

# Acute Myeloid Leukemia Risk Factor Information

This document gives a general overview of risk factors. The document covers:

- About Cancer and Risk Factors
- About Acute Myeloid Leukemia
- Types of Leukemia
- Known Risk Factors
- Possible Risk Factors
- Other Risk Factors That Have Been Investigated
- References / More Information

## About Cancer and Risk Factors

### **Cancer is not just one disease.**

Cancer is a group of over 100 different diseases. Cancer occurs when abnormal cells grow out of control and crowd out the normal cells. It can start anywhere in the body and can spread (“metastasize”) to other parts of the body. Cancer types are named for the original location in the body and the type of cell or tissue. Different types of cancer have different causes and risk factors.

### **Cancer can take a long time to develop.**

The cause of cancer is sometimes related to events that happened many years ago. Most cancer types are thought to take anywhere from 10 to over 50 years to develop. A few types, such as leukemia or lymphoma, are thought to take less than 10 years.

### **A risk factor is anything that increases your chance of getting cancer.**

Some risk factors can be controlled while others cannot. Risk factors can include:

- Hereditary conditions (e.g., genes passed down from parents)
- Medical conditions or treatments (e.g., a previous cancer diagnosis)
- Infections (e.g., human papilloma virus)
- Lifestyle factors (e.g., smoking cigarettes)
- Environmental exposures (e.g., certain air pollutants)

### **Most risk factors do not directly cause cancer.**

A risk factor influences the development of cancer but usually does not directly cause cancer. Instead, a combination of risk factors likely drives cancer development. For example, genetic factors can make individuals more likely to get cancer when they are exposed to a cancer-causing chemical.

**Environmental risk factors depend on how, how much, and how long you are exposed.**

Your risk from exposure to certain chemicals or radiation depends on the type, extent, and duration of exposure. For example, inhaling a certain chemical may increase your risk of getting cancer. However, touching the same chemical may not. In addition, some substances may increase your risk only if you are exposed to high amounts over a long time.

**It is difficult to identify the exact causes of cancer.**

- Many cancers can develop due to random chance.
- Multiple risk factors can act in combination.
- Risk factors can change over time.
- Cancer might not develop or get diagnosed for a long time after an initiating event (such as exposure or random cell mutation).

**Knowing your risk factors can help you make more informed choices.**

Discuss your risk factors with your health care provider to make more informed decisions on lifestyle and health care.

## **About Acute Myeloid Leukemia (AML)**

**AML is fairly rare, accounting for about 1% of all cancers.**

The American Cancer Society estimates that 60,650 individuals will be diagnosed with leukemia in the United States in 2022. About 20,050 will be diagnosed with AML specifically.<sup>1, 2</sup> In Massachusetts, leukemia accounted for about 2.6% of all cancers diagnosed between 2013 and 2017.<sup>8</sup>

**AML is one of the most common types of leukemia in adults.**

AML is uncommon before the age of 45. The average age at diagnosis is about 68 years. AML is slightly more common among males than females. The average lifetime risk of getting AML is about half of 1 percent.<sup>2</sup>

**Leukemia is the most common type of childhood cancer.**

Leukemia makes up nearly 1 out of every 3 childhood cancers. Although more common among adults, AML can occur in children, usually during the first 2 years of life and in the teenage years. However, childhood leukemia is still a rare disease overall.<sup>1,2,3,7</sup>

## Types of Leukemia

**Leukemia is a cancer of the bone marrow and blood.**

Leukemia types are grouped according to the type of blood cell affected and how fast the disease progresses.

- “Lymphocytic” leukemias start in early forms of white blood cells called lymphocytes. “Myeloid” (or myelogenous) leukemias start from myeloid cells that normally form red blood cells, platelets, or white blood cells other than lymphocytes.
- “Acute” leukemias progress faster than “chronic” leukemias. Acute and chronic forms of leukemia have different approaches to diagnosis and treatment.<sup>2</sup>

**AML is one of the most common types of leukemia.**

There are 4 main groups of leukemia:

- Acute myeloid leukemia (AML) - about 33%
- Chronic lymphocytic leukemia (CLL) - about 33%
- Chronic myeloid leukemia (CML) - about 15%
- Acute lymphocytic leukemia (ALL) - about 11%<sup>1</sup>

There are also a few rare types, such as hairy cell leukemia, that make up the remaining 8% of leukemia diagnoses.<sup>4,9</sup>

## Known Risk Factors

There are some known risk factors for AML. Many individuals diagnosed with AML have few or no known risk factors.

