Dietary fat intake in the European Prospective Investigation into Cancer and Nutrition: results from the 24-h dietary recalls

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Objectives: This paper describes the dietary intake of total fat, saturated (SFA), monounsaturated (MUFA) and polyunsaturated fatty acids (PUFA) and cholesterol of participants in the European Prospective Investigation into Cancer and Nutrition (EPIC) in 27 centres across 10 countries.

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Contributors: JL carried out the statistical analyses, prepared the tables and figures, and wrote the paper, taking into account comments from all co-authors. NS was the overall coordinator of this project and the EPIC nutritional databases (ENDB) project. AW, MO, PA, CA, PF, ES, VC, and HB B-d-M were members of the 'working group on fat intake' and gave inputs on the statistical analysis, drafting of the paper and interpretation of the results. RK, CW, MD, LR, IE, AM, YTvdS, JM, SN, MJ, EL, MB, JH, MUJ, KTK, FC, CG, GM, MN, MT, SB were local EPIC collaborators involved in the collection of data and in documenting, compiling and evaluating the subset of their national nutrient databases used in the ENDB. ER is the overall coordinator of the EPIC study.

Methods: Between 1995 and 2000, a stratified random sample of 36 034 participants (age range 35–74 years) completed a standardized 24-h dietary recall, assessed by means of the computer software EPIC-SOFT. Lipid intake data were calculated using a standardized nutrient database.
Results: On average, the contribution of fat to total energy intake was $\geqslant$34% of energy intake (%en) in women and $\geqslant$36%en in men for most EPIC centres, except for the British, Dutch and most Italian cohorts. Total fat ($>$40%en) and MUFA intakes (21%en, mainly from olive oil) were highest in Greece. Except for the Greek, Spanish and Italian centres, the average MUFA intake ranged between 10 and 13%en, with a high proportion derived from animal sources. SFA intake in women and men was lowest in the Greek, Spanish, Italian and UK cohorts with an average of $\leqslant$13%en (down to 9%en), and highest in the Swedish centres (16%en). The mean PUFA intake was in the range of 4–8%en, being highest in the UK health-conscious cohort. The average cholesterol intake across EPIC varied from 140 to 384 mg/d in women and 215–583 mg/d in men.
Conclusions: The presented data show differences and similarities in lipid intake across the European EPIC cohorts and also show differences in food sources of dietary lipids.

Introduction

Diet has a major impact on modulating the risk and severity of a number of chronic diseases including obesity and obesity-related metabolic disorders, cardiovascular diseases and cancer. Among macronutrients, dietary fat has been studied extensively in recent decades, and both the quantity and quality of dietary fat intake have been considered. Dietary advice for reducing cardiovascular risk includes the limitation of total fat, saturated (SFA), cholesterol and trans fatty acid intake, whereas the intake of n-3 polyunsaturated fatty acids (PUFA) (fish oil fatty acids) has been reported to exert beneficial effects (Mead *et al.*, 2006; Brunner *et al.*, 2007). Despite improvements in pharmacological treatment, modification of lipid intake (restriction of saturated fat, trans fatty acids and cholesterol intake) is still recommended for controlling dyslipidaemia, especially high plasma LDL cholesterol (Grundy, 2007). In line with the results of many short-term intervention studies, lower total fat intake was shown to be associated with a lower body weight over 7 years of intervention in the WHI trial (Howard *et al.*, 2006). As reflected by current discussions on the suggested effect of fat intake (total fat, SFA, trans fatty acids) on breast cancer risk (Bingham and Day, 2006; Thiébaut *et al.*, 2007; Chajès *et al.*, 2008), the role of dietary lipids in cancer prevention still needs to be defined (WCRF/AICR, 2007).

The promotion of dietary recommendations on the quantity and quality of dietary fat intake has increased public awareness of possible health risks because of a high or unbalanced lipid intake and, along with modifications to the lipid content of processed foods by the food industry (for example, low-fat foods), lipid intake may have changed over time (Helsing, 1993). Thus, it is desirable to have more precise data on lipid intake, ensuring comparability across European countries, and this can be achieved through standardized food composition databases. So far, the most comprehensive cross-European data on lipid supply have been based either on household budget survey data (DAFNE—food availability at the household level) or on a compilation of intake data based on different dietary assessment methods as reported in the European Nutrition and Health Report 2004 (Elmadfa and Weichselbaum, 2005). In both instances, country-specific food composition tables were applied to derive nutrient intake estimates.

This study evaluates dietary intake data as assessed by means of standardized 24-h diet recalls in a representative subgroup of each cohort participating in the European Prospective Investigation into Cancer and Nutrition (EPIC), an international multi-centre cohort study primarily aimed at studying relationships between diet and the development of chronic diseases, particularly cancer (Riboli and Kaaks, 1997; Slimani *et al.*, 2002a). The recently created EPIC Nutrient Database (ENDB) (Slimani *et al.*, 2007), which harmonizes separate nutrient databases from 10 European countries, now makes it possible to calculate dietary lipid intake data with improved comparability across EPIC centres. Previous analyses of EPIC food group intake data revealed significant differences between centres, for example, for the consumption of added fats and oils, meat and meat products and dairy products (Hjartåker *et al.*, 2002; Linseisen *et al.*, 2002a, b), which could also result in differences in fat intake. Following this work, we present here the results of a detailed analysis of the intake of dietary fat, types of fatty acids and cholesterol across the EPIC centres.

Materials and methods

Study population

The study population sample consisted of a stratified random sample (36 994 women and men) from the cohorts participating in EPIC, who were administered a standardized, computer-assisted 24-h dietary recall (24-HDR) (Slimani *et al.*, 2002a). This calibration study was conducted between 1995 and 2000 to improve the comparability of food

frequency-derived dietary data across EPIC countries and centres by partially correcting for dietary measurement error arising from country- or centre-specific bias and random and systematic within-person errors (Willett, 1998; Ferrari *et al.*, 2004). The EPIC cohorts were recruited in 10 western European countries (Greece, Spain, Italy, France, Germany, the Netherlands, United Kingdom, Denmark, Sweden and Norway) to investigate the associations between diet, lifestyle and chronic diseases, especially cancer (Riboli *et al.*, 2002; Slimani *et al.*, 2002a). EPIC participants were mostly recruited from the general population residing within defined geographical areas, with some exceptions: women members of a health insurance for school employees (France); women attending breast cancer screening (Utrecht, the Netherlands); blood donors (centres in Italy and Spain) and a cohort consisting predominantly of vegetarians ('health-conscious' cohort in Oxford, UK) (Riboli *et al.*, 2002). Nineteen of the 27 EPIC centres had both female and male participants, and eight centres recruited only women (France, Norway, Utrecht and Naples).

A total of 36 034 subjects with 24-HDR data were included in this analysis, after systematic exclusion of 960 subjects aged under 35 or over 74 years because of low participation in these age categories. Approval for the study was obtained from the ethical review boards of all local recruiting institutes. All participants provided written informed consent.

Measurements of diet and other lifestyle factors

The 24-HDR was administered in a face-to-face interview, except in Norway where it was obtained by telephone (Brustad *et al.*, 2003). A computerized interview programme (EPIC-SOFT) was developed specifically for the calibration study (Slimani *et al.*, 1999, 2000). A detailed description of the rationale, methodology and population characteristics of the 24-h recall calibration study nested in the EPIC cohort is given elsewhere (Kaaks *et al.*, 1994, 1995; Slimani *et al.*, 2002a).

Dietary intakes (g/d) of total fat, types of fatty acids and cholesterol were estimated from the 24-HDR using country-specific food composition tables that were standardized as far as possible across countries to allow calibration at the nutrient level. The EPIC Nutrient Database (ENDB) project outlines in detail the methods used to standardize the national nutrient databases across the 10 countries, including matching EPIC foods to the national databases, deriving nutrient values of unavailable foods and imputing missing values (Slimani *et al.*, 2007). The definitions of total fat (including the glycerol moiety), SFA, MUFA, PUFA and cholesterol and the methods used to determine their values have been described earlier (Slimani *et al.*, 2007). As the standardization of individual fatty acids was not performed because of the lack of reliable local data, a distinction between n-6 and n-3 PUFA was not possible. However, the available data on the food source of fat allowed a description of fat intake by consumption of foods of plant origin, animal origin or mixed/unspecified origin. An 'ORIGIN' variable has been given by the compilers for each national item used in EPIC to compile the ENDB. It gives only qualitative information on the predominant animal and/or plant origin of the food ('100% animal origin', 'above 95% animal origin', '100% plant origin', 'above 95% plant origin', 'mixed origin', 'non-organic', 'unknown'). We endeavoured to use the variable 'ORIGIN' to obtain quantitative information on fat intake; approximations of 5% error were accepted ('above 95%'). Otherwise, the fat origin was coded as 'unknown'. On the basis of this information, it was possible to estimate the intake of fat of animal and plant origin. Where the origin was unclear (as, for example, for ready-to-eat dishes and cakes without any clear declaration or containing ingredients of mixed or unknown origin), fat origin was classified as 'unknown'.

In addition, information on major food sources contributing to the intake of total fat, SFA, MUFA, PUFA and cholesterol is provided, using the refined EPIC-SOFT food classification scheme.

Data on other lifestyle factors, including the educational level, total physical activity and smoking history considered in this analysis, were collected at baseline through standardized questionnaires and clinical examinations for the calibration sample, and have been described elsewhere (Riboli *et al.*, 2002; Slimani *et al.*, 2002a; Haftenberger *et al.*, 2002a, b). Data on age as well as body weight and height were self-reported by the participants during the 24-HDR interview. The mean time interval between these baseline questionnaire measures and the 24-HDR interview varied by country, from 1 day to 3 years later (Slimani *et al.*, 2002a).

Statistical methods

Dietary intake data are presented as mean (*M*, least square mean) and standard error (s.e.), stratified by gender, study centre and 10-year age groups and ordered according to a geographical south/north gradient.

In generalized linear models, the mean intake data were adjusted for age, and weighted by season and day of the week of 24-HDR to control for different distributions of 24-HDR interviews across seasons and days of the week (Tables A1–A5 in Appendix). Such minimally adjusted intake data are given in all articles of this supplement and ensure direct comparability across articles. However, the rest of the analyses were performed using the fully adjusted model; that is, adjusted further for total energy, body weight and height. (Tables 1–7).

We examined the effect of adjustment for several covariates—including total energy intake, body weight and height, BMI, smoking status, education level and physical activity—on the mean intake data of total fat, SFA, MUFA, PUFA and cholesterol. Analyses were run stratified by BMI, smoking status, educational level, physical activity and season (data not shown but available on the EPIC website

