**Nutrition indicators based on average consumption of nutrients per capita per day**

Additional nutrition indicators based on per capita nutrients available for consumption have also been compiled. These indicators are calculated by first multiplying the edible amounts of the food commodities listed in the food module of the HCES survey and said to be available for consumption (not the actual intake) for each household, with their corresponding nutrient content derived from food composition tables (mostly for the raw form of the food before preparation).The nutrients that can be included are the essential amino acids, vitamins B1, B2, B6, B12, and C, folate, total vitamin A (expressed as both Retinal Equivalents and Retinol Activity Equivalents, zinc, calcium, and total iron. The next step is to estimate average consumption per capita per day. This is achieved by taking into account the number of members and visitors recorded as eating each meal in each household. Both p*er capita* nutrient consumption and when expressed as nutrient density (i.e., per 1000 Kcals) can be estimated at the national level and when disaggregated into categories used to monitor or identify target populations for policy makers. The categories that can be included depends on the type of household socio-economic characteristics collected in the HCES in the country. In addition, heme iron, expressed as a percentage of total iron, can also be estimated.

Examples of these nutrient-based indicators disaggregated by region, urban-rural areas, and quintile of income are given in Box 2.x.

Note that in the past, attempts to assess nutrient adequacy from HCES survey data estimated ratios of per capita availability of nutrients to the average weighted nutrient requirement at the population level. These ratios provided a gross indication of issues with

meeting requirements of selected nutrients at the population

level, but allowed no information on the prevalence of inadequate nutrient intakes in the population (Moltedo et al. 2018). Such information can only be generated from nutrient intakes measured at the individual level and compared with age- and sex-specific nutrient requirements using the methods described in Chapter 8b.

Consequently, recently efforts have been made to estimate the prevalence of nutrient inadequacy (PoNI) in the population based on HCES survey data. The new method extends the FAO probabilistic cut-point method used earlier to estimate chronic dietary energy inadequacy to include nutrients other than dietary energy. To achieve this objective, the data generated on average per capita nutrient consumption must first be pre-adjusted to yield the distribution of usual consumption by removing the excess variation due to within-person day-to-day variability and seasonal variability. Next, the distribution of usual consumption levels is then compared to a threshold to estimate PoNI. The threshold is based on the weighted average of the estimated average requirement (EAR)for the nutrient under study for each sex-age group in the population.

Detailed instructions for estimating these indictors based on nutrient analysis using FCTs and the data from HCES and the new FAO probabilistic cut-point method, respectively, are available at:

UPGRADING ADePT-FSM FOR ANALZING FOOD SECURITY STATISTICS USING HOUDEHOLD CONSUMPTION AND EXPENDITURE SURVEY DATA

And

Moltedo, A., Álvarez-Sánchez, C., Troubat, N. & Cafiero, C. 2022. Estimating the prevalence of nutrient inadequacy from household consumption and expenditure surveys. FAO Statistics Working Paper Series, No. 22/30. Rome, FAO. https://doi.org/10.4060/cc2780ede.

Special attention must also be given to the choice of the food composition tables used for the nutrient analysis. For discussion of some of the limitations of the nutrient values in food composition tables, consult Section 1.2 in the above ADePT-FSM Version 3 Software. Note that this version of the ADePT software also

permits an assessment of the micronutrient content in foods consumed away from home.

**Box 2.x** **Selected indicators\* based on average nutrient consumption per capita per day**

* **Household share of animal protein in total protein.**
  + based on acquisition and/or consumption and an example of a nutrient-based indicator that can be used as a proxy measure of dietary quality at the population level.
  + Calculated as: total protein from animal sources (in grams) x 100/ Total protein in grams)from all foods
  + Higher percentage of animal source protein likely to be associated with a higher absolute consumption of animal source foods, which provide a variety of micronutrients that are either less frequent or less bioavailable in plant-based food sources. Food commodities considered as animal source foods include meat, fish, eggs, milk, and cheese. See ADePT-FSM SOFTWARE for more details.
* **Zinc consumption (mg/capita/day)** at national, income quintile, and urban-rural levels
  + Note that zinc consumption is not adjusted for bioavailability in view of the paucity of phytate data currently available in FCTs
* **Zinc density (mg/1000Kcal**) at national, income quintile, and urban-rural levels
  + Density computed as mean of HHs nutrient densities
* **Folate consumption** expressed as Dietary Folate Equivalents (DFEs) **(ug/capita/day)** at national, income quintile, and urban-rural levels
* **DFE density (ug/1000Kcal)** at national, income quintile, and urban-rural levels
* **Vitamin A consumption expressed as Retinol Eqivalents or Retinol Activity Equivalents (ug Re or RAE/capita/day)** at national, income quintile, and urban-rural levels
* **RAE density (ug/1000Kcal)** at national, income quintile, and urban-rural levels
* **Total iron (mg/capita/day** at national, income quintile, and urban-rural levels
* **Heme iron (as percent of total iron)** at national, income quintile, and urban-rural levels
  + Heme iron content estimated from raw and cooked meat from literature sources
* **Prevalence of Nutrient Inadequacy (PoNI) for vitamins B1,B2,B6, B12, vitamin A, vitamin C, Ca, Zn**
  + Estimates via probabilistic EAR cut-point method.
  + These estimates compared with individual level Bangladeshi data and EAR cut-point methods appear promising.

For additional food security and nutrition indicators, see

https://www.fao.org/3/cb2465en/cb2465en/pdf

Moltedo et al. (2022) compared the prevalence of

inadequacy estimated with pre-treated data from the Bangladesh Integrated Household Survey versus estimates obtained from individual-level Bangladesh data. The analysis was performed for eight micronutrients (vitamins A, B1, B2, B6, B12 and C, and calcium and zinc). They concluded that the use of HCES data to estimate PoNI based on their new method appears promising, especially when no large-scale dietary surveys at the individual level exist. Further studies are needed, however, using data sets from other countries to explore further the usefulness of this new approach.