other cancers can also cause swollen lymph nodes. If you have an enlarged lymph node, especially if you haven’t had a recent infection, it’s best to see your doctor so that the cause can be found and treated without delay, if needed.

**General (non-specific) symptoms**

Some people with Hodgkin disease have what are known as B symptoms:

- Fever (which can come and go over several days or weeks) without an infection
- Drenching night sweats
- Weight loss without trying (at least 10% of body weight over 6 months)

These symptoms are also important in determining the stage of Hodgkin lymphoma and a person’s prognosis (outlook). See [Hodgkin Lymphoma Stages](#).

Other possible symptoms of Hodgkin lymphoma include:

- Itching skin
- Feeling tired
- Loss of appetite

Sometimes the only symptom might be feeling tired all the time.

**Cough, trouble breathing, chest pain**

If Hodgkin lymphoma affects lymph nodes inside the chest, the swelling of these nodes might press on the windpipe (trachea) and make you cough or even have trouble breathing, especially when lying down. Some people might have pain behind the breast bone.

Having one or more of the symptoms above doesn’t mean you definitely have Hodgkin
lymphoma. In fact, many of these symptoms are more likely to be caused by other conditions, such as an infection. Still, if you or your child has any of these symptoms, have them checked by a doctor so that the cause can be found and treated, if needed.

- References

Tests for Hodgkin Lymphoma

Most people with Hodgkin lymphoma see their doctor because they have certain symptoms, or because they just don’t feel well and go in for a checkup.

If a person has signs or symptoms that suggest Hodgkin lymphoma, exams and tests will be done to find out for sure and, if so, to determine the exact type.

Medical history and physical exam

Your doctor will want to get a thorough medical history, including information about symptoms, possible risk factors, family history, and other medical conditions.

Next, the doctor will examine you, paying special attention to the lymph nodes and other areas of the body that might be affected, including the spleen and liver. Because infections are the most common cause of enlarged lymph nodes, especially in children, the doctor will look for an infection in the part of the body near any swollen lymph nodes.

The doctor also might order blood tests to look for signs of infection or other problems. If the doctor suspects that Hodgkin lymphoma might be causing the symptoms, he or she might recommend a biopsy of a swollen lymph node.

Biopsies

Because swollen lymph nodes are more likely to be caused by something other than
Hodgkin lymphoma, such as an infection, doctors often wait a few weeks to see if they shrink on their own as the infection goes away. Antibiotics may also be prescribed to see if they cause the nodes to shrink.

If the nodes don’t shrink or if they continue to grow, a lymph node (or a small piece of a node) is removed to be looked at under a microscope and for other lab tests. This procedure, called a biopsy, is needed to be sure of the diagnosis. If it is Hodgkin lymphoma, the biopsy sample can also show what type it is.

**Types of biopsies**

There are different types of biopsies. Doctors choose the best one based on the situation.

**Excisional or incisional biopsy:** This is the preferred and most common type of biopsy for an enlarged lymph node. The doctor cuts through the skin to remove the lymph node.

- If the entire lymph node is removed, it is an **excisional** biopsy.
- If a small part of a larger tumor or node is removed, it is an **incisional** biopsy.

If the node is just under the skin, this is a fairly simple operation that can sometimes be done with numbing medicine (local anesthesia). But if the node is inside the chest or abdomen, the patient is sedated or given general anesthesia (where he or she is in a deep sleep). This type of biopsy almost always provides enough of a tissue sample to make a diagnosis of Hodgkin lymphoma and to tell the exact type.

**Needle biopsy:** Needle biopsies are less invasive than excisional or incisional biopsies, but the drawback is that they might not remove enough of a sample to diagnose Hodgkin lymphoma (or to determine which type it is). There are 2 main types of needle biopsies:

- A **fine needle aspiration (FNA) biopsy** uses a very thin, hollow needle attached to a syringe to withdraw (aspirate) a small amount of fluid and tiny bits of tissue.
- A **core needle biopsy** uses a larger needle to remove a slightly larger piece of tissue.

To biopsy an enlarged node just under the skin, the doctor can aim the needle while feeling the node. If a node or tumor is deep inside the body, the doctor can guide the needle using a computed tomography (CT) scan or ultrasound (see below).

Most doctors do not use needle biopsies (especially FNA biopsies) to diagnose Hodgkin
lymphoma. But if the doctor suspects that your lymph node swelling is caused by an infection or by the spread of cancer from another organ (such as the breast, lungs, or thyroid), a needle biopsy might be the first type of biopsy done. An excisional biopsy may still be needed to diagnose Hodgkin lymphoma, even after a needle biopsy has been done.

If Hodgkin lymphoma has already been diagnosed, needle biopsies are sometimes used to check abnormal areas in other parts of the body that might be from the lymphoma spreading or coming back after treatment.

**Bone marrow aspiration and biopsy:** These tests are not used to diagnose Hodgkin lymphoma, but they may be done after the diagnosis is made to see if the lymphoma is in the bone marrow. The bone marrow aspiration and biopsy are usually done at the same time. The samples are taken from the back of the pelvic (hip) bone, although sometimes they may be taken from other bones.

In **bone marrow aspiration**, you lie on a table (either on your side or on your belly). After cleaning the skin over the hip, the doctor numbs the area and the surface of the bone by injecting a local anesthetic, which may cause a brief stinging or burning sensation. A thin, hollow needle is then inserted into the bone, and a syringe is used to suck out a small amount of liquid bone marrow. Even with the anesthetic, most patients have some brief pain when the marrow is removed.

A **bone marrow biopsy** is usually done just after the aspiration. A small piece of bone and marrow is removed with a slightly larger needle that is pushed down into the bone. The biopsy may also cause some brief pain.

Most children having a bone marrow aspiration and biopsy either receive medicine to make them drowsy or have general anesthesia so they are asleep.

**Lab tests of biopsy samples**

All biopsy samples are looked at under a microscope by a pathologist (a doctor specially trained to recognize cancer cells), who will look for Hodgkin lymphoma cells (called **Reed-Sternberg cells**). Sometimes the first biopsy does not give a definite answer and more biopsies are needed.

Looking at the samples under the microscope is often enough to diagnose Hodgkin lymphoma (and what type it is), but sometimes further lab tests are needed.

**Immunohistochemistry:** This lab test looks for certain proteins on cells, such as CD15
and CD30, which are found on the surface of the Reed-Sternberg cells in classic Hodgkin lymphoma. Tests for other proteins may point to nodular lymphocyte predominant Hodgkin lymphoma, to non-Hodgkin lymphoma (rather than Hodgkin lymphoma), or to other diseases entirely.

**Imaging tests**

Imaging tests use x-rays, sound waves, magnetic fields, or radioactive particles to make pictures of the inside of the body. Imaging tests may be done for a number of reasons, including:

- To look for possible causes of certain symptoms, such as enlarged lymph nodes in the chest
- To help determine the **stage** (extent) of Hodgkin lymphoma
- To help show if treatment is working
- To look for possible signs of cancer coming back after treatment

**Chest x-ray**

Hodgkin lymphoma often enlarges lymph nodes in the chest, which can usually be seen on a chest x-ray.

**Computed tomography (CT) scan**

A [CT scan](#) combines many x-rays to make detailed cross-sectional images of your body. This scan can help tell if any lymph nodes or organs in your body are enlarged. CT scans are useful for looking for Hodgkin lymphoma in the neck, chest, abdomen, and pelvis.

**CT-guided needle biopsy:** A CT scan can also be used to guide a biopsy needle into a suspicious area. For this procedure, a person lies on the CT scanning table while the doctor moves a biopsy needle through the skin and toward the area. CT scans are repeated until the needle is in the right place. A biopsy sample is then removed and sent to the lab to be looked at under a microscope.

