Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
Indicator 3.3.3: Malaria incidence per 1,000 population

Institutional information

Organization(s):
Global Malaria Programme at World Health Organization (WHO)

Concepts and definitions

Definition:
Incidence of malaria is defined as the number of new cases of malaria per 1,000 people at risk each year.

Rationale:
To measure trends in malaria morbidity and to identify locations where the risk of disease is highest. With this information, programmes can respond to unusual trends, such as epidemics, and direct resources to the populations most in need. This data also serves to inform global resource allocation for malaria such as when defining eligibility criteria for Global Fund finance.

Concepts:
Case of malaria is defined as the occurrence of malaria infection in a person whom the presence of malaria parasites in the blood has been confirmed by a diagnostic test. The population considered is the population at risk of the disease.

Comments and limitations:
The estimated incidence can differ from the incidence reported by a Ministry of Health which can be affected by:

- the completeness of reporting: the number of reported cases can be lower than the estimated cases if the percentage of health facilities reporting in a month is less than 100%
- the extent of malaria diagnostic testing (the number of slides examined or RDTs performed)
- the use of private health facilities which are usually not included in reporting systems.
- the indicator is estimated only where malaria transmission occurs.

Methodology

Computation Method:
Malaria incidence (1) is expressed as the number of new cases per 100,000 population per year with the population of a country derived from projections made by the UN Population Division and the proportion at risk estimated by a country's National Malaria Control Programme. More specifically, the country estimates what is the proportion at high risk (H) and what is the proportion at low risk (L) and the population at risk is estimated as UN Population * H + UN population * L/2.

The number of new cases, M, is estimated from the number of malaria cases reported by a Ministry of Health which is adjusted to take into account (i) incompleteness in reporting systems (ii) patients seeking treatment in the private sector, self-medicating or not seeking treatment at all, and (iii) potential over-diagnosis through the lack of laboratory confirmation of cases. The procedure, which is described in the *World malaria report 2008* (2), combines data reported by NMCPs (reported cases, reporting completeness and likelihood that cases are parasite positive) with data obtained from nationally representative household surveys on health-service use. Briefly,

$$Cases_{public\ sector} = (Cases_{confirmed} + Cases_{presumed} \times Test\ positivity\ rate)/Reporting\ completeness$$

$$Cases_{private\ sector} = Cases_{public\ sector} \times Prop.\ seeking\ care_{private\ sector} /Prop.\ seeking\ care_{public\ sector}$$

$$Cases_{Not\ seeking\ treatment} = Cases_{public\ sector} \times Prop.\ not\ seeking\ care/Prop.\ seeking\ care_{public\ sector}.$$

To estimate the uncertainty around the number of cases, the test positivity rate was assumed to have a normal distribution centred on the *Test positivity rate* value and standard deviation defined as $0.244 \times Test\ positivity\ rate^{0.5547}$ and truncated to be in the range 0, 1. Reporting completeness was assumed to have one of three distributions, depending on the value reported by the NMCP. If the value was greater than 80% the distribution was assumed to be triangular, with limits of 0.8 and 1 and the peak at 0.8. If the value was greater than 50% then the distribution was assumed to be rectangular, with limits of 0.5 and 0.8. Finally, if the value was lower than 50% the distribution was assumed to be triangular, with limits of 0 and 0.5 and the peak at 0.5 (3). The proportions of children for whom care was sought in the private sector and in the public sector were assumed to have a beta distribution, with the mean value being the estimated value in the survey and the standard deviation calculated from the range of the estimated 95% confidence intervals (CI) divided by 4. The proportion of children for whom care was not sought was assumed to have a rectangular distribution, with the lower limit 0 and upper limit calculated as:
$$1 - Prop.\ seeking\ care_{public\ sector} - Prop.\ ceeking\ care_{private\ sector}.$$

Values for the proportion seeking care were linearly interpolated between the years that have a survey, and were extrapolated for the years before the first or after the last survey. Missing values for the distributions were imputed using a mixture of the distribution of the country, with equal probability for the years where values were present or, if there was no value at all for any year in the country, a mixture of the distribution of the region for that year. The data were analysed using the R statistical software (4). Convolution of the distributions is made using the package "distr" (5,6) (Afghanistan, Angola, Armenia, Azerbaijan, Bangladesh, Bolivia (Plurinational State of), Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Colombia, Dominican Republic, Ethiopia, French Guiana, Gambia, Georgia, Ghana, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Indonesia, Kyrgyzstan, Lao People's Democratic Republic, Liberia, Madagascar, Mauritania, Mayotte, Myanmar, Namibia, Nepal, Nicaragua, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Solomon Islands, Sri Lanka, Tajikistan, Timor-Leste, Turkey, Turkmenistan, Uganda, United Republic of Tanzania, Uzbekistan, Vanuatu, Venezuela (Bolivarian Republic of), Viet Nam, Yemen and Zimbabwe). For India, values are estimated at subnational level but adjusting the private sector for an additional factor due to the active case detection.

For some high-transmission African countries the quality of case reporting is considered insufficient for the above formulae to be applied. In such cases estimates of the number of malaria cases are derived from information on parasite prevalence obtained from household surveys. First, data on parasite prevalence from nearly 60 000 survey records were assembled within a spatiotemporal Bayesian geostatistical model, along with environmental and sociodemographic covariates, and data distribution on interventions such as ITNs, antimalarial drugs and IRS. The geospatial model enabled predictions of Plasmodium falciparum prevalence in children aged 2–10 years, at a resolution of 5 × 5 km2, throughout all malaria endemic African countries for each year from 2000 to 2016 (see http://www.map.ox.ac.uk/making-maps/ for methods on the development of maps by the Malaria Atlas Project). Second, an ensemble model was developed to predict malaria incidence as a function of parasite prevalence. The model was then applied to the estimated parasite prevalence in order to obtain estimates of the malaria case incidence at 5 × 5 km^2 resolution for each year from 2000 to 2016. Data for each 5 × 5 km^2 area were then aggregated within country and regional boundaries to obtain both national and regional estimates of malaria cases (7). (Benin, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Gabon, Guinea, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Somalia, South Sudan, Sudan, Togo and Zambia)
For most of the elimination countries, the number of indigenous cases registered by the NMCPs are reported without further adjustments. (Algeria, Argentina, Belize, Bhutan, Cabo Verde, China, Comoros, Costa Rica, Democratic People's Republic of Korea, Ecuador, El Salvador, Iran (Islamic Republic of), Iraq, Malaysia, Mexico, Paraguay, Republic of Korea, Sao Tome and Principe, Saudi Arabia, South Africa, Suriname, Swaziland and Thailand).

Disaggregation:
The indicator is estimated at country level.

Treatment of missing values:

- At country level
For missing values of the parameters (test positivity rate and reporting completeness) a distribution based on a mixture of the distribution of the available values is used, if any value exists for the country or from the region otherwise. Values for health seeking behaviour parameters are imputed by linear interpolation of the values when the surveys where made or extrapolation of the first or last survey. When no reported data is available the number of cases is interpolated taking into account the population growth.

- At regional and global levels
Not Applicable

Regional aggregates:
Number of cases are aggregated by region, and uncertainty obtained from the aggregation of each country's distribution. Population at risk is aggregated without any further adjustment. Estimation at global level are obtained from aggregation of the region values.

Sources of discrepancies:
The estimated incidence can differ from the incidence reported by a Ministry of Health which can be affected by:

- the completeness of reporting: the number of reported cases can be lower than the estimated cases if the percentage of health facilities reporting in a month is less than 100%
- the extent of malaria diagnostic testing (the number of slides examined or RDTs performed)
- the use of private health facilities which are usually not included in reporting systems.

Methods and guidance available to countries for the compilation of the data at the national level:
Information is provided by each country's NMCP using a DHIS 2 application created specifically for this purpose.

Quality assurance
- We have a specific standardize form depending on the status of malaria control, elimination or prevention of reinfection. We perform internal validation for outliers and completeness and rise queries to countries through the regional offices for clarification. When necessary we rely on data quality assessment information from external sources such as partners working in malaria monitor and evaluation.

- The World Malaria Report is sent to the countries via regional offices for consultation and approval.

Data Sources

Description:
Cases reported by the NMCP are obtained from each country surveillance system. This include among others information on the number of suspected cases, number of tested cases, number of positive cases by method of detection and by species as well as number of health facilities that report those cases. This information is summarized in a DHIS2 application developed for this purpose. Data for representative household surveys are publicly available and included National Demographic Household Surveys (DHS) or Malaria Indicator Survey (MIS).

Collection process:
The official counterpart for each country is the National Malaria Control Program at the Ministry of Health.

Data Availability

Description:
91 countries

Time series:
Annually from 2000

Calendar

Data collection:

Data is collected every year.

Data release:
Data is release yearly. Next release is expected by December 2018.

Data providers

The National Malaria Control Program is the responsible to collect the information at each country.

Data compilers

The Surveillance. Monitoring and Evaluation Unit of the Global Malaria Control Programme is the responsible to compile and process all the relevant information. National estimates for some countries are estimated in collaboration with the Oxford University (Malaria Atlas Project).

References

URL:
http://www.who.int/malaria/publications/world-malaria-report-2017/en/

References:

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3.   Cibulskis RE, Aregawi M, Williams R, Otten M, Dye C. Worldwide Incidence of Malaria in 2009: Estimates, Time Trends, and a Critique of Methods. Mueller I, editor. PLoS Med. 2011 Dec 20;8(12):e1001142.

4.   R Core Team. R: A Language and Environment for Statistical Computing [Internet]. Vienna, Austria: R Foundation for Statistical Computing; 2016. Available from: http://www.R-project.org/

5.   Ruckdeschel P, Kohl M, Stabla T, Camphausen F. S4 Classes for Distributions. R News. 2006 May;6(2):2–6.

6.   Ruckdeschel P, Kohl M. General Purpose Convolution Algorithm in S4 Classes by Means of FFT. J Stat Softw. 2014;59(4):1–25.

7.   Bhatt S, Weiss DJ, Cameron E, Bisanzio D, Mappin B, Dalrymple U, et al. The effect of malaria control on Plasmodium falciparum in Africa between 2000 and 2015. Nature. 2015 Oct 8;526(7572):207–11.

Related indicators

Not Applicable

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.a: Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate
Indicator 3.a.1: Age-standardized prevalence of current tobacco use among persons aged 15 years and older

Institutional information

Organizations:
World Health Organization;
Secretariat of the WHO Framework Convention on Tobacco Control

Concepts and definitions

Definition:
The indicator is defined as the percentage of the population aged 15 years and over who currently use any tobacco product (smoked and/or smokeless tobacco) on a daily or non-daily basis.

Rationale:
Tobacco use is a major contributor to illness and death from non-communicable diseases (NCDs). There is no proven safe level of tobacco use or of second-hand smoke exposure. All daily and non-daily users of tobacco are at risk of a variety of poor health outcomes across the life-course, including NCDs. Reducing the prevalence of current tobacco use will make a large contribution to reducing premature mortality from NCDs (Target 3.4). Routine and regular monitoring of this indicator is necessary to enable accurate monitoring and evaluation of the impact of implementation of the WHO Framework Convention on Tobacco Control (WHO FCTC), or tobacco control policies in the countries that are not yet Parties to the WHO FCTC, over time. Tobacco use prevalence levels are an appropriate indicator of implementation of SDG Target 3.a "Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate".

Concepts:
Tobacco use means use of smoked and/or smokeless tobacco products. "Current use" means use within the previous 30 days at the time of the survey, whether daily or non-daily use.

Tobacco products means products entirely or partly made of the leaf tobacco as raw material intended for human consumption through smoking, sucking, chewing or sniffing.
"Smoked tobacco products" include cigarettes, cigarillos, cigars, cheroots, bidis, pipes, shisha (water pipes), roll-your-own tobacco, kretek and any other form of tobacco that is consumed by smoking.

"Smokeless tobacco product" includes moist snuff, creamy snuff, dry snuff, plug, dissolvables, gul, loose leaf, red tooth powder, snus, chimo, gutkha, khaini, gudakhu, zarda, quiwam, dohra, tuibur, nasway, naas, naswar, shammah, toombak, paan (betel quid with tobacco), iq'mik, mishri, tapkeer, tombol and any other tobacco product that consumed by sniffing, holding in the mouth or chewing.

Prevalence estimates have been "age-standardized" to make them comparable across all countries no matter the demographic profile of the country. This is done by applying each country's age-and-sex specific prevalence rates to the WHO Standard Population. The resulting rates are hypothetical numbers which are only meaningful when comparing rates obtained for one country with those obtained for another country.

Comments and limitations:

Raw data collected through nationally representative population-based surveys in the countries are used to calculate comparable estimates for this indicator. Information from subnational surveys are not used.

While less than 1 in 5 countries are currently reporting on all types of tobacco use, three-quarters of countries have robust data on tobacco smoking. Until the majority of countries are reporting on all types of tobacco use (smoked and smokeless), this indicator will be populated with tobacco smoking rates. In some countries, all tobacco use and tobacco smoking may be equivalent, but for many countries, smoking rates will be lower than tobacco use rates to some degree.

The comparability, quality and frequency of household surveys affects the accuracy and quality of the estimates. Non-comparability of data can arise from the use of different survey instruments, sampling and analysis methods, and indicator definitions across Member States. Surveys may cover a variety of age ranges (not always 15+) and be repeated at irregular intervals. Surveys may include a variety of different tobacco products, or sometimes only one product such as cigarettes, based on the country's perception of which products are important to monitor. Unless both smoked and smokeless products are monitored simultaneously, tobacco use prevalence will be underreported. Countries have begun to monitor use of e-cigarettes and other emerging products, which may confound countries' definitions of tobacco use. The definition of current use may not always be restricted to the 30 days prior to the survey. In addition, surveys ask people to self-report their tobacco use, which can lead to under-reporting of tobacco use.

There is no standard protocol used across Member States to ask people about their tobacco use. WHO's Tobacco Questions for Surveys (TQS) have been adopted in many surveys, which helps improve comparability of indicators across countries.

