

**MICRONUTRIENT LANDSCAPE OF EUROPE:
COMPARISON OF INTAKES
AND METHODOLOGIES WITH
PARTICULAR REGARD TO
HIGHER CONSUMPTION**



SUMMARY REPORT OF A WORKSHOP HELD IN APRIL 2008 IN GUBBIO,
ITALY

Organised by the ILSI Europe Addition of Nutrients to Food
Task Force

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REGARD TO HIGHER CONSUMPTION***

By John Howlett and Nino Binns

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ORGANISED BY THE ILSI EUROPE ADDITION OF NUTRIENTS TO FOOD TASK FORCE

DECEMBER 2009

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Printed in Belgium

D/2009/10.996/11

ISBN: 9789078637189

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GOAL AND PURPOSE OF THE WORKSHOP

EU legislation relating to food supplements (Directive 2002/46/EC) and the addition of vitamins, minerals and certain other substances to foods (Regulation 1925/2006) calls for maximum amounts of addition to be established for nutrients to protect consumers where considerations of safety may be required. The ILSI Europe Task Force on the Addition of Nutrients to Food established an Expert Group on Patterns of Intake of Fortified Foods and Supplements to review data existing in EU Member States on intakes of vitamins and minerals and to explore how a sound scientific basis for setting maximum amounts might be established. The Expert Group has collated, compared and critically reviewed intake databases in Denmark (DK), Finland (FI), Germany (DE), Ireland (IE), Italy (IT), The Netherlands (NL), Poland (PL), Spain (ES) and the United Kingdom (UK).

The findings of the Expert Group were presented at a Workshop held from 16 to 18 April 2008 in Gubbio, Italy. The objectives of the Workshop were:

- To gain insight into nutrient intake patterns (base diet, fortified foods, supplements) across Europe and within specific countries, to identify data gaps and address the comparability of methodology to measure intakes of micronutrients.
- To discuss the use and misuse of dietary reference values (DRVs) and, particularly, the use of upper safe levels (ULs) in risk analysis.
- To present the findings of the Expert Group to a wider audience.

During the course of the Workshop, members of the ILSI Europe Expert Group and additional invited experts presented the results of their systematic collation, analysis and compilation of the available intake databases, and their assessments of the possibilities for harmonising intake survey methodologies and sharing data in Europe. Workshop participants were given the opportunity to discuss the findings in depth in working groups and to further explore and develop the concepts presented by the expert speakers.

The Workshop was chaired by Professor Lisette de Groot (University of Wageningen, NL) and co-chaired by Professor Lluís Serra-Majem (University of Barcelona, ES). It was attended by 58 delegates from academia, national and EU regulatory/advisory authorities and from the food and food supplement industries. In all, participants from 17 European countries were present.

SESSION 1: INTRODUCTORY SESSION

Professor de Groot chaired the Session and set the scene by describing the objectives for the meeting and also highlighting the current diversity of nutrient recommendations (DRVs) across Europe. She emphasised the importance of a strong science base for setting maximum amounts and the opportunity for building on the knowledge shared by members of the Expert Group. Subsequent to the workshop the Expert Group has published a detailed report 'Intake of selected nutrients from foods, from fortification and from supplements in various European countries' in *Food and Nutrition Research*. (suppl 1). 2009. This is freely available from www.foodandnutritionresearch.net

Setting maximum levels for vitamins and minerals

Fabio D'Atri, European Commission, Directorate General Health and Consumer Protection, Brussels (BE)

Dr. D'Atri outlined the European Commission's approach to setting maximum amounts of vitamins and minerals as required by the EU legislation on foods (EC Regulation No 1925/2006) and food supplements (Directive 2002/46/EC). Ultimately the policy on amounts set and, where necessary, how those amounts should be allocated between foods and food supplements will be decided by the EU Member States (MS).

- The Commission is required to propose maximum amounts (MAs) for addition of vitamins and minerals to food by 19th January 2009. Although there is no time limit for setting the maximum amounts for food supplements the work will be progressed in parallel, as the basis for the two tasks is similar.
- The criteria to be taken into account when setting maximum amounts are:
 - > Upper safe levels (UL) established by scientific risk assessment.
 - > The intakes of vitamins and minerals from other dietary sources.
 - > The nutrient reference intake for the population (RDA, PRI).
- Where the UL is close to the PRI then account should also be taken of:
 - > Contribution of the products to the diet of the population.
 - > Nutrient profiles established under the claims Regulation.
- The European Food Safety Authority (and its predecessor the Scientific Committee on Food) set 16 numerical ULs but was unable to set numerical levels for all 34 vitamins and minerals.
- Other key issues highlighted in the Commission Discussion paper (2006) and a more recent orientation paper (made available to member states in 2007) are the lack of data on intakes and the difficulty of setting MAs for foods and food supplements.
- Following consultation with stakeholders and Member State (MS) experts the Commission finds general agreement on the categorisation of vitamins and minerals into 3 groups:
 - > Group A nutrients where there is no evidence of any risk of consumers exceeding the ULs and where it would be disproportionate to set MAs.
 - > Group B where there is a low risk of consumers exceeding the UL and where MAs can be set as % daily amount for food supplements and as an amount per 100kcal for foods (noting there may be a different approach for liquids or light products).
 - > Group C nutrients where there is a higher risk of consumers exceeding the UL such that a case by case approach will be needed by nutrient and, perhaps, category to balance the risk of exceeding the UL with the risk of deficiency.
- The majority of MS and stakeholders agree to link the minimum amount to the significant amount (15% RDA) in line with nutrition labelling (Council Directive 90/496/EEC) and the claims Regulation (Regulation No 1924/2006) n 2006a).

SESSION 2: WORK AND RESULTS OF THE ILSI EUROPE EXPERT GROUP ON INTAKE PATTERNS

Session Chair: Lisette de Groot, Wageningen University (NL)

Overview of expert group work and approach used

Reg Fletcher, Kellogg Europe, Dublin (IE)

Mr. Fletcher provided an overview of the work of the Expert Group on patterns of intake.

