



MULTIPLE MYELOMA
Research Foundation

MULTIPLE MYELOMA DISEASE OVERVIEW

themmrf.org





ABOUT THE **MMRF**

The Multiple Myeloma Research Foundation® (MMRF®) is the largest nonprofit in the world solely focused on accelerating a cure for each and every multiple myeloma patient. We drive the development and delivery of next-generation therapies, leverage data to identify optimal and more personalized treatment approaches, and empower myeloma patients and the broader community with information and resources to extend their lives.

Central to our mission is our commitment to advancing access for all so that every myeloma patient can benefit from the scientific and clinical advances we pursue. Since our inception, the MMRF has raised over \$600 million for research, opened over 100 clinical trials, and helped bring more than 15 FDA-approved therapies to market, which have tripled the life expectancy of myeloma patients.

To learn more about the MMRF, visit themmrf.org.

To speak to a patient navigator at the Patient Navigation Center, call **1-888-841-6673** or email patientnavigator@themmrf.org.

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INTRODUCTION

Multiple myeloma is a treatable cancer, with many therapies under investigation that are bringing ever closer the promise of a cure. There have been significant advances in myeloma diagnosis, treatment, and **supportive care** over the last two decades. In this time, many new myeloma drugs have been approved by the US Food and Drug Administration. Survival rates for myeloma patients have tripled.

This booklet has been designed to help you better understand multiple myeloma: what it is and how it develops. Words that may be unfamiliar are **bolded** and defined in the Glossary (page 21).

It's our hope that learning about multiple myeloma will give you the knowledge and confidence you need to partner with your care team in making decisions about your treatment.

For more information about multiple myeloma and its treatment, refer to the other booklets in our Patient Toolkit, as well as the MMRF website, themmrf.org.

The information in this booklet is not intended to replace the services or advice of trained health care professionals. Please consult with your care provider regarding specific questions relating to your health, especially questions about myeloma diagnosis or treatment.

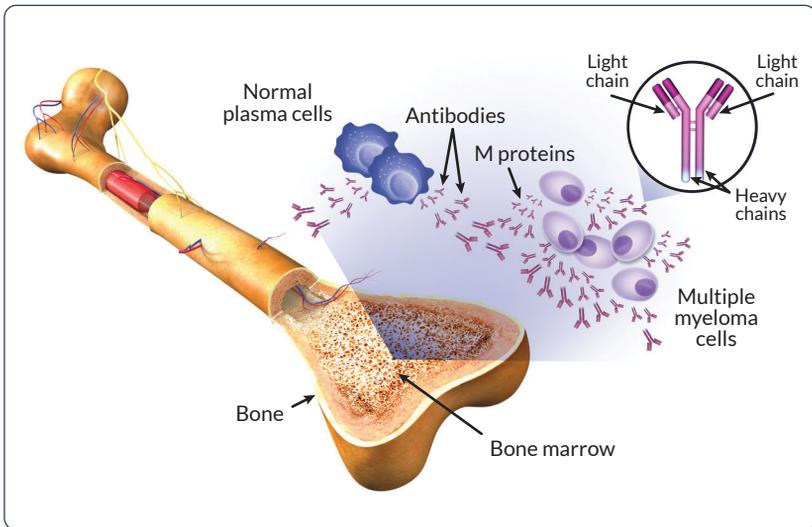
WHAT IS MULTIPLE MYELOMA?

Multiple myeloma is a blood cancer that develops in the **bone marrow**, the soft, spongy tissue found in the center of many bones and the location where blood cells are produced.

In myeloma, **plasma cells**, which are normal cells that produce **antibodies** that help protect your body from foreign invaders such as bacteria and viruses, transform into myeloma cells.

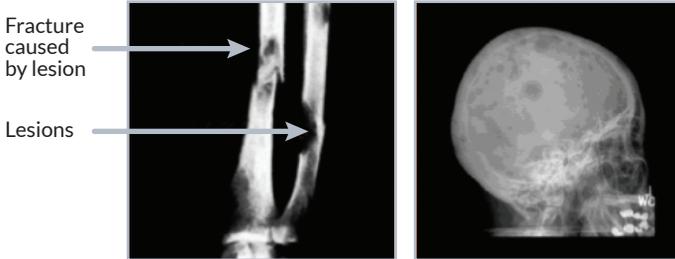
Myeloma cells produce large quantities of **M proteins** (which are abnormal forms of antibodies), as well as incomplete parts of antibodies (called **light chains**). They also crowd out and inhibit the production of normal blood cells in the bone marrow.

Multiple myeloma.



In addition, myeloma cells can cause **osteolytic lesions**, which are holes that weaken the bones and increase the risk of fractures.

