SDG indicator metadata
(Harmonized metadata template - format version 1.0)

0. Indicator information

0.a. Goal
Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

0.b. Target
Target 2.2: by 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons

0.c. Indicator
Indicator 2.2.1: Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age

0.d. Series
Not Applicable

0.e. Metadata update
2022-11-22

0.f. Related indicators
Good nutrition lays the foundation for achieving many of the SDGs with improvements in nutrition directly supporting the achievement of SDG3 (ensuring healthy lives), while also playing a role in ending poverty (SDG1), ensuring quality education (SDG4), achieving gender equality (SDG5), promoting economic growth (SDG8), and reducing inequalities (SDG 10). In this way, nutrition is the lifeblood of sustainable development, and drives the changes needed for a more sustainable and prosperous future.

0.g. International organisations(s) responsible for global monitoring
United Nations Children's Fund (UNICEF)
World Health Organization (WHO)
World Bank (WB)

1. Data reporter

1.a. Organisation
United Nations Children's Fund (UNICEF)
World Health Organization (WHO)
World Bank (WB)

2. Definition, concepts, and classifications

2.a. Definition and concepts

Definition:
Prevalence of stunting (height-for-age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age.
(French: pourcentage de retard de croissance (i.e., longueur/taille pour l'âge < -2 écarts types par rapport à la médiane des normes de croissance de l'enfant de l'Organisation Mondiale de la Santé (OMS)) chez les enfants de moins de cinq ans; Spanish: porcentaje de retraso del crecimiento (i.e., longitud/estatura para la edad < -2 desviaciones estándar de la mediana de los estándares de crecimiento infantil de la Organización Mundial de la Salud (OMS)) en los niños y niñas menores de cinco años de edad.)

Concepts:


2.b. Unit of measure

Proportion

2.c. Classifications

The WHO Multicentre Growth Reference Study (MGRS) (WHO 2006) was undertaken to generate a growth standard for assessing the growth and development of infants and young children around the world. The MGRS collected primary growth data and related information from children from widely different ethnic backgrounds and cultural settings (Brazil, Ghana, India, Norway, Oman, and the USA). The resulting growth standard can be applied to all children everywhere, regardless of ethnicity, socioeconomic status and type of feeding. The indicator refers to those moderately or severely stunted, that is with a z-score below -2 standard deviations for height-for-age from the median of the growth standard.

3. Data source type and data collection method

3.a. Data sources

For the majority of countries, nationally representative household surveys constitute the primary data source used to generate the JME global estimates. For a limited number of countries data from surveillance systems are also used as a primary data source for generation of the JME global estimates if sufficient population coverage is documented (about 80%). For both types of primary data sources, the child’s height/length and date of birth as well as date of measurement (to generate age in days) have to be collected following recommended standard measuring techniques (WHO/UNICEF 2019).

3.b. Data collection method

UNICEF, WHO and the World Bank group jointly review new data sources to update the country level estimates. Each agency uses their existing mechanisms for obtaining data.
For UNICEF, the cadre of dedicated data and monitoring specialists working at national, regional and international levels in 190 countries routinely provide technical support for the collection and analysis of nutrition data. UNICEF also relies on a data source catalogue that is regularly updated using data sources from catalogues of other international organizations and national statistics offices. This data collection is done in close collaboration with UNICEF regional offices with the purpose of ensuring that UNICEF global databases contain updated and internationally comparable data. The regional office staff work with country offices and local counterparts to ensure the most relevant data are shared.

WHO data gathering strongly relies on the organization’s structure and network established over the past 30 years, since the creation of its global database, the WHO Global Database on Child Growth and Malnutrition, in the late 1980’s (de Onis et al. 2004).

The World Bank Group provides estimates available through the Living Standard Measurement Surveys (LSMS) which usually requires re-analysis of datasets given that the LSMS reports often do not tabulate the stunting data.

3.c. Data collection calendar

Data collection is carried out by the three-agency group regularly throughout the year.

3.d. Data release calendar

The UNICEF-WHO-WB Joint Child Malnutrition (JME) group releases country, regional and worldwide estimates at the end of March so that data are available for the SDG report and database. The JME group also maintain a dataset of primary data sources (household surveys) used to generate the JME global estimates.