### *Hereditary Conditions*

#### **Family history of AML:**

Although most diagnoses of AML are not thought to have a strong genetic link, having a close relative (such as a parent or sibling) with AML increases the risk. Individuals with an identical twin who develops AML during the first year of life have a very high risk of also getting AML.<sup>2</sup>

## *Lifestyle Factors*

### **Smoking cigarettes:**

The only proven lifestyle risk factor for AML is smoking. Cancer-causing substances in tobacco smoke are absorbed by the lungs and spread through the bloodstream to many parts of the body.<sup>2</sup> Cigarette smoking may increase the risk of developing AML by 22-60% among current smokers and 15-36% among former smokers.<sup>10</sup>

Information about quitting smoking and related services is available from the Massachusetts DPH Tobacco Cessation and Prevention Program at 1-800-Quit-Now or 1-800-784-8669.

## *Environmental Exposures*

### **Ionizing radiation:**

Exposure to high-level ionizing radiation (e.g., survivors of atomic bombs or nuclear reactor accidents) is associated with the development of AML.<sup>2,6</sup>

### **Previous radiation treatment for another cancer:**

Radiation therapy as treatment for another cancer raises a person's risk of developing AML.<sup>2,6</sup>

### **Certain chemicals such as benzene:**

Long-term exposure to high levels of benzene is a risk factor for AML. Benzene is a chemical used in industrial workplaces such as the rubber industry, oil refineries, chemical plants, shoe manufacturing, and gasoline-related industries. It is also found in cigarette smoke, petroleum, and other products.<sup>2,6</sup>

### **Certain chemotherapy drugs:**

Cancer patients treated with certain chemotherapy drugs, especially alkylating and platinum agents, have a higher risk of developing AML.<sup>2</sup>

## **Possible Risk Factors**

### *Medical Conditions*

#### **Certain blood disorders:**

People with certain blood disorders seem to be at increased risk for developing AML. These include chronic myeloproliferative disorders such as polycythemia vera, essential thrombocytopenia, and idiopathic myelofibrosis. In addition, some patients who have myelodysplastic syndrome (a preleukemic condition) may develop AML.<sup>2</sup>

## *Hereditary Conditions*

### **Certain genetic syndromes:**

Certain genetic syndromes and conditions (some of which can be inherited from a parent) appear to increase the risk of AML, including:<sup>2,6</sup>

- Down syndrome
- Fanconi anemia
- Bloom syndrome
- Ataxia-telangiectasia
- Diamond-Blackfan syndrome
- Li-Fraumeni syndrome
- Klinefelter syndrome
- Wiskott-Aldrich syndrome
- Familial Platelet Disorder syndrome
- Schwachman-Diamond syndrome
- Neurofibromatosis type 1
- Severe congenital neutropenia (also called Kostmann syndrome)

## *Environmental Exposures*

### **Exposure to lower levels of radiation:**

Exposure to lower levels of radiation from medical imaging tests, especially very early in life, may increase the risk of leukemia, but this is unclear. Any risk would likely be small. To be safe, doctors try to limit radiation exposure from these tests as much as possible, especially in children and pregnant women.<sup>2,5</sup>

## **Other Risk Factors That Have Been Investigated**

### *Environmental Exposures*

#### **Electromagnetic fields or certain chemicals?**

Some studies investigated a possible link between AML and exposure to electromagnetic fields (e.g., living near power lines), workplace exposure to diesel, gasoline, formaldehyde, and certain other chemicals and solvents, and exposure to herbicides and pesticides. To date, there is no strong evidence to link these environmental factors to AML.<sup>2,6</sup>

## **References / More Information**

*This information sheet should not be considered exhaustive. For more information on other possible risk factors and health effects being researched, please see the resources below. Much of the information contained in this summary has been taken directly from these sources. This material is provided for informational purposes only and should not be considered as medical advice. Consult your physician if you have questions regarding a specific medical problem or condition.*

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