




# Understanding Multiple Myeloma

Know about multiple myeloma  
and your treatment options



You've just been diagnosed with multiple myeloma  
or know someone who has. You might have a lot  
going through your mind. We're here to help.

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## Newly Diagnosed?

### Your Care Team Is Here to Help You From Diagnosis Through Your Treatment Journey.

- You are encouraged to learn as much as possible about **myeloma** and to seek out the best care possible
- Start by understanding the disease, then proceed to learn about tests, treatments, **supportive care**, and survivorship.

### Knowledge Is POWER.

- Developing a working knowledge of myeloma and how it is monitored and treated can help you reduce anxiety, gain a sense of control, and make communication with your healthcare team much more effective.

Your healthcare team will typically include most of these members:

- **Hematologist-oncologist** (a specialist that treats cancers of the blood), preferably a myeloma specialist, if possible.
- **Primary care physician** or family doctor
- **Nurse** or nurse practitioner
- **Orthopedic** surgeon (bone specialist)
- **Pharmacist**
- **Nephrologist** (kidney specialist)
- **Dentist** or oral surgeon



The best outcome for the patient happens when the members of the healthcare team communicate with each other and with the patient or designed caregiver.



# About Multiple Myeloma

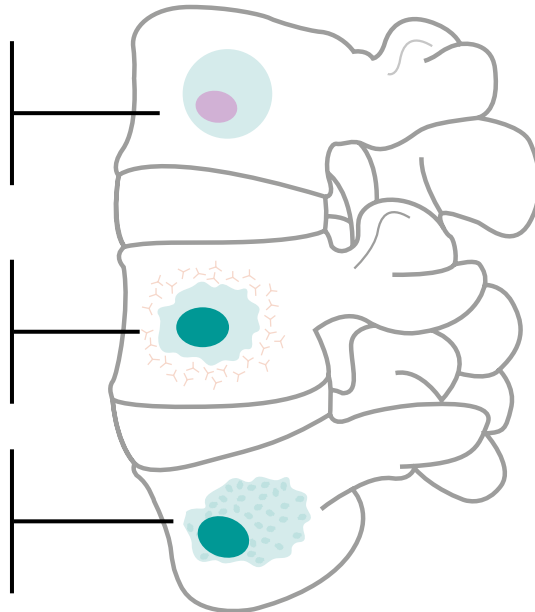
## What Is Multiple Myeloma?

Multiple **myeloma** (MM) is a blood cancer that affects a type of white blood cell called a plasma cell. These white blood cells are found mostly in bone marrow, the soft substance inside some hollow bones where blood cells are made.

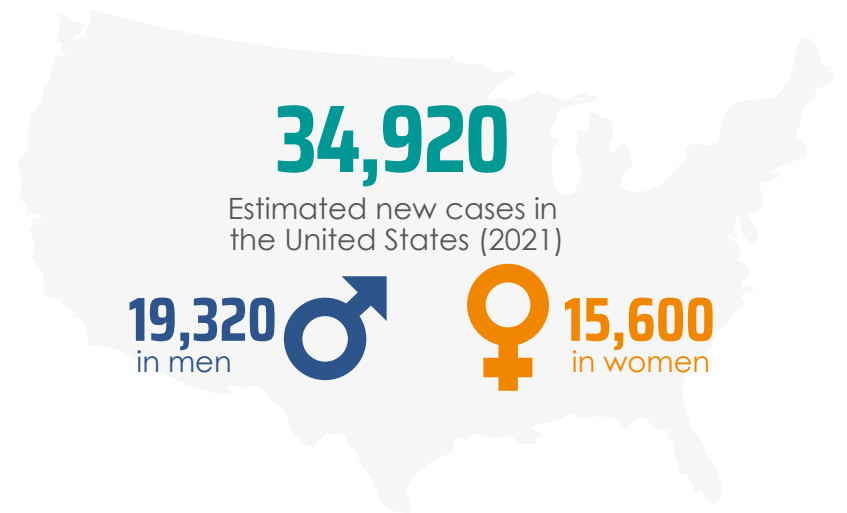
Normal, healthy **plasma** cells are white blood cells that produce antibodies. **Antibodies** are part of the **immune system** and help the body fight infections.

When plasma cells have **DNA** damage, they can overproduce. This can weaken the immune system and can lead to abnormal amounts of **M-protein** that can damage the **kidneys**.

