

Nutrient Needs at a Glance

Extension Nutrition Specialists
The Texas A&M System



Glossary

| | | | |
|--|---|--|--|
| Adequate Intake (AI): | set when there is no data to set the RDA | Hemorrhagic: | loss of blood from blood vessels |
| Acceptable Macronutrient Distribution Range (AMDR): | range of intake for an energy source that reduces risk of chronic disease while providing essential nutrients. Excess leads to weight gain and increased risk of chronic disease. | Ketosis: | a condition caused by abnormal burning of fat in the body |
| Anorexia: | loss of appetite | Macronutrients: | nutrients—proteins, fats, carbohydrates, others—needed by the body in large amounts |
| Antioxidant: | a substance that prevents the deterioration or rancidity of fats | Microgram (µg - mcg): | one millionth of a gram |
| Ataxia: | inability to coordinate voluntary muscles | Milligram (mg): | one thousandth of a gram |
| Cachexia: | general physical wasting and malnutrition | Neural Tube Defects (NTD): | birth defects due to failure of the neural tube to develop properly during fetal development |
| Cheilosis: | cracks at the corner of the mouth | Osteomalacia: | softening of bones in adults |
| Coenzyme: | compound that forms the actual part in an enzyme after combining with a protein component | Osteoporosis: | porous, brittle bones |
| Daily Values (DVs): | the amount of a nutrient needed daily as determined by the Food and Drug Administration (FDA) | Photophobia: | sensitivity to light |
| Dermatitis: | inflammation of the skin | Recommended Dietary Allowances (RDA): | the amount of nutrients needed to promote good growth and optimum health in people ages 25 to 50 |
| Desquamation: | loss of a layer of skin | Rickets: | bone deformation in children |
| Dietary Reference Intakes (DRIs) | general term for a set of reference values for planning and assessing nutrient intakes of healthy people | Scurvy: | weakened cartilages and connective tissue |
| Eczema: | an inflammatory condition of the skin characterized by redness and itching | Tolerable Upper Intake Level (UL): | highest daily intake that will not cause adverse effects |
| Edema: | abnormal accumulation of fluid in the body | Xerophthalmia: | an eye condition that can lead to blindness |
| Glucose Tolerance Factor (GTF): | a dietary agent that facilitates the reaction of insulin | | |
| Gram (g): | metric unit of mass equal to one thousandth (10^{-3}) of a kilogram | | |

References

Data compiled by the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes for Nutrients Reports (www.nap.edu), the Food and Nutrition Board, Institute of Medicine, National Academy of Sciences, Washington, DC: National Academy Press, 1997-2010.

Center for Nutrition Policy and Promotion (www.cnpp.usda.gov/dietaryguidelines.htm); Office of Dietary Supplements, National Institute of Health, 2010.

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Estimated safe and adequate daily dietary intakes of selected vitamins and minerals