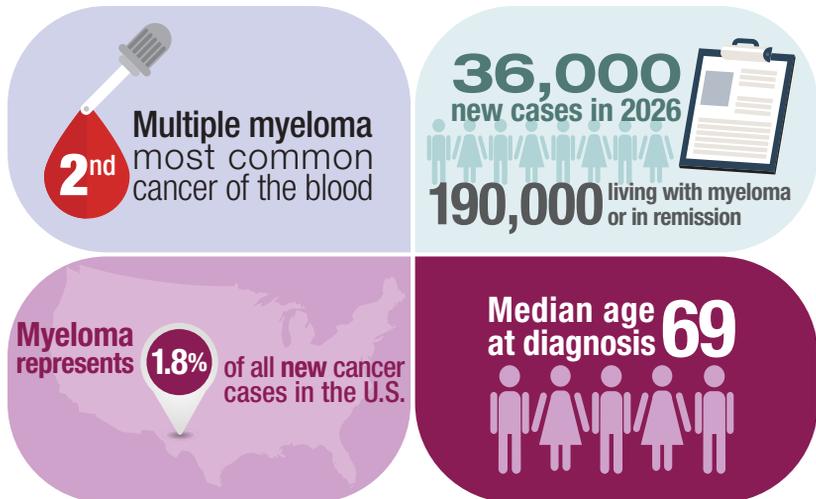
Bone disease in multiple myeloma.



HOW COMMON IS MULTIPLE MYELOMA?

More than 168,000 people in the United States are living with multiple myeloma today, and the American Cancer Society estimates that multiple myeloma will be diagnosed in 36,110 people in 2025. Multiple myeloma is second to non-Hodgkin's **lymphoma** as the most common blood cancer and represents 1.8% of all cancers.

Prevalence of multiple myeloma in the United States.



Multiple myeloma occurs more often in certain groups:

- Older adults (average age at diagnosis is 69), and the risk increases with age
- More common in men than women
- People of African descent are about twice as likely to develop myeloma as are those of other races
- More people are living with myeloma today because survival has improved

Advances in treatment have contributed to people living longer with this disease.

WHAT CAUSES MULTIPLE MYELOMA?

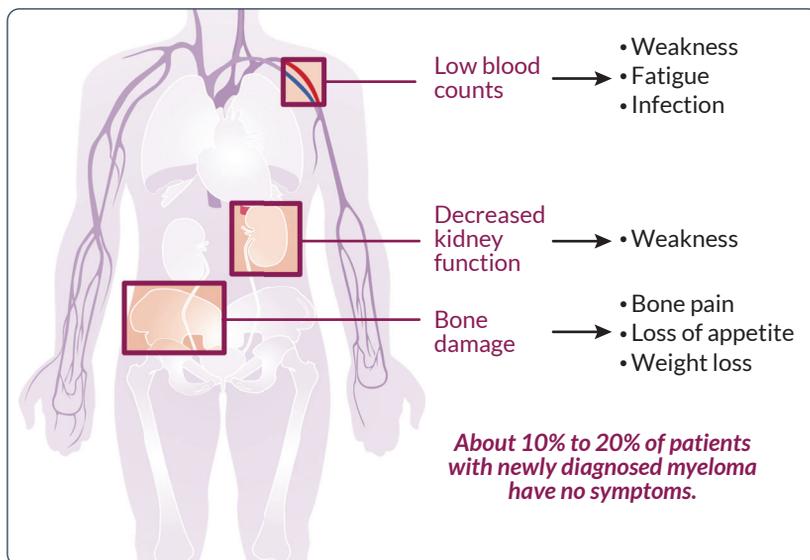
To date, no cause for myeloma has been identified. Research suggests that the disease could be related to certain occupations, exposure to certain chemicals or radiation, or a decline in the **immune system**. However, these connections are not proven.

In most cases, multiple myeloma develops in people who have no known risk factors. Multiple myeloma may be the result of several factors acting together. It's uncommon for myeloma to develop in more than one member of a family.

HOW DOES MULTIPLE MYELOMA AFFECT THE BODY?

Multiple myeloma affects your bones, blood, and kidneys.

Common symptoms of myeloma patients.



Bone

Bone loss is the most common effect of multiple myeloma, occurring in 85% of myeloma patients. The most commonly affected bones are the spine, pelvis, and rib cage.

Myeloma leads to bone loss in two ways. First, the myeloma cells form masses (**plasmacytomas**) that can damage the surrounding bone. Second, myeloma cells release substances that interfere with bone repair and growth. Bone destruction can also increase the level of **calcium** in the blood (**hypercalcemia**), which may cause issues like kidney problems and confusion that can be a serious problem if not treated immediately.

