

Iodine Deficiency

WHAT IS THE THYROID GLAND?

Your thyroid gland is a butterfly-shaped gland located in the lower front of your neck. The job of your thyroid gland is to make thyroid hormones. Thyroid hormones are released into your blood and carried to every tissue in your body. Thyroid hormones help your body use energy, stay warm and keep your brain, heart, muscles, and other organs working normally.

WHAT IS IODINE DEFICIENCY?

Iodine deficiency is when your body does not get enough iodine for the thyroid gland to work normally.

- Thyroid cells need iodine to make thyroid hormone. If you do not have enough iodine in your body, you cannot make enough thyroid hormone.
- Iodine deficiency can cause:
 - your thyroid gland to grow too big (goiter – see [Goiter brochure](#)),
 - your thyroid gland to not make enough thyroid hormone (hypothyroidism) (see [Hypothyroidism brochure](#)),
 - intellectual disabilities in babies whose mothers did not have enough iodine during pregnancy.
- The body does not make iodine, so you need to get it from the foods you eat. Iodine is found in various food (see Table 1)

Before the 1920s, iodine deficiency was common in the Great Lakes, Appalachian, and Northwestern United States (U.S.) regions and in most of Canada. When people started using iodized salt, iodine deficiency became much less common in the U.S. and Canada.

Today, people in many parts of the world still do not have enough iodine and iodine deficiency continues to be a public health problem. About 30% of the people in the world are at risk for iodine deficiency.

Table 1: Common Sources of Dietary Iodine

Iodized table salt
Iodine-containing multivitamins
Seaweed (kelp, kombu, nori, dulse)
Saltwater fish (cod, sardines, salmon, tuna)
Shellfish (scallops, shrimp)
Dairy (milk, cheese, yogurt)
Eggs

HOW DO YOU DIAGNOSE IODINE DEFICIENCY?

Iodine is hard to measure in the body because it is mostly inside of your thyroid gland. Since iodine leaves the body in the urine, we can measure the amount of iodine in a urine sample.

- Iodine deficiency is different for pregnant vs non-pregnant people. For pregnant people, iodine deficiency is defined as iodine level in the urine of less than 150µg/L in nonpregnant people, it is less than 100 µg/L urine.
- Some regions of the world have been identified as iodine deficient based on low urinary iodine levels in the people living in these areas.



IODINE DEFICIENCY

WHERE DO YOU GET IODINE?

Iodine is present naturally in soil, seawater, and in some foods (see Table 1). The amount of iodine in foods differs in regions of the world.

- In the United States, iodine is found in iodized table salt, fish, dairy products, meat, some bread, eggs, or in multivitamins containing iodine.
 - Sea salt and Pink Himalayan salt contain some iodine, but not as much as iodized table salt. Kosher salt and non-iodized table salt do not contain iodine.
- If you do not regularly eat foods containing iodine (such as dairy, seafood, or eggs) or iodized salt, you may not be getting enough iodine and will be at risk for iodine deficiency unless you take a multivitamin containing iodine.
- The amount of iodine in foods is not usually listed on food packaging in the U.S., and it can be difficult to identify sources of iodine in foods. For more information:
<https://www.ign.org/4-where-do-we-get-iodine-from.htm>
or
<https://ods.od.nih.gov/pdf/factsheets/Iodine-Consumer.pdf>

WHAT ARE THE SYMPTOMS OF IODINE DEFICIENCY?

All the symptoms of iodine deficiency are due to its effect on the thyroid gland:

- GOITER – When iodine levels are too low, the thyroid gland gets bigger (a goiter) as it tries to make more thyroid hormone.
 - Worldwide, iodine deficiency is the most common cause of goiter (see [Goiter brochure](#)).
 - Within a goiter, thyroid nodules can develop (see [thyroid nodule brochure](#)).
 - If you have a large goiter, you may have symptoms of neck pressure or a feeling of choking, especially when lying down, as well as difficulty swallowing and breathing.

