Iron Deficiency Anemia

What is anemia?

Anemia is a medical term that describes low amounts of red blood cells or hemoglobin in the body.

What is a red blood cell?

Red blood cells are the most common type of blood cell, and are responsible for delivering oxygen to all parts of the body.

What is hemoglobin?

The majority of the red blood cell is made up of hemoglobin. Hemoglobin carries 4 iron molecules. In the lungs, oxygen binds to the iron in the red blood cell. The red cell then travels through the bloodstream to the rest of the body and delivers the oxygen to provide energy.

Low hemoglobin is called '*anemia*'.

What causes anemia?

In children, the most common cause of anemia is iron deficiency anemia due to low amounts of iron in the child's diet.

There are many other causes of anemia, and sometimes a child can have more than one cause.

What are the signs and symptoms of iron deficiency anemia?

Symptoms usually develop slowly over months to years. This can make symptoms hard to recognize, but may include:

- Looking pale
- Fatigue or weakness
- Difficulty exercising or keeping up with peers
- Poor concentration
- Headaches
- Behavioral or school difficulties

How is iron deficiency anemia diagnosed?

Anemia is diagnosed on a blood test called a *'complete blood count'* or CBC. The CBC will report low hemoglobin and low red cell count. Under the microscope, the red cells look small and pale.

Low iron is diagnosed by checking iron levels in the blood, usually by a test called '*ferritin*'.

What is the outlook for children with iron deficiency anemia?

Most of the symptoms improve quickly once iron is replaced. Therapy is usually given until the anemia is corrected, and then for another 3 months to ensure the body's iron store is replenished.

How much iron does my child need?

The recommended daily allowance (RDA) for iron varies by age and gender:

Infants aged 0-6 months	0.27 mg
Infants aged 7-12 months	11 mg
Children aged 1-3 years	7 mg
Children aged 4-8 years	10 mg
Boys aged 9-18 years	8-11 mg
Girls aged 9-18 years	8-15 mg

How is iron deficiency anemia treated?

Iron is provided through the diet and with oral supplements. In special cases children are given iron intravenously.

There are 2 forms of food iron – '*heme*' iron and '*non-heme*' iron.

Heme iron is:

- Present in meats like beef, pork, seafood
- Absorbed very well in the body – about 15-35% absorbed

Amount of iron (mg) in 2½ ounces of:

Clams	21	Beef	2.4
Pork liver	13.4	Shrimp	2.3
Chicken liver	8.7	Sardines	2
Oysters	6.4	Turkey, Lamb	1.5
Mussels	5	Chicken	0.7
Beef liver	4.9	Fish	0.24

Non-heme iron is:

- Present in non-meat products like fruit, vegetables, grains
- Poorly absorbed – only 2-5% absorbed
- Better absorbed if eaten with meat, citrus juice, vitamin C

Amount of iron (mg) in:

Infant cereal, 1 cup	5-10	Spinach, ½ cup	3.4
Tofu, ¾ cup	2.5-8	Soy beans, ½ cup	2.4
Oatmeal, 1pkg	2.5-5.5	Quinoa, ½ cup	1.7
Lentils, ¾ cup	4.9	Brown bread, 1 sl	1.2
Hummus, ¾ cup	3-4.5	Eggs, 2	1.2

Iron supplements come in liquid and pill forms. All the supplements work equally well, but some may taste better or be gentler on the stomach. Iron supplements are usually tolerated well, but side effects can occur, such as stomach upset, constipation or diarrhea.

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IRON PREPARATIONS

Oral formulations

For best absorption, give on an empty stomach. If stomach upset occurs, may give with food or snack.

PRODUCT	SUPPLIED	NOTES
Ferrous fumarate (Palafer)	Capsule 300mg (100mg Elemental Iron)	
	Liquid 60mg/ml (20mg Elemental Iron/ml)	Cherry flavor May stain teeth – give with dropper or drink through straw
Ferrous gluconate (Fergon)	Tablet 300mg (35 mg Elemental Iron)	
Ferrous sulphate (Fer-in-sol)	Tablet 300 mg (60 mg Elemental Iron)	
	Syrup 30mg/ml (6 mg Elemental Iron/ml)	Lime flavor May stain teeth – give with dropper or drink through straw
	Drops 75mg/ml (15 mg Elemental Iron/ml)	Peppermint flavor May stain teeth – give with dropper or drink through straw
Feramax	Capsules 150mg (150 mg Elemental Iron)	
	Powder ¼ teaspoon (15 mg Elemental Iron/scoop)	

Intravenous formulations

An IV is placed in the child's vein and the iron is given directly to the bloodstream.

PRODUCT	SUPPLIED	NOTES
Iron sucrose (Venofer)	Suspension (20mg Iron/ml)	Must be given in health care facility No test dose required May cause an allergic reaction Generally well-tolerated with few side effects May be used in patients sensitive to iron dextran
Iron dextran complex (Infed)	Suspension (50mg Iron/ml)	Must be given in health care facility Test dose of 0.5ml must be given. May case an allergic reaction. If there is no reaction after 1 Hour, the remainder of the dose may be given