CONDITION

Anemia

Learn about anemia symptoms, common causes, diagnostic tests, treatment options, complications, and when to seek urgent medical care.

WHAT IT IS
Too few healthy red blood cells or hemoglobin

BODY SYSTEM
Blood and circulation

MAIN SYMPTOMS
Tiredness, shortness of breath, dizziness, fast heartbeat

WHAT CAUSES IT
Blood loss, reduced production, increased destruction

HOW IT IS DIAGNOSED
Complete blood count

MAIN TREATMENT
Cause-directed treatment and replacement therapy

CAN IT BE CURED?
Sometimes, if underlying cause is treatable

IS IT AN EMERGENCY?
Sometimes, with chest pain or severe breathlessness

LONG-TERM OUTLOOK
Often improves with treatment but may recur

Overview

Anemia means the blood does not have enough healthy red blood cells or hemoglobin for the body's needs. Hemoglobin is the protein in red blood cells that carries oxygen from the lungs to tissues throughout the body.

Anemia is not a single disease. It is a finding that can have many causes, from low iron levels to bleeding, chronic illness, inherited blood disorders, or problems making red blood cells. The definition also depends on factors such as age, sex, pregnancy, altitude, and the laboratory method used.

Mild anemia may cause few symptoms. More significant anemia can reduce the oxygen available to muscles and organs, leading to tiredness, shortness of breath, or a fast heartbeat. Symptoms may develop slowly if anemia builds over months. Sudden blood loss can cause

more serious symptoms even before a blood test fully reflects what has happened.

Finding the cause matters. Replacing iron may help iron-deficiency anemia, for example, but it will not treat anemia caused by vitamin B12 deficiency, kidney disease, or rapid red blood cell destruction. Unexplained anemia may also be a sign of hidden bleeding or another condition that needs attention.

Symptoms

Symptoms vary with the severity of anemia, how quickly it develops, and a person's overall health. Someone with heart or lung disease may notice symptoms at a level that causes few problems for another person.

Possible symptoms include:

Certain symptoms can suggest a particular cause but cannot confirm it. Iron deficiency may be associated with brittle nails, a sore tongue, restless legs, or cravings for nonfood substances such as ice, clay, or starch. This type of craving is called pica.

Vitamin B12 deficiency can cause numbness, tingling, balance problems, memory changes, or a painful tongue. These nerve symptoms may occur even when anemia is mild.

Seek prompt medical advice for new anemia symptoms, visible blood in the stool or urine, black or tar-like stool, vomiting blood, unusually heavy menstrual bleeding, or symptoms that are getting worse.

Call emergency services for severe trouble breathing, chest pain, fainting, new confusion, uncontrolled bleeding, or a rapid heartbeat with severe weakness or dizziness. These symptoms can have causes other than anemia, but they need immediate assessment.

- Unusual tiredness or weakness
- Shortness of breath, especially with activity
- Dizziness or lightheadedness
- Headaches
- A faster or more noticeable heartbeat
- Pale skin, lips, or nail beds
- Trouble concentrating
- Feeling unusually cold
- Reduced exercise tolerance

Causes and risk factors

Anemia generally develops through one or more of three processes: blood loss, reduced red blood cell production, or increased destruction of red blood cells.

Blood loss is a common cause. Menstrual bleeding, childbirth, surgery, injury, or frequent blood donation can reduce iron stores. Slow bleeding from the digestive tract may come from an ulcer, inflammation, hemorrhoids, medicines that irritate the stomach, or a growth. Digestive bleeding may not always be visible.

Reduced red blood cell production can happen when the body lacks needed nutrients. Iron deficiency is common, but vitamin B12 or folate deficiency can also cause anemia. Poor intake is only one possibility. Conditions such as celiac disease, inflammatory bowel disease, autoimmune gastritis, or previous stomach or intestinal surgery can interfere with nutrient absorption.

The kidneys make erythropoietin, a hormone that tells bone marrow to produce red blood cells. Chronic kidney disease may reduce this signal. Long-term inflammatory conditions, infections, cancer, and some autoimmune diseases can also limit red blood cell production or make stored iron less available.

Less commonly, bone marrow disorders affect the tissue where blood cells are made. Some medicines, chemotherapy, radiation, toxins, and severe infections can also suppress blood cell production.

Increased red blood cell destruction is called hemolysis. It may result from an inherited condition, an immune reaction, an infection, certain medicines, or a mechanical problem involving a heart valve. Sickle cell disease and thalassemia are inherited disorders that can cause anemia, although they affect red blood cells in different ways.

Factors that may raise the chance of anemia include:

Anemia should not automatically be blamed on age, diet, or menstruation. A clinician may need to look for more than one contributing cause.

- Pregnancy or heavy menstrual bleeding
- A diet low in iron, vitamin B12, or folate
- Digestive conditions that affect absorption
- Kidney disease or chronic inflammation
- Recent surgery, injury, or blood donation
- A family history of inherited blood disorders

- Use of medicines that can cause bleeding or affect blood cell production
- Older age, particularly when combined with chronic illness or poor nutrition

Diagnosis

A complete blood count, or CBC, is the main blood test used to identify anemia. It measures hemoglobin, the proportion of blood made up of red cells, and features of the cells themselves. Results are interpreted using an appropriate reference range rather than one cutoff for everyone.

