CONDITION

# Anemia caused by low iron - infants and toddlers

Learn about iron-deficiency anemia in infants and toddlers, including symptoms, risk factors, testing, treatment, nutrition, and when to seek urgent care.

**WHAT IT IS**
Low hemoglobin caused by iron deficiency

**BODY SYSTEM**
Blood and circulation

**MAIN SYMPTOMS**
Pale skin, tiredness, irritability, poor appetite

**WHAT CAUSES IT**
Low iron intake, blood loss, poor absorption

**HOW IT IS DIAGNOSED**
CBC and ferritin blood tests

**MAIN TREATMENT**
Iron supplements and dietary changes

**CAN IT BE CURED?**
Yes, iron treatment corrects anemia

**IS IT AN EMERGENCY?**
Sometimes, with severe trouble breathing

**LONG-TERM OUTLOOK**
Treatable, but developmental effects may not fully reverse

## Overview

Iron-deficiency anemia happens when a child does not have enough iron to make a healthy amount of hemoglobin. Hemoglobin is the protein in red blood cells that carries oxygen throughout the body.

Iron deficiency develops before anemia does. A child may first use up stored iron without having a low hemoglobin level. If the shortage continues, the red blood cells may become smaller and carry less hemoglobin. This is called iron-deficiency anemia.

Infants and toddlers have a higher risk because they grow quickly and need iron to make new blood cells. Their brains also use iron during an important period of development. Finding and treating a deficiency supports healthy growth and development and may also help identify feeding problems, blood loss, or another medical condition.

Low iron is treatable. However, anemia should not be diagnosed from symptoms or diet alone. Other conditions can also cause a low hemoglobin level, so a clinician may need blood tests to confirm the cause.

## Symptoms

Mild iron deficiency or anemia may not cause noticeable symptoms. It is often found during a routine checkup or blood test.

When symptoms occur, they can include:

These symptoms are not specific to iron deficiency. For example, pale skin may be normal for a child, and tiredness may occur with many illnesses. A pediatric clinician can decide whether testing is needed.

Arrange prompt medical care if a child is unusually tired, has worsening paleness, is eating poorly, has pica, or is not growing as expected.

Seek emergency care for severe trouble breathing, fainting, extreme weakness, blue or gray coloring, or difficulty waking the child. These symptoms are not typical of mild anemia and need immediate assessment.

Accidental ingestion of iron tablets or liquid can cause dangerous poisoning. If a child may have swallowed an unknown or excessive amount, contact emergency services or a poison control center immediately rather than waiting for symptoms.

- Pale skin, lips, or nail beds
- Tiredness, weakness, or less interest in active play
- Irritability or unusual fussiness
- Poor appetite
- Slower weight gain
- A fast heartbeat or faster breathing with activity
- Trouble with attention, learning, or development
- Pica, which means eating nonfood items such as paper, dirt, clay, or ice

## Causes and risk factors

Babies are born with stored iron. Full-term infants usually have enough stored iron for the first

months of life, but the supply falls as they grow. After that, they need iron from breast milk supplements when appropriate, iron-fortified formula, and iron-rich complementary foods.

Breast milk provides many benefits but contains relatively little iron. The American Academy of Pediatrics advises that exclusively or partly breastfed infants may need supplemental iron beginning in early infancy until they regularly eat enough iron-containing foods. A clinician should advise families about whether and how to supplement. Standard iron-fortified infant formula usually provides iron without an additional supplement.

Premature or low-birth-weight infants may begin life with smaller iron stores. Their needs can differ from those of full-term infants, so their neonatal or pediatric team may recommend a specific prevention plan.

Feeding patterns can also affect risk. Common concerns include:

Large amounts of cow's milk can replace foods that contain iron. Cow's milk is also low in iron, and in some young children it may contribute to small amounts of intestinal blood loss. Families can ask their child's clinician how much milk is appropriate for the child's age and overall diet.

Less common causes include ongoing blood loss, poor absorption of nutrients, or increased iron needs. Intestinal conditions such as celiac disease can interfere with absorption. Blood loss may come from the digestive tract or, rarely, another source.

Lead exposure and iron deficiency can occur together. Children may be exposed to lead through older paint, contaminated dust or soil, water, imported products, or certain household occupations and hobbies. A clinician may recommend lead testing based on age, local requirements, and exposure risk.

- Delayed introduction of iron-rich complementary foods
- A diet with few meats, beans, lentils, tofu, or iron-fortified cereals
- Drinking large amounts of cow's milk after the first birthday
- Using cow's milk as a main drink before 12 months of age
- Feeding difficulties or a very restricted diet
- Ongoing breastfeeding without enough iron from supplements or complementary foods

## Diagnosis

A clinician begins by reviewing the child's diet, growth, medical history, birth history, and possible lead exposure. The examination may look for paleness, a fast heartbeat, growth concerns, or signs of another illness. None of these findings can confirm iron-deficiency

anemia by itself.

A complete blood count, or CBC, measures hemoglobin and other features of the blood. Iron-deficiency anemia often causes red blood cells to be smaller than expected. However, small red blood cells can also occur with inherited conditions such as thalassemia.

