

# Appendix

**Table A.1** Equations for predicting the average basal metabolic rate (BMR) from body weight (W), expressed in kg, and for children and adolescents, from body weight and height (H expressed in m) (BMR expressed in MJ per day)

Age in years	BMR (from weight)	BMR (from weight and height)
<i>Males</i> < 3	$0.249 W - 0.13$	$0.0007 W + 6.35 H - 2.58$
3-9	$0.095 W + 2.11$	$0.082 W + 0.55 H + 1.74$
10-17	$0.074 W + 2.75$	$0.068 W + 0.57 H + 2.16$
18-29	$0.064 W + 2.84$	
30-59	$0.0485 W + 3.67$	
60-74	$0.0499 W + 2.93$	
$\geq 75$	$0.035 W + 3.43$	
<i>Females</i> < 3	$0.244 W - 0.13$	$0.068 W + 4.28 H - 1.73$
3-9	$0.085 W + 2.03$	$0.071 W + 0.68 H + 1.55$
10-17	$0.056 W + 2.90$	$0.035 W + 1.95 H + 0.84$
18-29	$0.0615 W + 2.08$	
30-59	$0.0364 W + 3.47$	
60-74	$0.0386 W + 2.88$	
$\geq 75$	$0.0410 W + 2.61$	

These values are taken from the WHO/FAO/UNU report on energy and protein requirements <sup>1</sup> and Schofield *et al.* <sup>2</sup> except for the data on the two older groups where selected data, taken from Schofield *et al.* <sup>2</sup> and used in the report, have been amplified by new and more extensive data collected on Scottish elderly men and from both elderly men and women in Italy.

**Table A.2** *Estimated Energy Requirements (MJ/d) for groups of men and women at various ages, weights and activity levels*

**Physical Activity Level (PAL)**

Body weight (kg)	BMR (MJ/d)	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
<i>Men 18-29 yr</i>										
60	6.7	9.3	10.0	10.7	11.4	12.0	12.7	13.4	14.1	14.7
65	7.0	9.8	10.5	11.2	11.9	12.6	13.3	14.0	14.7	15.4
70	7.3	10.2	11.0	11.7	12.5	13.2	13.9	14.6	15.4	16.1
75	7.6	10.7	11.5	12.2	13.0	13.7	14.5	15.2	16.0	16.8
80	8.0	11.2	12.0	12.8	13.6	14.4	15.2	16.0	16.8	17.6
<i>Men 30-59 yr</i>										
60	6.6	9.2	9.9	10.6	11.2	11.9	12.5	13.2	13.9	14.5
65	6.8	9.5	10.2	10.8	11.5	12.2	12.9	13.5	14.2	14.9
70	7.1	10.0	10.7	11.4	12.1	12.8	13.5	14.2	14.9	15.6
75	7.3	10.2	10.9	11.6	12.4	13.1	13.8	14.5	15.3	16.0
80	7.6	10.6	11.4	12.2	12.9	13.7	14.4	15.2	16.0	16.7
<i>Men 60-74 yr</i>										
60	5.9	8.3	8.9	9.4	10.0	10.6	11.2	11.8	12.4	13.0
65	6.2	8.7	9.3	9.9	10.5	11.2	11.8	12.4	13.0	13.6
70	6.4	9.0	9.6	10.2	10.9	11.5	12.2	12.8	13.4	14.1
75	6.7	9.4	10.1	10.7	11.4	12.1	12.7	13.4	14.1	14.7
80	6.9	9.7	10.4	11.0	11.7	12.4	13.1	13.8	14.5	15.2
<i>Men ≥75 yr</i>										
60	5.5	7.7	8.3	8.8	9.4	9.9	10.5	11.0	11.6	12.1
65	5.7	8.0	8.6	9.1	9.7	10.3	10.8	11.4	12.0	12.5
70	5.9	8.3	8.9	9.4	10.0	10.6	11.2	11.8	12.4	13.0
75	6.1	8.5	9.2	9.8	10.4	11.0	11.6	12.2	12.8	13.4
80	6.2	8.7	9.3	9.9	10.5	11.2	11.8	12.4	13.0	13.6

(continues Table A.2)

