Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Biotin	Coenzyme in synthesis of fat, glycogen, and amino acids	Infants	(µg/d)		Liver and smaller amounts in fruits and meats	No adverse effects of biotin in humans or animals were found. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of biotin are limited, caution may be warranted.	None
		0–6 mo	5*	ND[b]			
		7–12 mo	6*	ND			
		Children					
		1–3 y	8*	ND			
		4–8 y	12*	ND			
		Males					
		9–13 y	20*	ND			
		14–18 y	25*	ND			
		19–30 y	30*	ND			
		31-50 y	30*	ND			
		50-70 y	30*	ND			
		> 70 y	30*	ND			
		Females					
		9–13 y	20*	ND			
		14–18 y	25*	ND			
		19–30 y	30*	ND			
		31-50 y	30*	ND			
		50-70 y	30*	ND			
		> 70 y	30*	ND			
		Pregnancy					
		≤ 18 y	30*	ND			
		19-30y	30*	ND			
		31-50 y	30*	ND			
		Lactation					
		≤ 18 y	35*	ND			
		19-30y	35*	ND			
		31–50 y	35*	ND			
Choline	Precursor for acetylcholine, phospholipids and betaine	Infants	(mg/d)	(mg/d)	Milk, liver, eggs, peanuts	Fishy body odor, sweating, salivation, hypotension, hepatotoxicity	Individuals with trimethylaminuria, renal disease, liver disease, depression and Parkinson's disease, may be at risk of adverse effects with choline intakes at the UL. Although AIs have been set for choline, there are few data to assess whether a dietary supply of choline is needed at all stages of the life cycle, and it may be that the choline requirement can be met by endogenous synthesis at some of these stages.
		0–6 mo	125*	ND			
		7–12 mo	150*	ND			
		Children					
		1–3 y	200*	1000			
		4–8 y	250*	1000			
		Males					
		9–13 y	375*	2000			
		14–18 y	550*	3000			
		19–30 y	550*	3500			
		31-50 y	550*	3500			
		50-70 y	550*	3500			
		> 70 y	550*	3500			
		Females					
		9–13 y	375*	2000			
		14–18 y	400*	3000			
		19–30 y	425*	3500			
		31-50 y	425*	3500			
		50-70 y	425*	3500			
		> 70 y	425*	3500			
		Pregnancy					
		≤ 18 y	450*	3000			
		19-30y	450*	3500			
		31-50 y	450*	3500			
		Lactation					
		≤ 18 y	550*	3000			
		19-30y	550*	3500			
		31–50 y	550*	3500			

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[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); and *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001). These reports may be accessed via www.nap.edu.

Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Folate Also known as: Folic acid Folacin Pteroylpolyglutamates Note: Given as dietary folate equivalents (DFE). 1 DFE = 1 µg food folate = 0.6 µg of folate from fortified food or as a supplement consumed with food = 0.5 µg of a supplement taken on an empty stomach.	Coenzyme in the metabolism of nucleic and amino acids; prevents megaloblastic anemia	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(µg/d) 65* 80* **150** **200** **300** **400** **400** **400** **400** **400** **300** **400** **400** **400** **400** **400** **600** **600** **600** **500** **500** **500**	(µg/d) ND[b] ND 300 400 600 800 1,000 1,000 1,000 1,000 600 800 1,000 1,000 1,000 1,000 800 1,000 1,000 800 1,000 1,000	Enriched cereal grains, dark leafy vegetables, enriched and whole-grain breads and bread products, fortified ready-to-eat cereals	Masks neurological complication in people with vitamin B_{12} deficiency. No adverse effects associated with folate from food or supplements have been reported. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of folate are limited, caution may be warranted. The UL for folate applies to synthetic forms obtained from supplements and/or fortified foods.	In view of evidence linking folate intake with neural tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 µg from supplements or fortified foods in addition to intake of food folate from a varied diet. It is assumed that women will continue consuming 400 µg from supplements or fortified food until their pregnancy is confirmed and they enter prenatal care, which ordinarily occurs after the end of the periconceptional period—the critical time for formation of the neural tube.
Niacin Includes nicotinic acid amide, nicotinic acid (pyridine-3-carboxylic acid), and derivatives that exhibit the biological activity of nicotinamide. Note: Given as niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan; 0–6 months = preformed niacin (not NE).	Coenzyme or cosubstrate in many biological reduction and oxidation reactions—thus required for energy metabolism	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(mg/d) 2* 4* **6** **8** **12** **16** **16** **16** **16** **16** **12** **14** **14** **14** **14** **14** **18** **18** **18** **17** **17** **17**	(mg/d) ND ND 10 15 20 30 35 35 35 35 20 30 35 35 35 35 30 35 35 30 35 35	Meat, fish, poultry, enriched and whole-grain breads and bread products, fortified ready-to-eat cereals	There is no evidence of adverse effects from the consumption of naturally occurring niacin in foods. Adverse effects from niacin containing supplements may include flushing and gastrointestinal distress. The UL for niacin applies to synthetic forms obtained from supplements, fortified foods, or a combination of the two.	Extra niacin may be required by persons treated with hemodialysis or peritoneal dialysis, or those with malabsorption syndrome.

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[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); and *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001). These reports may be accessed via www.nap.edu.

Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Pantothenic Acid	Coenzyme in fatty acid metabolism	Infants	(mg/d)	(mg/d)	Chicken, beef, potatoes, oats, cereals, tomato products, liver, kidney, yeast, egg yolk, broccoli, whole grains	No adverse effects associated with pantothenic acid from food or supplements have been reported. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of pantothenic acid are limited, caution may be warranted.	None
		0–6 mo	1.7*	ND[b]			
		7–12 mo	1.8*	ND			
		Children					
		1–3 y	2*	ND			
		4–8 y	3*	ND			
		Males					
		9–13 y	4*	ND			
		14–18 y	5*	ND			
		19–30 y	5*	ND			
		31-50 y	5*	ND			
		50-70 y	5*	ND			
		> 70 y	5*	ND			
		Females					
		9–13 y	4*	ND			
		14–18 y	5*	ND			
		19–30 y	5*	ND			
		31-50 y	5*	ND			
		50-70 y	5*	ND			
		> 70 y	5*	ND			
		Pregnancy					
		≤ 18 y	6*	ND			
		19-30y	6*	ND			
		31-50 y	6*	ND			
		Lactation					
		≤ 18 y	7*	ND			
		19-30y	7*	ND			
		31–50 y	7*	ND			
Riboflavin Also known as: Vitamin B_2	Coenzyme in numerous redox reactions	Infants	(mg/d)	(mg/d)	Organ meats, milk, bread products and fortified cereals	No adverse effects associated with riboflavin consumption from food or supplements have been reported. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of riboflavin are limited, caution may be warranted.	None
		0–6 mo	0.3*	ND			
		7–12 mo	0.4*	ND			
		Children					
		1–3 y	**0.5**	ND			
		4–8 y	**0.6**	ND			
		Males					
		9–13 y	**0.9**	ND			
		14–18 y	**1.3**	ND			
		19–30 y	**1.3**	ND			
		31-50 y	**1.3**	ND			
		50-70 y	**1.3**	ND			
		> 70 y	**1.3**	ND			
		Females					
		9–13 y	**0.9**	ND			
		14–18 y	**1.0**	ND			
		19–30 y	**1.1**	ND			
		31-50 y	**1.1**	ND			
		50-70 y	**1.1**	ND			
		> 70 y	**1.1**	ND			
		Pregnancy					
		≤ 18 y	**1.4**	ND			
		19-30y	**1.4**	ND			
		31-50 y	**1.4**	ND			
		Lactation					
		≤ 18 y	**1.6**	ND			
		19-30y	**1.6**	ND			
		31–50 y	**1.6**	ND			

