



GUIDE



Nutritional guidelines to help increase your intake of iron



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Disclaimer

This is general information developed by The Ottawa Hospital. It is not intended to replace the advice of a qualified health-care provider. Please consult your own health-care provider who will be able to determine the appropriateness of the information for your specific situation.

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A. What is iron?

Iron is a mineral, found in food, which you need to keep your body healthy. Your body contains less than a teaspoon of iron. Yet maintaining that small amount is a problem for many Canadians.

It is a particular problem for women in their child-bearing years, teenagers and children, but a concern for men, seniors and athletes as well.

B. Why your body needs iron?

Iron forms part of the hemoglobin in your red blood cells which carry oxygen throughout your body. This oxygen is used to release energy from the food that you eat—energy to grow, move, breathe, make the heart beat and keep warm.

People of all ages need iron for vitality. Iron is essential for keeping the body functioning at its best. Children and pregnant women need iron to help build new body tissue. Teenage girls and women need more iron to replace iron lost through menstruation. Athletes need iron to achieve peak performance.

C. What are the consequences?

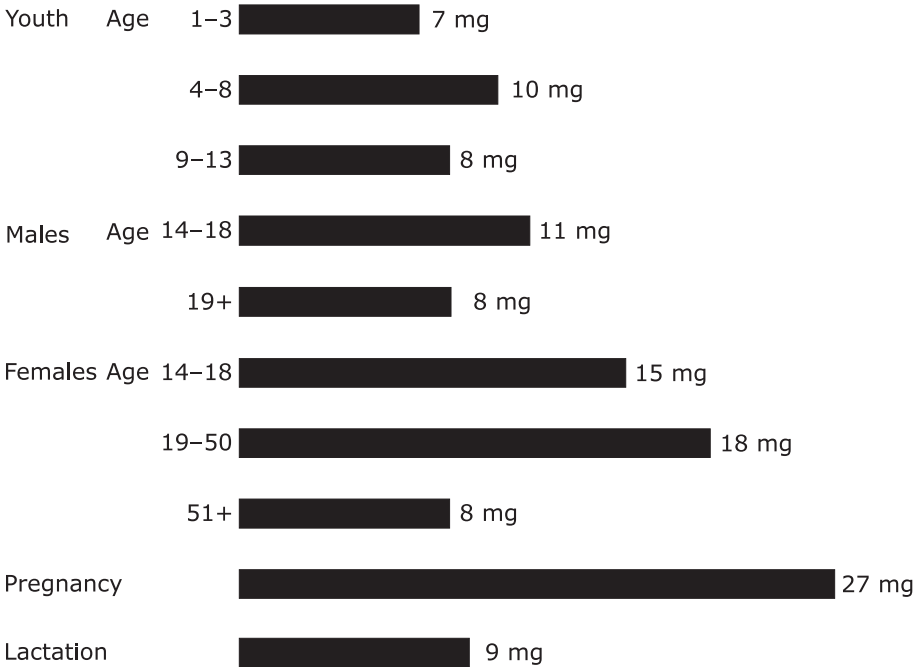
An iron shortage can result in a “dead-tired” feeling, poor appetite, pale listless appearance, weight loss, shortness of breath, sensitivity to cold, irritability and you may find it hard to pay attention. In children, low iron levels can also result in lower learning ability and depressed growth. This condition is called iron deficiency anemia.

Poor food habits are not the only cause of iron deficiency anemia, but frequently the problem is nutrition-related. Other times certain stresses such as pregnancy, or unusually large

or prolonged blood loss may cause anemia to develop more quickly.

D. How much iron do you need?*

The following is a summary of iron requirements from the Recommended Dietary Allowances (RDAs), which outlines the amount of nutrients needed each day by Canadians.



* People who eat no meat, fish or poultry may need more iron than indicated above, due to the lower availability of iron from plant foods and eggs.

E. Choose the best iron sources

Not many foods are rich in iron. That means you cannot depend on any one food to take care of your iron needs. Instead, you must obtain smaller amounts of iron from several different foods.

There are two types of iron in food. Heme iron from animal sources such as meat, fish and poultry is more readily used by the body (20 to 30%). Non-heme iron (eggs, dairy and cereal products, vegetable sources) is absorbed at 3 to 8% only. Here is a list to choose from.

Heme iron (20 to 30% absorption)

Excellent sources (4 to 8 mg/serving)

Clams	30 g (1 oz.)
Pork liver, cooked	30 g (1 oz.)
Liver.	90 g (3 oz.)
Heart	90 g (3 oz.)
Oysters	90 g (3 oz.)
Mussels	90 g (3 oz.)