Blood

The growing number of myeloma cells can interfere with the production of all types of blood cells.

A reduction in **white blood cells** can increase the risk of infection. Decreased **red blood cell** production can result in **anemia**, which is present in about 60% of patients at diagnosis. A reduction in **platelets** can interfere with blood clotting.

Kidneys

The accumulation of M protein and calcium in the blood can overwork the kidneys, which may fail to function normally. More than half of myeloma patients experience a decrease in kidney function (also called renal function) at some point in the course of the disease.

Symptoms of multiple myeloma

There are often no symptoms in the early stages of myeloma. When symptoms are present, they may be vague and similar to those of other conditions.

Some of the more common symptoms are:

- Bone pain
- Fatigue
- Weakness
- Infection
- Weight loss and loss of appetite

Symptoms related to hypercalcemia or kidney problems may include:

- Increased or decreased urination
- Increased thirst
- Restlessness, eventually followed by extreme weakness and fatigue
- Confusion
- Nausea and vomiting



MYELOMA PRECURSOR CONDITIONS

Before developing multiple myeloma, many patients go through earlier stages of disease. During these stages, changes start happening in the bone marrow, but people don't feel sick and there's no damage to their organs.

These stages are **monoclonal gammopathy of undetermined significance (MGUS)** and **smoldering multiple myeloma (SMM)**. Together, these stages are known as **myeloma precursor conditions**.

Myeloma precursor conditions.

The multiple myeloma disease spectrum:



SMM and MGUS are known as myeloma precursor conditions. Not every patient with MGUS or SMM develops myeloma. It's not yet known what triggers the progression of SMM to myeloma in some patients but not in others

MGUS

In MGUS, plasma cells grow abnormally and produce excess M protein, which is detectable in the blood. There are no tumors, bone lesions, or symptoms, and the other criteria for a myeloma diagnosis are absent.

MGUS occurs in about 1% of the general population and in about 5% of healthy people over 50. The risk of MGUS progressing to symptomatic myeloma is small, with only 1% of people developing symptomatic myeloma per year.

For most people, MGUS is **benign** (that is, it does not cause symptoms or damage to the body) and does not develop into smoldering or symptomatic multiple myeloma.

SMM

SMM usually occurs before symptomatic myeloma and is associated with a higher risk of progression to myeloma.

The risk of SMM progressing to symptomatic multiple myeloma.

1 to 5 years after diagnosis	10 out of 100 people with SMM are likely to progress to multiple myeloma every year
5 to 10 years after diagnosis	3 out of 100 people with SMM are likely to progress to multiple myeloma every year
10 years or more after diagnosis	1 out of 100 people with SMM are likely to progress to multiple myeloma every year

The level of M protein is higher in SMM than in MGUS. Like in MGUS, there are no symptoms or signs that are typically associated with symptomatic myeloma, such as bone lesions or anemia.

People with SMM receive close follow-up (also called observation), with visits to their doctor and/or testing about every 3 months.

Some patients with SMM are more likely to develop myeloma than others; this is referred to as high-risk SMM.

For patients with high-risk SMM, Darzalex (daratumumab) has been shown to delay progression to symptomatic myeloma, and it's now FDA-approved to treat high-risk SMM. People with high-risk SMM should talk to their provider and discuss whether this treatment is an option.

MANAGING MULTIPLE MYELOMA

Multiple myeloma is different in every patient. Each patient differs in terms of their genetic features, clinical features (that is, symptoms and disease course), **prognosis**, and treatment response.

Following The Right Track is key when you first learn that you may have multiple myeloma. The Right Track is the MMRF's framework designed to help myeloma patients achieve long-term survival and the best possible quality of life.

The Right Track includes three components: seeing the Right Team, having the Right Tests, and getting the Right Treatment.

Key steps for the best possible care for patients with myeloma.

THE RIGHT TRACK



Right Team

Access experts and centers that have extensive experience treating multiple myeloma



Right Tests

Get the information, tests and precise diagnoses to make the right treatment decisions



Right Treatment

Work with your team to decide on the best treatment plan and identify clinical trials that are right for you

THE RIGHT TEAM

For diseases that are rare or complicated, such as multiple myeloma, specialized care is especially important. When considering potential doctors, it's important to ask about their experience treating multiple myeloma.

Questions might include:

- How many myeloma patients are treated at your center?
- How many myeloma patients do you provide care for?
- How do you stay current with rapidly changing myeloma treatments and guidelines?
- How often will I see you versus other members of the team?
- Does your center participate in **clinical trials**?

