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SCIENTIFIC REPORT submitted to EFSA

Long-term dietary exposure to lead in young children living in different European countries[1]

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Abstract

Long-term dietary exposure to lead in children aged 1 up to 14 years living in 12 different European countries was estimated using daily food consumption patterns and mean lead concentrations in various food commodities. Food consumption data were all categorised according to a harmonised system to allow for linkage with lead concentration data in a standardised way. Two different models were used for the calculations: the beta-binomial-normal (BBN) model and the observed individual means (OIM) model. For both models the lower bound exposure ranged from 0.4 to 1.7 µg/kg bw per day for median consumers. For 99th percentile consumers however the exposure differed between the two models with a lower bound exposure ranging from 0.7 to 4.1 µg/kg bw per day with the BBN model and 0.9 to 7.9 µg/kg bw per day with the OIM model. Upper bound exposures were on average a factor 1.8 higher for both models. Exposures on a body weight basis were higher in younger compared to older children. To assess the long-term exposure to lead in European children, a model, such as the BBN model, that corrects for the within-person variation is the preferred method to be used. The OIM method results in an overestimation of the percentage of the population exceeding a provisional tolerable weekly intake which is of relevance for risk management decisions.

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Summary

Long-term dietary exposures to lead in children living in 12 different European countries, namely Belgium, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Spain and Sweden were estimated using daily food consumption patterns of children aged 1 up to 14 years derived from national food consumption databases and mean lead concentrations in various food commodities as supplied to EFSA. These concentrations were predominantly derived from 14 European countries. In total more than 100,000 lead concentrations in various food commodities were submitted. After the data cleaning steps, 94,126 sample results were found suitable for use in the exposure assessments.

Long-term dietary exposures were estimated using two models for long-term exposure. For this, daily food consumption patterns were combined with mean lead concentrations, and summed over foods consumed per day per individual. These daily exposure estimates were adjusted for the individual's body weight. In the observed individual means (OIM) approach, these daily exposure levels were averaged over the number of days present in the food consumption database per individual, resulting in a distribution of average exposure levels. This distribution of average exposure levels contains however both the variation between and within individuals. Variation in long-term exposure between individuals was estimated by correcting for the within individual variation using one of the available models for this purpose, the beta-binomial-normal (BBN) model. Food consumption data were all categorised according to a harmonised system to allow for linkage with lead concentration data in a standardized way, as well as the performance of a harmonised dietary exposure assessment to lead.

Using the BBN model, the national long-term exposures to lead from food across the 12 European countries, using lower bound concentrations, ranged from 0.4 to 1.7 µg/kg bw per day for median consumers, and from 0.7 to 4.1 µg/kg bw per day for 99th percentile consumers. Using upper bound concentrations, the exposures at the median and 99th percentile level were on average a factor 1.8 higher. Exposure levels in younger children were higher compared to older children. The food groups 'vegetables', 'cereals', 'miscellaneous', 'fruit juices', soft drinks/edible ices' and 'milk/dairy drinks' were identified as largely contributing to the long-term dietary exposure to lead.

With the OIM model, the median exposures were comparable to those obtained with the BBN model using lower bound concentrations. For 99th percentile consumers however, the exposures tended to be higher using the OIM model and ranged from 0.9 to 7.9 µg/kg bw per day . As with the BBN model, the exposures at the median and 99th percentile level were on average a factor 1.8 higher using upper bound concentrations. The food groups contributing largely to the exposure according to the OIM approach were similar to those resulting from the BBN model.

To assess whether there is a health risk of long-term dietary exposure to lead in children, the 99th percentile of exposure was compared to the daily equivalent of the provisional tolerable weekly intake (PTWI) of 3.6 µg/kg bw per day for lead. When the 99th percentile of long-term exposure exceeded the daily equivalent of the PTWI, the exact percentage of children was estimated. Using the BBN model and lower bound concentrations, we showed that the

percentage of children of which the 99th percentile of exposure exceeded the daily equivalent of the PTWI increased with decreasing age. In the lower bound scenario, only 1-, 2- and 3-year olds from Finland, and 1- and 2-year olds from Germany exceeded the daily equivalent of the PTWI. Using upper bound concentrations, 99th percentile consumers aged 1 to 10 years exceeded the daily equivalent of the PTWI in the majority of countries. Percentages of exceedances ranged from 1.1 % in 6-year olds from Denmark up to 28 % of the 1-year olds in Finland. High level consumers aged 11 to 14 years did not exceed the daily equivalent of the PTWI in any of the examined countries. Using the OIM model, the percentages of children with exposures above the daily equivalent of the PTWI tended to be higher: about a factor 7 using lower bound concentrations and 1.5 using upper bound concentrations.

To assess the long-term exposure to lead in European children, a model, such as the BBN model, that corrects for the within-person variation is the preferred method to be used. The OIM model only reflects the exposure during the duration of the food consumption survey which is more variable than the true long-term exposure. The OIM method results in an overestimation of the percentage of the population exceeding the daily equivalent of the PTWI which is of relevance for risk management decisions.

Another important advantage of the BBN model is that it can model covariates, such as age. This is important when assessing the exposure in children, because it is known that the exposure decreases with age, as shown for lead in this report. Ignoring the effect of age on the exposure when present may result in imprecise estimates of exposure and thus to wrong conclusions. However, models that correct for the within-person variation can only be used when the condition of normality of the transformed positive daily exposure distribution is met. This should always be checked when using these models to assess the long-term exposure to food chemicals.

Methodological issues of an exposure study linking different national food consumption databases with one "European" lead concentration database were addressed in the discussion.

Key words: dietary exposure, long-term exposure, children, lead, Europe

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Background

In order to carry out their risk assessments, the EFSA Panels on additives, flavourings, processing aids and materials in contact with food (AFC), on contaminants in the food chain (CONTAM), on Biological Hazards (BIOHAZ) and on additives and products or substances used in animal feed (FEEDAP) expressed the need to have reliable and detailed individual food consumption data for children and, in particular, of young children. In addition, a requirement for specific exposure assessment studies was identified in the same population groups. One of these studies should estimate the dietary exposure to lead.

Commission Regulation (EC) No 1881/2006[3] lays down maximum levels for lead in certain foods, but these levels need to be constantly reviewed by the Commission. Therefore, EFSA has recently been asked by the Commission to carry out an up-to-date risk assessment on lead exposure.

Keywords

Dietary exposure, long-term exposure, children, lead, Europe

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1.   Introduction

In this report, we describe the long-term exposure to lead in children living in 12 different European countries, namely Belgium, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Spain and Sweden. Lead intake can be adverse to human health on the long run (FAO/WHO, 1987, 2000), making a long-term exposure assessment most suitable.

For this exposure assessment food consumption data of children aged 1 up to 14 years were combined with concentration data. To estimate the long-term exposure we used the Monte Carlo Risk Assessment (MCRA) system (de Boer and van der Voet, 2007). In this program, different models to assess long-term dietary exposure to chemicals have been implemented.

In section 2, we describe the input data and the methodology used to assess the long-term dietary exposure to lead. In section 3, the results are described and listed. In the last section, these results are discussed in relation to their methodological limitations.

2.   Materials and Methods

2.1.   Lead concentration data

The lead concentration data were supplied to EFSA through the DATEX-2008-0002 call for concentration data on lead covering the period 2003 to 2008, issued by EFSA in April 2008 with a closing date of July 2008. EFSA received 139,113 sample results of which 98 % were supplied by 14 Member States (Austria, Belgium, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Great Britain, Ireland, Poland, Romania and Sweden) and Norway and 2 % by three commercial operators.

Germany was the major contributor providing 44 % of the concentration data followed by France (15 %), Czech Republic (9.7 %) and Romania (9.6 %). Since the last EU-wide data collection on lead was undertaken in 2002 (SCOOP, 2004), it was decided that the new data collection should cover the years 2003 to 2008. Samples from the years prior to 2003 were excluded, as 15,843 samples identified during the data cleaning steps with incomplete or incorrect food type or value unit description or insufficient sensitivity of the analytical method (a limit of detection (LOD) of more than 0.1 mg/kg or a limit of quantification (LOQ) of more than 0.3 mg/kg). A total of 94,126 sample results were correctly described with sufficient detail to be used for the estimation of the mean lead concentrations of the different food groups (see below).

The data were processed by EFSA and categorised in 42 communal food groups (Table 1). Measurements reported as 'below limit of determination (LOD)' or 'below limit of quantification (LOQ)' were imputed by zero (lower bound (LB) calculation) or the limit value itself (upper bound (UB) calculation). See Table 1 for the LB and UB mean lead concentrations per food group. We estimated usual intake based on mean lead concentrations, because lead is known to be toxic after a longer period of ingestion (see section 2.5). It is very unlikely that over a longer period of time any consumer only ingests foods with high lead concentrations. They are more likely to consume foods for which the contamination varies.

Table 1.   Mean lead concentration per food group[a] as used in the long-term exposure assessments, following two scenarios of assigning lead concentrations to non-detect samples.

Food group		Mean lead concentration (mg/kg)[b]	
Nr	Name	Lower bound	Upper bound
1	Composed foods-cereal based mixed dishes and cereal-based desserts	0.0045	0.0283
2	Vegetables excl. dried vegetables[c]	0.0325	0.0457
3	Nuts/seeds	0.0394	0.0632
4	Coffee/tea in concentrated and in powdered form	0.0038	0.0061
5	Chocolate (products)	0.0305	0.0406
6	Fruit excl. dried fruit[c]	0.0105	0.0228
7	Dried fruit	0.0350	0.0451
8	Fresh and dried herbs, spices, seasonings and condiments	0.2132	0.2253
9	Food supplements	0.7111	0.7271
10	Waters	0.0015	0.0030
11	Sugar, sweeteners and sugar products (e.g. sugar based confectionery, chewing gum and decorations)	0.0266	0.0554
12	Fats, oils and fat emulsions (also e.g. rice milk (no soy milk))	0.0292	0.0550
13	Composed foods: meat based mixed dishes	0.0159	0.0467
14	Composed foods: fish based mixed dishes	0.0222	0.0431
15	Dried vegetables	0.3797	0.3851
16	Pulses/legumes	0.0162	0.0422
17	Soy milk/soy based dessert	0.0040	0.0075
18	Milk/dairy drinks	0.0050	0.0117
19	Cheese	0.0176	0.0436
20	Dairy based products	0.0168	0.0323
21	Salt	0.1122	0.1776
22	Fish	0.0146	0.0469
23	Molluscs	0.2068	0.2676
24	Cephalopods	0.0224	0.0820
25	Crustaceans	0.0188	0.1216
26	Other seafood (echinoderms)	0.0786	0.1843

Food group		Mean lead concentration (mg/kg)[b]	
Nr	Name	Lower bound	Upper bound
27	Beer/malt beverages	0.0132	0.0321
28	Wine/substitutes	0.0249	0.0340
29	Other alcoholic beverages	0.0093	0.0137
30	Fruit juices/nectars[c]	0.0144	0.0250
31	Vegetable juices/nectars	0.0065	0.0177
32	Soft drinks/edible ices	0.0040	0.0403
33	Cereals/cereal products (no cereal based desserts or cereal based mixed dishes)[b]	0.0259	0.0444
34	Other food for special dietary uses	0.0146	0.0246
35	Infant formulae, follow up formulae, food for young children and infant formulae and follow up formulae for medical purposes[b]	0.0051	0.0125
37	Miscellaneous foods[c]	0.1041	0.1179
38	Liver/kidney	0.0782	0.1014
39	Offal except liver/kidney	0.0119	0.0528
40	Types of vegetarian substitutes for meat/fish	0.0128	0.0162
41	Fresh meat	0.0176	0.0364
42	Processed meat	0.0178	0.0416
45	Eggs	0.0052	0.0252

[a] No information was available about the years in which the foods categorised in the food groups were sampled.

[b] Samples with a lead concentration below limit of detection or quantification were assigned either a zero concentration (lower bound) or a concentration equal to the limit of detection or quantification (upper bound).

[c] These food groups have been renamed in Tables 4, 6, 9 and 10: nr 2 = vegetables; nr 6 = fruit; nr 30 = fruit juices; nr 33 = cereals; nr 35 = infant formulae; nr 37 = miscellaneous.

No information was available regarding the composition of the 42 communal food groups in relation to the foods analysed. This issue will therefore not be addressed here, although it is important for a correct interpretation of the lead exposure results.

2.2. National food consumption surveys

All national food consumption databases included in the lead dietary exposure assessments are described shortly below (see also Table 2). In this description, only children up to the age of 14 years are included in the analyses. Some surveys included dietary consumption figures up to the age of 15 years.

In all surveys, also non-dietary information of the children was obtained, including sex, age and body weight. When age or sex was missing the subject was excluded from the database. When weight was missing, it was replaced by the average estimated in the same group (defined by age, sex and country).

2.2.1. Belgium

For Belgium, food consumption data of preschool children living in Flanders (Dutch-speaking part of Belgium) were collected in 2002-2003 (Huybrechts et al., 2008). A representative sample of Flemish children aged 2.5 to 6.5 years were selected on the basis of a random cluster sampling strategy. In this study, eating habits were recorded of 661 children using a consecutive 3-day estimated dietary record. Caretakers were asked to estimate the portion sizes as accurate as possible: in standard units (e.g. one apple), in household measures (e.g. a small glass, half a plate) or, if possible, in the exact weight or volume (g or ml).

The survey was carried out from October 2002 until February 2003 (so data did not cover spring and summer). The research team ensured that all days of the week were approximately equally covered in the dietary records.

2.2.2. Cyprus

In Cyprus, a national study evaluating the frequency of eating disorder cases (Cyprus Study on eating disorders among High School students[5]) has been conducted since 2002 up to today. Between 2002 and 2006, food consumption data were collected of 1500 children, aged 2 to 18 years. Of this database, only the records of 268 students aged 11 to 14 years were used in the assessment, because these data were collected using a 3-day estimated dietary record. The food consumption data of the younger children were collected using a 1-day estimated dietary record. These data are therefore not suitable to assess the long-term dietary exposure. The children aged 15 to 18 years were excluded because they did not belong to the target population.

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[5] www.childhealth.ac.cy/ResearchGr.htm

Table 2.   Information on the food consumption data per country used to model long-term dietary exposure to lead

| Country | Year of survey | Represen- tativeness | Ages (year)[a] | Number of individuals | | | | Number of days / consecutive (yes or no) | Dietary survey method |
				Total	1-2 years	3-10 years	11-14 years		
Belgium	2002-2003	Regional	2-6	661	36	625	-	3 days / Yes	Dietary record
Cyprus	2002-2006	National	11-14	268	-	-	268	3 days / Yes	Dietary record
Czech Republic	2003-2004	National	4-14	602	-	493	109	2 days / No	24-h recall
Denmark	2000-2002	National	4-10	610	-	610	-	7 days / Yes	Dietary record
Finland-DIPP	2005	Regional	1, 3, 6	1,500	500	1,000	-	3 days / Yes	Dietary record
Finland-STRIP	2000	Regional	7-8	250	-	250	-	4 days / Yes	Dietary record
France	2005-2007	Regional	3-10	574	-	574	-	7 days / Yes	Dietary record
Germany	2006	Regional	1-10	303	92	211	-	3 days / Yes	Dietary record
Germany	2007	Regional	1-10	311	85	226	-	3 days / Yes	Dietary record
Germany	2008	National	1-10	307	84	223	-	3 days / Yes	Dietary record
Greece	2004-2005	Regional	4-6	795	-	795	-	3 days / Yes	Dietary record
Italy	2005-2006	National	1-10	252	36	189	-	3 days / Yes	Dietary record
Netherlands	2005-2006	National	2-6	1,279	322	957	-	2 days / No	Dietary record
Spain-Basque	2004-2005	Regional	4-14	760	-	462	298	2 days / No	24-h recall
Spain-enKid	1998-2000	National	1-14	382	17	178	187	2 days / No	24-h recall
Sweden	2003	National	3-13	2,298	-	1,379	919	4 days / Yes	Dietary record

[a] Upper age of the range is included in the selection.

The three days covered per student two weekdays and one weekend day. Most, but not all, dietary records were collected during consecutive days. Amounts consumed were estimated using food package sizes and household measures (e.g. cups and spoons). The food consumption database covered all seasons of the year as well as all days of the week, excluding national holidays (schools closed). Due to the small number of records included in the long-term exposure assessment to lead, the sample cannot be considered nationally representative.

2.2.3. Czech Republic

In Czech Republic, a food consumption survey (SISP04) was conducted between November 2003 and 2004 covering a 1-year period (Ruprich et al., 2006). In this study, eating habits were recorded of 602 children aged 4 to 14 years using two non-consecutive 24-h recalls. The repeated recall was within a period of 1 to 6 months after the first recall and addressed another day of the week. Amounts consumed were estimated using either photographs of portions for the most frequently consumed meals, or measuring guides, such as spoons and cups.

The food consumption database covered evenly all seasons of the year as well as all days of the week, excluding holidays and festive periods due to divergent food habits during those periods (in total 13 days per year).

2.2.4. Denmark

For Denmark food consumption levels derived from the National Food Consumption Survey conducted in 2000-2002 were used (Lyhne et al., 2005). In this survey, the food consumption was recorded of 610 persons aged 4 to 10 years using a consecutive 7-day estimated dietary record. Amounts consumed were estimated using photographs of portion sizes or household measures (e.g. cups and spoons).

2.2.5. Finland

Finnish food consumption data were derived from two studies in children: the DIPP (The Finnish Type I DIabetes Prediction and Prevention) study (Räsänen et al., 2006) and the STRIP (Special Turku Coronary Risk Factor Intervention Project) study (Simell et al., 2009). The DIPP study is an ongoing cohort study that was established to predict type I diabetes. Families with genetically susceptible babies were invited to participate in the study. The data consisted of food consumption data of 1,500 children in Southern Finland (Tampere region), aged 1, 3 or 6 years. Caretakers recorded the child's food consumption levels using a 3-day estimated dietary record that included one weekend day. Therefore, most, but not all, dietary records were collected during consecutive days. Amounts consumed were estimated using a portion size picture booklet, domestic measures or in grams or litres. The data were collected all year round, covering all seasons.

The STRIP study is a cross-sectional follow-up study. This data consists of 250 children from South-western Finland (Turku area), aged 7 to 8 years. Food consumption was estimated using a consecutive 4-day estimated dietary record which included at least one weekend day. Amounts consumed were estimated using a portion size picture booklet, domestic measures or

in grams or litres. The records were evenly distributed throughout the year, and covered all seasons.

2.2.6. France

The French food consumption data were derived from the second French Individual National Food Consumption Survey (INCA 2) conducted between December 2005 and April 2007 (AFSSA, 2009). In this study, food consumption data of 574 children aged 3 to 10 years were collected using a consecutive 7-day estimated dietary record. Amounts consumed were estimated using either a validated photographic booklet (Le Moullec et al., 1996), or using quantity or volume per unit of food consumed in discrete amounts, or household measures, such as spoons and cups.

At group level, all days of the week were equally represented. The seasons of the year were all covered with an over-representation of winter (36.5 %) and an under-representation of spring (17.2 %).

2.2.7. Germany

Food consumption data of Germany were derived from the DONALD (Dortmund Nutritional and Anthropometric Longitudinally Designed) study, which is an ongoing, longitudinal (open cohort) study. In this study, detailed data are collected on diet, growth, development and metabolism between 3 months and 18 years of age from 1985 onwards (Kroke et al., 2004). The same individuals are followed during the years until the age of 18. Every year new subjects aged 1 are included in the study, so that the age range covered by the project is constant over time.

For the present evaluation, dietary records of subjects aged 1 to 10 years in the study period of 2006 (303 subjects), 2007 (311 subjects) and 2008 (307 subjects) were used. These years covered the three most recent years for which data were available, and included more or less the same individuals. On average, about 15 % of the children included in the survey was newly recruited per year. Presently, no model is available to assess the long-term exposure based on longitudinal data, in which dietary records from the same subjects are collected on a yearly basis. We therefore assessed the exposure for each of the years separately.

A consecutive 3-day weighed dietary record was used to collect information on food consumption per child. Semi quantitative recording was allowed when weighing was not possible. The food consumption survey covered all seasons of the year and all days of the week. However, weekdays and weekend days were proportionally distributed in the sample (Sichert-Hellert and Kersting, 2004). Special days like holiday or travelling were included in the survey.

2.2.8. Greece

The food consumption data in Greece (Crete) were collected using convenience sampling of all state nursery schools in one of the four prefectures on the island. The survey was undertaken in two phases: February to July 2004 and April to July 2005 (Linardakis et al., 2008). Food consumption was recorded using a consecutive 3-day dietary record with amounts being noted either in grams/litres or as household measures such as tablespoons,

teaspoons, slices of bread, etc. Of the 1,988 children for whom parental consent was provided (77 % of the 2,630 children enrolled at nursery school), 850 returned the dietary records. Of these, information was provided for all three days for 795 children. The children were aged from 4 to 6 years.

The food consumption survey covered the seasons spring and summer and all days of the week. The three days covered per child included one weekend day.

2.2.9. Italy

For Italy food consumption data collected by the Italian National Research Institute on Food and Nutrition (INRAN) during the period of 2005-2006 was used. In this survey, named INRAN-SCAI 2005-06 (Leclercq et al., 2009), information on food consumption was collected of 1,329 households randomly selected. The individual food consumption levels were quantified using a consecutive 3-day dietary record. Amounts consumed were estimated using a photographic booklet. Food consumption data were collected of 252 children aged 1 to 10 years out of in total 3,323 subjects.

The survey was planned in order to capture a proportional number of weekdays and weekend day and seasonal variations. Christmas, Easter and August periods were left out (like holidays) due to divergent eating habits.

2.2.10. Netherlands

The food consumption data from the Netherlands was that of the Dutch National Food Consumption Survey-Young Children 2005/2006 (Ocké et al., 2008). In this survey, the food consumption was recorded on two non-consecutive days (separated by 8 to 13 days) of 1,279 children aged 2 to 6 years using an estimated pre-structured dietary record. Amounts consumed were estimated as accurate as possible: using photographs, in household measures or, if possible, in exact weight or volume (g or ml).

At group level, all days of the week were equally represented (Ocké et al., 2008). The seasons of the year were all covered with a slight overrepresentation of winter and autumn (54 %) compared to summer and spring (46 %). Special days, such as holiday, travelling day or illness, were included in the survey, and identified as such.

2.2.11. Spain

Spanish food consumption data were derived from two studies: the Nutrition Survey of Basque population (Larrañaga Larrañaga et al., 2006) and the enKid study (Serra-Majem et al., 2001).

The Nutrition Survey of Basque population study was conducted in the Basque Country and covered individuals aged 4 to 18 years. The study took place between March 2004 and February 2005. The information on food consumption was recorded of 760 children aged 4 to 14 years, using a computerised 24-h recall, in a personal interview. For children aged below 12 years the interview was compiled with their caretaker (or tutor). Amounts consumed were estimated using a picture book, household measures, portions, standard units, and weight or volume (g or ml).

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Food consumption was recorded during two non-consecutive days, leaving an interval of 7 to 10 days, seven days a week and covered the whole year, including all four seasons. Children that under- or over-reported their energy intake according to the equations proposed by Goldberg et al. (1991) were excluded.

The second Spanish study, the enKid study (Serra-Majem et al., 2001), was a cross sectional survey conducted in a representative sample of the Spanish population aged 2 to 24 years. The study was conducted between May 1998 and April 2000. Food consumption data was obtained using one 24-h recall (and a repeated recall within 15 to 30 days after the first recall, covering another day of the week, in 25 % of the individuals). The 24-h recalls were administered throughout the whole year, covered all seasons and days of the week. Non ordinary days such as holidays or illness were registered. Volumes and portions sizes were estimated using household measures found in the subject's own homes by previously trained dieticians.

