



- [Having certain chemical exposures](#)
- [Family history](#)
- [Being male](#)
- [Race/ethnicity](#)

There are very few known risk factors for chronic lymphocytic leukemia (CLL). These

- Age
- Exposure to certain chemicals
- Family history
- Sex
- Race/ethnicity

The risk of CLL does not seem to be linked to smoking, diet, or infections.

## **Getting older**

The risk of CLL goes up as you get older. About 9 out of 10 people with CLL are over

## **Having certain chemical exposures**

## Family history

First-degree relatives (parents, siblings, or children) of people with CLL have more than twice the risk for this cancer.

## Being male

In general, leukemia is more common in men than women. This includes CLL that is slightly more common in males than in females. The reason for this is not clear.

## Race/ethnicity

CLL is more common in North America and Europe than in Asia. Asian people who live in the United States do not have a higher risk than those living in Asia. This is why experts think the differences in risk are related to [genetics](#)<sup>2</sup> rather than environmental factors.

## Hyperlinks

1. [www.cancer.org/cancer/risk-prevention/chemicals/agent-orange-and-cancer.html](http://www.cancer.org/cancer/risk-prevention/chemicals/agent-orange-and-cancer.html)
2. [www.cancer.org/cancer/risk-prevention/genetics.html](http://www.cancer.org/cancer/risk-prevention/genetics.html)

## References

American Society of Clinical Oncology. Leukemia - Chronic Lymphocytic - CLL: Risk Factors (06/2016). Accessed at [www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/risk-factors](http://www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/risk-factors) on April 12, 2018.

National Cancer Institute. Chronic Lymphocytic Leukemia Treatment (PDQ®)—Patient Version. March 28, 2018. Accessed at [www.cancer.gov/types/leukemia/patient/cll-treatment-pdq](http://www.cancer.gov/types/leukemia/patient/cll-treatment-pdq) on April 12, 2018.

Oancea SC, Rundquist BC, Simon I, et al. County level incidence rates of chronic lymphocytic leukemia are associated with residential radon levels. *Future Oncol.* 2017;13(21):1873-1881.

Last Revised: February 27, 2024

## Do We Know What Causes Chronic Lymphocytic Leukemia?

The exact cause of most cases of chronic lymphocytic leukemia (CLL) is not known. But scientists have learned a great deal about the differences between normal lymphocytes and CLL cells.

Normal human cells grow and function based on information in each cell's chromosomes. Chromosomes are long molecules of DNA. DNA is the chemical that carries our genes—the instructions for how our cells work. We look like our parents because they are the source of our DNA. But our genes affect more than the way we look.

Each time a cell prepares to divide into 2 new cells, it must make a new copy of the DNA in its chromosomes. This process is not perfect, and errors can occur that may affect genes within the DNA.

Some [genes](#)<sup>1</sup> contain instructions for controlling when our cells grow and divide.

- Certain genes that promote cell growth and division 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 mutations (changes) that turn on oncogenes or turn off tumor suppressor genes.

Each human cell contains 23 pairs of chromosomes. In most cases of CLL, a change can be found in at least one of these chromosomes. Most often this change is a deletion—that is, loss of part of a chromosome. The loss of part of chromosome 13 is the most common deletion, but other chromosomes such as 11 and 17 can also be affected. You might see this written as del(13q), del(11q), or del(17p). Sometimes there is an extra chromosome 12 (trisomy 12). Other, less common abnormalities may also be found. Scientists know these chromosome changes are important in CLL, but it's not yet clear which genes they involve or exactly how they lead to leukemia.

We do know that normal B lymphocytes are part of the immune system. They're

programmed to grow and divide when they come into contact with a foreign substance called an **antigen**. (Scientists call substances foreign if they don't normally occur in a person's body and can be recognized by their immune system. Germs contain foreign antigens. So do blood cells from someone else with a different blood type.) Scientists think that CLL begins when B lymphocytes continue to divide without restraint after they have reacted to an antigen. But why this happens is not yet known.

Sometimes people inherit DNA mutations from a parent that greatly increase their risk of getting certain types of cancer. But inherited mutations rarely cause CLL. DNA changes related to CLL usually occur during the person's lifetime, rather than having been passed on from a parent.

## Hyperlinks

1. [www.cancer.org/cancer/understanding-cancer/genes-and-cancer.html](http://www.cancer.org/cancer/understanding-cancer/genes-and-cancer.html)

## References

American Society of Clinical Oncology. Leukemia - Chronic Lymphocytic - CLL: Diagnosis (06/2016). Accessed at [www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/diagnosis](http://www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/diagnosis) on April 12, 2018.

Last Revised: May 10, 2018

---

# Can Chronic Lymphocytic Leukemia Be Prevented?

Many types of cancer can be prevented by lifestyle changes to avoid certain risk factors, but there are very few [known risk factors for chronic lymphocytic leukemia \(CLL\)](#), and most of these cannot be avoided. Most CLL patients have no known risk factors, so there is no way to prevent these cancers.

Last Revised: April 11, 2016

**Written by**

The American Cancer Society medical and editorial content team  
(<https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html>)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.

American Cancer Society medical information is copyrighted material. For reprint requests, please see our Content Usage Policy ([www.cancer.org/about-us/policies/content-usage.html](http://www.cancer.org/about-us/policies/content-usage.html)).

**cancer.org | 1.800.227.2345**