

Energy and Nutrient Intake in the European Union Based on National Data

7.1 Methodology

The following chapter will describe the energy and nutrient intake on the individual level by sex and age group, using data from dietary surveys undertaken by the participating countries. Although the comparability of data is limited because of the use of different methods such as 24-hour recalls or Food Frequency Questionnaires, different years and periods of data collection, and different age classifications, they still can give an overview on the nutritional situation in countries of the European Union. Nevertheless, the data have to be interpreted cautiously. At the beginning of every part of this chapter an overview of the surveys which were included is given. If one of the participating countries provided more than one study for the different age groups, the study with the largest sample size followed by the most recent year of the survey were taken into account.

In Europe many different reference values exist [see SCF, 2003]. For example, the 'Dietary Reference Values for Food Energy and Nutrients for the United Kingdom' of the Department of Health [1991] and the 'Dietary reference intakes: energy, proteins, fats, and digestible carbohydrates' of the Health Council of The Netherlands [2001]. In addition to those national reference values, further nutrient based guidelines for groups of countries were developed. Those are the D-A-CH Reference values for the German-speaking countries and central Europe [D-A-CH, 2000] which are applied also in Hungary, Slovenia and the Czech Republic, and the Nordic Nutrition Recommendations [NNR, 2004] for the Nordic Countries respectively. Regarding the coverage of countries the most complete reference values for the participating countries are those published by the World Health Organization/Food and Agriculture Organization of the United Nations [WHO, 2003], Eurodiet [Eurodiet, 2000] and the Scientific Committee on Food [SCF, 1993]. In this report data will be discussed using the recommendations published by the WHO and Eurodiet. When no reference value was given by those two publications, the intake

was compared to the D-A-CH reference values. In some cases the D-A-CH and the NNR deviate a lot. For those nutrients intake data were discussed considering both reference values.

Table 7.1 gives an overview on the different nutrient based guidelines which are used in Europe. To give a complete picture the SCF recommendations [SCF, 1993] are given in table 7.1. However, as those recommendations are outdated they will not be discussed.

Updated internationally harmonized recommendations based on up-to-date scientific data are needed. Therefore, the European Commission asked the European Food Safety Authority (EFSA) to advise on values for micronutrient recommendations, after first advising on existing values for energy, macronutrients and dietary fibers in 2005.

The discussion will focus on the comparison between the four different regions North, South, Central and East, and West.

7.2 Energy and Nutrient Intake in European Children

Background

Data on energy and nutrient intake of children were available from 16 countries. It was not possible for all 16 countries to provide data for the same age groups, a situation which makes comparison for this population group especially difficult. Nevertheless, these data give a valuable overview on nutrient and energy intake of European children.

Dietary assessment in the age group 4–6 years was done in most participating countries using dietary records over 2–7 days or recalls (one or repeated 24-hour recalls, 48-hour recall) or as in one case a combination of a 3-day weighed record and one 24-hour recall. In the reported surveys use of supplements was considered only by five countries (table 7.2). Dietary intake data therefore has to be interpreted cautiously as large differences in intake levels in certain nutrients might be caused by this methodological aspect. For this age group data from 7,467 children were available.

Also for the age group 7–9 years assessment methods used were weighed records over 2–7 days (8 countries) and recalls, one or repeated 24-hour recalls (5 countries). The use of supplements was considered only by two countries. Data from 9,815 children of 13 countries were available (table 7.3).

In nine countries energy and nutrient intakes in the 10- to 14-year-old children were calculated from weighed records over 2–7 days, in other four countries recalls, one or repeated 24-hour, and from one country only FFQ was used. The use of supplements was considered only by three countries. From this age group data from 8,995 children are available (table 7.4).

Table 7.1. Comparison of different reference values using the example of adults

	WHO 2003, 2007, 2009b		Eurodiet 2000		SCF 1993 ¹
	M	F	M	F	M
<i>Energy and macronutrients</i>					
Energy					
Protein	10–15%E	10–15%E			56 g/day
Carbohydrates	50–75%E	50–75%E	>50%E	>50%E	
Sucrose	<10%E	<10%E			
Dietary fiber	>25 g/day	>25 g/day	>25 g/day	>25 g/day	
Fat	15–30%E	15–30%E	<30%E	<30%E	
SFA	<10%E	<10%E	<10%E	<10%E	
MUFA					
PUFA	6–11%E	6–11%E	4–8%E n-6 + 2 g linolenic + 200 mg very long chain	4–8%E n-6 + 2 g linolenic + 200 mg very long chain	6 g n-6 + 1.5 g n-3/ day
Cholesterol	<300 mg/day	<300 mg/day			
<i>Vitamins</i>					
Vitamin A					500 µg retinol equivalents/day
Thiamine					1.1 mg/day
Riboflavin					1.6 mg/day
Niacin					18 mg niacin equivalents/day
Vitamin B ₆					1.5 mg/day
Folate			>400 µg/day (from food)	>400 µg/day (from food)	200 µg mixed dietary folates/ day
Cobalamin					1.4 µg/day
Ascorbic acid					45 mg/day
Vitamin D					0–10 µg/day
Vitamin E					

SCF 1993 ¹	DACH 2000 ²		NNR 2004 ⁴	
F	M	F	M	F
	12.5/12.0/10.5 MJ/day ³	10.0/9.5/8.5 MJ/day ³	12.3/11.8 MJ/day ⁵	9.4/9.2 MJ/day ⁵
47 g/day	59/59/58 g/day	48/47/46 g/day	10–20%E	10–20%E
	>50%E	>50%E	50–60%E	50–60%E
			<10%E	<10%E
	>30 g/day	>30 g/day	25–35 g/day	25–35 g/day
	30%E	30%E	25–35%E	25–35%E
			10–15%E	10–15%E
4.5 g n-6 + 1 g n-3/day	2.5 n-6 + 0.5 n-3%E	2.5 n-6 + 0.5 n-3%E	5–10%E	5–10%E
400 µg retinol equivalents/day	1 mg retinol equivalents/day	0.8 mg retinol equivalents/day	900 µg retinol equivalents/day	700 µg retinol equivalents/day
0.9 mg/day	1.3/1.2/1.1 mg/day	1 mg/day	1.4 mg/day	1.1 mg/day
1.3 mg/day	1.5/1.4/1.3 mg/day	1.2 mg/day	1.7 mg/day	1.3 mg/day
14 mg niacin equivalents/day	17/16/15 mg niacin equivalents/day	13 mg niacin equivalents/day	19 mg niacin equivalents/day	15 mg niacin equivalents/day
1.1 mg/day	1.5 mg/day	1.2 mg/day	1.6 mg/day	1.2 mg/day
200 µg mixed dietary folates/day	400 µg folate equivalents/day	400 µg folate equivalents/day	300 µg/day	300 µg/day
1.4 µg/day	3 µg/day	3 µg/day	2 µg/day	2 µg/day
45 mg/day	100 mg/day	100 mg/day	75 mg/day	75 mg/day
010 µg/day	5 µg/day	5 µg/day	7.5 µg/day	7.5 µg/day
	15/14/13 mg α-tocopherol equivalents/day	12 mg α-tocopherol equivalents/day	10 mg α-tocopherol equivalents/day	8 mg α-tocopherol equivalents/day

Table 7.1. Continued

	WHO 2003, 2007, 2009b		Eurodiet 2000		SCF 1993 ¹
	M	F	M	F	M
<i>Minerals</i>					
Calcium			>800 mg/day	>800 mg/day	700 mg/day
Magnesium					150–500 mg/day
Phosphorus					550 mg/day
Sodium	<2 g/day	<2 g/day	<6 g salt/day	<6 g salt/day	575–3,500 mg/day
Potassium					3,100 mg/day
Iron				15 mg/day	
Zinc					9.5 mg/day
Copper					1.1 mg/day
Selenium					55 µg/day
Iodine	150 µg/day	150 µg/day	150 µg/day	150 µg/day	130 µg/day
Manganese					1–10 mg/day

¹ Population Reference Intake; ² reference values refer to age groups 19–24 years, 25–50 years and 51–64 years; ³ 19–24 years: PAL 1.75, 25–50 years: PAL 1.7, 51–64 years: PAL 1.6; ⁴ reference values refer to age groups 18–30 years and 31–60 years, recommended intake; ⁵ PAL 1.6; ⁶ postmenopause.

Energy and Macronutrients

Comparison of Countries

Tables 7.5–7.7 show that in most countries the energy intake increased with increasing age. Exceptions are Portuguese boys and Austrian, Danish, Portuguese and Swedish girls. With increasing age the difference between the energy intake of girls and boys increased as well. The energy intake in male children was 6.2–11.7 MJ/day, in female children 5.5–10.6 MJ/day.

Protein intake in percent of total energy intake was between 11.1 and 17.6%E. Lowest share of protein intake was found in 7- to 9-year-old children from Poland. Highest intake was found in 10- to 14-year-old girls from Spain. Protein intake (%E) was above the recommendation of 10–15%E in seven countries, namely Finland (only boys), France, Greece, Italy, Portugal, Spain, and Sweden [WHO, 2003].

As already documented in the European Nutrition and Health Report 2004 in Spain and Greece the mean carbohydrate intake of children was particularly low

SCF 1993 ¹	DACH 2000 ²		NNR 2004 ⁴	
F	M	F	M	F
700 mg/day	1,000 mg/day	1,000 mg/day	800 mg/day	800 mg/day
150–500 mg/day	400/350/350 mg/day	310/300/300 mg/day	350 mg/day	280 mg/day
550 mg/day	700 mg/day	700 mg/day	600 mg/day	600 mg/day
575–3,500 mg/day	550 mg/day	550 mg/day	1–2 g/day	1–2 g/day
3,100 mg/day	830 mg/day	830 mg/day	3.5 g/day	3.1 g/day
	10 mg/day	15/15/10 mg/day	9 mg/day	15/9 mg/day
7 mg/day	10 mg/day	7 mg/day	9 mg/day	7 mg/day
	1.0–1.5 mg/day	1.0–1.5 mg/day	0.9 mg/day	0.9 mg/day
	30–70 µg/day	30–70 µg/day	50 µg/day	40 µg/day
	200/200/180 µg/day	200/200/180 µg/day	150 µg/day	150 µg/day
	2–5 mg/day	2–5 mg/day	–	–

(41–45%E). Only children from France, Greece (4–6 years), Portugal (7–9 years) and Spain (10–14 years) did not meet the recommendations for carbohydrate intake of 50–75%E [WHO, 2007]. With a mean share of sucrose of 15.5%E the recommendation of less than 10%E was exceeded considerably. The lowest intake was observed for 10- to 14-year-old boys from Sweden (11.7%E). This value was around twice as high in Portuguese children (21.8–25.4%E) [WHO, 2003].

The intake of dietary fibers is highly associated with the mean energy intake. So it is lower for younger children as their energy intake is in general lower than in older age groups. The mean intake of dietary fiber which was less than 10 g/day was particularly low in Irish (all age groups) and Finnish children (aged 4). Only children from Germany (girls aged 12, boys aged 12–14) and Portugal (aged 13) reached the recommendation of at least 25 g/day [Eurodiet, 2000].

In all countries and age groups, the fat intake expressed in percent of total energy intake was above the recommended maximum of 30%E [WHO, 2003]. It was particularly high (above 35%E) in France (aged 7–9 and 10–14), Greece, Portugal (aged 7–9),

Table 7.2. Methods and period of dietary assessment in children aged **4–6 years** of the participating countries (data available from 7,467 children aged 4–6 years)

Country	Age group years	Method	Year of survey	n	Survey included supplements	Reference
Czech Republic	4–6	48-hour recall	n.a.	1,087	no	Tláškal, Hrstková, unpubl. data ¹
Denmark	4–6	7-day dietary record	2000–2002	233	no	Fagt et al., 2008; Lyhne et al., 2005
Finland	4 6	3-day dietary record 3-day dietary record	2008 2008	554 713	yes yes	Kyttälä et al., 2008
France	4–6	3 × 24-hour recall	2006/2007	326	no	Castetbon et al., 2009
Germany	6	3-day dietary record (random)	2007	208	no	Mensink et al., 2007b
Greece	1–5	3 days overall, combination of weighed food records and 24-hour recall or food diaries (3-day)	2003/2004	2,374	no	Manios et al., 2006
Ireland	5–6	7-day weighed dietary records 7-day weighed dietary records	2003/2004	148	yes	National Children's Food Survey, 2005
Italy	4–6	7-day dietary record	n.a.	38	no	D'Amicis, 2000
Norway	4	4-day dietary record (precoded)	2000	391	yes	Øverby et al., 2003 (UNGKOST 2000)
Poland	4–6	24-hour recall	2000	166	no	Szponar et al., 2000, unpubl.
Sweden	4–6	4-day dietary record (open)	2006	590	no	Becker et al., 2000
The Netherlands	4–6	2-day dietary record	2005/2006	639	no	Ocké et al., 2008

n.a. = Not available.

¹ Data provided by the Czech Nutrition Society.

Table 7.3. Methods and period of dietary assessment in children aged **7–9 years** of the participating countries (data available from 9,158 children aged 7–9 years)

Country	Age group years	Method	Year of survey	n	Survey included supplements	Reference
Austria	7–9	3-day dietary record	2007	280	no	Elmadfa et al., 2008
Czech Republic	7–9	48-hour recall	n.a.	1,705	no	Tláškal, Hrstková, unpubl data ¹
Denmark	7–9	7-day dietary record	2000-2002	257	no	Fagt et al., 2008; Lyhne et al., 2005
France	7–9	3 × 24-hour recall	2006/2007	304	no	Castetbon et al., 2009
Germany	7–9	3-day dietary record (random)	2007	629	no	Mensink et al., 2007b
Greece	6–15	3 x 24-hour recall	2005	524	n.a.	Papandreou et al., 2006a
Ireland	7–9	7-day weighed dietary records	2003-2004	224	yes	National Children's Food Survey, 2005
Italy	7–9	7-day dietary record		50	no	D'Amicis, 2000
Norway	9	4-day dietary record (precoded)	2000	810	yes	Øverby et al., 2003 (UNGKOST 2000)
Poland	7–9	24-hour recall	2000	204	no	Szponar et al., 2000, unpubl.
Portugal	7–9	24-hour recall		3,044	no	Moreira et al., 2005
Sweden	7–9	4-day dietary record (open)	2006	889	no	Enghardt et al., 2006
The Netherlands	7–9	2-day dietary record	1997/1998	238	no	Ocké et al., 2008

n.a. = Not available.

¹ Data provided by the Czech Nutrition Society.

Table 7.4. Methods and period of dietary assessment in children aged **10–14 years** of the participating countries (data available from 8,985 children aged 10–14 years)

Country	Age group years	Method	Year of survey	n	Survey included supplements	Reference
Austria	10–14	3-day dietary record	2007	487	no	Elmadfa et al., 2008
Denmark	10–14	7-day dietary record	2000–2002	333	no	Fagt et al., 2008; Lyhne et al., 2005
France	10–14	3 × 24-hour recall	2006/2007	550	no	Castetbon et al., 2009
Germany	10–11	3-day dietary record (random)	2007	397	no	Mensink et al., 2007b
	12	personal interview	2007	217	no	
	13–14	personal interview	2007	444	no	
Greece	12 years at baseline	7-day dietary record	1999–2001	210	n.a.	Papandreou et al., 2006a
Hungary	11–14	3 × 24-hour recall	2005/2006	235	no	Bíró et al., 2007
Ireland	10–12	7-day weighed dietary records	2003/2004	222	yes	The National Teen's Food Survey, 2008
Italy	10–14	7-day dietary record	n.a.	99	no	D'Amicis, 2000
Norway	13	4-day dietary record (precoded)	2000	1,005	yes	Øverby et al., 2003 (UNGKOST 2000)
Poland	10–14	24-hour recall	2000	404	no	Szponar et al., 2000, unpubl. data
Portugal	13	FFQ	n.a.	2,040	no	Ramos E, data collected under the EPITeen Project from the Epidemiology Department – Medical School Oporto University (personal data never published)
Spain	10–14	2 × 24-hour recall	2002/2003	119	no	Serra Majem and Ribas 2007; Serra-Majem L et al., 2007; Serra Majem et al., 2006
Sweden	10–14	4-day dietary record (open)	2006	1,016	no	Enghardt et al., 2006
The Netherlands	10–14	2-day dietary record	1997/1998	410	no	Ocké et al., 2008
United Kingdom	2–15	n.a.	2003–2005	797	no	Low Income Diet and Health Survey, 2003–2005 ¹

¹ Data provided by the University of Southampton; n.a. = not available.

Spain and the United Kingdom. For the prevention of non-communicable diseases not only is the amount of fat of importance but also the quality of fat. Apart from Italian boys aged 7–9 the mean intake of saturated fatty acids exceeded the recommended maximum of 10%E and polyunsaturated fatty acids were generally below the intake level recommended for the heart health promotion (6–11%E) [WHO 2003, 2009b].

Cholesterol intake was above the recommended maximum of 300 mg/day in Germany (girls aged 12, boys aged 12–14), Italy, Poland (girls aged 10–14, boys aged 7–14), Portugal (aged 13) and Spain. A relatively low cholesterol intake was observed in Finland, Norway, Sweden and The Netherlands [WHO, 2003].

Comparison of Regions

To describe regional differences in dietary intake every participating country was assigned to one of four regions. In order not to compare intake levels of younger children to older children the tables are split into three age groups. However, the tendencies of differences between regions are similar throughout the age groups. Tables 7.8–7.10 show minimum and maximum values for energy, protein, carbohydrates/sugar and dietary fiber in the European regions. Following results have to be interpreted carefully because of different survey methods and age groups. However, despite these limitations trends in different nutrient intake patterns in the regions can be recognized.

Whereas for 7- to 9-year-old children, the South region showed a higher energy intake as well as a higher protein and fat intake (%E) and a lower carbohydrate intake (%E) compared to the other regions. All other regions show otherwise comparable intake levels. The intake of macronutrients in 4- to 14-year-old children can be considered less favorable in the South region than in the other three regions.

For dietary fiber, intake levels were far below the recommended level of 25 g/day in every region [Eurodiet, 2000].

Regarding fat quality, the South region tended to show in all age intervals the lowest share of saturated fatty acids (9.4–14.5%E). Lowest intake of polyunsaturated fatty acids was observed in the North region (3.6%E). A considerably high cholesterol intake (308–375 mg/day) was observed in the South region (cf. tables 7.11–7.13).

Vitamins

Comparison of Countries

The mean daily intake of retinol equivalents was between 0.4 and 2.4 mg. Compared to the D-A-CH reference values, younger children are more likely to reach the recommendations than children from the older age groups [D-A-CH, 2000]. In the age group of 10- to 14-year-olds, only 4 countries reached the recommended intake levels (Germany, Norway, Poland, Portugal). The lowest intake levels were observed in children from Ireland (all age groups: 0.3–0.4 mg/day). The intake of β -carotene was about 1.1–5.2 mg/day.

Table 7.5. Intake of energy and macronutrients (mean \pm SD) in children aged **4–6 years** of European countries (male and female); total n = 5,894

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates %E ¹	
					total	sucrose
Male						
Czech Republic	4–6	641	6.5 \pm 1.3	14.0 \pm 2.2	56.0 \pm 5.8	n.a.
Denmark	4–6	117	7.8 \pm 1.7	14.0 \pm 1.9	50.0 \pm 4.2	12.0 \pm 4.4
Finland	4	307	5.8 \pm 1.1	15.0	53.0	13.7
	6	364	6.7 \pm 1.2	16.0	53.0	13.0
France	4–6	164	6.3 \pm 0.1	15.5 \pm 0.2	49.8 \pm 0.8	n.a.
Germany	<7	102	7.2 \pm 1.4	13.3 \pm 1.9	53.3 \pm 6.2	n.a.
Greece	4–5	356	6.2 \pm 0.1	16.4 \pm 2.5	44.8 \pm 6.5	n.a.
Ireland	5–6	72	6.3 \pm 1.2	13.6 \pm 1.8	52.1 \pm 4.6.	n.a.
Italy	4–6	21	7.4 \pm 1.6	15.8 \pm 2.5	50.0 \pm 5.5	n.a.
Norway	4	206	6.3 \pm 1.5	14.0 \pm 2.0	53.0 \pm 5.0	15.0 \pm 5.0
Poland	4–6	82	7.9 \pm 2.4	11.1 \pm 2.3	57.0 \pm 7.9	18.5 \pm 5.8
Sweden	4–6	302	6.5 \pm 1.3	14.4 \pm 2.2	54.2 \pm 4.8	13.8 \pm 4.6
The Netherlands	4–6	327	6.8 \pm 0.9	13.0 \pm 2.0	56.0 \pm 5.0	n.a.
All countries (min.–max.)			6.2–7.9	11.1–16.4	44.8–57.0	12.0–18.5
Female						
Czech Republic	4–6	446	6.5 \pm 1.3	14.0 \pm 2.2	56.0 \pm 5.8	n.a.
Denmark	4–6	116	7.3 \pm 1.6	13.0 \pm 1.8	50.0 \pm 3.8	12.0 \pm 4.1
Finland	4	307	5.5 \pm 1.0	15.0	53.0	13.6
	6	349	6.0 \pm 1.1	15.0	53.0	13.8
France	4–6	162	6.3 \pm 0.1	15.0 \pm 0.2	48.6 \pm 0.5	n.a.
Germany	<7	102	6.3 \pm 1.3	13.6 \pm 2.0	53.3 \pm 5.2	n.a.
Greece	4–5	389	5.9 \pm 0.1	16.3 \pm 2.3	45.2 \pm 6.4	n.a.
Ireland	5–6	76	5.9 \pm 9.3	13.6 \pm 1.9	51.7 \pm 4.0	n.a.
Italy	4–6	17	7.4 \pm 1.4	15.6 \pm 1.8	50.3 \pm 4.9	n.a.
Norway	4	185	6.1 \pm 1.2	14.0 \pm 2.0	54.0 \pm 6.0	16.0 \pm 6.0
Poland	4–6	84	7.1 \pm 2.4	12.0 \pm 2.8	55.6 \pm 7.5	17.9 \pm 6.0
Sweden	4–6	288	6.1 \pm 1.2	14.4 \pm 2.1	59.4 \pm 5.1	13.7 \pm 4.5
The Netherlands	4–6	312	6.3 \pm 1.0	13.0 \pm 2.0	57.0 \pm 4.0	n.a.
All countries (min.–max.)			5.5–7.4	12.0–16.3	45.2–59.4	12.0–17.9
Reference values			6.4 (male)/ 5.8 (female) ²	10–15 %E ³	50–75 %E ⁴	<10 %E ³

n.a. = Not available.

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000; ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000.

Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
15.3 ± 4.7	30.0 ± 5.3	n.a.	n.a.	n.a.	240.7 ± 111.3
17.0 ± 5.0	34.0 ± 4.0	15.0 ± 2.2	12.0 ± 1.6	5.0 ± 0.8	n.a.
9.6 ± 3.2 11.4 ± 3.7	31.0 31.0	13.7 13.5	10.6 10.8	4.0 4.2	153.0 ± 53.0 180.0 ± 60.0
11.8 ± 0.5	34.7 ± 0.84	15.1	n.a.	n.a.	n.a.
15.7 ± 4.1	32.6 ± 6.1	15.3 ± 2.9	12.5 ± 2.2	4.8 ± 1.0	246.8 ± 103.2
n.a.	40.2 ± 5.0	14.5 ± 2.9	n.a.	n.a.	n.a.
7.3 ± 2.7	33.8 ± 4.4	14.5 ± 2.8	11.3 ± 1.9	4.5 ± 1.2	141.4 ± 55.0
14.9 ± 4.7	34.3 ± 5.5	10.9 ± 2.5	10.6 ± 3.4	4.1 ± 1.5	327.6 ± 105.4
12.0 ± 5.0	33.0 ± 5.0	14.0 ± 2.0	10.0 ± 2.0	6.0 ± 2.0	185.0 ± 82.0
16.8 ± 5.8	31.9 ± 7.8	11.6 ± 3.9	13.7 ± 4.1	4.5 ± 2.2	240.0 ± 145.0
12.0 ± 3.0	31.3 ± 4.2	14.3 ± 2.4	11.1 ± 1.7	3.7 ± 1.0	196.0 ± 73.0
15.0 ± 3.0	31.0 ± 4.0	12.0 ± 2.0	10.0 ± 1.0	6.0 ± 1.0	126.0 ± 42.0
7.3–16.8	30.0–40.2	10.9–15.3	10.0–13.7	3.7–6.0	122.0–327.6
15.3 ± 4.7	30.0 ± 5.3	n.a.	n.a.	n.a.	240.7 ± 111.3
16.0 ± 4.0	35.0 ± 4.0	15.0 ± 2.4	12.0 ± 1.5	5.0 ± 0.8	n.a.
9.4 ± 3.0 10.3 ± 3.3	31.0 31.0	13.7 13.8	10.6 10.7	4.0 4.1	139.0 ± 51.0 156.0 ± 56.0
11.5 ± 0.3	36.3 ± 0.5	15.8	n.a.	n.a.	n.a.
15.8 ± 4.7	32.2 ± 4.6	15.2 ± 2.0	12.1 ± 1.6	4.9 ± 1.1	201.4 ± 89.3
n.a.	40.5 ± 5.0	14.4 ± 2.9	n.a.	n.a.	n.a.
6.9 ± 2.8	34.3 ± 3.5	15.0 ± 2.6	11.2 ± 1.5	4.6 ± 1.3	145.0 ± 63.8
15.8 ± 3.9	33.8 ± 3.5	10.8 ± 2.0	9.7 ± 2.3	4.0 ± 1.2	327.1 ± 107.0
12.0 ± 6.0	32.0 ± 5.0	14.0 ± 3.0	10.0 ± 2.0	6.0 ± 2.0	174.0 ± 65.0
14.6 ± 5.9	32.5 ± 7.0	12.0 ± 3.3	13.6 ± 3.9	4.7 ± 2.2	245.0 ± 176.0
11.0 ± 3.0	32.1 ± 4.6	14.6 ± 2.5	11.5 ± 1.9	3.7 ± 0.9	187.0 ± 68.0
18.0 ± 3.0	37.0 ± 4.0	12.0 ± 2.0	10.0 ± 1.0	5.0 ± 1.0	166.0 ± 116.0
6.9–18.0	30.0–40.5	10.8–15.8	9.7–13.6	3.7–6.0	113.0–327.1
>25 g.day ^{-1,6}	15–30 %E ³	<10 %E ³		6–11 %E ⁵	<300 mg·d ^{-1,3}

Table 7.6. Intake of energy and macronutrients (mean \pm SD) in children aged **7–9 years** of European countries (male and female): total n = 8,634

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹	
					total	sucrose
Male						
Austria	7–9	146	6.9 \pm 1.9	14.4 \pm 2.7	51.4 \pm 6.8	16.6 \pm 7.1
Czech Republic	7–9	940	7.6 \pm 2.8	14.5 \pm 2.4	53.4 \pm 6.7	n.a.
Denmark	7–9	139	9.3 \pm 1.9	14.0 \pm 1.8	51.0 \pm 3.7	14.0 \pm 5.1
France	7–9	160	7.6 \pm 0.2	14.7 \pm 0.2	49.3 \pm 0.5	n.a.
Germany	7–9	321	7.8 \pm 1.6	13.5 \pm 2.1	53.2 \pm 6.1	n.a.
Ireland	7–9	110	7.4 \pm 1.6	13.6 \pm 2.3	n.a.	n.a.
Italy	7–9	29	9.1 \pm 1.2	15.5 \pm 1.6	n.a.	n.a.
Norway	9	402	8.6 \pm 2.0	15.0 \pm 2.0	54.0 \pm 6.0	16.0 \pm 6.0
Poland	7–9	101	9.1 \pm 2.9	11.7 \pm 2.8	56.3 \pm 7.9	17.3 \pm 5.6
Portugal	7–9	1,541	11.3 \pm 21.4	16.6 \pm 3.8	48.6 \pm 7.8	22.5 \pm 7.1
Sweden	7–9	444	7.2 \pm 1.5	15.4 \pm 2.2	53.3 \pm 4.9	12.6 \pm 4.2
The Netherlands	7–9	104	8.4 \pm 1.8	13.5 \pm 2.7	55.3 \pm 7.0	n.a.
All countries (min.–max.)			7.2–11.3	11.7–16.6	49.3–56.3	12.6–17.3
Female						
Austria	7–9	134	6.3 \pm 1.6	13.5 \pm 2.7	52.2 \pm 7.0	18.0 \pm 6.9
Czech Republic	7–9	765	7.6 \pm 2.8	14.5 \pm 2.4	53.4 \pm 6.7	n.a.
Denmark	7–9	118	8.1 \pm 1.7	14.0 \pm 2.0	52.0 \pm 4.6	14.0 \pm 4.8
France	7–9	144	6.9 \pm 0.2	15.0 \pm 0.3	48.5 \pm 0.7	n.a.
Germany	7–9	308	7.0 \pm 1.4	13.6 \pm 2.7	54.2 \pm 6.7	n.a.
Ireland	7–9	114	6.8 \pm 1.2	13.6 \pm 2.1	n.a.	n.a.
Italy	7–9	21	7.9 \pm 1.1	15.9 \pm 2.1	n.a.	n.a.
Norway	9	408	7.7 \pm 2.0	14.0 \pm 3.0	55.0 \pm 6.0	18.0 \pm 6.0
Poland	7–9	103	8.0 \pm 2.5	11.3 \pm 2.5	55.5 \pm 7.7	16.4 \pm 6.2
Portugal	7–9	1,503	10.6 \pm 11.8	16.6 \pm 3.7	48.3 \pm 7.9	21.8 \pm 7.1
Sweden	7–9	445	7.2 \pm 1.5	15.4 \pm 2.2	53.3 \pm 4.9	12.6 \pm 4.2
The Netherlands	7–9	134	7.6 \pm 1.6	13.5 \pm 2.6	52.0 \pm 7.0	n.a.
All countries (min.–max.)			6.3–10.6	11.3–16.6	48.3–55.5	12.6–21.8
Reference values			7.9 (male)/ 7.1 (female) ²	10–15%E ³	50–75%E ⁴	<10%E ³

n.a. = Not available.

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000; ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000.

Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
15.0 ± 5.9	34.1 ± 5.3	14.4 ± 2.7	11.7 ± 2.4	6.1 ± 2.0	259.0 ± 111.1
n.a.	32.2 ± 5.6	n.a.	n.a.	n.a.	n.a.
18.0 ± 6.7	33.0 ± 3.6	15.0 ± 2.0	11.0 ± 1.4	5.0 ± 0.8	n.a.
13.5 ± 0.4	36.0 ± 0.4	15.1	n.a.	n.a.	n.a.
17.5 ± 5.3	32.4 ± 5.5	15.1 ± 2.5	12.5 ± 2.0	4.8 ± 1.0	246.0 ± 98.9
9.2 ± 3.4	33.3 ± 4.7	14.0 ± 2.5	11.0 ± 2.2	4.7 ± 1.3	176.2 ± 82.9
18.5 ± 5.1	34.8 ± 5.9	9.4 ± 2.2	10.9 ± 3.1	4.6 ± 3.1	375.2 ± 193.3
16.0 ± 7.0	32.0 ± 5.0	14.0 ± 3.0	10.0 ± 2.0	6.0 ± 2.0	225.0 ± 103.0
19.6 ± 6.8	32.0 ± 7.5	12.0 ± 3.8	13.3 ± 3.6	4.6 ± 1.9	315.0 ± 220.0
20.2 ± 8.1	35.9 ± 6.6	13.0 ± 3.3	15.0 ± 3.4	5.0 ± 1.7	n.a.
13.0 ± 4.0	31.3 ± 4.4	14.1 ± 2.3	11.3 ± 1.9	3.6 ± 0.9	216.0 ± 78.0
17.0 ± 6.0	34.0 ± 6.0	13.0 ± 3.0	12.0 ± 3.0	6.0 ± 2.0	155.0 ± 63.0
9.2–20.2	31.3–36.0	9.4–15.1	10.0–15.0	3.6–6.1	155.0–375.2
14.3 ± 4.4	34.2 ± 5.7	14.3 ± 3.0	11.5 ± 2.3	6.5 ± 2.3	261.7 ± 303.8
n.a.	32.2 ± 5.6	n.a.	n.a.	n.a.	n.a.
17.0 ± 4.7	32.0 ± 4.4	14.0 ± 2.3	11.0 ± 1.8	5.0 ± 0.7	n.a.
12.2 ± 0.4	36.5 ± 0.6	15.5	n.a.	n.a.	n.a.
16.8 ± 5.4	31.3 ± 5.8	14.9 ± 2.6	11.8 ± 2.2	4.5 ± 1.1	168.0 ± 54.0
7.6 ± 3.0	34.4 ± 4.1	14.6 ± 2.6	11.1 ± 1.8	4.9 ± 1.4	157.2 ± 65.2
15.2 ± 5.0	34.9 ± 4.7	10.9 ± 2.4	9.9 ± 1.8	4.3 ± 1.8	308.6 ± 119.2
14.0 ± 6.0	31.0 ± 5.0	14.0 ± 3.0	10.0 ± 2.0	6.0 ± 2.0	200.0 ± 105.0
17.4 ± 6.7	33.2 ± 7.6	11.8 ± 3.6	14.2 ± 3.8	5.1 ± 2.6	281.0 ± 194.0
19.4 ± 8.2	36.2 ± 6.7	13.1 ± 3.3	15.1 ± 3.5	5.1 ± 1.6	n.a.
13.0 ± 4.0	31.3 ± 4.4	14.1 ± 2.3	11.3 ± 1.9	3.6 ± 0.9	216.0 ± 78.0
15.0 ± 5.0	34.0 ± 7.0	14.0 ± 3.0	12.0 ± 3.0	7.0 ± 2.0	147.0 ± 72.0
7.6–19.4	31.0–36.5	11.8–15.5	9.9–15.1	3.6–7.0	147.0–308.6
>25 g·day ^{-1,6}	15–30 %E ³	<10 %E ³		6–11 %E ⁵	<300 mg·d ^{-1,3}

Table 7.7. Intake of energy and macronutrients (mean \pm SD) in children aged **10–14 years** of European countries (male and female); total n = 8,405

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
Male					
Austria	10–14	248	7.0 \pm 2.0	14.6 \pm 3.2	50.8 \pm 7.5
Denmark	10–14	172	9.6 \pm 2.4	14.0 \pm 2.1	52.0 \pm 4.9
France	10–14	160	8.7 \pm 0.2	15.5 \pm 0.2	48.1 \pm 0.4
Germany	10–11	199	8.0 \pm 1.8	13.8 \pm 2.3	53.2 \pm 6.4
	12	114	10.6 \pm 3.2	13.3 \pm 1.9	52.0 \pm 5.4
	13–14	214	11.7 \pm 3.8	13.7 \pm 2.3	51.7 \pm 6.2
Hungary	11–14	124	10.4 \pm 1.9	14.6 \pm 2.0	50.3 \pm 5.6
Ireland	10–12	109	8.1 \pm 1.5	13.5 \pm 2.4	n.a.
Italy	10–14	52	10.3 \pm 2.3	15.6 \pm 1.8	n.a.
Norway	13	590	9.5 \pm 3.5	15.0 \pm 3.0	55.0 \pm 7.0
Poland	10–14	202	11.2 \pm 4.0	11.5 \pm 2.8	53.9 \pm 8.0
Portugal	13	987	10.7 \pm 3.1	17.3 \pm 2.6	52.3 \pm 5.7
Spain	10–14	66	9.8 \pm 1.7	16.9 \pm 2.1	41.0 \pm 4.2
Sweden	10–14	517	7.8 \pm 2.2	15.9 \pm 2.7	52.4 \pm 5.6
The Netherlands	10–14	211	10.1 \pm 2.6	13.0 \pm 2.0	51.0 \pm 6.0
United Kingdom	2–15	364	7.9 \pm 2.7	13.0 \pm 2.3	50.6 \pm 5.4
All countries (min.–max.)			7.8–11.7	13.0–17.3	41.0–55.0
Female					
Austria	10–14	239	6.1 \pm 1.7	14.1 \pm 3.0	52.1 \pm 8.0
Denmark	10–14	161	8.1 \pm 2.1	14.0 \pm 2.2	52.0 \pm 5.0
France	10–14	144	7.5 \pm 0.1	15.6 \pm 0.2	48.0 \pm 0.4
Germany	10–11	198	7.6 \pm 1.6	13.7 \pm 2.4	53.1 \pm 7.2
	12	103	9.3 \pm 3.2	13.1 \pm 1.9	52.8 \pm 6.6
	13–14	230	9.5 \pm 2.7	13.1 \pm 2.2	52.7 \pm 6.1
Hungary	11–14	111	9.2 \pm 1.5	13.9 \pm 1.9	51.7 \pm 5.4
Ireland	10–12	113	7.0 \pm 1.4	13.6 \pm 2.2	n.a.
Italy	10–14	47	8.6 \pm 1.5	15.7 \pm 2.0	n.a.
Norway	13	515	8.1 \pm 2.6	14.0 \pm 3.0	55.0 \pm 6.0
Poland	10–14	202	9.4 \pm 3.4	11.7 \pm 2.7	54.0 \pm 7.7

	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
sucrose						
17.6 ± 8.2	15.1 ± 6.1	34.5 ± 6.2	14.5 ± 3.3	12.0 ± 2.5	6.1 ± 1.9	271.1 ± 146.4
14.0 ± 5.9	18.0 ± 6.3	32.0 ± 4.4	14.0 ± 2.3	11.0 ± 1.8	5.0 ± 0.8	n.a.
n.a.	15.2 ± 0.4	36.3 ± 0.4	15.1	n.a.	n.a.	n.a.
n.a.	17.9 ± 6.0	32.1 ± 5.8	15.1 ± 2.6	12.4 ± 2.2	4.6 ± 1.0	261.2 ± 118.1
n.a.	25.3 ± 9.4	33.7 ± 5.2	15.6 ± 2.3	12.7 ± 1.9	5.3 ± 1.0	343.0 ± 142.2
n.a.	27.7 ± 12.2	33.5 ± 5.5	15.5 ± 2.4	12.7 ± 2.0	5.2 ± 1.2	382.4 ± 165.4
11.9 ± 5.6	20.8 ± 5.9	35.0 ± 4.9	10.9 ± 2.1	10.8 ± 2.1	8.2 ± 2.1	347.3 ± 115.9
n.a.	9.4 ± 3.8	33.3 ± 4.2	13.9 ± 2.6	10.9 ± 1.8	4.6 ± 1.3	178.6 ± 68.0
n.a.	21.6 ± 7.6	35.8 ± 5.3	10.8 ± 2.4	11.9 ± 2.9	5.1 ± 1.5	370.1 ± 100.6
18.0 ± 8.0	16.0 ± 8.0	31.0 ± 6.0	13.0 ± 3.0	10.0 ± 2.0	5.0 ± 2.0	241.0 ± 134.0
15.2 ± 5.8	24.6 ± 10.0	34.6 ± 7.7	12.1 ± 3.8	14.7 ± 3.9	5.5 ± 2.9	408.0 ± 323.0
24.2 ± 6.0 ³	25.4 ± 10.3	32.0 ± 4.5	10.9 ± 1.8	13.1 ± 2.5	5.3 ± 1.1	377.7 ± 147.7
16.1 ± 3.3	18.5 ± 1.6	40.8 ± 4.1	14.3 ± 1.8	16.7 ± 2.5	5.7 ± 0.9	362.1 ± 34.4
11.7 ± 5.0	13.0 ± 4.0	31.7 ± 4.6	14.1 ± 2.4	11.6 ± 2.1	3.7 ± 1.0	233.0 ± 92.0
n.a.	20.0 ± 7.0	35.0 ± 6.0	14.0 ± 3.0	13.0 ± 3.0	7.0 ± 2.0	189.0 ± 92.0
16.9 ± 6.5	10.9 ± 4.3	36.3 ± 5.0	14.5 ± 2.9	n.a.	n.a.	203.5 ± 112.3
11.7–24.2	9.4–27.7	31.0–40.8	10.8–15.6	10.0–16.7	3.7–8.2	178.6–408.0
16.8 ± 7.3	13.7 ± 4.3	33.7 ± 7.0	14.1 ± 3.6	11.5 ± 2.8	6.2 ± 2.3	228.3 ± 160.4
14.0 ± 5.2	15.0 ± 4.8	32.0 ± 4.7	14.0 ± 2.4	11.0 ± 1.8	5.0 ± 0.8	n.a.
n.a.	13.8 ± 0.3	36.4 ± 0.5	14.9	n.a.	n.a.	n.a.
n.a.	17.7 ± 5.5	32.3 ± 6.3	14.8 ± 2.7	12.6 ± 2.5	4.8 ± 1.2	253.1 ± 110.1
n.a.	25.0 ± 10.9	33.1 ± 6.2	15.4 ± 2.9	12.3 ± 2.1	5.3 ± 1.1	301.5 ± 144.5
n.a.	24.4 ± 8.8	32.9 ± 5.8	15.4 ± 2.7	12.3 ± 2.1	5.1 ± 1.0	297.7 ± 117.3
12.5 ± 5.9	20.1 ± 6.7	34.3 ± 5.2	10.6 ± 2.2	10.2 ± 2.1	8.6 ± 2.0	291.8 ± 96.0
n.a.	7.7 ± 3.4	34.5 ± 4.3	14.0 ± 2.3	11.4 ± 1.7	5.1 ± 1.4	158.1 ± 65.5
n.a.	16.8 ± 3.9	33.4 ± 4.5	10.1 ± 2.3	11.0 ± 2.3	4.4 ± 1.9	319.9 ± 111.0
19.0 ± 7.0	14.0 ± 7.0	31.0 ± 5.0	14.0 ± 3.0	10.0 ± 2.0	5.0 ± 2.0	198.0 ± 106.0
15.5 ± 6.0	20.9 ± 8.7	34.3 ± 7.5	12.0 ± 3.7	14.6 ± 4.1	5.5 ± 2.8	321.0 ± 235.0

Table 7.7. Continued

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
Portugal	13	1053	10.3 ± 3.2	17.1 ± 2.9	52.6 ± 6.2
Spain	10–14	53	8.4 ± 0.9	17.6 ± 1.9	41.6 ± 3.3
Sweden	10–14	499	6.9 ± 1.9	15.4 ± 2.7	53.2 ± 5.5
The Netherlands	10–14	199	8.7 ± 1.8	13.0 ± 2.0	52.0 ± 6.0
United Kingdom	2–15	433	7.0 ± 2.1	13.3 ± 2.4	50.6 ± 5.1
All countries (min.–max.)			6.1–10.3	13.0–17.6	41.6–55.0
Reference values			9.4/11.2 (male)/ 8.5/9.4 (female) ²	10–15 %E ³	50–75 %E ⁴

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000, reference values refer to age group 10–12 years and 13–14 years; ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000; n.a. = not available.

Table 7.8. Intake of energy and macronutrients (min.–max.) in children aged **4–6 years** in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	5.8–7.8	14.0–16.0	50.0–54.2 (12.0–15.0)	9.6–17.0	31.0–34.0
Female	5.5–7.3	13.0–15.0	50.0–59.4 (12.0–16.0)	9.4–16.0	31.0–35.0
<i>South</i> ²					
Male	6.2–7.4	15.8–16.4	44.8–50.0 (n.a.)	14.9 ⁵	34.3–40.2
Female	5.9–7.4	15.6–16.3	45.2–50.3 (n.a.)	15.8 ⁵	33.8–40.5
<i>Central and East</i> ³					
Male	6.5–7.9	11.1–14.0	56.0–57.0 (18.5 ⁶)	15.3–16.8	30.0–31.9
Female	6.5–7.1	12.0–14.0	55.6–56.0 (17.9 ⁶)	14.6–15.3	30.0–32.5
<i>West</i> ⁴					
Male	6.3–6.8	13.0–15.5	49.8–56.0 (n.a.)	7.3–15.0	31.0–34.7
Female	5.9–6.3	13.0–15.0	48.6–57.0 (n.a.)	6.9–18.0	31.0–37.0

¹ North: SE, NO, FI, DK; ² South: IT, GR; ³ Central and East: CZ, PL; ⁴ West: NL, FR, IR; ⁵ only IT; ⁶ only PL; n.a. = not available.

	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
sucrose						
25.4 ± 7.0	25.2 ± 10.6	32.0 ± 4.7	10.9 ± 1.9	13.0 ± 2.6	5.3 ± 1.2	359.6 ± 146.3
16.0 ± 2.5	17.5 ± 1.1	39.7 ± 2.9	13.6 ± 1.2	16.6 ± 1.2	5.4 ± 0.4	312.6 ± 49.9
12.9 ± 5.0	12.0 ± 4.0	31.3 ± 4.6	14.0 ± 2.3	11.4 ± 2.1	3.7 ± 1.0	204.0 ± 87.0
n.a.	17.0 ± 6.0	35.0 ± 6.0	14.0 ± 3.0	12.0 ± 3.0	7.0 ± 2.0	174.0 ± 84.0
16.7 ± 6.0	10.0 ± 3.4	36.0 ± 4.8	14.4 ± 3.0	n.a.	n.a.	179.0 ± 83.1
12.5–25.4	7.7–25.2	31.0–39.7	10.1–15.4	10.0–16.6	3.7–8.6	158.1–359.6
<10 %E ³	>25 g·d ^{-1,6}	15–30 %E ³	<10 %E ³		6–11 %E ⁵	<300 mg·d ^{-1,3}

Table 7.9. Intake of energy and macronutrients (min.-max.) in children aged 7–9 years in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	7.2–9.3	14.0–15.4	51.0–54.0 (12.6–16.0)	13.0–18.0	31.3–33.0
Female	7.2–8.1	14.0–15.4	52.0–55.0 (12.6–18.0)	13.0–17.0	31.0–32.0
<i>South</i> ²					
Male	9.1–11.3	15.5–16.6	48.6 (22.5) ⁵	18.5–20.2	34.8–35.9
Female	7.9–10.6	15.9–16.6	48.3 (21.8) ⁵	15.2–19.4	34.9–36.2
<i>Central and East</i> ³					
Male	7.6–9.1	11.7–14.5	51.4–56.3 (16.6–17.3) ⁶	15.0–19.6 ⁷	32.0–34.1
Female	6.3–8.0	11.3–14.5	52.2–55.5 (16.4–18.0) ⁶	14.3–17.4 ⁷	31.3–34.2
<i>West</i> ⁴					
Male	7.4–8.4	13.5–14.7	49.3–53.0 ⁸ (n.a.)	9.2–17.0	33.3–34.0
Female	6.8–7.6	13.5–15.0	48.5–52.0 ⁸ (n.a.)	7.6–15.0	34.0–36.5

¹ North: SE, NO, DK; ² South: PT, IT; ³ Central and East: AT, CZ, DE, PL; ⁴ West: NL, FR, IR; ⁵ only PT; ⁶ only AT and PL; ⁷ only AT, DE and PL; ⁸ only NL and FR; n.a. = not available.

Table 7.10. Intake of energy and macronutrients (min.-max.) in children aged **10–14 years** in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	7.8–9.6	14.0–15.9	52.0–55.0 (11.7–18.0)	13.0–18.0	31.0–32.0
Female	6.9–8.1	14.0–15.4	52.0–55.0 (12.9–19.0)	12.0–15.0	31.0–32.0
<i>South</i> ²					
Male	9.8–10.3	15.6–16.9	41.0 (16.1) ⁵	18.5–21.6	35.8–40.8
Female	8.4–8.6	15.7–17.6	41.6 (16.0) ⁵	16.8–17.5	33.4–39.7
<i>Central and East</i> ³					
Male	7.0–11.7	11.5–14.6	50.8–53.9 (15.2–17.6) ⁶	15.1–27.7	32.1–34.6
Female	6.1–9.5	11.7–14.1	51.7–54.0 (12.5–16.8) ⁶	13.7–25.0	32.3–34.3
<i>West</i> ⁴					
Male	7.9–10.1	13.0–15.5	48.1–51.0 ⁷ (16.9 ⁸)	9.4–20.0	33.3–36.3
Female	7.0–8.7	13.0–15.6	48.0–52.0 ⁷ (16.7 ⁸)	7.7–17.0	34.5–36.4

¹ North: SE, NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL (female: HU); ⁴ West: NL, FR, IR, UK; ⁵ only ES; ⁶ only AT and PL (female HU); ⁷ only NL and FR; ⁸ only UK.

The vitamin D intake in European children was generally low. Only Finland, Norway and Sweden reached the recommended intake of 5 µg/day [D-A-CH, 2000]. It is remarkable that it was not reached in the 10- to 14-year-old children by any country. The requirement for preformed vitamin D intake depends on the amount of endogenously produced vitamin D. Regarding the relatively low sun exposure during winter months and the possibly low sun exposure through a lifestyle that is dominated by indoor activities, these low amounts of dietary vitamin D intake may be insufficient.

The recommended intake values for α-tocopherol equivalents were between 5.3 and 14.5 mg/day in boys and 5.1 and 18.1 mg/day in girls [D-A-CH, 2000]. It was particularly low in Denmark, Finland, Ireland and Sweden. In the age group of 10–14 years, only 3 countries reached the reference values (Germany, Poland, The Netherlands).

The intake of thiamine, riboflavin and niacin equivalents can be regarded as sufficient in almost every participating country. Only children from Austria (7- to 14-year-old girls and 10- to 14-year-old boys) did not meet the recommendation for thiamine and riboflavin [D-A-CH, 2000]. Concerning the intake of niacin equivalents, from

Table 7.11. Intake of fat, fatty acids and cholesterol (min.-max.) in children aged **4–6 years** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.0–34.0	13.5–15.0	10.0–12.0	3.7–6.0	153.0–186.0 ⁵
Female	31.0–35.0	13.7–15.0	10.0–12.0	3.7–6.0	139.0–187.0 ⁵
<i>South</i> ²					
Male	34.3–40.2	10.9–14.5	10.6 ⁶	4.1 ⁶	327.6 ⁶
Female	33.8–40.5	10.8–14.4	9.7 ⁶	4.0 ⁶	327.1 ⁶
<i>Central and East</i> ³					
Male	30.0–31.9	11.6–15.3 ⁷	12.5–13.7 ⁷	4.5–4.8 ⁷	240.0–246.8
Female	30.0–32.5	12.0–15.2 ⁷	12.1–13.6 ⁷	4.7–4.9 ⁷	201.4–245.0
<i>West</i> ⁴					
Male	31.0–34.7	12.0–15.1	10.0–11.3 ⁸	4.5–6.0 ⁸	122.0–141.4 ⁸
Female	31.0–36.3	12.0–15.8	10.0–11.2 ⁸	4.6–5.0 ⁸	113.0–166.0 ⁸

¹ North: SE, NO, FI, DK; ² South: IT, GR; ³ Central and East: CZ, DE, PL; ⁴ West: NL, FR, IR; ⁵ only SE, NO and FI; ⁶ only IT; ⁷ only DE and PL; ⁸ only NL and IR; n.a. = not available.

the United Kingdom only values for niacin were available and therefore cannot be compared to the recommended intake values.

Vitamin B₆ and vitamin B₁₂ intake were above the D-A-CH 2000 recommendations in all countries. The intake of folate equivalents was between 109 and 428 µg/day. Only 10- to 14-year-old children from Portugal met the reference intake [D-A-CH, 2000]. In the female group, the intake was below the recommendation in Sweden, Austria, Hungary and The Netherlands.

The intake of ascorbic acid ranged from 57 to 222 mg/day. It was remarkably high in the Czech Republic in all age groups and in German children from 12 to 13 years of age, and especially low in The Netherlands (cf. tables 7.14–7.16).

Comparison of Regions

In general, the vitamin intake levels did not show big differences across the regions. The vitamin D intake revealed remarkably high maximum intakes in children aged 4–14 in the North region (5.1–6.8 µg/day) (cf. table 7.17–7.19).

Table 7.12. Intake of fat, fatty acids and cholesterol (min.-max.) in children aged **7–9 years** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.3–33.0	14.0–15.0	10.0–11.3	3.6–6.0	216.0–225.0 ⁵
Female	31.0–32.0	14.0–14.1	10.0–11.3	3.6–6.0	200.0–216.0 ⁵
<i>South</i> ²					
Male	34.8–35.9	9.4–13.0	10.9–15.0	4.6–5.0	375.2 ⁶
Female	34.9–36.2	10.9–13.1	9.9–15.1	4.3–5.1	308.6 ⁶
<i>Central and East</i> ³					
Male	32.0–34.1	12.0–15.1	11.7–13.3	4.6–6.1	240.0–259.0
Female	31.3–34.2	11.8–14.9	11.5–14.2	4.5–6.5	168.0–281.0
<i>West</i> ⁴					
Male	33.3–34.0	13.0–15.1	11.0–12.0 ⁷	4.7–6.0 ⁷	141.4–155.0 ⁷
Female	34.0–36.5	14.0–15.5	11.1–12.0 ⁷	4.9–7.0 ⁷	147.0–157.2 ⁷

¹ North: SE, NO, DK; ² South: IT, PT; ³ Central and East: AT, DE, PL; ⁴ West: NL, FR, IR; ⁵ only SE and NO; ⁶ only IT; ⁷ only NL and IR; n.a. = not available.

Minerals

Comparison of Countries

The sodium intake was in all countries above the recommendations. However, the salt intake should be lowered in most countries in order to prevent chronic diseases such as cancer and cardiovascular disease.

The reference values for potassium were met by all countries and all age groups. The recommendations for calcium intake were met better by younger children. It was especially low in Austrian and Polish children [D-A-CH, 2000].

The mean phosphorus intake can be considered as sufficient in most countries. Children from the older age groups are more likely to have an intake below the reference values than the younger children. The intake levels were especially low in Austrian 10- to 14-year-old children.

Intake of iron was sufficient for boys and girls aged up to 10 years but very much below the D-A-CH 2000 recommendations for girls from 10 to 14 years apart from Portuguese girls aged 13 [D-A-CH, 2000].

Table 7.13. Intake of fat, fatty acids and cholesterol (min.-max.) in children aged **10–14 years** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.0–32.0	13.0–14.1	10.0–11.6	3.7–5.0	233.0–241.0 ⁵
Female	31.0–32.0	14.0	10.0–11.4	3.7–5.0	198.0–204.0 ⁵
<i>South</i> ²					
Male	35.8–40.8	10.8–14.3	11.9–16.7	5.1–5.7	362.1–370.1
Female	33.4–39.7	10.1–13.6	11.0–16.6	4.4–5.4	312.6–319.9
<i>Central and East</i> ³					
Male	32.1–34.6	12.1–15.6	12.0–14.7	4.6–8.2	261.2–408.0
Female	32.3–34.3	10.6–15.4	10.2–14.6	4.8–8.6	228.3–321.0
<i>West</i> ⁴					
Male	33.3–36.3	13.9–15.1	10.9–13.0 ⁶	4.6–7.0 ⁶	178.6–203.5 ⁷
Female	34.5–36.4	14.0–14.9	11.4–12.0 ⁶	5.1–7.0 ⁶	158.1–179.0 ⁷

¹ North: SE, NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL, HU; ⁴ West: UK, NL, FR, IR; ⁵ only SE, NO; ⁶ only NL and IR; ⁷ only UK, NL, IR; n.a. = not available.

For zinc generally the recommendations were met better in younger age groups and in boys. Girls from older age groups from Austria, Denmark, Hungary, Ireland, Poland, Spain, Sweden and The Netherlands and boys from Austria and Ireland did not reach the levels of recommendation [D-A-CH, 2000].

The mean dietary intake of iodine was insufficient for children from the Czech Republic, Germany and Poland.

Dietary selenium intake was sufficient for almost all children, where again children from older age groups had a poorer intake than younger children.

The intake of copper and manganese can be regarded as sufficient in all countries except for boys from the United Kingdom. Girls from older age groups from Sweden, Spain, Italy, the United Kingdom, The Netherlands, Ireland, Austria and Poland did not reach the levels of recommendation either (cf. tables 7.20–7.22).

Comparison of Regions

Tables 7.23–7.25 show intake data for selected minerals in the different regions. As was the case with vitamins in general, no big differences could be observed between the regions except for the iodine intake which tended to be higher in the northern

Table 7.14. Vitamin intake (mean \pm SD) in children aged **4–6 years** of European countries (male and female); total n = 4,857

	Age years	n	Vitamin A ¹ mg	β -Carotene mg	Vitamin D μ g	Vitamin E ² mg
Male						
Czech Republic	4–6	641	0.6 \pm 1.6	2.8 \pm 2.6	2.3 \pm 3.0	9.1 \pm 6.4
Denmark	4–6	117	1.0 \pm 0.5	3.8 \pm 2.7	2.3 \pm 1.7	6.4 \pm 2.0
Finland	4	307	0.6 \pm 0.7	1.7 \pm 1.4	5.9 \pm 3.6	5.3 \pm 2.5
	6	364	0.7 \pm 0.7	1.8 \pm 1.5	6.3 \pm 3.5	6.1 \pm 2.5
Germany	<7	102	0.8 \pm 0.5	2.4 \pm 2.1	1.8 \pm 1.9	9.8 \pm 4.7
Ireland	5–6	72	0.4 \pm 0.4	2.0 \pm 1.6	2.4 \pm 2.7	5.8 \pm 4.0
Italy	4–6	21	0.8 \pm 0.3	2.0 \pm 1.3	2.3 \pm 1.3	6.5 \pm 2.8
Norway	4	206	1.1 \pm 5.6	n.a.	6.8 \pm 5.3	9.0 \pm 5.4 ⁷
Poland	4–6	82	0.9 \pm 1.2	2.4 \pm 3.4	2.0 \pm 1.7	8.8 \pm 5.2
Sweden	4–6	302	0.8 \pm 0.4	1.2 \pm 1.1	6.7 \pm 4.4	6.0 \pm 2.2
The Netherlands ⁶	4–6	327	0.5 \pm 0.3	n.a.	2.2 \pm 0.8	8.8 \pm 2.8
All countries (min.–max.)			0.4–1.1	1.2–3.8	1.8–5.8	5.3–9.8
Female						
Czech Republic	4–6	446	0.6 \pm 1.6	2.8 \pm 2.6	2.3 \pm 3.0	9.1 \pm 6.4
Denmark	4–6	117	0.9 \pm 0.5	3.4 \pm 2.9	2.0 \pm 0.9	6.2 \pm 1.9
Finland	4	307	0.5 \pm 0.5	1.6 \pm 1.3	6.1 \pm 4.1	5.1 \pm 2.8
	6	349	0.6 \pm 0.6	1.7 \pm 1.4	5.5 \pm 3.2	5.5 \pm 2.3
Germany	<7	102	0.7 \pm 0.4	2.4 \pm 1.6	1.5 \pm 1.4	8.5 \pm 3.0
Ireland	5–6	72	0.4 \pm 0.7	1.4 \pm 1.2	1.9 \pm 2.1	5.4 \pm 3.5
Italy	4–6	21	0.9 \pm 0.7	2.0 \pm 1.3	2.2 \pm 1.2	6.7 \pm 2.2
Norway	4	185	1.2 \pm 0.4	n.a.	7.1 \pm 5.6	9.8 \pm 7.3 ⁷
Poland	4–6	82	1.0 \pm 0.6	2.7 \pm 3.2	1.9 \pm 1.5	8.0 \pm 0.3
Sweden	4–6	302	0.7 \pm 0.4	1.1 \pm 0.9	6.5 \pm 4.6	5.9 \pm 2.3
The Netherlands ⁶	4–6	312	0.5 \pm 0.2	n.a.	1.9 \pm 0.6	7.5 \pm 2.3
All countries (min.–max.)			0.4–1.2	1.1–3.4	1.5–6.5	5.1–9.8
Reference values ⁵			0.7	n.a.	5	8

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans- β -carotene = 12 mg other carotenoids); ² RRR- α -tocopherol equivalent (= mg α -tocopherol + mg β -tocopherol \times 0.5 + mg γ -tocopherol \times 0.25 + mg δ -tocopherol \times 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 μ g food folate = 0.5 μ g folic acid (PGA) = 0.6 μ g folic acid taken with meals); ⁵ D-A-CH, 2000; ⁶ using different conversion factors for vitamin A, vitamin E and folate; ⁷ alpha-tocopherol only; n.a. = not available.

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ μg	Cobalamin μg	Ascorbic acid mg
1.3 ± 0.6	1.6 ± 0.9	22.8 ± 10.2	1.7 ± 0.9	190 ± 110	5.0 ± 3.9	157 ± 95
1.1 ± 0.3	1.6 ± 0.4	18.9 ± 4.5	1.1 ± 0.3	256 ± 72	5.0 ± 1.7	86 ± 40
1.0 ± 0.6	1.8 ± 0.7	19.5 ± 6.1	1.5 ± 0.6	135 ± 52	4.6 ± 2.6	60 ± 41
1.1 ± 0.7	2.1 ± 0.8	22.2 ± 6.5	1.6 ± 0.6	166 ± 61	5.3 ± 2.8	72 ± 49
1.2 ± 0.5	1.6 ± 0.5	20.4 ± 5.2	1.8 ± 0.9	213 ± 91	4.4 ± 1.9	91 ± 45
1.4 ± 0.5	1.7 ± 0.7	15.7 ± 6.5	1.8 ± 0.7	225 ± 116	4.0 ± 1.9	74 ± 47
0.9 ± 0.2	1.3 ± 0.3	24.9 ± 5.5	1.6 ± 0.4	198 ± 66	n.a.	76 ± 36
1.2 ± 0.5	1.6 ± 0.8	n.a.	n.a.	n.a.	n.a.	81 ± 44
0.8 ± 0.3	1.3 ± 0.5	n.a.	1.3 ± 0.5	169 ± 51	2.7 ± 2.3	66 ± 46
1.1 ± 0.4	1.6 ± 0.5	20.9 ± 5.3	1.5 ± 0.5	174 ± 67	4.2 ± 2.0	90 ± 71
0.9 ± 0.2	1.4 ± 0.4	n.a.	1.4 ± 0.4	120 ± 29	2.9 ± 1.2	72 ± 26
0.8–1.4	1.3–2.1	15.7–24.9	1.3–1.8	120–256	2.7–5.3	60–157
1.3 ± 0.6	1.6 ± 0.9	22.8 ± 10.2	1.7 ± 0.9	190 ± 110	5.0 ± 3.9	157 ± 95
1.0 ± 0.3	1.4 ± 0.5	17.0 ± 4.4	1.0 ± 0.3	235 ± 70	4.4 ± 1.9	83 ± 37
1.0 ± 0.5	1.7 ± 0.6	18.4 ± 5.9	1.5 ± 0.7	132 ± 49	4.2 ± 2.1	61 ± 41
1.0 ± 0.6	1.8 ± 0.7	19.5 ± 5.9	1.5 ± 0.6	144 ± 51	4.5 ± 2.4	61 ± 36
1.0 ± 0.3	1.3 ± 0.4	17.9 ± 4.7	1.9 ± 0.4	175 ± 65	3.0 ± 1.1	91 ± 51
1.2 ± 0.5	1.6 ± 0.6	14.4 ± 6.5	1.7 ± 0.7	196 ± 88	4.3 ± 3.3	77 ± 47
0.9 ± 0.2	1.3 ± 0.3	24.6 ± 4.5	1.6 ± 0.4	199 ± 52	n.a.	82 ± 38
1.2 ± 0.5	1.6 ± 0.7	n.a.	n.a.	n.a.	n.a.	88 ± 41
0.8 ± 0.3	1.3 ± 0.6	n.a.	1.2 ± 0.5	164 ± 57	2.9 ± 3.4	61 ± 50
1.1 ± 1.5	1.5 ± 0.9	19.5 ± 4.8	1.5 ± 1.6	162 ± 56	4.7 ± 14.8	88 ± 74
0.8 ± 0.2	1.2 ± 0.3	n.a.	1.2 ± 0.3	109 ± 29	2.6 ± 0.8	65 ± 26
0.8–1.3	1.2–1.8	14.4–24.6	1.0–1.9	109–199	2.6–5.0	61–157
0.8	0.9	10	0.5	300	1.5	70

Table 7.15. Vitamin intake (mean \pm SD) in children aged **7–9 years** of European countries (male and female); total n = 5,438

	Age years	n	Vitamin A ¹ mg	β -Carotene mg	Vitamin D μ g	Vitamin E ² mg
Male						
Austria	7–9	146	0.8 \pm 0.6	2.2 \pm 2.9	1.5 \pm 0.8	10.7 \pm 4.4
Czech Republic	7–9	940	0.8 \pm 1.8	2.5 \pm 1.7	2.7 \pm 12.7	9.4 \pm 5.3
Denmark	7–9	139	1.0 \pm 0.6	4.1 \pm 3.6	2.5 \pm 1.4	7.2 \pm 2.4
Germany	7–9	321	1.0 \pm 0.6	3.0 \pm 2.8	1.8 \pm 2.0	10.6 \pm 4.6
Ireland	7–9	110	0.4 \pm 0.5	2.3 \pm 2.2	2.2 \pm 2.0	7.4 \pm 5.8
Italy	7–9	29	0.9 \pm 0.7	2.1 \pm 1.6	2.8 \pm 1.3	8.7 \pm 3.3
Norway	9	402	1.3 \pm 0.7	n.a.	6.4 \pm 5.6	10.4 \pm 6.0 ⁶
Poland	7–9	101	1.4 \pm 2.4	2.6 \pm 3.5	2.8 \pm 2.8	10.1 \pm 5.5
Sweden	7–9	444	0.9 \pm 0.6	1.6 \pm 1.4	5.1 \pm 2.8	6.3 \pm 1.8
The Netherlands	7–9	104	0.7 \pm 0.5	n.a.	2.9 \pm 1.6	11.2 \pm 5.4
All countries (min.–max.)			0.4–1.3	1.6–4.1	1.5–6.4	6.3–11.2
Female						
Austria	7–9	146	0.7 \pm 0.4	1.9 \pm 1.5	1.5 \pm 1.0	10.7 \pm 4.1
Czech Republic	7–9	765	0.8 \pm 1.8	2.5 \pm 1.7	2.7 \pm 12.7	9.4 \pm 5.3
Denmark	7–9	139	0.9 \pm 0.5	4.0 \pm 3.3	2.2 \pm 1.1	6.4 \pm 2.0
Germany	7–9	321	0.9 \pm 0.5	2.8 \pm 2.3	1.7 \pm 1.8	9.4 \pm 4.0
Ireland	7–9	110	0.4 \pm 0.3	2.0 \pm 1.5	2.4 \pm 2.4	6.2 \pm 3.7
Italy	7–9	29	0.8 \pm 0.8	2.2 \pm 1.4	2.1 \pm 0.8	9.8 \pm 8.8
Norway	9	408	1.1 \pm 0.6	n.a.	5.1 \pm 4.2	8.5 \pm 4.6 ⁶
Poland	7–9	101	1.0 \pm 0.7	2.7 \pm 3.6	2.3 \pm 1.5	9.9 \pm 5.6
Sweden	7–9	444	0.7 \pm 0.4	1.6 \pm 1.2	4.8 \pm 2.8	5.9 \pm 2.1
The Netherlands	7–9	134	0.7 \pm 0.6	n.a.	2.8 \pm 1.3	10.4 \pm 4.8
All countries (min.–max.)			0.4–1.1	1.6–4.0	1.5–5.1	5.9–13.3
Reference values ⁵			0.8	n.a.	5	10 (male)/ 9 (female)

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans- β -carotene = 12 mg other carotenoids); ² RRR- α -tocopherol equivalent (= mg α -tocopherol + mg β -tocopherol \times 0.5 + mg γ -tocopherol \times 0.25 + mg α -tocotrienol \times 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 μ g food folate = 0.5 μ g folic acid (PGA) = 0.6 μ g folic acid taken with meals); ⁵ D-A-CH, 2000; ⁶ alpha-tocopherol only; n.a. = not available.