Methodology

Computation Method:

A statistical model based on a Bayesian negative binomial meta-regression is used to model prevalence of current tobacco smoking for each country, separately for men and women. A full description of the method is available as a peer-reviewed article in The Lancet, volume 385, No. 9972, p966–976 (2015). Once the age-and-sex-specific prevalence rates from national surveys were compiled into a dataset, the model was fit to calculate trend estimates from the year 2000 to 2030. The model has two main components: (a) adjusting for missing indicators and age groups, and (b) generating an estimate of trends over time as well as the 95% credible interval around the estimate. Depending on the completeness/comprehensiveness of survey data from a particular country, the model at times makes use of data from other countries to fill information gaps. To fill data gaps, information is "borrowed" from countries in the same UN sub-region. The resulting trend lines are used to derive estimates for single years, so that a number can be reported even if the country did not run a survey in that year. In order to make the results comparable between countries, the prevalence rates are age-standardized to the WHO Standard Population.

Estimates for countries with irregular surveys or many data gaps will have large uncertainty ranges, and such results should be interpreted with caution.

Disaggregation:
By sex.

Treatment of missing values:

- At country level
  For countries with less than two surveys completed in different years since 1990, no estimate is calculated, since no trend can be determined. For countries with data from two or more surveys, data gaps, if any, are filled as described in the Computation Method.

- At regional and global levels
  Countries where no estimate can be calculated are included in regional and global averages by assuming their prevalence rates for men and women are equal to the average rates for men and women seen in the UN sub-region[1] in which they are located. Where fewer than 50% of a UN sub-region's population was surveyed, UN sub-regions are grouped with neighbouring sub-regions until at least 50% of the grouped population has contributed data to the region's average rates.

Regional aggregates:
Average prevalence rates for regions are calculated by population-weighting the age-specific prevalence rates in countries, then age-standardizing the age-specific average rates of the region.

Sources of discrepancies:
WHO estimates differ from national estimates in that they are
  (i)   age-standardised to improve international comparability and
  (ii)   calculated using different methods. Infrequent surveys or unavailability of recent surveys lead to more reliance on modelling.
As the data set for each country improves over time with addition of new surveys, recent estimates may seem inconsistent with earlier estimates. WHO estimates undergo country consultation prior to release.

Methods and guidance available to countries for the compilation of the data at the national level:
- Information not available.

Quality assurance
- Information not available

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[1] For a listing of countries by UN region, please refer to pages ix to xiii of World Population Prospects: The 2015 Revision, published by the UN Department of Economic and Social Affairs in 2015 at https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Volume-I_Comprehensive-Tables.pdf (accessed May 25, 2017). For the purposes of smoking analysis, the following adjustments were made: (i) Eastern Africa sub-region was divided into two regions: Eastern Africa Islands and Remainder of Eastern Africa; (ii) Armenia, Azerbaijan, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Tajikistan, Uzbekistan and Turkmenistan were classified with Eastern Europe, (iii); Cyprus, Israel and Turkey were classified with Southern Europe, and (iv) Melanesia, Micronesia and Polynesia sub-regions were combined into one sub-region.

Data Sources

Description:

Prevalence rates by age-by-sex from national representative population surveys conducted since 1990:
- officially recognized by the national health authority;
- of randomly selected participants representative of the general population; and
- reporting at least one indicator measuring current tobacco use, daily tobacco use, current tobacco smoking, daily tobacco smoking, current cigarette smoking or daily cigarette smoking.

Official survey reports are gathered from Member States by one or more of the following methods:
- reporting system of the WHO FCTC;
- review of surveys conducted under the aegis of the Global Tobacco Surveillance System;
- review of other surveys conducted in collaboration with WHO such as STEPwise surveys and World Health Surveys;
- scanning of international surveillance databases such as those of the Demographic and Health Survey (DHS), Multiple Indicator Cluster Survey (MICS) and the World Bank Living Standards Measurement Survey (LSMS); and
- identification and review of country-specific surveys that are not part of international surveillance systems.

Collection process:

Reports either downloaded from websites or emailed by national counterparts. WHO shares and makes public the methodologies for its estimates through the WHO global report on trends in tobacco smoking 2000-2025 and the WHO Report on the Global Tobacco Epidemic. The WHO estimates undergo country consultation prior to publication.

Data Availability

Description:

The indicator is available for all countries from 2000 to the current year, depending on availability of empirical data for each country.

Calendar

Data collection:

Continual data collection.

Data release:

Biennial release via the WHO Global Report on Trends in Tobacco Smoking 2000-2025, the WHO Global Health Observatory and the Implementation Database of the WHO FCTC.

Data providers

WHO Member States, Parties to the WHO FCTC.

Data compilers

WHO Department of the Prevention of Noncommunicable Diseases; Secretariat of the WHO Framework Convention on Tobacco Control.

References

URL:
http://www.who.int/tobacco/surveillance/tqs/en/
http://www.who.int/gho/en/
http://apps.who.int/fctc/implementation/database/

Related indicators

Indicator 3.4.1: Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.b: Support the research and development of vaccines and medicines for the communicable and non‑communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all

Indicator 3.b.1: Proportion of the target population covered by all vaccines included in their national programme

Institutional information

Organization(s):

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

Concepts and definitions

Definition:

Coverage of DTP containing vaccine (3ʳᵈ dose): Percentage of surviving infants who received the 3 doses of diphtheria and tetanus toxoid with pertussis containing vaccine in a given year.

Coverage of Measles containing vaccine (2ⁿᵈ dose): Percentage of children who received two dose of measles containing vaccine according to nationally recommended schedule through routine immunization services.

Coverage of Pneumococcal conjugate vaccine (last dose in the schedule): Percentage of surviving infants who received the recommended doses of pneumococcal conjugate vaccine.

Coverage of HPV vaccine (last dose in the schedule): Percentage of 15 years old girls received the recommended doses of HPV vaccine.

Rationale:

This indicator aims to measure access to vaccines, including the newly available or underutilized vaccines, at the national level. In the past decades all countries added numerous new and underutilised vaccines in their national immunization schedule and there are several vaccines under final stage of development to be introduced by 2030. For monitoring diseases control and impact of vaccines it is important to measure coverage from each vaccine in national immunization schedule and the system is already in place for all national programmes, however direct measurement for proportion of population covered with all vaccines in the programme is only feasible if the country has a well-functioning national nominal immunization registry, usually an electronic one that will allow this coverage to be easily estimated. While countries will develop and strengthen immunization registries it is a need for an alternative measurement.

Concepts:

In accordance with its mandate to provide guidance to Member States on health policy matters, WHO provides global vaccine and immunization recommendations for diseases that have an international public health impact. National programmes adapt the recommendations and develop national immunization schedules, based on local disease epidemiology and national health priorities. National immunization schedules and number of recommended vaccines vary between countries, with only DTP polio and measles containing vaccines being used in all countries.

The target population for given vaccine is defined based on recommended age for administration. The primary vaccination series of most vaccines are administered in the first two years of life.

Coverage of DTP containing vaccine measure the overall system strength to deliver infant vaccination
Coverage of Measles containing vaccine ability to deliver vaccines beyond first year of life through routine immunization services.
Coverage of Pneumococcal conjugate vaccine: adaptation of new vaccines for children
Coverage of HPV vaccine: life cycle vaccination

Comments and limitations:
The rational to select a set of vaccines reflects the ability of immunization programmes to deliver vaccines over the life cycle and to adapt new vaccines. Coverage for other WHO recommended vaccines are also available and can be provided.

Given that HPV vaccine is relatively new and vaccination schedule varies from countries to country coverage estimate will be made for girls vaccinated by ag 15 and at the moment data is limited to very few countries therefore reporting will start later.

Methodology

Computation Method:

WHO and UNICEF jointly developed a methodology to estimate national immunization coverage form selected vaccines in 2000. The methodology has been refined and reviewed by expert committees over time. The methodology was published and reference is available under the reference section. Estimates time series for WHO recommended vaccines produced and published annually since 2001.
The methodology uses data reported by national authorities from countries administrative systems as well as data from immunization or multi indicator household surveys.

Disaggregation:
Geographical location, i.e. regional and national and potentially subnational estimates

Treatment of missing values:
- At country level
The first data point is the first reporting year after vaccine introduction. When country data are not available interpolation is used between 2 data points and extrapolation from the latest available data point.
- At regional and global levels

Any needed imputation is done at country level. These country values can then be used to compute regional and global ones.

Regional aggregates:
Weighted average of the country-level coverage rates where the weights are the country target population sizes based on World Population Prospects: 2017 revision from the UN Population Division. All countries from the region are included.

Sources of discrepancies:
Countries often relay on administrative coverage data, while WHO and UNICEF review and assess data from different sources including administrative systems and surveys. Differences between country produced and international estimates are mainly due to differences between coverage estimates from administrative system and survey results.

In case the vaccine is not included in national immunization schedule the coverage from private sector will not be reflected.

Data Sources

Description:
National Health Information Systems or National Immunization systems
National immunization registries
High quality household surveys with immunization module (e.g. DHS, MICS, national in-country surveys)

Collection process:
Annual data collection through established mechanism. Since 1998, in an effort to strengthen collaboration and minimize the reporting burden, WHO and UNICEF jointly collect information through a standard questionnaire (the Joint Reporting Form) sent to all Member States
http://www.who.int/immunization/monitoring_surveillance/routine/reporting/en/

Data Availability

Description:
Coverage data for different vaccines are collected annually and reviewed by WHO and UNICEF inter agency expert group and estimates made for each country and each year. Data are published both on WHO and UNICEF web sites.
http://www.who.int/immunization/ monitoring_surveillance/routine/coverage/en/index4.html
http://www.data.unicef.org/child-health/immunization

Coverage for 2016

	DTP3	MCV2	PCV last
Global	86%	64%	42%
Australia and New Zealand	94%	93%	94%
Central Asia and Southern Asia	87%	74%	23%
Eastern Asia and South-eastern Asia	94%	88%	10%
Latin America & the Caribbean	90%	73%	81%

Northern America and Europe	92%	58%	68%
Oceania	75%	10%	29%
Sub-Saharan Africa	73%	22%	64%
Western Asia and Northern Africa (M49)	88%	84%	52%

Calendar

Data collection:

Annual data collection March-May each year. Country consultation June each year

Data release:

15 July each year for time series 1980 – release year -1. (in July 2017 estimates from 1980-2016)

Data providers

Ministries of Health, Immunization programmes

Data compilers

WHO and UNICEF

References

URL:

http://www.who.int/immunization/monitoring_surveillance/routine/coverage/en/index4.html
https://www.unicef.org/immunization/

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Burton A, Monasch R, Lautenbach B, Gacic-Dobo M, Neill M, Karimov R, Wolfson L, Jones G, Birmingham M. WHO and UNICEF estimates of national infant immunization coverage: methods and processes. Bull World Health Organ. 2009;87(7):535-41.Available at: http://www.who.int/bulletin/volumes/87/7/08-053819/en/

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 Brown D, Burton A, Gacic-Dobo M, Karimov R An Introduction to the Grade of Confidence in the WHO and UNICEF Estimates of National Immunization Coverage The Open Public Health Journal, 2013, 6, 73-76. Available at: http://www.benthamscience.com/open/tophj/articles/V006/73TOPHJ.pdf

Related indicators

Target 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all. Indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.b : Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all
Indicator 3.b.2: Total net official development assistance to the medical research and basic health sectors

Institutional information

Organization(s):

Organisation for Economic Co-operation and Development (OECD)

Concepts and definitions

Definition:

Gross disbursements of total ODA from all donors to medical research and basic health sectors.

Rationale:

Total ODA flows to developing countries quantify the public effort that donors provide to developing countries for medical research and basic health.

Concepts:

ODA: The DAC defines ODA as "those flows to countries and territories on the DAC List of ODA Recipients and to multilateral institutions which are

i)   provided by official agencies, including state and local governments, or by their executive agencies; and

ii)   each transaction   is administered with the promotion of the economic development and welfare of developing countries as its main objective; and

is concessional in character and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent). (See http://www.oecd.org/dac/stats/officialdevelopmentassistancedefinitionandcoverage.htm)

Medical research and basic health sectors are as defined by the DAC. Medical research refers to CRS sector code 12182 and basic health covers all codes in the 122 series (see here: http://www.oecd.org/dac/stats/purposecodessectorclassification.htm)

Comments and limitations:

Data in the Creditor Reporting System are available from 1973. However, the data coverage is considered complete from 1995 for commitments at an activity level and 2002 for disbursements.

Methodology

Computation Method:

The sum of ODA flows from all donors to developing countries for medical research and basic health.

Disaggregation:

This indicator can be disaggregated by donor, recipient country, type of finance, type of aid, health sub-sector, etc.

Treatment of missing values:

- At country level

  Due to high quality of reporting, no estimates are produced for missing data.

- At regional and global levels

  Not applicable.

Regional aggregates:

Global and regional figures are based on the sum of ODA flows to medical research and basic health.

Sources of discrepancies:

DAC statistics are standardized on a calendar year basis for all donors and may differ from fiscal year data available in budget documents for some countries.

Data Sources

Description:

The OECD/DAC has been collecting data on official and private resource flows from 1960 at an aggregate level and 1973 at an activity level through the Creditor Reporting System (CRS data are considered complete from 1995 for commitments at an activity level and 2002 for disbursements).

The data are reported by donors according to the same standards and methodologies (see here: http://www.oecd.org/dac/stats/methodology.htm).

Data are reported on an annual calendar year basis by statistical reporters in national administrations (aid agencies, Ministries of Foreign Affairs or Finance, etc.

Collection process:

A statistical reporter is responsible for the collection of DAC statistics in each providing country/agency. This reporter is usually located in the national aid agency, Ministry of Foreign Affairs or Finance etc.

Data Availability

Description:

On a recipient basis for all developing countries eligible for ODA.

Time series:

Data available since 1973 on an annual (calendar) basis

Calendar

Data collection:

Data are published on an annual basis in December for flows in the previous year.

Data release:

Detailed 2015 flows will be published in December 2016.

Data providers

Name:

Data are reported on an annual calendar year basis by statistical reporters in national administrations (aid agencies, Ministries of Foreign Affairs or Finance, etc.