Table 1 Fully adjusted[a] mean daily intake of total fat (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*											*Women*										
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*			*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	
Greece	1311	113.9	0.7	113.0	2.1	112.8	1.5	113.0	1.3	115.7	1.2	0.21	1373	87.3	0.5	88.9	1.3	89.5	0.9	86.0	0.9	85.0	1.0	0.10
Spain																								
Granada	214	108.1	1.7	—	—	111.4	3.7	105.2	2.4	114.5	3.9	0.24	300	79.7	1.1	81.2	2.7	82.0	1.8	78.7	1.6	74.7	3.4	0.10
Murcia	243	102.3	1.6	103.2	5.1	96.8	2.9	105.2	2.3	101.6	5.7	0.86	304	79.3	1.0	83.3	2.1	77.7	1.8	78.5	1.7	—	—	0.94
Navarra	444	105.2	1.2	113.2	5.3	103.6	2.0	104.8	1.7	107.9	3.7	0.56	271	85.4	1.1	87.5	2.9	85.7	1.8	84.4	1.7	—	—	0.84
San Sebastian	490	100.5	1.2	107.6	2.7	99.2	1.6	98.5	2.2	87.5	5.8	0.05	244	76.7	1.2	83.5	2.5	75.8	1.9	73.6	2.0	—	—	0.59
Asturias	386	93.0	1.3	87.5	4.9	92.9	2.2	94.5	1.9	90.5	3.5	0.56	324	72.5	1.0	72.6	2.4	76.3	1.6	70.3	1.6	66.4	3.7	0.23
Italy																								
Ragusa	168	83.5	2.0	—	—	82.0	2.9	85.3	3.1	—	—	0.30	138	74.1	1.5	84.4	2.6	66.1	2.9	70.3	2.8	—	—	0.77
Naples													403	69.8	0.9	75.9	2.9	69.9	1.4	67.6	1.4	73.8	2.9	0.70
Florence	271	82.7	1.5	83.8	4.9	84.9	2.6	80.6	2.2	—	—	0.42	784	67.9	0.6	70.7	2.2	68.4	1.1	67.2	0.9	67.7	2.5	0.15
Turin	676	77.7	1.0	77.7	3.2	77.2	1.6	78.0	1.4	74.4	3.7	0.29	392	65.6	0.9	71.8	2.9	66.4	1.5	64.4	1.3	—	—	0.02
Varese	327	79.2	1.4	—	—	79.9	3.1	78.9	1.7	81.4	4.7	0.16	794	66.3	0.6	68.9	2.1	68.0	1.1	65.3	1.0	62.9	1.9	0.02
France																								
South coast													620	81.5	0.7			80.1	1.2	81.5	1.1	82.8	1.5	0.01
South													1425	76.1	0.5			76.6	0.7	75.7	0.8	75.3	1.1	0.13
Northeast													2059	78.2	0.4			79.9	0.6	76.7	0.6	76.9	0.9	0.38
Northwest													631	75.5	0.7			76.9	1.1	74.3	1.1	74.8	1.7	0.43
Germany																								
Heidelberg	1034	102.5	0.8	99.3	2.1	101.4	1.3	104.2	1.2	—	—	0.45	1087	77.2	0.6	77.0	0.9	78.0	1.0	77.9	0.9	—	—	0.07
Potsdam	1233	110.5	0.7	109.9	2.1	108.2	1.5	111.6	1.0	108.9	2.8	0.95	1061	76.0	0.6	76.0	1.1	76.5	1.1	76.1	0.8	78.3	3.5	0.22
The Netherlands																								
Bilthoven	1024	98.8	0.8	100.1	1.6	97.3	1.2	98.1	1.4	—	—	0.15	1086	72.2	0.6	73.1	1.0	72.8	0.9	72.1	1.1	—	—	0.07
Utrecht													1870	71.1	0.4			71.1	0.7	70.4	0.6	71.1	0.9	0.99
United Kingdom																								
General population	402	94.5	1.3	92.1	4.2	91.8	2.3	94.1	2.3	98.8	2.3	0.10	570	67.5	0.8	67.1	2.3	66.4	1.2	67.2	1.4	69.5	1.6	0.23
Health-conscious	114	95.8	2.4	—	—	94.0	3.9	97.6	3.7	—	—	0.89	197	71.4	1.3	71.6	4.1	73.4	2.1	70.1	2.0	69.7	3.6	0.31
Denmark																								
Copenhagen	1356	102.7	0.7			101.8	1.1	103.1	0.9	105.3	3.5	0.09	1484	72.4	0.5			71.9	0.8	72.5	0.6	71.4	2.2	0.72
Aarhus	567	102.9	1.1			104.6	1.5	101.3	1.5	—	—	0.11	510	71.9	0.8			70.5	1.1	73.1	1.2	—	—	0.16
Sweden																								
Malmö	1421	106.4	0.7	—	—	105.0	2.0	106.9	1.1	107.5	1.0	0.20	1711	78.6	0.5			76.7	0.9	79.1	0.7	78.1	0.7	0.60
Umeå	1344	105.8	0.7	107.2	2.4	105.0	1.3	105.6	1.0	108.7	2.1	0.61	1574	74.1	0.5	74.7	1.1	73.9	0.8	73.9	0.7	74.6	1.5	0.85
Norway																								
South and East													1004	73.2	0.6	72.7	1.4	73.3	0.7	76.0	1.4			0.24
North and West													793	73.2	0.7	75.6	1.5	73.0	0.8	74.3	1.7			0.67

Abbreviations: M, mean; s.e., standard error; '—' If a group comprised fewer than 20 persons, mean intake is not presented.
[a]Adjusted for age (when not stratified for age), total energy intake, weight and height and weighted by season and day of recall.

(http://epic.iarc.fr)). Fat intake data were presented in g/d and in percentage contribution to total daily energy intake (%en). If fewer than 20 persons were represented in a stratum defined by centre, gender and age group, descriptive data are not presented in the tables.

The contribution of food groups to total fat, SFA, MUFA, PUFA and cholesterol intake is given as the mean percentage of intake (percentage of total intake, derived from the crude intake data); the contribution of a subgroup is given as a percentage of the food group. The contribution of food groups to total fat is provided in Table 8. The contribution for the other fat components is not shown but is available on the EPIC website (http://epic.iarc.fr). The categorization into food groups and food subgroups is common across centres and is adapted from the EPIC-SOFT food classification system as described elsewhere (Slimani *et al.*, 2000, 2002b). All statistical analyses were performed using SAS software (version 9.1, SAS Institute, Cary, NC, USA).

Results

Minimally adjusted data on fat, fatty acid and cholesterol intake (Tables A1–A5) are presented in the Appendix. Total energy intake proved to be by far the strongest predictor of variability, whereas the other tested covariates, including

Table 2 Fully adjusted[a] mean daily intake of saturated fatty acids (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*											*Women*										
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*			*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	
Greece	1311	35.1	0.4	36.5	1.1	35.7	0.8	34.3	0.7	35.2	0.6	0.26	1373	27.9	0.3	30.3	0.7	29.2	0.5	26.6	0.5	26.5	0.5	0.05
Spain																								
Granada	214	32.7	0.9	—	—	31.9	1.9	33.0	1.2	33.5	2.0	0.04	300	24.7	0.6	27.3	1.4	24.5	0.9	24.5	0.9	22.9	1.8	0.07
Murcia	243	27.7	0.8	27.7	2.6	24.9	1.5	29.5	1.2	26.7	2.9	0.91	304	21.6	0.6	23.0	1.1	21.9	0.9	20.7	0.9	—	—	0.36
Navarra	444	28.2	0.6	28.6	2.7	27.1	1.0	28.4	0.9	30.7	1.9	0.34	271	25.1	0.6	28.0	1.5	25.5	1.0	24.0	0.9	—	—	0.32
San Sebastian	490	26.9	0.6	28.7	1.4	27.2	0.8	24.6	1.1	25.8	3.0	0.17	244	21.8	0.6	23.1	1.3	21.5	1.0	21.3	1.0	—	—	0.83
Asturias	386	29.2	0.7	27.8	2.5	28.4	1.1	29.7	1.0	30.4	1.8	0.01	324	23.8	0.5	23.2	1.3	24.4	0.9	23.5	0.9	24.3	2.0	0.47
Italy																								
Ragusa	168	26.3	1.0	—	—	25.6	1.5	25.8	1.6	—	—	0.18	138	23.1	0.8	27.9	1.4	22.0	1.5	18.1	1.5	—	—	0.90
Naples													403	24.4	0.5	22.9	1.5	24.7	0.8	23.5	0.7	28.9	1.5	0.20
Florence	271	26.3	0.8	27.0	2.5	27.0	1.4	25.2	1.1	—	—	0.69	784	23.0	0.3	24.1	1.1	23.0	0.6	22.7	0.5	24.4	1.3	0.92
Turin	676	25.4	0.5	24.8	1.6	25.4	0.8	25.5	0.7	24.1	1.9	0.57	392	22.1	0.5	24.7	1.5	22.3	0.8	21.7	0.7	—	—	0.02
Varese	327	25.9	0.7	—	—	26.2	1.6	26.0	0.9	23.6	2.4	0.05	794	22.9	0.3	23.5	1.1	23.5	0.6	22.5	0.5	21.8	1.0	0.05
France																								
South coast													620	33.2	0.4			34.6	0.6	31.7	0.6	33.3	0.8	0.70
South													1425	32.0	0.3			32.5	0.4	31.3	0.4	31.9	0.6	0.65
North-East													2059	33.7	0.2			34.8	0.3	32.8	0.3	32.8	0.5	0.35
North-West													631	33.1	0.4			33.4	0.6	32.0	0.6	34.7	0.9	0.69
Germany																								
Heidelberg	1034	41.7	0.4	40.8	1.1	40.8	0.6	42.6	0.6	—	—	0.40	1087	31.9	0.3	31.4	0.5	32.6	0.5	32.4	0.5	—	—	0.23
Potsdam	1233	44.8	0.4	43.8	1.1	43.2	0.8	45.6	0.5	44.6	1.5	0.42	1061	31.0	0.3	31.2	0.6	31.2	0.6	30.9	0.4	31.8	1.9	0.54
The Netherlands																								
Bilthoven	1024	38.6	0.4	38.0	0.8	38.1	0.6	39.1	0.7	—	—	0.95	1086	29.6	0.3	29.5	0.5	30.2	0.5	29.6	0.6	—	—	0.34
Utrecht													1870	29.8	0.2			29.2	0.4	29.8	0.3	30.0	0.4	0.23
United Kingdom																								
General population	402	37.4	0.7	34.9	2.1	35.8	1.2	37.7	1.2	39.6	1.2	0.01	570	27.0	0.4	26.3	1.2	26.4	0.7	26.8	0.7	28.2	0.9	0.09
Health-conscious	114	30.9	1.2	—	—	26.6	2.0	33.1	1.9	—	—	0.20	197	23.7	0.7	27.2	2.2	23.3	1.1	22.9	1.1	24.4	1.9	0.42
Denmark																								
Copenhagen	1356	42.0	0.4			41.1	0.6	42.7	0.5	42.2	1.8	0.52	1484	30.1	0.3			29.7	0.4	30.2	0.3	30.5	1.2	0.12
Aarhus	567	44.1	0.5			45.1	0.8	43.3	0.8	—	—	0.19	510	30.7	0.4			30.5	0.6	30.8	0.6	—	—	0.29
Sweden																								
Malmö	1421	45.3	0.4			44.9	1.0	45.8	0.5	45.5	0.5	0.58	1711	34.2	0.2			33.1	0.5	34.3	0.4	34.2	0.4	0.35
Umeå	1344	46.8	0.4	48.5	1.2	46.4	0.7	46.7	0.5	47.5	1.1	0.60	1574	32.7	0.2	32.8	0.6	32.7	0.4	32.4	0.4	33.1	0.8	0.73
Norway																								
South and East													1004	30.6	0.3	29.4	0.7	30.9	0.4	32.1	0.7			0.03
North and West													793	30.5	0.3	32.2	0.8	30.3	0.4	31.0	0.9			0.56

Abbreviations: M, mean; s.e., standard error; '—' If a group comprised fewer than 20 persons, mean intake is not presented.
[a]Adjusted for age (when not stratified for age), total energy intake, weight and height and weighted by season and day of recall.

smoking, BMI, physical activity and education, explained only a very small part, if any, of the variation (data not shown but available on the EPIC website (http://epic.iarc.fr)). Thus, the following section presents data adjusted for age, total energy intake (not for data expressed as %en), body weight and height and weighted by season and day of the week of the recall.

