National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Dutch National Food Consumption Survey 2007-2010

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Report number: 350050006/2011

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This investigation has been performed by order and for the account of Ministry of Health, Welfare and Sports, within the framework of 5.4.3 Monitoring Nutrition.

Abstract

Dutch National Food Consumption Survey 2007-2010
Diet of children and adults aged 7 to 69 years

Dutch people still consume insufficient fruit, vegetables, fish and fibre. Improvement of the type of fat in the diet by the reduction of trans fatty acids in foods is a favourable development. However, the proportion of saturated fatty acids in the diet is still high and overweight is common. These are conclusions of a recent food consumption survey by the National Institute for Public Health and the Environment (RIVM), carried out between 2007 and 2010 among children and adults in the Netherlands.

The importance of a healthy dietary pattern
A healthy dietary pattern is important to prevent obesity and chronic diseases. The survey provides insight into food consumption which can be used to stimulate healthier dietary patterns. This can be achieved by changes in both the food supply and consumer behaviour.

Intake of vitamins and minerals
The survey also shows that some people have intakes below the recommended amounts for some vitamins and minerals, such as vitamins A, B_1, C, E, magnesium, potassium and zinc. More information on the possible health effects of these low intakes is desirable. Furthermore, age groups with specific higher intake requirements often do not meet these, i.e. concerning folate (for women with a pregnancy wish), vitamin D (people above 50), iron (women of childbearing age) and calcium (adolescents). This observation underlines the advice of the Health Council of the Netherlands to these specific groups with regard to the use of folate and vitamin D supplements. The effects on health of low iron and calcium intakes are unclear; more research is needed in this area.

Use of food consumption data
The last survey that included information on food consumption in the Dutch population was conducted in 1997/1998. The recent survey (2007-2010) provides more detailed information. The data from this survey can be used to support policy regarding healthy and safe foods, for improving food supply and in food education and research.

Keywords:
food consumption survey, nutrients, foods, adults, children

Rapport in het kort

Nederlandse voedselconsumptiepeiling 2007-2010
Voeding van kinderen en volwassenen van 7 tot 69 jaar

Nederlanders eten nog steeds te weinig fruit, groente, vis en vezel. Wel is het type vet in de voeding verbeterd, doordat vooral de hoeveelheid transvetzuren in voedingsmiddelen is afgenomen. Het aandeel verzadigde vetzuren in de voeding is echter nog ongunstig en overgewicht komt frequent voor. Dit blijkt uit recente voedselconsumptiegegevens van het RIVM. Hiervoor is tussen 2007 en 2010 in kaart gebracht wat kinderen en volwassenen consumeren.

Belang gezond voedingspatroon
Een gezond voedingspatroon is van belang om overgewicht en chronische ziekten tegen te gaan. Met de verkregen kennis van het huidige consumptiepatroon kan een gezondere voeding worden gestimuleerd. Dit kan via veranderingen in het voedselaanbod en het voedingsgedrag.

Inname van vitamines en mineralen
Uit de peiling blijkt ook dat een deel van de bevolking minder vitamine A, B_1, C en E, magnesium, kalium en zink binnen krijgt dan wordt aanbevolen. Onderzoek is nodig naar de effecten hiervan op de gezondheid. Verder wordt het advies aan specifieke leeftijdsgroepen voor hogere innames van foliumzuur (voor vrouwen die zwanger willen worden), vitamine D (voor senioren), ijzer (voor vrouwen in de vruchtbare leeftijd) en calcium (voor adolescenten) lang niet altijd opgevolgd. Dit onderschrijft de adviezen van de Gezondheidsraad aan genoemde groepen om foliumzuur- en vitamine D-supplementen te slikken. Voor de lage inname van ijzer en calcium zijn de gezondheidsconsequenties onduidelijk. Hiernaar is meer onderzoek nodig.

Toepassingen voedselconsumptiegegevens
Deze voedselconsumptiepeiling bevat gedetailleerdere gegevens dan de vorige bevolkingsbrede peiling in 1997/1998. De actuele gegevens kunnen worden gebruikt als ondersteuning van beleid op het gebied van gezonde voeding en veilig voedsel, om het voedingsmiddelenaanbod te verbeteren, bij voedingsvoorlichting en binnen het voedingsonderzoek.

Trefwoorden:
voedselconsumptiepeiling, voedingsstoffen, voedingsmiddelen, volwassenen, kinderen

Contents

Summary

For effective health and food safety policy in the Netherlands, data are required both on food consumption and on the nutritional status of the Dutch population, including specific groups within the population. As part of the Dutch dietary monitoring system, data on the food consumption of children and adults in the Netherlands, aged 7 to 69 years, has been collected from March 2007 to April 2010 by the National Institute for Public Health and the Environment (RIVM).

This food consumption survey aimed to gain insight into the diet of the Dutch general population. More specifically the goals were to establish:

- the consumption of food groups;
- the percentage of children and adults that meet the dietary recommendations for fruits, vegetables and fish;
- the intake of energy and nutrients from foods;
- the use of dietary supplements and the intake of micronutrients from foods and dietary supplements;
- the percentage of children and adults that meet the recommendations on energy and nutrients.

The last survey that included information on food consumption of the total Dutch population was conducted in 1998. The recent survey (DNFCS 2007-2010) provides more detailed information. Hereby, the data is suitable for answering different research questions on the diet of the Dutch population. This can be questions related to the consumption of foods, the intake of macronutrients, micronutrients and potentially harmful chemical substances as well as questions related to nutritional trends. Insight in these issues can be helpful to support policy regarding healthy and safe foods, for improving food supply and in food education and research.

Results from this survey show that the consumption of fruit, vegetables, fish and fibre is still insufficient. Improvement of the type of fat in the diet by the reduction of trans fatty acids in foods is a favourable development. However, the proportion of saturated fatty acids in the diet is still high. Overweight remains common in adults and children.

The survey also shows that the intake of vitamin B_2, B_6 and B_{12} and copper was sufficient in the whole population. Some people have intakes below the recommended amounts for some vitamins and minerals, such as vitamins A, B_1, C, E, magnesium, potassium and zinc. More information on the possible health effects of these low intakes is desirable. Furthermore, age groups with specific higher intake requirements often do not meet these, i.e. concerning folate (for women with a pregnancy wish), vitamin D (women over 50), iron (women of childbearing age) and calcium (adolescents). This observation underlines the advice of the Health Council of the Netherlands to these specific groups with regard to the use of folate and vitamin D supplements. The effects on health of the observed low iron and calcium intakes are unclear; more research is needed in this area.

A healthy dietary pattern is important to prevent obesity and chronic diseases. The survey provides insight into food consumption which can be used to stimulate healthier dietary patterns. This can be achieved by changes in both the food supply and consumer behaviour.

1 Introduction

1.1 Dutch National Food Consumption Surveys

The aim of the Dutch policy on health and diet is to facilitate a healthy lifestyle in society. A more balanced diet of the population contributes to the prevention of morbidity from conditions such as cardiovascular diseases and obesity. A healthy lifestyle also includes foods free of harmful micro-organisms, residuals and contamination risks.

Monitoring of food consumption forms the basis of nutrition and food policy.[36] Food consumption surveys provide insight into a population's consumption of foods and the intake of macro and micronutrients, into intake risks of potentially harmful chemical substances and also into dietary trends. To effectively formulate and evaluate health, nutrition, and food safety policy, data from food consumption surveys are needed, together with data on the composition of foods and information on nutritional status. Furthermore, consumption data are required for improving food supply, public health programmes and for scientific research.

Data on food consumption and nutritional status of the general Dutch population and of specific groups in that population have been collected periodically since 1987. In 2003, the Dutch National Food Consumption Surveys (DNFCS) were redesigned for several reasons: to meet changing policy requirements, to be able to reflect socio-demographic developments and trends in dietary habits and due to developments in dietary assessment methods.[1, 18] Because of the differences in survey design and methods before and after 2003, no direct comparison of survey results can be made. A detailed description of the system of dietary monitoring in the Netherlands was proposed and published in 2005.[38] Recently, some revisions to this system were made due to the limited budgets and capacity available.[41] The current dietary monitoring system consists of 3 modules. Module 1 is the core food consumption survey among the general population. Module 2 focuses on the nutritional status of the general population in relation to food consumption by measuring specific vitamins and minerals in blood and urine. Module 3 includes additional research on specific topics. Depending on the policy needs, specific dietary issues can be studied. Examples of this are monitoring of dietary habits or biomarkers in specific groups such as infants or pregnant women and the monitoring of consumption of specific foods.

The present report concerns the core survey on food consumption in children and adults living in the Netherlands and aged 7 to 69 years, conducted from 2007 to 2010.

1.2 DNFCS-core survey 2007-2010

The main aim of DNFCS 2007-2010 was to gain insight into the diet of children and adults aged 7 to 69 years and living in the Netherlands to establish:

- the consumption of food groups, including fruits, vegetables and fish and the percentage of children and adults that meet the recommendations of these foods;
- the intake of energy and nutrients from foods and the percentage of children and adults that meet the recommendations on energy and nutrients;
- the use of dietary supplements and the intake of micronutrients from foods and dietary supplements.

In addition, the dataset of DNFCS 2007-2010 should be suitable for research questions on food safety as well as for public health programmes and nutritional scientific research.

DNFCS 2007-2010 was authorised by the Dutch Ministry of Health, Welfare and Sport (VWS) and coordinated by the Dutch National Institute for Public Health and the Environment (RIVM). Part of the work was subcontracted to other organisations:

- data were collected by the Market Research Agency GfK Panel Services (Dongen, the Netherlands).
- software for 24-hour dietary protocols was updated by the International Agency for Research on Cancer (Lyon, France).

An Expert Committee (see Appendix A) advised the VWS Ministry on the survey during planning, data collection, data analyses and reporting of the results.

This report presents the survey results with regard to study population characteristics, consumed foods, energy and nutrients. More detailed reports and analyses on energy, nutrients and foods for different subgroups will be published on the DNFCS website.[45] This website also includes more information on the DNFCS in general as well as on the conditions and procedure to obtain the DNFCS database. It is also possible to receive information by e-mail on new topics appearing on the website.

2 Methods

2.1 Study population and recruitment

The target population consisted of people living in the Netherlands and aged 7 to 69 years, but did not include pregnant and lactating women. Also excluded were institutionalised people because of their reduced freedom in food choice. Respondents were drawn from representative consumer panels from Market Research GfK Panel Services. Panel characteristics, such as socio-demographic characteristics, were known to GfK. People in these panels participate in all types of surveys and were not specifically selected on dietary characteristics. The study participants had not been involved in any other type of food consumption survey during the previous four years. A maximum of 1 person per household was allowed. In addition, the panels only included people with adequate command of the Dutch language.

The data were collected over a 3-year period from March 2007 to April 2010. Per period of four weeks, age and gender stratified samples were drawn. The survey population was divided into age and gender groups as follows:

- 7 to 8 year-old children;
- 9 to 13 year-old boys;
- 9 to 13 year-old girls;
- 14 to 18 year-old boys;
- 14 to 18 year-old girls;
- 19 to 30 year-old men;
- 19 to 30 year-old women;
- 31 to 50 year-old men;
- 31 to 50 year-old women;
- 51 to 69 year-old men;
- 51 to 69 year-old women.

These age groups were in line with those used by the Health Council (GR) of the Netherlands for guidelines on a healthy diet.[19] As 4 to 6 year-old boys and girls had already been studied in 2005/2006, the youngest age group consisted of – in contrast to the guidelines – 7 to 8 year-old children. As the GR guidelines for boys and girls aged 4 to 8 years do not differ, the 7 to 8 year-old boys and girls were sampled as one stratum.

The survey population was intended to be representative with regard to age and sex within each age group, region, degree of urbanisation and educational level (or the educational level of the parents/carers for children up to 18 years). Therefore, during recruitment, the study population was monitored on these characteristics and, if necessary, the sampling was adjusted on these factors.

In total 5,502 people aged 7 to 69 years were invited to participate in the study, of which 3,819 agreed. More information about the response is presented in section 3.1. People who completed and returned all materials received an incentive bonus (credit points to be exchanged for gifts selected from a catalogue). For children up to 15 years both

the parent/carer and the child received an incentive; the parents received credit points, the child received a gift voucher.

2.2 Data collection and data handling

2.2.1 Overview of data collection

The study was conducted according to the guidelines of the Helsinki Declaration. The market research agency invited selected people to participate in the study approaching them by post and, where possible also by e-mail. Those who agreed to participate were sent a questionnaire. The dietary assessment was based on two non-consecutive 24-hour dietary recalls. For children aged 7 to 15 years, the two 24-hour recalls were carried out by means of face to face interviews during home visits. Contact with children aged 7 to 15 years was made initially through a parent or carer. The child's parent or carer was also present during the interviews. Participants aged 16 years and older were interviewed unannounced by telephone. Height and weight were also reported during the interviews. All interviews were carried out by trained dieticians.

2.2.2 Panel characteristics

The market research agency provided household background information (panel characteristics) on the place of residence and educational level. The place of residence included Dutch *region* (northern, eastern, southern and western region; the latter region was subdivided into the 3 largest cities and the rest of the western region) and *degree of urbanisation* (high, moderate and low). The *educational level* concerned the participant or, in case of participants under the age of 19, the head of household. Educational level was categorised into low (primary school, lower vocational, low or intermediate general education), middle (intermediate vocational education and higher general education) and high (higher vocational education and university). The information on these factors was also used during recruitment.

2.2.3 Questionnaire

The participants completed a questionnaire either on paper or online via the GfK website. Three different questionnaires were used: one for the age group of 7 to 11 year-olds, one for 12 to 18 year-olds and one for adults. A small number (n=6) of people completed the questionnaire for a different age group than they finally belonged to in the study, because the age groups used in this report were based on the participant's age at the first date of interview – the questionnaires had been sent prior to the interviews. Copies of the questionnaires (in Dutch) can be downloaded from the DNFCS website.[45] The questions covered various background and life style factors such as patterns of physical activity, educational level, working status, native country, family composition, smoking, alcohol consumption, use of breakfast, general characteristics of the diet and frequency of consumption of specific foods (e.g. fish) and dietary supplements.

Data from the questionnaires were checked for impossible values, inconsistencies and missing values.

With regard to the educational level, working status and native country, the information from the questionnaire was combined and/or aggregated into fewer categories. The *highest educational level* of the respondent or, in case of the 7 to 18 year-olds, the highest educational level of carer/s was defined. According to the panel characteristics 3 categories were distinguished: low, middle and high. *Working status* was aggregated into 'employed' or 'unemployed'. For those aged 7 to 18 years, information on both carers was used and combined into 2 categories 'Both employed' or 'At least 1 of the carers unemployed'. There was also a category for incomplete information. For *native country* a distinction was only made between 'Dutch origin' and 'Not of Dutch of origin'.

The information on *physical activity* was obtained according to the Squash (Short QUestionnaire to ASses Health enhancing physical activity) questionnaire for adolescents and adults.[63] Questions on physical activity included activities at work/school, household activities and activities during leisure time. Respondents were asked to state per activity how many days they performed the activity, how many hours per day and what the intensity of the activity was (the question on intensity was only available for adults). In the questionnaires for children (7 to 11 years) and adolescents (12 to 18 years) questions on activities more relevant for these age groups were included. For example, questions referring to watching television, computer time, sports at school, walking or cycling to school, sport club activities and playing outdoors.

Based on the information in the questionnaires, time spent on physical activities was taken together (based on the manual from Squash) and evaluated using the guideline on healthy physical activity.[35, 43] Adolescents should have at least 1 hour of moderate intense physical activity each day (≥5 MET). Adults should have at least 30 minutes of moderate intense physical activity (≥4 MET), for at least 5 days a week. For those aged 55 years or above, the intensity of the physical activity can be lower (≥3 MET). For the youngest age groups, different categories were used to describe physical activity: for 7 to 11 year-olds: inactive (<3 hours/week); semi inactive (3 to 5

hours/week), semi active (5 to 7 hours/week) and norm active (>7 hours/week); for 12 to 18 year-olds physical activity was also categorised into inactive (complies with 0 days a week), semi active (complies with 1-6 days/week) and norm active (complies with 7 days/week).[35, 43]

The information on consumption of *alcoholic drinks* was aggregated into the following variables: 'No alcohol' and the habitual number of days a week with consumption of alcoholic drinks. For adults, the mean number of glasses of alcoholic drinks per day was also classified.

The variable *smoking* was divided into 3 categories: current smoking of at least 1 cigarette, cigar or pipe a day, use of tobacco in the past and never-smokers.

Evaluation of the food frequency of *fish* is based on the aggregated food frequency information of four categories of fish in the questionnaire (shellfish, eel, herring and other fish).

The questions on the food frequency of *dietary supplements* distinguished the use of different supplements during winter time and during the rest of the year. For women above 50 years of age, the frequency of all supplements containing vitamin D (vitamin D, vitamin A/D, multi-vitamins and multivitamin/multimineral supplements) was taken together.

2.2.4 Height and body weight

During the home visits or telephone interviews, body weight and height were reported (not measured) and recorded to an accuracy of 0.1 kg and 0.5 cm respectively.

Based on the information on both interview days, the average body weight and height were calculated. Body mass index (BMI) was determined as the average body weight (in kg) divided by average height (in m) squared (kg/m^2). Subsequently, these BMIs were classified using age and gender specific cut off values. The evaluation of body weight in BMI classes is dependent on age and gender. Cut off points for children[26, 52] are lower than those for adults.[64]

2.2.5 24-hour dietary recall

Data collection

Two non-consecutive 24-hour dietary recalls were conducted per participant. Children aged 7 to 15 years were interviewed face to face during home visits. At least 1 of the child's parents or carers was also present during the interviews. The interviewing dietician made appointments for these interviews. Participants aged 16 and over were interviewed by telephone, at dates and times unannounced to the participants.

The 24-hour dietary recall covered the period from getting up in the morning until getting up on the following day (which was, in fact, the day of the interview). Food consumption on Sunday to Friday was recalled the next day, consumption on a Saturday was recalled on the following Monday.

Each person was interviewed twice with an interval of about 4 weeks (2 to 6 weeks). In order to gain insight into the habitual food consumption, the aim was to spread the recalls equally over all days of the week and the 4 seasons. Interview days and survey days were not planned on national and/or religious bank holidays, or when the participant was on holiday.

The 24-hour dietary recalls during the 3-year period were conducted by 38 dieticians using the computer directed interview programme EPIC–Soft (©IARC). With EPIC-Soft the interviews were standardized and facilitated to enter the answers directly into the computer.[48] The average time taken to complete the dietary recall was 42 minutes. The EPIC-Soft interviews comprised the following:

a. General information on the participant including date of birth, height and body weight, dietary rules or special diets on the survey day of the 24-hour recall and special information on the day itself – such as a feast day or holiday – or any illnesses.
b. A quick list for each food consumption moment – including the time, place and main foods consumed.
c. Description and quantification of foods reported in the quick list (see b). Food description consisted of a further specification of the foods using facets and descriptors such as preparation method and fat content. Portion sizes of the products and meals could be quantified in several ways: by means of quantities as shown on photos in a provided picture booklet, or in household measures, standard units, by weight and/or volume.
d. The possibility for entering notes with further information.
e. Intake of dietary supplements.

Quality assurance

For the purpose of quality assurance of the interviewers, regular updates of information and different controls were executed. After the initial 3-day training period, further training of the interviewers was given twice a year and a newsletter was sent every 3 months. During the 3-year study period, the interviewers were asked to record an interview on tape 3 times. These tapes were evaluated by RIVM dieticians and feedback was given to the interviewers. Once the interviewers contacted a for them unknown 'fake' respondent by telephone. This fake respondent was one of the RIVM dieticians.

In addition, various quality checks were carried out on the data entered. Firstly, notes made by the interviewers during the recall were checked and handled.
For example, if a new food was not available in EPIC-Soft, a note was written, and based on additional information this new food was added to the EPIC-Soft databases.
Secondly, several standardized quality checks were performed, such as a check on spelling errors in brand names, checks on processing variables, missing quantities and correct use of the household measures (for example, not a heaped spoon for fluid foods). Furthermore, extreme consumption data per food group and extremes in the energy and nutrient intake were checked. This check on extreme values was done using a statistical method, the Grubbs' method.[25] Finally, energy intake was compared with the basal metabolic rate estimated with Schofield equations using height, body weight, age and gender of the subjects to estimate the number of low reporters,[2] and assessed using the age specific expected PAL-values.[2, 51]

Food groups
The EPIC-Soft food group classification comprised 17 main groups and 75 subgroups. Eight of these subgroups were additionally broken down into in total 30 sub subgroups.

For food data analyses, foods were categorized into the food groups of the Dutch food based dietary guidelines (see Appendix B).[61]
For the assessment of the consumption of vegetables and fruit, the total vegetable or fruit consumption was taken into account, with and without products with a considerable percentage of vegetables or fruit. These juices, soups and sauces could only contribute up to a maximum amount of 50% of the daily recommended consumption with reference to the food based dietary guidelines.

Based on the information on fortification in the Dutch Food Composition Database (NEVO)[47], all foods consumed were classified as either fortified or not fortified with a specific nutrient. Spreads enriched with vitamin A or vitamin D were not classified as fortified products for that nutrient. Information on enrichment of vitamin E in all spreads was incomplete and unclear. Therefore, spreads enriched with vitamin E were also not classified as fortified. This will lead to an underestimation of the contribution of fortified products to the vitamin E intake.

Furthermore, all foods were characterized as artificially sweetened or not. If necessary, brand specific product information was obtained from the internet or from the food label.

Place of consumption and food consumption occasions
During the recalls also the place and time of consumption and the food consumption occasion was registered. In this report the different categories of *place of consumption* were aggregated into 2 categories: 'At home' and 'Not at home'. This last group contained different categories like at the home of friends/family, at school, on the street, in a canteen or in a restaurant. The *food consumption occasion* distinguished between 3 main meals (breakfast, lunch and dinner) and in between the main meals. The food consumption occasions in between the main meals are combined in this report.

Based on the two 24-hour recall data, also the number of food consumption occasions was defined. All foods and drinks consumed at the same place and same hour of the day were defined as 1 food consumption occasion. Based on the 2 interviews, for each participant the mean number of food consumption occasions was defined.

2.3 Data analyses and evaluation

Most results are described for each age gender group separately, since the dietary reference intakes differed for these groups. If no large differences existed in the results by age or gender, results are shown for the whole study population. P values below 0.05 were considered to be statistically significant. All statistical analyses were done using SAS, version 9.2.

2.3.1 Dutch reference population

All results were weighted for small deviances in socio-demographic characteristics, day of the week and season of data collection, in order to give results that are representative for the Dutch population and representative for all days of the week and all seasons. Results based on the 24-hour recall were weighted for the level of education, region and urbanisation as well as for season (based on the first interview day) and day of the week (aggregated into weekday and weekend day). For children up to 19 years, the educational level of the head of household was used in the weighting. Census data from 2008 was used as reference population to derive the weights.[6] This weighting factor was created in an iterative process.

2.3.2 Dietary characteristics and lifestyle factors

Frequency distributions of dietary characteristics and lifestyle factors were calculated for the 11 population groups.

2.3.3 Food consumption

Average food consumption over 2 days was calculated for each participant. From this, the median consumption per food (group) was estimated for each age gender group, as well as the 5th and 95th percentile of consumption. As the distributions were skewed, medians are presented in this report, as mean intakes would not reflect an accurate 'average'.

The percentage of consumption days of food (groups) was also calculated, as well as the median consumption (and 5th and 95th percentile) on these consumption days. This procedure was conducted for all foods and separately for all fortified and artificially sweetened foods. In addition, the proportions of the mean total consumption of food (groups) provided by either fortified or artificially sweetened foods were calculated. The percentage of consumption days and food quantities on consumption days was presented instead of the percentage of users and food quantities of users, which was presented in earlier DNFCS reports, because it gives a better insight into the consumption frequency as well as in the consumed amount on these days.

Although the Dutch food based dietary guidelines were developed for educational purposes and not for the evaluation of food consumption at population level, a rough comparison of the current food consumption was made using these guidelines.[20, 61]

To evaluate the consumption of fruit and vegetables, the habitual intake distributions were compared with the dietary reference intakes for fruit and vegetables. This method is described in section 2.3.4. To evaluate fish consumption, data from the food frequency questionnaire were used, which provided habitual consumption during the past month.

2.3.4 Habitual intake of nutrients

Energy and nutrient intakes were calculated using an extended version of the Dutch Food Composition Database (NEVO table 2011/3.0)[47] and the Dutch Supplement database (NES) dated 01-01-2008.[4] Definition of the nutrients can be found on the NEVO website.[46] In total, more than 28,005 different food items and 879 dietary supplement items were reported, which were linked to 1599 NEVO codes and 486 NES codes. Nutrient intake from foods was calculated referring to all nutrients; in addition, micronutrient and n-3 fish fatty acid intake from both foods and dietary supplements was calculated.

The selection of nutrients of interest was based on the relevance for policy makers, availability of dietary reference intakes for these nutrients and the quality of the data. Sodium and iodine were outside the scope of this report as a balanced evaluation of the intake requires information on the consumption of discretionary salt. The estimation of sodium and iodine intake therefore needs a different approach and modelling[56, 57] and will be published elsewhere.

The DNFCS 2007-2010 provided 2-day dietary intake data, concerning observed intakes. The variance in intake comprised both the intra-individual (or day-to-day) variance and the inter-individual (or between subject) variance.[65] However, to correctly evaluate the intakes of nutrients, it is not the observed intake but the long term mean intake, the habitual intake, that is needed. The habitual intake distribution was estimated from the observed daily intake by correction for the intra-individual (day-to-day) variation using SPADE (Statistical Program to Assess Dietary Exposure, RIVM).[49] With SPADE the habitual intake distribution was modelled age dependently. Data were not a priori divided into age categories, but data from the total population, by gender, was used in modelling. This resulted in habitual intake distributions by gender for each year of age separately. For all nutrients, the results of habitual intake distribution (median and 5th, 25th, 75th, 95th percentile) were presented by gender in 6 age categories; 7 to 8 years, 9 to 13 years, 14 to 18 years, 19 to 30 years, 31 to 50 years, 51 to 69 years. The habitual intake distribution of each age category was calculated from the age specific distributions taking into account the composition of the population (by age and gender at 01-01-2008; Statistics Netherlands (CBS))[6] to result in proportions representative for the Dutch population. For several macronutrients, also habitual intake as percentage of energy intake was calculated.

Habitual intake of micronutrients and n-3 fish fatty acids from both foods and dietary supplements was calculated with SPADE using a 3-part model as proposed by Verkaik-Kloosterman et al.[55] Data from the additional questionnaire on the frequency of use of dietary supplements in winter and the rest of the year was used in combination with data from the 24-hour recall. For subjects identified as potential user of dietary supplements containing a specific nutrient from the additional questionnaire for which no information about the dose was available from the 24-hour recalls, a dose from dietary supplements was imputed based on the known values and type of supplement used.

To evaluate the diet, habitual intake distributions of nutrients were compared with dietary reference intakes. For macronutrients the dietary recommendations or guidelines as set by the Health Council of the Netherlands were used.[17, 18, 20] In addition, the recommendations and

guidelines for carbohydrates, fibre and fat recently set by the European Food Safety Authority (EFSA) were also used.[12, 13] The micronutrients calcium, vitamin D, vitamin B_1, vitamin B_2, vitamin B_6, folate and vitamin B_{12} were evaluated using the Dutch reference values as set by the Health Council of the Netherlands.[16, 19] For other micronutrients the dietary reference intakes in the Netherlands were not recently updated. Therefore, for these nutrients, both the Dutch dietary reference values[19, 21, 59, 62] and the more recent dietary reference values set by the American Institute of Medicine (IOM) were applied.[28, 29, 31, 32, 34] For copper and zinc, the more recent derivation of the dietary reference value by the IOM was judged to be largely improved[53] compared with the older Dutch values. For these nutrients, only the IOM values were used in the evaluation.

To determine the proportion of the Dutch population who may be potentially at risk of adverse effects due to excessive intake of a nutrient, the habitual intake distributions were compared with the tolerable upper intake level (UL) for micronutrients as set by EFSA.[14] The UL set by the Health Council of the Netherlands was used only for calcium intake in children,[16] as the EFSA did not set an UL for this.

The approach towards evaluation of the diet differed according to the type of dietary reference value as recommended by the IOM (see text box 2.1. for an explanation of these different types).[30] In general, the evaluation was performed for each year of age separately, and combined in the above described age categories, taking into account the composition of the population (by age and gender, CBS)[6] to result in proportions representative for the Dutch population. For the presented proportions the modelling uncertainty is presented as a 95% confidence interval.

- When an estimated average requirement (EAR) of a nutrient was available, the habitual intake was compared using the EAR cut point approach. The proportion of subjects adhering to the dietary recommendations was estimated (see text box 2.2).
- When an adequate intake (AI) was available, the intake was evaluated qualitatively. If the median intake was above the AI, the prevalence of inadequate intakes was stated as 'low'. When this was not the case, the adequacy of the diet could not be evaluated ('no statement' (ns)).
- When a tolerable upper intake level (UL) of a nutrient was available, the habitual intake was compared using a cut point approach. The proportion of the population potentially at risk of adverse effects due to too high intake was estimated.

2.3.5 Sources of nutrients

In order to gain insight into the main sources of nutrients, the contribution of each food group to the total energy and nutrient intake on the 2 recall days was calculated for each participant. Subsequently, the mean of all these individual contributions was calculated. Intakes by dietary supplements were taken into account.

2.3.6 Occasion and place of consumption

Food intake varies across place of consumption and occasion. Therefore, the averages of the individual contributions of intake at various food consumption occasions and places of consumption to the total intake of energy, nutrients and food groups were calculated.

2.3.7 Trends

The dietary assessment methodology used for the DNFCS 2007-2010 was the same as the methodology used for the DNFCS-Young Adults conducted in 2003,[39] but differed to that of the last population wide survey conducted in 1997/1998.[60] Therefore, only the median intakes of main nutrients of young adults measured in 2003 were compared with those in the current survey (age gender groups 19 to 30 years). In addition, the percentages adhering to the guidelines for fruit and vegetables and fish were compared.

Text box 2.1 Dietary reference intakes and their relation to the probability of health effects

Dietary Reference Intakes (DRI) refer to a set of reference values for nutrients for use in dietary evaluation:

Estimated Average Requirement (EAR)
Level of intake sufficient to meet the requirement for half of the healthy individuals in a particular life stage and gender group (in Dutch: Gemiddelde behoefte).

Recommended Dietary Allowance (RDA)
Level of intake sufficient to meet the requirements for nearly all healthy individuals in a particular life stage and gender group (EAR + 2*sd) (in Dutch: Aanbevolen dagelijkse hoeveelheid).

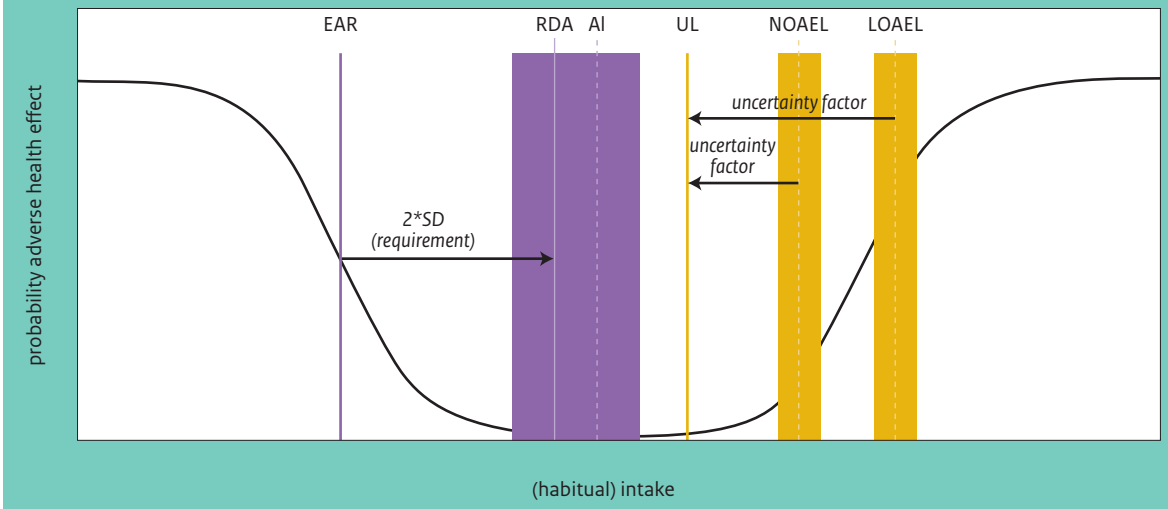
Adequate Intake (AI)
Level of intake assumed to be sufficient for almost all individuals in a particular life stage and gender group. Used when an RDA cannot be determined (in Dutch: Adequate inneming).

Tolerable Upper Intake Level (UL)
The highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals in the general population.

No Observed Adverse Effect Level (NOAEL)

Lowest Observed Adverse Effect Level (LOAEL)

Figure Schematic overview of the relationship between habitual intake and probability of adverse health effects including the different dietary reference intakes.[54]



Text box 2.2 EAR cut point method[30]

Proportion with a habitual intake less than their requirement

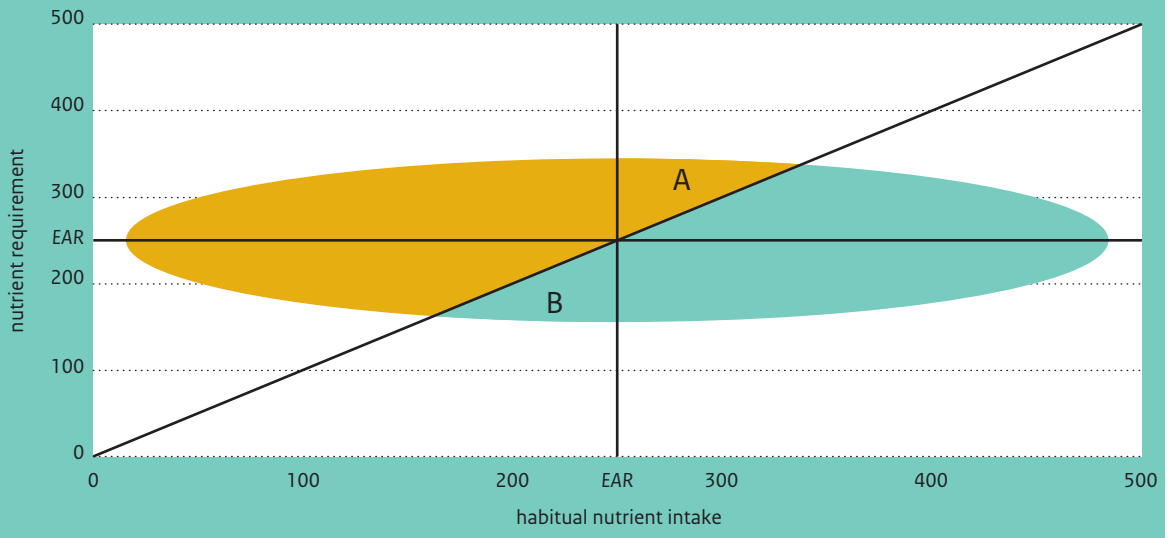
Individuals in a group vary both in the amounts of a nutrient they consume and in their requirements for the nutrient. This is illustrated in the figure below. It plots the usual intakes and requirements in a group (oval). The 45° line represents the points where the nutrient intake equals the nutrient requirement. Thus, the points to the right of that line are those individuals whose intakes are greater than their requirements. The points to the left of that line (the yellow area) are those individuals whose intakes are less than their requirements.

Why EAR cut point method?

If information were available on both the usual intakes and the requirements of all individuals in a group, determining the proportion of the group with intakes less than their requirements would be straightforward. One would observe how many individuals had inadequate intakes. Unfortunately, collecting such data is impractical. Therefore, it can be approximated with only habitual intake values by using the EAR cut point method.

How does it work?

Given several assumptions, one counts how many individuals in the group of interest have usual intakes that are below the EAR. That proportion is the estimate of the proportion of individuals in the group with inadequate intakes. This is also illustrated in the figure below. It assumes that the number of individuals indicated in the figure by A and B are equal.



3 Study population

3.1 Response

The response to the recruitment for DNFCS 2007-2010 is shown in Table 3.1. Of the 5,502 invited people, 78% were willing to participate (n=4,281). However, not all of these people actually completed two 24-hour dietary recalls and the general questionnaire: a total of 8% did not complete the study (n=462). The majority of these people dropped out during the study (66%) or could not be reached (26%), 28 women were excluded because they were pregnant or lactating and for 11 subjects the data was judged as unreliable. Therefore, the net response of the total population was 69% (n=3,819).

3.2 Representativeness of the study population

Table 3.2 shows the response of the participants in the DNFCS 2007-2010 by sex, age, and socio-demographic characteristics. The overall response varied between 55 and 88%. The response was the lowest among young adults, especially the 19 to 30 year-old men (55%). In women over 50 years of age, the response was the highest (88%). Furthermore, the response was the lowest (66 to 67%) in the western region of the Netherlands, in the more urbanised areas and for lower educated people.

Children were overrepresented in the study population and adults were underrepresented. The reason for this was that the study design aimed to include about 350 people in each defined age gender group. The distribution of levels of education, region, and urbanisation in the study population was close to that of the general Dutch population.

Table 3.3 contains the number and distribution of the recall days by day of the week and season. Young respondents (7 to 15 years) were visited at home, while respondents of 16 to 69 years old were interviewed by telephone. For face to face interviews, the recall days were less equally distributed than the recall days of the phone interviews. Saturdays were underrepresented with 12.7% and Tuesdays and Thursdays were overrepresented with 16.2%. For both types of interviews combined, all days of the week were almost equally represented. The recalls were also almost equally spread during the year, winter was slightly more represented (27.3%).

By weighing the results for these small deviations in socio-demographic characteristics and imbalances in day of the week and seasons, the results can be considered representative for the diet of the Dutch population taken over a calendar year.

Table 3.1 Response of invited participants in DNFCS 2007-2010.

	number	%
Overall sample	5,502	100
Non contacts	251	4.6
Refusals	970	17.6
Willing to participate	4,281	77.8
- Incomplete material (refused, non contacts, ineligible, unreliable, incomplete)	462	8.4
- Complete material (net sample)	3,819	69.4

Table 3.2 Response and representativeness on socio-demographic characteristics of participants in DNFCS 2007-2010.

	Overall sample			Net sample		Net sample after weighting for socio-demographic factors and season
	number	%	response %	number	%	%
Total	5,502	100	69.4	3,819	100	100
Age group						
7-8 years	407	7.4	74.7	304	8.0	3.1
Males, 9-13 years	495	9.0	70.9	351	9.2	3.8
Females, 9-13 years	464	8.4	75.9	352	9.2	3.6
Males, 14-18 years	579	10.5	60.8	352	9.2	3.8
Females, 14-18 years	560	10.2	63.2	354	9.3	3.7
Males, 19-30 years	648	11.8	54.9	356	9.3	8.9
Females, 19-30 years	569	10.3	61.0	347	9.1	8.8
Males, 31-50 years	494	9.0	70.4	348	9.1	18.4
Females, 31-50 years	454	8.3	77.3	351	9.2	18.2
Males, 51-69 years	431	7.8	81.4	351	9.2	13.9
Females, 51-69 years	401	7.3	88.0	353	9.2	13.9
Educational level[a, b]						
Low	1,757	31.9	66.1	1,162	30.4	29.3
Moderate	2,309	42.0	69.4	1,602	41.9	43.2
High	1,436	26.1	73.5	1,055	27.6	27.4
Region						
West[c]	2,506	45.5	66.7	1,671	43.8	44.4
North	529	9.6	75.2	398	10.4	10.4
East	1,148	20.9	71.9	825	21.6	21.3
South	1,319	24.0	70.1	925	24.2	24.0
Urbanisation[b]						
High	2,624	47.7	66.2	1,738	45.5	47.1
Moderate	1,151	20.9	70.1	807	21.1	19.1
Low	1,727	31.4	73.8	1,274	33.4	33.8

[a] For children (7 to 18 years) educational level of head of household is presented
[b] Format of educational level and degree of urbanisation is described in section 2.2.2
[c] This group was separately sampled for '3 largest cities in that region (Amsterdam, Rotterdam and The Hague)' and 'rest West'

3.3 Socio-demographic characteristics

The socio-demographic characteristics of the carers of respondents up to 19 years of age are shown in Table 3.4. Three-quarters of the children and adolescents lived in households of 4 people or more. For about 20% of the children both carers were low educated, whereas about 40% of the carers had a moderate level of education and 30% of the children had at least 1 highly educated carer.

For about 60% of the young people, both carers were working. More than 40% of the children and adolescents lived in the western part of the Netherlands, whereas 11% lived in the northern region. 40% of the families lived in highly urbanised areas, and a similar proportion lived in areas with a low population density. Around 90% of the carers of children up to 19 years old were born in the Netherlands.

Table 3.3 Number and distribution of recall days by day of the week, season and method of interview of participants in DNFCS 2007-2010.

	Net sample					
	face-to-face 7-15 years		by telephone 16-69 years		total	
	number	%	number	%	number	%
Total	2,594	100	5,044	100	7,638	100
Day of the week						
Monday	360	13.9	741	14.7	1,101	14.4
Tuesday	421	16.2	712	14.1	1,133	14.8
Wednesday	366	14.1	727	14.4	1,093	14.3
Thursday	420	16.2	683	13.5	1,103	14.4
Friday	347	13.4	689	13.7	1,036	13.6
Saturday	329	12.7	755	15.0	1,084	14.2
Sunday	351	13.5	737	14.6	1,088	14.2
Season						
Spring	616	23.7	1,240	24.6	1,856	24.3
Summer	622	24.0	1,188	23.6	1,810	23.7
Autumn	684	26.4	1,205	23.9	1,889	24.7
Winter	672	25.9	1,411	28.0	2,083	27.3

Socio-demographic characteristics of the adults that participated in the study are given in Table 3.5. About 50% of the people in their twenties lived in a household of 2 or 3 people, 25% in a household with 4 or more people. The percentage of households with 4 or more people in the 31 to 50 year-old group was higher (almost 40%). For participants older than 50 years of age, the size of households diminished again with more women than men living alone.

About half of the adults up to 51 years were moderately educated; in the group older than 50 this percentage was somewhat lower at 30% to 40%. In this age group half of the females were low educated. Overall, 24% of the 19 to 69 year-old participants were highly educated, though there were differences between the specific age gender groups (16-29%).

Men were more often in employment than women. In young female adults, 64% were employed compared with 79% of the male young adults. Overall, older people were less often employed than younger adults.

The distribution of the adults over the Dutch regions corresponded to that of the children in the study population: more than 40% were living in the western part of the Netherlands. The percentage of adults living in densely populated areas diminished by age class. Only 4% of the study group was not of Dutch origin.

3.4 Anthropometry

Mean self reported height and body weight, as well as an evaluation of body weight are presented in the Tables 3.6 and 3.7.

For children, the cut off points for the evaluation of BMI (kg/m^2) depends on age and gender.[26, 52] As shown in Table 3.6, the percentage of children who were overweight varied between 12 to 17%, depending on the age group. The percentage of obese children varied between 2 to 5%. In the higher age groups of children, the prevalence of obesity was somewhat lower. About 10% of the children up to 14 years of age had underweight; this percentage was around 8% for older children. In 2004, Van Buuren also recorded about 10% underweight in children 7 to 18 years of age.[52]

Overall more boys than girls had a normal body weight. The observed overweight prevalence in children in DNFCS 2007-2010 was somewhat higher than the prevalence reported in the general Dutch national data of 2010.[50] That study reported that 14% of children and adolescents in the Netherlands (2 to 21 years of age) were overweight with 2% being obese.

As presented in Table 3.7, the mean BMI of Dutch adults over 30 years exceeded the overweight cut off point of 25 kg/m^2.[64] Mean BMI data of 19 to 30 year-olds stayed just below this point, although about 33% of the men and even 41% of the females[7] in this age group were overweight or obese. This prevalence increased with age; the prevalence of males with a BMI above 25 kg/m^2 was twice as high in

Table 3.4 Characteristics of the carers of Dutch children and adolescents aged 7 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-8 years	9-13 years		14-18 years	
	total (n=304) %	male (n=351) %	female (n=352) %	male (n=352) %	female (n=354) %
Size of household					
1	0	0	0	1 [a]	2 [a]
2 and 3	26	22	25	26	22
4	44	46	42	47	47
5+	30	31	33	26	29
Highest educational level of carer(s) [b, c]					
Low	20	22	20	21	17
Moderate	43	44	42	36	42
High	33	31	33	36	34
At least one carer unknown	4	3	5	7	8
Working status of carer(s) [d]					
Both employed	60	58	62	57	66
At least one carer unemployed	29	31	29	29	23
At least for one carer unknown	11	11	8	13	11
Region					
West	42	44	43	42	44
North	11	10	10	11	11
East	24	23	23	23	22
South	24	24	24	24	24
Urbanization [c]					
High	42	42	43	42	44
Moderate	20	21	21	20	20
Low	38	37	37	37	36
Native country of carers					
Both of Dutch origin	89	89	88	93	92
At least one carer not of Dutch origin	11	11	11	7	8
Unknown for at least one carer	0	0	1	0	0

[a] Concerns information on respondent, not on carer
[b] For 29 children/adolescents no information on education of carers was available
[c] Format of educational level and degree of urbanisation is described in section 2.2.2
[d] This category includes working single carers

the 31 to 50 year-old men compared with the young adult men, 61 and 31%, respectively. In the oldest age group, this prevalence of overweight and obesity was about 10% higher. In people over 30 years of age, overweight was more prevalent in men than in women, while obesity was more prevalent in women. These results correspond with Dutch national data from 2009 in which 47% of Dutch adults were found to be overweight.[44] These data also showed that men were more often overweight while women were more often obese.