A ferritin test estimates the body's stored iron. A low ferritin level strongly supports iron deficiency. Ferritin can rise during infection or inflammation, however, and may appear normal even when iron stores are low. A clinician may interpret it with the child's recent health history or order an inflammation test, such as C-reactive protein.

Other tests may include a reticulocyte measurement, which provides information about newly produced red blood cells, or tests of iron transport. Lead testing may be appropriate. If blood loss, poor absorption, or an inherited blood condition is suspected, further testing may be needed.

The American Academy of Pediatrics recommends screening for anemia with a hemoglobin measurement and an assessment of risk factors at about 12 months of age. The U.S. Preventive Services Task Force has found insufficient evidence to determine the overall benefits and harms of routine screening in all children ages 6 to 24 months who have no symptoms. This does not mean screening is harmful or unnecessary. Pediatric practices may follow specialty guidance, local public health requirements, and the child's individual risks.

Sometimes a clinician uses improvement after a supervised course of iron as additional evidence that iron deficiency caused the anemia. A lack of improvement should lead to a review of how the medicine was given and whether another diagnosis or ongoing source of blood loss is present.

## Treatment and management

Treatment usually combines an iron supplement with changes that improve the child's long-term iron intake. Diet alone may not replace iron quickly enough once anemia has developed.

Oral iron, meaning iron taken by mouth, is the usual first treatment. The clinician selects the product and amount based on the child's weight, test results, age, and medical needs. Families should not use an adult iron product or start a supplement without professional guidance. Multivitamins may not contain enough iron to treat anemia, while too much iron can be toxic.

Iron is often absorbed better away from milk and with a source of vitamin C. Vitamin C-containing foods include strawberries, oranges, tomatoes, broccoli, and bell peppers. Families should follow the product and clinician instructions because administration may vary

by formulation and by the child's feeding schedule.

Liquid iron may temporarily stain the teeth. Placing the liquid toward the back or side of the mouth and cleaning the teeth afterward may help. Iron can also cause dark stools, constipation, nausea, or stomach discomfort. Darkening of the stool is expected, but blood in the stool, persistent vomiting, severe abdominal pain, or other concerning symptoms should be discussed promptly with a clinician.

Keep all iron products locked away and out of sight. Child-resistant packaging does not replace safe storage. Iron poisoning can begin with vomiting, abdominal pain, diarrhea, or unusual sleepiness, but treatment should not be delayed while waiting for symptoms.

Iron-rich foods remain important during and after treatment. Options appropriate for many infants and toddlers include iron-fortified infant cereal, meat, poultry, fish, beans, lentils, tofu, and well-prepared leafy green vegetables. Pairing plant sources of iron with vitamin C-containing foods can improve absorption.

Cow's milk should not be used as the main drink before 12 months. After the first birthday, milk can be part of a balanced diet, but excessive intake may crowd out iron-rich foods. A pediatric clinician or dietitian can help with feeding plans for children who avoid many foods, follow vegetarian or vegan diets, have food allergies, or have growth concerns.

Treatment generally continues after the hemoglobin level improves so the body can rebuild stored iron. The clinician determines the duration from follow-up tests and the suspected cause. Intravenous iron is reserved for selected situations, such as serious absorption problems or an inability to take oral treatment. Blood transfusion is uncommon and is generally considered only for severe anemia with significant symptoms or medical instability.

## Complications

Untreated iron deficiency can affect more than the blood. Iron is involved in brain development, movement, behavior, and learning. Studies have linked deficiency in early childhood with developmental and behavioral concerns. Treatment corrects the blood abnormality, but it is not always clear whether every developmental effect is fully reversible. This is one reason prevention and timely follow-up matter.

Severe anemia can make the heart work harder to deliver oxygen. It may lead to a rapid heartbeat, poor feeding, breathing difficulty, or marked tiredness. Severe complications are not typical of a mild deficiency found during routine screening.

Iron deficiency may also be a sign of an underlying feeding disorder, absorption problem, or ongoing blood loss. Identifying and addressing the cause helps prevent the anemia from

returning.

## Follow up

The clinician will usually repeat blood testing after treatment begins to confirm that hemoglobin is improving. The exact timing depends on the child's starting hemoglobin, symptoms, age, and treatment plan. Later testing may check whether iron stores have been restored.

At routine follow-up, families should discuss missed doses, side effects, feeding challenges, milk intake, and any difficulty obtaining or giving the supplement. If the blood count does not improve as expected, the clinician may check whether the child is receiving the intended amount and look for continued blood loss, poor absorption, inflammation, lead exposure, or another type of anemia.

Keep scheduled well-child visits so growth, diet, development, and anemia risk can be reviewed. Contact the clinician sooner if the child becomes more pale or tired, eats poorly, develops pica, has persistent digestive symptoms, or cannot tolerate the prescribed iron.

Seek urgent or emergency care for difficulty breathing, fainting, extreme weakness, blue or gray coloring, difficulty waking, or a possible iron overdose.

## Sources

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