3.e. Data providers

Majority of the data sources used are nationally representative household surveys e.g., Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) and National Nutrition Surveys (NNS). Data providers vary and most commonly are ministries of health, national offices of statistics or national institutes of nutrition.

3.f. Data compilers

UNICEF, WHO and the World Bank group

3.g. Institutional mandate

UNICEF is responsible for global monitoring and reporting on the wellbeing of children. UNICEF actively supports countries in data collection and analysis for reporting on child malnutrition indicators primarily through high-quality MICS surveys, as well as providing technical and financial support to other surveys. UNICEF not only supports household surveys but also works with global partners to define technical standards for the collection and analysis of anthropometric data. UNICEF also compiles statistics on child nutrition with the goal of making internationally comparable estimates and databases publicly available. In-depth analyses of the data on child malnutrition, which are included in relevant data-driven
publications, including in its flagship publication, *The State of the World’s Children*, and the *Child Nutrition Report* are also conducted by UNICEF.

WHO has an established role in the monitoring of child growth and malnutrition since the late 1980’s, and had the mandate to developed the WHO Child Growth Standards, launched in 2006, and adopted by more than 160 countries. WHO has published several per-reviewed articles with regional and global estimates until 2012, when they joined forces with UNICEF and the World Bank, with the objective of harmonizing child malnutrition estimates. WHO has the mandate to monitor and report progress on the six global nutrition targets, endorsed in 2012 by the World Health Assembly, amongst them, three on child malnutrition, namely stunting, wasting and overweight (SDG 2.2.1, 2.2.2a and 2.2.b).

4. Other methodological considerations

4.a. Rationale

Child growth is an internationally accepted outcome reflecting child nutritional status. Child stunting refers to a child who is too short for his or her age and is the result of chronic or recurrent malnutrition. Stunting is a contributing risk factor to child mortality and is also a marker of inequalities in human development. Stunted children fail to reach their physical and cognitive potential. Child stunting is one of the World Health Assembly nutrition target indicators.

4.b. Comment and limitations

Survey estimates come with levels of uncertainty due to both sampling error and non-sampling error (e.g., measurement technical error, recording error etc.). The JME global estimates for stunting take into account estimates of sampling error around survey estimates. While non-sampling error cannot be accounted for or reviewed in full, when available, a data quality review of weight, height and age measurements from household surveys supports compilation of a time series that is comparable across countries and over time.

Of particular concern for overweight is the fact that data for high-income countries are scarce yet the rates are generally higher among the high-income countries with data. The JME group are working closely with countries in the European region to increase coverage, as well as to apply age adjustments for data covering only partially the age interval 0 to 59 months.

The JME working group carefully utilizes all available national data sources, and documents all the steps taken to infer about country trends based on the national data sources. The estimation method (McClain et al 2018) is based on and closely aligned to country data. The approach smooths and fits a trend line across the national data points. The basis of the estimates are nationally representative household surveys. However, as surveys are conducted infrequently (e.g., less frequently than every 3 years) in some countries, models can help generate a complete time series with estimates available in the same years for all countries. This allows for comparable assessment of progress; for example, all countries can be assessed using the same baseline year. For any individual country, an increase in the availability of primary data points can result in more robust and accurate modelled estimates.

4.c. Method of computation
National estimates from primary sources (e.g., from household surveys) used to generate the JME global estimates are based on standardized methodology using the WHO Child Growth Standards as described in Recommendations for data collection, analysis and reporting on anthropometric indicators in children under 5 years old (WHO/UNICEF 2019) and WHO Anthro Survey Analyser (WHO, 2019). The JME global estimates are generated using smoothing techniques and covariates (McLain et al. 2018) applied to quality-assured national data to derive trends and up-to-date estimates. Worldwide and regional estimates are derived as the respective country averages weighted by the countries’ under-five population estimates (UNPD-WPP latest available edition) using annual JME global estimates for 204 countries (UNICEF-WHO-World Bank 2020).