In DNFCS 2007-2010, the percentage of adults with underweight was low (0 to 6%), with the highest percentage among 19 to 30 year-old females. Compared with the DNFCS data from 2007-2010, Dutch national data from 2009[7] showed similar prevalences, i.e. with 1.6% of adults underweight.

3.5 Physical activity

Results on physical activity are shown in Tables 3.8, 3.9 and 3.10. For children and adolescents, both physical activity and sedentary activities (watching tv/dvd) are presented. The large majority (84%) of the children 7 to 11 years of age complied with the physical activity guideline, whereas in adolescents these percentages were considerably lower (23% for girls and 35% for boys). Of the adults, 67 to 82% complied with the physical activity recommendations for their age group.

Table 3.5 Characteristics of Dutch adults aged 19 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	19-30 years		31-50 years		51-69 years	
	male (n=356) %	female (n=347) %	male (n=348) %	female (n=351) %	male (n=351) %	female (n=353) %
Size of household [a]						
1	22	26	23	19	14	26
2 and 3	53	50	39	41	76	70
4	18	17	26	28	8	3
5+	7	8	12	11	3	1
Highest educational level [b]						
Low	31	22	25	30	33	51
Moderate	54	59	46	45	39	28
High	16	19	29	26	28	20
Working status						
Employed	79	64	88	80	42	31
Unemployed	18	34	11	18	57	66
Unknown	3	2	1	1	1	2
Region						
West	46	47	45	45	42	43
North	10	10	10	10	11	11
East	21	21	21	21	21	21
South	22	22	24	24	26	25
Urbanization [b]						
High	56	58	48	48	43	44
Moderate	16	17	19	19	20	20
Low	28	25	33	33	38	37
Native country						
Dutch origin	96	97	98	96	97	95
Not of Dutch origin	4	3	2	4	3	5

[a] Missing information for 1 male 19-30 years

[b] Format of educational level and degree of urbanisation is described in section 2.2.2

Table 3.6 Height and weight of the Dutch population aged 7 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-8 years	9-13 years		14-18 years	
	total (n=304) mean	male (n=351) mean	female (n=352) mean	male (n=352) mean	female (n=354) mean
Height (cm)	132	152	153	179	169
Weight (kg)	29	42	44	67	61
BMI (kg/m^2)	16.5	17.9	18.5	21.0	21.3
Evaluation of weight [a]	%	%	%	%	%
Seriously underweight	2	3	3	1	1
Underweight	8	7	6	6	7
Normal weight	67	75	71	78	76
Overweight	17	14	17	12	14
Obesity	5	2	3	3	2

[a] Evaluation of weight is dependent on age and gender[26, 52]

Table 3.7 Height and weight of the Dutch population aged 19 to 69 years (DNFCS 2007-2010), weighted for socio-demographic characteristics and season.

	19-30 years		31-50 years		51-69 years	
	total (n=356) mean	female (n=347) mean	male (n=348) mean	female (n=351) mean	male (n=351) mean	female (n=353) mean
Height (cm)	184	170	182	169	179	167
Weight (kg)	81	73	88	76 [a]	87	74
BMI (kg/m^2)	24.0	25.1	26.5	26.3 [a]	27.0	26.8
Evaluation of weight [b]	**%**	**%**	**%**	**%**	**%**	**%**
Seriously underweight (BMI<17.0)	1	1	0	1	0	0
Underweight (BMI 17.0-<18.5)	2	5	1	2	0	0
Normal weight (BMI 18.5-<25.0)	64	54	38	49	32	38
Overweight (BMI 25.0-<30.0)	26	23	45	27	50	38
Obesity (BMI≥30.0)	7	18	16	22	18	23

[a] 1 person excluded due to missing information on weight
[b] Reference[64]

Table 3.8 Characteristics of physical activity in the Dutch population aged 7 to 11 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-11 years (n=730) %
Physical activity	
Inactive (<3 hours/week)	1
Semi-inactive (3-<5 hours/week)	5
Semi-active (5-≤7 hours/week)	10
Norm-active (>7 hours/week)	84
TV/video/DVD/PC	
Few (<3.5 hours/week)	8
Moderate (3.5-≤14 hours/week)	56
Many (>14 hours/week)	36
Sports	
Few (<1 hour/week)	50
Moderate (1-≤3 hours/week)	42
Many (>3 hours/week)	8

Table 3.9 Characteristics of physical activity in the Dutch population aged 12 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	12-18 years	
	male (n=487) %	female (n=498) [a] %
Physical activity [b]		
Inactive (0 days/week)	13	30
Semi-active (1-6 days/week)	51	48
Norm-active (7 days/week)	35	23
TV/video/DVD/PC		
Few (<3.5 hours/week)	1	1
Moderate (3.5-≤14 hours/week)	11	22
Many (>14 hours/week)	88	78

[a] Group includes 2 females that are 19 years old
[b] Evaluation according to Dutch Standard for Healthy Excercise (NNGB)[35, 43]

Table 3.10 Percentage of the Dutch population aged 12 to 69 years (DNFCS 2007-2010), that meets the physical activity guideline, weighted for socio-demographic factors and season.

	12-18 years		19-30 years		31-50 years		51-69 years	
	male (n=487) %	female (n=498) [a] %	male (n=356) %	female (n=345) [a] %	male (n=348) %	female (n=351) %	male (n=351) %	female (n=353) %
Meets physical activity guideline [b]	35	23	77	71	67	74	79	82

[a] 2 females turned 19 years old during the survey, they are here included in the group 12 to 18 years
[b] Evaluation according to the Dutch Standard for Healthy Exercise (NNGB)[35, 43]

Compared with children aged 2 to 6 years,[42] the 7 to 11 year-olds were more often norm-active (84% versus 64 to 66%). But also the time spent on sedentary activities like watching tv/video/dvd increased with age: 36% of the 7 to 11 year-olds watched tv more than 14 hours a week, of the 2 to 6 year-old children this was only 9 to 15%.[42]

The results of compliance with the physical activity guideline for adults were fairly high compared with general data on physical activity in the Netherlands from 2007.[44] In 2007 only half of the adult population (56% of the adults between 18 and 55 years) and a quarter of the adolescents (12 to 18 years) complied with the recommendations.

Table 3.11 Smoking and alcohol use by the Dutch population aged 14 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=352) %	female (n=354)[a] %	male (n=356) %	female (n=345)[a] %	male (n=348)[b] %	female (n=351) %	male (n=351) %	female (n=353) %
Smoking of at least one cigarette, cigar or pipe per day								
Yes	10	9	33	35	26	21	22	16
No, but did use tobacco in the past	2	6	18	13	27	33	55	44
No, never used tobacco	88	85	49	52	47	45	24	40
Number of days with alcoholic drinks								
No alcohol	53	54	21	43	21	43	19	35
>0-<1 day/week	20	24	21	28	15	20	7	8
1-<5 days/week	25	22	44	27	44	28	31	31
% of persons that used alcohol only on weekend days[c]	*23*	*25*	*14*	*20*	*11*	*11*	*7*	*12*
5-<6 days/week	1	0	5	1	4	2	8	5
≥6 days/week	0	0	9	1	16	7	34	21
Mean number of glasses alcoholic drinks per day								
Females								
≥0-≤1 glass/day[d]				89		85		67
>1-≤2 glasses/day				5		8		20
>2 glasses/day				6		7		13
Males								
≥0-≤2 glasses/day[e]			77		76		65	
>2-≤3 glasses/day			8		11		17	
>3 glasses/day			15		13		17	

[a] Missing information on tobacco use for 1 person
[b] Missing information on alcohol use for 1 person
[c] Belonging to the groups drinking <5 days per week
[d] Advised maximum of glasses per day for female adults[18, 20]
[e] Advised maximum of glasses per day for male adults[18, 20]

Furthermore, 73 to 76% of the older adults, aged 55 to 65 years, complied with the recommendations, compared with 79 to 82% in our study population. The observation that women in the age group of 31 to 69 years comply with the recommendations more often than men in that age group, has been observed before.

3.6 Smoking and consumption of alcoholic beverages

Information on smoking and consumption of alcoholic beverages by the adolescent and adult population has been summarised in Table 3.11. For children, no information was gathered on tobacco and alcohol use through the general questionnaire. One out of 10 adolescents smoked at least 1 cigarette, cigar or pipe per day and 86% of these young people had never smoked. In young adults, 1 out of 3 smoked, while about half of the young adults never used tobacco. These figures are comparable with the percentages reported in DNFCS-2003.[39] In the adults aged 31 to 50 years, the percentage of smokers was lower compared with young adults, about a quarter were current smokers. In the oldest age group, 44% (females) to 55% (males) had stopped smoking and about 20% were current smokers. In general, more men than women smoked, except in the 19 to 30 year-olds. Overall, the percentage of smokers in DNFCS 2007-2010 was lower than that reported by STIVORO in 2008.[44] This may be partly due to differences in the definition of a smoker (in this study we asked for daily smoking habits).

The number of days per month or per week on which alcoholic beverages had been consumed during the last 12 months was a question in the general questionnaire directed to all age gender groups of 12 years and older. Of the 12 to 13 year-olds 1% of the boys and 5% of the girls did drink alcoholic beverages (data not shown).

Table 3.12 General characteristics of the diet of the Dutch population aged 7 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-8 years	9-13 years		14-18 years	
	total (n=304) %	male [a] (n=351) %	female (n=352) %	male (n=352) %	female [b] (n=354) %
Breakfast					
7 days/week	94	89	88	73	77
4-6 days/week	4	7	6	15	14
1-3 days/week	1	2	3	7	7
Never/less than once per week	1	2	3	5	3
Number of food consumption occasions per day [c]					
≤5	15	8	6	15	8
6	30	22	22	20	20
7	31	30	33	24	24
8	15	24	24	20	22
9	6	11	10	12	13
≥10	3	5	5	9	11
Special diet [d]	5	6	7	5	8
Special eating habits [e]	2	3	4	2	5

[a] 1 missing on breakfast information
[b] 2 missings on breakfast information
[c] Mean number of food consumption occasions has been calculated out of 2 recall data per person, weighted for socio-demographic factors, season and days of the week
[d] Special diet = e.g. cow's milk protein free, lactose restricted, diabetes, energy restricted
[e] Special eating habits = e.g. vegetarian, vegan, macrobiotic, anthroposophic

Almost half of the 14 to 18 year-olds did drink alcoholic beverages. A quarter of the adolescents drank only during weekends (Fridays, Saturdays and Sundays). The guideline for the age group up to 18 is not to drink alcohol at all.[20] In the adult population, twice as many females as males were non-alcohol drinkers. Compared with DNFCS-2003,[39] the number of non-alcohol drinkers in the 19 to 30 year-old group increased: 21% and 43% in our study, compared with 10% and 23% during DNFCS-2003, respectively for males and females. Overall, more men than women drank alcoholic beverages. The number of days on which alcohol was consumed increased with age, whereas the percentage of people that drank alcoholic beverages only on weekend days diminished with age.

Adults were also asked about the number of glasses per day on drinking days. In 2006 the Health Council of the Netherlands advised[20] to those people who do want to drink alcohol, to restrict the number of glasses of alcoholic drinks to 1 glass per day for women and 2 glasses for men and to avoid extremes. Overall 85 to 89% of females and about 77% of males aged 19 to 50 years met these requirements when counting the mean number of glasses per day. In the older age groups this percentage diminished to about 66%. The total number of glasses recorded on 1 day differed. Among the 19 to 31 year-olds, 8% of the males and 1% of the females drank more than 10 glasses on a weekend day, in the age group of 51 to 69 year-olds these percentages were 1.6 and 0.2 respectively (data not shown).

3.7 General characteristics of the diet

General characteristics of the diet are given in Tables 3.12 and 3.13 Almost all children aged 7 to 8 years had breakfast daily (94%). This percentage decreased during adolescence and early adulthood. At the age of 19 to 30 years, almost 1 out of 2 men and 1 out of 3 women did not have breakfast every day. In people over 30 years of age, breakfast seemed to gain popularity again and in the oldest adult group, 81 to 87% had breakfast daily. Overall more adults than children ate breakfast 4 to 6 days a week. 1 to 5% of the children and 4 to 12% of the adults reported that they (almost) never ate breakfast.

According to the interview data, about 30% of the young children and 25% of the older children (≥ 14 years) consumed foods/drinks on 7 food consumption occasions per day, including breakfast, lunch and supper. About 24% of the young children and 39 to 48% of the older children had 8 or more food consumption occasions per day. Many fewer adults had 7 food consumption occasions, varying from 19% (females 19 to 30 years) to 10% (females 51 to 69 years). Adults had more food consumption occasions compared with children. More than half of the adults used

Table 3.13 General characteristics of the diet of the Dutch population aged 19 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	19-30 years		31-50 years		51-69 years	
	male (n=356) %	total (n=347) %	male (n=348) %	female (n=351) %	male (n=351) %	female (n=353) %
Breakfast						
7 days/week	52	65	64	75	81	87
4-6 days/week	19	20	15	11	8	6
1-3 days/week	18	7	9	8	6	2
Never/less than once per week	11	8	12	7	6	4
Number of food consumption occasions per day[a]						
≤5	5	6	1	3	3	2
6	10	7	6	7	8	6
7	16	19	12	12	14	10
8	18	19	15	21	21	18
9	19	18	15	16	16	18
≥10	32	31	50	42	38	46
Special diet[b]	5	17	9	19	18	24
Special eating habits[c]	2	7	2	6	3	4

[a] Mean number of food consumption occasions has been calculated out of 2 recall data per person, weighted for socio-demographic factors, season and days of the week

[b] Special diet = e.g. cow's milk protein free, lactose restricted, diabetes, energy restricted

[c] Special eating habits = e.g. vegetarian, vegan, macrobiotic, anthroposophic

9 food consumption occasions or more, the highest prevalence among males 31 to 50 years of age (65%) and females 51 to 69 years (64%).

More adults than children and more women than men reported specific diets and special eating habits. About a quarter of the women aged 51 to 69 years were on a specific diet. The most common diets in this group were energy restricted, fat and/or cholesterol restricted and diets for diabetes.

4 Foods

4.1 Introduction

In this chapter the consumption of all main food groups for each age gender group is presented. In Appendix C, consumption data for all subgroups of these main food groups is presented. In sections 4.2 and 4.3 the differences between gender and age groups are described. In addition, the consumption of fruit, vegetables and fish are described and compared with the recommendations. In the remaining sections, the consumption of the foods mentioned in the food based dietary guidelines, the use of dietary supplements and the consumption of artificially sweetened foods and fortified foods are described. At the end of this chapter the food consumption occasions and places of consumption are described.

4.2 Types of foods consumed by age and gender

Consumption of all main food groups is presented in Tables 4.1 to 4.11. Median intakes, as well as the 5th and 95th percentile of intake are presented for each age gender group. Intake by the total group (including non consumers), the percentage of consumption days in that group and intake on consumption days are presented.

Looking at the consumption of the 17 main food groups, food groups that were consumed on 90% or more of the days (percentage consumption days) in all age gender groups were: 'Dairy products' (in children especially subgroup milk, in adults subgroup 'Cheese'), 'Cereals and cereal products' (especially subgroup 'Bread'), 'Fat' (in young adult females on 89% of the days), and 'Non-alcoholic beverages' (mostly 'Coffee, tea and herbal teas' in adults, and 'Carbonated/soft/isotonic drinks and syrups' in children). Also shown is that 'Potatoes' are only consumed on about half of the days. 'Meat or meat products' were not consumed on about 1 out of 10 days. Food groups with the least number of consumption days on the 2 survey days were 'Legumes' (2-3% consumption days) and 'Fish and shellfish' (20% consumption days or less).

Based on the percentage of consumption days that a food (group) was consumed, differences in consumption of types of foods between gender and age groups are described.

By gender

Food groups more likely to be consumed by adult men than by adult women (aged 19 to 69 years) were:

- 'Alcoholic beverages' (48% consumption days for males compared with 31% for females);
- 'Condiments and sauces' (74% versus 68%);
- 'Potatoes and other tubers' (mainly potatoes are consumed, few other tubers) (57% versus 52%);
- 'Meat and meat products' (91% versus 86%).

Table 4.1 Food consumption (main food groups) of Dutch children aged 7 to 8 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=304).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	60	0	188	54	120	37	283
02. Vegetables	55	0	143	70	77	12	204
03. Legumes	0	0	0	2	59	27	167
04. Fruits, nuts and olives	83	0	259	67	128	20	321
05. Dairy products	373	50	833	94	391	35	955
06. Cereals and cereal products	153	73	295	100	140	60	336
07. Meat and meat products	70	10	160	87	79	13	196
08. Fish and shellfish	0	0	47	7	52	5	201
09. Eggs and egg products	0	0	42	18	45	5	99
10. Fat	18	2	45	91	18	2	49
11. Sugar and confectionery	70	14	195	95	70	10	218
12. Cakes	41	4	137	80	45	12	189
13. Non-alcoholic beverages	782	371	1,520	99	792	317	1,644
14. Alcoholic beverages	0	0	0	1	2	0	75
15. Condiments and sauces	16	0	62	65	23	3	86
16. Soups, bouillon	0	0	130	11	194	19	389
17. Miscellaneous	0	0	75	15	70	1	417

Food groups 'Cakes' (66% consumption days for females versus 58% for males) and 'Fruits, nuts and olives' (69% versus 62%) were more likely to be consumed by adult women compared with adult men.

In children and adolescents, no gender differences existed in the percentage of consumption days. Only 'Fruits, nuts and olives' were more likely to be consumed by girls compared with boys (girls 64%, boys 59%).

By age

Food groups more likely to be consumed by adults than by young children and adolescents were:

- 'Vegetables';
- 'Alcoholic beverages';
- 'Fish';
- 'Eggs and egg products';
- 'Soups, bouillon'.

The number of consumption days of 'Fruits, nuts and olives' decreased in adolescents and young adults, but increased again over the age of 30.

Children consumed 'Sugar and confectionary' more often (>93% for young children aged 7 to 13 years) compared with adults (74-82%); the percentage of consumption days decreased with age. 'Cakes' were also more often consumed by young children, the percentage of consumption days of children aged 7 to 13 years was 78-80% compared with 66-72% in adolescents and 50-70% in adults.

4.3 Food quantities consumed by age and gender

By gender

It appeared that (based on median intake of the total groups):

- men consumed larger quantities of many food groups compared with women;
- women consumed larger quantities of 'Fruits, nuts and olives', and 'Non-alcoholic beverages' than men;
- no differences existed between gender groups in consumption of 'Vegetables', 'Legumes', 'Fish and shellfish', 'Eggs and egg products', 'Cakes', and 'Soups and bouillon'.

By age

Consumption of the following food groups increased with age:

- 'Vegetables';
- 'Fruits' (but a decrease was seen in young adults);
- 'Fish and shellfish';
- 'Eggs and egg products';
- 'Non-alcoholic beverages' (but a decrease was seen in the older adults);
- 'Alcoholic beverages'.

Consumption of the following food groups decreased with age:

- 'Dairy products' (up till the age of 50);
- 'Sugar and confectionary';
- 'Cakes' (up till the age of 50).

Table 4.2 Food consumption (main food groups) of Dutch male children aged 9 to 13 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	75	0	226	54	143	49	311
02. Vegetables	68	0	187	72	94	14	248
03. Legumes	0	0	0	2	121	13	253
04. Fruits, nuts and olives	67	0	225	62	128	14	318
05. Dairy products	380	53	890	92	399	46	974
06. Cereals and cereal products	188	85	363	100	175	65	390
07. Meat and meat products	86	13	211	89	92	18	250
08. Fish and shellfish	0	0	61	9	75	9	280
09. Eggs and egg products	0	0	45	23	45	4	100
10. Fat	21	3	55	91	24	3	61
11. Sugar and confectionery	70	8	185	93	70	10	217
12. Cakes	48	0	176	79	60	14	214
13. Non-alcoholic beverages	1,000	473	1,768	99	995	400	2,036
14. Alcoholic beverages	0	0	0	2	22	2	400
15. Condiments and sauces	22	0	81	71	30	4	105
16. Soups, bouillon	0	0	185	15	210	40	551
17. Miscellaneous	0	0	71	17	66	1	250

Table 4.3 Food consumption (main food groups) of Dutch female children aged 9 to 13 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=352).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	72	0	218	57	140	37	300
02. Vegetables	62	0	178	75	80	12	204
03. Legumes	0	0	0	2	80	21	210
04. Fruits, nuts and olives	70	0	241	66	128	10	330
05. Dairy products	372	32	816	93	385	29	903
06. Cereals and cereal products	159	69	309	99	150	45	351
07. Meat and meat products	76	8	178	88	84	15	218
08. Fish and shellfish	0	0	50	8	52	6	225
09. Eggs and egg products	0	0	45	20	45	5	90
10. Fat	18	2	43	91	19	2	48
11. Sugar and confectionery	67	9	173	94	63	10	194
12. Cakes	45	0	147	78	52	12	195
13. Non-alcoholic beverages	946	475	1,618	99	925	400	1,700
14. Alcoholic beverages	0	0	0	1	17	1	97
15. Condiments and sauces	18	0	73	69	24	4	97
16. Soups, bouillon	0	0	184	13	250	47	564
17. Miscellaneous	0	0	70	18	63	1	250

Table 4.4 Food consumption (main food groups) of Dutch male adolescents aged 14 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=352).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	97	0	288	54	194	73	401
02. Vegetables	86	0	236	77	106	20	280
03. Legumes	0	0	0	2	132	40	228
04. Fruits, nuts and olives	50	0	248	53	128	13	362
05. Dairy products	375	10	967	90	422	40	1,174
06. Cereals and cereal products	235	103	468	98	233	79	537
07. Meat and meat products	107	27	239	90	112	31	304
08. Fish and shellfish	0	0	63	9	75	11	201
09. Eggs and egg products	0	0	45	17	45	5	100
10. Fat	25	2	63	93	26	2	74
11. Sugar and confectionery	52	1	191	85	60	6	219
12. Cakes	43	0	163	66	64	10	224
13. Non-alcoholic beverages	1,247	593	2,375	100	1,230	480	2,663
14. Alcoholic beverages	0	0	797	12	453	2	3,900
15. Condiments and sauces	30	0	105	75	37	6	144
16. Soups, bouillon	0	0	236	14	259	19	648
17. Miscellaneous	0	0	131	22	75	2	272

Table 4.5 Food consumption (main food groups) of Dutch female adolescents aged 14 to 18 years (DNFCS 2007-2008), weighted for socio-demographic factors, season and day of the week (n=354).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	70	0	201	54	140	40	286
02. Vegetables	82	0	200	79	98	16	264
03. Legumes	0	0	0	2	110	18	210
04. Fruits, nuts and olives	69	0	276	61	130	18	383
05. Dairy products	315	10	721	91	302	22	846
06. Cereals and cereal products	183	82	330	99	175	60	387
07. Meat and meat products	79	6	184	87	89	18	222
08. Fish and shellfish	0	0	39	9	59	10	201
09. Eggs and egg products	0	0	45	21	33	3	90
10. Fat	17	2	46	90	18	2	51
11. Sugar and confectionery	44	2	131	87	42	4	162
12. Cakes	44	0	151	72	55	10	200
13. Non-alcoholic beverages	1,293	583	2,429	100	1,250	483	2,473
14. Alcoholic beverages	0	0	182	9	250	1	1,960
15. Condiments and sauces	22	0	84	71	30	5	114
16. Soups, bouillon	0	0	200	16	259	17	630
17. Miscellaneous	0	0	72	21	70	2	210

Table 4.6 Food consumption (main food groups) of the Dutch male population aged 19 to 30 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=356).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	97	0	284	53	194	33	450
02. Vegetables	107	0	275	81	127	21	310
03. Legumes	0	0	0	2	140	15	231
04. Fruits, nuts and olives	51	0	252	54	130	7	345
05. Dairy products	340	13	1,049	91	341	25	1,218
06. Cereals and cereal products	256	83	521	97	245	80	564
07. Meat and meat products	127	27	295	91	120	30	350
08. Fish and shellfish	0	0	92	16	83	10	250
09. Eggs and egg products	0	0	75	26	47	8	135
10. Fat	27	3	70	90	30	3	80
11. Sugar and confectionery	45	0	160	82	49	7	200
12. Cakes	25	0	152	50	60	12	250
13. Non-alcoholic beverages	1,578	765	3,038	99	1,533	606	3,254
14. Alcoholic beverages	1	0	1,880	35	560	33	3,534
15. Condiments and sauces	36	0	146	75	47	5	167
16. Soups, bouillon	0	0	291	22	259	33	648
17. Miscellaneous	0	0	90	24	70	2	330

Table 4.7 Food consumption (main food groups) of the Dutch female population aged 19 to 30 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=347).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	68	0	201	48	140	32	280
02. Vegetables	95	2	283	83	110	16	348
03. Legumes	0	0	15	3	120	30	490
04. Fruits, nuts and olives	75	0	297	60	148	6	415
05. Dairy products	286	23	772	93	283	24	891
06. Cereals and cereal products	186	60	357	97	180	50	390
07. Meat and meat products	80	0	193	82	100	17	241
08. Fish and shellfish	0	0	63	13	76	10	188
09. Eggs and egg products	0	0	56	23	46	8	129
10. Fat	18	1	45	89	19	3	55
11. Sugar and confectionery	34	0	137	81	40	4	186
12. Cakes	33	0	153	59	55	14	215
13. Non-alcoholic beverages	1,711	895	3,165	100	1,735	705	3,396
14. Alcoholic beverages	0	0	370	15	250	2	1,500
15. Condiments and sauces	24	0	88	69	30	4	135
16. Soups, bouillon	0	0	259	17	259	32	593
17. Miscellaneous	0	0	92	28	48	1	200

Table 4.8 Food consumption (main food groups) of the Dutch male population aged 31 to 50 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=348).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	109	0	298	56	194	62	410
02. Vegetables	122	14	304	85	143	19	360
03. Legumes	0	0	0	2	122	10	399
04. Fruits, nuts and olives	72	0	357	62	153	8	439
05. Dairy products	334	30	987	95	350	24	1,084
06. Cereals and cereal products	229	99	428	97	220	74	513
07. Meat and meat products	119	30	278	90	125	30	325
08. Fish and shellfish	0	0	100	18	66	8	252
09. Eggs and egg products	0	0	58	22	45	6	135
10. Fat	30	6	67	95	31	5	79
11. Sugar and confectionery	39	0	156	79	44	6	189
12. Cakes	32	0	144	57	60	10	240
13. Non-alcoholic beverages	1,693	745	3,339	100	1,668	651	3,510
14. Alcoholic beverages	98	0	1,350	45	500	73	2,400
15. Condiments and sauces	30	0	112	75	43	6	143
16. Soups, bouillon	0	0	324	21	259	40	660
17. Miscellaneous	0	0	69	26	52	1	150

Table 4.9 Food consumption (main food groups) of the Dutch female population aged 31 to 50 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	70	0	194	49	140	31	280
02. Vegetables	119	13	279	84	135	19	336
03. Legumes	0	0	27	3	103	19	220
04. Fruits, nuts and olives	82	0	358	66	147	10	456
05. Dairy products	296	36	744	95	309	22	843
06. Cereals and cereal products	175	71	345	99	170	48	402
07. Meat and meat products	76	0	189	86	88	15	225
08. Fish and shellfish	0	0	84	17	80	11	218
09. Eggs and egg products	0	0	50	23	45	6	135
10. Fat	20	1	48	92	21	3	55
11. Sugar and confectionery	27	0	122	78	34	4	160
12. Cakes	38	0	142	66	55	12	203
13. Non-alcoholic beverages	1,843	918	3,274	100	1,825	775	3,469
14. Alcoholic beverages	0	0	396	27	208	34	925
15. Condiments and sauces	20	0	84	69	26	5	119
16. Soups, bouillon	0	0	259	23	220	52	500
17. Miscellaneous	0	0	92	33	12	1	227

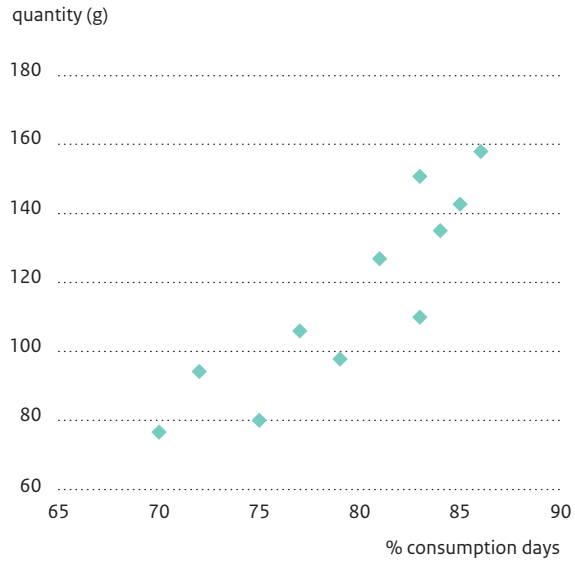
Table 4.10 Food consumption (main food groups) of the Dutch male population aged 51 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	97	0	262	60	150	51	342
02. Vegetables	126	11	287	83	151	22	360
03. Legumes	0	0	15	3	122	18	280
04. Fruits, nuts and olives	102	0	369	66	153	20	413
05. Dairy products	378	48	943	97	367	29	958
06. Cereals and cereal products	198	75	376	99	180	66	422
07. Meat and meat products	118	22	290	92	125	26	318
08. Fish and shellfish	0	0	110	18	96	18	280
09. Eggs and egg products	0	0	69	29	45	4	135
10. Fat	30	6	68	97	31	4	76
11. Sugar and confectionery	31	0	111	74	40	5	150
12. Cakes	35	0	138	65	55	12	195
13. Non-alcoholic beverages	1,431	713	2,666	100	1,405	619	2,792
14. Alcoholic beverages	180	0	1,100	59	370	73	1,500
15. Condiments and sauces	22	0	90	71	30	4	113
16. Soups, bouillon	0	0	324	27	289	59	648
17. Miscellaneous	0	0	75	28	14	2	180

Table 4.11 Food consumption (main food groups) of the Dutch female population aged 51 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=353).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	72	0	203	58	140	39	261
02. Vegetables	138	7	310	86	158	22	349
03. Legumes	0	0	0	2	101	14	213
04. Fruits, nuts and olives	134	0	366	77	165	25	447
05. Dairy products	298	33	804	96	304	26	832
06. Cereals and cereal products	153	62	265	99	140	50	344
07. Meat and meat products	80	9	186	87	91	15	222
08. Fish and shellfish	0	0	101	20	76	5	280
09. Eggs and egg products	0	0	50	30	50	6	100
10. Fat	20	4	50	94	22	4	55
11. Sugar and confectionery	20	0	103	74	25	3	133
12. Cakes	35	0	118	70	45	10	168
13. Non-alcoholic beverages	1,662	788	3,172	100	1,651	704	3,245
14. Alcoholic beverages	60	0	563	46	247	55	772
15. Condiments and sauces	16	0	83	66	23	3	116
16. Soups, bouillon	0	0	263	27	259	23	570
17. Miscellaneous	0	0	100	29	12	1	275

Figure 4.1 Association between the percentage of consumption days and consumption quantity of vegetables. Each dot represents the medians for each age gender group.



Not only the number of consumption days was related to age, but also the quantity of 'Fruit, nuts and olives' decreased in adolescents, but increased again in adults after the age of 30. Consumption of foods in the group 'Cereals and cereal products' increased with age until adolescence, and decreased in adults over 30 years. Absolute consumption of 'Sugar and confectionery', as well as the percentage of consumption days were highest in young children and decreased by age.

For the food groups 'Vegetables', 'Fish and shellfish', 'Eggs and egg products' and 'Alcoholic beverages', absolute consumption as well as the percentage of consumption days increased by age. Figure 4.1 shows this association for vegetable consumption. The older age groups consumed vegetables more frequently, and also the quantity of vegetable consumption was higher on these days.

4.4 Food based dietary guidelines

4.4.1 Fruit and Vegetables

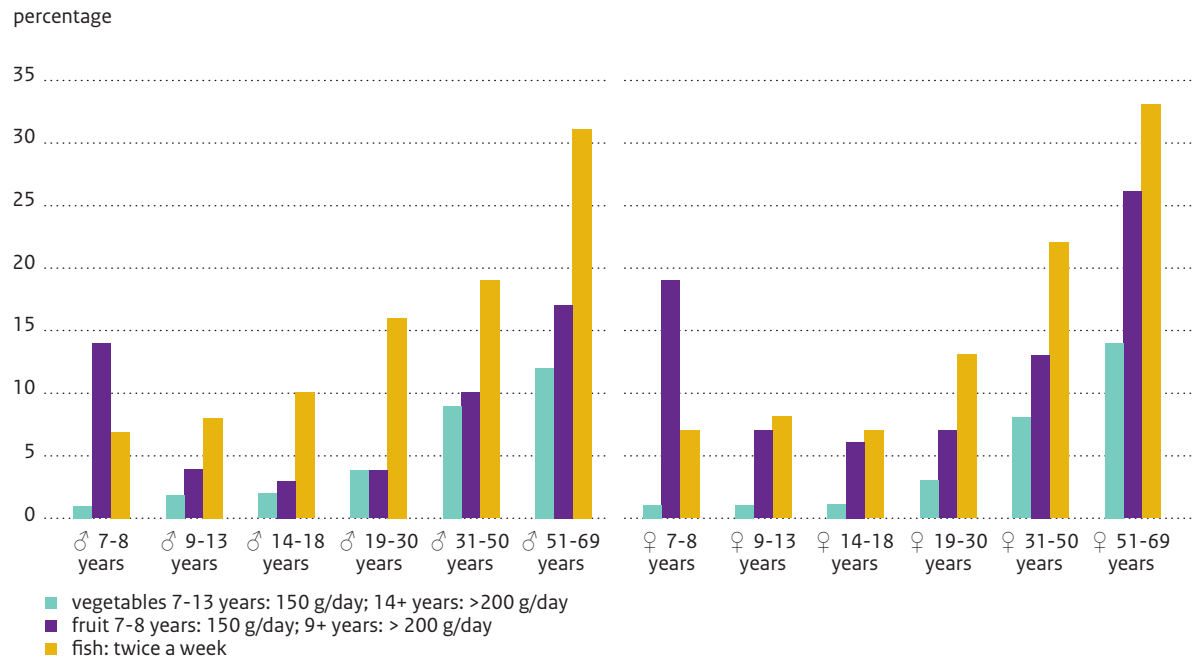
Table 4.12 shows the habitual fruit and vegetable consumption per day by the Dutch population aged 7 to 69 years. The fruit and vegetable consumption was far below the recommendations for all age groups.[61] The median habitual intake of vegetables was 60-92 g for children and 103-140 g for adults, while the food based dietary guideline for vegetables is 150 g for children and 200 g for adults. Only 1-2% of the children met the recommendations for vegetables. In adults, this percentage increased with age, 3-14% of the adults complied with the recommendations (see also Figure 4.2).

The most frequently consumed vegetables were 'Fruiting vegetables', 'Onion, garlic' and 'Leafy vegetables'. The consumed quantities varied across the types of vegetables; the amount of 'Cabbages' per consumption day was higher compared with the other types of vegetables (about 120 g for 19 to 30 year-old men). (See Figure 4.3 and Appendix C.)

Table 4.12 Habitual consumption of fruit and vegetables by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Vegetables (g/day)												
P50	62	60	76	73	92	87	109	103	127	122	135	140
P5	26	25	33	32	42	40	52	50	64	61	68	72
P95	124	119	146	141	170	162	195	186	221	213	231	239
Guideline (g/d)	150	150	150	150	200	200	200	200	200	200	200	200
% with intake below guideline	99	99	98	99	98	99	96	97	91	92	88	86
Fruit (g/day)												
P50	81	89	72	86	62	82	61	85	89	105	111	145
P5	21	22	15	20	9	18	5	17	10	26	13	45
P95	194	220	185	216	178	212	193	218	238	252	271	309
Guideline (g/d)	150	150	200	200	200	200	200	200	200	200	200	200
% with intake below guideline	86	81	96	93	97	94	96	93	90	87	83	74

Figure 4.2 Percentage of the Dutch population aged 7 to 69 years (DNFCS 2007-2010) meeting the recommended consumption of fruit, vegetables and fish (n=3,819).



Habitual fruit consumption was also low. Median consumption per day varied between 62 and 89 g for children and between 61 and 145 g for adults. In many age groups the median intake was even below 1 of the 2 recommended pieces of fruit. Even when extra fruit products like juices were taken into account, the median consumption hardly increased, because few juices met the inclusion criteria (see Appendix B). The guideline for fruit was met by 3-26% in the different age groups.

4.4.2 Fish

The number of subjects complying with the current recommendation of eating fish twice a week increased with age (Table 4.13). This information is based on data from the general questionnaire on the frequency of fish consumption. For children up to 19 years of age, only 6-7% ate fish twice a week or more, except for 14 to 18 year-old males of whom 9% met the recommendation. Over a quarter of the adults aged 51 to 69 years reported that they ate fish twice a week or more. The overall percentage of non-fish eaters varied between 5 and 18% and was highest in the females aged 14 to 18 years.
Recently the Health Council of the Netherlands published a report on the ecological aspects of the current food based dietary guidelines.[24] They suggested that a recommendation for eating fish once a week might be sufficient with regard to the prevention of cardiovascular diseases. However, even this may be ecologically adverse. From Table 4.13 it is clear that in most age groups more than one third of the population would meet such a recommendation; in the age group over 50 years of age, this could be as many as two thirds.

4.4.3 Basic foods

Table 4.14 shows the consumption of specific food groups that are mentioned in the food based dietary guidelines.[61] These dietary guidelines describe one of the food pattern possibilities for meeting most of the nutrient requirements. However, it should be noted that even when other food patterns are followed, these requirements can be achieved. For example, bread can be replaced by cereal products. The dietary guidelines have been developed for educational purposes and not for an evaluation of food consumption at population level, these food groups are used to describe food consumption.

Bread, potatoes, rice, pasta and legumes are important sources of carbohydrates, protein, minerals, fibre and B-vitamins. The bread consumption of the Dutch population was shown to increase up until the age of 18 years. In adults, bread consumption decreased with age. In all age groups the median consumption was below the guideline. For example, 50% of boys aged 14 to 18 years consumed less than 167 g per day (4-5 slices) while the guideline is 7 slices per day for this age group. Also the use of spreads was low; median consumption was 6-11 g/day in children and 7-20 g in adults, while a use of 20-35 g is recommended for children and 25-35 g for adults. Spreads are a source of essential fatty acids and vitamin A, D and E. The use of cooking fat also seems low.

Figure 4.3 Types of vegetables. Percentage of consumption days and median consumed amounts on consumption days for 19 to 30 year-old Dutch men (DNFCS 2007-2010) (n=356).

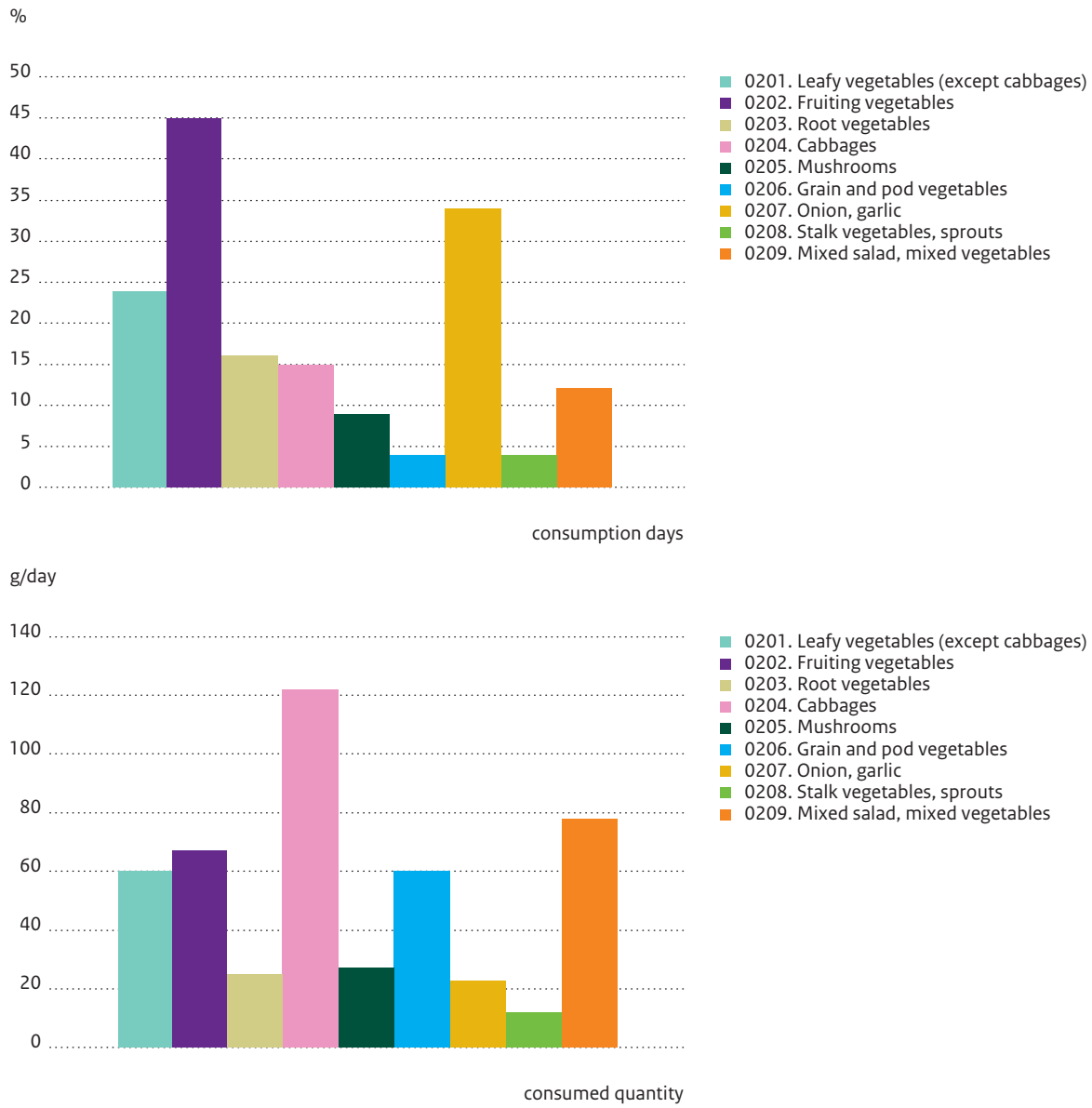


Table 4.13 Reported frequency of fish consumption by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

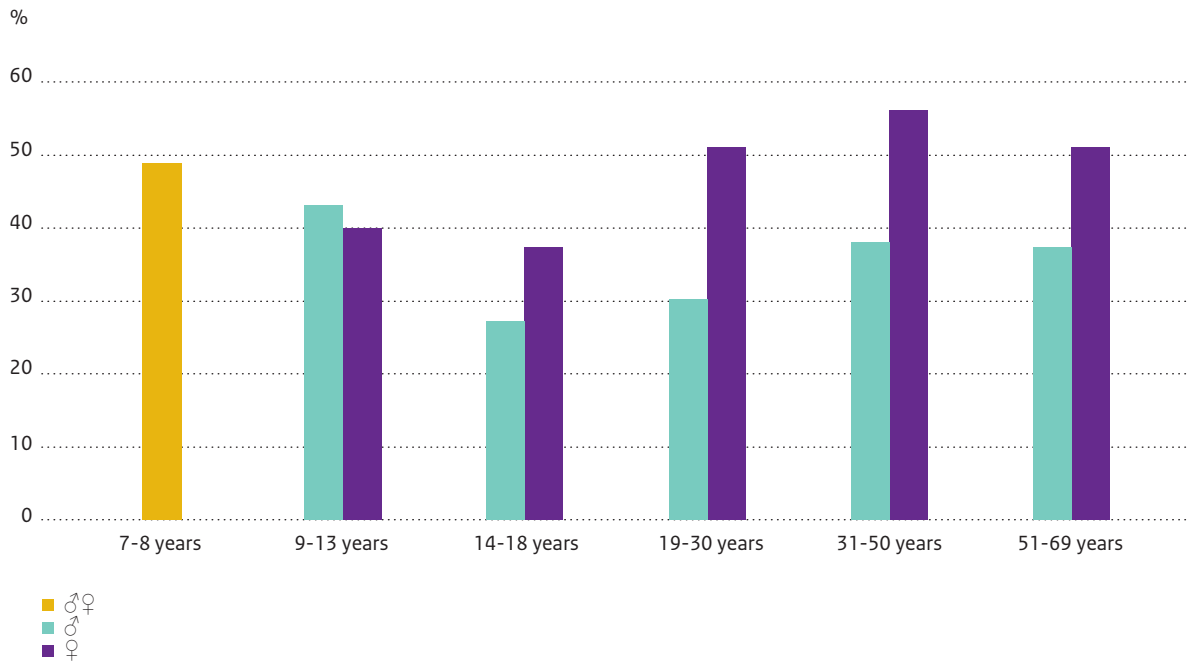
	7-8 years	9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	total (n=304) %	male (n=351) %	female (n=352) %	male (n=352) %	female (n=354) %	male (n=356) %	female (n=347) %	male (n=348) %	female (n=351) %	male (n=351) %	female (n=353) %
Twice or more per week (=recommended)[61]	6	7	7	9	7	13	11	17	19	28	28
Less than twice per week	82	87	79	80	76	73	75	73	72	66	67
Less than twice but at least once per week	*41*	*36*	*28*	*31*	*30*	*43*	*43*	*47*	*56*	*64*	*65*
Never	12	6	14	11	18	14	14	10	9	6	5

Table 4.14 Consumption of foods mentioned in the food based dietary guidelines[a] for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week.