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ μg	Cobalamin μg	Ascorbic acid mg
0.9 ± 0.4	1.2 ± 0.5	19.1 ± 6.1	1.2 ± 0.5	154 ± 64	3.6 ± 1.4	125 ± 92
1.4 ± 0.9	1.5 ± 0.7	24.9 ± 23.8	1.8 ± 1.3	200 ± 109	5.3 ± 5.3	172 ± 113
1.3 ± 0.3	1.8 ± 0.6	22.6 ± 6.1	1.3 ± 0.4	290 ± 101	5.4 ± 2.2	101 ± 61
1.4 ± 0.6	1.6 ± 0.7	23.4 ± 6.8	1.8 ± 0.8	229 ± 108	4.2 ± 1.7	110 ± 60
1.6 ± 0.5	2.0 ± 0.7	18.7 ± 6.1	2.2 ± 0.7	256 ± 99	4.8 ± 2.5	98 ± 87
1.1 ± 0.2	1.5 ± 0.3	29.9 ± 6.5	1.8 ± 0.5	242 ± 58	n.a.	102 ± 61
1.5 ± 0.7	1.9 ± 0.9	n.a.	n.a.	n.a.	n.a.	102 ± 56
1.0 ± 0.5	1.6 ± 0.8	n.a.	1.5 ± 0.7	214 ± 102	4.2 ± 6.4	77 ± 71
1.4 ± 0.5	1.9 ± 0.6	27.5 ± 6.3	2.5 ± 14.2	204 ± 66	5.5 ± 5.2	88 ± 68
0.9 ± 0.3	1.4 ± 0.4	n.a.	1.3 ± 0.5	144 ± 51	n.a.	63 ± 48
0.9–1.6	1.2–2.0	18.7–29.9	1.2–2.5	144–290	3.6–5.5	63–172
0.8 ± 0.3	1.1 ± 0.4	16.7 ± 5.1	1.1 ± 0.4	145 ± 55	3.0 ± 1.4	110 ± 73
1.4 ± 0.9	1.5 ± 0.7	24.9 ± 23.8	1.8 ± 1.3	200 ± 109	5.3 ± 5.3	172 ± 113
1.1 ± 0.3	1.6 ± 0.5	20.0 ± 4.7	1.2 ± 0.3	264 ± 80	4.8 ± 1.8	96 ± 49
1.2 ± 0.5	1.4 ± 0.6	20.5 ± 6.8	1.6 ± 0.7	212 ± 88	3.4 ± 1.5	108 ± 69
1.4 ± 0.5	1.7 ± 0.7	16.2 ± 5.9	1.9 ± 0.6	226 ± 90	4.2 ± 1.9	100 ± 61
0.9 ± 0.3	1.2 ± 0.3	25.9 ± 6.7	1.7 ± 0.5	211 ± 63	n.a.	87 ± 45
1.2 ± 0.5	1.6 ± 0.7	n.a.	n.a.	n.a.	n.a.	95 ± 55
0.9 ± 0.4	1.3 ± 0.5	n.a.	1.3 ± 0.6	190 ± 75	2.8 ± 2.4	71 ± 55
1.3 ± 0.4	1.6 ± 0.5	24.6 ± 6.0	1.6 ± 0.5	187 ± 64	4.7 ± 5.1	86 ± 83
0.9 ± 0.5	1.4 ± 0.4	n.a.	1.2 ± 0.4	133 ± 55	n.a.	57 ± 33
0.8–1.4	1.1–1.7	16.2–26.3	1.1–1.9	133–264	2.2–5.3	57–172
1	1.1	12	0.7	300	1.8	80

Table 7.16. Vitamin intake (mean \pm SD) in children aged **10–14 years** of European countries (male and female); total n = 8,026

	Age years	n	Vitamin A ¹ g	β -Carotene mg	Vitamin D μ g	Vitamin E ² mg
Male						
Austria	10–14	248	0.8 \pm 0.6	1.7 \pm 1.7	1.5 \pm 1.4	10.9 \pm 5.3
Denmark	10–14	172	0.9 \pm 0.4	3.1 \pm 2.7	2.6 \pm 1.6	7.0 \pm 2.7
Germany	10–11	199	1.0 \pm 0.5	2.9 \pm 2.3	2.3 \pm 2.5	10.7 \pm 5.2
	12	114	1.4 \pm 0.7	4.4 \pm 3.4	2.4 \pm 1.8	17.1 \pm 9.6
	13–14	214	1.5 \pm 0.9	4.8 \pm 3.9	2.3 \pm 1.5	18.2 \pm 11.4
Ireland	10–12	109	0.4 \pm 0.3	2.7 \pm 2.4	2.2 \pm 2.0	6.9 \pm 3.4
Italy	10–14	52	0.9 \pm 0.5	2.5 \pm 1.4	3.0 \pm 1.8	11.1 \pm 6.1
Hungary	11–14	124	0.6 \pm 0.4	n.a.	2.5 \pm 1.1	14.1 \pm 5.0
Norway	13	490	1.2 \pm 2.4	n.a.	4.4 \pm 6.6	9.8 \pm 6.6 ⁶
Poland	10–14	202	1.3 \pm 1.8	2.8 \pm 3.2	3.9 \pm 4.5	14.5 \pm 9.1
Portugal	13	987	2.4 \pm 1.6	1.1 \pm 1.0	4.8 \pm 2.5	9.4 \pm 3.9
Spain	10–14	66	0.6 \pm 0.1	1.2 \pm 0.3	1.8 \pm 0.5	8.5 \pm 1.5
Sweden	10–14	517	0.7 \pm 0.4	1.1 \pm 1.0	4.8 \pm 2.8	5.9 \pm 2.1
The Netherlands	10–14	211	0.7 \pm 0.5	n.a.	3.8 \pm 1.9	13.7 \pm 6.0
United Kingdom	2–15	364	0.6 \pm 0.8	1.5 \pm 2.0	2.1 \pm 1.3	9.0 \pm 4.4
All countries (min.–max.)			0.4–2.4	1.1–4.8	1.5–4.8	5.9–14.5
Reference values ⁵			0.9/1.1	n.a.	5	13/14
Female						
Austria	10–14	248	0.6 \pm 0.5	1.4 \pm 2.1	1.2 \pm 0.8	10.0 \pm 4.3
Denmark	10–14	172	0.7 \pm 0.3	2.8 \pm 2.3	2.2 \pm 1.7	6.1 \pm 2.4
Germany	10–11	199	0.9 \pm 0.6	2.8 \pm 2.5	1.9 \pm 2.1	10.8 \pm 5.2
	12	114	1.5 \pm 0.8	5.2 \pm 4.0	2.0 \pm 1.5	18.1 \pm 14.9
	13–14	214	1.5 \pm 0.7	4.9 \pm 3.1	2.1 \pm 1.8	16.1 \pm 9.4
Hungary	11–14	111	0.6 \pm 0.4	n.a.	2.2 \pm 1.0	13.3 \pm 3.6
Ireland	10–12	109	0.3 \pm 0.3	2.1 \pm 2.1	2.4 \pm 2.3	6.6 \pm 4.3
Italy	10–14	52	0.8 \pm 0.4	2.0 \pm 1.3	2.9 \pm 2.2	9.2 \pm 2.8
Norway	13	515	1.0 \pm 1.2	n.a.	4.0 \pm 4.9	8.8 \pm 8.6 ⁶
Poland	10–14	202	1.1 \pm 1.2	3.0 \pm 4.9	2.9 \pm 2.4	12.3 \pm 8.1
Portugal	13	987	2.3 \pm 1.4	1.1 \pm 0.9	4.5 \pm 2.5	9.4 \pm 4.0

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
0.9 ± 0.4	1.2 ± 0.5	19.7 ± 7.6	1.2 ± 0.5	149 ± 59	3.6 ± 1.9	113 ± 96
1.3 ± 0.3	1.8 ± 0.6	24.3 ± 6.6	1.4 ± 0.4	298 ± 100	5.2 ± 1.9	103 ± 63
1.4 ± 0.6	1.7 ± 0.7	23.8 ± 7.7	1.8 ± 0.9	233 ± 116	4.4 ± 1.9	119 ± 108
2.0 ± 1.1	2.3 ± 1.3	34.3 ± 16.2	2.5 ± 1.6	328 ± 183	5.5 ± 2.6	172 ± 102
2.3 ± 1.4	2.6 ± 1.6	40.4 ± 20.1	3.1 ± 2.1	380 ± 259	6.4 ± 3.0	197 ± 135
1.8 ± 0.7	2.1 ± 0.9	20.7 ± 7.5	2.4 ± 0.9	271 ± 109	4.9 ± 2.2	94 ± 72
1.2 ± 0.4	1.6 ± 0.5	34.5 ± 9.6	2.2 ± 0.7	290 ± 106	n.a.	101 ± 106
1.0 ± 0.3	1.4 ± 0.4	30.8 ± 7.8	1.8 ± 0.5	150.6 ± 58.1	3.2 ± 2.5	99.3 ± 78.9
1.4 ± 0.7	1.7 ± 0.9	n.a.	n.a.	n.a.	n.a.	106 ± 74
1.3 ± 0.5	1.7 ± 0.7	n.a.	1.8 ± 0.8	250 ± 96	3.8 ± 4.5	81 ± 79
2.2 ± 0.7	2.9 ± 1.0	28.3 ± 9.5	2.8 ± 1.0	428 ± 183	11.8 ± 7.8	161 ± 94
1.6 ± 0.3	1.9 ± 0.4	21.1 ± 4.6	2.0 ± 0.4	236 ± 42	4.7 ± 0.9	73 ± 34
1.4 ± 1.2	1.8 ± 1.3	27.7 ± 7.4	1.8 ± 1.2	191 ± 69	4.9 ± 3.4	82 ± 120
1.2 ± 0.6	1.6 ± 0.6	n.a.	1.5 ± 0.5	170 ± 56	n.a.	76 ± 46
1.6 ± 0.7	1.7 ± 0.8	8.7 ± 5.1 ⁷	2.0 ± 0.8	202.3 ± 81	4.4 ± 2.2	75 ± 52
0.9–2.3	1.2–2.9	8.7–40.4	1.2–2.8	149–428	3.2–11.8	73–197
1.2/1.4	1.4/1.6	15/18	1.0/1.4	400	2.0/3.0	90/100
0.8 ± 0.3	1.1 ± 0.5	16.9 ± 6.2	1.1 ± 0.5	138 ± 53	2.9 ± 1.4	113 ± 67
1.0 ± 0.3	1.4 ± 0.5	19.4 ± 5.6	1.1 ± 0.3	238 ± 70	4.0 ± 1.8	94 ± 47
1.3 ± 0.5	1.5 ± 0.6	21.6 ± 5.7	1.6 ± 0.6	219 ± 86	3.8 ± 1.6	110 ± 61
1.9 ± 1.3	2.3 ± 1.6	32.5 ± 18.4	2.5 ± 1.9	360 ± 234	4.9 ± 2.8	222 ± 243
1.8 ± 1.1	2.1 ± 1.3	31.1 ± 13.8	2.4 ± 1.4	326 ± 164	4.8 ± 2.3	201 ± 12
0.9 ± 0.3	1.2 ± 0.4	26.3 ± 5.9	1.6 ± 0.5	140 ± 65	2.2 ± 1.1	94.3 ± 70.0
1.7 ± 3.4	1.9 ± 3.4	17.1 ± 6.9	2.3 ± 3.5	217 ± 99	4.1 ± 2.6	96 ± 77
1.0 ± 0.2	1.3 ± 0.3	28.8 ± 6.0	1.8 ± 0.3	234 ± 55	n.a.	85 ± 36
1.2 ± 0.9	1.5 ± 1.1	n.a.	n.a.	n.a.	n.a.	103 ± 81
1.1 ± 0.4	1.4 ± 0.6	n.a.	1.6 ± 0.7	224 ± 93	2.9 ± 3.5	88 ± 87
2.1 ± 0.7	2.8 ± 1.0	26.6 ± 8.9	2.7 ± 0.9	412 ± 177	11.1 ± 6.8	170 ± 96

Table 7.16. Continued

	Age years	n	Vitamin A ¹ g	β-Carotene mg	Vitamin D µg	Vitamin E ² mg
Spain	10–14	53	0.5 ± 0.1	1.1 ± 0.4	1.6 ± 0.5	7.6 ± 1.4
Sweden	10–14	517	0.6 ± 0.4	1.1 ± 1.1	4.4 ± 2.6	5.6 ± 2.1
The Netherlands	10–14	199	0.7 ± 0.6	n.a.	3.2 ± 1.4	12.0 ± 5.2
United Kingdom	2–15	364	0.6 ± 0.6	1.5 ± 1.3	1.9 ± 1.1	8.0 ± 3.7
All countries (min.–max.)			0.3–2.3	1.1–5.2	1.2–4.5	5.6–18.1
Reference values ⁵			0.9/1.0	n.a.	5	11/12

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans-β-carotene = 12 mg other carotenoids); ² RRR-α-tocopherol equivalent (= mg α-tocopherol + mg β-tocopherol × 0.5 + mg γ-tocopherol × 0.25 + mg α-tocotrienol × 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁵ D-A-CH, 2000, reference values refer to age group 10–12 years and 13–14 years; ⁶ alpha-tocopherol only; ⁷ niacin; n.a. = not available.

Table 7.17. Intake of selected vitamins (min.–max.) in children aged **4–6 years** in the four regions

Region/sex	Vitamin B ₆ mg	Folate µg ⁵	Cobalamin µg	Vitamin D µg
<i>North</i> ¹				
Male	1.1–1.6 ⁶	135–256 ⁶	4.2–5.3	2.3–6.8
Female	1.0–1.5 ⁶	132–235 ⁶	4.2–4.7	2.0–6.5
<i>South</i> ²				
Male	1.6	198	n.a.	2.3
Female	1.6	199	n.a.	2.2
<i>Central and East</i> ³				
Male	1.5–1.8	190–214	4.2–5.0	1.8–2.3
Female	1.2–1.9	164–190	2.9–5.0	1.5–2.3
<i>West</i> ⁴				
Male	1.3–1.8	120–225	2.9–4.0	2.2–2.4
Female	1.2–1.7	109–196	2.6–4.3	1.9

¹ North: SE, NO, FI, DK; ² South: IT; ³ Central and East: CZ, DE, PL; ⁴ West: NL, IR; ⁵ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only SE, FI and DK; n.a. = not available.

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
1.3 ± 0.2	1.6 ± 0.2	18.8 ± 3.7	1.9 ± 0.4	207 ± 39	3.9 ± 0.6	77 ± 37
1.2 ± 0.4	1.4 ± 0.6	23.7 ± 6.7	1.5 ± 0.6	174 ± 61	4.0 ± 1.8	78 ± 79
1.0 ± 0.4	1.4 ± 0.5	n.a.	1.3 ± 0.4	156 ± 57	n.a.	77 ± 60
1.4 ± 0.5	1.4 ± 0.6	6.9 ± 3.7 ⁷	1.9 ± 0.7	186 ± 69	3.9 ± 1.1	81 ± 56
0.8–1.9	1.1–2.8	6.9–32.5	1.1–2.7	140–360	2.2–11.1	77–222
1.0/1.1	1.2/1.3	13/15	1.0/1.4	400	2.0/3.0	90/100

Table 7.18. Intake of selected vitamins (min.–max.) in children aged 7–9 years in the four regions

Region/sex	Vitamin B ₆ mg	Folate µg ⁵	Cobalamin µg	Vitamin D µg
<i>North</i> ¹				
Male	1.3–2.5 ⁶	204–290 ⁶	5.4–5.5 ⁶	2.5–6.4
Female	1.2–1.6 ⁶	187–264 ⁶	4.7–4.8 ⁶	2.2–5.1
<i>South</i> ²				
Male	1.8	242	n.a.	2.8
Female	1.7	211	n.a.	2.1
<i>Central and East</i> ³				
Male	1.2–1.8	154–229	3.6–5.3	1.5–2.8
Female	1.1–1.8	145–212	2.8–5.3	1.5–2.7
<i>West</i> ⁴				
Male	1.3–2.2	144–256	4.8 ⁷	2.2–2.9
Female	1.2–1.9	133–226	4.2 ⁷	2.4–2.8

¹ North: SE, NO, DK; ² South: IT; ³ Central and East: AT, CZ, DE, PL; ⁴ West: NL, IR; ⁵ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only SE and DK; ⁷ only IR; n.a. = not available.

Table 7.19. Intake of selected vitamins (min.-max.) in children aged **10–14 years** in the four regions

Region/sex	Vitamin B ₆ mg	Folate µg ⁵	Cobalamin µg	Vitamin D µg
<i>North</i> ¹				
Male	1.4–1.8 ⁶	191–298 ⁶	4.9–5.2 ⁶	2.6–4.8
Female	1.1–1.5 ⁶	174–238 ⁶	4.0 ⁶	2.2–4.4
<i>South</i> ²				
Male	2.0–2.8	236–428	4.7–11.8 ⁷	1.7–4.8
Female	1.8–2.7	207–412	3.9–11.1 ⁷	1.6–4.5
<i>Central and East</i> ³				
Male	1.2–3.1	149–380	3.2–6.4	1.5–3.9
Female	1.1–2.5	138–360	2.2–4.9	1.2–2.9
<i>West</i> ⁴				
Male	1.5–2.4	170–271	4.4–4.9 ⁸	2.1–3.8
Female	1.3–2.3	156–217	3.9–4.1 ⁸	1.9–3.2

¹ North: SE, NO, DK; ² South: IT, PT, ES; ³ Central and East: AT, DE, PL; ⁴ West: UK, NL, IR, HU; ⁵ Folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only SE and DK; ⁷ only PT and ES; ⁸ only UK and IR; n.a. = not available.

European countries. No data on iodine intake were available for the South. Intake levels in 10- to 14-year-old children in the Central and East region showed an inhomogeneous picture. For example, the minimum as well as the maximum intake of calcium (593–1,381 mg/day) and phosphorus (807–1,615 mg/day) can be observed in this region. The intake levels of selenium showed a wide range but kept within the recommendation except for central and east Europe where the maximum exceeded the recommended range in 4- to 9-year-old children [D-A-CH, 2000].

7.3 Energy and Nutrient Intake in European Adolescents

Background

Although about half of the participating countries had data on energy and nutrient intake of European adolescents, this population group was the group with the fewest

data available. 13 of the 25 participating countries had data on energy, macronutrient and mineral intake and 12 had data on vitamin intake. The methods which were used to assess the energy and nutrient intake, the periods of data collection and sample sizes are shown in table 7.26.

Energy and Macronutrients

Comparison of Countries

The energy intake was between 9.5 and 14.5 MJ/day in male adolescents and between 6.8 and 9.7 MJ/day in female adolescents. Despite the high prevalence of overweight and obesity (cf. chapter 8) the intake of energy was in general below the reference intake values of 13.0 (males) and 10.5 MJ/day (females) [D-A-CH, 2000]. It must be noted, that these reference values refer to a physical activity level (PAL) of 1.75, which was on average probably not achieved.

The share of protein in total energy intake was between 12.4 and 17.8%E in male and between 12.0 and 18.0%E in female adolescents and was therefore within or slightly above the recommended range of the WHO [WHO, 2003] in the participating countries.

The intake of carbohydrates (%E) was in general within the recommendation of the WHO (WHO, 2007). Male adolescents from Denmark, Norway, Poland, Slovenia, and The Netherlands as well as female adolescents from Belgium, Denmark, Germany, Norway, Poland, Slovenia, The Netherlands and the United Kingdom met the recommendation. The intake of sucrose was above the recommendation of less than 10%E [WHO, 2003] in every country. The intake of dietary fibers was between 13.7 and 33.0 g/day in male and between 10.2 and 27.0 g/day in female adolescents. In general, the intake was lower than the Eurodiet recommendation [Eurodiet, 2000] of ingesting more than 25 g dietary fibers per day. Only male German, Norwegian and Polish adolescents as well as male and female Slovenian adolescents met the recommendation.

The intake of fat was between 28.0 and 40.4%E in male and between 25.5 and 41.9%E in female adolescents. The intake of female adolescents was in general lower than that of male adolescents. The intake of saturated fatty acids was in every country and in both sexes above the recommendation [WHO, 2003], whereas the intake of polyunsaturated fatty acids was in every country except for male adolescents from Belgium, The Netherlands and Poland and female adolescents from Belgium, The Netherlands, Slovenia and Spain below the recommendation [WHO, 2009b]. The cholesterol intake was between 219 and 566 mg/day in male adolescents and between 183 and 340 mg/day in female adolescents (cf. table 7.27).

Comparison of Regions

Table 7.28 shows the intake of energy and macronutrients (min.-max.) in the four regions. In general the intake of energy was higher in the Central and East region (CE) than in the other regions. The share of protein and fat in total energy intake

Table 7.20. Mineral intake (mean \pm SD) in children aged **4–6 years** of European countries (male and female)

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Male						
Czech Republic	4–6	641	2.5 \pm 0.9	2.7 \pm 1.0	809 \pm 240	1,183 \pm 285
Denmark	4–6	117	3.0 \pm 0.8	2.5 \pm 0.6	1 008 \pm 273	1,260 \pm 289
Finland	4	307	2.0 \pm 0.5	2.4 \pm 0.6	983 \pm 306	1,116 \pm 274
	6	364	2.3 \pm 0.5	2.8 \pm 0.6	1,103 \pm 302	1,284 \pm 271
France	4–6	164	2.1 \pm 0.1	n.a.	813 \pm 21	n.a.
Germany	<7	102	1.8 \pm 0.6	2.3 \pm 0.6	900 \pm 200	1,000 \pm 200
Greece ¹	4–5	745	n.a.	n.a.	1,024	n.a.
Ireland	5–6	72	1.9 \pm 0.4	2.0 \pm 0.4	837 \pm 257	944 \pm 236
Italy	4–6	21	3.4 \pm 1.5	2.4 \pm 0.8	793 \pm 212	1,085 \pm 280
Norway	4	206	n.a.	n.a.	687 \pm 217	n.a.
Poland	4–6	82	2.5 \pm 0.9	2.5 \pm 0.7	604 \pm 301	882 \pm 273
Sweden	4–6	302	2.1 \pm 0.5	2.4 \pm 0.6	889 \pm 288	1,042 \pm 262
The Netherlands	4–6	327	n.a.	2.3 \pm 0.4	856 \pm 270	1,067 \pm 239
All countries (min.–max.)			1.8–3.4	2.0–2.8	604–1,103	882–1,284
Female						
Czech Republic	4–6	446	2.5 \pm 0.9	2.7 \pm 1.0	809 \pm 240	1,183 \pm 285
Denmark	4–6	117	2.7 \pm 0.7	2.3 \pm 0.6	886 \pm 301	1,115 \pm 307
Finland	4	307	1.8 \pm 0.5	2.3 \pm 0.5	930 \pm 255	1,052 \pm 237
	6	349	2.0 \pm 0.6	2.5 \pm 0.6	991 \pm 286	1,137 \pm 272
France	4–6	162	2.1 \pm 0.1	n.a.	783 \pm 20	n.a.
Germany	<7	102	1.7 \pm 0.5	2.0 \pm 0.5	800 \pm 200	900 \pm 200
Greece ¹	4–5	745	n.a.	n.a.	1 024	n.a.
Ireland	5–6	72	1.8 \pm 1.5	1.9 \pm 0.5	794 \pm 214	904 \pm 206
Italy	4–6	21	3.4 \pm 1.1	2.3 \pm 0.4	701 \pm 180	1,063 \pm 211
Norway	4	185	n.a.	n.a.	673 \pm 212	n.a.
Poland	4–6	82	2.4 \pm 0.9	2.4 \pm 0.9	606 \pm 309	877 \pm 324
Sweden	4–6	302	2.0 \pm 0.5	2.2 \pm 0.6	819 \pm 257	966 \pm 228
The Netherlands	4–6	312	n.a.	2.0 \pm 0.4	750 \pm 209	950 \pm 195
All countries (min.–max.)			1.7–3.4	1.9–2.7	606–1024	900–1,183
Reference values ³			0.41/<2 ⁴	1.4	700	600

¹ Sum of males and females; ² iodised salt was not taken into account in each country; ³ D-A-CH, 2000; ⁴ WHO, 2003; n.a. = not available.

Magnesium mg	Iron mg	Zinc mg	Iodine μg^2	Copper mg	Manganese mg	Selenium μg
267 ± 70	10.6 ± 3.6	7.2 ± 1.8	69 ± 31	1.3 ± 3.3	n.a.	61 ± 41
265 ± 63	7.8 ± 1.9	8.8 ± 2.0	173 ± 48	n.a.	n.a.	31 ± 8
211 ± 52	8.0 ± 3.6	8.0 ± 2.7	196 ± 57	n.a.	n.a.	39 ± 12
246 ± 67	8.6 ± 2.8	9.1 ± 2.8	223 ± 53	n.a.	n.a.	45 ± 13
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
265 ± 67	10.0 ± 2.9	7.7 ± 1.6	77 ± 28	n.a.	n.a.	n.a.
188.0	10.0	8.4	n.a.	0.7	n.a.	n.a.
171 ± 41	8.7 ± 3.6	6.0 ± 2.5	142 ± 75	0.7 ± 0.4	1.4 ± 0.5	23 ± 7
171 ± 33	8.8 ± 2.4	9.2 ± 2.6	n.a.	1.0 ± 0.4	n.a.	29 ± 10
n.a.	7.8 ± 3.8	n.a.	n.a.	n.a.	n.a.	n.a.
216 ± 66	8.0 ± 3.3	6.8 ± 2.0	87 ± 37	0.9 ± 0.3	3.3 ± 1.3	27 ± 9
216 ± 51	8.3 ± 3.4	7.8 ± 2.3	n.a.	n.a.	n.a.	26 ± 9
219 ± 45	7.3 ± 1.7	6.0 ± 1.4	n.a.	0.8 ± 0.2	n.a.	27 ± 6
171–267	7.3–10.6	6.0–9.2	69–223	0.7–2.2	1.4–3.3	23–61
267 ± 70	10.6 ± 3.6	7.2 ± 1.8	69 ± 31	1.3 ± 3.3	n.a.	61 ± 41
235 ± 55	6.9 ± 1.7	7.7 ± 1.9	151 ± 49	n.a.	n.a.	28 ± 8
199 ± 41	7.0 ± 2.7	7.2 ± 2.0	183 ± 47	n.a.	n.a.	35 ± 10
216 ± 50	7.7 ± 3.3	8.2 ± 3.1	197 ± 55	n.a.	n.a.	39 ± 11
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
246 ± 60	8.8 ± 2.2	7.3 ± 1.9	70 ± 23	n.a.	n.a.	n.a.
188	10.0	8.4	n.a.	0.7	n.a.	n.a.
166 ± 38	7.8 ± 2.9	5.6 ± 1.5	137 ± 65	0.7 ± 0.6	1.3 ± 0.5	23 ± 8
164 ± 40	10.1 ± 3.6	8.9 ± 2.1	n.a.	1.0 ± 0.3	n.a.	28 ± 7
n.a.	7.4 ± 3.9	n.a.	n.a.	n.a.	n.a.	n.a.
205 ± 73	7.4 ± 3.6	6.4 ± 2.3	82 ± 32	0.9 ± 0.4	3.0 ± 1.2	29 ± 27
199 ± 45	7.7 ± 2.8	7.1 ± 1.9	n.a.	n.a.	n.a.	24 ± 9
191 ± 39	6.8 ± 1.9	5.3 ± 1.0	n.a.	0.7 ± 0.1	n.a.	24 ± 5
166–267	6.8–10.6	5.3–8.9	70–198	0.7–2.0	1.3–3.0	24–61
120	8	5	120	0.5–1.0	1.5–2.0	15–45

Table 7.21. Mineral intake (mean \pm SD) in children aged 7–9 years of European countries (male and female)

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Male						
Austria	7–9	146	2.8 \pm 1.0	1.9 \pm 0.7	732 \pm 294	960 \pm 306
Czech Republic ¹	7–9	940	3.0 \pm 2.4	2.9 \pm 1.2	882 \pm 280	1,295 \pm 440
Denmark	7–9	139	3.5 \pm 1.0	3.0 \pm 0.9	1,207 \pm 388	1,455 \pm 403
France	7–9	160	2.6 \pm 0.1	n.a.	855 \pm 22	n.a.
Germany	7–9	321	2.2 \pm 0.6	2.4 \pm 0.6	900 \pm 300	1,100 \pm 300
Ireland	7–9	110	2.3 \pm 0.8	2.4 \pm 0.6	943 \pm 325	1,098 \pm 309
Italy	7–9	29	4.2 \pm 1.4	2.7 \pm 0.7	904 \pm 232	1,253 \pm 189
Norway	9	402	n.a.	n.a.	917 \pm 338	n.a.
Poland	7–9	101	3.0 \pm 1.1	2.7 \pm 0.9	628 \pm 356	1 031 \pm 370
Portugal	7–9	1,541	n.a.	n.a.	1,174 \pm 430	n.a.
Sweden	7–9	444	2.9 \pm 0.7	2.9 \pm 0.7	1,024 \pm 352	1,300 \pm 329
The Netherlands	7–9	104	n.a.	2.8 \pm 0.8	914 \pm 324	1,273 \pm 303
All countries (min.–max.)			2.2–4.2	1.9–3.0	732–1,207	960–1,455
Female						
Austria	7–9	146	2.5 \pm 0.8	1.8 \pm 0.6	631 \pm 249	851 \pm 262
Czech Republic ¹	7–9	765	3.0 \pm 2.4	2.9 \pm 1.2	882 \pm 280	1,295 \pm 440
Denmark	7–9	139	3.0 \pm 0.8	2.7 \pm 0.7	1,094 \pm 366	1,288 \pm 334
France	7–9	144	2.4 \pm 0.1	n.a.	799 \pm 23	n.a.
Germany	7–9	321	1.9 \pm 0.6	2.2 \pm 0.7	800 \pm 300	1,000 \pm 300
Ireland	7–9	110	2.1 \pm 0.6	2.1 \pm 0.5	857 \pm 283	991 \pm 254
Italy	7–9	29	3.7 \pm 0.9	2.4 \pm 0.5	715 \pm 170	1,091 \pm 244
Norway	9	408	n.a.	n.a.	756 \pm 273	n.a.
Poland	7–9	101	2.8 \pm 1.0	2.5 \pm 0.9	548 \pm 283	892 \pm 295
Portugal	7–9	1,053	n.a.	n.a.	1 126 \pm 419	n.a.
Sweden	7–9	444	2.6 \pm 0.6	2.6 \pm 0.7	894 \pm 306	1,155 \pm 288
The Netherlands	7–9	134	n.a.	2.6 \pm 0.6	901 \pm 296	1,185 \pm 283
All countries (min.–max.)			1.9–3.7	1.8–2.9	631–1 126	851–1,295
Reference values ³			0.46/<2 ⁴	1.6	900	800

¹ Male and female; ² iodised salt was not taken into account in each country; ³ D-A-CH, 2000; ⁴ WHO, 2003; n.a. = not available.

