



# 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
- 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.
- Anorexia:** loss of appetite
- Antioxidant:** a substance that prevents the deterioration or rancidity of fats
- Ataxia:** inability to coordinate voluntary muscles
- Cachexia:** general physical wasting and malnutrition
- Cheilosis:** cracks at the corner of the mouth
- Coenzyme:** compound that forms the actual part in an enzyme after combining with a protein component
- Daily Values (DVs):** the amount of a nutrient needed daily as determined by the Food and Drug Administration (FDA)
- Dermatitis:** inflammation of the skin
- Desquamation:** loss of a layer of skin
- Dietary Reference Intakes (DRIs)** general term for a set of reference values for planning and assessing nutrient intakes of healthy people
- Eczema:** an inflammatory condition of the skin characterized by redness and itching
- Edema:** abnormal accumulation of fluid in the body
- 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

**Hemorrhagic:**

loss of blood from blood vessels

**Ketosis:**

a condition caused by abnormal burning of fat in the body nutrients—proteins, fats, carbohydrates, others—needed by the body in large amounts

**Macronutrients:**

one millionth of a gram

**Microgram ( $\mu\text{g}$  - mcg):**

one thousandth of a gram

**Milligram (mg):**

birth defects due to failure of the neural tube to develop properly during fetal development

**Neural Tube Defects (NTD):**

softening of bones in adults

**Osteomalacia:**

porous, brittle bones

**Osteoporosis:**

sensitivity to light

**Recommended**

the amount of nutrients needed to promote good growth and optimum health in people ages 25 to 50