A **hematologist-oncologist** who focuses on multiple myeloma will be up-to-date with the latest research and treatments. If seeing a hematologist-oncologist is not possible, you can receive treatment from another specialist, such as a medical oncologist, who may consult with a hematologist-oncologist about your care.

Often, specialists work out of specialized treatment centers. Centers that have myeloma specialists and treat large numbers of myeloma patients have been shown to produce the best outcomes.

You may not live close enough for a specialist at a cancer center to be your only source of treatment. Nevertheless, consulting with a specialist at important times and obtaining specific types of care at a specialized center may help you get the best care.

Telehealth may be an option that lets you connect with a specialist by video or phone for expert advice, treatment planning, and follow-up care even if you live far from a major cancer center.

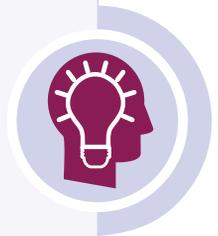
Should you get a second opinion?

An increasingly important part of establishing a myeloma diagnosis is getting a second opinion from a myeloma specialist. Getting a second set of eyes can be crucial to confirming a myeloma diagnosis and helping you and your care team move with confidence toward the management plan that will yield the best results.

Many health insurance companies authorize second opinions for myeloma patients.

The MMRF Patient Navigation Center can help you find a myeloma specialist in your area.

Call **1-888-841-6673**, Monday to Friday from 9:00 AM to 7:00 PM ET or email [**patientnavigator@themmrf.org**](mailto:patientnavigator@themmrf.org).



THE RIGHT TESTS

Multiple myeloma management involves several tests that allow your care team to monitor the disease and guide treatment.

Test	Purpose and examples
Blood tests	<ul style="list-style-type: none">• Measure M protein and assess kidney function, blood cell levels, and other markers of myeloma activity• Examples include complete blood count (CBC), comprehensive metabolic panel (CMP), lactate dehydrogenase, serum protein electrophoresis, immunofixation electrophoresis, serum free light chain assay
Bone marrow tests	<ul style="list-style-type: none">• Measure how many myeloma cells are present and determine their genetic makeup• Examples include karyotyping, fluorescence in situ hybridization (FISH), genomic sequencing
Imaging tests	<ul style="list-style-type: none">• Used to find areas of bone damage or tumors• Repeated regularly to check how well treatment is working and to watch for changes in the disease• Examples include x-rays, magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET)

For more information about the testing used to diagnose and manage multiple myeloma, refer to the ***Understanding Your Test Results*** booklet in our Patient Toolkit, as well as the MMRF website, themmrf.org.

THE RIGHT TREATMENT

The treatment options for patients with multiple myeloma, regardless of stage, are more plentiful and varied than ever before. Newer treatments keep myeloma in **remission** for longer periods, so many people are living with their myeloma under good control for a longer time than was previously possible.

The goal of therapy is to induce a remission as quickly as possible to minimize the risk of organ damage, maintain that remission for as long as possible, improve quality of life (reduce pain, lessen fatigue), and minimize the occurrence and/or severity of side effects.

The right treatment for myeloma is a plan that fits the individual, not just the disease, and requires that many factors be considered.

For more information about the treatments used for multiple myeloma, refer to the ***Treatment Overview*** booklet in our Patient Toolkit, as well as the MMRF website, **themmr.org**.

Factors affecting treatment.

Factor	What it means	How it affects treatment choices
Age and overall fitness	How strong and independent the patient is, including energy level, balance, and ability to manage daily tasks	Patients who are more fit may be offered more intensive treatments (like stem cell transplant), whereas less fit patients may receive options with fewer side effects
Other health conditions (comorbidities)	Whether the patient has other illnesses and, if so, what they are	Certain treatments may be avoided or adjusted to protect organs affected by disease
Myeloma stage and risk level	How advanced and aggressive the myeloma is, based on blood tests, bone marrow tests, imaging, and genetic changes in the myeloma cells	Higher-risk disease may require stronger combinations of medicines and closer follow-up
Symptoms and organ damage	Problems like bone pain, fractures, kidney trouble, anemia, or high calcium	Treatment may be started urgently or tailored to quickly control symptoms and protect organs such as bones and kidneys
Prior treatments and responses	What treatments were used before and how well they worked or what side effects they caused	Doctors avoid drugs that no longer work or caused serious side effects
Patient goals and preferences	What matters most to the patient: longer survival, fewer side effects, staying at work, caring for family, or avoiding long hospital stays	Treatment is selected (for example, more pills at home vs more clinic infusions) to match personal goals and lifestyle
Practical and logistic issues	How far the patient lives from a cancer center, their ability to travel, insurance coverage, and support at home	Telehealth, local lab visits, and simpler or less frequent treatments may be chosen to make care realistic and sustainable

For more information about stem cell transplant, refer to the ***Autologous Stem Cell Transplant*** booklet in our Patient Toolkit, as well as the MMRF website, themmrf.org.