**Magnetic resonance imaging (MRI)**

Like CT scans, [MRIs](#) show detailed images of soft tissues in the body. But MRIs use radio waves and strong magnets instead of x-rays. This test is rarely used in Hodgkin
lymphoma, but if the doctor is concerned about spread to the spinal cord or brain, MRI is very useful for looking at these areas.

**Positron emission tomography (PET) scan**

For a [PET scan](#), you are injected with a slightly radioactive form of sugar, which collects especially in cancer cells. A special camera is then used to create a picture of areas of radioactivity in the body. The picture is not detailed like a CT or MRI scan, but it can provide helpful information about your whole body.

PET scans can be used for many reasons in a person with Hodgkin lymphoma:

- They can help show if an enlarged lymph node contains Hodgkin lymphoma.
- They can help spot small areas in the body that might be lymphoma, even if the area looks normal on a CT scan.
- They can help tell if the lymphoma is responding to treatment. Some doctors will repeat the PET scan after a few courses of chemotherapy. If it is working, the lymph nodes will no longer take up the radioactive sugar.
- They can be used after treatment to help decide if an enlarged lymph node still has cancer or if it is just scar tissue.

**PET/CT scan:** Some machines can do both a PET scan and a CT scan at the same time. This lets the doctor compare areas of higher radioactivity on the PET scan with the more detailed appearance of that area on the CT scan. PET/CT scans often can help pinpoint the areas of lymphoma better than a CT scan alone.

**Bone scan**

This test is not usually done unless a person is having bone pain or has lab test results that suggest the lymphoma might have reached the bones.

For this test, a radioactive substance (technetium) is injected into a vein. It travels to damaged areas of bone, and a special camera can then detect the radioactivity. Hodgkin lymphoma sometimes causes bone damage, which may be picked up on a bone scan. But bone scans can’t show the difference between cancers and non-cancerous problems, so further tests might be needed.

**Other tests**

**Blood tests**
Blood tests aren't used to diagnose Hodgkin lymphoma, but they can help your doctor get a sense of how advanced it is and how well you might tolerate certain treatments.

The **complete blood count (CBC)** is a test that measures the levels of different cells in the blood. People with Hodgkin lymphoma can sometimes have abnormal blood counts. For example, if the lymphoma invades the bone marrow (where new blood cells are made) a person might have anemia (not enough red blood cells). A high white blood cell count is another possible sign of Hodgkin lymphoma, although it can also be caused by infection.

A test called an **erythrocyte sedimentation rate (ESR)** can help measure how much inflammation is in the body. It can be elevated in some people with Hodgkin lymphoma.

Blood tests might also be done to check **liver and kidney function** and to look for signs that the cancer might have reached the bones.

Your doctor might also suggest other blood tests to look for signs of certain infections:

- **HIV test**: especially if you have abnormal symptoms that might be related to HIV infection
- **Hepatitis B virus test**: if your doctor plans on using the drug rituximab (Rituxan) in your treatment, which could cause problems if you have this infection

**Tests of heart and lung function**

These tests might be done if certain chemotherapy drugs that could affect the heart or the lungs are going to be used.

- An **echocardiogram** (an ultrasound of the heart) or a **MUGA scan** can be used to check heart function.
- **Lung (pulmonary) function tests (PFTs)** can be used to see how well the lungs are working. For these tests, you breathe into a tube connected to a machine.

**References**

Hodgkin Lymphoma Stages

After someone is diagnosed with Hodgkin lymphoma, doctors will try to figure out if it has spread, and if so, how far. This process is called staging. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to treat it. Doctors also use a cancer’s stage when talking about survival statistics.

Hodgkin lymphoma generally starts in the lymph nodes. If it spreads, it is usually to another set of nearby lymph nodes. It can invade (grow into) nearby organs as well. Rarely, Hodgkin lymphoma will start in an organ other than lymph nodes, such as a lung.

The stage is based on:

- Your medical history (if you have certain symptoms)
- The physical exam
- Biopsies
Imaging tests, which typically include a chest x-ray, CT (computed tomography) scan of the chest/abdomen/pelvis, and PET (positron emission tomography) scan.

- Bone marrow aspiration and biopsy (sometimes but not always done)
- These exams, tests, and biopsies are discussed in Tests for Hodgkin Lymphoma.

In general, the results of imaging tests such as PET and CT scans are the most important when determining the stage of the lymphoma.

Lugano classification

A staging system is a way for the cancer care team to sum up the extent of a cancer's spread. The staging system for Hodgkin lymphoma is the Lugano classification, which is based on the older Ann Arbor system. It has 4 stages, labeled I, II, III, and IV.

For limited stage (I or II) Hodgkin lymphoma that affects an organ outside of the lymph system, the letter E is added to the stage (for example, stage IE or IIE).

**Stage I:** Either of the following means that the lymphoma is stage I:

- Hodgkin lymphoma is found in only 1 lymph node area or lymphoid organ such as the thymus (I).
- The cancer is found only in 1 area of a single organ outside the lymph system (IE).

**Stage II:** Either of the following means that the lymphoma is stage II:

- Hodgkin lymphoma is found in 2 or more lymph node areas on the same side of (above or below) the diaphragm, which is the thin muscle beneath the lungs that separates the chest and abdomen (II).
- The cancer extends locally from one lymph node area into a nearby organ (IIE).

**Stage III:** Either of the following means that the lymphoma is stage III:

- Hodgkin lymphoma is found in lymph node areas on both sides of (above and below) the diaphragm (III).
- Hodgkin lymphoma is in lymph nodes above the diaphragm, as well as in the spleen.

**Stage IV:** Hodgkin lymphoma has spread widely into at least one organ outside of the lymph system, such as the liver, bone marrow, or lungs.

Other modifiers may also be used to describe the Hodgkin lymphoma stage:
Bulky disease

This term is used to describe tumors in the chest that are at least as wide as the chest, or tumors in other areas that are at least 10 centimeters (about 4 inches) across. It is usually labeled by adding the letter X to the stage. It is especially important for stage II lymphomas, as bulky disease may require more intensive treatment.

A vs. B

Each stage may also be assigned a letter (A or B). B is added (stage IIIb, for example) if a person has any of these B symptoms:

- Loss of more than 10% of body weight over the previous 6 months (without dieting)
- Unexplained fever of at least 100.4°F (38°C)
- Drenching night sweats

If a person has any B symptoms, it usually means the lymphoma is more advanced, and more intensive treatment is often recommended. If no B symptoms are present, the letter A is added to the stage.

Resistant or recurrent Hodgkin lymphoma

Resistant or recurrent Hodgkin lymphoma is not part of the formal staging system, but doctors or nurses might use these terms to describe what is going on with the lymphoma in some cases.

- The terms resistant or progressive disease are used when the lymphoma does not go away or progresses (grows) while you are still being treated.
- Recurrent or relapsed disease means that Hodgkin lymphoma initially went away with treatment, but it has now come back. If the lymphoma returns, it may be in the same place where it started or in another part of the body. This may occur shortly after treatment or years later.

References


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## Survival Rates for Hodgkin Lymphoma By Stage

Survival rates tell you what portion of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can’t tell you how long you will live, but they may help give you a better understanding about how likely it is that your treatment will be successful.

### What is a 5-year survival rate?

Statistics on the outlook for a certain type and stage of cancer are often given as 5-year survival rates. The 5-year survival rate is the percentage of people who live at least 5 years after being diagnosed with cancer. For example, a 5-year survival rate of 70% means that an estimated 70 out of 100 people who have that cancer are still alive 5
years after being diagnosed. Keep in mind, however, that many of these people live much longer than 5 years after diagnosis.

But remember, the 5-year survival rates are estimates – your outlook can vary based on a number of factors specific to you.