	7-8 years	9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	total (n=304) g/day	male (n=351) g/day	female (n=352) g/day	male (n=352) g/day	female (n=354) g/day	male (n=356) g/day	female (n=347) g/day	male (n=348) g/day	female (n=351) g/day	male (n=351) g/day	female (n=353) g/day
Bread											
P50	109	133	114	167	128	160	124	161	121	145	115
P5	53	54	40	51	58	45	38	70	47	53	44
P95	213	264	207	303	235	350	210	293	223	280	220
Guideline	140	140-175	140-175	245	210	245	210	245	210	210	175
Potatoes (or rice, pasta or legumes)											
P50	79	113	104	154	108	164	109	157	112	145	105
P5	0	0	0	15	0	0	0	0	0	30	0
P95	213	280	248	333	242	370	243	354	241	300	226
Guideline	150	150-200	150-200	250	225	250	200	250	200	200	150
Dairy products											
P50	361	371	354	355	297	297	244	283	253	307	266
P5	30	30	0	0	0	0	0	0	0	0	0
P95	810	847	768	910	694	1,036	750	928	687	886	729
Guideline	400	600	600	600	600	450	450	450	450	500	550
Cheese											
P50	12	14	15	22	21	31	23	29	29	33	29
P5	0	0	0	0	0	0	0	0	0	0	0
P95	64	73	74	94	77	109	95	107	87	97	95
Guideline	10	20	20	20	20	30	30	30	30	30	30
Meat (products) fish, chicken, egg or other meat replacement products											
P50	84	103	86	122	94	155	106	148	106	154	118
P5	19	31	22	40	30	51	35	54	29	48	37
P95	183	239	214	277	201	341	216	325	241	324	233
Guideline	80	80-100	80-100	100-125	100-125	100-125	100-125	100-125	100-125	100-125	100-125
Spread											
P50	11	11	9	10	6	12	7	18	11	20	12
P5	0	0	0	0	0	0	0	0	0	0	0
P95	30	39	30	50	33	54	33	47	32	51	36
Guideline	20	20-25	20-25	35	30	35	30	35	30	30	25
Cooking fat											
P50	6	8	7	9	7	12	8	11	7	10	7
P5	0	0	0	1	0	0	0	1	0	0	0
P95	24	25	22	35	24	33	26	35	27	30	23
Guideline	15	15	15	15	15	15	15	15	15	15	15
Drinks											
P50	804	1,012	966	1,312	1,333	1,837	1,762	2,018	1,941	1,708	1,814
P5	382	502	478	625	584	920	945	1,031	1,008	903	921
P95	1,642	1,768	1,636	2,668	2,596	3,840	3,338	3,642	3,401	3,273	3,387
Guideline	1,000	1,000-1,500	1,000-1,500	1,000-1,500	1,000-1,500	1,500-2,000	1,500-2,000	1,500-2,000	1,500-2,000	1,500-2,000	1,500-2,000

[a] Observed consumption is presented. The estimated habitual consumption of fruit and vegetables are presented in Table 4.12

Figure 4.4 Percentage dietary supplement users in the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).



The consumption of potatoes (or rice, pasta, legumes) increased with age. The highest consumption was seen in 19 to 30 year-old males, with a median consumption of 164 g per day (3-4 serving spoons). Consumption of 250 g (5 serving spoons) is recommended for this age group.

Consumption of dairy products was highest in children and decreased in adults, but increased again after the age of 50. The median consumption of these products among adults aged 51 to 69 years was 307 and 266 g, for men and women respectively, while 500 and 550 g is recommended. Dairy products are a source of protein and calcium.

The median consumption of cheese and cheese products in the Dutch population was around the guideline. The median consumption of meat (products), fish, chicken, egg or other meat replacement products varied in children between 84 g and 122 g, with a recommended consumption of 80-125 g. In adults, especially in men, the consumption was high; median consumption in 19 to 30 year-old men was 155 g.

Dutch children were found to drink about 1 litre of liquid per day, the median consumption varied between 0.8 and 1.3 litres. In the adult age groups this amount was somewhat higher, with age group specific medians varying between 1.7-2.0 litres. This is in line with the recommendations. For adult men some of these drinks are represented by alcoholic drinks; the median consumption of alcoholic drinks was 0.1 litres (31 o 50 year-olds) and 0.2 litres (51 to 69 year-olds) (data not shown).

4.5 Dietary supplements

Figure 4.4 shows that 27-56% of the study population reported the use of dietary supplements. This use was higher during winter than the rest of the year. Dietary supplement use was highest in young children and women; about half of the 7 to 8 year-olds and half of the women aged 19 years and older used dietary supplements. The lowest use of dietary supplements during winter was reported by male adolescents in the age group of 14 to 18 years (27%).

In Tables 4.15 and 4.16 the difference between the reported supplement use during the past winter and the rest of the year can be seen. The most commonly taken dietary supplements in all age groups were multivitamins/minerals, both in winter and during the rest of the year. Overall more dietary supplements were used in wintertime, especially vitamin C by all age groups and multivitamins/minerals by the adult population. Dietary supplements with fish oil were also frequently used by all age groups (2-19%), mostly by older adults.

Within the investigated age groups, vitamin D supplementation is recommended for women above 50 years. Only 37% of these women were taking vitamin D containing dietary supplements in the winter, during the rest of the year this was 28% of the women.

Table 4.15 Intake of dietary supplements by the Dutch population aged 7 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors and season.

	7-8 years		9-13 years				14-18 years			
	total (n=304)		male (n=351)		female (n=352)		male (n=352)		female (n=354)	
	W %	R %	W %	R %	W %	R %	W %	R %	W %	R %
Overall supplement use	48	27	41	27	39	21	26	17	34	23
Vitamin A	2	1	3	1	3	1	3	3	5	3
Vitamin A/D	4	2	4	2	3	2	3	3	4	3
Vitamin B	2	1	3	2	3	1	3	3	7	5
Folic acid	2	1	2	2	1	0	2	2	2	1
Vitamin C	9	4	14	9	12	4	12	8	19	12
Vitamin D	3	1	4	3	3	1	4	2	6	5
Vitamin E	2	1	3	1	1	1	3	3	5	3
Multi vitamins	10	6	9	5	6	4	6	3	7	5
Multi vitamins/minerals	30	18	24	15	26	13	12	9	19	13
Iron	1	1	1	1	0	0	2	1	6	3
Calcium	2	1	3	2	1	1	3	2	5	3
Fish oil	9	8	12	9	5	4	8	6	9	6
Other supplements	2	2	2	3	2	0	1	1	2	2

W = % users of specific supplements during winter
R = % users of specific supplements during the rest of the year

Table 4.16 Intake of dietary supplements by the Dutch population (DNFCS 2007-2010), weighted for socio-demographic factors and season (n=2,106).

	19-30 years				31-50 years				51-69 years			
	male (n=356)		female (n=347)		male (n=348)		female (n=351)		male (n=352)		female (n=354)	
	W %	R %	W %	R %	W %	R %	W %	R %	W % [a]	R %	W % [a]	R %
Overall supplement use	29	18 [a]	47	36 [a]	36	27	54	41	36	27	49	37
Vitamin A	6	3	5	4	2	2	3	1	3	3	2	2
Vitamin A/D	5	2	5	4	3	2	3	2	4	3	4	4
Vitamin B	7	3	11	7	5	3	13	7	6	5	8	6
Folic acid	4	1	8	6	2	1	6	4	4	3	4	3
Vitamin C	15	9	21	15	16	10	19	13	13	10	18	11
Vitamin D	6	3	7	5	3	2	4	3	6	5	6	4
Vitamin E	5	3	5	4	3	2	4	2	4	3	6	5
Multi vitamins	8	3	9	5	6	3	7	5	6	5	5	3
Multi vitamins/ minerals	20	13	31	23	26	20	39	30	23	16	30	23
Iron	5	2	6	4	3	3	5	3	3	3	3	2
Calcium	5	2	6	4	3	3	8	6	7	5	11	9
Fish oil	8	2	6	5	9	7	14	11	13	10	19	13
Other supplements	2	3	5	5	2	3	9	7	7	7	14	12

W = % users of specific supplements during winter
R = % users of specific supplements during the rest of the year
[a] Information on supplement use missing for 1 person

4.6 Fortified foods

Three quarters of the study population consumed fortified products on one or both of the survey days (73%; data not shown). Children were more often consumers compared with adults; 89% of the children aged 7 to 8 years consumed fortified foods compared with 64-68% of the adults aged 51 to 69 years. This decline of fortified food use with age can be seen in Figure 4.5.

The most frequently consumed fortified products, when looking at the number of consumption days, were 'Dairy products' (12% consumption days), 'Margarines' (28%) and 'Non-alcoholic beverages' (19%) (Table 4.17). The number

Table 4.17 Consumption of fortified foods by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

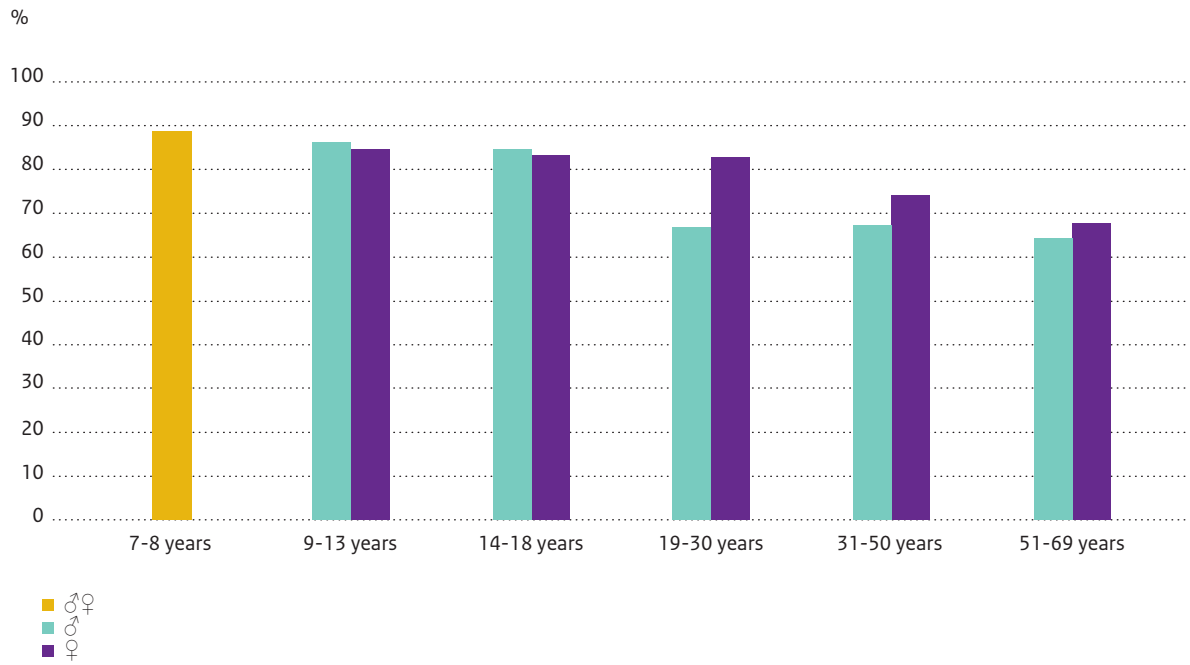
Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P95 g/day	proportion of total consumption %	consumption days %	median g/day	P5 g/day	P95 g/day
04. Fruits, nuts and olives	**0**	**0**	**0.0**	**0**	**90**	**90**	**90**
0403. Mixed fruits	0	0	2.3	0	90	90	90
05. Dairy products	**0**	**250**	**9.7**	**12**	**258**	**65**	**594**
0501. Milk	0	0	0.7	0	258	149	1,133
0502. Milk beverages	0	0	22.6	2	258	137	567
0503. Yoghurt	0	206	27.1	9	261	65	594
0504. Fromage blanc, petits suisses	0	0	12.7	0	140	50	250
0505. Cheese (including fresh cheese)	0	0	0.0	0	7	7	20
0506. Cream desserts, puddings (milk based)	0	0	7.3	1	206	96	330
06. Cereals and cereal products	**0**	**30**	**1.8**	**6**	**40**	**10**	**150**
0603. Bread, crisp bread, rusks	0	0	1.6	2	62	14	200
060301. Bread	0	0	1.6	2	75	30	210
060302. Crispbread, rusks	0	0	1.1	0	15	7	30
0604. Breakfast cereals	0	10	23.0	4	40	10	80
10. Fat	**0**	**30**	**22.4**	**28**	**18**	**4**	**48**
1003. Margarines	0	30	33.6	28	18	4	48
11. Sugar and confectionery	**0**	**19**	**6.1**	**8**	**21**	**8**	**105**
1101. Sugar, honey, jam	0	0	0.5	0	20	3	70
1102. Chocolate, candy bars, etc	0	0	4.1	2	20	10	80
1103. Confectionery non-chocolate	0	0	0.0	0	22	22	24
1104. Syrup	0	13	32.8	6	20	6	121
1105. Ice cream, water ice	0	0	0.8	0	54	50	67
12. Cakes	**0**	**19**	**3.7**	**5**	**38**	**18**	**84**
1201. Cakes, pies, pastries, etc.	0	0	0.5	0	27	20	100
1202. Dry cakes, biscuits	0	17	10.6	4	38	18	76
13. Non-alcoholic beverages	**0**	**392**	**4.6**	**19**	**275**	**145**	**990**
1300. Unclassified	0	0	2.2	0	300	145	488
1301. Fruit and vegetable juices	0	200	29.4	9	242	133	733
1302. Carbonated/soft/iso drinks, diluted syrups	0	271	15.0	11	330	167	1,000
15. Condiments and sauces	**0**	**0**	**0.1**	**0**	**10**	**5**	**30**
1501. Sauces	0	0	0.0	0	33	33	33
1502. Yeast	0	0	98.0	0	10	5	30
17. Miscellaneous	**0**	**0**	**32.6**	**3**	**100**	**20**	**600**
1700. Unclassified	0	0	63.7	0	94	38	141
1701. Soy products	0	0	86.6	2	140	20	500
1702. Dietetic products	0	0	67.8	1	40	14	726
170200. Unclassified	0	0	98.1	1	40	14	726

of consumption days of fortified dairy products and fat did not differ much between age groups (data not presented). Fortified 'Non-alcoholic beverages' were consumed more often by children (39% of the 7 to 8 year-olds, 33% of the 9 to 18 year-olds) compared with adults (16%). Fortified 'Sugar and confectionery products' (mainly syrups) were also consumed more often by children, 23% of the 7 to 8 year-olds consumed these products and 15% of the 9 to 18 year-olds, compared with 6% of the adults (data not shown).

For these analyses, spreads enriched with vitamin E, vitamin A or vitamin D were not classified as fortified products for these nutrients. However, about a third of the 'Margarines' consumed were fortified with other nutrients. Furthermore, 33% of the syrups were fortified and 29% of the fruit and vegetable containing drinks. The group 'Fruit and vegetable juices' also contained some fruit drinks and sodas. In the food group 'Dairy products', 23% of the 'Milk beverages' consumed were fortified and 27% of the 'Yoghurts'. Other food groups with a high proportion of fortified products were 'Breakfast cereals' (23%), 'Soy products' (87%) and 'Dietetic products' (68%).

The contribution of fortified foods to the nutrient intake is described in chapter 6.

Figure 4.5 Percentage users of fortified products by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season and day of the week (n=3,819).



4.7 Artificially sweetened foods

The consumption of artificial sweeteners and artificially sweetened products is shown in Table 4.18. Based on the 2 recall days, 59% of the population consumed artificially sweetened products (data not shown). Younger children were the most frequent consumers, 71-73% of the 7 to 13 year-old children consumed artificially sweetened products compared with 51-52% of the adults aged 51 to 69 years (see Figure 4.6). As was seen with the use of fortified foods, the consumption of artificially sweetened foods also declined with age.

Based on the number of consumption days, the following food groups contributed mostly to the consumption of artificially sweetened foods: 'Non-alcoholic beverages' (26%), 'Miscellaneous' (14%) (including the subgroup 'Artificial sweeteners'), 'Dairy products' (11%) (mainly 'Yoghurt'), and 'Sugar and confectionery' (9%).

40% of the consumed subgroup 'Carbonated/soft/iso drinks, diluted syrups' was artificially sweetened and 20% of the subgroup 'Syrup'. Of the consumed 'Yoghurts', 23% were artificially sweetened.

4.8 Consumption by place of consumption

For all 17 food groups studied, more than 50% were found to be eaten at home. Food groups with more than 80% of consumption taking place at home were 'Legumes', 'Potatoes and other tubers', and 'Vegetables'. The products most frequently consumed away from home were: 'Cakes' (43%), 'Soups' (39%), 'Fish and shellfish' (37%), 'Non-alcoholic beverages' (35%), 'Alcoholic beverages' (35%), 'Miscellaneous' (35%) and 'Fruits, nuts and olives' (34%) (Table 4.19).

Statistically significant differences of more than 5% between males and females were found (data not shown). Males were more likely to consume the following food groups away from home: 'Fruits, nuts and olives' (38% away from home for males, versus 30% in females), 'Cereals and cereal products' (32% versus 25%), 'Eggs and egg products' (26% versus 20%), 'Fat' (30% versus 24%), 'Non-alcoholic drinks' (38% versus 32%) and 'Soups' (44% versus 33%).

In addition, differences between age groups (divided into children 7 to 13 years, adolescents 14 to 18 years and adults 19 to 69 years) were found. This data is not shown. Children and adolescents were more likely to consume 'Vegetables' at home (86%, compared with 80% in adults). Adults ate fewer 'Legumes' at home (83%, compared with 92% in children and 100% in adolescents). Adolescents were more likely to consume 'Fruits, nuts and olives' at home (77%, compared with 67% in children and 65% in adults). Children were more likely to consume 'Fish and shellfish', 'Eggs and egg products' and 'Soups, bouillon' at home. Adults ate more 'Soups, bouillon' away from home (40%, compared with 26% and 31% in children and adolescents).

Figure 4.6 Percentage users of artificially sweetened food by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors and season and day of the week (n=3,819).

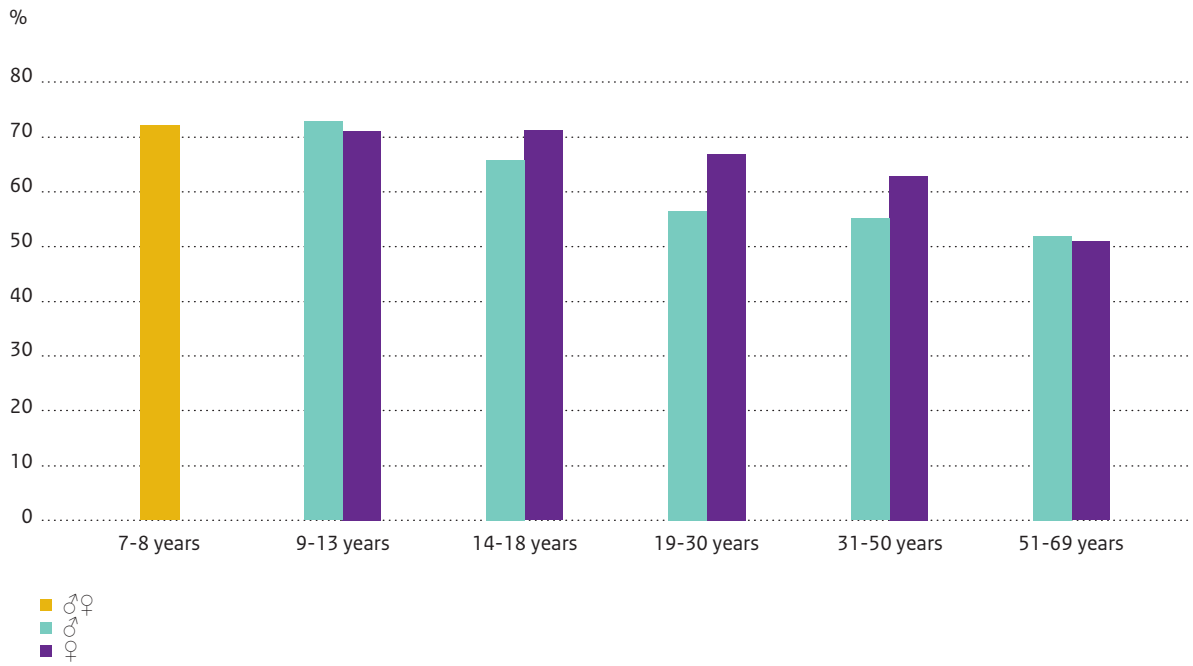


Table 4.18 Consumption of artificially sweetened foods by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted by socio-demographic factors, season and day of the week.

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P95 g/day	proportion of total consumption %	consumption days %	median g/day	P5 g/day	P95 g/day
04. Fruits, nuts and olives	**0**	**0**	**0.2**	**0**	**250**	**43**	**325**
0401. Fruits	0	0	0.2	0	250	43	325
05. Dairy products	**0**	**208**	**7.9**	**11**	**240**	**96**	**594**
0501. Milk	0	0	0.2	0	258	249	1,030
0502. Milk beverages	0	0	12.7	1	258	149	498
0503. Yoghurt	0	165	23.4	8	243	65	594
0504. Fromage blanc, petits suisses	0	0	9.0	0	250	140	250
0506. Cream desserts, puddings (milk based)	0	0	8.6	1	192	60	283
11. Sugar and confectionery	**0**	**6**	**3.6**	**9**	**5**	**1**	**90**
1103. Confectionery non-chocolate	0	2	4.0	6	2	1	16
1104. Syrup	0	0	19.7	3	27	7	156
1105. Ice cream, water ice	0	0	1.0	0	93	75	150
13. Non-alcoholic beverages	**0**	**720**	**8.1**	**26**	**387**	**167**	**1,450**
1301. Fruit and vegetable juices	0	100	12.8	4	242	100	725
1302. Carbonated/soft/iso drinks, diluted syrups	0	671	40.2	23	400	167	1,450
15. Condiments and sauces	**0**	**0**	**0.2**	**0**	**20**	**8**	**35**
1501. Sauces	0	0	0.2	0	20	8	35
17. Miscellaneous	**0**	**6**	**5.0**	**14**	**4**	**1**	**16**
1702. Dietetic products	0	6	36.7	14	4	1	16
170200. Unclassified	0	0	8.4	0	38	20	335
170201. Artificial sweeteners	0	6	100	14	4	1	15

Table 4.19 Average contribution of places of consumption to total food group consumption of the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Food groups based on EPIC-Soft Classification	At home mean%	Not at home mean%
01. Potatoes and other tubers	81	19
02. Vegetables	81	19
03. Legumes	85	15
04. Fruits, nuts and olives	66	34
05. Dairy products	78	22
06. Cereals and cereal products	71	29
07. Meat and meat products	75	25
08. Fish and shellfish	63	37
09. Eggs and egg products	77	23
10. Fat	73	27
11. Sugar and confectionery	70	30
12. Cakes	57	43
13. Non-alcoholic beverages	65	35
14. Alcoholic beverages	65	35
15. Condiments and sauces	76	24
16. Soups, bouillon	61	39
17. Miscellaneous	65	35

Table 4.20 Average contribution of food consumption occasions to total food group consumption of the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Food groups based on EPIC-Soft Classification	Breakfast mean%	Lunch mean%	Dinner mean%	In between mean%
01. Potatoes and other tubers	0	3	95	2
02. Vegetables	1	7	89	4
03. Legumes	1	5	92	3
04. Fruits, nuts and olives	9	17	19	54
05. Dairy products	24	28	29	19
06. Cereals and cereal products	24	37	26	13
07. Meat and meat products	4	17	73	6
08. Fish and shellfish	2	25	59	14
09. Eggs and egg products	15	28	49	8
10. Fat	19	30	44	7
11. Sugar and confectionery	22	16	14	49
12. Cakes	7	6	4	84
13. Non-alcoholic beverages	11	8	8	72
14. Alcoholic beverages	0	1	20	79
15. Condiments and sauces	1	11	82	6
16. Soups, bouillon	1	39	47	13
17. Miscellaneous	13	17	33	38

4.9 Consumption by time of consumption

Time of consumption has been categorized into breakfast, lunch, dinner and in between meals. Table 4.20 shows the consumption of the total population by occasion. Dinner was the most important food consumption occasion for 'Potatoes and other tubers', 'Vegetables', 'Legumes', 'Meat and meat products', 'Fish and shellfish', 'Eggs and egg products', 'Fat', 'Condiments and sauces' and 'Soups' (Table 4.20). During dinner, 95% of 'Potatoes and other tubers' were consumed.

'Cakes' (84%), 'Alcoholic beverages' (79%)' and 'Non-alcoholic beverages' (72%) were mostly consumed in between meals. More than half of the fruit consumption (54%) occurred in between meals. Lunch provided most 'Cereals and cereal products' (37%). Consumption of 'Dairy products' was equally distributed over the various food consumption occasions.

Statistically significant differences were found between males and females. Differences higher than 5% were seen in 'Fruit, nuts and olives', this food group was consumed more frequently in between meals by females (57%,

compared with 52% in males), and in 'Eggs and egg products', which were consumed more frequently at breakfast by females (18%, compared with 12% in males).

Differences between age groups showed that dinner was the only source of 'Legumes' for adolescents, while for adults dinner accounted for only 90% of this food group. Furthermore, for adults lunch was a more important source for 'Dairy products' compared with breakfast, 29% of the 'Dairy products' were consumed during lunch, versus 23% during breakfast, while for children and adolescents it was the other way around. Lunch was a more important source of 'Soups, bouillon' for adults (40%, compared with 25% in children and 26% in adolescents; data not shown).

5 Energy and macronutrients

5.1 Introduction

The habitual intake distributions of energy and macronutrients from food sources are presented in Tables 5.1 to 5.14. For each macronutrient the habitual intake was compared with dietary reference values. Whether this assessment was qualitatively or quantitatively performed, depends on the type of dietary reference value (see section 2.3). At the end of this chapter the sources of these macronutrients are presented, as well as the food consumption occasion and place of intake.

5.2 Energy intake

The habitual intake distribution of energy is presented in Table 5.1. In general, the habitual energy intake was higher for men than for women. For men the median habitual energy intake increased from childhood (7 to 8 years; boys 8.1 MJ) to young adulthood (19 to 30 years; 11.5 MJ). For women, the median habitual energy intake was stable from childhood to young adulthood (8.4 MJ). From young adulthood to the oldest adult age category (51 to 69 years) the median habitual energy intake decreased for both men and women to 10.0 and 7.8 MJ respectively.

The median habitual energy intake was below the age-group specific estimated average requirement, except for children 7 to 8 years. However, due to the correlation between energy intake and energy requirements, it is not possible to evaluate the adequacy of energy intake without information on individual energy requirements.[33]

In Figure 5.1 the contribution of macronutrients to energy is shown. Fat was responsible for one third of the energy supply, carbohydrates for about 50% and protein for about one seventh part. See the next sections for more specific findings on these macronutrients.

5.3 Intake of fat

Total fat

In Table 5.2 the habitual intake distribution of total fat is presented in both absolute amounts (g/day) as well as relative to total energy intake (En%). The median habitual total fat intake (g/day) was higher for men than women, except for young children 7 to 8 years. Seen over all age groups, the median habitual total fat intake ranged from 71-105 g/day for men and from 70-76 g/day for women. Total fat is responsible for about one-third of the energy intake. Despite some differences in the habitual intake distributions for the absolute total fat intake, (especially in men) the habitual intake distribution of the relative contribution of total fat to energy intake is similar for all age groups and also between men and women.

The adequate intake range set by the Health Council of the

Table 5.1 Habitual intake distribution of energy by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Energy	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
kcal/day												
P5	1,267	1,409	1,576	1,408	1,830	1,406	1,940	1,399	1,848	1,361	1,637	1,268
P25	1,638	1,753	2,000	1,752	2,278	1,750	2,400	1,742	2,299	1,700	2,062	1,599
P50	1,929	2,011	2,330	2,010	2,622	2,008	2,753	1,999	2,647	1,956	2,390	1,849
P75	2,247	2,285	2,688	2,284	2,994	2,282	3,134	2,273	3,022	2,227	2,747	2,115
P95	2,753	2,706	3,253	2,705	3,580	2,703	3,731	2,693	3,611	2,644	3,309	2,525
MJ/day												
P5	5.3	5.9	6.6	5.9	7.7	5.9	8.1	5.9	7.7	5.7	6.9	5.3
P25	6.9	7.4	8.4	7.4	9.6	7.3	10.1	7.3	9.6	7.1	8.6	6.7
P50	8.1	8.4	9.8	8.4	11.0	8.4	11.5	8.4	11.1	8.2	10.0	7.8
P75	9.4	9.6	11.3	9.6	12.6	9.6	13.1	9.5	12.7	9.3	11.5	8.9
P95	11.6	11.3	13.7	11.3	15.0	11.3	15.6	11.3	15.1	11.1	13.9	10.6
EAR[a] (MJ/day)	7.2	6.5	10.6	9.5	14.0	10.4	12.9	10.2	12.2	9.7	11.0	9.0

[a] Due to correlation between energy intake and energy requirement adequacy cannot be assessed

Figure 5.1 Macronutrients (in proportion of energy intake (En%)) of the Dutch female population (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=1,908). Results for the male population are very similar.

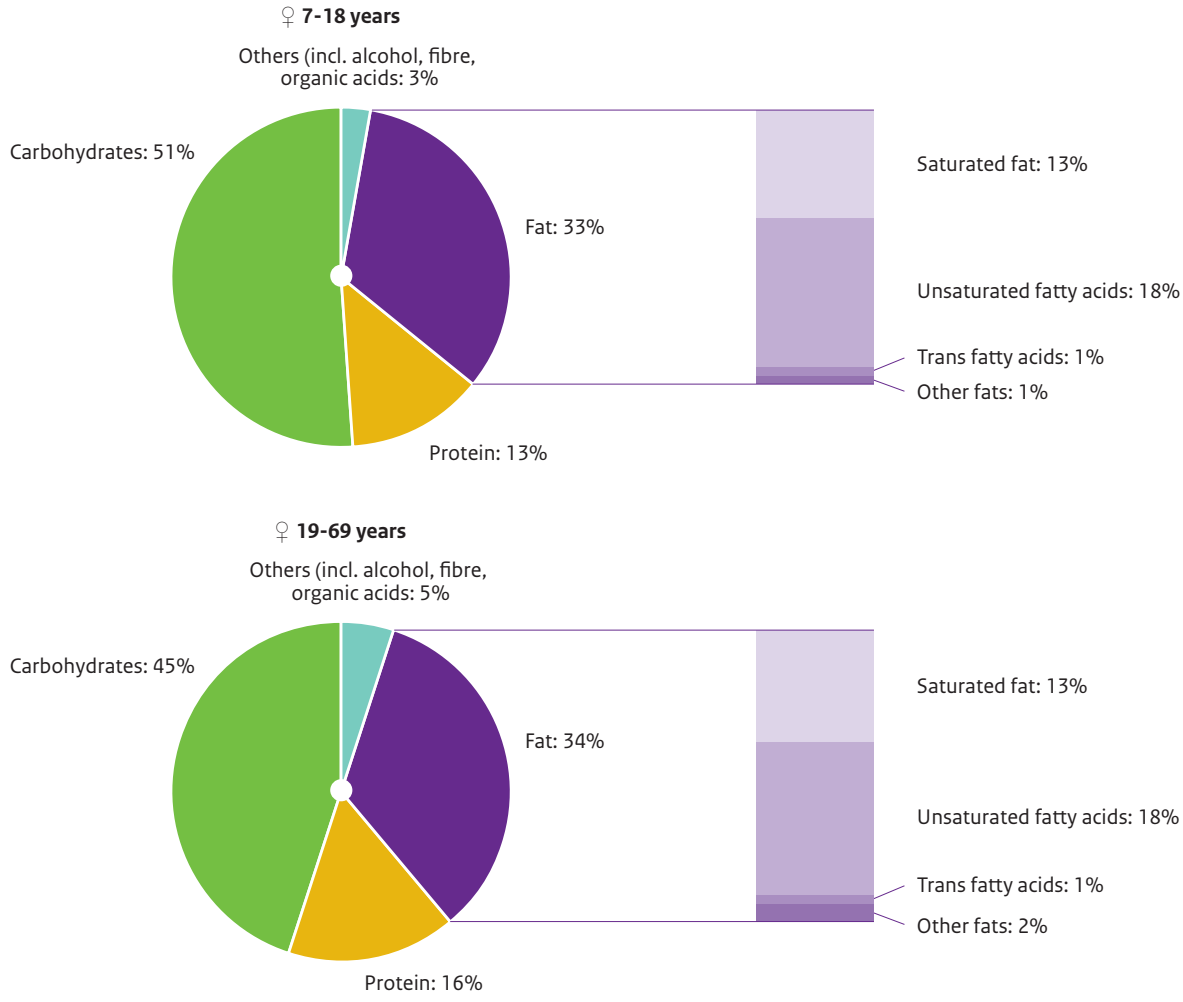


Table 5.2 Habitual intake distribution of total fat by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Total fat	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Fat g/day												
P5	43	47	54	47	63	47	68	46	67	45	58	43
P25	59	63	72	63	83	63	89	62	87	61	77	58
P50	71	76	86	76	98	76	105	75	103	74	92	70
P75	86	90	103	90	116	90	123	89	121	88	109	84
P95	109	113	129	113	144	113	153	112	150	111	137	106
En%/day from fat												
P5	25.0	25.4	26.4	25.4	27.1	25.5	27.4	25.8	27.6	26.4	27.6	26.1
P25	29.0	29.9	30.4	29.9	31.1	30.0	31.5	30.3	31.6	30.9	31.7	30.6
P50	31.9	33.0	33.3	33.1	34.0	33.2	34.3	33.5	34.5	34.0	34.5	33.8
P75	34.7	36.2	36.1	36.2	36.8	36.3	37.2	36.6	37.3	37.2	37.4	36.9
P95	38.8	40.7	40.2	40.8	40.9	40.9	41.2	41.2	41.4	41.8	41.5	41.5
Lower bound range (En%/day) (GR[17] & EFSA[13])	20	20	20	20	20	20	20	20	20	20	20	20
% with intake < lower bound	low	low	low	low	low	low	low	low	low	low	low	low
Upper bound range (En%/day) (EFSA[13])	35	35	35	35	35	35	35	35	35	35	35	35
% with intake > upper bound	23	34	34	34	40	35	44	37	45	42	46	40
95% CI	18-36	30-39	29-38	31-39	34-43	32-39	37-47	35-40	41-50	36-46	40-51	36-45
Upper bound range (En%/day) (GR[17])	40	40	40	40	40	40	40	40	40	40	40	40
% with intake > upper bound	3	7	6	7	8	7	9	8	10	10	10	9
95% CI	2-7	5-9	4-7	5-9	5-9	6-9	6-11	7-10	7-13	7-12	7-13	7-12

Netherlands for total fat is 20 to 40 En%. In all age groups the median habitual total fat intake was above the 20 En% and even the intake at the 5th percentile was higher. This indicates that the risk of inadequate total fat intake was low. The proportion of people with habitual total fat intakes above 40 En% was 3-10% for men and 7-10% for women, both showed a slight increase with age. Recently the EFSA set an adequate intake range for total fat of 20-35 En%. The proportion of people with habitual total fat intakes above 35% was 23-46%. This proportion showed an increase with age and was highest for adult men (Table 5.2).

In addition to total fat intake, the type of fatty acids consumed is of interest. In Tables 5.3 to 5.6 the habitual intake distributions of saturated, total unsaturated, polyunsaturated, and n-3 fish fatty acids (EPA and DHA) are presented. More specific findings on these fatty acids is presented in the sections below.

Saturated fatty acids

The median habitual saturated fatty acid (SFA) intake ranged from 27-38 g/day for men and 27-29 g/day for women (Table 5.3). The habitual intake distribution of En% from saturated fatty acids was similar over ages and gender, with a median at 12-13 En%. For 86-92% of the population, the habitual proportion of the energy intake from saturated fatty acids was higher than the recommended maximum of 10 En%. The proportion of people with excessive intakes increased somewhat with age. In a recent recommendation given by the EFSA, the intake of saturated fatty acids was advised to be as low as possible.[12]

Unsaturated fatty acids

The median habitual intake of total unsaturated fatty acids (cis) was somewhat higher compared with saturated fatty acids and ranged from 39-58 g/day for men and 37-41 g/day for women (Table 5.4). Similar to saturated fatty acids, the habitual intake distributions of the proportion of

Table 5.3 Habitual intake distribution of saturated fatty acids by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Saturated fatty acids	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	15	17	19	17	22	16	24	16	23	16	21	16
P25	22	23	26	23	30	23	32	23	31	23	29	22
P50	27	29	32	28	36	28	38	28	38	28	35	27
P75	33	35	39	34	43	34	45	34	45	34	41	33
P95	43	44	49	44	54	44	57	44	56	43	53	43
En%/day from saturated fatty acids												
P5	8.9	8.8	8.9	8.8	9.0	8.9	9.1	9.0	9.3	9.1	9.6	9.3
P25	10.8	10.9	10.9	10.9	10.9	11.0	11.1	11.1	11.3	11.3	11.6	11.5
P50	12.2	12.5	12.3	12.5	12.3	12.6	12.5	12.6	12.7	12.8	13.0	13.0
P75	13.7	14.1	13.7	14.1	13.8	14.1	13.9	14.2	14.2	14.4	14.4	14.6
P95	15.8	16.4	15.9	16.5	15.9	16.5	16.1	16.6	16.3	16.8	16.6	17.0
Upper bound range (En%/day) (GR[17])	10	10	10	10	10	10	10	10	10	10	10	10
% with intake > upper bound	86	86	86	86	87	87	88	88	90	89	92	91
95% CI	83-89	84-89	84-89	84-89	85-90	85-89	86-91	86-90	88-93	87-91	90-95	88-93

Table 5.4 Habitual intake distribution of unsaturated fatty acids by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Unsaturated fatty acids (cis)	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	22	25	28	25	34	25	37	24	35	24	30	22
P25	31	33	39	33	45	33	48	33	47	32	41	30
P50	39	41	47	41	54	41	58	40	56	39	50	37
P75	47	49	57	49	65	49	69	48	67	47	60	44
P95	61	62	73	62	82	62	86	61	84	60	76	57
En%/day from unsaturated fatty acids (cis)												
P5	13.0	13.0	13.6	13.0	14.1	13.1	14.4	13.2	14.4	13.4	14.0	12.9
P25	15.5	15.7	16.2	15.7	16.6	15.8	16.9	15.9	17.0	16.1	16.6	15.6
P50	17.3	17.6	18.0	17.6	18.5	17.7	18.8	17.9	18.9	18.1	18.4	17.5
P75	19.2	19.6	19.9	19.7	20.4	19.7	20.7	19.9	20.8	20.2	20.4	19.6
P95	22.0	22.7	22.8	22.7	23.3	22.8	23.6	23.0	23.7	23.2	23.2	22.6
Lower bound range (En%/day) (GR[17])	8	8	8	8	8	8	8	8	8	8	8	8
% with intake < lower bound	low	low	low	low	low	low	low	low	low	low	low	low
Upper bound range (En%/day) (GR[17])	38	38	38	38	38	38	38	38	38	38	38	38
% with intake > upper bound	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

Table 5.5 Habitual intake distribution of poly unsaturated fatty acids by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Poly unsaturated fatty acids	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	7	8	9	8	11	8	12	8	12	8	10	7
P25	11	11	13	11	15	11	17	11	17	11	15	10
P50	14	14	16	14	19	14	20	14	20	14	18	13
P75	17	17	20	17	23	17	25	17	25	18	22	16
P95	23	22	27	22	30	22	32	23	32	23	29	22
En%/day from poly unsaturated fatty acids												
P5	4.0	3.9	4.2	3.9	4.4	4.0	4.5	4.1	4.6	4.3	4.7	4.2
P25	5.1	5.1	5.4	5.1	5.6	5.2	5.7	5.3	5.8	5.5	5.9	5.4
P50	6.0	6.0	6.3	6.1	6.5	6.1	6.6	6.2	6.8	6.5	6.8	6.4
P75	6.9	7.1	7.3	7.1	7.5	7.1	7.6	7.3	7.8	7.5	7.8	7.4
P95	8.5	8.7	8.8	8.7	9.1	8.8	9.2	8.9	9.4	9.2	9.5	9.1
Upper bound range (En%/day) (GR[17])	12	12	12	12	12	12	12	12	12	12	12	12
% with intake > upper bound	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

the energy intake from unsaturated fatty acids (cis) was similar over ages and gender, with a median of 17-19 En%. In all age groups, the prevalence of inadequate unsaturated fatty acids (cis) intake (i.e. <8 En%) was low. Intakes above the upper limit of the recommended range (i.e. >38 En%) were not observed. About one third of the unsaturated fatty acids (cis) intake came from polyunsaturated fatty acids (PUFA). The intake ranged from 14-20 g/day for men and was about 14 g/day for women. Polyunsaturated fatty acids contributed to the total energy intake by 6-7 En% at the median (Table 5.5).

n-3 fish fatty acids (EPA and DHA)

The intake of n-3 fish fatty acids was low, the median ranged from 48-110 mg/day and showed a slight increase with age. The median habitual n-3 fish fatty acid intake was below the AI, therefore no statement about the prevalence of inadequate intake could be made (Table 5.6). Dietary supplements can also be sources of n-3 fish fatty acids. These dietary supplements slightly increased the median intake to a range of 62-133 mg/day (Appendix D). The median intake remained below the AI and therefore again no statement about the prevalence of inadequate intake could be made.

Alpha linolenic acid (ALA) and linoleic acid

The median ALA intake ranged from 1,237 to 2,069 mg/day for men and from 1,166 to 1,465 mg/day for women, both showed a slight increase with age (Table 5.7). The contribution of ALA to total energy intake was 0.5-0.7 En% at the median. For all age groups this was below the AI, therefore no statement on the prevalence of inadequate intake could be made. Recently the EFSA proposed an AI level of 0.5 En% ALA per day. In the whole population, the median intake was higher than this AI indicating a low prevalence of inadequate intakes. In this study population, 13 people used dietary supplements containing ALA, the daily dosage ranged from 112.5 to 660 mg/day for men (median 278.75 mg/day) and from 112.5 to 1,170 mg/day for women (median 263.5 mg/day); data not shown.

The linoleic acid intake increased slightly with age for men and ranged from 11-17 g/day. For women, the intake was stable over the age groups at about 11 g/day (Table 5.8). At the median, linoleic acid contributed 5-6 En% to total energy intake. For all age groups this was higher than the AI, the prevalence of inadequate intake was regarded as low.

Trans fatty acids (TFA)

The median habitual TFA intake ranged from 1.1-1.5 g/day for men and increased with age until young adulthood (19 to 30 years) (Table 5.9). For women this median was 1.2 g/day from early childhood to 50 years of age and 1.3 g/day for the age group 51 to 69 years. The upper bound for the percentage of energy from trans fatty acids is set at 1 En%. The majority of the Dutch population (7 to 69 years) was found not to exceed this level. There was a slight increase in the prevalence of trans fatty acid intake above 1 En% with age; up to the age of 50 the prevalence was 1-2%, among 51 to 69 year-old adults this was 3% among men and 5% among women.

Table 5.6 Habitual intake distribution of n-3 fish fatty acids (EPA & DHA) by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

n-3 fish fatty acids (EPA and DHA)	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	9	13	11	14	13	15	16	16	20	20	24	24
P25	25	34	29	35	35	38	41	41	52	49	60	60
P50	48	63	56	65	65	69	77	75	95	89	110	107
P75	88	112	102	119	118	122	139	133	169	155	194	185
P95	200	243	230	251	263	263	305	285	364	330	414	388
AI (mg/day) (EFSA[13])	250	250	250	250	250	250	250	250	250	250	250	250
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
AI (mg/day) (GR[17])	150	150	150	150	150	150	200	200	200	200	200	200
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

[a] ns = no statement

Table 5.7 Habitual intake distribution of alpha linolenic acid (ALA) by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Alpha linolenic acid	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	640	617	796	682	969	733	1,122	770	1,191	800	1,093	815
P25	959	912	1,168	998	1,388	1,062	1,583	1,110	1,668	1,149	1,547	1,167
P50	1,237	1,166	1,489	1,267	1,745	1,343	1,972	1,390	2,069	1,444	1,930	1,465
P75	1,567	1,464	1,867	1,582	2,160	1,669	2,423	1,734	2,533	1,786	2,375	1,811
P95	2,141	1,978	2,520	2,122	2,869	2,226	3,188	2,306	3,316	2,369	3,130	2,398
En%/day from alpha linolenic acid												
P5	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
P25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
P50	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
P75	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.9	0.9
P95	0.8	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.0	1.0	1.1	1.1
AI (En%/day) (EFSA[13])	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
AI (En%/day) (GR[17])	1	1	1	1	1	1	1	1	1	1	1	1
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

[a] ns = no statement

5.4 Intake of protein

In general, protein intake was higher for men than women and increased with age up to 50 years of age (Table 5.10). Over 50 years, the median habitual total protein intake decreased slightly. The median habitual total protein intake ranged from 61-98 g/day for men and 60-75 g/day for women. The habitual protein intake was above the EAR for almost the whole population (7 to 69 years). The median habitual proportion of the energy intake from proteins was similar between men and women and increased slightly with age from 12-16 En%. For the whole population (7 to 69 years) the energy intake from proteins was below the UL of 25 En%.

