National Institutes of Health
Office of Dietary Supplements

Zinc

Fact Sheet for Consumers

For information on zinc and COVID-19, see Dietary Supplements in the Time of COVID-19.

What is zinc and what does it do?

Zinc is a nutrient that people need to stay healthy. Zinc is found in cells throughout the body. It helps your immune system fight off invading bacteria and viruses. Your body also uses zinc to make DNA (the genetic material in cells) and proteins. During pregnancy, infancy, childhood, and adolescence the body needs zinc to grow and develop properly. Zinc also helps wounds heal and is important for the proper sense of taste.

How much zinc do I need?

The amount of zinc you need each day depends on your age. Average daily recommended amounts for different ages are listed below in milligrams (mg).

Life Stage	Recommended Amount
Birth to 6 months	2 mg
Infants 7–12 months	3 mg
Children 1–3 years	3 mg
Children 4–8 years	5 mg
Children 9–13 years	8 mg
Teen males 14–18 years	11 mg
Teen females 14–18 years	9 mg
Adult males	11 mg
Adult females	8 mg
Pregnant teens	12 mg
Pregnant adults	11 mg
Breastfeeding teens	13 mg
Breastfeeding adults	12 mg

What foods provide zinc?

Many foods contain zinc. You can get recommended amounts of zinc by eating a variety of foods including the following:

- Oysters, which have very high amounts of zinc.
- Meat, fish, poultry, seafood such as crab and lobsters, and fortified breakfast cereals are also good sources of zinc.
- Beans, nuts, whole grains, eggs, and dairy products provide some zinc.

What kinds of zinc dietary supplements are available?

Almost all multivitamin/mineral dietary supplements contain zinc. Zinc is also available alone or combined with calcium, magnesium, or other ingredients in dietary supplements.

Dietary supplements can have several different forms of zinc, such as zinc sulfate, zinc acetate, and zinc gluconate. It's not clear whether one form is better than the others.

Zinc is also found in some denture adhesive creams and over-the-counter products, including those labeled as homeopathic medications for colds.

Am I getting enough zinc?

Most people in the United States get enough zinc from the foods they eat.

However, certain groups of people may have trouble getting enough zinc:

- People who have had gastrointestinal surgery, such as weight loss surgery, or people who have digestive disorders, such as ulcerative colitis or Crohn's disease. These conditions can decrease the amount of zinc that the body absorbs and increase the amount that is lost in urine.
- People who follow vegetarian or vegan diets because they do not eat meat, which is a good source of zinc. Also, beans and grains contain phytates that reduce the amount of zinc the body absorbs. Vegetarians and vegans might benefit from taking zinc supplements.
- People who are pregnant or breastfeeding because they need more zinc for their growing baby and to make breast milk.
- Older infants who are breastfed because breast milk does not provide enough zinc for infants over 6 months of age. Older infants should be given foods that have zinc, such as pureed meats.
- Children who have sickle cell disease, possibly because the medications they take can cause low levels of zinc. These children might benefit from taking zinc supplements.
- People who have alcohol use disorder, because alcohol reduces the amount of zinc the body absorbs and increases the amount that is lost in urine. Also, people with alcohol use disorder tend to consume lower amounts of nutrients, including zinc.

What happens if I don't get enough zinc?

Zinc deficiency causes diarrhea, slow growth, and loss of appetite in infants and children. Infants and children who have had a zinc deficiency may have reproductive problems when they become adults. In older children, zinc deficiency also causes hair loss and frequent infections.

Zinc deficiency at any age can cause a loss of taste and smell. In older adults, zinc deficiency can delay wound healing and cause problems with thinking, reasoning, and memory.

In lower income countries, zinc deficiency during pregnancy can cause premature births and other complications. Babies may have low weight at birth and a higher risk of death.

Many of these symptoms can be signs of problems other than a zinc deficiency. If you have any of these symptoms, your health care provider can help determine if you might have a zinc deficiency.

What are some effects of zinc on health?

Scientists are studying zinc to better understand how it affects health. Here are several examples of what research on zinc has shown.

