# The DAFNE V project

Expansion of the DAFNE databank to new European Union Member States: Data Food Networking, based on household budget surveys.

**Agreement No SPC.2003117**

# Final Implementation Report of the DAFNE V project


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| **Republic of Slovenia (SI)** | Institute of Public Health of the Republic of Slovenia |
| **Slovak Republic (SK)** | Food Research Institute |

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## *II. The Data Food Networking (DAFNE) initiative*

Both nationally and internationally, nutrition monitoring calls for sources of dietary data that would provide a regular and comparable flow of information. There are several individual-based dietary surveys undertaken in Europe, but the lack of periodicity in data collection, the variability in the methods of both data collection and analysis and the coverage only of some European regions limit the undertaking of national and international comparisons. Last but not least, the demanding nature of individual-based dietary surveys, in terms of both expertise and financial resources, restrict their wide applicability. A central element, however, in formulating nutrition policy in Europe is comparability and coverage of all the European Union Member States. Data collected through the national household budget surveys (HBS) on the other hand, possess several attributes that address the aforementioned limitations.

The HBS are undertaken using harmonized methodologies in all European countries and the collected data are nationally representative, detailed enough, linked to explanatory demographic and socio-economic factors and updated on a regular basis.

The potential of exploiting the food and socio-demographic HBS data in order to develop a European databank has been evaluated through the DAFNE initiative[1], which has been successful in :

- developing the methodology for post-harmonising the HBS data so as to be integrated in a dynamic database, which serves as a source of comparable between countries information on dietary determinants, as these are prioritised in the European Community Health Indicators (ECHI) list (http://ec.europa.eu/health/ph_information/dissemination/echi/echi_en.htm ).
- increasing the understanding of dietary habits and of the socio-economic determinants shaping them, in countries where such data are limited or non-existent.
- providing data to tackle inequalities in health that stem from socio-economic disparities in the dietary choices of the populations.
- following up time trends in nutritional practices of nationally representative population samples.

As evidenced through a number of publications and reports the DAFNE data have been used to:
(a) identify dietary patterns prevailing in Europe and their socio-demographic determinants[2,3]
(b) follow-up time trends in the food habits of European populations[4,5]
(c) develop the methodology to estimate the daily energy and nutrient intake of nationally representative population samples[6]
(d) calculate the intake of additives and contaminants, using novel and sophisticated statistical modelling[7]
(e) evaluate ecological associations with diet and morbidity/mortality data[8], and to
(f) evaluate nutrition action plans and related strategies implemented at national or international level.[9,10]

The DAFNE data are integrated in a web-based application, the *DafneSoft* (http://www.nut.uoa.gr/Dafnesoftweb/), which allows free access to comparable between countries information on the daily individual food availability. The application allows the user to monitor dietary choices and patterns within and between countries and to follow trends in food availability in Europe, using data presented in tables, bars, pie charts and maps. *DafneSoft* further allows for cross-linkages of food availability data with socio-economic and demographic indicators. The applications of the DAFNE data, as these are described above, further evidence how the DAFNE databank can be a useful tool in addressing the objectives of several of the projects included in the Working Party on Lifestyle and Nutrition.

When the DAFNE V project was launched, the databank comprised data of 16 European countries (namely: Austria, Belgium, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Norway, Poland, Portugal, Spain, Sweden and the UK) and through this project, the Coordinating Centre was successful in enriching the databank with information collected in five new EU Member States (Cyprus, Latvia, Malta, Republic of Slovenia and the Slovak Republic), as well as with information collected through the most recent Greek HBS of 2004-05.

## *III. The DAFNE V project - Objectives*

The DAFNE V project aimed at establishing in the European Union (EU) and in the new Member States (MS) a nutrition monitoring system, which will be based on compatible and comparable between countries dietary data. This nutrition monitoring system will contribute in:

- increasing the understanding of dietary habits and of the socio-economic factors shaping them, in countries where such data are limited or non-existent. These data are essential in supporting national efforts for improving the nutrition of the population.

- integrating regularly updated food and related data into a cost-effective databank, which serves as a source of comparable between countries nutrition indicators.

- providing data to tackle inequalities in health that stem from socio-economic disparities in the dietary choices of the populations.

- following up changes of food availability in the new MS during recent years.

- identifying health challenges that the new MS may face.

- enlarging the already operating DAFNE food databank, so as to include data of 20 EU MS and Norway, strengthening thus the capacity to plan and assess nutrition strategies and interventions within the enlarged EU.

In the context of the DAFNE V project, the Athens Coordinating Centre was further granted EC support for acquiring the Greek HBS data undertaken in 2004/05. This development enriched both the project's objectives and deliverables with the potential of analysing data from one additional country and reporting on trends in the food choices of the Greek population from 1981 to 2005.

To better employ the potential of the DAFNE database and to ensure an efficient dissemination of the results, the Coordinating Center integrated the DAFNE data in the *DafneSoft*, which is directly accessible through the website of the DAFNE Coordinating Centre (http://www.nut.uoa.gr/Dafnesoftweb/).