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[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

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Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Thiamin Also known as: Vitamin B_1 Aneurin	Coenzyme in the metabolism of carbohydrates and branched-chain amino acids	Infants	(mg/d)		Enriched, fortified, or whole-grain products; bread and bread products, mixed foods whose main ingredient is grain, and ready-to-eat cereals	No adverse effects associated with thiamin from food or supplements have been reported. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of thiamin are limited, caution may be warranted.	Persons who may have increased needs for thiamin include those being treated with hemodialysis or peritoneal dialysis, or individuals with malabsorption syndrome.
		0–6 mo	0.2*	ND[b]			
		7–12 mo	0.3*	ND			
		Children					
		1–3 y	**0.5**	ND			
		4–8 y	**0.6**	ND			
		Males					
		9–13 y	**0.9**	ND			
		14–18 y	**1.2**	ND			
		19–30 y	**1.2**	ND			
		31-50 y	**1.2**	ND			
		50-70 y	**1.2**	ND			
		> 70 y	**1.2**	ND			
		Females					
		9–13 y	**0.9**	ND			
		14–18 y	**1.0**	ND			
		19–30 y	**1.1**	ND			
		31-50 y	**1.1**	ND			
		50-70 y	**1.1**	ND			
		> 70 y	**1.1**	ND			
		Pregnancy					
		≤ 18 y	**1.4**	ND			
		19-30y	**1.4**	ND			
		31-50 y	**1.4**	ND			
		Lactation					
		≤ 18 y	**1.4**	ND			
		19-30y	**1.4**	ND			
		31–50 y	**1.4**	ND			
Vitamin A Includes provitamin A carotenoids that are dietary precursors of retinol. Note: Given as retinol activity equivalents (RAEs). 1 RAE = 1 μg retinol, 12 μg β-carotene, 24 μg α-carotene, or 24 μg β-cryptoxanthin. To calculate RAEs from REs of provitamin A carotenoids in foods, divide the REs by 2. For preformed vitamin A in foods or supplements and for provitamin A carotenoids in supplements, 1 RE = 1 RAE.	Required for normal vision, gene expression, reproduction, embryonic development and immune function	Infants	(μg/d)	(μg/d)	Liver, dairy products, fish	Teratological effects, liver toxicity Note: From preformed Vitamin A only.	Individuals with high alcohol intake, pre-existing liver disease, hyperlipidemia or severe protein malnutrition may be distinctly susceptible to the adverse effects of excess preformed vitamin A intake. β-carotene supplements are advised only to serve as a provitamin A source for individuals at risk of vitamin A deficiency.
		0–6 mo	400*	600			
		7–12 mo	500*	600			
		Children					
		1–3 y	**300**	600			
		4–8 y	**400**	900			
		Males					
		9–13 y	**600**	1,700			
		14–18 y	**900**	2,800			
		19–30 y	**900**	3,000			
		31-50 y	**900**	3,000			
		50-70 y	**900**	3,000			
		> 70 y	**900**	3,000			
		Females					
		9–13 y	**600**	1,700			
		14–18 y	**700**	2,800			
		19–30 y	**700**	3,000			
		31-50 y	**700**	3,000			
		50-70 y	**700**	3,000			
		> 70 y	**700**	3,000			
		Pregnancy					
		≤ 18 y	**750**	2,800			
		19-30y	**770**	3,000			
		31-50 y	**770**	3,000			
		Lactation					
		≤ 18 y	**1,200**	2,800			
		19-30y	**1,300**	3,000			
		31–50 y	**1,300**	3,000			