It's important for you to have all the appropriate tests done, as the results will help the doctor choose the best treatment and determine your prognosis.

You should discuss with your myeloma specialist the option of sharing your data on registries (secure online platforms designed to record and store patient data). Sharing your data helps clinicians and researchers identify trends, learn about the most effective treatments, and work toward bringing more personalized treatment approaches to all patients.



DETERMINING RISK

Myeloma is classified based on the results of diagnostic testing. These results tell whether or not immediate treatment is needed. A stage is also assigned to indicate the extent of disease.

Certain test results provide important information about how your disease might progress. These **prognostic indicators** may also help your doctor decide when treatment should begin and aid in monitoring the disease. Many tests can be performed routinely in any lab, whereas others are performed only in specialized labs or a research setting.

Your age and myeloma stage are important factors in predicting your prognosis.

Myeloma staging is based on the results of blood tests and genetic testing of the bone marrow. These tests show how active the disease is and identify aggressive disease, giving a clearer picture of risk and helping guide treatment planning.

For an overview of how genetics affect risk, see the **Genomics High-Impact Topic** video.

bit.ly/Genomics_HIT



The more you know about your myeloma, the better you'll be able to communicate with your care team. The best way for you to get answers is to talk to your doctor.

Questions to ask your doctor.



For pointers on how to talk to your care team, see the ***How to Talk to Your Care Team*** High-Impact Topic video.

bit.ly/TalkToCareTeam_HIT



LIVING WITH MULTIPLE MYELOMA

Myeloma often weakens bones, damages kidney function, and leads to anemia and infection. Also, the drugs used to treat myeloma often produce side effects. Therapies are available to address the symptoms of myeloma and the complications of its treatment; these are called supportive therapies or supportive care.

BONE HEALTH

Bone damage (lesions and **osteoporosis**) is common in multiple myeloma, occurring in about 85% of patients. Weakened bones can result in fractures and compression of **vertebrae** (the bones that make up the spine).

Maintaining Bone Health

Eating calcium-rich foods, taking calcium and vitamin D supplements (if recommended by your doctor), and performing weight-bearing exercise (with caution) can help you maintain bone health.

Drugs

Zometa (zoledronic acid), Aredia (pamidronate disodium), and Xgeva (denosumab) are drugs that help protect and strengthen bones in people with myeloma. These drugs help stop myeloma cells from breaking down bone, which can reduce pain, fractures, and other bone problems caused by myeloma.

By keeping the bones stronger and more stable, these treatments can improve comfort, mobility, and overall quality of life during myeloma care.

Treatment	What it does	How it's given	Side effects/risks
Zometa, Aredia (bisphosphonates)	Helps strengthen bones and reduce bone damage by slowing down cells that break down bone. May be used to treat hypercalcemia.	Into a vein (intravenous)	<ul style="list-style-type: none">• Flu like symptoms• Fatigue• Low calcium• Kidney strain*• Small risk of osteonecrosis of the jaw (ONJ)
Xgeva	Helps protect bones by blocking a signal that tells bone eating cells to grow and become active.	Under the skin (subcutaneous)	<ul style="list-style-type: none">• Low calcium• Fatigue• Mild injection site reactions• Small risk of ONJ

*Before taking a bisphosphonate, you'll undergo blood tests to monitor levels of **creatinine** (a protein that can indicate if there's a problem with your kidneys) to reduce the risk of developing kidney impairment. Also, it's important that you stay hydrated.

Some studies have shown that long-term use of bisphosphonates and Xgeva may be associated with a risk of developing ONJ, a painful condition in which the bones of the mouth and jaw wear away and die, potentially resulting in an open sore that leaves the jawbone exposed. Regular follow-up with a dentist is recommended to maintain dental health.

Reducing ONJ risk.

- Complete major dental work before beginning treatment for bone disease
- Practice good oral hygiene
- Schedule regular dental visits
- Let your dentist know that you are receiving treatment for bone disease
- Keep your doctor informed of dental issues/need for dental work
- Be attentive! ONJ seems to be related to how long patients are on treatment for bone disease



If you have bone disease, tell your care team about treatments you receive from other providers such as chiropractors, massage therapists, and holistic medicine practitioners. Inform all providers of any treatments you receive for your bone disease.