Table 5.8 Habitual intake distribution of linoleic acid by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Linoleic acid	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	6	6	7	6	9	6	10	6	10	6	8	6
P25	9	9	11	9	13	9	14	9	13	9	12	8
P50	11	11	13	11	16	11	17	11	17	12	15	11
P75	14	14	17	14	19	14	21	14	21	15	18	13
P95	19	19	23	19	26	19	28	19	27	20	25	18
En%/day from linoleic acid												
P5	3.3	3.1	3.4	3.1	3.6	3.2	3.7	3.2	3.7	3.4	3.8	3.3
P25	4.2	4.1	4.4	4.1	4.6	4.2	4.7	4.3	4.8	4.4	4.8	4.3
P50	5.0	4.9	5.2	4.9	5.4	5.0	5.5	5.1	5.6	5.3	5.6	5.1
P75	5.8	5.8	6.0	5.9	6.2	5.9	6.4	6.0	6.5	6.3	6.5	6.1
P95	7.1	7.3	7.4	7.4	7.6	7.4	7.8	7.6	7.9	7.8	8.0	7.6
AI (En%/day) (EFSA[13])	4	4	4	4	4	4	4	4	4	4	4	4
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
AI (En%/day) (GR[17])	2	2	2	2	2	2	2	2	2	2	2	2
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low

Table 5.9 Habitual intake distribution of trans fatty acids by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Trans fatty acids	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	0.5	0.6	0.6	0.6	0.7	0.6	0.8	0.6	0.8	0.6	0.8	0.6
P25	0.8	0.9	1.0	0.9	1.1	0.9	1.2	0.9	1.2	0.9	1.2	1.0
P50	1.1	1.2	1.3	1.2	1.4	1.2	1.5	1.2	1.5	1.2	1.5	1.3
P75	1.4	1.5	1.7	1.5	1.8	1.5	1.9	1.6	2.0	1.6	2.0	1.6
P95	2.0	2.2	2.4	2.2	2.6	2.2	2.7	2.2	2.8	2.3	2.8	2.3
En%/day from trans fatty acids												
P5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
P25	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
P50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
P75	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.8
P95	0.8	0.9	0.8	0.9	0.8	0.9	0.8	0.9	0.9	0.9	0.9	1.0
Upper bound range (En%/day) (GR[17])	1	1	1	1	1	1	1	1	1	1	1	1
% with intake > upper bound	1	2	1	2	1	2	1	2	2	2	3	5
95% CI	0-1	1-3	0-1	1-3	0-1	1-3	0-2	1-3	1-2	1-4	1-4	3-8

Table 5.10 Habitual intake distribution of protein, vegetable protein and animal protein by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Protein	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	39	39	50	42	59	45	66	49	70	52	66	51
P25	51	51	64	54	74	58	82	62	86	65	83	64
P50	61	60	75	64	86	67	94	71	98	75	95	74
P75	71	70	87	74	99	78	107	82	112	86	108	85
P95	88	85	106	90	119	94	128	99	133	103	129	102
EAR (g/day) (GR[17])	17	16	28	28	43	38	47	40	45	39	46	40
% with intake < EAR	0	0	0	0	0	1	0	1	0	0	0	1
95% CI	0-0	0-0	0-0	0-0	0-0	1-2	0-0	0-2	0-0	0-1	0-0	0-1
En%/day from protein												
P5	9.6	9.0	9.8	9.6	10.1	10.2	10.5	10.8	11.4	11.7	12.5	12.4
P25	11.5	10.9	11.7	11.5	12.0	12.2	12.5	12.9	13.5	13.9	14.7	14.6
P50	12.9	12.4	13.1	13.0	13.4	13.7	13.9	14.5	15.0	15.6	16.2	16.3
P75	14.3	13.9	14.6	14.6	14.9	15.4	15.5	16.3	16.6	17.3	17.9	18.2
P95	16.6	16.3	16.8	17.1	17.2	18.0	17.8	18.9	19.0	20.1	20.4	21.0
Upper bound range (En%/day) (GR[17])	25	25	25	25	25	25	25	25	25	25	25	25
% with intake >upper bound	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
Vegetable protein (g/day)												
P5	15	14	18	16	21	18	23	19	24	19	20	18
P25	20	19	24	21	28	23	31	24	31	24	27	23
P50	25	23	30	25	33	27	36	28	37	28	33	26
P75	30	26	35	29	39	31	43	32	43	32	39	31
P95	38	33	44	35	49	37	53	39	53	39	48	37
Animal protein (g/day)												
P5	20	19	25	21	30	23	34	25	37	26	39	27
P25	29	28	36	31	42	33	46	35	50	37	52	38
P50	36	36	45	39	51	41	56	43	60	46	62	47
P75	45	44	54	47	62	50	67	53	72	55	74	57
P95	59	58	71	62	79	65	85	68	90	70	93	72

Dietary protein may have an animal or vegetable origin. In all age groups the median habitual amount was higher for animal than for vegetable protein. The median habitual animal protein intake ranged from 36-62 g/day for men and 36-47 g/day for women. The median habitual vegetable protein intake ranged from 25-37 g/day for men and 23-28 g/day for women.

5.5 Intake of carbohydrates

Carbohydrates

The median habitual carbohydrate intake was higher for men than women and increased with age for men up to the age group 14 to 18 years, in adult men the carbohydrate intake decreased with age. For women the mean habitual carbohydrate intake was rather stable up to 14 to 18 years, and thereafter also decreased with age (Table 5.11). For men the median habitual total carbohydrate intake ranged from 240-318 g/day, for women this range was 195-255 g/day. The proportion of the population with a habitual total carbohydrate intake below the EAR was highest in the oldest age group (51 to 69 years) and was higher for females compared with males. Almost all children 7 to 8 years had habitual carbohydrate intakes above the EAR.

For 9 to 13 year-old girls, the prevalence of habitual carbohydrate intakes below the EAR was 15%. This

Table 5.11 Habitual intake distribution of carbohydrates by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Carbohydrates	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	165	174	195	173	214	171	213	163	185	142	150	123
P25	217	221	252	219	273	217	272	208	241	186	201	164
P50	258	255	297	254	318	251	317	242	284	219	240	195
P75	303	292	344	291	367	288	366	279	331	254	284	228
P95	373	349	419	347	444	344	442	334	405	308	353	280
EAR (g/day) (GR[17])	140	140	201	201	223	223	202	202	194	194	194	194
% with intake < EAR	2	1	6	15	7	29	3	21	7	31	21	49
95% CI	1-3	0-2	5-7	12-17	5-8	25-32	2-4	19-25	5-9	27-35	18-24	44-54
En%/day from carbohydrates												
P5	45.9	42.6	43.4	42.4	41.0	41.8	38.2	40.1	34.9	35.8	32.5	33.5
P25	50.7	47.9	48.3	47.7	45.9	47.1	43.2	45.5	39.9	41.5	37.5	39.0
P50	54.1	51.5	51.7	51.3	49.3	50.7	46.6	49.2	43.4	45.3	41.0	42.8
P75	57.5	55.1	55.1	54.8	52.7	54.3	50.1	52.8	46.8	49.1	44.4	46.5
P95	62.3	60.1	60.0	59.9	57.5	59.4	55.0	57.9	51.7	54.4	49.3	51.7
AI (En%/day) (EFSA[12])	45	45	45	45	45	45	45	45	45	45	45	45
Prevalence with inadequate intake[a]	low	low	low	low	low	low	low	low	low/ns[b]	low/ns[b]	ns	ns
Upper bound (En%/day) (EFSA[12])	60	60	60	60	60	60	60	60	60	60	60	60
% with intake < upper bound	12	5	5	5	2	4	0	2	0	0	0	0
95% CI	6-14	4-9	3-6	4-7	1-3	2-5	0-1	1-3	0-0	0-1	0-0	0-0

[a] ns = no statement
[b] Male 31 years low; male 32-50 years ns; female 31-41 years low; female 42-50 years ns

prevalence fluctuated over the age groups from 14 to 50 years (21-31%) and increased to 49% for women aged 51 to 69 years. For boys and men aged 9 to 50 years the prevalence of inadequate carbohydrate intake was 3-7%, for men aged 51 to 69 years it was 21%.

The percentage of energy from carbohydrates was highest for children 7 to 8 years (51-54 En%) and decreased with age to 41-43 En% for adults aged 51 to 69 years. Recently the EFSA set an adequate intake range for carbohydrates of 45-60 En% per day. Up to the age of 31 years for men and 41 years for women, the median percentage of energy from carbohydrates was higher than the lower bound of this range, indicating low prevalence of inadequate intakes. For the older adults the median was somewhat below the lower bound, therefore no statement about the inadequacy could be made. With regard to the upper bound, 2-12% of the children and adolescents had higher intakes, among the adults only 2% of the females 19 to 30 years had intakes above this level.

Mono and disaccharides

The median habitual mono and disaccharides intake was generally higher for males compared with females and ranged from 103-157 g/day for men and 90-140 g/day for women (Table 5.12). For women, the intake of mono and disaccharides decreased with age, while for men it increased up to the age group of 14 to 18 years, and decreased thereafter. For children (boys 7 to 13 years and girls 7 to 18 years), the median habitual intake was higher for mono and disaccharides compared with polysaccharides. For adults and adolescent boys it was the other way around, the median habitual polysaccharide intake was higher compared with the mono and disaccharide intake. For both males and females, the habitual polysaccharide intake was bell-shaped over the ages, with the highest intakes for men 19 to 30 years (168 g/day) and adolescent girls (124 g/day). The median habitual polysaccharide intake ranged between 116-168 g/day in men and 103-124 g/day in women.

Table 5.12 Habitual intake distribution of mono-, di- and polysaccharides by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Sugars	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Mono & disaccharides (g/day)												
P5	75	82	85	77	86	72	77	64	61	54	48	45
P25	111	115	124	109	125	102	114	93	94	80	78	70
P50	141	140	156	134	157	126	145	116	122	102	103	90
P75	175	169	191	162	192	153	179	143	153	127	132	113
P95	230	214	248	206	249	197	234	185	205	167	180	151
Polysaccharides (g/day)												
P5	71	73	90	81	105	85	113	84	105	77	86	67
P25	96	94	118	103	136	107	144	106	135	99	114	88
P50	116	110	141	119	159	124	168	123	159	115	136	103
P75	138	127	165	137	185	141	194	141	185	132	160	120
P95	173	154	204	164	225	169	235	168	225	159	198	146

Table 5.13 Habitual intake distribution of alcohol by the Dutch population aged 14 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=2,812).

Alcohol	14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day								
P5	0.0	0.0	0.3	0.0	0.7	0.0	0.7	0.0
P25	0.1	0.1	3.1	0.5	6.4	0.6	8.6	1.3
P50	0.9	0.5	9.4	2.0	16.1	3.7	20.9	9.2
P75	4.9	2.0	19.9	5.4	29.2	11.4	34.9	22.4
P95	18.7	7.6	41.1	14.6	52.3	28.9	58.2	43.4
En%/day from alcohol								
P5	0.0	0.0	0.1	0.0	0.2	0.0	0.2	0.0
P25	0.0	0.0	0.6	0.2	1.5	0.2	2.5	0.4
P50	0.2	0.1	1.9	0.6	3.8	1.2	6.0	3.3
P75	1.2	0.6	4.2	1.7	7.0	3.8	9.9	8.0
P95	4.6	2.3	8.8	4.7	12.5	9.6	16.0	15.1

5.6 Intake of alcohol

The median habitual alcohol intake showed an increase with age and was higher in men than women (Table 5.13). The median absolute intake ranged from 0.9-20.9 g/day for men and 0.5-9.2 g/day for women. The median contribution of alcohol to energy intake ranged from 0-6.0 En% for men and 0-3.3 En% for women. Children aged 7 to 13 years were not taken into account in these calculations, although some of the children in this age group did consume alcoholic beverages or foods containing alcohol.

5.7 Intake of fibre

The median habitual fibre intake (excluding dietary supplements, but including foods enriched with fibre) ranged from 15-23 g/day (Table 5.14), was somewhat higher for men compared with women, and increased little with age (except for the oldest males 51 to 69 years).

The guidelines for fibre are set proportionally to energy intake (g/MJ). In all age groups the median habitual fibre intake was lower than the guideline, therefore no statement could be given on the prevalence of inadequacy. In addition, for almost all age gender categories, even the 95th percentile the amount of fibre per MJ was below the guideline. Only the 95th percentile fibre intake per MJ of 51 to 69 year-old women met the guideline.

Recently the EFSA set an AI for absolute fibre intake at 16 g/day for children to 25 g/day for adults. For adults the median fibre intake from foods was below this AI, meaning that taking these dietary reference values into account, no statement about inadequacy for fibre intake could be made for adults. For adult men the difference between the

Table 5.14 Habitual intake distribution of fibre by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Fibre	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
g/day												
P5	9	9	11	10	13	11	14	11	15	12	13	12
P25	13	12	15	13	17	14	19	15	19	15	18	16
P50	16	15	18	16	20	17	22	18	23	18	21	19
P75	19	17	22	19	24	20	26	21	27	22	25	22
P95	24	22	28	24	30	25	33	26	33	27	32	27
AI[a] (g/day) (EFSA[12])	16	16	16	16	19	19	25	25	25	25	25	25
Prevalence with inadequate intake[b]	low/ns[c]	ns	low/ns[c]	ns	low/ns[c]	ns	ns	ns	ns	ns	ns	ns
g/MJ/day												
P5	1.3	1.2	1.3	1.3	1.3	1.4	1.4	1.5	1.4	1.6	1.5	1.7
P25	1.6	1.6	1.6	1.7	1.7	1.8	1.7	1.9	1.8	2.0	1.9	2.1
P50	1.9	1.8	1.9	1.9	1.9	2.0	2.0	2.2	2.1	2.3	2.2	2.4
P75	2.2	2.1	2.2	2.3	2.2	2.4	2.3	2.5	2.4	2.7	2.5	2.8
P95	2.6	2.6	2.7	2.8	2.7	2.9	2.8	3.1	2.9	3.3	3.0	3.4
Guideline (g/MJ/day) (GR[20])	3	3	3.2	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Prevalence with intake < guideline[b]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

[a] 9-10 years AI=16 g/day; 11-14 years AI=19 g/day; 15-17 years AI=21 g/day; 18 years AI=25 g/day

[b] ns = no statement

[c] 7, 11-12, 15-18 years ns; 8-10, 13-14 years low

median intake and AI was only 2-4 g/day. In children the median fibre intake was generally close to the AI.

5.8 Food sources of macronutrients

The mean contribution of each food group and dietary supplements to the reported intake of macronutrients is shown in Table 5.15. The most important sources are summarized below with each source contributing by at least 10% to the total nutrient intake. The contribution of the highest source is mentioned separately:

- energy: 'Cereals and cereal products' (23%), 'Dairy products', 'Meat and meat products';
- protein: 'Meat and meat products' (29%), 'Dairy products', 'Cereals and cereal products';
- vegetable protein: 'Cereals and cereal products' (57%);
- animal protein: 'Meat and meat products' (47%), 'Dairy products';
- total fat: 'Meat and meat products' (19%), 'Fat' (19%), 'Dairy products', 'Cereals and cereal products';
- SFA: 'Dairy products' (30%), 'Meat and meat products', 'Fat', 'Cakes';
- MUFA: 'Meat and meat products' (23%), 'Fat', 'Dairy products', 'Cereals and cereal products';
- PUFA: 'Fat' (32%), 'Cereals and cereal products', 'Condiments and sauces', 'Meat and meat products';
- TFA: 'Dairy products' (34%), 'Fat', 'Cakes', 'Meat and meat products'.
- ALA: 'Fat' (31%), 'Condiments and sauces', 'Cereals and cereal products', 'Dairy products';
- EPA and DHA: 'Meat and meat products' (34%), 'Fish and shellfish', 'Eggs and egg products';
- unsaturated fatty acids: 'Fat' (24%), 'Meat and meat products', 'Cereals and cereal products', 'Condiments and sauces';
- linoleic acid: 'Fat' (33%), 'Cereals and cereal products', 'Condiments and sauces', 'Meat and meat products';
- carbohydrates: 'Cereals and cereal products' (35%), 'Sugar and confectionery' , 'Non-alcoholic beverages', 'Dairy products';
- mono and disaccharides: 'Non-alcoholic beverages' (22%), 'Sugar and confectionery' , 'Dairy products', 'Fruits, nuts and olives', 'Cakes';
- polysaccharides: 'Cereals and cereal products' (60%), 'Potatoes and other tubers';
- fibre: 'Cereals and cereal products' (43%), 'Vegetables', 'Fruits, nuts and olives', 'Potatoes and other tubers';
- alcohol: 'Alcoholic beverages' (96%).

Energy was mainly provided by the basic foods such as 'Cereals and cereal products', 'Dairy products' and 'Meat

Table 5.15 Average contribution of food groups to the intake of macronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Food groups based on EPIC-Soft Classification	Energy	Protein	Vegetable protein	Animal protein	Fat	Saturated fatty acids	Mono unsaturated fatty acids	Poly unsaturated fatty acids	Trans fatty acids	Alpha Linolenic Acid	EPA and DHA	Unsaturated fatty acid	Linoleic acid	Carbohydrates	Mono and disaccharide	Polysacharides	Fibre	Alcohol
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
01. Potatoes and other tubers	5	3	7	0	2	2	1	2	1	4	0	1	1	8	0	14	10	0
02. Vegetables	2	2	7	0	1	0	0	2	0	6	0	1	1	2	3	1	14	0
03. Legumes	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
04. Fruits, nuts and olives	5	3	6	0	5	2	5	7	0	5	1	6	8	6	11	2	11	0
05. Dairy products	14	23	0	38	18	30	12	4	34	10	1	9	2	10	19	2	3	1
06. Cereals and cereal products	23	22	57	1	10	6	11	16	5	13	5	12	17	35	6	60	43	0
07. Meat and meat products	11	29	0	47	19	19	23	11	15	7	34	19	10	1	1	1	2	0
08. Fish and shellfish	1	4	0	6	1	1	1	2	0	1	22	2	1	0	0	0	0	0
09. Eggs and egg products	1	2	0	3	1	1	2	1	0	0	11	1	1	0	0	0	0	0
10. Fat	7	0	0	0	19	14	19	32	18	31	6	24	33	0	0	0	0	0
11. Sugar and confectionery	7	2	3	1	5	7	6	3	3	1	0	5	2	11	20	2	3	1
12. Cakes	8	3	7	1	8	10	7	6	16	5	6	7	6	9	11	9	5	3
13. Non-alcoholic beverages	6	2	5	0	1	1	0	0	1	0	0	0	0	11	22	1	2	0
14. Alcoholic beverages	4	1	2	0	0	0	0	0	0	0	0	0	0	2	2	2	2	96
15. Condiments and sauces	3	1	2	0	7	3	8	14	1	15	5	10	14	2	3	1	1	0
16. Soups, bouillon	1	1	1	1	1	1	1	1	3	1	3	1	1	1	1	1	2	0
17. Miscellaneous	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	1	0
20. Dietary supplements	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0

and meat products'. About 18% of the total energy was derived from non basic foods, like 'Sugar and confectionery', 'Cakes' and 'Condiments and sauces'. These products also contributed on average 20% to the saturated fatty acids intake. The majority of protein was derived from animal sources. About one third was derived from meat and fish (products).

The main sources of trans fatty acids were 'Dairy products' (34%), 'Meat and meat products' (15%), 'Fat' (18%), and 'Cakes' (16%). In 2003, the contribution of cakes was 19%, and cereals contributed to about one quarter of the intake.[39]

Dietary supplements did not contribute much to the macronutrient intake, the highest contribution was found in EPA and DHA whereof 7% of the total intake came from dietary supplements.

Looking at the differences between age groups, in adults 'Alcoholic beverages' were a more important source of energy, while the contribution of 'Non-alcoholic beverages' was lower, compared with children and adolescents (data not shown).

5.9 Consumption by place of consumption

For all macronutrients, more than 65% of their intake took place at home (Table 5.16). Trans fatty acids (31%), mono and disaccharides (31%) and alcohol (35%) were the macronutrients with the highest contribution to outside home consumption.

5.10 Consumption by time of consumption

The contribution of the time of consumption to the intake of energy and macronutrients is shown in Table 5.17. Dinner was the most important food consumption occasion for most nutrients, except for alcohol, mono and disaccharides and carbohydrates. These nutrients were consumed relatively more often in between meals. On average, about 30% of the energy was consumed in between the main meals. Breakfast contributed the least to macronutrient intake.

Table 5.16 Average contribution of places of consumption to the intake of macronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Nutrient	At home mean%	Not at home mean%
Energy	**71**	**29**
Protein	**73**	**27**
Vegetable protein	71	29
Animal protein	75	25
Fat	**72**	**28**
Saturated fatty acids	71	29
Unsaturated fatty acids	72	28
Mono unsaturated fatty acids	72	28
Poly unsaturated fatty acids	72	28
Trans fatty acids	69	31
EPA and DHA	74	26
Alpha Linolenic Acid	72	28
Linoleic acid	72	28
Carbohydrates	**70**	**30**
Mono and disaccharide	69	31
Polysacharides	71	29
Fibre	**72**	**28**
Alcohol	**65**	**35**

Table 5.17 Average contribution of food consumption occasions to the intake of macronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Nutrient	Breakfast mean%	Lunch mean%	Dinner mean%	In between mean%
Energy	**14**	**21**	**36**	**30**
Protein	**14**	**24**	**45**	**17**
Vegetable protein	18	28	30	23
Animal protein	12	21	55	12
Fat	**12**	**22**	**42**	**23**
Saturated fatty acids	13	23	38	26
Unsaturated fatty acids	12	22	45	22
Mono unsaturated fatty acids	11	20	45	24
Poly unsaturated fatty acids	14	24	44	18
Trans fatty acids	13	24	35	29
EPA and DHA	8	20	60	13
Alpha Linolenic Acid	15	27	44	15
Linoleic acid	14	24	43	18
Carbohydrates	**16**	**21**	**29**	**35**
Mono and disaccharide	16	16	21	48
Polysacharides	16	25	36	23
Fibre	**17**	**25**	**36**	**22**
Alcohol	**0**	**1**	**20**	**79**

6 Micronutrients

6.1 Introduction

The habitual intake distributions of micronutrients from foods are presented in Tables 6.1 to 6.18. For each micronutrient the habitual intake was compared with dietary reference values as set by the Health Council of the Netherlands.[16, 18-21, 59, 62] If the dietary reference values of the Health Council had been published before 2000, then the reference values set by the US Institute of Medicine (IOM) were also applied.[28, 29, 31, 32] For copper and zinc, only the IOM dietary reference values were applied.[32] For comparison with the tolerable upper intake level (UL), the values as set by the EFSA were used[14], except for calcium for children where the Health Council values were applied.[16] Depending on the type of dietary reference value, this assessment was qualitatively (AI) or quantitatively (EAR and UL). See text box 2.1 for an explanation of the different parameters.

In addition to foods, dietary supplements may also contribute to total micronutrient intake. Therefore, the habitual micronutrient intake distributions aggregated from foods and dietary supplements are also described below and presented in Appendix E (Tables E.1 to E.17). Similar to the intakes from food sources, the total habitual micronutrient intake distributions were also compared with the dietary reference values.

At the end of this chapter the sources of the micronutrients are presented, as well as the food consumption occasions and places of intake.

6.2 Intake of vitamins

The habitual intake distributions were estimated for vitamin A, vitamin B_1, B_2, B_6, B_{12}, folate, vitamin C, vitamin D and vitamin E. Generally, adolescent and adult males did have higher median habitual vitamin intakes than females in the same age category. For most vitamins, the median habitual intake showed an increase with age.

6.2.1 Vitamin A

The median habitual retinol activity equivalent (RAE) intake from foods ranged from 553-891 µg RAE/day for men and 542-742 µg RAE/day for women (Table 6.1). The median habitual intake increased with age and was higher for men than women in all age categories. Taking the intake from dietary supplements into account resulted in an increase of the median intake to the range of 642-947 µg RAE/day for men and to the range of 597-839 µg RAE/day for women (Table E.1). This increase was highest for women and children. At the median the proportional increase was 2-16% depending on age, at the 95th percentile of the intake distribution the proportional increase was higher 7 to 39%. The prevalence of

Table 6.1 Habitual intake distribution of vitamin A from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin A	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Retinol activity equivalent (µg/day)												
P5	271	260	311	266	350	275	388	291	428	323	454	365
P25	416	404	475	413	531	426	585	450	643	498	680	558
P50	553	542	629	554	701	571	770	602	844	664	891	742
P75	730	720	827	735	917	757	1,006	797	1,098	877	1,157	976
P95	1,070	1,066	1,207	1,088	1,331	1,119	1,454	1,175	1,582	1,289	1,661	1,427
EAR (µg RAE/day) (GR[21])	300	300	440	440	600	510	620	530	620	530	610	530
% with intake < EAR	8	9	20	30	35	40	30	38	22	30	17	21
95% CI	4-13	6-11	15-24	25-34	30-41	35-45	25-35	35-43	17-26	26-35	13-22	17-25
Retinol (µg/day)												
P5	195	172	215	176	237	181	264	191	299	209	329	233
P25	317	287	348	293	381	301	421	315	475	345	518	381
P50	437	401	477	409	521	420	574	440	644	479	701	527
P75	594	554	647	564	704	578	773	604	864	656	937	720
P95	907	860	985	874	1,066	896	1,166	934	1,296	1,010	1,398	1,102
UL (retinol µg/day) (EFSA[14])	1,500	1,500	1,500	1,500	2,000	2,000	3,000	3,000	3,000	3,000	3,000	1,500
% with intake > UL	0	0	1	0	0	0	0	0	0	0	0	1
95% CI	0-1	0-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-2

inadequate vitamin A intake was assessed against, the EAR values from the IOM but adjusted to Dutch growth data by the Health Council of the Netherlands.[21] About 7% of the children aged 7 to 8 years had total RAE intakes below the EAR. Among the older children and adults, the proportions with intakes below EAR were higher and ranged from 16-34%, with the highest proportion in the adolescent group (32-34%) (Table E.1). The EAR for vitamin A is based on adequate liver stores. It is unknown whether intake below these values will result in health problems.[21] More research on the health effects associated with low vitamin A intake is recommended, as well as nutritional status research using isotope techniques.[21]

The UL is based on the intake of preformed vitamin A only (i.e. retinoids). The habitual intake of preformed vitamin A was lower than the intake of total vitamin A, as provitamins A, like carotenoids, were not included. For a large part of the population, the habitual preformed vitamin A (retinol) intake from foods was below the UL. When the intake from dietary supplements was included, the proportion of the population with intake above the UL increased somewhat but remained low: about 1% for children aged 7 to 13 years and 4% for the older adult women (51 to 69 years; Table E.1).

6.2.2 Vitamin B_1 (Thiamin)

In men the median habitual vitamin B_1 intake from foods ranged from 0.8-1.3 mg/day, in women this range was 0.8-1.0 mg/day (Table 6.2). Inclusion of dietary supplements resulted in an increase of the median intake of 0-25% depending on age (0.9-1.4 mg/day for men and 1.0-1.2 mg/day for women (Table E.2)). The highest increments were observed for the youngest children and women. The increase in intake was larger at the 95th percentile of the habitual intake distribution, 14% to more than 100% depending on age (Table E.2).

Comparison of the total vitamin B_1 intake with the reference values showed that for adolescent women alone, the median intake was just below the AI (the AI is 1.1 mg/day, the median was 1.0 mg/day). The median intake in children, adolescent males and older adults was higher than the AI. This indicated that the prevalence of inadequate intake was generally low. For adults (19 to 50 years) the intake was evaluated using an EAR. In women 15-19% had a total vitamin B_1 intake below the EAR, for men this proportion was lower, namely 4%. The reference values for vitamin B_1 are based on a biochemical status biomarker and in basis related to the energy intake. It remains unclear whether intakes below these values will result in health problems. As about one fifth of the adult women had an intake below EAR. Additional research on

Table 6.2 Habitual intake distribution of vitamin B_1 from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin B_1	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.5	0.5	0.6	0.5	0.7	0.6	0.8	0.6	0.8	0.6	0.8	0.6
P25	0.7	0.7	0.9	0.7	1.0	0.8	1.1	0.8	1.1	0.8	1.0	0.8
P50	0.8	0.8	1.1	0.9	1.2	1.0	1.3	1.0	1.3	1.0	1.2	1.0
P75	1.0	1.0	1.3	1.1	1.5	1.2	1.6	1.2	1.6	1.3	1.5	1.3
P95	1.4	1.4	1.7	1.5	2.0	1.6	2.1	1.6	2.1	1.7	2.0	1.7
AI (mg/day) (GR[16])	0.5	0.5	0.8	0.8	1.1	1.1					1.1	1.1
Prevalence inadequate intake[a]	low	low	low	low	low	ns					low	ns
EAR (mg/day) (GR[16])							0.8	0.8	0.8	0.8		
% with intake < EAR							5	24	5	21		
95% CI							3-7	19-29	3-7	15-24		

[a] ns = no statement

Table 6.3 Habitual intake distribution of vitamin B_2 from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin B_2	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.7	0.7	0.8	0.7	0.9	0.7	1.0	0.8	1.0	0.8	1.0	0.8
P25	1.0	1.0	1.2	1.0	1.3	1.1	1.4	1.1	1.5	1.1	1.4	1.1
P50	1.3	1.3	1.5	1.3	1.6	1.3	1.7	1.3	1.8	1.4	1.7	1.4
P75	1.6	1.6	1.8	1.6	2.0	1.6	2.2	1.7	2.2	1.7	2.1	1.8
P95	2.2	2.2	2.5	2.2	2.7	2.2	2.9	2.2	3.0	2.3	2.8	2.3
AI (mg/day) (GR[16])	0.7	0.7	1	1	1.5	1.1						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (mg/day) (GR[16])							1.1	0.8	1.1	0.8	1.1	0.8
% with intake < EAR							8	7	7	6	9	5
95% CI							6-12	5-8	5-9	4-7	7-12	3-7

vitamin B_1 status is recommended together with research on the health effects associated with low vitamin B_1 intake.

6.2.3 Vitamin B_2 (Riboflavin)

In women the median habitual vitamin B_2 intake from foods was similar over the age groups: 1.3-1.4 mg/day. In men, there was some increase over the ages up to 50 years, the median habitual intake from foods ranged from 1.3-1.8 mg/day (Table 6.3). Taking the intake from dietary supplements into account showed an increase in vitamin B_2 intake of 6-15% at the median depending on age (women 1.4-1.6 mg/day, men 1.4-1.9 mg/day (Table E.3)). The highest increment was observed for adult women. At the 95th percentile of the habitual intake distribution, the increase was 11-91% depending on age. In children and adolescents the median total vitamin B_2 intake was above the AI indicating that the prevalence of inadequate intakes was low. For adults the proportion with total vitamin B_2 intakes below the EAR was less than 10%. No public health problems regarding low vitamin B_2 intakes are expected.

6.2.4 Vitamin B_6

The median habitual vitamin B_6 intake from foods ranged from 1.4-2.2 mg/day for men and 1.3-1.8 mg/day for women (Table 6.4). Inclusion of the vitamin B_6 intake from dietary supplements showed an increase of 5-17% at the median (1.5-2.4 mg/day and 1.4-2.1 mg/day for total vitamin B_6 intake for men and women respectively) and an increase of 9-93% at the 95th percentile of the intake distribution (Table E.4). For children and adolescents the

Table 6.4 Habitual intake distribution of vitamin B_6 from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin B_6	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.7	0.7	1.0	0.8	1.2	0.9	1.3	1.0	1.3	1.0	1.2	0.9
P25	1.1	1.0	1.4	1.2	1.7	1.3	1.8	1.4	1.8	1.4	1.7	1.3
P50	1.4	1.3	1.8	1.5	2.1	1.7	2.2	1.8	2.2	1.8	2.2	1.7
P75	1.7	1.6	2.2	1.9	2.6	2.1	2.8	2.2	2.8	2.2	2.7	2.1
P95	2.4	2.3	3.1	2.6	3.5	2.9	3.7	3.0	3.7	3.0	3.6	2.9
AI (mg/day) (GR[19])	0.7	0.7	1.1	1.1	1.5	1.5						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (mg/day) (GR[19])							1.1	1.1	1.1	1.1	1.3	1.1
% with intake < EAR							2	9	2	9	6	12
95% CI							1-3	7-11	1-3	6-11	4-9	9-15
UL (mg/day) (EFSA[14])	10	10	10	10	15	15	25	25	25	25	25	25
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

median habitual total vitamin B_6 intake was above the AI. The prevalence for inadequate total vitamin B_6 intake was therefore regarded as low. In adults the proportions with intakes below the EAR were less than 10%. No public health problems regarding low vitamin B_6 intakes are expected.

The UL was not exceeded for vitamin B_6 intake from foods only. When dietary supplements were included about 1% of the adult female population had total vitamin B_6 intake above the UL.

6.2.5 Folate/folic acid

The median habitual folate equivalent intake from foods was 161-309 µg/day for men and 164-262 µg/day for women (Table 6.5). Taking into account the folate equivalent intake from dietary supplements, the median intake increased by 4-17% and the 95th percentile of the intake distribution increased by 15-94%, depending on age. The total median folate equivalent intake ranged from 184-334 µg/day for men and 177-294 µg/day for women (Table E.5).

Compared with previous studies, the current study shows that the folate equivalent intake has improved. This has at least been partly caused by an update of the food composition table (NEVO) resulting in higher folate levels due to updated values and a different chemical analysing method.

For children 7 to 8 years, the median habitual total folate equivalent intake was above the AI, indicating a low prevalence of inadequate folate equivalent intake. For children 9 to 18 years no statement about the prevalence of inadequate total folate equivalent intakes could be made, as the median intake was below the AI.

For adults the intake was compared with the EAR. 14-28% of the adult females had total folate equivalent intakes below the EAR. This proportion showed a decrease with age, so high proportions of intake below the EAR were observed especially in women of childbearing age (Table E.5). For men the proportion with total folate equivalent intakes below the EAR was 7-15%. Here also in men aged 19 to 30 years the proportion was highest.

In a recent report, the Health Council of the Netherlands stated that the prevalence of inadequate folate status was lower than the previous predictions for low intakes.[22] The new results presented above are more in line with the results of studies on folate status, indicating that one fifth to one fourth of the population, especially women of childbearing age, had intakes that were too low.[22]

The UL was based on the intake of synthetic folic acid only. The median folic acid intake from foods ranged from 2-13 µg/day (Table 6.5), the total folic acid intake from foods and dietary supplements ranged from 9-55 µg/day (Table E.5). Up to 1% only of the population had a total folic acid intake above the UL – seen especially in younger children.

Table 6.5 Habitual intake distribution of folate from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Folate	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Folate equivalents (µg/day)												
P5	84	92	112	102	137	112	157	125	174	141	182	155
P25	125	131	162	143	194	157	219	174	240	195	251	213
P50	161	164	205	180	242	196	272	216	297	242	309	262
P75	203	205	257	223	299	243	334	266	362	297	376	321
P95	279	277	347	300	397	325	440	355	474	393	492	423
AI (µg/day) (GR[19])	150	150	225	225	300	300						
Prevalence inadequate intake[a]	low	low	ns	ns	ns	ns						
EAR (µg/day) (GR[19])							200	200	200	200	200	200
% with intake < EAR							17	41	11	27	9	19
95% CI							15-21	36-43	8-13	24-31	6-11	16-24
Folic acid (µg/day)												
P5	0	0	0	0	0	0	0	0	0	0	0	0
P25	0	1	0	1	0	0	0	1	0	0	0	0
P50	3	5	3	5	2	4	2	6	2	6	13	7
P75	16	18	22	18	24	18	25	22	30	31	68	45
P95	51	52	76	54	95	57	99	66	111	88	146	113
UL (µg/day) (EFSA[14])	400	400	400	400	600	600	1,000	1,000	1,000	1,000	1,000	1,000
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] ns = no statement

Table 6.6 Habitual intake distribution of vitamin B_{12} from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin B_{12}	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	1.5	1.7	1.9	1.7	2.2	1.7	2.5	1.8	2.7	2.0	2.8	2.2
P25	2.3	2.5	2.9	2.6	3.3	2.6	3.7	2.8	4.0	3.0	4.2	3.3
P50	3.0	3.3	3.8	3.4	4.3	3.4	4.8	3.6	5.2	3.9	5.4	4.2
P75	4.0	4.3	4.9	4.3	5.5	4.4	6.1	4.6	6.5	5.0	6.8	5.4
P95	5.7	6.0	6.8	6.1	7.7	6.3	8.4	6.5	9.0	7.0	9.3	7.5
AI (µg/day) (GR[19])	1.3	1.3	2	2	2.8	2.8						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (µg/day) (GR[19])							2	2	2	2	2	2
% with intake < EAR							2	8	1	5	1	3
95% CI							1-3	5-10	0-1	3-7	0-1	2-5

6.2.6 Vitamin B_{12}

In men the median habitual vitamin B_{12} intake from foods ranged from 3.0-5.4 µg/day, in women this was 3.3-4.2 µg/day (Table 6.6). The total vitamin B_{12} intake from foods and dietary supplements together was somewhat higher. The habitual median intake increased by 0-8% (3.2-5.6 µg/day for men, 3.3-4.5 µg/day for women), the intake at the 95th percentile of the distribution increased by 5-51% (Table E.6). For children and adolescents the median total vitamin B_{12} intake was higher than the AI, indicating a low prevalence of inadequate vitamin B_{12}

Table 6.7 Habitual intake distribution of vitamin C from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin C	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	32	37	39	37	43	38	45	39	44	41	42	44
P25	53	60	63	61	69	62	71	63	71	66	67	70
P50	73	82	85	82	92	84	96	86	95	89	90	94
P75	97	109	113	110	122	111	126	114	125	118	119	124
P95	144	158	165	160	176	161	180	165	180	171	172	178
AI (mg/day)[a] (GR[62])	50	50	50	50	65	65	70	70	70	70	70	70
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[30])	22	22	39	39	63	56	75	60	75	60	75	60
% with intake < EAR	1	1	5	6	19	19	29	22	29	19	34	16
95% CI	0-2	0-1	4-7	4-8	17-24	16-22	25-34	18-25	25-33	16-22	27-38	13-20

[a] 10-12 years AI=55 mg/day; 13 years AI=65 mg/day; male 16-18 years AI=70 mg/day

intake. In adults the proportion of people with total vitamin B_{12} intake below the EAR was 6% or less (Table E.6). Based on this information, no public health problems regarding low vitamin B_{12} intakes are expected.

6.2.7 Vitamin C

The median habitual vitamin C intake from foods ranged from 73-96 mg/day for men and 82-94 mg/day for women (Table 6.7). Taking the intake from dietary supplements into account resulted in an increased intake which ranged from 87-107 mg/day for men and 88-110 mg/day for women (Appendix E.7). This was an increase of 4-19% at the median and of 14-300% at the 95th percentile of the distribution.

Both the Health Council of the Netherlands and the US IOM did set a dietary reference value for vitamin C. However, these are based on different endpoints: either vitamin C saturation of the tissue or a biochemical biomarker. When the total vitamin C intake was assessed using the Dutch reference value, the median intake of the whole population is higher than the AI. This indicates that the prevalence of inadequate total vitamin C intake was low. If the total vitamin C intake was assessed using the IOM reference value, however, 0-18% of the children and adolescents and 12-28% of the adults had intakes below the EAR (Table E.7). It remains unknown whether health problems can be expected with intakes below this EAR. And due to the different dietary reference values, it also remains inconclusive whether or not the Dutch population is at risk from intakes of vitamin C that are too low. It is therefore recommended that the vitamin C status in the Dutch population be assessed. In addition, research into the health effects associated with low vitamin C intake is recommended.

6.2.8 Vitamin D

The habitual vitamin D intake from foods was higher for men than women and increased with age. In men the median habitual vitamin D intake from foods ranged from 2.3-4.1 µg/day and for women from 2.3-3.2 µg/day (Table 6.8). Inclusion of dietary supplements resulted in a total vitamin D intake that ranged from 2.8-4.4 µg/day for men and 2.5-3.8 µg/day for women (increase of 6-22%; Appendix E.8). At the 95th percentile of the habitual intake distribution, the increase was somewhat larger at 11-50%. For children, adolescents and adults up to the age of 50 the median intake was higher than the AI. This is in line with a study on vitamin D status among young children.[69] The prevalence of inadequate intake was regarded as low. For girls aged 7 to 13 years the median total vitamin D intake was around the AI. For older adults the AI is higher when compared with younger adults. The median total vitamin D intake in this group of older adults was below the AI, for both men and women. For women aged 50 years and over, the recommendation is to use vitamin D containing dietary supplements. Our results showed that not all women of this age used such supplements or used them at the appropriate dose. In a recent study on vitamin D status it was observed that 5-10% of Dutch adults (35 to 60 years) had an inadequate vitamin D status and about 40% had a moderate to inadequate vitamin D status.[58] It is therefore recommended that the advice to older adult women to use vitamin D containing dietary supplements will be underlined.

No habitual total vitamin D intakes above the tolerable upper intake level were observed.

Table 6.8 Habitual intake distribution of vitamin D from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin D	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	1.1	1.0	1.3	1.1	1.5	1.1	1.8	1.2	2.0	1.3	2.2	1.5
P25	1.7	1.7	2.0	1.7	2.4	1.8	2.7	1.9	3.0	2.1	3.2	2.4
P50	2.3	2.3	2.7	2.3	3.1	2.4	3.5	2.6	3.8	2.8	4.1	3.2
P75	3.0	3.0	3.5	3.1	4.0	3.2	4.4	3.4	4.9	3.7	5.1	4.1
P95	4.3	4.4	5.0	4.5	5.5	4.6	6.1	4.9	6.6	5.3	7.0	5.8
AI (µg/day)[a] (GR[16])	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5
Prevalence inadequate intake[b]	ns	ns	low	ns	low	ns	low	low/ns[c]	low	low	ns	ns
UL (µg/day)[d] (EFSA[14])	25	25	25	25	50	50	50	50	50	50	50	50
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] 51-60 years AI = 5.0 µg/day; 61-69 years AI=7.5 µg/day
[b] ns = no statement
[c] 19-20 years ns; 21-30 years low
[d] 9-11 years UL=25 µg/day; 12-13 years UL=50 µg/day

Table 6.9 Habitual intake distribution of vitamin E from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Vitamin E	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	5.8	5.6	7.1	6.2	8.2	6.5	8.9	6.6	9.0	6.7	8.2	6.7
P25	8.3	7.8	10.0	8.6	11.4	9.0	12.3	9.1	12.3	9.2	11.3	9.3
P50	10.5	9.8	12.5	10.6	14.1	11.1	15.1	11.3	15.1	11.4	14.0	11.5
P75	13.0	12.1	15.4	13.1	17.2	13.6	18.3	13.9	18.4	14.0	17.1	14.0
P95	17.4	16.0	20.4	17.3	22.5	18.0	23.9	18.3	24.0	18.4	22.5	18.5
AI (mg/day)[a, b] (GR[62])	9.1	8.3	9.1	8.3	11.8	10.6	13.0	9.9	11.8	9.3	10.7	8.7
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[30])	6	6	9	9	12	12	12	12	12	12	12	12
% with intake < EAR	6	7	16	30	30	60	23	58	22	56	31	56
95% CI	4-10	3-10	12-19	27-35	25-34	58-66	19-27	53-62	18-27	49-60	25-36	52-64
UL (mg/day) (EFSA[14])	160	160	160	160	220	220	300	300	300	300	300	300
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] Boys/men: 9 years AI=9.1 mg/day; 10-12 years AI=10.1 mg/day; 13 years AI=11.8 mg/day; 16-18 years AI=13.3; 19-21 years AI=13 mg/day; 22-30 years AI=11.8 mg/day
[b] Girls/women: 9 years AI=8.3 mg/day; 10-12 years AI=9.5 mg/day; 13 years AI=10.6 mg/day; 16-18 years AI=11.0 mg/day; 19-21 years AI=9.9 mg/day; 22-30 years AI=9.3 mg/day

6.2.9 Vitamin E

In men the median habitual vitamin E intake from foods ranged from 10.5-15.1 mg/day and showed an increase with age up to the age of 30. In women this range was more similar taken over the age groups: 9.8-11.5 mg/day (Table 6.9). With the intake from dietary supplements taken into account, the median intake increased by 3-17% to a range of 11.2-15.9 mg/day for men and 10.6-13.5 mg/day for women (Table E.9). At the 95th percentile of the intake distribution the increase was larger, namely 7-79% depending on age.

Similar to vitamin C, for vitamin E, both the Health Council and the IOM have set dietary reference values. Assessing the total vitamin E intake using the AI of the Health Council showed that the median total vitamin E intake was above the AI in all age groups, indicating a low prevalence of inadequate intake. However, with the IOM reference values, it was observed that 5-57% of the population had an intake below the EAR. It remains unknown whether health problems can be expected with intakes below this EAR. And due to the different dietary reference values it remains inconclusive whether the Dutch population is at risk with vitamin E intakes that are too low. Intakes above the UL were not observed.