**Dietary Allowances (RDA):**

bone deformation in children

**Rickets:**

weakened cartilages and connective tissue

**Scurvy:**

highest daily intake that will not cause adverse effects

**Tolerable Upper Intake Level (UL):**

an eye condition that can lead to blindness

**Xerophthalmia:**

## References

Data compiled by the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes for Nutrients Reports ([www.nap.edu](http://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](http://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
	Males	Females	Males	Females	M	F				
<b>Nutrients (macro*)</b>										
<b>Protein</b> (g/d) (grams*/day)	1-8 years 9-18 years 19-50 years 51-70 years	<b>13-19</b> <b>34-46</b> 46 46	<b>13-19</b> <b>34-46</b> 46 46		5-30 10-30 10-35 10-35		<ul style="list-style-type: none"> <li>Builds and repairs all body tissue</li> <li>Helps build blood</li> <li>Helps form antibodies to fight infection</li> <li>Supplies food energy at 4 calories per gram</li> </ul>	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	
<b>Fat</b> (g/d)	1-8 years 9-18 years 19-50 years 51-70 years	- - - -	- - - -		25-40 25-35 25-35 20-35		<ul style="list-style-type: none"> <li>Supplies 9 calories per gram (more energy in a small amount of food)</li> <li>Transports fat-soluble vitamins and essential fatty acids needed for body's proper use and storage of fat</li> </ul>	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	
<b>Carbohydrates</b> (g/d)	1-8 years 9-18 years 19-50 years 51-70 years	<b>130**</b> <b>130**</b> <b>130**</b> <b>130**</b>	<b>130**</b> <b>130**</b> <b>130**</b> <b>130**</b>		45-65 45-65 45-65 45-65		<ul style="list-style-type: none"> <li>Supply energy at 4 calories per gram to all body cells</li> <li>Supply glucose to spare protein</li> <li>Help the body use other nutrients</li> </ul>	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*	
<b>Fiber</b> (g/d)	1-8 years 9-18 years 19-50 years 51-70 years	14-17 25-31 31-34 28	None determined 22-25 25-28 22				<ul style="list-style-type: none"> <li>May help lower cholesterol</li> <li>Improves bowel motility</li> <li>Gives feeling of fullness without extra calories, promoting satiety and weight loss</li> <li>Contains phylic acids that tie up minerals, which can prevent absorption</li> </ul>	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	
<b>Water-soluble vitamins</b>										
<b>Vitamin C</b> <b>Ascorbic Acid</b> (mg/d) (milligrams*/day)	1-8 years 9-18 years 19-50 years 51-70 years	<b>15-25</b> <b>45-75</b> 90 90	<b>15-25</b> <b>45-65</b> 75 75		400-650 1,200-1,800 2,000 2,000		<ul style="list-style-type: none"> <li>Helps wounds heal</li> <li>Promotes iron absorption</li> <li>Helps the body maintain collagen (fibrous part of protein for cell structure)</li> <li>Acts as an antioxidant</li> </ul>	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	
<b>Vitamin B<sub>1</sub> - Thiamin</b> (mg/d)	1-8 years 9-18 years 19-50 years 51-70 years	<b>0.5-0.6</b> <b>0.9-1.2</b> 1.2 1.2	<b>0.5-0.6</b> <b>0.9-1.0</b> 1.1 1.1		None determined		<ul style="list-style-type: none"> <li>Helps the body use carbohydrates for energy</li> <li>Maintains appetite and muscle tone</li> <li>Involved in nervous system function</li> </ul>	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*	
<b>Vitamin B<sub>2</sub> - Riboflavin</b> (mg/d)	1-8 years 9-18 years 19-50 years 51-70 years	<b>0.5-0.6</b> <b>0.9-1.3</b> 1.3 1.3	<b>0.5-0.6</b> <b>0.9-1.0</b> 1.1 1.1		None determined		<ul style="list-style-type: none"> <li>Functions as a part of a coenzyme* that assists in energy release</li> <li>Helps in metabolism of amino acids</li> </ul>	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*	
<b>Niacin</b> (mg/d NE*) <i>Nicotinic acid</i> <i>Nicotinamide</i>	1-8 years 9-18 years 19-50 years 51-70 years	<b>6-8</b> <b>12-16</b> 16 16	<b>6-8</b> <b>12-14</b> 14 14		10-15 20-30 35 35		<ul style="list-style-type: none"> <li>Coenzyme* for carbohydrate metabolism</li> <li>Promotes normal appetite</li> </ul>	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	
<b>Vitamin B<sub>6</sub></b> (mg/d) <i>Pyridoxine</i> <i>Pyridoxal</i> <i>Pyridoxamine</i>	1-8 years 9-18 years 19-50 years 51-70 years	<b>0.5-0.6</b> <b>1.0-1.3</b> 1.3 1.7	<b>0.5-0.6</b> <b>1.0-1.2</b> 1.3 1.5		30-40 60-80 100 100		<ul style="list-style-type: none"> <li>Coenzyme* for protein utilization</li> <li>Helps convert the amino acid tryptophan to the vitamin Niacin</li> <li>Helps convert complex carbohydrates to simple carbohydrates</li> </ul>	Meat, poultry, fish, sweet potatoes, vegetables, whole grains, fortified cereals	Anemia, nervous irritability, convulsions, weakness, ataxia*, abdominal pain, dermatitis*	
<b>Choline</b> (mg/d)	1-8 years 9-18 years 19-50 years 51-70 years	200-250 375-550 550 550	200-250 375-400 425 425		1,000 2,000-3,000 3,500 3,500		<ul style="list-style-type: none"> <li>Plays a role in cell structure in lipids in the cell membranes</li> <li>Promotes brain and memory functions</li> <li>Gives to own manufacture in the body</li> </ul>	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	
<b>Vitamin B<sub>12</sub></b> (µg/d) (micrograms*/day) <i>Cobalamin</i>	1-8 years 9-18 years 19-50 years 51-70 years	<b>0.9-1.2</b> <b>1.8-2.4</b> 2.4 2.4	<b>0.9-1.2</b> <b>1.8-2.4</b> 2.4 2.4		None determined		<ul style="list-style-type: none"> <li>Helps maintain nerve tissue and normal blood formation</li> <li>Regeneration of folate</li> </ul>	Animal foods: organ meats, muscle meats, fish, poultry, eggs, milk; fortified cereals	Anemia, neurologic disorders	

	150-200		300-400		150-200		300-400		300-400		600-800		1,000		1,000		Sources	Deficiency		
	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	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)*					
<b>Folate</b> (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	Liver, and smaller amounts in meats and fruits	Because data on biotin's adverse effects are limited, caution may be needed		
<b>Biotin</b> (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	Helps red blood cells mature Interrelated with vitamin B <sub>12</sub> utilization Folic acid supplement*** during pregnancy recommended	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			
<b>Fat-soluble vitamins</b>	<b>Functions in the body</b>																			
					<b>Males</b>				<b>Females</b>				<b>UL*</b>							
					<b>M + F</b>				<b>M + F</b>											
<b>Vitamin A</b> (µg/d RAE*) <i>Retinol</i> , <i>Retinal</i> , <i>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	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		
<b>Vitamin D</b> (i/ud) <i>D Calciferol</i> <i>D<sub>2</sub> Ergocalciferol</i> <i>D<sub>3</sub> 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	Fish liver oils and fish, 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*		
<b>Vitamin E</b> (mg/d) <i>Alpha*</i> , <i>beta*</i> , <i>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	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		
<b>Vitamin K</b> (µg/d) <i>Phylloquinone (K<sub>1</sub>)</i> <i>Menadiquinone (MK<sub>7</sub>)</i> <i>Menadione</i>	1-8 years	9-18 years	19-50 years	51-70 years	30-55	60-75	120	90	30-55	60-75	90	90	None determined	None determined	None determined	None determined	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		
<b>Minerals/Elements</b>	<b>Functions in the body</b>																			
					<b>Males</b>				<b>Females</b>				<b>UL*</b>							
					<b>M + F</b>				<b>M + F</b>											
<b>Calcium</b> (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	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*		
<b>Chromium</b> (µg/d)	1-8 years	9-18 years	19-50 years	51-70 years	11-15	25-35	35	25	11-15	21-24	25	20	None determined	None determined	None determined	None determined	Brewer's yeast, liver, meat, cheese, whole-grain cereals, broccoli	Inability of cells to use glucose for energy		
<b>Copper</b> (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	Liver, shellfish, meats, nuts, legumes, whole-grain cereals	Anemia		
<b>Fluoride</b> (mg/d)	1-8 years	9-18 years	19-50 years	51-70 years	0.7-1	2-3	4	3	0.7-1	2-3	3	3	1.3-2.2	10	10	10	Water (1 part per million is added to some municipal water supplies)	None known		
<b>Iodine</b> (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	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		
<b>Iron</b> (mg/d)	1-8 years	9-18 years	19-50 years	50-70 years	7-10	8-11	8	8	7-10	8-11	8	8	40	45	45	45	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)		

