F O O D S A F E T Y

GEMS FOOD

REPORT OF THE WHO WORKING GROUP ON COLLECTION OF FOOD CONSUMPTION DATA (COFOCO)

30 January 2012

World Health Organization

WHO Library Cataloguing-in-Publication Data

GEMS/Food programme: report of the WHO working group on collection of food consumption data (COFOCO), 30 January 2012.

1.Food analysis. 2.Food contamination. 3.Diet surveys. 4.Data collection. 5.Risk assessment. I.World Health Organization.

ISBN 978 92 4 150411 9 (NLM classification: QU 146)

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1. Background

WHO is in the process of updating its GEMS/Food database format and data reporting procedures to ensure that:

- all information considered essential for estimating dietary exposure is captured;
- the information is accessible in a format that will allow data from different Member States to be compared and combined for the purpose of risk assessment;
- food composition/chemical occurrence data can be combined with available food consumption data for estimating dietary exposure; and
- the database will accommodate both aggregated and individual analytical results.

WHO also wants to anticipate future data needs for conducting risk assessment including:

- the ability to better quantify acute risks of exposure;
- the use of probabilistic approach for chronic and acute exposure assessment which requires the full distribution of occurrence and food consumption data instead of just mean/median and upper percentiles;
- the ability to conduct a risk/benefit analysis, which requires information on nutrient intakes; and
- the possibility of including in the database information on microbiological hazards in foods.

Related projects

In June 2010 the electronic working group (WG) on data reporting for hazards occurring in food (HOF) provided a report to WHO on how the process for submitting data and managing the GEMS/Food database, a central repository for data on the composition of and chemical occurrence in foods submitted by Member States could be improved (http://www.who.int/foodsafety/chem/gems/en/index.html).

It was intended that the nutrient composition and hazard occurrence data should be reported in a format that would allow data from different Member States to be combined with food consumption data for the purpose of conducting dietary exposure assessments as part of risk assessment processes.

The second WHO electronic WG is required to prepare a report on data reporting needs for food consumption to complement the report of the first WG.

2. Terms of reference

The GEMS Food program aims to support exposure assessment procedure undertaken at international and national level by the way of a network of national institutions collecting data and reporting to WHO in the GEMS Food database. The basis for estimating the exposure to food hazards is to combine data on food consumption with levels of occurrence of the hazards in the corresponding food categories. The GEMS Food program includes two food databases: the GEMS/Food cluster diets derived from food

balance sheet information[1] collected from all around the world and aggregated into 13 diets; and the GEMS/Food Large Portion database[2] . The GEMS Food Program also compiles levels of occurrence for chemical contaminants, including those reported in total diet studies.

Data needs for food consumption

Crucial issues in food safety are for both the risk assessor and the risk manager, on the one hand to have an access to the available data and on the other hand to share their own information with partners in other Member States. This information should not only be available but also accessible under a format allowing comparison and combination for the risk assessment purpose.

- The overall objective of collecting data on hazard occurrence and food consumption is to support the exposure assessment process. Because data collection requests long term programming to prepare hosting specific formats, it is necessary to anticipate the future changes and evolutions of the whole risk assessment process.

The main evolutions which can be expected in the next years are: (1) A better quantification of the acute risk both for chemical and microbiological hazards. This will request more detailed information on the size of portions eaten in a single eating occasion and/or over 1 day and on the frequency of consumption of large portions all over the year. (2) A probabilistic approach for acute and chronic exposure assessment. The full distribution of each food consumption data would be needed instead of the central tendency of each distribution.

The working group should advise WHO on the most appropriate format to collect food consumption data based on national food consumption surveys for individuals.

The advice should consider in particular:

- the current and future needs for exposure assessment, in particular those listed in para 2 above.
- the need to include water consumption;
- the existing food classification systems and in particular the Codex Alimentarius classifications for different types of food chemicals (Appendix 1 & 2);
- the optimal level of details in the description of food consumed to allow combining data from various countries;
- the work load for the data provider to report; and
- the level of detail for public access considering both the confidentiality of data and the

1 Food balance sheet data report food available for consumption in a country (food produced plus imports minus exports minus non-food use, may be adjusted for waste) usually on an annual basis, but may be expressed in grams per capita per day by dividing the annual total by the total population and number of days in the year (365).

2 A large portion size is defined as 97.5th percentile consumption of food for consumers only of that food, preferably derived as single person-day data, which for a survey of two days duration means data for the same individual for days 1 and 2 are treated as two separate records (FAO/WHO 2009). The term 'consumers' refers to only those people who report consumption of a particular food e.g. calculation of a 97.5th percentile for consumers only subsets the survey data, taking only those who reported consuming the food and then the 97.5th percentile food consumption amount is derived from these data only

transparency of the resulting exposure assessment

3. Project scope

The second WG focused on two aspects of reporting food consumption data for entry into the GEMS/Food database for use in future dietary exposure assessments: the appropriate food classification system(s) to be used at an international level; and specific information (meta data) required when submitting food consumption data files. The information required when completed dietary exposure assessments are submitted was also considered, including from a Total Diet Study.

4. Food classification systems

The WG identified the complexities of this project in that each country or groups of countries in a region tends to have their own food classifications systems for the purposes of reporting food and nutrient intakes from national dietary surveys; and that some countries have developed different food classification systems for use in food chemical dietary exposure assessments, often with separate systems for food additive assessments and for contaminant, agricultural or veterinary drug residue assessments.