These damaged (**cancerous**) plasma cells rapidly spread and replace normal cells with tumors, usually in the bone marrow.



## Estimated Multiple Myeloma Cases in the United States



## Common Risk Factors

A **risk factor** is anything that changes a person's chance of getting a disease

- ▶ Older age
- ▶ Male gender
- ▶ African American heritage
- ▶ Obesity
- ▶ Family history
- ▶ Other plasma cell disease



## How Does Multiple Myeloma Impact the Body?

### Bones



**Bone damage** and pain (often in the back, hips, and skull), weakness, and fractures.

### Blood



**Low red blood cell counts (anemia)** may cause weakness and tiredness.

**Low white blood cell counts (leukopenia)** may increase the risk of infections.

**Low platelet counts (thrombocytopenia)** may increase the risk of bleeding.

### Kidneys



**Kidney problems** that make it harder for your body to remove excess salt, fluid, and body waste.

### Calcium



**High levels of calcium** in blood that can strain the kidneys.

### Patient







Some patients may not have symptoms.

Multiple myeloma may affect patients in different ways.



## How Is It Diagnosed?

Blood tests and a **bone marrow biopsy** are used to confirm **diagnosis**. Urine tests are also done initially and at various points throughout treatment.

Initial tests	Advanced tests
 <b>Blood Tests</b> The first tests check for levels of <b>albumin</b> , calcium, <b>lactate dehydrogenase (LDH)</b> , <b>blood urea nitrogen (BUN)</b> , and <b>creatinine</b> (a marker of how well the kidneys are working). Your number of red blood cells, white blood cells, and platelets are also tested.	 <b>Blood Tests</b> These tests help doctors understand specifics about each person's disease. The test results help guide the treatment choices.
 <b>Imaging Tests</b> These <b>imaging tests</b> help check for bone loss and evidence of myeloma inside and outside of the bones.	 <b>Procedures</b> A bone marrow biopsy provides tissue samples for your doctors to analyze your disease.

For additional information on how multiple myeloma is diagnosed, please reference page 18



## Can It Be Treated?

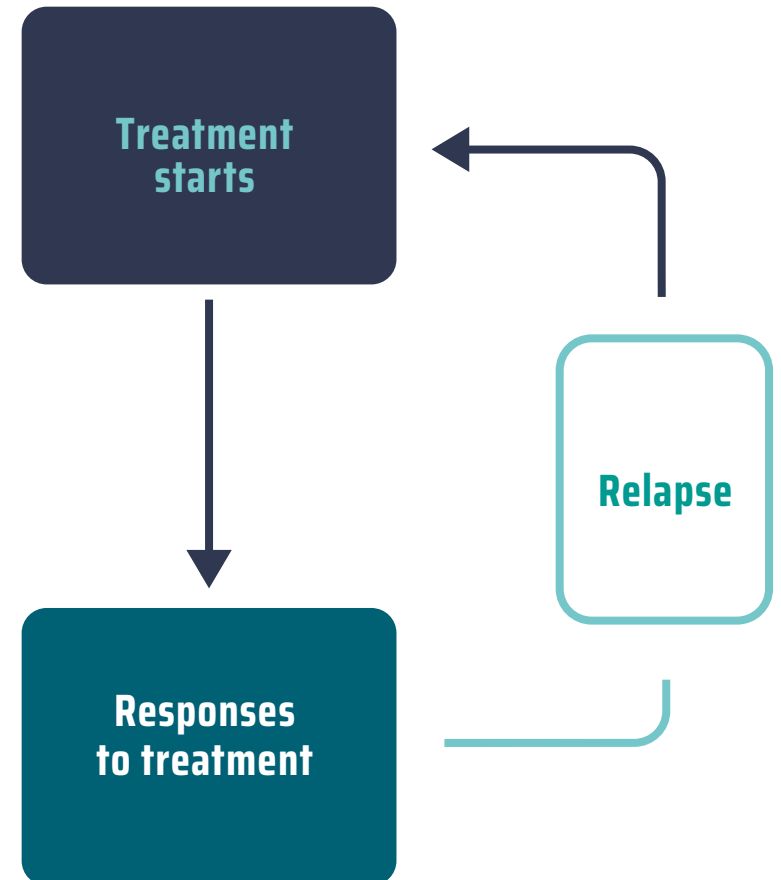
### Multiple Myeloma CAN Be Treated

- Sometimes multiple myeloma may not respond (is **resistant** to initial treatment)
- Also, sometimes cancer cells can stop responding to treatment and begin to multiply again
  - This is known as "**relapse**," which is common in patients with multiple myeloma
- If your multiple myeloma is resistant to treatment or undergoes a relapse, it's important to talk to your healthcare team to discuss treatment options to help get your MM back under control