Magnesium mg	Iron mg	Zinc mg	Iodine μg^2	Copper mg	Manganese mg	Selenium μg
230 ± 82	9.2 ± 3.4	8.0 ± 2.5	143 ± 54	1.5 ± 0.5	3.0 ± 1.3	n.a.
301 ± 103	11.8 ± 5.1	8.0 ± 3.4	73 ± 82	1.7 ± 5.7	n.a.	n.a.
303 ± 89	8.9 ± 2.2	10.3 ± 2.6	203 ± 60	n.a.	n.a.	36 ± 11
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
298 ± 77	11.4 ± 3.1	8.7 ± 2.2	84 ± 29	n.a.	n.a.	n.a.
211 ± 56	10.3 ± 3.5	7.0 ± 2.3	165 ± 78	0.9 ± 0.4	1.7 ± 0.8	27 ± 10
204 ± 37	11.1 ± 2.8	10.9 ± 2.1	n.a.	1.2 ± 0.3	n.a.	41 ± 14
n.a.	10.3 ± 4.8	n.a.	n.a.	n.a.	n.a.	n.a.
242 ± 79	9.9 ± 4.5	8.2 ± 2.9	95 ± 40	1.0 ± 0.4	3.7 ± 1.4	34 ± 18
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
262 ± 62	9.5 ± 3.3	10.4 ± 2.8	n.a.	n.a.	n.a.	34 ± 11
247 ± 64	8.4 ± 2.2	7.5 ± 2.0	n.a.	0.9 ± 0.2	n.a.	34 ± 13
204–303	8.4–11.8	7.0–10.9	73–203	0.9–2.8	1.7–3.7	27–41
209 ± 61	8.2 ± 2.4	7.1 ± 2.2	128 ± 45	1.4 ± 0.4	2.9 ± 1.2	n.a.
301 ± 103	11.8 ± 5.1	8.0 ± 3.4	73 ± 82	1.7 ± 5.7	n.a.	58 ± 35
266 ± 64	7.7 ± 1.7	8.9 ± 2.1	179 ± 52	n.a.	n.a.	32 ± 9
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
273 ± 73	10.2 ± 2.8	7.8 ± 1.9	78 ± 31	n.a.	n.a.	n.a.
187 ± 42	8.9 ± 2.5	6.4 ± 1.9	137 ± 60	0.8 ± 0.3	1.6 ± 0.6	26 ± 9
166 ± 37	9.8 ± 3.0	9.4 ± 3.1	n.a.	1.1 ± 0.3	n.a.	33 ± 12
n.a.	9.2 ± 4.4	n.a.	n.a.	n.a.	n.a.	n.a.
214 ± 73	8.5 ± 3.3	7.1 ± 2.4	90 ± 40	0.9 ± 0.3	3.4 ± 1.3	31 ± 25
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
236 ± 54	8.3 ± 2.7	9.3 ± 2.5	n.a.	n.a.	n.a.	30 ± 10
220 ± 54	7.8 ± 2.4	7.0 ± 2.0	n.a.	0.8 ± 0.2	n.a.	30 ± 10
166–301	7.7–11.8	6.4–9.4	73–179	0.8–2.6	1.6–3.4	26–58
170	10	7.0	140	1.0–1.5	2.0–3.0	20–50

Table 7.22. Mineral intake (mean \pm SD) in children aged **10–14 years** of European countries (male and female)

	Age, years	n	Sodium, g	Potassium, g	Calcium, mg	Phosphorus, mg
Male						
Austria	10–14	248	2.7 \pm 1.0	1.9 \pm 0.7	701 \pm 278	964 \pm 297
Denmark	10–14	172	3.7 \pm 1.1	3.0 \pm 0.8	1,193 \pm 392	1,472 \pm 413
France	10–14	160	3.0 \pm 0.1	n.a.	961 \pm 25	n.a.
Germany	10–11	199	2.3 \pm 0.8	2.3 \pm 0.6	900 \pm 300	1,100 \pm 300
	12	114	3.1 \pm 1.1	3.4 \pm 1.2	1,280 \pm 451	1,458 \pm 466
	13–14	214	3.5 \pm 1.4	3.6 \pm 1.3	1,381 \pm 554	1,615 \pm 578
Ireland	10–12	109	2.4 \pm 0.6	2.5 \pm 0.6	990 \pm 343	1,180 \pm 312
Italy	10–14	52	5.0 \pm 1.6	3.2 \pm 0.9	879 \pm 312	1,395 \pm 391
Norway	13	490	n.a.	n.a.	936 \pm 498	n.a.
Poland	10–14	202	4.0 \pm 2.6	3.3 \pm 1.3	686 \pm 397	1,227 \pm 463
Portugal	13	987	2.5 \pm 0.9	4.0 \pm 1.3	1,167 \pm 452	1,704 \pm 518
Spain	10–14	66	3.3 \pm 0.6	2.9 \pm 0.5	959 \pm 276	1,458 \pm 316
Sweden	10–14	517	2.9 \pm 0.8	2.8 \pm 0.8	949 \pm 401	1,259 \pm 381
The Netherlands	10–14	211	n.a.	3.3 \pm 1.0	1,023 \pm 405	1,493 \pm 417
United Kingdom	2–15	364	2.5 \pm 1.0	2.4 \pm 0.8	852 \pm 348	1,118 \pm 374
All countries (min.–max.)			2.3–5.0	1.9–4.0	701–1,381	964–1,704
Reference values ²			0.51/0.55/<2 ³	1.7/1.9	1,100/1,200	1,250
Female						
Austria	10–14	248	2.4 \pm 0.8	1.7 \pm 0.5	600 \pm 241	807 \pm 256
Denmark	10–14	172	3.1 \pm 1.0	2.6 \pm 0.7	1,003 \pm 357	1,184 \pm 363
France	10–14	144	2.7 \pm 0.1	n.a.	821 \pm 24	n.a.
Germany	10–11	199	2.2 \pm 0.7	2.3 \pm 0.7	900 \pm 300	1,100 \pm 300
	12	114	2.7 \pm 0.9	3.2 \pm 1.3	1,172 \pm 451	1,291 \pm 466
	13–14	214	2.8 \pm 0.8	3.2 \pm 1.0	1,238 \pm 413	1,324 \pm 429
Hungary	11–14	111	4.8 \pm 1.9	2.5 \pm 0.7	696 \pm 238	988 \pm 221
Ireland	10–12	109	2.2 \pm 0.8	2.2 \pm 0.5	803 \pm 301	977 \pm 275
Italy	10–14	52	4.3 \pm 1.4	2.5 \pm 0.3	769 \pm 186	1 169 \pm 213
Norway	13	515	n.a.	n.a.	785 \pm 359	n.a.
Poland	10–14	202	3.3 \pm 1.2	2.9 \pm 1.2	593 \pm 359	1,038 \pm 396
Portugal	13	987	2.4 \pm 0.9	4.0 \pm 1.3	1,130 \pm 465	1,636 \pm 528
Spain	10–14	53	2.8 \pm 0.7	2.6 \pm 0.4	849 \pm 159	1,297 \pm 155
Sweden	10–14	517	2.5 \pm 0.7	2.4 \pm 0.7	805 \pm 307	1,079 \pm 319
The Netherlands	10–14	199	n.a.	2.8 \pm 0.8	905 \pm 331	1,298 \pm 319
United Kingdom	2–15	364	2.3 \pm 0.8	2.2 \pm 0.7	743 \pm 299	983 \pm 303
All countries (min.–max.)			2.2–4.8	1.7–4.0	600–1,238	807–1,636
Reference values ²			0.51/0.55/<2 ³	1.7/1.9	1,100/1,200	1,250

¹ Iodised salt was not taken into account in each country; ² D-A-CH, 2000, reference values refer to age group 10–12 years and 13–14 years; ³ WHO, 2003; n.a. = not available.

Magnesium, mg	Iron, mg	Zinc, mg	Iodine, μg^1	Copper, mg	Manganese, mg	Selenium, μg
235 ± 79	9.2 ± 3.2	8.3 ± 2.6	134 ± 50	1.5 ± 0.5	3.2 ± 1.5	n.a.
306 ± 87	9.4 ± 2.4	10.8 ± 2.8	209 ± 62	n.a.	n.a.	37 ± 12
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
296 ± 80	11.7 ± 3.6	9.0 ± 2.3	89 ± 35	n.a.	n.a.	n.a.
443 ± 139	15.5 ± 5.6	12.3 ± 4.1	102 ± 36	n.a.	n.a.	n.a.
503 ± 204	17.9 ± 7.0	13.8 ± 4.9	106 ± 36	n.a.	n.a.	n.a.
224 ± 61	11.5 ± 4.4	7.8 ± 2.8	168 ± 84	0.9 ± 0.4	1.8 ± 0.8	29 ± 11
229 ± 68	13.3 ± 5.7	12.4 ± 3.4	n.a.	1.5 ± 0.5	n.a.	42 ± 18
n.a.	11.5 ± 7.6	n.a.	n.a.	n.a.	n.a.	n.a.
291 ± 111	11.9 ± 7.0	10.1 ± 3.7	125 ± 64	1.3 ± 0.6	4.6 ± 1.7	42 ± 21
375 ± 118	19.4 ± 6.9	14.6 ± 4.5	134 ± 74	1.9 ± 0.8	3.8 ± 1.5	110 ± 39
290 ± 46	12.9 ± 1.9	10.2 ± 1.8	n.a.	n.a.	n.a.	n.a.
254 ± 74	9.2 ± 3.1	10.5 ± 3.2	n.a.	n.a.	n.a.	33 ± 12
288 ± 85	10.4 ± 3.0	9.3 ± 2.9	n.a.	1.1 ± 0.3	n.a.	40 ± 14
200 ± 67	9.6 ± 4.0	7.0 ± 2.6	154 ± 76	0.8 ± 0.3	2.0 ± 0.8	n.a.
200–503	9.2–19.4	7.0–14.6	102–209	0.8–2.9	1.8–4.6	29–110
230/310	12	9.0/9.5	180/200	1.0–1.5	2.0–5.0	25–60
209 ± 66	8.1 ± 2.4	7.1 ± 2.1	123 ± 48	1.4 ± 0.5	2.8 ± 1.1	n.a.
256 ± 73	7.7 ± 2.1	8.6 ± 2.5	171 ± 57	n.a.	n.a.	30 ± 10
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
296 ± 87	10.8 ± 2.7	8.4 ± 2.2	85 ± 36	n.a.	n.a.	n.a.
412 ± 147	14.8 ± 6.1	10.9 ± 3.7	100 ± 48	n.a.	n.a.	n.a.
429 ± 121	14.8 ± 4.7	11.3 ± 3.7	94 ± 30	n.a.	n.a.	n.a.
324 ± 89	10.0 ± 2.9	7.2 ± 1.9	n.a.	0.9 ± 0.3	n.a.	n.a.
189 ± 46	8.9 ± 3.3	6.5 ± 1.8	129 ± 61	0.8 ± 0.3	1.7 ± 0.6	27 ± 10
197 ± 44	10.5 ± 2.1	10.7 ± 2.2	n.a.	1.2 ± 0.4	n.a.	36 ± 11
n.a.	10.3 ± 9.7	n.a.	n.a.	n.a.	n.a.	n.a.
246 ± 90	10.0 ± 5.1	8.7 ± 3.2	96 ± 44	1.1 ± 0.4	4.1 ± 1.6	34 ± 21
366 ± 122	18.3 ± 6.6	13.9 ± 4.5	127 ± 78	1.9 ± 0.7	3.7 ± 1.6	104 ± 39
268 ± 36	11.3 ± 1.3	8.7 ± 0.9	n.a.	n.a.	n.a.	n.a.
224 ± 63	7.9 ± 2.8	8.8 ± 2.7	n.a.	n.a.	n.a.	28 ± 10
244 ± 64	9.1 ± 2.4	7.7 ± 2.1	n.a.	0.9 ± 0.3	n.a.	34 ± 11
181 ± 57	8.3 ± 3.0	6.1 ± 2.1	137 ± 72	0.7 ± 0.3	1.8 ± 0.7	n.a.
181–429	7.7–14.8	6.1–13.9	85–171	0.7–2.8	1.7–4.1	28–104
250/310	15	7	180/200	1.0–1.5	2.0–5.0	25–60

Table 7.23. Intake of selected minerals (min.–max.) in children aged **4–6 years** in the four regions

Region/sex	Calcium, mg	Phosphorus, mg	Iron, mg	Zinc, µg	Iodine, µg	Selenium, µg
<i>North</i> ¹						
Male	687–1,103	1,042–1,284 ⁵	7.8–8.6	9.8–9.1 ⁵	173–223 ⁶	26–45 ⁵
Female	673–991	966–1,137 ⁵	6.9–7.7	7.1–8.2 ⁵	151–197 ⁶	24–39 ⁵
<i>South</i> ²						
Male	793–1,024	1,085 ⁷	8.8–10.0	8.4–9.2	n.a.	29 ⁷
Female	701–1,024	1,063 ⁷	10.0–10.1	8.4–8.9	n.a.	28 ⁷
<i>Central and East</i> ³						
Male	604–900	882–1,183	8.0–10.6	6.8–7.7	69–87	27–61 ⁸
Female	606–809	877–1,183	7.4–10.6	6.4–7.3	69–82	29–61 ⁸
<i>West</i> ⁴						
Male	813–856	944–1,067 ⁹	7.3–8.7 ⁹	6.0 ⁹	142 ¹⁰	23–27 ⁹
Female	750–794	904–950 ⁹	6.8–7.8 ⁹	5.3–5.6 ⁹	137 ¹⁰	23–24 ⁹

¹ North: SE, NO, FI, DK; ² South: IT, GR; ³ Central and East: CZ, DE, PL; ⁴ West: NL, FR, IR; ⁵ only SE, FI and DK; ⁶ only FI and DK; ⁷ only IT; ⁸ only CZ and PL; ⁹ only NL and IR; ¹⁰ only IR; n.a. = not available.

Table 7.24. Intake of selected minerals (min.–max.) in children aged **7–9 years** in the four regions

Region/sex	Calcium, mg	Phosphorus, mg	Iron, mg	Zinc, µg	Iodine, µg	Selenium, µg
<i>North</i> ¹						
Male	936–1,207	1,300–1,455 ⁵	8.9–10.3	10.3–10.4 ⁵	203 ⁶	34–36 ⁵
Female	756–1,094	1,155–1,288 ⁵	7.7–9.2	8.9–9.3 ⁵	179 ⁶	30–32 ⁵
<i>South</i> ²						
Male	904–1,174	1,253 ⁷	11.1 ⁷	10.9 ⁷	n.a.	41 ⁷
Female	715–1,126	1,091 ⁷	9.8 ⁷	9.4 ⁷	n.a.	33 ⁷
<i>Central and East</i> ³						
Male	628–900	960–1,295	9.2–11.8	8.0–8.7	73–143	34–58 ⁸
Female	548–882	851–1,295	8.2–11.8	7.1–8.0	73–128	31–58 ⁸
<i>West</i> ⁴						
Male	855–943	1,098–1,273 ⁹	8.4–10.3 ⁹	7.0–7.5 ⁹	165 ¹⁰	27–34 ⁹
Female	857–901	991–1,185 ⁹	7.8–8.9 ⁹	6.4–7.0 ⁹	137 ¹⁰	26–30 ⁹

¹ North: SE, NO, DK; ² South: IT, PT; ³ Central and East: AT, CZ, DE, PL; ⁴ West: NL, FR, IR; ⁵ only SE and DK; ⁶ only FI; ⁷ only IT; ⁸ only CZ and PL; ⁹ only NL and IR; ¹⁰ only IR; n.a. = not available.

Table 7.25. Intake of selected minerals (min.-max.) in children aged **10–14 years** in the four regions

Region/sex	Calcium, mg	Phosphorus, mg	Iron, mg	Zinc, µg	Iodine, µg	Selenium, µg
<i>North</i> ¹						
Male	936–1,193	1,259–1,472 ⁵	9.2–11.5	10.5–10.8 ⁵	209 ⁶	33–36 ⁵
Female	785–1,003	1,079–1,184 ⁵	7.7–10.3	8.6–8.8 ⁵	171 ⁶	28–30 ⁵
<i>South</i> ²						
Male	879–959	1,395–1,458	12.8–13.3	10.1–12.4	n.a.	42 ⁷
Female	769–849	1,169–1,297	10.5–11.3	8.7–10.7	n.a.	36 ⁷
<i>Central and East</i> ³						
Male	686–1,381	964–1,615	9.2–17.9	8.3–13.8	89–134	42 ⁸
Female	593–1,238	807–1,324	8.1–14.8	7.1–11.3	85–123 ¹²	34 ⁸
<i>West</i> ⁴						
Male	852–1,023	1,118–1,493 ⁹	9.6–11.5 ⁹	7.0–9.3 ⁹	154–168 ¹⁰	29–40 ¹¹
Female	743–905	977–1,298 ⁹	8.3–9.1 ⁹	6.1–7.7 ⁹	129–137 ¹⁰	27–34 ¹¹

¹ North: SE, NO, DK; ² South: IT, ES; ³ Central and East: AT, DE, PL (female: HU); ⁴ West: UK, NL, FR, IR; ⁵ only SE and DK; ⁶ only DK; ⁷ only IT; ⁸ only PL; ⁹ only UK, NL and IR; ¹⁰ only UK and IR; ¹¹ only NL and IR; ¹² only AT, DE and PL; n.a. = not available.

was higher in the South region and the share of carbohydrates in total energy intake was lower than in the other regions. The intake of sucrose was in general high (10–17%E), but the highest values were reported in the West region. The lowest intake values of dietary fibers were observed in the West region (10–23 g/day) and highest in the Central and East region, but the intake was as mentioned above lower than the Eurodiet recommendation [Eurodiet, 2000].

The fatty acid pattern was in general unfavorable. The share of saturated fatty acids (SFA) in total energy intake was in every region higher than the recommendation [WHO, 2003] and the share of polyunsaturated fatty acids (PUFA) in total energy intake was lower than the recommended intake range [WHO, 2009b]. Only in the West region the intake was close to the recommendation. The intake of cholesterol was desirable lower in countries of the West region than in the other regions (cf. table 7.29).

Vitamins

Comparison of Countries

The intake of retinol equivalents was between 0.3 and 1.8 mg/day in male and between 0.3 and 1.6 mg/day in female adolescents. Only adolescents from Germany,

Table 7.26. Methods and period of dietary assessment in **adolescents** of the participating countries (data available from 12,716 adolescents)

Country	Age group years	Method	Year of survey	n	Intake from dietary supplements is included	Reference
Austria	14–19	24-hour recall	2003/2004	2,949	no	Elmadfa et al., 2008
Belgium	15–18	24-hour recall	2004	3,249	no	Devriese et al., 2006
Denmark	15–18	7-day dietary record	2000–2002	199	no	Lyhne et al., 2005
France	15–17	3 × 24-hour recall	2006/2007	403	no	Castetbon et al., 2009
Germany	15–18	dietary history interview	2005–2007	1,203	no	Max Rubner-Institut (eds), 2008a, 2008b
Ireland	13–17	7-day semi-weighted dietary record	2005–2006	441	yes	Morgan et al., 2007
Italy	15–18	7-day dietary record	n.a.	99	no	D'Amicis, 2000
Norway	15–18	FFQ	2000	134	yes	Johansson and Solvoll, 1997
Poland	15–18	24-hour recall	2000	349	no	Szponar et al., 2000 (unpubl. data)
Slovenia	14–17	FFQ	n.a.	2,813	no	Fidler Mis et al. (unpubl. data ¹)
Spain	15–18	2 × 24-hour recall	2002–2003	118	no	Serra Majem and Ribas 2007; Serra-Majem L et al., 2007; Serra Majem et al., 2006
The Netherlands	15–18	2-day dietary record	1997/1998	361	no	Hulshof and van Staveren, 1991
United Kingdom	16–24	n.a.	2003–2005	398	yes	Low Income Diet and Health Survey, 2003–2005 ²

n.a. = Not available. ¹ Data provided by the Biotechnical faculty, University of Ljubljana; ² data provided by the University of Southampton.

Norway, Poland and Slovenia met the recommendation [D-A-CH, 2000]. The intake of β -carotene was between 1.2 and 4.7 mg/day in male and between 1.0 and 4.7 mg/day in female adolescents. In general, the intake was higher in the male group.

The intake of vitamin D was below the recommendation [D-A-CH, 2000] in every participating country except for Norway, both male and female, and Poland, only males. Under the climatic conditions in the Nordic countries there are indications that exposure to sunlight is insufficient for enough vitamin D to be formed in the skin and for vitamin D status to be maintained during the winter months. Therefore, the recommendation of the Nordic countries [NNR, 2004] is higher (7.5 μ g/day) than the recommendation for Central Europe [D-A-CH, 2000].

The α -tocopherol equivalents intake levels were between 6.8 and 20.8 mg/day in male and between 6.0 and 15.5 mg/day in female adolescents. German, Polish and Slovenian adolescents as well as male adolescents from The Netherlands met the recommendation [D-A-CH, 2000].

The recommendations for the intake of thiamine, riboflavin and niacin equivalents were met by almost every participating country as compared with the D-A-CH reference values [D-A-CH, 2000]. From the United Kingdom only values for preformed niacin were available and therefore cannot be compared to the recommended intake value. The recommendations for vitamin B₆ and cobalamin were met by almost every participating country, too. Only Danish male adolescents were slightly below the recommendation for vitamin B₆ [D-A-CH, 2000].

The intake of folate equivalents was between 190 and 365 μ g/day in male adolescents and between 154 and 298 μ g/day in female adolescents. Compared with the D-A-CH reference values, every participating country was below the recommendation [D-A-CH, 2000]. In the Nordic countries an intake of 300 μ g/day (400 μ g/day for women of fertile age) [NNR, 2004] is recommended. This recommendation was only met by male adolescents from Denmark, Germany, Italy and Poland.

The D-A-CH reference values recommend an intake of ascorbic acid of 100 mg/day [D-A-CH, 2000]. Adolescents from Austria, Belgium, Ireland, Spain, The Netherlands and the United Kingdom as well as female adolescents from Poland were below this recommendation. Compared with the NNR [NNR, 2004] every country was close to the recommended intake of 75 μ g/day (cf. table 7.30).

Comparison of Regions

The intake of vitamin B₆ was higher in the Central and East region than in the other regions. The lowest intake was reported in the North region, but also the highest intake of folate equivalents and vitamin D. Concerning cobalamin, no big difference between the regions could be observed (cf. table 7.31).

Table 7.27. Intake of energy and macronutrients (mean \pm SD) in **adolescents** of European countries (male and female)

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
Male					
Austria	14->19	1,527	11.5 \pm 3.0	16.1 \pm 4.0	46.1 \pm 9.9
Belgium	15-18	n.a.	11.1 \pm 2.6	13.5 \pm 2.0	48.5 \pm 4.4
Denmark	15-18	78	10.3 \pm 2.7	14.0 \pm 2.7	50.0 \pm 6.1
France	15-18	181	10.2 \pm 0.4	15.7 \pm 0.3	48.7 \pm 0.6
Germany	15-18	598	12.2 \pm 3.8	13.4 \pm 2.2	49.6 \pm 6.5
Ireland	13-17	224	9.5 \pm 2.4	15.2 \pm 2.5	n.a.
Italy	15-18	52	11.7 \pm 2.5	16.1 \pm 2.0	n.a.
Norway	15-18	72	13.9 \pm 6.1	15.0 \pm 3.0	53.0 \pm 7.0
Poland	15-18	174	14.5 \pm 4.7	12.4 \pm 3.0	50.7 \pm 7.4
Slovenia	15-18	1,010	12.7 \pm 6.9	15.0 \pm 3.0	57.0 \pm 9.0
Spain	15-18	61	10.7 \pm 2.0	17.8 \pm 2.6	39.7 \pm 4.7
The Netherlands	15-18	180	11.4 \pm 3.1	13.0 \pm 3.0	50.0 \pm 7.0
United Kingdom	16-24	150	10.6 \pm 3.4	13.9 \pm 2.9	49.3 \pm 6.8
All countries (min.-max.)			9.5-14.5	12.4-17.8	39.7-57.0
Female					
Austria	14->19	1,422	8.5 \pm 2.2	14.7 \pm 4.1	47.3 \pm 10.3
Belgium	15-18	n.a.	7.7 \pm 1.6	13.6 \pm 2.1	50.3 \pm 5.5
Denmark	15-18	121	8.2 \pm 2.0	14.0 \pm 2.6	52.0 \pm 5.2
France	15-18	222	6.8 \pm 0.2	15.6 \pm 0.2	48.8 \pm 0.7
Germany	15-18	605	8.8 \pm 2.9	12.9 \pm 2.0	52.7 \pm 6.4
Ireland	13-17	217	7.1 \pm 1.9	14.3 \pm 2.6	n.a.
Italy	15-18	47	8.7 \pm 1.5	16.0 \pm 3.6	n.a.
Norway	15-18	62	9.3 \pm 3.5	15.0 \pm 3.0	55.0 \pm 5.0
Poland	15-18	175	9.5 \pm 3.5	12.0 \pm 2.9	54.2 \pm 8.5
Slovenia	15-18	1,214	9.7 \pm 5.1	14.0 \pm 3.0	57.0 \pm 8.0
Spain	15-18	57	7.9 \pm 1.1	18.0 \pm 2.5	38.6 \pm 3.7
The Netherlands	15-18	181	8.9 \pm 2.2	14.0 \pm 3.0	50.0 \pm 7.0

	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
sucrose						
16.1 ± 8.9	15.6 ± 7.1	36.5 ± 8.9	18.3 ± 6.2	11.1 ± 3.4	4.7 ± 2.6	375.0 ± 204.0
n.a.	n.a.	36.0 ± 3.5	14.1 ± 2.4	12.8 ± 1.4	6.5 ± 1.5	n.a.
13.0 ± 7.2	18.0 ± 6.4	32.0 ± 4.7	14.0 ± 2.6	11.0 ± 1.7	5.0 ± 0.8	n.a.
n.a.	16.9 ± 0.8	34.2 ± 0.5	14.0	n.a.	n.a.	n.a.
n.a.	26.1 ± 10.7	34.6 ± 5.8	n.a.	n.a.	n.a.	400.5 ± 162.4
n.a.	17.6 ± 7.7	35.5 ± 5.2	14.5 ± 2.8	12.6 ± 2.3	5.6 ± 1.6	n.a.
n.a.	23.9 ± 9.1	37.0 ± 7.1	11.2 ± 2.4	12.9 ± 4.1	5.3 ± 2.2	437.6 ± 129.6
15.0 ± 8.0	27.0 ± 13.0	31.0 ± 6.0	13.0 ± 3.0	11.0 ± 2.0	5.0 ± 2.0	358.0 ± 174.0
12.5 ± 5.0	32.6 ± 12.5	36.8 ± 6.9	12.1 ± 3.8	16.0 ± 3.8	6.3 ± 2.9	566.0 ± 366.0
11.0 ± 4.0	33.0 ± 21.0	28.0 ± 7.0	13.0 ± 3.0	10.3 ± 3.0	5.0 ± 2.0	300.0 ± 188.0
14.8 ± 3.4	18.9 ± 1.8	40.4 ± 3.8	13.8 ± 1.8	16.7 ± 2.3	5.7 ± 0.9	382.4 ± 47.8
n.a.	23.0 ± 10.0	35.0 ± 6.0	14.0 ± 3.0	13.0 ± 3.0	7.0 ± 3.0	219.0 ± 98.0
17.5 ± 8.5	13.7 ± 8.5	36.8 ± 5.9	13.6 ± 3.0	n.a.	n.a.	292.7 ± 154.9
11.0–17.5	13.7–33.0	28.0–40.4	11.2–18.3	10.3–16.7	4.7–7.0	219.0–566.0
15.7 ± 8.7	13.8 ± 6.0	37.4 ± 9.6	19.1 ± 6.7	11.1 ± 3.5	4.8 ± 2.9	267.0 ± 141.0
n.a.	n.a.	25.5 ± 5.0	14.4 ± 2.4	12.8 ± 2.1	6.6 ± 2.1	n.a.
14.0 ± 6.9	16.0 ± 5.5	30.0 ± 4.6	13.0 ± 2.5	10.0 ± 1.7	4.0 ± 0.8	n.a.
n.a.	12.7 ± 0.3	35.3 ± 0.6	14.2	n.a.	n.a.	n.a.
n.a.	23.1 ± 8.3	33.0 ± 5.9	n.a.	n.a.	n.a.	269.0 ± 115.8
n.a.	13.3 ± 4.3	35.9 ± 4.8	14.2 ± 2.5	12.9 ± 2.2	5.9 ± 1.6	n.a.
n.a.	17.6 ± 4.7	33.7 ± 4.7	10.2 ± 2.3	10.9 ± 2.4	5.2 ± 1.7	340.3 ± 102.0
12.0 ± 6.0	22.0 ± 8.0	28.0 ± 5.0	12.0 ± 2.0	10.0 ± 2.0	5.0 ± 2.0	236.0 ± 117.0
14.1 ± 5.7	23.0 ± 8.9	33.8 ± 8.1	11.7 ± 4.2	14.4 ± 4.5	5.4 ± 2.6	326.0 ± 255.0
13.0 ± 4.0	27.0 ± 18.0	29.0 ± 7.0	13.0 ± 3.0	10.0 ± 3.0	6.0 ± 2.0	218.0 ± 139.0
15.4 ± 2.9	16.2 ± 2.0	41.9 ± 3.7	13.7 ± 1.3	17.7 ± 1.9	6.0 ± 1.0	313.9 ± 45.5
n.a.	19.0 ± 7.0	36.0 ± 6.0	14.0 ± 3.0	13.0 ± 3.0	7.0 ± 2.0	183.0 ± 86.0

Table 7.27. Continued

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
United Kingdom	16–24	248	7.0 ± 2.2	14.5 ± 3.7	50.5 ± 6.8
All countries (min.–max.)			6.8–9.7	12.0–18.0	38.6–57.0
Reference values			13.0 (male)/ 10.5 (female) ²	10–15%E ³	50–75%E ⁴

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000, reference values refer to age group 15–18 years (PAL 1.75); ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000; n.a. = not available.

Table 7.28. Intake of energy and macronutrients (min.–max.) in **adolescents** in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	10.3–13.9	14.0–15.0	50.0–53.0 (13.0–15.0)	18.0–27.0	31.0–32.0
Female	8.2–9.3	14.0–15.0	52.0–55.0 (12.0–14.0)	16.0–22.0	28.0–30.0
<i>South</i> ²					
Male	10.7–11.7	16.1–17.8	39.7 ⁵ (14.8) ⁵	18.9–23.9	37.0–40.4
Female	7.9–8.7	16.0–18.0	38.6 ⁵ (15.4) ⁵	16.2–17.6	33.7–41.9
<i>Central and East</i> ³					
Male	11.5–14.5	12.4–16.1	46.1–57.0 (11.0–16.1)	15.6–33.0	28.0–36.8
Female	8.5–9.7	12.0–14.7	47.3–57.0 (13.0–15.7)	13.8–27.0	29.0–37.4
<i>West</i> ⁴					
Male	9.5–11.4	13.0–15.7	48.5–50.0 ⁶ (17.5) ⁷	13.7–23.0	34.2–36.8
Female	6.8–8.9	13.6–15.6	48.8–50.5 ⁶ (16.5) ⁷	10.2–19.0	35.0–36.0

¹ North: NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL, SL; ⁴ West: UK, BE, NL, FR, IR; ⁵ only ES; ⁶ only UK, BE, NL and FR; ⁷ only UK

sucrose	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
16.5 ± 8.9	10.2 ± 4.2	35.0 ± 6.7	12.9 ± 3.4	n.a.	n.a.	187.0 ± 93.9
12.0–16.5	10.2–27.0	25.5–41.9	10.2–19.1	10.0–17.7	4.0–7.0	183.0–340.3
<10%E ³	>25 g·d ^{-1,6}	15–30%E ³	<10%E ³		6–11%E ⁴	<300 mg·d ^{-1,3}

Table 7.29. Intake of fat, fatty acids and cholesterol (min.–max.) in **adolescents** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.0–32.0	13.0–14.0	11.0	5.0	358 ⁵
Female	28.0–30.0	12.0–13.0	10.0	4.0–5.0	236 ⁵
<i>South</i> ²					
Male	37.0–40.4	11.2–13.8	12.9–16.7	5.3–5.7	383–438
Female	33.7–41.9	10.2–13.7	10.9–17.7	5.2–6.0	314–340
<i>Central and East</i> ³					
Male	28.0–36.8	12.1–18.3 ⁶	10.3–16.0 ⁶	4.7–6.3 ⁶	300–566
Female	29.0–37.4	11.7–19.1 ⁶	10.0–14.0 ⁶	4.8–6.0 ⁶	218–326
<i>West</i> ⁴					
Male	34.2–36.8	13.6–14.5	12.6–13.0 ⁷	5.6–7.0 ⁷	219–293 ⁸
Female	35.0–36.0	12.9–14.4	12.8–13.0 ⁷	5.9–7.0 ⁷	183–187 ⁸

¹ North: NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL, SL; ⁴ West: UK, BE, NL, FR, IR; ⁵ only NO; ⁶ only AT, PL and SL; ⁷ only BE, NL and IR; ⁸ only UK and NL.

