MAYO CLINIC

Diseases and Conditions

Anemia

By Mayo Clinic Staff

Anemia is a condition in which you don't have enough healthy red blood cells to carry adequate oxygen to your tissues. Having anemia may make you feel tired and weak.

There are many forms of anemia, each with its own cause. Loss of blood is the most common cause of anemia. Anemia can be temporary or long term, and it can range from mild to severe.

Treatments for anemia range from taking supplements to undergoing medical procedures. You may be able to prevent some types of anemia by eating a healthy, varied diet.

See your doctor if you suspect you have anemia because anemia can be a sign of serious illnesses.

Anemia symptoms vary depending on the cause of your anemia but may include:

- Fatigue
- Weakness
- Pale skin
- A fast or irregular heartbeat
- Shortness of breath
- Chest pain
- Dizziness
- Cognitive problems
- Cold hands and feet
- Headache

Initially, anemia can be so mild it goes unnoticed. But symptoms increase as anemia worsens.

When to see a doctor

Make an appointment with your doctor if you're feeling fatigued for unexplained reasons. Some anemias, such as iron deficiency anemia or vitamin B-12 deficiency, are common.

Fatigue has many causes besides anemia, so don't assume that if you're tired you must be anemic. Some people learn that their hemoglobin is low, which indicates anemia, when they go to donate blood.

Low hemoglobin may be a temporary problem remedied by eating more iron-rich foods or taking a multivitamin containing iron. It may also be a warning sign of bleeding in your body that may be causing you to be deficient in iron.

If you're told that you can't donate blood because of low hemoglobin, make an appointment with your doctor.

Anemia occurs when your blood doesn't have enough red blood cells. This can happen if:

- Your body doesn't make enough red blood cells
- Bleeding causes you to lose red blood cells more quickly than they can be replaced
- Your body destroys red blood cells

What red blood cells do

Your body makes three types of blood cells — white blood cells to fight infection, platelets to help your blood clot and red blood cells to carry oxygen throughout your body.

Red blood cells contain hemoglobin — a red, iron-rich protein that gives blood its red color. Hemoglobin enables red blood cells to carry oxygen from your lungs to all parts of your body and to carry carbon dioxide from other parts of the body to your lungs so that it can be exhaled.

Most blood cells, including red blood cells, are produced regularly in your bone marrow — a red, spongy material found within the cavities of many of your large bones. To produce hemoglobin and red blood cells, your body needs iron, vitamin B-12, folate and other nutrients from the foods you eat.

Causes of common types of anemia

Common types of anemia and their causes include:

- **Iron deficiency anemia.** Iron deficiency anemia is caused by a shortage of the element iron in your body. Your bone marrow needs iron to make hemoglobin. Without adequate iron, your body can't produce enough hemoglobin for red blood cells.

  This type of anemia is often caused by blood loss, such as from heavy menstrual bleeding, an ulcer, cancer, a polyp somewhere in your digestive system, and prolonged use of aspirin or drugs known as nonsteroidal anti-inflammatory drugs (NSAIDs).

- **Vitamin deficiency anemias.** In addition to iron, your body needs folate and vitamin B-12 to produce sufficient numbers of healthy red blood cells. A diet lacking in these and other key nutrients can cause decreased red blood cell production.

  Additionally, some people may eat enough B-12, but their bodies aren't able to process the vitamin. This can lead to vitamin deficiency anemia, also known as pernicious anemia.

- **Anemia of chronic disease.** Certain chronic diseases — such as cancer, HIV/AIDS, rheumatoid arthritis, Crohn's disease and other chronic inflammatory diseases — can interfere with the production of red blood cells, resulting in chronic anemia. Kidney failure also can cause anemia.
- **Aplastic anemia.** This very rare life-threatening anemia is caused by a decrease in the bone marrow's ability to produce red blood cells. Causes of aplastic anemia include infections, drugs and autoimmune diseases.
- **Anemias associated with bone marrow disease.** A variety of diseases, such as leukemia, myelodysplasia or myelofibrosis, can cause anemia by affecting blood production in your bone marrow. The effects of these types of cancer and cancer-like disorders vary from a mild alteration in blood production to a complete life-threatening shutdown of the blood-making process.

  Other cancers of the blood or bone marrow — such as multiple myeloma, myeloproliferative disorders and lymphoma — also can cause anemia.

