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Non-Hodgkin Lymphoma Causes, Risk Factors, and Prevention

Learn about the risk factors for non-Hodgkin lymphoma and what you might be able to do to help lower your risk.

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 non-Hodgkin lymphoma.

- [Non-Hodgkin Lymphoma Risk Factors](#)
- [What Causes Non-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 Non-Hodgkin Lymphoma Be Prevented?](#)

Non-Hodgkin Lymphoma Risk Factors

A risk factor is anything that increases your chance of getting a disease like cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be

changed. Others, like a person's age or family history, can't.

But having a risk factor, or even many risk factors, does not mean that you will get the disease. And many people who get the disease may have few or no known risk factors.

Researchers have found several factors that can affect a person's chance of getting

their immune system to prevent it from attacking the new organ. These people have a higher risk of developing NHL.

- The [human immunodeficiency virus \(HIV\)](#)⁴ can weaken the immune system, and people infected with HIV are at increased risk of NHL.
- In some genetic (inherited) syndromes, such as ataxia-telangiectasia (AT) and Wiskott-Aldrich syndrome, children are born with a deficient immune system. Along with an increased risk of serious infections, these children also have a higher risk of developing NHL.

Autoimmune diseases

Some autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus (SLE or lupus), Sjogren (Sjögren) disease, celiac disease (gluten-sensitive enteropathy), and others have been linked with an increased risk of NHL.

In autoimmune diseases, the immune system mistakenly sees the body's own tissues as foreign and attacks them, as it would a germ. Lymphocytes (the cells from which lymphomas start) are part of the body's immune system. The overactive immune system in autoimmune diseases may make lymphocytes grow and divide more often than normal. This might increase the risk of them developing into lymphoma cells.

Certain infections

Some types of infections may increase the risk of NHL in different ways.

Infections that directly transform lymphocytes

Some viruses can directly affect the DNA (genes) in lymphocytes, helping to transform them into cancer cells:

- Infection with **human T-cell lymphotropic virus (HTLV-1)** increases a person's risk of certain types of T-cell lymphoma. This virus is most common in some parts of Japan and in the Caribbean region, but it's found throughout the world. In the United States, it causes less than 1% of lymphomas. HTLV-1 spreads through sex and contaminated blood and can be passed to children through breast milk from an infected mother.
- Infection with the **Epstein-Barr virus (EBV)** is an important risk factor for **Burkitt lymphoma** in some parts of Africa. In developed countries such as the United

States, EBV is more often linked with lymphomas in people also infected with HIV, the virus that causes AIDS. EBV has also been linked with some less common types of lymphoma.

- **Human herpes virus 8 (HHV-8)** can also infect lymphocytes, leading to a rare type of lymphoma called primary effusion lymphoma. This lymphoma is most often seen in people who are infected with HIV. HHV-8 infection is also linked to another cancer, [Kaposi sarcoma](#)⁵. For this reason, another name for this virus is **Kaposi sarcoma-associated herpes virus (KSHV)**.

Infections that weaken the immune system

Infection with human immunodeficiency virus (HIV), the virus that causes AIDS, can weaken the immune system. HIV infection is a risk factor for developing certain types of NHL, such as primary CNS lymphoma, Burkitt lymphoma, and diffuse large B-cell lymphoma.

Infections that cause chronic immune stimulation

Some long-term infections may increase a person's risk of lymphoma by forcing their immune system to be constantly active. As more lymphocytes are made to fight the infection, there is a greater chance for mutations in key genes to occur, which might eventually lead to lymphoma. Some of the lymphomas linked with these infections actually get better when the infection is treated.

- *Helicobacter pylori*, a type of bacteria known to cause stomach ulcers, has also been linked to mucosa-associated lymphoid tissue (MALT) lymphoma of the stomach.
- *Chlamydia psittaci* (formerly known as *Chlamydia psittaci*) is a type of bacteria that can cause a lung infection called **psittacosis**. It has been linked to MALT lymphoma in the tissues around the eye (called **ocular adnexal marginal zone lymphoma**).
- Infection with the bacterium *Campylobacter jejuni* has been linked to a type of MALT lymphoma called **immunoproliferative small intestinal disease**. This type of lymphoma, which is also sometimes called **Mediterranean abdominal lymphoma**, typically occurs in young adults in eastern Mediterranean countries.
- Long-term infection with the hepatitis C virus (HCV) seems to be a risk factor for certain types of lymphoma, such as **splenic marginal zone lymphoma**.