- The ILSI Europe task force on addition of nutrients has already published a proposed model for the safe addition of vitamins and minerals to foods (Flynn *et al.* 2003) and a model for the risk benefit analysis of micronutrients (Renwick *et al.* 2004).
- The legislation (Regulation 1925/2006) requires that MAs be set based on safety not on need– thus it is important to use real data on intakes to ensure that risk of adverse effects and risk of deficiency are minimised.
- The Expert Group on patterns of intake of fortified foods and supplements (EG) was composed of experts on respective national dietary surveys in Denmark, Finland, Germany, Ireland, Italy, Netherlands, Poland and Spain. Data was also included using the extensive published analyses of the United Kingdom dietary surveys.
- The variation in methodology was reviewed.
- Key objectives for data analysis were:
 - > to identify population subgroups with the highest intake for particular nutrients; the intake cut-offs used were: P5 (5th percentile), P50, mean and P95 – the latter representing people with the highest 5% of intakes for a particular nutrient.
 - > to define the relative contribution from the base diet (including foods fortified by national mandate, foods fortified on a voluntary basis by manufactures and food supplements).
 - > to characterise the nature of risk presented by any excessive intakes by indicating the percentage of a population exceeding the UL, the nature of the adverse effect involved and the major sources of the nutrient were assessed and summarised.
- The Expert Group focused on nutrients for which the safe upper intake level is relatively close to the RDA, and which are likely to be used in food fortification (the minerals Calcium, Copper, Iodine, Iron, Magnesium, Phosphorus, Selenium and Zinc and the vitamins A/retinol, B6, D, E, Folic acid and Niacin).
- In order to compare national intakes more directly, all data was re-segmented into standardised age ranges of children 4-10 years and 11-17 years and male and female adults ≥ 18 years, which are consistent with groupings used by EFSA in setting ULs.
- Where EFSA/SCF ULs were not available the Expert Group used their expert judgement to assess the level of risk taking into account the nature of the possible adverse effect and its relevance to vulnerable sub-groups.
- A standard graphical format for presentation was developed.

Similarities and differences in the intake methodologies used

Gert Mensink, Robert Koch Institut, Berlin (DE)

Dr. Mensink summarised the dietary intake methodology used by the various European countries in the national surveys included in the current analysis and highlighted the impact of the differences and similarities on the results.

- The food energy and nutrient intake analyses were based on recently available nationally representative food consumption surveys in nine European countries.
- Some countries used 7-day weighed or estimated food records as the main dietary assessment instrument while some surveys used shorter records and others 24-hour or 48-hour recalls and one a diet history method.
- In order to assess usual intake, factors were sometimes applied to correct for intra-individual intake (extremes of intake on one day).
- There were differences in time reference periods for the individual's food consumption. Some surveys assessed data over a few months; most covered a year or even more. This resulted in some seasonal variation of intakes.
- The surveys also varied in terms of age-ranges, sample size, sampling procedures and use of weighting factors. Certain surveys were connected with, or sub-samples of, other studies (e.g. health surveys) and some were not fully representative for example because of language restrictions or the use of phone surveys so weighting factors were used.
- Some of the surveys used households as the sampling units (versus individuals in the others) and were therefore primarily representative for the household structure in those countries.
- About half of the countries included the contribution of supplement use to the intake of some nutrients, but few had information on consumption of fortified foods. Therefore, possible underestimation of particular nutrient intakes has to be considered.
- Underreporting occurred to different degrees. However, low energy reporters were not always excluded to avoid reducing population sample size.
- These differences in methodology as well as differences in non-responders may lead to unidentifiable grades of selection bias. Nevertheless, the country specific data were felt by EG members to reflect the reality in the particular countries.

Contribution of foods in the base diet to micronutrient intake

Lucjan Szponar, National Food and Nutrition Institute, Warsaw (PL)

Dr. Szponar described the contribution of the base diet to the intake of the selected micronutrient intakes in Europe, drawing on Polish data as examples.

- It should be noted that the base diet includes foods fortified by national mandate.
- The base diet was without exception the main contributor to intakes of micronutrients.
- Calcium, iron and iodine as well as vitamin A/retinol were used as examples in this presentation.
- P95 for calcium intake from the base diet was at the greatest 91% of the UL of 2500mg in men, higher intakes of calcium from the base diet being associated with high intakes of milk and dairy products.
- There is no EU UL set for calcium in children. The P95 intake for children was 1100mg to 1700mg and 1400 to 1900mg per day in 4-10 and 11-17 year age groups respectively.
- There is no UL for iron established by EFSA. The P95 daily intake for iron across the 7 countries was 9-16mg, 14-22mg, 13-20mg and 17-31mg in 4-10 year olds, 11-17 year olds and adult women and men respectively. Gastrointestinal adverse effects are reported only with single oral intakes as high as 50-60mg supplemental non-haem iron outside a meal occasion.

- The main base diet contributors to iron intake in Poland were cereal products in children and meat, fish and eggs in adults.
- The P95 intake of iodine from the base diet varied widely across countries but did not exceed the UL of 600µg for adults or of 450-500µg for older children.
- The UL for iodine of 250µg set for the youngest children, aged 4-6 years, was exceeded by P95 intake for the group 4-10 years in Denmark, Ireland and United Kingdom.
- The main source of iodine in the base diet in Poland was from fortified salt. Higher intakes in some countries may be associated with high milk consumption or geographical variations in natural sources of iodine.
- The P95 intake of total vitamin A from the base diet (retinol equivalents including beta carotene) exceeds the UL for retinol alone (no UL was set for beta carotene or total vitamin A) in some countries.
- The P95 intake of retinol from the base diet as a % of the UL (3000µg per day) ranges widely from 14 to 114% in men and from 10 to 112% in women.
- The P95 for retinol intake from the base diet exceeds the UL in Italian men, women and young children 4-10 years and probably exceeds the UL in young children in Poland and The Netherlands, the major sources being liver and sausages containing liver.

Fortification practices in Europe and contribution of fortified foods to micronutrient intakes

Tero Hirvonen, National Public Health Institute and Finnish Food Safety Authority (FI)

Dr. Hirvonen outlined the different practices per country for fortification of foods indicating which nutrients were subject to mandatory fortification (the intake of which are taken to contribute to the base diet). He went on to summarise the somewhat limited data on the contribution of fortified foods to micronutrient intakes.

- Mandatory food fortification is not common and has been restricted to few foods and nutrients – most common being iodization of salt and fortification of margarine with vitamins A and D (the intake of micronutrients from mandated fortification is included in the base diet in the context of the current work).
- National legislation on voluntary fortification varies between strict (Denmark) and relatively liberal (Finland, Ireland, United Kingdom) controls. In most countries permission is needed for voluntary fortification.
- Safety concerns have been the main reason to restrict or deny fortification. Most common voluntarily fortified foods have been fruit juices, energy drinks, margarines and breakfast cereals.
- Few countries have reliable data on the intake of voluntarily fortified foods and methods for estimates of intake vary:
 - > Finland: intake assessed by probabilistic simulation combining the data from internet based surveys on the use of fortified foods and data from the dietary survey.
 - > Ireland: participants of the dietary surveys were asked for detailed information, including brand names and this information was used in calculating the intakes from fortified foods.
- The impact of voluntary fortification on high intakes seems to be small for most of the nutrients and countries.
- Inclusion of the intake from voluntarily fortified foods with that from the base diet and supplements had little impact on the P95 intake.
- For most nutrients, the intake from voluntarily fortified foods is low. Possible reasons for this are the restrictive legislation and small market share of fortified products.
- However, these results must be interpreted cautiously, since only few countries had reliable data on the use of fortified foods.