| DRI's | Age range | RDA* (bold)/AI* | | AMDR* | Functions in the body | Sources | Deficiency |
|---|-------------|-----------------|----------------|-----------------|--|---|---|
| Nutrients (macro*) | | Males | Females | M + F | | | |
| Protein (g/d) (grams*/day) | 1–8 years | 13–19 | 13–19 | 5–30 | <ul style="list-style-type: none"> Builds and repairs all body tissue Helps build blood Helps form antibodies to fight infection Supplies food energy at 4 calories per gram | Animal protein: meat, fish, poultry, eggs, milk, cheese, yogurt Vegetable protein: legumes (peas, beans), whole grain breads and cereals, nuts, peanut butter, soy | Fatigue, loss of appetite, edema*, poor growth |
| | 9–18 years | 34–52 | 34–46 | 10–30 | | | |
| | 19–50 years | 56 | 46 | 10–35 | | | |
| | 51–70 years | 56 | 46 | 10–35 | | | |
| Fat (g/d) | 1–8 years | – | – | 25–40 | <ul style="list-style-type: none"> Supplies 9 calories per gram (more energy in a small amount of food) Transports fat-soluble vitamins and essential fatty acids needed for body's proper use and storage of fat | Butter, margarine, shortening, oil, salad dressing, palm and coconut oil, egg yolk, meat with fat, whole milk, cheese, peanut butter | Eczema*, retarded growth, diarrhea, loss of hair |
| | 9–18 years | – | – | 25–35 | | | |
| | 19–50 years | – | – | 25–35 | | | |
| | 51–70 years | – | – | 20–35 | | | |
| Carbohydrates (g/d) | 1–8 years | 130** | 130** | 45–65 | <ul style="list-style-type: none"> Supply energy at 4 calories per gram to all body cells Supply glucose to spare protein Help the body use other nutrients | Breads, cereals, flours, cornmeal, rice, macaroni, noodles, spaghetti, Irish and sweet potatoes, corn, dried fruits, bananas, sugar, syrup, jam, jellies, preserves, honey | Loss of energy, fatigue, ketosis* |
| | 9–18 years | 130** | 130** | 45–65 | | | |
| | 19–50 years | 130** | 130** | 45–65 | | | |
| | 51–70 years | 130** | 130** | 45–65 | | | |
| Fiber (g/d) | 1–8 years | 14–20 | 14–17 | None determined | <ul style="list-style-type: none"> May help lower cholesterol Improves bowel motility Gives feeling of fullness without extra calories, promoting satiety and weight loss Contains phytic acids that tie up minerals, which can prevent absorption | Whole grains (wheat, unmilled rice, oats) or enriched products: cereals, bread, noodles, tortillas, brown rice, oatmeal Vegetables: broccoli, spinach, carrots, beans, peas | Diarrhea; excess fiber makes bulk, which may prevent eating enough food energy or nutrients; high-fiber diets for elderly, very young or those on low-calorie diets may cause nutrient deficiencies |
| | 9–18 years | 25–31 | 22–25 | | | | |
| | 19–50 years | 31–34 | 25–28 | | | | |
| | 51–70 years | 28 | 22 | | | | |
| Water-soluble vitamins | | RDA*/AI* | | UL* | Functions in the body | Sources | Deficiency |
| | | Males | Females | M + F | | | |
| Vitamin C Ascorbic Acid (mg/d) (milligrams*/day) | 1–8 years | 15–25 | 15–25 | 400–650 | <ul style="list-style-type: none"> Helps wounds heal Promotes iron absorption Helps the body maintain collagen (fibrous part of protein for cell structure) Acts as an antioxidant | All citrus fruits, fruit juices, strawberries, cantaloupe; green or red peppers, raw cabbage, spinach, broccoli, turnip greens, collards, mustard greens, kale, tomatoes, Irish or sweet potatoes | Scurvy*, sore or bleeding gums, poor wound healing, pain in joints, bones, muscles |