### It's Important for You To Know That Relapse May Occur

You and your doctor will continue to evaluate where you are and adapt your treatment







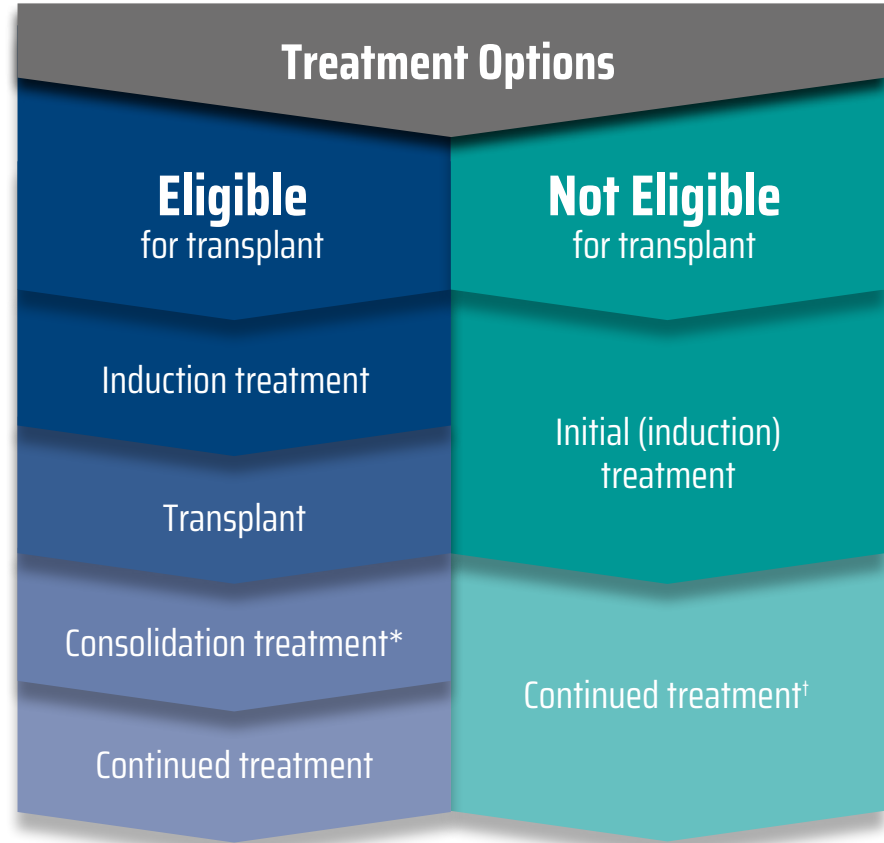
You and your doctor  
will work together to  
determine the treatment  
**regimen** that is right for you.



# Treatment Options

## It's Important to Talk to Your Doctor to Find the Treatment Approach That Is Right for You

- **Induction treatment:** Initially, you start with one or more medicines (called “induction treatment”)
  - Induction treatment may include a combination of several medicines
  - If you're eligible, a **stem cell transplant** may be the starting point
- **Consolidation treatment:** Treatment that is given after cancer has disappeared following the initial therapy in order to kill any cancer cells that may be left in the body
- **Continued treatment:** Helps maintain the results of prior treatments you've received



\*Not all patients will receive consolidation treatment.  
 †Continued treatment with one or more of your previous medicines.



## Treatment Options (cont'd)

### What Factors Can Affect My Treatment?

While there is no one treatment plan, usually treatment is decided based on your **staging\*** and **health status**

#### A Tailored Treatment Plan Depends on:



#### Current health

- ▶ Age and general health
- ▶ Other medical condition (also known as comorbidities)



#### Previous experience

- ▶ Signs and symptoms experienced with relapse



#### What's happening now with your myeloma?

- ▶ Extent of the disease
- ▶ Symptoms and complications
- ▶ New myeloma disease, new tumors, or high-risk **cytogenetics**



#### Your preferences—let your healthcare provider know

- ▶ Quality of life
- ▶ Understanding treatment goals
- ▶ **Side effect** tolerance
- ▶ Symptom relief
- ▶ Personal lifestyle or situation



\*View the Appendix to learn more about staging.