## *IV. The DAFNE V project - Material and Methods*

### *Material*

The DAFNE V project was aiming at enriching the DAFNE databank with harmonized information from five new EU Member Sates and Greece. The year and the procedures of data collection and storage, the methodological characteristics and other general information regarding the datasets which were integrated in the context of the DAFNE V project are presented in Appendix I. The information included in Appendix I summarizes the results of an inventory disseminated to and completed by all data providers, with the objective to understand the methodological attributes of each dataset and to evaluate the feasibility of comparisons between the participating countries.

In the case of Slovenia the data provided to the DAFNE V project are based on the HBSs carried out in 1998, 2000 and 2002. Since 1997, the Slovenian HBSs is a continuous survey undertaken on yearly rounds in samples of approximately 1,300 households. In agreement to the usual practice of the Slovenian Statistical Office when data are to be provided for further use, three datasets indicated as: "Survey of 1998"; "Survey of 2000" and "Survey of 2002" were prepared. In order to increase the sample size, the following procedure was applied by the Slovenian Statistical Office. The procedure is described on the basis of the "2002" dataset, but similar is the case for the other two. The 2002 dataset includes the data collected in 2002, as well as imputed data collected in 2001 and in 2003. The 2001 and 2003 data, before being added in the dataset, were adjusted taking into account the information collected in 2002, so that the new adjusted datasets include the information these households would have recorded if they participated in 2002 (imputations were made on the basis of the households' characteristics). The 2002 dataset was thus based on a sample of 3687 households (11652 members) distributed through three years period. All types of private households were included, while institutional

households were excluded. The response rate was 76.6 % and differed seasonally and regionally.

Similar is the case for the "1998" and the "2000" data. This means that the "1998" dataset includes the 1998 original data, as well as data collected in 1997 and 1999, but imputed on the basis of the 1998 dataset. Similarly, the "2000" dataset includes the 2000 original data, as well as imputed data collected in 1999 and 2001.

## *Methods*

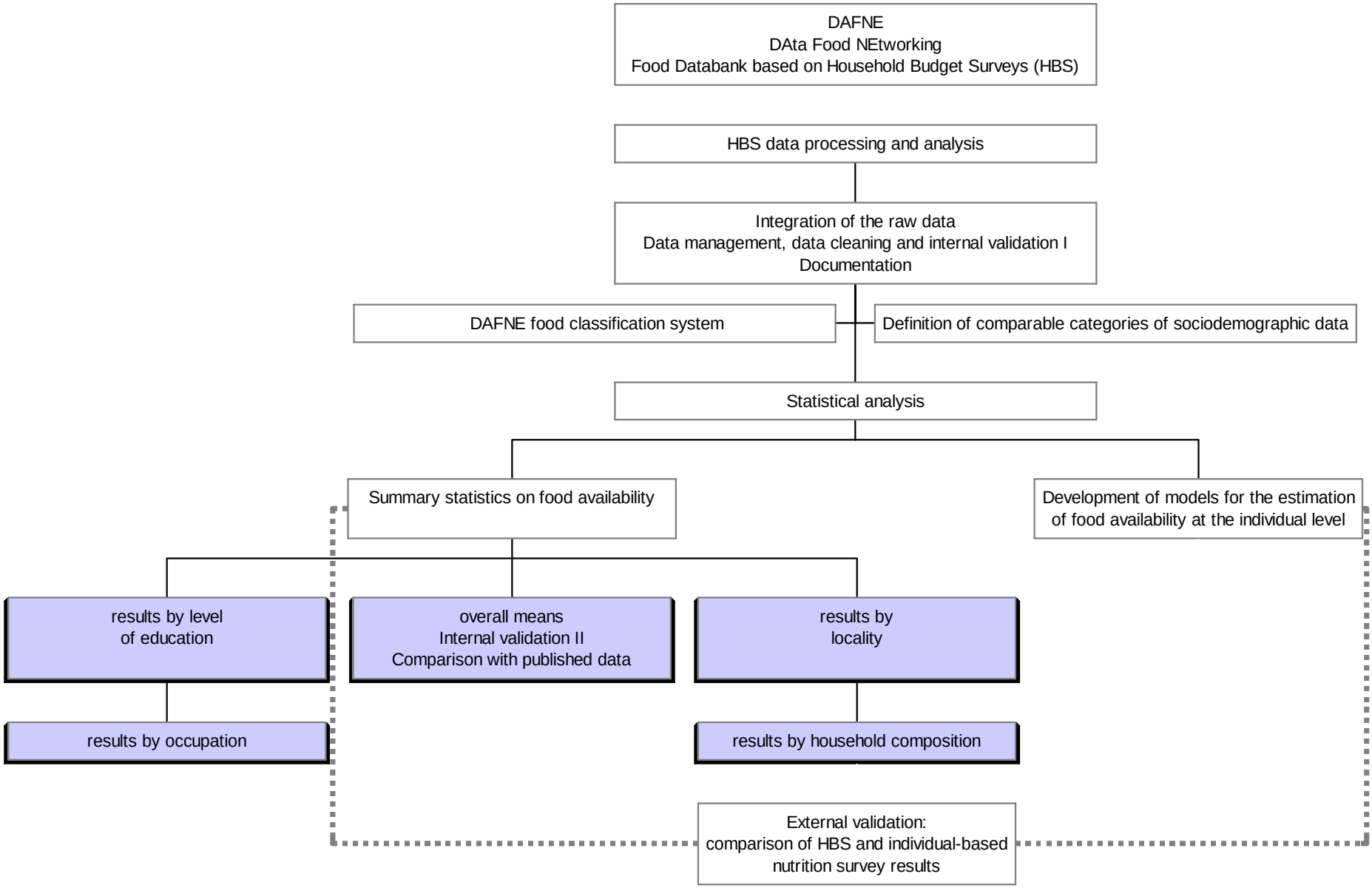
The tasks undertaken in the context of the DAFNE V project can be summarized in the following:

**Integrating new datasets in the DAFNE databank**

Tasks 1-4, as well as their interrelations are presented in a Pertt diagram (Figure 1). In brief, the procedures included the:

- management and processing of the raw food, demographic and socio-economic information collected in the HBS of the participating countries
- documentation of the HBS variables, which would be used in the analysis
- incorporation of the raw HBS data of each participating country in the central database, operating at the Coordinating Centre
- harmonization of the food, and socio-demographic information collected in the national HBSs
- estimation of the average daily food availability for the overall population and for population groups, defined according to socio-demographic indicators.

Figure 1: The Household Budget Survey data processing and analysis in the context of the DAFNE initiative



Management, Processing, Documentation and Incorporation of raw HBS data of each participating country in the central database

All datasets, together with their file descriptions, were prepared and provided by the national Statistical Offices to the Athens centre. In the majority of the cases, data were generally stored in either ASCII or SPSS files, with size and structure varying due to different sample sizes and variables provided. All datasets included information at least on the following variables:

**1. General information**

- household identification number
- trimester of participation

**2. Nutritional information (purchases, own production and contributions in kind)**

- food code
- total food expenditure (food expenditures outside the household included)
- expenditure per food item
- expenditure for meals out of home
- amounts per food item
- type of acquisition (purchases, own production and contributions in kind)

**3. Socioeconomic information**

- degree of urbanisation of household (urban, rural , semi-urban)
- number of inhabitants in the area where the household is situated
- population density of the area
- name of geographical area
- household size
- age and gender of household head and members
- relationship of household members with the household head
- household disposable income (net income)
- household total expenditure
- occupation / employment status / economic activity of household head and members
- education of household head and members
- income of household head
- data on the household's medical expenses

The understanding and correct reading of the data by the DAFNE coordinating team was evaluated through samples of random households which were sent to each country for cross-checking. Before finalizing the data integration in the central DAFNE database, the Athens team proceeded to checking of the data consistency by:

- estimating range of values
- evaluating the agreement between overlapping variables (e.g. age given in discrete years and in age groups)
- cross-tabulating categorical variables with connected content (e.g. the age of the household head and his/her employment status).
- identifying and estimating the extent of missing data for the variables that would be considered in the analysis.

The raw DAFNE data are stored and maintained in a Microsoft SQL Server 2000 DBMS on a Windows 2003 Server Operating System. For the verification and cleaning of the data, a visual FoxPro tool was used by the data managers of the Coordinating Centre. The data are stored per country/per survey year. The raw DAFNE data can be queried by users who login through the Department of Hygiene and Epidemiology's VLAN. Any user, except the Administrator, has only "view" privileges.

Harmonization of the food, demographic and socio-economic information collected in the national HBSs.

*The DAFNE food classification scheme*

The development of a common classification system that would allow international comparisons of dietary data is a central element in the development of a European food databank. In the DAFNE project, the process of post-harmonisation included the establishment of operational criteria for the classification of the national food codes, iterative cross-coding, as well as working group meetings and bilateral visits to address specific problems. This harmonisation procedure has resulted in the *DAFNE Food Classification System*, which allows grouping the HBS-collected food data into 56 common subgroups, which can be further aggregated at various levels ending up at 15 main food groups (Table 1).

In several cases, the recorded food items are grouped into pre-defined food codes, which can often be of an aggregated nature. As an example, a food code described as *minced meat* was recorded with no indication or details on which particular type of minced meat (beef or pork) the households reported consuming. To address this limitation, factors assigning the relative importance of food items in the corresponding code were used to allow for the eating habits and preferences of the population. These factors were determined either by a group of nutrition experts in the participating Insitutes, who examined the list of items in each aggregated code and discussed about the expected contribution, or through data on the populations' eating preferences collected in the national Food Balance Sheets or through specially designed dietary surveys. In particular, in the analysis of the Slovakian data, percentage contribution factors were estimated on the basis of information on food consumption in the country collected through the *Statistics of Food Consumption* project (Grant Agreement NO-66200.2005.001-2005.657).

In accordance to the DAFNE procedures, the Athens team has been closely collaborating with nutritionists from each country participating in the DAFNE V project in classifying the recorded food variables under the comparable between countries scheme. All food classifications, separately for each of the HBS dataset analysed in the context of the DAFNE V project, are included in Appendix II.

