**2. x Surveys of individual food consumption at the global level**

**FAO/WHO Global Individual Food consumption data Tool (FAO/WHO GIFT)** is a global database of surveys of food consumption at the individual-level which are collected at the national and subnational level throughout the world. Only data collected from 1980 by quantitative methods such as 24-hr recalls, food records (weighed or estimated), 12-hr recalls, and direct food weighing are considered. Portion sizes of all foods and beverages consumed by each survey participant must be assessed, including water if possible. For low- or middle-income countries, surveys comprising at least 100 subjects (with no evidence of strong selection bias) are included, whereas for high-income countries, surveys that are nationally representative are an additional criterion. The dietary data generated from FAO/WHO GIFT can be used to inform agricultural, nutrition, food safety and environmental policies and programs. A summary of 218 dietary surveys performed in low- and middle-income countries from 1980 to 2019 and included in the FAO/WHO GIFT inventory is available in Padula de Quadros et al. (2022).

*Ref to imbed in text: Padula de Quadros V, Balcerzak A, Allemand P, Ferreira de Sousa R, Bevere T, Arsenault J, Deitchler M, and Holmes BA. Global Trends in the Availability of Dietary Data in Low and Middle-Income Countries. Nutrients 14:2987, 2022*

FAO/WHO GIFT apply several criteria to validate the dietary databases included. For example, for all foods and drinks consumed by each survey participant on each survey day, a complete description, the amount consumed, and energy and nutrient values for each item must be included in the datasets. Additional compulsory variables are the age and sex of each subject, geographical location (country, and region(s) if available), type of area (e.g., rural, urban), and the number of survey days recorded per subject or for a subset of subjects. Inclusion of variables based on anthropometric data such as weight and height and the physiological status of both women (e.g., pregnant, lactation) and infants (i.e., breastfeeding status) are also recommended.

Recipes should be disaggregated whenever possible to provide data on the quantity of each separate ingredient, cooking method used, total amount prepared, number of people served from the recipe, and the quantity consumed by the survey participant (or served and leftover). Only with this information can each ingredient be attributed to their appropriate food group for the calculation of the FAO/WHO GIFT indicators and summary statistics.

The food composition values used are provided by the data providers. The use of a common food classification and description system among dietary surveys from different countries contributes to the global harmonisation of dietary data. For this reason, all individual quantitative dietary datasets shared through FAO/WHO GIFT are coded with the FoodEx2 system, a comprehensive and flexible food classification and description system. FoodEx2 was first developed by the European Food Safety Authority (EFSA) and was later scaled up to the global level in collaboration with FAO and the World Health Organization (WHO). Eligible dietary databases must be mapped manually by the investigator with FoodEx2 codes for food groups (n=24) and food subgroups based on the descriptions provided by FAO/WHO GIFT. Prior to the analysis and formatting by FAO/WHO GIFT, all eligible datasets are screened for potential errors, missing values and outliers. For further details of FAO/WHO GIFT see:

<https://www.fao.org/gift-individual-food-consumption/method>

Provided the eligible dietary datasets have been coded using FoodEx2, the FAO/WHO GIFT platform can compute ready-to-use indicators and summary statistics based on individual food consumption data in the areas of food consumption, food safety and nutrition. For example, of the indicators, one reflecting dietary diversity at the population level (a key component of diet quality) entitled the Minimum Dietary Diversity for Women (MDD-W) is computed. This is a food group-based indicator that estimates the proportion of non-pregnant women of reproductive age (15-49 years) who consumed at least five out of ten defined food groups over the previous 24 hours. For more details of MDD-W see Chapter 8c and <https://www.fao.org/nutrition/assessment/tools/minimum-dietary-diversity-women/en/>

The summary statistics generated by FAO/WHO GIFT comprise the estimated *usual* intakes of selected nutrients for pre-defined population groups by sex and age (except children less than aged 12 months) provided the datasets contain multiple non-consecutive days of 24hr recalls/food records for at least a subset of 50 individuals. The statistical program chosen to adjust the dietary data for day-to-day variation is the Statistical Program to Assess Dietary Exposure (SPADE) (Dekkers et al., 2014). In addition, information on Nutrient Reference Values (NRVs) set by FAO/WHO, the European Food Safety Authority (EFSA) and the Institute of Medicine (IOM) are provided on the FAO/WHO GIFT platform to facilitate comparison of the estimated usual intakes of selected nutrients with NRVs. For more details of the statistical program SPADE, see Chapter 3, Section 3.x, Dekkers et al. (2014), and the following website:

Reference for Dekkers:

* Dekkers AL, Verkaik-Kloosterman J, van Rossum CT, Ocké MC. SPADE, a new statistical program to estimate habitual dietary intake from multiple food sources and dietary supplements. J Nutr. 2014;144(12):2083-91. doi:* [*10.3945/jn.114.191288*](https://academic.oup.com/jn/article/144/12/2083/4644413)*. Epub 2014 Oct 15. PMID: 25320187.*

Manual SPADE Version 4.1.00: <https://www.rivm.nl/documenten/manual-spade-version-4100>  
In order to use SPADE, the program can be requested through the website: [www.spade.nl](https://www.rivm.nl/en/spade).