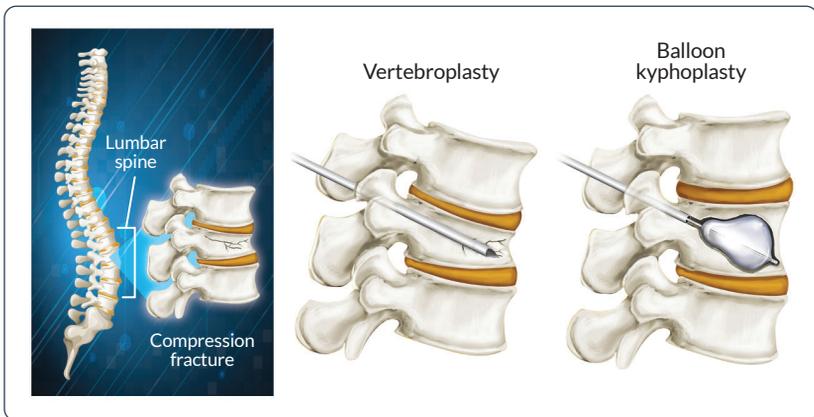
Orthopedic Interventions

Orthopedic interventions may be needed to control pain or maintain mobility. These may include physical therapy, splinting, surgery, or procedures to repair compression fractures of the spine. Two minimally invasive surgical procedures, **vertebroplasty** and **balloon kyphoplasty**, can reinforce the spine and can usually be done without hospitalization.

Vertebroplasty involves the injection of a cement-like material to reinforce the spine (specifically, the vertebrae).

Balloon kyphoplasty involves the insertion of a balloon to restore the height of the compressed vertebra, followed by injection of bone cement to maintain the re-established height. This procedure can provide relief in about 1 month following the procedure.

Orthopedic procedures to stabilize the spine.



Radiation Therapy

Low-dose **radiation therapy** is sometimes used to reduce bone pain. It's directed to specific bone lesions that are causing problems. However, it can affect the bone marrow and result in reduced blood counts, which may cause anemia, a weakened immune system, and blood clotting problems.

ANEMIA

Most myeloma patients have anemia when they're first diagnosed. Also, some drugs used to treat myeloma can lower red blood cell counts, resulting in anemia.

Anemia has many symptoms, including fatigue, depression, mood changes, difficulty breathing, weight loss, rapid heartbeat, nausea, dizziness, and difficulty sleeping. If you experience these symptoms, you should inform your doctor so that your blood counts can be checked.

The first step in treating anemia is to identify any possible causes other than myeloma or myeloma drugs; for example, deficiencies in iron, folate, or vitamin B12 can also cause anemia. Moderate or severe anemia is usually treated with drugs that stimulate production of red blood cells. If you have severe anemia, you may require blood transfusions.

INFECTION

When you have myeloma, you're more susceptible to infections. This is because myeloma reduces the level of white blood cells, which help fight infections. Some treatments may also reduce your white blood cells, leaving you with significantly higher risk of infections. Additionally, myeloma cells can crowd out the normal plasma cells that make antibodies, further weakening your immune system.

To reduce your infection risk, you should adopt general infection-prevention practices, including good personal hygiene (skin, oral) and environmental control (wash your hands, wear a mask, avoid crowds and sick people, etc). Your care team may also recommend one or more of the following to help with infection prevention:

- **Intravenous immunoglobulin (IVIG) for hypogammaglobulinemia** for serious recurrent infections
- Growth factors to stimulate the growth of white blood cells (Neupogen [filgrastim])
- Immunizations (for example, against COVID-19, influenza, pneumonia, shingles; NO live vaccines)
- Drugs to prevent or treat infection (antibacterial, antiviral, antifungal), including COVID-19 prevention (antibody levels, exposure minimization)

If you develop a fever of 100°F, shaking chills even without fever, dizziness, shortness of breath, or low blood pressure, report it to your care provider.

KIDNEY IMPAIRMENT

More than half of patients with myeloma experience kidney problems at some point, because abnormal proteins made by myeloma cells pass through and may build up in the kidneys. Kidney impairment can also be caused by other conditions, such as hypertension and diabetes. Some drugs can affect the kidney, as well.

Blood tests can detect certain proteins (such as creatinine) that are indicative of reduced kidney function. A decrease in the amount of urine is one sign of kidney problems; let your doctor know if you experience any changes in your urination.

