

New Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Protein, Sodium, Potassium, Chloride, and Water

Source: Dietary Reference Intakes, Institute of Medicine of the National Academies, 2002 and 2004, National Academy Press, Washington DC
Available at www.nap.edu

Energy (no comparable 1989 formulas)

Boy and Girl Infants and Toddlers

0-3 months	EER (kcal/d) = (89 x Wt [kg] – 100) + 175
4-6 months	EER(kcal/d) = (89 x Wt [kg] – 100) + 56
7-12 months	EER (kcal/d) = (89 x Wt [kg] – 100) + 22
13-35 months	EER (kcal/d) = (89 x Wt [kg] – 100) + 20

Boys 3-8 y	EER (kcal/d) = 88.5 – 61.9 x Age [y] + PA x (26.7 x Wt [kg] + 903 x Ht [m]) +20
Boys 9-18 y	EER (kcal/d) = 88.5 – 61.9 x Age [y] + PA x (26.7 x Wt [kg] + 903 x Ht [m]) +25

PA = 1.00	Sedentary
1.13	Low active
1.26	Active
1.42	Very Active

Girls 3-8 y	EER (kcal/d) = 135.3 – 30.8 x age [y] + PA x (10 x Wt [kg] + 934 x Ht [m]) + 20
Girls 9-18 y	EER (kcal/d) = 135.3 – 30.8 x age [y] + PA x (10 x Wt [kg] + 934 x Ht [m]) + 25

PA = 1.00	Sedentary
1.16	Low active
1.31	Active
1.56	Very active

Men 19 y and older $EER = 662 - 9.53 \times \text{Age [y]} + PA \times (15.91 \times \text{Wt [kg]} + 539.6 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.11 Low Active
1.25 Active
1.48 Very active

Women 19 y and older $EER = 354 - 6.91 \times \text{Age [y]} + PA \times (9.36 \times \text{Wt [kg]} + 726 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.12 Low active
1.27 Active
1.45 Very active

Pregnancy

14-18 y

1st trimester Kcals/d = Adolescent EER + 0
2nd trimester Kcals/d = Adolescent EER + 340
3rd trimester Kcals/d = Adolescent EER + 452

19-50 y

1st trimester Kcals/d = Adult EER + 0
2nd trimester Kcals/d = Adult EER + 340
3rd trimester Kcals/d = Adult EER + 452

Lactation

14-18 y

0-6 mo Kcals/d = Adolescent EER + 330
7-12 mo Kcals/d = Adolescent EER + 400

19-50 y

0-6 mo Kcals/d = Adult EER + 330
7-12 mo Kcals/d = Adult EER + 400

Energy Needs based on estimates of Total Energy Expenditure (TEE) or Overweight or Obese Adults, 19 y or older (maintenance)

Male $TEE = 1086 - 10.1 \times \text{Age [y]} + PA \times (13.7 \times \text{Wt [kg]} + 416 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.12 Low active
1.29 Active
1.59 Very active

Female $TER = 448 - 7.95 \times \text{Age [y]} + PA \times (11.4 \times \text{Wt [kg]} + 619 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.16 Low Active
1.27 Active
1.44 Very Active

Overweight or obese children, 3-18 y (maintenance)

Male $TEE = -114 - 50.9 \times \text{Age [y]} + PA \times (19.5 \times \text{Wt [kg]} + 1161.4 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.12 Low active
1.24 Active
1.45 Very active

Female $TEE = 389 - 41.2 \times \text{Age [y]} + PA \times (15 \times \text{Wt [kg]} + 701.6 \times \text{Ht [m]})$

PA = 1.00 Sedentary
1.18 Low active
1.35 Active
1.60 Very active

Carbohydrate (no comparable 1989 standards)

AI for Infants (0-12 mo)

0-6 mo	60 g/d
7-12 mo	95 g/d

RDA for Children and adolescents (1-18 y)

1-3 y	130 g/d
4-8 y	130 g/d

RDA for Boys

9-13 y	130 g/d
14-18 y	130 g/d

RDA for Girls

9-13 y	130 g/d
14-18 y	130 g/d

RDA for Men

19-30 y	130 g/d
31-50 y	130 g/d
51-70 y	130 g/d
> 70 y	130 g/d

RDA for Women

19-30 y	130 g/d
31-50 y	130 g/d
51-70 y	130 g/d
> 70 y	130 g/d

Carbohydrate (con't)

RDA for Pregnancy

14-18 y	175 g/d
19-30 y	175 g/d
31-50 y	175 g/d

RDA for Lactation

14-18 y	210 g/d
19-30 y	210 g/d
31-50 y	210 g/d

Intake of no more than 25% of kcals from added sugars is suggested.