The mean corpuscular volume, or MCV, describes the average size of red blood cells. Small cells may occur with iron deficiency or thalassemia. Large cells may be seen with vitamin B12 or folate deficiency, liver disease, alcohol use, thyroid problems, or certain medicines. Normal-sized cells can occur with kidney disease, inflammation, blood loss, or hemolysis. These patterns guide testing but do not establish the cause by themselves.

A reticulocyte count measures young red blood cells. A high count may mean the bone marrow is responding to bleeding or red cell destruction. A low or inappropriately normal count may suggest that the body is not producing enough cells.

Further testing depends on the history and CBC results. It may include:

Ferritin reflects stored iron, but inflammation can raise ferritin and make iron deficiency harder to recognize. Clinicians may consider ferritin together with transferrin saturation, the CBC, symptoms, and other test results.

If iron deficiency has no clear explanation, evaluation may include testing for celiac disease or examining the stomach and intestines. The appropriate approach depends on age, symptoms, menstrual history, pregnancy status, family history, and other risk factors.

A bone marrow test is not routine for most people with anemia. It may be considered when blood counts remain unexplained, several types of blood cells are abnormal, or a marrow disorder is suspected.

- Ferritin and other iron studies
- Vitamin B12 and folate levels
- Kidney, liver, or thyroid tests
- A blood smear examined under a microscope
- Tests for inflammation or red blood cell destruction
- Testing for inherited hemoglobin disorders

- Tests for blood in the digestive tract

Treatment and management

Treatment is directed at both the anemia and its cause. The best approach depends on symptoms, test results, other medical conditions, and how quickly the anemia developed.

Iron-deficiency anemia is often treated with oral iron. Different forms are available, and side effects can include nausea, constipation, stomach discomfort, or dark stool. A clinician may adjust the preparation or schedule if side effects are difficult. Iron should be kept away from children because an overdose can be dangerous.

Intravenous iron delivers iron through a vein. It may be used when oral iron is not tolerated, is not absorbed well, has not worked, or when iron needs to be replaced more quickly. It is given in a monitored setting because infusion reactions can occur.

Iron supplements should not be started simply because anemia is suspected. Excess iron can be harmful, and some anemias do not improve with iron. Identifying and treating a source of blood loss is also important; otherwise, anemia may return.

Vitamin B12 deficiency may be treated with oral medicine or injections, depending on the cause and clinical situation. Folate deficiency is treated with folic acid after vitamin B12 deficiency has been considered. Folate can improve the blood count while allowing nerve injury from untreated B12 deficiency to continue.

Anemia related to kidney disease or certain cancer treatments may sometimes be managed with an erythropoiesis-stimulating medicine. These medicines encourage red blood cell production but are not appropriate for every patient. Their benefits and risks require individual assessment.

Treatment for hemolytic anemia, inherited blood disorders, inflammation, or bone marrow disease varies widely. It may involve treating an infection or immune condition, changing a contributing medicine under medical supervision, or receiving care from a hematologist, a doctor who specializes in blood disorders.

A red blood cell transfusion may be needed for severe anemia, active bleeding, serious symptoms, or certain medical situations. The decision is based on the full clinical picture rather than a single hemoglobin number. Transfusions can improve oxygen delivery quickly, but they do not correct the underlying cause.

Do not stop a prescribed medicine because it might contribute to anemia without speaking with the prescribing clinician. Some medicines require gradual changes or have important benefits that must be weighed against their risks.

Complications

Untreated or severe anemia can make daily activity difficult and may worsen heart or lung symptoms. The heart may need to work harder to supply oxygen, especially when anemia is substantial or develops quickly.

During pregnancy, anemia may affect the health of both the pregnant person and the developing baby. Evaluation and treatment should be coordinated with prenatal care rather than managed with supplements alone.

Long-standing iron deficiency can affect attention, physical performance, and quality of life. In children, severe or prolonged deficiency may interfere with development.

Some complications come from the underlying cause rather than the anemia itself. Ongoing digestive bleeding, kidney disease, hemolysis, or a bone marrow disorder needs appropriate treatment. Nerve problems from vitamin B12 deficiency can become difficult to reverse if treatment is delayed.

Follow up

Follow-up usually includes another CBC to confirm that hemoglobin is improving. Depending on the cause, a clinician may also repeat a reticulocyte count, ferritin, iron studies, vitamin levels, or kidney tests. The timing varies with the severity of anemia and the treatment used.

Improvement in symptoms and hemoglobin does not always mean that treatment is complete. Iron stores may take longer to rebuild than the blood count. Continue treatment for the period recommended by the treating clinician rather than stopping as soon as you feel better.

Contact your healthcare team if symptoms do not improve, side effects prevent you from taking treatment, or bleeding continues. Recurrent anemia may mean that the original cause remains active, treatment was not fully absorbed, or more than one condition is present.

Routine follow-up is appropriate when symptoms are stable and a treatment plan is in place. New chest pain, fainting, severe shortness of breath, confusion, or uncontrolled bleeding requires emergency care rather than waiting for a scheduled appointment.

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