The following steps may help if you develop kidney problems:

- Drink plenty of fluids
- Avoid taking non-steroidal anti-inflammatory drugs such as Aleve (naproxen) and Advil/Motrin (ibuprofen) or other drugs that can affect kidney function
- **Plasmapheresis**, a procedure where your blood is run through a machine to remove the M proteins and then returned to you, may help slow or prevent kidney failure in some cases

The MMRF would like to thank Joshua Richter, MD, Associate Professor of Medicine, Hematology and Oncology, in the Myeloma Division at the Tisch Cancer Institute at the Icahn School of Medicine at Mount Sinai and Director of Myeloma at the Blavatnik Family Chelsea Medical Center at Mount Sinai, and our patient advocate, Scott Bowron of Grand Rapids, Michigan, for their contributions to this booklet.

GLOSSARY

albumin Protein found in the blood; albumin level can indicate a person's overall health and nutritional status

anemia Decrease in the number of red blood cells in the blood

antibodies Proteins produced by plasma cells that help protect the body from infection and disease (also called *immunoglobulins*)

balloon kyphoplasty Procedure used to treat some types of spinal fracture in which a balloon is inserted into the spine and inflated to elevate the collapsed section; the resulting space is then filled with bone cement, which strengthens the area

Bence Jones proteins Short proteins (immunoglobulin light chains) that are produced by myeloma cells and found in the urine

benign Not causing symptoms or damage to the body

bisphosphonates Type of drug used to treat osteoporosis and bone disease

blood urea nitrogen Byproduct of protein metabolism that is normally filtered out of the blood and found in the urine; elevated levels in the blood can indicate decreased kidney function

bone marrow Soft, spongy tissue found in the center of many bones and the site of blood cell production

calcium Mineral that is important in bone formation; elevated serum levels occur when there is bone destruction

chromosomes Thread-like structures in a living cell that contain *DNA* (genetic information)

clinical trials Studies of the safety and effectiveness of a drug using consenting human participants

comorbidities Diseases that are present at the same time as another disease

complete blood count (CBC) Blood test that measures the number of red blood cells, white blood cells, and platelets in the blood and the relative proportions of the various types of white blood cells

comprehensive metabolic panel (CMP) Blood test that measures levels of *albumin*, calcium, lactate dehydrogenase, *blood urea nitrogen*, and creatinine to assess bone status, the extent of disease, and the function of the kidneys and liver (also known as *chemistry profile*)

computed tomography (CT) Imaging technique that uses a computer to generate three-dimensional x-ray pictures (also referred to as *computerized axial tomography [CAT]*)

creatinine Product of muscle energy metabolism that is normally filtered out of the blood and found in the urine; elevated levels in the blood can indicate decreased kidney function

DNA Genetic material of the cell, located in the *chromosomes*

electrophoresis Lab technique that uses an electrical current to sort proteins by their charge

fluorescence in situ hybridization (FISH) Lab test used to measure if there are extra or missing chromosomes, or if any parts of chromosomes are missing, duplicated, or rearranged

free light chain Short protein (immunoglobulin light chain) that is produced by myeloma cells and found in the blood

genomic sequencing Study of the *DNA* of myeloma cells to detect *mutations* and to see how DNA changes over time

hematologist-oncologist Doctor who specializes in diagnosing and treating blood cancers

hypercalcemia Elevated levels of calcium in the blood; occurs as a result of bone destruction

hypogammaglobulinemia Condition in which the levels of serum immunoglobulin or antibodies in the body are reduced

immune system Network of cells that protect the body from foreign substances and destroy infected and cancerous cells

immunoglobulins Proteins that help protect the body from infection (also called *antibodies*)

intravenous Into a vein

intravenous immunoglobulin (IVIG) Biologic agent consisting of pooled antibodies used to treat immunodeficiencies and other conditions

karyotyping Test that looks at the number and structure of a patient's *chromosomes* to identify genetic problems

lactate dehydrogenase Enzyme found in body tissues; elevated levels in the blood indicate tissue damage and may occur in myeloma

light chains The shorter of two protein chains that make up an antibody, characterized as either kappa or lambda type; when these proteins chains are not part of an antibody, they are called *free light chains*

lymphoma Blood cancer that develops in the lymph nodes

M proteins Abnormal antibodies produced by myeloma cells that are found in large quantities in the blood and urine of people with myeloma

magnetic resonance imaging (MRI) Scanning technique that uses magnetic energy to provide detailed images of bone and soft tissue

monoclonal gammopathy of undetermined significance (MGUS) Condition that can occur before a patient develops or shows any symptoms of myeloma; indicated by the presence of M protein in the serum or urine, MGUS may eventually progress to multiple myeloma

multiple myeloma Blood cancer that develops in the bone marrow as a result of plasma cells transforming into myeloma cells

mutations Defects or errors in a gene

myeloma precursor conditions Either of two preceding phases of symptomatic multiple myeloma characterized by changes in the cells of the bone marrow but no symptoms or organ damage; see also *monoclonal gammopathy of undetermined significance (MGUS)*, *smoldering (asymptomatic) multiple myeloma (SMM)*