It is recommended that the vitamin E status in the Dutch population is assessed. In addition, research to the health effects associated with low vitamin E intake is recommended.

6.3 Intake of minerals and trace elements

The habitual intake distributions were estimated for calcium, copper, iron, magnesium, phosphorus, potassium, selenium, and zinc. Generally, adolescent and adult men did have higher median habitual mineral intakes than women in the same age category. For children, the intake was generally similar between boys and girls. For most minerals, the median habitual intake showed an increase with age. In general, the impact of mineral intake from dietary supplements on population total mineral intake distributions and on the prevalence of inadequate intakes or risk on too high intakes was limited.

6.3.1 Calcium

In men the median habitual calcium intake from foods ranged from 878-1136 mg/day, and in women this range was 817-985 mg/day (Table 6.10). The median total calcium intake from foods and supplements was in the same order of magnitude (Table E.10). For children aged 7 to 13 years the median total calcium intake was above the AI indicating a low prevalence of inadequate calcium intake. In adolescents the median total calcium intake was below the AI, therefore no statement about the prevalence of inadequacy could be made. For adult men the median total calcium intake was higher - or close to the AI, and the same applied to women aged 31 to 50 years. A low prevalence of inadequate total calcium intake was expected for these groups. For both the younger and older adult women, the median total calcium intake remained below the AI, meaning that no statement about adequacy could be made. Intake levels above the UL were not observed in any of the age groups.

Considering the above data derived from our study, it is recommended to measure calcium status (e.g. bone mass), especially in the identified risk groups. In addition, research on the health effects associated with low calcium intake, especially in adolescents and adult women, is recommended.

6.3.2 Copper

The median habitual copper intake was 0.8-0.9 mg/day for children 7 to 8 years and increased with age to 1.2-1.3 mg/day for adult men and 1.1 mg/day for adult women (Table 6.11). Inclusion of dietary supplements did increase the median habitual intake slightly by 0-10% (0.9-1.4 mg/day for men and 0.9-1.2 mg/day for women; Table E.11). The proportion of the population with total copper intakes below the EAR is low, namely 0-6%. The highest proportions were observed for women, especially adolescents. Compared with previous studies, the copper intake is now lower. This has been partly caused by updates of the food composition table regarding the copper content of chocolate sprinkles.[3] Copper intakes above the UL were not observed. Based on the results of our study, no public health problems regarding low copper intake are expected.

6.3.3 Iron

The median habitual total iron intake from foods ranged from 8.1-12.1 mg/day for men and 7.8-10.1 mg/day for women (Table 6.12). The largest part of the iron intake was non-heme iron, the median habitual intake ranged from 7.3-10.6 mg/day for men and 6.9-9.0 mg/day for women (Table 6.13). The median heme iron intake ranged from 0.7-1.4 mg/day and 0.8-0.9 mg/day for men and women respectively (Table 6.13). When dietary supplements were included, the median habitual total iron intake increased by 2-8% to 8.4-12.6 mg/day for men and 8.0-10.9 mg/day for women (Table E.12). At the 95th percentile of the intake distribution the increment was on average about 20%.

Table 6.10 Habitual intake distribution of calcium from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Calcium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	455	441	497	460	542	481	589	504	628	533	601	555
P25	683	645	738	670	795	696	856	725	904	762	872	790
P50	878	817	943	846	1,010	876	1,080	910	1,136	953	1,099	985
P75	1,106	1,016	1,181	1,050	1,258	1,084	1,339	1,123	1,403	1,172	1,361	1,208
P95	1,495	1,353	1,587	1,393	1,679	1,435	1,777	1,482	1,852	1,540	1,803	1,583
AI (mg/day) (GR[16])	700	700	700	700	1,200	1,100	1,000	1,000	1,000	1,000	1,100	1,100
Prevalence inadequate intake[a]	low	low	low	low	ns	ns	low	ns	low	ns	low/ns[b]	ns
UL (mg/day) (EFSA[14] & GR[16])	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] ns = no statement
[b] 51-59 years low; 60-69 years ns

Table 6.11 Habitual intake distribution of copper from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Copper	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.6	0.6	0.7	0.6	0.8	0.7	0.9	0.7	0.9	0.7	0.8	0.7
P25	0.8	0.7	0.9	0.8	1.0	0.8	1.1	0.9	1.1	0.9	1.1	0.9
P50	0.9	0.8	1.1	0.9	1.2	1.0	1.3	1.1	1.3	1.1	1.2	1.1
P75	1.1	1.0	1.2	1.1	1.4	1.2	1.5	1.2	1.5	1.3	1.4	1.2
P95	1.3	1.3	1.5	1.3	1.7	1.4	1.8	1.5	1.9	1.6	1.8	1.5
EAR (mg/day) (IOM[32])	0.34	0.34	0.54	0.54	0.685	0.685	0.7	0.7	0.7	0.7	0.7	0.7
% with intake < EAR	0	0	1	2	1	7	1	5	1	3	1	5
95% CI	0-0	0-0	0-1	1-3	1-2	5-9	0-1	4-6	0-1	2-5	1-2	3-6
UL (mg/day) (EFSA[14])	3	3	3	3	4	4	5	5	5	5	5	5
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

Compared with the AI, the prevalence of inadequate total iron intake was low for children aged 7 to 8 years, adult men (31 to 69 years) and older adult women (51 to 69 years). For the other groups no statement about the prevalence of inadequate total iron intake could be made. The IOM did set an EAR for iron. Under the assumption of a symmetrical requirement distribution, 0-34% of the population had an intake below the EAR. This proportion was highest in women of childbearing age. The assumption of symmetry is not valid for iron. The distribution is known to have a tail towards the right, i.e. higher requirements. Therefore, the proportions estimated are expected to be an underestimation. Although the public health implications of these low iron intakes are not well known, problems with inadequacy might occur. Studies on iron status have shown similar results.[23, 58] Research on the health effects associated with low iron intake is recommended.

6.3.4 Magnesium

In men the median habitual magnesium intake from foods ranged from 237-402 mg/day, and in women this range was 225-316 mg/day (Table 6.14). When dietary supplements were included, this resulted in a small increase with a range of 252-408 mg/day for men and 226-332 mg/day for women (Table E.13).

Table 6.12 Habitual intake distribution of total iron from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Total iron	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	5.1	5.1	5.9	5.3	6.8	5.7	7.7	6.1	8.2	6.8	0.6	0.4
P25	6.8	6.6	7.7	6.9	8.7	7.2	9.8	7.8	10.4	8.6	1.0	0.6
P50	8.1	7.8	9.1	8.1	10.3	8.5	11.4	9.1	12.1	10.0	1.4	0.9
P75	9.6	9.1	10.7	9.4	12.0	9.8	13.2	10.6	14.0	11.5	1.9	1.3
P95	11.9	11.2	13.3	11.6	14.7	12.1	16.1	12.9	17.0	14.0	2.9	2.0
AI (mg/day)[a, b] **(GR[62])**	8	8	8	8	15	12	11	16	9	15	9	8
Prevalence inadequate intake[c]	low/ns[d]	ns	low/ns[d]	ns	ns	ns	low/ns[d]	ns	low	low/ns[d]	low	low
EAR (mg/day) (IOM[32])	4.1	4.1	5.9	5.7	7.7	7.9	6	8.1	6	8.1	6	5

[a] Boys/men: 10-12 years AI=10 mg/day
[b] Girls/women: 10-12 years AI=11 mg/day; 13 years AI=12 mg/day; 16-18 years AI=14 mg/day; 22-30 years AI=15 mg/day; 50 years AI=8 mg/day
[c] ns = no statement
[d] Male 7, 10-13, 19-20 years ns; male 8-9, 21-30 years low; female 31-49 years ns; female 50 years low

Table 6.13 Habitual intake distribution of heme and non-heme iron from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Iron	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Heme iron (mg/day)												
P5	0.2	0.3	0.3	0.3	0.4	0.3	0.5	0.3	0.6	0.3	0.6	0.4
P25	0.5	0.5	0.6	0.6	0.8	0.6	0.9	0.6	1.0	0.6	1.0	0.6
P50	0.7	0.8	0.9	0.8	1.1	0.8	1.2	0.8	1.4	0.9	1.4	0.9
P75	1.0	1.1	1.3	1.1	1.5	1.2	1.7	1.2	1.9	1.2	1.9	1.3
P95	1.7	1.8	2.0	1.8	2.3	1.8	2.6	1.8	2.8	1.9	2.9	2.0
Non-heme iron (mg/day)												
P5	4.6	4.5	5.2	4.7	5.9	4.9	6.6	5.4	7.1	6.0	6.7	6.0
P25	6.1	5.8	6.9	6.1	7.7	6.4	8.5	6.9	9.0	7.6	8.6	7.7
P50	7.3	6.9	8.2	7.2	9.1	7.6	10.0	8.2	10.6	9.0	10.1	9.0
P75	8.6	8.2	9.6	8.5	10.7	8.9	11.7	9.6	12.3	10.4	11.7	10.5
P95	10.9	10.2	12.1	10.6	13.2	11.0	14.4	11.8	15.1	12.9	14.4	12.9

The Health Council of the Netherlands did set an AI for magnesium. In all age groups the median total magnesium intake was above the AI, indicating that the prevalence on inadequate intakes was low (Table E.13). Based on similar studies, the IOM set an EAR for magnesium. The EAR is highest for adolescents. In this age group the proportion with total magnesium intakes below the EAR was also highest, 57-72%. In adults, the proportion with intakes below the EAR were about 16-35%, for children 9 to 13 years old this proportion was 10-19%. Only for the youngest children (7 to 8 years) were no intakes below the EAR observed. The UL for magnesium is based on the intake of magnesium from dietary supplements only. In most age categories there was no exceeding of the UL. Only among adult women (31 to 69 years) 1-2% had habitual magnesium intakes from dietary supplements above the UL (Table E.13).

As the results are largely determined by the dietary reference values used, a re-evaluation of the dietary reference value of magnesium is recommended. A recent study on magnesium status showed that the levels were in a normal range for a large part of the study population (35 to 60 years).[58] Research on the health effects associated with low magnesium intake is recommended.

Table 6.14 tual intake distribution of magnesium from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Magnesium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	150	148	179	159	214	174	250	193	275	217	257	218
P25	198	191	234	204	275	222	317	244	346	272	326	273
P50	237	225	279	240	324	259	371	285	402	314	380	316
P75	281	263	328	280	378	301	431	329	463	361	441	364
P95	354	324	410	344	467	368	527	400	563	436	538	439
AI (mg/day)[a] (GR[62])	120	120	120	120	220	210	300	250	300	250	300	250
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[28])	110	110	200	200	340	300	330	255	350	265	350	265
% with intake < EAR	0	0	11	22	58	75	30	31	27	22	36	21
95% CI	0-1	0-1	8-12	19-25	54-62	70-78	27-35	28-36	23-30	18-27	32-40	17-24

[a] 10-12 years AI=150 mg/day; 13 years AI=220 mg/day; 16-18 years male AI=275 mg/day, female AI=225 mg/day

Table 6.15 Habitual intake distribution of phosphorus from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Phosphorus	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	705	719	896	767	1,063	817	1,177	869	1,234	916	1,163	901
P25	945	954	1,174	1,009	1,360	1,066	1,491	1,126	1,555	1,178	1,476	1,162
P50	1,135	1,136	1,392	1,198	1,591	1,259	1,735	1,325	1,803	1,381	1,719	1,364
P75	1,347	1,336	1,633	1,402	1,844	1,469	2,000	1,540	2,073	1,601	1,983	1,582
P95	1,689	1,651	2,017	1,726	2,246	1,800	2,421	1,879	2,499	1,945	2,403	1,925
AI (mg/day)[a](GR[62])	600	600	600	600	700	700	700	700	700	700	700	700
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[28])	405	405	1,055	1,055	1,055	1,055	580	580	580	580	580	580
% with intake < EAR	0	0	14	31	5	24	0	0	0	0	0	0
95% CI	0-0	0-0	12-17	26-33	3-6	20-27	0-0	0-0	0-0	0-0	0-0	0-0

[a] Boys 10-12 years AI= 900 mg/day; girls 10-12 years AI = 700 mg/day; male 16-18 years AI=800 mg/day

6.3.5 Phosphorus

For men the median habitual phosphorus intake from foods ranged between 1,135 and 1,803 mg/day, for women it ranged between 1,136 and 1,381 mg/day (Table 6.15). Inclusion of dietary supplements only slightly increased the median phosphorus intake (Table E.14). Based on the dietary reference values set by the Health Council of the Netherlands there are no indications of inadequate phosphorus intake. However, based on the dietary reference value set by the US IOM, in children and adolescents (9 to 18 years) 5-28% had intakes below the EAR. The EAR set by the IOM for these groups is 1.5 to 1.8 times higher than the AI set by the Health Council. Therefore a re-evaluation of the dietary reference value for phosphorus is recommended.

6.3.6 Potassium

The median habitual potassium intake from foods was 2,362-3,997 mg/day for men and 2,357-3,200 mg/day for women (Table 6.16). The intake from dietary supplements had a minor influence on the habitual intake (Table E.15). In all age gender categories the median potassium intake was below the AI, which means that no statement about the prevalence of inadequate potassium intake could be

Table 6.16 Habitual intake distribution of potassium from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Potassium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	1,470	1,517	1,783	1,590	2,144	1,698	2,497	1,865	2,775	2,119	2,621	2,204
P25	1,968	1,990	2,344	2,075	2,752	2,198	3,162	2,392	3,466	2,678	3,300	2,769
P50	2,362	2,357	2,785	2,451	3,227	2,584	3,676	2,796	3,997	3,105	3,823	3,200
P75	2,797	2,755	3,270	2,858	3,743	3,001	4,233	3,232	4,571	3,563	4,389	3,661
P95	3,495	3,382	4,043	3,496	4,560	3,654	5,112	3,914	5,472	4,276	5,281	4,378
AI (mg/day) (IOM[34])	3,800	3,800	4,500	4,500	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

[a] ns = no statement

Table 6.17 Habitual intake distribution of selenium from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Selenium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	19	18	25	21	29	23	33	25	35	26	34	27
P25	25	24	32	28	38	31	43	33	45	34	44	35
P50	31	30	39	34	45	37	51	39	54	41	52	42
P75	37	36	46	40	54	44	60	47	64	49	62	50
P95	47	46	59	52	69	56	76	59	81	62	78	63
AI (µg/day)[a] (GR[62])	20	20	20	20	40	40	50	50	50	50	50	50
Prevalence inadequate intake[b]	low	low	low	low/ns[c]	low/ns[c]	ns	low/ns[c]	ns	low	ns	low/ns[c]	ns
EAR (µg/day) (IOM[30])	23	23	35	35	45	45	45	45	45	45	45	45
% with intake < EAR	15	19	36	56	49	78	32	70	24	63	28	60
95% CI	9-20	12-22	31-41	53-61	44-54	76-84	28-36	67-75	20-29	56-67	23-33	55-67
UL (µg/day) (EFSA[14])	130	130	130	130	200	200	300	300	300	300	300	300
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] 10-12 years AI=30 µg/day; 13 years AI=40 µg/day; male 16-18 years AI=50 µg/day; female 16-18 years AI=45 µg/day
[b] ns = no statement
[c] Male 16-22, 68-69 years low; male 14-15, 23-30, 51-67 years ns; girls 9-12 years low; girls 13 years ns

made. In general (excluding adult men), even the 95th percentile of the intake distributions was below the AI. Our study indicates that the potassium intake in the population is too low. Additional research on potassium status is recommended.

6.3.7 Selenium

The median habitual selenium intake from foods ranged from 31-54 µg/day for men and 30-42 µg/day for women (Table 6.17). When the intake from dietary supplements was taken into account, then intake was increased by 0-10% (33-57 µg/day for men and 32-46 µg/day for women; Table E.16). Based on the dietary reference values set by the Health Council there are no indications of inadequate selenium intake in the youngest age groups (7 to 13 year-old boys and 7 to 8 year-old girls) and in adult men (31 to 69 years). For the other age groups the median total selenium intake was below or around the AI, and therefore no statement about the prevalence of inadequate intake could be made. Based on the dietary reference value set by the IOM, 11-75% of children and adolescents had intakes below the EAR. In adults this proportion ranged from 21-58%. For children and adolescents the EAR as set by the

Table 6.18 Habitual intake distribution of zinc from food sources only by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Zinc	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	4.7	4.9	5.9	5.2	7.0	5.5	7.8	5.9	8.3	6.4	8.1	6.4
P25	6.2	6.5	7.8	6.8	9.0	7.1	10.0	7.6	10.5	8.2	10.3	8.1
P50	7.5	7.7	9.3	8.0	10.7	8.4	11.7	8.9	12.3	9.5	12.0	9.5
P75	9.0	9.0	11.0	9.4	12.5	9.8	13.6	10.4	14.3	11.0	13.9	11.0
P95	11.4	11.1	13.7	11.6	15.4	12.1	16.7	12.8	17.4	13.5	17.1	13.4
EAR (mg/day) (IOM[32])	4	4	7	7	8.5	7.3	9.4	6.8	9.4	6.8	9.4	6.8
% with intake < EAR	2	1	15	29	18	28	18	13	13	8	15	8
95% CI	1-3	0-2	11-18	25-32	14-22	23-32	15-21	10-17	10-16	6-11	12-19	6-11
UL (mg/day)[a] (EFSA[14])	13	13	13	13	18	18	25	25	25	25	25	25
% with intake > UL	1	1	2	0	0	0	0	0	0	0	0	0
95% CI	1-2	0-2	1-3	0-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] 9-10 years UL=13 mg/day; 11-14 years UL=18 mg/day; 15-17 years UL=22 mg/day; 18 years UL=25 mg/day

IOM is higher than the AI set by the Health Council, for adults the AI is somewhat higher than the EAR. It is therefore recommended that a re-evaluation of the dietary reference value for selenium is made.

6.3.8 Zinc

In men the median habitual zinc intake from foods was 7.5-12.3 mg/day, in women it was 7.7-9.5 mg/day (Table 6.18). The inclusion of dietary supplements resulted in 1-11% higher ranges, namely 8.0-13.0 mg/day for men and 7.8-10.5 mg/day for women (Table E.17). The proportion with total zinc intakes below the EAR was 1% for children 7 to 8 years. In men aged 9 to 69 years, this proportion was 10-16% and in women 5-24%. Research on the health effects associated with intakes below the EAR is recommended.

In our study 0-8% of the people had a total zinc intake above the UL. Without dietary supplements, 1-2% of the youngest children (boys aged 7 to 13 years, girls 7 to 8 years) had intakes above the UL.

6.4 Sources of micronutrients

6.4.1 Food sources of micronutrients

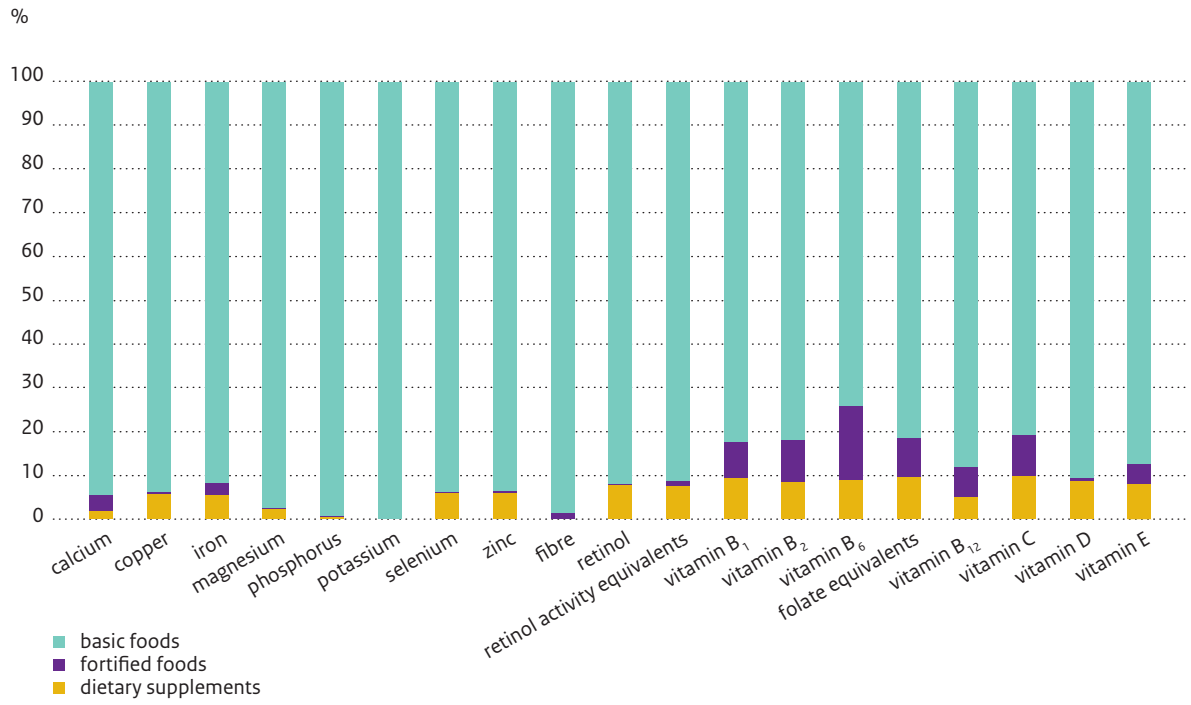
Table 6.19 shows the mean contribution of each food group and dietary supplements to the micronutrient intake. Here, the most important food sources of micronutrients are presented, each source contributes at least 10% to the total nutrient intake. The highest contributing source is mentioned separately:

- calcium: 'Dairy products' (58%), 'Non-alcoholic beverages';
- copper: 'Cereals and cereal products' (29%), 'Meat and meat products';
- iron: 'Cereals and cereal products' (26%), 'Meat and meat products';
- heme iron: 'Meat and meat products' (85%);
- non heme iron: 'Cereals and cereal products' (31%), 'Non-alcoholic beverages';
- magnesium: 'Cereals and cereal products' (24%), 'Dairy products', 'Non-alcoholic beverages';
- phosphorus: 'Dairy products' (32%), 'Cereals and cereal products', 'Meat and meat products';
- potassium: 'Dairy products' (17%), 'Non-alcoholic beverages', 'Meat and meat products', 'Cereals and cereal products', 'Potatoes and other tubers';
- selenium: 'Meat and meat products' (31%), 'Cereals and cereal products', 'Dairy products';
- zinc: 'Meat and meat products' (28%), 'Dairy products', 'Cereals and cereal products';
- retinol: 'Dairy products' (29%), 'Fat', 'Meat and meat products';
- RAE: 'Dairy products' (23%), 'Fat', 'Vegetables', 'Meat and meat products';
- vitamin B_1: 'Meat and meat products' (24%), 'Cereals and cereal products';
- vitamin B_2: 'Dairy products' (39%), 'Meat and meat products';
- vitamin B_6: 'Meat and meat products' (22%), 'Dairy products', 'Cereals and cereal products', 'Potatoes and other tubers';
- folate equivalents: 'Cereals and cereal products' (22%), 'Vegetables', 'Dairy products', 'Dietary supplements';

Table 6.19 Average contribution of food groups to the intake of micronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Food groups based on EPIC-Soft Classification	Calcium	Copper	Iron	Heme Iron	Non-heme Iron	Magnesium	Phosphorus	Potassium	Selenium	Zinc	Retinol	Retinol Activ	Vitamin B_1	Vitamin B_2	Vitamin B_6	Folate equivalents	Folic acid	Vitamin B_{12}	Vitamin C	Vitamin D	Vitamin E
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
01. Potatoes and other tubers	1	8	5	0	6	6	4	11	2	3	0	0	5	2	10	7	0	0	13	0	2
02. Vegetables	5	6	8	0	9	5	4	9	2	4	0	15	5	4	5	14	0	0	16	0	6
03. Legumes	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04. Fruits, nuts and olives	2	9	4	0	4	7	3	7	4	3	0	1	4	2	5	5	0	0	16	0	6
05. Dairy products	58	5	3	0	4	15	32	17	13	23	29	23	9	39	11	11	0	38	4	5	5
06. Cereals and cereal products	8	29	26	0	31	24	18	12	17	19	0	0	18	9	11	22	8	0	1	0	9
07. Meat and meat products	2	10	16	85	8	9	17	13	31	28	15	13	24	12	22	4	0	30	10	20	7
08. Fish and shellfish	1	2	1	5	1	1	3	1	8	1	1	1	1	1	2	1	0	9	0	8	2
09. Eggs and egg products	1	1	2	0	3	1	2	1	4	2	5	3	1	2	1	2	0	4	0	5	3
10. Fat	1	0	0	2	0	0	0	0	0	0	28	21	2	2	6	7	50	3	0	36	24
11. Sugar and confectionery	3	7	7	0	8	4	2	3	1	2	2	2	1	3	1	1	1	2	1	1	3
12. Cakes	3	4	5	1	6	3	4	3	4	3	7	5	2	3	2	2	0	1	0	7	7
13. Non-alcoholic beverages	10	9	9	0	10	13	4	15	4	2	0	2	9	7	9	8	1	2	24	0	4
14. Alcoholic beverages	1	1	3	0	3	4	2	3	0	0	0	0	0	2	3	3	0	1	0	0	0
15. Condiments and sauces	1	1	2	0	2	2	1	1	1	1	3	4	3	1	1	1	0	0	1	4	11
16. Soups, bouillon	1	2	2	3	2	2	1	2	1	1	0	1	4	1	1	1	0	2	2	2	1
17. Miscellaneous	1	1	2	4	2	1	1	1	2	2	1	1	1	1	1	1	2	2	0	2	1
20. Dietary supplements	2	6	6	0	0	2	0	0	6	6	8	8	9	9	9	10	37	5	10	9	8

Figure 6.1 Average contribution (%) of basic foods, fortified foods (with specific nutrients) and dietary supplements to nutrient intake, for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).



- folic acid: 'Fat' (50%), 'Dietary supplements';
- vitamin B_{12}: 'Dairy products' (38%), 'Meat and meat products';
- vitamin C: 'Non-alcoholic beverages' (24%), 'Vegetables', 'Fruits, nuts and olives', 'Potatoes and other tubers', 'Meat and meat products', 'Dietary supplements';
- vitamin D: 'Fat' (36%), 'Meat and meat products';
- vitamin E: 'Fat' (24%), 'Condiments and sauces'.

The basic foods, 'Dairy products', 'Meat and meat products', 'Cereals and cereal products', 'Fat' and 'Non-alcoholic beverages' provided a large proportion of the micronutrients. 'Non-alcoholic beverages' and 'Meat and meat products' together, contribute for one third to the total vitamin C intake. This is partly due to food fortification and processing. This contribution to vitamin C intake was comparable to the contribution of 'Fruits, nuts and olives' and 'Vegetables'.

Differences between age groups were seen (data not shown):
- 'Cereals and cereal products' were a more important source of folate equivalents for children, while for older adults 'Dietary supplements' were an important source (in older women dietary supplements contributed to 15% of folate equivalents).
- 'Cereals and cereal products' were also an important source of iron for children, while in older adults 'Dietary supplements' and 'Non-alcoholic beverages' were more important.
- Contribution of 'Dietary supplements' to vitamin D intake was highest in children and older women. The contribution of 'Fish and shellfish' to vitamin D intake increased with age.

6.4.2 Contribution of fortified foods and dietary supplements

The contribution of fortification was highest for the B vitamins and vitamin C.
Foods fortified with vitamin B_1 contributed to 8% of the total vitamin B_1 intake. For vitamin B_2 this was 10%, for vitamin B_6 17% and for folate equivalents 9%. For vitamin C, the contribution of fortified foods containing vitamin C was 9%, while the contribution of dietary supplements was 10%. When products fortified with other nutrients were taken into account, the contribution of fortified foods to the intake of vitamin D (12%) and vitamin E (13%) was higher (data not shown). This was probably due to the consumption of margarines.

Overall, fortified foods seemed to contribute more to the intake of vitamins (Figure 6.1). Dietary supplements contributed 6% to the intake of copper, iron, selenium and zinc (Table 6.19).

Table 6.20 Average contribution of places of consumption to the intake of micronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Nutrient	At home mean%	Not at home mean%
Calcium	74	26
Copper	72	28
Iron	72	28
Heme Iron	75	25
Non-heme Iron	72	28
Magnesium	72	28
Phosphorus	73	27
Potassium	73	27
Selenium	72	28
Zinc	74	26
Retinol	70	30
Retinol Activity Equivalents	72	28
Vitamin B_1	74	26
Vitamin B_2	74	26
Vitamin B_6	74	26
Folate equivalents	74	26
Folic acid	73	27
Vitamin B_{12}	74	26
Vitamin C	74	26
Vitamin D	72	28
Vitamin E	73	27

6.5 Consumption by place of consumption

The contribution of consumption at home was between 70% and 74% for all micronutrients (Table 6.20).

6.6 Consumption by time of consumption

Dinner was the most important food consumption occasion for most micronutrients, except for folic acid (breakfast contributed 43%, and lunch contributed 42%), and retinol (lunch contributed 32%) (Table 6.21).
The intake of calcium was equally distributed over the four food consumption occasions.

Table 6.21 Average contribution of food consumption occasions to the intake of micronutrients for the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=3,819).

Nutrient	Breakfast mean%	Lunch mean%	Dinner mean%	In between mean%
Calcium	20	27	28	26
Copper	15	21	37	27
Iron	15	21	38	26
Heme Iron	4	16	72	7
Non-heme Iron	17	21	34	28
Magnesium	16	22	33	30
Phosphorus	16	24	38	22
Potassium	13	17	42	29
Selenium	12	23	47	18
Zinc	14	23	45	17
Retinol	19	32	29	20
Retinol Activity Equivalents	15	27	39	19
Vitamin B_1	14	21	45	20
Vitamin B_2	18	24	34	24
Vitamin B_6	13	17	46	24
Folate equivalents	18	24	38	20
Folic acid	43	42	5	10
Vitamin B_{12}	15	26	43	16
Vitamin C	11	14	47	29
Vitamin D	14	26	44	15
Vitamin E	14	22	41	23

7 Trends in consumption over time

The dietary assessment methodology used for the DNFCS 2007-2010 was the same as the methodology applied in the DNFCS-Young Adults conducted in 2003.[39] However, dietary assessment in the last population-wide food consumption survey conducted in 1997/1998 was different.[60] For this reason the consumption differences observed between the surveys conducted in 1997/1998 and 2007-2010 could be due to time trends and/or due to methodological differences. Therefore, in this chapter trends in consumption are described quantitatively only for men and women aged 19 to 30 years and relate to consumption data of 2003 versus consumption data of 2007-2010.

Table 7.1 presents the main results of the DNFCS-Young adults[27] compared with the results for men and women aged 19 to 30 years in the DNFCS 2007-2010. The median consumption of vegetables increased in women. The percentage of young adults that met the vegetable recommendation rose from 0 to about 4%. The median consumption of fruit decreased from 82 to 61 g/day in men aged 19 to 30 years, and remained stable at about 85 g/day in women in this age group. Fish consumption in young adult men was similar in 2003 and 2007-2010. In women aged 19 to 30 years, the percentage that consumed fish never or less than once per month, decreased from 59 to 46% (data not shown). A large increase was observed in the consumption of foods fortified with micronutrients. In 2003 about 40% of the young adults consumed a fortified product on one or both of the survey days, whereas for the 2007-2010 survey this was about 75%.

In 2003, one third of total energy intake was consumed in between meals. This percentage was about even in 2007-2010, 33% and 29% for young adult men and women, respectively. The percentage of total energy eaten outside the home decreased. In 2003 this was 40% compared with the current 30%.

In contrast to 2003, the calculated intake of energy in 2007-2010 included energy derived from dietary fibre and organic acids.[47] This contribution was about 2%. Taking this into account, energy intake among people 19 to 30 years of age in both surveys was similar. In young adult men, the prevalence of overweight and obesity respectively increased from 22% and 4% in 2003 to 26% and 7% in 2007-2010. Among women in the 19 to 30 age group a shift from the prevalence of overweight to obesity was observed, i.e. in 2003, 28% was overweight and 12% was obese and in 2007-2010 overweight occurred in 23% and obesity in 18% of the young women. In other national data,[5] the percentage of people who are overweight has not risen or has risen only slightly since 2000, whereas the percentage of people who are seriously overweight rose in the same period by 2% points.

For men 19 to 30 years of age, the percentages of energy intake that were derived from fat and saturated fatty acids

Table 7.1 Main results for Dutch adults aged 19 to 30 years in 2003 (DNFCS-Young adults)[a] and in 2007 to 2010 (DNFCS 2007-2010).

Component[a]	Unit	Males				Females			
		P50		% that meets recommendation		P50		% that meets recommendation	
		2003	2007-2010	2003	2007-2010	2003	2007-2010	2003	2007-2010
Energy	MJ	11.5	11.5	-	-	8.1	8.4	-	-
Fat	En%	34.2	34.3	59	56	34.5	33.5	53	63
Saturated fatty acids	En%	12.5	12.5	11	12	13.3	12.6	6	12
Trans fatty acids	En%	1.0	0.5	58	99	1.1	0.5	28	98
Vegetables	g	114	109	0	4	90	103	0	3
Fruit	g	82	61	8	4	86	85	7	7
Fibre	g/MJ	2.0	2.0	-	-	2.1	2.2	-	-

[a] Fibre 2003, unpublished results. Other components[27]

Table 7.2 Median daily habitual intake of selected micronutrients from foods and dietary supplements for Dutch adults aged 19 to 30 years in 2003 (DNFCS-Young adults)[15] and in 2007 to 2010 (DNFCS 2007-2010).

Nutrient	Unit	Males		Females	
		2003	2007-2010	2003	2007-2010
Calcium	mg	1,164	1,091	968	918
Iron	mg	12.9	11.8	10.5	9.8
Magnesium	mg	400	378	289	292
Phosphorous	mg	1,839	1,753	1,308	1,329
Selenium	µg	54	53	42	42
Zinc	mg	11.8	12.2	9.3	9.6
Vitamin B_6	mg	2.4	2.4	1.8	2.0
Folate	µg	246	288	205	249
Vitamin D	µg	4.0	3.7	3.0	2.9
Vitamin E	mg	13.9	15.6	10.6	12.2

were similar in 2003 compared with 2007-2010; women in this age group showed a slight decrease (Table 7.1). However, adjusting for the fact that calculated energy intake in 2007-2010 also included the contribution from fibre and organic acids, there was in fact a small increase in the energy contribution from fat and saturated fatty acids in men, whereas for women no change was seen. Thus, the second aim of the Dutch Task Force for the Improvement of the Fatty Acid Composition, to reduce intake of saturated fatty acids[37] has not been achieved.

The decrease in the intake of trans fatty acids that was observed between 1987 and 1998[18] was seen to continue after 2003. In young adults, the median intake of trans fatty acids decreased from about 1 En% in 2003 to 0.5 En% in 2007-2010 (Table 7.1). In contrast to 2003, almost all young adults met the recommendation for trans fatty acids. The observed decrease is due to a decline in levels of industrial trans fatty acids from partially hydrogenated vegetable oils in foods. As a result, the relative contribution of ruminant sources of trans fatty acids increased over time. Meat and dairy products contributed for 47% to the intake of trans fatty acids in 2007-2010, compared with 30% in 2003. The observations confirm the positive effects of the activities of the Task Force for the Improvement of the Fatty Acid Composition on trans fatty acid intake.[37]

Furthermore, intake of fibre by young adults in 2003 and 2007-2010 was similar, i.e. about 2 g/MJ of energy which is far below the dietary recommendation.

In the period 1987-1998 a decline in the intake of many micronutrients occurred.[18] Especially the intake of vitamins A and E, and to a lesser extent the intake of vitamin D, called for attention. In addition, iron intake in women of childbearing age decreased. In 2007-2010 the intake of these micronutrients is still inadequate for part of the population.
In the period 2003 to 2007-2010, the median intake of vitamin A and iron in young adults decreased by 5-10%, whereas for vitamin E an increase of about 13% was observed, and vitamin D intake remained stable (see Table 7.2; data on vitamin A not shown). Another change in the median intake of micronutrients that occurred between 2003 and 2007-2010 among young adults was a decrease in median calcium intake of about 5%. With regard to folate, the median intake appeared to have increased. This was partly due to methodological changes in the food composition database,[47] but possibly also to increased fortification and supplementation. Finally, copper intake in 2003 (data not shown) appeared to be much higher than in 2007-2010. However, recent food analyses showed that copper values in some chocolate products were too high in

the food composition table that was used for the 2003 survey.[3]

In sum, this comparison shows that there have been some favourable trends taking place over the last 5 years among young adults. For example, the decrease in the intake of trans fatty acids, the higher intake of vitamin E and a slight improvement in the consumption of vegetables in women. Although consumption of fortified foods increased considerably, the intake of iron and calcium decreased. Moreover, low intakes of fruit, vegetables, fish and dietary fibre, and too high intake of saturated fatty acids are still the main nutritional points for improvements in the diet of this part of the Dutch population.

8 Discussion

8.1 Introduction

In the previous chapters the results of the survey on food consumption and intake of nutrients of the Dutch population have been set out. In this chapter the various findings will be jointly considered in order to assess the diet of the Dutch population. Furthermore, some general methodological issues will be discussed. Finally, recommendations and conclusions will be made.

8.2 Dietary pattern

- Diversity in the consumed foods and drink items was very large.
- Foods and drinks were consumed over the whole day. Not all dietary patterns in the Netherlands contained a breakfast. 1-5% of children and 4-12% of adults skip their breakfast almost every day.
- The number of food consumption occasions of the majority of the adult population was higher than the recommended 7 moments per day. For children the majority met the recommendation.
- Most of the basic foods were consumed during the main meals. 'Fat', 'Sugar and confectionary', 'Cakes' and 'Beverages', but also 'Fruit' were mainly consumed in between main meals. On average 30% of the energy intake was consumed outside the main meals.
- Dieting (such as a diet with restricted energy or fat, diabetic diet) was common in the Netherlands, especially in the older age groups. One quarter of women over the age of 50 years reported being on a special diet.
- Foods and drinks were consumed both at home and in other places. 29% of the total energy intake was consumed outside the home. The basic foods were mainly consumed at home, while more than 30% of the non- basic foods like cakes, beverages, sugar and confectionary and soups were consumed elsewhere. Of the basic food groups, 'Fruit' and 'Fish' were eaten relatively more often outside the home.

8.3 Foods

8.3.1 Fruit and vegetables

- A very low percentage of the population (1-14%) met the lower limit of the recommended vegetable consumption. For fruit, the percentage of people meeting the recommendation was somewhat higher at 3-26% (depending on the age gender group). In many age groups the majority of people did not even consume one piece of fruit per day, which is half of the recommended amount. The reasons for not meeting the recommendations are that not all persons consumed fruit and vegetables on a daily basis, and that the consumed quantity was low on consumption days.

- An increase in the consumption of fruit and vegetables could help to achieve health gain in the population, most probably with regard to cardiovascular diseases and some types of cancer. Furthermore, it appears to be probable that a diet rich in fruit and vegetables has a low energy density which contributes to a healthy energy balance. In addition, with an increase in fruit and vegetable consumption, the intake of some essential nutrients would increase accordingly.[20]
- For vegetables and fruit, the comparison with data on young adults from 2003 suggests that these items are still main points for nutritional improvements in the diet of the Dutch population. Only in women a slight improvement in the consumption of vegetables was shown.

8.3.2 Fish

- The nutrition based recommendation to consume fish twice a week was not met by the majority of the Dutch population. In a recent report on the ecological impact of dietary recommendations[24] the Health Council of the Netherlands questioned the nutritional need to eat fish twice a week. In a considerable part of the population, 28-65% (depending on the age group), fish is on the menu once a week. According to the Health Council a single portion of (oily) fish per week may be enough to lower the risk of cardiovascular diseases. However, this recommendation is also considered ecologically detrimental. Therefore, from an ecological perspective it is advisable to emphasise the use of those fish species that are not currently being overfished or those which are being farmed in an environmentally friendly way.

8.3.3 Other foods

- For the majority of the population the consumption of foods such as bread, potatoes, dairy products, spreads and cooking fat, mentioned in the food based dietary guidelines were found to be below the guidelines. In men, meat consumption was higher than the guideline.
- On about 55% of the days 'Potatoes' (cooked in different ways) were eaten at dinner. Pasta and rice were consumed twice a week.
- Although only a very small percentage of people indicated that they were vegetarian 'Meat and meat products' were not consumed daily; overall about 1 out of 10 days no 'Meat and meat products' were consumed.
- More men than women drink alcoholic beverages, the number of 'alcohol days' increased with age. For those people who want to drink alcohol, the Health Council of the Netherlands recommends no more than 2 glasses per day for men and 1 glass for women. This recommendation was least met by men and women over 50 (66%). Below the age of 18, alcohol use is discouraged completely by the Health Council.[20]

However, almost one quarter of adolescents drank alcoholic beverages on a weekly basis, especially during the weekends.

8.3.4 Fortified products and dietary supplements

- Three quarters of the population consumed fortified products. These products contributed most to the intake of B-vitamins and vitamin C.
- The use of supplements was common in the Dutch population, especially in young children and female adults (about 50%). The most commonly taken dietary supplements in all age groups were multivitamins/ minerals. Except for women over 50, this use of supplements was not in line with the underlying principle of the Health Council, that a diet in accordance with the Guidelines for a Healthy Diet supplies enough micronutrients for the general population.[23]
- Two thirds of women over the age of 50 did not take the recommended vitamin D supplementation for the prevention of osteoporosis and osteomalacia.

8.4 Energy and nutrients

8.4.1 Energy

- The energy intake for men followed a bell-shaped curve with the highest intake in young adults (12 MJ) and about 8 MJ in childhood and 10 MJ in the oldest age group. For women, the energy intake was stable from childhood to young adulthood (8 MJ) and decreased further slightly with increasing age.
- Fat was responsible for one third of the energy supply, carbohydrates for about 50% and protein for about one seventh part.
- The main food groups contributing to energy intake were basic foods: 'Cereals and cereal products' (23%), 'Dairy products' (14%), and 'Meat and meat products' (11%). But also non-basic foods like 'Sugar and confectionary', 'Cakes' and 'Non-alcoholic Beverages' contributed together for a considerable part (21%) of the energy intake.
- Energy balance in an individual depends on his/her dietary energy intake and energy expenditure. Imbalances between intake and expenditure result in gains or losses of body components, mainly in the form of fat, and these determine changes in body weight.[33] As the individual energy requirements were not available, the adequacy of energy intake can not be evaluated in surveys like the DNFCS 2007-2010. It should be taken into account that the information on height and weight was reported, not measured. Body weight does give an indication of the energy balance during life time:

- Three out of four children and adolescents had a normal body weight. This decreased during adulthood. Among the 50 to 69 year-olds only one out of three subjects had a normal body weight.
- Overweight and obesity increased with age (15% among the Dutch male adolescents to 68% among male adults over 50. In contrast, underweight was also reported. About 1 out of 10 children and adolescents were underweight.

8.4.2 Macronutrients

- Almost the whole population met the recommendations for protein intake, as the prevalence of inadequacy was below 1%. Median protein intake was ample and ranged from 60 g/day in the 7 to 8 year-old girls to almost 100 g/day in some of the adult male age groups. A larger proportion of protein intake was animal derived rather than plant derived.
- In the Dutch population, 32-35% of the consumed energy was derived from fat. The majority of the population met the recommendations for fat; 3 to 10% of the population (depending on the age gender group) had a fat intake above the upper bound of 40% of the recommended range of fat.
- The intake of saturated fatty acids was too high for the majority of the population, over 85% exceeded the upper bound of 10 En%.
- The main sources of fat and saturated fatty acids were 'Dairy products, 'Meat and meat products', 'Fat' and 'Cakes'.
- The intake of trans fatty acids favourably decreased due to a decline in levels of industrial trans fatty acids from partially hydrogenated vegetable oils in foods. The upper bound of 1% of energy from trans fatty acids was only exceeded by about 1-5% (depending on the age gender group) of the population.
- Median intake of EPA and DHA ranged from 0.04 to 0.10. The low fish consumption also contributed to an unfavourable fatty acid profile.
- Energy derived from carbohydrates decreased with age from more than 53 En% in young children to 42 En% in adults aged 51 to 69 years. Based on the recent EFSA reference values, the median contribution of carbohydrates to energy in older adults was below the lower bound. The main sources of carbohydrates were 'Cereals and cereal products' as well as 'Dairy products', 'Sugar and confectionary' and 'Non-alcoholic beverages'. The consumption of bread, potatoes, rice and pasta was not very high.
- Dietary fibre intake was far below the recommended amount. In almost all age groups even the 95th percentile was lower than the guideline. This was also due to a low consumption of 'Cereals and cereal products', 'Vegetables', 'Fruit', and 'Potatoes, rice or pasta'.

8.4.3 Vitamins

Table 8.1 contains an overview of the evaluation of the micronutrient intake of the Dutch population.