4.d. Validation

UNICEF, WHO and the World Bank undertake a joint review for each potential primary data source used to generate the JME global estimates. The group conducts a review when (at minimum) a final report with full methodological details and results are available, as well as (ideally) a data quality assessment flagging potential limitations. When the raw data are available, they are analysed using the Anthro Survey Analyzer software to produce a standard set of results and data quality outputs against which the review is conducted (UNICEF-WHO-World Bank 2020). Comments are documented in a standard review template extracting methodological details (e.g., sampling procedures, description of anthropometrical equipment), data quality outputs (e.g., weight and height distributions, percentage of cases that were flagged as implausible according to the WHO Child Growth Standards) and the malnutrition prevalence estimates from the data source under review generated based on the standard recommended methodology. These estimates are compared against the reported values, as well as against those from other data sources already included in the JME dataset, to assess the plausibility of the trend before including the new point. Reports that are preliminary, or that lack key details on methodology or results, cannot be reviewed and are left pending until full information is available.

The methods used to generate the JME global estimates for stunting and overweight were cross-validated to ensure estimates produced by the method are closely aligned to national data points. It was also reviewed through a technical consultation with experts and country representatives of National Statistics Offices as well as IAEG-SDGs Members in 2019 (UNICEF/WHO/World Bank, 2019). Country consultations with SDG 2.2 focal points were also held in 2020/2021 before finalizing and disseminating the JME global estimates for the 2021 edition of the JME. The purpose of the country consultations was to explain the updated methodology for stunting estimates to national governments; to ensure the estimates included all recent and relevant primary data sources; and to engage with and receive feedback from national governments on the estimates.

4.e. Adjustments

Adjustments to reported values from primary data sources (e.g., household surveys) used to generate the JME global estimates are made in cases where raw data are not available for re-analysis and it is known from the report that the estimates were derived based on indicators that do not adhere to the standard definition used for monitoring of the SDGs (e.g., they are based on different growth references, different age groups, etc.). The three types of adjustments that have been applied to the JME country dataset include adjustments to standardize for: (i) age, specifically for data sources that did not include the full 0–59-month age group (e.g., data sources reporting on 2–4-year-olds); (ii) area of residence, specifically for
data sources that were only nationally representative at the rural level; and (iii) growth reference, specifically for data sources that used the 1977 NCHS/WHO Growth Reference instead of the 2006 WHO Growth Standards to generate the child malnutrition estimates. These three types of adjustments are briefly described below with further details provided elsewhere (UNICEF-WHO-World Bank 2020).

i. Age-adjustment
There are several nationally representative surveys that report on age groups that do not cover the entire 0–59-month age range in the standard definition of SDG 2.2.1. Adjustment for age is needed as malnutrition prevalence can vary by sub-age group and surveys that omit part of the full age range might thus not be comparable with a survey that did cover all 0–59-month olds. The adjustment method applies the relative proportions of malnutrition prevalence for each sub-age group from the closest survey in the JME country dataset that covers the full age range, to the survey that covers only the smaller age range using the rule of three calculation. Surveys covering only a partial age range which were not adjusted before November 2020 using the above method were adjusted during the process of generating the JME global estimates as described elsewhere (UNICEF-WHO-World Bank 2020).

ii. Adjustment from national rural to national
A number of national surveys cover only rural areas of the country. Given that malnutrition prevalence can vary between urban and rural areas, a rural-only survey would not be comparable with a national survey that covered both urban and rural areas. To adjust rural-only estimates to be comparable with estimates that cover the entire national population, urban populations are accounted for using the same approach as for age adjustment – that is, to use another nationally representative survey that has disaggregated urban and rural estimates and apply relative proportions of malnutrition prevalence for each sub-group from that data source to the rural-only survey to adjust its estimate.

iii. Adjustment to use the 2006 WHO Growth Standard (converted estimates):
The indicators of stunting, wasting and overweight used to track SDG Target 2.2 require a standard deviation (SD) score (z-score) to be calculated for each child who is measured for a data source; and the z-score requires a growth reference against which it can be calculated. Prior to the release of the WHO Child Growth Standards in 2006, the 1977 NCHS/WHO reference was recommended for international comparisons. The WHO Growth Standard results in estimates of stunting and wasting prevalence that are higher as well as estimates of overweight that are lower than estimates generated using the NCHS/WHO growth standard (De Onis et al 2006). It is therefore necessary to account for these differences and standardize estimates across data sources. Data sources published prior to the release of the new growth standard in 2006 had to be re-analysed to obtain comparable estimates across time and location. For surveys lacking raw data for re-analysis, a conversion formula is applied (Yang and De Onis, 2008).