The common cold

Some studies suggest that zinc lozenges or zinc syrup speeds recovery from the common cold if you start taking them at the start of a cold. However, these products don't seem to affect the severity of cold symptoms. More study is needed to determine the best dose and form of zinc for the common cold as well as how often and how long it should be taken.

Pneumonia in children

Some studies in lower income countries show that zinc supplements lower the risk of pneumonia in young children. Zinc doesn't seem to speed recovery or reduce the number of deaths from pneumonia.

HIV in children and adults

Many people with HIV have low zinc levels. This occurs because they have trouble absorbing zinc from food. They also often have diarrhea, which increases zinc loss. Some studies show that supplemental zinc decreases diarrhea and complications of HIV, but other studies do not show this. Zinc supplements do not appear to reduce the risk of death in people with HIV. More research is needed to determine whether zinc supplements might help people with HIV.

Childhood diarrhea

Children in developing countries often die from diarrhea. Studies show that zinc supplements help reduce the duration of diarrhea in these children, many of whom are zinc deficient or otherwise malnourished. The World Health Organization and UNICEF recommend that children with diarrhea take zinc for 10–14 days (20 mg/day, or 10 mg/day for infants under 6 months). It's not clear whether zinc supplements help treat diarrhea in children who get enough zinc, such as most children in the United States.

Age-related macular degeneration

Age-related macular degeneration (AMD) is an eye disease that gradually causes vision loss. In large studies among older people with AMD who were at high risk of developing advanced AMD, those who took daily dietary supplements with zinc and other ingredients for 5 years had a lower risk of

developing advanced AMD than those who did not take the supplements. The ingredients in the supplements were: 80 mg zinc plus vitamin E, vitamin C, copper, and either beta-carotene or lutein and zeaxanthin. People who have or are developing AMD should talk with their doctor about taking a dietary supplement called AREDS or AREDS2 (https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/age-related-macular-degeneration/nutritional-supplements-age-related-macular-degeneration).

Type 2 diabetes

People with type 2 diabetes often have low zinc levels. Some research shows that zinc supplements might help lower blood sugar and cholesterol levels. However, more research is needed to learn if zinc might be recommended for people with type 2 diabetes.

Can zinc be harmful?

Yes, too much zinc can be harmful. Signs of too much zinc include nausea, dizziness, headaches, upset stomach, vomiting, and loss of appetite. If you take too much zinc for a long time, you could have problems such as lower immunity, low levels of high-density lipoprotein (HDL) (good) cholesterol, and low copper levels. Taking very high doses of supplemental zinc can reduce your body's absorption of magnesium.

Using large amounts of denture creams that contain zinc, well beyond what the label recommends, could lead to excessive zinc intake and copper deficiency. This can cause neurological problems, including loss of coordination, numbness, and weakness in the arms, legs, and feet.

The daily upper limits for zinc include intakes from all sources—foods, beverages, supplements, and medications. The chart below lists the amounts by age group. These upper limits do not apply to people who take supplemental zinc for medical reasons under the care of a doctor.

Ages	Upper Limit
Birth to 6 months	4 mg
Infants 7–12 months	5 mg
Children 1–3 years	7 mg
Children 4–8 years	12 mg
Children 9–13 years	23 mg
Teens 14–18 years	34 mg
Adults	40 mg

Does zinc interact with medications or other dietary supplements?

Yes. Zinc dietary supplements can interact or interfere with some medicines you might take. In some cases, medicines can lower zinc levels in your body. Here are several examples:

- Both quinolone antibiotics (such as Cipro) and tetracycline antibiotics (such as Achromycin and Sumycin) might reduce the amount of both zinc and the antibiotic that your body absorbs. To help avoid this interaction, take the antibiotic at least 2 hours before, or 4 to 6 hours after, taking a zinc supplement.
- Penicillamine is a drug used to treat rheumatoid arthritis and Wilson disease. Zinc supplements can reduce the amount of penicillamine that your body absorbs. To help avoid this interaction, take zinc supplements and penicillamine at least 1 hour apart.
- Thiazide diuretics, such as chlorthalidone (Hygroton) and hydrochlorothiazide (Esidrix and HydroDIURIL) increase the amount of zinc lost in urine. Taking thiazide diuretics for a long time might decrease the amount of zinc in your body.

