

Sodium and the Diet

Fact Sheet 9.354

Food and Nutrition Series | Health

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What is Sodium?

Sodium is an essential mineral and electrolyte necessary for many functions in the body. It has an important role in maintaining water balance within cells, and is involved in proper functioning of both nerve impulses and muscle activity within the body. Along with potassium, sodium also plays a crucial role in blood pressure regulation. Sodium is only needed in small quantities, and the kidneys are responsible for excreting extra sodium from the body.

Sources of Sodium

Sodium in Food—A small amount of sodium is naturally present in most foods, but most dietary sodium is found in processed foods in the form of salt. Salt may be added for flavor enhancement and to extend the shelf life of certain foods. Salt is added to most canned foods, some frozen vegetables, fast foods, smoked and cured meats, and pickled foods (Table 1). It is used in most cheeses, sauces, soups, salad dressings and many breakfast cereals. It is also commonly found in other ingredients used in food processing. Many commercially prepared condiments and seasonings are also high in sodium. The food industry is working to decrease sodium content in these food items.

Sodium in Salt—Sodium is a component of salt. Table salt is made up of a 1:1 ratio of sodium and chloride, but is 40%

sodium and 60% chloride by weight. The sodium portion of salt is associated with high blood pressure.

How Much Sodium is Required?

The Adequate Intake (AI) for sodium is 1,500 milligrams per day for males and females ages 19 years and above. The maximum recommended level of sodium intake is 2,300 milligrams per day, which is equal to about one teaspoon of table salt. On average, nearly 90% of adult Americans consume sodium in amounts that far exceed the maximum recommended level of intake of 2,300 milligrams per day.

Sodium Deficiency

Sodium deficiency is extremely rare, as most Americans over-consume sodium. Deficiency usually only occurs with prolonged bouts of fluid loss due to diarrhea, vomiting, or perspiration. However, those who have chronic kidney disease who undergo frequent dialysis may also be more likely to develop a sodium deficiency. Symptoms of deficiency include nausea, dizziness, and muscle cramps.



Quick Facts

- A diet high in sodium may be one factor in the development of high blood pressure, also called hypertension.
- Sodium is a component of salt: table salt is 40% sodium and 60% chloride, by weight.
- Processed and preserved food items such as canned foods, fast foods, cheese, and condiments usually have high sodium content, and are the main sources of dietary sodium for Americans.
- Several food industries are discovering methods to decrease sodium in their products.
- The Adequate Intake (AI) for all individuals is 1,500 milligrams per day. Even though all are advised not to exceed 1,500mg per day, those with certain conditions such as kidney disease, heart failure, osteoporosis, or hypertension are even more encouraged to meet this recommendation to reduce complications.

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Special Considerations

For athletes and those strenuously active for more than one hour in duration—Those exposed to conditions promoting sweat loss for extended periods may be at risk for low blood sodium levels, or hyponatremia. For those who are well hydrated and active for more than four hours, it is important to replenish sodium stores in the body. Usually, sodium losses can be easily replaced during the next meal. However, in endurance exercise longer than four hours, sodium stores should be replaced during exercise with food or sports drink. For more information on nutrition and exercise, see fact sheet Nutrition for the Athlete.

Too Much Sodium?

Most Americans consume too much sodium. However, there is not enough evidence to establish a Tolerable Upper Limit Level (UL) for sodium, as toxicity is not common in healthy individuals. Although not considered an UL value, the maximum recommended sodium intake for healthy adults is 2,300 milligrams per day. This maximum value is set in order to best prevent chronic disease and hypertension. Even so, all individuals are still encouraged to limit their sodium intake to 1,500 milligrams per day, unless contraindicated due to conditions that increase risk for deficiency.

In healthy individuals, excess sodium is usually excreted by the kidneys without an issue in the short term. However, chronic consumption of sodium over the adequate intake can result in hypertension, and even edema and water retention.

Special Conditions for a Low Sodium Diet:

Although it is now recommended that all individuals strive to limit sodium intake to 1,500mg per day, there are certain conditions (listed below) that require even closer adherence to this recommendation.

Kidney Disease:

Those with kidney disease may have trouble excreting sodium and other minerals, leading to water retention and swelling.

Congestive Heart Failure:

Those with heart failure experience swelling and fluid retention in the lungs and throughout the body. Since sodium promotes fluid retention, a low sodium diet may be helpful in relieving fluid accumulation.

Osteoporosis:

Women who consume excess sodium may be at higher risk for developing osteoporosis even if calcium intake is adequate. There is evidence suggesting that high sodium diets can lead to greater calcium excretion by the kidneys.

Hypertension:

High sodium consumption is one factor involved in the development of hypertension. Hypertension tends to develop as people age, and can lead to cardiovascular disease. A high intake of sodium early in life might weaken genetic defenses against developing hypertension. Experts recommend reducing sodium intake while blood pressure is still normal, which may decrease the risk for hypertension later in life.

For those with hypertension or any other special condition, following an overall eating plan known as DASH (Dietary Approaches to Stop Hypertension) and restricting sodium intake to 1,500 milligrams per day, may be useful for lowering blood pressure. Increasing potassium intake has also been shown to have beneficial effects for lowering blood pressure. For more information about the DASH eating plan or diet and hypertension, see fact sheet Diet and Hypertension and Understanding the DASH Diet. For more information on potassium and the diet, see fact sheet Potassium and the Diet.