**Table 1: The DAFNE Food Classification Scheme**

| | |
|---|---|
| **Cereals and cereal products** | **Vegetables** |
| Bread and rolls | FRESH VEGETABLES |
| Bakery products (bread and rolls excluded) | Green leafy vegetables |
| Rice, cereals and products (flour and pasta excluded) | Cabbage |
| Flour | Tomatoes |
| Pasta | Carrots |
| **Meat, meat products and dishes** | Onions, garlic and leek |
| RED MEAT | Other fresh vegetables |
| Pork meat (fresh and frozen) | PROCESSED VEGETABLES |
| Beef, veal and calf meat (fresh and frozen) | **Fruits** |
| Red meat, other than pork and beef (fresh and frozen) | FRESH FRUITS |
| OFFAL (fresh and frozen) | Apples |
| POULTRY (fresh and frozen) | Citrus fruits |
| CANNED MEAT AND MEAT PRODUCTS | Bananas |
| MEAT DISHES | Grapes |
| **Fish, seafood and dishes** | Plums |
| Fish (fresh, frozen and processed) | Berries |
| Seafood | Apricots and peaches |
| Fish dishes | Cherries and sour cherries |
| **Milk and milk products** | Pears |
| Milk | Other fresh fruits |
| Cheese | PROCESSED FRUITS |
| Milk products (cheese excluded) | **Fruit and vegetable juices** |
| **Eggs** | Fruit Juices |
| **Added lipids** | Vegetable Juices |
| LIPIDS OF ANIMAL ORIGIN | **Sugar and sugar products** |
| Butter | Sugar |
| Animal fat (butter excluded) | Sugar products |
| LIPIDS OF VEGETABLE ORIGIN | **Non-alcoholic beverages** |
| Vegetable fat | STIMULANTS |
| Margarine | Coffee |
| Vegetable fat (margarine excluded) | Tea and similar infusions |
| Vegetable oils | Cocoa |
| Olive oil | MINERAL WATER |
| Seed oils (olive oil excluded) | SOFT DRINKS |
| **Potatoes and other starchy roots (potato products included)** | **Alcoholic beverages** |
| **Pulses** | Wine |
| **Nuts** | Beer |
| | Spirits |

*Conversion of food expenses to food quantities*

The food data collected in the HBSs refer to the household's expenses, as well as the acquired food quantities. However, since the primary aim of the HBSs is the derivation of national price indices, attention is given to ensure the complete recording of expenses and data on food quantities (in terms of grams or mL) are either missing or incomplete.

In the case of the Cypriot surveys, for example, data refer only to expenses for food acquisition and a methodological approach was developed and applied in order to convert money spent into acquired quantities. The approach was based on a methodology previously developed and evaluated in the DAFNE network[11] and adopted to serve the characteristics of the Cypriot data.

The method for converting food expenditure to quantity data included the application of retail prices per unit weight, retrieved from three sources:

1. The Cypriot Statistical Office, providing prices per unit weight for approximately half of the recorded food codes (Source: Consumer Price Index Unit of the National Statistical Service).
2. The Ministry of Commerce, through which monthly data on the price per unit weight of a number of food items were retrieved. For items that were available from both sources (Statistical Office and Ministry of Commerce) the level of difference was assessed.
3. Retail prices collected from outlets ranging from small local shops to hypermarkets. Personnel from the Cypriot Ministry of Health surveyed shelves in each shop taking note of retail prices per unit weight for the requested items. When the product was available in different brands (and thus in different prices), the average one was calculated. For each food item, retail prices were collected from three different shops/outlets and the mean value was estimated. Values were further adjusted to the survey year using the Consumer Price Index provided by the National Statistical Office and were finally applied to the expenditure data.

For selecting the conversion factors to be applied, the three sources were prioritized in the following order: (1) Cypriot Statistical Office, (2) Ministry of Commerce and (3) Adjusted retail prices.

Prices per unit weight were also applied in the analysis of data collected in the Slovak Republic as, for some food codes, the information on food quantities was not complete. In these cases, expenses were converted to their respective quantities using data on prices per

unit weight either directly available through consumption price statistics or estimated by experts of the participating Institutes using information collected in consumption price statistics.

*The DAFNE Classification Scheme for socio-demographic data*

Several socio-demographic characteristics are recorded in the HBSs and many of them are included in the final roster of variables to be studied. Focus was, however, put on the locality of the residence, the educational status and occupation of the household head, and on the household's composition. Variables related to the above characteristics and recorded at national level were classified under common between countries groupings, formed through the establishment of operational criteria taking into consideration recommendations developed in the context of the Health Monitoring Programme of DG-SANCO of the European Commission.[12] More specifically:

- Locality of the residence

Using various criteria (e.g. number of inhabitants, population density) the following three categories of locality were formed:

- rural,
- semi-urban and
- urban

Information on the degree of urbanisation of the area where the household is located was not available in the Slovak HBSs used in the present analysis. In addition, analysis by locality of the residential area was not performed using Slovene data, as the statistical power of regional data was judged as weak. For the remaining countries, the identification of semi-urban areas was not feasible given the countries' size and structure. Thus, the project's Consortium decided to adopt the proposal made by Representatives of the Statistical Offices to group residential areas only as urban or rural.

- Education of the household head

Though differences in the national educational systems do exist, data on the education of the household head could be classified under three comparable categories:

- Illiterate / Elementary education,
- Secondary education and
- Higher education (College/University).

- Occupation of the household head

Occupation reflects a number of characteristics including education, income and physical activity. If properly harmonized, it can provide a suitable basis for comparison of dietary practices. In the DAFNE V project, occupation was classified under the five categories below, based on the occupational status and the profession, if employed, of the household head:

- Manual
- Non-manual
- Retired
- Unemployed
- Others (students, housewives or invalid persons as households' heads).

