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Nutrient Recommendations for Adults

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Research shows that adults are interested in their health. Nutrient intakes of individuals are related to their health. This publication presents nutrient recommendations for adults 19 years of age and older.

The leading causes of death in the United States are heart diseases and cancers. These are frequently related to diet. The nutrient recommendations discussed in this NebGuide are for men and women 19 years of age and older, excluding pregnant and lactating women.

Recommended Nutrient Intakes

Men and women have similar nutritional needs, except nutrient amounts frequently differ due to age and gender. Nutrient recommendations are given as Recommended Dietary Allowances and Adequate Intakes. Recommended Dietary Allowances are designed to meet the needs of almost all (97-98 percent) individuals in a group. When there is a lack of data or uncertainty with the data, Adequate Intakes are set that are believed to cover needs for all individuals in a group. These Recommended Dietary Allowances and Adequate Intakes are intended to be used as goals for individual intakes.

The Recommended Dietary Allowances (RDAs) and Adequate Intakes (AIs) for water, carbohydrate, fiber, fat, fatty acids and protein are given in *Table I*.

The information on food labels is listed by Percent (%) Daily Values. The Daily Values for some nutrients are given in grams (g) or milligrams (mg) in a 2,000 calorie diet and sometimes as a 2,500 calorie diet. The statement "*Your daily values may be higher or lower depending on your calorie needs*" is added. Daily Values for total and saturated fat, cholesterol, sodium, carbohydrate, and fiber are given in *Table II*. Food labels must be on all processed food products. Nutrition labeling is voluntary for raw foods. Labeling about protein, vitamin A, vitamin C, iron, calcium and sodium is required while labeling about other vitamins and minerals is optional.

Carbohydrates, fats and proteins provide the energy (calories) in food. For adequate food energy (calories) and nutrients and low risk of chronic diseases, diets should provide:

- 45-65 percent of calories from carbohydrates
- 20-35 percent of calories from fats
- 10-35 percent of calories from proteins

The National Academy of Sciences recommends that adults eat a nutritionally adequate diet while keeping the amount of cholesterol, trans fatty acids and saturated fatty acids as low as possible.

The Recommended Dietary Allowances or Adequate Intakes of adults for vitamins and minerals are given in *Table III*. The Daily Values for vitamins and minerals for individuals 4 years and older are also given in *Table III*. Choline is not listed in the table but also is an essential nutrient. The Adequate Intake for choline is 550 mg daily for men and 425 mg daily for women. A Daily Value for choline has not been established.

Estimated Energy Requirements

Body Weight

About a third of U.S. adults are obese. The chance of developing health problems is greater for individuals who are too fat or too thin. Body weights of adults can be evaluated by determining the Body Mass Index (BMI) along with waist circumference (taken using a tape measure). The BMI ranges shown in *Figure 1* are estimated ranges for "healthy" and

Table I. Recommended dietary allowances and adequate intakes of adults for water, carbohydrate, fiber, fatty acids and protein.[a]
(When recommended intakes are different for Women than for Men, the recommendations are given as Men/Women.)

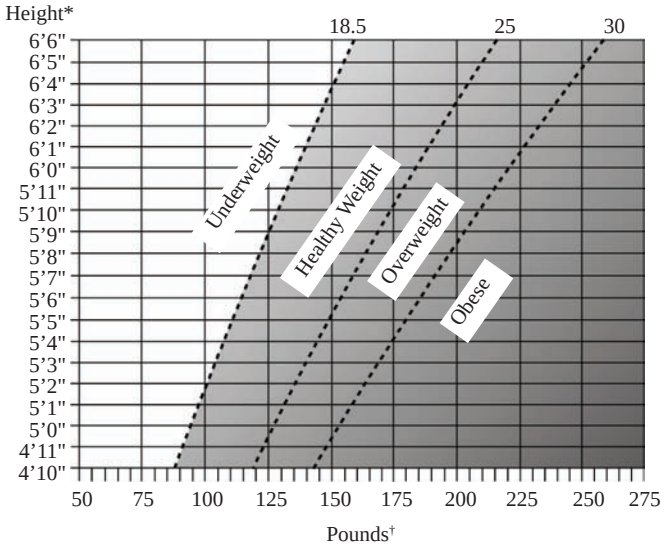
Age (yr)	Water: Beverage (quarts)	Water: Total[b] (quarts)	Carbohydrate (g)	Total Fiber (g)	Linoleic Acid[c] (g)	Linolenic Acid[d] (g)	Protein[e] (g)
19-50	3.2/2.3	3.9/2.9	130	38/25	17/12	1.6/1.1	56/46
51+	3.2/2.3	3.9/2.9	130	30/21	14/11	1.6/1.1	56/46