**Cancer survival rates don’t tell the whole story**

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can’t predict what will happen in any particular person’s case. There are a number of limitations to remember:

- The numbers below are among the most current available. But to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. As treatments are improving over time, people who are now being diagnosed with Hodgkin lymphoma may have a better outlook than these statistics show.
- These statistics are based on the stage of the cancer when it was first diagnosed. They do not apply to cancers that later come back or spread, for example.
- The outlook for people with Hodgkin lymphoma varies by the stage (extent) of the cancer – in general, the survival rates are higher for people with earlier stage cancers. But many other factors can affect a person’s outlook (see below). The outlook for each person is specific to their circumstances.

Your doctor should be able to tell you how these numbers may apply to you.

**Survival rates for Hodgkin lymphoma**

The numbers below come from the National Cancer Institute’s SEER database, looking at more than 8,000 people diagnosed with Hodgkin lymphoma between 1988 and 2001.

- The 5-year survival rate for people with stage I Hodgkin lymphoma is about 90%.
- For stage II Hodgkin lymphoma, the 5-year survival rate is about 90%.
- The 5-year survival rate for stage III Hodgkin lymphoma is about 80%.
- Stage IV Hodgkin lymphoma has a 5-year survival rate of about 65%.

Remember, these survival rates are only estimates – they can’t predict what will happen to any individual person. We understand that these statistics can be confusing and may lead you to have more questions. Talk to your doctor to better understand your specific situation.
Other prognostic factors

Along with the stage of the Hodgkin lymphoma, other factors can affect a person’s prognosis (outlook). For example, having some factors means the lymphoma is likely to be more serious:

- Having **B symptoms or bulky disease**
- Being older than 45
- Being male
- Having a high white blood cell count (above 15,000)
- Having a low red blood cell count (hemoglobin level below 10.5)
- Having a low blood lymphocyte count (below 600)
- Having a low blood albumin level (below 4)
- Having a high erythrocyte sedimentation rate, or ESR (over 30 in someone with B symptoms, or over 50 for someone without B symptoms)

Some of these factors are used to help divide stage I or II Hodgkin lymphoma into **favorable** and **unfavorable** groups, which can affect how intense the treatment needs to be. To learn more, see [Treating Classic Hodgkin Lymphoma by Stage](#).

**References**


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What Should You Ask Your Doctor About Hodgkin Lymphoma?

It’s important to have honest, open discussions with your cancer care team. You should ask any question, no matter how minor it might seem. Here are some questions you might want to ask:

**When you’re told you have Hodgkin lymphoma**

- What type of Hodgkin lymphoma do I have?
- What is the stage (extent) of the lymphoma? What does this mean?
- Do I need any other tests before we can decide on treatment?
- Do I need to see any other doctors?
- If I’m concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?

**When deciding on a treatment plan**

- How much experience do you have treating Hodgkin lymphoma?
- What are my treatment choices? Which do you recommend? Why?
- Does one type of treatment lessen the chance of the lymphoma coming back more than another?
- Should I get a second opinion before starting treatment? Can you suggest a doctor or cancer center?
- How soon do I need to start treatment?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What are the short-term side effects from treatment? Can anything be done about them?
- What are the possible long-term side effects?
- Will I still be able to have children after my treatment? Can I do anything about this?
- How might treatment affect my daily activities?
• What are the chances the lymphoma will come back? What would we do if this happens?

**During treatment**

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but getting answers to the ones that do may be helpful.

• How will we know if the treatment is working?
• Is there anything I can do to help manage side effects?
• What symptoms or side effects should I tell you about right away?
• How can I reach you on nights, holidays, or weekends?
• Are there any limits on what I can do?
• Can you suggest a mental health professional I can see if I start to feel overwhelmed, depressed, or distressed?

**After treatment**

• What type of follow-up will I need after treatment?
• What symptoms should I watch for?
• How will we know if the lymphoma has come back? What would my options be if that happens?

Along with these sample questions, be sure to write down your own questions. For instance, you might want more information about recovery times so that you can plan your work or school schedule. Or you might want to ask about clinical trials for which you may qualify.

Keep in mind that doctors aren’t the only ones who can give you information. Other health care professionals, such as nurses and social workers, can answer some of your questions. To find out more about communicating with your health care team, see **The Doctor-Patient Relationship**.

• **References**
Treating Hodgkin Lymphoma

General treatment information

If you (or your child) has been diagnosed with Hodgkin lymphoma, the cancer care team will discuss treatment options with you. It’s important to think carefully about your choices. You will want to weigh the benefits of each treatment option against the possible risks and side effects.

Treatment for Hodgkin lymphoma is based largely on the *stage* (extent) of the disease. But other factors, including a person’s age and general health, and the *type* and location of the lymphoma, might also affect treatment options.

For almost all patients with Hodgkin lymphoma, cure is the main goal. But treatment can have side effects that often don’t show up for many years. Because of this, doctors try to choose a treatment plan with the lowest risk of possible side effects.

**Which treatments are used for Hodgkin lymphoma?**

Depending on the type and stage of the lymphoma and other factors, treatment options for people with Hodgkin lymphoma can include:

- **Chemotherapy**
- **Radiation therapy**
- **Immunotherapy** (including monoclonal antibodies)
- **High-dose chemotherapy and stem cell transplant**

The main treatments for Hodgkin lymphoma are chemotherapy and radiation therapy. Depending on the situation, one or both of these treatments might be used.

Certain patients might be treated with immunotherapy or with a stem cell transplant, especially if other treatments haven’t worked. Except for biopsy and staging, surgery is
rarely used to treat Hodgkin lymphoma.

To learn about the most common approaches to treating these cancers and about treatment in special circumstances, see:

- Treating Classic Hodgkin Disease by Stage
- Treating Nodular Lymphocyte Predominant Hodgkin Disease
- Treating Hodgkin Disease in Children
- Hodgkin Disease During Pregnancy

What types of doctors treat Hodgkin lymphoma?

Based on your treatment options, you may have different types of doctors on your treatment team. These doctors may include:

- A hematologist: a doctor who treats disorders of the blood, including lymphomas.
- A medical oncologist: a doctor who treats cancer with medicines.
- A radiation oncologist: a doctor who treats cancer with radiation therapy.

Many other specialists might be part of your treatment team as well, including physician assistants, nurse practitioners, nurses, nutritionists, social workers, and other health professionals. See Health Professionals Associated With Cancer Care for more on this.

Making Treatment Decisions

It is important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. In choosing a treatment plan, consider your health and the type and stage of the Hodgkin lymphoma.

It's also very important to ask questions if you’re not sure about something. You can find some good questions in What Should You Ask Your Doctor About Hodgkin Lymphoma?

Getting a second opinion

If time allows, you may also want to get a second opinion. This can give you more information and help you feel more certain about the treatment plan you choose. If you aren’t sure where to go for a second opinion, ask your doctor for help.
Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. See Clinical Trials to learn more.

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn’t mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

**Complementary methods** refer to treatments that are used along with your regular medical care. **Alternative treatments** are used instead of a doctor’s medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. See the Complementary and Alternative Medicine section to learn more.

Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.
Chemotherapy for Hodgkin Lymphoma

Chemotherapy (chemo) is the use of drugs to kill cancer cells. Chemo is usually injected into a vein under the skin or taken as a pill. Chemo drugs enter the bloodstream and travel throughout the body to reach and destroy cancer cells wherever they may be.

Chemo is the main treatment for most people with Hodgkin lymphoma (other than some people with nodular lymphocyte predominant Hodgkin lymphoma, or NLPHL). Sometimes chemo is followed by radiation therapy.

Which chemo drugs are used to treat Hodgkin lymphoma?