Data compilers

OECD

References

URL:

www.oecd.org/dac/stats

References:

See all links here: http://www.oecd.org/dac/stats/methodology.htm

Related indicators

Other ODA indicators

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.c: Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States
Indicator 3.c.1: Health worker density and distribution

Institutional information

Organization(s):
World Health Organization (WHO)

Concepts and definitions

Definition:

Density of physicians: The density of physicians is defined as the number of physicians, including generalists and specialist medical practitioners per 1000 population in the given national and/or subnational area.
Density of nursing and midwifery personnel: The density of nursing and midwifery personnel is defined as the number of nursing and midwifery personnel per 1000 population in the given national and/or subnational area.
Density of dentistry personnel: The density of dentistry personnel is defined as the number of dentists, dental technician/assistants and related occupation personnel per 1000 population in the given national and/or subnational area.
Density of pharmaceutical personnel: The density of pharmaceutical personnel is defined as the number of pharmacists, pharmaceutical, technicians/assistants and related occupation personnel per 1000 population in the given national and/or subnational area.

Comments and limitations:

Data on health workers tend to be more complete for the public sector and may underestimate the active workforce in the private, military, nongovernmental organization and faith-based health sectors. As data is not always published annually for each country, the latest available data has been used. Due to the differences in data sources, considerable variability remains across countries in the coverage, periodicity, quality and completeness of the original data.

Methodology

Computation Method:

Though, traditionally, this indicator has been estimated using 2 measurements: density of physicians, and density of nursing and midwifery personnel. In the context of the SDG agenda, the dataset is expanded to physicians, nursing personnel, midwifery personnel, dentistry personnel and pharmaceutical personnel. The dataset is planned to progressively move to cover all health cadres.

The method of estimation for number of physicians (including generalist and specialist medical practitioners) depending on the nature of the original data source may include practising physicians only or all registered physicians.

The figures for number of nursing and midwifery include nursing personnel and midwifery personnel, whenever available. In many countries, nurses trained with midwifery skills are counted and reported as nurses. This makes the distinction between nursing personnel and midwifery personnel difficult to draw.

The figures for number of dentistry personnel include dentists, dental technicians/assistants and related occupations. Due to variability of data sources, the professional-level and associate-level occupations may not always be distinguishable.

The figures for number of pharmaceutical personnel include pharmacists, pharmaceutical technicians/assistants and related occupations. Due to variability of data sources, the professional-level and associate-level occupations may not always be distinguishable.

In general, the denominator data for workforce density (i.e. national population estimates) are obtained from the United Nations Population Division's World Population Prospects database. In cases where the official health workforce report provide density indicators instead of counts, estimates of the stock were then calculated using the population estimated from the United Nations Population Division's World population prospects database (2015).

Disaggregation:

National level data

Data Sources

The data is compiled from routine administrative information systems (including reports on public expenditure, staffing and payroll as well as professional training, registration and licensure), population censuses, labour force and employment surveys and health facility assessments. Most of the data from administrative sources are derived from published national health sector reviews and/or official country reports to WHO offices.

Following the adoption of the Global strategy on human resources for health: workforce 2030 and resolution (WHA 69.19) to address human resources for health (HRH) challenges at the 69th World Health Assembly, May 2016, Member States are called on to consolidate a core set of human resources for health data with annual reporting to the Global Health Observatory, as well as progressive implementation of national health workforce accounts, to support national policy and planning and the Global Strategy's monitoring and accountability framework.

Data Availability

NA

Time series

Available data for 2000-2015

Calendar

Data collection: Ongoing process

Data release: First quarter of 2017

Data providers

NA

Data compilers

NA

References

URL:
http://www.who.int/hrh/statistics/hwfstats/en/

References:
- Sixty-ninth World Health Assembly Agenda Item 16.1. Global strategy on human resources for health: workforce 2030 (2016), available from (http://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_R19-en.pdf)
- WHO (2014). Global strategy on human resources for health: Workforce 2030 (http://who.int/hrh/resources/pub_globstrathrh-2030/en/)
- "WHO Global Health Workforce Statistics." World Health Organization, n.d. Web. 24 Feb. 2017. (http://www.who.int/hrh/statistics/hwfstats/en/)
- "WHO Global Health Workforce Statistics." World Health Organization, n.d. Web. 24 Feb. 2017. (http://apps.who.int/gho/data/node.main.A1444?lang=en&showonly=HWF)
- WHO, National Health Workforce Accounts: A Handbook (Draft for Consultation), n.d. Wed. 25 Feb. 2017. (http://who.int/hrh/documents/brief_nhwa_handbook/en/

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.d: Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks
Indicator 3.d.1: International Health Regulations (IHR) capacity and health emergency preparedness

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

Percentage of attributes of 13 core capacities that have been attained at a specific point in time. The 13 core capacities are: (1) National legislation, policy and financing; (2) Coordination and National Focal Point communications; (3) Surveillance; (4) Response; (5) Preparedness; (6) Risk communication; (7) Human resources; (8) Laboratory; (9) Points of entry; (10) Zoonotic events; (11) Food safety; (12) Chemical events; (13) Radionuclear emergencies.

Rationale:

Annex 1 of International Health Regulations (2005) (IHR (2005))

http://apps.who.int/iris/bitstream/10665/43883/1/9789241580410_eng.pdf

Concepts:

Attributes: one of a set of specific elements or characteristics that reflect the level of performance or achievement of a specific indicator.

Core capacity: the essential public health capacity that States Parties are required to have in place throughout their territories pursuant to Articles 5 and 12, and Annex 1A of the IHR (2005) requirements by the year 2012. Eight core capacities are defined in this document.

Indicator: a variable that can be measured repeatedly (directly or indirectly) over time to reveal change in a system. It can be qualitative or quantitative, allowing the objective measurement of the progress of a programme or event. The quantitative measurements need to be interpreted in the broader context,

taking other sources of information (e.g. supervisory reports and special studies) into consideration and they should be supplemented with qualitative information.

The capability levels: Each attribute has been assigned a level of maturity, or a 'capability level.' Attainment of a given capability level requires that all attributes at lower levels are in place. In the checklist, the status of core capacity development is measured at four capability levels: Level < 1: prerequisites (foundational level); Level 1: inputs and processes; Level 2: outputs and outcomes; Level 3: additional.

Comments and limitations:

1) it is based on a self-reporting by the State Party
2) questionnaire is being revised and planned to be changed from 2017.

Methodology

Computation Method:

(Number of 'yes' to level 1 and 2 questions) / (Total number of level 1 and 2 questions) per core capacity

Disaggregation:

No disaggregation available.

Treatment of missing values:

- At country level

    No estimate is made.

- At regional and global levels

    No estimate is made.

Regional aggregates:

Aggregate of each scores by country/number of countries submitted the questionnaire

Sources of discrepancies:

No estimate is made. The Regional and global scores are all based on submitted questionnaires.

Data Sources

Description:

Key informant survey

Collection process:

i) National IHR Focal Points
ii) discussion with National IHR Focal Points, WHO country office counter parts and Regional IHR counterparts

iii) No breakdown is made

Data Availability

Description:

Since its launch in 2010, 194 out of 196 States Parties have submitted a completed questionnaire at least once.

Time series:

Annual

Calendar

Data collection:

Data collection for 2016 currently under way. Deadline for completed questionnaire submission is 31 October 2016, first report to be presented to 140 EB, second submission deadline 31 March 2017, and second and final report to be presented to 70 WHA and published in Global Health Observatory.

Data release:

Data collection for 2016 currently under way. Deadline for completed questionnaire submission is 31 October 2016, first report to be presented to 140 EB, second submission deadline 31 March 2017, and second and final report to be presented to 70 WHA and published in Global Health Observatory.

Data providers

National IHR Focal Points

Data compilers

World Health Organization

References

URL:

http://www.who.int/ihr/procedures/monitoring/en/

References:

http://apps.who.int/iris/bitstream/10665/43883/1/9789241580410_eng.pdf (Article 54)

WHA A 61/7

http://apps.who.int/iris/bitstream/10665/84933/1/WHO_HSE_GCR_2013.2_eng.pdf?ua=1

http://apps.who.int/iris/bitstream/10665/163737/1/WHO_HSE_GCR_2015.8_eng.pdf?ua=1&ua=1

http://www.who.int/ihr/mande/en/

Related indicators

Implementation of IHR (2005).

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
Indicator 3.1.1: Maternal mortality ratio

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The maternal mortality ratio (MMR) is defined as the number of maternal deaths during a given time period per 100,000 live births during the same time period. It depicts the risk of maternal death relative to the number of live births and essentially captures the risk of death in a single pregnancy or a single live birth.
Maternal deaths: The annual number of female deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, expressed per 100,000 live births, for a specified time period.

Rationale:

All maternal mortality indicators derived from the 2015 estimation round include a point-estimate and an 80% uncertainty interval (UI). For those indicators where only point-estimates are reported in the text or tables, UIs can be obtained from supplementary material online (http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/). Both point-estimates and 80% UIs should be taken into account when assessing estimates.

For example:
The estimated 2015 global MMR is 216 (UI 207 to 249)

This means:
• The point-estimate is 216 and the 80% uncertainty interval ranges 207 to 249.
• There is a 50% chance that the true 2015 global MMR lies above 216, and a 50% chance that the true value lies below 216.
• There is an 80% chance that the true 2015 global MMR lies between 207 and 249.
• There is still a 10% chance that the true 2015 global MMR lies above 249, and a 10% chance that the true value lies below 207.

Other accurate interpretations include:
• We are 90% certain that the true 2015 global MMR is at least 207.
• We are 90% certain that the true 2015 global MMR is 249 or less.

The amount of data available for estimating an indicator and the quality of that data determine the width of an indicator's UI. As data availability and quality improve, the certainty increases that an indicator's true value lies close to the point-estimate.

Concepts:

Definitions related to maternal death in ICD-10

Maternal death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management (from direct or indirect obstetric death), but not from accidental or incidental causes.

Pregnancy-related death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Late maternal death: The death of a woman from direct or indirect obstetric causes, more than 42 days, but less than one year after termination of pregnancy

Comments and limitations:

The extent of maternal mortality in a population is essentially the combination of two factors:
i. The risk of death in a single pregnancy or a single live birth.
ii. The fertility level (i.e. the number of pregnancies or births that are experienced by women of reproductive age).

The maternal mortality ratio (MMR) is defined as the number of maternal deaths during a given time period per 100 000 live births during the same time period. It depicts the risk of maternal death relative to the number of live births and essentially captures (i) above.

By contrast, the maternal mortality rate (MMRate) is calculated as the number of maternal deaths divided by person-years lived by women of reproductive age. The MMRate captures both the risk of maternal death per pregnancy or per total birth (live birth or stillbirth), and the level of fertility in the population. In addition to the MMR and the MMRate, it is possible to calculate the adult lifetime risk of maternal mortality for women in the population (see Box A2.2). An alternative measure of maternal mortality, the proportion of deaths among women of reproductive age that are due to maternal causes (PM), is calculated as the number of maternal deaths divided by the total deaths among women aged 15–49 years.

Related Statistical measures of maternal mortality

Maternal mortality ratio (MMR): Number of maternal deaths during a given time period per 100,000 live births during the same time period.

Maternal mortality rate (MMRate): Number of maternal deaths divided by person-years lived by women of reproductive age.

Adult lifetime risk of maternal death: The probability that a 15-year-old woman will die eventually from a maternal cause.

The proportion of deaths among women of reproductive age that are due to maternal causes (PM): The number of maternal deaths in a given time period divided by the total deaths among women aged 15–49 years.

Methodology

Computation Method:

The maternal mortality ratio can be calculated by dividing recorded (or estimated) maternal deaths by total recorded (or estimated) live births in the same period and multiplying by 100 000. Measurement requires information on pregnancy status, timing of death (during pregnancy, childbirth, or within 42 days of termination of pregnancy), and cause of death.

The maternal mortality ratio can be calculated directly from data collected through vital registration systems, household surveys or other sources. There are often data quality problems, particularly related to the underreporting and misclassification of maternal deaths. Therefore, data are often adjusted in order to take these data quality issues into account. Some countries undertake these adjustments or corrections as part of specialized/confidential enquiries or administrative efforts embedded within maternal mortality monitoring programmes.

Disaggregation:

Current MMR estimates are reported at Country, Regional, and Global levels. Regional level estimates have income strata per World Bank classification.

Treatment of missing values:

- At country level

    The Maternal Mortality Estimation Inter-Agency Group (MMEIG) uses the "BMaT" model to estimate MMR where there are missing values (see page 12 of the report http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1).

    Equation:
    $\log(PM_{ina}) = a_i - \beta_1 \log(GDP_i) + \beta_2 \log(GFR_i) - \beta_3 SAB_i$

    with random country intercepts modelled hierarchically within regions:

    $a_i \sim N(a_{region}, s_{2country})$, $a_r \sim N(a_{world}, s_{2region})$
    meaning country intercepts (a_i) are distributed normally with a country-specific variance (s2country)
    around random region intercepts (aregion), and random region intercepts (aregion) are distributed

normally with a region-specific variance (s2region) around a world intercept (aworld); and:

GDPi= gross domestic product per capita (in 2011 purchasing power parity [PPP] dollars)

GFRi= general fertility rate (live births per woman aged 15–49 years)

SABi= skilled attendant at birth (as a proportion of live births).

- At regional and global levels

To inform projection of trends across periods where data are sparse, or for countries with little or no data at all, the BMaT statistical model is used to estimate maternal mortality. The model includes factors known to be associated with maternal mortality as predictor covariates (GDP, GFR and SAB).

Regional aggregates:

The maternal mortality ratio can be calculated by dividing recorded (or estimated) maternal deaths by total recorded (or estimated) live births in the same period and multiplying by 100,000. Measurement requires information on pregnancy status, timing of death (during pregnancy, childbirth, or within 42 days of termination of pregnancy), and cause of death.

The maternal mortality ratio can be calculated directly from data collected through vital registration systems, household surveys or other sources. There are often data quality problems, particularly related to the underreporting and misclassification of maternal deaths. Therefore, data are often adjusted in order to take these data quality issues into account.

Because maternal mortality is a relatively rare event, large sample sizes are needed if household surveys are used to identify recent maternal deaths in the household (e.g. last year). This may still result in estimates with large confidence intervals, limiting the usefulness for cross-country or over-time comparisons.

To reduce sample size requirements, the sisterhood method used in the DHS and multiple indicator surveys (MICS4) measures maternal mortality by asking respondents about the survival of sisters. It should be noted that the sisterhood method results in pregnancy-related mortality: regardless of the cause of death, all deaths occurring during pregnancy, birth or the six weeks following the termination of the pregnancy are included in the numerator of the maternal mortality ratio.

Censuses have also included questions about maternal deaths with variable success.