Tell your doctor, pharmacist, and other health care providers about any dietary supplements and prescription or over-the-counter medicines you take. They can tell you if the dietary supplements might interact with your medicines. They can also explain whether the medicines you take might interfere with how your body absorbs or uses other nutrients.

Zinc and healthful eating

People should get most of their nutrients from food and beverages, according to the federal government's *Dietary Guidelines for Americans*. Foods contain vitamins, minerals, dietary fiber, and other components that benefit health. In some cases, fortified foods and dietary supplements are useful when it is not possible to meet needs for one or more nutrients (for example, during specific life stages such as pregnancy). For more information about building a healthy dietary pattern, see the *Dietary Guidelines for Americans* (https://www.dietaryguidelines.gov/) and the U.S. Department of Agriculture's (USDA's) MyPlate (https://www.myplate.gov/).

Where can I find out more about zinc?

- For general information on zinc
  - Office of Dietary Supplements (ODS) Health Professional Fact Sheet on Zinc and Consumer Fact Sheet on Zinc in Spanish
  - Zinc (https://medlineplus.gov/druginfo/natural/982.html) and Zinc in diet (https://medlineplus.gov/ency/article/002416.htm), MedlinePlus
- For more information on food sources of zinc
  - USDA's FoodData Central (https://fdc.nal.usda.gov/)
  - Nutrient List for zinc (listed by food (https://ods.od.nih.gov/pubs/usdandb/Zinc-Food.pdf) or by zinc content (https://ods.od.nih.gov/pubs/usdandb/Zinc-Content.pdf)), USDA
- For more advice on choosing dietary supplements
  - ODS Frequently Asked Questions: Which brand(s) of dietary supplements should I purchase? (https://ods.od.nih.gov/HealthInformation/ODS_Frequently_Asked_Questions.aspx#h9)
- For information about building a healthy dietary pattern
  - MyPlate (https://www.myplate.gov/)
  - *Dietary Guidelines for Americans* (https://www.dietaryguidelines.gov/)

Disclaimer

Glossary

absorption
: In nutrition, the process of moving protein, carbohydrates, fats, and other nutrients from the digestive system into the bloodstream. Most absorption occurs in the small intestine.

age-related macular degeneration
: AMD. An eye disease that results in a loss of central, “straight-ahead” vision. AMD is the leading cause of vision loss in older Americans.

antibiotic
: A drug used to treat infections caused by bacteria and other microorganisms.

bacteria
: Single-celled organisms that are too small to be seen without a microscope. Bacteria are found everywhere and may be helpful or harmful.

beta-carotene
: A carotenoid found in carrots, cantaloupe, apricots, sweet potatoes, pumpkin, winter squash, mangos, collard greens, spinach, kale, broccoli, and other orange, red, and dark green fruits and vegetables.

calcium
: A mineral found throughout the body. Calcium is needed for healthy bones and teeth, for nerves and enzymes to function properly, and for blood clotting. Calcium is found in some foods, including milk, yogurt, and cheese, and in Chinese cabbage, kale, broccoli and fortified foods, such as many drinks, tofu, and cereals.

cell
: The individual unit that makes up the tissues of the body. All living things are made up of one or more cells, which are the smallest units of living structure capable of independent existence.

cholesterol
: A substance found throughout the body. It is made by the liver and is an important component of cells. Cholesterol is also used to make hormones, bile acid, and vitamin D. Foods that come from animals contain cholesterol, including eggs, dairy products, meat, poultry and fish. High blood levels of cholesterol increase a person’s chance (risk) of developing atherosclerosis and heart disease.

common cold
: A nose and throat infection caused by a virus. Symptoms include runny nose, sneezing, congestion, sore throat, and cough.

copper
: In nutrition, a mineral the body needs (along with iron) to make red blood cells. Copper also helps keep the immune system, blood vessels, nerves, and bones healthy. Copper is found in some foods, including oysters and other shellfish, whole grains, beans, nuts, potatoes, organ meats, dark leafy greens, and dried fruits.