- **Hemolytic anemias.** This group of anemias develops when red blood cells are destroyed faster than bone marrow can replace them. Certain blood diseases can cause increased red blood cell destruction. You can inherit a hemolytic anemia, or you can develop it later in life.
- **Sickle cell anemia.** This inherited and sometimes serious anemia is caused by a defective form of hemoglobin that forces red blood cells to assume an abnormal crescent (sickle) shape. These irregular-shaped red blood cells die prematurely, resulting in a chronic shortage of red blood cells.
- **Other anemias.** There are several other rarer forms of anemia, such as thalassemia and anemias caused by defective hemoglobin.

These factors place you at increased risk of anemia:

- **A diet lacking in certain vitamins.** Choosing a diet that is consistently low in iron, vitamin B-12 and folate increases your risk of anemia.
- **Intestinal disorders.** Having an intestinal disorder that affects the absorption of nutrients in your small intestine — such as Crohn's disease and celiac disease — puts you at risk of anemia. Surgical removal of or surgery to the parts of your small intestine where nutrients are absorbed can lead to nutrient deficiencies and anemia.
- **Menstruation.** In general, women who haven't experienced menopause have a greater risk of iron deficiency anemia than do men and postmenopausal women.

That's because menstruation causes the loss of red blood cells.

- **Pregnancy.** If you're pregnant, you're at an increased risk of iron deficiency anemia because your iron stores have to serve your increased blood volume as well as be a source of hemoglobin for your growing baby.
- **Chronic conditions.** For example, if you have cancer, kidney or liver failure, or another chronic condition, you may be at risk of anemia of chronic disease. These conditions can lead to a shortage of red blood cells.

  Slow, chronic blood loss from an ulcer or other source within your body can deplete your body's store of iron, leading to iron deficiency anemia.
- **Family history.** If your family has a history of an inherited anemia, such as sickle cell anemia, you also may be at increased risk of the condition.
- **Other factors.** A history of certain infections, blood diseases and autoimmune disorders, alcoholism, exposure to toxic chemicals, and the use of some medications can affect red blood cell production and lead to anemia.

Left untreated, anemia can cause numerous complications, such as:

- **Severe fatigue.** When anemia is severe enough, you may be so tired that you can't complete everyday tasks. You may be too exhausted to work or play.
- **Heart problems.** Anemia can lead to a rapid or irregular heartbeat — an arrhythmia. Your heart must pump more blood to compensate for the lack of oxygen in the blood when you're anemic. This can even lead to congestive heart failure.
- **Death.** Some inherited anemias, such as sickle cell anemia, can be serious and lead to life-threatening complications. Losing a lot of blood quickly results in acute, severe anemia and can be fatal.

Make an appointment with your primary care doctor if you have prolonged fatigue or other signs or symptoms that worry you. If you're diagnosed with a type of anemia that requires more complex treatment, such as aplastic anemia or anemia caused by other diseases, you may be referred to a doctor who specializes in blood disorders (hematologist).

Because appointments can be brief and there's often a lot of ground to cover, it's a good idea to be well-prepared. Here's some information to help you get ready.

What you can do

- **List any symptoms you're experiencing,** including any that may seem unrelated to the reason for which you scheduled the appointment.
- **List key personal information,** including any major stresses or recent life changes.
- **Make a list of all medications,** vitamins or supplements that you're taking to show your doctor.
- **List questions to ask** your doctor.

Your time with your doctor is limited, so preparing a list of questions can help you make the most of your appointment. List your questions from most important to least important in case time runs out.

For anemia, some basic questions to ask your doctor include:

- What's the most likely cause of my symptoms?
- Are there other possible causes for my symptoms?
- What kinds of tests do I need?
- What caused my anemia?
- Is my anemia likely temporary, or will I always have it?
- What treatments are available? What are the possible side effects of each?
- What treatment do you recommend for me?
- I have these other health conditions. How can I best manage these conditions together?
- Do I need to follow any dietary restrictions?
- Are there foods I need to add to my diet? How often do I need to eat these foods?
- Do you have any brochures or other printed material that I can take with me? What websites do you recommend?

In addition to the questions that you've prepared to ask your doctor, don't hesitate to ask additional questions during your appointment.

What to expect from your doctor

Your doctor is likely to ask you a number of questions. Being ready to answer them may reserve time to go over any points you want to spend more time on. Your doctor may ask:

- When did you begin having these symptoms?
- Do you have your symptoms all the time, or do they come and go?
- How severe are your symptoms?
- What, if anything, seems to improve your symptoms?
- What, if anything, appears to worsen your symptoms?