For NRVs and their applications, see Chapters 8a and 8b, respectively.

**The Global Dietary Database (GDD)** aims to identify, compile and standardise individual-level data on dietary factors related to maternal-child health and chronic diseases. Currently the GDD comprises surveys across 188 countries conducted between 1980 and 2018 and provides empirical evidence on dietary intakes both across and within countries worldwide. Priority is given to nationally or sub-nationally representative dietary surveys based on 24-h recalls, food frequency questionnaires or short standardised questionnaires (e.g., Demographic Health Surveys (DHS)**. H**ousehold-level surveys are included if individual-level surveys are not available in a country and converted to individual-level intakes within each household using Adult Male Equivalents (AME), also known as Adult Consumption Equivalents (Weisell & Dop, 2012). The latter account for the household composition and differing energy intakes by age and sex of household members. See Coates et al. (2017) for discussion of the validity of the application of the AME method for household-level data.

*Weisell R & Dop M C (2012). The Adult Male Equivalent concept and its application to Household Consumption and Expenditures Surveys (HCES).Food and Nutrition Bulletin 33 (no.3) suppplement:S157-S162.*

*Coates J et al. Filling a dietary data gap? Validation of the adult male equivalent method of estimating individual nutrient intakes from household-level data in Ethiopia and Bangladesh. Food Policy 72:27-42.*

The FoodEx2 categorization system is used to standardize the description and classification of foods into food groups. Standardization also includes categorising nutrients and their units; quality assessment; aggregation by demographic strata and energy adjustment. For more details on data extraction and standardization see: <https://www.globaldietarydatabase.org> .

Mean intakes of 54 dietary factors by country, year, age, sex, education, urbanicity, and pregnancy/lactation status within nations can now be estimated using the GDD prediction model in 188 countries/territories in Asia, Asia-Pacific high-income countries, Oceania, Former Soviet Union, Latin America and Caribbean, Middle East and North Africa, South Asia, Sub-Saharan Africa, and the Western high-income countries in Australasia, Europe and North America (Miller et al., 2021). The dietary factors selected and defined based on evidence for relationships with maternal-child health or chronic diseases include 14 foods, 7 beverages, 12 macronutrients, and 18 micronutrients. See <https://www.globaldietarydatabase.org> for more details on data extraction and the standardization used for estimating dietary intakes. Several indicators of global dietary patterns (e.g., Alternative Healthy Eating Index (AHEI); Dietary Approaches to Stop Hypertension (DASH), and the Mediterranean Diet Score (MED)) among children and adults have also been compiled from the GDD sets and compared globally, regionally, and nationally (Miller et al. ,2022).

*Miller V, Webb P, Cudhea F, Shi P, Zhang J, Reedy J, Erndt-Marino J, Coates J, Mozaffarian D; Global Dietary Database. Global dietary quality in 185 countries from 1990 to 2018 show wide differences by nation, age, education, and urbanicity. Nat Food. 2022 Sep;3(9):694-702. doi: 10.1038/s43016-022-00594-9. Epub 2022 Sep 19. PMID: 37118151; PMCID: PMC10277807*

*Miller V, Singh GM et al. Global Dietary Database 2017: data availability and gaps on 54 major foods, beverages and nutrients among 5.6 million children and adults from 1220 surveys worldwide. BMJ Glob Health. 2021 Feb;6(2):e003585. doi: 10.1136/bmjgh-2020-003585. PMID: 33547175; PMCID: PMC7871251.*

**Institute for Health Metrics and Evaluation (IHME) initiative** database aims to provide rigorous and comparable measurement of the world’s most important health problems and evaluates the strategies used to prevent them**.** IHME uses FAO Food Balance Sheet estimates, national product sales, household surveys, and data based on 24 hr recalls (considered the gold standard).Datasets created by IHME are stored in the IHME data catalogue known as the Global Health Data Exchange and can be freely downloaded from the IHME website.

IHMEprovides freely available modeled data by country, age, sex and year, based on primary data collected in 204 countries and 87 indicators, including 15 dietary indicators (9 foods and 6 nutrients). The dietary indicators are included in the Global Burden of Diseases (GBD) (GBD,2017), a worldwide observational epidemiological study that tracks the progress within and between countries of the changing health challenges (Lim et al., 2013).

*GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2019 May 11;393(10184):1958-1972. doi: 10.1016/S0140-6736(19)30041-8. Epub 2019 Apr 4. Erratum in: Lancet. 2021 Jun 26;397(10293):2466. PMID: 30954305; PMCID: PMC6899507.*

*Lim SS et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012 Dec 15;380(9859):2224-60. doi: 10.1016/S0140-6736(12)61766-8. Erratum in: Lancet. 2013 Apr 13;381(9874):1276. Erratum in: Lancet. 2013 Feb 23;381(9867):628. AlMazroa, Mohammad A [added]; Memish, Ziad A [added]. PMID: 23245609; PMCID:*