[a]Source: National Academy of Sciences, 2002, 2004. Recommendations are given as Recommended Dietary Allowances for carbohydrate and protein and as Adequate Intakes for other nutrients.
[b]Total water is that from beverages plus that contained in the foods consumed.
[c]Omega-6 fatty acid.
[d]Omega-3 fatty acid.
[e]The Recommended Dietary Allowance for protein can also be calculated as 0.364 g/lb body weight/day.

Table II. Daily values for fat, sodium, carbohydrate and fiber.

Food Component	*2,000 calorie diet*	*2,500 calorie diet*	*Basis for Daily Value*
Total Fat (g)	65	80	30% of calories or less
Saturated Fat (g)	20	25	10% of calories or less
Cholesterol (mg)	300	300	300 mg
Sodium (mg)	2400	2400	2400 mg
Total Carbohydrate (g)	300	375	60% of calories
Fiber (g)	25	30	10-13 g per 1000 calories

"unhealthy" weights. The higher the BMI and waist measurement, and the more risk factors one has, the more one would benefit from weight loss. Risk factors include personal or family history of heart disease, over 45 years of age, smoker, sedentary lifestyle, diagnosed high blood pressure, abnormal blood lipids and type 2 diabetes. Excess fat in the stomach area is a greater health concern than when the fat is in the hips and thighs. Men should have a waist circumference less than 40 inches and women, less than 35 inches. Excess abdominal fat may place one at a greater risk of health problems, even if the BMI is in the range labeled as being "healthy." For the athletic population, multiple skinfold measurements may be a better method of evaluating body weight than BMI.



*Without shoes †Without clothes

Figure 1. Evaluation of body weight using Body Mass Index. Modification of 2000 Dietary Guidelines for Americans.

Table III. Recommended dietary allowances and adequate intakes of vitamins and minerals for adults[a] (also daily values for food labels).
(When recommended intakes are different for women than for men, the recommendations are given as Men/Women.)

VITAMINS

Age (yr)	*Vitamin A (μg RAE)[b]*	*Vitamin D (μg)[c]*	*Vitamin E (mg)[d]*	*Vitamin K (μg)*	*Vitamin C (mg)*	*Thiamin (mg)*	*Riboflavin (mg)*	*Niacin (mg)[e]*	*Vitamin B_6 (mg)*	*Folate (μg)[f]*	*Vitamin B_{12} (μg)*	*Pantothenic Acid (mg)*	*Biotin (μg)*
19-30	900/700	5	15	120/90	90/75	1.2/1.1	1.3/1.1	16/14	1.3	400[g]	2.4	5	30
31-50	900/700	5	15	120/90	90/75	1.2/1.1	1.3/1.1	16/14	1.3	400[g]	2.4	5	30
51-70	900/700	10	15	120/90	90/75	1.2/1.1	1.3/1.1	16/14	1.7/1.5	400	2.4[h]	5	30
70+	900/700	15	15	120/90	90/75	1.2/1.1	1.3/1.1	16/14	1.7/1.5	400	2.4[h]	5	30
Daily Value[i]	1000	10	20	80	60	1.5	1.7	20	2.0	400	6.0	10	300

MINERALS

Age (yr)	*Calcium (mg)*	*Phosphorus (mg)*	*Magnesium (mg)*	*Fluoride (mg)*	*Iron (mg)*	*Zinc (mg)*	*Iodine (μg)*
19-30	1000	700	400/310	4/3	8/18	11/8	150
31-50	1000	700	420/320	4/3	8/18	11/8	150
51-70	1200	700	420/320	4/3	8	11/8	150
70+	1200	700	420/320	4/3	8	11/8	150
Daily Value[i]	1000	1000	400	ND[j]	18	15	150