| | 9–18 years | 45–75 | 45–65 | 1,200–1,800 | | | |
| | 19–50 years | 90 | 75 | 2,000 | | | |
| | 51–70 years | 90 | 75 | 2,000 | | | |
| Vitamin B₁ – Thiamin (mg/d) | 1–8 years | 0.5–0.6 | 0.5–0.6 | None determined | <ul style="list-style-type: none"> Helps the body use carbohydrates for energy Maintains appetite and muscle tone Involved in nervous system function | Meat (especially pork), liver, heart, kidney, poultry, eggs, milk, dried peas and beans, nuts, whole-grain or enriched bread and cereals | Poor appetite, constipation, depression, apathy, cachexia*, edema*, cardiac failure, cheilosis* |
| | 9–18 years | 0.9–1.2 | 0.9–1.0 | | | | |
| | 19–50 years | 1.2 | 1.1 | | | | |
| | 51–70 years | 1.2 | 1.1 | | | | |
| Vitamin B₂ – Riboflavin (mg/d) | 1–8 years | 0.5–0.6 | 0.5–0.6 | None determined | <ul style="list-style-type: none"> Functions as a part of a coenzyme* that assists in energy release Helps in metabolism of amino acids | Milk, cheese, ice cream, organ meats, eggs, fish, dark green leafy vegetables, enriched breads and cereals | Cheilosis*, scaly desquamation* around nose and ears, sore tongue and mouth, burning and itching eyes, photophobia* |
| | 9–18 years | 0.9–1.3 | 0.9–1.0 | | | | |
| | 19–50 years | 1.3 | 1.1 | | | | |
| | 51–70 years | 1.3 | 1.1 | | | | |
| Niacin (mg/d NE*) <i>Nicotinic acid</i> <i>Nicotinamide</i> | 1–8 years | 6–8 | 6–8 | 10–15 | <ul style="list-style-type: none"> Coenzyme* for carbohydrate metabolism Promotes normal appetite | Meat, liver, poultry, fish, dried peas and beans, nuts (especially peanuts), whole-grain or enriched cereals and breads, milk, cheese, yogurt | Anorexia*, diarrhea, dermatitis*, confusion, anxiety |
| | 9–18 years | 12–16 | 12–14 | 20–30 | | | |
| | 19–50 years | 16 | 14 | 35 | | | |
| | 51–70 years | 16 | 14 | 35 | | | |
| Vitamin B₆ (mg/d) <i>Pyridoxine</i> <i>Pyridoxal</i> <i>Pyridoxamine</i> | 1–8 years | 0.5–0.6 | 0.5–0.6 | 30–40 | <ul style="list-style-type: none"> Coenzyme* for protein utilization Helps convert the amino acid tryptophan to the vitamin Niacin Helps convert complex carbohydrates to simple carbohydrates | Meat, poultry, fish, sweet potatoes, vegetables, whole grains, fortified cereals | Anemia, nervous irritability, convulsions, weakness, ataxia*, abdominal pain, dermatitis* |
| | 9–18 years | 1.0–1.3 | 1.0–1.2 | 60–80 | | | |
| | 19–50 years | 1.3 | 1.3 | 100 | | | |
| | 51–70 years | 1.7 | 1.5 | 100 | | | |
| Choline (mg/d) | 1–8 years | 200–250 | 200–250 | 1,000 | <ul style="list-style-type: none"> Plays a role in cell structure in lipids in the cell membranes Promotes brain and memory functions Gives to own manufacture in the body | Egg yolks, milk, peanuts, soy, wheat germ, livers (beef, veal and turkey) | When low during pregnancy, an increased risk of birth defects; low choline leads to increased risk of cardiovascular disease |
| | 9–18 years | 375–550 | 375–400 | 2,000–3,000 | | | |
| | 19–50 years | 550 | 425 | 3,500 | | | |
| | 51–70 years | 550 | 425 | 3,500 | | | |
| Vitamin B₁₂ (µg/d) (micrograms*/day) <i>Cobalamin</i> | 1–8 years | 0.9–1.2 | 0.9–1.2 | None determined | <ul style="list-style-type: none"> Helps maintain nerve tissue and normal blood formation Regeneration of folate | Animal foods: organ meats, muscle meats, fish, poultry, eggs, milk; fortified cereals | Anemia, neurologic disorders |
| | 9–18 years | 1.8–2.4 | 1.8–2.4 | | | | |
| | 19–50 years | 2.4 | 2.4 | | | | |
| | 51–70 years | 2.4 | 2.4 | | | | |