Reproductive Age Mortality Studies (RAMOS) is a special study that uses varied sources, depending on the context, to identify maternal deaths; no single source identifies all the deaths. Interviews with household members and health-care providers and reviews of facility records are used to classify the deaths as maternal or otherwise. If properly conducted, this approach provides a fairly complete estimation of maternal mortality (in the absence of reliable routine registration systems) and could provide subnational MMRs. However, inadequate identification of all deaths of reproductive-aged women results in underestimation of maternal mortality levels. This approach can be complicated, time-

consuming and expensive to undertake – particularly on a large scale. The number of live births used in the computation may not be accurate, especially in settings where most women deliver at home.

WHO, UNICEF, UNFPA, the United Nations Population Division and The World Bank have developed a method to adjust existing data in order to take into account these data quality issues and ensure the comparability of different data sources. This method involves assessment of data for completeness and, where necessary, adjustment for underreporting and misclassification of deaths as well as development of estimates through statistical modelling for countries with no reliable national level data.

Data on maternal mortality and other relevant variables are obtained through databases maintained by WHO, the United Nations Population Division, UNICEF, and The World Bank. Data available from countries varies in terms of source and methods. Given the variability of the sources of data, different methods are used for each data source in order to arrive at country estimates that are comparable and permit regional and global aggregation.

Currently, only about one third of all countries/territories have reliable data available and do not need additional estimations. For about half of the countries included in the estimation process, country-reported estimates of maternal mortality are adjusted for the purposes of comparability of the methodologies. For the remainder of countries/territories – those with no appropriate maternal mortality data -- a statistical model is employed to predict maternal mortality levels. However, the calculated point estimates with this methodology might not represent the true levels of maternal mortality. It is advised to consider the estimates together with the reported uncertainty margins within which the true levels are known to lie.
Details on adjustments and formulas are published/available here:

(1) http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1

 (2) Alkema L, Chou D, Hogan D, Zhang S, Moller A, Gemmill A et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. Lancet. Published online 12 November 2015. doi:10.1016/S0140- 6736(15)00838-7.

 (3) Alkema L, Zhang S, Chou D, Gemmill A, Moller A, Ma Fat D et al. A Bayesian approach to the global estimation of maternal mortality. 2015 (submitted for peer review; http://arxiv. org/abs/1511.03330).

Sources of discrepancies:

The maternal mortality ratio is defined as the number of maternal deaths divided by live births. However, to account for potential incompleteness of death recording in various data sources, the MMEIG first computes the fraction of deaths due to maternal causes from original data sources (referred to as the "proportion maternal", or PM), and then applies that fraction to WHO estimates of total deaths among women of reproductive age to obtain an estimate of the number of maternal deaths.

In other words, the following fraction is first computed from country data sources:

PM= Number of maternal deaths 15-49/All female deaths at ages 15-49

and then the PM is used to compute the MMR as follows:

MMR=PM ×(All female deaths at ages 15-49/Number of live births)

where the estimate of all deaths at ages 15-49 in the second equation is derived from WHO life tables, and the number of live births is from the World Population Prospects 2015.

With this as background, a few reasons that MMEIG estimates may differ from national statistics are as follows:

1. Civil registration and vital statistics systems are not always complete (i.e., they do not always capture 100% of all deaths) and completeness may change over time. The MMEIG estimation approach attempts to correct for this by using the above approach, which involves first computing the PM.

2. The MMEIG often applies adjustment factors to the PM computed from original data to account for measurement issues (such as how the country defined "maternal" deaths; misclassification; or undercounting).

3. The MMEIG uses the standardized series of live births from the United Nations Population Division, as published in World Population Prospects 2015, in the denominator of the MMR equation. To better inform the WPP, countries should discuss discrepancies directly with the UNPD. The contact address is population@un.org; this email address is monitored regularly and messages are dispatched to the appropriate analysts for each country or concern.

4. Statistically speaking, maternal deaths are a relatively rare event, which can lead to noisy time trends in data over time. As the goal of the MMEIG estimates is to track long term progress in reducing maternal mortality, the estimation process involves some smoothing to generate a curve that better captures changes in underlying risk

Data Sources

Description:

Please see page 5 of the report
http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1

Collection process:

The MMEIG maintains an input database consisting of maternal mortality data from civil registration, population based surveys, surveillance systems, censuses, and other specialized studies/surveys. This database is used to determine the number of maternal deaths and where possible the number of deaths among all women of reproductive age (WRA) to calculate the "PM" proportion of maternal deaths among WRA. The MMR is then calculated as MMR = PM(D/B); where "D" is the number of deaths in women aged 15-49 (WRA) and "B" is the number of live births. The number of live births is based upon the World Population Prospects.

Statistical modelling is undertaken to generate comparable Country, Regional, and Global level estimates. The model's fit is assessed by cross-validation. Estimates are then reviewed with Member States through a WHO country consultation process. In 2001, the WHO Executive Board endorsed a resolution (EB.107.R8) seeking to "establish a technical consultation process bringing together personnel and perspectives from Member States in different WHO regions". A key objective of this consultation process is "to ensure that each Member State is consulted on the best data to be used". Since the process is an integral step in the overall estimation strategy, it is described here in brief.

The country consultation process entails an exchange between WHO and technical focal person(s) in each country. It is carried out prior to the publication of estimates. During the consultation period, WHO invites focal person(s) to review input data sources, methods for estimation and the preliminary estimates. Focal person(s) are encouraged to submit additional data that may not have been taken into account in the preliminary estimates.

Adjustments are made according to the data source type:

(1) CRVS, for underreporting and misclassification of maternal deaths

(2) reports providing "pregnancy-related" mortality, for underreporting of these deaths, as well as over-reporting of maternal deaths due to inclusion of deaths which are accidental or incidental to pregnancy (thus outside of the definition of maternal mortality).

The analysis also accounts for stochastic errors due to the general rarity of maternal deaths, sampling error in the data source, errors during data collection and processing, and other random error.

Data Availability

The MMR estimates is limited to countries with population of greater than 100 000. Out of 183 countries, 171 have nationally representative data.

Calendar

Data collection:

Source data are collected by countries, typically yearly for CRVS sources, every 3-5 years for specialized reviews, every 5-7 years for population based surveys, every 10 years for censuses. (From NA to NA)

Data release:

The next round of MMR estimation is scheduled for publication late 2017/early 2018. (late 2017/early 2018)

Data providers

National level data providers may be statistical offices, specialized epi monitoring bodies.

Data compilers

MMEIG the Maternal Mortality Estimation Interagency Group, composed of: WHO UNICEF UNFPA World Bank UN Population Division

References

URL:

http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/

References:

(1) Trends in Maternal Mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division
http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1

(2) Alkema L, Chou D, Hogan D, Zhang S, Moller A, Gemmill A et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. Lancet. Published online 12 November 2015. doi:10.1016/S0140- 6736(15)00838-7.
(http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)00838-7/references)

(3) Alkema L, Zhang S, Chou D, Gemmill A, Moller A, Ma Fat D et al. A Bayesian approach to the global estimation of maternal mortality. 2015 (submitted for peer review; http://arxiv. org/abs/1511.03330).

Related indicators

3.1.2:
Proportion of births attended by skilled health personnel

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
Indicator 3.1.2: Proportion of births attended by skilled health personnel

Institutional information

Organization(s):
United Nations Children's Fund (UNICEF)

Concepts and definitions

Definition:
Percentage of births attended by skilled health personnel (generally doctors, nurses or midwives) is the percentage of deliveries attended by health personnel trained in providing lifesaving obstetric care, including giving the necessary supervision, care and advice to women during pregnancy, labour and the post-partum period, conducting deliveries on their own, and caring for newborns. Traditional birth attendants, even if they receive a short training course, are not included.

Rationale:
Having a skilled attendant at the time of delivery is an important lifesaving intervention for both mothers and babies. Not having access to this key assistance is detrimental to women's health and gender empowerment because it could cause the death of the mother or long lasting disability, especially in marginalized settings.

Methodology

Computation Method:
The number of women aged 15-49 with a live birth attended by a skilled health personnel (doctors, nurses or midwives) during delivery is expressed as a percentage of women aged 15-49 with a live birth in the same period.

Disaggregation:
For this indicator, when data are reported from household surveys, disaggregation is available for residence (urban/rural), household wealth (quintiles) and maternal age, geographic regions. When data are reported from administrative sources, disaggregation is more limited and tend to include only residence.

Treatment of missing values:

- At country level

There is no treatment of missing values at country level. If value is missing for a given year, then there is no reporting of that value.

- At regional and global levels

Missing values are not imputed for regional and global levels. The latest available year within each period is used for the calculation of regional and global average.

Regional aggregates:
Regional and global estimates are calculated using weighed averages. Annual number of births from UNPD World Population Prospects is used is as a weighing indicator. Regional values are calculated for a reference year, including a range of 4-5 years for each reference year. For example, for 2016, the latest year available for the period 2013-2016 was used for the estimate for reference year 2016.

Sources of discrepancies:
Discrepancies are possible if there are national figures compiled at the health facility level. These would differ from the global figures, which are typically based on survey data collected at the household level. In terms of survey data, some survey reports may present a total percentage of births attended by a skilled health professional that does not conform to the MDG definition (e.g., total includes provider that is not considered skilled, such as a community health worker). In that case, the percentage delivered by a physician, nurse, or a midwife are totalled and entered into the global database as the MDG estimate. In some countries where skilled attendant at birth is not available, birth in a health facility (institutional births) is used instead. This is frequent among Latin American countries, where the proportion of institutional births is very high. Nonetheless, it should be noted that institutional births may underestimate the percentage of births with skilled attendant.

Methods and guidance available to countries for the compilation of the data at the national level:
UNICEF and WHO maintain joint databases on skilled attendance at delivery (doctor, nurse or midwife) and both collaborate to ensure the consistency of data sources. National-level household surveys are the main data sources used to collect data for the antenatal care indicators. These surveys include Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Reproductive Health Surveys (RHS) and national surveys based on similar methodologies. The surveys are undertaken every 3 to 5 years. For mainly industrialized countries (where the coverage is high), data sources include routine service statistics.

Before acceptance into the joint global databases, UNICEF and WHO undergo a verification process that includes correspondence with field offices to clarify any questions regarding estimates. During this process, the national categories of skilled health personnel are verified, and so the estimates for some countries may include additional categories of trained personnel beyond doctors, nurses, and midwives.

Quality assurance
Data are reported to UNICEF on an annual basis. Values are reviewed and assess to make sure that reported indicator complies with standard definition and methodology. Additional data, mainly on high-income countries are compiled from primary sources and provided by World Health Organization

Data are reported by UNICEF country office to UNICEF-HQ for global compilation. At the national levels, country offices are in touch with national authorities to compile and provide requested data, and therefore, values reported in global database are validated by national authorities.

Data Sources

Description:
National-level household surveys are the main data sources used to collect data for the antenatal care indicators. These surveys include Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Reproductive Health Surveys (RHS) and national surveys based on similar methodologies. The surveys are undertaken every 3 to 5 years. For mainly industrialized countries (where the coverage is high), data sources include routine service statistics.

Collection process:
UNICEF and WHO maintain joint databases on skilled attendance at delivery (doctor, nurse or midwife) and both collaborate to ensure the consistency of data sources. National-level household surveys are the main data sources used to collect data for the antenatal care indicators. These surveys include Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Reproductive Health Surveys (RHS) and national surveys based on similar methodologies. The surveys are undertaken every 3 to 5 years. For mainly industrialized countries (where the coverage is high), data sources include routine service statistics.

Before acceptance into the joint global databases, UNICEF and WHO undergo a verification process that includes correspondence with field offices to clarify any questions regarding estimates. During this process, the national categories of skilled health personnel are verified, and so the estimates for some countries may include additional categories of trained personnel beyond doctors, nurses, and midwives.

Data Availability

Description:
Data are available for over 170 countries.
The lag between the reference year and actual production of data series depends on the availability of the household survey for each country. In developing countries they typically take place every three to five years, with results published within a year of field data collection.

Time series:
1990-2016

Calendar

Data collection:
As the main source of data is household surveys which are conducted every 3-5 years, the collection of data are under this schedule. When data comes from administrative source, data can be available on an annual basis.

Data release:
Estimates are published annually, in May by WHO in World Health Statistics (http://www.who.int/whosis/whostat/en/) and by UNICEF in State of the World's Children, and are available at www.data.unicef.org.

Data providers

Ministries of Health and National Statistical Offices, either through household surveys or routine sources.

Data compilers

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

References

URL: https://data.unicef.org/topic/maternal-health/delivery-care/#

References:
Joint UNICEF/WHO database 2016 of skilled health personnel, based on population-based national household survey data and routine health systems.

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.2: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
Indicator 3.2.1: Under-five mortality rate

Institutional information

Organization(s):

United Nations Children's Fund (UNICEF)

Concepts and definitions

Definition:

Under-five mortality is the probability of a child born in a specific year or period dying before reaching the age of 5 years, if subject to age specific mortality rates of that period, expressed per 1000 live births.

Rationale:

Mortality rates among young children are a key output indicator for child health and well-being, and, more broadly, for social and economic development. It is a closely watched public health indicator because it reflects the access of children and communities to basic health interventions such as vaccination, medical treatment of infectious diseases and adequate nutrition.

Concepts:

The under-five mortality rate as defined here is, strictly speaking, not a rate (i.e. the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as a rate per 1000 live births.

Methodology

Computation Method:

The UN Inter-agency Group for Child Mortality Estimation (UN IGME) estimates are derived from national data from censuses, surveys or vital registration systems. The UN IGME does not use any covariates to derive its estimates. It only applies a curve fitting method to good-quality empirical data to derive trend estimates after data quality assessment. In most cases, the UN IGME estimates are close to the underlying data. The UN IGME aims to minimize the errors for each estimate, harmonize trends over time and produce up-to-date and properly assessed estimates. The UN IGME applies the Bayesian B-splines bias-reduction model to empirical data to derive trend estimates of under-five mortality for all countries. See the UN IGME link for details.

For the underlying data mentioned above, the most frequently used methods are as follows:

Civil registration: Number of deaths at age 0-5 and population of the same age are used to calculate death rates which are then converted into age-specific probability of dying.

Census and surveys: An indirect method is used based on questions to each woman of reproductive age as to how many children she has ever given birth to and how many are still alive. The Brass method and model life tables are then used to obtain an estimate of under-five and infant mortality rates. Censuses often include questions on household deaths in the last 12 months, which can be used to calculate mortality estimates.