MINERALS (Continued)

Age (yr)	*Selenium (μg)*	*Chromium (μg)*	*Copper (μg)*	*Manganese (mg)*	*Molybdenum (μg)*	*Potassium (mg)*	*Sodium (mg)*	*Chloride (mg)*
19-30	55	35/25	900	2.3/1.8	45	4700	1500	2300
31-50	55	35/25	900	2.3/1.8	45	4700	1500	2300
51-70	55	30/20	900	2.3/1.8	45	4700	1300	2000
70+	55	30/20	900	2.3/1.8	45	4700	1200	1800
Daily Value[i]	70	120	2000	2.0	75	3500	2400	3400

[a]Source: National Academy of Sciences, 1997, 1998, 2000, 2001, 2003, 2004. Recommendations are given as Recommended Dietary Allowances for vitamin A, vitamin E, vitamin C, thiamin, riboflavin, niacin, vitamin B_6, folate, vitamin B_{12}, phosphorus, magnesium, iron, zinc, iodine, selenium, copper and molybdenum and as Adequate Intakes for the other nutrients.
[b]As retinol activity equivalents (RAE); 1 RAE = 1 μg retinol, 12 μg β-carotene, 24 mg α-carotene, or 24 μg β-cryptoxanthin. To calculate RAE from RE of provitamin A carotenoids in foods, divide the RE by 2. For preformed vitamin A in foods or supplements and for provitamin A carotenoids in supplements, 1 RE = 1 RAE.
[c]1 μg = 40 IU; this is in absence of adequate exposure to sunlight.
[d]As α-tocopherol; 15 mg α-tocopherol from food = 22 IU from natural-source vitamin E or 33 IU of the synthetic form.
[e]As niacin equivalents (NE); 1 mg niacin = 60 mg tryptophan.
[f]As dietary folate equivalents (DFE); 1 DFE = 1 μg food folate = 0.6 μg of folic acid from fortified food or as a supplement consumed with food = 0.5 μg of a supplement taken on an empty stomach.
[g]All women capable of becoming pregnant should consume 400 μg from supplements or fortified foods in addition to intake of food folate from a varied diet.
[h]As 10-30 percent of older people may malabsorb food-bound vitamin B_{12}, it is advisable for those older than 50 years to meet their Recommended Dietary Allowance mainly by consuming foods fortified with vitamin B_{12} or a supplement containing vitamin B_{12}.
[i]Adults and children 4 or more years of age.
[j]Daily Values have not been determined.

Table for Estimation of Energy Requirement

Table IV gives the estimated energy requirements of adults according to physical activity level. These estimated requirements are for adults 30 years of age, and may be adjusted to the age of the person by adding or subtracting 10 calories for each year of age under or over 30 years.

Table IV. Estimated energy requirements of men and women.[a,b]

Height (ft, in)	*Healthy Body Weight Range[c] (lb)*	*Physical Activity Level*	*Estimated Energy Requirement Range (Calories)*	
			Men	*Women*
5' 3"	104-141	Sedentary	2,000-2,200	1,800-2,000
		Low Active	2,200-2,400	2,000-2,200
		Active	2,400-2,800	2,200-2,400
		Very Active	2,800-3,200	2,400-2,600
5' 9"	125-169	Sedentary	2,200-2,600	2,000-2,200
		Low Active	2,400-2,800	2,200-2,400
		Active	2,600-3,000	2,400-2,600
		Very Active	3,200-3,600	2,800-3,000
6' 3"	147-199	Sedentary	2,400-2,800	2,200-2,400
		Low Active	2,600-3,200	2,400-2,600
		Active	3,000-3,400	2,600-3,000
		Very Active	3,400-4,000	3,000-3,400

[a]Source: National Academy of Sciences, 2002. The Estimated Energy Requirement represents the average energy intake that will maintain energy balance in a healthy person. Requirements have been rounded to the nearest 200 calories.
[b]For each year under 30 years of age, add 10 calories and for each year over 30 yers of age subtract 10 calories.
[c]Range is given for the individuals with desirable body mass index of 18.5 to 24.99.