| Folate (µg/d) <i>Folic acid</i> <i>Folacin</i> | 1–8 years 9–18 years 19–50 years 51–70 years | 150–200 300–400 400 400 | 150–200 300–400 400 400 | 300–400 600–800 1,000 1,000 | • Helps red blood cells mature • Interrelated with vitamin B ₁₂ utilization • Folic acid supplement*** during pregnancy recommended | Organ meats, deep green leafy vegetables, muscle meats, poultry, fish, eggs, whole-grain or fortified cereals | Anemia, fatigue, gastrointestinal disturbances, inadequate intake during pregnancy related to neural tube birth defects (NTD)* |
|---|--|--|--|--|--|--|--|
| Biotin (µg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 8–12 20–25 30 30 | 8–12 20–25 30 30 | None determined | • Coenzyme* in synthesis of fat, glycogen (carbohydrate stored in muscle and liver), and amino acids (protein building blocks) | Liver, and smaller amounts in meats and fruits | Because data on biotin’s adverse effects are limited, caution may be needed |
| Fat-soluble vitamins | | RDA*/AI* | | UL* | Functions in the body | Sources | Deficiency |
| | | Males | Females | M + F | | | |
| Vitamin A (µg/d RAE*) <i>Retinol, Retinal Carotene</i> *Retinol Activity Equivalent: 1 RAE = 1 µg Retinol | 1–8 years 9–18 years 19–50 years 51–70 years | 300–400 600–900 900 900 | 300–400 600–700 700 700 | 600–900 1,700–2,800 3,000 3,000 | • Promotes growth and normal vision, and protects against night blindness • Helps keep skin and mucous membrane linings healthy and resistant to infection • Large amounts are toxic | Dark leafy green or deep yellow vegetables (carrots, winter squash, cushaw, pumpkin, sweet potatoes); yellow fruits (peaches, cantaloupe, apricots); liver, fish liver oils, dairy foods, butter, margarine, egg yolks | Faulty bone and tooth development in infants, poor growth, xerophthalmia*, night blindness |
| Vitamin D (iu/d) <i>D Calciferol</i> <i>D₂ Ergocalciferol</i> <i>D₃ Cholecalciferol</i> | 1–8 years 9–18 years 19–50 years 51–70 years | 600 600 600 600 | 600 600 600 600 | 4,000 4,000 4,000 4,000 | • Synthesized in skin by ultraviolet light • Functions to regulate amount of calcium/ phosphorus absorbed in the blood to mobilize and mineralize the bone • Large amounts are toxic • Needed to fight off bacteria and viruses | Fish liver oils and flesh, fortified milk, exposure to sunlight. Minute amounts in butter, liver, egg yolk, salmon and sardines | Rickets* (soft, fragile bones, enlarged joints, bowed legs); chest, spinal and pelvic bone deformities; convulsions; osteomalacia* |
| Vitamin E (mg/d) <i>Alpha²-, beta-, gamma-tocopherol</i> | 1–8 years 9–18 years 19–50 years 51–70 years | 6–7 11–15 15 15 | 6–7 11–15 15 15 | 200–300 600–800 1,000 1,000 | • Not stored in body to any extent • Related to action of selenium • Reduces oxidation of vitamin A, carotenes and polyunsaturated fatty acids | Plant tissues: wheat or rice germ, vegetable oils, green leafy vegetables, nuts, legumes; meats (other animal foods are poor sources) | Anemia in premature infants, problems of nervous system |
| Vitamin K (µg/d) <i>Phylloquinone (K₁)</i> <i>Menaquinone (MK_n)</i> <i>Menadiol</i> | 1–8 years 9–18 years 19–50 years 51–70 years | 30–55 60–75 120 120 | 30–55 60–75 90 90 | None determined | • Bile is necessary for absorption of the vitamin • Needed to form prothrombin in blood • Sulfa drugs and antibiotics interfere with absorption • Large amounts are toxic | Deep green leaves (alfalfa, spinach, cabbage), liver, egg yolk, butterfat, (is synthesized in intestine by beneficial bacteria) | Prolonged clotting time, hemorrhagic* disease in newborn infants |
| Minerals/Elements | | RDA*/AI* | | UL* | Functions in the body | Sources | Deficiency |
| | | Males | Females | M + F | | | |
| Calcium (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 700–1,000 1,300 1,000 1,200 | 700–1,000 1,300 1,000 1,200 | 2,500 2,500 2,500 2,500 | • Needed to build bones and teeth; helps clot blood • Helps muscles contract and relax normally. Delays fatigue | Milk, cheese, ice cream, greens (kale, broccoli, collards, turnips, mustard), dried peas and beans, fortified juice, soy milk | Retarded bone mineralization, fragile bones, rickets*, osteomalacia*, osteoporosis* |
| Chromium (µg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 11–15 25–35 35 30 | 11–15 21–24 25 20 | None determined | • Works along with insulin in carbohydrate, protein and fat metabolism; glucose tolerance factor (GTF)* | Brewer’s yeast, liver, meat, cheese, whole-grain cereals, broccoli | Inability of cells to use glucose for energy |
| Copper (µg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 340–440 700–890 900 900 | 340–440 700–890 900 900 | 1,000–3,000 5,000–8,000 10,000 10,000 | • Aids absorption and use of iron to form hemoglobin in red bloods cells | Liver, shellfish, meats, nuts, legumes, whole-grain cereals | Anemia |
| Fluoride (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 0.7–1 2–3 4 4 | 0.7–1 2–3 3 3 | 1.3–2.2 10 10 10 | • Makes teeth resistant to decay; most effective in young children • Moderate levels in bone may reduce osteoporosis* | Water (1 part per million is added to some municipal water supplies) | None known |
| Iodine (µg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 90 120–150 150 150 | 90 120–150 150 150 | 200–300 600–900 1,100 1,100 | • Integral part of thyroid hormones: thyroxine and triiodothyronine | Iodized table salt (76 µg/g of salt), seafood, plants grown in iodine-rich soils, dairy products | Cretinism (stunted growth with mental retardation); endemic goiter |
| Iron (mg/d) | 1– 8 years 9–18 years 19–50 years 50–70 years | 7–10 8–11 8 8 | 7–10 8–15 18 8 | 40 45 45 45 | • Part of blood hemoglobin and myoglobin • Enzyme involved in energy metabolism • Involved in oxygen transport | Liver, organ meats, meat, poultry, egg yolk, enriched and whole-grain breads, cereals, legumes, dark green vegetables, black strap molasses, peaches, apricots, raisins, prunes, oysters | Anemia (frequent in infants, preschool children, teenage girls and pregnant women) |