Crohn’s disease
: A long-lasting (chronic) disease that causes severe irritation in the gastrointestinal tract. It usually affects the lower small intestine (called the ileum) or the colon, but it can affect any part of the digestive tract from the mouth to the anus. It is painful, causing severe watery or bloody diarrhea, and may lead to life-threatening complications. Crohn’s disease is a form of inflammatory bowel disease.

dairy food

Milk and products made with milk, such as buttermilk, yogurt, cheese, cottage cheese, and ice cream.

deficiency
: An amount that is not enough; a shortage.

deoxyribonucleic acid
: DNA. The molecules inside cells that carry genetic information and pass it from one generation to the next.

diarrhea
: Loose, watery stools.

dietary fiber
: A substance in plants that you cannot digest. It adds bulk to your diet to make you feel full, helps prevent constipation, and may help lower the risk of heart disease and diabetes. Good sources of dietary fiber include whole grains (such as brown rice, oats, quinoa, bulgur, and popcorn), legumes (such as black beans, garbanzo beans, split peas, and lentils), nuts, seeds, fruit, and vegetables.

Dietary Guidelines for Americans
: Advice from the federal government to promote health and reduce the chance (risk) of long-lasting (chronic) diseases through nutrition and physical activity. The Guidelines are updated and published every 5 years by the US Department of Health and Human Services and the US Department of Agriculture.

dietary supplement
: A product that is intended to supplement the diet. A dietary supplement contains one or more dietary ingredients (including vitamins, minerals, herbs or other botanicals, amino acids, and other substances) or their components; is intended to be taken by mouth as a pill, capsule, tablet, or liquid; and is identified on the front label of the product as being a dietary supplement.

digestive disorder
: An abnormal condition affecting any part of the digestive tract (mouth, esophagus, stomach, small and large intestines, rectum and anus) or organs involved in digestion (such as the stomach, liver, pancreas, or gallbladder). Also called digestive disease.

diuretic
: A drug or other substance that increases the amount of urine made by the body.

dose
: The amount of medicine or other substance taken at one time or over a specific period of time.

drug
: Any substance (other than food) that is used to prevent, diagnose, treat, or relieve symptoms of a disease or abnormal condition. Also, a substance that alters mood or body function or that can be habit-forming or addictive, especially a narcotic.

duration
: The length of time that something lasts.

fortified
: When nutrients (such as vitamins and minerals) are added to a food product. For example, when calcium is added to orange juice, the orange juice is said to be “fortified with calcium”. Similarly, many breakfast cereals are “fortified” with several vitamins and minerals.

gastrointestinal
: GI. Having to do with the gastrointestinal tract (the large, muscular tube that extends from the mouth to the anus, where the movement of muscles and release of hormones and enzymes digest food).

gene

The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein.

homeopathy

An alternative medical system based on the ideas that “like cures like” (a disease can be cured by a substance that produces similar symptoms in healthy people) and the “law of minimum dose” (the lower the dose of medication, the greater its effectiveness). Homeopathic remedies are made from plant, mineral, or animal substances and are available as pills placed under the tongue, ointments, gels, drops, and creams.

immune system

A group of organs and cells that defends the body against infection, disease, and altered (mutated) cells. It includes the thymus, spleen, lymphatic system (lymph nodes and lymph vessels), bone marrow, tonsils, and white blood cells.

immunity

The condition of being protected against or resistant to an infectious disease.

infant

A child younger than 12 months old.

infection

The invasion and spread of germs in the body. The germs may be bacteria, viruses, yeast, or fungi.

ingredient

In a dietary supplement, an ingredient is a component of the product, such as the main nutrient (vitamin, mineral, herb, amino acid, or enzyme) or any binder, color, filler flavor, or sweetener. In herbal supplements, the common name and Latin name (the genus and species) of the plant is given in the ingredient list. On a dietary supplement label, the ingredients are listed by weight, with the ingredient used in the largest amount first on the list and the ingredient used in the least amount at the end of the list.