Very good sources (2 to 4 mg/serving)

Liver pâté.	60 mL (¼ cup)
Tongue.	90 g (3 oz.)
Turkey – dark meat	90 g (3 oz.)
Beef	90 g (3 oz.)
Shrimps	90 g (3 oz.)
Sardines	90 g (3 oz.)
Grilled trout	90 g (3 oz.)

Good sources (1 to 2 mg/serving)

Pork	90 g (3 oz.)
Chicken	90 g (3 oz.)
Turkey – white meat	90 g (3 oz.)

Veal	90 g (3 oz.)
Lamb	90 g (3 oz.)
Haddock, herring	90 g (3 oz.)

Non-heme iron (3 to 8% absorption)

Excellent sources (4 to 8 mg/serving)

Enriched baby cereals	125 mL (½ cup)
Instant oatmeal	1 pouch
Bran flakes	40 g (1.25 oz.)
Breakfast cereals (All Bran, Shreddies)	200 mL (¾ cup)
Legumes (lentils, dried peas and beans)	250 mL (1 cup)

Very good sources (2 to 4 mg/serving)

Blackstrap molasses	15 mL (1 Tbsp)
Seeds	60 mL (¼ cup)
Wheat germ	75 mL (5 Tbsp)
Spinach, chard	125 mL (½ cup)
Other enriched breakfast cereals	200 mL (¾ cup)
Enriched egg noodles	250 mL (1 cup)
Potato with skin	1 medium

Good sources (1 to 2 mg/serving)

Cumin seeds, thyme	5 mL (1 tsp)
Cinnamon	10 mL (2 tsp)
Molasses	15 mL (1 Tbsp)
Sauerkraut, green peas, beet greens, fresh parsley	125 mL (½ cup)
Prune juice	125 mL (½ cup)
Beets, parsnip, broccoli, carrots (cooked)	250 mL (1 cup)
Chinese cabbage (cooked), mushrooms, snowpeas	250 mL (1 cup)
Canned tomatoes, corn niblets	250 mL (1 cup)

Vegetable juice, tomato juice.	250 mL (1 cup)
Raisins, apricots (dried).	50 mL (¼ cup)
Prunes (cooked)	5
Avocado.	½
Almonds, mixed nuts	28 g (1 oz.)
Egg	1
Millet (cooked)	250 mL (1 cup)
Pasta (whole grain and enriched)	250 mL (1 cup)
Whole wheat or enriched bread.	2 slices
Bagel	50 g (2 oz.)
Bran muffin	1

F. Maximize your iron absorption

It is important to keep in mind not only the iron content of the food you eat, but also how well it is absorbed by your body.

Several factors affect the quantity of iron which your body absorbs:

The form of iron eaten

Remember that heme iron is much better absorbed (refer to page 3). For example, while a serving of bran flakes contains more iron than a serving of beef, your body absorbs almost twice as much iron from the meat.

The combination of foods eaten

Vitamin C (ascorbic acid) increases the absorption of iron from cereal and vegetable products (2 to 3 times).

For example, if you drink a glass of orange juice with a bowl of oatmeal cereal, you will absorb more iron from the oatmeal than if you eat it alone.

A diet which contains meat, fish, or poultry increases the absorption of iron in other foods (2 to 4 times). Good combinations are: chili con carne, spaghetti with meat sauce, chicken noodle casserole, salmon broccoli quiche.

The absorption of heme iron is only slightly influenced by other foods in the diet.

Iron status

More iron is absorbed by the body when there is a greater need for iron. If body stores are low, the body adapts to absorb more iron from the diet. For example, absorption is more efficient in people who are anemic.

Iron inhibitors

Some foods contain iron inhibitors which decrease iron absorption. Oxalates in spinach and phytates in whole grains reduce the absorption of iron from these foods.

A high fibre intake in general may also reduce the absorption of non-heme iron. In fact, excessive amounts of bran and legumes (soy beans, split peas, dried beans and lentils) should be avoided. You should vary your sources of fibre.

Other common foods that contain inhibitors are tea and coffee. Tanins contained in tea reduce the absorption of non-heme iron by 50 to 75%. Drinking coffee may decrease it by 30%. You should wait at least 1 hour after a meal before drinking tea or coffee.

G. Boost the iron in your diet

Liver, kidney and other organ meats

Experiment with different ways of cooking them as tasty main courses. Add them to family favorites such as meatloaf, shepherd's pie, spaghetti sauce or stew. Serve pâté as an appetizer or snack on whole grain crackers or toast, or for lunch on a bagel, bun or bread.