Since all the remaining households were classified in the last heterogeneous group, participants decided to label this group as *Others*. If the *Others* category corresponds to more than 5% of the total survey sample, details will be sought with respect to the type of households classified under this category.

In the Latvian HBS of 2002 and 2003, only paid workers (employees) were asked about their profession. This lack of detailed information made difficult the identification of certain codes (i.e. self-employed, craftsmen) as manual or non-manual. As, however, this information was available in the 2004 dataset, it was decided to base the 2002 and 2003 classifications on the 2004 ones as important changes in the country's social structure were not expected to have occurred during this period.

- Household composition

Though not frequently considered in dietary analyses, household composition can have an influence on dietary choices and practices. With children defined as being up to 18 years old, adults being between 19 and 65 years of age and individuals more than 65 years old considered as elderly, and with an intended distinction between single and other households, eight categories were formed:

- households of one adult resident (single adult households),
- households of two adult residents,
- households of one adult resident and children (lone parent),
- households of two adult residents and children,

- households of adult and elderly residents,
- households of children, adult and elderly residents,
- households of one elderly (single elderly households) and
- households of two elderly residents.

Because of the small number of households classified in some of the above groups, participants decided that data on the daily food availability will be reported only if:

- The group corresponds to at least 0.5% of the total survey sample

AND

- More than 100 households are classified under this group.

Lastly, one group will be added including all households that are left unclassified and will be labeled as *Others.*

All classification schemes for the socio-demographic variables under study and separately for each country and survey year are included in Appendix III.

*Identification of the household head*

The DAFNE classifications of the households' socio-economic characteristics (as described by educational attainment and occupational status) are based on information provided for the "household head".

In the Latvian HBS, however, household members are asked to define the head of household, although the person who best reflects the households' social characteristics is the "*main breadwinner"*, defined as the person who has the highest contribution to the common household budget. It should further be pointed that the *main breadwinner* of the household and the *head of the household* may or may not be the same person. In order to respect the societal norms of the country and classify households according to their characteristics in the most valid manner, the *main breadwinner* was used as the household's reference person, when analyzing the Latvian data. For similar reasons and following the advice of the data provider, in the analysis of the Slovenian data the head of the household was identified on the basis of each member's declared income.

Estimation of the average daily food availability for the overall population and for socio-demographic groups.

Analyses were conducted separately for each of the participating countries. Food availability per person per day was calculated by dividing the household availability by the product of the referent time period and the mean household size. Individual availability was estimated without making allowances for inedible parts, preparation losses, or spoilage on the plate and under the assumption of equal distribution of food within the household and during the survey period. After indication and the advice of the national data providers, a weighting factor was incorporated in the formula whenever necessary to accommodate for the sampling scheme.

**Integrating the DAFNE data into nutrition-related information systems**

Upon completion of tasks 1-4, the derived data were incorporated into the operating DAFNE databank, which was updated to include harmonised information on the mean daily food availability in 20 EU Member States and Norway (Task 6). The DAFNE databank was further integrated into the operating *DafneSoft* application tool (freely available at http://www.nut.uoa.gr/dafnesoftweb/).

Results on the mean food availability (g-mL/person/day) in all countries of the DAFNE network are currently available to any interested user through *DafneSoft*, which allows:

(a) presenting the DAFNE data in various formats (tables, bars, pie charts, map presentations) and at various levels of detail (from the analytical national food codes to the common DAFNE food groups)
(b) monitoring trends in food availability over time, both within and between the 21 countries of the network
(c) studying the effect of the household's locality and composition, together with the education and occupation of the household head, on the daily food choices and
(d) exporting the data for further uses.

## *V. The DAFNE V project – Summary of the findings*

Tables presenting the mean availability of the 15 main DAFNE food groups by country and survey year are included as Appendix IV. Mean values of daily food availability by the four socio-demographic characteristics under study are also presented for each country and survey year.

Changes in the daily availability of foods and beverages over time, the effect of socio-economic characteristics on food choices, together with graphical presentations are included and commented upon in the national reports of the participating countries (Task 5 – project deliverables). Furthermore, to address the lack of other nationally representative information on the dietary habits of these populations and to assure an efficient dissemination of results to potential stakeholders, the countries' reports have been translated to national languages. Both versions of these reports (in English and in the country's language) are submitted as project deliverables. In this context, the present section of the project's activity report aims to summarise findings described in the national reports.

The constellation of countries compared in the present analysis possess several characteristics, which may explain the inability to identify concise dietary patterns. Cyprus and Malta for example, are two countries in the Mediterranean sea which for centuries are in the cross-road of several historical cultures. Latvia, Slovakia and Slovenia, on the other hand, were undergoing to varying extent through a transition phase during the data collection period. In addition, the westernisation of the traditional Southern dietary choices is documented and one should not ignore the diet-related health mandates to which all European populations are exposed.