## Treatment Options (cont'd)

### What Medicines Might Be Used in My Treatment?

It's important to discuss with your doctor all the potential benefits and risks associated with the treatment options that you are considering.

#### Monoclonal antibodies

- ▶ **Monoclonal antibodies** kill cancer cells directly and help the immune system attack them. They can also affect normal cells.

#### Immunomodulatory agents

- ▶ **Immunomodulatory agents** can send signals to the immune system to destroy cancerous cells.

#### Proteasome inhibitors (PIs)

- ▶ **Proteasome inhibitors (PIs)** interfere with actions inside cancer cells that help them grow and spread.

#### Steroids

- ▶ **Steroids** help decrease **inflammation** and swelling.

#### Conventional chemotherapy

- ▶ **Chemotherapy** either kills cancer cells or stops them from spreading. It can also kill normal cells.

#### Conditioning and stem cell transplants

- ▶ **Conditioning** (high-dose chemotherapy and other drugs) used as preparation for a stem cell transplant destroys cells in the blood, including the cancerous plasma cells, and then the stem cell transplant replaces them with healthy stem cells.

#### Bone support medication

- ▶ **Bisphosphonates** help improve bone strength and prevent loss of bone mass.

#### CAR-T therapy

- ▶ **CAR-T therapy** is a single infusion made from your own blood cells that have been reprogrammed to recognize and attack the cancer cells in your body.

#### Experimental treatment

- ▶ You may be eligible for experimental treatment options currently available in clinical trials.

Talk to your doctor about what treatment options may be right for you.



## Treatment Options (cont'd)

### How Do the Medicines Work Together?

It's common to be on a combination of two or more drugs.

- Two drugs at the same time is called a **doublet regimen**
- Three medicines at the same time is called a **triplet regimen**
- Four drugs at the same time is called a **quad regimen**



### See Below for Potential Treatment Regimens

#### Quad Regimen



#### Triplet Regimen



#### Doublet Regimen



■ = Monoclonal antibody

◆ = Proteasome inhibitor

● = Corticosteroid

▲ = Immunomodulatory agent

Note: Not everyone is eligible for stem cell transplant or clinical trials.

Talk to your doctor about the best treatment options for you.

# Meeting the Challenge: Controlling What You Can Control

## DOs

- ✓ **DO** go to follow-up appointments and let your healthcare providers know about any new symptoms or side effects.
- ✓ **DO** talk with your healthcare provider about how to stay well hydrated and help your kidneys.
- ✓ **DO** take as directed all medications your healthcare providers prescribe, and tell your healthcare provider about any other medications, vitamins, or supplements you may be taking.
- ✓ **DO** ask your healthcare team for counseling and support group recommendations if you feel depression, stress, or anxiety.
- ✓ **DO** call your healthcare providers if you have symptoms of spinal cord compression: back pain, loss of coordination in feet or hands, tingling or numbness in feet or hands, or loss of bowel or bladder control.
- ✓ **DO** call your doctor if you have bruising or blood in stool, urine, phlegm, vomit, or a persistent nose bleed.
- ✓ **DO** ask your healthcare team for help maintaining a healthy body to reduce **fatigue**.

## DON'Ts

- ⊘ **DON'T** participate in high-impact activities or lift heavy items. It can increase the risk of bone fractures.
- ⊘ **DON'T** suffer. Let your doctor know if you have new or worsening pain.
- ⊘ **DON'T** miss follow-up appointments. Your doctor needs to repeat blood, imaging, and urine tests to check and identify changes as early as possible, or decide to start or change treatment.

## Caring for Yourself or a Loved One

- ✓ Make a plan that addresses more than just the symptoms and disease and takes care of your mind, body, and spirit.
- ✓ There's a powerful mind-body connection that may affect your health. Learning **mindfulness** meditation (a practice that involves focusing thoughts on what you are feeling in the present moment) or other relaxation techniques may help anxiety, stress, sleep disturbances, and general mood.
- ✓ Get proper rest. Sleep problems are common during treatment. Experts say you should try to sleep 7 to 8 hours each night.
- ✓ We all need emotional support, but sometimes you may not feel comfortable opening up to loved ones about your concerns. If you feel that way or are just looking to connect with others who are sharing your experience, consider joining a patient support group.