Chemo for Hodgkin lymphoma combines several drugs because different drugs kill cancer cells in different ways. The combinations used to treat Hodgkin lymphoma are often referred to by abbreviations. The most common regimen in the United States is a 4-drug combination called ABVD, which consists of:

- Adriamycin® (doxorubicin)
- Bleomycin
- Vinblastine
- Dacarbazine (DTIC)

Other common regimens include:

BEACOPP

- Bleomycin
- Etoposide (VP-16)
- Adriamycin (doxorubicin)
- Cyclophosphamide (Cytoxan®)
- Oncovin® (vincristine)
- Procarbazine
- Prednisone

**Stanford V**

- Doxorubicin (Adriamycin)
- Mechlorethamine (nitrogen mustard)
- Vincristine
- Vinblastine
- Bleomycin
- Etoposide
- Prednisone

*Radiation* is given after chemo in the Stanford V regimen, and it is sometimes given after the ABVD or BEACOPP regimens as well.

Other chemo combinations can also be used for Hodgkin lymphoma. Most use some of the same drugs listed above, but they might include different combinations and be given on different schedules.

Chemo is given in cycles (a period of treatment followed by a rest period to give the body time to recover). Each cycle generally lasts for several weeks.

Most chemo treatments are given in the doctor’s office, clinic, or hospital outpatient department, but some may require a hospital stay.

**Possible side effects of chemotherapy**

Chemo drugs can cause side effects. These depend on the type and dose of drugs given and how long treatment lasts. Common short-term side effects include:

- Hair loss
- Mouth sores
- Loss of appetite
- **Nausea and vomiting**
- Diarrhea
- Increased chance of *infection* (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- **Fatigue** (from having too few red blood cells)

These side effects are usually short-lived and go away after treatment is finished. If serious side effects occur, the chemotherapy may have to be delayed or the doses reduced.
Be sure to tell your doctor or nurse if you do have side effects, as there are often ways to help with them. For example, drugs are usually given to help prevent nausea and vomiting.

**Late or long-term side effects:** Some chemo drugs can have long-lasting side effects, some of which might not occur until months or years after treatment has ended. For example:

- Doxorubicin can damage the heart, so your doctor may order tests to check your heart function before and during treatment with this drug.
- Bleomycin can damage the lungs, so some doctors order tests of lung function (called *pulmonary function tests*) before starting patients on this drug.
- Some chemo drugs can increase the risk of getting a [second type of cancer](https://www.cancer.org) later in life (such as leukemia), especially in patients who also get radiation therapy.
- In children and young adults, some chemo drugs can also affect body growth and fertility (ability to have children) later on.

Long-term effects are discussed in more detail in [Living As a Hodgkin Lymphoma Survivor](https://www.cancer.org).

Before starting chemo, ask your doctor to explain possible side effects and the chances of having them.

To learn more, see the [Chemotherapy](https://www.cancer.org) section of our website.

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**Radiation Therapy for Hodgkin Lymphoma**

Radiation therapy uses high-energy rays (or particles) to destroy cancer cells.

**When is radiation therapy used for Hodgkin**
lymphoma?

Radiation therapy is part of the treatment for most people with Hodgkin lymphoma. It is especially useful when Hodgkin lymphoma is only in one part of the body.

For classic Hodgkin lymphoma, radiation is often given after chemotherapy, especially when there is a large or bulky tumor mass (usually in the chest). Chemotherapy or radiation alone would probably not cure the lymphoma, but both treatments together usually get rid of it.

Radiation therapy can also be used by itself to treat some cases of nodular lymphocyte predominant Hodgkin lymphoma (NHLPL).

Radiation therapy is often very good at killing Hodgkin lymphoma cells. But over the years as it has become clear that chemotherapy is also effective, doctors have used less radiation because of its possible long-lasting side effects.

How is radiation therapy given?

To treat Hodgkin lymphoma, a carefully focused beam of radiation is delivered from a machine. This is known as external beam radiation.

- Before the treatments start, the radiation team takes careful measurements to determine the correct angles for aiming the radiation beams and the dose needed. This planning session, called simulation, usually includes getting imaging tests such as CT, MRI, or PET scans.

Most often, radiation treatments are given 5 days a week for several weeks. The treatment is much like getting an x-ray, but the radiation is stronger. Each treatment lasts only a few minutes, although the setup time – getting you or your child into place – usually takes longer. The treatment is painless, but some younger children might still need to be sedated to make sure they don’t move during the treatment. Modern imaging tests can pinpoint the sites of Hodgkin lymphoma very precisely, which helps doctors aim the radiation only at the lymphoma while sparing nearby normal tissues. This can help limit side effects.

Involved site radiation therapy (ISRT)

Many doctors prefer this newer approach to radiation therapy when treating Hodgkin lymphoma. In ISRT, the radiation is aimed only at the lymph nodes that originally
contained lymphoma, as well as any nearby areas it extended into. This helps spare nearby normal tissues from getting radiation.

**Involved field radiation therapy (IFRT)**

This was the preferred form of radiation therapy for Hodgkin lymphoma until recently, but it is now largely being replaced by ISRT. In this technique, only the lymph node regions that have Hodgkin lymphoma are treated, but this includes larger treatment areas than ISRT does (which might expose some nearby organs to radiation).

**Extended field radiation**

In the past, radiation was given to the major lymph node areas that contained lymphoma, as well as the surrounding “normal” lymph node areas, just in case the lymphoma had spread, even though the doctors could not actually detect it in these areas. This is called extended field radiation.

- If the lymphoma was in the upper body, radiation was given to the mantle field, which included lymph node areas in the neck, chest, and under the arms. Sometimes this was extended to also include lymph nodes in the upper abdomen.
- **Inverted Y field** radiation therapy included the lymph nodes in the upper abdomen, the spleen, and the lymph nodes in the pelvis.
- When inverted Y field radiation was given together with mantle field radiation, the combination was called total nodal irradiation.

Because nearly all patients with Hodgkin lymphoma are now treated with chemotherapy, extended field radiation is seldom used any more.

**Total body irradiation**

People who are getting a stem cell transplant may get radiation to the whole body along with high-dose chemotherapy, to try to kill lymphoma cells throughout the body. For more information on this procedure, see High-dose Chemotherapy and Stem Cell Transplant.

**Possible side effects of radiation therapy**

The side effects of radiation therapy depend on where the radiation is aimed.

Some possible temporary effects include:
- Skin changes in areas getting radiation, ranging from redness to blistering and peeling
- Feeling tired
- Dry mouth
- Nausea
- Diarrhea

Radiation given to several areas, especially after chemotherapy, can lower blood cell counts and increase the risk of infections.

**Radiation therapy can also have long-lasting effects, including:**

- An increased risk of **another cancer** in the part of the body that was exposed to radiation.
- Damage to the **thyroid gland** (from radiation to the chest or neck), which can affect its ability to make thyroid hormone. This can lead to fatigue and weight gain. Treatment with thyroid hormone pills can help with this.
- An increased risk of **heart disease** (such as heart attacks) and lung problems from radiation to the chest
- An increased risk of **stroke** many years later after radiation to the neck
- **Slowed bone growth in children.** Depending on where the radiation is given, this could result in deformities or a lack of growth to full height. Radiation to the lower part of the body in children and young adults could also affect fertility later in life.

To reduce the risk of side effects, doctors carefully calculate the exact dose of radiation needed and aim the radiation beams as accurately as they can. Shields might also be placed over nearby parts of the body to protect them from the radiation. To help preserve fertility in girls and young women, the ovaries might be moved out of the way with minor surgery before radiation is given.

For more information about long-lasting side effects, see [Late and Long-term Side Effects of Hodgkin Lymphoma Treatment](#). If you or your child is getting radiation therapy, ask your doctor about the possible long-term side effects.

To learn more about radiation, see [Radiation Therapy](#).

