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## **What Are Myelodysplastic Syndromes (MDS)?**

abnormal, resulting in the marrow not making enough healthy new blood cells. This leads to low levels of one or more types of blood cells. MDS is considered a type of [cancer](#)<sup>1</sup>.

- [Normal bone marrow](#)
- [Myelodysplastic syndromes](#)
- [Related conditions of blood and bone marrow](#)

## Normal bone marrow

Bone marrow is the spongy substance in the middle of certain bones. It is made up of blood-forming cells, fat cells, and supporting tissues. A small fraction of the blood-forming cells are **blood stem cells**. Stem cells are needed to make new blood cells.

There are 3 main types of blood cells: red blood cells, white blood cells, and platelets.

**Red blood cells (RBCs)** pick up oxygen in the lungs and carry it to the rest of the body. These cells also bring carbon dioxide back to the lungs. Having too few red blood cells is a condition called **anemia**. It can make a person feel tired and weak and look pale (which might be harder to notice in people of color). Severe anemia can cause shortness of breath.

**White blood cells (WBCs, also known as leukocytes)** help defend the body against infection.

called **thrombocytopenia**, can result in abnormal bleeding or bruising.

## Myelodysplastic syndromes

In MDS, some of the cells in the bone marrow are abnormal (dysplastic) and have problems making new blood cells. Many of the blood cells formed by these bone marrow cells are defective. Defective cells can build up in the bone marrow, crowding out the normal cells. This can lead to a person not having enough normal blood cells.

Different blood cell types can be affected in MDS, although the most common finding is a shortage of red blood cells (anemia).

Even if a person with MDS has a normal number of blood cells, their blood and bone marrow cells can still be abnormal and may not work well.

There are different [types of MDS](#), based on how many types of blood cells are affected and other factors.

In about 1 in 3 people with MDS, the disease can progress to a fast-growing cancer of bone marrow cells called [acute myeloid leukemia \(AML\)](#)<sup>2</sup>. In the past, MDS was sometimes referred to as pre-leukemia or smoldering leukemia. Now MDS is considered a form of cancer.

## Related conditions of blood and bone marrow

Myelodysplastic syndromes (MDS) are part of a group of diseases known as **chronic myeloid disorders** that affect the blood and bone marrow.

### Myelodysplastic/myeloproliferative neoplasms (D/Ms)

MDS/MPNs have 2 types of features:

**Myelodysplastic:** The blood stem cells in these conditions don't mature into healthy red blood cells, white blood cells, or platelets. The immature blood cells (blasts) don't work the way they should, and they tend to die quickly.

**Myeloproliferative:** Too many blood stem cells become one or more type of blood cell, resulting in too many of these types of cells. The number of these blood cells goes up slowly over time.

The 3 main types of MDS/MPNs are:

- [Chronic myelomonocytic leukemia \(CMML\)](#)<sup>3</sup>
- [Juvenile myelomonocytic leukemia \(JML\)](#)<sup>4</sup>
- Atypical chronic myeloid leukemia (aCML)

## Chronic myeloproliferative neoplasms (MPNs)

In myeloproliferative neoplasms (sometimes called **myeloproliferative disorders** or **myeloproliferative diseases**), too many blood stem cells become one or more type of blood cell. These cells then build up in the bone marrow and blood slowly over time. This condition usually gets worse slowly as the number of blood cells goes up.

There are 6 main types of chronic MPNs:

- [Chronic myeloid leukemia \(CML\)](#)<sup>5</sup>
- Polycythemia vera
- Primary myelofibrosis
- Essential thrombocythemia
- Chronic neutrophilic leukemia
- Chronic eosinophilic leukemia

## Hyperlinks

1. [www.cancer.org/cancer/understanding-cancer/what-is-cancer.html](http://www.cancer.org/cancer/understanding-cancer/what-is-cancer.html)
2. [www.cancer.org/cancer/types/acute-myeloid-leukemia.html](http://www.cancer.org/cancer/types/acute-myeloid-leukemia.html)
3. [www.cancer.org/cancer/types/chronic-myelomonocytic-leukemia.html](http://www.cancer.org/cancer/types/chronic-myelomonocytic-leukemia.html)

<https://www.cancer.gov/types/myeloproliferative/patient/chronic-treatment-pdq> on November 11, 2024.

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Last Revised: November 21, 2024

## Types of Myelodysplastic Syndromes (MDS)

There are different types of myelodysplastic syndromes (MDS), and different systems can be used to classify them. Your doctor may use one or more of these systems to understand how you are affected by MDS.

- [How is MDS classified?](#)
- [WHO classification system for MDS](#)
- [International Consensus Classification \(ICC\) system](#)
- [Prognostic scores \(risk groups\) for MDS](#)

## **How is MDS classified?**

MDS is classified into types to help describe the disease, how severe it's likely to be, and the need for treatment. Doctors use lab tests to find out the type of MDS a person has, so this might not be known until all the tests are finished.

Knowing the type of MDS a person has helps doctors recommend the best treatment options. It can also help predict a person's prognosis (outlook).

This system was developed in collaboration with the Society for Hematopathology and the European Association for Haematopathology. The ICC system is similar to the WHO system in many ways, although it uses slightly different definitions and categories for some types of MDS.

## **Prognostic scores (risk groups) for MDS**

Along with determining the type of MDS a person has, doctors use other factors to help predict a person's outlook and decide how best to treat it. Some of these factors have been combined to develop scoring systems, which put people with MDS into different risk groups. To learn more about these systems, see [Myelodysplastic Syndrome Prognostic Scores \(Risk Groups\)](#).

## **References**

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Last Revised: November 21, 2024

## Key Statistics for Myelodysplastic Syndromes (MDS)

The number of people diagnosed with myelodysplastic syndromes (MDS) in the United States each year is not known for sure. Some estimates have put this number at about 10,000, while other estimates have been much higher.

MDS is uncommon before age 50, and the risk increases as a person gets older. It is most commonly diagnosed in people in their 70s. The number of new cases diagnosed each year is likely increasing as the average age of the US population increases.

Statistics related to survival among people with MDS are discussed in [Survival Statistics for Myelodysplastic Syndromes](#).<sup>1</sup>



SEER\*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute; 2024 Apr 17. [updated: 2024 Jun 27; cited 2024 Jun 27]. Accessed at <https://seer.cancer.gov/statistics->

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## **What's New in Myelodysplastic Syndrome (MDS) Research?**



best chance for long-term remission (and a possible cure) for people with MDS. But this is an intense treatment, and many people with MDS can't tolerate it.

Researchers continue to look for ways to make this procedure more effective, reduce complications from it, and possibly make more people eligible to be helped by [this treatment](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/chemotherapy.html](http://www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/chemotherapy.html)
2. [www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/chemotherapy.html](http://www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/chemotherapy.html)
3. [www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/stem-cell-transplant.html](http://www.cancer.org/cancer/types/myelodysplastic-syndrome/treating/stem-cell-transplant.html)

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Last Revised: November 21, 2024

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