4.f. Treatment of missing values (i) at country level and (ii) at regional level

- At country level
  Missing values were derived as part of the methods used to generate the JME global estimates, by closely fitting the estimates from country primary data sources, with due attention to unwarranted variability. Please refer to McLain et al. 2018 for technical details of the methods applied. Based on these methods, the JME global estimates were produced from 2000 to 2020 for 204 countries which were used to generate regional and worldwide aggregates. For 49 of these countries, the JME global estimates were produced solely for generation of regional and worldwide aggregates, and were not released to the public because these 49 countries did not have any primary data sources (e.g., household surveys) in the JME country dataset or because the JME global estimates remained pending final review at the time of publication. For the remaining 155 countries with at
least one primary data source (e.g., from household survey) included in the 2021 JME country
dataset, the JME global estimates are included in the public JME databases.

- **At regional and worldwide levels**

  There are no missing data for the generation of worldwide and regional estimates as country
  estimates derived are used. Worldwide and regional estimates for all years from 2000 to 2020
  were thus aggregated as the respective JME global estimates for 204 countries, weighted by the
countries’ under-five population from the latest revision of The United Nations World Population
Prospects available online.

4.g. Regional aggregations

Regional aggregates are available for the following classifications: UN, SDG, UNICEF, WHO, The World
Bank regions and income groups.

4.h. Methods and guidance available to countries for the compilation of the data at
the national level

Methods and guidance:

**Recommendations for data collection, analysis and reporting on anthropometric indicators in children
under 5 years of age (WHO/UNICEF, 2019)**

Analysis tool: [WHO Anthro Survey Analyser (shinyapps.io)](https://shinyapps.io/WHOAnthroSurveyAnalyser/)

UNICEF-WHO-World Bank 2020. Technical notes from the country consultation on SDG Indicators 2.2.1
on stunting, 2.2.2a on wasting and 2.2.2b on overweight.

4.i. Quality management

The JME working group, which was formed in 2011 with representatives from UNICEF, WHO and the
World Bank, is responsible for management of the processes used to develop annual updates of the JME
estimates. This includes the regular update of the country dataset of surveys used to generate the JME
global estimates; regular communication with regional and country teams allows the JME working group
to secure microdata for re-analysis according to the standard method and discuss potential data quality
issues. The JME working group also continuously review methods and considers and tests different
methodologies to improve the estimates as necessary. Additionally, a Technical Expert Advisory Group on
Nutrition Monitoring (TEAM), jointly established by UNICEF and WHO, provides advice on nutrition
monitoring methods and processes, including on the JME.

4.j Quality assurance

The quality criteria established in the 2019 UNICEF/WHO guidance ([WHO/UNICEF, 2019](https://www.who.int/food-nutrition/publications/2019/anthro-report/en/)) were used to
is used to abstract key information including methodological details (e.g., sampling procedures,
description of anthropometrical equipment), data quality outputs (e.g., response rates, weight and height
distributions, percentage of cases that were flagged as having implausible anthropometry outcomes
according to the WHO Child Growth Standards) and the malnutrition prevalence estimates from each
primary data source (e.g., household survey) under review. One JME working group member fills in the
review form for each data source and when information is missing or further details are required, the
country teams are contacted. Once all information is available and the JME primary data source review
form is completed, each data source is reviewed by the three agencies (UNICEF, WHO, WB) which form the JME working group. This allows for a thorough and efficient standard joint review of each data source by the three agencies prior to inclusion in the JME country dataset of primary sources (e.g., household surveys) that are used to generate the JME global estimates.