## Building A Support Team

It may be helpful to talk with family or friends, see a counselor, or join a support group

- ▶ Don't be afraid to share your emotions; experiencing a wide range of emotions is normal

## Shared Decision Making

- ▶ Working with your doctor is one way to ensure the best care
- ▶ Ask questions and let the doctor know your preferences to help create the best treatment decisions and goal



## Educational & Support Groups

### American Cancer Society

[www.cancer.org](http://www.cancer.org) | 800.227.2345

### CancerCare®

[www.cancercares.org](http://www.cancercares.org) | 800-813-HOPE (4673)

### National Comprehensive Cancer Care Network® (NCCN®)

<https://www.nccn.org/patients/>

### National Cancer Institute

<https://www.cancer.gov/> | 1-800-4-CANCER

### Multiple Myeloma Research Foundation

<https://themmr.org> | 866-603-MMCT (6628)

### International Myeloma Foundation

[www.myeloma.org](http://www.myeloma.org) | 800-452 CURE (2873)

### Cancer Support Community

[www.cancersupportcommunity.org](http://www.cancersupportcommunity.org) | 888-793-9355

### Leukemia and Lymphoma Society

[www.LLS.org](http://www.LLS.org) | 800.955.4572

### Myeloma Crowd

[www.myelomacrowd.org](http://www.myelomacrowd.org)

### The Myeloma Beacon™

<https://myelomabeacon.org/>







# Appendix

## A1: Additional Information on How Multiple Myeloma May Impact Your Body

- **Bones:** Myeloma cells in the bone marrow increase bone breakdown and prevent new bone cell production. Both increase the risk of fractures. The by-product of bone breakdown is calcium released into the blood. This is called hypercalcemia.
- **Blood:** New red blood cells, white blood cells, and platelets are made in the bone marrow. Myeloma in the bone marrow disrupts the production of these new blood cells. As a result, multiple myeloma patients may develop anemia, or low red blood cell count. They may also experience low white blood cell count, or neutropenia. This can increase risk of infection. Lastly, patients may have thrombocytopenia, or low platelet count. This increases a tendency for bleeding.
- **Kidneys:** Kidney disease is a serious complication of myeloma that occurs in 20%–25% of newly diagnosed patients. Up to 50% of patients with active myeloma may also develop kidney disease. This kidney damage is linked to the toxic effects of myeloma cell-derived monoclonal proteins, hypercalcemia, or infection.
- **Immune System:** Myeloma suppresses the immune **response** as a whole. It reduces the number of normal antibodies, or immunoglobulins. In turn, all the cells that would patrol for and attack any abnormal infectious agents and/or cells are affected.

# Appendix

## A2: Additional Information on Diagnosis

Initial tests	Advanced tests
 <b>Blood Tests</b> The first tests check for levels of albumin, calcium, lactate dehydrogenase (LDH), blood urea nitrogen (BUN), and creatinine (a marker of how well the kidneys are working). Your number of red blood cells, white blood cells, and platelets are also tested.	 <b>Blood Tests</b> These tests help doctors understand specifics about each person's disease. The test results help guide the treatment choices.
 <b>Imaging Tests</b> These tests help check for bone loss and evidence of myeloma inside and outside of the bones.	 <b>Procedures</b> A bone marrow biopsy provides tissue samples for your doctors to analyze your disease.

### Additional Testing Options for Multiple Myeloma

Tests include SPEP, sFLC, B2M, and SIFE, which can measure certain proteins and pieces of antibodies in the blood, as well as **flow cytometry** and other tests to measure abnormal cells and determine radiologic imaging, such as CT, **PET/CT**, **MRI**, **skeletal survey**.

B2M = **beta-2-microglobulin**  
CT = **computed tomography**  
MRI = **magnetic resonance imaging**  
PET = **positron emission tomography**

sFLC = **serum free light chain**  
SIFE = **serum immunofixation electrophoresis**  
SPEP = **serum protein electrophoresis**

Please see Key Terms Defined on pages 20-21.

# Appendix

## A3: What Is Staging?

Staging describes how much disease is in the body. Knowing the stage helps you and your healthcare provider decide the best course of treatment. Kidney function, age, and overall health can also affect treatment choices and outcomes.

### Disease Staging Is Based on 4 Factors\*:



#### Albumin level

Albumin is the main protein found in blood.



#### Beta-2-microglobulin level

Beta-2-microglobulin is a protein found on the surface of most cells and sheds into the blood.



#### Lactate dehydrogenase (LHD) level

Lactate dehydrogenase is a protein that helps produce energy in the body.