| | | | | | | | |
|--------------------------|---|---|---|----------------------------------|--|---|---|
| Magnesium (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 80–130 240–410 400–420 420 | 80–130 240–360 310–320 320 | 65–100 350 350 350 | <ul style="list-style-type: none"> • Activates enzymes involved in protein synthesis • Helps muscles and nerves work • Helps regulate blood sugar levels and promotes normal blood pressure | Whole-grain cereals, nuts, legumes, meats, milk, green leafy vegetables | Tremors, growth failure |
| Manganese (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 1.2–1.5 1.9–2.2 2.3 2.3 | 1.2–1.5 1.6 1.8 1.8 | 2–3 6–9 11 11 | <ul style="list-style-type: none"> • Activates many enzymes used in carbohydrate and protein metabolism • Bone formation | Legumes, whole-grain cereals, nuts, tea | None known |
| Phosphorus (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 460–500 1,250 700 700 | 460–500 1,250 700 700 | 3,000 4,000 4,000 4,000 | <ul style="list-style-type: none"> • Builds strong bones and teeth • Releases energy from fat, protein and carbohydrates during metabolism • Aids in formation of genetic material, cell membranes and enzymes | Breads, cereals, lima beans, meat, poultry, fish, meat alternates, milk, cheese, yogurt | Found widely in foods, so deficiency is rare. Bone loss characterized by weakness, anorexia*, malaise, and pain |
| Selenium (µg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 20–30 40–55 55 55 | 20–30 40–55 55 55 | 90–150 280–400 400 400 | <ul style="list-style-type: none"> • Antioxidant • Lessens breakdown of vitamin E | Organ meats, seafoods, cereal foods and plants grown in selenium-rich soil | Hair and nail brittleness and loss |
| Zinc (mg/d) | 1–8 years 9–18 years 19–50 years 51–70 years | 3–5 8–11 11 11 | 3–5 8–9 8 8 | 7–12 23–34 40 40 | <ul style="list-style-type: none"> • Component of many enzymes (carbonic anhydrase and anhydrase carboxypeptidase) and proteins • Controls information from gene to gene so living things develop and function • Plays role in immune function, protein synthesis, and wound healing. | Seafoods, liver and other organ meats, meats, fish, wheat, yeast. Plant foods are generally low in zinc | Poor wound healing, decreased taste ability |