For children aged 6 to 13 years, the interviews were answered by the children themselves, with support from the caretaker responsible for his/her feeding. In the present study, data from children aged 1 to 14 years with two 24-h recalls (n=382) were used.

2.2.12. Sweden

In 2003, a nationwide food consumption survey was conducted among children aged 3 to 4 and 7 to 13 years in Sweden (Enghardt-Barbieri et al., 2006.). The selection of children was made from a stratified sample of municipalities representative of Sweden. Non-school children were randomly sampled from a register of households with 3 to 4 year old children, and school children on the basis of school classes. Data were collected during spring (May-June) and autumn (October-November), using an open, estimated consecutive 4-d dietary record. Complete food consumption data were available for 2,495 children. Amounts consumed were estimated using photographs of portions sizes and with household measures (glasses, plates, spoons, etc.), standard units (e.g., one banana), or in weight or volume (g or ml).

At group level, all days of the week were equally represented. Possible holidays or other special days (days of illness, travelling days, etc.) were included and not identified as such. Children with missing information on age or body weight were excluded from the database, leaving 2,298 children available for the lead dietary exposure assessments.

2.3.   Linkage food consumption and lead concentration data

All foods present in the national/regional food consumption databases of the participating countries were categorised according to a harmonised system to allow for linkage with lead concentration data in a standardized way .This has been described in detail in the manual of De Neve (2009) (freely available on request). The food categorisation system used was based on that described in the SCOOP Task report Task 3.2.11 (SCOOP, 2004). In short, all foods recorded in the different national/regional food consumption databases were assigned to one of 17 main food groups, and subsequently to corresponding sub food groups depending on the information available or needed on the food. For example main food group 'dairy products and analogues' consisted of many sub food groups including 'cheese', 'butter milk',

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'condensed milk', 'dairy-based deserts', etc. The categorisation of all foods in these food groups was closely supervised by Ghent University, Belgium, ensuring that this was performed in a standardized way by all countries.

Lead concentration data were supplied to EFSA according to a food classification system derived from the EFSA Concise Food Consumption Database[6] including a number of 'communal food groups'. Since the reclassification of the lead concentration data was not considered possible, the food consumption data were also classified according to these food groups to allow for the linkage between consumption and concentration data.

In order to link the previous defined food categories to the communal food groups for which mean lead concentration data were provided by EFSA (Table 1), the different main and sub food groups were linked to the most obvious EFSA food group (Appendix A). This re-classification was performed in close cooperation with EFSA.

For a complete overview of consumption levels per food group for all participating countries and relevant age groups, see Appendix B. Note that not all countries had consumption levels on all food groups. Mostly that was due to non-consumption of foods belonging to these groups. An exception was the food group 'food supplements'. For example, in Belgium, Czech Republic, France, Netherlands and Spain (both studies), no food consumption data were included on food supplements in the national food consumption surveys used in this study.

2.4. Modelling of long-term dietary exposure to lead

2.4.1. Methodology

The long-term dietary exposure was calculated using the 'Monte Carlo risk assessment' programme (MCRA), Release 6.2, available for registered users at the RIKILT website (de Boer and van der Voet, 2007)[7]. For the estimation of the long-term exposure, daily consumption patterns (e.g., 2,558 measurements, 2 days $\times$ 1,279 Dutch children) were multiplied with the food group-specific LB and UB mean lead concentration, and summed over foods consumed per day per individual. In this way, the whole diet was addressed when assessing the exposure to lead. The estimated exposures were adjusted for the individuals' body weight.

A distribution of daily lead exposures, calculated as described above using mean concentrations per food group and summing up the exposure over foods, includes both the variation between individuals and between days within individuals. However, to assess the long-term intake within a population only the former type of variation is of interest, since in the long run the intake between different days of one individual will level out. Therefore, to calculate a long-term dietary exposure distribution, the distribution of daily exposures should first be corrected for the within-person (between days) variation using statistical models. In this report, the betabinomial-normal (BBN) model (de Boer and van der Voet, 2007; Slob, 2006) was used for this.

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[6] www.efsa.europa.eu/EFSA/ScientificPanels/DATEX/efsa_locale-1178620753812_ConciseEuropeanConsumption Database.htm

[7] For the settings used within MCRA to perform the long-term exposure calculations see Appendix B.

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Shortly, the BBN model refers to a betabinomial (BB) distribution used for modelling exposure frequencies and a normal (N) distribution used for modelling positive exposures on a suitably chosen transformed scale. Exposure frequency modelling concerns the number of days for which an exposure is recorded. This number of days is assumed to have a binomial distribution, with a binomial index equal to the total observed number of days, and as parameter the probability of exposure, which may itself vary between individual persons. In the current application it was observed that all children had a positive expected lead intake on all days (combining mean lead concentrations with actual consumptions aggregated over food groups). Therefore, the modelling of exposure frequencies was trivial in this case, they were always estimated at 100 %.

Modelling of positive exposures concerns the amount ingested of the substance on the days that exposure to contaminated foods takes place. The exposure for an individual on a specific day is assumed to have an approximate normal distribution after a suitable data transformation. In this report the natural logarithmic transformation was used. Variation between and within persons is estimated by analysing the transformed positive exposures with a linear random effects model, assuming that within-person variances are homogeneous (only one variance component for day-to-day variation is estimated). The models for the exposure frequencies and the transformed positive exposures can be extended with covariates, for example sex and/or age. After correction for the within-person variation, the logarithmically transformed positive exposure distribution is back-transformed and combined with the exposure frequency to estimate the long-term exposure distribution. This is achieved by sampling a large number of times from both the exposure frequency and the back-transformed positive exposure distribution (Monte Carlo integration). The BBN model assumes that the probability of exposure is unrelated to the individual's exposure level. For more details, see de Boer et al. (2009).

The transformation of the positive daily exposure distribution into a normal distribution, which is in our application of BBN performed using a logarithmic transformation, is an important prerequisite to use standard statistical models for estimating long-term exposure. To study whether the normality assumption was reasonable, we checked the normality of the logarithmically positive daily exposure distribution using the normal quantile-quantile (q-q) plot, a graphical display of residuals. This graphical method was found preferable to the use of formal lack-of-normality significance tests by de Boer et al. (2009). These authors concluded that with only slight deviations from normality and with large sample sizes (as we often have) formal tests easily give significant results. Testing normality is then like asking a question one already knows the answer to. Therefore, their proposal is to use graphical methods to investigate the seriousness of the non-normality of the data. In Figure 1, we have plotted two examples in which the residuals of two logarithmically transformed positive daily exposure distributions are shown. In the left panel, the residuals (in red) follow approximately a straight line (with the exception of the left tail) showing the logarithmically transformed positive daily exposure distribution can be considered reasonably normal (at least in the right tail), while in the right panel the residuals markedly deviate from the straight line. In that case the assumption of normality seems unreasonable. We also investigated the use of a power transformation as is also available in the BBN method (de Boer et al. 2009), but found that this did not provide a solution for those cases where the logarithmic transformation was insufficient to achieve normality (results not shown).

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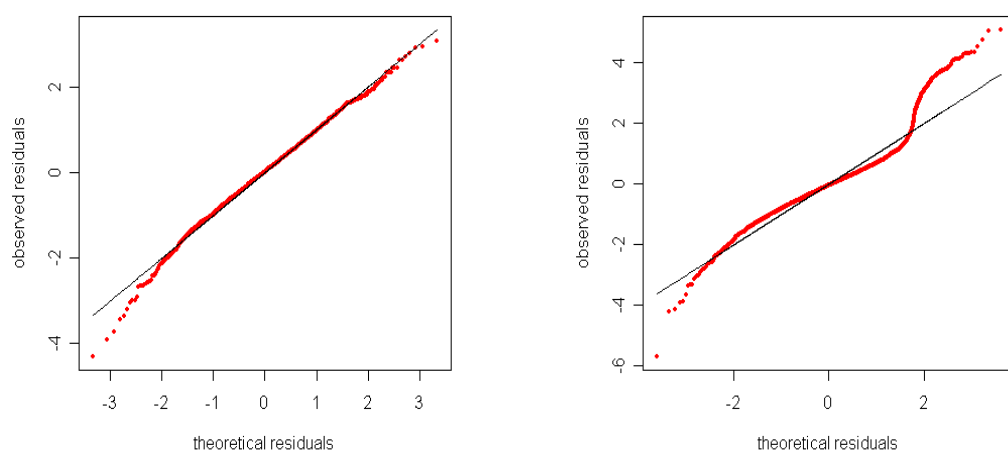
Figure 1. Two examples of the q-q-plot of residuals for the lead exposure after logarithmic transformation of the positive daily exposure distribution using the BBN (betabinomial-normal) model. Left panel: points lie on or close to the diagonal except in the left-hand tail. Right panel: points deviate considerably from the diagonal.

No models are presently available to estimate the long-term exposure based on transformed positive daily exposure distributions that are not approximately normally distributed. Because this was true for some countries, we also calculated the long-term exposure using a simpler approach: averaging all daily exposures per individual, and the resulting distribution of observed individual means (OIM) is interpreted as the long-term exposure distribution. However, the observed individual means are more variable than the true long-term exposures unless there are many measured days per individual (which is typically not the case). Consequently, high percentiles in the OIM distribution are expected to be conservative.

The reported percentiles of the long-term exposure distribution are the 50th, 95th and 99th (P50, P95 and P99, respectively). These percentiles were reported for ages 1 up to 14 years for all countries, according to the ages present in the country-specific databases, as shown in Table 2.

2.4.2. Age dependency of exposure

The age range covered in the different national food consumption surveys differed (Table 2). Since, in general, the dietary exposure of children is expected to be higher at lower ages (due to a higher amount of food consumed per kg body weight), we calculated exposure estimates as a function of age using the BBN model (de Boer et al., 2009). The long-term exposure was therefore reported per age and compared between countries at that level. Within the BBN model exposure frequency and positive exposures are modelled separately and afterwards combined to estimate the long-term exposure distribution (section 2.4.1). Both exposure frequency and positive exposures can be modelled as a function of age. However, the exposure frequency of lead was not modelled as a function of age because a preliminary analysis showed that the exposure frequency of lead was always 100 % and therefore independent of age (all children had an expected exposure to lead on all days). For each

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national food consumption database included in the project, age dependency of positive exposures was included in the model when it was found statistically significant at p = 0.05.

With the OIM approach, the exposure cannot be modelled as a function of age. We therefore calculated the exposure separately for the data corresponding to three age groups: 1 to 2, 3 to 10 and 11 to 14 years. It should be noted that the different dietary surveys do not all cover these age groups (Table 2). For example, the age group 3 to 10 years only included the ages 4 to 6 years for Greece and 3 to 6 years for Belgium and the Netherlands, and only Belgium, Finland, Germany, Italy, Netherlands and Spain (enKid study) have data on consumption levels in the age group 1 to 2 years. The number of individuals per age group differed also between and within countries. For example, for Belgium 36 of the 661 children belong to the age group 1 to 2 years, all the rest to the group 3 to 10 years.

2.4.3. Contribution of food groups to the total long-term exposure

Apart from exposure percentiles, the relative contribution of the food groups to the total long-term exposure distribution was calculated, per survey, using both the BBN and OIM method. For this, we divided the children in two age groups: the age groups 1 to 10 and 11 to14 years. We did not divide the 1 to 10 year group in 1 to 2 and 3 to 10 years consistent with the OIM approach, due to the limited number of children in the 1 to 2 year group. Contributions calculated with the OIM model were reported for the three age groups.

We report the three food groups contributing most to the long-term exposure to lead. This included in all cases all food groups that contributed more than 10 % to the total long-term exposure.

2.5. Risk characterisation of the long-term exposure

To assess whether there is a health risk of long-term dietary exposure to lead in children the 99th percentile of exposure was compared with the provisional tolerable weekly intake (PTWI) of lead. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) has established a PTWI for lead in 1987 (FAO/WHO, 1987). It is set to 25 μg/kg bw/week for infants and children (equivalent to 3.6 μg/kg bw per day) on the basis that lead is accumulating in the body and an increase of the body burden of lead should be avoided. In 1993 and 2000, the JECFA reconfirmed this PTWI and extended it to all age groups (FAO/WHO, 2000). When the 99th percentile of lead exposure exceeded the daily equivalent of the PTWI of lead, the estimated percentage of children exceeding this toxicological reference value was reported.

3. RESULTS

3.1. Long-term dietary exposure to lead using the BBN approach

3.1.1. Long-term exposure for age range of 1 to 10 years of age

In Table 3, the estimated long-term dietary exposure to lead in children covering the age 1 to 10 years in the different countries is listed for the LB and UB concentration scenarios. These exposure results were calculated using the BBN approach. As expected, exposure to lead was

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a function of age with highest exposures in the youngest children. Only in the Finnish STRIP - study no significant effect of age on long-term lead exposure was observed due to the limited number of ages included in this study (7 and 8 years). In the LB concentration scenario, the 99th percentile of exposure ranged from 1.2 µg/kg bw per day in 10-year olds from Sweden to 4.1 µg/kg bw per day in 1-year olds from Finland (DIPP-study). The 99th percentile of exposure in the UB concentration scenario was on average about a factor 1.9 higher than in the LB concentration scenario,

Table 3. Percentiles of long-term dietary exposure to lead in children aged 1 to 10 years living in different European countries, following two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Exposures were calculated using the statistical model BBN[(a)] and a logarithmic data transformation.

| Country | Age (years) and exposure (µg/kg bw per day) | | | | | | | | | | | | | | | | | | | |
| | Using LB concentrations | | | | | | | | | | Using UB concentrations | | | | | | | | | |
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
P50 of exposure																				
Belgium		1.7	1.6	1.4	1.3	1.2						3.1	2.9	2.6	2.4	2.2				
Czech Republic				1.1	1.1	1.0	0.9	0.8	0.8	0.7				2.2	2.0	1.9	1.8	1.7	1.6	1.5
Denmark[(b)]				1.2	1.1	1.1	1.0	0.9	0.8	0.7				2.2	2.2	2.1	2.0	1.8	1.6	1.5
Finland-DIPP[(b,c)]	1.6	1.5	1.5	1.4	1.3	1.3					2.9	2.8	2.7	2.6	2.5	2.4				
Finland-STRIP[(b,d)]							1.0	1.0									2.0	2.0		
France			1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8			2.4	2.3	2.1	2.0	1.8	1.7	1.6	1.5
Germany-2008[(b)]	1.3	1.4	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	2.6	2.6	2.1	1.8	1.7	1.7	1.6	1.5	1.5	1.4
Germany-2007[(b)]	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4
Germany-2006[(b)]	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	2.4	2.3	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.4
Greece[(b)]				0.9	0.9	0.8								1.7	1.6	1.5				
Italy	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3
Netherlands[(e)]		1.3	1.2	1.1	1.1	1.0						2.5	2.4	2.2	2.1	2.0				
Spain-Basque				1.3	1.2	1.1	1.0	0.9	0.8	0.8				2.3	2.1	2.0	1.8	1.6	1.5	1.4
Spain-enKid	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.7	3.0	2.7	2.5	2.3	2.1	1.9	1.7	1.6	1.4	1.3
Sweden[(f)]			1.3	1.2	1.2	1.1	1.0	0.9	0.8	0.6			2.8	2.6	2.4	2.2	2.0	1.8	1.7	1.3
P95 of exposure																				
Belgium		2.7	2.5	2.3	2.1	1.9						4.7	4.3	4.0	3.7	3.4				
Czech Republic				1.8	1.6	1.5	1.4	1.3	1.2	1.1				3.5	3.3	3.1	3.0	2.8	2.6	2.5
Denmark[(b)]				1.8	1.7	1.6	1.5	1.4	1.2	1.1				3.3	3.2	3.1	2.9	2.7	2.4	2.2
Finland-DIPP[(b,c)]	3.1	3.0	2.8	2.7	2.5	2.4					5.5	5.4	5.2	5.0	4.9	4.7				
Finland-STRIP[(b)]							1.5	1.5									2.7	2.7		
France			2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4			3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.4
Germany-2008[(b)]	2.7	2.8	2.3	2.0	1.8	1.7	1.6	1.5	1.5	1.4	5.2	5.2	4.3	3.7	3.5	3.4	3.2	3.1	2.9	2.8
Germany-2007[(b)]	2.9	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.6	1.4	5.4	5.1	4.8	4.4	4.2	3.9	3.6	3.4	3.2	3.0
Germany-2006[(b)]	2.6	2.4	2.2	2.1	1.9	1.8	1.7	1.5	1.5	1.3	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	3.0	2.8
Greece[(b)]				1.5	1.4	1.3								2.7	2.5	2.4				

Country	Age (years) and exposure (µg/kg bw per day) Using LB concentrations 1	2	3	4	5	6	7	8	9	10	Using UB concentrations 1	2	3	4	5	6	7	8	9	10
Italy	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.4	1.3	1.2	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.1
Netherlands[d]		1.8	1.7	1.6	1.5	1.4							3.6	3.4	3.2	3.0	2.8			
Spain-Basque				1.8	1.7	1.5	1.4	1.3	1.2	1.1				3.1	2.8	2.6	2.4	2.2	2.0	1.9
Spain-enKid	2.4	2.2	2.0	1.8	1.7	1.5	1.4	1.3	1.1	1.0	4.5	4.1	3.8	3.4	3.1	2.9	2.6	2.4	2.2	2.0
Sweden[e]			1.9	1.9	1.7	1.6	1.5	1.4	1.3	1.0			4.1	3.9	3.6	3.3	3.0	2.8	2.6	2.0
P99 of exposure																				
Belgium		3.2	3.0	2.7	2.5	2.3						5.7	5.2	4.8	4.3	4.0				
Czech Republic				2.1	2.0	1.8	1.7	1.6	1.5	1.4				4.3	4.1	3.8	3.6	3.4	3.2	3.0
Denmark[b]				2.1	2.0	1.9	1.8	1.6	1.5	1.3				3.9	3.8	3.6	3.4	3.2	2.9	2.6
Finland-DIPP[b,c]	4.1	3.9	3.7	3.5	3.3	3.2					7.2	7.0	6.7	6.5	6.3	6.1				
Finland-STRIP[b,d]							1.7	1.7									3.1	3.1		
France			2.7	2.6	2.4	2.2	2.1	1.9	1.8	1.7			4.8	4.5	4.1	3.8	3.6	3.4	3.1	2.9
Germany-2008[b]	3.7	3.7	3.1	2.6	2.4	2.4	2.2	2.1	2.0	1.9	7.0	7.1	5.8	4.9	4.6	4.6	4.3	4.1	3.9	3.7
Germany-2007[b]	4.0	3.7	3.4	3.1	2.9	2.7	2.5	2.3	2.2	2.0	7.5	7.0	6.6	6.1	5.7	5.4	5.0	4.7	4.4	4.1
Germany-2006[b]	3.5	3.2	3.0	2.8	2.6	2.4	2.2	2.1	2.0	1.8	6.6	6.2	5.9	5.4	5.1	4.8	4.5	4.2	4.0	3.7
Greece[b]				1.8	1.7	1.6								3.3	3.1	2.9				
Italy	2.5	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6
Netherlands[e]		2.1	2.0	1.9	1.8	1.6						4.2	3.9	3.7	3.5	3.3				
Spain-Basque				2.1	1.9	1.8	1.6	1.5	1.4	1.3				3.5	3.2	3.0	2.7	2.5	2.3	2.1
Spain-enKid	2.9	2.6	2.4	2.2	2.0	1.8	1.7	1.5	1.4	1.3	5.4	5.0	4.5	4.1	3.7	3.4	3.1	2.8	2.6	2.4
Sweden[f]			2.3	2.2	2.1	1.9	1.8	1.6	1.5	1.2			4.9	4.6	4.3	3.9	3.5	3.3	3.1	2.4

[a] BBN = betabinomial-normal

[b] Positive daily exposure distributions for both the LB and UB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Exposure results may therefore not be correct.

[c] Consumption data of Finland-DIPP included the ages 1, 3 and 6 years. The exposures reported for the ages 2, 4 and 5 years were estimated by interpolation.

[d] Lead exposure was independent of age at p-level 0.05.

[e] Positive daily exposure distribution for the LB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Exposure result may therefore not be correct.

[f] Consumption data of Sweden included the ages 3 and 4, and 7 to 13 years. The exposures reported for the ages 5 and 6 years were estimated by interpolation.

resulting in a range from 2.1 µg/kg bw per day in 10-year olds from Spain (Basque study) to 7.5 µg/kg bw per day in 1-year olds from Germany (2007 study). Table 4 lists for each country the three food groups contributing most to the long-term exposure distribution of lead for children within the age range of 1 to 10 years for both concentration scenarios. Please note that the ages present in this age range differ per country. In the LB concentration scenario, important food groups that contributed most to the exposure were 'cereals', 'vegetables', 'miscellaneous' and 'fruit juices'. In the UB concentration scenario, the food groups 'cereals', 'vegetables', 'miscellaneous', 'soft drinks/edible ices' and 'milk/dairy drinks' emerged as the most important sources of exposure (Table 4).

3.1.2.   Long-term exposure for age range of 11 to 14 years

The percentiles of long-term dietary exposure to lead in children aged 11 to 14 years are listed in Table 5 for the LB and UB concentration scenarios. In this age group, the 99th percentile of exposure ranged from 0.7 µg/kg bw per day in 14-year olds from Cyprus to 1.6 µg/kg bw per day in 11-year olds from the Czech Republic for the LB concentration scenario. 99th percentile levels of exposure calculated using mean UB concentrations were on average a factor 1.9 higher (Table 5).

The contribution of the three most important food groups to the long-term exposure is listed in Table 6 for all countries and both concentration scenarios. As in younger children, also in the older children food groups 'miscellaneous', 'cereals' and 'vegetables' were important food groups contributing to the exposure in the LB concentration scenario. Food group 'fruit juices' was only an important contributor to the exposure in Cyprus. In the UB concentration scenario, the same food groups appeared as in the LB concentration scenario, together with the food group 'soft drinks/edible ices'. In Cyprus the food group 'fruit juices' was replaced by food group 'milk/dairy drinks' as an important source of exposure in the UB concentration scenario (Table 6).