Fiber (no comparable 1989 standards)

Total fiber is the sum of **dietary fiber** and **functional fiber**.

Dietary fiber is the intact and intrinsic nondigestible carbohydrates and lignins in plant foods.

Functional fiber is defined as isolated nondigestible carbohydrates that have beneficial physiological effects in humans.

AI for children

1-3 y 19 g/d total fiber

4-8 y 25 g/d total fiber

AI for boys

9-13 y 31 g/d total fiber

14-18 y 38 g/d total fiber

AI for girls

9-13 y 26 g/d total fiber

14-18 y 26 g/d total fiber

AI for men

19-30 y 38 g/d total fiber

31-50 y 38 g/d total fiber

51-70 y 30 g/d total fiber

> 70 y 30 g/d total fiber

AI for women

19-30 y 25 g/d total fiber

31-50 y 25 g/d total fiber

51-70 y 21 g/d total fiber

> 70 y 21 g/d total fiber

Fiber (con't)

AI for Pregnancy

14-18 y	28 g/d total fiber
19-30 y	28 g/d total fiber
31-50 y	28 g/d total fiber

AI for Lactation

14-18 y	29 g/d total fiber
19-30 y	29 g/d total fiber
31-50 y	29 g/d total fiber

No UL for fiber was established.

Fats and fatty acids (no comparable 1989 standards)

AI for Infants (total fat), based on human milk and human milk + supplemental foods

0-6 mo 31 g/d total fat

7-12 mo 30 g/d total fat

AI for Infants (n-6 fat)

0-6 mo 4.4 g/d omega-6 polyunsaturated fatty acids

7-12 mo 4.6 g/d omega-6 polyunsaturated fatty acids

AI for Infants (n-3 fat)

0-6 mo 0.5 g/d omega-3 polyunsaturated fatty acids

7-12 mo 0.5 g/d omega-3 polyunsaturated fatty acids

AI for children (1-18 y) and adults 19 y and over

Age/gender group Linoleic acid (g/d) α-linolenic acid (g/d)

1-3 y, boys and girls 7 0.7

4-8 y, boys and girls 10 0.9

9-13 y, boys 12 1.2

9-13 y, girls 10 1.0

14-18 y, boys 16 1.6

14-18 y, girls 11 1.1

19-30 y, men 17 1.6

31-50 y, men 17 1.6

51-70 y, men 14 1.6

> 70 y, men 14 1.6

19-30 y, women 12 1.1

31-50 y, women 12 1.1

51-70 y, women 11 1.1

<u>Age/gender group</u>	<u>Linoleic acid (g/d)</u>	<u>α-linolenic acid (g/d)</u>
> 70 y, women	11	1.1
14-18 y, pregnant	13	1.4
19-30 y, pregnant	13	1.4
31-50 y, pregnant	13	1.4
14-18 y, lactating	13	1.3
19-30 y, lactating	13	1.3
31-50 y, lactating	13	1.3

No UL were set for any individual fatty acids

No separate recommendations for saturated fatty acids or monounsaturated fatty acids

No standard for dietary cholesterol, though a positive linear trend between dietary cholesterol intake and LDL-cholesterol levels was noted.

Principle regarding dietary cholesterol, saturated fatty acids, or trans fatty acids is that there is no biological need for these and any intake is considered to be negative to health (no threshold level). No UL was set.