Contribution of supplements to micronutrient intakes across Europe and challenges related to supplement consumption measurement

Marga Ocké, Centre for Nutrition and Health, National Institute for Public Health and the Environment, Bilthoven (NL)

Dr. Ocké presented the data from the relatively few countries that have tried to estimate the contribution of food supplements to micronutrient intakes.

- Quantitative data on intake of vitamins and minerals from dietary supplements were scarce and derived using different methodologies i.e. usual intake from food frequency or history methods vs. specific intake from diet record or diet recalls methods.
- National or study specific supplement composition details were used to calculate vitamin and mineral intake from dietary supplements. For Denmark information on generic supplements was combined with information on brands from consumer scan data.
- Use of dietary supplements varied considerably among European populations. The highest percentage of users of dietary supplements was observed in Denmark (>50%).
- For most vitamins and minerals the highest levels of intake (P95) from supplements as observed in Finland and Denmark.
- For children, the P95 of intake from dietary supplements was high in some countries for retinol (up to 70% of UL for children 4-10 y of age), zinc (80% of UL for 11-17 y olds) and vitamin D (40% of UL for 4-10 y old children).
- For adults, the P95 of intake from dietary supplements was high in some countries for magnesium (up to 100% of UL), zinc (up to 65% of UL) and vitamin B6 (up to 50% of UL).
- More women than men used dietary supplements; mean intake was usually higher for women; P50 was usually higher but not always P95.
- Estimating micronutrient intake from food supplements is hampered by a lack of compositional information and rapidly changing supplement composition together with limited survey methodology and statistical methods: an estimate of usual intake is essential.

Comparison of micronutrient intakes across Europe

Inge Tetens, Department of Nutrition, National Food Institute, Technical University of Denmark (DK)

Taking the data for the intake of micronutrients from base diet, fortified foods and food supplements Dr. Tetens provided a picture of total micronutrient intakes at the P50 and P95 levels per country.

- Overall, the results show that the base diet is by far the major contributor to the total intake of all the micronutrients included in the analysis.
- P95 intake of micronutrients from all sources (base diet, voluntarily fortified foods and food supplements) generally did not exceed the ULs where they have been set.
- The highest percentages of UL at P95 intake from all sources were for copper, retinol, zinc and calcium, with the UL exceeded for copper by women in the Netherlands and for zinc by all groups in Denmark.
- However, P95 for intakes from the base diet alone exceeded the UL for copper in adolescents and women in the Netherlands, for retinol in adults in Italy and for zinc in children aged 4-10 years in Italy and Denmark.
- The results also show major differences in micronutrient intakes from dietary supplements with Finland and Denmark as the countries with the highest percentage of users.
- Significant contribution to the total micronutrient intake from voluntary fortification is restricted to a few countries and a few nutrients.

Micronutrient intakes in Europe: conclusions and implications

Albert Flynn, University College, Cork (IE)

Concluding that the overall intake of micronutrient intakes for adults and children in the countries examined rarely exceeded the UL, Professor Flynn described the value of using actual intake data in setting maximum amounts.

- For adults and children across the surveyed countries and nutrients, P95 of intake of micronutrients from all sources (base diet, including mandatory fortified foods, voluntarily fortified foods and food supplements) generally did not exceed the UL; the highest %UL was observed for zinc, copper, retinol and calcium.
- This indicates a very low risk of adverse health effects from excessive intakes of these micronutrients in EU populations.
- For children aged 4-10 years, P95 intakes of zinc and retinol exceeded the UL in some countries, mainly from the base diet. However, no adverse health effects have been associated with low proportions of children in the population consuming zinc or retinol at these levels.
- For high consumers of micronutrients, the main sources were the base diet and supplements (for some nutrients).
- Fortified foods did not contribute much to high intakes even in developed markets for these products such as in Ireland and in the United Kingdom.
- In high consumers of supplements differences in use of food supplements contributed to the considerable differences observed in micronutrient intakes between EU countries; Finland and Denmark were the countries with the highest use of supplements.
- For setting maximum safe levels in fortified foods and food supplements a nutrient by nutrient approach using risk management models has been proposed.
- In addition to data on high level intakes of micronutrients from the base diet, this exercise needs to take into account:
 - > data on current practices of addition of micronutrients to foods and food supplements.
 - > patterns of consumption of these products.
 - > recommended intakes.
 - > adequacy of micronutrient intakes in the EU population.
- In Ireland, fortified foods contained a median of 22-43% RDA per serving and at the top end of the range (P75) they contained 27-82% RDA while the levels for supplements were median 19-100% RDA and P75 28-725% RDA.
- The amount of fortified foods (fortified with any nutrient) consumed in the Irish surveys represented 9.3% of food energy at the 95th percentile of fortified food intake. The P95 for % energy from vitamin D fortified foods was 5%. The Dutch model assumed 15% of energy from fortified foods (Kloosterman *et al*, 2007).
- Knowing the real P95 intake levels and the actual proportion of fortified foods and level of supplement use, it is possible to avoid the need for a correction factor for high energy consumers used in prior models.
- Real data may help avoid an overly conservative approach that could lead to the unintended restriction of intakes at the lower end of the intake spectrum.

- The Dutch model assumed P95 for both energy intake and for consumption of fortified foods and the proportion of energy from fortified foods was set at 15% of the P95 of daily energy intake (3600 kcal). On the basis of these assumptions, the model predicts high intakes of micronutrients from fortified foods.
- In the new approach actual intakes of fortified food from the Irish data were used and the P95 proportion of energy from foods fortified with individual nutrients could be used in the calculation. Further, as actual data for micronutrient intake were used, the mean [or median] energy intake of 2200 kcal could be used in the formula.

Dutch Model:

$$MA = (UL - [CI_{95} + SI]) / (EI_{95} / 100) * PFFn$$

New Approach:

$$MA = (UL - [CI_{95} + SI]) / (EI_{50} / 100) * PFFn$$

MA – Maximum Amount

UL – Upper Safe Level

CI₉₅ – 95th percentile of habitual intake of the nutrient from the base diet

SI – supplement intake

EI – Energy Intake

PFFn – percent of energy from fortified foods

Discussion points

It was noted that the Dutch model referred to was developed as a specific risk management tool in the Netherlands and not for general setting of MAs.

ULs are set for the most sensitive groups and then used across the board.

ULs for children should be used with intake data for children. There will be new intake data shortly from Germany. Concern that children eat too high levels of fortified foods.

Professor Flynn reported that in Ireland, calculations using the actual data still leave room for addition of nutrients to foods for children.

Also ULs were set for children across 4 age bands – while the Expert Group looked only at 2 age bands. The sample sizes of national databases were too small to allow 4 bands at the P95 level.