3.1.3.   Transformation positive daily exposure distribution to normality

As explained in section 2.4.1, transformation of the positive daily exposure distribution into a normal distribution using a suitable transformation is an important prerequisite to be able to use the BBN model to assess the long-term exposure using food consumption data collected during a limited number of days. Based on the q-q plot, the logarithmically transformed positive daily exposure distribution could be considered reasonably normal for the databases of Belgium, Cyprus, Czech Republic, France, Italy, Netherlands (LB concentration scenario), Spain (both studies) and Sweden (LB and UB concentration scenario for 3- to 10-year olds and LB concentration scenario for 11- to 13-year olds). For these countries we expect the BBN model to give an adequate estimation of the long-term exposures to lead. For the other databases, including Denmark, Finland (both studies), Germany (all three studies) and Greece, the assumption of normality of the logarithmically transformed positive daily lead exposure distributions was however not met in both concentration scenarios. For the Netherlands the assumption was violated in the UB concentration scenario, as well as for Sweden for the ages 11 to 13 years. In all these cases, the q-q plot (section 2.4.1) deviated from the straight line, as shown in the right panel of Figure 1. The reason for this was, in most cases, a strong

Table 4.   Contribution of the different food groups[a] to the long-term exposure to lead in children within the age range of 1 to 10 years living in different European countries for two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Contributions were calculated with the statistical model BBN[b] and a logarithmic data transformation.

| Country/ age range (years) | Top 3[c] food groups contributing most to the dietary exposure to lead | | | | | |
| | Using LB concentrations | | | Using UB concentrations | | |
	1	2	3	1	2	3
Belgium 2-6	Miscellaneous 28 %	Vegetables 18 %	Cereals 15 %	Miscellaneous 18 %	Cereals 15 %	Vegetables 14 %
Czech Republic 4-10	Cereals 22 %	Vegetables 21 %	Fruit 8 %	Cereals 19 %	Vegetables 15 %	Soft drinks/ edible ices 13 %
Denmark[d] 4-10	Vegetables 23 %	Cereals 20 %	Milk/dairy drinks 8 %	Cereals 17 %	Vegetables 16 %	Soft drinks/ edible ices 12 %
Finland-DIPP[d] 1-6	Vegetables 29 %	Cereals 10 %	Fruit juices 9 %	Vegetables 22 %	Milk/dairy drinks 11 %	Cereals 9 %
Finland-STRIP[d] 7-8	Cereals 23 %	Miscellaneous 14 %	Vegetables 14 %	Cereals 20 %	Vegetables 10 %	Soft drinks/ edible ices 10 %
France 3-10	Miscellaneous 24 %	Cereals 19 %	Vegetables 17 %	Cereals 17 %	Miscellaneous 15 %	Vegetables 12 %
Germany- 2008[d] 1-10	Cereals 21 %	Vegetables 21 %	Fruit juices 9 %	Cereals 19 %	Vegetables 15 %	Soft drinks/ edible ices 9 %
Germany- 2007[d] 1-10	Cereals 21 %	Vegetables 21 %	Fruit juices 9 %	Cereals 19 %	Vegetables 15 %	Soft drinks/ edible ices 9 %
Germany- 2006[d] 1-10	Cereals 21 %	Vegetables 19 %	Fruit juices 10 %	Cereals 18 %	Infant formulae 14 %	Soft drinks/ edible ices 9 %
Greece[d] 4-6	Cereals 22 %	Vegetables 19 %	Miscellaneous 16 %	Cereals 20 %	Vegetables 15 %	Miscellaneous 9 %

| Country/ age range (years) | Top 3[c] food groups contributing most to the dietary exposure to lead | | | | | |
| | Using LB concentrations | | | Using UB concentrations | | |
	1	2	3	1	2	3
Italy 1-10	Cereals 25 %	Vegetables 23 %	Fruit 7 %	Cereals 24 %	Vegetables 18 %	Fruit 8 %
Netherlands[e] 2-6	Miscellaneous 19 %	Cereals 18 %	Vegetables 14 %	Soft drinks/ edible ices 17 %	Cereals 15 %	Miscellaneous 11 %
Spain-Basque 4-10	Miscellaneous 21 %	Cereals 18 %	Vegetables 12 %	Cereals 18 %	Miscellaneous 13 %	Vegetables 9 %
Spain-enKid 1-10	Vegetables 19 %	Miscellaneous 17 %	Cereals 17 %	Cereals 15 %	Vegetables 14 %	Miscellaneous 10 %
Sweden 3-10	Miscellaneous 19 %	Vegetables 19 %	Cereals 18 %	Soft drinks/ edible ices 18 %	Cereals 15 %	Vegetables 12 %

[a] For a more elaborate description of (some of) the food groups see Table 1.

[b] BBN = betabinomial-normal

[c] Top 3 of food groups included for all countries the food groups that contributed more than 10 % to the total long-term exposure.

[d] Positive daily exposure distributions for both the lower bound and upper bound concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Contribution may therefore not be correct.

[e] Positive daily exposure distribution of the lower bound concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Contribution may therefore not be correct.

Table 5. **Percentiles of long-term dietary exposure to lead in children aged 11 to 14 years living in three European countries, following two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Exposures were calculated with the statistical model BBN[a] and a logarithmic data transformation.**

Country	Age (years) and exposure (µg/kg bw per day)							
	Using LB concentrations				Using UB concentrations			
	11	12	13	14	11	12	13	14
P50 of exposure								
Cyprus	0.5	0.4	0.4	0.4	0.9	0.8	0.8	0.7
Czech Republic	0.8	0.7	0.6	0.6	1.5	1.4	1.3	1.2
Spain-Basque	0.7	0.6	0.6	0.6	1.2	1.2	1.1	1.1
Spain-enKid	0.6	0.6	0.5	0.5	1.1	1.1	1.1	1.1
Sweden[b]	0.6	0.5	0.5		1.3	1.1	1.0	
P95 of exposure								
Cyprus	0.8	0.7	0.7	0.6	1.4	1.3	1.3	1.1
Czech Republic	1.3	1.2	1.1	1.0	2.7	2.4	2.2	2.0
Spain-Basque	1.0	0.9	0.9	0.8	1.8	1.7	1.6	1.5
Spain-enKid	1.1	1.0	0.9	0.9	1.8	1.8	1.8	1.8
Sweden[b]	1.1	0.9	0.8		2.3	2.0	1.7	
P99 of exposure								
Cyprus	0.9	0.9	0.8	0.7	1.7	1.6	1.5	1.4
Czech Republic	1.6	1.5	1.4	1.2	3.4	3.1	2.8	2.5
Spain-Basque	1.1	1.1	1.0	1.0	2.0	2.0	1.9	1.8
Spain-enKid	1.4	1.3	1.2	1.1	2.3	2.3	2.3	2.3
Sweden[b]	1.4	1.2	1.0		2.9	2.5	2.2	

[a] BBN = betabinomial-normal
[b] Positive daily exposure distribution for the UB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Exposure result may therefore not be correct

contribution from specific food groups to the right tail of the logarithmically transformed positive exposure distribution (see Figure 2 for two examples). Examining this further by removing from the analyses food groups that contributed largely to the exposure, the increase in exposure in the right tail of the logarithmically transformed exposure distribution could be contributed to one specific food group in all cases, except for Germany, Finland (DIPP study) and Sweden, For Finland (STRIP study), Greece and Netherlands this was the food group 'miscellaneous' and for Denmark the food group 'vegetables' in the LB concentration scenario and the food group 'soft drinks/edible ices' in the UB concentration scenario. Removal of these food groups from the respective databases resulting in a satisfactory transformation of the positive daily exposure distribution into a normal distribution using a logarithmic transformation. For the databases of Germany and Finland (DIPP study) no food groups could be identified. The deviations from normality of the logarithmically transformed positive exposure distribution (difference between the black line and blue graphs in Figure 2) indicated that the estimated long-term exposure was most likely underestimated. However, to which extent is unclear.

Table 6. **Contribution of the different food groups[a] to the long-term exposure to lead in children in the age of 11 to 14 years living in different European countries for two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Contributions were calculated with the statistical model BBN[b] and a logarithmic data transformation.**

| Country / age range (years) | Top 3[c] food groups contributing most to the dietary exposure to lead | | | | | |
| | Using LB concentrations | | | Using UB concentrations | | |
	1	2	3	1	2	3
Cyprus 11-14	Vegetables 27 %	Cereals 24 %	Fruit juices 8 %	Cereals 22 %	Vegetables 20 %	Milk/dairy drinks 8 %
Czech Republic 11-14	Cereals 24 %	Vegetables 23 %	Miscellaneous 7 %	Cereals 19 %	Soft drinks/ edible ices 16 %	Vegetables 16 %
Spain-Basque 11-14	Cereals 20 %	Miscellaneous 20 %	Vegetables 13 %	Cereals 18 %	Miscellaneous 12 %	Vegetables 10 %
Spain-enKid 11-14	Cereals 23 %	Vegetables 20 %	Miscellaneous 15 %	Cereals 20 %	Vegetables 14 %	Soft drinks/ edible ices 10 %
Sweden[d] 11-13	Vegetables 20 %	Cereals 20 %	Miscellaneous 18 %	Soft drinks/ edible ices 19 %	Cereals 16 %	Vegetables 13 %

[a] For a more elaborate description of (some of) the food groups see Table 1.

[b] BBN = betabinomial-normal

[c] Top 3 of food groups included for all countries the food groups that contributed more than 10 % to the total long-term exposure

[d] Positive daily exposure distribution for the UB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Contribution may therefore not be correct.
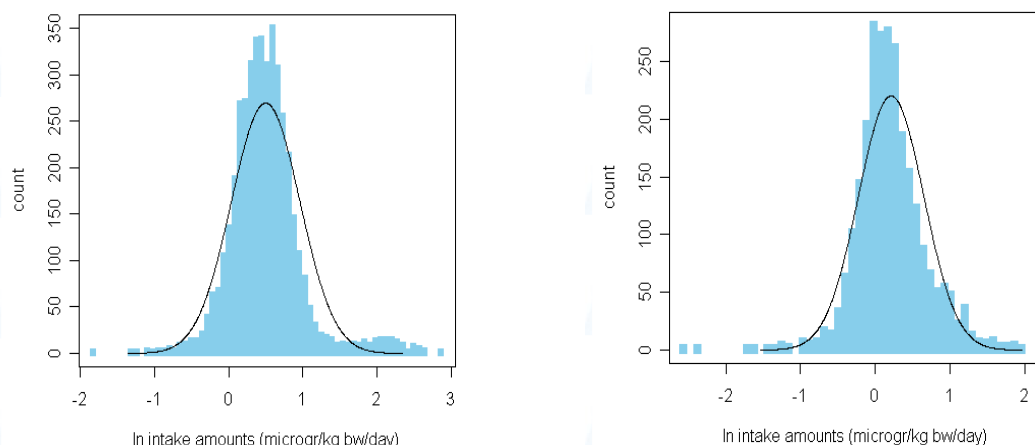
Figure 2. **Two examples of logarithmically transformed positive exposure distributions (blue) where the assumption of normality (black line) was violated due to an increase in exposure at the right tail of the logarithmically transformed positive exposure distributions. Left panel: Finland-STRIP, lower bound concentration scenario; right panel: Netherlands, lower bound concentration scenario.**

3.1.4. Risk characterisation using the BBN approach to assess exposure

To assess whether there may be a possible health risk related to the exposure to lead in children, the 99th percentile of exposure was compared to the daily equivalent of the PTWI 3.6 µg/kg bw per day. Based on this comparison there is a possible health risk in children aged 1, 2 and 3 years in Finland and Germany in the LB concentration scenario. In Table 7, the percentage of children exceeding the daily equivalent of the PTWI was further quantified for these age-country combinations. The percentages varied from 1.1 % for 1- and 2-year olds in Germany (2008 and 2007 study, respectively) to 2.1 % of 1-year olds in Finland (DIPP study). In the UB concentration scenario, the 99th percentile of exposure exceeded the daily equivalent of the PTWI in the majority of countries (although not at all ages) (Table 7). Percentages of children with a level of exposure exceeding the daily equivalent of the PTWI ranged from 1.2 % in 10-year olds from Germany (2006 and 2008 study) to 28 % in 1-year olds from Finland (DIPP study) and 2-year olds from Belgium.

The 99th percentile of exposure of children in the age group of 11 to 14 years did not exceed the daily equivalent of the PTWI for all countries studied and both concentration scenarios (Table 5). We therefore did not quantify the exact percentage of children exceeding this health limit for this age group.

3.2. Long-term dietary exposure to lead using the OIM approach

3.2.1. Long-term exposure for age groups 1 to 2, 3 to 10 and 11 to 14 years

In Table 8, the estimated long-term dietary exposure to lead in children covering the age ranges of 1 to 2, 3 to 10 and 11 to 14 years in the different countries are listed for the LB and

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UB concentration scenarios. These exposures were calculated using the OIM approach. As in the BBN approach, the exposure to lead was highest in the youngest age group and decreased with age. In the LB concentration scenario, the 99th percentile of exposure for 1- to 2-year olds ranged from 2.6 µg/kg bw per day in Italy to 7.9 µg/kg bw per day in Germany (2007 study). For 3- to 10-year olds, corresponding exposure levels were 1.8 µg/kg bw per day in Denmark and 5.6 µg/kg bw per day in Finland (DIPP study), and for 11- to 14-year olds 0.9 µg/kg bw per day in Cyprus and 1.4 µg/kg bw per day in Czech Republic. 99th percentile levels of exposure calculated using mean UB concentrations were on average a factor 1.8 higher (Table 8).

Table 9 lists for each country the three food groups contributing most to the long-term exposure distribution of lead for the three age groups and the LB concentration scenario. As with the BBN model, the food groups contributing most to the exposure were 'cereals', 'vegetables', 'miscellaneous' and 'fruit juices'. Other important food groups were 'fruit', 'milk/dairy drinks' and 'dairy based products'. For the UB concentration scenario, the same food groups appeared to contribute largely to the exposure as in the LB concentration scenario (Table 10). However, also the food group 'soft drinks/edible ices' emerged as an important contributor to the exposure', as with the BBN model. This food group was not an important source of exposure in the LB concentration scenario.

3.2.2. Risk characterisation using the OIM approach to assess exposure

It is clear from Table 8 that in the LB concentration scenario the 99th percentile of exposure for 1- to 2-year olds exceeded the daily equivalent of the PTWI in Finland (DIPP study) and Germany. Of the 3- to 10-year olds, only in Finland (DIPP study) the 99th percentile of exposure level exceeded the toxicological reference value, while of the 11- to 14-year olds none of the countries had a 99th percentile of exposure that exceeded this value. In the UB concentration scenario, the 99th percentile of exposure of the majority of countries with consumption data of 1- to 2-year and 3- to 10-year olds exceeded the daily equivalent of the PTWI. Of the 11- to 14-year olds, none of the countries exceeded the toxicological reference value at the 99th percentile of exposure.

In Table 11, we listed the percentage of children that exceeded the daily equivalent of the PTWI for those countries and age groups where the 99th percentile of exposure was exceeded. In the LB concentration scenario, the percentages ranged from 1.8 % for 3- to 10-year olds in Finland (DIPP study) to 17 % in 1- to 2-year olds in Germany (2008 study). In the UB concentration scenario, the percentages increased to maximally 33 % in 1- to 2-year olds in Belgium (Table 11).

Table 7. **Percentages of children aged 1 to 10 years living in different European countries with an exposure exceeding the daily equivalent of the provisional tolerable weekly intake (PTWI) of 3.6 µg/kg bw per day, following two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Exposures were calculated using the statistical model BBN[a] and a logarithmic data transformation.**

Country	Age (years) and percentage																			
	Using LB concentrations										Using UB concentrations									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Belgium		-[b]	-	-	-	-						28	18	10	5.6	2.7				
Czech Republic				-	-	-	-	-	-	-				4.2	2.8	1.7	-	-	-	-
Denmark[c]				-	-	-	-	-	-	-				2.4	1.7	1.1	-	-	-	-
Finland-DIPP[c,d]	2.1	1.5	1.2	-	-	-					28	26	23	21	18	16				
Finland-STRIP[c]						-	-												-	-
France			-	-	-	-	-	-	-	-			8.6	5.5	3.1	1.8	-	-	-	-
Germany-2008[c]	1.1	1.2	-	-	-	-	-	-	-	-	22	22	11	5.7	4.1	3.7	2.8	2.1	1.6	1.2
Germany-2007[c]	1.7	1.1	-	-	-	-	-	-	-	-	22	18	14	11	9.0	6.8	5.2	3.8	2.9	2.0
Germany-2006[c]	-	-	-	-	-	-	-	-	-	-	18	14	11	8.7	6.4	4.7	3.5	2.5	1.8	1.2
Greece[c]				-	-	-								-	-	-				
Italy	-	-	-	-	-	-	-	-	-	-	7.7	5.0	3.1	1.8	-	-	-	-	-	-
Netherlands[e]		-	-	-	-	-						5.0	2.7	1.4	-	-				
Spain-Basque			-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-
Spain-enKid	-	-	-	-	-	-	-	-	-	-	23	14	7.2	3.3	1.5	-	-	-	-	-
Sweden[f]			-	-	-	-	-	-	-	-			14	9.8	5.3	2.1	-	-	-	-

[a] BBN = betabinomial-normal

[b] To assess whether there is a possible health risk related to the long-term exposure to lead in children, the 99th percentile levels of exposure (as reported in Table 3) were compared with the daily equivalent of the PTWI of lead. When the 99th percentile of exposure exceeded this health limit, the exact percentage of children exceeding the limit value was reported. Notation '-' means that the percentage of children exceeding the daily equivalent of the PTWI was 1 % or less.

[c] Positive daily exposure distributions for both the LB and UB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Exposures may therefore not be correct.

[d] Consumption data of Finland-DIPP included the ages 1, 3 and 6 years. The percentages children exceeding the daily equivalent of the PTWI as listed for the ages 2, 4 and 5 years were estimated by interpolation.

[e] Positive daily exposure distribution for the LB concentration scenario could not be transformed satisfactorily to normality using a logarithmic transformation. Exposures may therefore not be correct.

[f] Consumption data of Sweden included the ages 3 and 4, and 7 to 13 years. The percentages children exceeding the daily equivalent of the PTWI as listed for the ages 5 and 6 years were estimated by interpolation.

Table 8.   Percentiles of long-term dietary exposure to lead in children in the age classes 1 to 2, 3 to 10 and 11 to 14 years living in different European countries, following two scenarios of assigning lead concentrations to non-detect samples (LB: lower bound; UB: upper bound). Exposures were calculated using the OIM[(a)] model.

Country	Age range (years) and eexposure (µg/kg bw per day)					
	Using LB concentrations			Using UB concentrations		
	1-2	3-10	11-14	1-2	3-10	11-14
P50 of exposure						
Belgium	1.9	1.4	-	3.4	2.5	-
Cyprus			0.4			0.7
Czech Republic	-	0.9	0.6	-	1.7	1.3
Denmark	-	1.0	-	-	1.9	-
Finland-DIPP	1.5	1.4	-	2.7	2.6	-
Finland-STRIP		1.0			2.0	
France	-	1.0	-	-	1.8	-
Germany-2008	1.0	0.9	-	1.9	1.8	-
Germany-2007	1.0	0.9	-	1.8	1.8	-
Germany-2006	1.1	0.9	-	1.9	1.7	-
Greece	-	0.9	-	-	1.6	-
Italy	1.3	0.9	-	2.4	1.6	-
Netherlands	1.2	1.0	-	2.5	2.1	-
Spain-Basque	-	0.9	0.6	-	1.7	1.1
Spain-enKid	1.5	0.9	0.5	2.5	1.7	1.1
Sweden	-	1.0	0.6	-	2.1	1.3
P95 of exposure						
Belgium	3.0	2.6		4.6	4.3	-
Cyprus			0.7			1.3
Czech Republic	-	1.5	1.2	-	3.1	2.6
Denmark	-	1.5		-	3.0	-
Finland-DIPP	3.7	2.5	-	6.8	4.5	-
Finland-STRIP		1.7			2.9	
France	-	1.8	-	-	3.0	-
Germany-2008	4.9	1.4	-	8.7	2.7	-
Germany-2007	5.2	1.5	-	10.0	3.1	-
Germany-2006	4.4	1.4	-	8.3	2.7	-
Greece	-	1.6	-	-	2.7	-
Italy	2.1	1.5	-	3.8	2.7	-
Netherlands	2.2	1.8	-	4.3	3.6	-
Spain-Basque	-	1.6	1.0	-	2.7	1.8
Spain-enKid	2.7	1.7	1.0	4.7	3.1	2.0
Sweden	-	1.6	1.0	-	3.4	2.1
P99 of exposure						
Belgium	3.5	3.2		6.0	5.6	-
Cyprus			0.9			1.6
Czech Republic	-	2.0	1.4	-	4.3	3.1
Denmark	-	1.8	-	-	3.4	-
Finland-DIPP	4.8	5.6	-	8.9	11	-
Finland-STRIP		2.0			3.2	
France	-	2.5	-	-	3.9	-
Germany-2008	6.1	2.6	-	10	4.9	-
Germany-2007	7.9	3.2	-	14	5.8	-

| Country | Age range (years) and eexposure (µg/kg bw per day) | | | | | |
| | Using LB concentrations | | | Using UB concentrations | | |
	1-2	3-10	11-14	1-2	3-10	11-14
Germany-2006	5.0	3.5	-	9.0	6.3	-
Greece	-	2.2	-	-	3.4	
Italy	2.6	2.0	-	4.2	3.5	-
Netherlands	3.1	2.5	-	4.8	4.3	-
Spain-Basque	-	2.1	1.3	-	3.3	2.0
Spain-enKid	3.0	2.2	1.2	4.9	4.0	2.3
Sweden	-	2.1	1.3	-	4.2	2.6

[a] OIM = observed individual means

4. Discussion

In this document, we report on the long-term dietary exposure to lead in children aged 1 to 14 years living in 12 different European countries. For this we used national/regional individual food consumption data collected among children during at least two days using either the 24-h recall method or the dietary record method. We addressed children because they are known to have a higher exposure level than adults given their higher consumption levels per kg body weight. Furthermore there are few data published in children. Lead concentration levels were obtained from EFSA, and were used to assess the country-specific exposure.

4.1. Food consumption data

In Europe, there is a need for harmonised approaches for risk assessment, as well as harmonised procedures to collect input data in order to ensure that exposures calculated for different countries within Europe are comparable. In this report, we used 1) a common food classification system, 2) a harmonised approach to assess the long-term dietary exposure to lead, and 3) the same lead concentration data ("collected European data") as input for all participating countries. Due to lack of harmonised food consumption data within Europe, we used in this report food consumption data collected at national or regional level in different European countries. There are continuous efforts within Europe to harmonise the collection of food consumption data (e.g. EU-projects EFCOSUM (Brussaard et al., 2002), and EFCOVAL[8]). However, these efforts have not yet resulted in the use of one harmonised approach of food consumption data collection within Europe or to the collection of food consumption data at a pan-European level. Until that time, food consumption data collected at a national/regional level are used to assess the exposure within Europe, acknowledging methodological differences, mainly related to the dietary assessment methods used, number of days included, and the study subjects' sampling criteria. These data are used for risk assessment purposes on the national/regional level, possibly accounting for all potential sources of uncertainties.

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[8] www.efcoval.eu

Table 9. **Contribution of the different food groups[a] to the long-term exposure to lead for the lower bound (LB) concentration scenario of assigning lead concentrations to non-detect samples. Contributions were calculated for three age groups using the OIM[b] approach.**

Country	Top 3[c] food groups contributing most to the dietary exposure to lead								
	1-2 years			3-10 years			11-14 years		
	1	2	3	1	2	3	1	2	3
Belgium	Miscellaneous 32 %	Vegetables 17 %	Cereals 14 %	Miscellaneous 27 %	Vegetables 18 %	Cereals 16 %			
Cyprus							Vegetables 27 %	Cereals 24 %	Fruit juices 8 %
Czech Republic				Cereals 22 %	Vegetables 21 %	Fruit 8 %	Cereals 24 %	Vegetables 23 %	Fruit 7 %
Denmark				Vegetables 23 %	Cereals 18 %	Milk/dairy drinks 8 %			
Finland-DIPP	Vegetables 37 %	Cereals 9 %	Dairy based products 9 %	Vegetables 25 %	Fruit juices 13 %	Cereals 10 %			
Finland-STRIP				Cereals 23 %	Miscellaneous 14 %	Vegetables 14 %			
France				Miscellaneous 24 %	Cereals 19 %	Vegetables 16 %			
Germany-2008	Vegetables 23 %	Cereals 18 %	Fruit 10 %	Vegetables 23 %	Cereals 19 %	Fruit juices 10 %			
Germany-2007	Vegetables 23 %	Cereals 19 %	Milk/dairy drinks 9 %	Cereals 22 %	Vegetables 19 %	Fruit juices 10 %			
Germany-2006	Vegetables 21 %	Cereals 19 %	Fruit 8 %	Cereals 22 %	Vegetables 18 %	Fruit juices 12 %			

| Country | Top 3[c] food groups contributing most to the dietary exposure to lead | | | | | | | | |
| | 1-2 years | | | 3-10 years | | | 11-14 years | | |
	1	2	3	1	2	3	1	2	3
Greece				Cereals 22 %	Vegetables 19 %	Miscellaneous 16 %			
Italy	Cereals 22 %	Vegetables 16 %	Milk/dairy drinks 9 %	Cereals 26 %	Vegetables 25 %	Fruit 6 %			
Netherlands	Cereals 17 %	Miscellaneous 15 %	Vegetables 15 %	Miscellaneous 20 %	Cereals 18 %	Vegetables 13 %			
Spain-Basque				Miscellaneous 21 %	Cereals 18 %	Vegetables 12 %	Cereals 20 %	Miscellaneous 20 %	Vegetables 13 %
Spain-enKid	Miscellaneous 29 %	Vegetables 16 %	Cereals 10 %	Vegetables 20 %	Cereals 18 %	Miscellaneous 15 %	Cereals 23 %	Vegetables 20 %	Miscellaneous 15 %
Sweden				Miscellaneous 19 %	Vegetables 19 %	Cereals 18 %	Vegetables 20 %	Cereals 20 %	Miscellaneous 18 %

[a] For a more elaborate description of (some of) the food groups see Table 1.