Protein

	Current Standard		1989 RDA	Difference
AI for infants	<hr/>		<hr/>	<hr/>
0-6 mo	1.52 g/kg/d	9.1 g/d	13g/d	(3.9 g/d)
RDA for infants				
7-12 mo	1.50 g/kg/d	13.5 g/d	14 g/d	(0.5 g/d)
RDA for Boys and Girls				
1-3 y	1.1 g/kg/d	13 g/d	16 g/d	(3 g/d)
4-8 y	0.95 g/kg/d	19 g/d	24-28 g/d	(5-9 g/d)
9-13 y	0.95 g/kg/d	34 g/d	45-46 g/d	(11-12 g/d)
RDA for Boys				
14-18 y	0.85 g/kg/d	52 g/d	59 g/d	(7 g/d)
RDA for Girls				
14-18 y	0.85 g/kg/d	46 g/d	44 g/d	2 g/d
RDA for Men				
19-30 y	0.80 g/kg/d	56 g/d	58 g/d	(2 g/d)
31-50 y	0.80 g/kg/d	56 g/d	63 g/d	(7 g/d)
51-70 y	0.80 g/kg/d	56 g/d	63 g/d	(7 g/d)
>70 y	0.80 g/kg/d	56 g/d	63 g/d	(7 g/d)
RDA for Women				
19-30 y	0.80 g/kg/d	46 g/d	46 g/d	0 g/d
31-50 y	0.80 g/kg/d	46 g/d	50 g/d	(4 g/d)
51-70 y	0.80 g/kg/d	46 g/d	50 g/d	(4 g/d)
> 70 y	0.80 g/kg/d	46 g/d	50 g/d	(4 g/d)

Protein (con't)

	Current Standard		1989 RDA	Difference
RDA for Pregnancy	1.1 g/kg/d	71 g/d	60 g/d	11 g/d
RDA for Lactation	1.1 g/kg/d	71 g/d	62-65 g/d	6-9 g/d

No separate RDA for vegetarians and no increases to the RDA for the elderly or for strength training or endurance athletes.

Sodium

	<u>Current Standard</u>	<u>1989 Minimum Requirement</u>	<u>Difference</u>
AI for Infants			
0-6 mo	120 mg/d	120 mg/d	0 mg/d
AI for infants			
7-12 mo	370 mg/d	200 mg/d	170 mg/d
AI for Boys and Girls			
1-3 y	1000 mg/d	225-300 mg/d	700-775 mg/d
4-8 y	1200 mg/d	300-400	800-900 mg/d
9-13 y	1500 mg/d	500 mg/d	1000 mg/d
AI for Boys			
14-18 y	1500 mg/d	500 mg/d	1000 mg/d
AI for Girls			
14-18 y	1500 mg/d	500 mg/d	1000 mg/d
AI for Men			
19-30 y	1500 mg/d	500 mg/d	1000 mg/d
31-50 y	1500 mg/d	500 mg/d	1000 mg/d
51-70 y	1300 mg/d	500 mg/d	800 mg/d
>70 y	1200 mg/d	500 mg/d	700 mg/d
AI for Women			
19-30 y	1500 mg/d	500 mg/d	1000 mg/d
31-50 y	1500 mg/d	500 mg/d	1000 mg/d
51-70 y	1300 mg/d	500 mg/d	800 mg/d
> 70 y	1200 mg/d	500 mg/d	700 mg/d
AI for Pregnancy	1500 mg/d	500 mg/d	1000 mg/d
AI for Lactation	1500 mg/d	500 mg/d	1000 mg/d

Potassium

	<u>Current Standard</u>	<u>1989 Minimum Requirement</u>	<u>Difference</u>
AI for infants 0-6 mo	400 mg/d	500 mg/d	(100 mg/d)
AI for infants 7-12 mo	700 mg/d	700 mg/d	0 mg/d
AI for Boys and Girls			
1-3 y	3000 mg/d	1000-1400 mg/d	1600-2000 mg/d
4-8 y	3800 mg/d	1600 mg/d	2200 mg/d
9-13 y	4500 mg/d	2000 mg/d	2500 mg/d
AI for Boys			
14-18 y	4700 mg/d	2000 mg/d	2700 mg/d
AI for Girls			
14-18 y	4700 mg/d	2000 mg/d	2700 mg/d
AI for Men			
19-30 y	4700 mg/d	2000 mg/d	2700 mg/d
31-50 y	4700 mg/d	2000 mg/d	2700 mg/d
51-70 y	4700 mg/d	2000 mg/d	2700 mg/d
>70 y	4700 mg/d	2000 mg/d	2700 mg/d
AI for Women			
19-30 y	4700 mg/d	2000 mg/d	2700 mg/d
31-50 y	4700 mg/d	2000 mg/d	2700 mg/d
51-70 y	4700 mg/d	2000 mg/d	2700 mg/d
> 70 y	4700 mg/d	2000 mg/d	2700 mg/d
AI for Pregnancy	4700 mg/d	2000 mg/d	2700 mg/d
AI for Lactation	5100 mg/d	2000 mg/d	3100 mg/d

