SDG indicator metadata

(Harmonized metadata template - format version 1.1)

0. Indicator information (SDG_INDICATOR_INFO)

0.a. Goal (SDG_GOAL)

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

0.b. Target (SDG_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 (SDG_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 (SDG_SERIES_DESCR)

SH_STA_STNT - Proportion of children moderately or severely stunted [2.2.1]

SH_STA_STNTN - Children moderately or severely stunted (number) [2.2.1]

0.e. Metadata update (META_LAST_UPDATE)

2024-07-29

0.f. Related indicators (SDG_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 (SDG10). 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 (SDG_CUSTODIAN_AGENCIES)

United Nations Children's Fund (UNICEF)

World Health Organization (WHO)

World Bank (WB)

1. Data reporter (CONTACT)

1.a. Organisation (CONTACT_ORGANISATION)

United Nations Children's Fund (UNICEF)
World Health Organization (WHO)
World Bank (WB)

2. Definition, concepts, and classifications (IND_DEF_CON_CLASS)

2.a. Definition and concepts (STAT_CONC_DEF)

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:

The UNICEF/WHO/World Bank Joint Malnutrition Estimates (JME) working group generates modelled estimates for 205 countries and territories utilizing primary data sources (e.g., household surveys). The global SDG Indicators Database only contains modelled estimates. Primary data sources can be found at data.unicef.org/nutrition/malnutrition.html, https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb, http://datatopics.worldbank.org/child-malnutrition.

2.b. Unit of measure (UNIT_MEASURE)

Proportion

2.c. Classifications (CLASS_SYSTEM)

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 (SRC_TYPE_COLL_METHOD)
3.a. Data sources (SOURCE_TYPE)

For the majority of countries, nationally representative household surveys constitute the primary data source used to generate the JME modelled estimates. For a limited number of countries, data from surveillance systems are also used as a primary data source for generation of the JME modelled 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 (COLL_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 that all 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 (FREQ_COLL)

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

3.d. Data release calendar (REL_CAL_POLICY)

The UNICEF-WHO-WB Joint Child Malnutrition (JME) group releases country, regional and worldwide estimates at the end of March every other year so that data are available for the SDG report and database. The JME group also maintain a database of primary data sources (e.g., household surveys) which is updated every six months and used to generate the JME modelled estimates.

3.e. Data providers (DATA_SOURCE)

The 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). Some data come from other sources (administrative, sentinel systems). Data providers vary and most commonly are ministries of health, national offices of statistics or national institutes of nutrition.

3.f. Data compilers (COMPILING_ORG)

UNICEF, WHO and the World Bank group

3.g. Institutional mandate (INST_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 develop the WHO Child Growth Standards, launched in 2006, and adopted by more than 160 countries. WHO has published several peer-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, overweight and wasting (SDG 2.2.1, 2.2.2 (1) and 2.2.2 (2)).

4. Other methodological considerations (OTHER_METHOD)

4.a. Rationale (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 (REC_USE_LIM)

Survey estimates have uncertainty due to both sampling error and non-sampling error (e.g., measurement technical error, recording error etc.,). The JME modelled 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 data from household surveys supports compilation of a time series that is comparable across countries and over time.

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 produce 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 (DATA_COMP)

National estimates from primary sources (e.g., from household surveys) used to generate the JME country modelled 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 country modelled 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 country modelled estimates. .

4.d. Validation (DATA_VALIDATION)

UNICEF, WHO and the World Bank undertake a joint review for each potential primary data source used to generate the JME modelled 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 . 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 database, 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 country modelled estimates for stunting and overweight were cross-validated to ensure estimates produced by the method are closely aligned to national data points. The methodology used to model these estimates was 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 are also held every two years before finalizing and disseminating each edition of the JME global, regional and country estimates. The purpose of the country consultations is to ensure the estimates include all recent and relevant primary data sources and to engage with and receive feedback from national governments on the estimates.

4.e. Adjustments (ADJUSTMENT)

Adjustments to reported values 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, etc.). The three types of adjustments that have been applied to the JME country database include adjustments to standardize for: (i) area of residence, specifically for data sources that were only nationally representative at the rural level; (ii) 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; and (iii) 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). These three types of adjustments are described further in this section.

i. Adjustment from national rural to national

A number of surveys cover only rural areas, and, while they have been sampled to be nationally representative for the rural parts of the country, they did not sample any urban areas. Given that malnutrition prevalence generally varies between urban and rural areas (i.e., stunting prevalence was reported to be two times higher in rural areas compared to urban areas at the global level (5)), a rural-only survey would not be comparable with a national survey representative of both urban and rural areas. To improve comparability of the rural-only data sources for the specific country, it is necessary to account for urban populations in estimates from these surveys.