The challenges of establishing a multi-faceted system that can enable end users to analyse the data held in a central food system from different perspectives was noted in the 2010 EFSA colloquium on food classification (EFSA 2010a). It was also recognised at this meeting that no single system existed to meet all the potential end user needs, and that it was not possible to develop a unique system to meet all requirements. However, the EFSA reports emphasis the fact that use of a common food classification system at the European level could provide a central linking system or translational function between current disparate systems to promote more accurate dietary exposure calculations (EFSA 2010a, EFSA 2011b). This sentiment is equally true at world-wide level.

The selection of a food classification system to describe food consumption patterns for use in dietary exposure assessments is determined by whether it is a nutrient of interest or hazard occurrence in food. Food classification systems for use in nutrient intake and food additives assessments include codes for processed foods and some foods 'as consumed' in the system, whereas those for contaminant/ agricultural and veterinary drug residue assessments are based on raw commodities, though may have a few processed or semi-processed food items such as beer and flour (FAO/WHO 2009).

The food descriptors or level of detail required in a food classification system used in dietary exposure assessments is also determined to some extent by the purpose of the assessment, whether it is for reporting nutrient intake results from a dietary survey, for reporting nutrients and/or hazardous chemical results from a total diet study or for food regulatory purposes. In the latter case, the food classification system selected to be appropriate for the dietary exposure assessment will be influenced by the level of detail or description of different foods required in relevant food standards (legislation), where specific food groups or foods may be assigned a legal maximum or minimum level.

The information required for food standards development or monitoring of standards as part of the risk assessment process (Codex, national, or regional such as EC standards) may also determine the data and meta data generated on nutrient content or hazard occurrence in foods.

The food classification system is the means by which these two sets of information are reported and

ultimately matched, so it is obviously important that there is either an agreed common system to be used by those reporting nutrient content or hazard occurrence data and food consumption data; or an agreed means of 'mapping' the codes used in one system to another (FAO/WHO 2009).

The food classification system required for risk assessment is determined by the type of food chemicals considered, as discussed in detail below.

Nutrient intake assessments

The WG noted that nutrient assessments tend to be undertaken at a national level to assess population health status, where foods reported as consumed in national dietary surveys are coded within a food classification system and matched to an individual nutrient line, derived either from analyses, recipes, imputed or borrowed data. Water (e.g. tap or bottled) tends to be reported as consumed along with other drinks, as fluid intakes are of interest in health assessments. Increasingly, as use of dietary supplements becomes more common, information may be collected in national dietary surveys on consumption amounts of supplements so that total intake of nutrients can be determined (i.e. from food and supplements).

Food classification systems for use in nutrient intake assessments therefore tend to be developed for use in national dietary surveys and are therefore country and time specific, reflecting known food consumption patterns at the time of the survey. Individual foods reported as consumed in a survey are first matched to specific food codes and then assigned to the appropriate food sub-group and major food groups, for example, foods based on cereals, meat, fish, eggs, dairy products, fruit, vegetables, alcoholic, non-alcoholic beverages and may include other significant minor food groups. The food classification systems may be expanded to include a classification of different kinds of supplements.

At an international level, there is no agreed food classification system used in Codex food standards specifically for nutrients, as permissions for addition of nutrients to specific foods are generally only found in national or regional food standards. Codex standards set the principles for nutrient addition: addition of nutrients for fortification to meet identified nutrient deficiencies in the population; substitution to match nutrient profiles of similar products (e.g. Vitamin D added to margarine to match profile of butter) or restoration of nutrient profiles in specific foods following losses during processing. In some countries and regions, there are an increasing number of food standards that permit the addition of nutrients or novel food ingredients to foods to achieve a specific (health) function, for example the addition of plant sterols to margarine, yoghurts and other foods intended to reduce cholesterol levels, omega-3 to milk, bread or juice to improve nutrient profiles, lutein added to infant formula to protect eye health.

Nutrient risk assessments may however be undertaken at an international level as part of the risk assessment process for the proposed use of new fortificants in specific foods (e.g. sodium iron EDTA as a source of iron, FAO/WHO 2007), either for whole populations or for food aid, or when assessing risks associated with the addition of nutrients to the food supply via use of food additives (e.g. calcium lignosulphate as a carrier of nutrients, FAO/WHO 2009). These are undertaken on a case by case basis and generally assess baseline nutrient intakes from the food supply in different countries or regions, accounting for use of supplements if possible, and additions arising from the proposed addition of fortified food and/or use of food additives under consideration.

For nutrient risk assessments undertaken at an international level, the food classification system used for food additive dietary exposure assessments would be a useful starting point if a common system is required, as this will classify processed foods according to the Codex General Standard for Food Additives (GSFA) classification, for which data on the nutrient content of foods are likely to be available..

Food chemical assessments

The previous WHO working group on Hazard Occurrence in Food (HOF) noted that for use in international dietary exposure assessments:

- Codex food classification systems and that used in GEMS/Food need to be more descriptive and inclusive to include a wider range of fruit and vegetables, so that they can be used by all countries;

- Codex food classification systems for food additives and raw commodities need to be linked, either by use of processing or yield factors, noting it would be useful to have a database of processing factors and yield factors available on-line;

- inclusion of processing factors and yield factors as data entry items in the GEMS/Food system could be useful for data providers to gather and include this information with their data submissions;

- food consumption data from national surveys could be 'recoded' in two different ways depending on whether a food additive or contaminant/residue is of interest for the dietary exposure assessment, using standard recipes to disaggregate processed foods and mixed dishes to raw commodities and other conversion factors (noting this is a time consuming process); and

- any coding system developed for use at an international level needs to have the capacity to apply various factors on a case-by-case basis and draw on more than one coding system (processed/raw commodities) in parallel.

It is noted by this WG that the emphasis in Codex food standards on 'western' foods reflects goods likely to be sold in international trade rather than the variety of foods available at a national or local level.