interaction

A change in the way a dietary supplement acts in the body when taken with certain other supplements, medicines, or foods, or when taken with certain medical conditions. Interactions may cause the dietary supplement to be more or less effective, or cause effects on the body that are not expected.

label

When referring to dietary supplements, information that appears on the product container, including a descriptive name of the product stating that it is a “supplement”; the name and place of business of the manufacturer, packer, or distributor; a complete list of ingredients; and each dietary ingredient contained in the product. Supplements must also include directions for use, nutrition labeling in the form of a Supplement Facts panel that identifies each dietary ingredient contained in the product and the serving size, amount, and active ingredients.

lozenge

A small, hard candy containing medicine that is dissolved in the mouth.

magnesium

In nutrition, a mineral the body needs for normal muscles, nerves, and bones. It also helps keep a steady heart rhythm, a healthy immune system, normal blood sugar levels and blood pressure, and is involved in making energy and protein for the body. Magnesium is found in some foods, including green vegetables, beans and peas, nuts and seeds, and whole grains.

malnourished

Describes a condition caused by not getting enough calories or the right amount of key nutrients needed for health. Key nutrients include vitamins and minerals.

milligram

mg. A measure of weight. It is a metric unit of mass equal to 0.001 gram (it weighs 28,000 times less than an ounce).

mineral
: In nutrition, an inorganic substance found in the earth that is required to maintain health.

multivitamin/mineral dietary supplement
: MVM. A product that is meant to supplement the diet. MVMs contain a variety of vitamins and minerals. The number and amounts of these nutrients can vary substantially by product.

nausea
: The uneasy feeling of having an urge to throw up (vomit).

neurologic
: Having to do with nerves and the nervous system.

nutrient
: A chemical compound in food that is used by the body to function and maintain health. Examples of nutrients include proteins, fats, carbohydrates, vitamins, and minerals.

Office of Dietary Supplements
: ODS, Office of Disease Prevention, Office of Director, National Institutes of Health, Department of Health and Human Services. ODS strengthens knowledge and understanding of dietary supplements by evaluating scientific information, stimulating and supporting research, disseminating research results, and educating the public to foster an enhanced quality of life and health for the US population.

pharmacist
: A person licensed to make and dispense (give out) prescription drugs and who has been taught how they work, how to use them, and their side effects.

pneumonia
: Inflammation of one or both lungs. Bacteria, viruses, fungi, parasites, other germs, and injury can cause the lungs to become inflamed and fill with fluid. Symptoms can appear suddenly, range from mild to severe, and may include fever, chills, chest pain, cough, shortness of breath, and difficult breathing. Anyone can develop pneumonia, but it is especially dangerous in babies, older people, and people with weakened immune systems, lung disease, heart disease, or diabetes.

poultry
: Birds that are raised for eggs or meat, including chickens, turkeys, ducks, and geese.

prescription
: A written order from a health care provider for medicine, therapy, or tests.

protein
: A molecule made up of amino acids that the body needs for good health. Proteins are the basis of body structures such as skin and muscle, and substances such as enzymes and antibodies.

rheumatoid arthritis
: An autoimmune disease that causes pain, swelling, and stiffness in the joints. It may cause severe joint damage, loss of function, and disability. The disease may last from months to a lifetime, and symptoms may improve and worsen over time.

risk
: The chance or probability that a harmful event will occur. In health, for example, the chance that someone will develop a disease or condition.

sickle cell disease
: An inherited disease in which the body makes abnormal red blood cells that carry less oxygen from the lungs to the rest of the body. These abnormal red blood cells form clumps that get stuck in the blood vessels, causing pain, infections, and organ damage.

sign

An indication of disease that can be seen and/or measured. Examples include high fever, high blood pressure, infection, and coughing up blood.

supplement
: A nutrient that may be added to the diet to increase the intake of that nutrient. Sometimes used to mean dietary supplement.

symptom
: A feeling of sickness that an individual can sense, but that cannot be measured by a healthcare professional. Examples include headache, tiredness, stomach ache, depression, and pain.

thiazide diuretic
: A drug used in the treatment of high blood pressure and swelling caused by excess fluid in body tissues (edema). It increases the amount of urine made by the body.

treat
: To care for a patient with a disease by using medicine, surgery, or other approaches.

ulcerative colitis
: Chronic inflammation of the colon that causes ulcers to form in its lining. This condition is marked by abdominal pain, cramps, and loose discharges of pus, blood, and mucus from the bowel.

