Bristol Myers Squibb™

# Myelodysplastic Syndromes

## Mechanism of Disease

Myelodysplastic Syndromes (MDS) are a group of closely related but diverse blood cancers.[1] In healthy people, bone marrow is responsible for making blood stem cells, which eventually form into healthy blood cells.[2] In people affected by MDS, mutations prevent the bone marrow from making the blood stem cells that form healthy blood cells.[2] Low blood cell counts, known as cytopenias, are the defining feature of MDS.[2]

**Three types of blood cells are needed for different functions in the body, and all three are affected by MDS:**[3]

**Red blood cells (RBCs)**
work to bring oxygen from the lungs to the rest of the body[3]

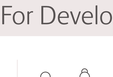
**WHITE blood cells (WBCs)**
help the body fight off infections[3]

**Platelets**
help your blood clot after an injury[3]

## Symptoms

### Many symptoms of MDS can be life-threatening:

**Low RBC counts** (known as anemia) can cause fatigue, weakness, shortness of breath[2]



**Low WBC counts** (known as neutropenia) can cause recurring infections, fevers,[2] sore mouth[4]

**Low platelet cell counts** (known as thrombocytopenia) can cause easy bruising, bleeding from the nose and mouth,[2] and a rash of small red dots on the skin[6]

**Many patients experience severe chronic anemia** due to lack of mature RBCs, requiring frequent transfusions.[5]

**Frequent transfusions are associated with an increased risk** of iron overload, transfusion reactions and infections.[2,6]



MDS patients **may die from bleeding or infection** from low blood cell counts.[7]

## Risks For Developing MDS[8]



OLDER AGE

PRIOR CANCER TREATMENT

FAMILY HISTORY

HISTORY OF SMOKING

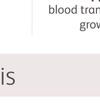
EXPOSURE TO HIGH DOSE RADIATION OR WORKPLACE BENZENE

## MDS By the Numbers[2]


**of MDS patients are over**

**AGE 60**

although the disease can also affect young adults and children




**12,000 to 20,000**
new MDS cases are reported every year

**60,000 to 170,000**
people living with MDS

## Diagnosis

**Diagnosis of MDS uses a series of evaluations to[9]:**

RULE OUT OTHER CAUSES OF
**BLOOD CELL DEFICIENCIES**

IDENTIFY
**TYPE OF MDS**

### An MDS diagnosis may include[9]:

Patient history and physical exam

Blood test, which counts blood cell levels and types, known as a complete blood count

Bone marrow tests



Flow cytometry and immunocytochemistry tests, which rule out other potential illnesses



Chromosome tests to look at DNA

## Treatment Options

### Treatment options depend on the needs of the individual patient. Some treatment options include:



**Stem cell transplant**
also known as a bone marrow transplant[2,11]



**Chemotherapy drugs**[10]



**Supportive care**
blood transfusion, blood cell growth factors[10]

## Prognosis

### Average Survival Time

For the most severe forms is
**just five months**[2]



For lower risk MDS patients is
**six years**[2]







**>30% of MDS patients may progress to a deadly blood cancer called Acute Myeloid Leukemia (AML)**[2]



AML starts in the bone marrow and quickly moves to the blood, often spreading to other parts of the body[12]



AML can progress quickly and become fatal within a few months if not treated[13]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