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Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Vitamin B_6 Vitamin B_6 comprises a group of six related compounds: pyridoxal, pyridoxine, pyridoxamine, and 5'-phosphates (PLP, PNP, PMP)	Coenzyme in the metabolism of amino acids, glycogen and sphingoid bases	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(mg/d) 0.1* 0.3* **0.5** **0.6** **1.0** **1.3** **1.3** **1.3** **1.7** **1.7** **1.0** **1.2** **1.3** **1.3** **1.5** **1.5** **1.9** **1.9** **1.9** **2.0** **2.0** **2.0**	(mg/d) ND[b] ND 30 40 60 80 100 100 100 100 60 80 100 100 100 100 80 100 100 80 100 100	Fortified cereals, organ meats, fortified soy-based meat substitutes	No adverse effects associated with Vitamin B_6 from food have been reported. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of Vitamin B_6 are limited, caution may be warranted. Sensory neuropathy has occurred from high intakes of supplemental forms.	None
Vitamin B_{12} Also known as: Cobalamin	Coenzyme in nucleic acid metabolism; prevents megaloblastic anemia	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(µg/d) 0.4* 0.5* **0.9** **1.2** **1.8** **2.4** **2.4** **2.4** **2.4** **2.4** **1.8** **2.4** **2.4** **2.4** **2.4** **2.4** **2.6** **2.6** **2.6** **2.8** **2.8** **2.8**	 ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND	Fortified cereals, meat, fish, poultry	No adverse effects have been associated with the consumption of the amounts of vitamin B_{12} normally found in foods or supplements. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of vitamin B_{12} are limited, caution may be warranted.	Because 10 to 30 percent of older people may malabsorb food-bound vitamin B_{12}, it is advisable for those older than 50 years to meet their RDA mainly by consuming foods fortified with vitamin B_{12} or a supplement containing vitamin B_{12}.

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[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

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Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Vitamin C Also known as: Ascorbic acid Dehydroascorbic acid (DHA)	Cofactor for reactions requiring reduced copper or iron metalloenzyme and as a protective antioxidant	Infants	(mg/d)	(mg/d)	Citrus fruits, tomatoes, tomato juice, potatoes, brussel sprouts, cauliflower, broccoli, strawberries, cabbage and spinach	Gastrointestinal disturbances, kidney stones, excess iron absorption	Individuals who smoke require an additional 35 mg/d of vitamin C over that needed by nonsmokers. Nonsmokers regularly exposed to tobacco smoke are encouraged to ensure they meet the RDA for vitamin C.
		0–6 mo	40*	ND[b]			
		7–12 mo	50*	ND			
		Children					
		1–3 y	**15**	400			
		4–8 y	**25**	650			
		Males					
		9–13 y	**45**	1,200			
		14–18 y	**75**	1,800			
		19–30 y	**90**	2,000			
		31-50 y	**90**	2,000			
		50-70 y	**90**	2,000			
		> 70 y	**90**	2,000			
		Females					
		9–13 y	**45**	1,200			
		14–18 y	**65**	1,800			
		19–30 y	**75**	2,000			
		31-50 y	**75**	2,000			
		50-70 y	**75**	2,000			
		> 70 y	**75**	2,000			
		Pregnancy					
		≤ 18 y	**80**	1,800			
		19-30y	**85**	2,000			
		31-50 y	**85**	2,000			
		Lactation					
		≤ 18 y	**115**	1,800			
		19-30y	**120**	2,000			
		31–50 y	**120**	2,000			
Vitamin D Also known as: Calciferol Note: 1 µg calciferol = 40 IU vitamin D The DRI values are based on the absence of adequate exposure to sunlight.	Maintain serum calcium and phosphorus concentrations.	Infants	(ug/d)	(ug/d)	Fish liver oils, flesh of fatty fish, liver and fat from seals and polar bears, eggs from hens that have been fed vitamin D, fortified milk products and fortified cereals	Elevated plasma 25 (OH) D concentration causing hypercalcemia	Patients on glucocorticoid therapy may require additional vitamin D.
		0–6 mo	5*	25			
		7–12 mo	5*	25			
		Children					
		1–3 y	5*	50			
		4–8 y	5*	50			
		Males					
		9–13 y	5*	50			
		14–18 y	5*	50			
		19–30 y	5*	50			
		31-50 y	5*	50			
		50-70 y	10*	50			
		> 70 y	15*	50			
		Females					
		9–13 y	5*	50			
		14–18 y	5*	50			
		19–30 y	5*	50			
		31-50 y	5*	50			
		50-70 y	10*	50			
		> 70 y	15*	50			
		Pregnancy					
		≤ 18 y	5*	50			
		19-30y	5*	50			
		31-50 y	5*	50			
		Lactation					
		≤ 18 y	5*	50			
		19-30y	5*	50			
		31–50 y	5*	50			