[b] OIM = observed individual means

[c] Top 3 of food groups included for all countries the food groups that contributed more than 10 % to the total long-term exposure.

Table 10. Contribution of the different food groups[a] to the long-term exposure to lead for the upper bound (UB) concentration scenario of assigning lead concentrations to non-detect samples. Contributions were calculated for three different age groups using the OIM[b] approach.

| Country | Top 3[c] food groups contributing most to the dietary exposure to lead per age class | | | | | | | | |
| | 1-2 years | | | 3-10 years | | | 11-14 years | | |
	1	2	3	1	2	3	1	2	3
Belgium	Miscellaneous 21 %	Cereals 14 %	Vegetables 14 %	Miscellaneous 18 %	Cereals 15 %	Vegetables 14 %			
Cyprus							Cereals 22 %	Vegetables 20 %	Milk/dairy drinks 8 %
Czech Republic				Cereals 19 %	Vegetables 15 %	Soft drinks/ edible ices 13 %	Cereals 19 %	Soft drinks/ edible ices 17 %	Vegetables 16 %
Denmark				Cereals 17 %	Vegetables 16 %	Soft drinks/ edible ices 12 %			
Finland-DIPP	Vegetables 30 %	Milk/dairy drinks 11 %	Waters 10 %	Vegetables 19 %	Fruit juices 12 %	Milk/dairy drinks 11 %			
Finland-STRIP				Cereals 20 %	Vegetables 10 %	Soft drinks/ edible ices 8 %			
France				Cereals 17 %	Miscellaneous 15 %	Vegetables 12 %			
Germany-2008	Vegetables 18 %	Cereals 7 %	Fruit 11 %	Cereals 20 %	Vegetables 14 %	Soft drinks/ edible ices 13 %			
Germany-2007	Cereals 18 %	Vegetables 17 %	Milk/dairy drinks 11 %	Cereals 19 %	Vegetables 14 %	Soft drinks/ edible ices 13 %			
Germany-2006	Cereals 17 %	Vegetables 16 %	Fruit 9 %	Cereals 19 %	Soft drinks/ edible ices 13 %	Vegetables 13 %			

| Country | Top 3[c] food groups contributing most to the dietary exposure to lead per age class | | | | | | | | |
| | 1-2 years | | | 3-10 years | | | 11-14 years | | |
	1	2	3	1	2	3	1	2	3
Greece				Cereals 21 %	Vegetables 15 %	Miscellaneous 10 %			
Italy	Cereals 21 %	Vegetables 12 %	Milk/dairy drinks 11 %	Cereals 24 %	Vegetables 19 %	Fruit 7 %			
Netherlands	Cereals 15 %	Soft drinks/ edible ices 15 %	Milk/dairy drinks 11 %	Soft drinks/ edible drinks 18 %	Cereals 15 %	Miscellaneous 12 %			
Spain-Basque				Cereals 18 %	Miscellaneous 13 %	Vegetables 9 %	Cereals 19 %	Miscellaneous 12 %	Vegetables 10 %
Spain-enKid	Miscellaneous 18 %	Vegetables 13 %	Milk/dairy drinks 11 %	Cereals 16 %	Vegetables 14 %	Miscellaneous 9 %	Cereals 20 %	Vegetables 14 %	Soft drinks/ edible drinks 10 %
Sweden				Soft drinks/ edible drinks 18 %	Cereals 15 %	Vegetables 12 %	Soft drinks/ edible drinks 18 %	Cereals 16 %	Vegetables 13 %

[a] For a more elaborate description of (some of) the food groups see Table 1.

[b] OIM = observed individual means

[c] Top 3 of food groups included for all countries the food groups that contributed more than 10 % to the total long-term exposure.

Table 11. Percentage of children in the age classes 1-2 and 3-10[a] years living in different European countries that exceeded the daily equivalent of the provisional tolerable weekly intake (PTWI) of 3.6 µg/kg bw per day, following two scenarios of assigning lead concentrations to non-detect samples. Exposures were calculated using the OIM[b] approach.

| Country | Age (years) and p percentage | | | |
| | Using LB concentrations | | Using UB concentrations | |
	1-2	3-10	1-2	3-10
Belgium	2.8	-[c]	33	13
Cyprus				
Czech Republic		-		2.0
Denmark		-		-
Finland-DIPP	5.4	1.8	19	14
Finland-STRIP		-		-
France		-		1.9
Germany-2008	17	-	28	2.7
Germany-2007	16	-	26	4.9
Germany-2006	16	-	23	3.3
Greece		-		-
Italy	-	-	8.3	-
Netherlands	-	-	11	4.7
Spain-Basque		-		-
Spain-enKid	-	-	24	2.8
Sweden	-	-		3.7

[a] Children in the age class 11-14 years did not exceed the daily equivalent of the PTWI of lead (Table 8).

[b] OIM = observed individual means

[c] To assess whether there is a possible health risk related to the long-term exposure to lead in children, the 99th percentile levels of exposure (as reported in Table 8) were compared with the daily equivalent of the PTWI of lead (3.6 µg/kg bw per day). When the 99th percentile of exposure exceeded this health limit, the exact percentage of children exceeding the limit was reported. Notation '-' means that the percentage of children exceeding the daily equivalent of the PTWI was 1 % or less.

The food consumption data used in this project were collected using different dietary assessment methods, and cover different age ranges. An important difference is also the way in which the various primary dietary information were aggregated into food items and (sub) food groups. Due to these differences it is difficult to compare the food consumption data, and consequently the resulting exposure levels between countries. Furthermore, the food consumption data were collected either at regional or national level (Table 2). In case of regionally collected food consumption data, the resulting lead exposure levels may not representative of the exposure levels at a national level.

A careful evaluation of the exposure assessment includes a critical examination of concentration data. Concentration data were supplied by EFSA that received the lead concentration data from the different Member States. An important issue is the representativity of the concentration data in relation to the lead concentration levels consumers in different European countries are exposed to. The lead concentration data were predominantly supplied by 14 Member States, of which 44 % was supplied by Germany and 15 % by France (section 2.1). The concentration data used for this exposure assessment did therefore not cover all European countries involved in the present study equally. However, no information is currently available about differences in lead concentrations in food items in

different European countries to assess how representative these data are to estimate the lead intake at a national level. Another important factor affecting the representativity of the concentration data is sampling strategy, such as sampling at randomly or with pre-knowledge of possible contamination, and sampling with the aim to analyse all relevant foods that may contain lead or only a sub-selection of foods (e.g. only the highly contaminated foods). No information on this was available.

Other factors to be considered to objectively evaluate the reliability of exposure assessments produced in this work related to the concentration data used in this assessment are::

The grouping of the analysed commodities in the different food groups in relation to the grouping of the consumed foods.

The effect of differences in LODs/LOQs between the data suppliers on the exposure results.

The exposure results presented in this report should therefore be interpreted with caution and do not necessarily represent the intake of lead at the national level.

4.2. Linkage of food consumption data to concentration data

To link food consumption data to lead concentration data, both data were categorised in 42 communal food groups (Table 1, section 2.3). In this way, we were able to calculate the exposure to lead in a harmonised way using food consumption data of different countries within Europe and one 'European' lead concentration database. The exposure results presented in this report can thus be regarded as an important step forward in harmonising exposure calculations within Europe. The 42 food groups used to assess the exposure to lead were however very broad. For example food group 'vegetables' contained all types of raw and processed vegetables, including potatoes. Because of this there may be a large variation in the lead concentration levels within a food group, resulting in a mean lead level that is not representative of all foods belonging to the food group. Linking this mean level to all foods belonging to the food group may thus result in wrong conclusions regarding exposure.

Linking food consumption and concentration data is a crucial step in dietary exposure assessments. Given the high exposure levels calculated in both concentration scenario's, a critical examination of the linkage between the food groups consumed and those analysed is advised to study whether this can be improved by, for example, defining more detailed food groups.

4.3. Long-term exposure to lead

Comparisons of lead exposure estimates between countries are hampered by the difference in age ranges covered in these studies. The effects of these differences can be partly minimized by assessing the exposure per age as done using the BBN model and to compare the exposure between countries at that level. When examining the age range of 4 to 6 years, the age range for which exposure estimates were obtained for all countries, the highest exposures were calculated for Finland and Germany and the lowest for Greece and the Netherlands in the LB concentration scenario. After exclusion of countries for which the transformed positive daily exposure distributions were not satisfactorily transformed to normality using a logarithmic transformation, Belgium tended to have the highest exposure levels and Czech Republic, Italy,

Spain (both studies) and Sweden the lowest. However, whether these are real differences should to be examined further (see sections 4.1 and 4.2).

Using the OIM approach, age differences were addressed by calculating the exposure for three age groups: 1 to 2 years, 3 to 10 years and 11 to 14 years. However, comparing the exposure for these age groups is hampered by differences between countries in which the surveys covered the different age groups. In the age group 1 to 2 years, Belgium and Netherlands covered both only age 2, while Germany, Italy and Spain (enKid study) covered the whole age range. Comparisons show that the exposure was higher in Belgium compared to the Netherlands, and that Germany had the highest exposure of the countries that covered the whole age range of 1- to 2-years. It is noteworthy that the number of children in this age group was very low in especially Belgium, Italy and Spain (enKid study), resulting in uncertain exposure estimates.

For the age group 3 to 10 years comparisons in exposure could again be made for Belgium and Netherlands (covered the ages 3 to 6 years, Table 2). As for the age group 1 to 2 years, also the exposure in this age group tended to be highest in Belgium in both concentration scenarios. Data from France, Germany, Italy, Spain (enKid study) and Sweden covered the whole 3 to 10 year age group, resulting in the highest exposure in Germany and the lowest in Italy in both lead concentration scenarios (Table 8). The Czech Republic, Denmark, and Spain (Basque study) covered the ages 4 to 10 years in this age group (Table 2).

Because the lead concentration data used in the calculations were identical for all countries, the differences in exposure between countries are due to (1) differences in "description" of food consumption patterns between the countries and (2) real differences in consumption patterns between the countries. In Belgium, and also France, the mean consumption of the food group 'miscellaneous' (which includes soups, sauces, potato and pasta salads, mustard, and vinegar), one of the main contributors to the long-term exposure to lead in the LB concentration scenario (Table 4) was relatively high compared to the other countries in the age group of 1 to 10 years: 71 g/d for Belgium and 58 g/d for France compared to, for example, 6 g/d in Italy (Appendix B). Consumption levels of the other two main contributors to the total exposure, food groups 'vegetables' and 'cereals', were on the other hand highest in Italy, 166 and 225 g/d respectively (Appendix B).

In the age group 11 to 14 years, food consumption data of five surveys from four countries were available. For this age category, the exposure levels tended to be highest in the Czech Republic and lowest in Cyprus in both the LB and UB concentration scenario using the BBN approach (Table 5). The very likely reason for this was that the mean consumption of the food groups 'vegetables' and 'cereals', main contributors to the lead exposure in all countries (Table 6), was the highest in the Czech Republic (225 and 265 g/d, respectively) and lowest in Cyprus (176 and 195 g/d; Appendix B). Spain (Basque study) had comparable mean consumption levels of these food groups as Cyprus, but had the highest mean consumption level of the food group 'miscellaneous' of all four studies, 62 g/d (Appendix B). Because for this age group the BBN model resulted in a satisfactory result for all countries (except for Sweden in the UB concentration scenario), the results of this model should preferably be used to compare the exposures.

Although the lead concentrations were not extremely high in the food groups contributing most to the exposure (Table 1), in combination with consumption levels, they became the

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main contributors to the exposure. Food groups with relatively high contamination levels were 'other food for special dietary uses', 'food supplements', and 'dried vegetables'. However consumption levels of these food groups were very low or not recorded (e.g. true for 'food supplements' in some countries), and did therefore not significantly contribute to the exposure in any of the countries / ages addressed.

The food group 'miscellaneous' contributed largely to the overall long-term exposure to lead. This food group consisted of a very diverse group of foods, including soups, snacks, sauces, gravy, and whey drinks (Appendix A). Given this diversity in composition, a critical examination of this food group to study whether a more detailed link between foods consumed and those analysed could be achieved is advised. Furthermore, when comparing the exposure between countries we ignored other methodological differences between the different national/regional food consumption surveys that very likely also explain partly the differences in exposure.

4.4.   Dietary exposure assessment

In this report, we estimated the long-term exposure to lead in children. Because food consumption data are predominantly collected during a limited number of days (e.g. two up to seven days per individual), statistical models are needed to correct for the within-subject variation to accurately estimate the long-term dietary exposure. Here two models were used for this, the OIM and BBN model. Among these two methods, the BBN model is the preferred method to estimate the long-term exposure to lead if its assumptions are reasonable. Unlike the OIM method, BBN corrects for the within-person variation to estimate the long-term exposure. This approach has been proven very useful for the estimation of long-term exposure (Dodd et al., 2006; Hoffmann et al., 2002). Another advantage of the BBN model is that it can model covariates, such as age. This is important when assessing the exposure in children, because it is known that the exposure decreases with age, as shown in this report for lead (Table 3). Ignoring the effect of age on the exposure when present may result in wrong conclusions.

Like all statistical models and especially parametric models, the BBN method should always be used with caution. The results can be misleading for various reasons, e.g. when the transformed positive daily exposure distribution is markedly non-normal, when there is a sizeable correlation between frequency and amount of exposure or between exposures at subsequent days, or when the within-person variation is strongly heterogeneous. Furthermore, estimation of consumption frequencies is rough when there are only very few days per person in the database (as commonly the case). However, a positive lead exposure was observed on all days for all countries. The estimation of frequencies was therefore not an issue in the analyses described here.

For some countries BBN could not be used in a satisfactory way due to lack of normality of the logarithmically transformed positive daily exposure distributions. In those cases, the long-term exposure estimates may be wrong. We therefore also used a simpler approach: in the OIM method, replicates of one-day measurements of dietary exposure are averaged per person. In this way, the within-person variation is not corrected for, resulting in more conservative estimates of long-term exposure in the right tail of the exposure distribution compared to models that do so, like BBN. The exposure results obtained with this approach

(Table 8) and the corresponding percentages of children exceeding the daily equivalent of the PTWI (Table 11) should be considered as conservative estimates, and interpreted with caution. Furthermore, OIM cannot address age as a covariate. We therefore selected subsets of the data corresponding with given age ranges to explore differences in exposure between age groups. However, this resulted in a decrease of statistical power due to a lower sample size, particularly for the age group 1 to 2 years. For example, this group consisted of only 17 children in the Spain-enKid study and 36 in the Belgian and Italian studies (Table 2). The resulting estimates of exposure of such small groups lack precision. To our knowledge, OIM is the only method presently available to assess the long-term exposure in cases of non-normality of transformed positive daily exposure distributions. We therefore recommend that statistical models will be developed that deal with arbitrary (non-normal) positive daily exposure distributions. These models should also be able to assess the exposure as a function of cofactors (categorical factors such as gender) and covariables (continuous variables such as age).

The reason that some daily exposure distributions, namely of Denmark, Finland (both studies), Germany, Greece, Netherlands (only LB concentration scenario) and Sweden (only UB concentration scenario for 11- to 13-year olds), could not be transformed satisfactorily to approximate normality using a logarithmic transformation was in most cases that the transformed distribution was still right-skewed leading to an underestimation of the right tail (see Figure 2 for two examples). As described in section 3.1.3, the 'heavy' right tail of the distribution could in some cases be attributed to lead exposure via one specific food group. Given this observation, it needs to be investigated whether the linkage of the food consumption data to the analysed foods using a rather rough food categorisation system of 42 food groups was the reason why some positive daily exposure distributions could not be transformed to normality satisfactorily using a logarithmic transformation. For the databases of Germany and Finland (DIPP study) however no food groups could be identified that resulted in non-normality of the logarithmically transformed positive daily exposure distribution. The reason for this is unclear.

To assess long-term exposure food consumption data should be collected during two or more, preferably, non-consecutive days (Hoffmann et al., 2002), covering all seasons of the year. This holds for both models used in this report. For the majority of food consumption data used in the exposure calculations, the data were however collected on consecutive days (Table 2), except for Czech Republic, Netherlands and Spain (both studies) and partly for Cyprus and Finland-DIPP. As described by Hoffman et al. (2002), a sampling design based on adjacent days can result in an underestimation of the within-person variation, and to an over-estimation of the between-person variability, which is the quantity of interest. As a result long-term exposure levels may be overestimated. However, the food consumption databases with consecutive days all included three days or more, making it possible to select also in these surveys non-consecutive days (e.g. first and last recording day of surveys covering three days).

In this report, we calculated the exposure at the 99th percentile level. In the BBN approach, any percentile of long-term exposure can be calculated based on the simulated long-term exposure distribution, generated by combining the exposure frequency model with the back-transformed exposure distribution (see section 2.4.1). Both the BBN and the OIM approach are based on the exposure data of a limited set of individuals. A low number of persons in the database can be a limiting factor. In all datasets used in this report, the number of individuals

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exceeded 100, except for the age group 1 to 2 years of the Belgian, German, Italian and Spain-enKid studies (Table 2). Obviously with the latter studies there is no empirical basis for the 99th percentile with regard to the consumption data. For BBN the results are based on an assumed normal distribution of transformed positive daily exposure levels. The estimation of the 99th percentile level of exposure for small consumption databases suffers from uncertainty. The influence of this sampling uncertainty on the 99th percentile estimates can be investigated by running an uncertainty analysis using bootstrap sampling of the set of persons (see section 4.6). Furthermore, we compared the 99th percentile of exposure with the daily equivalent of the PTWI to assess whether there is a possible health risk of lead exposure in the examined populations. Apart from the feasibility of calculating such a high percentile of exposure, also the question should be raised which percentile to choose to assess whether there is a health risk or not. There are no guidelines on this, and normally several percentiles of exposure are reported (as done here) to make it possible to compare the toxicological reference value also with other levels of exposure.

4.5. Uncertainty

There are different sources of uncertainty in dietary exposure assessments. Important sources are study design, under- and over-reporting of food consumption, linkage of foods consumed to those analysed and uncertainty due to the sample size of the consumption and concentration database.

In this report, the uncertainties are related to the food consumption and lead concentration data used, and the linkage of the foods consumed to those analysed. Also model uncertainty is present in those cases where the exposure data could not be converted to normality in a satisfactory way.

We could perform a bootstrap analysis to quantify the uncertainty in the exposure percentiles due to the size of the database: normally smaller databases will result in larger confidence intervals around a certain exposure percentile than larger databases. However, this is too much detail for this report and should be part of the ensuing scientific paper. In that paper, also the uncertainty in the concentration database should be included.

4.6. Conclusion and recommendations for future analysis

In this study, we calculated the long-term dietary exposure to lead in children for different European countries and regions using the same lead concentration data and the same models to assess the exposure. To establish this, the foods recorded in the different surveys were categorised in a harmonised way, so that the consumption data could be linked to the lead concentration levels. The results showed that the lead exposure differed between the participating countries as well as between the different age groups, with higher lead exposures in younger children. Furthermore, the exposure levels were relatively high in the younger children resulting in exceedances of the daily equivalent of the PTWI at the 99th percentile level of exposure.

To assess the long-term exposure to lead in European children, a model, such as the BBN model, that corrects for the within-person variation is the preferred method to be used. The OIM model only reflects the exposure during the duration of the food consumption survey

which is more variable than the true long-term exposure. Another important advantage of the BBN model is that it can model covariates, such as age. This is important when assessing the exposure in children, because it is known that the exposure decreases with age, as shown for lead in this report. Ignoring the effect of age on the exposure when present may result in imprecise estimates of exposure and thus to wrong conclusions. However, models that correct for the within-person variation can only be used when the condition of normality of the transformed positive daily exposure distribution is met. This should always be checked when using these models to assess the long-term exposure to food chemicals.

Due to the uncertainties related to the lead exposure assessment presented here (section 4.6), the exposure results should be interpreted with caution and do not necessarily represent the intake of lead at the national level. We recommend refining the risk assessment of the dietary exposure to lead in young children in European countries by:

Gaining insight in the grouping of the analysed commodities in the different food groups, and to improve consequently the linkage between food consumed and analysed;

Gaining insight in the representativity of the lead concentration data used in the assessment to assess the national exposures to lead;

Developing a long-term model that can deal with non-normally distributed transformed positive exposure distributions, including cofactor and covariable analysis.