**References**

Immunotherapy for Hodgkin Lymphoma

Immunotherapy is the use of medicines to stimulate someone’s immune system to recognize and destroy cancer cells more effectively. Immunotherapy can be used to treat some people with Hodgkin lymphoma.

Monoclonal antibodies

Antibodies are proteins made by your immune system to help fight infections. Man-made versions, called monoclonal antibodies (mAbs), can be designed to attack a specific target, such as a substance on the surface of lymphocytes (the cells in which Hodgkin lymphoma starts).

Some mAbs are now being used to treat Hodgkin lymphoma.

Brentuximab vedotin (Adcetris): This drug is an anti-CD30 antibody attached to a chemotherapy drug. Hodgkin lymphoma cells usually have the CD30 molecule on their
surface. The antibody acts like a homing signal, bringing the chemo drug to the lymphoma cells, where it enters the cells and makes them die when they try to divide into new cells.

This drug has been shown to help many people whose Hodgkin disease has come back after other treatments, including a stem cell transplant, as well as people who can’t have a stem cell transplant. It is also being studied to see if it can be given with chemotherapy and if can be helpful earlier in the course of the disease.

Brentuximab is infused into a vein (IV), usually every 3 weeks. Common side effects include:

- Nerve damage (neuropathy)
- Low blood cell counts
- Fatigue
- Fever
- Nausea and vomiting
- Infections
- Diarrhea
- Cough

Rarely, serious side effects occur during infusions, such as trouble breathing and low blood pressure

**Rituximab (Rituxan):** This antibody attaches to a substance called CD20 found on some types of lymphoma cells, which seems to kill the lymphoma cell. Rituximab may be used to treat nodular lymphocyte predominant Hodgkin disease (NLPHD), often with chemotherapy and/or radiation therapy.

Rituximab is given as an IV infusion in the doctor’s office or clinic. When it is used by itself, it is usually given once a week for 4 weeks, which may then be repeated several months later. When it is combined with chemotherapy, it is most often given on the first day of each chemo cycle.

Common side effects are usually mild but can include:

- Chills
- Fever
- Nausea
- Rashes
- Fatigue
• Headaches

Rarely, more severe side effects occur during infusions, such as trouble breathing and low blood pressure. Even if these symptoms occur during the first infusion, it is very unusual for them to recur with later doses. Rituximab can cause prior hepatitis B infections to become active again, which sometimes leads to severe liver problems or even death. Your doctor will probably check your blood for signs of hepatitis before starting this drug. This drug can also increase the risk of certain infections for several months after the drug is stopped.

Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking normal cells in the body. To do this, it uses “checkpoints” – molecules on immune cells that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to avoid being attacked by the immune system. But newer drugs that target these checkpoints hold a lot of promise as cancer treatments.

Nivolumab (Opdivo) and pembrolizumab (Keytruda) target PD-1, a protein on immune system cells called T cells that normally helps keep these cells from attacking other cells in the body. By blocking PD-1, these drugs boost the immune response against cancer cells. This can shrink some tumors or slow their growth.

These drugs can be used in people with classic Hodgkin lymphoma whose cancer has grown or returned after other treatments have been tried.

These drugs given as an intravenous (IV) infusion, typically every 2 or 3 weeks.

Possible side effects

Side effects of these drugs can include:

• Fatigue
• Fever
• Cough
• Nausea
• Itching
• Skin rash
• Loss of appetite
• Joint pain
• Constipation
Diarrhea
Other, more serious side effects occur less often. These drugs work by basically removing the brakes on the body's immune system. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, or other organs.

It's very important to report any new side effects to your health care team promptly. If serious side effects do occur, treatment may need to be stopped and you may get high doses of corticosteroids to suppress your immune system.

References


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High-dose Chemotherapy and Stem Cell Transplant for Hodgkin Lymphoma

Stem cell transplants (SCTs) are sometimes used for hard-to-treat Hodgkin lymphoma, such as disease that doesn’t go away completely after chemotherapy (chemo) and/or radiation or if it comes back after treatment.

The doses of chemo drugs given to patients normally are limited by the side effects these drugs cause. Higher doses can’t be used, even if they might kill more cancer cells, because they would severely damage the bone marrow, where new blood cells are made.

A stem cell transplant lets doctors give higher doses of chemo (sometimes along with radiation therapy). This is because after getting high-dose chemo treatment, the patient receives a transplant of blood-forming stem cells to restore the bone marrow.

The blood-forming stem cells used for a transplant can come either from the blood or from the bone marrow.

Types of transplants

There are 2 main types of stem cell transplants. They use different sources of blood-forming stem cells.

- In an autologous stem cell transplant, a patient’s own blood stem cells are collected from bone marrow or blood several times in the weeks before treatment. The cells are frozen and stored while the person gets treatment (high-dose chemo and/or radiation) and then are given back into the patient’s blood by an IV. This is the more common type of transplant for Hodgkin lymphoma.
- In an allogeneic stem cell transplant, the blood stem cells come from someone else. Usually this is a brother or sister, although the source may be an unrelated donor or umbilical cord blood. The donor’s tissue type (also known as the HLA type) needs to match the patient’s tissue type as closely as possible to help prevent major problems with the transplant. In treating Hodgkin lymphoma, an allogeneic transplant is generally used only if an autologous transplant has already been tried without success.

A stem cell transplant is a complex treatment that can cause life-threatening side effects. If the doctors think a person might benefit from a transplant, it should be done at
a cancer center where the staff has experience with the procedure and with managing the recovery phase.

For more on stem cell transplants, see Stem Cell Transplant for Cancer.

- **References**


Treating Classic Hodgkin Lymphoma, by Stage

This section sums up the treatment options for Hodgkin lymphoma (HL) in adults, based on the stage of cancer. Treatment of the disease in children is slightly different from the treatment used for adults. Some of the differences in treating adults and children are discussed in Treating Hodgkin Lymphoma in Children. For teens with HL who are fully
grown, the treatment is usually the same as that for an adult.

Treatment options depend on many factors, including:

- The type of Hodgkin disease
- The stage (extent) of the Hodgkin disease
- Whether or not the disease is bulky (large)
- Whether the disease is causing certain symptoms (known as B symptoms)
- Results of blood and other lab tests
- A person’s age
- A person’s general health

Based on these factors, a person’s treatment might be a little different from the general outline below.

**Stages IA and IIA, favorable**

This group includes HL that is only on one side of the diaphragm (above or below) and that doesn’t have any unfavorable factors. For example:

- It is not bulky
- It is not in several different lymph node areas
- It doesn’t cause any of the B symptoms
- It doesn’t cause an elevated erythrocyte sedimentation rate (ESR)

Treatment for most patients is chemotherapy (usually 2 to 4 cycles of the ABVD regimen or 8 weeks of the Stanford V regimen), followed by radiation to the initial site of the disease. Another option is chemotherapy alone (usually for 4 or 6 cycles) in selected patients.

Doctors often order a PET/CT scan after a few courses of chemo to see how well the treatment is working and to determine how much more treatment (if any) is needed.

If a person can’t have chemotherapy because of other health issues, radiation therapy alone may be an option.

For those who don’t respond to treatment, chemotherapy using different drugs or high-dose chemotherapy (and possibly radiation) followed by a stem cell transplant may be recommended. Treatment with the monoclonal antibody brentuximab vedotin (Adcetris) may be another option. If this isn’t helpful, the immunotherapy drug nivolumab (Opdivo) might be useful.
Stages I and II, unfavorable

This group includes HD that is only on one side of the diaphragm (above or below), but that is bulky, is in several different areas, is causing any of the B symptoms, and/or is causing an elevated erythrocyte sedimentation rate (ESR).

Treatment is generally more intense than that for favorable disease. It typically starts with chemotherapy (usually ABVD for 4 to 6 cycles or other regimens such as Stanford V for 12 weeks).