#### Cytogenetics

Cytogenetics is a lab test that looks at changes to genetic information (DNA) in cancer cells.

**Staging can be complex, so discuss it with your doctor**

\*According to Revised International Staging System.



## Key Terms Defined



**Albumin** – The main protein in blood plasma (yellowish part of blood).

**Anemia** – A condition marked by a low level of red blood cells, which may cause weakness, fatigue, shortness of breath, and dizziness.

**Antibody** – Also called “immunoglobulin,” a protein produced by plasma cells that helps protect the body from infection and disease.

**Asymptomatic** – Having no signs or symptoms of disease.

**B-cell** – A type of white blood cell that turns into a plasma cell in response to germs.

**Beta-2-microglobulin** – A small protein made by many cells, including white blood cells and myeloma cells.

**Biopsy** – Removal of small amounts of tissue from the body to be tested for disease.

**Bisphosphonates** – Drugs that help improve bone strength and prevent loss of bone mass.

**Bone densitometry** – A test that uses x-rays to make pictures that show **bone density**—how strong or thin bones are.

**Bone marrow** – The soft, sponge-like tissue in the center of most bones. It produces white blood cells, red blood cells, and platelets.

**Bone marrow biopsy** – The removal of a small amount of solid bone and bone marrow to test for disease.

**Blood urea nitrogen (BUN)** – A test that helps show how well your kidneys are working.

**Calcium** – A mineral needed for healthy teeth, bones, and other body tissues.

**Cancerous** – Affected by cancer.

**CAR-T therapy** – A treatment consisting of a single infusion made from your own blood cells that have been reprogrammed to recognize and attack the cancer cells in your body.

**Chemotherapy** – Treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing.

**Clinical trial** – Research on a test or treatment to assess its safety or how well it works.

**Complete response** – The disappearance of all signs of cancer in response to treatment. This does not always mean the cancer has been cured. Also called complete remission.

**Computed tomography (CT) scan** – A test that uses x-rays from many angles to make a picture of the inside of the body.

**Conditioning** – A regimen that uses chemotherapy to destroy as many myeloma cells as possible before a stem cell transplant.

**Consolidation treatment** – Treatment that is given after cancer has disappeared following the initial therapy in order to kill any cancer cells that may be left in the

body.

**Continued treatment** – Medicine that is given in a lower dose or less often to keep (maintain) good results of prior treatments.

**Creatinine** – A waste product of muscles that is filtered out of blood into urine by the kidneys.

**Cycle** – Days of treatment followed by days of rest.

**Cytogenetics** – The study of chromosomes (strands of DNA and protein that hold genetic information) to help diagnose a disease, plan treatment, or find out how well treatment is working.

**Diagnose** – To confirm or identify a disease or health condition.

**Diagnosis** – Identifying a disease by its signs or symptoms, and by using imaging tests, lab tests, or biopsy.

**DNA** – Deoxyribonucleic acid, the main component of chromosomes, and the carrier of genetic information.

**Fatigue** – Severe tiredness despite getting enough sleep.

**Flow cytometry** – A test that measures myeloma cells in the bone marrow.

**Fracture** – A crack or break in a bone.

**Free light chain** – The unattached, shorter fragments of M-proteins that are made by myeloma cells.

**Health status** – A generic term referring to the health of a person.

**Heavy chain** – The longer protein

chain that is part of an antibody.

**Imaging test** – A test that makes pictures (images) of the inside of the body.

**Immune system** – Several types of cells and organs that work together to help the body fight infections and other diseases.

**Immunomodulatory agents** – Drugs that change a patient’s immune response by enhancing or suppressing the immune system.

**Immunotherapy** – Drugs that stimulate the immune system to help treat or prevent disease.

**Induction treatment** – The first treatment given to destroy as many myeloma cells as possible before a stem cell transplant or continued treatment with medicines.

**Inflammation** – Redness, heat, pain, and swelling from injury or infection.

**Intravenous (IV) infusion** – A way of giving medicines or other fluids by inserting them into the bloodstream through a needle or tube in a vein.

**Kidneys** – A pair of organs that filter blood and remove waste from the body through urine.

**Lactate dehydrogenase (LDH)** – A protein found in the blood that is involved in energy production in cells.

**Leukopenia** – Low levels of white blood cells, which can increase your risk of infections and weaken the immune system.