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Appendices

APPENDIX A LINKAGE OF THE FOOD CATEGORIES AS DEFINED IN DE NEVE ET AL (2009) (SO-CALLED 'EXPOCHI' FOOD GROUPS) TO THE FOOD GROUPS OF THE EFSA CONCISE FOOD CONSUMPTION DATABASE

EFSA Concise food consumption database food groups		EXPOCHI food groups	
Nr	Name	Nr	Name
1	Composed foods-cereal based mixed dishes and cereal-based desserts	6.5	Cereal and starch-based desserts (e.g. rice pudding, tapioca pudding)
		16.1	Composite foods: cereal based (e.g. casseroles, meat pies) -foods that can not be placed in categories 1-15.
2	Vegetables excl. dried vegetables[b]	4.2	Vegetables incl. mushrooms & fungi, roots & tubers, pulses and legumes), and nuts & seeds
		4.2.1	Fresh vegetables
		4.2.2	Processed vegetables, and nuts and seeds
		4.2.2.1	Frozen vegetables
		4.2.2.3	Vegetables in vinegar, oil or brine
		4.2.2.4	Canned or bottled (pasteurised) vegetables
		4.2.2.5	Vegetable, and nut & seed purees and spreads (e.g. peanut butter)
		4.2.2.6	Vegetable, and nut & seed pulps and preparations other than 4.2.2.5
		4.2.2.7	Fermented vegetable products
		4.2.2.8	Cooked or fried vegetables
3	Nuts/seeds	4.2	Vegetables incl. mushrooms & fungi, roots & tubers, pulses and legumes), and nuts & seeds
		4.2.2.5	Vegetable, and nut & seed purees and spreads (e.g. peanut butter)
		4.2.2.6	Vegetable, and nut & seed pulps and preparations other than 4.2.2.5
		15.2	Processed nuts, incl. coated nuts and nut mixtures (with e.g., dried fruit)
4	Coffee/tea in concentrated and in powdered form	14.1.5	Coffee, coffee substitutes, tea, herbal infusions, and other hot cereal beverages, excl cocoa.
5	Chocolate (products)	5.1	Cocoa products and chocolate products incl. limitations and chocolate substitutes
6	Fruit excl. dried fruit[b]	4.1	Fruit
		4.1.1	Fresh fruit
		4.1.2	Processed fruit
		4.1.2.1	Frozen fruit
		4.1.2.3	Fruit in vinegar, oil or brine

EFSA Concise food consumption database food groups		EXPOCHI food groups	
Nr	Name	Nr	Name
		4.1.2.4	Canned or bottled (pasteurised) fruit
		4.1.2.5	Jams, jellies, marmalades
		4.1.2.6	Fruit-based spreads other than 4.1.2.5 (e.g. chutney)
		4.1.2.7	Candied fruit
		4.1.2.8	Fruit preparations, incl. pulp and fruit toppings
		4.1.2.9	Fruit-based desserts, incl. fruit-flavoured water-based desserts
		4.1.2.10	Fermented fruit products
		4.1.2.11	Fruit fillings for pastries
		4.1.2.12	Cooked or fried fruit
7	Dried fruit	4.1.2.2	Dried fruit
8	Fresh and dried herbs, spices, seasonings and condiments	12.2	Herbs, spices, seasonings , and condiments
9	Food supplements	13.6	Food supplements
10	Waters	14.1.1	Waters
11	Sugar, sweeteners and sugar products (e.g. sugar based confectionery, chewing gum and decorations)	5.2	Sugar based confectionery other than 5.1, 5.3 and 5.4, incl. hard and soft candy, nougats, etc.
		5.3	Chewing gum
		5.4	Decorations (e.g. for fine bakery wares), toppings (non-fruit) and sweet sauces.
		11	Sweeteners, including honey
12	Fats, oils and fat emulsions (also e.g. rice milk (no soy milk))	2	Fats and oils, and fat emulsions (type water-in-oil)
13	Composed foods: meat based mixed dishes	16.2	Composite foods meat based (e.g. casseroles, meat pies) -foods that can not be placed in categories 1-15.
14	Composed foods: fish based mixed dishes	16.3	Composite foods fish based (e.g. casseroles, meat pies) -foods that can not be placed in categories 1-15.
15	Dried vegetables	4.2.2.2	Dried vegetables
16	Pulses/legumes	4.2	Vegetables incl. mushrooms & fungi, roots & tubers, pulses and legumes), and nuts & seeds
17	Soy milk/soy based dessert	2.3	2.3 Fat emulsions other than 2.2, incl. mixed and/or flavoured products based on fat emulsions.
		2.4	2.4 Fat based desserts (excl,. dairy based desserts)
18	Milk/dairy drinks	1.1.2	Milk, incl, sterilised and UHT goats milk
		1.1.4	Dairy-based drinks, flavoured and/or fermented (e.g. chocolate, milk, cocoa, eggnog)
		1.3	Condensed milk (plain) and analogues

EFSA Concise food consumption database food groups		EXPOCHI food groups	
Nr	Name	Nr	Name
		1.5	Milk powder and cream powder (plain)
19	Cheese	1.6	Cheese
20	Dairy based products	1.1.3	Buttermilk (Plain)
		1.2	Fermented and renneted milk products (plain) excluding drinks
		1.4	Cream (plain) and the like
		1.7	Dairy-based desserts (e.g. ice cream, ice milk, pudding, fruit or flavoured yoghurt)
21	Salt	12.1	Salt (incl. salt substitutes)
22	Fish	9	Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
23	Molluscs	9	Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
24	Cephalopods	9	Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
25	Crustaceans	9	Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
26	Other seafood (echinoderms)	9	Fish and fish products, including molluscs, crustaceans and echinoderms (MCE)
27	Beer/malt beverages	14.2.1	Beer and malt beverages
28	Wine/substitutes	14.2.3	Wines
29	Other alcoholic beverages	14.2.2	Cider and perry
		14.2.4	Fruit wine
		14.2.5	Mead
		14.2.6	Spirituous beverages
		14.3	Other alcoholic beverages (e.g. beer, wine, or spirit coolers. etc.)
30	Fruit juices/nectars[b]	14.1.2	Fruit and vegetable juices
		14.1.3	Fruit and vegetable nectars
31	Vegetable juices/nectars	14.1.2	Fruit and vegetable juices
		14.1.3	Fruit and vegetable nectars
32	Soft drinks/edible ices	3	Edible ices, including sherbet and sorbet
		14.1.4	Water-based flavoured drinks, incl. "sport" or "electrolyte" drinks
33	Cereals/cereal products (no cereal based desserts or cereal based mixed dishes)[b]	6.1	Whole, broken or flaked grain, incl. rice
		6.2	Flours and starch
		6.3	Breakfast cereals, incl. rolled oats
		6.4	Pastas and noodles

EFSA Concise food consumption database food groups		EXPOCHI food groups	
Nr	Name	Nr	Name
		6.6	Batters (e.g. for breading or batters for fish or poultry)
		7.1	Bread and ordinary bakery wares
		7.1.1	Breads and rolls
		7.1.2	Crackers, excluding sweet crackers
		7.1.3	Other ordinary bakery products (e.g. bagels, pita, English muffins)
		7.1.4	Bread-type products, incl. bread stuffing & bread crumbs
		7.2	Fine bakery wares
		7.2.1	Cakes, cookies and pies (e.g. fruit-filled or custard types)
		7.2.2	Other fine bakery products (e.g. doughnuts, sweet rolls, scones and muffins)
		7.2.3	Mixes for fine bakery wares (e.g. cakes, pancakes)
34	Other food for special dietary uses	13.4	Dietetic formulae for slimming purposes and weight reduction
		13.5	Dietetic foods other than 13.1-13.4
35	Infant formulae, follow up formulae, food for young children and infant formulae and follow up formulae for medical purposes[b]	13.1	Infant formulae and follow-on formulae
		13.2	Foods for young children (weaning foods)
		13.3	Dietetic foods intended for special medical purposes
37	Miscellaneous foods[b]	1.8	Whey and whey products, excl, whey cheese
		10.4	Egg-based desserts (e.g. custard)
		12.3	Vinegars
		12.4	Mustards
		12.5	Soups and broths
		12.6	Sauces and like products
		12.7	Salads (e.g. macaroni or potato salad), sandwich spreads (excl. cocoa- and nut-based spreads)
		12.8	Yeast
		12.9	Protein products
		15.1	Snacks - potato, cereal, flour or starch based (from roots & tubes, pulses & legumes)
38	Liver/kidney	8.4.1	Liver
		8.4.2	Kidney
		8.4.4	Liver and other meat
39	Offal except liver/kidney	8.4.3	Other offal

EFSA Concise food consumption database food groups		EXPOCHI food groups	
Nr	Name	Nr	Name
		8.5	Edible casings (e.g. sausage casings)
40	Types of vegetarian substitutes for meat/fish	17	Vegetarian meat and fish substitutes
41	Fresh meat	8.1	Fresh meat, poultry and game
42	Processed meat	8.2	Processed meat, poultry and game products in whole pieces or cuts
		8.3	Processed comminuted meat, poultry and game products
45	Eggs	10.1	Fresh eggs
		10.2	Egg products
		10.3	Preserved eggs, incl. alkaline, salted, and canned eggs

APPENDIX B DAILY CONSUMPTION LEVELS OF THE DIFFERENT FOOD GROUPS PER COUNTRY AND
RELEVANT AGE GROUP

Explanation column names

MeanConsum	average consumption, all consumers, all days
MeanConsDays	average consumption, consumption days only
Median	median consumption, consumption days only
NConsDays	number of consumption days in the data set
NDays	total number of days
%ConsDays	percentage consumption days

Belgium, age 2 to 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	22.54	143.73	125.00	311	1983	15.7
Waters	226.09	298.49	150.00	1502	1983	75.7
Sugar, sweeteners and sugar	3.81	15.60	8.00	484	1983	24.4
Fats, oils and fat emulsions	8.58	11.61	5.00	1465	1983	73.9
Composed foods: meat based	2.32	38.42	30.00	120	1983	6.1
Composed foods: fish based	0.40	24.00	20.00	33	1983	1.7
Pulses and legumes	0.94	58.09	42.50	32	1983	1.6
Soy milk and soy based dessert	17.35	318.52	125.00	108	1983	5.4
Milk and dairy drinks	360.58	422.09	200.00	1694	1983	85.4
Cheese	14.41	36.96	22.50	773	1983	39.0
Vegetables excl. dried vegetables	145.59	161.29	40.00	1790	1983	90.3
Dairy based products	42.38	119.71	100.00	702	1983	35.4
Salt	0.00	0.25	0.25	1	1983	0.1
Fish	8.45	80.56	75.00	208	1983	10.5
Molluscs	0.12	60.50	69.50	4	1983	0.2
Crustaceans	0.29	29.03	26.50	20	1983	1.0
Beer and malt beverages	0.50	70.57	32.50	14	1983	0.7
Wine and substitutes	0.05	13.44	7.50	8	1983	0.4
Nuts and seeds	0.35	18.11	10.00	38	1983	1.9
Fruit juices and nectars	174.98	299.12	200.00	1160	1983	58.5
Vegetable juices and nectars	0.23	150.00	112.50	3	1983	0.2
Soft drinks and edible ices	121.61	273.11	150.00	883	1983	44.5
Cereals and cereal products	152.95	152.95	30.00	1983	1983	100.0
Infant formulae	5.87	323.47	240.00	36	1983	1.8
Miscellaneous foods/products	71.47	110.90	30.00	1278	1983	64.4
Liver and kidney	0.77	21.52	19.00	71	1983	3.6
Offal except liver and kidney	0.37	82.44	95.00	9	1983	0.5
Types of vegetarian substitute	0.57	59.46	57.00	19	1983	1.0
Fresh meat	51.72	70.54	50.00	1454	1983	73.3
Processed meat	19.57	44.55	25.00	871	1983	43.9
Eggs	5.27	47.74	50.00	219	1983	11.0
Chocolate and chocolate products	13.27	24.32	13.50	1082	1983	54.6
Fruit excl. dried fruit	112.38	156.72	62.50	1422	1983	71.7
Dried fruit	0.39	20.77	20.00	37	1983	1.9

Belgium, age 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	17.19	109.21	125.00	17	108	15.7
Waters	153.13	232.93	150.00	71	108	65.7
Sugar, sweeteners and sugar	2.54	12.45	8.00	22	108	20.4
Fats, oils and fat emulsions	8.02	11.25	5.00	77	108	71.3
Composed foods: meat based	1.94	35.00	30.00	6	108	5.6
Composed foods: fish based	1.13	24.30	22.50	5	108	4.6
Pulses and legumes	0.32	35.00	35.00	1	108	0.9
Soy milk and soy based dessert	41.18	404.27	150.00	11	108	10.2
Milk and dairy drinks	361.44	424.30	200.00	92	108	85.2
Cheese	13.79	37.23	22.50	40	108	37.0
Vegetables excl. dried vegetables	141.04	153.86	37.61	99	108	91.7
Dairy based products	34.56	116.66	95.00	32	108	29.6
Fish	5.56	54.55	52.00	11	108	10.2
Crustaceans	0.63	34.00	34.00	2	108	1.9
Wine and substitutes	0.37	40.00	40.00	1	108	0.9
Nuts and seeds	0.48	13.00	6.00	4	108	3.7
Fruit juices and nectars	198.03	292.97	200.00	73	108	67.6
Soft drinks and edible ices	116.27	256.28	150.00	49	108	45.4
Cereals and cereal products	144.16	144.16	28.00	108	108	100.0
Infant formulae	20.00	360.00	240.00	6	108	5.6
Miscellaneous foods/products	81.71	127.90	39.79	69	108	63.9
Liver and kidney	1.23	26.50	22.00	5	108	4.6
Types of vegetarian substitute	0.30	32.20	32.20	1	108	0.9
Fresh meat	53.11	69.10	37.50	83	108	76.9
Processed meat	17.97	43.13	35.50	45	108	41.7
Eggs	4.50	48.59	50.50	10	108	9.3
Chocolate and chocolate products	15.50	25.36	17.00	66	108	61.1
Fruit excl. dried fruit	109.79	162.43	62.50	73	108	67.6
Dried fruit	0.39	42.00	42.00	1	108	0.9

Belgium, age 3 to 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	22.85	145.72	125.00	294	1875	15.7
Waters	230.29	301.74	150.00	1431	1875	76.3
Sugar, sweeteners and sugar	3.88	15.75	8.00	462	1875	24.6
Fats, oils and fat emulsions	8.61	11.63	5.00	1388	1875	74.0
Composed foods: meat based	2.35	38.60	30.00	114	1875	6.1
Composed foods: fish based	0.36	23.95	20.00	28	1875	1.5
Pulses and legumes	0.97	58.84	50.00	31	1875	1.7
Soy milk and soy based dessert	15.98	308.80	125.00	97	1875	5.2
Milk and dairy drinks	360.53	421.97	200.00	1602	1875	85.4
Cheese	14.44	36.95	22.50	733	1875	39.1
Vegetables excl. dried vegetables	145.85	161.72	40.00	1691	1875	90.2
Dairy based products	42.83	119.86	100.00	670	1875	35.7
Salt	0.00	0.25	0.25	1	1875	0.1

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Fish	8.62	82.02	75.00	197	1875	10.5
Molluscs	0.13	60.50	69.50	4	1875	0.2
Crustaceans	0.27	28.47	25.00	18	1875	1.0
Beer and malt beverages	0.53	70.57	32.50	14	1875	0.7
Wine and substitutes	0.04	9.64	6.50	7	1875	0.4
Nuts and seeds	0.34	18.71	11.50	34	1875	1.8
Fruit juices and nectars	173.65	299.53	200.00	1087	1875	58.0
Vegetable juices and nectars	0.24	150.00	112.50	3	1875	0.2
Soft drinks and edible ices	121.92	274.10	150.00	834	1875	44.5
Cereals and cereal products	153.46	153.46	30.00	1875	1875	100.0
Infant formulae	5.06	316.17	240.00	30	1875	1.6
Miscellaneous foods/products	70.89	109.93	30.00	1209	1875	64.5
Liver and kidney	0.74	21.14	17.50	66	1875	3.5
Offal except liver and kidney	0.40	82.44	95.00	9	1875	0.5
Types of vegetarian substitute	0.59	60.97	58.50	18	1875	1.0
Fresh meat	51.64	70.62	50.00	1371	1875	73.1
Processed meat	19.66	44.62	25.00	826	1875	44.1
Eggs	5.32	47.70	50.00	209	1875	11.1
Chocolate and chocolate products	13.14	24.26	13.00	1016	1875	54.2
Fruit excl. dried fruit	112.53	156.41	62.50	1349	1875	71.9
Dried fruit	0.39	20.18	17.00	36	1875	1.9

Cyprus, age 11 to 14 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	38.88	202.99	160.00	154	804	19.2
Waters	0.31	250.00	250.00	1	804	0.1
Sugar, sweeteners and sugar	3.67	13.65	10.00	216	804	26.9
Fats, oils and fat emulsions	6.09	11.05	10.00	443	804	55.1
Composed foods: meat based	13.18	135.83	100.00	78	804	9.7
Pulses and legumes	28.35	180.91	160.00	126	804	15.7
Milk and dairy drinks	258.18	321.32	220.00	646	804	80.3
Cheese	30.66	59.98	40.00	411	804	51.1
Vegetables excl. dried vegetables	175.88	215.56	60.00	656	804	81.6
Dairy based products	18.12	74.34	45.00	196	804	24.4
Fish	12.94	110.69	90.00	94	804	11.7
Cephalopods	6.75	118.04	90.00	46	804	5.7
Beer and malt beverages	0.93	750.00	750.00	1	804	0.1
Wine and substitutes	0.15	120.00	120.00	1	804	0.1
Nuts and seeds	1.84	25.50	20.00	58	804	7.2
Fruit juices and nectars.	114.24	197.95	200.00	464	804	57.7
Soft drinks and edible ices	58.13	322.31	240.00	145	804	18.0
Cereals and cereal products (n	194.89	204.82	60.00	765	804	95.1
Infant formulae	0.15	60.00	60.00	2	804	0.2
Miscellaneous foods/products	14.04	55.35	45.00	204	804	25.4
Liver and kidney	0.55	111.25	90.00	4	804	0.5
Ovaltine	0.68	5.03	5.00	109	804	13.6
Fresh meat	74.63	139.22	100.00	431	804	53.6

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Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Processed meat	13.09	39.13	30.00	269	804	33.5
Eggs	5.54	46.86	50.00	95	804	11.8
Chocolate and chocolate products	11.32	40.63	35.00	224	804	27.9
Fruit excl. dried fruit	95.85	204.96	145.00	376	804	46.8
Fresh and dried herbs, spices	0.21	18.33	15.00	9	804	1.1

Czech Republic, age 4 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	9.37	149.03	150.00	62	986	6.3
Waters	623.05	633.33	189.39	970	986	98.4
Sugar, sweeteners and sugar	19.56	22.87	8.36	843	986	85.5
Fats, oils and fat emulsions	32.35	32.54	7.14	980	986	99.4
Composed foods: meat based	1.12	184.17	182.50	6	986	0.6
Dried vegetables	0.09	2.04	0.59	45	986	4.6
Pulses and legumes	2.50	28.66	18.18	86	986	8.7
Milk and dairy drinks	199.19	230.25	46.50	853	986	86.5
Cheese	16.84	35.47	20.00	468	986	47.5
Vegetables excl. dried vegetable	158.39	161.17	8.00	969	986	98.3
Dairy based products	85.17	130.60	80.00	643	986	65.2
Salt	4.78	4.79	1.33	984	986	99.8
Fish	13.11	85.05	75.00	152	986	15.4
Molluscs	0.01	10.00	10.00	1	986	0.1
Beer and malt beverages	3.96	650.00	500.00	6	986	0.6
Wine and substitutes	0.22	15.59	4.59	14	986	1.4
Other alcoholic beverages	0.05	8.08	0.71	6	986	0.6
Nuts and seeds	0.97	14.94	7.58	64	986	6.5
Fruit juices and nectars	84.36	346.58	200.00	240	986	24.3
Soft drinks and edible ices	155.38	284.77	200.00	538	986	54.6
Cereals and cereal products	204.52	204.52	40.00	986	986	100.0
Infant formulae	2.74	142.35	150.00	19	986	1.9
Miscellaneous foods/products	11.70	18.31	3.00	630	986	63.9
Liver and kidney	3.90	34.02	15.15	113	986	11.5
Offal except liver and kidney	0.15	29.67	27.27	5	986	0.5
Coffee and tea in concentrated	2.17	2.70	2.00	793	986	80.4
Types of vegetarian substitute	0.04	13.97	15.00	3	986	0.3
Fresh meat	70.33	105.22	72.22	659	986	66.8
Processed meat	33.11	61.48	40.00	531	986	53.9
Eggs	15.81	22.65	6.78	688	986	69.8
Chocolate and chocolate products	14.62	27.09	9.00	532	986	54.0
Fruit excl. dried fruit	174.70	201.70	90.00	854	986	86.6
Dried fruit	0.41	5.95	1.36	68	986	6.9
Fresh and dried herbs, spices	1.76	1.85	0.13	937	986	95.0

Czech Republic, age 11 to 14 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	8.30	164.55	112.50	11	218	5.0
Waters	760.41	763.91	200.00	217	218	99.5
Sugar, sweeteners and sugar	19.98	24.89	10.00	175	218	80.3
Fats, oils and fat emulsions	44.96	45.38	8.93	216	218	99.1
Composed foods: meat based	0.55	120.00	120.00	1	218	0.5
Composed foods: fish based	0.46	100.00	100.00	1	218	0.5
Dried vegetables	0.03	0.68	0.74	9	218	4.1
Pulses and legumes	3.01	29.86	22.73	22	218	10.1
Milk and dairy drinks	184.62	221.13	42.64	182	218	83.5
Cheese	20.64	45.44	30.00	99	218	45.4
Vegetables excl. dried vegetables	224.64	233.19	10.50	210	218	96.3
Dairy based products	76.48	137.79	100.00	121	218	55.5
Salt	6.18	6.26	1.50	215	218	98.6
Fish	12.94	128.24	112.50	22	218	10.1
Beer and malt beverages	2.29	500.00	500.00	1	218	0.5
Wine and substitutes	0.02	3.67	3.67	1	218	0.5
Other alcoholic beverages	0.01	0.80	0.71	4	218	1.8
Nuts and seeds	1.26	13.71	7.14	20	218	9.2
Fruit juices and nectars	41.56	292.26	225.00	31	218	14.2
Soft drinks and edible ices	256.11	393.18	250.00	142	218	65.1
Cereals and cereal products	264.76	264.76	40.00	218	218	100.0
Miscellaneous foods/products	18.91	25.29	3.64	163	218	74.8
Liver and kidney	5.88	51.26	42.50	25	218	11.5
Offal except liver and kidney	0.42	45.45	45.45	2	218	0.9
Coffee and tea in concentrated	2.05	2.68	2.00	167	218	76.6
Fresh meat	93.56	134.19	96.77	152	218	69.7
Processed meat	61.00	93.00	41.67	143	218	65.6
Eggs	21.69	31.32	9.33	151	218	69.3
Chocolate and chocolate products	12.36	32.86	9.00	82	218	37.6
Fruit excl. dried fruit	195.82	258.71	100.00	165	218	75.7
Dried fruit	0.14	2.18	1.82	14	218	6.4
Fresh and dried herbs, spices	1.67	1.80	0.15	203	218	93.1

Denmark, age 4 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Waters	514.89	546.48	150.00	3944	4186	94.2
Sugar, sweeteners and sugar	25.74	34.25	8.50	3146	4186	75.2
Fats, oils and fat emulsions	27.89	28.53	5.48	4092	4186	97.8
Dried vegetables	0.00	2.88	2.88	1	4186	0.0
Pulses and legumes	4.18	30.85	6.84	567	4186	13.5
Milk and dairy drinks	435.62	457.71	64.00	3984	4186	95.2
Cheese	18.59	30.01	7.70	2593	4186	61.9
Vegetables excl. dried vegetables	183.34	196.84	13.30	3899	4186	93.1
Dairy based products	87.18	109.62	35.71	3329	4186	79.5

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Salt	2.46	2.64	0.48	3889	4186	92.9
Fish	11.34	33.14	5.64	1432	4186	34.2
Cephalopods	0.01	24.72	24.72	1	4186	0.0
Crustaceans	0.71	11.22	1.53	265	4186	6.3
Beer and malt beverages	0.75	348.33	330.00	9	4186	0.2
Wine and substitutes	0.17	37.32	36.36	19	4186	0.5
Nuts and seeds	1.52	22.38	4.50	285	4186	6.8
Fruit juices and nectars	123.95	178.31	40.00	2910	4186	69.5
Soft drinks and edible ices	167.87	438.65	300.00	1602	4186	38.3
Cereals and cereal products	198.71	199.13	9.00	4177	4186	99.8
Miscellaneous foods/products	15.84	26.10	4.50	2541	4186	60.7
Liver and kidney	7.17	20.81	15.00	1442	4186	34.4
Offal except liver and kidney	0.02	22.00	22.00	3	4186	0.1
Fresh meat	61.29	72.23	18.67	3552	4186	84.9
Processed meat	31.07	43.43	7.84	2995	4186	71.5
Eggs	12.57	18.48	5.29	2847	4186	68.0
Chocolate and chocolate products	13.55	24.65	4.95	2301	4186	55.0
Fruit excl. dried fruit	133.46	168.53	60.00	3315	4186	79.2
Dried fruit	1.97	16.46	12.00	500	4186	11.9
Fresh and dried herbs, spices	0.08	0.46	0.23	760	4186	18.2