<https://doi.org/10.3322/caac.21719>

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What Causes Non-Hodgkin Lymphoma?

Researchers have found that non-Hodgkin lymphoma (NHL) is linked with a number of [risk factors](#), but the cause of most lymphomas is not known. This is complicated by the fact that there are many types of lymphomas are actually a diverse group of cancers, which might have difdemat Aesthet Surrset5s5mas is not known51 71 11.1 re f 0 g Q BT 1 0 0 s is not

right time are known as **tumor suppressor genes**. Changes that turn off these genes can result in cells growing out of control.

- Some genes normally help repair mistakes in a cell's DNA. Changes that turn off these **DNA repair genes** can result in the buildup of DNA changes within a cell, which might lead to them growing out of control.

Any of these types of DNA changes might lead to cells growing out of control and forming a tumor. To learn more, see [Oncogenes, Tumor Suppressor Genes, and DNA Repair Genes](#)¹.

Some people **inherit** DNA mutations from a parent that increase their risk for some types of cancer. Having a family history of lymphoma does seem to increase your [risk of lymphoma](#). Still, most people with lymphoma don't have a strong family history of it.

Gene changes related to NHL are usually **acquired** (picked up) during life, rather than being inherited. Acquired gene changes can result from exposure to radiation, cancer-causing chemicals, or infections, but often these changes occur for no clear reason. They seem to happen more often as we age, which might help explain why most lymphomas are seen in older people.

Some of the gene changes that lead to certain types of lymphoma are now known. For example, in follicular lymphoma, the cells often have an exchange of DNA (known as a **translocation**) between chromosomes 14 and 18, which turns on the *BCL-2* oncogene. (Chromosomes are long strands of DNA in each cell.) This oncogene stops the cell from dying at the right time, which can lead to lymphoma.

Scientists are learning about the exact gene changes involved in the different types of NHL. This information is being used to develop better tests to detect and classify certain types of lymphoma. Hopefully, these discoveries can be used to develop new treatments as well.

While researchers are beginning to understand some of the gene changes that can lead to NHL, they still do not know why many of these gene changes develop, especially in people with no clear risk factors.

Changes in the immune system

Lymphocytes (the cells from which lymphomas start) are immune system cells, so it's not surprising that changes in the immune system seem to play an important role in many cases of lymphoma:

- People with **weakened immune systems** (due to inherited conditions, treatment with certain drugs, organ transplants, or HIV infection) have a much higher chance of developing lymphoma than people without a weakened immune system.
- People with certain **autoimmune diseases** (where the immune system constantly attacks a certain part of the body) have an increased risk of lymphoma.
- People with certain **chronic infections** are also at increased risk, probably because the immune system is constantly making new lymphocytes to fight the infection, which increases the chances for mistakes in their DNA.

Hyperlinks

1. www.cancer.org/cancer/understanding-cancer/genes-and-cancer/oncogenes-tumor-suppressor-genes.html

References

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Can Non-Hodgkin Lymphoma Be Prevented?

There is no sure way to prevent non-Hodgkin lymphoma (NHL). But there are some

things you can do that might help lower your risk.

Most people with NHL have no [risk factors](#)

1. www.cancer.org/cancer/risk-prevention/infections/hiv-infection-aids.html
2. www.cancer.org/cancer/survivorship/long-term-health-concerns/second-cancers-in-adults.html
3. www.cancer.org/cancer/risk-prevention/diet-physical-activity/body-weight-and-cancer-risk.html
4. www.cancer.org/cancer/risk-prevention/diet-physical-activity/take-control-your-weight.html
5. www.cancer.org/cancer/risk-prevention/diet-physical-activity/get-active.html
6. www.cancer.org/cancer/risk-prevention/diet-physical-activity/eat-healthy.html

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