Surveys: A direct method is used based on birth history a series of detailed questions on each child a woman has given birth to during her lifetime. Neonatal, post-neonatal, infant, child and under-five mortality estimates can be derived from full birth history module.

Disaggregation:

The common disaggregation for mortality indicators includes disaggregation by sex, age (neonatal, infant, child), wealth quintile, residence, and mother's education. Disaggregated data are not always available. Disaggregation by geographic location is usually at regional level, or the minimum provincial level for survey or census data. Data from well-functioning vital registration systems can provide further geographical breakdowns.

Treatment of missing values:

- At country level

  UN IGME estimates are based on underlying empirical data. If the empirical data refer to an earlier reference period than the end year of the period the estimates are reported, UN IGME extrapolates the estimates to the common end year. UN IGME does not use any covariates to derive the estimates.

- At regional and global levels

  To construct aggregate estimates of under-five mortality before 1990, regional averages of mortality rates were used for country-years with missing information and weighted by the respective population in the country-year.

Regional aggregates:

Global and regional estimates of under-five mortality rates are derived by aggregating the number of country-specific under-five deaths estimated by the UN IGME and the country-specific population from the United Nations Population Division, through a period life table approach.

Sources of discrepancies:

The UN IGME estimates are derived based on national data. Countries often use one single source as their official estimates or apply methods different from the UN IGME methods to derive estimates. The differences between the UN IGME estimates and national official estimates are usually not large if empirical data has good quality.

Many countries lack a single source of high-quality data covering the last several decades. Data from different sources require different calculation methods and may suffer from different errors, for example random errors in sample surveys or systematic errors due to misreporting. As a result, different surveys often yield widely different estimates of under-five mortality for a given time period and available data collected by countries are often inconsistent across sources. It is important to analyse, reconcile and evaluate all data sources simultaneously for each country. Each new survey or data point must be examined in the context of all other sources, including previous data. Data suffer from sampling or non-sampling errors (such as misreporting of age and survivor selection bias; underreporting of child deaths is also common). UN IGME assesses the quality of underlying data sources and adjusts data when necessary. Also the latest data produced by countries often are not current estimates but refer to an earlier reference period. Thus, the UN IGME also projects estimates to a common reference year. In order to reconcile these differences and take better account of the systematic biases associated with the various types of data inputs, the UN IGME has developed an estimation method to fit a smoothed trend curve to a set of observations and to extrapolate that trend to a defined time point. The UN IGME aims to minimize the errors for each estimate, harmonize trends over time and produce up-to-date and properly assessed estimates of child mortality. In the absence of error-free data, there will always be uncertainty around data and estimates, both national and interagency. To allow for added comparability, the UN IGME generates such estimates with uncertainty bounds. Applying a consistent methodology also allows for comparisons between countries, despite the varied number and types of data sources. UN IGME applies a common methodology across countries and uses original empirical data from each country but does not report figures produced by individual countries using other methods, which would not be comparable to other country estimates.

Data Sources

Description:

Nationally-representative estimates of child mortality can be derived from a number of different sources, including civil registration and sample surveys. Demographic surveillance sites and hospital data are excluded as they are rarely representative. The preferred source of data is a civil registration system which records births and deaths on a continuous basis. If registration is complete and the system functions efficiently, the resulting estimates will be accurate and timely. However, many countries do not have well-functioning vital registration systems. In such cases household surveys, such as the UNICEF-supported Multiple Indicator Cluster Surveys (MICS), the USAID-supported Demographic and Health Surveys (DHS) and periodic population censuses have become the primary source of data on under-five mortality. These surveys ask women about the survival of their children, and it is these reports that provide the basis of child mortality estimates for a majority of low- and middle- income countries. These data, however, are often subject to sampling or/and non-sampling errors, which might be substantial.

Civil registration

Civil registration data are the preferred data source for under-five, infant and neonatal mortality estimation. The calculation of the under-five and infant mortality rates from civil registration data is derived from a standard period abridged life table. For civil registration data (with available data on the number of deaths and mid-year populations), initially annual observations were constructed for all observation years in a country.

Population census and household survey data

The majority of survey data comes in one of two forms: the full birth history (FBH), whereby women are asked for the date of birth of each of their children, whether the child is still alive, and if not the age at death; and the summary birth history (SBH), whereby women are asked only about the number of their children ever born and the number that have died (or equivalently the number still alive).

Collection process:

For under-five mortality, UNICEF and the UN IGME compile data from all available data sources, including household surveys, censuses, vital registration data etc. UNICEF and the UN IGME compile these data whenever they are available publically and then conduct data quality assessment. UNICEF also collects data through UNICEF country offices by reaching national counterpart(s). UNICEF also collects vital registration data reported by ministry of health to WHO.

Adjustments of empirical data are made in high prevalence HIV settings to adjust for under reporting of under-five mortality due to missing mothers in survey data. UNIGME than applies a curve fitting method to these empirical data to derive the UN IGME trend estimates of the under-five mortality rates. Because deaths by crisis are difficult to capture in household survey or census data UN IGME adjusts the estimates for crisis mortality.

Then the UN IGME conducts a country consultation by sending the UN IGME estimates, empirical data used to derive the UN IGME estimates, notes on methodology etc. to National Statistical Office through UNICEF and to Ministry of Health through WHO for feedback on the UN IGME estimates and the empirical data. National Statistical Office and Ministry of Health review the UN IGME estimates and empirical data and send feedback or comments and sometimes additional empirical data if these data are not included in the UN IGME database.

To increase the transparency of the estimation process, the UN IGME has developed a child mortality database: CME Info (www.childmortality.org). It includes all available data and shows estimates for each country. Once the new estimates are finalized, CME Info will be updated to reflect all available data and the new estimates.

Data Availability

Description:

Indicator is available for all countries from 1990 (or earlier) to 2015, depending on availability of empirical data for each country before 1990.

Calendar

Data collection:

The UN IGME underlying database is continuously updated whenever new empirical data become available.

Data release:

New round of estimates of the UN IGME will be released in 2017, usually the release date is in the month of September.

Data providers

National Statistical Office or the Ministry of Health are mostly involved in generating under-five mortality data at the national level.

Data compilers

UNICEF

References

URL:

childmortality.org and data.unicef.org

References:

United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels & trends in child mortality. Report 2015. New York: UNICEF, 2015. Available at http://childmortality.org/files_v20/download/IGME%20report%202015%20child%20mortality%20final.pdf

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Alkema L, Chao F, You D, Pedersen J, Sawyer CC. National, regional, and global sex ratios of infant, child, and under-5 mortality and identification of countries with outlying ratios: a systematic assessment. The Lancet Global Health. 2014; 2(9): e521–e530.

Pedersen J, Liu J. Child Mortality Estimation: Appropriate Time Periods for Child Mortality Estimates from Full Birth Histories. Plos Medicine. 2012;9(8). Available at: http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001289

Silva R. Child Mortality Estimation: Consistency of Under-Five Mortality Rate Estimates Using Full Birth Histories and Summary Birth Histories. Plos Medicine. 2012;9(8). Available at: http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001296

Walker N, Hill K, Zhao FM. Child Mortality Estimation: Methods Used to Adjust for Bias due to AIDS in Estimating Trends in Under-Five Mortality. Plos Medicine. 2012;9(8). Available at: http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001298

Related indicators

3.2.2:
Neonatal mortality rate

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.2: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
Indicator 3.2.2: Neonatal mortality rate

Institutional information

Organization(s):

United Nations Children's Fund (UNICEF)

Concepts and definitions

Definition:

The neonatal mortality rate is the probability that a child born in a specific year or period will die during the first 28 completed days of life if subject to age-specific mortality rates of that period, expressed per 1000 live births.

Neonatal deaths (deaths among live births during the first 28 completed days of life) may be subdivided into early neonatal deaths, occurring during the first 7 days of life, and late neonatal deaths, occurring after the 7th day but before the 28th completed day of life.

Rationale:

Mortality rates among young children are a key output indicator for child health and well-being, and, more broadly, for social and economic development. It is a closely watched public health indicator because it reflects the access of children and communities to basic health interventions such as vaccination, medical treatment of infectious diseases and adequate nutrition.

Methodology

Computation Method:

The UN Inter-agency Group for Child Mortality Estimation (UN IGME) estimates are derived from national data from censuses, surveys or vital registration systems. The UN IGME does not use any covariates to derive its estimates. It only applies a curve fitting method to good-quality empirical data to derive trend estimates after data quality assessment. In most cases, the UN IGME estimates are close to the underlying data. The UN IGME aims to minimize the errors for each estimate, harmonize trends over time and produce up-to-date and properly assessed estimates. The UN IGME produces neonatal mortality rate estimates with a Bayesian spline regression model which models the ratio of neonatal mortality rate / (under-five mortality rate - neonatal mortality rate). Estimates of NMR are obtained by recombining the

estimates of the ratio with UN IGME-estimated under-five mortality rate. See the UN IGME link for details.

For the underlying data mentioned above, the most frequently used methods are as follows:

Civil registration: Number of children who died during the first 28 days of life and the number of births used to calculate neonatal mortality rates.

Census: Census often includes questions on household deaths in the last 12 months, which can be used to calculate mortality estimates.

Surveys: A direct method is used based on birth history a series of detailed questions on each child a woman has given birth to during her lifetime. Neonatal, post-neonatal, infant, child and under-five mortality estimates can be derived from full birth history module.

Disaggregation:

The common disaggregation for mortality indicators includes disaggregation by sex, age (neonatal, infant, child), wealth quintile, residence, and mother's education. Disaggregated data are not always available. Disaggregation by geographic location is usually at the regional level, or the minimum provincial level for survey or census data. Data from well-functioning vital registration systems can provide further geographical breakdowns.

Neonatal mortality rates can be also disaggregated by cause, including preterm birth complications, pneumonia, and diarrhoea.

Treatment of missing values:

- At country level

  UN IGME estimates are based on underlying empirical data. If the empirical data refer to an earlier reference period than the end year of the period the estimates are reported, UN IGME extrapolates the estimates to the common end year. UN IGME does not use any covariates to derive the estimates.

- At regional and global levels

  To construct aggregate estimates of neonatal mortality before 1990, regional averages of mortality rates were used for country-years with missing information and weighted by the respective population in the country-year.

Regional aggregates:

Global and regional estimates of neonatal mortality rates are derived by aggregating the number of country-specific neonatal deaths estimated by the UN IGME and the country-specific population from the United Nations Population Division.

Sources of discrepancies:

The UN IGME estimates are derived based on national data. Countries often use one single source as their official estimates or apply methods different from the UN IGME methods to derive estimates. The differences between the UN IGME estimates and national official estimates are usually not large if empirical data has good quality.

Many countries lack a single source of high-quality data covering the last several decades. Data from different sources require different calculation methods and may suffer from different errors, for example random errors in sample surveys or systematic errors due to misreporting. As a result, different surveys often yield widely different estimates of neonatal mortality for a given time period and available data collected by countries are often inconsistent across sources. It is important to analyse, reconcile and evaluate all data sources simultaneously for each country. Each new survey or data point must be examined in the context of all other sources, including previous data. Data suffer from sampling or non-sampling errors (such as misreporting of age and survivor selection bias; underreporting of child deaths is also common). UN IGME assesses the quality of underlying data sources and adjusts data when necessary. Also the latest data produced by countries often are not current estimates but refer to an earlier reference period. Thus, the UN IGME also projects estimates to a common reference year. In order to reconcile these differences and take better account of the systematic biases associated with the various types of data inputs, the UN IGME has developed an estimation method to fit a smoothed trend curve to a set of observations and to extrapolate that trend to a defined time point. The UN IGME aims to minimize the errors for each estimate, harmonize trends over time and produce up-to-date and properly assessed estimates of child mortality. In the absence of error-free data, there will always be uncertainty around data and estimates, both national and interagency. To allow for added comparability, the UN IGME generates such estimates with uncertainty bounds. Applying a consistent methodology also allows for comparisons between countries, despite the varied number and types of data sources. UN IGME applies a common methodology across countries and uses original empirical data from each country but does not report figures produced by individual countries using other methods, which would not be comparable to other country estimates.

Data Sources

Description:

Nationally-representative estimates of child mortality can be derived from a number of different sources, including civil registration and sample surveys. Demographic surveillance sites and hospital data are excluded as they are rarely representative. The preferred source of data is a civil registration system which records births and deaths on a continuous basis. If registration is complete and the system functions efficiently, the resulting estimates will be accurate and timely. However, many countries do not have well-functioning vital registration systems. In such cases household surveys, such as the UNICEF-supported Multiple Indicator Cluster Surveys (MICS), the USAID-supported Demographic and Health Surveys (DHS) and periodic population censuses have become the primary source of data on under-five and neonatal mortality. These surveys ask women about the survival of their children, and it is these reports that provide the basis of child mortality estimates for a majority of low- and middle- income countries. These data, however, are often subject to sampling or/and non-sampling errors, which might be substantial.

Civil registration

Civil registration data are the preferred data source for under-five, infant and neonatal mortality estimation. The calculation of neonatal mortality rates are derived from the number of neonatal deaths and number of births over a period. For civil registration data (with available data on the number of deaths and mid-year populations), initially annual observations were constructed for all observation years in a country.

Population census and household survey data

The majority of survey data comes from the full birth history (FBH), whereby women are asked for the date of birth of each of their children, whether the child is still alive, and if not the age at death.

Collection process:

For neonatal mortality, UNICEF and the UN IGME compile data from all available data sources, including household surveys, censuses, vital registration data etc. UNICEF and the UN IGME compile these data whenever they are available publically and then conduct data quality assessment. UNICEF also collects data through UNICEF country offices by reaching national counterpart(s). UNICEF also collects vital registration data reported by the Ministry of Health to WHO.

Adjustments of empirical data are made in high prevalence HIV settings to adjust for under reporting of child mortality due to missing mothers in survey data. UN IGME than applies a curve fitting method to these empirical data to derive the UN IGME trend estimates of the neonatal mortality rates. Because deaths by crisis are difficult to capture in household survey or census data UN IGME adjusts the neonatal mortality estimates for crisis mortality.