PET/CT scans are often done after several cycles of chemo to determine how much more treatment you need. This is often followed by more chemo. Radiation therapy is typically given to the sites of the tumor at this point, especially if it was bulky.

For those who don’t respond to treatment, chemotherapy using different drugs or high-dose chemotherapy (and possibly radiation) followed by a stem cell transplant may be recommended. Treatment with the monoclonal antibody brentuximab vedotin may be another option. If this isn’t helpful, the immunotherapy drug nivolumab (Opdivo) might be useful.

Stages III and IV

This includes HL that is both above and below the diaphragm and/or has spread widely through one or more organs outside the lymph system.

Doctors generally treat these stages with chemotherapy using more intense regimens than what is used for earlier stages. Although ABVD (for at least 6 cycles) can be used, some doctors favor more intense treatment with the Stanford V regimen for 12 weeks, or even the BEACOPP regimen if there are several unfavorable prognostic factors.

PET/CT scans might be used during or after chemo to assess how much more treatment you need. Depending on the results of the scans, more chemo may be given. Radiation therapy may be given after chemo, especially if there were any large tumor areas.

For those whose HL doesn’t respond to treatment, chemo using different drugs or high-dose chemotherapy (and possibly radiation) followed by a stem cell transplant may be recommended. Treatment with the monoclonal antibody brentuximab vedotin may be another option. If this isn’t helpful, an immunotherapy drug such as nivolumab (Opdivo) or pembrolizumab (Keytruda) might be useful.
Resistant Hodgkin disease

Treatment for HL should remove all traces of the lymphoma. Once initial treatment is complete, the doctor will do tests such as PET/CT scans to look for any signs of HL. If HL is still there, most experts think that more of the same treatment is unlikely to cure it.

Sometimes, radiation therapy to an area of disease that remains after chemotherapy might be curative. Using a different combination of chemo drugs may be another option. If radiation alone was the initial treatment, using chemo (with or without more radiation) might also be curative.

If HL is still there after a combination of these treatments, most doctors would recommend high-dose chemo (and possibly radiation) followed by an autologous stem cell transplant, if it can be done. If cancer still remains after this, an allogeneic stem cell transplant may be an option.

Another option, either instead of or after a stem cell transplant, may be treatment with the monoclonal antibody brentuximab vedotin (Adcetris). If this isn’t helpful, the immunotherapy drug nivolumab (Opdivo) might be useful.

Recurrent or relapsed Hodgkin disease

If HL comes back after treatment, further treatment depends on where the lymphoma comes back, on how long it has been since the initial treatment, and on what the initial treatment was.

If the initial treatment was radiation therapy alone, chemotherapy is usually given for recurrent disease.

If chemotherapy without radiation therapy was used first, and the cancer comes back only in the lymph nodes, the patient could receive radiation therapy to the lymph nodes with or without more chemo. Chemo with different drugs may be another option.

Radiation usually cannot be repeated in the same area. If, for example, HL in the chest was treated with radiation and it comes back in the chest, it usually cannot be treated with more radiation to the chest. This holds true no matter how long ago the radiation was first given.

If the lymphoma returns after several years, then using the same or different chemo drugs (possibly along with radiation) might still cure it. On the other hand, patients
whose HL recurs soon after treatment may need more intensive treatment. For example, if the HL has returned within a few months of the original treatment, high-dose chemo (and possibly radiation) followed by an autologous stem cell transplant may be recommended.

If the HL still remains after an autologous transplant, an allogeneic stem cell transplant may be an option. Another option, either instead of or after a stem cell transplant, may be treatment with the monoclonal antibody brentuximab vedotin (Adcetris). If this isn’t helpful, the immunotherapy drug such as nivolumab (Opdivo) or pembrolizumab (Keytruda) might be useful.

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- References


Last Medical Review: February 10, 2017 Last Revised: March 29, 2017
Treating Nodular Lymphocytic Predominant Hodgkin Lymphoma (NLPHL)

Because this rare type of Hodgkin lymphoma (HL) tends to grow more slowly than classic HL, it is sometimes treated slightly differently.

In people with early stage NLPHL without any B symptoms, radiation therapy alone is often all that is needed. An option for some people might be to have the lymphoma watched closely at first, and then start treatment only when symptoms appear.

If early-stage NLPHL is bulky (large) or is causing B symptoms, the main treatment is usually chemotherapy followed by radiation therapy. Many doctors use the ABVD chemo regimen, although some doctors prefer others. The monoclonal antibody rituximab (Rituxan) might be given along with the chemotherapy.

If the lymphoma is more advanced (stage III or IV), chemotherapy, with or without radiation therapy and/or the monoclonal antibody rituximab (Rituxan), is likely to be recommended. Many doctors use the ABVD chemo regimen, although some doctors prefer others. Some patients without B symptoms might be given rituximab alone.

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- References
Treating Hodgkin Lymphoma in Children

Treatment of Hodgkin lymphoma in children is slightly different from the treatment for adults. Children’s bodies tend to tolerate chemotherapy better in the short term than adults do. But some side effects are more likely to occur in children. And because some of these side effects could be long-term, children who survive their cancer need careful attention for the rest of their lives.

Since the 1960s, most children and teens with cancer have been treated at special centers designed for them. Being treated in these centers offers the advantage of having a team of specialists who are experienced with the differences between adult and childhood cancers, as well as the unique needs of children with cancer and their families. This team usually includes pediatric oncologists, surgeons, radiation oncologists, pathologists, pediatric oncology nurses, and nurse practitioners.

Childhood cancer centers also have psychologists, social workers, child life specialists, nutritionists, rehabilitation and physical therapists, and educators who can support and educate the entire family.
Most children with cancer in the United States are treated at a center that is a member of the Children’s Oncology Group (COG). All of these centers are associated with a university or children’s hospital. As we have learned more about treating childhood cancer, it has become even more important that treatment be given by experts in this area.

In these centers, doctors treating children with Hodgkin lymphoma often use treatment plans that are part of clinical trials. The purpose of these studies is to find the most effective treatment that causes the fewest side effects.

Any time a child or teen is diagnosed with cancer, it affects every family member and nearly every aspect of the family’s life. You can read more about coping with these changes in Children Diagnosed With Cancer: Dealing With Diagnosis.

**Differences from treatment in adults**

As in adults, the main goal in treating Hodgkin lymphoma in children is to cure the lymphoma without causing long-term problems. Doctors adjust the treatment based on the child’s age, the extent of the lymphoma, how well the lymphoma is responding to treatment, and other factors.

If the child is past puberty and muscles and bones are fully developed, treatment is usually the same as that given to adults. But if the child has not reached his or her full body size, chemotherapy (chemo) will likely be favored over radiation therapy. This is because radiation can affect bone and muscle growth and prevent children from reaching their normal size.

When treating children with HL, doctors often combine chemo with low doses of radiation. The chemo often includes combinations of many drugs rather than just the usual adult ABVD regimen, especially for cancers that have unfavorable features or are more advanced. This approach has had excellent success rates, even for children with more advanced disease.

**Stages IA and IIA, favorable:** Treatment generally starts with chemo alone, used at the lowest dose that is likely to result in a cure. If the lymphoma doesn’t go away completely, radiation therapy or more chemo might be added.

If radiation therapy is used, the dose and area treated are kept as small as possible. If radiation is used on the lower part of the body in girls and young women, the ovaries should be protected to help preserve fertility.
Stages I and II, unfavorable: Treatment is likely to consist of more intense chemo combined with radiation therapy, although the dose and field of radiation are still kept as small as possible.

Stages III and IV: Treatment includes more intense chemo, either alone or combined with low-dose radiation therapy to areas with bulky disease (areas that contain a lot of lymphoma).