The elderly were under-represented in surveys – though there is a UK survey available that included institutionalised and non-institutionalised individuals over 64 years. Many of the former had intakes below the LRNI (Lower Reference Nutrient Intake).

Food frequency questionnaires were considered by the expert group as a poor tool for food intake but acceptable for food supplements. Multiple food supplement use is low e.g. in Germany (<0.1%) so the power of surveys is usually inadequate to look at this sub-sample.

Consumers have difficulty identifying fortified foods and supplements so self-reported data may be less reliable than that recorded by the interviewer. Also, when relying on labels – actual usage may differ.

SESSION 3: POTENTIAL APPLICATIONS OF THE EXPERT GROUP WORK ON SETTING MAXIMUM LEVELS: HOW TO SET MAXIMUM LEVELS?

Session Chair: Helle Margrete Meltzer, Institute of Public Health (NO)

Principles involved in setting maximum levels – use and misuse of reference values

Hans Verhagen, National Institute for Public Health & the Environment (NL)

Dr. Verhagen provided the definitions of dietary reference values and then, using the Dutch Model as an example, explained the development of models to calculate appropriate maximum amounts, the difficulties that can be encountered and the solutions that can be adopted.

- Different evaluating bodies show variation in the levels set for dietary reference intakes (DRIs) for:
 - > EAR – estimated average requirement that meets the needs of 50% of the population.
 - > RDA – Recommended Daily Amount, which is the EAR plus 2 x the standard deviation. This level of intake is estimated to meet the needs of 97.5% of the population.
 - > TUIL – Tolerable Upper Intake level, which is the maximum level of total chronic daily intake of a nutrient (from all sources) judged to be unlikely to pose a risk of adverse health effects to humans.
- TUIL are set on the basis of the classic risk analysis paradigm – hazard identification, hazard characterization and exposure assessment leading to risk characterisation. They may be set for different age groups or at risk groups.
- These DRIs have been used along with estimates of intake and estimates of the extent of use of fortified foods and food supplements to propose models for setting maximum amounts (Kloosterman *et al.*, 2007, Rasmussen *et al.*, 2006, Domke *et al.*, 2006).
- The Dutch model (Kloosterman *et al.*, 2007) was applied to establish maximum amounts permitted without recourse to the authorities for vitamin A, vitamin D and folic acid.
- This allowed, for example, for a practical decision to allow voluntary fortification of foods with 100µg folic acid per 100kcal. In the case of vitamin D, all foods could voluntarily be fortified with an amount of 4.5µg per 100kcal, whereas for vitamin A no voluntary fortification was allowed.
- Quantified risk benefit analysis and tools such as DALYs (Disability Adjusted Life Years) may also be used, for example, to show that the public health benefits of folic acid fortification of bread far outweigh the risks.
- Safe food fortification in practice thus requires data and risk management decisions.

WORKING GROUPS 1

Participants dispersed into five working groups, which were asked to address a series of questions and consider these, and other aspects of the topic assigned to them. A moderator and rapporteur were assigned to each working group. Workshop participants engaged in free ranging discussions on the questions posed and the moderators and rapporteurs prepared summary slides to report back to the plenary session where there was a chance for further debate. Some key points are captured as part of the concluding session in this report and the ILSI Europe Expert Group will be able to take the output of the workshop sessions into account in preparing the detailed report of their analyses and in any further work. See Annex 1 for details of the working group questions, moderators and rapporteurs.

SESSION 4: HARMONISING METHODOLOGIES AND SHARING DATA IN EUROPE

Session Chair: Ibrahim Elmadfa, University of Vienna (AT)

This session provided an opportunity to discuss the challenges presented by the diversity of databases and methodologies for data collection and compilation across European countries. Presentations addressed ongoing activities in the fields of data collection on the consumption of foods and food supplements and on food composition, their limitations and the possibilities for improving their harmonisation in the future.

Future harmonisation of food consumption databases

Davide Arcella, European Food Safety Authority (IT)

Dr. Arcella described the work in progress to promote harmonisation of dietary survey methodology in Europe and to provide a central database for pan-European data.

- Data on food consumption and composition, and food and feed contaminants underpin risk assessments carried out by EFSA across the whole range of its activities.
- Comparison of existing data gathered at the national level for the purpose of pan-European risk assessments is hampered by the use of different survey methodologies and food categorisation systems in data collection.
- EFSA has established a Data Collection and Exposure Unit (DATEX) to coordinate the collection, collation and analysis of relevant data from across Europe on a coherent basis.
- An Expert Food Consumption and Exposure Working Group (FCE WG) drawn from 32 countries is in place to provide a platform for exchange of views on the harmonisation of data collection methodologies and to facilitate the merger of national food consumption information into a pan-European database.
- Work has started on a Concise European Food Consumption Database, which will provide a limited number of data from 16 countries to be used as a screening tool for preliminary exposure assessments. In the first instance the database will contain food consumption data for adults only and will use a simplified food categorisation system to increase comparability between national datasets. Summary statistics from the database are available on the EFSA web site (see EFSA DATEX in reference list).
- Overall, the short-term objective is to complete the compilation of existing food consumption data at the lowest level of detail for population groups additional to adults.
- The long-term objective is to promote the harmonised collection of food consumption data both by Member States and within a pan-European dietary survey.
- With these objectives in mind, the EFSA DATEX Food Consumption and Exposure Expert Group (FCE EG) is tasked to determine the feasibility of creating a pan-European food consumption survey, to outline the requirements for food consumption studies, to recommend survey methods with a view to improving harmonisation and to explore accessibility and data exchange from existing food consumption databases. It will also explore the possibilities for collaboration with other ongoing EU initiatives in the field (EFCOVAL, Eurostat, IARC, EFCOSUM, EPIC, FACET).

Future harmonisation of food consumption surveys

Lluís Serra-Majem, Universities of Las Palmas de Gran Canaria and Barcelona (ES)

Professor Serra Majem reminded the audience of the many sources of European intake data other than the national surveys. He then discussed the impact of intra-individual variation and under-reporting and the type of corrections that can be applied and stressed the importance of choosing methodology according to the issue to be addressed.