Then the UN IGME conducts a country consultation by sending the UN IGME estimates, empirical data used to derive the UN IGME estimates, notes on methodology etc. to National Statistical Office through UNICEF and to Ministry of Health through WHO for feedback on the UN IGME estimates and the empirical data. National Statistical Office and Ministry of Health review the UN IGME estimates and empirical data and send feedback or comments and sometimes additional empirical data if these data are not included in the UN IGME database.

To increase the transparency of the estimation process, the UN IGME has developed a child mortality database: CME Info (www.childmortality.org). It includes all available data and shows estimates for each country. Once the new estimates are finalized, CME Info will be updated to reflect all available data and the new estimates.

Data Availability

Description:

Indicator is available for all countries from 1990 (or earlier) to 2015, depending on availability of empirical data for each country before 1990.

Calendar

Data collection:

The UN IGME underlying database is continuously updated whenever new empirical data become available.

Data release:

New round of estimates of the UN IGME will be released in 2017, usually the release date is in the month of September.

Data providers

National Statistical Office or the Ministry of Health are mostly involved in generating neonatal mortality data at the national level.

Data compilers

UNICEF

References

URL:

childmortality.org and www.data.unicef.org/child-mortality/neonatal

References:

United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels & trends in child mortality. Report 2015. New York: UNICEF, 2015. Available at http://childmortality.org/files_v20/download/IGME%20report%202015%20child%20mortality%20final.pdf

Alexander M, Alkema L. Estimating Neonatal Mortality. Annual Meeting of the Population Association of America. 2015. (Available at http://paa2015.princeton.edu/uploads/151676)

Alkema L, New JR. Global estimation of child mortality using a Bayesian B-spline bias-reduction method. The Annals of Applied Statistics. 2014; 8(4): 2122–2149. Available at: http://arxiv.org/abs/1309.1602

Alkema L, Chao F, You D, Pedersen J, Sawyer CC. National, regional, and global sex ratios of infant, child, and under-5 mortality and identification of countries with outlying ratios: a systematic assessment. The Lancet Global Health. 2014; 2(9): e521–e530.

Pedersen J, Liu J. Child Mortality Estimation: Appropriate Time Periods for Child Mortality Estimates from Full Birth Histories. Plos Medicine. 2012;9(8). Available at:
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001289

Silva R. Child Mortality Estimation: Consistency of Under-Five Mortality Rate Estimates Using Full Birth Histories and Summary Birth Histories. Plos Medicine. 2012;9(8). Available at:
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001296

Walker N, Hill K, Zhao FM. Child Mortality Estimation: Methods Used to Adjust for Bias due to AIDS in Estimating Trends in Under-Five Mortality. Plos Medicine. 2012;9(8). Available at:
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001298

Related indicators

3.2.1:
Under-five mortality rate

Institutional information

Organization(s):

The Joint United Nations Programme on HIV/AIDS (UNAIDS)

Concepts and definitions

Definition:

The number of new HIV infections per 1,000 uninfected population, by sex, age and key populations as defined as the number of new HIV infections per 1000 person-years among the uninfected population.

Rationale:

The incidence rate provides a measure of progress toward preventing onward transmission of HIV.

Methodology

Computation Method:

Longitudinal data on individuals are the best source of data but are rarely available for large populations. Special diagnostic tests in surveys or from health facilities can be used to obtain data on HIV incidence. HIV incidence is thus modelled using the Spectrum software.

Disaggregation:

General population, Key populations (men who have sex with men, sex workers, people who inject drugs, transgender people, prisoners), Age groups (0-14, 15-24, 15-49, 50+ years), for key populations (< 25, 25+ years), mode of transmission (including mother-to-child transmission), place of residence, sex

Treatment of missing values:

- At country level

  Estimates are not collected from countries with populations < 250,000. In addition no estimates are available for 10 countries with very small HIV epidemics who do not produce estimates.

For some countries the estimates were not finalized at the time of publication. The country specific values are not presented for these countries.

- At regional and global levels

    The countries with populations < 250,000 and the 10 countries that do not produce estimates are not included in regional or global level estimates. For countries in which the estimates were not finalized at the time of publication, the unofficial best estimates are included in the regional and global values.

Regional aggregates:

NA

Sources of discrepancies:

These variations will differ by country.

Methods and guidance available to countries for the compilation of the data at the national level:

A description of the methodology is available at:
http://www.unaids.org/sites/default/files/media_asset/2016_methods-for-deriving-UNAIDS-estimates_en.pdf

Countries are providing with capacity building workshops every two years on the methods. In addition, they are supported by in country specialists in roughly 45 countries. Where no in country specialists are available remote assistance is provided. Guidelines are also available at:
http://www.unaids.org/en/dataanalysis/datatools/spectrumepp and at www.avenirhealth.org

Quality assurance

http://www.unaids.org/sites/default/files/media_asset/2016_methods-for-deriving-UNAIDS-estimates_en.pdf

Countries are fully involved in the development of the estimates. The final values are reviewed for quality by UNAIDS and approved by senior managers at national Ministries of Health.

Data Sources

Description:

Spectrum modelling, household or key population surveys with HIV incidence-testing,

Other possible data sources: Regular surveillance system among key populations.

Collection process:

Country teams use UNAIDS-supported software to develop estimates annually. The country teams are comprised of primarily epidemiologists, demographers, monitoring and evaluation specialists and technical partners.

The software used to produce the estimates is Spectrum—developed by Avenir Health (www.avenirhealth.org)—and the Estimates and Projections Package, which is developed by the East-West Center (www.eastwestcenter.org). The UNAIDS Reference Group on Estimates, Modelling and Projections provides technical guidance on the development of the HIV component of the software (www.epidem.org).

Data Availability

Description:

160 countries in 2016

Time series:

1990-2015

Calendar

Data collection:

Data sources are compiled all year long. The spectrum models are created in the first three months of every year and finalized by June. The next report will be in June 2017.

Data release:

June 2016, June 2017, etc.

Data providers

The estimates are produced by a team consisting of ministry of health, national AIDS advisory groups and development partners. The results are signed off on by senior managers at the ministries of health.

Data compilers

UNAIDS

References

URL:

unaids.org

References:

http://www.unaids.org/en/dataanalysis/datatools/spectrumepp

UNAIDS Global AIDS response progress reporting 2015: construction of core indicators for monitoring the 2011

United Nations political declaration on HIV/AIDS. Geneva: Joint United Nations Programme on HIV/AIDS; 2015

http://www.unaids.org/sites/default/files/media_asset/JC2702_GARPR2015guidelines_en.pdf a2015.

UNAIDS website for relevant data and national Spectrum files http://aidsinfo.unaids.org/

Consolidated Strategic Information Guidelines for HIV in the Health Sector. Geneva: World Health Organization;

2015.http://www.who.int/hiv/pub/guidelines/strategic-information-guidelines/en/ accessed on 7 October 2015

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
Indicator 3.3.2: Tuberculosis incidence per 100,000 population

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The tuberculosis incidence per 100,000 population as defined as the estimated number of new and relapse TB cases (all forms of TB, including cases in people living with HIV) arising in a given year, expressed as a rate per 100 000 population.

Rationale:

Following two years of consultations, a new post-2015 global tuberculosis strategy was endorsed by the World Health Assembly in May 2014. Known as the End TB Strategy, it covers the period 2016-2035. The overall goal is to "End the global tuberculosis epidemic", and correspondingly ambitious targets for reductions in tuberculosis deaths and cases are set for 2030 (80% reduction in incidence rate compared with the level of 2015) and 2035 (90% reduction in incidence rate), in the context of the SDGs.
The tuberculosis incidence rate was selected as an indicator for measuring reductions in the number of cases of disease burden. Although this indicator was estimated with considerable uncertainty in most countries in 2014, notifications of cases to national authorities provide a good proxy if there is limited under-reporting of detected cases and limited under or over-diagnosis of cases.

Concepts:

Direct measurement requires high-quality surveillance systems in which underreporting is negligible, and strong health systems so that under-diagnosis is also negligible; otherwise indirect estimates are based on notification data and estimates of levels of underreporting and under-diagnosis.

Comments and limitations:
TB incidence has been used for over a century as a main indicator of TB burden, along with TB mortality. The indicator allows comparisons over time and between countries. Improvement in the quality of TB surveillance data result in reduced uncertainty about indicator values.

Methodology

Computation Method:

Estimates of TB incidence are produced through a consultative and analytical process led by WHO and are published annually. These estimates are based on annual case notifications, assessments of the quality and coverage of TB notification data, national surveys of the prevalence of TB disease and information from death (vital) registration systems.

Estimates of incidence for each country are derived, using one or more of the following approaches depending on available data: (i) incidence = case notifications/estimated proportion of cases detected; (ii) capture-recapture modelling, (iii) incidence = prevalence/duration of condition.

Uncertainty bounds are provided in addition to best estimates.

Details are available from TB impact measurement: policy and recommendations for how to assess the epidemiological burden of TB and the impact of TB control and from the online technical appendix to the WHO global tuberculosis report 2015 and https://arxiv.org/abs/1603.00278

Disaggregation:

The indicator is disaggregated by country, sex and age (children vs adults).

Treatment of missing values:

- At country level

  Details available in the following publicly available paper:
  https://arxiv.org/ftp/arxiv/papers/1603/1603.00278.pdf

- At regional and global levels

  Details available in the following publicly available paper:
  https://arxiv.org/ftp/arxiv/papers/1603/1603.00278.pdf

Regional aggregates:

Country estimates of case counts are aggregated. Uncertainty is propagated assuming independence of country estimates.

Sources of discrepancies:

Population denominators may differ between national sources and UNPD. WHO uses UNPD population estimates.

Data Sources

Description:

Details about data sources and methods are available in the following publicly available paper: https://arxiv.org/ftp/arxiv/papers/1603/1603.00278.pdf

Collection process:

National TB Programmes report every year between March and June their annual TB data to WHO using a standardized online data reporting system maintained at WHO. The system includes real-time checks for data consistency. Estimates of TB burden are prepared in July-August and communicated with countries. In selected countries with new survey data, estimates are updated separately during the year. All estimates are communicated in August-September and revisions are done based on feedback. The final set of estimates is reviewed in WHO before publication in October, for compliance with specific international standards and harmonization of breakdowns for age and sex groups.

Data Availability

Description:

All countries

Time series:

2000 onwards

Calendar

Data collection:

current: March-June 2016 next: March-June 2017

Data release:

October 2016, for the years 2000-2015 (October 2016.)

Data providers

National TB Programmes, Ministries of Health

Data compilers

WHO

References

URL:

http://www.who.int/tb/country/data/download/en/

References:

Global TB Report 2015: 2015.(http://www.who.int/tb/publications/global_report/en/, accessed 21 June 2016).

Methods used by WHO to estimate the Global burden of TB disease:
https://arxiv.org/ftp/arxiv/papers/1603/1603.00278.pdf

Definitions and reporting framework for tuberculosis – 2013 revision (WHO/HTM/TB/2013.2). Geneva: World Health Organization; 2013 (http://www.who.int/tb/publications/definitions/en/, accessed 21 June 2016).

World Health Assembly governing body documentation: official records. Geneva: World Health Organization (http://apps.who.int/gb/or/, accessed 21 June 2016).

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
Indicator 3.3.5: Number of people requiring interventions against neglected tropical diseases

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

Number of people requiring treatment and care for any one of the neglected tropical diseases (NTDs) targeted by the WHO NTD Roadmap and World Health Assembly resolutions and reported to WHO.

Rationale:

The average annual number of people requiring treatment and care for NTDs is the number that is expected to decrease toward "the end of NTDs" by 2030 (target 3.3), as NTDs are eradicated, eliminated or controlled. The number of people requiring other interventions against NTDs (e.g. vector management, veterinary public health, water, sanitation and hygiene) are expected to need to be maintained beyond 2030 and are therefore to be addressed in the context of other targets and indicators, namely Universal Health Coverage (UHC) and universal access to water and sanitation.

This number should not be interpreted as the number of people at risk for NTDs. It is in fact a subset of the larger number of people at risk. Mass treatment is limited to those living in districts above a threshold level of prevalence; it does not include all people living in districts with any risk of infection. Individual treatment and care is for those who are or have already been infected; it does not include all contacts and others at risk of infection. This number can better be interpreted as the number of people at a level of risk requiring medical intervention – that is, treatment and care for NTDs.

Concepts:

Treatment and care is broadly defined to allow for preventive, curative, surgical or rehabilitative treatment and care. In particular, it includes both:

1) Average annual number of people requiring mass treatment known as preventive chemotherapy (PC) for at least one PC-NTD; and

2) Number of new cases requiring individual treatment and care for other NTDs.

Other key interventions against NTDs (e.g. vector management, veterinary public health, water, sanitation and hygiene) are to be addressed in the context of other targets and indicators, namely Universal Health Coverage (UHC) and universal access to water and sanitation.

Comments and limitations:

Country reports may not be perfectly comparable over time. Improved surveillance and case-finding may lead to an apparent increase in the number of people known to require treatment and care. Some further estimation may be required to adjust for changes in surveillance and case-finding. Missing country reports may need to be imputed for some diseases in some years.

Methodology

Computation Method:

Some estimation is required to aggregate data across interventions and diseases. There is an established methodology that has been tested and an agreed international standard.
[http://www.who.int/wer/2012/wer8702.pdf?ua=1]

1) Average annual number of people requiring mass treatment known as PC for at least one PC-NTD: People may require PC for more than one PC-NTD. The number of people requiring PC is compared across the PC-NTDs, by age group and implementation unit (e.g. district). The largest number of people requiring PC is retained for each age group in each implementation unit. The total is considered to be a conservative estimate of the number of people requiring PC for at least one PC-NTD. Prevalence surveys determine when an NTD has been eliminated or controlled and PC can be stopped or reduced in frequency, such that the average annual number of people requiring PC is reduced.

2) Number of new cases requiring individual treatment and care for other NTDs: The number of new cases is based on country reports, whenever available, of new and known cases of Buruli ulcer, Chagas disease, cysticercosis, dengue, guinea-worm disease, echinococcosis, human African trypanosomiasis (HAT), leprosy, the leishmaniases, rabies and yaws. Where the number of people requiring and requesting surgery for PC-NTDs (e.g. trichiasis or hydrocele surgery) is reported, it can be added here. Similarly, new cases requiring and requesting rehabilitation (e.g. leprosy or lymphoedema) can be added whenever available.