- The intake of vitamin B_2, B_6 and B_{12} was sufficient in the whole population.
- For some vitamins, the age gender specific increased recommendations for specific vitamins were not met:
  - In older adults, the median intake of vitamin D was below the AI, even when the dietary supplements were taken into account. In women above 50 the difference between the median intake and the AI was largest and the use of vitamin D supplements is recommended. Only about one third of them actually met this recommendation. This result is in line with recent nutritional status research in these age groups.[58] The potential health effects are rickets, osteomalacia and osteoporosis.
  - Low intakes of vitamin B_1 was observed in the female adult population. The health effects of this are not clear.
  - The intake of folate is possibly an issue among women of childbearing age, as the intake of 28% in young female adults and in 18% of the 31 to 50 year-old women was below the EAR. This has been confirmed in a study on nutritional status in these age groups.[22] The potential health risk is giving birth to a child with a neural tube defect.
- For vitamin A (RAE), the estimated percentage of inadequacy was about 7% in the youngest age group and more than 15% in all other age groups, with the highest percentage in adolescents (about 33%). The consumption of the main sources of RAE, which are 'Vegetables', 'Cooking fat', 'Spread' and 'Dairy products', were in most age gender groups low. The health risks of these potential low vitamin A intakes are not clear.
- Due to the variation in the dietary reference values, it remains inconclusive whether the Dutch population is at risk from too low intakes of vitamin C and vitamin E. The health effects of this are not known.[23]
- For most vitamins, very few people exceeded the upper safe levels.
- Dietary supplements contribute on average at most 10% to the daily intake of vitamins. However, dietary supplements had little impact on the proportion of the population with an inadequate intake of vitamins and minerals. Only for folate and vitamin E the impact was more pronounced.
- Three quarters of the population consumed fortified products, like margarines, syrups, non-alcoholic beverages and dairy products, with the highest percentages in the youngest age groups. Fortified foods contributed mainly to the intake of B-vitamins and vitamin C.

Table 8.1 Overview of the evaluation of the intake of the micronutrients from foods and dietary supplements for the Dutch population aged 7 to 69 years (DNFCS 2007-2010) and the conclusions and/or recommendations.

Nutrient	Population group	% inadequacy	Comment	Conclusion/ recommendation	Comment
Vitamin B_2	children adults	low <10%		No public health problem	
Vitamin B_6	children adults	low <10%		No public health problem	
Vitamin B_{12}	children adults	low <10%		No public health problem	
Copper	children adults	<10% <5%		No public health problem	
Folate equivalents	children men women	≤8 years low; **>8 years unclear** **7-15%** **14-28%**	girls >8 years: large differences between P50 and AI % decreased with age % decreased with age	Public health problem for women with desire to get pregnant Research on health effects for other age groups	Low intakes are confirmed in nutritional status research DRI based on biochemical status marker Health effect: having a child with a neural tube defect.
Vitamin D	children adults	low; unclear ≤50 years low; **>50 years unclear**	unclear for some girls, but P50 close to AI higher AI for adults >50 years; women > 50 years have larger difference between P50 and AI then men	Suppletion of risk groups	Health effects: rickets, osteomalacia, osteoporosis
Vitamin A (RAE)	children adults	**6-34%** **16-30%**	% increased with age % decreased with age	Nutritional status research (isotope techniques) Research on health effects	DRI based on optimal liver storage
Vitamin B_1	children men women	≤13 years low; >13 years unclear ≤50 years 4%; >50 years low **≤50 years 15-19%**; >50 years low	>13 years P50 close to AI	Nutritional status research Research on health effects	DRI based on biochemical status marker
Vitamin C	children adults	low (GR)/**0-18% (IOM)** low (GR)/**12-28% (IOM)**	% increased with age % higher for men	Nutritional status research Research on health effects Re-evaluation of DRI	Base of DRIs differs for GR and IOM: vitamin C saturation of the tissue or a biochemical status marker
Vitamin E	children adults	low (GR)/**5-56% (IOM)** low (GR)/ **19-48% (IOM)**	% increased with age; % higher for girls % higher in women	Nutritional status research Research on health effects Re-evaluation of DRI	
Calcium	children adults	≤13 years low; **>13 years unclear** low; unclear	>13 years: large difference between P50 and AI unclear for some adults, but P50 close to AI	Research on health effects, especially among adolescents Research on nutritional status	DRI based on bone mass, fracture incidents, max. calcium retention
Iron	children men women	≤10 years low; **>10 years unclear** low **≤50 years unclear**; >50 years low	indication of high % inadequacy using IOM reference for women in fertile age	Research on health effects	DRI based on factorial method
Magnesium	children adults	low (GR)/≤8 years 0%; **9-13 years 10-19%**; **>13 years 57-72% (IOM)** low (GR)/16-35% (IOM)	% higher for girls (IOM)	Re-evaluation of DRI Research on health effects	DRI based on balance studies

Table 8.1 continued

Nutrient	Population group	% inadequacy	Comment	Conclusion/ recommendation	Comment
Potassium	children	**unclear**	large differences between P50 and AI; P95 below AI	Derivation of DRI Nutritional status research	DRI based on blunting salt sensitivity in African american men, risk of kidney stones; supported by studies on blood pressure & risk of bone loss
	adults	**unclear**	large differences between P50 and AI; for women P95 below AI		
Zinc	children	**1-24%**	% higher for girls > 8 years	Research on health effects	DRI based on factorial method
	adults	**5-14%**			
Phosphorous	children	low (GR)/≤8 years 0%; >8 years 5-28% (IOM)		Re-evaluation of DRI	DRI based on biochemical status marker
	adults	low (GR)/0% (IOM)			
Selenium	children	low/unclear (GR)/ 11-75% (IOM)	% increased with age; % higher for girls	Re-evaluation of DRI	DRI based on biochemical status marker
	men	low (GR)/21-28% (IOM)			
	women	unclear (GR)/46-58% (IOM)			

DRI = Dietary Reference Intake
IOM = Evaluation based on DRI's from US Institute of Medicine
GR = Evaluation based on DRI's of the Health Council of the Netherlands
Low = When the median intake was above the Adequate intake the prevalence of inadequate intakes is likely to be low
Unclear = When the median intake is below the adequate intake the adequacy can not be evaluated

8.4.4 Minerals and trace elements

Evaluation of the intake of minerals is complicated by the lack of data with regard to the association between low intake and adverse effects on health. In addition, dietary reference values are diverse. A quantitative conclusion cannot be drawn for all minerals - due to the type of dietary reference value.

- Copper does not pose a public health problem as the prevalence of inadequacy was lower than 10%.
- The median intake of calcium did not exceed the adequate intake in some groups with a higher recommended intake (especially adolescents). This can be explained by a low intake of dairy products. The health implications on this point, especially in adolescents, need further research.
- There is an indication that women of childbearing age had low intakes of iron. The health effects of a low iron intake are insufficiently known.
- The potassium intake in the population is low. Additional research on potassium status is recommended. A higher vegetable and fruit consumption might improve the potassium intake in order to prevent high blood pressure levels.
- Prevalence of inadequacy is observed for zinc. However, also for this nutrient, the health effects of a low intake are insufficiently known. Besides inadequacies, part of the population (mainly children) exceeded the recommended upper level (between 0-8% depending on the age gender group). This was mainly due to dietary supplements (without supplements only 2% of the children aged 7 to 13 years had an intake above the dietary reference intake).
- Finally, there is large diversity in the dietary reference values for magnesium, phosphorus and selenium. Therefore, no straight conclusion can be drawn on the inadequacy for these nutrients.

8.5 Methodological issues

8.5.1 Reponse and representativeness

The overall response of the survey was 69% and varied across the age groups between 55 and 88%. Despite the trend in non-response over time, the response is equal to the response of the national survey on food consumption in 1998. Compared with the response rate in the pilot of the Dutch food consumption survey among young adults (42%), the response in this survey is much higher. This can be explained by the longer period of research, and the extra effort made to contact people in these specific age groups.

The study population is assumed to be representative for the population in the Netherlands with regard to age, level of education, and region of residence and population

density. For small deviations in the distributions, these factors were taken into account in the weighing factor. In addition, the data were collected over a period of three years, spread over all seasons and days of the week. Also these factors were taken into account in the weighing factor.
By study design the results are not fully representative for immigrants, as well as for pregnant and lactating women. A specific food consumption survey needs to be carried out to assess the dietary intake of these groups. As a 24-hour recall in immigrant groups requires intensive adaptations of the tool, the main dietary key issues will be investigated from 2011 to 2013, in collaboration with the University of Amsterdam and using specific developed food frequency questionnaires.

8.5.2 Method of dietary assessment

The method of dietary assessment in the Dutch population is different from the method used in 1998. More detail on this comparison is described elsewhere.[40] As a consequence a straight comparison of the current results with previous findings in order to describe time trends is complicated. The advantage of this new method is that the data collection was standardized as much as possible. The 24-hour recall data contain a great level of detail because all information is systematically stored, which makes the results suitable for a great range of research questions and for underpinning policy measures. For example, the collected data are suitable to quantify the contribution of fortified products and supplements to micronutrient intake. This was one of the recommendations in the report 'Towards an adequate intake of vitamins and minerals' of the Health Council of the Netherlands.[23] Furthermore, this survey followed the new guidelines of the EFSA for conducting a food consumption survey,[11] which makes the data also suitable for research on nutritional issues at European level.

From the EPIC-study and the recent results of the EFCOFAL-project it is known that the methodology works in older adults and in children.[8, 9, 48] In 2003 the method of dietary assessment was piloted in young adults in the Netherlands. At the start of the study this method was hardly being used for children and adolescents. Therefore, a pilot has been carried out to test this method with regard to feasibility and the presence of the carer during the interviews among children and adolescents. The results showed that the presence of the carer was useful and did not negatively affect the answers of the adolescents.

Numerous quality checks were performed and systematic quality controls were conducted during the fieldwork and data handling. However, it is still possible that misreporting, underreporting or overreporting occur.

Gross low reporting of energy intake was evaluated by means of the ratio of the reported energy intake and estimated energy requirements for basal metabolic rate. However, low energy reporting can also be the result of a diet, fasting or illness. The mean expected ratio of the energy intake and energy requirements of the study population was 1.74 and varied between 1.61 and 1.85. The mean observed ratio, however, was 1.46. Based on the age-specific cut offs, the proportion of low reporters was 17%, while the proportion of high energy reporters was 1.5%.
These figures correspond with similar studies in Belgium and previous food consumption surveys in the Netherlands.[10, 39, 42] Due to this low reporting the results on inadequacy can be slightly overestimated, while percentages above the upper levels might be underestimated.

Further, the interviewers can introduce bias in the results. During the fieldwork several quality checks were carried out. Furthermore, some statistics on the differences between interviewers have been monitored during the study. Where possible, the interviewers were given additional instructions. These statistics show that interviewers differed in the duration of the interviews as well as in the total number of reported food items and PAL-values. During the fieldwork these items were informative in the monitoring of the quality of the interviews. The impact of these findings on the final results is assumed to be limited.

One strength of the current study is that the habitual intake of all nutrients was assessed instead of the intake over two independent days. Hereby, for most nutrients the percentage exceeding the upper levels, as well as the percentage of inadequacy, were estimated without a bias due to the day to day variation. In addition, a newly developed technique for the intake of nutrients through foods and dietary supplements was used.[55] For these analyses, not only the information on supplement use during the recall, but also that from the additional questionnaire was used in order to obtain better estimates.

Unfortunately, not all dietary reference values were suitable for drawing quantitative conclusions on the prevalence of inadequacy. Furthermore, dietary reference values for some minerals are based on very limited data so caution should be used in assessing adequacy of intake. In addition, there is a large variety in the dietary reference values set by different institutes. For some nutrients the dietary reference values set by the Health Council of the Netherlands were determined some decades ago, therefore, the more recent dietary reference values from the EFSA or the US's IOM were also taken into account. However, different procedures were used to assign these

dietary values. The EURRECA Network of Excellence proposed a General Framework for the process leading to nutrient recommendations.[67] In the evaluation of the intakes the different dietary reference values were considered and taken into account in the conclusions.

8.6 Comparison with results of other national surveys

In 2003 we conducted the food consumption survey in young adults[27], in 2008 we reported on the food consumption in young children,[39, 42] and now we report on the diet for a broad age range. In this report the potential trends in time were discussed for young adults. Additionally, these surveys show that limited consumption of vegetables, fruit and fish and a low intake of fibre was observed population wide in all age groups. This report also shows that the fatty acids profile became more favourable for trans fatty acids, but still, the fatty acid profile, especially the content of saturated fatty acids can be improved.

Although national dietary surveys are conducted in many European countries, it is not currently possible to carry out a quantitative EU-wide analysis or country-to-country comparisons on food consumption due to differences in how information is collected. Therefore, the EFSA coordinates the project EU Menu in cooperation with member states of the EU. This project aims to harmonize data collection on food consumption across Europe. This current survey followed largely these new guidelines.[11] Based on the available European data the nutrition and health situation was described in 2009 in the European Nutrition and health report (ENHR 2009).[66] Our findings are in line with the reported dietary habits.

8.7 Recommendations

Based on the findings in this survey, recommendations can be made on possible improvements to the Dutch diet. This would then result in a diet more in accordance with the guidelines of a healthy diet. To achieve this, improvements can be made in the food supply, in the way foods are promoted and the settings where foods are offered or sold, as well as in the food behaviour on the part of consumers. It is outside the scope of this report to set priorities to these possible improvements and the way in which they could be achieved.

The Dutch diet can be improved on the following aspects:

- Increase the consumption of *basic foods* like bread, potatoes, rice or pasta, dairy products, spreads and cooking fat and decrease the energy dense and low nutrient dense foods.
- Increase *fruit and vegetable consumption and consumption of wholemeal products*. By increasing these foods, the dietary concentration of essential micronutrients will be improved (for example folate) as well as the dietary sodium/potassium balance and fibre intake. Moreover, this will help to reduce the energy density and would facilitate the maintenance of a healthy energy balance.
- Increase the frequency of *fish consumption*; however as fish consumption in general has ecological disadvantages, the sustainability aspect should be taken into account.
- Limit the *number of food occasions* to a maximum of 7 per day and improve the quality of foods and drinks consumed outside the main meals (less energy dense and more nutrient dense). By eating more basic foods such as fruit and vegetables, also in between meals, it should be possible to improve the nutrient density of the diet.
- Improve the *energy balance* over a lifetime. As overweight is very common in the Dutch population, the guidelines that apply to people with undesirable weight gain or overweight should be followed. For example, by taking more physical activity and reducing intake of energy dense foods as much as possible e.g. by replacing it with nutrient dense foods and foods high in dietary fibre.
- Create a more *healthy fatty acids profile* by lowering energy derived from saturated fatty acids. For example, by taking more low-fat choices from the food groups 'Dairy products' and 'Meat and meat products'. In the food group 'Fat' the consumption of products with a more favourable fatty acid composition should be encouraged.
- Improve the nutrient intake of *specific population groups*. Some specific subgroups may not obtain adequate quantities of certain micronutrients. If nutritional status research confirms the inadequacy for specific age groups, and the health consequences are clearer, the age specific dietary guidelines should be followed. For example, supplementation of vitamin D by women over 50 years of age.

More research is recommended on the following topics:

- In order to improve the dietary pattern, more additional research on the *determinants of the dietary patterns* would be useful.
  For several nutrients low intakes were observed in this study. However, it is unclear whether this low intake is associated with adverse health effects. More insight into these *health effects* is needed. This is the case for vitamins A, B_1, E, and C, calcium, folate (effect in other groups than childbearing women), iron, magnesium and zinc.
- For the vitamins A, B_1, C and E, and calcium also *nutritional status research* is recommended in order to verify the results of the current study. This research will *elucidate whether* a low intake also means that the nutritional status for these nutrients is low.

- For several nutrients the *dietary reference values* varied between the IOM and GR. Based on the results of this survey a re-evaluation of the GR dietary reference values is recommended for vitamin C, vitamin E, magnesium, phosphorus, potassium and selenium. For potassium no dietary reference value was set by the GR, derivation of such a value is advised. The EURRECA Network of Excellence assigned priorities for which recommendations are most in need of alignment. The ranking was based on three criteria: (A) the amount of new scientific evidence, particularly from randomized controlled trials; (B) the public health relevance of micronutrients; (C) variations in current micronutrient recommendations. The 10 highest ranked micronutrients were vitamin D, iron, folate, vitamin B_{12}, zinc, calcium, vitamin C, selenium, iodine and copper.[68] Taking this broader perspective into account, re-evaluation of micronutrients vitamin C and selenium have highest priority for interpretation of the results of the current food consumption survey.
- In this report only the results for the general population are described. No attention has been paid to specific risk groups. For example: is accordance with the dietary guidelines for a healthy diet higher among specific socio-demographic groups? The data from the DNFCS 2007-2010 is suitable for more detailed analyses on this subject to be conducted.
- In this survey not all *subpopulations of the Dutch society* were represented. If insight into the dietary patterns of these subpopulations is desirable, food consumption surveys should be conducted in these subpopulations as well. For example, people with a non-western background, pregnant women, elderly people.
- With this survey actual and detailed data on the food consumption has become available. It is recommended not to wait too long for a *new update*, in order to monitor the current trends in dietary patterns. For example, the use of fortified products and dietary supplements is becoming more common in the Dutch diet. Frequent monitoring of food consumption in the Dutch population is necessary to maintain insight in this trend.

8.8 Conclusions

The former survey that included information on food consumption in the total Dutch population was conducted in 1997/1998. The recent survey carried out between 2007 and 2010 among children and adults aged 7 to 69 years in the Netherlands provides more detailed information. This data can be used to answer all kind of research questions on the diet of the Dutch population. This can be questions related to the consumption of foods, the intake of macro and micronutrients and of potentially harmful chemical substances as well as questions related to nutritional trends. The data can also be used to support policy regarding healthy and safe foods, for improving food supply and in food education and research.

Based on the survey findings, we conclude that people in the Netherlands still consume insufficient fruit, vegetables, fish and fibre. Improvement of the type of fat in the diet by reduction of trans fatty acids in foods is a favourable development. However, the proportion of saturated fatty acids in the diet is still high. Overweight remains common in adults and children.

The survey also shows that some people have intakes below the recommended amounts for some vitamins and minerals, such as vitamins A, B_1, C, E, magnesium, potassium and zinc. More information on the possible health effects of these low intakes is desirable. Furthermore, age groups with specific higher intake requirements often do not meet these, i.e. concerning folate (for women with a pregnancy wish), vitamin D (women over 50), iron (women of childbearing age) and calcium (adolescents). This observation underlines the advices of the Health Council of the Netherlands to these specific groups with regard to the use of folate and vitamin D supplements. The effects on health of the observed low iron and calcium intakes are unclear; more research is needed in this area.

A healthy dietary pattern is important to prevent obesity and chronic diseases. The survey provides insight into the food consumption which can be used to stimulate healthier dietary patterns. This can be achieved by changes in both the food supply and consumer behaviour.

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Acknowledgement

First and foremost we wish to thank the participants (and for the young participants also their parents/carers) for participating in the survey. Without their collaboration this survey could not have been conducted. Furthermore, we would like to thank the contact persons of the Netherlands Ministry of Health, Welfare and Sport, Letteke Boot, Danielle Mulukom and Nienke Blok. We appreciated your involvement in our work and your effort in the build up of the current food monitoring system new style. Nadia Slimani and your team from the International Agency for Research on Cancer, thank you for the EPIC-Soft updates for the dietary assessment. We also thank the project team from GfK Panel Services, Marcel Temminghoff, Kim Paulussen, Anne-Louise van Bijnen, Frans Louwen, Willem van der Linden, Inge Snoeren, Sjannie van Vugt and Maxime Valstar. We appreciate your expertise. Furthermore we would like to thank all interviewers for performing the fieldwork. Due to your involvement, flexibility and enthousiasm, not just we but also the interviewees have indicated the interviews as very positive.

Furthermore, we appreciate the willingness of the expert committee (Dr. P.E. Boon, J. Bouwens, Dr. J.J.M. Castenmiller, Dr. M.C.J.M. van Dongen, A. Kruizinga, A. de Mul, S. Peters, Dr. C.J. Spaaij, Dr. R.M.C. Theelen, Dr. J.H.M. de Vries, Dr. A.M. Werkman) headed by Prof. Dr. P. van 't Veer to comment on our proposals and drafts during the meetings in The Hague or by e-mail. Also the input on vitamins from Henk van de Berg were very useful.

Moreover we would like to thank our (former) colleagues in RIVM Centre for Nutrition and Health (and in the first year also those from TNO) for their contribution to the design, preparation, fieldwork, data handling, and/or report and dissemination of this survey: Agnes Roos, Annet Stafleu, Arnold Dekkers, Caroline Wilson, Coline van Oosterhout, Evelien de Boer, Henny Brants, Jan van der Laan, Jildau Meijers, José Drijvers, Karin Hulshof, Louise Verloop, Marloeke Geominy, Marja Beukers, Martine Jansen, Maryse Niekerk, Robert Jan de Klein, Susanne Westenbrink, Yvonne van Nes and Zohreh Etemad.

List of Abbreviations

AI	Adequate Intake
ALA	Alpha Linolenic Acid
BMI	Body Mass Index
CBS	Statistics Netherlands (Centraal Bureau voor de Statistiek)
DHA	Docosahexaenoic acid
DNFCS	Dutch National Food Consumption Survey
DRI	Dietary Reference Intake
EAR	Estimated Average Requirement
EFCOVAL	EUropean Food COnsumption VALidation
EFSA	European Food Safety Authority
ENHR	European Nutrition and Health Report
En%	Procentual contribution to the total daily energy intake
EPA	Eicosapentaenoic acid
EPIC	European Prospective Investigation into Cancer and nutrition
GfK	Market Research Agency GfK Panel Services
GR	Health Council of the Netherlands (GezondheidsRaad)
IARC	International Agency for Research on Cancer
IOM	US Institute Of Medicine
MET	Metabolic Equivalent
MUFA	Mono Unsaturated Fatty Acids
NES	Dutch Supplement Database (NEderlands Supplementenbestand)
NEVO	Dutch Food Composition Database (NEderlands VOedingsstoffenbestand)
NNGB	The Dutch Standard for Healthy Exercise
ns	No Statement on prevalence of inadequacy
PAL	Physical Activity Level
PUFA	Poly Unsaturated Fatty Acids
RAE	Retinol Activity Equivalent
RDA	Recommended Dietary Allowance
RE	Retinol Equivalent

SFA	Saturated Fatty Acids
SPADE	Statistical Program to Assess Dietary Exposure
SQUASH	Short QUestionnaire to ASsess Health enhancing physical activity
TFA	Trans Fatty Acids
UL	Tolerable Upper intake level

Appendices

Appendix A	List of experts
Appendix B	Dutch food based dietary guidelines61 and food groups within EPIC-Soft
Appendix C	Food consumption data (main food groups and all subgroups) per age gender group
Appendix D	Habitual intake distribution of n-3 fatty acids from foods and supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010)
Appendix E	Habitual intake distribution of micronutrients from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010)

Appendix A List of experts

Ministry of Health, Welfare and Sports
E.N. Blok (from June 2010)
C.A Boot (until September 2009)
D. Mulukom (from September 2009 until June 2010)

Members of expert-panel
Dr. P.E. Boon (from June 2008)
J. Bouwens (from June 2008 until November 2008)
B.C. Breedveld (until June 2008)
Dr. J.J.M. Castenmiller
Dr. M.C.J.M. van Dongen
A. Kruizinga (from June 2008)
A. de Mul (until June 2008)
S. Peters (from June 2008 until September 2009)
Dr. C.J. Spaaij (until March 2007)
Prof. Dr. P. van 't Veer (chairman)
Dr. J.H.M. de Vries
Dr. A.M. Werkman (from September 2009)

Conducting organisations
Dr. E.J. de Boer (until July 2007 TNO/from July 2007 RIVM)
Dr. M.C. Ocké
Dr. C.T.M. van Rossum
Dr. A. Stafleu - TNO (from July 2006 to March 2007)

Appendix B Dutch food based dietary guidelines[61] and food groups within EPIC-Soft

Vegetables and fruit

For the assessment of the consumption of vegetables and fruit, the total vegetable and fruit consumption can be taken into account, including fruit juices, vegetable juices, soups and sauces with a considerable percentage of vegetables. These juices, soups and sauces could only contribute up to a maximum of 50% of the daily recommended consumption amounts with reference to the food based dietary guidelines. The following classifications were used.

The group 'Vegetables' contained:
- Foods from EPIC-Soft food group 02 'Vegetables' of which the matrix is intact.

The group 'Vegetables and vegetable products' contained:
- Foods from EPIC-Soft food group 02 'Vegetables' of which the matrix is intact.
- Vegetable juices (a selection of EPIC-Soft subgroup 1301 'Fruit and vegetable juices', based on their name, if they contained at least 8 mg vitamin C and 20 µg folate equivalents and/or 80 ug RAE per 100 ml, and if they met the following criteria: per 100 g a maximum of saturated fat of 1.1 g, 0.1 g trans fat and 200 mg sodium, and contained at least 1.3 g fibre per 100 kcal.
- Vegetable soups, if they contained at least 2 mg vitamin C and 4 µg folate equivalents and/or 15 µg RAE per 100 ml. 20% of these soups counted as vegetables.
- Sauces, if they contained at least 5 mg vitamin C and 13 µg folate equivalents or 50 µg RAE per 100 g. 66% of these sauces counted as vegetables.

The group 'Fruit' contained:
- EPIC-Soft food groups 0401 'Fruit' and 0403 'Mixed fruits' without 'Elitehaver'.

The group 'Fruit and fruit juices' contained:
- EPIC-Soft food groups 0401 'Fruit' and 0403 'Mixed fruits' without 'Elitehaver'.
- Fruit juices (a selection of EPIC-Soft subgroup 1301 'Fruit and vegetable juices', based on their name), if they contained at least 8 mg vitamin C and 10 µg folate equivalents per 100 ml, and if they met the following criteria: per 100 g a maximum of saturated fat of 1.1 g, 0.1 g trans fat and 200 mg sodium and at least 0.75 g fibre per 100 kcal.

Bread

The group 'Bread' contained:
- EPIC-Soft food groups 0603 'Bread, crispbread, rusks' and 0604 'Breakfast cereals'.

Potatoes (or rice, pasta or legumes)

This group contained:
- EPIC-Soft food groups 0101 'Potatoes', 0301 'Legumes' and 0602 'Pasta, rice, other grain'.

Dairy products

The group 'Dairy products' contained:
- EPIC-Soft food groups 0501 'Milk', 0502 'Milk beverages', 0503 'Yogurt', 0504 'Fromage blanc, petits suisses', 0506 'Cream desserts, puddings (milk based)'.
- A selection of EPIC-Soft food group 1701 'Soya products', if they contained protein and at least 80 mg calcium and 0.25 µg vitamin B_{12} per 100 gram.

Cheese

The group 'Cheese' contained:
- EPIC-Soft food group 0505 'Cheeses (including fresh cheeses)'.

Meat (products), fish, chicken, egg or other meat replacement products

This group contained:

- EPIC-Soft food group 07 'Meat and meat products'.
- EPIC-Soft food group 08 'Fish and shellfish'.
- EPIC-Soft food group 09 'Eggs and egg products'.
- A selection from EPIC-Soft food group 1701 'Soya products', if they contained protein and at least 0.7 mg iron and 0.13 µg vitamin B_{12} and/or 0.06 mg vitamin B1 per 100 g.

Spread

The group 'Spread' contained:

- A selection of EPIC-Soft food groups 1002 'Butter' and 1003 'Margarines', if they were consumed together with bread (food group 0603 or 0604).

Cooking fat

The group 'Cooking fat' contained:

- EPIC-Soft food group 10 'Fat', if the product is not already included in the group 'Spread'.

Drinks

The group 'Drinks' contained:

- EPIC-Soft food group 1104 'Syrup', without NEVO-codes 376, 381, 427 (syrups not used for drinks) and food groups 13 'Non-alcoholic beverages' and 14 'Alcoholic beverages'.

Appendix C Food consumption data (main food groups and all subgroups) per age gender group

Table C.1 Food consumption (main food groups and all subgroups) of Dutch children aged 7 to 8 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=304).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**60**	**0**	**188**	**54**	**120**	**37**	**283**
0101. Potatoes	60	0	188	54	120	37	280
0102. Other tubers	0	0	0	0	120	19	120
02. Vegetables	**55**	**0**	**143**	**70**	**77**	**12**	**204**
0201. Leafy vegetables (except cabbages)	0	0	61	13	54	7	174
0202. Fruiting vegetables	12	0	84	39	51	4	168
0203. Root vegetables	0	0	63	11	77	3	229
0204. Cabbages	0	0	68	14	81	5	180
0205. Mushrooms	0	0	7	7	10	3	34
0206. Grain and pod vegetables	0	0	6	3	25	2	91
0207. Onion, garlic	0	0	21	20	11	1	60
0208. Stalk vegetables, sprouts	0	0	0	2	8	2	40
0209. Mixed salad, mixed vegetables	0	0	17	7	26	8	91
03. Legumes	**0**	**0**	**0**	**2**	**59**	**27**	**167**
0301. Legumes	0	0	0	2	59	27	167
04. Fruits, nuts and olives	**83**	**0**	**259**	**67**	**128**	**20**	**321**
0401. Fruits	72	0	240	58	130	32	311
0402. Nuts and seeds (+nut spread)	0	0	28	21	20	10	60
0403. Mixed fruits	0	0	0	2	90	50	270
0404. Olives	0	0	0	0	48	48	48
05. Dairy products	**373**	**50**	**833**	**94**	**391**	**35**	**955**
0501. Milk	114	0	637	55	275	39	793
0502. Milk beverages	0	0	215	17	200	137	582
0503. Yoghurt	58	0	430	41	216	100	675
0504. Fromage blanc, petits suisses	0	0	45	5	63	50	150
0505. Cheese (including fresh cheeses)	12	0	64	47	29	9	103
0506. Cream desserts, puddings (milk based)	0	0	163	23	144	48	258
0507. Dairy and non-dairy creams	0	0	10	6	12	3	47
050701. Dairy creams	0	0	10	6	12	3	47
050702. Non-dairy creams	0	0	0	0	0	0	0
0508. Milk for coffee and creamers	0	0	0	1	3	2	28
06. Cereals and cereal products	**153**	**73**	**295**	**100**	**140**	**60**	**336**
0601. Flour, flakes, starches, semolina	0	0	0	3	1	0	15
0602. Pasta, rice, other grain	0	0	109	22	101	33	234
0603. Bread, crisp bread, rusks	105	50	213	97	105	35	233
060301. Bread	103	44	210	95	105	35	235
060302. Crispbread, rusks	0	0	20	25	14	3	40
0604. Breakfast cereals	0	0	34	14	40	13	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	40	31	25	6	70
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	63	7	108	21	285
07. Meat and meat products	**70**	**10**	**160**	**87**	**79**	**13**	**196**
0701.Fresh meat	8	0	89	32	60	14	178
070100. Unclassified	0	0	44	9	60	13	124
070101. Beef	0	0	52	13	55	17	182
070102. Veal	0	0	0	1	76	28	141
070103. Pork	0	0	41	10	63	10	178
070104. Mutton/Lamb	0	0	0	0	18	18	125
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0

Table C.1 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
0702. Poultry	0	0	46	13	64	5	122
070200. Unclassified and other poultry	0	0	0	0	75	75	75
070201. Chicken, hen	0	0	44	12	55	5	112
070202. Turkey, young turkey	0	0	0	0	76	15	224
070203. Duck	0	0	0	0	0	0	0
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	0	0	0
0704. Processed meat	38	0	122	70	56	10	175
0705. Offals	0	0	0	0	9	9	9
08. Fish and shellfish	**0**	**0**	**47**	**7**	**52**	**5**	**201**
0801. Fish	0	0	13	3	37	5	200
0802. Crustaceans, molluscs	0	0	0	2	14	4	116
0803. Fish products, fish in crumbs	0	0	4	2	78	9	250
09. Eggs and egg products	**0**	**0**	**42**	**18**	**45**	**5**	**99**
0901. Egg	0	0	42	18	45	5	99
10. Fat	**18**	**2**	**45**	**91**	**18**	**2**	**49**
1000. Unclassified	0	0	9	12	14	2	33
1001. Vegetable oils	0	0	9	21	6	1	24
1002. Butter	0	0	9	8	12	2	56
1003. Margarines	12	0	33	79	15	2	40
1004. Deep frying fats	0	0	13	8	16	6	31
1006. Other animal fat	0	0	0	0	6	6	6
11. Sugar and confectionery	**70**	**14**	**195**	**95**	**70**	**10**	**218**
1100. Unclassified	0	0	0	0	1	1	1
1101. Sugar, honey ,jam	1	0	33	35	10	2	66
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	17	0	63	62	25	7	91
1103. Confectionery non-chocolate	10	0	45	60	18	3	64
1104. Syrup	9	0	73	51	27	8	125
1105. Ice cream, water ice	0	0	83	24	69	35	165
110501. Ice cream	0	0	70	15	70	33	172
110502. Sorbet	0	0	0	0	100	88	100
110503. Water ice	0	0	35	10	55	35	130
12. Cakes	**41**	**4**	**137**	**80**	**45**	**12**	**189**
1201. Cakes, pies, pastries, etc.	15	0	105	40	50	20	200
1202. Dry cakes, biscuits	18	0	63	62	30	8	90
13. Non-alcoholic beverages	**782**	**371**	**1,520**	**99**	**792**	**317**	**1,644**
1300. Unclassified	0	0	0	0	25	25	44
1301. Fruit and vegetable juices	83	0	442	40	200	100	683
1302. Carbonated/soft/isotonic drinks, diluted syrups	250	0	904	67	400	133	1,013
1303. Coffee, tea and herbal teas	0	0	261	22	188	55	550
130301. Coffee	0	0	0	1	53	23	125
130302. Tea	0	0	213	19	188	93	550
130303. Herbal tea	0	0	75	3	188	133	450
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	276	0	1,087	81	358	42	1,237
14. Alcoholic beverages	**0**	**0**	**0**	**1**	**2**	**0**	**75**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	0	0	57	57	57
1402. Fortified wines (sherry, port, vermouth)	0	0	0	1	1	0	2
1403. Beer, cider	0	0	0	0	26	20	26
1404. Spirits, brandy	0	0	0	0	18	18	18
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	0	0	0	0
1407. Cocktails, punches	0	0	0	0	0	0	0

Table C.1 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
15. Condiments and sauces	**16**	**0**	**62**	**65**	**23**	**3**	**86**
1501. Sauces	15	0	62	62	23	4	89
150100. Unclassified and other sauces	0	0	40	30	23	3	80
150101. Tomato sauces	0	0	31	22	19	4	87
150102. Dressing sauces	0	0	17	16	15	3	40
150103. Mayonnaises and similars	0	0	17	15	13	2	70
150104. Dessert sauces	0	0	0	1	15	10	23
1502. Yeast	0	0	0	0	0	0	0
1504. Condiments	0	0	3	8	5	1	22
16. Soups, bouillon	**0**	**0**	**130**	**11**	**194**	**19**	**389**
1601. Soups	0	0	130	10	196	63	400
1602. Bouillon	0	0	0	2	20	10	50
17. Miscellaneous	**0**	**0**	**75**	**15**	**70**	**1**	**417**
1700. Unclassified	0	0	0	0	20	20	20
1701. Soya products	0	0	0	3	188	52	930
1702. Dietetic products	0	0	0	2	1	0	26
170200. Unclassified	0	0	0	0	26	26	26
170201. Artificial sweeteners	0	0	0	1	1	0	3
1703. Snacks	0	0	60	11	70	30	203

Table C.2 Food consumption (main food groups and all subgroups) of Dutch male children aged 9 to 13 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**75**	**0**	**226**	**54**	**143**	**49**	**311**
0101. Potatoes	75	0	226	54	143	59	311
0102. Other tubers	0	0	0	0	16	16	16
02. Vegetables	**68**	**0**	**187**	**72**	**94**	**14**	**248**
0201. Leafy vegetables (except cabbages)	0	0	65	16	40	8	174
0202. Fruiting vegetables	5	0	105	38	52	5	185
0203. Root vegetables	0	0	73	10	50	2	228
0204. Cabbages	0	0	90	14	98	10	229
0205. Mushrooms	0	0	7	5	14	4	51
0206. Grain and pod vegetables	0	0	23	5	45	1	91
0207. Onion, garlic	0	0	30	23	17	2	98
0208. Stalk vegetables, sprouts	0	0	0	2	9	2	71
0209. Mixed salad, mixed vegetables	0	0	42	11	43	3	162
03. Legumes	**0**	**0**	**0**	**2**	**121**	**13**	**253**
0301. Legumes	0	0	0	2	121	13	253
04. Fruits, nuts and olives	**67**	**0**	**225**	**62**	**128**	**14**	**318**
0401. Fruits	64	0	220	53	128	16	318
0402. Nuts and seeds (+nut spread)	0	0	35	20	20	6	90
0403. Mixed fruits	0	0	0	1	120	36	292
0404. Olives	0	0	0	0	5	0	13
05. Dairy products	**380**	**53**	**890**	**92**	**399**	**46**	**974**
0501. Milk	142	0	540	57	258	57	644
0502. Milk beverages	0	0	202	14	206	119	567
0503. Yoghurt	63	0	510	40	209	78	832
0504. Fromage blanc, petits suisses	0	0	30	5	60	21	300
0505. Cheese (including fresh cheeses)	14	0	73	47	30	12	116
0506. Cream desserts, puddings (milk based)	0	0	193	24	192	73	343
0507. Dairy and non-dairy creams	0	0	16	9	20	4	51
050701. Dairy creams	0	0	16	9	20	4	51
050702. Non-dairy creams	0	0	0	0	0	0	0
0508. Milk for coffee and creamers	0	0	0	2	9	5	124
06. Cereals and cereal products	**188**	**85**	**363**	**100**	**175**	**65**	**390**
0601. Flour, flakes, starches, semolina	0	0	0	2	2	1	20
0602. Pasta, rice, other grain	0	0	160	23	112	41	320
0603. Bread, crisp bread, rusks	128	53	245	97	135	45	275
060301. Bread	128	48	245	96	135	45	278
060302. Crispbread, rusks	0	0	15	17	10	3	32
0604. Breakfast cereals	0	0	40	13	40	19	100
0605. Salty biscuits, aperitif biscuits, crackers	10	0	63	40	35	10	100
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	59	6	99	15	219
07. Meat and meat products	**86**	**13**	**211**	**89**	**92**	**18**	**250**
0701.Fresh meat	15	0	120	35	76	17	210
070100. Unclassified	0	0	44	10	63	11	181
070101. Beef	0	0	53	13	66	17	141
070102. Veal	0	0	0	0	74	37	74
070103. Pork	0	0	81	13	79	11	264
070104. Mutton/Lamb	0	0	0	1	83	11	240
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	63	14	65	4	178
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	63	14	65	3	178
070202. Turkey, young turkey	0	0	0	0	4	4	45
070203. Duck	0	0	0	0	0	0	0

Table C.2 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	28	28	76
0704. Processed meat	49	0	136	71	60	10	190
0705. Offals	0	0	0	0	0	0	0
08. Fish and shellfish	**0**	**0**	**61**	**9**	**75**	**9**	**280**
0801. Fish	0	0	16	5	60	7	180
0802. Crustaceans, molluscs	0	0	0	1	16	4	100
0803. Fish products, fish in crumbs	0	0	36	3	123	52	328
09. Eggs and egg products	**0**	**0**	**45**	**23**	**45**	**4**	**100**
0901. Egg	0	0	45	23	45	4	100
10. Fat	**21**	**3**	**55**	**91**	**24**	**3**	**61**
1000. Unclassified	0	0	13	10	17	4	31
1001. Vegetable oils	0	0	11	26	5	1	28
1002. Butter	0	0	9	9	12	3	60
1003. Margarines	14	0	40	76	18	3	49
1004. Deep frying fats	0	0	16	11	20	5	45
1006. Other animal fat	0	0	0	0	0	0	0
11. Sugar and confectionery	**70**	**8**	**185**	**93**	**70**	**10**	**217**
1100. Unclassified	0	0	0	0	0	0	0
1101. Sugar, honey ,jam	2	0	27	39	10	1	43
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	16	0	73	59	30	5	100
1103. Confectionery non-chocolate	7	0	58	56	16	2	90
1104. Syrup	9	0	79	45	27	9	125
1105. Ice cream, water ice	0	0	78	22	70	35	175
110501. Ice cream	0	0	66	16	75	38	150
110502. Sorbet	0	0	0	0	50	50	100
110503. Water ice	0	0	33	7	59	32	162
12. Cakes	**48**	**0**	**176**	**79**	**60**	**14**	**214**
1201. Cakes, pies, pastries, etc.	20	0	130	42	60	20	250
1202. Dry cakes, biscuits	21	0	70	59	36	9	90
13. Non-alcoholic beverages	1,000	473	1,768	99	995	400	2,036
1300. Unclassified	**0**	**0**	**0**	**0**	**500**	**250**	**500**
1301. Fruit and vegetable juices	97	0	448	41	250	113	750
1302. Carbonated/soft/isotonic drinks, diluted syrups	385	0	1,125	74	500	167	1,433
1303. Coffee, tea and herbal teas	0	0	352	29	220	100	563
130301. Coffee	0	0	53	4	188	3	437
130302. Tea	0	0	329	21	200	110	550
130303. Herbal tea	0	0	94	4	250	150	550
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	308	0	1,107	77	417	50	1,353
14. Alcoholic beverages	**0**	**0**	**0**	**2**	**22**	**2**	**400**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	0	0	2	2	22
1402. Fortified wines (sherry, port, vermouth)	0	0	0	0	2	2	4
1403. Beer, cider	0	0	0	1	330	200	400
1404. Spirits, brandy	0	0	0	0	0	0	0
1405. Aniseed drinks (pastis,...)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	0	4	4	4
1407. Cocktails, punches	0	0	0	0	133	133	133
15. Condiments and sauces	**22**	**0**	**81**	**71**	**30**	**4**	**105**
1501. Sauces	20	0	80	68	28	5	105
150100. Unclassified and other sauces	0	0	49	30	23	4	94
150101. Tomato sauces	0	0	39	27	21	3	90
150102. Dressing sauces	0	0	20	15	17	3	65

Table C.2 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	24	21	20	3	70
150104. Dessert sauces	0	0	0	1	15	12	30
1502. Yeast	0	0	0	0	5	5	5
1504. Condiments	0	0	6	9	7	1	36
16. Soups, bouillon	**0**	**0**	**185**	**15**	**210**	**40**	**551**
1601. Soups	0	0	185	13	259	105	630
1602. Bouillon	0	0	0	1	40	0	72
17. Miscellaneous	**0**	**0**	**71**	**17**	**66**	**1**	**250**
1700. Unclassified	0	0	0	0	47	47	72
1701. Soya products	0	0	0	2	160	1	500
1702. Dietetic products	0	0	1	4	2	0	10
170200. Unclassified	0	0	0	0	40	40	40
170201. Artificial sweeteners	0	0	0	4	2	0	5
1703. Snacks	0	0	68	11	72	31	210

Table C.3 Food consumption (main food groups and all subgroups) of Dutch female children aged 9 to 13 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=352).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**72**	**0**	**218**	**57**	**140**	**37**	**300**
0101. Potatoes	72	0	218	57	140	37	300
0102. Other tubers	0	0	0	0	0	0	0
02. Vegetables	**62**	**0**	**178**	**75**	**80**	**12**	**204**
0201. Leafy vegetables (except cabbages)	0	0	69	15	46	10	204
0202. Fruiting vegetables	12	0	103	42	51	7	164
0203. Root vegetables	0	0	61	11	49	2	200
0204. Cabbages	0	0	72	14	78	11	180
0205. Mushrooms	0	0	9	6	17	4	36
0206. Grain and pod vegetables	0	0	20	4	60	19	120
0207. Onion, garlic	0	0	27	26	14	3	70
0208. Stalk vegetables, sprouts	0	0	0	2	11	3	32
0209. Mixed salad, mixed vegetables	0	0	27	9	27	4	94
03. Legumes	**0**	**0**	**0**	**2**	**80**	**21**	**210**
0301. Legumes	0	0	0	2	80	21	210
04. Fruits, nuts and olives	**70**	**0**	**241**	**66**	**128**	**10**	**330**
0401. Fruits	64	0	234	58	128	15	318
0402. Nuts and seeds (+nut spread)	0	0	25	19	20	5	60
0403. Mixed fruits	0	0	0	2	90	8	455
0404. Olives	0	0	0	0	6	5	10
05. Dairy products	**372**	**32**	**816**	**93**	**385**	**29**	**903**
0501. Milk	107	0	567	54	264	12	687
0502. Milk beverages	0	0	283	18	237	125	567
0503. Yoghurt	50	0	395	38	216	100	594
0504. Fromage blanc, petits suisses	0	0	0	2	80	40	250
0505. Cheese (including fresh cheeses)	15	0	74	53	30	10	110
0506. Cream desserts, puddings (milk based)	0	0	135	19	150	60	254
0507. Dairy and non-dairy creams	0	0	16	10	13	3	48
050701. Dairy creams	0	0	16	10	12	3	48
050702. Non-dairy creams	0	0	0	0	29	20	29
0508. Milk for coffee and creamers	0	0	0	1	13	6	16
06. Cereals and cereal products	**159**	**69**	**309**	**99**	**150**	**45**	**351**
0601. Flour, flakes, starches, semolina	0	0	0	3	2	0	8
0602. Pasta, rice, other grain	0	0	123	23	104	30	265
0603. Bread, crisp bread, rusks	105	35	200	96	105	35	235
060301. Bread	105	33	200	94	105	35	235
060302. Crispbread, rusks	0	0	20	22	13	3	54
0604. Breakfast cereals	0	0	40	13	40	10	80
0605. Salty biscuits, aperitif biscuits, crackers	13	0	60	41	30	6	105
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	56	7	97	17	225
07. Meat and meat products	**76**	**8**	**178**	**88**	**84**	**15**	**218**
0701.Fresh meat	6	0	89	33	69	11	163
070100. Unclassified	0	0	46	9	58	11	116
070101. Beef	0	0	56	15	62	15	176
070102. Veal	0	0	0	0	18	8	18
070103. Pork	0	0	56	10	76	8	178
070104. Mutton/Lamb	0	0	0	0	0	0	0
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	64	13	54	10	175
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	64	13	54	10	175
070202. Turkey, young turkey	0	0	0	0	19	19	19
070203. Duck	0	0	0	0	0	0	0