Physical Activity Recommendations

The major cause of individuals being overweight is that more calories are eaten than the body needs. Exercise, which increases energy output, helps in weight loss and in obtaining and maintaining good health. Anyone with a disease, more than 20 percent overweight, or over age 40-50 should consult a physician before beginning a physical activity program. Moderate physical activity is recommended for all adults. Moderate physical activity requires about as much energy as walking two miles in 30 minutes. Adults should accumulate 30-60 minutes of moderate activity daily most days of the week. Adults should also perform strength-building exercises two to three days weekly. To manage weight loss, adults should participate in 60-90 minutes of moderate-intensity physical activity daily.

Health Problems Associated with High and Low Body Weights

Obesity has been associated with several diseases including heart diseases, certain cancers, high blood pressure, stroke, hypertension, osteoarthritis, type 2 diabetes, respiratory disorders, gall bladder disease and a greater risk of early death. Being too thin is linked with anorexia nervosa, osteoporosis and a greater risk of early death.

Adequate Nutrients within Calorie Needs

Most Americans eat more calories than they need without getting recommended intakes of several of the essential nutrients. Adults should eat foods that limit their intakes of saturated and trans fats, cholesterol, added sugars, salt and alcohol. Many adults have intakes of the following nutrients that are lower than recommended:

- Calcium
- Potassium
- Dietary Fiber
- Magnesium
- Carotenoids
- Vitamin C
- Vitamin E

Low intakes of the following nutrients are frequently seen in specific adult population groups:

- Vitamin B_{12} in adults over age 50
- Iron in women of child-bearing age
- Folate in women of child-bearing age
- Vitamin D in the elderly and individuals with dark skin

Adults who are exposed to heat stress or perform sustained vigorous physical activity should be sure that they drink enough fluids.

Fats Including Cholesterol

Fats include both fats and oils. The types and amounts of fats eaten are of importance to health. High intakes of saturated fats, trans fats and cholesterol increase the risk of undesirable blood lipid values which increases the risk of coronary heart disease. Trans fats are produced when vegetable oils are hydrogenated into soft solids. Processed foods (bakery products, margarine, fried potatoes) provide about 80 percent of the trans fats in the American diet as compared to 20 percent that occur naturally in foods from animal sources. Fat intakes above 35 percent of calories usually increase saturated fat intake as well as obesity. Fat intakes below 20 percent of calories increase the risk of inadequate intakes of vitamin E and essential fatty acids as well as undesirable blood lipid values. Sources of the essential fatty acid linoleic acid are soybean oil, corn oil and safflower oil. Sources of the essential fatty acid linolenic acid are soybean oil, canola oil, walnuts and flaxseed. Evidence exists that suggests that consumption of omega-3 fatty acids in fish and shellfish is associated with reduced risk of mortality from heart disease. Most of the dietary fats should come from sources of polyunsaturated and monounsaturated fatty acids. Plant sources that are rich in monounsaturated fatty acids include vegetable oils (canola, olive, high oleic safflower and sunflower) and nuts. The nutritional factor with the greatest effect on blood cholesterol levels is dietary saturated fat. Increased physical activity also helps reduce blood cholesterol levels. Eating foods with saturated fatty acids and cholesterol should be curtailed.

Added Sugars

Added sugars are those added to foods during processing, preparation or at the table. The body's response to sugars does not depend on whether the sugars are naturally present or added to a food. However, added sugars supply calories but few, if any, essential nutrients.

Salt (Sodium)

Sodium is found in table salt and processed foods, though some processed foods are made and labeled as sodium-free or low-sodium. When sodium intake is higher than output, edema (swelling of hands, feet and legs) may occur. High sodium intakes have been associated with high blood pressure and stroke. Some people are more susceptible to salt-induced hypertension than others.

Alcohol

Alcohol is high in calories (7 calories per g) and low in nutrient content. Nutrient inadequacies in alcoholics may be caused by poor diet or interference with the absorption of specific nutrients.

Calcium

The dietary recommendations for adults have been increased for calcium, and the intakes of most adults are less than recommended. Adults 51+ years of age need more calcium than younger adults. Low calcium intakes have been associated with osteoporosis and perhaps hypertension. Foods rich in calcium include milk and milk products, fortified cereals, calcium-fortified beverages, calcium-set tofu, bony fish, kale and Chinese cabbage.