Populations referred to under 1) and 2) may overlap; the sum would overestimate the total number of people requiring treatment and care. The maximum of 1) or 2) is therefore retained at the lowest common implementation unit and summed to get conservative country, regional and global aggregates. By 2030, improved co-endemicity data and models will validate the trends obtained using this simplified approach.

Disaggregation:

Disaggregation by disease is required; ending the epidemic of NTDs requires a reduction in the number of people requiring interventions for each NTD.

Disaggregation by age is required for PC: pre-school-aged children (1-4 years), school-aged (5-14 years) and adults (= 15 years).

Treatment of missing values:

- At country level

    We do not impute missing values for countries that have never reported data for any NTD. For countries that have reported data in the past, we impute missing values only for those NTDs that have been reported in the past but that have not been reported in the current year.

    For reproducibility, we employ multiple imputation techniques using the freely available Amelia package in R. We impute 100 complete datasets using all available cross-sectional data (countries and years), applying a square root transformation to exclude negative values of incidence, as well as categorical variables denoting regions and income groups, and allowing for country-specific linear time effects. We aggregate across diseases and extract the mean and 2.5th and 97.5th centile values to report best estimates and uncertainty intervals for each country.

- At regional and global levels

    Using the 100 imputed datasets, we aggregate across diseases and regions, extract the mean and 2.5th and 97.5th centile values to report best estimates and uncertainty intervals at the regional and global levels.

Regional aggregates:

Global and regional estimates are simple aggregates of the country values, with no particular weighting. There is no further adjustment for global and regional estimates.

Sources of discrepancies:

Countries do not typically aggregate their data across NTDs, but if they applied the aggregation method as described above, they would obtain the same number. The only exceptions would be countries with one or more missing values for individual NTDs. In these exceptional cases, internationally estimated aggregates will be higher than country produced aggregates that assume missing values are nil. We present best estimates with uncertainty intervals to highlight those missing values that have a significant impact on country aggregates, until such time that missing values are reported.

Methods and guidance available to countries for the compilation of the data at the national level:

This indicator is based on national-level data reported to WHO by its Member States and disseminated via the WHO Global Health Observatory (http://www.who.int/gho/neglected_diseases/en/) and PCT Databank (http://www.who.int/neglected_diseases/preventive_chemotherapy/databank/en/). Some adjustment is required to aggregate country-reported data on individual neglected tropical diseases (NTDs) across all NTDs included in this indicator. There is an established methodology to standardize this aggregation: http://www.who.int/wer/2012/wer8702.pdf?ua=1

Following a recommendation by the Working Group on Monitoring and Evaluation of the Strategic and Technical Advisory Group for NTDs, WHO has led the development of an integrated NTD database to improve evidence-based planning and management of NTD programmes at the national and sub-national levels. The Integrated NTD database is available here: http://www.who.int/neglected_diseases/data/ntddatabase/en/. For NTDs requiring preventive chemotherapy, a joint reporting mechanism and set of reporting forms have been developed to facilitate the process of requesting donated medicines and reporting progress as well as to improve coordination and integration among programmes, more information is available here, http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/

Quality assurance:

Training materials for the Integrated NTD database are available here: http://www.who.int/neglected_diseases/data/ntddatabase/en/. A user guide and video tutorial for the joint reporting mechanism and set of reporting forms are available here: http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/
Details about individual NTD data are available via: http://www.who.int/gho/neglected_diseases/en/. For NTDs requiring preventive chemotherapy, reports are signed by the NTD coordinator or a Ministry of Health representative to formally endorse the country's request for medicines (when applicable) and data. They are submitted to the WHO Representative of the concerned WHO Country office.

Data Sources

Description:

The number of people requiring treatment and care for NTDs is measured by existing country systems, and reported through joint request and reporting forms for donated medicines, the integrated NTD database, and other reports to WHO.

http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/
http://www.who.int/neglected_diseases/data/ntddatabase/en/

Country data are published via the WHO Global Health Observatory and Preventive Chemotherapy Databank.

http://www.who.int/gho/neglected_diseases/en/
http://www.who.int/neglected_diseases/preventive_chemotherapy/databank/en/

Collection process:

As part of global efforts to accelerate expansion of preventive chemotherapy for elimination and control of lymphatic filariasis (LF), schistosomiasis (SCH) and soil-transmitted helminthiases (STH), WHO facilitates the supply of the following medicines donated by the pharmaceutical industry: diethylcarbamazine citrate, albendazole, mebendazole, and praziquantel. WHO also collaborates to supply ivermectin for onchocerciasis (ONCHO) and lymphatic filariasis elimination programmes.

A joint mechanism and a set of forms have been developed to facilitate the process of application, review and reporting as well as to improve coordination and integration among different programmes.

Joint Request for Selected PC Medicines (JRSM) – designed to assist countries in quantifying the number of tablets of the relevant medicines required to reach the planned target population and districts in a coordinated and integrated manner against multiple diseases during the year for which medicines are requested.

Joint Reporting Form (JRF) – designed to assist countries in reporting annual progress on integrated and coordinated distribution of medicines across diseases in the reporting year in a standardized format.

PC Epidemiological Data Reporting Form (EPIRF) – designed to standardize national reporting of epidemiological data on lymphatic filariasis, onchocerciasis, soil-transmitted helminthiases and schistosomiasis. National authorities are encouraged to complete this form and submit it to WHO on a yearly basis, together with the JRF.

The reports generated in the JRSM and in the JRF (SUMMARY worksheets) must be printed and signed by the NTD coordinator or a Ministry of Health representative to formally endorse the country's request for these medicines and the reported annual progress of the national programme(s). The date of signature must also be included. Once signatures have been obtained, the scanned copies of the two worksheets, together with the full Excel versions of the JRSM, the JRF and the EPIRF can be jointly submitted to WHO.

The forms are submitted to the WHO Representative of the concerned WHO Country office with electronic copies to PC_JointForms@who.int and the concerned Regional focal point, no later than 15 August of the year preceding the year for which medicines are intended to be used (e.g. at the latest by 15 August 2015 for implementation of preventive chemotherapy in 2016) but at least 6-8 months before the planned PC intervention(s) to allow time for reviewing and approval of the request, placing order, manufacturing PC medicines and shipment to the country.

http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/

Data Availability

Data are currently being reported by 185 countries, with good coverage of all regions.

Calendar

Data collection:

2015 data is being collected throughout Q2 and Q3 of 2016.

Data release:

Q1 2017 for 2015 data.

Data providers

National NTD programmes within Ministries of Health

Data compilers

WHO

References

URL:

http://www.who.int/neglected_diseases/en/

References:

Global plan to combat neglected tropical diseases, 2008–2015. Geneva: World Health Organization; 2007 (http://whqlibdoc.who.int/hq/2007/who_cds_ntd_2007.3_eng.pdf, accessed 29 March 2015).

Accelerating work to overcome the global impact of neglected tropical diseases: A Roadmap for Implementation. Geneva: World Health Organization; 2012 (http://www.who.int/neglected_diseases/NTD_RoadMap_2012_Fullversion.pdf, accessed 29 March 2015).

Investing to overcome the global impact of neglected tropical diseases. Geneva: World Health Organization; 2015 (http://www.who.int/neglected_diseases/9789241564861/en/, accessed 29 March 2015).

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

Indicator 3.4.1: Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease. Probability of dying between the ages of 30 and 70 years from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases, defined as the per cent of 30-year-old-people who would die before their 70th birthday from cardiovascular disease, cancer, diabetes, or chronic respiratory disease, assuming that s/he would experience current mortality rates at every age and s/he would not die from any other cause of death (e.g., injuries or HIV/AIDS). This indicator is calculated using life table methods (see further details in section 3.3).

Rationale:

Disease burden from non-communicable diseases (NCDs) among adults is rapidly increasing in developing countries due to ageing. Cardiovascular diseases, cancer, diabetes and chronic respiratory diseases are the four main causes of NCD burden. Measuring the risk of dying from these four major causes is important to assess the extent of burden from premature mortality due NCDs in a population.

Concepts:

Probability of dying: The likelihood that an individual would die between two ages given current mortality rates at each age, calculated using life table methods. The probability of death between two ages may be called a mortality rate.

Life table: A table showing the mortality experience of a hypothetical group of infants born at the same time and subject throughout their lifetime to a set of age-specific mortality rates.

Cardiovascular disease, cancer, diabetes or chronic respiratory diseases: ICD-10 underlying causes of death I00-I99, COO-C97, E10-E14 and J30-J98.

Comments and limitations:

Cause of death estimates have large uncertainty ranges for some causes and some regions. Data gaps and limitations in high-mortality regions reinforce the need for caution when interpreting global comparative cause of death assessments, as well as the need for increased investment in population health measurement systems. The use of verbal autopsy methods in sample registration systems, demographic surveillance systems and household surveys provides some information on causes of death in populations without well-functioning death registration systems, but there remain considerable challenges in the validation and interpretation of such data, and in the assessment of uncertainty associated with diagnoses of underlying cause of death.

Methodology

Computation Method:

There are 4 steps involved in the calculation of this indicator:

1. Estimation of WHO life tables, based on the UN World Population Prospects 2012 revision.

2. Estimation of cause-of-death distributions.

3. Calculation of age-specific mortality rates from the four main NCDs for each five-year age range between 30 and 70.

4. Calculation of the probability of dying between the ages of 30 and 70 years from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases.

The methods used for the analysis of causes of death depend on the type of data available from countries:
For countries with a high-quality vital registration system including information on cause of death, the vital registration that member states submit to the WHO Mortality Database were used, with adjustments where necessary, e.g. for under-reporting of deaths.

For countries without high-quality death registration data, cause of death estimates are calculated using other data, including household surveys with verbal autopsy, sample or sentinel registration systems, special studies and surveillance systems. In most cases, these data sources are combined in a modelling framework.

The probability of dying between ages 30 and 70 years from the four main NCDs was estimated using age-specific death rates of the combined four main NCD categories. Using the life table method, the risk of death between the exact ages of 30 and 70, from any of the four causes and in the absence of other causes of death, was calculated using the equation below. The ICD codes used are: Cardiovascular disease: I00-I99, Cancer: C00-C97, Diabetes: E10-E14, and Chronic respiratory disease: J30-J98 Formulas to (1) calculate age-specific mortality rate for each five-year age group between 30 and 70, (2) translate the 5-year death rate into the probability of death in each 5-year age range, and (3) calculate

the probability of death from age 30 to age 70, independent of other causes of death, can be found on page 6 of this document:

NCD Global Monitoring Framework: Indicator Definitions and Specifications. Geneva: World Health Organization, 2014 (http://www.who.int/nmh/ncd-tools/indicators/GMF_Indicator_Definitions_FinalNOV2014.pdf?ua=1)

Disaggregation:

Sex

Treatment of missing values:

- At country level

  For countries with high-quality cause-of-death statistics, interpolation/extrapolation was done for missing country-years; for countries with only low-quality or no data on causes of death, modelling was used. Complete methodology may be found here:
  WHO methods and data sources for global causes of death, 2000–2015 (http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2015.pdf)

- At regional and global levels

  NA

Regional aggregates:

Aggregation of estimates of deaths by cause, age and sex by country.

Sources of discrepancies:

In countries with high quality vital registration systems, point estimates sometimes differ primarily for two reasons: 1) WHO redistributes deaths with ill-defined cause of death; and 2) WHO corrects for incomplete death registration.

Data Sources

Description:

The preferred data source is death registration systems with complete coverage and medical certification of cause of death. Other possible data sources include household surveys with verbal autopsy, and sample or sentinel registration systems.

Collection process:

WHO conducts a formal country consultation process before releasing its cause-of-death estimates.

Data Availability

Around 70 countries currently provide WHO with regular high-quality data on mortality by age, sex and causes of death, and another 40 countries submit data of lower quality. However, comprehensive cause-of-death estimates are calculated systematically by WHO for all of its Member States (with a certain population threshold) every 3 years.

Calendar

Data collection:

WHO sends an e-mail two times per year requesting tabulated death registration data (including all causes of death) from Member States. Countries submit annual cause-of-death statistics to WHO on an ongoing basis.

Data release:

End of 2016.

Data providers

National statistics offices and/or ministries of health.

Data compilers

WHO

References

URL:

http://www.who.int/gho/en/

References:

NCD Global Monitoring Framework: Indicator Definitions and Specifications. Geneva: World Health Organization, 2014 (http://www.who.int/nmh/ncd-tools/indicators/GMF_Indicator_Definitions_FinalNOV2014.pdf?ua=1)

WHO indicator definition
(http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=3354)

WHO methods and data sources for global causes of death, 2000–2015
(http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2015.pdf)

World Health Assembly Resolution, WHA66.10 (2014): Follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases. Including Appendix 2: Comprehensive global monitoring framework, including 25 indicators, and a set of nine voluntary global targets for the prevention and control of noncommunicable diseases.
(http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R10-en.pdf?ua=1)

WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020
(http://apps.who.int/iris/bitstream/10665/94384/1/9789241506236_eng.pdf?ua=1)

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
Indicator 3.4.2: Suicide mortality rate

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The Suicide mortality rate as defined as the number of suicide deaths in a year, divided by the population, and multiplied by 100 000.

Rationale:

Mental disorders occur in all regions and cultures of the world. The most prevalent of these disorders are depression and anxiety, which are estimated to affect nearly 1 in 10 people. At its worst, depression can lead to suicide. In 2012, there were over 800,000 estimated suicide deaths worldwide. Suicide was the second leading cause of deaths among young adults aged 15–29 years, after road traffic injuries.

Comments and limitations:

The complete recording of suicide deaths in death-registration systems requires good linkages with coronial and police systems, but can be seriously impeded by stigma, social and legal considerations, and delays in determining cause of death. Less than one half of WHO Member States have well-functioning death-registration systems that record causes of death.

Methodology

Computation Method:

Suicide mortality rate (per 100,000 population) = (Number of suicide deaths in a year x 100,000) / Mid-year population for the same calendar year

The methods used for the analysis of causes of death depend on the type of data available from countries:

For countries with a high-quality vital registration system including information on cause of death, the vital registration that member states submit to the WHO Mortality Database were used, with adjustments where necessary, e.g. for under-reporting of deaths.

For countries without high-quality death registration data, cause of death estimates are calculated using other data, including household surveys with verbal autopsy, sample or sentinel registration systems, special studies and surveillance systems. In most cases, these data sources are combined in a modelling framework.