- HYPOTHYROIDISM – Without enough iodine to make thyroid hormone, hypothyroidism may develop.
 - While this is uncommon in the United States, iodine deficiency is a common cause of hypothyroidism worldwide (see [Hypothyroidism brochure](#)).
 - Treating your iodine deficiency by getting iodine from your foods or supplements can help correct this form of hypothyroidism.
 - Adding iodine through foods or supplements is not needed and will not be helpful if you have hypothyroidism from another cause such as autoimmune thyroiditis (Hashimoto's thyroiditis) or if you are taking thyroid hormone medication.
- PREGNANCY-RELATED PROBLEMS – Iodine deficiency is especially important in women who are pregnant or breastfeeding.
 - Severe iodine deficiency in a pregnant mother can cause miscarriage, stillbirth, preterm delivery, and birth defects in the baby.
 - Babies born to mothers with severe iodine deficiency during pregnancy can have intellectual disabilities and problems with growth, hearing, and speech.
- In the most severe form, an underactive thyroid due to iodine deficiency can result in the medical condition called cretinism, (which can cause permanent brain damage, deaf mutism, spasticity, and short stature).
- Iodine deficiency is still the most common preventable cause of intellectual disabilities in the world.
 - Even mild iodine deficiency during pregnancy, which may be present in some women in the United States, may be associated with low intelligence in children.



IODINE DEFICIENCY

HOW IS IODINE DEFICIENCY TREATED?

- For people living in an area of the world with low levels of iodine, it is important to add iodine to foods that people commonly eat or to add iodine to salt (iodized salt).
 - Over the last 80 years, worldwide efforts have been made to put an end to iodine deficiency. Ending iodine deficiency has been a major goal of the Iodine Global Network, UNICEF, and the World Health Organization.
- Even mild iodine deficiency during pregnancy can have effects on a pregnancy and the developing baby. If you are planning pregnancy, are pregnant, or are breastfeeding, you should take a multivitamin containing 150 µg iodine every day.
 - Be sure to check the label of your prenatal vitamin since not all prenatal vitamins contain iodine.

HOW IS IODINE DEFICIENCY PREVENTED?

As with many diseases, it is better to prevent iodine deficiency rather than treat it.

- Iodized salt has been the main tool to prevent iodine deficiency worldwide.
- In regions where iodized salt is not widely available, or where pregnant women are known to have inadequate iodine intake, use of daily iodine-containing vitamins is recommended for pregnant and breastfeeding women.

UNITED STATES RECOMMENDATIONS

The Institute of Medicine has set the Recommended Dietary Allowance (RDA) for iodine intake in adult men and women at 150 µg per day.

- People who add salt to their food regularly during cooking or at the table should use iodized salt. In the US and Canada, one teaspoon of iodized salt contains approximately 250 µg iodine.
- The major food sources of iodine in the U.S. are dairy products, seafood, and eggs. If you follow a vegan diet, you may not be getting enough iodine unless you add an iodine supplement, such as a multivitamin.
- Most U.S. iodine-containing multivitamins for non-pregnant adults have at least 150 µg iodine, but only about 60% of the prenatal multivitamins in the U.S. contain iodine.

RECOMMENDATIONS FOR IODINE INTAKE DURING PREGNANCY AND BREAST FEEDING

Recommended iodine intake is higher for women who are pregnant or breastfeeding. The RDA is 220 µg of iodine per day for pregnant women and 290 µg of iodine per day for breastfeeding women.

- Because the effects of iodine deficiency are most severe in pregnant women and their babies, the American Thyroid Association® has recommended that all U.S. women who are planning pregnancy, pregnant, or breastfeeding take a prenatal multivitamin containing at least 150 µg iodine daily.

ARE THERE PROBLEMS WITH TAKING TOO MUCH IODINE?

Taking too much iodine can also cause problems.

- This is especially true if you already have thyroid problems, such as nodules, hyperthyroidism, and autoimmune thyroid disease.
- Taking large amounts of iodine through medications (e.g., Amiodarone), radiology procedures (iodinated intravenous dye) and dietary excess (dulse, kelp) can make hyperthyroidism and hypothyroidism worse.
- If you move from an iodine deficient region (for example, parts of Europe) to a region with enough iodine intake (for example, the United States), you may develop thyroid problems since your thyroid gland has become very good at using small amounts of iodine. In particular, you may develop iodine-induced hyperthyroidism (see [Hyperthyroidism brochure](#)).