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- References


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Treating Hodgkin Lymphoma in Pregnancy

If a woman is pregnant and diagnosed with Hodgkin lymphoma, treatment options depend on several factors. The woman and her doctors must take into account the extent of the lymphoma, how quickly it is growing, how far along the pregnancy is, and the woman’s own personal preferences.

If the Hodgkin lymphoma requires treatment during the pregnancy, it is usually delayed until after the first trimester, if possible, because the risks to the baby are lower after this. Treatment usually consists of chemotherapy using either one or a few drugs, based on the circumstances.

If the lymphoma is diagnosed during the second half of the pregnancy and is not causing problems, a woman can often wait until the baby is born (sometimes by inducing labor a few weeks early) before starting treatment. This is the approach that is safest for the baby.

Radiation therapy is not often given during pregnancy because of concerns about the possible long-term effects on the unborn baby. But a few studies suggest that as long as very careful precautions are taken to aim the radiation precisely, limit the doses, and shield the baby, pregnant women with Hodgkin lymphoma in lymph nodes in the neck, underarm area, or inside the chest can have this treatment with little or no apparent risk to the baby. If radiation is given, it should be delayed until at least the second trimester, if possible.

The need to avoid radiation also limits which imaging tests can be used to help determine the stage (extent) of the lymphoma or to see if treatment is working. CT scans, PET scans, and x-rays all use radiation, so they are avoided if at all possible. MRI scans and ultrasound can often be used instead.

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1-800-227-2345 or www.cancer.org
After Hodgkin Disease Treatment

Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- Living As a Hodgkin Lymphoma Survivor
- Late and Long-term Side Effects of Hodgkin Lymphoma Treatment

Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it is very common to have questions about cancer coming back or treatment no longer working.

- Second Cancers After Hodgkin Lymphoma

Living As a Hodgkin Lymphoma Survivor

For many people with Hodgkin lymphoma, treatment can destroy the lymphoma. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about the lymphoma coming back. (When cancer comes back after treatment, it is called a recurrence.) This is very common if you’ve had cancer.

For some people, Hodgkin lymphoma may never go away completely. These people may get regular treatments with chemotherapy, radiation therapy, or other therapies to help control it for as long as possible and to help relieve symptoms. Learning to live with Hodgkin lymphoma that does not go away can be difficult and very stressful.
Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions

Follow-up after Hodgkin Lymphoma

Even if you’ve completed treatment, your doctors will still want to watch you closely. It’s very important to go to all your follow-up appointments, as Hodgkin lymphoma can sometimes come back even many years after treatment.

Some treatment side effects might last a long time or might not even show up until years after you have finished treatment (see Late and Long-term Side Effects of Hodgkin Lymphoma Treatment). Your doctor visits are a good time to ask questions and talk about any changes or problems you notice or concerns you have.

Exams and tests

During follow-up visits, the doctor will ask about symptoms, do physical exams, and may order blood tests or imaging tests such as CT scans or chest x-rays. Doctor visits and tests are usually recommended every few months for the first several years after treatment. Gradually, the length of time between visits can be increased, but even after 5 years they should be done at least yearly.

People whose Hodgkin lymphoma doesn’t go away completely with treatment will have a follow-up schedule that is based on their specific situation.

Keeping health insurance and copies of your medical records
Even after treatment, it’s very important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your treatment, you might find yourself seeing a new doctor who doesn’t know about your medical history. It’s important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in *Keeping Copies of Important Medical Records*.

**Can I lower my risk of Hodgkin lymphoma progressing or coming back?**

If you have (or have had) Hodgkin lymphoma, you probably want to know if there are things you can do that might lower your risk of the lymphoma growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Unfortunately, it’s not yet clear if there are things you can do that will help.

Adopting healthy behaviors such as not smoking, *eating well, getting regular physical activity*, and staying at a healthy weight might help, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of Hodgkin lymphoma or other cancers.

**About dietary supplements**

So far, no dietary supplements (including vitamins, minerals, and herbal products) have been shown to clearly help lower the risk of Hodgkin lymphoma progressing or coming back. This doesn’t mean that no supplements will help, but it’s important to know that none have been proven to do so.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they’re allowed to claim they can do. If you’re thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that might be harmful.

**If Hodgkin lymphoma comes back**

If Hodgkin lymphoma does come back at some point, your treatment options will depend on where the lymphoma is, what treatments you’ve had before, how long it’s
been since treatment, and your current health and preferences. For more on how recurrent Hodgkin lymphoma is treated, see Treating Classic Hodgkin Lymphoma, by Stage.

For more general information on dealing with a recurrence, see Understanding Recurrence.

Could I get a second cancer after treatment?

People who’ve had Hodgkin lymphoma can still get other cancers. In fact, Hodgkin lymphoma survivors are at higher risk for getting some other types of cancer. Learn more in Second Cancers After Hodgkin Lymphoma.

Getting emotional support

Some amount of feeling depressed, anxious, or worried is normal when Hodgkin lymphoma is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in Coping With Cancer.

References


National Cancer Institute. Physician Data Query (PDQ). Childhood Hodgkin Lymphoma
Second Cancers After Hodgkin Lymphoma

Cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. If a cancer comes back after treatment it is called a recurrence. But some cancer survivors may develop another type of cancer later. This is called a second cancer.

People who have had Hodgkin lymphoma can get any type of second cancer, but research has found they have an increased risk of certain cancers, including:

- Leukemia and myelodysplastic syndrome (MDS)
- Non-Hodgkin lymphoma
- Breast cancer (in women)
- Lung cancer
- Thyroid cancer
- Cancer of the lip and tongue
- Salivary gland cancer
- Stomach cancer
- Colon cancer
- Liver cancer
- Bone cancer
- Soft tissue cancer
- Anal cancer
- Cancer of the uterus
- Cancer of the ureter (the tube that connects the kidney and the bladder)
- Melanoma of the skin
- Kaposi sarcoma

The increased risk of many of these cancers seems to be linked to treatment with radiation. For example:

- Women who have had chest radiation (especially before age 30) have been found to have a higher risk of breast cancer.
- Radiation to the neck has been linked to a higher risk of thyroid cancer.
- Radiation to the chest has been linked to a higher risk of lung cancer.

But over time, the use of radiation to treat Hodgkin lymphoma has changed. Radiation is now given in lower doses, and often only to the areas directly affected by Hodgkin lymphoma. The risks with modern radiation treatment are likely to be lower, although long-term studies are needed to be sure.

Chemotherapy (chemo), especially with drugs called alkylating agents (such as mechlorethamine) has been linked with a higher risk of several types of cancer, including leukemias. Treatment with alkylating agents has become much less common, so these risks are probably not as high as they were in the past, but long-term follow-up studies are needed to be sure.

**Follow-up care after Hodgkin lymphoma treatment**

After completing treatment for Hodgkin lymphoma, you should still see your doctor regularly and may have tests to look for signs that the cancer has come back. Let them know about any new symptoms or problems, because they could be caused by the lymphoma coming back or by a new disease or second cancer.

Women who were treated with radiation therapy to the chest (such as mantle field radiation therapy) before age 30 have an increased risk of breast cancer. The American Cancer Society recommends yearly breast MRIs in addition to mammograms and clinical breast exams beginning at age 30 for these women.
The Children's Oncology Group has guidelines for the follow-up of patients treated for cancer as a child, teen, or young adult, including screening for second cancers. These can be found at [www.survivorshipguidelines.org](http://www.survivorshipguidelines.org).

Survivors of Hodgkin lymphoma should also follow the [American Cancer Society guidelines for the early detection of cancer](http://www.cancer.org), such as those for colorectal and lung cancer. Most experts don’t recommend any other testing to look for second cancers unless you have symptoms.

**Can I lower my risk of getting a second cancer?**

There are steps you can take to lower your risk and stay as healthy as possible. For example, it’s important to [stay away from tobacco](http://www.cancer.org) products. Smoking increases the risk of many cancers, including some of the second cancers seen in people who have had Hodgkin lymphoma.