- Current assessments of food and nutrient intakes in Europe comprise the output from a number of activities, of which some are completed and some are ongoing. Over the past three decades the EU has supported a number of major projects with a focus on nutrition, of which 14 were described (EURONUT, MONICA, SENECA, EPIC, DAFNE, EURALIM, EURODIET, EFCOSUM, ENHR I & II, HELENA, HECTOR, EFCOVAL, EURRECA).
- In addition, the ILSI Europe Expert Group on Patterns of Intake has undertaken a systematic review and compilation of information from databases in Denmark, Finland, Germany, Ireland, Italy, Poland, The Netherlands, Spain and the United Kingdom with a view to enabling meaningful comparisons of nutrient intakes. The aim is to identify best practices in nutritional assessment to serve as the basis for future harmonisation.
- Comparisons and alignments between dietary intake assessments have to accommodate differences in the objectives of the study designs, the different survey methodologies employed in data collection and the choice of reference point against which the intake has been assessed.
- Survey methods encompass 24-hour-recall, dietary records, food frequency and other forms of questionnaire, and the use of biochemical indicators of exposure (biomarkers).
- The level at which intakes have been assessed ranges from intakes at the level of the population to intakes at the level of the individual.
- Key points of reference against which nutrient intakes have commonly been assessed include the estimated average requirement (EAR), the reference nutrient intake (RNI), the population reference intake (PRI), the recommended daily allowance (RDA) and the upper safe level (UL).
- Causes of concern in relation to survey accuracy include intra-individual variation and seasonal influences on intake and misreporting, usually in the form of under-reporting. These factors distort the distribution of intake estimates produced by any given survey and the extent of the distortion is a characteristic of the survey method chosen.
- A study in Spain assessed the impact of intra-individual variation and under-reporting on the intake estimation of a range of nutrients in a comparison of the use of one with two 24-hour recalls, and the use of a 24-hour recall compared with a food frequency questionnaire. Intake distributions, as assessed by the ratio of mean to 95th percentile estimates, varied with the survey method used. Adjustment for intra-individual variation and a comparison of the effects of exclusion and inclusion of under-reporters elicited further differences between the survey methods.
- Under-reporting is less relevant where the focus is on high intakes. The best solution may be to use repeated 24-hour recalls with adjustment for intra-individual variation in order to achieve the optimum estimate of usual intake. It is also important not just to select an appropriate tool but also to ensure that it is used properly.
- The definition of a “gold standard” around which to base a strategy for the future harmonisation of survey methodology is somewhat elusive because the method of choice will be dependent on the focus required for any particular nutrient whether the key aspect to be addressed is the low or high intake, the percentage of the population consuming and whether the source of intake under study is a regular food or a food supplement.

Future harmonisation of consumption surveys on food supplements including herbal substances [and fortified foods]

Patrick Coppens, European Responsible Nutrition Alliance – ERNA (BE)

Mr. Coppens presented an historical and a future perspective on the collection and use of dietary intake data. He also described an approach developed to determine appropriate values for the maximum amount of micronutrients that may be added to food supplements.

- Difficulties hindering the assessment of intakes of nutrients from food supplements include the limited availability of survey data on consumption of food supplements and fortified foods, the fact that existing consumption surveys have different goals and designs and cannot easily be consolidated, the limited applicability of survey methodology to micro-nutrients and bio-active substances and the limited availability of market data.
- Although many surveys and projects aimed at assessing dietary intakes have been conducted over the past 50 years, differences in their purpose and design limit the extent to which they can be combined to provide a comprehensive picture of intakes at the European level.
- Recent EU initiatives have sought to identify ways in which the use of existing data can be maximised at the pan-European level and how survey methodologies might be harmonised to ensure greater compatibility of food consumption data in the future. The recently launched Concise European Food Consumption Database will provide a useful screening tool to assess exposure to food chemicals but it must be kept in mind that it will produce conservative estimates rather than estimates that necessarily closely reflect actual usage.
- Reasons for collecting intake data are varied and include monitoring for economic/agronomic purposes, monitoring to identify determinants of health and to assess health outcomes, and to obtain estimates of exposure for risk assessment purposes. The use of intake data so collected must be undertaken in context.
- Appreciation of attitudes to foods, knowledge of religious and cultural determinants of food choice, food preparation and purchasing practices, including availability and price, should be taken into account when making assessments on the basis of intake data.
- In developing an appropriate strategy for assessing the intake of nutrients, the nature of the nutrients must be taken into account:
 - > Macronutrients are naturally present in foods, they are present with low variability, they can be easily quantified by analysis, they have a continuous intake pattern and generally have relatively high intakes.
 - > Micronutrients and bioactives are naturally present in foods but may also be added, they are present with high variability, they may be difficult to characterise and determine analytically, they have a non-continuous pattern of intake and generally have low intakes.
- Risk benefit assessment requires knowledge of the overall population intake and also exposure by high and low intake groups and intake by population groups who may be at particular risk. It also requires quantification of the toxicity profile and the health benefits of the nutrient. Market data is of benefit in identifying routes of exposure and the proportion of foods that contain the nutrient under study. Choice of an appropriate modelling technique is key to the estimation of exposure by high or low intake groups; a number of different models exist.
- A paradigm for the setting of maximum levels for nutrients in supplements based on the population safety index (PSI) (Richardson, 2007) was described in which the potential of higher intake groups to exceed upper safe levels is quantified as the margin between the upper safe level and the total intake from foods (including fortified foods and supplements) and water expressed as a multiple of the RDA (here quantified as the reference labelling value).

Future harmonisation of food composition databases

Paul Finglas, Institute of Food Research (UK)

Good information on food composition databases is a pre-requisite for good estimates of micronutrient intake. Dr. Finglas provided an overview of current efforts in Europe and worldwide to harmonise and improve data and stressed the importance of continuing this work.

- Conceptual issues to be addressed in building food composition databases for nutrients include the need to meet the requirements of the regulatory environment in establishing nutritional components of food legislation, the commitment of funds at a level adequate to meet the present and ongoing future costs, agreement on scope (the specific foods and nutrients to be included), the availability of data on nutrients and the feasibility of maintaining currency of the data.
- Food classification systems are a key component of food composition databases. The level at which foods are classified (foods as eaten, as ingredients of compound and/or raw foods, or as commodities) will determine the level at which data can be input and must be capable of generating output at a level appropriate for the intended purpose(s) of the database.
- The structure of the classification system will determine the extent to which data may be exchanged between, or combined from, different databases. The key features of LanguaL as a tool for describing, capturing and retrieving food composition data were presented.
- Food composition databases must be responsive to changes in the market place and to new insights into the nutritional significance of foods and their components. They must be capable of capturing data on new foods, recipes and formulations coming into the market place and of providing information on food components of new nutritional concern or interest.
- In order to facilitate harmonisation and exchangeability of data, managers of existing databases should collaborate on a continuous basis to ensure that their databases are adapted to current best practice methods and tools. Food composition databases must be capable of being updated and the updating must be sustainable over time.
- Collaboration between database managers can be harnessed to inform policy development in areas such as nutrient profiling and through platforms working to change dietary habits or to develop healthier food choices.
- Future objectives include the development of a common repository for food composition and nutrition information on processed foods based on Global Trade Item Numbers (GTIN) and updating the draft European Food Information Resource Network (EuroFIR) standard and EuroFIR/ LanguaL in line with the GS1 Standard.