**Light chain** – The shorter protein chain that is part of an antibody.



## Key Terms Defined (cont'd)



**Lymphocyte** – A type of white blood cell that helps to protect the body from infection.

**Magnetic resonance imaging (MRI) scan** – A test that uses radio waves and powerful magnets to view parts of the inside of the body and see how they are working.

**Maintenance treatment** – Medicine that is given in a lower dose or less often to keep (maintain) good results of prior treatments.

**Malignant** – Cancerous cells that can invade and destroy nearby tissue and spread to other parts of the body.

**Mass spectrometry (MS)** – A new method of measuring plasma cells to help determine the presence of M-proteins in the blood.

**Mindfulness** – The practice of maintaining a state of complete awareness of one's thoughts, emotions, or experiences on a moment-to-moment basis.

**Minimal residual disease negativity (MRD negativity)** – MRD-negative status means to have a low level of disease. This assessment tool may be used to determine the effectiveness of therapy.

**Monoclonal antibodies** – A man-made molecule that binds to substances in the body, including cancer cells.

**M-protein** – An abnormal antibody made by myeloma cells that does not fight germs. Also called monoclonal protein.

**Myeloma** – Cancer that arises in plasma cells, a type of white blood

cell.

**Partial response** – A decrease in the size of a tumor, or in the extent of cancer in the body, in response to treatment. Also called partial remission.

**Physical exam** – A review of the body by a health expert for signs of disease.

**Plasma** – The yellowish liquid part of blood that carries blood cells.

**Plasma cell** – A type of white blood cell that makes germ-fighting proteins.

**Positron emission tomography/computed tomography (PET/CT) scan** – A test that uses radioactive material and x-rays to see the shape and function of organs and tissues inside the body.

**Prognosis** – The likely outcome or course of a disease; the chance of recovery or recurrence.

**Progression** – The course of disease as it gets worse or spreads in the body.

**Proteasome inhibitors (PIs)** – Drugs that slow down cancer cell growth by interfering with processes that play a role in cell function.

**Protein** – A chain of small chemical compounds that are needed for the body to function properly. Proteins are the basis of skin, hair, and other substances in the body.

**Radiation therapy** – The use of high-energy rays (radiation) to destroy cancer cells.

**Regimen** – A treatment plan that specifies the dose, schedule, and

duration of treatment.

**Relapse** – The return or worsening of a disease that had previously responded to therapy.

**Resistance (refractory)** – To remain unaffected by treatment.

**Response** – An improvement related to medical treatment, determined by a healthcare professional or clinical trial.

**Risk factor** – Something that increases the chance of developing a disease.

**Serum free light chain assay** – A blood test that measures the amount of the shorter fragments of the proteins made by myeloma cells.

**Serum immunofixation electrophoresis (SIFE)** – A test used to identify the type of M-proteins in the blood.

**Serum protein electrophoresis (SPEP)** – A test that measures the amount of M-proteins in the blood.

**Side effect** – An unwanted or unexpected reaction to a drug. Side effects can vary from minor problems like a runny nose to life-threatening events, such as a heart attack. Sometimes referred to as an adverse event.

**Skeletal survey** – A set of x-rays of the entire skeleton to look for broken or damaged bones. Also called bone survey.

**Spine** – The bones, muscles, and other tissues along the back from the base of the skull to the tailbone.

**Staging** – Doing exams and tests to learn the extent of the multiple

myeloma and how far it has progressed.

**Stem cell** – A cell that grows and divides to produce red blood cells, white blood cells, and platelets. Stem cells are found in bone marrow and blood.

**Stem cell transplant** – Treatment that uses chemotherapy to destroy cells in the bone marrow and then replaces them with healthy blood stem cells.

**Steroid** – A drug used to reduce swelling, redness, and pain.

**Supportive care** – Treatment for symptoms of cancer or side effects of cancer treatment.

**Symptom** – A physical or mental problem a person experiences that may indicate a certain disease or health condition.

**Systemic therapy** – Drugs that spread to reach cells, including cancer cells, throughout the body.

**Targeted therapy** – A type of systemic therapy that targets a specific or unique feature of cancer cells.

**Thrombocytopenia** – A low blood platelet count.

**Urine protein electrophoresis (UPEP)** – A test that shows the amount of M-proteins in the urine.

**Vaccinate** – To insert a biological agent (vaccine) into the body to prevent a disease.

**White blood cell** – A type of blood cell that fights infection.

**X-ray** – A type of radiation used to take pictures of the inside of the body, such as bones.