| Electrolytes | | RDA*/AI* | | UL* | Functions in the body | Sources | Deficiency |
|-------------------------------------|-------------|----------|---------|-----------------|---|--|--|
| | | Males | Females | M + F | | | |
| Sodium (g/d) ⁴ | 1–8 years | 1–1.2 | 1–1.2 | 1.5–1.9 | • Found in extracellular fluid (blood) • Maintains fluid balance and nerve transmission | Table salt, cheddar cheese, ham, snack foods, most processed foods, salt (sodium chloride) and sodium benzoate/phosphate are added | Fatigue caused by profuse sweating, vomiting and diarrhea |
| | 9–18 years | 1.5 | 1.5 | 2.2–2.3 | | | |
| | 19–50 years | 1.5 | 1.5 | 2.3 | | | |
| | 51–70 years | 1.3 | 1.3 | 2.3 | | | |
| Chloride (g/d) | 1–8 years | 1.5–1.9 | 1.5–1.9 | 2.3–2.9 | • Helps maintain normal pH of blood (7.35) • Maintains fluid balance and nerve transmission | Table salt (sodium chloride), barley, wheat, green leafy vegetables, melon, pineapple | Heat cramps, hair loss, tooth loss |
| | 9–18 years | 2.3 | 2.3 | 3.4–3.6 | | | |
| | 19–50 years | 2.3 | 2.3 | 3.6 | | | |
| | 51–70 years | 2 | 2 | 3.6 | | | |
| Potassium (g/d) ⁴ | 1–8 years | 3–3.8 | 3–3.8 | None determined | • Found inside the cell • Maintains fluid balance and nerve transmission | Bananas, orange juice, most fruits, potatoes, dried peas, peanuts, nuts, dairy products, and meats | Weakness, poor muscle tone, heart abnormalities, apathy (lack of energy) |
| | 9–18 years | 4.5–4.7 | 4.5–4.7 | | | | |
| | 19–50 years | 4.7 | 4.7 | | | | |
| | 51–70 years | 4.7 | 4.7 | | | | |
| Water (liters/day) | 1–8 years | 1.3–1.7 | 1.3–1.7 | None determined | • Transports nutrients • Transports waste • Lubricates joints • Regulates body temperature • Cell hydration | Water, juices, beverages, high-moisture solid foods (soups, watermelon, meats, etc.) | Dehydration, constipation |
| | 9–18 years | 2.4–3.3 | 2.1–2.3 | | | | |
| | 19–50 years | 3.7 | 2.7 | | | | |
| | 51–70 years | 3.7 | 2.7 | | | | |

* See Glossary for definitions

**Average minimum amounts of glucose used by brain

***Supplement during pregnancy of 400 µg or mcg folic acid plus folate intake of a varied diet

¹ NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan

² RAE = Retinol activity equivalents. 1 retinol equivalent = 1 µg retinol or 6 µg beta-carotene

³ α-tocopherol includes the only form (RRR-α-tocopherol) that occurs naturally in foods and with variations of this form in fortified foods and supplements.

⁴ Estimated sodium and potassium minimum requirements. AI* has been set for healthy individuals and the UL* may be too high for persons with hypertension.

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