Sardines, oysters, clams, mussels

Delicious with a salad or as a snack on wholegrain crackers or toast.

Eggs

Use in egg nog, as a main dish or garnish, or hard-boiled as a snack.

Dried peas, beans and lentils

Add them to soups and casseroles and use in baked beans, spaghetti, lasagna and chili. Offer them as purées (humus, pâté). Try mutli-cultural cuisines that use these ingredients.

Wheat germ

Sprinkle over cereals. Add to muffins and homemade breads. Shake onto salads and cooked vegetables for added crunch.

Brown barley

Use to thicken soups and stews.

Granola

Make your own with whole grain and enriched cereals, dried fruits, wheat germ, molasses and nuts. Mmmmmmm.

Currants, raisins and other dried fruits

Sprinkle on cereals, yogurt, fruit compotes. Add to favorite desserts and breads. Pack them in your lunch box.

Prune and tomato juices

Good to drink. Use in cooking too.

Green vegetables

Serve often, fresh, frozen or canned!

Blackstrap molasses

Add to muffins or baked beans in place of sugar.

Cookware

Preparing foods in cast-iron cookware increases iron content.

H. What about iron supplements?

If you're healthy, follow Canada's Food Guide to Healthy Eating and include high iron choices in your diet every day, you're not likely to need an iron supplement. Sensible eating is the key to getting enough iron, as it is to getting all the other nutrients you need.

If indicated, supplemental iron is best absorbed when taken between meals, with water or juice, and not at the same time as other supplements.

I. Iron-clad recipes

Iron-rich quick bread

250 mL	(1 cup)	all purpose flour*
250 mL	(1 cup)	whole wheat flour
30 mL	(2 tbsp)	wheat germ
10 mL	(2 tsp)	baking powder
5 mL	(1 tsp)	baking soda
5 mL	(1 tsp)	salt
250 mL	(1 cup)	quick oats
125 mL	(½ cup)	brown sugar
1		egg beaten
50 mL	(¼ cup)	vegetable oil
125 mL	(½ cup)	blackstrap molasses
300 mL	(1¼ cup)	buttermilk
250 mL	(1 cup)	raisins

Combine flours, wheat germ, baking powder, baking soda and salt. Stir oats and brown sugar; mix thoroughly. Add raisins. Combine egg, oil, molasses and buttermilk. Add to dry ingredients, stirring until thoroughly blended. Turn into greased 23×13×7 cm (9×5×3 in.) loaf pan. Bake in 180°C (350°F) oven for 50 minutes, or until toothpick comes out clean. Turn out on rack, and cool completely before slicing.

* You may replace 1 cup of all purpose flour with 2 cups of enriched baby cereals in any of your recipes to increase the iron content even more!

Cheese broccoli bake

283 g	(10 oz.)	package frozen broccoli, or one small bunch, fresh
4 to 6		hard cooked eggs
45 mL	(3 tbsp)	butter or margarine
45 mL	(3 tbsp)	flour
Pinch		salt, pepper and dry mustard
500 mL	(2 cups)	milk
250 mL	(1 cup)	grated Cheddar cheese
30 mL	(2 tbsp)	grated Parmesan cheese
30 mL	(2 tbsp)	wheat germ

Cut broccoli into thin stalks, and cook in boiling water until tender but still crisp. Spread in greased baking dish. Top with quartered eggs. While broccoli cooks, make sauce.

In saucepan, melt butter or margarine. Stir in flour and seasonings. Stir in milk, bring to boil, stirring until smooth and thickened. Stir in 175 mL ($\frac{3}{4}$ cup) grated Cheddar cheese. Pour over eggs and broccoli. Combine remaining Cheddar, Parmesan and wheat germ. Sprinkle on top of sauce. Bake in 200°C (400°F) oven about 10 minutes until heated through, then slip under the broiler to brown lightly. Makes about four servings.

Iron-clad meat-loaf

750 g	(1½ lbs.)	lean ground beef
115–170 g	(4–6 oz.)	pork liver (ground in blender or food processor)
1		egg
1		small raw potato, grated
125 mL	(½ cup)	wheat germ
50 mL	(¼ cup)	skim milk powder
125 mL	(½ cup)	chopped onion
7 mL	(1½ tsp)	salt

Pinch		pepper
5 mL	(1 tsp)	Worcestershire sauce
15 mL	(1 tbsp)	prepared mustard
30 mL	(2 tbsp)	tomato juice

Combine all ingredients. Mold into a 23 × 13 × 7 cm (9 × 5 × 3 in.) loaf pan. Bake in 180°C (350°F) oven for 1 hour. Serve with chili sauce or your favourite tomato sauce.

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