Total fat intake

In both men and women, fully adjusted mean total fat intake was lowest in Turin with 77.7 and 65.6 g/d, and highest in Greece with 113.9 and 87.3 g/d, respectively (Table 1). Expressed as a contribution to the total energy intake, the corresponding figures were 28.3%en (men) and 31.3%en (women) in Turin and 40.9%en (men) and 42.0%en (women) in Greece (Table 6). A mean total fat intake of $\geqslant$36%en in men and $\geqslant$34%en in women was found in the majority of EPIC centres except for the UK, the Netherlands, Asturias/Spain (men) and most centres in Italy (Figures 1a and b). Differences by gender were statistically significant at $P<0.001$. In many EPIC centres, fat intake decreased with age; lower mean intake values were noted especially in the highest age group (65–74 years) (Table A1). After adjustment for energy intake, the differences became smaller or disappeared (Table 1). In southern European centres, about half of the total fat intake (Italian centres, Asturias/Spain) or more than half (Greece, most Spanish

Table 3 Fully adjusted[a] mean daily intake of monounsaturated fatty acids (g/d) by centre ordered from south to north, gender, and age group

Country and centre	*Men*											*Women*										
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*			*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	
Greece	1311	55.6	0.4	52.9	1.1	54.8	0.7	55.9	0.7	56.7	0.6	0.02	1373	41.5	0.3	40.2	0.7	43.0	0.4	40.9	0.5	40.8	0.5	0.97
Spain																								
Granada	214	52.5	0.9	—	—	57.1	1.9	49.7	1.2	56.0	2.0	0.57	300	37.3	0.5	36.9	1.4	39.9	0.9	36.0	0.8	34.7	1.7	0.39
Murcia	243	51.3	0.8	50.2	2.6	49.3	1.5	52.7	1.2	50.5	2.9	0.61	304	37.6	0.5	39.6	1.1	37.4	0.9	36.7	0.9	—	—	0.78
Navarra	444	52.0	0.6	55.3	2.7	51.4	1.0	52.0	0.9	51.7	1.9	0.28	271	40.8	0.6	40.4	1.5	40.5	0.9	41.0	0.9	—	—	0.11
San Sebastian	490	46.7	0.6	49.4	1.4	46.1	0.8	46.4	1.1	39.1	2.9	0.09	244	34.7	0.6	38.8	1.3	34.9	1.0	32.7	1.0	—	—	0.08
Asturias	386	42.1	0.7	35.5	2.5	42.7	1.1	43.2	1.0	40.0	1.8	0.49	324	31.0	0.5	31.7	1.3	32.8	0.8	29.9	0.8	26.8	1.9	0.13
Italy																								
Ragusa	168	41.2	1.0	—	—	40.4	1.5	42.9	1.6	—	—	0.38	138	36.1	0.8	40.5	1.3	30.8	1.5	37.0	1.4	—	—	0.46
Naples													403	31.9	0.5	39.2	1.5	31.0	0.7	31.1	0.7	32.4	1.5	0.33
Florence	271	40.8	0.8	41.1	2.5	42.3	1.3	40.0	1.1	—	—	0.17	784	31.9	0.3	33.8	1.1	32.4	0.6	31.3	0.5	30.9	1.3	0.03
Turin	676	36.4	0.5	36.2	1.6	36.0	0.8	36.7	0.7	35.4	1.9	0.58	392	29.9	0.5	32.6	1.5	30.7	0.8	29.0	0.7	—	—	0.00
Varese	327	38.5	0.7	—	—	39.2	1.6	37.8	0.9	43.8	2.4	0.10	794	30.3	0.3	30.7	1.1	31.2	0.6	30.1	0.5	27.6	1.0	0.15
France																								
South coast													620	28.2	0.4			26.7	0.6	28.8	0.6	29.3	0.8	0.22
South													1425	25.6	0.2			25.7	0.4	25.5	0.4	25.2	0.6	0.02
North-East													2059	25.9	0.2			26.4	0.3	25.5	0.3	25.7	0.5	0.53
North-West													631	24.4	0.4			25.6	0.6	23.7	0.6	23.1	0.9	0.18
Germany																								
Heidelberg	1034	36.1	0.4	35.4	1.1	35.9	0.6	36.3	0.6	—	—	0.30	1087	26.8	0.3	27.0	0.5	26.9	0.5	27.1	0.5	—	—	0.20
Potsdam	1233	37.2	0.4	37.0	1.1	36.4	0.7	37.3	0.5	37.9	1.4	0.28	1061	25.6	0.3	25.7	0.6	25.7	0.6	25.7	0.4	24.2	1.8	0.25
The Netherlands																								
Bilthoven	1024	29.7	0.4	30.1	0.8	28.9	0.6	29.5	0.7	—	—	0.33	1086	21.4	0.3	21.6	0.5	21.7	0.4	21.6	0.5	—	—	0.28
Utrecht													1870	21.0	0.2			21.5	0.4	20.3	0.3	20.9	0.4	0.68
United Kingdom																								
General population	402	33.5	0.6	32.8	2.1	32.6	1.1	33.4	1.2	35.1	1.2	0.14	570	23.6	0.4	24.6	1.2	23.2	0.6	23.5	0.7	23.9	0.8	0.60
Health-conscious	114	36.4	1.2	—	—	36.7	2.0	36.9	1.9	—	—	0.27	197	26.9	0.7	26.1	2.1	28.6	1.1	25.5	1.0	27.0	1.8	0.94
Denmark																								
Copenhagen	1356	36.0	0.4			36.1	0.6	36.0	0.5	36.5	1.8	0.41	1484	24.7	0.2			24.7	0.4	24.6	0.3	24.2	1.1	0.25
Aarhus	567	34.7	0.5			35.3	0.8	34.0	0.8	—	—	0.08	510	23.8	0.4			23.1	0.6	24.5	0.6	—	—	0.22
Sweden																								
Malmö	1421	38.6	0.4			38.3	1.0	38.6	0.5	39.3	0.5	0.15	1711	28.1	0.2			27.4	0.5	28.3	0.4	27.8	0.4	0.78
Umeå	1344	37.5	0.4	37.8	1.2	37.1	0.7	37.4	0.5	39.1	1.0	0.38	1574	26.1	0.2	26.5	0.6	25.9	0.4	25.9	0.4	26.2	0.8	0.52
Norway																								
South and East													1004	23.2	0.3	24.0	0.7	23.0	0.4	24.2	0.7			0.91
North and West													793	22.8	0.3	23.1	0.8	23.1	0.4	22.8	0.9			0.35

Abbreviations: M, mean; s.e., standard error; '—' If a group comprised fewer than 20 persons, mean intake is not presented.
[a]Adjusted for age (when not stratified for age), total energy intake, weight and height and weighted by season and day of recall.

centres) was of plant origin (Table 7). In central and northern European centres, food of animal origin was the dominant fat source. Especially in the Scandinavian centres, consumption of mixed margarines containing animal and plant fat in varying amounts contributed to the group 'fat of mixed or unknown origin'. This pattern is also reflected in the contribution of specific food groups and subgroups to the total fat intake by centre, as listed in Table 8.

Intake of SFA, MUFA and PUFA

On average, SFA intake in men and women was lowest in the Greek, Spanish, Italian and UK cohorts with an average intake of $\leqslant$13%en (down to 9%en) (Table 6), which corresponds to $\leqslant$35 g/d in men and $\leqslant$28 g/d in women (Table 2). In the other EPIC countries/centres (except for men in Bilthoven), SFA intake was $\geqslant$14%en in both men and women (Figures 1a and b). Mean intake figures were highest in both Swedish centres (16%en). Again, differences by gender were statistically significant ($P<0.001$). The contribution of food groups to SFA intake by EPIC centre is not shown but is available on the EPIC website (http://epic.iarc.fr), the main sources being dairy products, meat, added fats and oils and cakes.

The adjusted mean intake of MUFA among men ranged from 30 g/d in Bilthoven (the Netherlands) to 56 g/d in Greece (Table 3). Among women, the corresponding figures were 21 g/d (Dutch centres) and 42 g/d (Greece). In Greek women and men, MUFA intake provided more than 20% of the total energy intake. Except for the Greek, Spanish and most Italian

Table 4 Fully adjusted[a] mean daily intake of polyunsaturated fatty acids (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*											*Women*										
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*			*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	
Greece	1311	15.2	0.2	15.7	0.7	14.2	0.5	14.9	0.4	15.8	0.4	0.85	1373	11.7	0.2	12.3	0.5	11.0	0.3	12.4	0.3	11.5	0.4	0.84
Spain																								
Granada	214	14.9	0.6	—	—	14.4	1.2	14.6	0.8	16.9	1.3	0.04	300	11.3	0.4	10.7	0.9	11.2	0.6	11.7	0.6	10.9	1.2	0.64
Murcia	243	15.2	0.5	17.3	1.6	14.8	0.9	14.9	0.7	15.9	1.8	0.53	304	13.9	0.4	14.6	0.7	12.3	0.6	14.9	0.6	—	—	0.61
Navarra	444	16.7	0.4	20.8	1.7	16.8	0.7	16.2	0.6	17.2	1.2	0.29	271	12.8	0.4	12.7	1.0	13.1	0.6	12.7	0.6	—	—	0.23
San Sebastian	490	18.7	0.4	21.3	0.9	17.9	0.5	19.2	0.7	15.2	1.9	0.14	244	14.2	0.4	15.5	0.9	13.5	0.7	13.6	0.7	—	—	0.64
Asturias	386	14.1	0.4	16.5	1.6	14.2	0.7	13.8	0.6	13.2	1.1	0.07	324	11.7	0.3	11.4	0.8	12.9	0.6	10.9	0.6	9.8	1.3	0.32
Italy																								
Ragusa	168	11.4	0.6	—	—	11.4	0.9	12.0	1.0	—	—	0.24	138	10.8	0.5	11.8	0.9	9.3	1.0	11.4	1.0	—	—	0.61
Naples													403	9.2	0.3	10.3	1.0	9.9	0.5	8.7	0.5	7.8	1.0	0.02
Florence	271	10.9	0.5	11.4	1.6	10.8	0.9	10.8	0.7	—	—	0.41	784	8.7	0.2	8.4	0.8	8.8	0.4	8.8	0.3	8.2	0.9	0.65
Turin	676	11.1	0.3	11.9	1.0	11.0	0.5	11.2	0.5	10.4	1.2	0.13	392	9.4	0.3	9.9	1.0	9.1	0.5	9.6	0.4	—	—	0.89
Varese	327	10.3	0.5	—	—	9.8	1.0	10.5	0.5	9.6	1.5	0.78	794	8.8	0.2	10.0	0.7	8.9	0.4	8.4	0.3	9.3	0.7	0.51
France																								
South coast													620	12.3	0.3			11.4	0.4	12.9	0.4	13.0	0.5	0.29
South													1425	11.2	0.2			10.8	0.3	11.5	0.3	11.2	0.4	0.62
North-East													2059	10.8	0.1			10.9	0.2	10.7	0.2	10.9	0.3	0.83
North-West													631	10.2	0.3			10.1	0.4	10.8	0.4	9.2	0.6	0.61
Germany																								
Heidelberg	1034	17.7	0.3	16.2	0.7	17.9	0.4	18.0	0.4	—	—	0.24	1087	13.2	0.2	13.4	0.3	13.2	0.3	13.0	0.3	—	—	0.14
Potsdam	1233	21.2	0.2	22.1	0.7	21.5	0.5	21.2	0.3	19.3	0.9	0.07	1061	14.2	0.2	13.8	0.4	14.3	0.4	14.2	0.3	17.1	1.2	0.17
The Netherlands																								
Bilthoven	1024	20.2	0.3	21.0	0.5	20.3	0.4	19.6	0.4	—	—	0.28	1086	13.3	0.2	14.0	0.3	13.0	0.3	13.1	0.4	—	—	0.63
Utrecht													1870	12.5	0.1			12.5	0.3	12.4	0.2	12.6	0.3	0.66
United Kingdom																								
General population	402	16.2	0.4	17.7	1.3	16.2	0.7	15.7	0.7	16.4	0.7	0.33	570	11.4	0.3	11.0	0.8	11.5	0.4	11.3	0.5	11.7	0.6	0.16
Health-conscious	114	21.3	0.8	—	—	23.7	1.3	20.4	1.2	—	—	0.17	197	15.5	0.4	12.8	1.4	16.1	0.7	16.5	0.7	13.0	1.2	0.94
Denmark																								
Copenhagen	1356	15.0	0.2			15.0	0.4	14.8	0.3	16.5	1.1	0.42	1484	10.5	0.2			10.5	0.3	10.5	0.2	9.9	0.8	0.41
Aarhus	567	14.1	0.3			14.1	0.5	14.1	0.5	—	—	0.31	510	10.1	0.3			9.8	0.4	10.4	0.4	—	—	0.59
Sweden																								
Malmö	1421	14.8	0.2			14.4	0.7	14.7	0.3	14.8	0.3	0.19	1711	10.5	0.2			10.5	0.3	10.6	0.3	10.2	0.2	0.40
Umeå	1344	13.7	0.2	13.4	0.8	13.7	0.4	13.7	0.3	14.2	0.7	0.06	1574	9.8	0.2	9.9	0.4	9.7	0.3	9.9	0.2	9.7	0.5	0.40
Norway																								
South and East													1004	12.5	0.2	12.6	0.5	12.5	0.2	12.4	0.5			0.15
North and West													793	12.9	0.2	13.3	0.5	12.7	0.3	13.1	0.6			0.79

Abbreviations: M, mean; s.e., standard error; '—' If a group comprised fewer than 20 persons, mean intake is not presented.
[a]Adjusted for age (when not stratified for age), total energy intake, weight and height and weighted by season and day of recall.

centres, average MUFA intake was between 10%en and 13%en (Figures 1a and b). Food sources of MUFA also differed in a similar manner: in Greece, Spain and Italy, vegetable (olive) oil provided more than 40% (up to 64% in Greece) of MUFA intake, whereas in most other EPIC centres the main contributors to total MUFA intake were meat and meat products, added fats and dairy products (data not shown but available on the EPIC website (http://epic.iarc.fr); the UK health-conscious cohort differed from the other centres, with an expected low contribution from meat and meat products but a high contribution from nuts and seeds to overall MUFA (and to a minor extent also to SFA and PUFA) intake. Although statistically significant, differences among gender were generally small.