Table C.3 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	0	0	0
0704. Processed meat	44	0	131	70	62	9	170
0705. Offals	0	0	0	0	0	0	0
08. Fish and shellfish	**0**	**0**	**50**	**8**	**52**	**6**	**225**
0801. Fish	0	0	22	5	43	10	280
0802. Crustaceans, molluscs	0	0	0	1	18	4	68
0803. Fish products, fish in crumbs	0	0	0	3	104	20	225
09. Eggs and egg products	**0**	**0**	**45**	**20**	**45**	**5**	**90**
0901. Egg	0	0	45	20	45	5	90
10. Fat	**18**	**2**	**43**	**91**	**19**	**2**	**48**
1000. Unclassified	0	0	12	14	12	4	30
1001. Vegetable oils	0	0	10	24	5	1	24
1002. Butter	0	0	9	8	10	1	40
1003. Margarines	10	0	31	78	13	1	38
1004. Deep frying fats	0	0	13	10	18	5	36
1006. Other animal fat	0	0	0	0	11	6	11
11. Sugar and confectionery	**67**	**9**	**173**	**94**	**63**	**10**	**194**
1100. Unclassified	0	0	0	0	2	1	2
1101. Sugar, honey ,jam	2	0	29	38	10	1	55
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	13	0	56	61	25	7	80
1103. Confectionery non-chocolate	9	0	54	59	15	2	69
1104. Syrup	5	0	76	40	26	6	125
1105. Ice cream, water ice	0	0	75	21	70	35	180
110501. Ice cream	0	0	64	16	75	35	150
110502. Sorbet	0	0	0	0	50	50	50
110503. Water ice	0	0	28	7	55	35	188
12. Cakes	**45**	**0**	**147**	**78**	**52**	**12**	**195**
1201. Cakes, pies, pastries, etc.	15	0	120	39	66	20	240
1202. Dry cakes, biscuits	19	0	70	61	31	8	94
13. Non-alcoholic beverages	**946**	**475**	**1,618**	**99**	**925**	**400**	**1,700**
1300. Unclassified	0	0	0	0	488	488	488
1301. Fruit and vegetable juices	88	0	500	42	250	120	725
1302. Carbonated/soft/isotonic drinks, diluted syrups	347	0	1,015	72	483	153	1,209
1303. Coffee, tea and herbal teas	0	0	413	27	193	107	660
130301. Coffee	0	0	13	3	133	4	542
130302. Tea	0	0	281	20	188	117	600
130303. Herbal tea	0	0	143	7	188	124	825
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	250	0	1,000	77	345	40	1,200
14. Alcoholic beverages	**0**	**0**	**0**	**1**	**17**	**1**	**97**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	0	0	17	8	49
1402. Fortified wines (sherry, port, vermouth)	0	0	0	0	2	1	2
1403. Beer, cider	0	0	0	0	0	0	0
1404. Spirits, brandy	0	0	0	0	2	2	2
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	0	26	13	53
1407. Cocktails, punches	0	0	0	0	97	97	97
15. Condiments and sauces	**18**	**0**	**73**	**69**	**24**	**4**	**97**
1501. Sauces	17	0	73	66	25	4	97
150100. Unclassified and other sauces	0	0	38	28	23	3	78
150101. Tomato sauces	0	0	25	24	13	2	87
150102. Dressing sauces	0	0	19	17	17	3	56

Table C.3 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	24	22	17	3	53
150104. Dessert sauces	0	0	0	1	15	5	34
1502. Yeast	0	0	0	0	0	0	0
1504. Condiments	0	0	3	9	5	1	18
16. Soups, bouillon	**0**	**0**	**184**	**13**	**250**	**47**	**564**
1601. Soups	0	0	162	12	259	130	564
1602. Bouillon	0	0	0	1	47	4	200
17. Miscellaneous	**0**	**0**	**70**	**18**	**63**	**1**	**250**
1700. Unclassified	0	0	0	0	31	31	94
1701. Soya products	0	0	0	2	93	20	587
1702. Dietetic products	0	0	0	3	2	1	250
170200. Unclassified	0	0	0	0	250	250	250
170201. Artificial sweeteners	0	0	0	3	2	1	21
1703. Snacks	0	0	62	13	63	31	153

Table C.4 Food consumption (main food groups and all subgroups) of Dutch male adolescents aged 14 to 18 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=352).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**97**	**0**	**288**	**54**	**194**	**73**	**401**
0101. Potatoes	97	0	288	54	194	73	401
0102. Other tubers	0	0	0	0	0	0	0
02. Vegetables	**86**	**0**	**236**	**77**	**106**	**20**	**280**
0201. Leafy vegetables (except cabbages)	0	0	75	19	45	8	175
0202. Fruiting vegetables	15	0	114	42	52	7	202
0203. Root vegetables	0	0	73	11	76	4	230
0204. Cabbages	0	0	99	16	98	9	240
0205. Mushrooms	0	0	12	7	17	5	43
0206. Grain and pod vegetables	0	0	30	4	60	8	128
0207. Onion, garlic	0	0	43	29	25	3	85
0208. Stalk vegetables, sprouts	0	0	3	3	10	5	75
0209. Mixed salad, mixed vegetables	0	0	64	13	50	4	162
03. Legumes	**0**	**0**	**0**	**2**	**132**	**40**	**228**
0301. Legumes	0	0	0	2	132	40	228
04. Fruits, nuts and olives	**50**	**0**	**248**	**53**	**128**	**13**	**362**
0401. Fruits	32	0	239	42	130	13	370
0402. Nuts and seeds (+nut spread)	0	0	60	20	35	10	140
0403. Mixed fruits	0	0	0	1	150	100	189
0404. Olives	0	0	0	1	8	2	20
05. Dairy products	**375**	**10**	**967**	**90**	**422**	**40**	**1,174**
0501. Milk	147	0	672	57	283	33	906
0502. Milk beverages	0	0	224	12	250	129	567
0503. Yoghurt	0	0	450	31	252	101	891
0504. Fromage blanc, petits suisses	0	0	0	2	150	50	500
0505. Cheese (including fresh cheeses)	22	0	94	52	48	13	132
0506. Cream desserts, puddings (milk based)	0	0	205	22	192	85	321
0507. Dairy and non-dairy creams	0	0	15	9	16	7	64
050701. Dairy creams	0	0	15	9	16	7	64
050702. Non-dairy creams	0	0	0	0	26	26	26
0508. Milk for coffee and creamers	0	0	8	8	13	6	48
06. Cereals and cereal products	**235**	**103**	**468**	**98**	**233**	**79**	**537**
0601. Flour, flakes, starches, semolina	0	0	1	5	2	1	23
0602. Pasta, rice, other grain	0	0	179	28	172	63	402
0603. Bread, crisp bread, rusks	158	36	293	94	160	50	340
060301. Bread	155	35	293	93	160	50	340
060302. Crispbread, rusks	0	0	13	13	10	3	50
0604. Breakfast cereals	0	0	40	14	40	17	80
0605. Salty biscuits, aperitif biscuits, crackers	8	0	85	34	57	11	160
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	81	7	154	39	277
07. Meat and meat products	**107**	**27**	**239**	**90**	**112**	**31**	**304**
0701.Fresh meat	29	0	140	40	81	18	237
070100. Unclassified	0	0	67	14	68	24	178
070101. Beef	0	0	67	13	85	18	200
070102. Veal	0	0	0	0	74	74	80
070103. Pork	0	0	88	14	80	15	264
070104. Mutton/Lamb	0	0	0	1	92	79	240
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	89	17	82	12	225
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	89	16	84	12	225
070202. Turkey, young turkey	0	0	0	0	76	76	76
070203. Duck	0	0	0	0	0	0	0

Table C.4 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	0	0	0
0704. Processed meat	50	0	179	71	70	15	226
0705. Offals	0	0	0	0	105	105	105
08. Fish and shellfish	**0**	**0**	**63**	**9**	**75**	**11**	**201**
0801. Fish	0	0	28	5	50	12	305
0802. Crustaceans, molluscs	0	0	6	3	32	11	150
0803. Fish products, fish in crumbs	0	0	0	1	131	22	201
09. Eggs and egg products	**0**	**0**	**45**	**17**	**45**	**5**	**100**
0901. Egg	0	0	45	17	45	5	100
10. Fat	**25**	**2**	**63**	**93**	**26**	**2**	**74**
1000. Unclassified	0	0	18	14	17	1	49
1001. Vegetable oils	0	0	14	27	8	1	36
1002. Butter	0	0	15	12	11	2	51
1003. Margarines	12	0	55	73	18	2	63
1004. Deep frying fats	0	0	19	10	24	3	53
1006. Other animal fat	0	0	0	0	0	0	0
11. Sugar and confectionery	**52**	**1**	**191**	**85**	**60**	**6**	**219**
1100. Unclassified	0	0	0	0	2	2	2
1101. Sugar, honey ,jam	2	0	43	40	14	3	77
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	13	0	78	50	30	10	109
1103. Confectionery non-chocolate	2	0	51	39	14	2	123
1104. Syrup	0	0	69	24	36	9	150
1105. Ice cream, water ice	0	0	75	12	90	50	200
110501. Ice cream	0	0	75	11	90	50	200
110502. Sorbet	0	0	0	0	125	125	125
110503. Water ice	0	0	0	2	55	35	110
12. Cakes	**43**	**0**	**163**	**66**	**64**	**10**	**224**
1201. Cakes, pies, pastries, etc.	11	0	122	33	72	20	300
1202. Dry cakes, biscuits	14	0	83	47	36	9	130
13. Non-alcoholic beverages	**1,247**	**593**	**2,375**	**100**	**1,230**	**480**	**2,663**
1300. Unclassified	0	0	0	0	88	27	300
1301. Fruit and vegetable juices	0	0	500	34	250	1	935
1302. Carbonated/soft/isotonic drinks, diluted syrups	592	0	1,478	83	725	200	1,742
1303. Coffee, tea and herbal teas	18	0	550	39	275	117	825
130301. Coffee	0	0	360	18	267	107	800
130302. Tea	0	0	350	22	275	144	750
130303. Herbal tea	0	0	94	4	188	30	550
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	290	0	1,338	68	480	50	1,742
14. Alcoholic beverages	**0**	**0**	**797**	**12**	**453**	**2**	**3,900**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	0	1	130	31	433
1402. Fortified wines (sherry, port, vermouth)	0	0	0	2	2	1	5
1403. Beer, cider	0	0	750	9	660	280	5,640
1404. Spirits, brandy	0	0	0	1	73	4	92
1405. Aniseed drinks (pastis,..)	0	0	0	0	30	30	30
1406. Liqueurs	0	0	0	1	53	11	88
1407. Cocktails, punches	0	0	0	1	153	125	500
15. Condiments and sauces	**30**	**0**	**105**	**75**	**37**	**6**	**144**
1501. Sauces	27	0	105	73	37	5	144
150100. Unclassified and other sauces	4	0	66	36	34	3	125
150101. Tomato sauces	0	0	45	25	25	3	125
150102. Dressing sauces	0	0	23	15	23	4	76

Table C.4 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	35	24	23	5	81
150104. Dessert sauces	0	0	0	1	15	8	36
1502. Yeast	0	0	0	0	0	0	0
1504. Condiments	0	0	6	10	5	1	27
16. Soups, bouillon	**0**	**0**	**236**	**14**	**259**	**19**	**648**
1601. Soups	0	0	235	11	271	150	648
1602. Bouillon	0	0	16	3	39	11	300
17. Miscellaneous	**0**	**0**	**131**	**22**	**75**	**2**	**272**
1700. Unclassified	0	0	0	1	86	16	200
1701. Soya products	0	0	0	1	100	50	500
1702. Dietetic products	0	0	1	5	3	1	40
170200. Unclassified	0	0	0	1	27	26	249
170201. Artificial sweeteners	0	0	1	4	2	1	8
1703. Snacks	0	0	113	16	108	40	272

Table C.5 Food consumption (main food groups and all subgroups) of Dutch female adolescents aged 14 to 18 years (DNFCS 2007-2008), weighted for socio-demographic factors, season and day of the week (n=354).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**70**	**0**	**201**	**54**	**140**	**40**	**286**
0101. Potatoes	70	0	201	54	140	40	286
0102. Other tubers	0	0	0	0	27	27	27
02. Vegetables	**82**	**0**	**200**	**79**	**98**	**16**	**264**
0201. Leafy vegetables (except cabbages)	0	0	77	22	45	10	180
0202. Fruiting vegetables	18	0	113	46	54	7	200
0203. Root vegetables	0	0	73	12	56	2	187
0204. Cabbages	0	0	90	15	98	10	180
0205. Mushrooms	0	0	13	8	15	5	95
0206. Grain and pod vegetables	0	0	20	4	60	6	91
0207. Onion, garlic	0	0	34	29	16	2	76
0208. Stalk vegetables, sprouts	0	0	0	2	8	5	50
0209. Mixed salad, mixed vegetables	0	0	38	10	39	7	170
03. Legumes	**0**	**0**	**0**	**2**	**110**	**18**	**210**
0301. Legumes	0	0	0	2	110	18	210
04. Fruits, nuts and olives	**69**	**0**	**276**	**61**	**130**	**18**	**383**
0401. Fruits	65	0	262	54	131	18	395
0402. Nuts and seeds (+nut spread)	0	0	27	15	20	9	70
0403. Mixed fruits	0	0	0	1	70	35	189
0404. Olives	0	0	0	1	14	2	20
05. Dairy products	**315**	**10**	**721**	**91**	**302**	**22**	**846**
0501. Milk	97	0	532	50	249	15	623
0502. Milk beverages	0	0	200	14	200	110	600
0503. Yoghurt	0	0	365	34	216	100	522
0504. Fromage blanc, petits suisses	0	0	0	2	140	23	233
0505. Cheese (including fresh cheeses)	21	0	77	57	33	11	113
0506. Cream desserts, puddings (milk based)	0	0	129	15	160	52	309
0507. Dairy and non-dairy creams	0	0	16	10	12	3	52
050701. Dairy creams	0	0	16	10	12	3	52
050702. Non-dairy creams	0	0	0	0	12	12	12
0508. Milk for coffee and creamers	0	0	5	6	9	1	58
06. Cereals and cereal products	**183**	**82**	**330**	**99**	**175**	**60**	**387**
0601. Flour, flakes, starches, semolina	0	0	1	6	3	0	25
0602. Pasta, rice, other grain	0	0	141	25	113	39	284
0603. Bread, crisp bread, rusks	123	45	225	97	120	45	258
060301. Bread	120	38	219	95	120	45	245
060302. Crispbread, rusks	0	0	21	22	14	3	60
0604. Breakfast cereals	0	0	40	14	40	20	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	50	30	40	8	100
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	80	7	122	17	268
07. Meat and meat products	**79**	**6**	**184**	**87**	**89**	**18**	**222**
0701.Fresh meat	18	0	97	37	76	17	178
070100. Unclassified	0	0	45	11	60	19	127
070101. Beef	0	0	58	15	70	19	178
070102. Veal	0	0	0	0	74	74	74
070103. Pork	0	0	56	12	79	14	178
070104. Mutton/Lamb	0	0	0	1	112	9	176
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	67	19	80	9	178
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	67	19	79	9	178
070202. Turkey, young turkey	0	0	0	0	112	80	112
070203. Duck	0	0	0	0	0	0	0

Table C.5 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	264	264	264
0704. Processed meat	37	0	125	62	56	10	178
0705. Offals	0	0	0	0	0	0	0
08. Fish and shellfish	**0**	**0**	**39**	**9**	**59**	**10**	**201**
0801. Fish	0	0	28	5	51	3	126
0802. Crustaceans, molluscs	0	0	0	2	22	13	204
0803. Fish products, fish in crumbs	0	0	0	2	78	52	201
09. Eggs and egg products	**0**	**0**	**45**	**21**	**33**	**3**	**90**
0901. Egg	0	0	45	21	33	3	90
10. Fat	**17**	**2**	**46**	**90**	**18**	**2**	**51**
1000. Unclassified	0	0	10	11	10	1	31
1001. Vegetable oils	0	0	11	25	6	1	24
1002. Butter	0	0	12	14	10	0	36
1003. Margarines	9	0	32	73	12	2	38
1004. Deep frying fats	0	0	13	9	18	3	40
1006. Other animal fat	0	0	0	1	7	4	13
11. Sugar and confectionery	**44**	**2**	**131**	**87**	**42**	**4**	**162**
1100. Unclassified	0	0	0	0	2	2	3
1101. Sugar, honey ,jam	2	0	28	40	12	2	48
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	12	0	64	52	26	8	95
1103. Confectionery non-chocolate	2	0	38	42	10	1	73
1104. Syrup	0	0	38	19	20	8	144
1105. Ice cream, water ice	0	0	50	13	80	50	183
110501. Ice cream	0	0	50	11	86	49	175
110502. Sorbet	0	0	0	0	50	50	100
110503. Water ice	0	0	0	3	55	35	250
12. Cakes	**44**	**0**	**151**	**72**	**55**	**10**	**200**
1201. Cakes, pies, pastries, etc.	5	0	116	33	67	20	222
1202. Dry cakes, biscuits	18	0	69	55	38	8	114
13. Non-alcoholic beverages	**1,293**	**583**	**2,429**	**100**	**1,250**	**483**	**2,473**
1300. Unclassified	0	0	0	1	300	10	375
1301. Fruit and vegetable juices	83	0	467	39	242	20	700
1302. Carbonated/soft/isotonic drinks, diluted syrups	325	0	1,047	67	500	167	1,384
1303. Coffee, tea and herbal teas	118	0	794	52	375	124	1,125
130301. Coffee	0	0	191	12	188	93	487
130302. Tea	56	0	605	39	300	133	940
130303. Herbal tea	0	0	300	12	311	117	1,100
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	492	0	1,588	80	617	80	1,750
14. Alcoholic beverages	**0**	**0**	**182**	**9**	**250**	**1**	**1,960**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	30	3	167	100	1,742
1402. Fortified wines (sherry, port, vermouth)	0	0	0	2	2	1	230
1403. Beer, cider	0	0	140	3	364	250	5,100
1404. Spirits, brandy	0	0	0	1	46	9	187
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	2	127	24	319
1407. Cocktails, punches	0	0	0	2	193	20	550
15. Condiments and sauces	**22**	**0**	**84**	**71**	**30**	**5**	**114**
1501. Sauces	21	0	84	67	31	6	115
150100. Unclassified and other sauces	0	0	47	29	28	3	112
150101. Tomato sauces	0	0	40	23	18	3	108
150102. Dressing sauces	0	0	21	17	17	3	51

Table C.5 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	29	25	18	5	70
150104. Dessert sauces	0	0	0	2	23	12	60
1502. Yeast	0	0	0	0	5	5	5
1504. Condiments	0	0	5	11	4	1	29
16. Soups, bouillon	**0**	**0**	**200**	**16**	**259**	**17**	**630**
1601. Soups	0	0	194	12	259	175	648
1602. Bouillon	0	0	8	4	33	13	275
17. Miscellaneous	**0**	**0**	**72**	**21**	**70**	**2**	**210**
1700. Unclassified	0	0	0	1	94	72	94
1701. Soya products	0	0	0	2	80	27	250
1702. Dietetic products	0	0	2	7	4	1	57
170200. Unclassified	0	0	0	1	30	1	773
170201. Artificial sweeteners	0	0	1	6	2	1	8
1703. Snacks	0	0	64	13	70	34	153

Table C.6 Food consumption (main food groups and all subgroups) of the Dutch male population aged 19 to 30 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=356).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**97**	**0**	**284**	**53**	**194**	**33**	**450**
0101. Potatoes	97	0	284	53	194	33	450
0102. Other tubers	0	0	0	0	0	0	0
02. Vegetables	**107**	**0**	**275**	**81**	**127**	**21**	**310**
0201. Leafy vegetables (except cabbages)	0	0	91	24	60	7	243
0202. Fruiting vegetables	21	0	126	45	67	6	222
0203. Root vegetables	0	0	73	16	25	2	203
0204. Cabbages	0	0	116	15	122	10	282
0205. Mushrooms	0	0	21	9	27	7	57
0206. Grain and pod vegetables	0	0	19	4	60	11	200
0207. Onion, garlic	1	0	49	34	23	2	110
0208. Stalk vegetables, sprouts	0	0	5	4	12	5	35
0209. Mixed salad, mixed vegetables	0	0	107	12	78	4	280
03. Legumes	**0**	**0**	**0**	**2**	**140**	**15**	**231**
0301. Legumes	0	0	0	2	140	15	231
04. Fruits, nuts and olives	**51**	**0**	**252**	**54**	**130**	**7**	**345**
0401. Fruits	18	0	232	42	130	4	346
0402. Nuts and seeds (+nut spread)	0	0	58	21	40	15	150
0403. Mixed fruits	0	0	0	0	189	60	250
0404. Olives	0	0	0	1	12	6	80
05. Dairy products	**340**	**13**	**1,049**	**91**	**341**	**25**	**1,218**
0501. Milk	103	0	798	48	308	10	1,082
0502. Milk beverages	0	0	250	10	283	137	850
0503. Yoghurt	0	0	351	28	225	65	650
0504. Fromage blanc, petits suisses	0	0	35	3	150	51	500
0505. Cheese (including fresh cheeses)	31	0	109	61	49	20	148
0506. Cream desserts, puddings (milk based)	0	0	150	15	192	92	258
0507. Dairy and non-dairy creams	0	0	10	6	19	6	64
050701. Dairy creams	0	0	10	6	19	6	64
050702. Non-dairy creams	0	0	0	0	12	12	12
0508. Milk for coffee and creamers	0	0	33	20	18	2	78
06. Cereals and cereal products	**256**	**83**	**521**	**97**	**245**	**80**	**564**
0601. Flour, flakes, starches, semolina	0	0	1	4	2	1	20
0602. Pasta, rice, other grain	0	0	230	27	172	63	498
0603. Bread, crisp bread, rusks	158	40	315	93	170	60	350
060301. Bread	158	40	310	92	171	60	350
060302. Crispbread, rusks	0	0	12	12	13	3	40
0604. Breakfast cereals	0	0	49	11	60	16	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	83	27	41	12	200
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	105	9	157	23	318
07. Meat and meat products	**127**	**27**	**295**	**91**	**120**	**30**	**350**
0701.Fresh meat	34	0	176	40	100	23	280
070100. Unclassified	0	0	99	14	88	22	235
070101. Beef	0	0	83	12	99	23	264
070102. Veal	0	0	0	0	110	110	110
070103. Pork	0	0	89	15	90	11	344
070104. Mutton/Lamb	0	0	0	1	176	79	240
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	76	76	76
0702. Poultry	0	0	100	19	82	5	274
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	90	19	82	5	269
070202. Turkey, young turkey	0	0	0	0	0	0	0
070203. Duck	0	0	0	0	274	150	274

Table C.6 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	0	0	0
0704. Processed meat	55	0	169	73	75	16	232
0705. Offals	0	0	0	0	105	105	105
08. Fish and shellfish	**0**	**0**	**92**	**16**	**83**	**10**	**250**
0801. Fish	0	0	75	10	75	8	200
0802. Crustaceans, molluscs	0	0	9	4	26	10	250
0803. Fish products, fish in crumbs	0	0	45	3	145	40	500
09. Eggs and egg products	**0**	**0**	**75**	**26**	**47**	**8**	**135**
0901. Egg	0	0	75	26	47	8	135
10. Fat	**27**	**3**	**70**	**90**	**30**	**3**	**80**
1000. Unclassified	0	0	18	17	13	2	43
1001. Vegetable oils	0	0	19	29	10	1	40
1002. Butter	0	0	13	11	15	2	55
1003. Margarines	15	0	58	70	22	2	72
1004. Deep frying fats	0	0	16	8	23	5	59
1006. Other animal fat	0	0	0	0	13	3	15
11. Sugar and confectionery	**45**	**0**	**160**	**82**	**49**	**7**	**200**
1100. Unclassified	0	0	0	0	3	3	50
1101. Sugar, honey ,jam	9	0	53	57	20	3	66
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	4	0	60	36	30	8	120
1103. Confectionery non-chocolate	0	0	40	26	15	2	165
1104. Syrup	0	0	36	15	26	3	244
1105. Ice cream, water ice	0	0	75	10	93	53	236
110501. Ice cream	0	0	75	9	100	50	240
110502. Sorbet	0	0	0	0	147	147	147
110503. Water ice	0	0	0	1	55	55	125
12. Cakes	**25**	**0**	**152**	**50**	**60**	**12**	**250**
1201. Cakes, pies, pastries, etc.	0	0	133	30	60	20	297
1202. Dry cakes, biscuits	0	0	60	29	36	10	102
13. Non-alcoholic beverages	**1,578**	**765**	**3,038**	**99**	**1,533**	**606**	**3,254**
1300. Unclassified	0	0	0	1	600	4	660
1301. Fruit and vegetable juices	0	0	492	32	250	1	990
1302. Carbonated/soft/isotonic drinks, diluted syrups	483	0	1,729	71	667	208	2,000
1303. Coffee, tea and herbal teas	400	0	1,238	76	542	133	1,433
130301. Coffee	250	0	963	61	455	130	1,320
130302. Tea	0	0	521	27	294	133	1,013
130303. Herbal tea	0	0	166	7	275	144	753
130304. Chicory, substitutes	0	0	0	0	301	301	301
1304. Waters	363	0	1,775	67	550	50	2,175
14. Alcoholic beverages	**1**	**0**	**1,880**	**35**	**560**	**33**	**3,534**
1400. Unclassified	0	0	0	0	72	72	420
1401. Wine	0	0	125	6	247	55	834
1402. Fortified wines (sherry, port, vermouth)	0	0	0	2	3	1	108
1403. Beer, cider	0	0	1,838	27	790	300	3,900
1404. Spirits, brandy	0	0	0	2	48	10	367
1405. Aniseed drinks (pastis,...)	0	0	0	0	50	50	50
1406. Liqueurs	0	0	0	1	61	13	477
1407. Cocktails, punches	0	0	0	0	169	153	242
15. Condiments and sauces	**36**	**0**	**146**	**75**	**47**	**5**	**167**
1501. Sauces	35	0	146	72	47	5	162
150100. Unclassified and other sauces	3	0	71	34	35	4	140
150101. Tomato sauces	0	0	54	26	25	2	144
150102. Dressing sauces	0	0	29	17	23	3	88

Table C.6 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	2	0	47	32	23	4	100
150104. Dessert sauces	0	0	0	0	24	15	30
1502. Yeast	0	0	0	0	10	10	10
1504. Condiments	0	0	8	12	7	1	65
16. Soups, bouillon	**0**	**0**	**291**	**22**	**259**	**33**	**648**
1601. Soups	0	0	291	19	259	173	648
1602. Bouillon	0	0	9	3	52	11	330
17. Miscellaneous	**0**	**0**	**90**	**24**	**70**	**2**	**330**
1700. Unclassified	0	0	0	0	40	32	141
1701. Soya products	0	0	0	1	330	32	880
1702. Dietetic products	0	0	3	7	6	1	781
170200. Unclassified	0	0	0	1	400	10	824
170201. Artificial sweeteners	0	0	2	6	4	1	14
1703. Snacks	0	0	72	16	102	48	212

Table C.7 Food consumption (main food groups and all subgroups) of the Dutch female population aged 19 to 30 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=347).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**68**	**0**	**201**	**48**	**140**	**32**	**280**
0101. Potatoes	68	0	201	48	140	32	280
0102. Other tubers	0	0	0	0	0	0	0
02. Vegetables	**95**	**2**	**283**	**83**	**110**	**16**	**348**
0201. Leafy vegetables (except cabbages)	0	0	80	24	60	10	200
0202. Fruiting vegetables	26	0	149	50	60	6	228
0203. Root vegetables	0	0	54	13	29	3	178
0204. Cabbages	0	0	90	16	98	11	216
0205. Mushrooms	0	0	19	8	20	5	66
0206. Grain and pod vegetables	0	0	12	3	91	14	175
0207. Onion, garlic	1	0	39	33	19	1	91
0208. Stalk vegetables, sprouts	0	0	9	4	19	5	145
0209. Mixed salad, mixed vegetables	0	0	70	13	72	7	228
03. Legumes	**0**	**0**	**15**	**3**	**120**	**30**	**490**
0301. Legumes	0	0	15	3	120	30	490
04. Fruits, nuts and olives	**75**	**0**	**297**	**60**	**148**	**6**	**415**
0401. Fruits	67	0	289	52	153	7	415
0402. Nuts and seeds (+nut spread)	0	0	33	18	20	3	78
0403. Mixed fruits	0	0	0	1	50	12	200
0404. Olives	0	0	0	1	10	1	38
05. Dairy products	**286**	**23**	**772**	**93**	**283**	**24**	**891**
0501. Milk	38	0	490	45	249	19	791
0502. Milk beverages	0	0	206	12	275	125	567
0503. Yoghurt	0	0	364	33	216	65	600
0504. Fromage blanc, petits suisses	0	0	47	4	125	10	250
0505. Cheese (including fresh cheeses)	23	0	95	61	40	12	130
0506. Cream desserts, puddings (milk based)	0	0	142	15	192	48	336
0507. Dairy and non-dairy creams	0	0	16	10	12	3	64
050701. Dairy creams	0	0	16	10	12	3	64
050702. Non-dairy creams	0	0	0	0	0	0	0
0508. Milk for coffee and creamers	0	0	24	21	16	2	57
06. Cereals and cereal products	**186**	**60**	**357**	**97**	**180**	**50**	**390**
0601. Flour, flakes, starches, semolina	0	0	2	5	5	1	61
0602. Pasta, rice, other grain	0	0	160	29	129	60	320
0603. Bread, crisp bread, rusks	114	35	210	94	120	35	260
060301. Bread	110	25	208	90	120	35	260
060302. Crispbread, rusks	0	0	25	23	20	5	56
0604. Breakfast cereals	0	0	45	17	40	19	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	63	29	40	7	119
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	73	6	125	23	254
07. Meat and meat products	**80**	**0**	**193**	**82**	**100**	**17**	**241**
0701.Fresh meat	17	0	106	35	79	23	183
070100. Unclassified	0	0	60	10	73	17	178
070101. Beef	0	0	63	14	76	20	163
070102. Veal	0	0	0	1	76	20	150
070103. Pork	0	0	77	11	77	14	232
070104. Mutton/Lamb	0	0	0	1	88	37	158
070105. Horse	0	0	0	0	175	175	175
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	75	20	80	11	178
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	75	20	80	11	178
070202. Turkey, young turkey	0	0	0	0	112	112	112
070203. Duck	0	0	0	0	0	0	0

Table C.7 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	0	0	0
0704. Processed meat	28	0	113	58	50	10	178
0705. Offals	0	0	0	0	53	53	53
08. Fish and shellfish	**0**	**0**	**63**	**13**	**76**	**10**	**188**
0801. Fish	0	0	50	8	76	10	201
0802. Crustaceans, molluscs	0	0	6	3	38	9	188
0803. Fish products, fish in crumbs	0	0	0	2	104	26	145
09. Eggs and egg products	**0**	**0**	**56**	**23**	**46**	**8**	**129**
0901. Egg	0	0	56	23	46	8	129
10. Fat	**18**	**1**	**45**	**89**	**19**	**3**	**55**
1000. Unclassified	0	0	12	12	12	2	30
1001. Vegetable oils	0	0	15	31	7	1	30
1002. Butter	0	0	11	12	10	3	41
1003. Margarines	9	0	39	68	15	3	45
1004. Deep frying fats	0	0	12	8	16	4	34
1006. Other animal fat	0	0	0	0	5	5	12
11. Sugar and confectionery	**34**	**0**	**137**	**81**	**40**	**4**	**186**
1100. Unclassified	0	0	0	1	2	1	3
1101. Sugar, honey ,jam	3	0	40	49	14	2	60
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	5	0	58	39	25	7	104
1103. Confectionery non-chocolate	0	0	30	29	10	1	64
1104. Syrup	0	0	36	16	21	6	106
1105. Ice cream, water ice	0	0	75	11	87	48	274
110501. Ice cream	0	0	75	9	100	48	283
110502. Sorbet	0	0	0	1	50	50	100
110503. Water ice	0	0	0	2	55	50	105
12. Cakes	**33**	**0**	**153**	**59**	**55**	**14**	**215**
1201. Cakes, pies, pastries, etc.	10	0	130	35	66	20	240
1202. Dry cakes, biscuits	5	0	52	36	32	10	96
13. Non-alcoholic beverages	**1,711**	**895**	**3,165**	**100**	**1,735**	**705**	**3,396**
1300. Unclassified	0	0	0	0	4	4	31
1301. Fruit and vegetable juices	0	0	522	35	242	2	773
1302. Carbonated/soft/isotonic drinks, diluted syrups	286	0	1,217	61	483	167	1,600
1303. Coffee, tea and herbal teas	486	0	1,585	82	578	144	1,783
130301. Coffee	65	0	765	46	397	107	1,193
130302. Tea	138	0	1,051	47	450	144	1,393
130303. Herbal tea	0	0	650	21	377	133	1,245
130304. Chicory, substitutes	0	0	0	0	275	275	275
1304. Waters	540	0	2,207	82	725	63	2,400
14. Alcoholic beverages	**0**	**0**	**370**	**15**	**250**	**2**	**1,500**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	167	8	240	115	750
1402. Fortified wines (sherry, port, vermouth)	0	0	0	1	1	0	77
1403. Beer, cider	0	0	150	4	490	250	2,100
1404. Spirits, brandy	0	0	0	2	114	9	184
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	1	70	33	319
1407. Cocktails, punches	0	0	0	0	167	97	550
15. Condiments and sauces	**24**	**0**	**88**	**69**	**30**	**4**	**135**
1501. Sauces	23	0	88	66	32	4	135
150100. Unclassified and other sauces	0	0	58	32	26	3	120
150101. Tomato sauces	0	0	48	19	19	2	160
150102. Dressing sauces	0	0	17	16	17	4	47

Table C.7 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	24	22	20	4	60
150104. Dessert sauces	0	0	0	0	15	8	30
1502. Yeast	0	0	0	0	5	5	20
1504. Condiments	0	0	6	10	5	1	28
16. Soups, bouillon	**0**	**0**	**259**	**17**	**259**	**32**	**593**
1601. Soups	0	0	259	15	259	175	593
1602. Bouillon	0	0	16	3	144	19	275
17. Miscellaneous	**0**	**0**	**92**	**28**	**48**	**1**	**200**
1700. Unclassified	0	0	0	2	74	24	151
1701. Soya products	0	0	3	3	100	6	600
1702. Dietetic products	0	0	10	16	4	1	54
170200. Unclassified	0	0	0	2	50	13	541
170201. Artificial sweeteners	0	0	5	14	4	1	16
1703. Snacks	0	0	68	10	90	48	213

Table C.8 Food consumption (main food groups and all subgroups) of the Dutch male population aged 31 to 50 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=348).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**109**	**0**	**298**	**56**	**194**	**62**	**410**
0101. Potatoes	109	0	298	56	194	62	410
0102. Other tubers	0	0	0	0	0	0	0
02. Vegetables	**122**	**14**	**304**	**85**	**143**	**19**	**360**
0201. Leafy vegetables (except cabbages)	0	0	117	27	60	9	243
0202. Fruiting vegetables	18	0	128	44	62	4	236
0203. Root vegetables	0	0	87	15	49	3	230
0204. Cabbages	0	0	120	16	136	10	310
0205. Mushrooms	0	0	22	7	28	6	69
0206. Grain and pod vegetables	0	0	14	3	60	15	176
0207. Onion, garlic	3	0	52	36	25	2	128
0208. Stalk vegetables, sprouts	0	0	8	6	14	4	69
0209. Mixed salad, mixed vegetables	0	0	90	15	84	8	256
03. Legumes	**0**	**0**	**0**	**2**	**122**	**10**	**399**
0301. Legumes	0	0	0	2	122	10	399
04. Fruits, nuts and olives	**72**	**0**	**357**	**62**	**153**	**8**	**439**
0401. Fruits	65	0	339	52	153	6	437
0402. Nuts and seeds (+nut spread)	0	0	50	20	35	10	110
0403. Mixed fruits	0	0	0	1	70	24	250
0404. Olives	0	0	0	2	20	2	100
05. Dairy products	**334**	**30**	**987**	**95**	**350**	**24**	**1,084**
0501. Milk	103	0	719	51	283	26	1,000
0502. Milk beverages	0	0	194	10	258	130	680
0503. Yoghurt	1	0	362	36	238	65	540
0504. Fromage blanc, petits suisses	0	0	24	3	187	48	500
0505. Cheese (including fresh cheeses)	29	0	107	64	48	17	146
0506. Cream desserts, puddings (milk based)	0	0	219	21	192	60	381
0507. Dairy and non-dairy creams	0	0	16	8	20	2	64
050701. Dairy creams	0	0	16	8	20	2	64
050702. Non-dairy creams	0	0	0	0	0	0	0
0508. Milk for coffee and creamers	0	0	48	33	17	3	81
06. Cereals and cereal products	**229**	**99**	**428**	**97**	**220**	**74**	**513**
0601. Flour, flakes, starches, semolina	0	0	2	5	4	1	17
0602. Pasta, rice, other grain	0	0	208	27	172	67	476
0603. Bread, crisp bread, rusks	155	59	290	95	160	60	320
060301. Bread	151	53	290	94	155	60	315
060302. Crispbread, rusks	0	0	20	15	14	5	59
0604. Breakfast cereals	0	0	50	14	40	19	100
0605. Salty biscuits, aperitif biscuits, crackers	0	0	50	22	40	7	120
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	78	5	119	26	333
07. Meat and meat products	**119**	**30**	**278**	**90**	**125**	**30**	**325**
0701.Fresh meat	39	0	163	42	107	35	278
070100. Unclassified	0	0	62	11	86	26	211
070101. Beef	0	0	110	18	107	38	264
070102. Veal	0	0	0	0	74	74	74
070103. Pork	0	0	107	14	112	22	300
070104. Mutton/Lamb	0	0	0	1	125	59	224
070105. Horse	0	0	0	0	264	264	264
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	96	20	78	6	205
070200. Unclassified and other poultry	0	0	0	0	76	76	112
070201. Chicken, hen	0	0	94	18	76	6	205
070202. Turkey, young turkey	0	0	0	1	112	20	178
070203. Duck	0	0	0	0	228	137	228

Table C.8 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	218	218	218
0703. Game	0	0	0	0	75	75	75
0704. Processed meat	44	0	171	71	60	15	226
0705. Offals	0	0	0	0	35	35	35
08. Fish and shellfish	**0**	**0**	**100**	**18**	**66**	**8**	**252**
0801. Fish	0	0	90	12	76	12	201
0802. Crustaceans, molluscs	0	0	6	4	15	3	131
0803. Fish products, fish in crumbs	0	0	39	3	145	12	350
09. Eggs and egg products	**0**	**0**	**58**	**22**	**45**	**6**	**135**
0901. Egg	0	0	58	22	45	6	135
10. Fat	**30**	**6**	**67**	**95**	**31**	**5**	**79**
1000. Unclassified	0	0	15	12	15	3	46
1001. Vegetable oils	1	0	17	33	9	1	35
1002. Butter	0	0	18	13	14	3	50
1003. Margarines	18	0	55	78	24	4	67
1004. Deep frying fats	0	0	17	9	23	3	51
1006. Other animal fat	0	0	0	0	13	13	27
11. Sugar and confectionery	**39**	**0**	**156**	**79**	**44**	**6**	**189**
1100. Unclassified	0	0	0	0	2	2	2
1101. Sugar, honey ,jam	11	0	57	56	23	2	81
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	5	0	69	38	25	8	116
1103. Confectionery non-chocolate	0	0	23	24	10	1	62
1104. Syrup	0	0	30	14	21	2	100
1105. Ice cream, water ice	0	0	58	8	86	50	200
110501. Ice cream	0	0	58	7	86	50	200
110502. Sorbet	0	0	0	0	100	100	100
110503. Water ice	0	0	0	1	55	54	55
12. Cakes	**32**	**0**	**144**	**57**	**60**	**10**	**240**
1201. Cakes, pies, pastries, etc.	15	0	127	35	75	20	272
1202. Dry cakes, biscuits	4	0	55	34	30	8	110
13. Non-alcoholic beverages	**1,693**	**745**	**3,339**	**100**	**1,668**	**651**	**3,510**
1300. Unclassified	0	0	0	2	300	78	900
1301. Fruit and vegetable juices	0	0	371	31	242	1	690
1302. Carbonated/soft/isotonic drinks, diluted syrups	167	0	988	50	483	192	1,363
1303. Coffee, tea and herbal teas	812	167	1,825	95	832	235	1,925
130301. Coffee	590	0	1,582	87	667	140	1,650
130302. Tea	0	0	700	35	337	144	1,400
130303. Herbal tea	0	0	283	9	275	160	1,500
130304. Chicory, substitutes	0	0	0	0	0	0	0
1304. Waters	313	0	1,875	67	552	45	2,272
14. Alcoholic beverages	**98**	**0**	**1,350**	**45**	**500**	**73**	**2,400**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	247	15	200	93	617
1402. Fortified wines (sherry, port, vermouth)	0	0	0	3	60	1	173
1403. Beer, cider	0	0	1,275	28	600	300	2,800
1404. Spirits, brandy	0	0	36	5	73	21	275
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	1	80	6	532
1407. Cocktails, punches	0	0	0	0	275	275	275
15. Condiments and sauces	**30**	**0**	**112**	**75**	**43**	**6**	**143**
1501. Sauces	29	0	112	71	44	7	142
150100. Unclassified and other sauces	6	0	69	37	35	4	120
150101. Tomato sauces	0	0	48	21	14	2	114
150102. Dressing sauces	0	0	25	16	23	4	74

Table C.8 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	36	26	23	5	80
150104. Dessert sauces	0	0	0	1	23	14	45
1502. Yeast	0	0	0	0	30	30	30
1504. Condiments	0	0	9	15	6	1	43
16. Soups, bouillon	**0**	**0**	**324**	**21**	**259**	**40**	**660**
1601. Soups	0	0	324	18	259	175	660
1602. Bouillon	0	0	13	3	40	10	308
17. Miscellaneous	**0**	**0**	**69**	**26**	**52**	**1**	**150**
1700. Unclassified	0	0	0	1	94	38	189
1701. Soya products	0	0	0	1	59	23	140
1702. Dietetic products	0	0	7	13	6	1	22
170200. Unclassified	0	0	0	0	38	38	38
170201. Artificial sweeteners	0	0	7	13	6	1	20
1703. Snacks	0	0	63	13	72	36	207

Table C.9 Food consumption (main food groups and all subgroups) of the Dutch female population aged 31 to 50 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**70**	**0**	**194**	**49**	**140**	**31**	**280**
0101. Potatoes	70	0	194	49	140	31	280
0102. Other tubers	0	0	0	0	108	108	108
02. Vegetables	**119**	**13**	**279**	**84**	**135**	**19**	**336**
0201. Leafy vegetables (except cabbages)	0	0	89	27	60	15	174
0202. Fruiting vegetables	30	0	163	49	67	6	240
0203. Root vegetables	0	0	73	17	50	3	227
0204. Cabbages	0	0	99	15	111	15	243
0205. Mushrooms	0	0	19	10	25	7	75
0206. Grain and pod vegetables	0	0	30	5	60	9	160
0207. Onion, garlic	4	0	38	35	20	2	80
0208. Stalk vegetables, sprouts	0	0	6	5	14	3	145
0209. Mixed salad, mixed vegetables	0	0	81	15	72	9	284
03. Legumes	**0**	**0**	**27**	**3**	**103**	**19**	**220**
0301. Legumes	0	0	27	3	103	19	220
04. Fruits, nuts and olives	**82**	**0**	**358**	**66**	**147**	**10**	**456**
0401. Fruits	74	0	342	58	150	8	464
0402. Nuts and seeds (+nut spread)	0	0	38	19	24	5	100
0403. Mixed fruits	0	0	0	1	125	49	236
0404. Olives	0	0	2	3	12	4	48
05. Dairy products	**296**	**36**	**744**	**95**	**309**	**22**	**843**
0501. Milk	86	0	491	51	252	15	608
0502. Milk beverages	0	0	137	6	258	128	567
0503. Yoghurt	42	0	367	38	216	100	540
0504. Fromage blanc, petits suisses	0	0	15	3	140	30	250
0505. Cheese (including fresh cheeses)	29	0	87	68	42	12	120
0506. Cream desserts, puddings (milk based)	0	0	120	15	150	60	283
0507. Dairy and non-dairy creams	0	0	16	11	12	3	103
050701. Dairy creams	0	0	16	11	12	3	103
050702. Non-dairy creams	0	0	0	0	3	3	36
0508. Milk for coffee and creamers	0	0	43	31	18	4	61
06. Cereals and cereal products	**175**	**71**	**345**	**99**	**170**	**48**	**402**
0601. Flour, flakes, starches, semolina	0	0	2	5	4	1	27
0602. Pasta, rice, other grain	0	0	172	29	127	40	320
0603. Bread, crisp bread, rusks	113	38	220	96	116	35	254
060301. Bread	107	34	215	91	115	45	245
060302. Crispbread, rusks	0	0	20	28	20	5	44
0604. Breakfast cereals	0	0	43	20	40	18	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	53	26	38	6	118
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	65	4	132	18	228
07. Meat and meat products	**76**	**0**	**189**	**86**	**88**	**15**	**225**
0701.Fresh meat	20	0	110	37	79	17	194
070100. Unclassified	0	0	46	8	69	22	164
070101. Beef	0	0	68	18	75	23	178
070102. Veal	0	0	0	0	76	76	76
070103. Pork	0	0	63	11	85	10	218
070104. Mutton/Lamb	0	0	0	1	79	13	125
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	78	17	75	6	178
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	75	17	75	6	178
070202. Turkey, young turkey	0	0	0	0	70	20	94
070203. Duck	0	0	0	0	79	79	79