Table 7.30. Vitamin intake (mean ± SD) in **adolescents** of European countries (male and female)

	Age years	n	Vitamin A ¹ mg	β-Carotene mg	Vitamin D µg	Vitamin E ² mg
Male						
Austria	>13	1,527	1.0 ± 1.3	1.5 ± 1.7	2.0 ± 1.8	11.8 ± 8.4
Belgium	15–18	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	15–18	78	0.9 ± 0.5	2.6 ± 2.2	2.6 ± 1.6	6.8 ± 2.5
Germany	15–18	598	1.8 ± 1.1	4.7 ± 3.4	2.8 ± 1.9	18.7 ± 11.1
Ireland	13–17	224	0.4 ± 0.3	2.9 ± 2.8	3.0 ± 2.6	9.3 ± 6.4
Italy	15–18	52	1.0 ± 0.4	2.6 ± 1.5	3.3 ± 1.9	12.1 ± 3.8
Norway	15–18	72	1.8 ± 1.2 ⁵	n.a.	7.5 ± 6.3	n.a.
Poland	15–18	174	2.3 ± 4.3	4.2 ± 4.2	5.5 ± 4.2	20.8 ± 12.2
Slovenia	15–18	1,010	1.4 ± 1.1	3.1 ± 3.2	4.0 ± 6.0	15.0 ± 11.0
Spain	15–18	61	0.6 ± 0.1	1.2 ± 0.3	1.8 ± 0.5	9.0 ± 1.9
The Netherlands	15–18	180	0.9 ± 0.9	n.a.	4.4 ± 2.2	16.3 ± 8.4
United Kingdom	16–24	150	0.6 ± 0.4	1.4 ± 1.3	3.0 ± 1.9	11.9 ± 5.5
All countries (min.–max.)			0.4–1.8	1.2–4.7	1.8–7.5	6.8–20.8
Reference values ⁶			1.1	n.a.	5	15
Female						
Austria	>13	1,422	0.8 ± 1.0	1.5 ± 1.9	1.7 ± 1.6	9.6 ± 6.5
Belgium	15–18	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	15–18	121	0.7 ± 0.3	3.0 ± 2.7	2.1 ± 1.7	6.0 ± 1.9
Germany	15–18	605	1.6 ± 0.8	4.7 ± 2.8	2.0 ± 1.3	15.5 ± 8.5
Ireland	13–17	217	0.3 ± 0.3	2.3 ± 1.9	2.3 ± 2.2	8.0 ± 9.7
Italy	15–18	47	0.8 ± 0.4	2.2 ± 1.0	3.0 ± 2.0	11.0 ± 3.8
Norway	15–18	62	1.6 ± 1.0 ⁵	n.a.	7.1 ± 6.6	n.a.
Poland	15–18	175	1.6 ± 2.6	4.2 ± 6.8	3.0 ± 3.1	12.9 ± 7.3
Slovenia	15–18	1,214	1.1 ± 0.9	2.7 ± 2.1	3.0 ± 3.0	14.0 ± 10.0
Spain	15–18	57	0.6 ± 0.1	1.0 ± 0.3	1.5 ± 0.5	8.3 ± 2.0
The Netherlands	15–18	181	0.8 ± 0.7	n.a.	3.3 ± 1.8	11.7 ± 5.2
United Kingdom	16–24	248	0.6 ± 0.4	1.7 ± 1.7	2.0 ± 1.2	8.0 ± 3.7
All countries (min.–max.)			0.3–1.6	1.0–4.7	1.5–7.1	6.0–15.5
Reference values ⁶			0.9	n.a.	5	12

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans-β-carotene = 12 mg other carotenoids); ² RRR-α-Tocopherol equivalent (= mg α-tocopherol + mg β-tocopherol × 0.5 + mg γ-tocopherol × 0.25 + mg α-tocotrienol × 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁵ values refer to α-tocopherol, only; ⁶ D-A-CH, 2000, reference values refer to age groups 15–18 years; ⁷ niacin; n.a. = not available.

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
1.4 ± 0.7	1.5 ± 0.8	38.0 ± 17.0	2.4 ± 2.5	195 ± 88	5.3 ± 3.1	91 ± 96
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	90 ± 42
1.4 ± 0.4	1.8 ± 0.7	28.0 ± 7.9	1.5 ± 0.4	306 ± 96	5.1 ± 2.2	100 ± 60
2.3 ± 1.4	2.6 ± 1.6	41.4 ± 19.8	3.1 ± 1.9	360 ± 214	6.4 ± 2.8	167 ± 108
2.3 ± 2.4	2.6 ± 2.5	43.3 ± 14.6	3.1 ± 2.5	320 ± 157	6.0 ± 3.2	98 ± 87
1.4 ± 0.3	1.7 ± 0.4	40.0 ± 8.7	2.3 ± 0.6	336 ± 104	n.a.	129 ± 74
2.1 ± 0.9	2.7 ± 1.2	23.0 ± 12.0	n.a.	n.a.	n.a.	146 ± 105
1.8 ± 0.7	2.3 ± 1.4	n.a.	2.5 ± 1.0	365 ± 192	6.2 ± 11.3	120 ± 80
1.5 ± 0.9	2.0 ± 1.2	37.0 ± 22.0	2.3 ± 1.4	288 ± 176	7.5 ± 5.9	201 ± 164
1.7 ± 0.3	1.9 ± 0.4	23.6 ± 3.9	2.2 ± 0.4	237 ± 38	4.9 ± 1.3	73 ± 28
1.3 ± 0.6	1.6 ± 0.7	n.a.	1.8 ± 0.7	190 ± 70	n.a.	71 ± 49
1.8 ± 0.8	1.9 ± 1.2	12.2 ± 8.8 ⁷	2.7 ± 1.4	281 ± 140	5.6 ± 3.2	80 ± 56
1.3–2.3	1.5–2.6	12.2–43.3	1.5–3.1	190–365	4.9–7.5	71–201
1.3	1.5	17	1.6	400	3	100
1.0 ± 0.5	1.1 ± 0.6	26.0 ± 12.0	1.7 ± 1.7	154 ± 69	3.5 ± 2.2	90 ± 93
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	88 ± 38
1.0 ± 0.3	1.4 ± 0.5	20.0 ± 5.8	1.2 ± 0.4	262 ± 87	3.8 ± 2.0	103 ± 63
1.7 ± 1.0	2.0 ± 1.2	29.0 ± 14.2	2.4 ± 1.5	298 ± 159	4.0 ± 1.8	164 ± 84
1.9 ± 3.2	2.0 ± 3.1	30.5 ± 10.8	2.5 ± 3.1	230 ± 129	4.2 ± 3.1	92 ± 100
1.1 ± 0.3	1.4 ± 0.3	29.6 ± 8.0	1.9 ± 0.6	254 ± 70	n.a.	107 ± 56
1.9 ± 1.0	2.3 ± 1.2	21.0 ± 13.0	n.a.	n.a.	n.a.	149 ± 85
1.1 ± 0.5	1.5 ± 0.8	n.a.	1.7 ± 0.7	244 ± 106	3.7 ± 6.1	94 ± 73
1.1 ± 0.6	1.5 ± 0.9	27.0 ± 14.0	1.8 ± 1.0	242 ± 141	5.2 ± 4.0	205 ± 178
1.3 ± 0.2	1.5 ± 0.2	18.0 ± 3.1	1.7 ± 0.3	196 ± 31	4.0 ± 0.6	75 ± 28
1.1 ± 0.7	1.4 ± 0.6	n.a.	1.4 ± 0.5	166 ± 58	n.a.	81 ± 49
1.3 ± 0.5	1.2 ± 0.6	7.3 ± 5.2 ⁷	1.9 ± 0.9	196 ± 99	3.6 ± 2.0	67 ± 55
1.0–1.9	1.2–2.3	7.3–30.5	1.2–2.5	154–298	3.5–5.2	67–205
1.0	1.1	13	1.2	400	3	100

Table 7.31. Intake of selected vitamins (min.-max.) in **adolescents** in the four regions

Region/sex	Vitamin B ₆ mg	Folate µg ⁵	Cobalamin µg	Vitamin D µg
<i>North</i> ¹				
Male	1.5 ⁶	306 ⁶	5.1 ⁶	2.6–7.5
Female	1.2 ⁶	262 ⁶	3.8 ⁶	2.1–7.1
<i>South</i> ²				
Male	2.2–2.3	237–336	4.9 ⁷	1.8–3.3
Female	1.7–1.9	196–254	4.0 ⁷	1.5–3.0
<i>Central and East</i> ³				
Male	2.3–3.1	195–365	5.3–7.5	2.0–5.5
Female	1.7–2.4	154–298	3.5–5.2	1.7–3.0
<i>West</i> ⁴				
Male	1.8–3.1	190–320	4.2–6.0 ⁸	3.0–4.4
Female	1.4–2.5	166–230	3.6–4.2 ⁸	2.0–3.3

¹ North: NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL, SL; ⁴ West: UK, NL, IR; ⁵ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only DK; ⁷ only ES; ⁸ only UK and IR.

Minerals

Comparison of Countries

The intake of sodium was between 2.9 and 6.5 g/day in male adolescents and between 2.2 and 4.5 g/day in female adolescents. In order to prevent chronic diseases it is recommended by the WHO [WHO, 2003] not to ingest more than 2 g sodium per day. Every country was above this recommendation.

With the exception of female adolescents from Slovenia and Austria the potassium intake was within the recommendation [D-A-CH, 2000].

The intake of calcium was between 806 and 1,447 mg/day in male adolescents and between 645 and 1,040 mg/day in female adolescents. Only male adolescents from Denmark, Germany, Norway and Slovenia were within the recommended calcium intake levels [D-A-CH, 2000]. Compared with the recommendation for the Nordic countries [NNR, 2004], all male adolescents met the recommendation of 800 mg/day. In the female group this recommendation was not met by adolescents from Austria, Belgium, France, Ireland, Poland and the United Kingdom.

The intake of phosphorus was between 1,413 and 1,705 mg/day in male adolescents and therefore within the recommendation [D-A-CH, 2000]. In the female group the intake was between 962 and 1,356 mg/day, but only female adolescents from Slovenia, Spain and The Netherlands met the recommendation [D-A-CH, 2000].

Apart from Germany, Norway (only male) and Slovenia (both male and female) the intake of magnesium was below the recommendation [D-A-CH, 2000].

The intake of iron was between 10.2 and 19 mg/day in male adolescents and between 7.8 and 14.0 mg/day in female adolescents. With the exception of Denmark and The Netherlands every country met the recommended 12 mg/day [D-A-CH, 2000] in the male group. The recommendation for women is higher (15 mg/day) because of iron losses during menstruation. The intake in the female group was in most countries below the recommendation [D-A-CH, 2000].

The recommended intake for zinc (10 mg/day for male and 7 mg/day for female adolescents [D-A-CH, 2000]) was met by all participating countries except for the United Kingdom.

The intake of iodine was between 93 and 221 µg/day in male adolescents and between 115 and 182 µg/day in female adolescents. With the exception of Ireland all participating countries met the recommendation of 150 µg iodine per day in the male group [Eurodiet, 2000]. In the female group, the intake was in general lower. Only female adolescents from Denmark and Slovenia were within the recommendation.

The recommended intake for copper is between 1.0 and 1.5 mg/day [D-A-CH, 2000]. In the male group every country except for The Netherlands and the United Kingdom was above this recommended level. In the female group every country met the recommendation except for Ireland and the United Kingdom where the intake was below and Slovenia where the intake was above the recommended level.

The intake of manganese was between 2.5 and 6.1 mg/day in male adolescents and between 1.9 and 4.4 mg/day in female adolescents. Female Irish as well as male Polish and Slovenian adolescents did not meet the recommendation [D-A-CH, 2000].

Data concerning the selenium intake were available only from Denmark, Ireland, Italy, Poland and The Netherlands. The intake was in every country within the recommendation [D-A-CH, 2000] (cf. table 7.32).

Comparison of Regions

Table 7.33 shows the intake of selected minerals (min.-max.) in the four regions. The intake of calcium was lower in female than in male adolescents in all regions. The intake was higher in the North region than in the other regions. Concerning the intake of phosphorus no big difference between the regions could be observed. The intake values of iron ranged in average from 8 mg/day in female adolescents of the North region to 19 mg/day in male adolescents from the Central and East region. In general, the intake of zinc was lower in the West region than in the other regions. Data for iodine were only available in three out of the four regions. In comparison

Table 7.32. Mineral intake (mean ± SD) in **adolescents** of European countries (male and female)

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Male						
Austria	>13	1,527	n.a.	2.4 ± 0.9	863 ± 478	n.a.
Belgium	15–18	n.a.	n.a.	n.a.	869 ± 358	n.a.
Denmark	15–18	78	4.0 ± 1.1	3.3 ± 1.0	1,209 ± 487	1,525 ± 472
France	15–18	181	3.5 ± 0.2	n.a.	974 ± 46	n.a.
Germany	15–18	598	3.6 ± 1.2	3.7 ± 1.2	1,283 ± 446	n.a.
Ireland	13–17	224	2.9 ± 0.8	3.0 ± 0.9	1,070 ± 409	1,413 ± 430
Italy	15–18	52	6.5 ± 2.2	3.4 ± 1.0	1,001 ± 332	1,605 ± 372
Norway	15–18	72	n.a.	n.a.	1,447 ± 688	n.a.
Poland	15–18	174	5.7 ± 2.0	4.4 ± 1.6	806 ± 519	1,646 ± 597
Slovenia	15–18	1,010	4.5 ± 2.8	4.0 ± 2.3	1,238 ± 783	1,705 ± 1000
Spain	15–18	61	3.5 ± 0.8	3.0 ± 0.5	941 ± 252	1,596 ± 323
The Netherlands	15–18	180	n.a.	3.6 ± 1.2	1,086 ± 473	1,697 ± 523
United Kingdom	16–24	150	3.5 ± 1.4	3.0 ± 1.1	1,032 ± 535	1,468 ± 541
All countries (min.–max.)			2.9–6.5	2.4–4.4	806–1,447	1,413–1,705
Reference values ²			0.55/<2 ⁴	2	1,200	1,250
Female						
Austria	>13	1,422	n.a.	1.9 ± 0.8	710 ± 395	n.a.
Belgium	15–18	n.a.	n.a.	n.a.	700 ± 216	n.a.
Denmark	15–18	121	3.2 ± 0.9	2.6 ± 0.8	1,040 ± 382	1,194 ± 362
France	15–18	222	2.4 ± 0.1	n.a.	732 ± 25	n.a.
Germany	15–18	605	2.5 ± 0.9	3.0 ± 1.0	1,022 ± 369	n.a.
Ireland	13–17	217	2.2 ± 0.7	2.3 ± 0.7	738 ± 328	1,000 ± 331
Italy	15–18	47	4.5 ± 1.3	2.7 ± 0.6	803 ± 181	1,208 ± 272
Norway	15–18	62	n.a.	n.a.	1,025 ± 406	n.a.
Poland	15–18	175	3.6 ± 1.4	1.2 ± 3.3	678 ± 435	1,124 ± 455
Slovenia	15–18	1,214	3.6 ± 2.3	3.3 ± 1.9	1,018 ± 595	1,265 ± 702
Spain	15–18	57	2.6 ± 0.8	2.5 ± 0.4	810 ± 206	1,272 ± 206
The Netherlands	15–18	181	n.a.	3.0 ± 0.8	911 ± 396	1,356 ± 379
United Kingdom	16–24	248	2.3 ± 0.8	2.2 ± 0.7	645 ± 282	962 ± 317
All countries (min.–max.)			2.2–4.5	1.2–3.3	645–1,040	962–1,356
Reference values ²			0.55/<2 ⁴	2	1,200	1,250

¹ Iodised salt was not taken into account in each country; ² D-A-CH, 2000, reference values refer to age groups 15–18 years; ³ Eurodiet, 2000; ⁴ WHO, 2003; n.a. = not available.

Magnesium mg	Iron mg	Zinc mg	Iodine μg^1	Copper mg	Manganese mg	Selenium μg
302 ± 110	12.6 ± 4.5	12.2 ± 4.4	172 ± 72	n.a.	n.a.	n.a.
n.a.	12.5 ± 2.9	n.a.	n.a.	n.a.	n.a.	n.a.
338 ± 101	10.2 ± 2.8	11.7 ± 3.3	221 ± 74	n.a.	n.a.	39 ± 11
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
440 ± 132	15.8 ± 5.1	12.9 ± 4.4	93 ± 33	n.a.	n.a.	n.a.
271 ± 92	14.1 ± 11.5	10.2 ± 3.7	185 ± 117	2.3 ± 17.2	2.5 ± 1.5	49 ± 102
260 ± 60	14.7 ± 3.6	14.5 ± 3.6	n.a.	1.7 ± 0.5	n.a.	50 ± 15
415 ± 167	15.1 ± 7.9	n.a.	n.a.	n.a.	n.a.	n.a.
388 ± 141	16.7 ± 7.8	14.5 ± 5.0	161 ± 71	1.7 ± 0.7	6.1 ± 2.2	59 ± 27
467 ± 282	19.0 ± 11.0	15.2 ± 8.5	196 ± 114	2.5 ± 1.4	5.6 ± 3.9	n.a.
309 ± 47	13.4 ± 1.6	10.8 ± 1.7	n.a.	n.a.	n.a.	n.a.
328 ± 114	11.3 ± 3.8	10.4 ± 3.4	n.a.	1.2 ± 0.4	n.a.	44 ± 17
270 ± 94	12.1 ± 5.1	9.3 ± 3.3	196 ± 109	1.2 ± 0.4	2.7 ± 1.2	n.a.
260–467	10.2–19.0	9.3–15.2	93–221	1.2–3.4	2.5–6.1	39–59
400	12	10.0	150 ³	1.0–2.5	2–5	30–70
244 ± 86	9.6 ± 3.4	9.1 ± 3.4	140 ± 61	n.a.	n.a.	n.a.
n.a.	9.6 ± 2.3	n.a.	n.a.	n.a.	n.a.	n.a.
264 ± 78	7.8 ± 2.3	8.9 ± 2.6	175 ± 56	n.a.	n.a.	31 ± 12
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
347 ± 103	12.0 ± 3.9	9.3 ± 3.1	78 ± 29	n.a.	n.a.	n.a.
196 ± 62	10.7 ± 11.6	7.2 ± 3.1	115 ± 75	0.8 ± 0.4	1.9 ± 0.8	30 ± 13
198 ± 36	10.8 ± 2.2	11.0 ± 2.7	n.a.	1.2 ± 0.3	n.a.	38 ± 15
316 ± 112	12.7 ± 6.5	n.a.	n.a.	n.a.	n.a.	n.a.
273 ± 101	10.7 ± 5.2	9.4 ± 3.6	115 ± 55	1.2 ± 0.5	4.4 ± 1.7	37 ± 20
369 ± 204	14.0 ± 8.0	10.8 ± 5.7	182 ± 102	2.1 ± 1.1	4.2 ± 2.8	n.a.
264 ± 45	10.9 ± 1.6	8.5 ± 0.9	n.a.	n.a.	n.a.	n.a.
260 ± 75	9.7 ± 3.1	8.4 ± 2.6	n.a.	1.0 ± 0.3	n.a.	36 ± 12
186 ± 61	8.3 ± 3.3	6.4 ± 2.4	126 ± 74	0.8 ± 0.3	2.0 ± 0.9	n.a.
186–369	7.8–14.0	6.4–11.0	115–182	0.8–2.1	1.9–4.4	30–38
350	15	7	150 ³	1.0–1.5	2–5	30–70

to the other regions a lower intake was observed in the Central and East region. Selenium intake values were only reported from one to two countries within the regions.

7.4 Energy and Nutrient Intake in European Adults

Background

Twenty-one of the participating countries of the European Nutrition and Health report 2009 could provide data concerning the energy and nutrient intake of adults. Due to the fact that different dietary assessment methods were used, attention should be paid when comparing the data (cf. table 7.34).

Energy and Macronutrients

Comparison of Countries

The daily energy intake was between 8.5 and 13.9 MJ in males and between 6.3 and 11.4 MJ in females. The reference intake values [D-A-CH, 2000] range from 10.5 to 12.5 MJ/day in males and from 8.5 to 10.0 MJ/day in females. The intake was in most of the participating countries below these reference values. This may partly be due to under-reporting of food intake. Regarding the high prevalence of overweight and obesity in adults, it can be assumed that most adults did not meet the recommended physical activity level with according low energy expenditure.

The share of protein in total energy intake was between 13.5 and 18.5%E in males and between 13.1 and 19.3%E in females and was therefore within or slightly above the recommended range of the WHO [WHO, 2003] in the participating countries.

The share of carbohydrates in total energy intake was between 36.8 and 51.0%E in males and between 37.7 and 51.8%E in females. Only males from Norway and females from the Czech Republic, Finland, Norway, Poland and Portugal were within the recommended range of the WHO of 50–75%E/day [WHO, 2007] whereas the share of sucrose in total energy intake was above the recommendation in Lithuania, Spain and the United Kingdom, in both groups males and females, as well as in Polish men and Austrian and Finnish women [WHO, 2003]. The dietary fiber intake was in most of the participating countries lower than the recommendation of Eurodiet [Eurodiet, 2000]. Only German, Norwegian and Polish males met the recommendation.

The share of fat in total energy intake was between 28.4 and 45.0%E in males and between 29.9 and 47.2%E in females. Thus, the majority of the participating countries were above the recommended range of the WHO [WHO, 2003]. In general, the fatty acid pattern did not meet the recommendations of the WHO 2009. The share of saturated fatty acids (SFA) in total energy intake was in general above the recommendation (<10%E) and the share of polyunsaturated fatty acids (PUFA) in total energy intake was below the recommended intake range (6–11%E) in most of the

Table 7.33. Intake of selected minerals (min.–max.) in **adolescents** in the four regions

Region/sex	Calcium mg	Phosphorus mg	Iron mg	Zinc µg	Iodine µg	Selenium µg
<i>North</i> ¹						
Male	1,209–1,447	1,525 ⁵	10.2–15.1	11.7 ⁵	221 ⁵	39 ⁵
Female	1,025–1,040	1,194 ⁵	7.8–12.7	8.9 ⁵	175 ⁵	31 ⁵
<i>South</i> ²						
Male	941–1,001	1,596–1,605	13.4–14.7	10.8–14.5	n.a.	50 ⁶
Female	803–810	1,208–1,272	10.8–10.9	8.5–11.0	n.a.	38 ⁶
<i>Central and East</i> ³						
Male	806–1,283	1,646–1,705 ⁷	12.6–19.0	12.2–15.2	93–196	59 ⁸
Female	678–1,021	1,124–1,265 ⁷	9.6–14.0	9.1–10.8	78–182	37 ⁸
<i>West</i> ⁴						
Male	869–1,086	1,413–1,697 ⁹	11.3–14.1 ¹⁰	9.3–10.4 ⁹	185–196 ¹¹	44–49 ¹²
Female	645–911	962–1,356 ⁹	8.3–10.7 ¹⁰	6.4–8.4 ⁹	115–126 ¹¹	30–36 ¹²

¹ North: NO, DK; ² South: ES, IT; ³ Central and East: AT, DE, PL, SL; ⁴ West: UK, BE, NL, FR, IR; ⁵ data only available for DK; ⁶ data only available for IT; ⁷ only PL and SL; ⁸ only PL; ⁹ only UK, NL and IR; ¹⁰ only UK, BE, NL and IR; ¹¹ only UK and IR; ¹² only NL and IR; n.a. = not available.

participating countries [WHO, 2003, 2009b]. The intake of cholesterol was between 211 and 800 mg/day in males and between 176 and 680 mg/day in females. The intake was higher in males than in females. In the male group only Finnish, Greek and Dutch males as well as males aged 35–54 years from the United Kingdom were within the recommendation [WHO, 2003]. In the female group, females from Hungary, Italy, Lithuania, Poland, Portugal as well as Romania exceeded it (cf. table 7.35).

Comparison of Regions

Table 7.36 shows the intake of energy and macronutrients (min.–max.) in the four regions. Whereas there is no big difference between the regions concerning the energy intake and share of protein in total energy intake as well as the relatively low intake of dietary fibers, the share of carbohydrates in total energy intake is lower and the share of sucrose in total energy intake is higher in the South region than in the other regions. The highest as well as the lowest intake values of fat in total energy intake were observed in the South region (28–47%E).

Table 7.34. Methods and period of dietary assessment in **adults** of the participating countries (data available from 80,103 adults)

Country	Age group years	Method	Year of survey	n	Intake from dietary supplements is included	Reference
Austria	19–64	24-hour recall	2007	2,123	no	Elmadfa et al., 2008
Belgium	19–64	24-hour recall	2004	3,249	no	Devriese et al., 2006
Czech Republic	19–64	n.a.	n.a.	2,140	n.a.	Cífková et al., 2004
Denmark	19–64	7-day dietary record	2000–2002	2,769	n.a.	Lyhne et al., 2005
Estonia	19–64	24-hour recall	1997	2,012	n.a.	1997 National Dietary Survey
Finland	19–64	48-hour recall	2007	1,576	no	The National Findiet 2007 Survey
France	19–64	3 × 24-hour recall	2006/2007	2,351	no	Castetbon et al., 2009
Germany	19–64	dietary history interview	2005–2007	10 928	no	Max Rubner-Institut (eds), 2008a, 2008b
Greece	19–64 22±2	FFQ 24-hour recall	1994–1999 1989–2001	20,399 951	no yes	EPIC study – Greek cohort ¹
Hungary	≥18	3-day dietary record	2003/2004	1,179	no	Rodler et al., 2007; Zajkás et al., 2007; Bíró et al., 2007
Ireland	18–64 19–64	FFQ 7-day dietary record (estimated)	2007 1997–1999	7,813 1,379	yes yes	SLÁN, 2007 SLÁN, 1997/1998
Italy	19–64	7-day dietary record	n.a.	1,461	no	D’Amicis, 2000
Latvia	19–64	24-hour recall	1997	2,308	no	Pomerlau et al., 1999
Lithuania	19–64	24-hour recall	2007	1,936	no	unpubl. data ²
Norway	19–64	FFQ	1997	2,196	yes	Norkost, 1997
Poland	19–64	24-hour recall	2000	2,440	no	Szponar et al., 2000 (unpubl.)
Portugal	≥18	FFQ	n.a.	2,389	no	EPIPorto. study held by the Department of Hygiene and Epidemiology, University of Porto Medical School
Romania	19–64	personal interview	2006	518	no	National synthesis. 2006

Table 7.34. Continued

Country	Age group years	Method	Year of survey	n	Intake from dietary supplements is included	Reference
Spain	19–64	2 × 24-hour recall	2002–2003	1,581	no	Serra Majem and Ribas. 2007; Serra-Majem et al, 2007; Serra-Majem et al., 2006
Sweden	19–64	7-day dietary record	1997/1998	1,092	no	Becker et al., 2002
The Netherlands	19–64	2-day dietary record	1997/1998	3,948	no	Hulshof and van Steveren, 1991
United Kingdom	25–34	n.a.	2003–2005	414	n.a.	Low income diet and health survey, 2003–2005 ³
	35–44	n.a.	2003–2005	501	n.a.	
	45–54	n.a.	2003–2005	388	n.a.	
	55–64	n.a.	2003–2005	425	n.a.	

¹ unpublished data estimated for the purposes of the ENHR 2009 project; ²data provided by the Institute of Biochemical Research of Kaunas University of Medicine; ³data provided by the University of Southampton; n.a. = not available.

Concerning fatty acids the highest intake values of SFA were found in the Central and East region. The share of PUFA in total energy intake was relatively similar in the four regions. The intake of cholesterol was higher in the Central and East region than in the other regions (cf. table 7.37).

Vitamins

Comparison of Countries

The intake of retinol equivalents was between 0.5 and 2.2 mg/day in males and between 0.5 and 2.0 mg/day in females. Only in Greece, Hungary, Spain and the United Kingdom (25–54 years) the intake was below the recommendation [D-A-CH, 2000] in both males and females, as well as in Finland, Ireland and Latvia, but only in females. The daily intake of β -carotene was between 1.4 and 5.3 mg/day in males and between 1.4 and 5.6 mg/day in females.

With a vitamin D intake of 1.6–10.9 and 1.2–10.1 μ g/day most of the countries were below the recommended intake of 5 μ g/day [D-A-CH, 2000]. Only Finnish, Lithuanian, Norwegian and Polish males as well as Finnish and Norwegian females met the recommendation. The recommended intake of the Nordic countries of 7.5 μ g/day [NNR, 2004] was only met by Norwegian adults.

Table 7.35. Intake of energy and macronutrients (mean \pm SD) in **adults** of European countries (male and female)

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
Male					
Austria	19–64	778	9.0 \pm 3.1	16.8 \pm 4.9	42.5 \pm 10.5
Belgium	19–64	n.a.	12.2 \pm 3.4	15.1 \pm 2.8	42.4 \pm 6.8
Czech Republic	19–64	1,064	12.4 \pm 3.7	14.1 \pm 4.0	49.5 \pm 10.5
Denmark	19–64	1,283	10.6 \pm 2.9	14.1 \pm 2.2	44.1 \pm 6.4
Estonia	19–64	899	9.6 \pm 4.8	14.7 \pm 4.7	42.8 \pm 13.9
Finland	19–64	730	9.2 \pm 3.0	16.8 \pm 3.7	47.1 \pm 8.8
France	19–64	852	10.0 \pm 0.1	16.3 \pm 0.1	43.4 \pm 0.3
Germany	19–64	4,912	11.0 \pm 4.3	14.6 \pm 3.2	45.3 \pm 8.4
Greece	19–64	8,365	10.4 \pm 3.0	14.1 \pm 1.7	37.9 \pm 5.9
Hungary	\geq 18	473	11.7 \pm 2.4	14.7 \pm 2.0	45.0 \pm 6.6
Ireland	19–64	662	11.0 \pm 3.1	15.5 \pm 2.7	43.5 \pm 6.4
Italy	19–64	660	10.3 \pm 1.9	16.2 \pm 2.6	n.a.
Latvia	19–64	1,065	10.8 \pm 5.0	13.7 \pm 4.2	42.4 \pm 11.8
Lithuania	19–64	849	10.3 \pm 4.3	16.5 \pm 5.2	38.9 \pm 9.3
Norway	19–64	1,050	11.1 \pm 3.9	16.0 \pm 2.0	51.0 \pm 6.0
Poland	19–64	1,106	13.4 \pm 4.5	13.5 \pm 3.1	48.0 \pm 8.4
Portugal	19–64	917	9.9 \pm 2.3	17.6 \pm 2.4	47.0 \pm 6.8
Romania	19–64	177	13.9 \pm 5.2	17.8 \pm 3.8	43.3 \pm 9.4
Spain	19–64	706	9.1 \pm 1.7	18.5 \pm 2.4	36.9 \pm 5.8
Sweden	19–64	517	9.9 \pm 2.7	15.7 \pm 2.2	46.2 \pm 5.7
The Netherlands	19–64	1,836	11.1 \pm 2.9	14.7 \pm 3.1	44.2 \pm 7.5
United Kingdom	25–34	119	10.1 \pm 3.4	15.5 \pm 3.2	48.0 \pm 7.2
	35–44	152	9.0 \pm 3.3	15.5 \pm 3.3	48.4 \pm 7.9
	45–54	143	8.7 \pm 3.2	16.5 \pm 4.0	47.0 \pm 8.0
	55–64	189	8.5 \pm 2.6	17.1 \pm 3.7	46.9 \pm 7.4
All countries (min.–max.)			8.5–13.9	13.5–18.5	36.8–51.0
Reference values			12.5/12.0/10.5 ²	10–15%E ³	50–75%E ⁴
Female					
Austria	19–64	1,345	7.5 \pm 2.5	15.4 \pm 4.8	46.0 \pm 10.6

sucrose	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
8.7 ± 6.4	19.5 ± 9.9	37.4 ± 8.9	14.3 ± 4.3	13.0 ± 3.8	7.9 ± 3.7	352.5 ± 227.0
n.a.	n.a.	36.5 ± 5.6	14.6 ± 3.0	13.3 ± 2.2	6.7 ± 2.1	n.a.
n.a.	18.7 ± 37.5	31.3 ± 7.8	n.a.	n.a.	n.a.	383.0 ± 204.6
8.9 ± 5.5	20.9 ± 7.9	33.1 ± 5.6	14.2 ± 2.8	11.7 ± 2.2	4.8 ± 0.9	n.a.
n.a.	20.7 ± 12.2	36.5 ± 12.6	14.1 ± 5.8	13.9 ± 5.9	5.6 ± 3.0	347.7 ± 275.3
9.7 ± 5.9	24.0 ± 11.0	33.1 ± 7.9	12.9 ± 4.1	12.0 ± 3.9	5.9 ± 2.2	256.0 ± 152.0
n.a.	18.7 ± 0.4	35.5 ± 0.3	14.4	n.a.	n.a.	n.a.
n.a.	26.7 ± 12.6	35.9 ± 7.7	n.a.	n.a.	n.a.	395.8 ± 209.0
n.a.	n.a.	45.0 ± 5.5	12.7 ± 2.5	21.9 ± 4.0	6.4 ± 2.6	282.9 ± 116.2
7.9 ± 5.2	24.2 ± 6.6	38.2 ± 5.9	11.7 ± 2.4	12.5 ± 2.9	8.8 ± 2.4	463.0 ± 177.2
n.a.	23.2 ± 8.5	34.8 ± 5.7	n.a.	n.a.	n.a.	n.a.
n.a.	21.8 ± 6.5	35.0 ± 6.0	10.6 ± 2.4	12.8 ± 3.6	4.8 ± 2.2	378.4 ± 133.3
n.a.	n.a.	42.7 ± 11.7	n.a.	n.a.	n.a.	n.a.
10.8 ± 5.6	20.9 ± 12.4	44.9 ± 9.1	13.5 ± 7.0	16.9 ± 8.0	8.9 ± 5.4	477.9 ± 264.7
9.0 ± 6.0	25.0 ± 10.0	31.0 ± 6.0	12.0 ± 3.0	11.0 ± 2.0	6.0 ± 2.0	344.0 ± 143.0
11.0 ± 5.2	29.7 ± 11.4	36.7 ± 7.9	12.3 ± 3.9	16.2 ± 4.3	5.7 ± 2.4	553.2 ± 382.4
n.a.	23.5 ± 9.0	28.4 ± 4.7	8.8 ± 2.0	12.3 ± 2.3	4.8 ± 0.9	324.4 ± 106.1
n.a.	n.a.	38.9 ± 9.0	26.3 ± 5.0	n.a.	n.a.	800.0 ± 430.0
15.1 ± 4.2	19.3 ± 3.4	39.9 ± 3.8	12.3 ± 1.7	17.6 ± 2.3	5.9 ± 1.0	375.4 ± 53.7
8.6 ± 4.3	18.0 ± 6.4	34.4 ± 5.2	14.6 ± 2.7	12.7 ± 2.1	4.7 ± 1.4	345.4 ± 117.1
n.a.	24.4 ± 9.0	36.5 ± 6.4	14.3 ± 3.2	12.8 ± 2.8	7.0 ± 2.3	250.0 ± 125.0
15.1 ± 8.1	14.0 ± 5.7	36.5 ± 6.5	13.8 ± 3.5	n.a.	n.a.	317.3 ± 172.4
15.9 ± 11.3	11.7 ± 5.3	36.1 ± 7.1	13.6 ± 3.6	n.a.	n.a.	268.8 ± 148.5
14.8 ± 9.2	12.3 ± 6.3	36.4 ± 7.4	13.8 ± 3.7	n.a.	n.a.	210.9 ± 107.7
13.4 ± 8.4	13.0 ± 5.7	36.0 ± 7.5	13.7 ± 3.8	n.a.	n.a.	319.1 ± 161.7
7.9–15.9	11.7–29.7	28.4–45.0	8.8–26.3	11.0–21.9	4.7–8.9	210.9–800.0
<10%E ³	>25 g•d ^{-1,6}	15–30 %E ³	<10 %E ³		6–11 %E ⁵	<300 mg•d ^{-1,3}
10.9 ± 6.5	20.1 ± 9.3	37.3 ± 8.8	14.9 ± 4.6	12.3 ± 3.6	8.1 ± 4.0	282.8 ± 175.8