The mean PUFA intake among women ranged between 9 and 16 g/d (Table 4), corresponding to 4–7%en (Table 6). Among men, the mean intake figures were between 10 and 21 g/d, or 4–8%en. The highest PUFA intake was noted for the UK health-conscious cohort, with a contribution from nuts and seeds of >15% of the total intake (data not shown but available on the EPIC website: http://epic.iarc.fr).

Cholesterol intake

Cholesterol intake was lowest in the UK health-conscious cohort, with mean intake figures of 215 mg in men and 140 mg in women, followed by the Greek and Dutch centres (Table 5). The highest average cholesterol intakes—with up

Table 5 Fully adjusted[a] mean daily intake of cholesterol (mg/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*											*Women*										
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		P_{trend}
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*			*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	
Greece	1311	274.3	6.0	289.3	17.6	276.7	12.0	264.6	10.9	275.9	9.6	0.33	1373	211.3	4.8	237.9	12.5	218.8	8.1	200.3	8.4	199.3	9.6	0.05
Spain																								
Granada	214	410.5	14.3	—	—	410.4	30.0	407.6	19.4	412.4	32.3	0.27	300	294.6	9.9	318.5	25.3	291.1	16.5	276.0	15.4	355.4	31.6	0.65
Murcia	243	370.3	13.5	414.5	41.7	346.6	24.1	383.3	18.7	320.0	46.6	0.23	304	281.2	9.8	295.4	19.6	293.3	16.4	258.8	16.2	—	—	0.77
Navarra	444	477.4	10.0	569.5	43.2	483.7	16.6	469.0	14.2	448.4	30.4	0.08	271	347.6	10.3	404.3	27.1	328.8	16.9	345.8	15.8	—	—	0.44
San Sebastian	490	583.1	9.6	593.7	22.4	591.8	13.1	564.7	18.0	538.8	47.5	0.05	244	384.0	10.9	425.0	23.2	397.0	17.6	350.1	18.3	—	—	0.21
Asturias	386	511.0	10.7	532.7	40.0	516.7	17.8	515.0	15.9	470.4	28.9	0.09	324	370.4	9.5	370.6	22.9	393.2	15.3	356.3	15.2	340.3	34.7	0.26
Italy																								
Ragusa	168	360.7	16.2	—	—	403.1	24.0	303.2	25.2	—	—	0.49	138	262.9	14.5	289.9	24.0	285.8	27.0	211.9	25.8	—	—	0.94
Naples													403	292.3	8.5	286.7	27.5	304.6	13.4	271.2	13.1	344.9	27.5	0.43
Florence	271	348.6	12.7	397.7	40.0	364.8	21.7	329.6	18.0	—	—	0.06	784	286.1	6.1	320.2	20.4	287.9	10.5	284.3	8.4	245.4	23.7	0.04
Turin	676	340.8	8.1	318.8	26.0	377.6	13.4	323.8	11.5	297.8	30.7	0.56	392	279.6	8.6	343.3	27.1	287.5	14.2	258.0	12.0	—	—	0.99
Varese	327	303.6	11.6	—	—	328.2	25.7	297.3	13.9	292.3	38.9	0.19	794	275.9	6.1	285.5	19.4	276.5	10.1	282.6	9.1	239.6	18.2	0.20
France																								
South coast													620	304.0	6.9			314.4	11.2	280.1	10.7	324.9	14.2	0.86
South													1425	307.2	4.6			316.7	7.0	303.2	7.2	291.4	10.1	0.02
North-East													2059	324.5	3.8			333.9	5.9	325.0	5.9	298.5	8.6	0.18
North-West													631	332.4	6.8			343.8	10.7	309.6	10.2	358.9	16.3	0.81
Germany																								
Heidelberg	1034	378.2	6.5	381.9	17.4	364.1	10.3	391.9	9.6	—	—	0.29	1087	283.0	5.2	284.2	8.8	282.8	9.4	283.9	8.6	—	—	0.23
Potsdam	1233	365.7	5.9	357.4	17.1	358.8	12.0	374.3	7.8	329.1	23.2	0.52	1061	267.0	5.2	278.8	10.3	268.6	10.1	265.4	7.7	219.2	32.9	0.11
The Netherlands																								
Bilthoven	1024	268.0	6.8	256.8	12.8	264.8	10.2	280.2	11.4	—	—	0.59	1086	210.3	5.3	203.1	9.2	216.5	8.0	220.0	9.9	—	—	0.96
Utrecht													1870	214.6	4.0			216.4	6.8	208.6	6.0	216.5	8.0	0.99
United Kingdom																								
General population	402	335.8	10.4	299.5	34.2	304.0	18.6	343.5	19.0	372.2	18.9	0.04	570	251.5	7.1	235.6	21.4	237.3	11.6	263.0	12.8	266.7	15.2	0.07
Health-conscious	114	215.1	19.6	—	—	171.8	31.9	208.3	30.2	—	—	0.13	197	139.5	12.1	182.1	38.2	127.2	19.8	129.9	19.0	172.7	33.4	0.88
Denmark																								
Copenhagen	1356	432.8	5.7			430.8	9.2	433.7	7.4	440.7	28.5	0.15	1484	316.0	4.4			306.2	7.3	321.0	5.7	311.7	20.9	0.76
Aarhus	567	417.1	8.8			432.4	12.4	405.1	12.5	—	—	0.18	510	321.4	7.5			304.5	10.6	339.9	10.8	—	—	0.92
Sweden																								
Malmö	1421	407.6	5.9			395.9	16.6	400.1	8.8	417.4	7.9	0.21	1711	320.2	4.2			312.2	8.4	323.2	6.8	315.9	6.4	0.79
Umeå	1344	407.0	5.8	372.0	19.3	417.9	10.7	399.2	7.9	444.0	17.0	0.16	1574	298.1	4.3	290.5	10.4	299.1	7.6	306.1	6.5	272.4	13.7	0.58
Norway																								
South and East													1004	280.6	5.5	276.3	12.9	275.9	6.6	320.2	13.3			0.34
North and West													793	281.5	6.1	281.3	13.8	283.2	7.4	292.4	15.8			0.23

Abbreviations: M, mean; s.e., standard error; '—' If a group comprised fewer than 20 persons, mean intake is not presented.
[a]Adjusted for age (when not stratified for age), total energy intake, weight and height and weighted by season and day of recall.

Table 6 Adjusted[a] mean daily intake of total fat, SFA, MUFA and PUFA (as a percentage of total daily energy intake) by centre ordered from south to north, and gender

Country and centre	*Men*									*Women*								
	N	*Total fat*		*SFA*		*MUFA*		*PUFA*		N	*Total fat*		*SFA*		*MUFA*		*PUFA*	
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*		*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*
Greece	1311	40.9	0.2	12.1	0.1	20.6	0.1	5.3	0.1	1373	42.0	0.2	12.7	0.1	20.8	0.1	5.6	0.1
Spain																		
Granada	214	38.7	0.6	11.7	0.3	18.8	0.3	5.3	0.2	300	37.5	0.5	11.4	0.3	17.7	0.3	5.3	0.2
Murcia	243	36.8	0.6	10.2	0.3	18.2	0.3	5.5	0.2	304	38.0	0.5	10.6	0.3	17.8	0.3	6.5	0.2
Navarra	444	38.1	0.4	10.4	0.2	18.6	0.2	6.1	0.1	271	40.8	0.5	12.0	0.3	19.5	0.3	6.1	0.2
San Sebastian	490	36.6	0.4	10.4	0.2	16.7	0.2	6.5	0.1	244	36.9	0.6	10.6	0.3	16.6	0.3	6.7	0.2
Asturias	386	33.8	0.4	10.8	0.2	15.1	0.2	5.1	0.1	324	34.4	0.5	11.3	0.2	14.7	0.2	5.5	0.2
Italy																		
Ragusa	168	29.5	0.7	9.5	0.3	14.3	0.3	4.0	0.2	138	35.3	0.7	11.2	0.4	16.9	0.4	5.1	0.2
Naples										403	33.2	0.4	11.6	0.2	15.2	0.2	4.4	0.1
Florence	271	30.0	0.5	9.6	0.3	14.6	0.3	3.9	0.2	784	32.2	0.3	10.8	0.2	15.2	0.2	4.1	0.1
Turin	676	28.3	0.3	9.2	0.2	13.3	0.2	4.0	0.1	392	31.3	0.4	10.4	0.2	14.4	0.2	4.5	0.1
Varese	327	29.7	0.5	10.0	0.2	14.0	0.2	3.9	0.2	794	31.7	0.3	10.9	0.2	14.6	0.2	4.2	0.1
France																		
South coast										620	38.9	0.3	15.8	0.2	13.5	0.2	5.9	0.1
South										1425	36.6	0.2	15.3	0.1	12.3	0.1	5.4	0.1
North-East										2059	37.7	0.2	16.1	0.1	12.6	0.1	5.3	0.1
North-West										631	36.5	0.3	15.8	0.2	11.8	0.2	5.1	0.1
Germany																		
Heidelberg	1034	36.2	0.3	14.6	0.1	12.7	0.1	6.3	0.1	1087	36.6	0.3	15.1	0.1	12.7	0.1	6.3	0.1
Potsdam	1233	39.3	0.2	15.9	0.1	13.2	0.1	7.6	0.1	1061	36.2	0.3	14.7	0.1	12.1	0.1	6.8	0.1
The Netherlands																		
Bilthoven	1024	35.1	0.3	13.6	0.1	10.8	0.1	7.1	0.1	1086	34.4	0.3	14.0	0.1	10.3	0.1	6.3	0.1
Utrecht										1870	33.9	0.2	14.2	0.1	10.0	0.1	6.0	0.1
United Kingdom																		
General population	402	32.9	0.4	12.9	0.2	11.6	0.2	5.7	0.1	570	31.4	0.4	12.6	0.2	10.9	0.2	5.4	0.1
Health-conscious	114	32.5	0.8	9.9	0.4	12.4	0.4	7.8	0.3	197	33.9	0.6	11.4	0.3	12.8	0.3	7.3	0.2
Denmark																		
Copenhagen	1356	36.2	0.2	14.7	0.1	12.8	0.1	5.4	0.1	1484	34.3	0.2	14.3	0.1	11.7	0.1	5.0	0.1
Aarhus	567	37.0	0.4	15.6	0.2	12.7	0.2	5.2	0.1	510	35.1	0.4	14.8	0.2	11.8	0.2	5.0	0.1
Sweden																		
Malmö	1421	37.2	0.2	16.0	0.1	13.4	0.1	5.1	0.1	1711	37.1	0.2	16.2	0.1	13.2	0.1	5.0	0.1
Umeå	1344	37.2	0.2	16.4	0.1	13.2	0.1	4.9	0.1	1574	35.0	0.2	15.4	0.1	12.3	0.1	4.7	0.1
Norway																		
South and East										1004	34.5	0.3	14.3	0.1	10.9	0.1	5.9	0.1
North and West										793	34.4	0.3	14.3	0.2	10.7	0.2	6.1	0.1

Abbreviations: M, mean; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; s.e., standard error; SFA, saturated fatty acids.
[a]Adjusted for age, weight and height and weighted by season and day of recall.

to 583 mg in men and 384 mg in women in San Sebastian—were found for the northern Spanish cohorts (San Sebastian, Asturias and Navarra). As expected, the main food sources of cholesterol were meat, eggs, dairy products, fish and cakes (data not shown but available on the EPIC website (http://epic.iarc.fr). A specifically high contribution of butter to total cholesterol intake was observed for the German centres, followed by the UK general population.

Discussion

Using the recently standardized food composition tables (ENDB) (Slimani *et al.*, 2007), we were able to improve the comparability of the fat content data among 10 European countries. The standardized dietary assessment instrument applied in all cohorts—24-HDRs administered with the software EPIC-SOFT—also ensured the validity of the data on fat intake across the EPIC centres. We observed a wide range of intake of total fat, types of fatty acids and cholesterol in EPIC at the group level. Despite some similarities in the average lipid intake among several EPIC centres, marked differences in lipid intake profiles were observed, particularly between the Mediterranean and other EPIC centres.