Finland-DIPP, age 1, 3, and 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.69	100.83	72.00	43	2558	1.7
Waters	264.76	352.00	145.00	1924	2558	75.2
Sugar, sweeteners and sugar	11.82	17.85	7.00	1694	2558	66.2
Fats, oils and fat emulsions	12.96	13.82	5.00	2398	2558	93.7
Composed foods: meat based	7.55	71.23	70.00	271	2558	10.6
Pulses and legumes	1.61	63.32	53.30	65	2558	2.5
Soy milk and soy based dessert	5.84	304.63	170.00	49	2558	1.9
Milk and dairy drinks	331.77	382.98	162.00	2216	2558	86.6
Cheese	11.07	26.37	17.20	1074	2558	42.0
Vegetables excl. dried vegetables	87.19	104.72	36.00	2130	2558	83.3
Dairy based products	93.76	144.83	100.00	1656	2558	64.7
Fish	4.49	60.50	52.20	190	2558	7.4
Molluscs	0.02	11.33	10.30	4	2558	0.2
Crustaceans	0.15	18.92	4.80	20	2558	0.8
Wine and substitutes	0.02	6.97	4.90	6	2558	0.2
Other alcoholic beverages	0.00	0.46	0.50	8	2558	0.3
Nuts and seeds	4.92	22.88	20.00	550	2558	21.5
Fruit juices and nectars	118.03	272.25	200.00	1109	2558	43.4
Vegetable juices and nectars	0.93	140.34	100.00	17	2558	0.7
Soft drinks and edible ices	177.58	209.33	42.60	2170	2558	84.8
Cereals and cereal products	142.86	143.25	30.00	2551	2558	99.7
Other food for special dietary	0.02	7.56	5.20	8	2558	0.3
Infant formulae	7.56	87.49	22.00	221	2558	8.6
Miscellaneous foods/products	39.36	58.94	15.00	1708	2558	66.8

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Liver and kidney	4.62	24.17	20.00	489	2558	19.1
Offal except liver and kidney	0.01	11.35	11.35	2	2558	0.1
Types of vegetarian substitute	0.68	60.13	24.00	29	2558	1.1
Fresh meat	28.14	48.83	37.50	1474	2558	57.6
Processed meat	12.19	28.38	15.00	1099	2558	43.0
Eggs	5.28	33.67	40.00	401	2558	15.7
Chocolate and chocolate products	14.55	23.71	12.00	1570	2558	61.4
Fruit excl. dried fruit	119.97	151.55	65.00	2025	2558	79.2
Dried fruit	0.98	16.01	14.00	157	2558	6.1
Fresh and dried herbs, spices	0.34	6.99	5.40	125	2558	4.9

Finland-DIPP, age 1 year

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	2.66	234.47	150.00	17	1497	1.1
Waters	966.73	976.52	31.47	1482	1497	99.0
Sugar, sweeteners and sugar	11.08	12.21	2.14	1358	1497	90.7
Fats, oils and fat emulsions	12.45	13.56	1.47	1375	1497	91.9
Dried vegetables	0.30	1.46	0.50	308	1497	20.6
Pulses and legumes	2.45	11.13	7.03	329	1497	22.0
Soy milk and soy based dessert	2.11	210.39	125.00	15	1497	1.0
Milk and dairy drinks	291.05	356.85	62.62	1221	1497	81.6
Cheese	14.35	39.92	10.00	538	1497	35.9
Vegetables excl. dried vegetables	196.24	200.12	15.00	1468	1497	98.1
Dairy based products	87.54	132.24	19.12	991	1497	66.2
Salt	0.97	1.09	0.16	1331	1497	88.9
Fish	6.15	28.40	19.03	324	1497	21.6
Crustaceans	0.01	3.07	3.28	4	1497	0.3
Beer and malt beverages	0.01	8.52	8.52	1	1497	0.1
Wine and substitutes	0.01	5.96	4.33	2	1497	0.1
Other alcoholic beverages	0.03	25.04	25.04	2	1497	0.1
Nuts and seeds	0.23	3.89	0.25	88	1497	5.9
Fruit juices and nectars	32.28	102.81	10.00	470	1497	31.4
Vegetable juices and nectars	0.00	0.39	0.39	1	1497	0.1
Soft drinks and edible ices	6.69	126.69	25.00	79	1497	5.3
Cereals and cereal products	62.16	62.88	3.10	1480	1497	98.9
Other food for special dietary	0.00	1.29	0.21	3	1497	0.2
Infant formulae	45.69	141.91	32.53	482	1497	32.2
Miscellaneous foods/products	4.88	6.61	0.62	1105	1497	73.8
Liver and kidney	0.40	33.31	15.00	18	1497	1.2
Offal except liver and kidney	0.18	15.79	9.26	17	1497	1.1
Types of vegetarian substitute	0.03	12.59	5.00	3	1497	0.2
Fresh meat	45.72	50.81	10.72	1347	1497	90.0
Processed meat	7.74	46.18	18.94	251	1497	16.8
Eggs	2.70	9.39	2.80	431	1497	28.8
Chocolate and chocolate products	0.61	9.48	1.50	97	1497	6.5
Fruit excl. dried fruit	80.83	86.12	10.50	1405	1497	93.9

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
Dried fruit	0.58	11.49	4.00	75	1497	5.0
Fresh and dried herbs, spices	0.51	1.00	0.20	756	1497	50.5
Food supplements	0.45	11.50	0.00	58	1497	3.9

Finland-DIPP, age 3 and 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.57	393.33	150.00	12	3000	0.4
Waters	707.36	738.12	25.00	2875	3000	95.8
Sugar, sweeteners and sugar	21.94	24.35	2.50	2703	3000	90.1
Fats, oils and fat emulsions	37.23	39.16	2.59	2852	3000	95.1
Dried vegetables	1.16	3.81	1.62	914	3000	30.5
Pulses and legumes	2.54	21.31	8.73	357	3000	11.9
Soy milk and soy based dessert	4.62	308.32	125.00	45	3000	1.5
Milk and dairy drinks	483.50	524.97	100.00	2763	3000	92.1
Cheese	31.28	56.56	10.00	1659	3000	55.3
Vegetables excl. dried vegetables	202.60	217.22	15.26	2798	3000	93.3
Dairy based products	128.77	171.85	31.77	2248	3000	74.9
Salt	2.73	2.84	0.31	2876	3000	95.9
Fish	10.22	47.23	30.00	649	3000	21.6
Crustaceans	0.20	15.30	10.61	40	3000	1.3
Beer and malt beverages	0.43	142.61	50.00	9	3000	0.3
Wine and substitutes	0.02	4.81	2.29	13	3000	0.4
Other alcoholic beverages	0.29	107.50	100.00	8	3000	0.3
Nuts and seeds	0.73	5.59	0.85	391	3000	13.0
Fruit juices and nectars	238.87	360.28	100.00	1989	3000	66.3
Vegetable juices and nectars	0.01	3.14	1.88	5	3000	0.2
Soft drinks and edible ices	84.57	274.89	100.00	923	3000	30.8
Cereals and cereal products	104.20	108.58	5.60	2879	3000	96.0
Other food for special dietary	0.03	4.80	3.61	16	3000	0.5
Infant formulae	2.76	129.29	40.00	64	3000	2.1
Miscellaneous foods/products	11.73	12.69	0.84	2772	3000	92.4
Liver and kidney	3.56	37.48	15.00	285	3000	9.5
Offal except liver and kidney	1.54	41.60	25.56	111	3000	3.7
Types of vegetarian substitute	0.03	50.00	50.00	2	3000	0.1
Fresh meat	54.62	74.79	27.05	2191	3000	73.0
Processed meat	49.51	82.51	21.72	1800	3000	60.0
Eggs	10.55	17.69	4.82	1789	3000	59.6
Chocolate and chocolate products	5.65	17.76	2.50	954	3000	31.8
Fruit excl. dried fruit	91.24	113.96	19.14	2402	3000	80.1
Dried fruit	1.26	12.55	4.27	302	3000	10.1
Fresh and dried herbs, spices,	0.17	0.91	0.20	549	3000	18.3
Food supplements	0.07	3.70	0.00	53	3000	1.8

Finland-STRIP, age 7 to 8 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	55.80	186.00	110.00	300	1000	30.0
Waters	99.26	260.52	170.00	381	1000	38.1
Sugar, sweeteners and sugar	21.41	35.69	10.00	600	1000	60.0
Fats, oils and fat emulsions	12.72	14.93	5.00	852	1000	85.2
Composed foods: meat based	47.37	205.96	150.00	230	1000	23.0
Composed foods: fish based	9.00	147.48	80.00	61	1000	6.1
Dried vegetables	1.80	120.00	100.00	15	1000	1.5
Pulses and legumes	11.17	47.13	30.00	237	1000	23.7
Milk and dairy drinks	432.90	468.50	200.00	924	1000	92.4
Cheese	15.82	32.61	20.00	485	1000	48.5
Vegetables excl. dried vegetables	123.81	147.05	30.00	842	1000	84.2
Dairy based products	118.57	185.85	100.00	638	1000	63.8
Salt	0.60	3.10	0.75	195	1000	19.5
Fish	7.95	64.61	45.00	123	1000	12.3
Molluscs	0.01	12.00	12.00	1	1000	0.1
Beer and malt beverages	2.05	341.67	200.00	6	1000	0.6
Other alcoholic beverages	5.75	319.44	200.00	18	1000	1.8
Nuts and seeds	0.68	42.69	16.50	16	1000	1.6
Fruit juices and nectars	157.55	292.84	200.00	538	1000	53.8
Vegetable juices and nectars	0.05	50.00	50.00	1	1000	0.1
Soft drinks and edible ices	138.31	310.81	200.00	445	1000	44.5
Cereals and cereal products	255.73	256.50	36.00	997	1000	99.7
Infant formulae, follow up for	2.06	137.20	135.00	15	1000	1.5
Miscellaneous foods/products	41.35	69.38	18.00	596	1000	59.6
Liver and kidney	2.83	31.48	20.00	90	1000	9.0
Fresh meat	35.29	88.23	60.00	400	1000	40.0
Processed meat	49.76	80.91	36.00	615	1000	61.5
Eggs	5.12	50.66	60.00	101	1000	10.1
Chocolate and chocolate products	5.29	29.71	20.00	178	1000	17.8
Fruit excl. Dried fruit	105.39	152.74	65.00	690	1000	69.0
Dried fruit	0.48	23.83	12.00	20	1000	2.0
Fresh and dried herbs, spices	0.03	1.57	1.00	17	1000	1.7
Food supplements	0.91	6.05	1.25	151	1000	15.1

France, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	28.50	121.29	100.00	944	4018	23.5
Waters	408.65	466.07	300.00	3523	4018	87.7
Sugar, sweeteners and sugar	5.19	14.48	10.00	1439	4018	35.8
Fats, oils and fat emulsions	16.69	23.15	10.00	2898	4018	72.1
Composed foods: meat based	41.00	159.34	113.00	1034	4018	25.7
Composed foods: fish based	1.53	94.35	100.00	65	4018	1.6
Pulses and legumes	7.25	115.21	100.00	253	4018	6.3

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Soy milk and soy based dessert	2.48	255.44	200.00	39	4018	1.0
Milk and dairy drinks	214.58	289.72	250.00	2976	4018	74.1
Cheese	18.29	37.53	22.80	1958	4018	48.7
Vegetables excl. dried vegetables	118.73	147.47	50.00	3235	4018	80.5
Dairy based products	108.07	158.07	120.00	2747	4018	68.4
Salt	0.18	2.78	2.00	257	4018	6.4
Fish	18.09	78.77	60.00	923	4018	23.0
Molluscs	0.56	40.05	30.00	56	4018	1.4
Cephalopods	0.17	86.25	80.00	8	4018	0.2
Crustaceans	0.51	29.03	25.50	70	4018	1.7
Beer and malt beverages	0.17	226.67	120.00	3	4018	0.1
Wine and substitutes	0.09	25.32	12.00	14	4018	0.3
Other alcoholic beverages	1.47	219.07	150.00	27	4018	0.7
Nuts and seeds	0.63	24.06	12.00	106	4018	2.6
Fruit juices and nectars	78.41	200.28	150.00	1573	4018	39.1
Vegetable juices and nectars	0.27	220.00	200.00	5	4018	0.1
Soft drinks and edible ices	86.36	241.13	150.00	1439	4018	35.8
Cereals and cereal products	177.36	185.24	50.00	3847	4018	95.7
Infant formulae	4.29	249.93	250.00	69	4018	1.7
Miscellaneous foods/products	57.77	114.45	20.00	2028	4018	50.5
Liver and kidney	0.33	63.57	50.00	21	4018	0.5
Offal except liver and kidney	1.22	82.03	80.00	60	4018	1.5
Coffee and tea in concentrated	0.07	5.19	4.00	53	4018	1.3
Types of vegetarian substitute	0.04	56.67	75.00	3	4018	0.1
Fresh meat	42.45	93.40	80.00	1826	4018	45.4
Processed meat	29.32	65.74	40.00	1792	4018	44.6
Eggs	9.45	78.12	60.00	486	4018	12.1
Chocolate and chocolate products	13.83	23.13	10.00	2403	4018	59.8
Fruit excl. dried fruit	89.76	147.93	90.00	2438	4018	60.7
Dried fruit	0.23	24.64	10.20	38	4018	0.9
Fresh and dried herbs, spices	0.25	3.56	1.25	279	4018	6.9

Germany 2008, age 1 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	10.79	141.92	108.50	70	921	7.6
Waters	581.24	659.27	191.05	812	921	88.2
Sugar, sweeteners and sugar	9.40	18.65	8.00	464	921	50.4
Fats, oils and fat emulsion	10.28	12.97	5.00	730	921	79.3
Composed foods: meat based	1.85	141.64	106.20	12	921	1.3
Dried vegetables	0.20	3.46	0.10	53	921	5.8
Pulses and legumes	0.98	32.30	23.50	28	921	3.0
Soy milk and soy based dessert	0.98	225.50	147.00	4	921	0.4
Milk and dairy drinks	233.24	322.54	143.10	666	921	72.3
Cheese	18.47	37.88	17.00	449	921	48.8

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Vegetables excl. dried vegetables	126.75	158.39	30.00	737	921	80.0
Dairy based products	76.34	133.42	50.00	527	921	57.2
Salt	0.06	0.40	0.00	130	921	14.1
Fish	9.09	74.73	55.00	112	921	12.2
Crustaceans	0.19	35.48	22.00	5	921	0.5
Beer and malt beverages	3.23	248.25	221.00	12	921	1.3
Wine and substitutes	0.02	15.50	15.50	1	921	0.1
Other alcoholic beverages	0.02	4.60	4.00	5	921	0.5
Nuts and seeds	1.01	19.05	9.00	49	921	5.3
Fruit juices and nectars.	137.10	264.16	120.00	478	921	51.9
Vegetable juices and nectars	2.24	108.37	96.00	19	921	2.1
Soft drinks and edible ices	115.23	379.03	200.00	280	921	30.4
Cereals and cereal products	176.39	195.72	34.00	830	921	90.1
Infant formulae	47.69	278.01	57.20	158	921	17.2
Miscellaneous foods/products	18.78	33.20	4.54	521	921	56.6
Liver and kidney	2.46	19.85	10.00	114	921	12.4
Coffee and tea in concentrated	0.28	7.95	2.00	33	921	3.6
Types of vegetarian substitute	0.51	58.58	19.00	8	921	0.9
Fresh meat	10.41	49.42	35.50	194	921	21.1
Processed meat	39.92	57.80	21.00	636	921	69.1
Eggs	12.13	39.75	25.90	281	921	30.5
Chocolate and chocolate products	12.82	25.17	11.00	469	921	50.9
Fruit excl. dried fruit	137.98	185.52	64.00	685	921	74.4
Dried fruit	0.59	24.63	25.00	22	921	2.4
Fresh and dried herbs, spices	0.17	0.50	0.10	306	921	33.2

Germany 2008, age 1 to 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed food: cereal based	6.11	136.59	62.00	11	246	4.5
Waters	714.16	992.57	169.38	177	246	72.0
Sugar, sweeteners and sugar	3.66	21.41	7.00	42	246	17.1
Fats, oils and fat emulsions	9.10	13.57	4.00	165	246	67.1
Composed foods: meat based	3.68	181.30	106.20	5	246	2.0
Dried vegetables	0.00	0.21	0.13	3	246	1.2
Pulses and legumes	1.30	45.69	31.10	7	246	2.8
Milk and dairy drinks	328.42	568.96	159.55	142	246	57.7
Cheese	18.10	48.94	15.20	91	246	37.0
Vegetables excl. dried vegetables	136.02	230.77	28.00	145	246	58.9
Dairy based products	60.14	174.05	50.00	85	246	34.6
Salt	0.04	0.37	0.00	28	246	11.4
Fish	6.89	67.81	39.25	25	246	10.2

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Other alcoholic beverages	0.06	4.67	4.00	3	246	1.2
Nuts and seeds	0.19	9.22	4.78	5	246	2.0
Fruit juices and nectars	102.14	264.48	75.00	95	246	38.6
Vegetable juices and nectars	6.10	150.15	121.60	10	246	4.1
Soft drinks and edible ices	11.18	152.74	53.00	18	246	7.3
Cereals and cereal products	137.32	196.40	23.00	172	246	69.9
Infant formulae	155.65	303.88	55.96	126	246	51.2
Miscellaneous foods/products	11.79	37.66	3.00	77	246	31.3
Liver and kidney	4.51	25.82	10.00	43	246	17.5
Types of vegetarian substitute	1.25	102.33	89.45	3	246	1.2
Fresh meat	5.51	30.83	23.61	44	246	17.9
Processed meat	23.08	52.10	15.00	109	246	44.3
Eggs	10.99	52.01	20.75	52	246	21.1
Chocolate and chocolate products	3.53	21.72	6.00	40	246	16.3
Fruit excl. dried fruit	176.96	302.31	58.50	144	246	58.5
Dried fruit	0.60	36.75	30.00	4	246	1.6
Fresh and dried herbs, spices	0.19	0.97	0.10	47	246	19.1

Germany 2008, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	12.60	142.91	120.00	59	669	8.8
Waters	533.11	566.11	200.00	630	669	94.2
Sugar, sweeteners and sugar	11.59	18.38	8.00	422	669	63.1
Fats, oils and fat emulsions	10.78	12.83	5.07	562	669	84.0
Composed foods: meat based	1.19	113.31	110.00	7	669	1.0
Dried vegetables	0.27	3.66	0.10	50	669	7.5
Pulses and legumes	0.87	27.84	21.40	21	669	3.1
Soy milk and soy based dessert	1.35	225.50	147.00	4	669	0.6
Milk and dairy drinks	199.85	256.14	139.85	522	669	78.0
Cheese	18.72	35.18	18.00	356	669	53.2
Vegetables excl. dried vegetables	124.37	141.02	30.00	590	669	88.2
Dairy based products	82.97	126.15	50.00	440	669	65.8
Salt	0.06	0.41	0.00	102	669	15.2
Fish	9.98	76.71	62.40	87	669	13.0
Crustaceans	0.27	35.48	22.00	5	669	0.7
Beer and malt beverages	4.45	248.25	221.00	12	669	1.8
Wine and substitutes	0.02	15.50	15.50	1	669	0.1
Other alcoholic beverages	0.01	4.50	4.50	2	669	0.3
Nuts and seeds	1.33	20.17	11.00	44	669	6.6
Fruit juices and nectars	150.31	263.24	150.00	382	669	57.1
Vegetable juices and nectars	0.83	61.96	25.50	9	669	1.3

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Soft drinks and edible ices	151.99	391.07	219.00	260	669	38.9
Cereals and cereal products	191.92	196.92	40.00	652	669	97.5
Infant formulae	6.53	167.92	97.00	26	669	3.9
Miscellaneous foods/products	21.52	32.43	5.15	444	669	66.4
Liver and kidney	1.71	16.38	13.00	70	669	10.5
Coffee and tea in concentrated	0.39	7.95	2.00	33	669	4.9
Types of vegetarian substitute	0.24	32.33	16.60	5	669	0.7
Fresh meat	12.24	55.34	41.15	148	669	22.1
Processed meat	46.42	59.04	24.00	526	669	78.6
Eggs	12.65	36.97	28.00	229	669	34.2
Chocolate and chocolate products	16.35	25.49	11.90	429	669	64.1
Fruit excl. dried fruit	124.72	154.80	66.00	539	669	80.6
Dried fruit	0.59	21.93	23.50	18	669	2.7
Fresh and dried herbs, spices	0.16	0.41	0.10	259	669	38.7

Germany 2007, age 1 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	15.20	191.64	116.00	74	933	7.9
Waters	549.30	637.44	190.00	804	933	86.2
Sugar, sweeteners and sugar	10.90	20.80	8.00	489	933	52.4
Fats, oils and fat emulsions	10.98	13.94	5.00	735	933	78.8
Composed foods: meat based	2.07	137.79	118.10	14	933	1.5
Dried vegetables	0.41	7.07	0.20	54	933	5.8
Pulses and legumes	1.38	76.01	31.10	17	933	1.8
Soy milk and soy based dessert	1.30	201.67	144.00	6	933	0.6
Milk and dairy drinks	287.80	397.80	156.85	675	933	72.3
Cheese	17.32	34.76	16.00	465	933	49.8
Vegetables excl. dried vegetables	134.03	172.01	30.55	727	933	77.9
Dairy based products	82.07	137.72	57.00	556	933	59.6
Salt	0.00	0.31	0.00	9	933	1.0
Fish	9.46	74.16	53.40	119	933	12.8
Crustaceans	0.08	15.46	10.50	5	933	0.5
Beer and malt beverages	4.58	610.29	415.00	7	933	0.8
Wine and substitutes	0.09	7.13	2.80	12	933	1.3
Other alcoholic beverages	0.00	0.50	0.50	1	933	0.1
Nuts and seeds	1.27	16.63	6.20	71	933	7.6
Fruit juices and nectars.	134.15	251.33	126.00	498	933	53.4
Vegetable juices and nectars	1.63	152.47	147.00	10	933	1.1
Soft drinks and edible ices	127.02	373.84	200.00	317	933	34.0
Cereals and cereal products	183.08	205.06	34.45	833	933	89.3
Infant formulae	47.46	305.38	64.20	145	933	15.5

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
Miscellaneous foods/products	17.36	31.95	3.60	507	933	54.3
Liver and kidney	1.80	17.46	11.50	96	933	10.3
Coffee and tea in concentrated	0.26	7.95	3.00	31	933	3.3
Types of vegetarian substitute	0.47	62.66	48.50	7	933	0.8
Fresh meat	13.17	55.12	33.90	223	933	23.9
Processed meat	39.59	60.55	22.80	610	933	65.4
Eggs	10.83	38.58	18.40	262	933	28.1
Chocolate and chocolate products	13.97	27.22	12.00	479	933	51.3
Fruit excl. dried fruit	138.21	183.95	64.00	701	933	75.1
Dried fruit	0.66	20.00	13.50	31	933	3.3
Fresh and dried herbs, spices	0.16	0.49	0.10	299	933	32.0

Germany 2007, age 1 to 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	10.12	215.03	78.50	12	255	4.7
Waters	683.37	936.88	175.00	186	255	72.9
Sugar, sweeteners and sugar	3.66	12.78	5.00	73	255	28.6
Fats, oils and fat emulsions	9.85	15.14	4.30	166	255	65.1
Composed foods: meat based	0.92	78.13	68.10	3	255	1.2
Dried vegetables	0.64	8.56	2.95	19	255	7.5
Milk and dairy drinks	378.83	585.47	162.80	165	255	64.7
Cheese	18.27	41.97	13.60	111	255	43.5
Vegetables excl. dried vegetables	140.67	235.99	32.20	152	255	59.6
Dairy based products	80.77	182.26	63.35	113	255	44.3
Salt	0.00	.	0.00	0	255	0.0
Fish	8.81	77.46	46.00	29	255	11.4
Crustaceans	0.02	4.00	2.00	1	255	0.4
Wine and substitutes	0.14	12.17	8.70	3	255	1.2
Other alcoholic beverages	0.00	0.50	0.50	1	255	0.4
Nuts and seeds	0.50	8.04	4.00	16	255	6.3
Fruit juices and nectars	101.89	229.93	100.00	113	255	44.3
Vegetable juices and nectars	3.21	204.68	78.00	4	255	1.6
Soft drinks and edible ices	40.25	320.73	125.75	32	255	12.5
Cereals and cereal products	151.47	208.78	25.00	185	255	72.5
Infant formulae	154.05	360.39	63.00	109	255	42.7
Miscellaneous foods/products	7.91	24.02	1.90	84	255	32.9
Liver and kidney	2.85	17.70	10.00	41	255	16.1
Coffee and tea in concentrated	0.23	14.85	6.30	4	255	1.6
Types of vegetarian substitute	0.65	82.70	41.35	2	255	0.8
Fresh meat	8.90	43.63	21.60	52	255	20.4
Processed meat	34.82	74.61	20.00	119	255	46.7
Eggs	6.55	40.75	9.10	41	255	16.1