Table 7.35. Continued

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹ total
Belgium	n.a.	n.a.	8.1 ± 2.2	16.0 ± 3.1	45.2 ± 6.8
Czech Republic	19–64	1,094	9.7 ± 3.0	14.7 ± 7.7	53.9 ± 12.0
Denmark	19–64	1,486	8.2 ± 2.2	14.3 ± 2.3	47.5 ± 6.1
Estonia	19–64	1,113	6.9 ± 3.2	15.0 ± 4.4	47.2 ± 12.5
Finland	19–64	846	6.8 ± 2.0	17.2 ± 4.1	50.2 ± 8.3
France	19–64	1,499	7.2 ± 0.1	17.0 ± 0.1	44.4 ± 0.2
Germany	19–64	6,016	8.1 ± 2.5	14.4 ± 2.6	48.7 ± 7.4
Greece	19–64	12,034	8.3 ± 2.4	14.4 ± 1.7	39.5 ± 5.4
Hungary	≥18	706	9.2 ± 1.8	14.6 ± 1.9	48.0 ± 5.8
Ireland	19–64	717	7.6 ± 2.0	15.6 ± 2.9	45.1 ± 6.1
Italy	19–64	801	8.4 ± 1.6	16.3 ± 2.5	n.a.
Latvia	19–64	1,238	7.5 ± 3.4	13.7 ± 4.8	44.6 ± 11.9
Lithuania	19–64	1,087	7.4 ± 3.0	16.7 ± 6.2	42.9 ± 10.3
Norway	19–64	1,146	8.1 ± 2.7	16.0 ± 3.0	51.0 ± 6.0
Poland	19–64	1,334	8.4 ± 3.0	13.1 ± 3.5	51.8 ± 9.1
Portugal	19–64	1,472	8.7 ± 2.1	19.0 ± 2.4	50.1 ± 5.9
Romania	19–64	341	11.4 ± 4.9	17.1 ± 3.6	43.6 ± 9.7
Spain	19–64	875	7.1 ± 1.5	19.3 ± 2.7	37.7 ± 5.3
Sweden	19–64	575	7.8 ± 1.8	16.0 ± 2.3	47.4 ± 5.3
The Netherlands	19–64	2,112	8.4 ± 2.3	15.6 ± 3.8	44.7 ± 7.9
United Kingdom	25–34	295	7.0 ± 2.1	15.1 ± 3.3	48.3 ± 7.3
	35–44	349	6.6 ± 2.1	16.0 ± 3.5	48.2 ± 7.2
	45–54	245	6.4 ± 2.2	16.6 ± 4.1	47.7 ± 7.3
	55–64	236	6.3 ± 2.0	17.0 ± 3.6	47.7 ± 7.0
All countries (min.–max.)			6.3–11.4	13.1–19.3	37.7–51.8
Reference values			10.0/9.5/8.5 ²	10–15%E ³	50–75%E ⁴

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000, reference values refer to age groups 19–24 years (PAL 1.75), 25–50 years (PAL 1.70) and 51–64 years (PAL 1.60); ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000; n.a. = not available.

	Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
sucrose						
n.a.	n.a.	35.1 ± 6.4	14.6 ± 3.2	12.8 ± 2.2	6.7 ± 2.7	n.a.
n.a.	20.4 ± 63.6	31.2 ± 8.4	n.a.	n.a.	n.a.	277.0 ± 157.4
9.8 ± 5.7	18.8 ± 6.6	31.6 ± 5.3	13.6 ± 2.8	10.9 ± 2.1	4.7 ± 0.9	n.a.
n.a.	16.2 ± 8.8	36.3 ± 11.2	14.4 ± 5.3	13.5 ± 5.5	5.5 ± 3.0	251.9 ± 196.5
10.5 ± 5.1	21.0 ± 9.0	31.2 ± 7.4	12.0 ± 3.9	10.9 ± 3.2	5.7 ± 2.2	176.0 ± 93.0
n.a.	15.7 ± 0.2	36.7 ± 0.2	14.7	n.a.	n.a.	n.a.
n.a.	24.7 ± 9.6	34.8 ± 6.7	n.a.	n.a.	n.a.	278.8 ± 2.1
n.a.	n.a.	47.2 ± 4.7	13.2 ± 2.6	22.9 ± 4.1	6.9 ± 2.9	227.6 ± 92.3
8.6 ± 4.8	21.7 ± 5.6	36.8 ± 5.4	11.0 ± 2.3	11.4 ± 2.5	9.2 ± 2.3	327.2 ± 125.4
n.a.	17.4 ± 5.9	35.6 ± 5.8	n.a.	n.a.	n.a.	n.a.
n.a.	18.9 ± 6.1	33.0 ± 5.8	10.1 ± 2.5	11.6 ± 3.2	4.5 ± 1.7	310.8 ± 101.6
n.a.	n.a.	40.1 ± 11.3	n.a.	n.a.	n.a.	n.a.
14.0 ± 6.6	15.6 ± 9.9	41.9 ± 9.5	12.9 ± 7.0	15.7 ± 7.6	8.7 ± 5.4	318.8 ± 209.1
9.0 ± 6.0	21.0 ± 8.0	31.0 ± 6.0	12.0 ± 3.0	11.0 ± 2.0	5.0 ± 2.0	260.0 ± 101.0
13.7 ± 6.6	19.7 ± 7.9	34.7 ± 8.3	11.7 ± 4.1	15.0 ± 4.5	5.6 ± 2.6	322.2 ± 244.5
n.a.	23.7 ± 9.4	29.9 ± 4.5	9.4 ± 2.0	13.0 ± 2.3	4.9 ± 0.9	302.3 ± 102.5
n.a.	n.a.	39.7 ± 7.7	24.8 ± 3.8	n.a.	n.a.	680.0 ± 340.0
17.3 ± 3.7	16.9 ± 3.4	40.2 ± 4.3	12.4 ± 1.9	17.9 ± 2.4	5.7 ± 1.0	285.6 ± 39.7
9.0 ± 3.7	16.1 ± 4.8	33.8 ± 4.8	14.3 ± 2.3	12.3 ± 2.0	4.7 ± 1.4	289.7 ± 95.3
n.a.	20.1 ± 7.1	36.9 ± 6.9	14.6 ± 3.4	13.1 ± 3.0	6.7 ± 2.4	201.0 ± 99.0
15.0 ± 8.3	10.0 ± 3.6	36.6 ± 6.5	13.9 ± 3.7	n.a.	n.a.	218.3 ± 118.4
13.5 ± 8.4	10.0 ± 4.2	35.7 ± 6.9	13.5 ± 3.2	n.a.	n.a.	205.0 ± 104.0
12.9 ± 9.0	10.3 ± 4.4	35.7 ± 6.9	13.7 ± 3.6	n.a.	n.a.	210.9 ± 107.7
11.1 ± 7.4	11.1 ± 4.5	35.3 ± 7.3	13.8 ± 4.3	n.a.	n.a.	226.5 ± 122.5
8.6–17.3	10.0–24.7	29.9–47.2	9.4–24.8	10.9–22.9	4.5–9.2	176.0–680.0
<10%E ³	>25 g·d ^{-1,6}	15–30 %E ³	<10 %E ³		6–11 %E ⁵	<300 mg·d ^{-1,3}

Table 7.36. Intake of energy and macronutrients (min.–max.) in **adults** in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	9.2–11.1	13.7–16.8	42.4–51.0 (8.6–10.8 ⁵)	18.0–25.0 ⁶	31.0–44.9
Female	6.8–8.2	13.7–17.2	42.9–51.0 (9.0–14.0 ⁵)	15.6–21.0 ⁶	31.0–41.9
<i>South</i> ²					
Male	9.1–10.4	14.1–18.5	36.8–47.0 ⁷ (15.1 ⁸)	19.3–23.5 ⁹	28.4–45.0
Female	7.1–8.7	14.4–19.3	37.7–50.1 ⁷ (17.3 ⁸)	16.9–23.7 ⁹	29.9–47.2
<i>Central and East</i> ³					
Male	9.0–13.9	13.5–17.8	42.5–49.5 (7.9–11.0 ¹⁰)	18.7–29.7 ¹¹	31.3–38.9
Female	7.5–11.4	13.1–17.1	43.6–53.9 (10.9–13.7 ¹⁰)	19.7–24.7 ¹¹	31.2–39.7
<i>West</i> ⁴					
Male	9.1–12.2	14.7–16.3	42.4–47.6 ¹² (14.8 ¹³)	12.8–24.4 ¹⁴	34.8–36.5
Female	6.6–8.4	15.6–17.0	44.4–48.0 ¹² (13.1 ¹³)	10.4–20.1 ¹⁴	35.1–36.9

¹ North: SE, NO, FI, EE, LV, LT, DK; ² South: PT, ES, IT, GR; ³ Central and East: PL, CZ, RO, HU, AT, DE; ⁴ West: UK, BE, NL, FR, IR; ⁵ only SE, NO, FI, LT and DK; ⁶ only SE, NO, FI, EE, LT and DK; ⁷ only PT, ES and GR; ⁸ only ES; ⁹ only PT, ES and IT; ¹⁰ only PL, HU and AT; ¹¹ only PL, CZ, HU, AT and DE; ¹² only UK, BE, NL and FR; ¹³ only UK; ¹⁴ only NL, FR, IR and UK.

The intake of α -tocopherol equivalents was between 3.3 and 17.4 mg/day in males and 4.2 and 16.1 mg/day in females. The recommendations range from 13 to 15 mg/day for males and 12 mg/day for females [D-A-CH, 2000]. Only Austrian, German, Hungarian, Lithuanian, Polish and Dutch males as well as females from Austria, Germany, Hungary and Lithuania met the recommendations.

The intake of thiamine was between 1.1 and 2.3 mg/day in males and between 0.9 and 2.1 mg/day in females, that of riboflavin between 1.4 and 2.4 mg/day and 1.2 and 2.8 mg/day and that of vitamin B₆ between 1.6 and 3.5 mg/day and 1.3 and 2.1 mg/day. Therefore, the intake levels were within the recommendations except for Hungarian females in whom the intake of thiamine was slightly below the recommendation [D-A-CH, 2000].

The intake of folate equivalents was between 203 and 494 μ g/day in males and between 131 and 392 μ g/day in females, therefore the D-A-CH reference value of 400 μ g/day [D-A-CH, 2000] was not met by all countries. Compared with the recommendation for the Nordic countries – 300 μ g/day (400 for women of fertile

Table 7.37. Intake of fat, fatty acids and cholesterol (min.-max.) in **adults** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.0–44.9	12.0–14.6 ⁵	11.0–16.9 ⁵	4.7–8.9 ⁵	256.0–477.9 ⁶
Female	31.0–41.9	12.0–14.4 ⁵	10.9–15.7 ⁵	4.7–8.7 ⁵	176.0–318.8 ⁶
<i>South</i> ²					
Male	28.4–45	8.8–12.7	12.3–21.9	4.8–6.4	282.9–378.4
Female	29.9–47.2	9.4–13.2	13.0–22.9	4.5–6.9	227.6–310.8
<i>Central and East</i> ³					
Male	31.3–38.9	11.7–26.3 ⁷	12.5–16.2 ⁸	5.7–8.8	352.5–800.0
Female	31.2–39.7	11.7–24.8 ⁷	14.0–15.0 ⁸	5.6–9.2	277.0–680.0
<i>West</i> ⁴					
Male	34.8–36.5	13.7–14.6	12.8–13.3 ⁹	6.7–7.0 ⁹	250.0–279.0 ¹⁰
Female	35.1–36.9	13.7–14.7	12.8–13.1 ⁹	6.7 ⁹	201.0–215.2 ¹⁰

¹ North: SE, NO, FI, EE, LV, LT, DK; ² South: PT, ES, IT, GR; ³ Central and East: PL, CZ, RO, HU, AT, DE; ⁴ West: UK, BE, NL, FR; ⁵ only SE, NO, FI, EE, LT and DK; ⁶ only SE, NO, FI, EE and LT; ⁷ only PL, RO, HU and AT; ⁸ only PL, HU and AT; ⁹ only BE and NL; ¹⁰ only UK and NL.

age) – Austrian, Finnish, Greek, Hungarian, Spanish, Swedish and Dutch males as well as males aged 35–64 years from the United Kingdom did not meet the recommendation. In the female group, the recommendation of 300 µg/day was only met by Estonian and Portuguese females [NNR, 2004].

The recommendation for Central Europe for ascorbic acid is 100 mg/day [D-A-CH, 2000]. It was only met by Austrian, Czech, Danish, German, Greek, Irish, Italian, Norwegian and Portuguese adults in both men and women, as well as by Finnish and Spanish females. The recommended intake of the Nordic countries of 75 mg/day was met by almost all participating countries except for Latvia, Lithuania and the United Kingdom (55–64 years) [NNR, 2004] (cf. table 7.38).

Comparison of Regions

The intake of selected vitamins in the four regions is shown in table 7.39. In general, no big differences between the regions could be observed. However the lowest intake levels of cobalamin and the highest intake levels of vitamin D were reported in the North region.

Table 7.38. Vitamin intake (mean ± SD) in **adults** of European countries (male and female)

	Age years	n	Vitamin A ¹ mg	β-Carotene mg	Vitamin D µg	Vitamin E ² mg
Male						
Austria	19–64	778	1.0 ± 1.2	2.8 ± 3.1	1.8 ± 3.8	17.4 ± 10.3
Belgium	19–64	n.a.	n.a.	n.a.	n.a.	n.a.
Czech Republic	19–64	1,064	n.a.	n.a.	n.a.	3.3 ± 2.7
Denmark	19–64	1,283	1.2 ± 0.8	3.5 ± 3.5	3.6 ± 2.8	7.6 ± 3.1
Estonia	19–64	899	1.9 ± 6.0	n.a.	3.6 ± 6.2	9.2 ± 9.2
Finland	19–64	730	1.0 ± 1.4	n.a.	7.1 ± 5.7	10.3 ± 4.8
Germany	19–64	4,912	2.1 ± 1.4	5.3 ± 4.2	3.8 ± 3.6	16.2 ± 11.3
Greece	22±2	500	0.9 ± 1.3	n.a.	n.a.	8.9 ± 15.2
Hungary	≥18	473	0.6 ± 0.8	2.2 ± 1.9	2.2 ± 1.2	16.0 ± 5.8
Ireland	19–64	662	1.0 ± 0.9	2.5 ± 2.1	3.7 ± 3.4	11.2 ± 37.2
Italy	19–64	660	1.3 ± 1.4	3.1 ± 1.9	3.5 ± 2.3	11.6 ± 5.0
Latvia	19–64	1,065	1.0 ± 2.0	n.a.	n.a.	n.a.
Lithuania	19–64	849	1.3 ± 2.9	3.5 ± 7.0	6.3 ± 9.7	16.8 ± 11.1
Norway	19–64	1,050	2.0 ± 1.3 ⁵	n.a.	10.9 ± 10.7	n.a.
Poland	19–64	1,106	1.8 ± 3.6	3.6 ± 3.4	5.9 ± 6.1	16.7 ± 9.6
Portugal	19–64	917	1.5 ± 0.8	n.a.	3.6 ± 1.7	8.4 ± 2.7
Romania	19–64	177	2.2 ± 1.1	n.a.	n.a.	n.a.
Spain	19–64	706	0.6 ± 0.1	1.4 ± 0.5	1.6 ± 0.8	9.5 ± 2.0
Sweden	19–64	517	1.3 ± 0.9 ⁵	1.7 ± 3.3	6.1 ± 2.7	7.9 ± 2.7
The Netherlands	19–64	1,836	1.1 ± 1.2	n.a.	4.6 ± 2.5	14.8 ± 7.0
United Kingdom	25–34	119	0.9 ± 1.4	2.5 ± 2.5	2.9 ± 1.7	10.5 ± 5.5
	35–44	152	0.8 ± 1.5	1.7 ± 1.7	2.8 ± 1.9	9.1 ± 4.5
	45–54	143	0.8 ± 0.7	1.9 ± 2.1	3.2 ± 2.0	10.0 ± 6.8
	55–64	189	1.3 ± 2.4	2.3 ± 2.5	3.7 ± 3.0	9.7 ± 5.3
All countries (min.–max.)			0.5–2.2	1.4–5.3	1.6–10.9	3.3–17.4
Reference values ⁶			1.0	n.a.	5.0	15/14/13
Female						
Austria	19–64	1,345	1.2 ± 1.8	3.5 ± 4.0	1.8 ± 2.8	16.1 ± 9.1
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Czech Republic	19–64	1,094	n.a.	n.a.	n.a.	4.2 ± 4.1

Thiamine g	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
1.4 ± 0.7	1.4 ± 0.6	16.8 ± 8.4	1.8 ± 1.0	203 ± 107	5.4 ± 4.3	130 ± 120
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	88 ± 36
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	111 ± 119
1.4 ± 0.5	1.8 ± 0.7	33.5 ± 9.4	1.6 ± 0.5	323 ± 120	5.8 ± 3.3	102 ± 56
n.a.	n.a.	32.0 ± 32.0	2.0 ± 2.0	494 ± 494	n.a.	82 ± 96
1.5 ± 0.6	2.1 ± 0.9	35.0 ± 12.0	2.1 ± 0.9	270 ± 120	6.6 ± 6.5	98 ± 88
1.9 ± 1.4	1.4 ± 0.7	41.3 ± 20.9	2.7 ± 1.9	321 ± 202	6.6 ± 3.7	153 ± 106
2.2 ± 2.1	2.2 ± 1.3	21.7 ± 11.0	1.9 ± 1.3	283 ± 190	5.3 ± 11.4	146 ± 130
1.1 ± 0.3	1.4 ± 0.5	38.8 ± 9.9	1.9 ± 0.5	152 ± 53	4.0 ± 2.9	79 ± 50
2.3 ± 1.5	2.2 ± 1.5	28.2 ± 9.9	3.5 ± 1.9	332 ± 128	5.4 ± 3.7	116 ± 223
1.2 ± 0.3	1.7 ± 0.5	36.7 ± 8.2	2.2 ± 0.6	315 ± 91	n.a.	122 ± 65
1.6 ± 1.0	1.7 ± 1.1	17.0 ± 11.0	n.a.	n.a.	n.a.	64 ± 63
1.6 ± 0.9	1.7 ± 0.9	19.1 ± 11.1	1.8 ± 0.9	344 ± 358	1.9 ± 6.8	69 ± 53
2.0 ± 1.2	2.4 ± 1.4	24.2 ± 14.8	n.a.	n.a.	n.a.	140 ± 95
1.9 ± 0.9	2.1 ± 1.1	n.a.	2.6 ± 1.1	329 ± 146	5.6 ± 8.7	98 ± 84
1.9 ± 0.5	2.0 ± 0.6	23.6 ± 5.9	2.1 ± 0.6	302 ± 130	9.3 ± 4.1	116 ± 54
2.0 ± 0.8	3.6 ± 2.4	n.a.	n.a.	n.a.	n.a.	82 ± 48
1.3 ± 0.2	1.6 ± 0.3	21.8 ± 3.2	2.0 ± 0.4	237 ± 45	5.0 ± 1.0	97 ± 37
1.6 ± 0.5	1.9 ± 0.6	38.9 ± 10.2	2.2 ± 0.6	232 ± 73	6.8 ± 3.8	79 ± 45
1.5 ± 0.8	1.7 ± 0.7	n.a.	1.9 ± 0.7	215 ± 98	n.a.	79 ± 49
1.7 ± 0.7	1.9 ± 0.9	11.4 ± 8.4 ⁷	2.8 ± 1.3	310 ± 150	5.7 ± 3.7	78 ± 66
1.5 ± 0.7	1.7 ± 0.8	10.3 ± 7.9 ⁷	2.3 ± 1.2	268 ± 137	5.4 ± 4.7	56 ± 48
1.6 ± 0.7	1.8 ± 0.8	9.7 ± 6.6 ⁷	2.4 ± 1.1	281 ± 131	5.5 ± 2.7	59 ± 50
1.7 ± 0.6	1.9 ± 0.9	9.2 ± 6.2 ⁷	2.4 ± 0.9	287 ± 124	7.7 ± 8.7	71 ± 53
1.1–2.3	1.4–2.4	9.2–41.3	1.6–3.5	203–494	1.9–9.3	64–153
1.3/1.2/1.1	1.5/1.4/1.3	17/16/15	1.5	400	3.0	100
1.1 ± 0.5	1.3 ± 0.6	12.7 ± 6.2	1.5 ± 0.8	204 ± 102	3.9 ± 4.6	133 ± 105
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	92 ± 44
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	138 ± 142

Table 7.38. Continued

	Age years	n	Vitamin A ¹ mg	β-Carotene mg	Vitamin D µg	Vitamin E ² mg
Denmark	19–64	1,486	1.0 ± 0.7	4.6 ± 4.5	2.8 ± 2.3	6.6 ± 2.5
Estonia	19–64	1,113	1.4 ± 1.4	n.a.	2.8 ± 4.6	7.0 ± 4.7
Finland	19–64	846	0.7 ± 0.7	n.a.	5.2 ± 4.2	8.1 ± 3.7
Germany	19–64	6,016	1.8 ± 1.0	5.6 ± 4.0	2.0 ± 1.3	13.4 ± 6.7
Greece	22±2	451	0.9 ± 1.3	n.a.	n.a.	6.2 ± 4.6
Hungary	≥18	706	0.5 ± 0.8	2.3 ± 2.0	1.9 ± 1.1	13.9 ± 5.0
Ireland	19–64	717	0.5 ± 0.8	2.3 ± 1.6	3.7 ± 8.7	11.0 ± 27.4
Italy	19–64	801	1.1 ± 1.1	3.1 ± 1.9	2.8 ± 1.8	10.8 ± 5.1
Latvia	19–64	1,238	0.8 ± 1.6	n.a.	n.a.	n.a.
Lithuania	19–64	1,087	1.0 ± 3.1	3.0 ± 8.1	3.9 ± 7.0	12.3 ± 8.1
Norway	19–64	1,146	1.9 ± 1.2 ⁵	n.a.	10.1 ± 9.1	n.a.
Poland	19–64	1,334	1.2 ± 2.5	2.8 ± 3.2	3.4 ± 4.6	11.2 ± 6.8
Portugal	19–64	1,472	1.6 ± 0.8	n.a.	3.5 ± 1.6	8.2 ± 2.6
Romania	19–64	341	2.0 ± 0.9	n.a.	n.a.	n.a.
Spain	19–64	875	0.5 ± 0.1	1.4 ± 0.6	1.2 ± 0.6	8.4 ± 1.8
Sweden	19–64	575	1.1 ± 0.6 ⁵	1.8 ± 1.2	4.8 ± 1.9	6.8 ± 2.0
The Netherlands	19–64	2,112	0.8 ± 0.8	n.a.	3.2 ± 1.7	11.5 ± 5.7
United Kingdom	25–34	295	0.7 ± 1.0	2.0 ± 1.8	2.1 ± 1.4	7.9 ± 3.4
	35–44	349	0.8 ± 1.3	2.0 ± 2.7	2.3 ± 2.1	7.7 ± 4.0
	45–54	245	0.7 ± 0.7	2.0 ± 2.1	2.5 ± 2.4	7.7 ± 4.4
	55–64	236	1.1 ± 1.7	2.5 ± 2.3	2.9 ± 1.9	7.5 ± 4.1
All countries (min.–max.)			0.5–2.0	1.4–5.6	1.2–10.1	4.2–16.1
Reference values ⁶			0.8	n.a.	5.0	12

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans-β-carotene = 12 mg other carotenoids); ² RRR-α-tocopherol equivalent (= mg α-tocopherol + mg β-tocopherol × 0.5 + mg γ-tocopherol × 0.25 + mg α-tocotrienol × 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁵ values refer to α-tocopherol, only; ⁶ D-A-CH, 2000, reference values refer to age groups 19–24 years, 25–50 years and 51–64 years; ⁷ Niacin; n.a. = not available.

Thiamine g	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
1.1 ± 0.3	1.5 ± 0.6	25.8 ± 7.3	1.3 ± 0.4	296 ± 111	4.3 ± 2.6	107 ± 61
n.a.	n.a.	23.4 ± 11.6	1.5 ± 0.8	392 ± 219	n.a.	82 ± 81
1.1 ± 0.4	1.6 ± 0.6	26.0 ± 8.0	1.7 ± 0.6	226 ± 88	4.5 ± 3.4	118 ± 82
1.4 ± 0.7	1.8 ± 0.9	29.4 ± 11.2	2.0 ± 1.0	277 ± 124	4.4 ± 2.1	153 ± 84
1.3 ± 0.9	1.5 ± 1.0	14.0 ± 7.7	1.3 ± 0.7	221 ± 184	3.8 ± 9.7	145 ± 120
0.9 ± 0.3	1.2 ± 0.5	30.4 ± 7.5	1.6 ± 0.4	131 ± 47	2.8 ± 2.4	80 ± 52
2.1 ± 4.1	2.0 ± 3.4	20.7 ± 9.9	3.3 ± 6.4	260 ± 144	4.1 ± 3.6	108 ± 183
1.0 ± 0.3	1.5 ± 0.5	30.0 ± 7.3	1.8 ± 0.5	283 ± 100	n.a.	113 ± 58
1.0 ± 0.6	1.3 ± 0.9	12.0 ± 8.0	n.a.	n.a.	n.a.	70 ± 65
1.0 ± 0.6	1.3 ± 0.8	13.0 ± 8.1	1.4 ± 0.7	238 ± 231	1.0 ± 2.7	66 ± 62
1.8 ± 1.1	2.1 ± 1.2	21.2 ± 13.4	n.a.	n.a.	n.a.	149 ± 88
1.1 ± 0.5	1.4 ± 0.8	n.a.	1.6 ± 0.7	221 ± 105	3.5 ± 6.3	80 ± 68
1.7 ± 0.4	2.1 ± 0.6	21.6 ± 5.3	2.1 ± 0.6	304 ± 144	8.8 ± 4.0	131 ± 63
1.5 ± 0.7	2.8 ± 1.8	n.a.	n.a.	n.a.	n.a.	76 ± 41
1.1 ± 0.2	1.4 ± 0.3	17.3 ± 2.6	1.7 ± 0.3	220 ± 48	4.0 ± 0.8	108 ± 42
1.3 ± 0.3	1.6 ± 0.5	30.6 ± 7.5	1.9 ± 0.5	215 ± 65	5.9 ± 5.4	90 ± 50
1.2 ± 1.1	1.5 ± 0.6	n.a.	1.5 ± 0.5	174 ± 78	n.a.	84 ± 54
1.2 ± 0.5	1.3 ± 0.6	6.9 ± 6.0 ⁷	1.9 ± 1.3	202 ± 83	4.3 ± 2.6	62 ± 49
1.3 ± 0.6	1.5 ± 0.8	7.0 ± 4.9 ⁷	1.8 ± 0.8	204 ± 91	4.7 ± 5.3	60 ± 45
1.3 ± 0.5	1.4 ± 0.7	6.4 ± 4.3 ⁷	1.7 ± 0.7	213 ± 95	4.6 ± 3.4	63 ± 50
1.4 ± 0.5	1.5 ± 0.7	7.2 ± 4.4 ⁷	1.8 ± 0.6	225 ± 88	5.3 ± 5.4	72 ± 56
0.9–2.1	1.2–2.8	6.4–30.6	1.3–2.1	131–392	1.0–8.8	62–153
1.0	1.2	13	1.2	400	3.0	100

Table 7.39. Intake of selected vitamins (min.-max.) in **adults** in the four regions

Region/sex	Vitamin B ₆ mg	Folate µg ⁵	Cobalamin µg	Vitamin D µg
<i>North</i> ¹				
Male	1.6–2.2 ⁶	232–494 ⁶	1.9–6.8 ⁷	3.6–10.9
Female	1.3–1.9 ⁶	215–392 ⁶	1.0–5.9 ⁷	2.8–10.1
<i>South</i> ²				
Male	1.9–2.2	237–315	5.3–9.3 ⁸	1.6–3.6 ⁹
Female	1.3–2.1	220–304	3.8–8.8 ⁸	1.2–3.5 ⁹
<i>Central and East</i> ³				
Male	1.8–2.7	203–329	4.0–6.6	1.8–5.9
Female	1.5–2.0	131–277	2.8–4.4	1.8–3.4
<i>West</i> ⁴				
Male	1.9–3.5	215–332	5.4–6.1 ¹⁰	3.2–4.6
Female	1.5–3.3	174–260	4.1–4.7 ¹⁰	2.5–3.7

¹ North: SE, NO, FI, EE, LT, DK; ² South: PT, ES, IT, GR; ³ Central and East: PL, HU, AT, DE; ⁴ West: UK, NL, IR; ⁵ Folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only SE, EE, FI, LT and DK; ⁷ only SE, FI, LT and DK; ⁸ only PT, ES and GR; ⁹ only PT, ES and IT; ¹⁰ only IR and UK.

Minerals

Comparison of Countries

The intake of sodium was between 3.6 and 7.3 g/day in males and between 1.7 and 5.6 g/day in females. Therefore, every participating country was above the D-A-CH recommended minimum intake level of 0.55 g/day [D-A-CH, 2000]. The recommendation of the WHO of <2 g sodium per day was only met by Greek females [WHO, 2003].

Compared with the D-A-CH reference values [D-A-CH, 2000], the potassium, manganese and phosphorus intake levels were within the recommendations except for Polish females in whom the intake of manganese was slightly above the recommendation.

The intake of calcium was between 687 and 1,171 mg/day in males and between 508 and 1,047 mg/day in females. Males from Denmark, Finland, Germany, Norway, Sweden and The Netherlands as well as females from Finland and Germany met the

recommendation for Central Europe of 1,000 mg/day [D-A-CH, 2000]. The recommendation for the Nordic countries is lower (800 mg/day [NNR, 2004]). This recommendation was not met by Austrian, Czech, Estonian, Hungarian and Polish men as well as by females from Austria, Belgium, the Czech Republic, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Romania, Spain and the United Kingdom.

Compared with the D-A-CH reference values for magnesium the group of males from almost one-third of the participating countries and the female group from half of the participating countries did not meet the recommendation [D-A-CH, 2000].

The iron intake was between 10.6 and 26.9 mg/day in males and between 8.2 and 22.2 mg/day in females. Males from all participating countries met the recommendation of 10 mg/day, in the female group only Czech, Portuguese and Romanian women met the reference value of 15 mg/day [D-A-CH, 2000].

With the exception of the United Kingdom (35–64 years in males and 25–54 years in females) the zinc intake was above the recommendation [D-A-CH, 2000].

The iodine intake was between 67 and 264 mg/day in males and between 48 and 200 mg/day in females. All countries were within the recommendation, except for German and Lithuanian adults, both males and females, as well as females from Portugal [Eurodiet, 2000].

The copper intake was between 1.1 and 2.3 mg/day in males and between 0.1 and 2.2 mg/day in females. The intake of males in Austria, Finland, Italy, Lithuania and Poland was above the recommended intake range of 1.0–1.5 mg/day. In the female group, in Austria the intake was above and in the United Kingdom below the recommended intake range [D-A-CH, 2000].

The intake of selenium was within the recommendation in all participating countries except for Finnish females in whom the intake was slightly above the recommended intake range of 30–70 µg/day [D-A-CH, 2000] (cf. table 7.40).