osteolytic lesions Holes in a bone where bone tissue has been destroyed by myeloma cells

osteonecrosis of the jaw (ONJ) Death or destruction of bone tissue in the jaw due to trauma, loss of blood supply, or disease; can be associated with long-term bisphosphonate treatment in myeloma patients

osteoporosis Bone loss typically associated with old age; can occur in myeloma

plasma cells Antibody-secreting immune cells that develop from a B cell; in myeloma, it is these cells that have become cancerous or abnormal

plasmacytomas Tumors made up of myeloma cells

plasmapheresis Method of removing blood plasma from the body by withdrawing blood, separating it into plasma and cells, and transfusing the cells back into the bloodstream; it is often performed when treating autoimmune conditions and may be used in myeloma

platelets Small cell fragments in the blood that help it to clot

positron emission tomography (PET) Imaging technique in which radioactive glucose (sugar) is used to highlight cancer cells

prognosis Prediction of the course and outcome of a disease

prognostic indicators Factors that help predict the course and outcome of a patient's disease, such as symptoms, age, and disease stage

radiation therapy Use of high-energy rays; sometimes used to relieve bone pain (also called *radiotherapy*)

red blood cells Blood cells that carry oxygen

remission Period when the signs and symptoms of a disease lessen or disappear

smoldering multiple myeloma (SMM) Condition that is characterized by increased M protein and slightly increased numbers of plasma cells in the bone marrow and an absence of symptoms; patients with SMM are monitored and only treated if their disease progresses; about 5% of myeloma patients have SMM

subcutaneous Under the skin

supportive care Treatment that addresses the symptoms and complications of a disease rather than the disease itself

vertebrae The bones that stack together to make up the spine

vertebroplasty Procedure used to treat fractures of the spine

white blood cells One of the major cell types in the blood; attack infection and cancer cells as part of the immune system



MMRF PATIENT SUPPORT AND RESOURCES

The MMRF supports the myeloma community by providing a broad range of resources for myeloma patients and their family members and caregivers. The MMRF is available to help guide you through your multiple myeloma journey every step of the way.



YOUR QUESTIONS ANSWERED

The Patient Navigation Center is available to answer your questions about disease management and treatments, help you find clinical trials, and connect you with financial and other resources.

Telephone: 1-888-841-6673

Monday–Friday, 9:00 AM to 7:00 PM ET

Email: patientnavigator@themmrf.org

themmrf.org/support/patient-navigation-center

CONNECT WITH AN MMRF MYELOMA MENTOR

Connect one-on-one with a trained patient and/or caregiver mentor that can share their patient journeys and experiences.

themmrf.org/support/myeloma-mentors



FIND A CLINICAL TRIAL

The MMRF Clinical Trial Finder lets you search for a clinical trial in your area.

themmrf.org/diagnosis-and-treatment/clinical-trials-and-emerging-therapies/clinical-trial-finder/

VIEW PAST PROGRAMS ON DEMAND

Access our archive of recorded Patient Summits and webcasts. Hear expert perspectives on key clinical research and the rapidly evolving myeloma treatment landscape. All available online, and free.

themmrf.org/educational-resources



SUPPORT THE MMRF

Help support the MMRF's efforts to accelerate research and find a cure! Participate in an event or donate today.

Telephone: 1-203-229-0464

Donate now/Take action: themmrf.org/get-involved

ATTEND A MULTIPLE MYELOMA PATIENT SUMMIT

Available in-person and virtually, MMRF Patient Summits discuss new treatments, promising clinical trials, and all the information you need to make well-informed decisions about your treatment and care.

themmrf.org/educational-resources



Don't miss out on the latest myeloma updates! Sign up today to receive news updates and notice of educational programs.

Name: _____

Address: _____

City: _____

State: _____

ZIP: _____

Telephone: _____

Mobile: _____

Email: _____

Or sign up at themmrf.org

I AM A:

- Myeloma Patient
- Myeloma Patient Caregiver
- Myeloma Patient Family Member (non-caregiver)
- Family/Friend of Deceased Myeloma Patient
- Healthcare Professional or Researcher
- Biopharma, Medical Device, or Healthcare Technology Industry Professional
- None of the Above

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Norwalk, CT 06851

Contact one of our
patient navigators at the
Patient Navigation Center

1-888-841-6673

Hours: **Mon-Fri, 9 AM-7 PM ET**

Email: **patientnavigator@themmrf.org**



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383 Main Avenue, 7th Floor, Norwalk, CT 06851

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