Chocolate and chocolate products	5.27	21.34	8.00	63	255	24.7
Fruit excl. dried fruit	152.26	239.67	57.80	162	255	63.5
Dried fruit	0.66	21.00	5.00	8	255	3.1
Fresh and dried herbs, spices	0.07	0.48	0.10	38	255	14.9

Germany 2007, age, 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	17.11	184.15	122.00	63	678	9.3
Waters	498.88	544.67	200.00	621	678	91.6
Sugar, sweeteners and sugar	13.62	22.04	8.90	419	678	61.8
Fats, oils and fat emulsions	11.41	13.57	5.00	570	678	84.1
Composed foods: meat based	2.50	154.06	122.50	11	678	1.6
Dried vegetables	0.32	5.93	0.10	37	678	5.5
Pulses and legumes	1.91	76.01	31.10	17	678	2.5
Soy milk and soy based dessert	1.78	201.67	144.00	6	678	0.9
Milk and dairy drinks	253.56	335.11	155.00	513	678	75.7
Cheese	16.97	32.50	16.85	354	678	52.2
Vegetables excl. dried vegetables	131.53	154.29	30.00	578	678	85.3
Dairy based products	82.56	125.79	55.00	445	678	65.6
Salt	0.00	0.31	0.00	9	678	1.3
Fish	9.70	73.10	61.60	90	678	13.3
Crustaceans	0.11	18.33	19.50	4	678	0.6
Beer and malt beverages	6.30	610.29	415.00	7	678	1.0
Wine and substitutes	0.07	5.46	2.70	9	678	1.3
Nuts and seeds	1.55	19.13	9.25	55	678	8.1
Fruit juices and nectars	146.28	255.61	149.00	388	678	57.2
Vegetable juices and nectars	1.04	117.67	147.00	6	678	0.9
Soft drinks and edible ices	159.65	378.48	200.00	286	678	42.2
Cereals and cereal products	194.97	203.06	40.00	651	678	96.0
Infant formulae	7.37	131.51	96.50	38	678	5.6
Miscellaneous foods/products	20.91	33.28	4.40	426	678	62.8
Liver and kidney	1.40	17.28	14.00	55	678	8.1
Coffee and tea in concentrated	0.28	6.93	3.00	27	678	4.0
Types of vegetarian substitute	0.40	54.64	48.50	5	678	0.7
Fresh meat	14.78	58.61	46.50	171	678	25.2
Processed meat	41.39	56.80	23.00	494	678	72.9
Eggs	12.44	38.18	21.90	221	678	32.6
Chocolate and chocolate products	17.25	27.91	12.00	419	678	61.8
Fruit excl. dried fruit	132.93	166.28	66.00	542	678	79.9
Dried fruit	0.67	19.66	14.50	23	678	3.4
Fresh and dried herbs, spices	0.19	0.50	0.11	261	678	38.5

Germany 2006, age 1 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	13.20	166.62	123.00	72	909	7.9
Waters	551.56	615.93	187.00	814	909	89.5
Sugar, sweeteners and sugar	10.49	20.68	8.00	461	909	50.7
Fats, oils and fat emulsions	10.86	13.88	5.00	711	909	78.2
Composed foods: meat based	1.82	92.04	64.10	18	909	2.0
Dried vegetables	0.36	7.13	0.10	46	909	5.1
Pulses and legumes	1.23	69.70	30.05	16	909	1.8
Soy milk and soy based dessert	1.53	231.22	140.90	6	909	0.7
Milk and dairy drinks	220.89	305.16	140.70	658	909	72.4
Cheese	13.85	30.71	16.00	410	909	45.1
Vegetables excl. dried vegetables	117.14	154.32	29.75	690	909	75.9
Dairy based products	77.52	136.55	60.00	516	909	56.8
Salt	0.00	0.15	0.00	7	909	0.8
Fish	9.75	77.06	50.90	115	909	12.7
Crustaceans	0.18	23.24	15.80	7	909	0.8
Beer and malt beverages	2.69	244.60	200.00	10	909	1.1
Other alcoholic beverages	0.00	0.55	0.55	2	909	0.2
Nuts and seeds	0.70	10.61	4.90	60	909	6.6
Fruit juices and nectars	144.12	246.25	132.85	532	909	58.5
Vegetable juices and nectars	1.26	81.59	58.00	14	909	1.5
Soft drinks and edible ices	117.38	404.16	200.00	264	909	29.0
Cereals and cereal products	167.37	183.30	33.00	830	909	91.3
Infant formulae	70.16	377.35	62.00	169	909	18.6
Miscellaneous foods/products	18.35	33.09	5.45	504	909	55.4
Liver and kidney	2.60	19.10	12.00	124	909	13.6
Coffee and tea in concentrated	0.51	11.90	3.80	39	909	4.3
Types of vegetarian substitute	0.18	40.53	29.65	4	909	0.4
Fresh meat	10.67	58.81	36.95	165	909	18.2
Processed meat	39.79	59.69	22.00	606	909	66.7
Eggs	11.21	41.42	30.00	246	909	27.1
Chocolate and chocolate products	12.50	26.36	12.00	431	909	47.4
Fruit excl. dried fruit	140.74	181.21	62.75	706	909	77.7
Dried fruit	0.92	20.90	11.00	40	909	4.4
Fresh and dried herbs, spices	0.12	0.47	0.10	237	909	26.1
Food supplements	0.01	10.00	10.00	1	909	0.1

Germany 2006, age 1 to 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	5.58	118.38	34.00	13	276	4.7
Waters	639.90	833.07	171.05	212	276	76.8
Sugar, sweeteners and sugar	3.36	12.86	6.00	72	276	26.1
Fats, oils and fat emulsions	10.24	15.62	4.00	181	276	65.6
Composed foods: meat based	0.99	90.73	64.10	3	276	1.1
Dried vegetables	0.29	6.62	0.10	12	276	4.3
Pulses and legumes	0.11	31.60	15.80	1	276	0.4
Soy milk and soy based dessert	4.10	282.95	280.00	4	276	1.4
Milk and dairy drinks	260.92	431.23	125.00	167	276	60.5
Cheese	14.72	33.58	14.00	121	276	43.8
Vegetables excl. dried vegetables	112.82	187.59	25.40	166	276	60.1
Dairy based products	72.93	173.53	62.50	116	276	42.0
Salt	0.00	0.02	0.00	1	276	0.4
Fish	7.55	77.19	49.60	27	276	9.8
Crustaceans	0.27	18.40	15.40	4	276	1.4
Beer and malt beverages	0.72	200.00	200.00	1	276	0.4
Nuts and seeds	0.53	11.34	4.00	13	276	4.7
Fruit juices and nectars	88.63	179.87	66.00	136	276	49.3
Vegetable juices and nectars	1.61	148.00	79.00	3	276	1.1
Soft drinks and edible ices	31.51	289.85	100.00	30	276	10.9
Cereals and cereal products	128.66	167.50	22.85	212	276	76.8
Infant formulae	204.21	426.98	60.70	132	276	47.8
Miscellaneous foods/products	10.89	33.41	5.60	90	276	32.6
Liver and kidney	4.01	22.15	10.00	50	276	18.1
Coffee and tea in concentrated	0.54	16.49	3.30	9	276	3.3
Fresh meat	9.34	51.56	26.10	50	276	18.1
Processed meat	26.89	54.98	19.00	135	276	48.9
Eggs	11.03	64.74	41.70	47	276	17.0
Chocolate and chocolate products	3.33	17.03	5.55	54	276	19.6
Fruit excl. dried fruit	136.31	202.26	49.85	186	276	67.4
Dried fruit	1.13	23.92	11.00	13	276	4.7
Fresh and dried herbs, spices	0.10	0.43	0.10	61	276	22.1

Germany 2006, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	16.52	177.24	136.00	59	633	9.3
Waters	513.04	539.46	200.00	602	633	95.1
Sugar, sweeteners and sugar	13.60	22.13	9.00	389	633	61.5
Fats, oils and fat emulsions	11.13	13.29	5.05	530	633	83.7

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: meat based	2.19	92.30	69.30	15	633	2.4
Dried vegetables	0.39	7.32	0.10	34	633	5.4
Pulses and legumes	1.71	72.24	33.55	15	633	2.4
Soy milk and soy based dessert	0.40	127.75	125.00	2	633	0.3
Milk and dairy drinks	203.44	262.28	146.00	491	633	77.6
Cheese	13.48	29.51	18.00	289	633	45.7
Vegetables excl. dried vegetables	119.02	143.78	30.20	524	633	82.8
Dairy based products	79.51	125.83	60.00	400	633	63.2
Salt	0.00	0.17	0.00	6	633	0.9
Fish	10.71	77.03	61.10	88	633	13.9
Crustaceans	0.14	29.70	43.10	3	633	0.5
Beer and malt beverages	3.55	249.56	200.00	9	633	1.4
Other alcoholic beverages	0.00	0.55	0.55	2	633	0.3
Nuts and seeds	0.77	10.41	5.00	47	633	7.4
Fruit juices and nectars	168.31	269.05	164.00	396	633	62.6
Vegetable juices and nectars	1.10	63.47	51.50	11	633	1.7
Soft drinks and edible ices	154.82	418.82	200.00	234	633	37.0
Cereals and cereal products	184.25	188.72	40.00	618	633	97.6
Infant formulae	11.71	200.28	78.15	37	633	5.8
Miscellaneous foods/products	21.60	33.03	5.30	414	633	65.4
Liver and kidney	1.99	17.03	13.50	74	633	11.7
Coffee and tea in concentrated	0.50	10.52	4.03	30	633	4.7
Types of vegetarian substitute	0.26	40.53	29.65	4	633	0.6
Fresh meat	11.26	61.96	48.00	115	633	18.2
Processed meat	45.42	61.04	24.00	471	633	74.4
Eggs	11.29	35.91	28.10	199	633	31.4
Chocolate and chocolate products	16.49	27.69	14.00	377	633	59.6
Fruit excl. dried fruit	142.68	173.69	68.50	520	633	82.1
Dried fruit	0.83	19.45	13.10	27	633	4.3
Fresh and dried herbs, spices	0.13	0.48	0.10	176	633	27.8
Food supplements	0.02	10.00	10.00	1	633	0.2

Greece, age 4 to 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	53.98	169.17	120.00	761	2385	31.9
Waters*	0.51	403.33	240.00	3	2385	0.1
Sugar, sweeteners and sugar	3.10	12.47	7.00	592	2385	24.8
Fats, oils and fat emulsions	7.51	14.39	10.00	1245	2385	52.2
Composed foods: meat based	17.07	148.59	100.00	274	2385	11.5
Composed foods: fish based	1.13	225.00	205.00	12	2385	0.5
Pulses and legumes	33.42	235.09	200.00	339	2385	14.2
Milk and dairy drinks	280.33	299.68	125.00	2231	2385	93.5

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Cheese	17.65	44.07	30.00	955	2385	40.0
Vegetables excl. dried vegetables	119.69	169.52	80.00	1684	2385	70.6
Dairy based products	63.86	133.14	100.00	1144	2385	48.0
Fish	10.64	96.84	80.00	262	2385	11.0
Molluscs	0.18	18.57	12.00	23	2385	1.0
Cephalopods	2.40	96.86	50.00	59	2385	2.5
Crustaceans	0.20	34.79	20.00	14	2385	0.6
Beer and malt beverages	0.06	150.00	150.00	1	2385	0.0
Wine and substitutes**	0.02	17.33	12.00	3	2385	0.1
Other alcoholic beverages	0.04	47.50	47.50	2	2385	0.1
Nuts and seeds	1.46	26.57	15.00	131	2385	5.5
Fruit juices and nectars	105.75	264.65	240.00	953	2385	40.0
Vegetable juices and nectars	0.19	13.53	10.00	34	2385	1.4
Soft drinks and edible ices	32.61	236.36	240.00	329	2385	13.8
Cereals and cereal products	170.57	180.32	48.50	2256	2385	94.6
Infant formulae	0.69	150.45	100.00	11	2385	0.5
Miscellaneous foods/products	30.51	143.54	50.00	507	2385	21.3
Liver and kidney	0.22	85.83	60.00	6	2385	0.3
Offal except liver and kidney	0.03	75.00	75.00	1	2385	0.0
Coffee and tea in concentrated	0.01	4.75	3.50	4	2385	0.2
Fresh meat	46.40	90.78	60.00	1219	2385	51.1
Processed meat	2.29	36.87	27.50	148	2385	6.2
Eggs	17.15	74.64	55.00	548	2385	23.0
Chocolate and chocolate products	13.31	27.43	10.00	1157	2385	48.5
Fruit excl. dried fruit	73.04	138.15	90.00	1261	2385	52.9
Dried fruit	0.05	31.25	30.00	4	2385	0.2
Fresh and dried herbs, spices	0.66	143.64	50.00	11	2385	0.5

* Information was not collected on consumption of drinking water.
** Used in recipes.

Italy, age 1 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	2.61	103.99	107.4	19	756	2.5
Waters	490.35	500.27	320	741	756	98
Sugar, sweeteners and sugar	9.73	16.2	13	454	756	60.1
Fats, oils and fat emulsions	29.67	30.56	14	734	756	97.1
Pulses and legumes	13.17	65.07	55.3	153	756	20.2
Soy milk and soy based dessert						
Milk and dairy drinks	204.38	233.76	225	661	756	87.4
Cheese	42.86	55.97	17.5	579	756	76.6
Vegetables excl. dried vegetables	165.57	176.3	18.38	710	756	93.9
Dairy based products	31.91	112.2	100	215	756	28.4
Fish	29.13	107.43	93.82	205	756	27.1
Molluscs	1.7	58.38	28.88	22	756	2.9
Cephalopods	6.3	122.17	66.84	39	756	5.2
Crustaceans	1.94	77.12	66.43	19	756	2.5
Beer and malt beverages	-	-	-	-	-	-

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
Wine and substitutes*	0.4	2.99	0.18	102	756	13.5
Other alcoholic beverages	0	0.33	0.35	7	756	0.9
Nuts and seeds	1.29	18.77	13.9	52	756	6.9
Fruit juices and nectars	83.93	184.98	150	343	756	45.4
Vegetable juices and nectars	-	-	-	-	-	-
Soft drinks and edible ices	26.7	203.86	160	99	756	13.1
Cereals and cereal products	224.99	225.58	45	754	756	99.7
Infant formulae	6.99	114.87	80	46	756	6.1
Miscellaneous foods/products	6.29	13.37	3.6	356	756	47.1
Liver and kidney	0.58	87.67	75	5	756	0.7
Offal except liver and kidney	1.21	24.01	26.25	38	756	5
Coffee and tea in concentrated	0.75	26.86	6	21	756	2.8
Fresh meat	67.94	110.69	87.19	464	756	61.4
Processed meat	23.27	49.42	40	356	756	47.1
Eggs	17.86	45	22.67	300	756	39.7
Chocolate and chocolate products	8.9	28.89	20	233	756	30.8
Fruit excl. dried fruit	134.48	180.58	100	563	756	74.5
Dried fruit	0.08	7.34	6	8	756	1.1
Fresh and dries herbs, spices	1.49	3.18	1.13	354	756	46.8
Food supplements	0.3	6.8	1.38	33	756	4.4

*Alcohol consumption was due to residual quantities used in preparing recipes especially cakes. Wine or sweet alcoholics are used, beer is usually not used. It is not used at all for children aged 1 to 2 years.

Italy, age 1 to 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.04	112.50	112.50	1	108	0.9
Waters	375.09	405.10	240.00	100	108	92.6
Sugar, sweeteners and sugar	7.69	15.96	10.00	52	108	48.1
Fats, oils and fat emulsions	15.89	18.26	9.00	94	108	87.0
Pulses and legumes	7.54	50.89	41.48	16	108	14.8
Milk and dairy drinks	277.15	315.07	250.00	95	108	88.0
Cheese	29.89	40.35	15.00	80	108	74.1
Vegetables excl. dried vegetables	84.16	106.94	9.38	85	108	78.7
Dairy based products	41.98	119.30	125.00	38	108	35.2
Fish	31.40	121.13	121.45	28	108	25.9
Molluscs	0.47	25.27	25.27	2	108	1.9
Cephalopods	0.34	37.13	37.13	1	108	0.9
Crustaceans	0.34	37.13	37.13	1	108	0.9
Wine and substitutes	0.01	0.14	0.11	6	108	5.6
Nuts and seeds	0.69	18.76	12.00	4	108	3.7
Fruit juices and nectars.	84.78	190.76	150.00	48	108	44.4
Soft drinks and edible ices	2.96	160.00	160.00	2	108	1.9
Cereals and cereal products	141.46	141.46	35.50	108	108	100.0
Infant formulae	40.37	121.11	80.00	36	108	33.3
Miscellaneous foods/products	10.51	20.28	1.61	56	108	51.9
Offal except liver and kidney	1.15	20.78	19.69	6	108	5.6
Coffee and tea in concentrated	4.60	55.17	14.00	9	108	8.3
Fresh meat	31.40	73.73	72.00	46	108	42.6
Processed meat	11.78	42.40	40.00	30	108	27.8

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
Eggs	8.42	28.41	18.52	32	108	29.6
Chocolate and chocolate products	2.62	21.79	16.39	13	108	12.0
Fruit excl. Dried fruit	125.71	178.63	100.00	76	108	70.4
fresh and dried herbs, spices	0.47	1.76	0.81	29	108	26.9
Food supplements	0.68	7.33	1.50	10	108	9.3

Italy, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	2.88	103.52	103.70	18	648	2.8
Waters	509.56	515.12	320.00	641	648	98.9
Sugar, sweeteners and sugar	10.07	16.23	13.00	402	648	62.0
Fats, oils and fat emulsions	31.97	32.37	15.12	640	648	98.8
Pulses and legumes	14.11	66.73	55.30	137	648	21.1
Milk and dairy drinks	192.26	220.11	200.00	566	648	87.3
Cheese	45.03	58.47	18.71	499	648	77.0
Vegetables excl. dried vegetables	179.14	185.73	18.64	625	648	96.5
Dairy based products	30.23	110.68	100.00	177	648	27.3
Fish	28.75	105.27	91.44	177	648	27.3
Molluscs	1.90	61.69	28.88	20	648	3.1
Cephalopods	7.30	124.40	66.84	38	648	5.9
Crustaceans	2.20	79.34	73.36	18	648	2.8
Wine and substitutes	0.47	3.17	0.19	96	648	14.8
Other alcoholic beverages	0.00	0.33	0.35	7	648	1.1
Nuts and seeds	1.39	18.77	13.90	48	648	7.4
Fruit juices and nectars.	83.78	184.04	200.00	295	648	45.5
Soft drinks and edible ices	30.65	204.76	160.00	97	648	15.0
Cereals and cereal products	238.91	239.65	45.00	646	648	99.7
Infant formulae	1.43	92.40	80.00	10	648	1.5
Miscellaneous foods/products	5.59	12.08	4.11	300	648	46.3
Liver and kidney	0.68	87.67	75.00	5	648	0.8
Offal except liver and kidney	1.22	24.61	26.25	32	648	4.9
Coffee and tea in concentrated	0.10	5.63	4.25	12	648	1.9
Fresh meat	74.03	114.76	92.70	418	648	64.5
Processed meat	25.19	50.06	40.00	326	648	50.3
Eggs	19.43	46.99	23.10	268	648	41.4
Chocolate and chocolate products	9.95	29.31	20.00	220	648	34.0
Fruit excl. Dried fruit	135.94	180.88	100.00	487	648	75.2
Dried fruit	0.09	7.34	6.00	8	648	1.2
fresh and dried herbs, spices	1.66	3.31	1.14	325	648	50.2
Food supplements	0.23	6.57	1.38	23	648	3.5

Netherlands, age 2 to 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.69	100.83	72.00	43	2558	1.7
Waters	264.76	352.00	145.00	1924	2558	75.2

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Sugar, sweeteners and sugar	11.82	17.85	7.00	1694	2558	66.2
Fats, oils and fat emulsions	12.96	13.82	5.00	2398	2558	93.7
Composed foods: meat based	7.55	71.23	70.00	271	2558	10.6
Pulses and legumes	1.61	63.32	53.30	65	2558	2.5
Soy milk and soy based dessert	5.84	304.63	170.00	49	2558	1.9
Milk and dairy drinks	331.77	382.98	162.00	2216	2558	86.6
Cheese	11.07	26.37	17.20	1074	2558	42.0
Vegetables excl. dried vegetables	87.19	104.72	36.00	2130	2558	83.3
Dairy based products	93.76	144.83	100.00	1656	2558	64.7
Fish	4.49	60.50	52.20	190	2558	7.4
Molluscs	0.02	11.33	10.30	4	2558	0.2
Crustaceans	0.15	18.92	4.80	20	2558	0.8
Wine and substitutes	0.02	6.97	4.90	6	2558	0.2
Other alcoholic beverages	0.00	0.46	0.50	8	2558	0.3
Nuts and seeds	4.92	22.88	20.00	550	2558	21.5
Fruit juices and nectars.	118.03	272.25	200.00	1109	2558	43.4
Vegetable juices and nectars	0.93	140.34	100.00	17	2558	0.7
Soft drinks and edible ices	177.58	209.33	42.60	2170	2558	84.8
Cereals and cereal products	142.86	143.25	30.00	2551	2558	99.7
Other food for special dietary	0.02	7.56	5.20	8	2558	0.3
Infant formulae, follow up for	7.56	87.49	22.00	221	2558	8.6
Miscellaneous foods/products	39.36	58.94	15.00	1708	2558	66.8
Liver and kidney	4.62	24.17	20.00	489	2558	19.1
Offal except liver and kidney	0.01	11.35	11.35	2	2558	0.1
Types of vegetarian substitute	0.68	60.13	24.00	29	2558	1.1
Fresh meat	28.14	48.83	37.50	1474	2558	57.6
Processed meat	12.19	28.38	15.00	1099	2558	43.0
Eggs	5.28	33.67	40.00	401	2558	15.7
Chocolate and chocolate products	14.55	23.71	12.00	1570	2558	61.4
Fruit excl. dried fruit	119.97	151.55	65.00	2025	2558	79.2
Dried fruit	0.98	16.01	14.00	157	2558	6.1
Fresh and dried herbs, spices	0.34	6.99	5.40	125	2558	4.9

Netherlands, age 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.88	120.75	137.50	10	644	1.6
Waters	280.04	368.05	135.00	490	644	76.1
Sugar, sweeteners and sugar	8.43	14.60	6.80	372	644	57.8
Fats, oils and fat emulsions	11.06	11.89	4.00	599	644	93.0
Composed foods: meat based	6.76	65.93	63.00	66	644	10.2
Pulses and legumes	1.80	60.91	53.30	19	644	3.0
Soy milk and soy based dessert	10.39	352.11	177.50	19	644	3.0
Milk and dairy drinks	330.56	378.12	154.50	563	644	87.4
Cheese	9.45	23.05	14.00	264	644	41.0
Vegetables excl. dried vegetables	82.78	99.27	31.00	537	644	83.4
Dairy based products	90.60	130.53	100.00	447	644	69.4
Fish	3.09	49.79	41.60	40	644	6.2
Molluscs	0.03	9.00	9.00	2	644	0.3