Comparison of Regions

The intake data of selected minerals in the four regions is shown in table 7.41. Concerning the intake values of calcium, phosphorus and iron no big difference between the regions could be observed. The intake of zinc was lower in the West region than in the other regions and that of selenium was lower in the North region.

7.5 Energy and Nutrient Intake in European Elderly

Background

More than 70% of the participating countries had data on energy and nutrient intake of people older than 64 years. In contrast to the European Nutrition and Health Report 2004, the age groups in the current report are more homogeneous, only the methods used for the assessment of dietary intake data were different (cf. table 7.42).

Table 7.40. Mineral intake (mean \pm SD) in **adults** of European countries (male and female)

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Male						
Austria	19–64	778	3.9 \pm 1.6	2.7 \pm 1.1	782 \pm 445	1,302 \pm 492
Belgium	19–64	n.a.	n.a.	n.a.	847 \pm 326	n.a.
Czech Republic	19–64	1,064	n.a.	n.a.	687 \pm 512	n.a.
Denmark	19–64	1,283	4.2 \pm 1.3	3.8 \pm 1.1	1,055 \pm 448	1,519 \pm 479
Estonia	19–64	899	3.6 \pm 2.3	3.8 \pm 1.8	717 \pm 543	n.a.
Finland	19–64	730	3.3 \pm 1.2	4.2 \pm 1.3	1,202 \pm 592	1,778 \pm 622
France	19–64	852	3.9 \pm 0.1	n.a.	981 \pm 16	n.a.
Germany	19–64	4,912	3.5 \pm 1.5	3.9 \pm 1.4	1,171 \pm 556	n.a.
Greece	22 \pm 2	500	2.6 \pm 1.5	3.1 \pm 1.5	991 \pm 614	1,389 \pm 619
Hungary	\geq 18	473	7.3 \pm 1.7	3.0 \pm 0.9	717 \pm 319	1,290 \pm 303
Ireland	19–64	662	n.a.	n.a.	949 \pm 354	1,645 \pm 463
Italy	19–64	660	5.8 \pm 2.4	3.4 \pm 0.8	947 \pm 309	1,467 \pm 311
Latvia	19–64	1,065	n.a.	4.3 \pm 2.2	855 \pm 547	1,485 \pm 687
Lithuania	19–64	849	4.3 \pm 2.3	3.3 \pm 1.4	812 \pm 446	1,403 \pm 603
Norway	19–64	1,050	n.a.	n.a.	1 068 \pm 460	n.a.
Poland	19–64	1,106	6.0 \pm 2.3	4.4 \pm 1.5	666 \pm 423	1,596 \pm 568
Portugal	19–64	917	3.8 \pm 1.0	3.8 \pm 0.9	883 \pm 354	1,434 \pm 381
Romania	19–64	177	n.a.	n.a.	875 \pm 497	n.a.
Spain	19–64	706	3.0 \pm 0.7	3.0 \pm 0.5	830 \pm 200	1,418 \pm 217
Sweden	19–64	517	3.6 \pm 0.9	3.5 \pm 0.9	1 069 \pm 395	1,577 \pm 427
The Netherlands	19–64	1,836	n.a.	4.1 \pm 1.1	1 082 \pm 464	1,755 \pm 511
United Kingdom	25–34	119	3.4 \pm 1.5	3.2 \pm 1.2	934 \pm 445	1,464 \pm 523
	35–44	152	2.9 \pm 1.2	2.9 \pm 1.0	853 \pm 371	1,264 \pm 449
	45–54	143	3.1 \pm 1.3	2.9 \pm 1.0	875 \pm 408	1,306 \pm 473
	55–64	189	2.9 \pm 1.1	3.1 \pm 0.9	899 \pm 340	1,323 \pm 387
All countries (min.-max.)			2.6–7.3	2.7–4.4	687–1,171	1 264–1,778
Reference values ²			0.55/<2 ⁴	2	1,000	700
Female						
Austria	19–64	1,345	3.1 \pm 1.4	2.6 \pm 1.0	774 \pm 404	1,102 \pm 421
Belgium	n.a.	n.a.	n.a.	n.a.	750 \pm 260	n.a.

Magnesium mg	Iron mg	Zinc mg	Iodine μg^1	Copper mg	Manganese mg	Selenium μg
338 ± 132	13.4 ± 5.1	12.2 ± 4.8	199 ± 112	2.3 ± 1.0	4.7 ± 2.8	n.a.
n.a.	13.3 ± 3.1	n.a.	n.a.	n.a.	n.a.	n.a.
n.a.	19.3 ± 18.3	n.a.	n.a.	n.a.	n.a.	n.a.
394 ± 115	11.1 ± 3.3	12.3 ± 3.6	213 ± 74	n.a.	n.a.	42 ± 14
348 ± 179	15.3 ± 10.0	12.4 ± 6.8	264 ± 170	n.a.	n.a.	n.a.
428 ± 134	13.6 ± 5.7	13.6 ± 4.8	253 ± 220	1.6 ± 0.7	n.a.	73 ± 27
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
465 ± 162	15.5 ± 5.8	12.6 ± 4.9	108 ± 46	n.a.	n.a.	n.a.
281 ± 127	13.7 ± 6.4	n.a.	n.a.	n.a.	n.a.	n.a.
442 ± 117	12.5 ± 3.4	10.2 ± 2.8	n.a.	1.4 ± 0.9	3.0 ± 7.9	n.a.
354 ± 116	14.4 ± 5.5	11.6 ± 4.4	n.a.	1.5 ± 0.8	n.a.	n.a.
230 ± 58	14.7 ± 3.9	12.9 ± 3.2	n.a.	1.6 ± 0.7	n.a.	48 ± 20
383 ± 197	19.0 ± 10.0	n.a.	n.a.	n.a.	n.a.	n.a.
353 ± 155	14.3 ± 7.0	13.4 ± 6.4	67 ± 67	1.8 ± 1.1	4.9 ± 4.3	n.a.
392 ± 121	13.4 ± 5.1	n.a.	n.a.	n.a.	n.a.	n.a.
393 ± 127	17.1 ± 10.6	14.6 ± 5.6	181 ± 91	1.6 ± 0.6	6.1 ± 2.3	64 ± 33
354 ± 97	16.7 ± 4.6	n.a.	n.a.	n.a.	n.a.	n.a.
372 ± 157	26.9 ± 11.0	n.a.	n.a.	n.a.	n.a.	n.a.
309 ± 50	13.0 ± 1.8	9.4 ± 1.4	n.a.	n.a.	n.a.	n.a.
348 ± 94	12.4 ± 3.4	12.7 ± 3.4	n.a.	n.a.	n.a.	36 ± 12
380 ± 109	12.9 ± 4.2	11.3 ± 3.6	n.a.	1.3 ± 0.4	n.a.	52 ± 22
289 ± 109	11.7 ± 5.0	10.0 ± 4.2	213 ± 111	1.2 ± 0.6	2.9 ± 1.3	n.a.
256 ± 106	10.9 ± 5.4	8.6 ± 3.6	197 ± 109	1.1 ± 0.7	2.8 ± 1.5	n.a.
257 ± 95	10.6 ± 4.6	9.1 ± 3.8	203 ± 101	1.1 ± 0.5	3.0 ± 1.8	n.a.
259 ± 90	11.5 ± 4.2	9.5 ± 3.0	209 ± 95	1.3 ± 1.4	3.1 ± 1.4	n.a.
256–465	10.6–26.9	8.6–14.6	67–264	1.1–2.3	2.8–6.1	36–73
400/350/350	10	10	150 ³	1.0–1.5	2–5	30–70
306 ± 113	11.9 ± 4.4	10.0 ± 3.7	192 ± 107	2.2 ± 0.9	5.0 ± 3.0	n.a.
n.a.	9.9 ± 2.3	n.a.	n.a.	n.a.	n.a.	n.a.

Table 7.40. Continued

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Czech Republic	19–64	1,094	n.a.	n.a.	679 ± 456	n.a.
Denmark	19–64	1,486	3.1 ± 0.9	3.2 ± 0.9	990 ± 389	1,238 ± 370
Estonia	19–64	1,113	2.5 ± 1.5	3.1 ± 1.3	590 ± 362	n.a.
Finland	19–64	846	2.4 ± 0.8	3.4 ± 1.0	1 007 ± 450	1,363 ± 448
France	19–64	1,499	2.8 ± 0.0	n.a.	841 ± 13	n.a.
Germany	19–64	6,016	2.5 ± 0.9	3.3 ± 1.0	1 047 ± 389	n.a.
Greece	22±2	451	1.7 ± 1.0	2.4 ± 1.1	744 ± 438	n.a.
Hungary	≥18	706	5.6 ± 1.8	2.7 ± 1.1	656 ± 276	1,047 ± 254
Ireland	19–64	717	n.a.	n.a.	742 ± 299	1,161 ± 318
Italy	19–64	801	5.0 ± 2.4	2.9 ± 0.8	851 ± 264	1,213 ± 268
Latvia	19–64	1,238	n.a.	3.1 ± 1.6	742 ± 456	1,081 ± 493
Lithuania	19–64	1,087	2.8 ± 1.5	2.5 ± 1.0	674 ± 338	1,034 ± 456
Norway	19–64	1,146	n.a.	n.a.	833 ± 340	n.a.
Poland	19–64	1,334	3.4 ± 1.4	3.1 ± 1.1	508 ± 317	1,017 ± 405
Portugal	19–64	1,472	3.5 ± 0.9	3.6 ± 1.0	963 ± 395	1,422 ± 415
Romania	19–64	341	n.a.	n.a.	792 ± 409	n.a.
Spain	19–64	875	2.2 ± 0.5	2.7 ± 0.5	778 ± 170	1,197 ± 187
Sweden	19–64	575	2.9 ± 0.8	3.0 ± 0.8	922 ± 300	1,285 ± 322
The Netherlands	19–64	2,112	n.a.	3.4 ± 0.9	965 ± 393	1,383 ± 387
United Kingdom	25–34	295	2.2 ± 0.8	2.3 ± 0.7	687 ± 284	1,021 ± 320
	35–44	349	2.2 ± 0.8	2.3 ± 0.8	717 ± 348	1,019 ± 353
	45–54	245	2.1 ± 0.8	2.4 ± 0.8	740 ± 330	1,026 ± 356
	55–64	236	2.1 ± 0.8	2.4 ± 0.7	751 ± 300	1,037 ± 334
All countries (min.–max.)			1.7–5.6	2.3–3.6	508–1,047	1,017–1,422
Reference values ²			0.55/<2 ⁴	2	1 000	700

¹ Iodised salt was not taken into account in each country; ² D-A-CH, 2000, reference values refer to age groups 19–24 years, 25–50 years and 51–64 years; ³ Eurodiet, 2000; ⁴ WHO, 2003; n.a. = not available.

Magnesium mg	Iron mg	Zinc mg	Iodine μg^1	Copper mg	Manganese mg	Selenium μg
n.a.	16.5 ± 18.8	n.a.	n.a.	n.a.	n.a.	n.a.
325 ± 88	8.9 ± 2.5	9.7 ± 2.6	175 ± 58	n.a.	n.a.	34 ± 11
261 ± 109	11.7 ± 6.8	9.1 ± 4.5	200 ± 121	n.a.	n.a.	n.a.
340 ± 102	10.3 ± 3.4	10.0 ± 3.3	194 ± 121	1.3 ± 0.5	n.a.	54 ± 19
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
382 ± 348	12.6 ± 3.8	9.7 ± 3.1	101 ± 40	n.a.	n.a.	n.a.
213 ± 102	9.7 ± 5.4	n.a.	n.a.	n.a.	n.a.	n.a.
372 ± 100	9.8 ± 2.6	7.8 ± 2.2	n.a.	1.0 ± 0.5	2.5 ± 8.0	n.a.
255 ± 83	14.1 ± 18.7	8.5 ± 5.0	n.a.	1.2 ± 0.7	n.a.	n.a.
197 ± 53	11.9 ± 3.4	10.7 ± 2.8	n.a.	1.3 ± 0.5	n.a.	39 ± 16
285 ± 143	13.0 ± 7.0	n.a.	n.a.	n.a.	n.a.	n.a.
263 ± 113	9.9 ± 5.4	9.3 ± 4.8	48 ± 48	1.4 ± 1.1	3.8 ± 5.5	n.a.
303 ± 90	12.2 ± 5.6	n.a.	n.a.	n.a.	n.a.	n.a.
263 ± 91	10.7 ± 6.5	8.9 ± 3.5	118 ± 55	1.1 ± 0.4	4.2 ± 1.7	38 ± 21
328 ± 98	15.0 ± 4.4	n.a.	n.a.	n.a.	n.a.	n.a.
306 ± 129	22.2 ± 9.2	n.a.	n.a.	n.a.	n.a.	n.a.
269 ± 51	10.5 ± 1.7	7.8 ± 1.2	n.a.	n.a.	n.a.	n.a.
293 ± 68	10.3 ± 3.4	9.9 ± 2.4	n.a.	n.a.	n.a.	31 ± 11
301 ± 86	10.6 ± 3.2	9.0 ± 2.8	n.a.	1.0 ± 0.3	n.a.	41 ± 19
193 ± 60	8.2 ± 3.2	6.7 ± 2.2	142 ± 73	0.9 ± 0.4	2.2 ± 0.9	n.a.
192 ± 65	8.5 ± 3.7	6.8 ± 2.4	146 ± 83	0.9 ± 0.5	2.3 ± 1.2	n.a.
195 ± 72	8.3 ± 3.5	6.7 ± 2.6	161 ± 88	0.8 ± 0.5	2.5 ± 1.2	n.a.
199 ± 64	9.0 ± 3.2	7.1 ± 2.6	158 ± 80	0.1 ± 1.1	2.6 ± 1.1	n.a.
192–372	8.2–22.2	6.7–10.7	48–200	0.1–2.2	2.2–5.0	31–54
310/300/300	15/15/10	7	150 ³	1.0–1.5	2–5	30–70

Table 7.41. Intake of selected minerals (min.-max.) in **adults** in the four regions

Region/sex	Calcium mg	Phosphorus mg	Iron mg	Zinc µg	Iodine µg	Selenium µg
<i>North</i> ¹						
Male	717–1,202	1,403–1,778 ⁵	11.1–19.0	12.3–13.6 ⁶	67–264 ⁷	42–73 ⁸
Female	590–1,007	1,034–1 363 ⁵	8.9–13.0	9.1–10.0 ⁶	48–200 ⁷	31–54 ⁸
<i>South</i> ²						
Male	830–991	1,389–1,467	13.0–16.7	9.4–12.9 ⁹	n.a.	48 ¹⁰
Female	744–963	1,197–1,422 ¹⁹	9.7–15.0	7.8–10.7 ⁹	n.a.	39 ¹⁰
<i>Central and East</i> ³						
Male	666–1,171	1,290–1,596 ¹¹	12.5–26.9	10.2–14.6 ¹²	108–199 ¹³	64 ¹⁴
Female	508–1,047	1,017–1,102 ¹¹	9.8–22.2	7.8–10.0 ¹²	101–192 ¹³	38 ¹⁴
<i>West</i> ⁴						
Male	847–1,082	1,339–1,755 ¹⁵	11.2–14.4 ¹⁶	9.3–11.6 ¹⁵	205 ¹⁷	52 ¹⁸
Female	724–965	1,026–1,383 ¹⁵	8.5–14.1 ¹⁶	6.8–9.0 ¹⁵	152 ¹⁷	48 ¹⁸

¹ North: SE, NO, EE, FI, LV, LT, DK; ² South: PT, ES, IT, GR; ³ Central and East: AT, CZ, DE, HU, PL, RO; ⁴ West: BE, NL, FR, IR, UK; ⁵ only SE, FI, LV, LT and DK; ⁶ only SE, EE, FI, LT and DK; ⁷ only EE, FI, LT and DK; ⁸ only SE, FI and DK; ⁹ only ES and IT; ¹⁰ IT; ¹¹ only AT, HU and PL; ¹² only AT, DE, HU and PL; ¹³ only AT, DE and PL; ¹⁴ only PL; ¹⁵ only NL, IR and UK; ¹⁶ only BE, NL, IR and UK; ¹⁷ only UK; ¹⁸ only NL; ¹⁹ only PT, ES and IT.

Table 7.42. Methods and period of dietary assessment in **elderly** of the participating countries (data available from 19,328 elderly)

Country	Age group years	Method	Year of survey	n	Intake from dietary supplements is included	Reference
Austria	>64	3-day dietary record	2007	349	no	Elmadfa et al., 2008
Belgium	>64	24-hour recall	2004	3,249	no	Devriese et al., 2006
Denmark	>64	7-day dietary record	2000–2002	329	no	Lyhne et al., 2005
Finland	>64	48-hour recall	2007	463	no	The National Findiet 2007 Survey
France	65–74	3 × 24-hour recall	2006/2007	349	no	Castetbon et al., 2009

Table 7.42. Continued

Country	Age group years	Method	Year of survey	n	Intake from dietary supplements is included	Reference
Germany	>64	dietary history interview	2005–2007	3,031	no	Max Rubner-Institut (eds), 2008a, 2008b
Greece	>64	FFQ	1994–1999	6,108	no	EPIC study – Greek cohort ¹
Hungary	≥60	3-day dietary record	2003/2004	373	no	unpubl. data ²
Ireland	>64	FFQ	2007	1,322	no	SLÁN, 2007 SLÁN, 1997/1998
Italy	>64	7-day dietary record		167	no	D'Amicis, 2000
Norway	>64	FFQ	1997	342	yes	Norkost 1997
Poland	>64	24-hour recall	2000	453	no	Szponar et al., 2000 (unpubl.)
Portugal	>64	FFQ		585	no	EPIPorto, Study held by the Department of Hygiene and Epidemiology, University of Porto Medical School
Romania	>64	personal interview	2006	518	no	National synthesis, 2006
Spain	>64	2 × 24-hour recall	2002–2003	342	no	Serra Majem and Ribas, 2007; Serra-Majem L et al, 2007; Serra Majem et al., 2006
Sweden	65–74	7-day dietary record	1997/1998	122	no	Becker et al., 2002
The Netherlands	>64	2-day dietary record	1997/1998	421	no	Hulshof and van Staveren, 1991
United Kingdom	65–74 ≥75	n.a. n.a.	2003–2005 2003–2005	397 408	n.a. n.a.	Low income diet and health survey, 2003–2005 ³

¹ unpubl. data estimated for the purposes of the ENHR 2009 project; ² data provided by the National Institute of Food Safety and Nutrition, Hungary; ³ data provided by the University of Southampton; n.a. = not available.

Table 7.43. Intake of energy and macronutrients (mean \pm SD) in **elderly** of European countries (male and female)

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹	
					total	sucrose
Male						
Austria	>64	147	7.7 \pm 2.4	14.9 \pm 3.1	41.7 \pm 7.5	10.0 \pm 5.3
Belgium	>64	n.a.	8.9 \pm 2.3	15.2 \pm 2.7	40.7 \pm 7.4	n.a.
Denmark	>64	165	9.7 \pm 2.9	14.0 \pm 2.1	42.0 \pm 5.9	7.0 \pm 4.1
Finland	>64	229	7.7 \pm 2.3	17.4 \pm 3.8	49.7 \pm 8.9	9.3 \pm 5.6
France	>64	130	9.0 \pm 0.2	16.5 \pm 0.3	44.0 \pm 0.9	n.a.
Germany	>64	1,469	9.2 \pm 2.5	14.5 \pm 2.6	44.6 \pm 7.3	n.a.
Greece	>64	2,508	8.5 \pm 2.5	14.1 \pm 1.7	39.8 \pm 5.9	n.a.
Hungary	>59	138	10.5 \pm 2.3	14.8 \pm 2.1	45.6 \pm 6.5	6.5 \pm 4.0
Ireland	>64	580	8.6 \pm 3.3	19.0 \pm 8.0	49.0 \pm 4.2	n.a.
Italy	>64	60	9.4 \pm 2.2	15.8 \pm 2.4	n.a.	n.a.
Norway	>64	176	9.0 \pm 3.1	16.0 \pm 2.0	51.0 \pm 6.0	8.0 \pm 5.0
Poland	>64	176	10.3 \pm 3.6	13.6 \pm 3.3	50.0 \pm 9.5	12.0 \pm 7.1
Portugal	>64	246	9.3 \pm 2.2	17.5 \pm 2.4	n.a.	n.a.
Romania	>64	177	13.0 \pm 4.1	17.2 \pm 3.5	41.2 \pm 7.7	n.a.
Spain	>64	163	7.1 \pm 1.3	18.7 \pm 2.9	39.1 \pm 5.8	16.8 \pm 4.7
Sweden	65–74	64	9.6 \pm 2.8	15.6 \pm 1.9	47.4 \pm 6.1	7.8 \pm 3.0
The Netherlands	>64	185	9.4 \pm 2.4	16.0 \pm 3.0	43.0 \pm 7.0	n.a.
United Kingdom	65–74	144	7.7 \pm 2.5	16.8 \pm 3.3	46.8 \pm 6.7	12.0 \pm 6.9
	>74	124	7.4 \pm 2.3	16.5 \pm 3.7	47.5 \pm 7.0	14.1 \pm 6.9
All countries (min.–max.)			7.1–13.0	13.6–19.0	39.1–51.0	6.5–16.8
Female						
Austria	>64	202	7.1 \pm 1.7	15.0 \pm 2.5	45.9 \pm 6.1	12.6 \pm 4.7
Belgium	>64	n.a.	6.4 \pm 1.5	16.3 \pm 3.3	42.7 \pm 6.4	n.a.
Denmark	>64	164	7.8 \pm 1.9	14.0 \pm 2.1	46.0 \pm 6.2	9.0 \pm 5.3
Finland	>64	234	5.9 \pm 1.7	17.6 \pm 3.4	51.2 \pm 8.0	9.3 \pm 5.1
France	>64	219	6.7 \pm 0.1	17.5 \pm 0.3	45.4 \pm 0.6	n.a.
Germany	>64	1,562	7.3 \pm 2.1	14.4 \pm 2.7	48.5 \pm 7.2	n.a.
Greece	>64	3,600	6.8 \pm 2.1	14.4 \pm 1.8	41.8 \pm 5.6	n.a.

Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
16.7 ± 5.9	37.6 ± 5.8	15.6 ± 3.1	12.7 ± 3.4	7.4 ± 2.2	329.6 ± 136.0
n.a.	37.9 ± 7.7	15.6 ± 4.4	13.5 ± 2.9	6.7 ± 2.6	n.a.
21.0 ± 8.8	33.0 ± 5.5	14.0 ± 3.0	12.0 ± 2.1	5.0 ± 1.0	n.a.
24.0 ± 10.0	31.4 ± 7.9	12.0 ± 4.5	11.1 ± 3.5	5.7 ± 2.0	217.0 ± 115.0
22.3 ± 0.8	33.7 ± 0.7	13.6	n.a.	n.a.	n.a.
27.3 ± 9.9	36.0 ± 6.7	n.a.	n.a.	n.a.	329.6 ± 133.9
n.a.	43.9 ± 5.4	12.1 ± 2.6	21.0 ± 4.2	6.7 ± 3.1	214.8 ± 96.4
24.2 ± 6.5	37.5 ± 5.9	11.4 ± 2.5	12.0 ± 2.9	8.7 ± 2.3	418.2 ± 182.2
24.6 ± 12.1	34.0 ± 6.5	13.0 ± 3.9	10.0 ± 2.3	6.0 ± 2.1	361.3 ± 197.8
22.1 ± 7.6	33.2 ± 6.5	10.0 ± 3.0	13.1 ± 4.0	4.8 ± 2.5	313.1 ± 97.3
24.0 ± 9.0	31.0 ± 6.0	12.0 ± 3.0	11.0 ± 2.0	5.0 ± 2.0	316.0 ± 132.0
23.0 ± 9.2	36.0 ± 9.2	12.8 ± 4.2	15.4 ± 4.9	5.3 ± 2.6	433.0 ± 311.0
25.9 ± 10.4	26.7 ± 4.6	7.8 ± 1.9	11.9 ± 2.3	4.6 ± 0.9	276.0 ± 95.4
n.a.	41.0 ± 9.0	25.3 ± 4.3	15.7 ± 4.7	n.a.	810.0 ± 350.0
19.6 ± 3.8	35.6 ± 4.2	10.3 ± 1.6	16.6 ± 2.7	5.2 ± 1.3	265.5 ± 28.5
19.8 ± 7.2	33.9 ± 5.9	15.0 ± 3.2	12.2 ± 2.2	4.2 ± 0.8	383.1 ± 182.6
24.0 ± 10.0	37.0 ± 7.0	15.0 ± 4.0	12.0 ± 3.0	7.0 ± 2.0	231.0 ± 107.0
12.1 ± 4.7	36.5 ± 6.9	14.4 ± 4.1	n.a.	n.a.	280.7 ± 162.4
11.9 ± 5.4	36.1 ± 6.4	14.5 ± 4.0	n.a.	n.a.	268.8 ± 148.5
11.9–27.3	26.7–43.9	7.8–25.3	11.0–21.0	4.2–8.7	214.8–810.0
17.5 ± 6.2	37.7 ± 5.2	16.4 ± 3.2	12.3 ± 2.0	6.9 ± 2.1	323.8 ± 118.8
n.a.	37.5 ± 6.4	16.4 ± 4.2	13.4 ± 2.5	5.9 ± 2.1	n.a.
20.0 ± 6.7	32.0 ± 5.8	14.0 ± 3.0	11.0 ± 2.2	5.0 ± 1.0	n.a.
21.0 ± 9.0	30.4 ± 7.3	11.4 ± 3.9	10.4 ± 3.2	5.6 ± 1.9	159.0 ± 82.0
18.5 ± 0.5	34.5 ± 0.6	13.3	n.a.	n.a.	n.a.
24.9 ± 9.1	35.5 ± 6.7	n.a.	n.a.	n.a.	252.33 ± 279.0
n.a.	45.3 ± 5.0	12.3 ± 2.5	21.8 ± 4.4	7.0 ± 3.3	173.4 ± 76.1

Table 7.43. Continued

	Age years	n	Energy MJ	Protein %E ¹	Carbohydrates, %E ¹	
					total	sucrose
Hungary	>59	235	8.8 ± 1.7	14.5 ± 1.8	48.6 ± 5.9	8.0 ± 5.0
Ireland	>64	742	8.1 ± 3.1	19.0 ± 8.1	50.0 ± 4.1	n.a.
Italy	>64	107	7.6 ± 1.6	16.8 ± 2.5	n.a.	n.a.
Norway	>64	166	7.0 ± 2.0	17.0 ± 3.0	52.0 ± 6.0	8.0 ± 4.0
Poland	>64	277	8.1 ± 2.7	13.2 ± 3.5	52.6 ± 8.6	13.2 ± 6.3
Portugal	>64	339	8.0 ± 1.9	18.7 ± 2.3	n.a.	n.a.
Romania	>64	341	10.9 ± 3.4	16.3 ± 3.0	43.9 ± 9.2	n.a.
Spain	>64	179	5.8 ± 0.7	20.0 ± 2.0	39.1 ± 5.0	18.5 ± 4.1
Sweden	65–74	58	7.9 ± 2.0	16.3 ± 2.6	48.4 ± 5.2	8.7 ± 3.6
The Netherlands	>64	236	7.5 ± 1.9	17.0 ± 4.0	44.0 ± 7.0	n.a.
United Kingdom	65–74	253	6.2 ± 1.8	17.2 ± 3.8	48.0 ± 7.0	11.4 ± 7.0
	>74	284	5.9 ± 1.7	16.6 ± 3.7	47.6 ± 6.0	12.4 ± 6.0
All countries (min.–max.)			5.8–10.9	13.2–20.0	39.1–52.6	8.0–18.5
Reference values			9.5 ² (male)/ 7.5 ² (female)	10–15%E ³	50–75%E ⁴	<10%E ³

¹ Difference is not necessarily alcohol; ² D-A-CH, 2000, reference values refer to age groups ≥ 65 years (PAL 1.60); ³ WHO, 2003; ⁴ WHO, 2007; ⁵ WHO, 2009b; ⁶ Eurodiet, 2000; n.a. = not available.

Energy and Macronutrients

Comparison of Countries

The daily energy intake was between 7.1 and 13.0 MJ in male and between 5.8 and 10.9 MJ in female elderly. As the D-A-CH reference values (9.5 MJ/day in male and 7.5 MJ/day in female elderly) apply for a physical activity level (PAL) of 1.6 and elderly are a very inhomogeneous group (ranging from go-goes to no-goes), it is very difficult to compare the intake with the reference values [D-A-CH, 2000].

The share of protein in total energy intake per day was in the range of 13.6 and 19.0%E in male and 13.2 and 20.0%E in female elderly. Only Austrian, Danish, German, Greek, Hungarian and Polish male as well as Danish, German, Greek, Hungarian and Polish female elderly were within the recommended intake range (10–15%E) of the WHO [WHO, 2003].

The share of total carbohydrates in total energy intake per day was between 39.1 and 51.0%E in male and between 39.1 and 52.6%E in female elderly. The recommended

Dietary fiber g	Fat %E ¹	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
21.7 ± 5.4	36.3 ± 5.5	10.9 ± 2.9	11.3 ± 2.5	9.1 ± 2.2	297.0 ± 112.5
24.6 ± 11.3	33.0 ± 6.7	12.0 ± 3.8	10.0 ± 2.4	5.0 ± 2.5	305.8 ± 145.9
18.8 ± 5.6	30.5 ± 5.9	9.4 ± 2.6	11.8 ± 3.0	4.4 ± 1.9	279.3 ± 121.7
21.0 ± 7.0	30.0 ± 6.0	12.0 ± 3.0	11.0 ± 2.0	5.0 ± 1.0	260.0 ± 91.0
19.1 ± 7.0	34.1 ± 7.9	12.6 ± 4.0	14.3 ± 4.4	4.8 ± 2.3	317.0 ± 204.0
23.7 ± 10.4	28.0 ± 4.8	8.4 ± 2.1	12.3 ± 2.4	4.8 ± 1.0	247.2 ± 85.2
n.a.	39.9 ± 8.1	24.9 ± 4.7	15.0 ± 3.4	n.a.	690.0 ± 280.0
17.5 ± 3.8	37.4 ± 2.9	10.8 ± 1.1	17.5 ± 1.8	5.3 ± 1.0	209.3 ± 25.8
19.8 ± 7.6	33.2 ± 4.1	14.3 ± 2.2	12.0 ± 1.5	4.6 ± 1.4	309.7 ± 120.0
21.0 ± 6.0	37.0 ± 7.0	15.0 ± 4.0	12.0 ± 3.0	7.0 ± 3.0	195.0 ± 86.0
11.2 ± 4.3	34.8 ± 6.9	13.9 ± 4.2	n.a.	n.a.	220.1 ± 102.2
10.3 ± 4.0	35.8 ± 6.5	15.0 ± 4.2	n.a.	n.a.	215.9 ± 101.7
10.3–24.9	28.0–45.3	8.4–24.9	10.0–21.8	4.4–9.1	159.0–690.0
>25 g·d ^{-1,6}	15–30%E ³	<10%E ³		6–11%E ⁵	<300 mg·d ^{-1,3}

intake level of 50–75%E of the WHO [WHO, 2007] was only met by elderly from Norway and Portugal and by female elderly from Finland and Ireland. Whereas the proportion of total carbohydrates in total energy intake was lower than the recommendation, the share of sucrose in total energy intake was above the recommended level in both elderly males and females from Poland, Spain and the United Kingdom. In general, the intake of dietary fibers was below the recommended level (>25 g/day) of Eurodiet [Eurodiet, 2000]. Only Portuguese and German male elderly met the recommendation.

The share of fat in total energy intake was above the recommendation of the WHO [WHO, 2003] in almost every country. Only Portuguese elderly, both males and females, and Norwegian female elderly ingested less than 30%E fat. The share of saturated fatty acids (SFA) in total energy intake was between 7.8 and 25.3%E in male and between 8.4 and 24.9%E in female elderly and therefore in most participating countries in average above the recommended level (<10%E) with the exception of Portugal, both groups males and females, and Italy, only females. Due to the generally high intake of SFA, the share of polyunsaturated fatty acids (PUFA) in total energy intake

Table 7.44. Intake of energy and macronutrients (min.–max.) in **elderly** in the four regions

Region/sex	Energy MJ	Protein %E	Carbohydrates, %E (of that sucrose)	Dietary fiber g	Fat %E
<i>North</i> ¹					
Male	7.7–9.7	14.0–17.4	42.0–51.0 (7.0–9.3)	19.8–24.0	31.0–33.9
Female	5.9–7.9	14.0–17.6	46.0–52.0 (8.0–9.3)	19.8–21.0	30.0–33.2
<i>South</i> ²					
Male	7.1–9.4	14.1–18.7	39.1–39.8 ⁵ (16.8 ⁶)	19.6–25.9 ⁷	26.7–43.9
Female	5.8–8.0	14.4–20.0	39.1–41.8 ⁵ (18.5 ⁶)	17.5–23.7 ⁷	28.0–45.3
<i>Central and East</i> ³					
Male	7.7–13.0	13.6–17.2	41.2–50.0 (6.5–12.0 ⁸)	16.7–27.3 ⁹	36.0–41.0
Female	7.1–10.9	13.2–16.3	43.9–52.6 (8.0–13.2 ⁸)	17.5–24.9 ⁹	34.1–39.9
<i>West</i> ⁴					
Male	7.6–9.4	15.2–19.0	40.7–49.0 (13.1 ¹⁰)	12.0–24.6 ¹¹	33.7–37.9
Female	6.1–8.1	16.3–19.0	42.7–50.0 (11.9 ¹⁰)	10.8–24.6 ¹¹	33.0–37.5

¹ North: SE, NO, FI, DK; ² South: PT, ES, IT, GR; ³ Central and East: AT, DE, HU, PL, RO; ⁴ West: BE, NL, FR, IR, UK; ⁵ only ES and GR; ⁶ only ES; ⁷ only ES, IT and PT; ⁸ only AT, HU and PL; ⁹ only AT, DE, HU and PL; ¹⁰ only UK; ¹¹ only NL, FR, IR and UK.

was below the recommended range in almost every country. Only elderly males from Austria, Belgium, Greece, Hungary, Ireland and The Netherlands as well as elderly females from Austria, Greece, Hungary and The Netherlands met the recommendation of ingesting between 6 and 11%E of PUFA [WHO, 2009b]. The cholesterol intake was between 215 and 810 mg/day in male and between 159 and 690 mg/day in female elderly. Elderly from Finland, Greece, Portugal, Spain, The Netherlands and the United Kingdom, both males and females, as well as elderly females from Germany, Hungary, Italy and Norway were within the recommendation [WHO, 2003] (cf. table 7.43).