As could be expected from food-based analyses in the EPIC cohorts (Linseisen *et al.*, 2002a, b), Greek participants had the highest total fat and MUFA intake in EPIC, provided mainly by olive oil. Other southern European centres (Spain followed by Italy) showed a high MUFA intake but, at the

Table 7 Fully adjusted[a] mean daily intake of fat of animal origin, plant origin or mixed/unknown origin (g/d) by centre ordered from south to north and gender

Country and centre	*Men*										*Women*									
	N	*Fat of animal origin*			*Fat of plant origin*			*Mixed/unknown origin*			N	*Fat of animal origin*			*Fat of plant origin*			*Mixed/unknown origin*		
		M	*s.e.*	*Percentage of total fat*	*M*	*s.e.*	*Percentage of total fat*	*M*	*s.e.*	*Percentage of total fat*		*M*	*s.e.*	*Percentage of total fat*	*M*	*s.e.*	*Percentage of total fat*	*M*	*s.e.*	*Percentage of total fat*
Greece	1311	39.1	0.7	34.3	66.9	0.7	58.7	7.8	0.6	6.8	1373	29.7	0.5	34.0	50.2	0.5	57.5	7.4	0.4	8.5
Spain																				
Granada	214	43.7	1.7	40.4	59.4	1.6	54.9	4.9	1.4	4.5	300	29.3	1.1	36.8	44.4	1	55.7	5.9	0.8	7.4
Murcia	243	35.9	1.6	35.1	61.4	1.5	60.0	5.0	1.3	4.9	304	26.5	1.1	33.4	47.9	1	60.4	4.9	0.8	6.2
Navarra	444	39.7	1.2	37.7	61.1	1.1	58.1	4.4	1.0	4.2	271	32.4	1.1	37.9	47.2	1	55.3	5.8	0.9	6.8
San Sebastian	490	42.1	1.2	41.9	55.6	1.0	55.3	2.7	0.9	2.7	244	27.3	1.2	35.6	43.9	1.1	57.2	5.5	0.9	7.2
Asturias	386	43.8	1.3	47.1	43.8	1.2	47.1	5.4	1.0	5.8	324	31.8	1	43.9	35.2	1	48.6	5.4	0.8	7.4
Italy																				
Ragusa	168	29.2	2.0	35.0	42.9	1.8	51.4	11.5	1.6	13.8	138	28.6	1.6	38.6	38.4	1.5	51.8	7.1	1.2	9.6
Naples											403	28.0	0.9	40.1	34.4	0.9	49.3	7.3	0.7	10.5
Florence	271	30.6	1.5	37.0	42.7	1.4	51.6	9.5	1.2	11.5	784	26.4	0.7	38.9	32.4	0.6	47.7	9.1	0.5	13.4
Turin	676	30.8	1.0	39.6	38.2	0.9	49.2	8.6	0.8	11.1	392	25.8	0.9	39.3	31.4	0.9	47.9	8.5	0.7	13.0
Varese	327	34.8	1.4	43.9	37.7	1.3	47.6	6.7	1.1	8.5	794	27.0	0.7	40.7	29.9	0.6	45.1	9.4	0.5	14.2
France																				
South coast											620	44.2	0.7	54.2	31.3	0.7	38.4	6	0.6	7.4
South											1425	43.4	0.5	57.0	26.8	0.5	35.2	5.9	0.4	7.8
North-East											2059	44.1	0.4	56.4	25.8	0.4	33.0	8.2	0.3	10.5
North-West											631	45.0	0.7	59.6	23.0	0.7	30.5	7.5	0.6	9.9
Germany																				
Heidelberg	1034	62.9	0.8	61.4	30.1	0.7	29.4	9.4	0.6	9.2	1087	44.5	0.6	57.6	24.9	0.5	32.3	7.7	0.4	10.0
Potsdam	1233	65.4	0.7	59.2	37.6	0.6	34.0	7.5	0.6	6.8	1061	41.5	0.6	54.6	26.9	0.5	35.4	7.6	0.4	10.0
The Netherlands																				
Bilthoven	1024	43.8	0.8	44.3	38.5	0.7	39.0	16.5	0.7	16.7	1086	30.6	0.6	42.4	27.1	0.5	37.5	14.5	0.4	20.1
Utrecht											1870	32.7	0.4	46.0	24.2	0.4	34.0	14.2	0.3	20.0
United Kingdom																				
General population	402	42.0	1.3	44.4	26.7	1.1	28.3	25.7	1.0	27.2	570	28.6	0.8	42.4	20.7	0.7	30.7	18.2	0.6	27.0
Health-conscious	114	29.5	2.4	30.8	45.5	2.1	47.5	20.8	1.9	21.7	197	18.2	1.3	25.5	37.4	1.2	52.4	15.8	1	22.1
Denmark																				
Copenhagen	1356	50.9	0.7	49.6	16.2	0.6	15.8	35.6	0.6	34.7	1484	34.7	0.5	47.9	15.6	0.4	21.5	22.1	0.4	30.5
Aarhus	567	49.2	1.1	47.8	15.7	1.0	15.3	38.0	0.9	36.9	510	33.3	0.8	46.3	15.5	0.8	21.6	23.1	0.6	32.1
Sweden																				
Malmö	1421	46.6	0.7	43.8	29.3	0.6	27.5	30.5	0.6	28.7	1711	34.9	0.5	44.4	22.3	0.4	28.4	21.4	0.4	27.2
Umeå	1344	46.0	0.7	43.5	25.9	0.6	24.5	34.0	0.6	32.1	1574	32.1	0.5	43.3	20.7	0.4	27.9	21.4	0.4	28.9
Norway																				
South and East											1004	37.8	0.6	51.6	20.5	0.6	28.0	14.9	0.5	20.4
North and West											793	38.0	0.7	51.9	20.6	0.6	28.1	14.6	0.5	19.9

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age, total energy intake, weight and height and weighted by season and day of recall.

Table 8 Mean contribution of major food groups and *selected subgroups*[a] to total dietary fat intake (%) by centre ordered from south to north and gender

Foodgroup/*subgroup*	*Greece*	*Granada*	*Murcia*	*Navarra*	*San Sebastian*	*Asturias*	*Ragusa*	*Naples*	*Florence*	*Turin*	*Varese*	*South coast–France*	*South–France*	*North-East–France*	*North-West–France*	*Heidelberg*	*Potsdam*	*Bilthoven*	*Utrecht*	*UKCP*	*UKHC*	*Copenhagen*	*Aarhus*	*Malmö*	*Umea*	*South-East–Norway*	*North-West–Norway*
Men																											
Added fats and oils	48	38	37	42	36	30	30	—	36	33	23	—	—	—	—	24	38	25	—	29	35	25	26	30	32	—	—
Vegetable oils	*92*	*92*	*93*	*98*	*97*	*92*	*94*	—	*90*	*91*	*77*	—	—	—	—	*14*	*5*	*9*	—	*17*	*27*	*8*	*6*	*4*	*4*	—	—
Butter	*1*	*4*	*2*	*0*	*0*	*1*	*2*	—	*8*	*5*	*15*	—	—	—	—	*57*	*41*	*14*	—	*27*	*18*	*20*	*15*	*7*	*8*	—	—
Margarine	*4*	*4*	*3*	*1*	*3*	*7*	*0*	—	*0*	*1*	*1*	—	—	—	—	*20*	*48*	*65*	—	*46*	*54*	*63*	*74*	*85*	*84*	—	—
Dairy products	18	16	10	9	11	16	16	—	17	19	19	—	—	—	—	16	15	18	—	15	8	15	16	17	18	—	—
Milk	*23*	*46*	*41*	*50*	*48*	*50*	*12*	—	*23*	*15*	*24*	—	—	—	—	*20*	*14*	*15*	—	*37*	*29*	*20*	*20*	*20*	*22*	—	—
Cheese	*71*	*46*	*52*	*36*	*36*	*40*	*85*	—	*68*	*77*	*69*	—	—	—	—	*54*	*54*	*63*	—	*40*	*47*	*54*	*52*	*58*	*45*	—	—
Meat and meat products	10	18	17	23	23	24	13	—	14	14	16	—	—	—	—	25	24	22	—	13	3	22	21	19	18	—	—
Processed meat	*22*	*64*	*58*	*59*	*49*	*64*	*53*	—	*50*	*56*	*56*	—	—	—	—	*73*	*76*	*62*	—	*54*	*49*	*50*	*52*	*56*	*60*	—	—
Fish and shellfish	1	3	3	3	4	5	2	—	2	2	1	—	—	—	—	1	2	1	—	2	0	5	4	3	3	—	—
Egg and egg products	1	3	2	4	5	4	2	—	2	2	1	—	—	—	—	1	1	2	—	2	1	2	2	2	2	—	—
Cereals and cereal products	5	3	4	3	3	3	5	—	5	7	5	—	—	—	—	4	2	6	—	9	10	6	6	5	6	—	—
Cakes	4	5	10	5	5	6	7	—	11	9	10	—	—	—	—	9	7	6	—	14	11	8	10	10	10	—	—
Sugar and confectionery	2	1	2	1	1	2	2	—	3	3	3	—	—	—	—	2	1	3	—	4	3	3	3	4	3	—	—
Condiments and sauces	4	4	2	2	4	3	15	—	6	6	17	—	—	—	—	10	4	7	—	5	6	11	8	8	6	—	—
Fruit	4	4	8	3	4	3	3	—	2	3	3	—	—	—	—	3	2	5	—	2	11	1	1	1	1	—	—
Nuts (Spread) and seeds	*43*	*65*	*70*	*71*	*73*	*68*	*47*	—	*34*	*38*	*57*	—	—	—	—	*65*	*52*	*93*	—	*83*	*93*	*42*	*45*	*56*	*53*	—	—
Women																											
Added fats and oils	48	39	40	40	39	27	30	28	34	33	22	21	20	21	21	23	32	23	21	24	28	21	19	24	25	18	17
Vegetable oils	*93*	*88*	*91*	*94*	*93*	*86*	*97*	*94*	*90*	*92*	*82*	*46*	*36*	*28*	*18*	*17*	*9*	*12*	*10*	*22*	*30*	*13*	*11*	*6*	*9*	*14*	*9*
Butter	*1*	*2*	*2*	*2*	*1*	*3*	*2*	*4*	*8*	*6*	*15*	*33*	*41*	*45*	*60*	*60*	*43*	*21*	*23*	*29*	*24*	*21*	*18*	*7*	*6*	*21*	*16*
Margarine	*5*	*9*	*4*	*4*	*6*	*9*	*1*	*1*	*0*	*1*	*1*	*12*	*10*	*15*	*16*	*16*	*43*	*56*	*60*	*40*	*45*	*60*	*64*	*84*	*82*	*60*	*70*
Dairy products	19	17	12	13	13	19	17	22	19	20	20	23	23	22	21	21	19	20	23	16	11	19	19	20	22	23	22
Milk	*31*	*50*	*44*	*54*	*54*	*55*	*13*	*18*	*24*	*18*	*27*	*9*	*9*	*8*	*9*	*20*	*14*	*14*	*16*	*36*	*28*	*14*	*14*	*19*	*18*	*12*	*13*
Cheese	*62*	*40*	*48*	*34*	*27*	*29*	*81*	*75*	*65*	*73*	*62*	*67*	*63*	*63*	*60*	*51*	*46*	*62*	*61*	*37*	*45*	*51*	*54*	*54*	*48*	*66*	*63*
Meat and meat products	7	12	13	18	16	17	14	10	12	11	12	16	17	17	18	17	18	17	17	11	2	17	17	16	14	18	19
Processed meat	*20*	*61*	*56*	*58*	*47*	*58*	*53*	*50*	*42*	*47*	*60*	*40*	*42*	*38*	*43*	*70*	*69*	*57*	*56*	*52*	*55*	*39*	*46*	*57*	*58*	*60*	*60*
Fish and shellfish	1	3	3	3	3	4	2	2	1	2	2	2	2	2	3	1	2	1	2	3	2	5	4	3	3	4	5
Egg and egg products	1	3	3	3	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2
Cereals and cereal products	5	4	3	3	3	3	5	6	5	7	5	4	4	4	4	4	3	7	7	9	9	7	7	5	7	7	7
Cakes	6	7	12	10	8	12	12	11	12	10	11	9	9	10	10	10	10	10	11	14	13	11	15	13	13	9	11
Sugar and confectionery	3	2	1	1	1	2	3	3	3	3	4	3	3	3	3	2	2	5	4	6	5	4	4	5	4	6	5
Condiments and sauces	3	3	2	2	4	3	11	9	4	5	16	11	12	11	11	12	6	7	7	6	6	9	8	9	7	7	6
Fruit	4	4	5	4	4	5	2	3	3	3	3	4	3	3	3	3	2	4	4	2	9	3	2	1	1	3	2
Nuts (Spread) and seeds	*50*	*63*	*61*	*73*	*68*	*75*	*39*	*42*	*52*	*32*	*53*	*62*	*58*	*66*	*68*	*66*	*49*	*86*	*89*	*75*	*90*	*35*	*29*	*53*	*43*	*76*	*81*

[a]Expressed as a percentage of the corresponding food group.