NOTE: The table is adapted from the DRI reports, see www.nap.edu. It represents Recommended Dietary Allowances (RDAs) in **bold type**, Adequate Intakes (AIs) in ordinary type followed by an asterisk (*), and Upper Limits (ULs)[a]. RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of almost all (97 to 98 percent) individuals in a group. For healthy breastfed infants, the AI is the mean intake. The AI for other life stage and gender groups is believed to cover the needs of all individuals in the group, but lack of data prevent being able to specify with confidence the percentage of individuals covered by this intake.

[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); and *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001). These reports may be accessed via www.nap.edu.

Dietary Reference Intakes: Vitamins

Nutrient	Function	Life Stage Group	RDA/AI*	UL[a]	Selected Food Sources	Adverse effects of excessive consumption	Special Considerations
Vitamin E Also known as: α-tocopherol Note: As α-tocopherol. α-Tocopherol includes *RRR*-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the *2R*-stereoisomeric forms of α-tocopherol (*RRR*-, *RSR*-, *RRS*-, and *RSS*-α-tocopherol) that occur in fortified foods and supplements. It does not include the *2S*-stereoisomeric forms of α-tocopherol (*SRR*-, *SSR*-, *SRS*-, and *SSS*-α-tocopherol), also found in fortified foods and supplements.	A metabolic function has not yet been identified. Vitamin E's major function appears to be as a non-specific chain-breaking antioxidant.	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(mg/d) 4* 5* **6** **7** **11** **15** **15** **15** **15** **15** **11** **15** **15** **15** **15** **15** **15** **15** **15** **19** **19** **19**	(mg/d) ND[b] ND 200 300 600 800 1,000 1,000 1,000 1,000 600 800 1,000 1,000 1,000 1,000 800 1,000 1,000 800 1,000 1,000	Vegetable oils, unprocessed cereal grains, nuts, fruits, vegetables, meats	There is no evidence of adverse effects from the consumption of vitamin E naturally occurring in foods. Adverse effects from vitamin E containing supplements may include hemorrhagic toxicity. The UL for vitamin E applies to any form of α-tocopherol obtained from supplements, fortified foods, or a combination of the two.	Patients on anticoagulant therapy should be monitored when taking vitamin E supplements.
Vitamin K	Coenzyme during the synthesis of many proteins involved in blood clotting and bone metabolism	Infants 0–6 mo 7–12 mo Children 1–3 y 4–8 y Males 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Females 9–13 y 14–18 y 19–30 y 31-50 y 50-70 y > 70 y Pregnancy ≤ 18 y 19-30y 31-50 y Lactation ≤ 18 y 19-30y 31–50 y	(μg/d) 2.0* 2.5* 30* 55* 60* 75* 120* 120* 120* 120* 60* 75* 90* 90* 90* 90* 75* 90* 90* 75* 90* 90*	 ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND ND	Green vegetables (collards, spinach, salad greens, broccoli), brussel sprouts, cabbage, plant oils and margarine	No adverse effects associated with vitamin K consumption from food or supplements have been reported in humans or animals. This does not mean that there is no potential for adverse effects resulting from high intakes. Because data on the adverse effects of vitamin K are limited, caution may be warranted.	Patients on anticoagulant therapy should monitor vitamin K intake.

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