Comparison of Regions

Table 7.44 shows the intake of energy and macronutrients distribution (min-max) in the four regions. Generally, no remarkable differences between the regions could be observed. It is notable that both lowest and highest relative intake values of fat could be found in the South region.

Concerning fatty acids, the highest intake values of SFA were found in the Central and East region. The share of PUFA in total energy intake was also higher in the Central and East region than in the other regions. The intake of cholesterol was higher in the Central and East region than in the other regions (cf. table 7.45).

Table 7.45. Intake of fat, fatty acids and cholesterol (min.–max.) in **elderly** in the four regions

Region/sex	Fat %E	SFA %E	MUFA %E	PUFA %E	Cholesterol mg
<i>North</i> ¹					
Male	31.0–33.9	12.0–15.0	11.0–12.2	4.2–5.7	217.0–383.1 ⁵
Female	30.0–33.2	11.4–14.3	10.4–12.0	4.6–5.6	159.0–309.7 ⁵
<i>South</i> ²					
Male	26.7–43.9	7.8–12.1	11.9–21.0	4.6–6.7	214.8–313.1
Female	28.0–45.3	8.4–12.3	12.3–21.8	4.4–7.0	173.4–279.3
<i>Central and East</i> ³					
Male	36.0–41.0	11.4–25.3 ⁶	12.0–15.7 ⁶	5.3–8.7 ⁷	329.6–810.0
Female	34.1–39.9	10.9–24.9 ⁶	11.3–15.0 ⁶	4.8–9.1 ⁷	252.3–690.0
<i>West</i> ⁴					
Male	33.7–37.9	13.0–15.6	10.0–13.5 ⁸	6.0–7.0 ⁸	231.0–361.3 ⁹
Female	33.0–37.5	12.0–16.4	10.0–13.4 ⁸	5.0–7.0 ⁸	195.0–305.8 ⁹

¹ North: SE, NO, FI, DK; ² South: PT, ES, IT, GR; ³ Central and East: AT, DE, HU, PL, RO; ⁴ West: BE, NL, FR, IR, UK; ⁵ only SE, NO and FI; ⁶ only AT, HU, PL and RO; ⁷ only AT, HU and PL; ⁸ only BE, NL and IR; ⁹ only NL, IR and UK.

Vitamins

Comparison of Countries

The intake of retinol equivalents in elderly of the participating countries was on average above the recommendation [D-A-CH, 2000]. Only Spanish and Hungarian elderly, both males and females, as well as Finnish female elderly did not meet the reference value. The daily intake of β -carotene was between 1.3 and 4.8 mg/day in male and between 1.3 and 5.0 mg/day in female elderly.

The vitamin D intake was below the recommended intake of 10 μ g/day [Eurodiet, 2000] in almost all countries. Only in Norway was it clearly above this recommendation. The recommended vitamin D intake for all individuals above the age of 60 years in the Nordic countries [NNR, 2004] is also 10 μ g/day. In this recommendation the rather short time spent outdoor and the age related diminished vitamin D synthesis are taken into account.

The daily intake of α -tocopherol equivalents was between 6.3 and 13.7 mg/day in male and between 6.7 and 13.7 mg/day in female elderly. The recommendation is 12 mg/day for men and 11 mg/day for women D-A-CH, 2000. Only male elderly from Austria, Hungary and The Netherlands as well as female elderly from Austria, Germany, Hungary and The Netherlands met this recommendation.

Table 7.46. Vitamin intake (mean \pm SD) in **elderly** of European countries (male and female)

	Age years	n	Vitamin A ¹ mg	β -Carotene mg	Vitamin D μ g	Vitamin E ² mg
Male						
Austria	>64	147	1.2 \pm 1.6	2.2 \pm 1.7	2.9 \pm 4.5	13.0 \pm 4.2
Belgium	>64	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	>64	165	1.2 \pm 0.9	2.9 \pm 2.4	3.9 \pm 3.1	7.1 \pm 3.1
Finland	>64	229	0.8 \pm 1.1	n.a.	9.0 \pm 8.2	8.7 \pm 3.9
Germany	>64	1,469	2.1 \pm 1.1	4.8 \pm 2.8	4.4 \pm 4.1	6.3 \pm 6.3
Hungary	>59	138	0.6 \pm 0.8	2.4 \pm 2.1	2.1 \pm 1.3	15.1 \pm 5.2
Ireland	>64	580	1.3 \pm 1.2	n.a.	3.5 \pm 2.1	7.6 \pm 4.6
Italy	>64	60	1.2 \pm 0.9	3.6 \pm 2.2	2.5 \pm 1.7	11.5 \pm 4.4
Norway	>64	176	2.5 \pm 1.4 ⁵	n.a.	15.0 \pm 11.4	n.a.
Poland	>64	176	1.5 \pm 3.3	2.8 \pm 2.7	4.4 \pm 5.9	11.5 \pm 6.4
Portugal	>64	246	1.6 \pm 0.8	n.a.	3.4 \pm 1.6	8.3 \pm 2.7
Romania	>64	177	2.2 \pm 0.9	n.a.	n.a.	n.a.
Spain	>64	163	0.5 \pm 0.1	1.3 \pm 0.4	0.7 \pm 0.1	8.4 \pm 2.3
Sweden	65–74	64	1.5 \pm 0.7 ⁵	2.0 \pm 1.8	7.1 \pm 2.6	7.6 \pm 2.7
The Netherlands	>64	185	1.1 \pm 0.8	n.a.	4.8 \pm 2.9	13.7 \pm 6.5
United Kingdom	65–74	144	1.0 \pm 1.0	2.5 \pm 2.4	3.1 \pm 2.1	8.8 \pm 5.8
	>74	124	1.3 \pm 1.9	2.5 \pm 2.4	3.7 \pm 2.4	9.0 \pm 6.0
All countries (min.–max.)			0.5–2.5	1.3–4.8	0.7–15.0	6.3–13.7
Female						
Austria	>64	202	1.3 \pm 1.7	2.4 \pm 2.5	2.4 \pm 2.1	12.5 \pm 4.5
Belgium	>64	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	>64	164	1.0 \pm 0.7	4.1 \pm 3.4	3.1 \pm 2.1	6.7 \pm 2.6
Finland	>64	234	0.8 \pm 1.2	n.a.	6.5 \pm 4.6	7.3 \pm 3.2
Germany	>64	1,562	1.7 \pm 0.8	5.0 \pm 3.7	3.4 \pm 2.8	12.6 \pm 6.5
Hungary	>59	235	0.4 \pm 0.5	2.1 \pm 1.4	1.8 \pm 1.0	13.3 \pm 4.2
Ireland	>64	742	1.3 \pm 0.9	n.a.	3.2 \pm 1.9	7.8 \pm 4.6
Italy	>64	107	1.2 \pm 1.4	2.7 \pm 1.8	2.4 \pm 1.8	10.6 \pm 4.4
Norway	>64	166	2.3 \pm 1.3 ⁵	n.a.	12.9 \pm 11.8	n.a.
Poland	>64	277	1.2 \pm 2.4	2.5 \pm 2.6	2.9 \pm 2.9	9.3 \pm 5.3

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ μg	Cobalamin μg	Ascorbic acid mg
1.0 ± 0.3	1.2 ± 0.4	25.0 ± 8.2	1.2 ± 0.4	166 ± 68	4.7 ± 2.3	102 ± 59
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	91 ± 43
1.2 ± 0.5	1.7 ± 0.6	30.5 ± 8.4	1.5 ± 0.5	308 ± 122	6.0 ± 3.3	95 ± 52
1.3 ± 0.5	1.8 ± 0.8	30.0 ± 11.0	2.0 ± 1.2	243 ± 102	6.5 ± 6.0	92 ± 72
1.4 ± 0.5	1.8 ± 0.7	32.7 ± 9.6	2.2 ± 0.7	276 ± 93	5.9 ± 2.5	142 ± 70
0.9 ± 0.3	1.2 ± 0.4	34.2 ± 8.6	1.6 ± 0.1	139 ± 49	3.6 ± 2.8	79 ± 53
2.1 ± 1.0	2.0 ± 0.9	24.1 ± 10.7	3.0 ± 1.1	343 ± 148	n.a.	n.a.
1.1 ± 0.3	1.6 ± 0.4	33.2 ± 8.7	2.1 ± 0.6	325 ± 146	n.a.	125 ± 75
1.8 ± 1.1	2.1 ± 1.2	21.6 ± 13.7	n.a.	n.a.	n.a.	139 ± 81
1.3 ± 0.6	1.8 ± 1.0	n.a.	1.9 ± 0.8	255 ± 132	5.4 ± 9.1	73 ± 57
1.8 ± 0.5	1.9 ± 0.6	22.0 ± 5.8	2.1 ± 0.6	312 ± 156	8.2 ± 3.8	121 ± 57
1.6 ± 0.7	3.2 ± 1.7	n.a.	n.a.	n.a.	n.a.	77 ± 39
1.0 ± 0.2	1.3 ± 0.3	16.4 ± 2.7	1.7 ± 0.3	236 ± 47	3.8 ± 0.6	126 ± 50
1.5 ± 0.4	1.9 ± 0.6	37.9 ± 11.7	2.3 ± 0.7	240 ± 75	8.0 ± 3.9	93 ± 50
1.4 ± 0.7	1.6 ± 0.5	n.a.	1.8 ± 0.5	204 ± 78	n.a.	88 ± 56
1.5 ± 0.6	1.7 ± 0.8	8.7 ± 6.0 ^B	2.2 ± 0.9	263 ± 116	5.8 ± 4.2	63 ± 48
1.5 ± 0.6	1.7 ± 0.7	8.0 ± 4.9 ^B	2.0 ± 0.8	248 ± 106	6.6 ± 6.2	59 ± 40
0.9–2.1	1.2–3.2	8.0–37.9	1.2–3.0	139–343	3.1–8.2	59–142
0.9 ± 0.3	1.2 ± 0.4	22.7 ± 5.7	1.2 ± 0.4	166 ± 62	4.2 ± 2.4	115 ± 60
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	87 ± 44
1.0 ± 0.3	1.5 ± 0.6	25.6 ± 7.0	1.3 ± 0.4	297 ± 112	4.8 ± 2.7	115 ± 67
1.0 ± 0.4	1.5 ± 0.6	23.0 ± 7.0	1.5 ± 0.7	210 ± 96	5.2 ± 4.8	97 ± 68
1.2 ± 0.6	1.6 ± 0.8	25.9 ± 0.7	1.8 ± 0.9	276 ± 93	4.3 ± 2.0	148 ± 81
0.9 ± 0.4	1.2 ± 0.6	28.6 ± 7.6	1.6 ± 0.7	125 ± 43	2.5 ± 2.0	72 ± 40
2.0 ± 0.8	1.8 ± 0.8	22.2 ± 10.4	2.9 ± 1.2	335 ± 145	n.a.	n.a.
0.9 ± 0.2	1.4 ± 0.5	28.8 ± 6.8	1.7 ± 0.4	279 ± 174	n.a.	101 ± 47
1.8 ± 1.4	2.1 ± 1.5	20.8 ± 16.1	n.a.	n.a.	n.a.	160 ± 87
1.0 ± 0.5	1.5 ± 0.8	n.a.	1.5 ± 0.6	213 ± 101	3.4 ± 5.7	68 ± 53

Table 7.46. Continued

	Age years	n	Vitamin A ¹ mg	β-Carotene mg	Vitamin D µg	Vitamin E ² mg
Portugal	>64	339	1.6 ± 0.8	n.a.	3.3 ± 1.5	7.7 ± 2.5
Romania	>64	341	1.9 ± 0.7	n.a.	n.a.	n.a.
Spain	>64	179	0.4 ± 0.0	1.3 ± 0.3	0.7 ± 0.1	7.5 ± 1.7
Sweden	65–74	58	1.4 ± 0.7 ⁵	2.3 ± 1.3	6.1 ± 2.0	7.1 ± 2.4
The Netherlands	>64	236	0.8 ± 0.5	n.a.	3.6 ± 2.1	11.6 ± 6.6
United Kingdom	65–74	253	1.1 ± 1.5	2.5 ± 2.6	2.8 ± 1.8	7.2 ± 3.7
	>74	284	1.2 ± 1.8	2.4 ± 2.2	2.7 ± 1.8	7.5 ± 5.9
All countries (min.–max.)			0.4–2.3	1.3–5.0	0.7–12.9	6.7–13.7
Reference values ⁶			1.0 (male)/0.8 (female)	n.a.	10 ⁷	12 (male)/ 11 (female)

¹ Retinol equivalent (= 1 mg retinol = 6 mg all-trans-β-carotene = 12 mg other carotenoids); ² RRR-α-tocopherol equivalent (= mg α-tocopherol + mg β-tocopherol × 0.5 + mg γ-tocopherol × 0.25 + mg α-tocotrienol × 0.33); ³ niacin equivalent (= 1 mg niacin = 60 mg tryptophan); ⁴ folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁵ values refer to α-tocopherol, only; ⁶ D-A-CH, 2000, reference values refer to age groups ≥65 years; ⁷ Eurodiet, 2000; ⁸ niacin; n.a. = not available.

The daily intake of thiamine was at the recommendation of 1.0 mg/day in almost every participating country, only elderly from Hungary, both males and females, as well as female elderly from Austria and Italy were slightly below the reference value [D-A-CH, 2000].

The intakes of riboflavin, niacin, vitamin B₆ and cobalamin were in general above the recommendations in almost every country, except Austria where the vitamin B₆ intake in male elderly was below and Hungary where the cobalamin intake in female elderly was slightly below the recommendation. From the United Kingdom only values for niacin were available and therefore cannot be compared to the recommended intake value.

The intake of folate equivalents was between 139 and 343 µg/day in male and between 121 and 335 µg/day in female elderly. So the intake values were below the recommended 400 µg/day [D-A-CH, 2000]. The recommendation for the Nordic countries of 300 µg/day [NNR, 2004] was only met by male elderly from Denmark, Ireland, Italy and Portugal as well as by female elderly from Ireland (cf. table 7.46).

Thiamine mg	Riboflavin mg	Niacin ³ mg	Vitamin B ₆ mg	Folate ⁴ µg	Cobalamin µg	Ascorbic acid mg
1.6 ± 0.4	1.9 ± 0.6	20.1 ± 5.1	2.0 ± 0.6	290 ± 163	7.5 ± 4.1	118 ± 57
1.4 ± 0.5	2.6 ± 1.3	n.a.	n.a.	n.a.	n.a.	76 ± 40
1.0 ± 0.2	1.3 ± 0.2	14.4 ± 1.2	1.5 ± 0.2	216 ± 28	3.5 ± 0.5	115 ± 38
1.3 ± 0.4	1.7 ± 0.5	31.9 ± 8.3	2.0 ± 0.6	237 ± 81	7.4 ± 4.1	116 ± 68
1.1 ± 0.6	1.5 ± 0.5	n.a.	1.4 ± 0.4	177 ± 75	n.a.	95 ± 53
1.4 ± 0.5	1.5 ± 0.6	6.8 ± 3.9 ⁸	1.8 ± 0.6	225 ± 89	5.1 ± 4.0	71 ± 51
1.3 ± 0.5	1.6 ± 0.7	6.7 ± 3.9 ⁸	1.6 ± 0.6	212 ± 88	5.3 ± 5.3	60 ± 39
0.9–1.4	1.2–2.6	6.7–31.9	1.2–2.9	121–335	2.5–7.5	60–160
1.0	1.2	13	1.4 (male)/ 1.2 (female)	400	3.0	100

Table 7.47. Intake of selected vitamins (min.-max.) in **elderly** in the four regions

Region/sex	Vitamin B ₆ , mg	Folate, µg ⁵	Cobalamin, µg	Vitamin D, µg
<i>North¹</i>				
Male	1.5–2.3 ⁶	240–308 ⁶	6.0–8.0 ⁶	3.9–15.0
Female	1.3–2.0 ⁶	210–297 ⁶	4.8–7.4 ⁶	3.1–12.9
<i>South²</i>				
Male	1.7–2.1	236–325	3.8–8.2 ⁷	0.7–3.4
Female	1.5–2.0	216–290	3.5–7.5 ⁷	0.6–3.3
<i>Central and East³</i>				
Male	1.2–2.2	139–276	3.6–5.9	2.1–4.4
Female	1.2–1.8	125–276	2.5–4.3	1.8–3.4
<i>West⁴</i>				
Male	1.8–3.0	204–343	6.2 ⁸	3.4–4.8
Female	1.4–2.9	177–335	5.2 ⁸	2.8–3.6

¹ North: SE, NO, FI, DK; ² South: PT, ES, IT; ³ Central and East: AT, DE, HU, PL; ⁴ West: UK, NL, IR; ⁵ Folate equivalent (1 µg food folate = 0.5 µg folic acid (PGA) = 0.6 µg folic acid taken with meals); ⁶ only SE, FI and DK; ⁷ only PT and ES; ⁸ only UK.

Table 7.48. Mineral intake (mean \pm SD) in **elderly** of European countries (male and female)

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Male						
Austria	>64	147	3.4 \pm 0.9	2.2 \pm 0.7	649 \pm 295	1,059 \pm 390
Belgium	>64	n.a.	n.a.	n.a.	698 \pm 281	n.a.
Denmark	>64	165	3.6 \pm 1.2	3.6 \pm 1.1	874 \pm 359	1,371 \pm 470
Finland	>64	229	3.1 \pm 1.3	3.7 \pm 1.1	1,032 \pm 521	n.a.
France	>64	130	4.1 \pm 0.2	n.a.	893 \pm 28	n.a.
Germany	>64	1,469	3.1 \pm 0.9	3.5 \pm 0.9	970 \pm 357	n.a.
Hungary	>59	138	6.7 \pm 1.7	2.8 \pm 0.9	670 \pm 294	1,164 \pm 285
Ireland	>64	580	3.4 \pm 1.7	3.8 \pm 1.4	892 \pm 403	1,526 \pm 543
Italy	>64	60	5.9 \pm 2.5	3.3 \pm 0.9	936 \pm 258	1,381 \pm 329
Norway	>64	176	n.a.	n.a.	861 \pm 349	n.a.
Poland	>64	176	4.6 \pm 1.8	3.5 \pm 1.3	580 \pm 315	1,257 \pm 458
Portugal	>64	246	3.7 \pm 1.0	3.8 \pm 1.0	853 \pm 316	1,367 \pm 379
Romania	>64	177	n.a.	n.a.	931 \pm 365	n.a.
Spain	>64	163	2.3 \pm 0.5	2.8 \pm 0.4	757 \pm 152	1,165 \pm 187
Sweden	65–74	64	3.4 \pm 1.0	3.7 \pm 1.1	1,071 \pm 406	1,571 \pm 475
The Netherlands	>64	185	n.a.	3.8 \pm 1.1	1,024 \pm 414	1,576 \pm 472
United Kingdom	65–74	144	2.7 \pm 1.2	2.7 \pm 0.9	843 \pm 351	1,184 \pm 406
	>74	124	2.6 \pm 1.1	2.5 \pm 0.9	803 \pm 288	1,132 \pm 358
All countries (min.–max.)			2.3–7.0	2.2–3.8	627–1,071	1,059–1,576
Female						
Austria	>64	202	3.2 \pm 0.9	2.2 \pm 0.6	693 \pm 276	984 \pm 291
Belgium	>64	n.a.	n.a.	n.a.	615 \pm 225	n.a.
Denmark	>64	164	2.7 \pm 0.8	3.3 \pm 0.9	900 \pm 366	1,190 \pm 383
Finland	>64	234	2.3 \pm 0.7	3.2 \pm 0.9	900 \pm 426	n.a.
France	>64	219	2.9 \pm 0.1	n.a.	818 \pm 22	n.a.
Germany	>64	1,562	2.4 \pm 0.7	3.1 \pm 0.9	918 \pm 342	n.a.
Hungary	>59	235	5.4 \pm 1.3	2.6 \pm 1.5	626 \pm 264	998 \pm 259
Ireland	>64	742	3.1 \pm 1.3	3.7 \pm 1.3	823 \pm 370	1,404 \pm 516
Italy	>64	107	5.2 \pm 3.2	2.9 \pm 0.7	795 \pm 250	1,164 \pm 23

Magnesium mg	Iron mg	Zinc mg	Iodine μg^1	Copper mg	Manganese mg	Selenium μg
269 ± 89	10.9 ± 3.4	9.4 ± 3.0	188 ± 64	1.9 ± 0.6	4.3 ± 1.7	n.a.
n.a.	11.6 ± 2.8	n.a.	n.a.	n.a.	n.a.	n.a.
364 ± 118	10.7 ± 3.7	11.0 ± 3.6	194 ± 65	n.a.	n.a.	39. ± 13
379 ± 115	12.6 ± 5.6	12.3 ± 4.3	226 ± 94	1.4 ± 0.5	n.a.	66 ± 26
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
403 ± 109	13.6 ± 3.9	10.9 ± 3.2	107 ± 40	n.a.	n.a.	n.a.
403 ± 107	11.6 ± 3.5	9.0 ± 2.6	n.a.	1.2 ± 1.1	2.1 ± 0.8	n.a.
330 ± 125	12.6 ± 6.8	11.9 ± 5.0	169 ± 74	1.4 ± 0.9	4.0 ± 1.7	62 ± 27
226 ± 72	14.6 ± 4.5	12.2 ± 3.5	n.a.	1.5 ± 0.5	n.a.	43 ± 18
333 ± 93	12.3 ± 5.6	n.a.	n.a.	n.a.	n.a.	n.a.
300 ± 100	13.8 ± 14.0	11.0 ± 4.3	152 ± 73	1.3 ± 0.5	4.9 ± 1.7	51 ± 28
354 ± 108	16.3 ± 4.8	n.a.	n.a.	n.a.	n.a.	n.a.
341 ± 99	25.2 ± 7.0	n.a.	n.a.	n.a.	n.a.	n.a.
285 ± 48	11.2 ± 1.3	7.5 ± 1.0	n.a.	n.a.	n.a.	n.a.
350 ± 97	12.1 ± 3.6	12.0 ± 3.6	n.a.	n.a.	n.a.	40 ± 14
332 ± 101	11.4 ± 3.8	10.0 ± 3.3	n.a.	1.1 ± 0.4	n.a.	48 ± 24
234 ± 88	10.0 ± 3.6	8.5 ± 3.0	195 ± 92	1.1 ± 0.6	3.0 ± 1.5	n.a.
221 ± 83	10.2 ± 3.7	8.2 ± 2.9	184 ± 79	1.1 ± 0.8	3.0 ± 1.4	n.a.
221–403	10.0–25.2	7.5–12.3	107–226	1.1–1.9	2.2–4.9	39–62
256 ± 70	10.3 ± 2.9	8.8 ± 2.5	190 ± 60	1.9 ± 0.5	4.4 ± 2.0	n.a.
n.a.	8.7 ± 2.6	n.a.	n.a.	n.a.	n.a.	n.a.
318 ± 78	8.5 ± 2.2	9.1 ± 2.6	167 ± 56	n.a.	n.a.	34 ± 11
313 ± 95	9.9 ± 3.6	9.4 ± 2.9	182 ± 62	1.2 ± 0.5	n.a.	49 ± 17
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
348 ± 102	11.4 ± 3.5	8.8 ± 2.8	97 ± 38	n.a.	n.a.	n.a.
351 ± 103	9.2 ± 2.5	7.3 ± 2.1	n.a.	0.9 ± 0.5	2.9 ± 12.6	n.a.
313 ± 123	12.1 ± 6.3	11.2 ± 4.9	155 ± 67	1.3 ± 0.7	3.9 ± 1.6	55 ± 24
184 ± 38	11.5 ± 3.1	9.8 ± 2.5	n.a.	1.2 ± 0.5	n.a.	37 ± 15

Table 7.48. Continued

	Age years	n	Sodium g	Potassium g	Calcium mg	Phosphorus mg
Norway	>64	166	n.a.	n.a.	776 ± 266	n.a.
Poland	>64	277	3.2 ± 1.2	2.9 ± 1.0	533 ± 286	1,002 ± 363
Portugal	>64	339	3.3 ± 0.9	3.4 ± 1.0	904 ± 375	1,312 ± 414
Romania	>64	341	n.a.	n.a.	846 ± 334	n.a.
Spain	>64	179	1.8 ± 0.4	2.6 ± 0.4	712 ± 108	1,045 ± 112
Sweden	65–74	58	2.9 ± 0.7	3.3 ± 0.9	937 ± 312	1,357 ± 394
The Netherlands	>64	236	n.a.	3.3 ± 0.8	959 ± 359	1,338 ± 340
United Kingdom	65–74	253	2.1 ± 0.7	2.4 ± 0.7	735 ± 249	1,011 ± 277
	>74	284	2.0 ± 0.7	2.2 ± 0.6	714 ± 256	959 ± 281
All countries (min.-max.)			1.8–6.0	2.2–3.7	533–959	959–1,404
Reference values ²			0.55/<2 ⁴	2	1,000	700

¹ Iodised salt was not taken into account in each country; ² D-A-CH, 2000, reference values refer to age groups ≥65. years; ³ Eurodiet, 2000; ⁴ WHO, 2003; n.a. = not available.

Comparison of Regions

As shown in table 7.47, the highest intake values of vitamin B₆ can be observed in the West region. Concerning the intake of folate equivalents no remarkable differences between the regions were found, but the lowest intake values were reported in the Central and East region. The intake of vitamin D was higher in the North region than in the other regions.

Minerals

Comparison of Countries

With a daily intake of sodium between 2.3 and 7.0 g/day (males) and 1.8 and 6.0 g/day (females) every country was above the recommended minimum intake level of 0.55 g/day [D-A-CH, 2000]. The recommendation of the WHO of <2 g sodium per day was only met by Spanish females [WHO, 2003].

The intake of potassium was between 2.2 and 3.8 g/day in male and between 2.2 and 3.7 mg/day in female elderly, that of phosphorus between 1,059 and 1,576 mg/day and 959 and 1,404 mg/day, that of manganese between 2.2 and 4.9 mg/day and 2.4 and 4.4 mg/day and that of selenium between 39 and 62 µg/day and 34 and 55 µg/day. Therefore, the intake levels were within the recommendations [D-A-CH, 2000].

Magnesium mg	Iron mg	Zinc mg	Iodine μg^1	Copper mg	Manganese mg	Selenium μg
277 ± 69	10.8 ± 4.6	n.a.	n.a.	n.a.	n.a.	n.a.
240 ± 84	9.8 ± 6.2	8.4 ± 3.5	116 ± 53	1.0 ± 0.4	4.2 ± 1.6	36 ± 19
312 ± 105	14.2 ± 4.7	n.a.	n.a.	n.a.	n.a.	n.a.
291 ± 85	20.9 ± 6.5	n.a.	n.a.	n.a.	n.a.	n.a.
261 ± 50	9.6 ± 1.0	6.8 ± 0.7	n.a.	n.a.	n.a.	n.a.
323 ± 90	11.8 ± 4.9	10.5 ± 2.9	n.a.	n.a.	n.a.	37 ± 14
284 ± 74	10.1 ± 2.8	8.9 ± 2.5	n.a.	1.0 ± 0.3	n.a.	39 ± 15
197 ± 58	9.0 ± 3.4	7.0 ± 2.4	163 ± 73	0.9 ± 0.6	2.7 ± 1.0	n.a.
179 ± 55	8.8 ± 3.4	6.7 ± 2.6	155 ± 64	0.9 ± 0.8	2.4 ± 1.0	n.a.
179–348	8.5–20.9	6.7–11.2	97–190	0.9–1.9	2.4–4.4	34–55
350 (male)/ 300 (female)	10	10 (male)/ 7 (female)	150 ³	1.0–1.5	2–5	30–70

In male elderly, the intake of calcium was between 627 and 1,071 mg/day and in female elderly between 533 and 959 mg/day. With the exception of male elderly from Finland, Sweden and The Netherlands, all countries were below the D-A-CH reference value of 1,000 mg/day [D-A-CH, 2000]. Compared with the recommended intake for the Nordic countries of 800 mg/day [NNR, 2004], elderly from Austria, Belgium, Hungary, Poland and Spain as well as female elderly from the United Kingdom were below this recommendation.

The intake of magnesium was between 221 and 403 mg/day in male and between 179 and 348 mg/day in female elderly. Almost half of the participating countries were below the recommendation of 350 mg/day (male elderly) and 300 mg/day (female elderly).

The daily intake of iron was between 10.0 and 25.2 mg/day in male and between 8.5 and 20.9 mg/day in female elderly. Compared with the D-A-CH reference value of 10 mg/day [D-A-CH, 2000] male elderly met the recommendation whereas it was met in the female group only by Austrian, German, Irish, Italian, Norwegian, Portuguese, Romanian, Swedish and Dutch elderly.

Male elderly ingested between 6.7 and 11.2 mg zinc/day and female elderly between 7.5 and 12.3 mg zinc/day. Male and female elderly from Spain and the United Kingdom as well as male elderly from Austria and Hungary did not meet the recommended value of 10 mg/day [D-A-CH, 2000].

Table 7.49. Intake of selected minerals (min.–max.) in **elderly** in the four regions

Region/sex	Calcium mg	Phosphorus mg	Iron mg	Zinc µg	Iodine µg	Selenium µg
<i>North</i> ¹						
Male	861–1,071	1,371–1,571 ⁵	10.7–12.6	11.0–12.3 ⁶	194–226 ⁷	39–66 ⁶
Female	776–937	1,190–1,357 ⁵	8.5–11.8	9.1–10.5 ⁶	167–182 ⁷	34–49 ⁶
<i>South</i> ²						
Male	757–936	1,165–1,381	11.2–16.3	7.5–12.2 ⁸	n.a.	43 ⁹
Female	712–904	1,045–1,312	9.6–14.2	6.8–9.8 ⁸	n.a.	37 ⁹
<i>Central and East</i> ³						
Male	580–970	1,059–1,257 ¹⁰	10.9–25.2	9.0–11.0 ¹¹	107–188 ¹²	51 ¹³
Female	533–918	99–1,002 ¹⁰	9.2–20.9	7.3–8.8 ¹¹	96.9–189.6 ¹²	36 ¹³
<i>West</i> ⁴						
Male	698–1,024	1,158–1,576 ¹⁴	10.1–12.6 ¹⁵	8.4–11.9 ¹⁴	169–189 ¹⁶	48–62 ¹⁷
Female	615–959	985–1,404 ¹⁴	8.7–12.1 ¹⁵	6.9–11.2 ¹⁴	155–159 ¹⁶	39–55 ¹⁷

¹ North: SE, NO, FI, DK; ² South: PT, ES, IT; ³ Central and East: AT, DE, HU, PL, RO; ⁴ West: BE, NL, FR, IR, UK; ⁵ only SE and DK; ⁶ only SE, FI and DK; ⁷ only FI and DK; ⁸ only ES and IT; ⁹ only IT; ¹⁰ only AT, HU and PL; ¹¹ only AT, DE, HU and PL; ¹² only AT, DE and PL; ¹³ only PL; ¹⁴ only NL, IR and UK; ¹⁵ only BE, NL, IR and UK; ¹⁶ only IR and UK; ¹⁷ only NL and IR; n.a. = not available.

Every country except for Germany, both males and females, and Poland, only females, was within the recommendation for iodine of Eurodiet of 150 µg/day [Eurodiet, 2000].

The daily intake of copper was between 1.1 and 1.9 mg/day in male and between 0.9 and 1.9 mg/day in female elderly. The intake was slightly below the recommended intake range of 1.0–1.5 mg/day [D-A-CH, 2000] in female elderly from Hungary and the United Kingdom and above the recommended intake range in male and female elderly from Austria (cf. table 7.48).

Comparison of Regions

Table 7.49 shows the intake of selected minerals in elderly in the four regions. The calcium intake as well as the intake of phosphorus, zinc and iodine was higher in the North region than in the other regions. The highest intake values of iron were observed in the Central and East region.