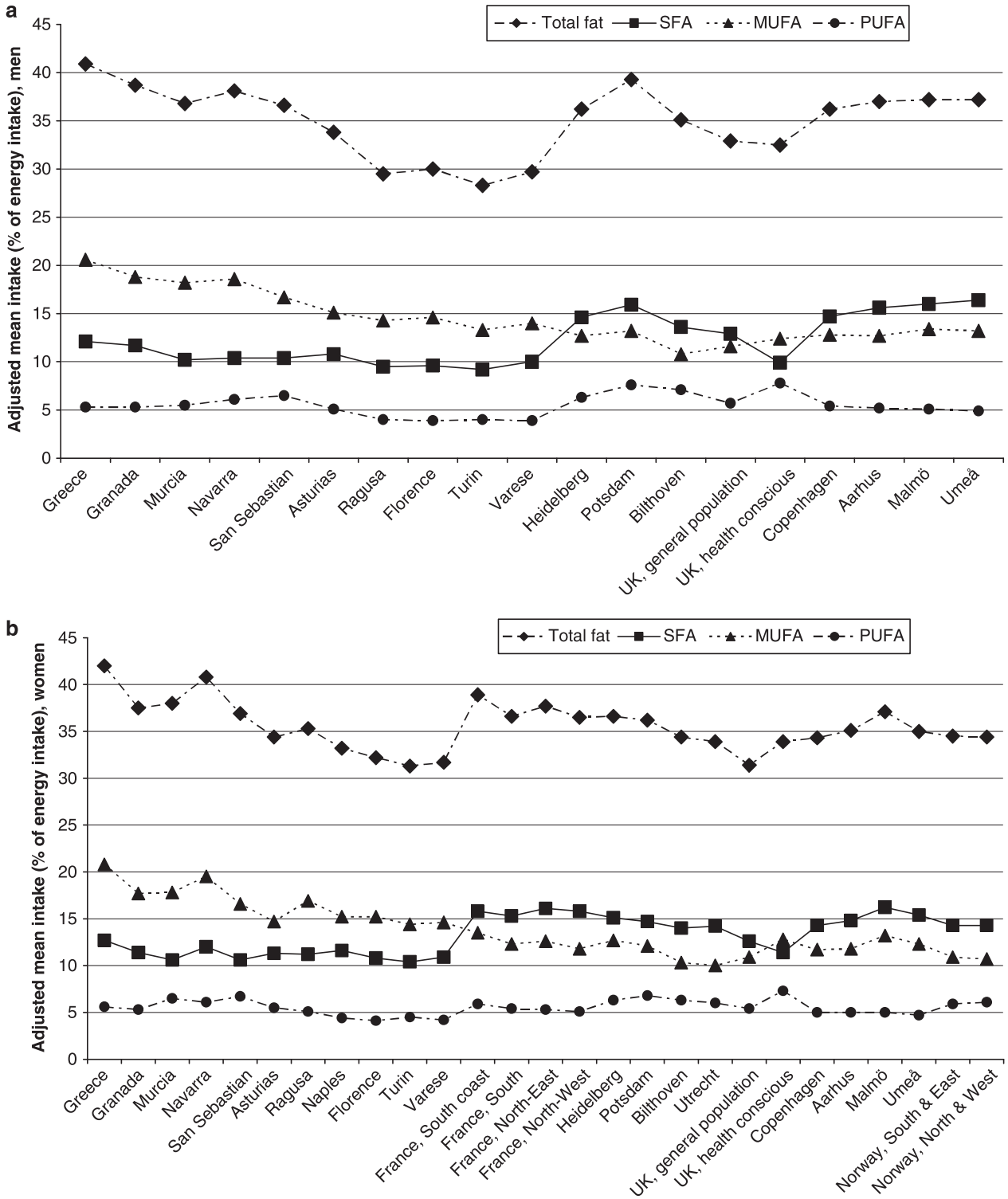

Figure 1 Mean intake of total fat, saturated (SFA), monounsaturated (MUFA) and polyunsaturated fatty acids (PUFA) (as a percentage of total energy intake) in (**a**) men and (**b**) women in the EPIC cohorts (adjusted for age, weight, height and weighted by day of 24-HDR and season). (Note: lines between centre means are included to facilitate readability of the graphs, but they do not indicate a relationship between centre means.)

same time, Italian centres had the lowest intake of total fat and SFA. Thus, southern European centres are characterized by high consumption of olive oil—a rich source of MUFA—and consequently by levels of MUFA in excess of SFA, whereas overall lipid intake in central and northern Europe (with the exception of the UK health-conscious cohort) is typified by a high proportion of lipids of animal origin—a rich source of saturated fats—and thus by levels of SFA higher than MUFA. SFA intakes in UK women and men from the general population cohort were intermediate between the results obtained for the southern European cohorts on the one hand and for the French, German and Scandinavian cohorts on the other hand. The UK health-conscious cohort also showed a very specific lipid intake pattern, with relatively low intakes of SFA and cholesterol but the highest intake of PUFA. Average cholesterol intake was also low in the Dutch and Greek EPIC centres.

The main sources of total fat intake were similar across EPIC but varied substantially in terms of percent contribution to intake. More than 50% (up to 76% in Greece) of the total fat intake was provided by the three food groups: 'added fats and oils' (including also fats and oils used during food preparation), 'meat and meat products' and 'dairy products'. An exception is the UK health-conscious cohort with only 41% (women) and 45% (men) of total fat from these three groups, and with lipids derived from 'nuts and seeds' contributing as much as 10% to the total lipid intake. The food group 'cakes' represented the fourth most important group in terms of its contribution to total fat intake, with an average of about 10% (range 4–15%). Even in countries/centres with a higher consumption of fatty fish (Welch *et al.*, 2002) the contribution of fish to total fat intake was relatively small ($\leqslant$5%). In the Spanish centres, fat from eggs provided up to 5% of fat intake. The high egg consumption combined with high meat and meat product consumption (Linseisen *et al.*, 2002b) helps to understand the comparatively high cholesterol intake in most Spanish centres.

Lipid intake data in EPIC and data obtained in the underlying populations, that is, from national or regional representative nutrition surveys, cannot be compared directly. It should be borne in mind that even the population-based EPIC cohorts are not strictly representative of the underlying population (Boeing *et al.*, 1999; Riboli *et al.*, 2002) because only volunteers can be enrolled, thus limiting external validity. Weighting for the deviation from the underlying population, as done for national evaluations (Linseisen *et al.*, 2003), was not performed for the current analyses because the data provided are meant to describe the lipid intake of the EPIC cohorts as a tool for investigating associations with disease risk. The European Nutrition and Health Report 2004 (Elmadfa and Weichselbaum, 2005) provides a comprehensive listing of dietary intake data assessed during roughly the same time window as the EPIC 24-HDRs. Data were included from adults in 14 European countries, covering all EPIC countries except the Netherlands. The dietary assessment methods applied in the different countries were, however, extremely heterogeneous, and unstandardized national food composition tables were used for nutrient calculations. Nevertheless, our findings are largely consistent with those reported from studies using more limited databases and procedures, but more representative samples (Elmadfa and Weichselbaum, 2005).

We then evaluated the mean intake levels in the EPIC cohorts in the light of dietary guidelines on lipid intake. Such guidelines may provide goals at the individual or at the population level, a difference that may have important implications for their interpretation. As we are dealing with data from a single dietary recall per subject, we can only present data at the group level. The proportion of total energy intake from fat ranged from 31 to 42%en in women and 28 to 41%en in men, which is in most cases (except for Italian men) higher than the goal of $<$30%en recommended by international and national expert panels (Sandström *et al.*, 1996; DGE, 2000; EURODIET, 2000; WHO/FAO, 2003). In many EPIC cohorts, the average total fat intake even exceeded the recommended dietary allowance of up to 35%en as set by the UK and US scientific boards (Department of Health, 1991; Food and Nutrition Board, 2005). Except for most Italian and Spanish EPIC centres and men in the UK health-conscious cohort, in which intakes were on average close to the SFA intake recommendation of $\leqslant$10%en (Department of Health, 1991; Sandström *et al.*, 1996; DGE, 2000; EURODIET, 2000; WHO/FAO, 2003), all other EPIC centres exceeded SFA intake recommendations. Concerning PUFA intake, an acceptable range of intake is given as 4–8%en (EURODIET, 2000) or 5–10%en (Sandström *et al.*, 1996; Food and Nutrition Board, 2005); an intake of $\geqslant$3%en (n-6 PUFA: 2.5%en; n-3 PUFA: 0.5%en) has also been recommended by a European expert group (DGE, 2000). The mean PUFA intake in the EPIC cohorts was between 4 and 8%en, and was thus in the acceptable range. Among men, the average cholesterol intake in most centres exceeded the recommended intake of $<$300 mg/d (DGE, 2000; WHO/FAO, 2003; Food and Nutrition Board, 2005), except for Greece, Bilthoven and the UK health-conscious cohort. However, among women, the mean cholesterol intake was below or close to 300 mg/d in almost all centres; only women in the northern Spanish centres had distinctly higher levels.

As we observed a very strong association between total energy intake and lipid intake data, we present only energy-adjusted data (g/d, %en) in the article, whereas non-energy-adjusted data are provided in the appendix. Although the levels of intake unadjusted for energy intake better reflect absolute intake levels, adjustment for total energy intake takes care of part of the measurement errors included in nutrient intake data (Willett, 1998; Spiegelman, 2004); it also takes into account the large physiological differences in anthropometry and physical activity reported between centres. It is well documented that overweight subjects are more likely to underestimate energy intake than normal weight subjects (Ferrari *et al.*, 2002). In addition, in the EPIC

study, we already observed that participants in Greece were more likely than those in other EPIC countries to underreport total energy intake (Ferrari *et al.*, 2002). Energy adjustment, however, also had a considerable effect on mean intake data in some other centres, including men in San Sebastian, Varese, the UK health-conscious cohort and Aarhus and women in some French centres and Aarhus. Our data consistently showed significant differences by gender for all lipid intake data (g/d) investigated. In addition, owing to the large size of the cohort, after adjustment for energy intake (data in %en), gender differences were still statistically significant even though actual differences decreased, for example, for MUFA intake.

Besides total energy intake and gender, we observed no distinct, consistent within- and between-centre effects of other factors (including education, physical activity, BMI, smoking, season) on the lipid intake results. Analysis of variance often showed statistically significant associations, but comparisons between strata of the potential covariates (including *P* for trend) showed no clear patterns (of practical relevance). Socio-economic status can obviously influence dietary habits (Lallukka *et al.*, 2007), but this may not necessarily be reflected in differences in lipid intake (Giskes *et al.*, 2004). In our study, education as a proxy of socio-economic status explained only a small part of the variation in lipid intake data. Smoking has also been reported to be related to diet quality (Boynton *et al.*, 2008), but we identified no substantial impact on fat intake in EPIC. The same is true for BMI or physical activity level (information available on the EPIC website: http://epic.iarc.fr).

A limitation of this study is the missing distinction between n-6 and n-3 PUFA, which is because of lack of information and standardization of individual fatty acid data across national food composition tables. Alternatively, plasma phospholipid fatty acid composition as a biomarker of fatty acid intake can be used to describe differences in (long-chain) n-6 and n-3 PUFA supply, an approach followed in a subsample of our study and detailed elsewhere (Saadatian-Elahi *et al.*, 2009). In this work, we used a food-based approach to distinguish between lipids of plant versus those of animal origin. Although plant-derived lipids were the dominating source of fat intake in the southern European countries—Greece, Spain and Italy, as well as in the UK health-conscious cohort—fats of animal origin clearly dominated in France (women) and Germany (see information available on the EPIC website (http://epic.iarc.fr)). In the other central or more northern European centres (the Netherlands, the UK general population, Denmark, Sweden and Norway), where the contribution of mixed fats (that is, mixed margarines, consisting of fat of animal and plant origin) was more important, the distinction between plant and animal sources of fat intake became less clear. The differences in consumption of fat of animal origin closely follow differences in arachidonic acid (C20:4 n-6) intake, which is only provided by foods of animal origin. The given data on the contribution of fish and fish product consumption to total lipid intake can be used to get a rough estimate on differences in the intake of fish oil fatty acids—n-3 PUFA eicosapentaenoic and docosahexaenoic acid—across EPIC centres. However, no conclusion on linoleic acid intake (C18:2 n-6) can be drawn because this fatty acid is provided by foods of both plant and animal origin.

