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Medical Encyclopedia: Serum iron

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Alternative names

Fe+2; Ferric ion; Fe++; Ferrous ion; Iron - serum

Definition

This is a test that measures the amount of iron in the blood.

How the test is performed

Blood is drawn from a vein, usually from the inside of the elbow or the back of the hand. The puncture site is cleaned with antiseptic, and an elastic band is placed around the upper arm to apply pressure and restrict blood flow through the vein. This causes veins below the band to fill with blood.

A needle is inserted into the vein, and the blood is collected in an air-tight vial or a syringe. During the procedure, the band is removed to restore circulation. Once the blood has been collected, the needle is removed, and the puncture site is covered to stop any bleeding.

In an infant or young child:

The area is cleansed with antiseptic and punctured with a sharp needle or a lancet. The blood may be collected in a pipette (small glass tube), on a slide, onto a test strip, or into a small container. Cotton or a bandage may be applied to the puncture site if there is any continued bleeding.

How to prepare for the test

For adults, no specific preparation is required.

For infants and children:

The preparation you can provide for this procedure depends on your child's age, previous experiences, and level of trust. For specific information regarding how you can prepare your child, see the following topics:

- [Enfant test or procedure preparation \(birth to 1 year\)](#)
- [Toddler test or procedure preparation \(1 to 3 years\)](#)
- [Preschooler test or procedure preparation \(3 to 6 years\)](#)
- [Schoolage test or procedure preparation \(6 to 12 years\)](#)
- [Adolescent test or procedure preparation \(12 to 18 years\)](#)

How the test will feel

When the needle is inserted to draw blood, some people feel moderate pain, while others feel only a prick or stinging sensation. Afterward, there may be some throbbing.

Why the test is performed

This test is performed when iron deficiency is suspected.

About 65% of the iron in the body is found in hemoglobin (in red blood cells) and about 4% in myoglobin (in skeletal muscle). About 30% of the iron in the body is stored (as ferritin or hemosiderin) in the liver, bone marrow, and spleen. A small percentage of the body's iron is in transport between various parts of the body or is a component of proteins in cells throughout the body.

The body efficiently conserves iron so that only about 1 mg (men and post-menopausal women) or 1.8 mg (premenopausal adult women) is lost per day in the urine or menstrual blood. Since only about 10-15% of the iron we eat in our food is absorbed, even under optimum circumstances, the recommended daily allowance for iron is 10 mg (men and post-menopausal women) and 18 mg (premenopausal adult women). Pregnancy greatly increases the need for iron, and iron deficiency is most common in women of reproductive age.

Serum iron, as measured in the laboratory, is really transferrin-associated ferric iron. Each transferrin molecule can carry 2 iron atoms. Normally about 30% of the available sites are filled. This is called the percent transferrin saturation. By completely saturating all the available binding sites, it is possible to measure the total iron binding capacity (TIBC). This is really a measure of the transferrin in the serum. TIBC and percent transferrin saturation are usually measured at the same time serum iron is measured.

Normal Values

- Iron: 60-170 mcg/dl
- TIBC: 240-450 mcg/dl
- Transferrin saturation: 20-50%

Note: mcg/dl = micrograms per deciliter

What abnormal results mean

Higher-than-normal levels may indicate:

- Hemochromatosis
- Hemolysis
- Hemolytic anemias
- Hemosiderosis
- Hepatic (liver) necrosis (tissue death)
- Hepatitis
- Vitamin B-12 deficiency, vitamin B-6 deficiency
- Iron poisoning
- Multiple blood transfusions

Lower-than-normal levels may indicate:

- Chronic gastrointestinal blood loss
- Chronic heavy menstrual bleeding
- Inadequate absorption of iron
- Insufficient dietary iron
- Pregnancy

Additional conditions under which the test may be performed:

- Anemia of chronic disease

What the risks are

- Excessive bleeding
- Gaiting or feeling light-headed
- Hematoma (blood accumulating under the skin)
- Infection (a slight risk any time the skin is broken)
- Multiple punctures to locate veins

Special considerations

Drugs that can increase iron measurements include chloramphenicol, estrogens, oral contraceptives, and methyldopa.

Drugs that can decrease iron measurements include cholestyramine, chloramphenicol, colchicine, deferoxamine, methicillin, allopurinol, and testosterone.

Veins and arteries vary in size from one patient to another and from one side of the body to the other. Obtaining a blood sample from some people may be more difficult than from others.

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