Discussion points

Total diet studies were judged likely to play a limited role in the future because they were not able to provide the level of information required on population extremes of intake and are expensive to conduct. While the value of biomarkers as evidence of exposure and indicators of nutrient status is acknowledged, they cannot replace information gathered by dietary surveys because they cannot provide information on sources of exposure. Furthermore, they are not easily available in all Member States.

It was suggested that screening for undesirable effects due to variations in potency of herbal remedies and extracts may be facilitated by the introduction of a rapid alert system. In response it was said that all manufacturers already have systems in place to ensure product quality. While post launch monitoring provides a theoretically possible means of identifying untoward effects, it was acknowledged that it was likely to be prohibitively expensive for this purpose.

At the invitation of the session chair, the four speakers summed up as follows:

- Legislation operates at EU level so risk assessment should be applied at the EU level. Data should be available from across the EU in standardised format and using harmonised methodology; harmonisation should be on the basis of “best practice” tools and methods and mediated through the EFSA DATEX Expert Food Consumption and Exposure Working Group (FCE WG).
- In order to achieve harmonisation of methods, there needs to be convergence between agencies responsible for enforcement, surveillance and research. Funding must be available to foster that convergence.
- No single approach to data collection will be enough; a prioritisation should be made in order to determine which methods are in need of the most urgent attention for development/improvement. Methods must be capable of identifying the highest intakes.
- More food composition databases should be structured for online access and data should be shared between databases. National efforts should be sustained but directed toward achieving convergence at EU level and there must be a commitment to continuance of funding in order to ensure future sustainability of database(s).

WORKING GROUPS 2 “FUTURE WORK”

Session Chair: Lluís Serra-Majem Universities of Las Palmas de Gran Canaria and Barcelona (ES)

Participants again dispersed into Working Groups, this time to address questions relating to the methodology of food and nutrient intake estimation and the use and comparability of data. Discussions focussed on how harmonisation of methods and the comparability of databases across the European region might be improved in the future. There was a moderator to lead each Working Group and a rapporteur presented the findings of each group to a subsequent plenary session where each Group’s conclusions were further discussed. The Working Groups were briefed in their tasks by Carel Wreemann (Akzo Nobel Chemicals bv, NL). The key outputs of the discussions are reflected in the conclusions section of this report. See Annex 2 for details of the working group questions, moderators and rapporteurs.

SESSION 5: FINAL DISCUSSION AND CONCLUSIONS

The final session was chaired by Prof. Lluís Serra-Majem. The overall rapporteurs presented a summary of the conclusions reached during the Workshop and then, at the request of a number of participants, Professor Albert Flynn provided a résumé of a proposed risk management model for establishing maximum amounts (MAs) for nutrients in fortified foods and dietary supplements.

Conclusions

On the basis of data on the intake of vitamins and minerals from seven EU countries between 1992 and 2004:

- The base diet was found to be the main contributor to high intakes of micronutrients. The P95 intake for retinol in base diet exceeded the UL in some countries.
- Data on fortified foods were lacking but indications are that their contribution to intake, even in developed markets like the United Kingdom and Ireland, is small.
- Supplements were found to contribute to high intakes in some countries, with the highest intakes in Denmark and Finland.
- With respect to total intake, the P95 intake of micronutrients generally does not exceed ULs, indicating a low risk of adverse health effects. The highest intakes as a percentage of UL were found to be for retinol, zinc, copper and calcium as well as magnesium in the case of supplements.

In relation to approaches to setting maximum amounts:

- The risk categorisation of micronutrients into the three groups (Groups A, B and C) was generally supported but there was some discussion as to whether the classifications of Vitamin K, Vitamin D and folic acid should be reviewed along with the possible effects of nutrient interactions.
- In using ULs it is important to consider the severity of hazard and also the applicability of biological risk to all age groups (e.g. folic acid) – i.e. whether the hazard characterisation for a particular nutrient applies equally to all age groups.
- For setting MAs:
 - > Variation in the base diet probably constitutes the most important data. New data indicates a less conservative approach to setting MAs is appropriate.
 - > For Group C nutrients, a nutrient by nutrient approach is required.
 - > Although the legal basis for setting MAs is safety, risk benefit considerations should not be left out of the equation (i.e. the risk of nutrient deficiency should somehow be taken into account).
 - > Particular attention should be given to at risk groups, to the bioavailability of nutrients and to uncertainties around the contribution to intake made by overages.
- Post launch monitoring may have a role to play in ensuring that ULs are respected.

In relation to harmonisation of methodology and data sharing:

- A wide range of methods is used at national level to assess food intake, some of which address micronutrient intake.
- The difficulty of combining national datasets presents a challenge to the use of data for setting MAs at Community level.
- Collaborative programmes – past and current (EU Funded projects and the EFSA Concise Database initiative) – are working to improve the availability of representative pan-European data.

- Harmonisation is needed both for survey methodology and for food composition databases if risk assessment is to be carried out at EU level.
- Funding is required to develop and sustain relevant programmes if harmonisation is to be achieved.

In considering future work, focus should be given to:

- Aspects of study and database design:
 - > Timeframe (short term/ long term), season influences on intake, and representativeness of sample.
 - > Standardisation and harmonisation to maximise exchangeability and applicability of data at EU level.
 - > Lessons for probabilistic modelling to be learned from experiences with exposure assessment for food safety purposes.
 - > Cost: proportionality (are study costs proportional to the objective) and sustainability (are database costs sustainable over time).
- Limitations to be addressed:
 - > Under- and over-reporting.
 - > Lack of consumer knowledge and information about fortified foods and dietary supplements.
 - > Lack of available composition databases for fortified foods and dietary supplements, including information and the consequences of overages.
- Use of Omics:
 - > Omics have high potential but require development to characterise relationships between dietary exposure and genomic/metabolomic response.
 - > Currently expensive but costs are reducing.
 - > There are legal and ethical aspects to consider: storage of personal data and provision of balanced information for consumers.

Proposed risk management model for establishing maximum amounts

Albert Flynn, University College Cork (IE)

Following his presentation on the first day of the workshop, in which he had described how survey data from Ireland provided a basis for assessing intakes of micronutrients by high users of fortified foods, a number of participants asked that Professor Flynn provide a more detailed account of a proposed risk management model for establishing maximum amounts (MAs) for nutrients in fortified foods and dietary supplements that could be based on real intake data.

The paragraphs below summarise Professor Flynn's presentation:

Premise

- Maximum amounts (MAs) set for nutrients in fortified foods and dietary supplements must reflect the upper safe levels for the nutrients they apply to.
- The sum of the intakes of any given nutrient from the fortified foods and dietary supplements containing it should not exceed the margin between the intake from the base diet and the upper safe level.
- Irrespective of the diversity of food types and products fortified with any given nutrient, the daily consumption of all fortified foods, which contain it, will contribute a constant proportion of any individual's habitual daily dietary energy intake.