In conclusion, in this large study, we describe differences and similarities in lipid intake across the EPIC cohorts of adults in 10 European countries using a recently standardized nutrient database to calculate the intake data. The heterogeneity in lipid intake shown in EPIC provides a good basis for future aetiological research on the role of different types of dietary lipids in health and disease outcomes.

Conflict of interest

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Appendix

Table A1 Minimally adjusted[a] mean daily intake of total fat (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*										*Women*									
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*	
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*		*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*
Greece	1311	99.5	1.3	109.8	3.9	104.8	2.7	95.0	2.4	92.9	2.1	1373	74.2	1.0	76.5	2.6	80.4	1.7	71.0	1.7	67.4	2.0
Spain																						
Granada	214	108.7	3.2	—	—	114.6	6.7	106.0	4.3	109.7	7.2	300	72.7	2.1	75.7	5.3	82.6	3.5	66.0	3.2	65.1	6.6
Murcia	243	108.6	3.0	121.2	9.4	108.0	5.4	109.3	4.2	99.9	10.4	304	83.6	2.0	90.2	4.1	83.8	3.4	82.9	3.4	—	—
Navarra	444	111.4	2.2	142.8	9.7	121.6	3.7	105.3	3.2	91.9	6.8	271	85.8	2.2	89.2	5.7	86.9	3.5	84.1	3.3	—	—
San Sebastian	490	116.0	2.1	129.0	5.0	121.2	2.9	112.4	4.0	93.4	10.7	244	81.0	2.3	94.7	4.9	87.8	3.7	68.8	3.8	—	—
Asturias	386	100.6	2.4	98.6	9.0	102.6	4.0	100.7	3.6	98.8	6.5	324	72.2	2.0	76.6	4.8	76.9	3.2	69.8	3.2	62.5	7.3
Italy																						
Ragusa	168	87.3	3.6	—	—	90.0	5.4	85.4	5.6	—	—	138	75.0	3.0	97.5	5.0	55.9	5.7	76.9	5.4	—	—
Naples												403	69.0	1.8	85.9	5.8	69.1	2.8	63.1	2.7	81.0	5.8
Florence	271	87.3	2.8	108.1	9.0	89.7	4.9	88.4	4.0	—	—	784	65.7	1.3	73.4	4.3	66.5	2.2	63.8	1.8	65.4	5.0
Turin	676	79.9	1.8	87.0	5.8	83.0	3.0	79.5	2.6	74.8	6.9	392	63.1	1.8	73.8	5.7	64.8	3.0	61.1	2.5	—	—
Varese	327	92.3	2.6	—	—	89.0	5.8	91.6	3.1	100.7	8.7	794	65.6	1.3	72.0	4.1	68.2	2.1	64.1	1.9	58.3	3.8
France																						
South coast												620	88.5	1.4			86.5	2.4	89.3	2.2	86.1	3.0
South												1425	80.9	0.9			81.2	1.5	80.8	1.5	77.4	2.1
North-East												2059	86.6	0.8			90.0	1.2	84.1	1.2	80.7	1.8
North-West												631	81.6	1.4			84.3	2.2	78.5	2.1	78.9	3.4
Germany																						
Heidelberg	1034	101.5	1.5	105.3	3.9	104.9	2.3	101.7	2.1	—	—	1087	77.9	1.1	82.8	1.8	81.8	2.0	75.6	1.8	—	—
Potsdam	1233	113.2	1.3	126.8	3.8	111.4	2.7	112.9	1.8	109.9	5.2	1061	74.2	1.1	75.3	2.2	78.1	2.1	74.1	1.6	76.9	6.9
The Netherlands																						
Bilthoven	1024	103.9	1.5	116.0	2.9	107.7	2.3	102.3	2.6	—	—	1086	73.9	1.1	81.7	1.9	76.4	1.7	70.0	2.1	—	—
Utrecht												1870	75.4	0.8			74.9	1.4	75.3	1.3	70.9	1.7
United Kingdom																						
General population	402	88.5	2.3	99.1	7.7	90.0	4.2	84.3	4.3	85.9	4.2	570	62.1	1.5	66.1	4.5	65.8	2.4	59.0	2.7	56.9	3.2
Health-conscious	114	84.5	4.4	—	—	75.8	7.1	87.7	6.8	—	—	197	73.5	2.5	70.5	8.0	73.1	4.1	75.4	4.0	72.4	7.0
Denmark																						
Copenhagen	1356	109.0	1.3			106.7	2.1	110.4	1.7	107.9	6.4	1484	75.4	0.9			75.4	1.5	74.8	1.2	67.3	4.4
Aarhus	567	114.2	2.0			117.4	2.8	113.2	2.8	—	—	510	83.3	1.6			84.6	2.2	81.9	2.3	—	—

Table A1 *Continued*

Country and centre	Men										Women									
	N	All		35–44 years		45–54 years		55–64 years		65–74 years		N	All		35–44 years		45–54 years		55–64 years		65–74 years	
		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.
Sweden																						
Malmö	1421	100.7	1.3			103.9	3.7	97.2	2.0	94.6	1.8	1711	76.8	0.9			77.0	1.8	74.8	1.4	72.8	1.3
Umeå	1344	107.0	1.3	125.8	4.3	107.2	2.4	103.1	1.8	104.4	3.8	1574	74.2	0.9	77.6	2.2	75.4	1.6	72.0	1.4	73.2	2.9
Norway																						
South and East												1004	72.1	1.1	76.1	2.7	73.9	1.4	73.9	2.8		
North and West												793	70.7	1.3	81.0	2.9	71.2	1.5	70.8	3.3		

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age (not when stratified for age) and weighted by season and day of recall.

Table A2 Minimally adjusted[a] mean daily intake of saturated fatty acids (g/d) by centre ordered from south to north, gender and age group

Country and centre	Men										Women									
	N	All		35–44 years		45–54 years		55–64 years		65–74 years		N	All		35–44 years		45–54 years		55–64 years		65–74 years	
		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.
Greece	1311	29.3	0.6	35.2	1.7	32.4	1.2	27.0	1.0	26.0	0.9	1373	22.5	0.4	25.2	1.1	25.4	0.7	20.3	0.8	19.1	0.9
Spain																						
Granada	214	32.7	1.4	—	—	32.9	2.9	33.1	1.9	31.4	3.1	300	21.7	0.9	25.0	2.3	24.6	1.5	19.2	1.4	18.8	2.9
Murcia	243	30.0	1.3	34.7	4.0	29.1	2.3	30.9	1.8	25.6	4.5	304	23.1	0.9	25.7	1.8	24.1	1.5	22.3	1.5	—	—
Navarra	444	30.5	1.0	40.1	4.2	34.1	1.6	28.3	1.4	24.1	2.9	271	25.2	0.9	28.7	2.5	25.8	1.6	23.7	1.4	—	—
San Sebastian	490	32.9	0.9	37.1	2.2	35.7	1.3	30.0	1.7	28.0	4.6	244	23.4	1.0	27.6	2.1	26.2	1.6	19.3	1.7	—	—
Asturias	386	32.0	1.0	32.0	3.9	32.1	1.7	32.0	1.5	33.4	2.8	324	23.6	0.9	24.8	2.1	24.6	1.4	23.2	1.4	22.7	3.2
Italy																						
Ragusa	168	27.6	1.6	—	—	28.7	2.3	25.7	2.4	—	—	138	23.3	1.3	33.1	2.2	17.8	2.5	20.6	2.4	—	—
Naples												403	23.9	0.8	27.0	2.5	24.3	1.2	21.5	1.2	31.4	2.5
Florence	271	28.1	1.2	36.7	3.9	29.0	2.1	28.2	1.7	—	—	784	22.1	0.6	25.3	1.9	22.2	1.0	21.3	0.8	23.3	2.2
Turin	676	26.2	0.8	28.6	2.5	27.7	1.3	25.9	1.1	24.2	3.0	392	21.1	0.8	25.5	2.5	21.7	1.3	20.4	1.1	—	—
Varese	327	31.0	1.1	—	—	29.8	2.5	30.9	1.3	31.1	3.8	794	22.6	0.6	24.8	1.8	23.6	0.9	22.0	0.8	19.8	1.7
France																						
South coast												620	36.2	0.6			37.3	1.0	35.0	1.0	34.7	1.3
South												1425	34.0	0.4			34.4	0.6	33.5	0.7	32.8	0.9
North-East												2059	37.1	0.3			38.9	0.5	35.8	0.5	34.4	0.8
North-West												631	35.6	0.6			36.6	1.0	33.8	0.9	36.4	1.5
Germany																						
Heidelberg	1034	41.3	0.6	43.3	1.7	42.2	1.0	41.6	0.9	—	—	1087	32.2	0.5	33.9	0.8	34.1	0.9	31.4	0.8	—	—
Potsdam	1233	45.9	0.6	50.6	1.7	44.4	1.2	46.1	0.8	45.0	2.2	1061	30.2	0.5	31.0	0.9	31.8	0.9	30.0	0.7	31.1	3.0
The Netherlands																						
Bilthoven	1024	40.7	0.7	44.4	1.2	42.3	1.0	40.8	1.1	—	—	1086	30.2	0.5	33.1	0.8	31.6	0.7	28.7	0.9	—	—
Utrecht												1870	31.5	0.4			30.8	0.6	31.8	0.6	29.8	0.7
United Kingdom																						
General population	402	35.1	1.0	37.8	3.3	35.2	1.8	33.9	1.8	34.6	1.8	570	24.8	0.7	26.0	2.0	26.2	1.1	23.5	1.2	23.1	1.4
Health-conscious	114	26.8	1.9	—	—	19.9	3.1	29.5	2.9	—	—	197	24.6	1.1	26.9	3.5	23.3	1.8	25.2	1.7	25.5	3.1
Denmark																						
Copenhagen	1356	44.6	0.5			43.1	0.9	45.6	0.7	43.3	2.8	1484	31.3	0.4			31.2	0.7	31.2	0.5	28.8	1.9
Aarhus	567	48.7	0.8			50.3	1.2	48.0	1.2	—	—	510	35.3	0.7			36.2	1.0	34.3	1.0	—	—
Sweden																						
Malmö	1421	43.2	0.6			44.6	1.6	42.1	0.8	40.5	0.8	1711	33.5	0.4			33.2	0.8	32.5	0.6	32.1	0.6
Umeå	1344	47.4	0.6	56.0	1.9	47.5	1.0	45.8	0.8	45.8	1.6	1574	32.7	0.4	34.0	1.0	33.4	0.7	31.6	0.6	32.5	1.3
Norway																						
South and East												1004	30.3	0.5	30.9	1.2	31.3	0.6	31.4	1.2		
North and West												793	29.6	0.6	34.5	1.3	29.7	0.7	29.6	1.5		

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age (not when stratified for age) and weighted by season and day of recall.

