



Total individual energy intake

Overview

Total individual energy intake is a member of the class of indicators that measure individual intake of nutrients. It quantifies daily energy intake based on individual calorie consumption. Prolonged insufficient energy intake results in undernutrition and impaired growth, development, and functioning, and as a result many developing countries still suffer from high rates of underweight among adolescents and adults, and stunting and/or wasting among young children ([Muller & Krawinkel, 2005](#) [1]). This is the only indicator included in the Data4Diets platform that strictly measures caloric intake at an individual level, but other indicators that measure caloric availability at the household or national level are: [household average dietary energy acquisition or consumption](#) [2] and [dietary energy supply](#) [3]. Examples of other indicators that use individual data to quantify nutrient intake include [total individual micronutrient intake](#) [4], which is measured in absolute terms, as well as the [Mean Adequacy Ratio](#) [5] (MAR), which uses a scaled system to measure adequacy of individuals' nutrient intake.

Method of Construction

In order to construct this indicator, an individual's intake must be recorded through a [24-hour Dietary Recall](#) [6] or [Weighed Food Record](#) [7]. Population mean consumption can be estimated with a single survey, but the survey must be repeated on at least a subsample of the survey population for two non-consecutive days of intake to estimate "usual intake" ([Institute of Medicine, 2000](#) [8]). When repeated measurements are available for at least a subsample of individuals, the "probability approach," which accounts for day-to-day variability of food intakes at the individual level, allows to calculate the individual probability of inadequate intake for each nutrient, and a mean probability of adequacy (MPA) over a range of micronutrients. The final sample in the dietary survey should be representative of all days of the week.

A [Food Frequency Questionnaire](#) [9] (FFQ) could also be used but would provide a less accurate estimate. A contextually relevant Food Composition Table (FCT) is used to determine the energy content in each food item consumed by the individual, and the caloric value of all food items are summed to calculate a daily total. For further information, please refer to Chapter 3 of this Food and Agriculture Organization (FAO) Food and Nutrition paper on calculating energy content of foods ([FAO, 2003](#) [10]).

Uses

This indicator is used to assess the most basic element of dietary quality: intake of sufficient calories. It can provide information on risk of both over- and undernutrition, particularly for vulnerable population subgroups, such as pregnant and lactating women, and for understanding the allocation of food resources within a household. However, this indicator does not provide information on the makeup of calories consumed, which has serious health implications. Indicators such as [total individual macronutrient intake](#) [11] or [total individual micronutrient intake](#) [4] may be more appropriate for assessing specific components of the diet.

Strengths and Weaknesses

One strength of this indicator, as well as of all individual-level indicators, is that they can be paired with findings on individual health outcomes or demographic information, such as religion, age, sex, education, or any other characteristics of interest, assuming the study has been designed for these purposes ([Ferro-Luzzi, 2002](#) [12]). One weakness is that obtaining dietary intake data is challenging due in large part to the collection methods used, including time and cost considerations ([Hedrick, 2012](#) [13]). Additionally, consumption of a sufficient number of calories is not an indicator of diet quality, as the source of the calories also affects nutritional outcomes. Other indicators such as [MAR](#) [5] or [probability of inadequacy](#) [14] may be more appropriate for using individual nutrient intake data to provide a picture of the diet as a whole, as they are calculated across several nutrients.

Data Source

The intake data required for this indicator can be obtained through [24-hour Dietary Recall](#) [6] surveys, weighed food records, or [FFQ](#) [9] (even if less accurate). The Food and Agriculture Organization and World Health Organization's Global Individual Food consumption data Tool ([FAO/WHO GIFT](#) [15]) is a source for quantitative individual-level dietary data. The FAO/WHO GIFT aims to make publicly available existing quantitative individual food consumption data from countries all over the world. National or regional FCTs should be used to identify the nutrient contents of the foods and can be found at FAO's International Network of Food Data Systems ([INFOODS](#) [16]) or the International Life Science Institute's (ILSI) World Nutrient Databases for Dietary Studies ([WNDDS](#) [17]). In addition, [Food Balance Sheet](#) [18] (FBS) data could be used to calculate a similar indicator, such as [dietary energy supply](#) [3]. Alternatively, [Household Consumption and Expenditure Survey](#) [19] (HCES) data could be used to calculate [household average dietary energy acquisition or consumption](#) [2].

Links to guidelines

- [FAO, \(2003\). "Chapter 3: Calculation of the Energy Content of Foods ? Energy Conversion Factors"](#) [10]
- [National Research Council Committee on Diet and Health, \(1989\). "Calories: Total Macronutrient Intake, Energy Expenditure, and Net Energy Stores"](#) [10]

Links to illustrative analyses

- [Cohen et al., \(1994\). "Effects of age of introduction of complementary foods on infant breast milk intake, total energy intake, and growth: a randomised intervention study in Honduras"](#) [20]
- [Schoeller, \(2014\). "How Accurate Is Self-Reported Dietary Energy Intake?"](#) [21]

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Food Security Dimensions

- [Quantity](#) [23]

Data Collection Levels

- [Individual](#) [24]

Data Sources and Methods

- [24-Hour Dietary Recall \(24HR\)](#)
- [Weighed Food Record \(WFR\)](#)
- [Food Frequency Questionnaire \(FFQ\)](#)
- [Food Composition Databases](#)

Requires Food Composition Database

- [Yes](#) [25]

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