Chloride

	<u>Current Standard</u>	<u>1989 Minimum Requirement</u>	<u>Difference</u>
AI for Infants			
0-6 mo	180 mg/d	180 mg/d	0 mg/d
AI for infants			
7-12 mo	570 mg/d	300 mg/d	270 mg/d
AI for Boys and Girls			
1-3 y	1500 mg/d	350-500 mg/d	1000-1150 mg/d
4-8 y	1900 mg/d	500-600 mg/d	1300-1400 mg/d
9-13 y	2300 mg/d	600-750 mg/d	1550-1700 mg/d
AI for Boys			
14-18 y	2300 mg/d	750 mg/d	1550 mg/d
AI for Girls			
14-18 y	2300 mg/d	750 mg/d	1550 mg/d
AI for Men			
19-30 y	2300 mg/d	750 mg/d	1550 mg/d
31-50 y	2300 mg/d	750 mg/d	1550 mg/d
51-70 y	2000 mg/d	750 mg/d	1250 mg/d
>70 y	1800 mg/d	750 mg/d	1050 mg/d
AI for Women			
19-30 y	2300 mg/d	750 mg/d	1550 mg/d
31-50 y	2300 mg/d	750 mg/d	1550 mg/d
51-70 y	2000 mg/d	750 mg/d	1250 mg/d
> 70 y	1800 mg/d	750 mg/d	1050 mg/d
AI for Pregnancy	2300 mg/d	750 mg/d	1550 mg/d
AI for Lactation	2300 mg/d	750 mg/d	1550 mg/d

Water (standard in 1989 was 1ml/kcal expended for adults in general and 1.5 ml/kcal expended for infants)

	<u>Current Standard</u>	<u>1989 Estimated Requirement</u>	<u>Difference</u>
AI for Infants			
0-6 mo	0.7 L/d	0.98 L/d	(0.18 L/d)
AI for infants			
7-12 mo	0.8L/d	1.28 L/d	(0.48 L/d)
AI for Boys and Girls			
1-3 y	1.3 L/d	1.3 L/d	0 L/d
4-8 y	1.7 L/d	1.8 L/d	(0.1 L/d)
AI for Boys			
9-13 y	2.4 L/d	2.5 L/d	(0.1 L/d)
AI for Girls			
9-13 y	2.1 L/d	2.2 L/d	(0.1 L/d)
AI for Boys			
14-18 y	3.3 L/d	3.0 L/d	0.3 L/d
AI for Girls			
14-18 y	2.3 L/d	2.2 L/d	0.1 L/d
AI for Men			
19-30 y	3.7 L/d	2.9 L/d	0.8 L/d
31-50 y	3.7 L/d	2.9 L/d	0.8 L/d
51-70 y	3.7 L/	2.3 L/d	1.4 L/d
>70 y	3.7 L/d	2.3 L/d	1.4 L/d
AI for Women			
19-30 y	2.7 L/d	2.2 L/d	0.5 L/d
31-50 y	2.7 L/d	2.2 L/d	0.5 L/d
51-70 y	2.7 L/d	1.9 L/d	0.8 L/d
> 70 y	2.7 L/d	1.9 L/d	0.8 L/d

	<u>Current Standard</u>	<u>1989 Estimated Requirement</u>	<u>Difference</u>
AI for Pregnancy	3.0 L/d	2.5 L/d	0.5 L/d
AI for Lactation	3.8 L/d	2.7 L/d	1.1 L/d

Acceptable Macronutrient Distribution Ranges (AMDRs) for Healthful Diets

Children

1-3 y	30-40% of kcals from fat 45-65% of kcals from carbohydrate 5-20% of kcals from protein
4-18 y	25-35% of kcals from fat 45-65% of kcals from carbohydrate 10-30% of kcals from protein

Adults

20-35% of kcals from fats
45-60% of kcal from carbohydrate
10-35% of kcal from protein
5-10% of kcal from omega-6 polyunsaturated fatty acids
0.6-1.2% of kcals from α -linolenic acid (up to 10% of that can be consumed as the fish oil fatty acids EPA or DHA)

Additionally, no more than 25% of kcals from added sugars, and minimize intake of saturated fatty acids, dietary cholesterol, and *trans* fats (no specific recommendations given).