Table A3 Minimally adjusted[a] mean daily intake of monounsaturated fatty acids (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*										*Women*									
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*	
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*		*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*
Greece	1311	50.0	0.6	51.7	1.7	51.8	1.1	49.0	1.0	47.9	0.9	1373	36.7	0.4	35.6	1.1	39.7	0.7	35.5	0.7	34.4	0.8
Spain																						
Granada	214	52.8	1.4	—	—	58.4	2.9	50.1	1.8	54.2	3.1	300	34.8	0.8	34.9	2.2	40.2	1.4	31.4	1.3	31.2	2.7
Murcia	243	53.7	1.3	57.1	4.0	53.6	2.3	54.3	1.8	49.9	4.4	304	39.3	0.8	42.2	1.7	39.7	1.4	38.4	1.4	—	—
Navarra	444	54.4	0.9	66.7	4.1	58.4	1.6	52.2	1.3	45.6	2.9	271	41.0	0.9	41.0	2.3	41.0	1.5	41.0	1.4	—	—
San Sebastian	490	52.7	0.9	57.6	2.1	54.6	1.2	51.8	1.7	41.3	4.5	244	36.4	0.9	42.9	2.0	39.4	1.5	30.9	1.6	—	—
Asturias	386	45.1	1.0	39.9	3.8	46.5	1.7	45.6	1.5	43.3	2.7	324	30.9	0.8	33.2	2.0	33.1	1.3	29.8	1.3	25.3	3.0
Italy																						
Ragusa	168	42.6	1.5	—	—	43.5	2.3	43.0	2.4	—	—	138	36.5	1.3	45.4	2.1	27.1	2.3	39.5	2.2	—	—
Naples												403	31.7	0.7	42.9	2.4	30.8	1.2	29.5	1.1	35.2	2.4
Florence	271	42.5	1.2	50.4	3.8	44.1	2.1	43.0	1.7	—	—	784	31.1	0.5	34.7	1.8	31.7	0.9	30.1	0.7	30.1	2.1
Turin	676	37.3	0.8	39.7	2.5	38.2	1.3	37.3	1.1	35.5	2.9	392	28.9	0.7	33.4	2.3	30.2	1.2	27.7	1.0	—	—
Varese	327	43.5	1.1	—	—	42.7	2.4	42.7	1.3	51.1	3.7	794	30.0	0.5	31.9	1.7	31.3	0.9	29.7	0.8	25.9	1.6
France																						
South coast												620	30.8	0.6			29.0	1.0	31.7	0.9	30.5	1.2
South												1425	27.3	0.4			27.4	0.6	27.3	0.6	26.0	0.9
North-East												2059	29.0	0.3			30.0	0.5	28.2	0.5	27.1	0.7
North-West												631	26.6	0.6			28.3	0.9	25.2	0.9	24.6	1.4
Germany																						
Heidelberg	1034	35.7	0.6	37.7	1.7	37.3	1.0	35.4	0.9	—	—	1087	27.1	0.5	29.1	0.8	28.3	0.8	26.3	0.7	—	—
Potsdam	1233	38.2	0.6	43.6	1.6	37.6	1.1	37.8	0.7	38.2	2.2	1061	24.9	0.5	25.4	0.9	26.3	0.9	25.0	0.7	23.8	2.8
The Netherlands																						
Bilthoven	1024	31.6	0.6	36.2	1.2	32.9	1.0	31.1	1.1	—	—	1086	22.1	0.5	24.8	0.8	23.0	0.7	20.9	0.9	—	—
Utrecht												1870	22.6	0.3			22.9	0.6	22.2	0.5	20.9	0.7
United Kingdom																						
General population	402	31.2	1.0	35.5	3.3	31.9	1.8	29.6	1.8	30.1	1.8	570	21.6	0.6	24.2	1.8	23.0	1.0	20.4	1.1	19.3	1.3
Health-conscious	114	32.0	1.9	—	—	29.5	3.0	33.0	2.9	—	—	197	27.6	1.0	25.7	3.3	28.5	1.7	27.4	1.6	28.0	2.9
Denmark																						
Copenhagen	1356	38.4	0.5			37.9	0.9	38.8	0.7	37.4	2.7	1484	25.8	0.4			26.0	0.6	25.5	0.5	22.6	1.8
Aarhus	567	39.1	0.8			40.3	1.2	38.6	1.2	—	—	510	28.1	0.6			28.3	0.9	27.8	0.9	—	—
Sweden																						
Malmö	1421	36.4	0.6			37.8	1.6	34.8	0.8	34.4	0.7	1711	27.4	0.4			27.6	0.7	26.7	0.6	25.8	0.6
Umeå	1344	37.9	0.5	44.9	1.8	38.0	1.0	36.4	0.8	37.5	1.6	1574	26.1	0.4	27.5	0.9	26.5	0.7	25.2	0.6	25.7	1.2
Norway																						
South and East												1004	22.7	0.5	25.2	1.1	23.2	0.6	23.4	1.1		
North and West												793	21.8	0.5	25.0	1.2	22.4	0.6	21.5	1.4		

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age (not when stratified for age) and weighted by season and day of recall.

Table A4 Minimally adjusted[a] mean daily intake of polyunsaturated fatty acids (g/d) by centre ordered from south to north, gender and age group

Country and centre	*Men*										*Women*									
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*	
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*		*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*
Greece	1311	13.2	0.3	15.3	0.8	13.1	0.6	12.3	0.5	12.6	0.4	1373	9.9	0.2	10.5	0.6	9.8	0.4	10.3	0.4	9.2	0.4
Spain																						
Granada	214	15.1	0.7	—	—	15.0	1.5	14.8	0.9	16.3	1.6	300	10.4	0.4	10.0	1.1	11.4	0.7	10.0	0.7	9.7	1.4
Murcia	243	16.3	0.6	20.1	2.0	16.6	1.2	15.7	0.9	15.9	2.2	304	14.7	0.4	15.7	0.9	13.3	0.7	15.7	0.7	—	—
Navarra	444	17.8	0.5	25.2	2.1	19.6	0.8	16.4	0.7	15.0	1.5	271	12.9	0.5	13.0	1.2	13.3	0.8	12.8	0.7	—	—
San Sebastian	490	21.1	0.5	24.5	1.1	21.3	0.6	21.4	0.9	16.1	2.3	244	14.9	0.5	17.2	1.1	15.3	0.8	13.0	0.8	—	—
Asturias	386	15.3	0.5	18.2	1.9	15.8	0.9	14.8	0.8	14.6	1.4	324	11.7	0.4	12.0	1.0	13.1	0.7	11.0	0.7	9.3	1.6
Italy																						
Ragusa	168	12.1	0.8	—	—	12.7	1.2	12.2	1.2	—	—	138	11.1	0.7	13.7	1.1	7.9	1.2	12.4	1.2	—	—
Naples												403	9.2	0.4	11.8	1.2	9.9	0.6	8.1	0.6	9.1	1.2
Florence	271	11.6	0.6	14.9	1.9	11.4	1.0	12.1	0.9	—	—	784	8.4	0.3	8.8	0.9	8.5	0.5	8.3	0.4	7.9	1.1
Turin	676	11.5	0.4	13.2	1.3	11.9	0.6	11.5	0.6	10.5	1.5	392	9.1	0.4	10.2	1.2	8.9	0.6	9.1	0.5	—	—
Varese	327	12.2	0.6	—	—	11.2	1.2	12.4	0.7	12.6	1.9	794	8.8	0.3	10.4	0.9	9.0	0.5	8.3	0.4	8.7	0.8

Table A4 *Continued*

Country and centre	Men										Women									
	N	All		35–44 years		45–54 years		55–64 years		65–74 years		N	All		35–44 years		45–54 years		55–64 years		65–74 years	
		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.
France																						
South coast												620	13.3	0.3			12.2	0.5	13.9	0.5	13.4	0.6
South												1425	11.8	0.2			11.4	0.3	12.2	0.3	11.5	0.5
North-East												2059	12.0	0.2			12.3	0.3	11.7	0.3	11.5	0.4
North-West												631	11.1	0.3			11.1	0.5	11.3	0.5	9.8	0.7
Germany																						
Heidelberg	1034	17.5	0.3	17.0	0.8	18.3	0.5	17.7	0.5	—	—	1087	13.3	0.2	14.2	0.4	13.7	0.4	12.7	0.4	—	—
Potsdam	1233	21.7	0.3	24.5	0.8	22.0	0.6	21.4	0.4	19.5	1.1	1061	14.0	0.2	13.6	0.5	14.6	0.5	13.9	0.3	16.9	1.5
The Netherlands																						
Bilthoven	1024	20.9	0.3	23.2	0.6	21.8	0.5	20.2	0.6	—	—	1086	13.6	0.2	15.2	0.4	13.5	0.4	12.9	0.5	—	—
Utrecht												1870	13.1	0.2			13.1	0.3	13.2	0.3	12.6	0.4
United Kingdom																						
General population	402	15.3	0.5	18.7	1.7	15.9	0.9	14.2	0.9	14.5	0.9	570	10.6	0.3	10.8	1.0	11.4	0.5	10.1	0.6	9.9	0.7
Health-conscious	114	19.4	0.9	—	—	20.8	1.5	18.7	1.5	—	—	197	15.8	0.5	12.5	1.7	16.0	0.9	17.2	0.9	13.4	1.5
Denmark																						
Copenhagen	1356	15.8	0.3			15.7	0.4	15.8	0.4	16.8	1.4	1484	10.9	0.2			10.9	0.3	10.9	0.3	9.3	1.0
Aarhus	567	15.8	0.4			15.9	0.6	15.9	0.6	—	—	510	11.7	0.3			11.8	0.5	11.7	0.5	—	—
Sweden																						
Malmö	1421	13.8	0.3			14.1	0.8	13.2	0.4	12.8	0.4	1711	10.2	0.2			10.6	0.4	10.0	0.3	9.5	0.3
Umeå	1344	13.8	0.3	16.0	0.9	13.9	0.5	13.3	0.4	13.5	0.8	1574	9.8	0.2	10.3	0.5	9.9	0.3	9.6	0.3	9.5	0.6
Norway																						
South and East												1004	12.3	0.2	13.0	0.6	12.5	0.3	12.0	0.6		
North and West												793	12.4	0.3	14.0	0.6	12.4	0.3	12.5	0.7		

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age (not when stratified for age) and weighted by season and day of recall.

Table A5 Minimally adjusted[a] mean daily intake of cholesterol (mg/d) by centre ordered from south to north, gender and age group

Country and centre	Men										Women									
	N	All		35–44 years		45–54 years		55–64 years		65–74 years		N	All		35–44 years		45–54 years		55–64 years		65–74 years	
		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.		M	s.e.	M	s.e.	M	s.e.	M	s.e.	M	s.e.
Greece	1311	229	7	280	21	253	14	207	13	203	11	1373	173	5	200	14	192	9	158	9	149	11
Spain																						
Granada	214	416	17	—	—	424	35	414	23	399	38	300	275	11	303	29	295	19	240	18	329	36
Murcia	243	392	16	472	49	385	28	398	22	320	55	304	297	11	317	22	315	19	276	19	—	—
Navarra	444	500	12	668	51	546	20	472	17	398	36	271	351	12	408	31	334	19	347	18	—	—
San Sebastian	490	635	11	663	26	666	15	612	21	559	56	244	399	12	459	27	435	20	337	21	—	—
Asturias	386	538	13	574	47	552	21	537	19	500	34	324	371	11	383	26	397	18	357	17	329	40
Italy																						
Ragusa	168	373	19	—	—	429	28	305	30	—	—	138	267	17	330	28	256	31	233	30	—	—
Naples												403	292	10	317	32	304	15	260	15	372	32
Florence	271	363	15	475	47	378	26	356	21	—	—	784	279	7	326	23	282	12	274	10	240	27
Turin	676	347	9	346	31	395	16	328	14	295	36	392	272	10	349	31	282	16	248	14	—	—
Varese	327	344	14	—	—	358	30	337	16	350	46	794	274	7	293	22	277	12	280	10	226	21
France																						
South coast												620	323	8			332	13	302	12	334	16
South												1425	320	5			328	8	317	8	296	12
North-East												2059	349	4			363	7	347	7	309	10
North-West												631	348	8			364	12	320	12	370	19
Germany																						
Heidelberg	1034	375	8	401	20	376	12	385	11	—	—	1087	285	6	300	10	295	11	278	10	—	—
Potsdam	1233	376	7	413	20	370	14	380	9	332	27	1061	263	6	275	12	274	12	261	9	217	38
The Netherlands																						
Bilthoven	1024	285	8	308	15	299	12	295	13	—	—	1086	217	6	229	10	228	9	216	11	—	—
Utrecht												1870	229	5			229	8	225	7	217	9

Table A5 *Continued*

Country and centre	*Men*										*Women*									
	N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*		N	*All*		*35–44 years*		*45–54 years*		*55–64 years*		*65–74 years*	
		M	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*		*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*	*M*	*s.e.*
United Kingdom																						
General population	402	314	12	321	40	297	22	310	22	328	22	570	235	8	231	25	235	13	238	15	228	17
Health-conscious	114	169	23	—	—	101	38	167	36	—	—	197	144	14	176	44	124	23	144	22	180	38
Denmark																						
Copenhagen	1356	454	7			446	11	458	9	447	34	1484	326	5			317	8	329	7	300	24
Aarhus	567	454	10			474	15	444	15	—	—	510	357	9			348	12	368	12	—	—
Sweden																						
Malmö	1421	387	7			391	20	367	10	373	9	1711	315	5			313	10	310	8	300	7
Umeå	1344	410	7	431	23	424	13	390	9	429	20	1574	299	5	299	12	304	9	301	8	269	16
Norway																						
South and East												1004	276	6	284	15	276	8	314	15		
North and West												793	273	7	296	16	277	8	281	18		

Abbreviations: M, mean; s.e., standard error.
[a]Adjusted for age (not when stratified for age) and weighted by season and day of recall.