4.k Quality assessment

Data consistency and quality checks described above (UNICEF-WHO-World Bank 2020) are conducted for each potential primary data source (e.g., household survey) before inclusion in the JME country dataset of primary sources that are used to generate the JME global estimates. Cross-validation exercises are performed for the global estimates to ensure the method generates estimates that are aligned to national data points. Country consultations with SDG 2.2 focal points also provide an overall evaluation of the estimates. For the 2021 edition of the JME, country consultations were used to explain the updated methodology to national governments, to ensure the estimates included all recent and relevant country data, and to engage with and receive feedback from national governments on the JME global estimates.

5. Data availability and disaggregation

Data availability:
The JME global estimates from 2000 to 2020 were released for 155 countries that had at least one primary data source (e.g., from household survey) included in the 2021 JME country dataset. JME global estimates were also produced for 49 countries which were solely generated for development of regional and worldwide aggregates and which are not released to the public because these 49 countries did not have any primary data sources (e.g., household surveys) in the JME country dataset or because the JME global estimates remained pending final review at the time of publication.

Time series:
At country level, JME global estimates from 2000 to the year before the JME release (e.g., 2020 estimates were the latest available for the 2021 release) are presented for countries with at least one data point (e.g., from survey/surveillance) are included in the joint dataset of primary data sources. Survey years range from 1983 to the year before the JME release. Worldwide and regional levels, annual estimates are available from 2000 to the year before the JME release.

Disaggregation:
Country, regional and worldwide JME global estimates refer to the age group of children under 5 years, sexes combined. Disaggregations are currently not available for the JME global estimates. However, a disaggregated dataset of national primary sources with sub national and stratified estimates (e.g., sex, age groups, wealth, mothers’ education, residence) is available.

6. Comparability / deviation from international standards

Sources of discrepancies:
For the survey estimates included in the JME joint dataset of primary sources, re-analysis based on standardized methodology using the WHO Child Growth Standards as described in *Recommendations for data collection, analysis and reporting on anthropometric indicators in children under 5 years old* ([WHO/UNICEF 2019](https://www.who.int/childgrowth/publications/Comparison_implications.pdf)) and WHO Anthro Survey Analyser ([WHO, 2019](https://www.who.int/childgrowth/publications/Comparison_implications.pdf)) is applied whenever microdata are available to enhance comparability across the time series. Country teams are encouraged to use the WHO Anthro Survey Analyser ([WHO, 2019](https://www.who.int/childgrowth/publications/Comparison_implications.pdf)) to undertake survey analysis and harmonize with the global standard analysis methods.

For the inclusion of survey estimates into the JME dataset, the inter-agency group applies a set of survey quality assessment criteria. When there is insufficient documentation, the survey is not included until information becomes available. Discrepancies between results from standardised methodology and those reported may occur for various reasons, for example, the use of different standards for z-score calculations, imputation of the day of birth when missing, the use of rounded age in months, the use of different flagging systems for data exclusion. For surveys based on the previous NCHS/WHO references, and for which raw data are not available, a method for converting the z-scores to be based on the WHO Child Growth Standards is applied ([Yang and de Onis, 2008](https://pubmed.ncbi.nlm.nih.gov/15542535/)). In addition, when surveys do not cover the age interval 0-59 months, or are only representative of the rural areas, an adjustment based on other surveys for the same country, is performed. Any adjustment or conversion is transparently stated in the annotated joint data set.

The JME global estimates, which are based on smoothing techniques and covariates, as described elsewhere ([McLain et al. 2018](https://pubmed.ncbi.nlm.nih.gov/30430613/)), vary from estimates from primary data sources such as household surveys, but in most cases the 95 per cent confidence bounds of the global estimates for a given country in a given year fall within the 95 per cent confidence bounds of the estimate from the primary source for the corresponding country and year(s).

### 7. References and Documentation

**URL:**

- [data.unicef.org/nutrition/malnutrition.html](https://data.unicef.org/nutrition/malnutrition.html);
- [https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb](https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb);
- [http://datatopics.worldbank.org/child-malnutrition](http://datatopics.worldbank.org/child-malnutrition);

**References:**


UNICEF-WHO-World Bank (2020). Technical notes from the country consultation on SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight <https://data.unicef.org/resources/jme-2021-country-consultations/>