To help maintain good health, Hodgkin lymphoma survivors should also:

- Get to and stay at a [healthy weight](http://www.cancer.org)
- Be [physically active](http://www.cancer.org)
- [Eat a healthy diet](http://www.cancer.org), with an emphasis on plant foods
- [Limit alcohol](http://www.cancer.org) to no more than 1 drink per day for women or 2 per day for men

These steps may also lower the risk of other health problems.

See [Second Cancers in Adults](http://www.cancer.org) for more information about causes of second cancers.

- **References**


Late and Long-term Side Effects of Hodgkin Lymphoma Treatment

Each type of treatment for Hodgkin lymphoma has side effects that could last for months or longer, or that might not show up until long after treatment has ended. Some side effects, like loss of fertility (ability to have children), could be permanent.

Because so many people are now living for a long time after their treatment, watching for these late and long-lasting side effects is very important. Be sure to discuss what these possible effects might be with your medical team so you know what to watch for and report to the doctor.

Second cancers

One uncommon but very serious side effect of Hodgkin lymphoma treatment is developing a second type of cancer later on. People who have had Hodgkin lymphoma have a higher risk for several types of cancer. See Second Cancers After Hodgkin Lymphoma.

Fertility issues

A possible long-term effect of chemotherapy and radiation therapy, especially in
younger patients, is reduced or lost fertility. For example, some chemo drugs can affect a male’s ability to make sperm, which might be temporary or permanent. If the patient is old enough and is going to get chemo drugs that can affect fertility, sperm banking should be considered before chemo is started.

Likewise, women may stop having menstrual periods with chemotherapy. This may or may not return to normal. Radiation to the lower abdomen can cause infertility unless the ovaries are surgically moved outside the radiation field beforehand. Moving the ovaries does not affect cure rates because Hodgkin lymphoma almost never spreads to the ovaries.

To learn more about fertility issues, see Fertility and Women With Cancer and Fertility and Men With Cancer.

Infections

For unknown reasons, the immune systems of Hodgkin lymphoma patients often do not work normally. Treatments such as chemotherapy, radiation therapy, or removal of the spleen (splenectomy) can add to this problem. Splenectomy was once commonly done but is now rare for people with Hodgkin lymphoma. Patients who have their spleen removed should get vaccinated against certain bacteria.

All people who have had Hodgkin lymphoma should keep up with their flu shots. Keeping up with vaccinations and careful, prompt treatment of infections are very important.

Thyroid problems

Radiation therapy to the chest or neck to treat Hodgkin lymphoma might affect the thyroid gland, causing it to make less thyroid hormone. People with this condition, known as hypothyroidism, may need to take thyroid medicine daily. People who got radiation to the neck or upper chest should have their thyroid function checked with blood tests at least yearly.

Heart disease and strokes

People who have had radiation to the chest have a higher risk of heart disease and heart attacks. This has become less of a problem with more modern radiation techniques, but it’s important to do what you can to help lower your risk, such as not
smoking, staying at a healthy weight, being active, and eating a healthy diet. Some chemo drugs such as doxorubicin (Adriamycin) can also cause heart damage. Your doctor might want to check your heart function for several years after your treatment.

Radiation to the neck increases the chance of stroke because it can damage the blood vessels in the neck that supply the brain. Smoking and high blood pressure also increase the risk of stroke. Once again, it's important to avoid smoking. It's also important to have regular check-ups with your doctor and to get treated if you have high blood pressure.

Lung damage

The chemo drug bleomycin can damage the lungs, as can radiation therapy to the chest. This can lead to problems such as shortness of breath, which might not show up until years after treatment. Smoking can also seriously damage the lungs, so it's important that people who have had these treatments do not smoke.

Special concerns in childhood Hodgkin lymphoma survivors

Just as the treatment of childhood Hodgkin lymphoma requires a very specialized approach, so does follow-up and monitoring for late effects of treatment. Careful follow-up after treatment is very important. The earlier problems are found, the more likely it is they can be treated effectively.

Along with physical side effects (including those listed above), survivors of childhood lymphoma may have emotional or psychological issues. They also may have some problems with normal functioning and school work. These can often be addressed with support and encouragement. Doctors and other members of the health care team can also often recommend special support programs and services to help children after treatment.

To help increase awareness of late effects and improve follow-up care for childhood cancer survivors throughout their lives, the Children's Oncology Group (COG) has developed long-term follow-up guidelines for survivors of childhood cancers. These guidelines can help you know what to watch for, what types of health screening should be done, and how late effects may be treated.

It's very important to discuss possible long-term complications with your child's health
care team, and to make sure there is a plan in place to watch for these problems and treat them, if needed. To learn more, ask your child’s doctors about the COG survivor guidelines. You can also download them for free on the COG website: www.survivorshipguidelines.org. The guidelines are written for health care professionals. Patient versions of some of the guidelines are available (as Health Links) on the site as well, but we urge you to discuss them with a doctor.

For more about some of the possible long-term effects of treatment, see Children Diagnosed With Cancer: Late Effects of Cancer Treatment.

- References


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If Treatment for Hodgkin Disease Is No Longer Working
If Hodgkin disease keeps growing or comes back after one kind of treatment, it’s often
possible to try other treatment plans that might still cure it, or at least keep it under control enough to help you live longer and feel better. Clinical trials also might offer chances to try newer treatments that could be helpful.

But when a person has tried many different treatments and the lymphoma is no longer getting better, even newer treatments may no longer be helpful. If this happens, it’s important to weigh the possible limited benefits of trying a new treatment against the possible downsides, including treatment side effects. Everyone has their own way of looking at this.

This is likely to be the hardest part of your battle with cancer — when you have been through many treatments and nothing’s working anymore. Your doctor might offer you new options, but at some point you may need to consider that treatment is not likely to improve your health or change your outcome or survival.

If you want to continue to get treatment for as long as you can, you need to think about the odds of treatment having any benefit and how this compares to the possible risks and side effects. Your doctor can estimate how likely it is the cancer will respond to treatment you’re considering. For instance, the doctor may say that more treatment might have about a 1 in 100 chance of working. Some people are still tempted to try this. But it’s important to have realistic expectations if you do choose this plan.

**Palliative care**

No matter what you decide to do, it’s important that you feel as good as you can. Make sure you are asking for and getting treatment for any symptoms you might have, such as nausea or pain. This type of treatment is called *palliative care*.

Palliative care helps relieve symptoms, but it is not expected to cure the disease. It can be given along with cancer treatment, or can even be cancer treatment. The difference is its purpose — the main goal of palliative care is to improve the quality of your life, or help you feel as good as you can for as long as you can. Sometimes this means using drugs to help with symptoms like *pain* or *nausea*. Sometimes, though, the treatments used to control your symptoms are the same as those used to treat cancer. For instance, radiation or other treatments might be used to help relieve pain caused by a large tumor. But this is not the same as treatment to try to cure the cancer.

**Hospice care**

At some point, you may benefit from hospice care. This is special care that treats the person rather than the disease; it focuses on quality rather than length of life. Most of
the time, it is given at home. Your cancer may be causing problems that need to be managed, and hospice focuses on your comfort. You should know that while getting hospice care often means the end of treatments such as chemo and radiation, it doesn’t mean you can’t have treatment for the problems caused by the cancer or other health conditions. In hospice the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult time. You can learn more in Hospice Care.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends — times that are filled with happiness and meaning. Pausing at this time in your cancer treatment gives you a chance to refocus on the most important things in your life. Now is the time to do some things you’ve always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

To learn more

You can learn more about the changes that occur when treatment stops working, and about planning ahead for yourself and your family, in Advance Directives and Nearing the End of Life.

- References

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