Bearing the above in mind, the DAFNE data point towards high availability of almost all food groups in countries of the South (Cyprus, Greece and Malta). With regards to plant foods in particular, the higher daily availability of vegetables was recorded in Cyprus (284 g/person/day, in 2003), followed by Greece and Malta, while in the three Central and Northern European countries (Latvia, Slovakia and Slovenia) the availability was below the recommended minimum of 250 grams per day. The daily fruit availability ranged from 264 g/person/day (in Greece and Malta) to 135 g/person/day in Slovenia and 120 g/person/day in Slovakia. Pulses are clearly a food choice of the South, as Cyprus recorded 23 g/person/day,

while in Slovakia the household availability barely exceeded 4 g/person/day. The pattern for cereals, potatoes and added lipids was, however, more complex. The highest daily availability of cereals and bakery products was recorded in Malta (444 g/person/day, in 2000), followed by Slovenia, and the lowest in Greece (246 g/person/day). Potatoes were the plant foods of preference in Latvia and the Central European countries, while, in recent years, Mediterranean countries recorded the lowest availability values. With respect to added fats and oils, the higher daily availability was recorded in Greece (77 g/person/day, 58 grams of which are olive oil and 12 grams are other vegetable oils), followed by Slovenia (54 g/person/day, 2 grams of which are olive oil and 39 grams are other vegetable oils) and Cyprus (47 g/person/day, 6 grams of which are olive oil and 32 grams are other vegetable oils). Lower availability of added fats and oils was recorded in Malta (45 g/person/day, 12 grams of which are olive oil and 12 grams are other vegetable oils) and the lowest in Latvia (43 g/person/day, 0.6 grams of which are olive oil and 23 grams are other vegetable oils).

With regards to foods of animal origin, the highest daily availability of meat, milk and products was recorded in Malta (203 g/person/day and 497 g/person/day, respectively). The daily availability of meat and meat products was also high in Latvia (185 g/person/day), followed by Cyprus (178 g/person/day). High availability of milk and milk products was recorded in Slovenia (355 g/person/day) and Slovakia (337 g/person/day). The higher fish availability was, however, recorded in Greece (46 g/person/day) and the lowest in Slovakia (11 g/person/day).

Although the out of home consumption of beverages (alcoholic, non-alcoholic and juices) is more common than the in-house one, the DAFNE data point towards a general increase in the household availability of soft drinks, fruit and vegetable juices in the participating countries. With respect to the daily availability of sugar and sugar products in the household, the higher values were recorded in Cyprus. More specifically, Cyprus was the only of the participating countries recording an increase in the household availability of sugar products, from 13 g/person/day in 1997 to 43 g/person/day in 2003.

The degree of urbanisation of the residential area has often been reported as an indicator of dietary choices, mostly in terms of the food variety available (hypermarkets, for example, are seldom located in rural areas). On the other hand, the rural residents are generally of a higher age and are expected to experience less eating out of home, when compared to their urban

counterparts. Given thus the above factors operating from various directions, one would expect rural households to report larger food acquisitions as well as choices that more closely adhere to traditional eating patterns. Our findings generally confirm this, with the exception of fruits (including juices) which in all countries are purchased more by urban households. In addition, urban households report higher daily availability of milk and milk products and non- alcoholic beverages (including soft drinks). In Latvia, urban households further reported acquiring larger quantities of meat and alcoholic beverages for in-house use. Malta stands as the sole exception, with urban households reporting larger food acquisitions for all food groups, except of milk and milk products.

Socio-economic differences in eating practices are often studied in terms of the level of education achieved. Education has been reported to be the strongest and most consistent indicator in assessing socio-economic differences as it expresses not only the individual's attainment and years of schooling, but it might also reflect occupation, income and, even more importantly when it comes to healthy dietary practice, the way an individual perceives and applies current nutritional information.[13]

Results presented by country in Appendix IV show that households with heads of higher educational attainment generally report lower food acquisitions for household use, with the exception of nuts (in all countries, but Slovenia), fish and seafood (in Cyprus), non-alcoholic beverages (in Cyprus, Latvia and Greece), alcoholic beverages (in Latvia) and juices (in all countries). In Greece and Latvia households with heads of higher education further report higher availability of fruits. In Latvia in particular, households of higher education report twice as much daily fruit availability (171 g/person/day), when compared to those of lower education (74 g/person/day).

Household heads exercising non-manual professions are generally expected to be of higher educational status and results indeed point similar dietary patterns between non-manual households and households of higher education. Non-manual households generally report higher daily availability of fruits, nuts, milk and products and non-alcoholic beverages (including juices). Interestingly enough, in all the countries under study non-manual households further reported higher daily availability of vegetables.

In all datasets, large food acquisitions are more common among households whose head is

retired and elderly, possibly indicating infrequent out of home consumption. In addition, elderly individuals, particularly women living alone, have often been reported to overpurchase during the survey period and the extra purchasing was occurring throughout the range of foodstuffs.[14]

The data on daily food availability by types of household composition should be interpreted with caution, as in the present analysis the individualization of the HBS data has been performed without taking into consideration the age and gender of the household members. There are different ways to estimate the per person food availability based on the HBS data and methods range from a simple division by the number of household members (as applied in the present analysis) to the application of sophisticated statistical modeling.[7,14] The present approach for allotting food shares to each household member is based on the assumption of equal distribution of food during the reporting period, but fails to consider factors such as energy requirements, as well as personal taste and related preferences which also affect the food quantity consumed. A child's consumption of milk, for example, is expected to be higher than that of a young adult male; while the consumption of alcoholic beverages is expected to be zero. Complex individualization processes that address the above limitations have been developed and tested in the context of the DAFNE project.[3,15] Their application in the present analysis, however, falls beyond the scope of the DAFNE V project which did not aim to present food availability by age and gender, but to compare average food choices among different European households.