The adjustment method used by the JME group is to apply the relative proportions of malnutrition prevalence for each urban and rural area from the closest survey in the country's JME database includes disaggregated estimates by area of residence, to the survey that covers only rural areas. This is done under the assumption that the urban:rural population ratio remains the same as the survey with the disaggregations available (e.g., the proportion of children living in rural areas in the country is the same in the survey year used for the adjustment as in the survey year being adjusted) and also that relative prevalence of malnutrition across urban-rural areas in the survey with the missing data is the same as in the survey with full information used for the adjustment.

ii. 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 reference (6). It was therefore necessary to account for these differences and standardize estimates across data sources. As such, data sources published prior to the release of the new growth standard in 2006 had to be re-analysed using the 2006 growth standards to obtain comparable estimates across time and location. When raw data were not available, a standard algorithm was applied to convert estimates from surveys based on the NCHS reference to estimates based on the WHO Growth Standards (7).

iii. Age-adjustment

A limited number of surveys in the JME country database of primary sources that do not have microdata report on age groups that do not cover the entire 0–59-month age range in the standard definition for stunting, wasting and overweight. Adjustment for age is needed as malnutrition prevalence can vary by sub-age group. For example, stunting prevalence among 24–59-month olds in recent surveys with age-disaggregations were more than two times higher than the stunting prevalence among 0–5-month olds (8). 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. Age adjustment can thus help to properly assess the country trend. Similar to the adjustment for rural-only surveys, the proportion of children with malnutrition in the two sub-age groups is assumed to be the same in the survey years in question.

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

- **At country level**

  Missing values were derived as part of the methods used to generate the JME **country modelled** 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 **country modelled** estimates are produced from 2000 until the year before the year of publication (e.g., until 2022 for the JME 2023 edition) and used to generate regional and worldwide aggregates. For countries without any primary input data meeting inclusion criteria, the JME **country modelled** estimates were produced solely for generation of regional and worldwide aggregates, and were not released to the public

- **At regional and worldwide levels**

  There are no missing data for the generation of worldwide and regional estimates as modelled estimates are produced for all countries, those with and those without primary data in the JME country database, even though the country estimates are not released to the public for those countries without primary data.

4.g. Regional aggregations (REG_AGG)

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 (DOC_METHOD)

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)
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 (QUALITY_MGMNT)

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 regular updates of the JME estimates. This includes the regular update of the country database of surveys used to generate the JME modelled 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 (QUALITY_ASSURE)

The quality criteria established in the 2019 UNICEF/WHO guidance (WHO/UNICEF, 2019)ewere used to update the JME primary data source review form. The JME review form 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 database of primary sources (e.g., household surveys) that are used to generate the JME country modelled estimates.

4.k Quality assessment (QUALITY_ASSMNT)

Data consistency and quality checks described above are conducted for each potential primary data source (e.g., household survey) before inclusion in the JME country database of primary sources that are used to generate the JME modelled estimates. Cross-validation exercises are performed for the modelled estimates to ensure the method generates estimates that are aligned to national data points. Country consultations with SDG 2.2 focal points held every other year also provide an opportunity to ensure the estimates include all recent and relevant country data.

5. Data availability and disaggregation (COVERAGE)

Data availability:
The JME modelled country estimates from 2000 to 2020 for stunting were released for 159 countries that had at least one primary data source (e.g., from household survey) included in the 2023 JME country database.

Time series:
At country level, JME modelled estimates from 2000 to the year before the JME release are presented for countries with at least one data point (e.g., from survey/surveillance) are included in the joint database 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 modelled estimates refer to the age group of children under 5 years, sexes combined. Disaggregations are currently not available for the JME modelled 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 (COMPARABILITY)

Sources of discrepancies:
For the survey estimates included in the JME joint database 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) and WHO Anthro Survey Analyser (WHO, 2019) 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) to undertake survey analysis and harmonize with the global standard analysis methods.

For the inclusion of survey estimates into the JME database, 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). In addition, when surveys do not cover the age interval 0-59 month, 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 **country modelled** estimates, which are based on smoothing techniques and covariates, as described elsewhere (McLain et al. 2018), vary from estimates from primary data sources such as household surveys, but in most cases the 95 per cent confidence bounds of the modelled 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 (OTHER_DOC)

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

References:
de Onis M, Blössner M, Borghi E, et al. (2004), Methodology for estimating regional and global trends of childhood malnutrition. Int J Epidemiol, 33(6):1260-70. <https://pubmed.ncbi.nlm.nih.gov/15542535/>

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<https://www.who.int/childgrowth/publications/Comparison_implications.pdf>

McLain A, Frongillo E, Feng J, Borghi E (2018). Prediction intervals for penalized longitudinal models with multi-source summary measures: an application to childhood malnutrition. Stat Med; 38(6):1002-1012; doi: 10.1002/sim.8024. Epub 2018 Nov 14. <https://pubmed.ncbi.nlm.nih.gov/30430613/>

United Nations Children's Fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development/The World Bank (2019). Meeting report on Technical Consultation on a Country-level model for SDG2.2. December 2019.

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/>

WHO (2006). WHO Multicentre Growth Reference Study (MGRS) <https://www.who.int/tools/child-growth-standards/who-multicentre-growth-reference-study>

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World Health Organization and the United Nations Children's Fund (UNICEF), 2019. Licence: CC BY-NC-SA 3.0 IGO. <https://www.who.int/nutrition/publications/anthropometry-data-quality-report>

WHO. WHO Anthro Survey Analyser (2019). Available at https://www.who.int/tools/child-growth-standards/software.

Yang H and de Onis M (2008). Algorithms for converting estimates of child malnutrition based on the NCHS reference into estimates based on the WHO Child Growth Standards. BMC Pediatrics 2008, 8:19 (05 May 2008) <http://www.biomedcentral.com/1471-2431/8/19>.