Table C.9 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	0	0	0
0703. Game	0	0	0	0	178	178	178
0704. Processed meat	28	0	118	63	42	10	173
0705. Offals	0	0	0	0	67	25	67
08. Fish and shellfish	**0**	**0**	**84**	**17**	**80**	**11**	**218**
0801. Fish	0	0	78	12	80	11	200
0802. Crustaceans, molluscs	0	0	18	4	53	6	180
0803. Fish products, fish in crumbs	0	0	0	2	145	20	436
09. Eggs and egg products	**0**	**0**	**50**	**23**	**45**	**6**	**135**
0901. Egg	0	0	50	23	45	6	135
10. Fat	**20**	**1**	**48**	**92**	**21**	**3**	**55**
1000. Unclassified	0	0	12	10	12	2	29
1001. Vegetable oils	0	0	15	27	7	1	30
1002. Butter	0	0	16	12	15	3	52
1003. Margarines	12	0	37	75	15	2	45
1004. Deep frying fats	0	0	9	6	17	6	36
1006. Other animal fat	0	0	0	0	9	5	9
11. Sugar and confectionery	**27**	**0**	**122**	**78**	**34**	**4**	**160**
1100. Unclassified	0	0	0	0	2	2	2
1101. Sugar, honey ,jam	2	0	50	43	16	2	72
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	0	0	44	35	20	6	98
1103. Confectionery non-chocolate	0	0	31	29	15	1	80
1104. Syrup	0	0	31	16	21	5	90
1105. Ice cream, water ice	0	0	50	9	70	35	183
110501. Ice cream	0	0	50	7	86	43	236
110502. Sorbet	0	0	0	0	50	50	50
110503. Water ice	0	0	0	2	55	35	100
12. Cakes	**38**	**0**	**142**	**66**	**55**	**12**	**203**
1201. Cakes, pies, pastries, etc.	20	0	118	40	63	20	230
1202. Dry cakes, biscuits	9	0	53	42	30	8	95
13. Non-alcoholic beverages	**1,843**	**918**	**3,274**	**100**	**1,825**	**775**	**3,469**
1300. Unclassified	0	0	0	1	68	25	200
1301. Fruit and vegetable juices	0	0	424	34	242	13	720
1302. Carbonated/soft/isotonic drinks, diluted syrups	121	0	1,088	45	387	167	1,559
1303. Coffee, tea and herbal teas	833	188	1,900	97	831	250	1,954
130301. Coffee	397	0	1,075	72	533	133	1,235
130302. Tea	150	0	1,292	51	550	150	1,858
130303. Herbal tea	0	0	888	25	500	150	1,650
130304. Chicory, substitutes	0	0	0	1	550	3	1,375
1304. Waters	500	0	1,937	82	625	67	2,100
14. Alcoholic beverages	**0**	**0**	**396**	**27**	**208**	**34**	**925**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	308	18	200	60	740
1402. Fortified wines (sherry, port, vermouth)	0	0	1	3	83	2	250
1403. Beer, cider	0	0	175	4	483	165	3,000
1404. Spirits, brandy	0	0	0	2	92	2	214
1405. Aniseed drinks (pastis,..)	0	0	0	0	30	30	77
1406. Liqueurs	0	0	0	2	56	2	275
1407. Cocktails, punches	0	0	0	0	275	20	290
15. Condiments and sauces	**20**	**0**	**84**	**69**	**26**	**5**	**119**
1501. Sauces	19	0	84	63	29	6	125
150100. Unclassified and other sauces	1	0	50	30	29	4	108
150101. Tomato sauces	0	0	30	16	19	2	150
150102. Dressing sauces	0	0	21	20	17	4	54

Table C.9 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	23	22	14	4	48
150104. Dessert sauces	0	0	0	1	15	8	30
1502. Yeast	0	0	0	0	0	0	0
1504. Condiments	0	0	7	14	5	1	36
16. Soups, bouillon	**0**	**0**	**259**	**23**	**220**	**52**	**500**
1601. Soups	0	0	238	20	259	173	500
1602. Bouillon	0	0	19	4	113	4	500
17. Miscellaneous	**0**	**0**	**92**	**33**	**12**	**1**	**227**
1700. Unclassified	0	0	0	1	72	12	94
1701. Soya products	0	0	2	4	185	8	472
1702. Dietetic products	0	0	9	22	4	1	25
170200. Unclassified	0	0	0	1	75	25	600
170201. Artificial sweeteners	0	0	7	21	4	1	14
1703. Snacks	0	0	63	11	70	34	225

Table C.10 Food consumption (main food groups and all subgroups) of the Dutch male population aged 51 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=351).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**97**	**0**	**262**	**60**	**150**	**51**	**342**
0101. Potatoes	97	0	262	60	150	51	342
0102. Other tubers	0	0	0	0	150	150	150
02. Vegetables	**126**	**11**	**287**	**83**	**151**	**22**	**360**
0201. Leafy vegetables (except cabbages)	0	0	112	28	68	20	225
0202. Fruiting vegetables	19	0	140	43	79	6	239
0203. Root vegetables	0	0	73	12	28	3	219
0204. Cabbages	0	0	122	19	138	10	272
0205. Mushrooms	0	0	16	6	28	3	100
0206. Grain and pod vegetables	0	0	30	5	88	10	120
0207. Onion, garlic	0	0	58	32	29	3	114
0208. Stalk vegetables, sprouts	0	0	6	5	11	3	182
0209. Mixed salad, mixed vegetables	0	0	81	11	83	15	280
03. Legumes	**0**	**0**	**15**	**3**	**122**	**18**	**280**
0301. Legumes	0	0	15	3	122	18	280
04. Fruits, nuts and olives	**102**	**0**	**369**	**66**	**153**	**20**	**413**
0401. Fruits	85	0	345	59	153	25	403
0402. Nuts and seeds (+nut spread)	0	0	50	22	40	10	124
0403. Mixed fruits	0	0	0	1	90	9	332
0404. Olives	0	0	0	2	12	2	60
05. Dairy products	**378**	**48**	**943**	**97**	**367**	**29**	**958**
0501. Milk	129	0	629	54	283	16	850
0502. Milk beverages	0	0	142	7	227	100	567
0503. Yoghurt	63	0	352	40	238	100	540
0504. Fromage blanc, petits suisses	0	0	0	2	187	12	250
0505. Cheese (including fresh cheeses)	33	0	97	75	44	13	145
0506. Cream desserts, puddings (milk based)	0	0	192	24	192	60	278
0507. Dairy and non-dairy creams	0	0	17	11	20	4	64
050701. Dairy creams	0	0	17	11	20	4	64
050702. Non-dairy creams	0	0	0	0	0	0	0
0508. Milk for coffee and creamers	0	0	44	39	21	3	72
06. Cereals and cereal products	**198**	**75**	**376**	**99**	**180**	**66**	**422**
0601. Flour, flakes, starches, semolina	0	0	2	6	4	1	23
0602. Pasta, rice, other grain	0	0	175	23	168	60	350
0603. Bread, crisp bread, rusks	140	53	280	97	140	45	300
060301. Bread	135	45	273	96	140	50	294
060302. Crispbread, rusks	0	0	20	25	15	5	40
0604. Breakfast cereals	0	0	35	14	40	10	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	40	18	25	4	100
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	0	2	105	30	333
07. Meat and meat products	**118**	**22**	**290**	**92**	**125**	**26**	**318**
0701.Fresh meat	37	0	180	46	95	21	264
070100. Unclassified	0	0	66	9	90	21	182
070101. Beef	0	0	104	21	84	17	250
070102. Veal	0	0	0	1	105	74	234
070103. Pork	0	0	103	16	97	18	315
070104. Mutton/Lamb	0	0	0	1	168	76	240
070105. Horse	0	0	0	0	178	139	178
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	94	18	100	14	264
070200. Unclassified and other poultry	0	0	0	0	0	0	0
070201. Chicken, hen	0	0	94	17	98	14	264
070202. Turkey, young turkey	0	0	0	0	178	132	178
070203. Duck	0	0	0	0	0	0	0

Table C.10 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	144	144	144
0703. Game	0	0	0	1	42	14	188
0704. Processed meat	43	0	171	76	52	13	223
0705. Offals	0	0	0	0	88	88	145
08. Fish and shellfish	**0**	**0**	**110**	**18**	**96**	**18**	**280**
0801. Fish	0	0	101	15	93	16	280
0802. Crustaceans, molluscs	0	0	9	4	36	7	161
0803. Fish products, fish in crumbs	0	0	0	2	77	2	201
09. Eggs and egg products	**0**	**0**	**69**	**29**	**45**	**4**	**135**
0901. Egg	0	0	69	29	45	4	135
10. Fat	**30**	**6**	**68**	**97**	**31**	**4**	**76**
1000. Unclassified	0	0	12	11	10	1	40
1001. Vegetable oils	0	0	15	32	8	1	27
1002. Butter	0	0	15	14	14	2	50
1003. Margarines	21	0	56	87	24	4	60
1004. Deep frying fats	0	0	14	7	23	5	49
1006. Other animal fat	0	0	0	1	10	3	14
11. Sugar and confectionery	**31**	**0**	**111**	**74**	**40**	**5**	**150**
1100. Unclassified	0	0	0	0	15	5	15
1101. Sugar, honey ,jam	9	0	64	55	28	3	80
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	0	0	38	26	20	7	75
1103. Confectionery non-chocolate	0	0	19	17	12	2	50
1104. Syrup	0	0	23	11	20	5	60
1105. Ice cream, water ice	0	0	63	8	100	49	200
110501. Ice cream	0	0	63	8	100	49	200
110502. Sorbet	0	0	0	0	0	0	0
110503. Water ice	0	0	0	0	59	59	59
12. Cakes	**35**	**0**	**138**	**65**	**55**	**12**	**195**
1201. Cakes, pies, pastries, etc.	20	0	115	44	60	20	226
1202. Dry cakes, biscuits	5	0	48	39	26	8	81
13. Non-alcoholic beverages	**1,431**	**713**	**2,666**	**100**	**1,405**	**619**	**2,792**
1300. Unclassified	0	0	0	1	300	48	1,200
1301. Fruit and vegetable juices	0	0	352	32	208	1	600
1302. Carbonated/soft/isotonic drinks, diluted syrups	0	0	695	35	333	167	1,300
1303. Coffee, tea and herbal teas	802	350	1,613	99	800	300	1,640
130301. Coffee	555	0	1,149	93	563	160	1,313
130302. Tea	113	0	763	50	375	150	1,140
130303. Herbal tea	0	0	267	10	338	117	1,125
130304. Chicory, substitutes	0	0	0	0	377	375	750
1304. Waters	266	0	1,250	70	419	50	1,500
14. Alcoholic beverages	**180**	**0**	**1,100**	**59**	**370**	**73**	**1,500**
1400. Unclassified	0	0	0	0	50	50	93
1401. Wine	0	0	352	25	250	97	625
1402. Fortified wines (sherry, port, vermouth)	0	0	40	4	87	1	217
1403. Beer, cider	0	0	1,000	30	600	250	1,990
1404. Spirits, brandy	0	0	76	14	73	19	261
1405. Aniseed drinks (pastis,...)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	0	2	44	13	363
1407. Cocktails, punches	0	0	0	0	0	0	0
15. Condiments and sauces	**22**	**0**	**90**	**71**	**30**	**4**	**113**
1501. Sauces	20	0	85	66	30	4	120
150100. Unclassified and other sauces	9	0	52	40	30	4	100
150101. Tomato sauces	0	0	32	12	20	1	174
150102. Dressing sauces	0	0	15	16	12	2	52

Table C.10 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	23	19	16	4	70
150104. Dessert sauces	0	0	0	1	15	5	36
1502. Yeast	0	0	0	0	6	5	30
1504. Condiments	0	0	8	13	7	1	33
16. Soups, bouillon	**0**	**0**	**324**	**27**	**289**	**59**	**648**
1601. Soups	0	0	319	23	315	175	648
1602. Bouillon	0	0	30	5	175	20	500
17. Miscellaneous	**0**	**0**	**75**	**28**	**14**	**2**	**180**
1700. Unclassified	0	0	0	0	94	47	94
1701. Soya products	0	0	0	2	140	21	550
1702. Dietetic products	0	0	8	17	6	1	20
170200. Unclassified	0	0	0	0	23	23	30
170201. Artificial sweeteners	0	0	7	17	6	1	18
1703. Snacks	0	0	64	11	75	34	180

Table C.11 Food consumption (main food groups and all subgroups) of the Dutch female population aged 51 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week (n=353).

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
01. Potatoes and other tubers	**72**	**0**	**203**	**58**	**140**	**39**	**261**
0101. Potatoes	72	0	203	58	140	41	261
0102. Other tubers	0	0	0	0	39	39	39
02. Vegetables	**138**	**7**	**310**	**86**	**158**	**22**	**349**
0201. Leafy vegetables (except cabbages)	0	0	129	27	75	10	260
0202. Fruiting vegetables	23	0	137	46	71	7	234
0203. Root vegetables	0	0	89	16	43	2	230
0204. Cabbages	0	0	120	25	100	10	243
0205. Mushrooms	0	0	13	6	20	1	138
0206. Grain and pod vegetables	0	0	5	3	91	10	173
0207. Onion, garlic	1	0	48	33	19	2	114
0208. Stalk vegetables, sprouts	0	0	8	7	12	3	184
0209. Mixed salad, mixed vegetables	0	0	93	11	81	8	330
03. Legumes	**0**	**0**	**0**	**2**	**101**	**14**	**213**
0301. Legumes	0	0	0	2	101	14	213
04. Fruits, nuts and olives	**134**	**0**	**366**	**77**	**165**	**25**	**447**
0401. Fruits	128	0	366	73	165	27	447
0402. Nuts and seeds (+nut spread)	0	0	35	20	25	3	100
0403. Mixed fruits	0	0	0	2	50	9	180
0404. Olives	0	0	4	3	16	3	36
05. Dairy products	**298**	**33**	**804**	**96**	**304**	**26**	**832**
0501. Milk	52	0	528	49	258	14	765
0502. Milk beverages	0	0	142	6	258	103	464
0503. Yoghurt	76	0	351	45	202	65	522
0504. Fromage blanc, petits suisses	0	0	70	6	140	36	400
0505. Cheese (including fresh cheeses)	29	0	95	79	34	13	120
0506. Cream desserts, puddings (milk based)	0	0	144	15	144	48	272
0507. Dairy and non-dairy creams	0	0	16	13	17	3	64
050701. Dairy creams	0	0	16	13	17	3	64
050702. Non-dairy creams	0	0	0	1	20	2	63
0508. Milk for coffee and creamers	0	0	51	33	20	2	75
06. Cereals and cereal products	**153**	**62**	**265**	**99**	**140**	**50**	**344**
0601. Flour, flakes, starches, semolina	0	0	2	6	3	1	30
0602. Pasta, rice, other grain	0	0	120	20	140	35	285
0603. Bread, crisp bread, rusks	110	40	203	97	108	35	230
060301. Bread	105	35	198	93	105	35	225
060302. Crispbread, rusks	0	0	25	30	14	5	40
0604. Breakfast cereals	0	0	34	13	30	10	80
0605. Salty biscuits, aperitif biscuits, crackers	0	0	30	19	20	3	77
0606. Dough and pastry (puff, shortcrust, pizza)	0	0	23	4	75	18	240
07. Meat and meat products	**80**	**9**	**186**	**87**	**91**	**15**	**222**
0701.Fresh meat	36	0	121	44	80	22	182
070100. Unclassified	0	0	46	8	62	17	157
070101. Beef	0	0	80	20	78	26	178
070102. Veal	0	0	0	1	76	74	178
070103. Pork	0	0	75	16	80	16	200
070104. Mutton/Lamb	0	0	0	1	94	29	125
070105. Horse	0	0	0	0	0	0	0
070106. Goat	0	0	0	0	0	0	0
0702. Poultry	0	0	70	16	75	5	180
070200. Unclassified and other poultry	0	0	0	0	11	11	11
070201. Chicken, hen	0	0	67	15	70	5	178
070202. Turkey, young turkey	0	0	0	0	80	15	86
070203. Duck	0	0	0	0	262	262	262

Table C.11 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
070205. Rabbit (domestic)	0	0	0	0	125	125	125
0703. Game	0	0	0	0	112	49	112
0704. Processed meat	22	0	95	63	33	10	146
0705. Offals	0	0	0	0	105	4	210
08. Fish and shellfish	**0**	**0**	**101**	**20**	**76**	**5**	**280**
0801. Fish	0	0	101	16	76	5	304
0802. Crustaceans, molluscs	0	0	6	4	24	3	150
0803. Fish products, fish in crumbs	0	0	0	2	145	73	300
09. Eggs and egg products	**0**	**0**	**50**	**30**	**50**	**6**	**100**
0901. Egg	0	0	50	30	50	6	100
10. Fat	**20**	**4**	**50**	**94**	**22**	**4**	**55**
1000. Unclassified	0	0	5	7	7	0	34
1001. Vegetable oils	0	0	13	30	6	1	27
1002. Butter	0	0	21	20	12	2	46
1003. Margarines	13	0	40	79	17	3	46
1004. Deep frying fats	0	0	8	4	16	4	30
1006. Other animal fat	0	0	0	0	9	5	9
11. Sugar and confectionery	**20**	**0**	**103**	**74**	**25**	**3**	**133**
1100. Unclassified	0	0	0	0	2	1	5
1101. Sugar, honey ,jam	3	0	45	47	15	2	70
1102. Chocolate, candy bars, paste, chocolate confetti/flocks	0	0	33	30	20	5	58
1103. Confectionery non-chocolate	0	0	15	21	10	2	40
1104. Syrup	0	0	27	13	20	4	100
1105. Ice cream, water ice	0	0	60	7	86	25	150
110501. Ice cream	0	0	60	7	86	29	150
110502. Sorbet	0	0	0	0	25	25	25
110503. Water ice	0	0	0	0	54	54	54
12. Cakes	**35**	**0**	**118**	**70**	**45**	**10**	**168**
1201. Cakes, pies, pastries, etc.	20	0	105	45	55	20	171
1202. Dry cakes, biscuits	7	0	46	43	20	7	75
13. Non-alcoholic beverages	**1,662**	**788**	**3,172**	**100**	**1,651**	**704**	**3,245**
1300. Unclassified	0	0	0	0	330	300	330
1301. Fruit and vegetable juices	0	0	343	38	192	1	575
1302. Carbonated/soft/isotonic drinks, diluted syrups	0	0	450	23	300	192	967
1303. Coffee, tea and herbal teas	867	267	1,850	99	864	240	1,925
130301. Coffee	521	0	1,093	93	533	120	1,207
130302. Tea	225	0	1,037	59	450	150	1,320
130303. Herbal tea	0	0	438	19	330	133	1,200
130304. Chicory, substitutes	0	0	0	1	6	2	133
1304. Waters	543	0	1,894	85	640	130	2,000
14. Alcoholic beverages	**60**	**0**	**563**	**46**	**247**	**55**	**772**
1400. Unclassified	0	0	0	0	0	0	0
1401. Wine	0	0	429	35	247	80	600
1402. Fortified wines (sherry, port, vermouth)	0	0	38	7	75	1	217
1403. Beer, cider	0	0	140	4	600	150	1,960
1404. Spirits, brandy	0	0	18	4	57	3	456
1405. Aniseed drinks (pastis,..)	0	0	0	0	0	0	0
1406. Liqueurs	0	0	13	3	55	26	132
1407. Cocktails, punches	0	0	0	0	0	0	0
15. Condiments and sauces	**16**	**0**	**83**	**66**	**23**	**3**	**116**
1501. Sauces	16	0	79	62	24	4	116
150100. Unclassified and other sauces	6	0	56	38	23	4	108
150101. Tomato sauces	0	0	19	10	13	1	167
150102. Dressing sauces	0	0	15	15	15	2	46

Table C.11 continued

Food groups based on EPIC-Soft classification					On consumption days		
	median g/day	P5 g/day	P95 g/day	consumption days %	median g/day	P5 g/day	P95 g/day
150103. Mayonnaises and similars	0	0	15	17	10	3	44
150104. Dessert sauces	0	0	0	1	30	15	135
1502. Yeast	0	0	0	0	2	2	10
1504. Condiments	0	0	6	9	5	1	60
16. Soups, bouillon	**0**	**0**	**263**	**27**	**259**	**23**	**570**
1601. Soups	0	0	259	22	259	158	583
1602. Bouillon	0	0	27	6	65	13	300
17. Miscellaneous	**0**	**0**	**100**	**29**	**12**	**1**	**275**
1700. Unclassified	0	0	0	0	94	94	94
1701. Soya products	0	0	40	5	200	20	483
1702. Dietetic products	0	0	8	20	4	1	38
170200. Unclassified	0	0	0	1	92	12	600
170201. Artificial sweeteners	0	0	6	19	4	1	14
1703. Snacks	0	0	35	7	65	18	136

Appendix D Habitual intake distribution of n-3 fatty acids from foods and supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010)

Appendix D Habitual intake distribution of n-3 fish fatty acids (EPA & DHA) from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of the week.

n-3 fish fatty acids (EPA and DHA)	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	11	14	12	15	13	16	15	17	19	22	27	28
P25	32	36	33	36	35	39	39	42	51	54	70	70
P50	62	66	65	66	67	71	75	76	97	100	131	133
P75	122	120	126	117	124	126	137	133	179	189	239	264
P95	314	294	317	264	295	282	312	296	416	488	513	611
AI (mg/day) (EFSA[13])	250	250	250	250	250	250	250	250	250	250	250	250
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
AI (mg/day) (GR[17])	150	150	150	150	150	150	200	200	200	200	200	200
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	low/ns[b]

[a] ns = no statement
[b] 57, 64 years low

Appendix E Habitual intake distribution of micronutrients from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010)

Table E.1 Habitual intake distribution of vitamin A from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin A	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Retinol activity equivalent (µg/day)												
P5	281	283	325	285	358	293	402	319	440	347	460	390
P25	460	439	513	442	553	451	612	497	676	545	705	609
P50	642	597	696	597	737	607	811	676	902	750	947	839
P75	892	824	930	808	973	818	1,066	923	1,199	1,051	1,268	1,184
P95	1,407	1,385	1,374	1,282	1,417	1,285	1,559	1,491	1,766	1,772	1,926	1,981
EAR (µg/day) (GR[21])	300	300	440	440	600	510	620	530	620	530	610	530
% with intake < EAR	7	6	16	25	32	34	26	30	19	23	16	16
95% CI	3-9	3-9	12-20	21-29	27-38	30-40	22-31	26-35	15-22	19-27	11-19	12-20
Retinol (µg/day)												
P5	201	190	223	193	241	197	274	212	314	229	333	252
P25	349	319	375	322	395	325	445	353	510	384	539	421
P50	505	452	528	453	549	454	615	500	708	550	746	604
P75	721	640	736	634	755	634	837	705	973	796	1,033	878
P95	1,137	1,050	1,147	1,027	1,165	1,022	1,278	1,146	1,501	1,307	1,623	1,432
UL (µg/day) (EFSA[14])	1,500	1,500	1,500	1,500	2,000	2,000	3,000	3,000	3,000	3,000	3,000	1,500
% with intake > UL	1	1	1	0	0	0	0	0	0	0	0	4
95% CI	0-2	0-2	0-1	0-1	0-0	0-0	0-0	0-0	0-0	0-1	0-0	2-6

Table E.2 Habitual intake distribution of vitamin B_1 from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin B_1	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.5	0.6	0.7	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6
P25	0.7	0.8	0.9	0.8	1.0	0.8	1.1	0.9	1.1	0.9	1.1	0.9
P50	0.9	1.0	1.1	1.0	1.3	1.0	1.4	1.1	1.4	1.2	1.3	1.2
P75	1.2	1.3	1.4	1.2	1.6	1.3	1.7	1.5	1.8	1.7	1.7	1.7
P95	1.8	2.1	2.1	1.9	2.3	2.0	2.4	2.7	3.1	3.6	3.5	3.7
AI (mg/day) (GR[16])	0.5	0.5	0.8	0.8	1.1	1.1					1.1	1.1
Prevalence inadequate intake[a]	low	low	low	low	low	ns					low	low
EAR (mg/day) (GR[16])							0.8	0.8	0.8	0.8		
% with intake < EAR							4	19	4	15		
95% CI							2-5	15-22	2-5	12-17		

[a] ns = no statement

Table E.3 Habitual intake distribution of vitamin B_2 from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin B_2	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.7	0.8	0.9	0.8	1.0	0.8	1.0	0.8	1.1	0.8	1.0	0.9
P25	1.1	1.1	1.2	1.1	1.3	1.1	1.5	1.2	1.5	1.2	1.4	1.2
P50	1.4	1.4	1.6	1.4	1.7	1.4	1.8	1.5	1.9	1.6	1.8	1.6
P75	1.8	1.8	2.0	1.7	2.1	1.8	2.3	1.9	2.5	2.2	2.4	2.3
P95	2.8	2.6	2.8	2.6	3.0	2.9	3.2	3.3	3.8	4.4	4.0	4.2
AI (mg/day) (GR[16])	0.7	0.7	1	1	1.5	1.1						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (mg/day) (GR[16])							1.1	0.8	1.1	0.8	1.1	0.8
% with intake < EAR							7	5	5	4	8	4
95% CI							4-9	3-6	3-7	3-5	6-11	2-5

Table E.4 Habitual intake distribution of vitamin B_6 from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin B_6	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.8	0.8	1.0	0.9	1.2	1.0	1.4	1.1	1.4	1.1	1.3	1.0
P25	1.2	1.1	1.5	1.3	1.7	1.4	1.9	1.5	1.9	1.6	1.8	1.4
P50	1.5	1.4	1.9	1.6	2.2	1.8	2.4	2.0	2.4	2.1	2.3	1.9
P75	2.0	1.8	2.4	2.1	2.7	2.3	3.0	2.6	3.1	2.9	3.0	2.7
P95	3.1	2.8	3.5	3.2	3.8	3.7	4.2	4.7	4.7	5.4	5.0	5.6
AI (mg/day) (GR[19])	0.7	0.7	1.1	1.1	1.5	1.5						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (mg/day) (GR[19])							1.1	1.1	1.1	1.1	1.3	1.1
% with intake < EAR							1	6	1	6	5	9
95% CI							1-2	4-8	0-2	4-7	3-7	5-12
UL (mg/day) (EFSA[14])	10	10	10	10	15	15	25	25	25	25	25	25
% with intake > UL	0	0	0	0	0	0	0	1	0	0	0	1
95% CI	0-1	0-1	0-0	0-0	0-0	0-1	0-0	0-2	0-0	0-1	0-0	0-2

Table E.5 Habitual intake distribution of folate equivalent and synthetic folic acid from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Folate	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
Folate equivalents (µg/day)												
P5	91	97	117	109	139	120	161	137	181	154	189	164
P25	138	139	172	153	198	166	228	193	255	216	265	229
P50	184	177	224	193	251	208	288	249	323	282	334	294
P75	251	229	292	247	317	266	363	341	414	405	430	418
P95	461	433	464	405	455	451	541	626	660	761	730	755
AI (µg/day) (GR[19])	150	150	225	225	300	300						
Prevalence inadequate intake[a]	low	low	low/ns[b]	ns	ns	ns						
EAR (µg/day) (GR[19])							200	200	200	200	200	200
% with intake < EAR							15	28	9	18	7	14
95% CI							12-18	25-34	6-11	16-23	4-8	10-18
Folic acid (µg)												
P5	0	0	0	0	0	0	0	0	0	0	0	0
P25	2	2	1	2	0	2	1	7	1	7	3	5
P50	20	14	18	13	9	14	14	31	22	45	50	55
P75	61	43	58	43	49	47	56	90	92	132	129	148
P95	180	150	154	154	146	181	159	244	230	326	320	321
UL (µg/day) (EFSA[14])	400	400	400	400	600	600	1,000	1,000	1,000	1,000	1,000	1,000
% with intake > UL	1	0	0	1	0	0	0	0	0	0	0	0
95% CI	0-3	0-1	0-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] ns = no statement

[b] Male 12-13 years low; 9-11 years ns

Table E.6 Habitual intake distribution of vitamin B_{12} from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin B_{12}	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	1.5	1.7	1.9	1.7	2.3	1.8	2.6	2.0	2.8	2.1	2.9	2.3
P25	2.4	2.5	2.9	2.6	3.4	2.7	3.8	3.0	4.2	3.2	4.3	3.5
P50	3.2	3.3	3.8	3.4	4.4	3.6	4.9	3.9	5.4	4.2	5.6	4.5
P75	4.3	4.3	5.0	4.4	5.6	4.7	6.3	5.1	6.8	5.6	7.1	5.9
P95	6.9	6.5	7.2	6.4	8.0	7.2	8.9	8.4	9.7	10.6	10.3	10.8
AI (µg/day) (GR[19])	1.3	1.3	2	2	2.8	2.8						
Prevalence inadequate intake	low	low	low	low	low	low						
EAR (µg/day) (GR[19])							2	2	2	2	2	2
% with intake < EAR							1	6	1	4	1	2
95% CI							1-2	4-7	0-1	2-5	0-1	1-3

Table E.7 Habitual intake distribution of vitamin C from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin C	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	37	39	41	40	43	40	47	44	48	46	43	47
P25	62	65	68	65	70	66	75	71	78	76	71	78
P50	87	88	94	89	96	90	103	98	107	106	99	110
P75	119	119	128	120	129	121	138	135	146	150	137	157
P95	205	187	219	188	200	192	227	234	270	308	259	535
AI (mg/day)[a] (GR[62])	50	50	50	50	65	65	70	70	70	70	70	70
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[30])	22	22	39	39	63	56	75	60	75	60	75	60
% with intake < EAR	1	0	4	5	18	16	25	15	23	13	28	12
95% CI	0-1	0-1	2-5	3-6	15-22	13-18	21-30	13-18	19-27	10-16	22-33	8-15

[a] 10-12 years AI=55 mg/day; 13 years AI=65 mg/day; male 16-18 years AI=70 mg/day

Table E.8 Habitual intake distribution of vitamin D from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin D	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	1.2	1.1	1.4	1.1	1.6	1.2	1.8	1.3	2.1	1.5	2.3	1.7
P25	2.0	1.8	2.3	1.8	2.5	1.9	2.8	2.1	3.2	2.4	3.4	2.7
P50	2.8	2.5	3.0	2.5	3.3	2.6	3.7	2.9	4.2	3.3	4.4	3.8
P75	3.8	3.5	4.1	3.4	4.2	3.5	4.7	4.0	5.5	4.7	5.7	5.3
P95	6.3	5.8	6.3	5.5	6.1	5.4	6.7	6.3	8.0	7.9	8.5	8.7
AI (µg/day)[a] (GR[16])	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5
Prevalence inadequate intake[b]	low	low/ns[c]	low	low/ns[c]	low	low/ns[c]	low	low	low	low	ns	ns
UL (µg/day)[d] (EFSA[14])	25	25	25	25	50	50	50	50	50	50	50	50
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] 51-60 years AI=5.0 µg/day; 61-69 years AI=7.5 µg/day
[b] ns = no statement
[c] 7, 12-14 years low; 8, 15-18 years ns
[d] 9-11 years UL=25 µg/day; 12-13 year UL=50 µg/day

Table E.9 Habitual intake distribution of vitamin E from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Vitamin E	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	6.0	5.9	7.5	6.3	8.7	6.6	9.3	6.9	9.3	7.2	8.7	7.2
P25	8.7	8.4	10.6	8.9	11.9	9.1	12.7	9.7	12.9	10.3	12.0	10.4
P50	11.2	10.6	13.3	11.0	14.6	11.4	15.6	12.2	15.9	13.2	15.0	13.5
P75	14.7	13.4	16.9	13.8	17.9	14.1	19.1	15.5	19.9	17.8	19.0	18.1
P95	22.4	21.0	24.7	19.4	24.3	20.1	25.7	24.1	28.8	32.8	28.7	31.5
AI (mg/day)[a, b] **(GR[62])**	8.3	8.3	9.1	8.3	11.8	10.6	13.0	9.9	11.8	9.3	10.7	8.7
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[30])	6	6	9	9	12	12	12	12	12	12	12	12
% with intake < EAR	5	5	13	26	26	56	20	48	19	40	25	39
95% CI	2-9	2-9	9-16	22-30	22-31	51-61	16-23	42-52	14-22	36-45	20-31	34-47
UL (mg/day) (EFSA[14])	160	160	160	160	220	220	300	300	300	300	300	300
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-1

[a] Boys/men 9 years AI=9.1 mg/day, 10-12 years AI=10.1 mg/day, 13 years AI=11.8 mg/day, 16-18 years AI=13.3 mg/day; 19-21 years AI=13 mg/day; 22-30 years AI=11.8 mg/day

[b] Girls/women 9 years AI=8.3 mg/day, 10-12 years AI=9.5 mg/day, 13 years AI=10.6 mg/day, 16-18 years AI=11.0 mg/day, 19-21 years AI=9.9 mg/day, 22-30 year AI=9.3 mg/day

Table E.10 Habitual intake distribution of calcium from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Calcium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	463	461	507	466	537	477	594	510	641	550	603	574
P25	695	674	756	677	795	693	864	732	922	786	878	819
P50	892	852	964	856	1,010	872	1,091	918	1,154	983	1,109	1,026
P75	1,121	1,058	1,207	1,064	1,262	1,078	1,353	1,136	1,421	1,211	1,372	1,266
P95	1,505	1,408	1,623	1,418	1,692	1,433	1,791	1,501	1,869	1,602	1,818	1,686
AI (mg/day) (GR[16])	700	700	700	700	1,200	1,100	1,000	1,000	1,000	1,000	1,100	1,100
Prevalence inadequate intake[a]	low	low	low	low	ns	ns	low	ns	low	low/ns[b]	low/ns[b]	ns
UL (mg/day) (EFSA[14] & GR[16])	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] ns = no statement

[b] Female 36, 42, 46, 48-50 years low; female 31-35, 37-41, 43-45 years ns; male 51-61 years low; male 62-69 years ns

Table E.11 Habitual intake distribution of copper from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Copper	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	0.6	0.6	0.7	0.6	0.8	0.7	0.9	0.7	0.9	0.8	0.8	0.7
P25	0.8	0.7	0.9	0.8	1.0	0.9	1.1	0.9	1.2	1.0	1.1	1.0
P50	0.9	0.9	1.1	1.0	1.2	1.0	1.3	1.1	1.4	1.2	1.3	1.2
P75	1.1	1.1	1.3	1.1	1.4	1.2	1.6	1.4	1.6	1.4	1.5	1.4
P95	1.6	1.4	1.8	1.5	1.8	1.6	2.0	1.9	2.3	2.1	2.1	2.2
EAR (mg/day) (IOM[32])	0.34	0.34	0.54	0.54	0.685	0.685	0.7	0.7	0.7	0.7	0.7	0.7
% with intake < EAR	0	0	1	1	1	6	1	3	0	2	1	3
95% CI	0-0	0-0	0-1	1-2	0-2	4-8	0-1	2-5	0-1	1-3	0-2	1-4
UL (mg/day) (EFSA[14])	3	3	3	3	4	4	5	5	5	5	5	5
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

Table E.12 Habitual intake distribution of iron from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Iron	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	5.2	5.2	6.0	5.5	6.9	5.7	7.8	6.4	8.4	7.0	7.9	7.2
P25	7.0	6.7	8.0	7.1	8.9	7.4	10.0	8.2	10.7	9.0	10.2	9.2
P50	8.4	8.0	9.6	8.4	10.5	8.7	11.8	9.8	12.6	10.7	12.0	10.9
P75	10.2	9.5	11.6	9.9	12.4	10.3	13.8	11.8	14.9	13.0	14.1	13.1
P95	14.3	12.9	15.9	13.0	16.1	14.5	17.7	16.9	20.6	20.6	19.2	20.0
AI (mg/day)[a, b] (GR[62])	8	8	8	8	15	12	11	16	9	15	9	8
Prevalence inadequate intake[c]	low	low	low/ns[d]	low/ns[d]	ns	ns	low/ns[d]	ns	low	low/ns[d]	low	low
EAR (mg/day) (IOM[32])	4.1	4.1	5.9	5.7	7.7	7.9	6	8.1	6	8.1	6	5

[a] Boys/men: 10-12 years AI=10 mg/day

[b] Girls/women: 10-12 years AI=11 mg/day; 13 years AI=12 mg/day; 16-18 years AI=14 mg/day; 22-30 years AI=15 mg/day; 50 years AI=8 mg/day

[c] ns = no statement

[d] Female 10-13, 31-49 years ns; female 9, 50 years low; male 9, 20-30 years low; male 10-13, 19 years ns

Table E.13 Habitual intake distribution of magnesium from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Magnesium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	152	148	181	164	216	177	255	198	279	219	258	228
P25	201	192	238	209	277	225	323	250	351	276	328	286
P50	242	226	284	246	326	264	378	292	408	321	383	332
P75	289	265	336	286	381	306	438	340	472	372	445	386
P95	372	328	423	355	472	381	536	421	576	471	548	497
AI (mg/day)[a] (GR[62])	120	120	120	120	220	210	300	250	300	250	300	250
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[28])	110	110	200	200	340	300	330	255	350	265	350	265
% with intake < EAR	0	0	10	19	57	72	28	28	25	20	35	16
95% CI	0-1	0-1	7-11	14-22	53-62	70-74	25-32	23-30	20-28	15-22	30-39	14-17
Magnesium from supplements only (mg/day)												
P5	0	0	0	0	0	0	0	0	0	0	0	0
P25	0	0	0	0	0	0	0	0	0	0	0	0
P50	0	0	0	0	0	0	0	0	0	0	0	0
P75	2	0	1	0	0	0	0	4	0	6	0	16
P95	35	31	30	24	19	28	21	49	63	89	47	99
UL[b] (mg/day)	250	250	250	250	250	250	250	250	250	250	250	250
% with intake > UL	0	0	0	0	0	0	0	0	0	1	0	2
95% CI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-1	0-0	0-1	0-1	1-3

[a] 10-12 years AI=150 mg/day; 13 years AI=220 mg/day; male 16-18 years AI=275 mg/day; female 16-18 years AI=225 mg/day

[b] Upper level for intake of magnesium from supplements only

Table E.14 Habitual intake distribution of phosphorus from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Phosphorus	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	712	707	898	783	1,061	829	1,194	873	1,230	900	1,170	920
P25	947	943	1,175	1,026	1,363	1,080	1,509	1,129	1,548	1,162	1,482	1,184
P50	1,137	1,130	1,393	1,217	1,599	1,274	1,753	1,329	1,794	1,365	1,725	1,387
P75	1,348	1,328	1,635	1,424	1,851	1,482	2,020	1,545	2,064	1,584	1,989	1,606
P95	1,687	1,634	2,017	1,746	2,259	1,812	2,445	1,888	2,493	1,929	2,403	1,952
AI (mg/day)[a] (GR[62])	600	600	600	600	700	700	700	700	700	700	700	700
Prevalence inadequate intake	low	low	low	low	low	low	low	low	low	low	low	low
EAR (mg/day) (IOM[28])	405	405	1,055	1,055	1,055	1,055	580	580	580	580	580	580
% with intake < EAR	0	0	14	28	5	22	0	0	0	0	0	0
95% CI	0-0	0-0	11-17	25-33	3-6	19-26	0-0	0-0	0-0	0-0	0-0	0-0

[a] Boys 10-12 years AI=900 mg/day; girls 10-12 years AI=700 mg/day; male 16-18 years AI=800 mg/day

Table E.15 Habitual intake distribution of potassium from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Potassium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	1,481	1,499	1,794	1,607	2,147	1,717	2,498	1,888	2,736	2,100	2,636	2,210
P25	1,983	1,974	2,355	2,095	2,744	2,211	3,167	2,417	3,458	2,659	3,313	2,776
P50	2,383	2,349	2,794	2,468	3,213	2,595	3,679	2,822	3,997	3,083	3,838	3,208
P75	2,816	2,753	3,281	2,879	3,717	3,014	4,232	3,260	4,576	3,544	4,410	3,669
P95	3,522	3,390	4,066	3,519	4,511	3,672	5,101	3,942	5,479	4,253	5,320	4,387
AI (mg/day) (IOM[34])	3,800	3,800	4,500	4,500	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700
Prevalence inadequate intake[a]	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

[a] ns = no statement

Table E.16 Habitual intake distribution of selenium from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Selenium	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
µg/day												
P5	20	20	25	22	30	24	34	26	36	28	34	29
P25	27	26	33	29	39	31	44	35	47	37	45	38
P50	33	32	40	35	46	37	53	42	57	45	54	46
P75	40	39	49	42	56	45	63	52	69	57	65	58
P95	55	56	66	58	73	62	83	79	94	91	91	88
AI (µg/day)[a] (GR[62])	20	20	20	20	40	40	50	50	50	50	50	50
Prevalence inadequate intake[b]	low	low	low	low/ns[c]	low/ns[c]	ns	low/ns[c]	ns	low	ns	low	low/ns[c]
EAR (µg/day) (IOM[30])	23	23	35	35	45	45	45	45	45	45	45	45
% with intake < EAR	11	13	32	51	45	75	28	58	21	49	26	46
95% CI	6-17	8-18	26-36	46-55	40-50	71-80	24-33	54-64	16-26	46-54	21-31	40-51
UL (µg/day) (EFSA[14])	130	130	130	130	200	200	300	300	300	300	300	300
% with intake > UL	0	0	0	0	0	0	0	0	0	0	0	0
95% CI	0-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

[a] 10-12 years AI=30 µg/day; 13 years AI=40 µg/day; male 16-18 years AI=50 µg/day; female 16-18 years AI=45 µg/day

[b] ns = no statement

[c] Female 9-12, 54 years low; female 13, 51-53, 55-69 years ns; male 14-15, 20-30 years low; male 16-19 years ns

Table E.17 Habitual intake distribution of zinc from foods and dietary supplements by the Dutch population aged 7 to 69 years (DNFCS 2007-2010), weighted for socio-demographic factors, season and day of week (n=3,819).

Zinc	7-8 years		9-13 years		14-18 years		19-30 years		31-50 years		51-69 years	
	male (n=153)	female (n=151)	male (n=351)	female (n=352)	male (n=352)	female (n=354)	male (n=356)	female (n=347)	male (n=348)	female (n=351)	male (n=351)	female (n=353)
mg/day												
P5	4.9	4.9	6.1	5.4	7.1	5.8	8.1	6.3	8.6	6.6	8.2	6.8
P25	6.6	6.5	8.0	7.1	9.2	7.5	10.4	8.1	11.0	8.5	10.5	8.8
P50	8.0	7.8	9.7	8.4	10.9	8.8	12.2	9.6	13.0	10.1	12.5	10.5
P75	9.7	9.2	11.7	9.9	12.9	10.4	14.3	11.6	15.5	12.4	14.8	12.7
P95	13.4	12.3	15.7	13.1	16.7	13.8	18.2	16.3	21.6	19.0	20.6	18.5
EAR (mg/day) (IOM[32])	4	4	7	7	8.5	7.3	9.4	6.8	9.4	6.8	9.4	6.8
% with intake < EAR	1	1	13	24	16	22	14	9	10	6	13	5
95% CI	0-2	0-2	9-14	21-27	13-19	19-27	12-17	7-11	7-12	4-8	9-17	3-7
UL (mg/day)[a] (EFSA[14])	13	13	13	13	18	18	25	25	25	25	25	25
% with intake > UL	6	4	8	3	1	0	0	0	3	1	2	1
95% CI	3-9	2-7	5-9	2-4	0-1	0-1	0-1	0-1	1-4	0-1	1-3	0-2

[a] 9-10 years UL=13 mg/day; 11-14 years UL=18 mg/day; 15-17 years UL=22 mg/day; 18 years UL=25 mg/day

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RIVM Report 350050006/2011

Dutch people still consume insufficient fruit, vegetables, fish and fibre. Improvement of the type of fat in the diet by the reduction of trans fatty acids in foods is a favourable development. However, the proportion of saturated fatty acids in the diet is still high and overweight is common. These are conclusions of a recent food consumption survey by the National Institute for Public Health and the Environment (RIVM), carried out between 2007 and 2010 among children and adults aged 7 to 69 years, in the Netherlands.

A healthy dietary pattern is important to prevent obesity and chronic diseases. The survey provides insight into food consumption. The data can be used to support policy regarding healthy and safe foods, for improving food supply and in food education and research.

Published by:

National Institute for Public Health and the Environment
P.O. Box 1 | 3720 BA Bilthoven
The Netherlands
www.rivm.nl

October 2011

002788