The HBS are not primarily designed to collect nutritional information and the food data bear limitations, which need to be considered when interpreting findings: in most cases, no records are collected on the type and quantity of food items and beverages consumed outside the home; food losses and waste, foods given to pets, and meals offered to guests are not consistently collected. Despite their limitations, however, the HBS provide a resource for the conduct of a wide range of nutritional analyses.

In parallel to enriching the databank, the DAFNE network is also working towards advancing the HBS dietary data. In this context, the EU supported FAIR-97-3096 project was carried out with the aim to compare individualised HBS data to those collected through individual nutrition surveys in four countries (Belgium, Greece, Norway and the UK). The

methodology and results were published in a Special Issue of the Public Health Nutrition journal and demonstrate that there is value in the HBS-derived nutritional information.[16]

In addition, the FP6-supported HECTOR project (entitled: *Eating Out: Habits, Determinants, and Recommendations for Consumers and the European Catering Sector*) is currently in progress (http://www.nut.uoa.gr/hector/). The project is lead by the DAFNE Coordinating Centre and, among its objectives, is the exploitation of data on out-of-home food expenditures, regularly collected through the HBSs, in order to develop a methodological framework which would conceptually allow the assessment and monitoring of the within-home and out-of-home food choices in Europe.

Besides expanding the DAFNE databank to possibly all EU Member States, there is a need to maintain the dynamic and regularly updated nature of the data, which can further provide for a realistic way for nutrition monitoring in Europe through the integration of an individual-based nutrition survey in the national HBS sampling scheme. Thus the HBS data will provide a comparable overview of the population dietary habits at short time intervals, which will be complemented by individual-based data collected in a sub-sample of the HBS in wider time intervals.

In conclusion, a system facilitating the regular update of the DAFNE database, as well as the expansion of the network to embrace all European countries could provide a ready source of data for monitoring public health nutrition in Europe at reasonable cost.

## *VI. The DAFNE V project – Working Sessions*

The project was coordinated by the Department of Hygiene and Epidemiology, Medical School University of Athens. Three plenary meetings took place in the course of the project and three bilateral meetings were undertaken between the Coordinating Center and participating countries to address country-specific problems. Summaries of the project's plenary meetings and bilateral working sessions are given below.

**Plenary meetings**

**1. First plenary meeting, Friesing, Germany (December 3, 2004).**

During the first meeting, participants were introduced to the DAFNE initiative. The methodology followed for post-harmonizing national HBS data was described and results based on DAFNE data were presented. The DafneSoft (a software application for the presentation of the DAFNE databank) was also presented.

Participants were further informed on the objectives of the DAFNE V project and presented the characteristics of their national datasets that will be incorporated in the DAFNE databank. The sequence of tasks and timeline of the DAFNE V project were described and discussed in detail.

The minutes of the first plenary meeting are included as Appendix V.

**2. Second plenary meeting, Athens, Greece (October 21-22, 2005)**

The main aim of the second plenary meeting was to address issues related to the data reading and management. The preliminary food and socio-demographic classifications were also discussed and commented upon. In view of the comments received, in certain cases a revision of the classification schemes was decided.

The meeting was preceded by a preparatory one, during which country-specific issues were discussed in small working groups. The minutes of the preparatory and second plenary meeting are included as Appendix VI.

In order to allow for a presentation of the DAFNE project in the 1st World Congress of Public Health Nutrition (Barcelona, September 28-30, 2006), the meeting's attendants have agreed on the submission of abstracts presenting methodological issues and national

preliminary results.

**3. Third plenary meeting, Ljubljana Slovenia (February 15-16, 2007)**

During the project's last plenary meeting, final results on mean daily food availability in Latvia and Slovenia were presented and discussed upon. Preliminary results after the analysis of the Cypriot data were also presented. At the time of the meeting, the analysis of data from Malta, the Slovak Republic and Greece has not been completed. Pending issues were however thoroughly discussed and solutions to complete the data analysis were decided. A representative from the Coordinating Centre also presented the DafneSoft application tool, in which data will be incorporated upon finalization of the analysis. During the meeting, participants further discussed on the layout of the national reports and formulated the strategy for disseminating the project's results. The minutes of the meeting are included as Appendix VII.

**Bilateral Sessions**

**Session between Latvia and the Coordinating Centre, held in the Dept. of Hygiene and Epidemiology, Medical School, University of Athens (July 14-15, 2005).**

Prior to the bilateral session, the 2002 and 2003 datasets had been sent to the Coordinating Centre. The session was therefore aiming to discuss issues related to data reading and cleaning and to draft the first food and socio-economic classifications.

A report of the bilateral session is attached as Appendix VIII.

**Session between Cyprus and the Coordinating Centre, held in the Cypriot Ministry of Health and the Cypriot Statistical Service (September 13-15, 2005).**

The 1997 and 2003 datasets were sent to the Coordinating Centre, prior to the bilateral session. Thus, the aim of the session was to discuss issues related to the data reading and understanding of the provided variables. The harmonization of the dietary and socio-demographic variables was also discussed in detail and the first decisions on the procedure to convert food expenses to quantities were taken.

A report of the bilateral session is attached as Appendix IX.