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Crustaceans	0.04	4.94	4.70	5	644	0.8
Wine and substitutes	0.04	14.20	14.20	2	644	0.3
Other alcoholic beverages	0.00	0.50	0.50	1	644	0.2
Nuts and seeds	4.09	17.44	10.00	151	644	23.4
Fruit juices and nectars.	109.10	266.14	150.00	264	644	41.0
Vegetable juices and nectars	1.79	143.75	150.00	8	644	1.2
Soft drinks and edible ices	131.63	162.71	29.10	521	644	80.9
Cereals and cereal products	121.21	121.59	25.00	642	644	99.7
Other food for special dietary	0.06	9.63	5.20	4	644	0.6
Infant formulae, follow up for	16.85	86.11	21.00	126	644	19.6
Miscellaneous foods/products	26.80	44.94	11.20	384	644	59.6
Liver and kidney	4.75	21.54	15.00	142	644	22.0
Offal except liver and kidney	0.01	6.70	6.70	1	644	0.2
Types of vegetarian substitute	0.64	45.86	17.80	9	644	1.4
Fresh meat	24.69	41.52	30.00	383	644	59.5
Processed meat	9.60	25.35	15.00	244	644	37.9
Eggs	4.29	29.10	24.50	95	644	14.8
Chocolate and chocolate products	11.14	19.71	10.00	364	644	56.5
Fruit excl. dried fruit	120.61	144.38	64.00	538	644	83.5
Dried fruit	1.96	15.74	14.00	80	644	12.4
Fresh and dried herbs, spices	0.24	6.20	4.15	25	644	3.9

Netherlands, age 3 to 6 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.63	94.79	72.00	33	1914	1.7
Waters	259.62	346.52	150.00	1434	1914	74.9
Sugar, sweeteners and sugar	12.96	18.76	7.00	1322	1914	69.1
Fats, oils and fat emulsions	13.60	14.47	6.00	1799	1914	94.0
Composed foods: meat based	7.81	72.94	75.00	205	1914	10.7
Pulses and legumes	1.55	64.31	53.30	46	1914	2.4
Soy milk and soy based dessert	4.30	274.57	162.50	30	1914	1.6
Milk and dairy drinks	332.18	384.63	163.10	1653	1914	86.4
Cheese	11.62	27.46	20.00	810	1914	42.3
Vegetables excl. dried vegetables	88.68	106.55	36.00	1593	1914	83.2
Dairy based products	94.83	150.12	103.00	1209	1914	63.2
Fish	4.97	63.36	52.20	150	1914	7.8
Molluscs	0.01	13.65	13.65	2	1914	0.1
Crustaceans	0.18	23.58	6.40	15	1914	0.8
Wine and substitutes	0.01	3.35	3.15	4	1914	0.2
Other alcoholic beverages	0.00	0.46	0.50	7	1914	0.4
Nuts and seeds	5.20	24.94	20.00	399	1914	20.8
Fruit juices and nectars.	121.04	274.16	200.00	845	1914	44.1
Vegetable juices and nectars	0.65	137.31	100.00	9	1914	0.5
Soft drinks and edible ices	193.04	224.06	50.00	1649	1914	86.2
Cereals and cereal products	150.14	150.53	35.00	1909	1914	99.7
Other food for special dietary	0.01	5.50	5.80	4	1914	0.2
Infant formulae, follow up for	4.43	89.34	27.50	95	1914	5.0
Miscellaneous foods/products	43.58	63.00	18.00	1324	1914	69.2

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
Liver and kidney	4.58	25.25	20.00	347	1914	18.1
Offal except liver and kidney	0.01	16.00	16.00	1	1914	0.1
Types of vegetarian substitute	0.70	66.56	26.50	20	1914	1.0
Fresh meat	29.30	51.40	39.45	1091	1914	57.0
Processed meat	13.06	29.24	15.00	855	1914	44.7
Eggs	5.61	35.10	45.00	306	1914	16.0
Chocolate and chocolate products	15.70	24.91	12.00	1206	1914	63.0
Fruit excl. dried fruit	119.76	154.15	70.00	1487	1914	77.7
Dried fruit	0.66	16.28	14.00	77	1914	4.0
Fresh and dried herbs, spices	0.38	7.18	5.40	100	1914	5.2

Spain-enKid, age 1 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	5.85	108.71	90.00	21	390	5.4
Waters	402.10	502.63	400.00	312	390	80.0
Sugar, sweeteners and sugar	9.92	20.69	10.00	187	390	47.9
Fats, oils and fat emulsions	31.50	39.76	15.00	309	390	79.2
Composed foods: meat based	12.19	110.58	100.00	43	390	11.0
Composed foods: fish based	0.99	77.00	80.00	5	390	1.3
Pulses and legumes	17.92	74.36	50.00	94	390	24.1
Milk and dairy drinks	351.93	383.39	250.00	358	390	91.8
Cheese	20.74	48.43	40.00	167	390	42.8
Vegetables excl. dried vegetables	147.14	182.18	40.00	315	390	80.8
Dairy based products	87.69	161.32	125.00	212	390	54.4
Fish	23.75	95.49	75.00	97	390	24.9
Molluscs	0.17	22.33	12.50	3	390	0.8
Cephalopods	2.79	60.50	50.00	18	390	4.6
Crustaceans	1.30	46.18	50.00	11	390	2.8
Wine and substitutes	0.08	15.00	15.00	2	390	0.5
Nuts and seeds	3.91	46.18	20.00	33	390	8.5
Fruit juices and nectars	32.94	194.62	200.00	66	390	16.9
Soft drinks and edible ices	104.44	318.20	200.00	128	390	32.8
Cereals and cereal products	163.47	166.02	50.00	384	390	98.5
Other food for special dietary	1.69	330.00	330.00	2	390	0.5
Infant formulae	5.56	80.33	50.00	27	390	6.9
Miscellaneous foods/products	37.82	107.66	45.00	137	390	35.1
Liver and kidney	0.23	90.00	90.00	1	390	0.3
Offal except liver and kidney	2.26	29.33	20.00	30	390	7.7
Fresh meat	80.46	117.97	100.00	266	390	68.2
Processed meat	31.98	52.63	30.00	237	390	60.8
Eggs	28.86	63.60	57.50	177	390	45.4
Chocolate and chocolate products	15.18	22.60	15.00	262	390	67.2
Fruit excl. dried fruit	102.73	172.69	100.00	232	390	59.5

Spain-enKid, age 1 to 2 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.47	50.00	50.00	1	34	2.9
Waters	328.53	485.65	400.00	23	34	67.6
Sugar, sweeteners and sugar	6.32	23.89	20.00	9	34	26.5
Fats, oils and fat emulsions	38.09	53.96	10.00	24	34	70.6
Composed foods: meat based	2.94	50.00	50.00	2	34	5.9
Pulses and legumes	16.18	61.11	40.00	9	34	26.5
Milk and dairy drinks	367.06	402.58	290.00	31	34	91.2
Cheese	17.06	38.67	25.00	15	34	44.1
Vegetables excl. dried vegetables	107.50	140.58	30.00	26	34	76.5
Dairy based products	107.21	182.25	125.00	20	34	58.8
Fish	22.35	152.00	115.00	5	34	14.7
Cephalopods	3.94	44.67	20.00	3	34	8.8
Nuts and seeds	1.79	20.33	21.00	3	34	8.8
Fruit juices and nectars.	20.59	140.00	100.00	5	34	14.7
Soft drinks and edible ices	80.88	250.00	200.00	11	34	32.4
Cereals and cereal products	86.82	92.25	36.00	32	34	94.1
Infant formulae	41.59	101.00	50.00	14	34	41.2
Miscellaneous foods/products	65.15	147.67	137.50	15	34	44.1
Liver and kidney	2.65	90.00	90.00	1	34	2.9
Offal except liver and kidney	0.59	6.67	5.00	3	34	8.8
Fresh meat	59.56	88.04	70.00	23	34	67.6
Processed meat	13.76	31.20	25.00	15	34	44.1
Eggs	24.56	59.64	55.00	14	34	41.2
Chocolate and chocolate products	10.03	16.24	10.00	21	34	61.8
Fruit excl. dried fruit	80.71	130.67	70.00	21	34	61.8

Spain-enKid, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	6.27	111.65	95.00	20	356	5.6
Waters	409.13	503.98	400.00	289	356	81.2
Sugar, sweeteners and sugar	10.26	20.53	10.00	178	356	50.0
Fats, oils and fat emulsions	30.87	38.56	15.00	285	356	80.1
Composed foods: meat based	13.08	113.54	100.00	41	356	11.5
Composed foods: fish based	1.08	77.00	80.00	5	356	1.4
Pulses and legumes	18.09	75.76	50.00	85	356	23.9
Milk and dairy drinks	350.49	381.57	250.00	327	356	91.9
Cheese	21.09	49.39	40.00	152	356	42.7
Vegetables excl. dried vegetables	150.93	185.92	40.00	289	356	81.2
Dairy based products	85.83	159.14	125.00	192	356	53.9
Fish	23.88	92.42	75.00	92	356	25.8
Molluscs	0.19	22.33	12.50	3	356	0.8
Cephalopods	2.68	63.67	50.00	15	356	4.2
Crustaceans	1.43	46.18	50.00	11	356	3.1
Wine and substitutes	0.08	15.00	15.00	2	356	0.6
Nuts and seeds	4.11	48.77	20.00	30	356	8.4

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
Fruit juices and nectars	34.12	199.10	200.00	61	356	17.1
Soft drinks and edible ices	106.69	324.62	200.00	117	356	32.9
Cereals and cereal products	170.79	172.73	50.00	352	356	98.9
Other food for special dietary	1.85	330.00	330.00	2	356	0.6
Infant formulae	2.12	58.08	40.00	13	356	3.7
Miscellaneous foods/products	35.21	102.75	40.00	122	356	34.3
Offal except liver and kidney	2.42	31.85	25.00	27	356	7.6
Fresh meat	82.46	120.80	100.00	243	356	68.3
Processed meat	33.72	54.08	30.00	222	356	62.4
Eggs	29.28	63.94	57.50	163	356	45.8
Chocolate and chocolate products	15.67	23.15	15.00	241	356	67.7
Fruit excl. died fruit	104.83	176.88	100.00	211	356	59.3

Spain-enKid, age 11 to 14 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	10.47	186.43	200.00	21	374	5.6
Waters	476.93	632.52	400.00	282	374	75.4
Sugar, sweeteners and sugar	16.09	25.82	14.50	233	374	62.3
Fats, oils and fat emulsions	25.51	29.53	15.00	323	374	86.4
Composed foods: meat based	9.32	116.17	90.00	30	374	8.0
Composed foods: fish based	4.39	149.09	100.00	11	374	2.9
Pulses and legumes	22.13	90.93	75.00	91	374	24.3
Soy milk and soy based dessert	0.27	100.00	100.00	1	374	0.3
Milk and dairy drinks	309.33	336.31	250.00	344	374	92.0
Cheese	19.73	51.96	30.00	142	374	38.0
Vegetables excl. dried vegetables	176.50	205.01	50.00	322	374	86.1
Dairy based products	63.14	156.39	125.00	151	374	40.4
Fish	32.05	114.14	90.00	105	374	28.1
Molluscs	1.58	45.38	25.00	13	374	3.5
Cephalopods	3.65	80.29	50.00	17	374	4.5
Crustaceans	1.15	47.78	30.00	9	374	2.4
Wine and substitutes	0.05	10.00	10.00	2	374	0.5
Nuts and seeds	7.66	43.39	25.00	66	374	17.6
Fruit juices and nectars	30.03	211.89	200.00	53	374	14.2
Vegetable juices and nectars	0.53	200.00	200.00	1	374	0.3
Soft drinks and edible ices	147.55	388.61	240.00	142	374	38.0
Cereals and cereal products	256.37	257.05	60.00	373	374	99.7
Other food for special dietary	2.65	495.00	495.00	2	374	0.5
Infant formulae	0.40	75.00	75.00	2	374	0.5
Miscellaneous foods/products	41.55	100.25	30.00	155	374	41.4
Liver and kidney	0.74	137.50	137.50	2	374	0.5
Offal except liver and kidney	1.26	39.17	27.50	12	374	3.2
Coffee and tea in concentrated	0.27	100.00	100.00	1	374	0.3
Fresh meat	111.28	148.64	100.00	280	374	74.9
Processed meat	51.58	79.07	40.00	244	374	65.2
Eggs	35.35	76.86	60.00	172	374	46.0
Chocolate and chocolate products	14.42	22.66	15.00	238	374	63.6
Fruit excl. dried fruit	118.75	201.88	135.00	220	374	58.8
Dried fruit	0.08	30.00	30.00	1	374	0.3

Spain-Basque, age 4 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.45	191.39	200	7	924	0.8
Waters	608.4	636.65	200	883	924	95.6
Sugar, sweeteners and sugar	5.15	16.37	8	291	924	31.5
Fats, oils and fat emulsions	19.51	20.07	6.3	898	924	97.2
Composed foods: meat based	3.95	59.89	56	61	924	6.6
Composed foods: fish based	1.34	49.38	42	25	924	2.7
Dried vegetables	1.17	153.86	141	7	924	0.8
Pulses and legumes	30.67	98.75	92.7	287	924	31.1
Soy milk and soy based dessert	3.4	349.08	206	9	924	1
Milk and dairy drinks	379.76	399.2	206	879	924	95.1
Cheese	20.47	48.12	20	393	924	42.5
Vegetables excl. dried vegetables	102.48	121.55	27	779	924	84.3
Dairy based products	101.39	170.95	125	548	924	59.3
Fish	32.9	87.86	71	346	924	37.4
Molluscs	0.39	12.51	6.8	29	924	3.1
Cephalopods	2.24	38.3	28	54	924	5.8
Crustaceans	0.72	18.37	13	36	924	3.9
Beer and malt beverages	0.04	40	40	1	924	0.1
Nuts and seeds	3.87	38.9	30	92	924	10
Fruit juices and nectars	106.54	235.5	200	418	924	45.2
Vegetable juices and nectars	0.19	90	90	2	924	0.2
Soft drinks and edible ices	36.2	238.94	200	140	924	15.2
Cereals and cereal products	200.22	200.87	40	921	924	99.7
Miscellaneous foods/products	56.05	85.04	33.8	609	924	65.9
Liver and kidney	0.28	64	72.25	4	924	0.4
Offal except liver and kidney	1.64	65.73	54	23	924	2.5
Coffee and tea in concentrated	0.01	2.1	2.15	4	924	0.4
Types of vegetarian substitute	0.04	40	40	1	924	0.1
Fresh meat	81.76	112.09	78	674	924	72.9
Processed meat	37.18	53.26	27.5	645	924	69.8
Eggs	21.63	59.83	45	334	924	36.1
Chocolate and chocolate products	14.94	19.15	7.3	721	924	78
Fruit excl. dried fruit	103.82	168.89	89.55	568	924	61.5

Spain-Basque, age 11 to 14 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	1.82	154.64	160	7	596	1.2
Waters	749.15	775.16	200	576	596	96.6
Sugar, sweeteners and sugar	7.07	19.98	9	211	596	35.4
Fats, oils and fat emulsions	24.04	24.71	7.4	580	596	97.3
Composed foods: Meat based	4.05	61.92	60	39	596	6.5
Composed foods: Fish based	2.31	86.16	90	16	596	2.7
Dried vegetables	0.81	160.67	141	3	596	0.5
Pulses and legumes	39.56	119.69	110.2	197	596	33.1
Soy milk and soy based dessert	4.73	313.41	231.8	9	596	1.5
Milk and dairy drinks	354.55	374	206	565	596	94.8

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
Cheese	16.67	42.65	20	233	596	39.1
Vegetables excl. dried vegetables	128.32	145.4	28.7	526	596	88.3
Dairy based products	101.13	170.27	125	354	596	59.4
Fish	37.86	94.81	73.75	238	596	39.9
Molluscs	0.56	15.11	6.35	22	596	3.7
Cephalopods	3.33	56.78	52	35	596	5.9
Crustaceans	1.56	28.15	14.9	33	596	5.5
Wine and substitutes	0.25	148.8	148.8	1	596	0.2
Other alcoholic beverages	0.09	27.55	27.55	2	596	0.3
Nuts and seeds	7.49	48.52	45	92	596	15.4
Fruit juices and nectars	112.71	255.41	200	263	596	44.1
Vegetable juices and nectars	0.53	78.75	77.5	4	596	0.7
Soft drinks and edible ices	72.97	319.76	200	136	596	22.8
Cereals and cereal products	243.28	243.69	40	595	596	99.8
Miscellaneous foods/products	61.6	96.11	40	382	596	64.1
Liver and kidney	0.55	109.83	79.5	3	596	0.5
Offal except liver and kidney	1.55	61.41	40	15	596	2.5
Coffee and tea in concentrated	0.05	3.4	1.8	9	596	1.5
Fresh meat	106.09	141.45	99	447	596	75
Processed meat	47.14	65.95	36.75	426	596	71.5
Eggs	25.25	64.58	50	233	596	39.1
Chocolate and chocolate products	16.9	21.66	7.3	465	596	78
Fruit excl. dried fruit	114.51	180.55	104	378	596	63.4

Sweden, age 3 to 10 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	89.11	247.24	200.00	1988	5516	36.0
Waters	154.23	270.50	200.00	3145	5516	57.0
Sugar, sweeteners and sugar	17.06	47.61	24.00	1977	5516	35.8
Fats, oils and fat emulsions	12.92	15.24	10.00	4676	5516	84.8
Composed foods: Meat based	14.36	123.36	100.00	642	5516	11.6
Composed foods: Fish based	2.75	133.06	120.00	114	5516	2.1
Pulses and legumes	0.86	41.27	32.00	115	5516	2.1
Soy milk and soy based dessert	0.44	174.14	125.00	14	5516	0.3
Milk and dairy drinks	367.06	422.87	400.00	4788	5516	86.8
Cheese	9.89	45.07	20.00	2059	5516	37.3
Vegetables excl. dried vegetables	147.93	170.32	145.00	4791	5516	86.9
Dairy based products	105.02	182.11	155.00	3181	5516	57.7
Salt	0.23	1.33	1.00	939	5516	17.0
Fish	15.47	72.70	60.00	1174	5516	21.3
Molluscs	0.05	72.75	52.50	4	5516	0.1
Cephalopods	0.02	100.00	100.00	1	5516	0.0
Crustaceans	0.47	46.77	31.00	56	5516	1.0
Wine and substitutes	0.01	30.00	30.00	1	5516	0.0
Other alcoholic beverages	2.31	212.53	200.00	60	5516	1.1
Nuts and seeds	0.39	21.16	12.00	101	5516	1.8
Fruit juices and nectars	62.37	241.42	210.00	1425	5516	25.8
Vegetable juices and nectars	0.14	195.00	152.50	4	5516	0.1
Soft drinks and edible ices	237.72	374.65	306.00	3500	5516	63.5
Cereals and cereal products	183.56	186.12	165.00	5440	5516	98.6
Infant formulae	5.85	319.39	250.00	101	5516	1.8
Miscellaneous foods/products	48.71	79.09	49.00	3397	5516	61.6
Liver and kidney	1.89	18.07	13.00	578	5516	10.5
Offal except liver and kidney	1.46	92.46	90.00	87	5516	1.6
Types of vegetarian substitutes	0.24	95.14	95.00	14	5516	0.3
Fresh meat	39.34	74.86	61.30	2899	5516	52.6
Processed meat	45.72	74.09	60.00	3404	5516	61.7
Eggs	5.91	52.54	50.00	620	5516	11.2
Chocolate and chocolate products	5.94	28.95	17.00	1131	5516	20.5
Fruit excl. dried fruit	139.37	191.72	159.00	4010	5516	72.7
Dried fruit	0.56	18.83	9.00	165	5516	3.0
Fresh and dried herbs, spices	0.12	2.91	2.00	229	5516	4.2
Food supplements	0.28	2.27	1.00	681	5516	12.3

Sweden, age 11 to 13 years

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: cereal based	69.81	241.41	200.00	1063	3676	28.9
Waters	187.93	363.21	219.28	1902	3676	51.7
Sugar, sweeteners and sugar	18.93	51.29	20.00	1357	3676	36.9
Fats, oils and fat emulsions	9.73	12.35	10.00	2898	3676	78.8
Composed foods: Meat based	20.37	162.78	142.50	460	3676	12.5

Food group	MeanConsum	MeanConsDays	Median	NConsDays	NDays	%ConsDays
	(g/d)	(g/d)	(g/d)			(%)
Composed foods: Fish based	4.05	158.34	120.00	94	3676	2.6
Pulses and legumes	1.85	67.49	36.00	101	3676	2.7
Milk and dairy drinks	362.76	452.65	400.00	2946	3676	80.1
Cheese	11.54	33.34	20.00	1272	3676	34.6
Vegetables excl. dried vegetables	158.07	198.99	170.00	2920	3676	79.4
Dairy based products	82.22	192.64	200.00	1569	3676	42.7
Salt	0.25	1.70	1.50	540	3676	14.7
Fish	15.34	92.92	100.00	607	3676	16.5
Molluscs	0.04	74.00	74.00	2	3676	0.1
Cephalopods	0.05	85.00	85.00	2	3676	0.1
Crustaceans	0.73	74.97	50.00	36	3676	1.0
Beer and malt beverages	0.32	386.67	330.00	3	3676	0.1
Other alcoholic beverages	4.75	379.52	300.00	46	3676	1.3
Nuts and seeds	0.80	37.19	20.00	79	3676	2.1
Fruit juices and nectars	68.21	296.03	210.00	847	3676	23.0
Vegetable juices and nectars	0.14	259.50	259.50	2	3676	0.1
Soft drinks and edible ices	256.01	474.33	400.00	1984	3676	54.0
Cereals and cereal products	196.43	201.08	176.00	3591	3676	97.7
Infant formulae	0.49	450.00	400.00	4	3676	0.1
Miscellaneous foods/products	45.61	86.16	51.00	1946	3676	52.9
Liver and kidney	1.15	20.97	14.00	201	3676	5.5
Offal except liver and kidney	0.88	115.50	100.00	28	3676	0.8
Types of vegetarian substitute	0.22	99.13	95.00	8	3676	0.2
Fresh meat	46.07	95.24	80.00	1778	3676	48.4
Processed meat	49.38	85.74	70.00	2117	3676	57.6
Eggs	4.63	57.33	50.00	297	3676	8.1
Chocolate and chocolate products	9.77	40.53	23.00	886	3676	24.1
Fruit excl. dried fruit	88.31	174.53	145.00	1860	3676	50.6
Dried fruit	0.31	19.61	15.00	59	3676	1.6
Fresh and dried herbs, spices	0.11	3.16	2.00	128	3676	3.5
Food supplements	0.19	1.70	1.00	405	3676	11.0

APPENDIX C **S**ETTINGS OF MCRA

BBN model

EXPOSURE SECTION
Chronic risk assessment
Betabinomial-normal model (BBN)

Intake frequency model is based on betabinomial-normal model

No effect of cofactor included
No effect of covariable included

Model for **intake amounts** is based on Maximum Likelihood

No effect of cofactor included	
Include effect of covariable	age
Transformation	Logarithmic
Function of covariable	spline
Minimum degrees of freedom	0
Maximum degrees of freedom	4
DF selection	backward
Testing at level	0.01

OIM model

EXPOSURE SECTION
Chronic risk assessment
Observed individual means (OIM)

Glossary / Abbreviations

BBN	Betabinominal-normal
Bw	Body weight
EFSA	European Food Safety Authority
JECFA	Joint FAO/WHO Expert Committee on Food Additives
LB	Lower bound
LOD	Limit of detection
LOQ	Limit of quantification
MCRA	Monte Carlo Risk Assessment
OIM	Observed individual means
PTWI	Provisional tolerable weekly intake
Q-q plot	Quantile-quantile plot
UB	Upper bound