Potassium

The consumption of a potassium-rich diet tends to blunt sodium's effects on blood pressure, may reduce the risk of developing kidney stones and perhaps reduce age-related bone loss. Potassium-rich fruits and vegetables include leafy green vegetables, fruit from vines and root vegetables.

Dietary Fiber

Consuming foods high in dietary fiber is usually beneficial in managing constipation and diverticular disease. The data are inconclusive as to whether dietary fiber plays a protective role in coronary heart disease, colon and certain other cancers, hypertension and gallstones. High-fiber diets may or may not lead to decreased absorption of several minerals. Diets high in fiber-rich foods are recommended. Foods rich in fiber include whole grain cereals and breads, dried beans and peas, seeds, nuts, and raw fruits and vegetables.

Magnesium

Some adults do not eat enough magnesium, especially the elderly. Refined foods have a low magnesium content, and many adults consume large amounts of refined foods. Rich sources of magnesium include green leafy vegetables, unpolished grains, nuts and seeds. Magnesium is frequently found in "hard" water. Evidence exists that low magnesium intakes may be associated with increased risk of heart diseases, hypertension and osteoporosis.

Carotenoids

Beta-carotene and some of the other carotenoids can be converted in the body to vitamin A if needed. To date, the Institute of Medicine, National Academy of Sciences, has not set recommended intakes of beta-carotene and other carotenoids. However, data exist that suggest eating foods containing 3 to 6 mg beta-carotene/day may be prudent. Epidemiological evidence suggests that high blood contents of beta-carotene and some of the other carotenoids obtained from foods is associated with lower risks of several chronic diseases. Beta-carotene is found in dark green vegetables and orange vegetables and fruits.

Vitamin C

Vitamin C, ascorbic acid, is a water-soluble antioxidant. Most adults consume recommended amounts of vitamin C, but some subgroups of the population do not. Several studies have reported an association between heart diseases, some cancers, cataracts and low vitamin C intakes. Rich sources of vitamin C include citrus fruits and juices, vitamin C-fortified beverages, red and green peppers, and some green vegetables.

Vitamin E

Vitamin E is a fat-soluble antioxidant. Most adults need to increase their vitamin E intakes. Evidence suggests that high intakes of vitamin E may reduce the risk of some chronic diseases, especially heart diseases. Foods that are rich in vitamin E include vegetables oils, green leafy vegetables, whole grain and vitamin E-fortified cereals, eggs, seeds, most nuts, wheat germ, tomato paste/puree/sauce, sardines and pickled herring.

Iron

Most men consume adequate quantities of iron. Women of child-bearing age frequently are iron deficient, and should eat foods high in heme-iron (meats) and/or consume iron-rich plant foods or iron-fortified foods along with sufficient vitamin C.

Folate

Women of child-bearing age should consume synthetic folic acid from fortified foods or dietary supplements in addition to food forms of folate as folic acid reduces the risk of neural tube defects. Foods that are rich in folate include green leafy vegetables, organ meats, sprouts, dried beans and folate fortified-orange juice.

Vitamin B_{12}

Adults over the age of 50 have reduced ability to absorb naturally occurring vitamin B_{12}, but they are able to absorb the crystalline form found in fortified foods and dietary supplements. Animal products are rich sources of vitamin B_{12}.

Vitamin D

The elderly and individuals with dark skin (because the ability of the body to make vitamin D from exposure to sunlight varies with the degree of skin pigmentation) should consume 25 μg (1,000 IU) of vitamin D daily; these individuals should eat vitamin D-fortified foods, such as fortified milk products and fortified cereals.

Upper Safe Levels of Vitamins and Minerals

If taken in large amounts, most of the vitamins and essential minerals can adversely affect the health of adults. NebFact NF03-580 *Upper Safe Levels of Intake for Adults: Vitamins, Macrominerals and Trace Minerals* (available at http:www.ianrpubs.unl.edu under Foods and Nutrition publications), summarizes this topic. Upper safe levels of intake have also been set for two electrolyte minerals — 2,300 mg daily for sodium and 3,500 mg daily for chloride.

UNL Extension publications are available online at *http://extension.unl.edu/publications*.

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