**Session between Malta and the Coordinating Centre, held in the Dept. of Hygiene and Epidemiology, Medical School, University of Athens (September 26-28, 2006).**

The DAFNE Coordinating Centre received the Maltese datasets in July 2006. Therefore and in order to speed up the data management and analysis, a bilateral working session took place in Athens so as to:

- inform participants on the tasks that need to be undertaken,
- clarify issues related to data reading and management
- assist participants in becoming acquainted with the DAFNE classification schemes
- apply the DAFNE groupings for food and socio-demographic data to the national datasets.

The report of the bilateral session is attached as Appendix X.

## *VII. The DAFNE V project – Dissemination Activities*

**The new updated DAFNE software – the *DafneSoft***

Upon completion of the DAFNE V project, the enlarged databank was integrated in the DafneSoft application tool. The *DafneSoft* is a web-based application, directly accessible through the Coordinating Centre's website (**www.nut.uoa.gr**).

**Contribution in the WHO European Ministerial Conference on Counteracting Obesity (Istanbul, November 2006)**

The DAFNE Coordinating Centre was asked to provide supporting data on dietary patterns in Europe to the participants of the WHO European Ministerial Conference on Counteracting Obesity. The information was included in a publication providing data on dietary indicators in European countries through simple pictorial presentations. The publication was introduced by Drs. John Ryan (Health Information, DG-SANCO) and Francesco Branca (Regional Advisor for Nutrition and Food Security, WHO Regional Office for Europe) and has been disseminated to the attendees of the Ministerial Conference. The publication is included among the project's deliverables and is available online (http://www.nut.uoa.gr/english/index.asp?page=301).

**Education / Seminars**

The presentation of the DAFNE project was included in the programme of the Summer School "EU Basics in Public Health Nutrition", organised by the Unit for Preventive Nutrition of the Karolinska Institute. The Summer School is included in the curriculum of the EU Masters in Public Health Nutrition.

The DAFNE databank and the DafneSoft tool were also presented to postgraduate students of the University of Athens Medical School, as well as in a series of seminars for health professionals undertaken from December 2006 to January 2008 on a monthly basis all over Greece.

**Contributions in other projects**

The DAFNE data forms an integral part in the evaluation of the health status of European populations, which will be undertaken in the context of the European Nutrition and Health report II project, supported by DG-SANCO and coordinated by the University of Vienna

(http://www.univie.ac.at/enhr/).

**Actions towards the enlargement and sustainability of the DAFNE databank**

To ensure the continuity of the DAFNE initiative on exploiting the HBS data and to expand the DAFNE databank, the Athens Coordinating Centre has submitted a proposal to enlarge the DAFNE databank by including data from two additional Member States, Estonia and Lithuania, as well as recent HBS data from Portugal.

**Printing of DAFNE bookmarks**

Bookmarks highlighting the data available through the DafneSoft application tool; indicating the website of the tool; and, presenting the DAFNE network have been published and sent to all members of the Consortium for wide dissemination. The bookmarks are included among the project's deliverables.

**Presentations**

The project has been presented in the following occasions:

- oral presentation at the Inter-country Technical Consultation on National Food-Based Dietary Guidelines. World Health Organization-Eastern Mediterranean Regional Office (Cairo, December 2004).

- oral presentation at the International Conference on "Traditional Mediterranean Diet Past, Present and Future Focusing on Olive Oil and Traditional Food Products. (Athens, April 2005).

- poster presentation at the International Conference on "Traditional Mediterranean Diet Past, Present and Future Focusing on Olive Oil and Traditional Food Products. (Athens, April 2005).

- organization of a DAFNE workshop at the 18$^{th}$ International Nutrition Congress (ICC Durban, South Africa, September 2005).

- reference to the project in the UK Presidency of the EU 2005 Summit: Tackling Health Inequalities: Governing for Health Summit. (London, October 2005).

- oral presentation at the Scientific Annual Congress on "Information on nations' diets: Needs and uses –experiences from the past, lessons for the future. Federal Research Centre for Nutrition and Food. (Karlsruhe, Germany, October 2005).

- oral presentation at the 13th European Conference on Public Health: Promoting the Public's Health (Graz, Austria, November 2005).

- oral presentation at the First World Congress of Public Health Nutrition (Barcelona Spain, September 2006).

- oral presentation at the 10th European Nutrition Conference (Paris France, July 2007)

- presentation in the meeting of the EURRECA project (supported by FP6) in Barcelona (March 2007)

- oral presentation at the 2nd Panhellenic Conference on "Fats, Oils and Lipids: Present and Future Perspectives" (Athens, June 2007)

- reference to the project in the WHO meeting of Nutrition and Food Safety Counterparts on the Second European action plan for food and nutrition policy (Paris, June 2007).

- reference to the project and dissemination of DAFNE bookmarks at the EuroFIR Governing Council meeting (Berlin, January 2008).

- article in German describing the DAFNE project [Gedrich K, Wagner K, Karg G (2007): DAFNE – Data Food Networking : Eine Datenbank mit harmonisierten Daten zum Lebensmittelverbrauch in Europa auf der Basis von Haushaltsbudgeterhebungen. Ernährungs-Umschau 54/8.

- a manuscript entitled "Food Balance Sheets, Household Budget Survey food availability and mortality patterns in Europe" is ready to be submitted to the British Journal of Nutrition.

Abstracts submitted to Conferences and published papers are included as Appendix XI.

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