## Physical Activity Level (PAL)

Body weight (kg)	BMR (MJ/d)	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
<i>Women 18-29 yr</i>										
45	4.8	6.8	7.2	7.7	8.2	8.7	9.2	9.7	10.2	10.6
50	5.1	7.2	7.7	8.2	8.7	9.2	9.7	10.3	10.8	11.3
55	5.5	7.7	8.3	8.8	9.4	9.9	10.4	11.0	11.6	12.1
60	5.8	8.1	8.7	9.2	9.8	10.4	11.0	11.5	12.1	12.7
65	6.1	8.5	9.1	9.7	10.3	10.9	11.5	12.1	12.7	13.3
70	6.4	8.9	9.6	10.2	10.8	11.5	12.2	12.8	13.4	14.0
<i>Women 30-59 yr</i>										
45	5.1	7.1	7.7	8.2	8.7	9.2	9.7	10.2	10.7	11.2
50	5.3	7.4	8.0	8.5	9.0	9.5	10.1	10.6	11.1	11.7
55	5.5	7.7	8.3	8.8	9.4	9.9	10.5	11.0	11.6	12.1
60	5.7	8.0	8.6	9.1	9.7	10.3	10.8	11.4	12.0	12.5
65	5.8	8.1	8.7	9.3	9.9	10.4	11.0	11.6	12.2	12.8
70	6.0	8.4	9.0	9.6	10.2	10.8	11.4	12.0	12.6	13.2
<i>Women 60-74 yr</i>										
45	4.6	6.4	6.9	7.4	7.8	8.3	8.7	9.2	9.7	10.1
50	4.8	6.7	7.2	7.7	8.2	8.6	9.1	9.6	10.1	10.6
55	5.0	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0
60	5.2	7.3	7.8	8.3	8.8	9.4	9.9	10.4	10.9	11.4
65	5.4	7.6	8.1	8.6	9.2	9.7	10.3	10.8	11.3	11.9
70	5.6	7.8	8.4	9.0	9.5	10.1	10.6	11.2	11.8	12.3
<i>Women ≥75 yr</i>										
45	4.5	6.3	6.8	7.2	7.7	8.1	8.6	9.0	9.5	9.9
50	4.7	6.6	7.1	7.5	8.0	8.5	8.9	9.4	9.9	10.3
55	4.9	6.9	7.4	7.8	8.3	8.8	9.3	9.8	10.3	10.8
60	5.1	7.1	7.7	8.2	8.3	9.2	9.7	10.2	10.7	11.2
65	5.3	7.4	8.0	8.5	8.7	9.5	10.1	10.6	11.1	11.7
70	5.5	7.7	8.3	8.8	9.4	9.9	10.5	11.0	11.6	12.1

**Table A.3 Mean body weights (kg) of European children <sup>1</sup>**

Age		Males	Females	Males & Females
years	months			
-	1	4.0	4.0	4.0
-	3	6.0	5.5	6.0
-	6	8.0	7.5	7.5
-	9	9.0	8.5	9.0
1	0	10.0	9.5	10.0
1	6	11.5	11.0	11.0
2	0	12.5	12.0	12.5
2	6	14.0	13.0	13.5
3	0	15.0	14.0	14.5
3	6	15.5	15.0	15.5
4	6	17.5	17.0	17.5
5	6	19.5	19.5	19.5
6	6	22.0	21.5	22.0
7	6	24.5	24.0	24.5
8	6	27.0	27.0	27.0
9	6	30.0	30.5	30.0
10	6	33.0	34.0	33.5
11	6	36.5	37.5	37.0
12	6	41.0	43.0	42.0
13	6	47.0	48.0	47.5
14	6	53.0	50.5	51.5
15	6	58.0	52.5	55.5
16	6	62.5	54.0	58.0
17	6	64.5	54.5	59.5

<sup>1</sup> Values, rounded to nearest 0.5 kg, obtained by pooling national data sets from Italy, Denmark, France, Spain, UK, The Netherlands, Germany, Belgium and Greece, weighted on the basis of each country's population at any given age. Luxemburg, Ireland, Portugal not included.

**Table A.4 Mean height (cm) of European children <sup>1</sup>**

Age		Males	Females	Males & Females
years	months			
-	1	53.0	52.5	53.0
-	3	60.0	59.0	59.5
-	6	67.5	66.0	66.5
-	9	71.5	70.0	70.5
1	0	75.5	74.0	75.0
1	6	82.0	80.5	81.5
2	0	87.5	86.0	86.5
2	6	92.0	90.5	91.0
3	0	96.0	95.0	95.5
3	6	99.0	98.0	98.5
4	6	106.5	105.5	106.0
5	6	112.5	111.5	112.0
6	6	119.0	118.0	118.5
7	6	124.5	123.5	124.0
8	6	130.5	129.0	129.5
9	6	135.5	135.0	135.0
10	6	140.5	140.5	140.5
11	6	145.5	146.5	146.0
12	6	150.5	153.0	151.5
13	6	158.0	157.5	158.0
14	6	166.0	160.5	163.0
15	6	171.0	162.0	166.5
16	6	174.0	162.5	168.0
17	6	175.5	163.0	169.0

<sup>1</sup> Values, rounded to nearest 0.5 cm, obtained by pooling national data sets from Italy, Denmark, France, Spain, UK, The Netherlands, Germany, Belgium and Greece, weighted on the basis of each country's population at any given age. Luxemburg, Ireland, Portugal not included.

**Table A.5** *Estimated time use and energy cost of activities in older children and adolescents aged 10-17 years*

Activity	Energy Cost (as ratio of BMR)					
	Hours		Boys		Girls	
	age yrs 10-13	age yrs 14-17	age yrs 10-13	age yrs 14-17	age yrs 10-13	age yrs 14-17
Bed	9	8	1.0		1.0	
School	5	6	1.6		1.5	
Light	4.5	7	1.6		1.5	
Moderate	5	2.5	2.5		2.2	
High	0.5	0.5	6.0		6.0	
<b>Total</b>	<b>24</b>	<b>24</b>				
<b>PAL</b>			1.65	1.58	1.55	1.50

Based on FAO/WHO/UNU values <sup>1</sup>

## References

1. World Health Organisation. (1985). *Energy and Protein Requirements. Report of a joint FAO/WHO/UNU meeting*. Geneva: World Health Organisation (WHO Technical Report Series; 724).
2. Schofield WN, Schofield C, James WPT. (1985). Basal Metabolic Rate: Review and Prediction. *Hum Nutr Clin Nutr*, **39** (Suppl 1): 1-96.