UNICEF
: An organization of the United Nations that provides food, clothing, health care, and support to women and children.

upper limit
: UL. The largest daily intake of a nutrient considered safe for most people. Taking more than the UL is not recommended and may be harmful. The UL for each nutrient is set by the Food and Nutrition Board at the National Academies of Sciences, Engineering, and Medicine. For example, the UL for vitamin A is 3,000 micrograms/day. Women who consume more than this amount every day shortly before or during pregnancy have an increased chance (risk) of having a baby with a birth defect. Also called the tolerable upper intake level.

urine
: Excess liquids and wastes that have been filtered from the blood by the kidneys, stored in the bladder, and removed from the body through the urethra (the tube that carries urine from the bladder to outside the body).

US Department of Agriculture
: USDA promotes America's health through food and nutrition, and advances the science of nutrition by monitoring food and nutrient consumption and updating nutrient requirements and food composition data. USDA is responsible for food safety, improving nutrition and health by providing food assistance and nutrition education, expanding markets for agricultural products, managing and protecting US public and private lands, and providing financial programs to improve the economy and quality of rural American life.

vegetarianism
: The practice of avoiding all or most animal products for environmental, philosophical, and health reasons. Vegetarians (people who practice vegetarianism) eat a diet based on foods that come from plants and may include some dairy products and eggs. See: vegetarian diet.

virus
: An organism that can grow and multiply only inside the cells of living humans, plants, or animals. It is able to change (mutate) as it multiplies, which makes viral illnesses difficult to treat. Viruses cause many infections and diseases such as the common cold, AIDS (acquired immunodeficiency syndrome), herpes, and hepatitis.

vitamin

A nutrient that the body needs in small amounts to function and maintain health. Examples are vitamins A, C, and E.

vitamin C
: A nutrient needed by the body to make collagen (a protein found in cartilage, tendons, ligaments, bone, and blood vessels), to absorb iron from food, and for wound healing. It is an antioxidant and protects cells from free radical damage. Vitamin C is found in some foods including citrus fruits, strawberries, peppers, dark green vegetables, tomatoes, and potatoes. Also called ascorbic acid.

vitamin E
: A nutrient needed by the body to help keep the immune system healthy and to repair damage to DNA. It is an antioxidant that protects cells from free radical damage. Vitamin E is found in some foods, including vegetable oils, nuts and seeds, fortified breakfast cereals, and spinach, broccoli, kiwi, and mangos.

whole grain
: Unprocessed seeds of edible grasses, including brown rice, buckwheat, bulgur, millet, popcorn, oats, quinoa, whole-grain barley, whole rye, whole wheat, and wild rice. Grains that are ground, cracked, or flaked can be labeled whole grain if they have the same amount of bran, germ, and endosperm (the inner part of the seed kernel) as the intact grain. Whole grains are sources of iron, magnesium, selenium, B vitamins, and dietary fiber. Eating whole grains may help lower the risk of heart disease, obesity, and type 2 diabetes.

World Health Organization
: WHO. An agency of the United Nations that is concerned with worldwide health.

zinc
: A mineral found in most cells of the body. It helps enzymes work properly, helps maintain a healthy immune system, helps maintain the senses of taste and smell, and is needed for wound healing, making DNA, and normal growth and development during pregnancy, childhood, and adolescence. Zinc is found in some foods, including oysters, red meat, poultry, beans, nuts, certain seafood, whole grains, fortified breakfast cereals, and dairy products.

Updated: October 4, 2022 History of changes to this fact sheet