Sodium Labeling - Health Claims

Specific health claims can be made about sodium for food products that meet certain requirements. For example, “A diet low in sodium may reduce the risk of hypertension, a disease associated with many factors.” In order to make a health claim about sodium and hypertension, the food must be low or very low in sodium. The following terms describe health claims from products that may help to reduce sodium intake:

- Sodium free: Less than 5 milligrams of sodium per serving.
- Very low sodium: 35 milligrams of sodium or less per serving.
- Low sodium: 140 milligrams of sodium or less per serving.
- Reduced sodium or Less sodium: At least 25% less sodium per serving than the reference food.
- Light in sodium: At least 50% less sodium per serving than the reference food.
- Unsalted or No salt added: No sodium has been added to the product, but the product still contains small amounts of naturally occurring sodium.

Steps to Reduce Sodium

An important recommendation from the Dietary Guidelines for Americans is to reduce consumption of sodium. The following suggestions are starting points to reduce dietary sodium:

- Consume more fresh fruits and vegetables and unprocessed, lean meats. Processed foods usually contain more sodium than whole, minimally processed or unprocessed foods (Table 1).
- When cooking, use canola oil or olive oil, which contain less sodium than butter or margarine.

- Check food labels for the words salt or sodium. Salt often is used as a preservative or flavoring agent. Any ingredient that has sodium, salt or soda as part of its name (monosodium glutamate (MSG), baking soda, and seasoned salt) contains sodium. For more information on food labels, see handout Reading Food Labels. Purchase foods low in sodium (Table 2).
- Do not use salt substitutes, especially those that contain potassium, without first talking to a medical professional. Remove the saltshaker from the table and season foods with herbs and spices rather than salt (Table 2).
- Try products such as low or reduced sodium to curb sodium intake (Table 1).
- Plan meals that contain less sodium. Try new recipes that use less salt and sodium-containing ingredients and seasonings. Adjust your own recipes by reducing such ingredients a little at a time. Make homemade condiments, dressings and sauces that are low in sodium.
- If using canned food, rinse in water to remove some of the salt before preparing or serving.
- Taste food before it is salted, it simply may not need it!

Salt-Sodium Conversions

- 1/4 teaspoon of salt = 575 milligrams of sodium
- 1/2 teaspoon of salt = 1,150 milligrams of sodium
- 2/3 teaspoon of salt = 1,500 milligrams of sodium
- 3/4 teaspoon of salt = 1,725 milligrams of sodium
- 1 teaspoon of salt = 2,300 milligrams of sodium



Table 1: Examples of no salt added, low sodium, and high sodium products categorized by food group

	No salt added	Low sodium (115 mg or less per serving)	High sodium (460 mg or more per serving)
Vegetables (1/2 cup serving)	<ul style="list-style-type: none"> • Fresh • <i>No salt added</i> canned varieties • Most frozen 	<ul style="list-style-type: none"> • <i>Low sodium</i> canned varieties 	<ul style="list-style-type: none"> • Some <i>regular</i> canned varieties • Most pickled products
Fruits (1/2 cup serving)	<ul style="list-style-type: none"> • Fresh • Frozen • Most canned varieties (not pickled) • Dried and unsalted 	<ul style="list-style-type: none"> • Dried and <i>lightly salted</i> 	<ul style="list-style-type: none"> • Pickled (ex: olives) • Dried and salted (found in most trail mixes)
Meats (2 ounce serving)	<ul style="list-style-type: none"> • Freshly cut or ground and uncured (one ingredient, nothing added) 	<ul style="list-style-type: none"> • <i>Low sodium</i> Deli style • Homemade sausages (made with fresh meats and only a little salt) 	<ul style="list-style-type: none"> • <i>Regular</i> Deli style • Some <i>lower sodium</i> Deli style • Bacon • Sausages (including hot dogs and bratwurst)
Fish (2 ounce serving)	<ul style="list-style-type: none"> • Most freshly trimmed varieties (one ingredient, nothing added) 	<ul style="list-style-type: none"> • Most canned varieties 	<ul style="list-style-type: none"> • Most fried fish sticks
Nuts/seeds (1 ounce serving)	<ul style="list-style-type: none"> • <i>Unsalted</i> varieties • <i>Unsalted</i> nut butters 	<ul style="list-style-type: none"> • Most <i>salted</i> and <i>lightly salted</i> varieties • Nut butters 	<ul style="list-style-type: none"> • Some <i>salted</i> varieties
Legumes (1/2 cup serving)	<ul style="list-style-type: none"> • Dried and soaked • <i>No salt added</i> canned varieties 	<ul style="list-style-type: none"> • <i>Low sodium</i> canned varieties • <i>Low sodium</i> refried beans 	<ul style="list-style-type: none"> • Some <i>regular</i> canned varieties • Most pickled products • Refried beans
Dairy (4 ounce serving)	<ul style="list-style-type: none"> • Milk • Some yogurts 	<ul style="list-style-type: none"> • Some flavored milk varieties • Most yogurts 	<ul style="list-style-type: none"> • Most cheeses
Fats (1 tablespoon)	<ul style="list-style-type: none"> • Cooking oils • Unsalted butter • Coconut oil • Lard 	<ul style="list-style-type: none"> • Salted Butter • Most margarines 	<ul style="list-style-type: none"> • Bacon fat

Table 2: Low sodium flavoring options versus high sodium products

Flavor	Low sodium choice	High sodium choice
Garlic	Fresh garlic, garlic powder	Garlic salt
Onion	Fresh onion, onion powder	Onion salt
Citrus	Fresh squeezed lemon/lime juice or zest	Lime salt, lemon pepper blends
Herbs (basil, oregano, thyme, rosemary, etc.)	Fresh herbs, dried herbs	Most seasoning blends and pestos
Spice (for color or flavor)	Turmeric, paprika, cumin	Season salt
Spice (for heat)	Fresh hot peppers, cayenne pepper, crushed red pepper	Most hot sauces and pickled peppers

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