

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)	1–8 years	150–200	150–200	300–400	<ul style="list-style-type: none"> • Helps red blood cells mature • Interrelated with vitamin B₁₂ 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)*
<i>Folic acid</i>	9–18 years	300–400	300–400	600–800			
<i>Folacin</i>	19–50 years	400	400	1,000			
	51–70 years	400	400	1,000			
Biotin (µg/d)	1–8 years	8–12	8–12	None determined	<ul style="list-style-type: none"> • 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
	9–18 years	20–25	20–25				
	19–50 years	30	30				
	51–70 years	30	30				
Fat-soluble vitamins		RDA*/AI*		UL*	Functions in the body	Sources	Deficiency
		Males	Females	M + F			
Vitamin A (µg/d RAE*)	1–8 years	300–400	300–400	600–900	<ul style="list-style-type: none"> • 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
<i>Retinol, Retinal Carotene</i>	9–18 years	600–900	600–700	1,700–2,800			
*Retinol Activity Equivalent:	19–50 years	900	700	3,000			
1 RAE = 1 µg Retinol	51–70 years	900	700	3,000			
Vitamin D (iu/d)	1–8 years	600	600	4,000	<ul style="list-style-type: none"> • 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*
<i>D Calciferol</i>	9–18 years	600	600	4,000			
<i>D₂ Ergocalciferol</i>	19–50 years	600	600	4,000			
<i>D₃ Cholecalciferol</i>	51–70 years	600	600	4,000			
Vitamin E (mg/d)	1–8 years	6–7	6–7	200–300	<ul style="list-style-type: none"> • 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
<i>Alpha²-, beta-, gamma-tocopherol</i>	9–18 years	11–15	11–15	600–800			
	19–50 years	15	15	1,000			
	51–70 years	15	15	1,000			
Vitamin K (µg/d)	1–8 years	30–55	30–55	None determined	<ul style="list-style-type: none"> • 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
<i>Phylloquinone (K₁)</i>	9–18 years	60–75	60–75				
<i>Menaquinone (MK_n)</i>	19–50 years	120	90				
<i>Menadione</i>	51–70 years	120	90				
Minerals/Elements		RDA*/AI*		UL*	Functions in the body	Sources	Deficiency
		Males	Females	M + F			
Calcium (mg/d)	1–8 years	700–1,000	700–1,000	2,500	<ul style="list-style-type: none"> • 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*
	9–18 years	1,300	1,300	2,500			
	19–50 years	1,000	1,000	2,500			
	51–70 years	1,200	1,200	2,500			
Chromium (µg/d)	1–8 years	11–15	11–15	None determined	<ul style="list-style-type: none"> • 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
	9–18 years	25–35	21–24				
	19–50 years	35	25				
	51–70 years	30	20				
Copper (µg/d)	1–8 years	340–440	340–440	1,000–3,000	<ul style="list-style-type: none"> • Aids absorption and use of iron to form hemoglobin in red bloods cells 	Liver, shellfish, meats, nuts, legumes, whole-grain cereals	Anemia
	9–18 years	700–890	700–890	5,000–8,000			
	19–50 years	900	900	10,000			
	51–70 years	900	900	10,000			
Fluoride (mg/d)	1–8 years	0.7–1	0.7–1	1.3–2.2	<ul style="list-style-type: none"> • 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
	9–18 years	2–3	2–3	10			
	19–50 years	4	3	10			
	51–70 years	4	3	10			
Iodine (µg/d)	1–8 years	90	90	200–300	<ul style="list-style-type: none"> • 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
	9–18 years	120–150	120–150	600–900			
	19–50 years	150	150	1,100			
	51–70 years	150	150	1,100			
Iron (mg/d)	1–8 years	7–10	7–10	40	<ul style="list-style-type: none"> • 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)
	9–18 years	8–11	8–15	45			
	19–50 years	8	18	45			
	50–70 years	8	8	45			

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 9–18 years 19–50 years 51–70 years	1–1.2 1.5 1.5 1.3	1–1.2 1.5 1.5 1.3	1.5–1.9 2.2–2.3 2.3 2.3	<ul style="list-style-type: none"> • 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
Chloride (g/d)	1–8 years 9–18 years 19–50 years 51–70 years	1.5–1.9 2.3 2.3 2	1.5–1.9 2.3 2.3 2	2.3–2.9 3.4–3.6 3.6 3.6	<ul style="list-style-type: none"> • 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
Potassium (g/d) ⁴	1–8 years 9–18 years 19–50 years 51–70 years	3–3.8 4.5–4.7 4.7 4.7	3–3.8 4.5–4.7 4.7 4.7	None determined	<ul style="list-style-type: none"> • 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)
Water (liters/day)	1–8 years 9–18 years 19–50 years 51–70 years	1.3–1.7 2.4–3.3 3.7 3.7	1.3–1.7 2.1–2.3 2.7 2.7	None determined	<ul style="list-style-type: none"> • Transports nutrients • Transports waste • Lubricates joints • Regulates body temperature • Cell hydration 	Water, juices, beverages, high-moisture solid foods (soups, watermelon, meats, etc.)	Dehydration, constipation

* 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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