Therefore

The total intake of a given nutrient from fortified foods should not exceed:

$$UL - (CI_{95} + SI)$$

Where

UL = upper safe level for the nutrient

CI₉₅ = P95 of the habitual current intake distribution of the nutrient from non-fortified foods

SI = realistic high intake scenario for that nutrient from dietary supplements

and

The maximum amount that can be set for the nutrient in fortified foods (MAFF) expressed per 100 kcal of fortified food is given by:

$$MA = \frac{UL - (CI_{95} + SI)}{(EI_{50} \times PFFn)} \times 100$$

Where

EI₅₀ = total energy intake at the P50 of the habitual daily energy intake distribution for the population/relevant age group

PFFn = proportion of EI₅₀ that comes from foods fortified with the nutrient in high consumers (P95) of those foods

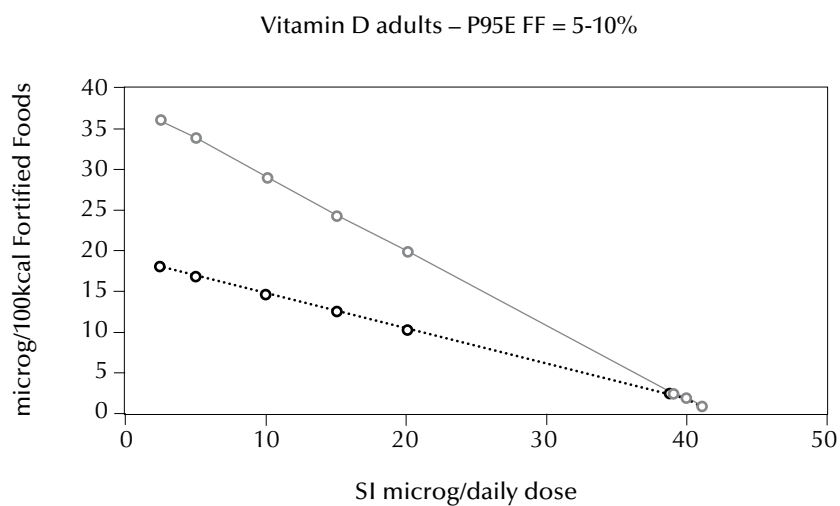
Where the MA for the nutrient in dietary supplements is set as a multiple of its RDA per daily dose (i.e. as $xRDA$ /daily dose), the relationship between the MA for fortified foods and the MA for dietary supplements is given by the expression:

$$MA = \frac{UL - (CI_{95} + xRDA)}{(EI_{50} \times PFFn)} \times 100$$

This expression defines a fixed relationship for any given nutrient between the MAs that can be set for fortified foods and dietary supplements such that the margin between its intake from the base diet and its upper safe level will not be exceeded. Where estimates of the current intake from the base diet (CI₉₅), the daily dietary energy intake (EI₅₀) and the proportion of the daily energy intake provided by fortified foods containing the nutrient (PFFn) are available from survey data, it provides a basis for fixing MAs taking into account the actual dietary practices of the population or population subgroup concerned.

This relationship illustrated in Figure 1 demonstrates how, for two scenarios of fortified food use where foods fortified with Vitamin D provide 5% (solid line) and 10% (dotted line) of dietary energy intake respectively, the MAs for fortified foods and dietary supplements can be set according to a straight line relationship.

Figure 1. Fortified food use and the setting of MAs for fortified foods and dietary supplements



Discussion

There was a brief discussion in which Professor Flynn's proposal was welcomed but where it was noted that the approach needs to be tested using data sets from other countries. It was noted that a nutrient by nutrient approach can be adopted and also that intake data and dietary reference values for different age groups and percentiles of the population may be used.

Closure

Professor Serra-Majem thanked participants for their valuable and constructive contributions to the Workshop and closed the meeting.

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LIST OF ABBREVIATIONS

Country Abbreviations	
AT	Austria
DK	Denmark
DE	Germany
ES	Spain
FI	Finland
IE	Ireland
IT	Italy
NL	The Netherlands
NO	Norway
PL	Poland
UK	United Kingdom
Other Abbreviations	
CI	Habitual intake of a nutrient from base diet
DALY	Disability Adjusted Life Years
DRIs	Dietary Reference Intakes
DRVs	Dietary Reference Values
EAR	Estimated Average Requirement
EFSA	European Food Safety Authority
EG	Expert Group
EI	Energy Intake
FCE	Food Consumption and Exposure
LRNI	Lower Reference Nutrient Intake
MA	Maximum Amount
MS	Member States
PFFn	Percent energy from fortified foods
PRI	Population Reference Intake
PSI	Population Safety Index
RDA	Recommended Daily Amount
RNI	Reference Nutrient Intake
SCF	Scientific Committee on Food
SI	Supplement Intake
TUIL	Tolerable Upper Intake Level
UL	Upper Safe Level

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ANNEX 1

WORKING GROUPS 1

1.1: To what extent do the newly compiled data fill gaps that previously hampered effective use of the models?

Moderator: David Richardson, DPR Nutrition (UK)

Rapporteur: Susanne Bügel, University of Copenhagen (DK)

- In which way can the information of different nutrient sources be used in risk modelling?
- The upper level of some nutrients applies only to a specific chemical structure. Will the newly available information help to improve existing models and how?
- Is information on differences in assessment methodology relevant for the setting of maximum levels?
- What is the importance of insight in variation on nutrient intakes between countries in Europe for setting maximum levels?
- Is it useful and possible to estimate the intakes from unknown sources to improve existing models?

1.2: Which nutrients should have maximum levels?

Moderator: Hans Verhagen, National Institute for Public Health & the Environment (NL)

Rapporteur: Inge Tetens, Technical University of Denmark (DK)

- **Questions on group A nutrients (nutrients for which there is no evidence of risk within ranges currently consumed: vitamin B1, B2, B12, biotin, pantothenic acid, chromium (III) and vitamin K)**
 - > Statement considered by the Group: "There seems to be an overall agreement on the nutrients for which setting maximum levels could be waived: vitamin B1, B2, B12, biotin, pantothenic acid, chromium (III) (?) and vitamin K (?)." These nutrients are found in the first group (A).
 - > Is there a consensus that there is no need to set maximum levels for use in food and food supplements for this category? Should maximum levels be set for the two nutrients with question marks: chromium and vitamin K? If yes, on what basis? Does the result of the expert group give some additional input on intake data for these two nutrients?
 - > Are there other means, besides setting maximum limits, how the safety aspects could be covered satisfactorily, e.g. current practices, technological restrictions, monitoring of future developments, intake recommendation also for foodstuff?
- **Questions on group B nutrients (nutrients with a low risk of exceeding the UL: Vitamin B6, C, D, E, folic acid, nicotinamide, phosphorus, magnesium, molybdenum and selenium)**
 - > Is there any result from the work of the expert group, which would lead to a change in the category grouping proposed in the EC orientation paper?
 - > Is there the need to re-group one or more nutrients, e.g. should one of the nutrients of the third group (group C) be classified in group B or vice versa, is group A complete?
 - > What is the rationale, if re-grouping is required which criteria should be used?