To diagnose anemia, your doctor may recommend:

- **Physical exam.** During a physical exam, your doctor may listen to your heart and your breathing. Your doctor may also place his or her hands on your abdomen to feel the size of your liver and spleen.
- **Complete blood count (CBC).** A CBC is used to count the number of blood cells in a sample of your blood. For anemia, your doctor will be interested in the levels of the red blood cells contained in the blood (hematocrit) and the hemoglobin in your blood.

Normal adult hematocrit values vary from one medical practice to another but are generally between 40 and 52 percent for men and 35 and 47 percent for women. Normal adult hemoglobin values are generally 14 to 18 grams per deciliter for men and 12 to 16 grams per deciliter for women.

- **A test to determine the size and shape of your red blood cells.** Some of your red blood cells may also be examined for unusual size, shape and color. Doing so can help pinpoint a diagnosis.

  For example, in iron deficiency anemia, red blood cells are smaller and paler in color than normal. In vitamin deficiency anemias, red blood cells are enlarged and fewer in number.

Additional tests

If you receive a diagnosis of anemia, your doctor may order additional tests to determine the underlying cause.

For example, iron deficiency anemia can result from chronic bleeding of ulcers, benign polyps in the colon, colon cancer, tumors or kidney problems.

Occasionally, it may be necessary to study a sample of your bone marrow to diagnose anemia.

Anemia treatment depends on the cause.

- **Iron deficiency anemia.** This form of anemia is treated with changes in your diet and iron supplements.

  If the underlying cause of iron deficiency is loss of blood — other than from menstruation — the source of the bleeding must be located and stopped. This may involve surgery.

- **Vitamin deficiency anemias.** Folic acid and vitamin C deficiency anemias are treated with dietary supplements and increasing these nutrients in your diet. If your digestive system has trouble absorbing vitamin B-12 from the food you eat, you may receive vitamin B-12 injections.
- **Anemia of chronic disease.** There's no specific treatment for this type of anemia. Doctors focus on treating the underlying disease. If symptoms become severe, a blood transfusion or injections of synthetic erythropoietin, a hormone normally produced by your kidneys, may help stimulate red blood cell production and ease fatigue.
- **Aplastic anemia.** Treatment for this anemia may include blood transfusions to boost levels of red blood cells. You may need a bone marrow transplant if your bone marrow is diseased and can't make healthy blood cells.
- **Anemias associated with bone marrow disease.** Treatment of these various diseases can include simple medication, chemotherapy or bone marrow

transplantation.

- **Hemolytic anemias.** Managing hemolytic anemias includes avoiding suspect medications, treating related infections and taking drugs that suppress your immune system, which may be attacking your red blood cells.

  Depending on the severity of your anemia, a blood transfusion or plasmapheresis may be necessary. Plasmapheresis is a type of blood-filtering procedure. In certain cases, removal of the spleen can be helpful.

- **Sickle cell anemia.** Treatment for this anemia may include the administration of oxygen, pain-relieving drugs, and oral and intravenous fluids to reduce pain and prevent complications. Doctors also may recommend blood transfusions, folic acid supplements and antibiotics.

  A bone marrow transplant may be an effective treatment in some circumstances. A cancer drug called hydroxyurea (Droxia, Hydrea) also is used to treat sickle cell anemia.

- **Thalassemia.** This anemia may be treated with blood transfusions, folic acid supplements, removal of the spleen (splenectomy), a bone marrow transplant or a another drug.

Choose a vitamin-rich diet

Many types of anemia can't be prevented. However, you can help avoid iron deficiency anemia and vitamin deficiency anemias by choosing a diet that includes a variety of vitamins and nutrients, including:

- **Iron.** Iron-rich foods include beef and other meats, beans, lentils, iron-fortified cereals, dark green leafy vegetables, and dried fruit.
- **Folate.** This nutrient, and its synthetic form folic acid, can be found in citrus fruits and juices, bananas, dark green leafy vegetables, legumes, and fortified breads, cereals and pasta.
- **Vitamin B-12.** This vitamin is found naturally in meat and dairy products. It's also added to some cereals and soy products, such as soy milk.
- **Vitamin C.** Foods containing vitamin C — such as citrus fruits, melons and berries — help increase iron absorption.

Consider genetic counseling if you have a family history of anemia

If you have a family history of an inherited anemia, such as sickle cell anemia or thalassemia, talk to your doctor and possibly a genetic counselor about your risk and what risks you may pass on to your children.

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