Electrolytes	RDA*/AI*	UL*		Functions in the body	Sources	Deficiency
		Males	Females			
<b>Magnesium</b> (mg/d)	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"> <li>• Activates enzymes involved in protein synthesis</li> <li>• Helps muscles and nerves work</li> <li>• Helps regulate blood sugar levels and promotes normal blood pressure</li> </ul>	Whole-grain cereals, nuts, legumes, meats, milk, green leafy vegetables	Tremors, growth failure
<b>Manganese</b> (mg/d)	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"> <li>• Activates many enzymes used in carbohydrate and protein metabolism</li> <li>• Bone formation</li> </ul>	Legumes, whole-grain cereals, nuts, tea	None known
<b>Phosphorus</b> (mg/d)	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"> <li>• Builds strong bones and teeth</li> <li>• Releases energy from fat, protein and carbohydrates during metabolism</li> <li>• Aids in formation of genetic material, cell membranes and enzymes</li> </ul>	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
<b>Selenium</b> (µg/d)	20-30 40-55 55 55	20-30 40-55 55 55	90-150 280-400 400 400	<ul style="list-style-type: none"> <li>• Antioxidant</li> <li>• Lessens breakdown of vitamin E</li> </ul>	Organ meats; seafoods; cereal foods and plants grown in selenium-rich soil	Hair and nail brittleness and loss
<b>Zinc</b> (mg/d)	3-5 8-11 11 11	3-5 8-9 8 8	7-12 23-34 40 40	<ul style="list-style-type: none"> <li>• Component of many enzymes (carbonic anhydrase and anhydrase carboxypeptidase) and proteins</li> <li>• Controls information from gene to gene so living things develop and function</li> <li>• Plays role in immune function, protein synthesis, and wound healing.</li> </ul>	Seafoods, liver and other organ meats, meats, fish, wheat, yeast. Plant foods are generally low in zinc	Poor wound healing, decreased taste ability
<b>Electrolytes</b>						
<b>Sodium</b> (g/d) <sup>1</sup>	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"> <li>• Found in extracellular fluid (blood)</li> <li>• Maintains fluid balance and nerve transmission</li> </ul>	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
<b>Chloride</b> (g/d)	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"> <li>• Helps maintain normal pH of blood (7.35)</li> <li>• Maintains fluid balance and nerve transmission</li> </ul>	Table salt (sodium chloride), barley, wheat, green leafy vegetables, melon, pineapple	Heat cramps, hair loss, tooth loss
<b>Potassium</b> (g/d) <sup>4</sup>	3-3.8 4.5-4.7 4.7 4.7	3-3.8 4.5-4.7 4.7 4.7	None determined None determined	<ul style="list-style-type: none"> <li>• Found inside the cell</li> <li>• Maintains fluid balance and nerve transmission</li> </ul>	Bananas, orange juice, most fruits, potatoes, dried peas, peanuts, nuts, dairy products, and meats	Weakness, poor muscle tone, heart abnormalities, apathy (lack of energy)
<b>Water</b> (liters/day)	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 None determined	<ul style="list-style-type: none"> <li>• Transports nutrients</li> <li>• Transports waste</li> <li>• Lubricates joints</li> <li>• Regulates body temperature</li> <li>• Cell hydration</li> </ul>	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

<sup>1</sup> NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan

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

<sup>3</sup> 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.

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