- **Questions on group C nutrients (nutrients with potential risk of exceeding the UL: vitamin A, calcium, copper, fluoride, iodine, manganese, zinc, beta-carotene for smokers and iron)**
 - > For the nutrients in group C, the safety margin is narrow. Paragraph 53 of the EC orientation paper indicates “Furthermore, it is recognised that this model can provide a general system for categorising nutrients according to the risk of exceeding the ULs determined by EFSA or by other scientific institutions. Applying this model, nutrients for which there is a risk of exceeding the UL can be identified and a more cautious approach could be considered”.
 - > In the light of the data collected by the expert group, in particular in respect to group C, do you agree with the statement under point 53 of the orientation paper?
 - > Is there an agreement that the risk of deficiencies should also be taken into account when setting maximum amounts? If not, what is the rationale?
 - > Should an UL for iron be set? Can we learn from the US (UL = 45mg/d)?

1.3: In setting maximum levels, how should food and food supplements be addressed?

Moderator: Gert Mensink, Robert Koch Institut, Berlin (DE)

Rapporteur: Lone Rasmussen, Technical University of Denmark (DK)

- Should some foods and supplements be addressed separately? Should products targeted at specific at-risk groups be addressed differently? Should multiple nutrient fortified products be addressed separately?
- What are the risks and benefits of food fortification versus supplement use? What are the advantages of fortification of some food groups or staple foods against fortification of many products?
- Is there a real issue of accumulative exposure due to a combination of natural sources, fortified food and supplements? Are particular population groups at risk? How large is the risk of overconsumption of nutrients from multiple sources? Should information policies be adapted (e.g. include warnings of overconsumption).

1.4: How to take into account the different levels of intake of micronutrients in different countries?

Moderator: Wulf Becker, The National Food Administration (SE)

Rapporteur: Catherine Mignot, DSM (FR)

- Variations in estimated nutrient intakes across different countries are due to a number of factors. Some reflect real differences in national cuisine or regulations covering food composition and consumption patterns of dietary supplements. Differences in population composition and ethnic mix may also be factors. Differences in survey methodology and data analysis may be considerable. There may be sources of variability between countries as well. This apparent heterogeneity in nutrient intakes raises a number of questions and challenges when considering the setting of maximum levels across Europe.
- How does heterogeneity of nutrient consumption data affect the setting of maximum levels? Are any nutrients more impacted than others?
- Can any differences be explained by differences in dietary patterns, fortification practices (mandatory or voluntary) or dietary supplement usage?
- What are the alternative strategies for accounting for apparent differences between countries? E.g. setting maximum levels in the context of countries with the highest intakes. Using data from surveys with the most accurate methodology?
- How can the data be “normalised/standardised” to make comparison between countries more meaningful?

1.5: Risk benefit analysis methods to be used for food (fortified and unfortified) and supplement use

Moderator: Tero Hirvonen, National Public Health Institute and Finnish Food Safety Authority (FI)

Rapporteur: Reg Fletcher, Kellogg Europe (IE)

- How can current models for calculating maximum levels in foods and food supplements be improved to reduce the need for disproportionate protection at either end of the intake distribution? How can actual (versus modelled/hypothetical) data be obtained and used?
- What other approaches might be considered?
- Are the UL and P95 level of intake the most appropriate measures? If not, what other approaches might be considered?
- How can the same degree of protection be given to population groups with high risk of low intakes?
- The adverse effect used to set ULs varies greatly in terms of severity. Is it possible to systematically take this into account in the risk assessment of intakes?

ANNEX 2

WORKING GROUPS 2: FUTURE WORK

2.1: Methodology of food consumption surveys

Moderator: David Tennant, Food Chemical Risk Analysis (UK)

Rapporteur: Maijaliisa Erkola, University of Helsinki (FI)

- What are the standard requirements for assessing maximum levels of dietary exposure from nutrients and other chemical compounds?
- Is there a consensus on the time frame to be used for assessment?
- What are the merits of consumers/users only vs per capita (population) estimates?

2.2: How to harmonise food composition data?

Moderator: Paul Finglas, Institute of Food Research (UK)

Rapporteur: Claudia Krines, Bremerhaven Technology Transfer Centre (DE)

This Working Group discussed elements that are important in defining the future harmonisation of food composition databases.

Input side:

- Criteria of inclusion: choice of food items, level of detail (category, group, food products), branded/ non branded food products, novel foods, supplements, medicines providing nutrients.
- Sampling strategies and methodologies to perform chemical analyses.

Output side:

- Expression of nutrients (e.g. monosaccharides vs. polysaccharides), unit of measures and numerical precision and the description and coding of food items.
- Are other examples of the harmonisation necessary to be achieved?
- How to deal with missing values and which list of nutrients to provide?

Which is the best/most suitable approach to achieve the food composition database harmonisation?

Does harmonisation deal with the coding of food description (reference the LANGUAL approach)?

What are the barriers to gathering harmonised data?

2.3: How to compare intake data from various countries? How to make them comparable?

Moderator: Aida Turrini, Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione (IT)

Rapporteur: Hans van Amelsvoort, Unilever (NL)

This Working Group discussed the possibilities and barriers in comparing micronutrient data collected in different countries, addressing the following questions:

- Which standard practices facilitating comparisons are in use already? (use of common denominators as basis for expressing content – eg per 10MJ; expression of intake as % of RDI, expression of 95th percentile as a % of RDI; expression of 95th percentile as % of mean intake, others ...).
- What are the benefits and barriers presented by the methods in use?
- What requirements must be fulfilled to make data more easily comparable?

2.4: Nutrigenomics – implications for food consumption surveys

Moderator: John Hesketh, University of Newcastle (UK)

Rapporteur: Reg Fletcher, Kellogg Europe (IE)

- What can genomics, proteomics and metabolomics be used for?
- What are the limitations of omics for personalised nutrition?
 - > Can omics contribute to food consumption surveys?
 - > What are the implications of omics for public health?
- How can current methodologies and nutrigenomics better serve public health?

2.5: Methodology for determining intakes of micronutrients from food supplements (including Monte Carlo modelling)

Moderator: Marga Ocké, National Institute for Public Health – RIVM (NL)

Rapporteur: Janneke Verkaik-Kloosterman, National Institute for Public Health – RIVM (NL)

- What are the issues to be addressed in the identification of fortified foods and food supplements and their composition?
- What strategies should be followed in the estimation of total usual intake of micronutrients from food supplements?

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ISBN 9789078637189



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