



[cancer.org](https://www.cancer.org) | 1.800.227.2345

---

# Multiple Myeloma 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 multiple myeloma.

- [Risk Factors for Multiple Myeloma](#)
- [What Causes Multiple Myeloma?](#)

## Prevention

For some types of cancer, risk factors are known for the majority of cases. For example, smoking causes most lung cancers. This provides an opportunity for prevention.

With multiple myeloma, few cases are linked to [risk factors](#) that can be avoided, so there is no known way to prevent most multiple myelomas from developing.

---

## Risk Factors for Multiple Myeloma

A risk factor is anything that changes a person's chance of getting a disease such as cancer. Different cancers have different risk factors. For example, exposing skin to strong sunlight is a risk factor for skin cancer. Smoking is a risk factor for lung cancer and many other cancers. But risk factors don't tell us everything. People who have no risk factors can still get the disease. Also, having a risk factor, or even several, does not

mean that a person will get the disease.

Here are a few risk factors that could affect someone's chance of getting multiple myeloma.

## **Age**

The risk of developing multiple myeloma goes up as people get older. Less than 1% of cases are diagnosed in people younger than 35. Most people diagnosed with this cancer are at least 65 years old.

## **Gender**

Men are slightly more likely to develop multiple myeloma than women.

## **Race**

Multiple myeloma is more than twice as common in African Americans than in white Americans. The reason is not known.

## **Family history**

Multiple myeloma seems to run in some families. Someone who has a sibling or parent with myeloma is more likely to get it than someone who does not have this family history. Still, most patients have no affected relatives, so this accounts for only a small number of cases.

## **Obesity**

Being [overweight or obese](#)<sup>1</sup> increases a person's risk of developing myeloma.

## **Having other plasma cell diseases**

People with monoclonal gammopathy of undetermined significance (MGUS) or solitary plasmacytoma are at higher risk of developing multiple myeloma than someone who does not have these diseases.

## **Hyperlinks**

1. [www.cancer.org/cancer/cancer-causes/diet-physical-activity/body-weight-and-cancer-risk.html](http://www.cancer.org/cancer/cancer-causes/diet-physical-activity/body-weight-and-cancer-risk.html)
2. [https://seer.cancer.gov/csr/1975\\_2014/](https://seer.cancer.gov/csr/1975_2014/)

Last Medical Review: February 28, 2018 Last Revised: February 28, 2018

## What Causes Multiple Myeloma?

Scientists still do not know exactly what causes most cases of multiple myeloma. However, they have made progress in understanding how certain changes in DNA can make plasma cells become cancerous. DNA is the chemical that carries the instructions for nearly everything our cells do.

- Some genes (parts of our DNA) contain instructions for controlling when our cells grow and divide. These genes that promote cell growth are called **oncogenes**.
- Others genes that slow down cell growth or make cells die at the right time are called **tumor suppressor genes**.

Cancers can be caused by mistakes, or defects, in the DNA called **mutations** that turn on oncogenes or turn off tumor suppressor genes.

Recent studies have found that abnormalities of some oncogenes (such as *MYC*) develop early in the course of plasma cell tumors. Changes in other oncogenes (such as the *RAS* genes) are more often found in myeloma cells in the bone marrow after treatment, and changes in tumor suppressor genes (such as the gene for *p53*) are associated with spread to other organs.

Myeloma cells also show abnormalities in their chromosomes. In human cells, DNA is packaged into chromosomes. Although normal human cells contain 46 chromosomes, some cancer cells may have extra chromosomes (called a duplication) or have all or part of a chromosome missing (called a deletion). One common finding in myeloma cells is that parts of chromosome number 17 are missing. These deletions appear to make the myeloma more aggressive and resistant to treatment.

In about half of all people with myeloma, part of one chromosome has switched with part of another chromosome in the myeloma cells. This is called a translocation. When this occurs in a crucial area next to an oncogene, it can turn the oncogene on.

Researchers have found that patients with plasma cell tumors have important abnormalities in other bone marrow cells and that these abnormalities may also cause excess plasma cell growth. Certain cells in the bone marrow called **dendritic cells** release a hormone called interleukin-6 (IL-6), which stimulates normal plasma cells to grow. Excessive production of IL-6 by these cells appears to be an important factor in development of plasma cell tumors.

Last Medical Review: February 28, 2018 Last Revised: February 28, 2018

---

## Can Multiple Myeloma Be Prevented?

For certain types of cancer, risk factors are known for the most of the cases. For example, smoking causes most lung cancers. This provides an opportunity for prevention. For other cancers, such as cervical cancer, pre-cancers can be detected early by a screening test (such as the Pap test) and treated before they develop into an invasive cancer.

With multiple myeloma, few cases are linked to risk factors that can be avoided. There is no known way to prevent multiple myeloma from developing in those people with monoclonal gammopathy of undetermined significance or solitary plasmacytomas. Research is investigating if treating certain high risk smoldering multiple myeloma may keep it from becoming active multiple myeloma.

Last Medical Review: February 28, 2018 Last Revised: February 28, 2018

### Written by

The American Cancer Society medical and editorial content team  
([www.cancer.org/cancer/acs-medical-content-and-news-staff.html](http://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.

Alexander DD, Mink PJ, Adami HO, et al. Multiple myeloma: a review of the epidemiologic literature. *Int J Cancer*. 2007;120 Suppl 12:40-61.

Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Kosary CL, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2014, National Cancer Institute. Bethesda, MD, [https://seer.cancer.gov/csr/1975\\_2014/](https://seer.cancer.gov/csr/1975_2014/) ([seer.cancer.gov/csr/1975\\_2014/](https://seer.cancer.gov/csr/1975_2014/))<sup>2</sup>, based on November 2016 SEER data submission, posted to the SEER web site, April 2017.

Marshall A. Lichtman. Obesity and the Risk for a Hematological Malignancy: Leukemia, Lymphoma, or Myeloma. *Oncologist*. 2010 Oct; 15(10): 1083–1101.

Munshi NC, Anderson KC. Ch. 112 Plasma cell neoplasms. In: DeVita VT, Hellman S, Rosenberg SA, eds. *Cancer: Principles and Practice of Oncology*. 10<sup>th</sup> edition. Philadelphia, PA: Lippincott Williams & Wilkins; 2015.

Rajkumar SV, Dispenzieri A. Multiple myeloma and related disorders. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE. *Abeloff's Clinical Oncology*. 5th edition. Philadelphia, PA. Elsevier: 2014:1991-2017.

VanValkenburg ME, Pruitt GI, Brill IK, et al. Family history of hematologic malignancies and risk of multiple myeloma: differences by race and clinical features. *Cancer Causes Control*. 2016 Jan;27(1):81-91.

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)).