Disaggregation:

Sex, age group

Treatment of missing values:

- At country level

    For countries with high-quality cause-of-death statistics, interpolation/extrapolation was done for missing country-years; for countries with only low-quality or no data on causes of death, modelling was used. Complete methodology may be found here:
    WHO methods and data sources for global causes of death, 2000–2015
    (http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2015.pdf)

- At regional and global levels

    NA

Regional aggregates:

Country estimates of number of deaths by cause are summed to obtain regional and global aggregates.

Sources of discrepancies:

In countries with high quality vital registration systems, point estimates sometimes differ primarily for two reasons: 1) WHO redistributes deaths with ill-defined cause of death (i.e. injuries of unknown intent, ICD codes Y10-Y34 and Y872) to suicide; and 2) WHO corrects for incomplete death registration.

Data Sources

Description:

The preferred data source is death registration systems with complete coverage and medical certification of cause of death, coded using the international classification of diseases (ICD). The ICD-10 codes for suicide are: X60-X84, Y87.0. Other possible data sources include household surveys with verbal autopsy, sample or sentinel registration systems, special studies and surveillance systems.

Collection process:

WHO conducts a formal country consultation process before releasing its cause-of-death estimates.

Data Availability

Description:

Around 70 countries currently provide WHO with regular high-quality data on mortality by age, sex and causes of death, and another 40 countries submit data of lower quality. However, comprehensive cause-of-death estimates are calculated by WHO systematically for all of its Member States (with a certain population threshold) every 3 years.

Calendar

Data collection:

WHO sends an e-mail two times per year requesting tabulated death registration data (including all causes of death) from Member States. Countries submit annual cause-of-death statistics to WHO on an ongoing basis. (From NA to NA)

Data release:

End of 2016

Data providers

National statistics offices and/or ministries of health.

Data compilers

WHO

References

URL:

http://www.who.int/gho/en/

References:

WHO indicator definition
(http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=4664)

WHO methods and data sources for global causes of death, 2000–2015
(http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2015.pdf)

World Health Assembly Resolution WHA66.8 (2013): Comprehensive mental health action plan 2013–2020, including Appendix 1: Indicators for Measuring Progress Towards Defined Targets of the Comprehensive Mental Health Action Plan 2013-2020
(http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R8-en.pdf?ua=1)

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.5: Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol
Indicator 3.5.2: Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
Total alcohol per capita consumption (APC) is defined as the total (sum of recorded APC three-year average and unrecorded APC) amount of alcohol consumed per adult (15+ years) over a calendar year, in litres of pure alcohol.
Recorded alcohol consumption refers to official statistics at country level (production, import, export, and sales or taxation data), while the unrecorded alcohol consumption refers to alcohol which is not taxed and is outside the usual system of governmental control, such as home or informally produced alcohol (legal or illegal), smuggled alcohol, surrogate alcohol (which is alcohol not intended for human consumption), or alcohol obtained through cross-border shopping (which is recorded in a different jurisdiction).
In circumstances in which the number of tourists per year is at least the number of inhabitants, the tourist consumption is also taken into account and is deducted from the country's recorded APC. The data on the number of tourists is from UN Tourist Statistics.

Rationale:

Alcohol consumption can have an impact not only on the incidence of diseases, injuries and other health conditions, but also on the course of disorders and their outcomes in individuals. Alcohol consumption has been identified as a component cause for more than 200 diseases, injuries and other health conditions. Per capita alcohol consumption is widely accepted as the best possible indicator of alcohol exposure in populations and the key indicator for estimation of alcohol-attributable disease burden and alcohol-attributable deaths. Its correct interpretation requires the use of additional population-based indicators such as prevalence of drinking, and, as a result, stimulates development of national monitoring systems on alcohol and health involving contributions from a wide range of stakeholders, including alcohol production and trade sectors.

Concepts:

Recorded alcohol per capita (15+) consumption of pure alcohol is calculated as the sum of beverage-specific alcohol consumption of pure alcohol (beer, wine, spirits, other) from different sources. The first priority in the decision tree is given to government national statistics; second are country-specific alcohol industry statistics in the public domain based on interviews or fieldwork (Canadean, International Wine and Spirit Research (IWSR), Wine Institute; historically World Drink Trends) or data from the International Organisation of Vine and Wine (OIV); third is the Food and Agriculture Organization of the United Nations' statistical database (FAOSTAT), and fourth is data from alcohol industry statistics in the public domain based on desk review. For countries, where the data source is FAOSTAT the unrecorded consumption may be included in the recorded consumption. As from the introduction of the "Other" beverage-specific category, beer includes malt beers, wine includes wine made from grapes, spirits include all distilled beverages, and other includes one or several other alcoholic beverages, such as fermented beverages made from sorghum, maize, millet, rice, or cider, fruit wine, fortified wine, etc. For unrecorded APC, the first priority in the decision tree is given to nationally representative empirical data; these are often general population surveys in countries where alcohol is legal. Second are specific other empirical investigations, and third is expert opinion supported by periodic survey of experts at country level (50 countries with significant estimates of unrecorded alcohol consumption) using modified Delphi-technique.

For recorded APC, in order to make the conversion into litres of pure alcohol, the alcohol content (% alcohol by volume) is considered to be as follows: Beer (barley beer 5%), Wine (grape wine 12%; must of grape 9%, vermouth 16%), Spirits (distilled spirits 40%; spirit-like 30%), and Other (sorghum, millet, maize beers 5%; cider 5%; fortified wine 17% and 18%; fermented wheat and fermented rice 9%; other fermented beverages 9%). Survey questions on consumption of unrecorded alcohol are converted into estimates per year of unrecorded APC. In some countries, unrecorded is estimated based on confiscated alcohol confiscated by customs or police.

Comments and limitations:

The indicator is feasible and suitable for monitoring purposes as evidenced by availability of data from 190 countries and inclusion of this indicator in global, regional and national monitoring frameworks. This is the key indicator for alcohol exposure in populations. The data available (based on production, import, export, and sales or taxation) do not enable the disaggregation of alcohol per capita consumption (APC) by sex or age; to this end, other data sources, such as survey data, are needed. The estimation of unrecorded APC remains a challenge, and triangulation of data from different sources as well as Delphi-techniques are used for increasing validity of estimates. In recent time the number of research activities focused on improvement of the estimates of unrecorded alcohol consumption as well as their geographical coverage have increased substantially. As a result, it leads to a more accurate assessment of the total amount of alcohol consumed per person per year in a given country.

Methodology

Computation Method:

Numerator: The sum of the amount of recorded alcohol consumed per capita (15+ years), average during three calendar years, in litres of pure alcohol, and the amount of unrecorded alcohol per capita consumption (15+ years), during a calendar year, in litres of pure alcohol.

Denominator: Midyear resident population (15+ years) for the same calendar year, UN World Population Prospects, medium variant.

Disaggregation:

Sex, age.

Treatment of missing values:

- At country level

  The values of missing countries (e.g. Monaco, San Marino) are that small that they would not affect global or regional figures.

- At regional and global levels

  The values of missing countries (e.g. Monaco, San Marino) are that small that they would not affect global or regional figures.

Regional aggregates:

Regional and global aggregates are population weighted averages from country values (weighted by population of inhabitants 15+ years of the respective countries).

Sources of discrepancies:

Population estimates, alcohol content by volume across different alcoholic beverage categories, age distributions, requirements for survey data used in producing the estimates, estimates of unrecorded alcohol consumption.

Data Sources

Description:

Recorded: Government statistics or, alternatively, alcohol industry statistics in the public domain, FAOSTAT;

Unrecorded: Nationally representative empirical data or, alternatively, specific empirical investigations, expert opinion.

Collection process:

The Global Survey on Alcohol and Health is conducted periodically (next one in 2016) in collaboration with all six WHO regional offices. National counterparts or focal points in all WHO Member States are officially nominated by the respective ministries of health. They are provided with the online survey data collection tool for completion. Where this is not feasible, a hard copy of the tool is forwarded directly to those who requested it. The survey submissions are checked and whenever information is incomplete or in need of clarification, the questionnaire is returned to the focal point or national counterpart in the country concerned for revision. Amendments to the survey responses are resubmitted by e-mail or electronically. Data submitted from countries is triangulated with data from key industry-supported data providers at annual meetings organized by WHO with an objective to identify discrepancies and solutions. Estimates for key indicators are compiled into country profiles which are sent to the focal point or national counterpart in the country for validation and endorsement.

Data Availability

Description:

Global, by WHO regions, by World Bank income groups, by country. The data are available for 190 WHO Member States.

Time series:

Recorded alcohol per capita consumption since 1960s, and total alcohol per capita consumption since 2005, with estimates for unrecorded alcohol consumption for 2005, 2010 and 2015.

Calendar

Data collection:

Passive surveillance ongoing. The next WHO global surveys on alcohol and health involving data collection from WHO Member States in 2016 and 2019.

Data release:

2016 and 2018

Data providers

Ministries of Health; National statistical bureau/agencies (data on alcohol production and trade/sales); National monitoring centres on alcohol and drug use; National academic and monitoring centres concerned with population-based surveys of risk factors to health.

Data compilers

World Health Organization (WHO)

References

URL:

http://apps.who.int/gho/data/?showonly=GISAH&theme=main

References:

http://apps.who.int/gho/data/?showonly=GISAH&theme=main

http://www.who.int/gho/alcohol/en/

http://www.who.int/substance_abuse/publications/global_alcohol_report/en/

Related indicators

Goal 8; Targets 3.4, 3.6

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents
Indicator 3.6.1: Death rate due to road traffic injuries

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

Death rate due to road traffic injuries as defined as the number of road traffic fatal injury deaths per 100,000 population.

Concepts:

Numerator: Number of deaths due to road traffic crashes

Absolute figure indicating the number of people who die as a result of a road traffic crash.

Denominator: Population (number of people by country)

Comments and limitations:

There are no vital registration data for all countries to make comparison against the data received on the survey. We published only confidence intervals for countries that have poor completeness of vital registration data. Also we cannot collect road traffic data every year using this methodology outlined in the Global status report.

Methodology

Computation Method:

Our model is based on the quality of data we received. As a health organization, we rely primarily on the submission of vital registration data from countries' Ministries of Health to WHO (through the official channels). These data, on all causes of death, are then analysed by our colleagues in the Health Information Systems department to decide on how good the data are, that is, determining if there is good completeness and coverage of deaths for all causes.

We classified the countries on 4 categories or groups namely,

Group1: Countries with death registration data (good vital/ death registration data)
Group2: Countries with other sources of information on causes of death
Group3: Countries with population less than 150 000
Group4: Countries without eligible death registration data.

The Health Information Systems department analyses the quality and the completeness of the data. For the road safety model, if the country is considered by WHO to have good vital registration (VR) data this means that the country is in group1, then we don't apply a regression model to come up with an estimate (we may, however, project forward if the vital registration data are dated). If the country is considered in group 4 then we apply a negative binomial regression where N is the total road traffic deaths , C is constant term, Xi are a set of explanatory covariates, Pop is the population for the country-year, and ? is the negative binomial error term.

For the countries from group 2, the regression method described above was used to project forward the most recent year for which an estimate of total deaths were available.

Finally, the countries from group 3 which have a population less than 150,000 and did not have eligible death registration data, regression estimates were not used. Only the reported death were directly without adjustment.

More details about this estimation process in Global Status Report on Road Safety 2015.

Disaggregation:

We disaggregated the data by types of road users, age, sex, income groups and WHO regions

Treatment of missing values:

- At country level

    Treatment of missing data was carried out as follows:

    1) Identified missing values (or years) in vital registration (VR) data and looked for other sources in our case data from the questionnaire/survey (reported) for these years. We then calculated the factor VR/Reported for the latest 3 years where VR and Reported data were available and used this factor to adjust Reported data to replace the missing value of VR data.

    2) In the case where there is missing data in VR and Reported data, the missing values were imputed with a negative binomial regression of rate for each country if the regression converged or was significant. Otherwise we used the average rate of years with data.

- At regional and global levels

    Same as the procedure described for 11.2 above

Regional aggregates:

We used the WHO's regional grouping and the average to calculate the rate for each region. This means sum of road traffic deaths for region (i) multiplied by 100,000 and divided by the population in region(i).

Sources of discrepancies:

WHO's estimation of road traffic rates are, in many countries, different to the official estimates for the reasons described above that relate to our methodology.

There are also differences in the data used for population between the national data and the estimates produced by the United Nations department of population.

Data Sources

Description:

For the road traffic deaths we have two sources of data. Data from Global Status Report on Road Safety survey and Vital registration or certificate deaths data that WHO receive every year from member states (ministries of health).

For the population, we used data from the United Nations / Department of Economic and Social Affairs/ Population division.

Collection process:

The methodology involved collecting data from a number of different sectors and stakeholders in each country is as follows. National Data Coordinators (NDCs), who were nominated by their governments, were trained in the project methodology. As representatives of their ministries, they were required to identify up to eight other road safety experts within their country from different sectors (e.g. health, police, transport, nongovernmental organizations and/or academia) and to facilitate a consensus meeting of these respondents. While each expert responded to the questionnaire based on their expertise, the consensus meeting facilitated by NDCs allowed for discussion of all responses, and the group used this discussion to agree on one final set of information that best represented their country's situation at the time (up to 2014, using the most recent data available). This was then submitted to the World Health Organization (WHO). More details are in the Global Status Report on Road Safety 2015. A guide to our questionnaire describing age groups and other dimensions was provided to countries in order to standardize data collected.

Data Availability

Description:

We have data for 194 countries.

Time series:

From 2000 to 2013

Calendar

Data collection:

The next collection of data is planned for 2017, although the data collected on fatalities is likely to be 2015 or 2016 (we will ask for the most recent country data available).

Data release:

The new data for this indicator will be published in early 2019

Data providers

The road traffic deaths data were provided nationally by mainly three ministries, namely, ministry of health, ministry of interior and ministry of transport

Data compilers

WHO is the organization responsible for compilation and reporting on this indicator at the global level

References

URL:

http://www.who.int/violence_injury_prevention

References:

http://www.who.int/violence_injury_prevention/road_safety_status/2015/en/

Related indicators

3.5, 11.2

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
Indicator 3.7.1: Proportion of women of reproductive age (aged 15-49 years) who have their need for family planning satisfied with modern methods

Institutional information

Organization(s):

Population Division, Department of Economic and Social Affairs (DESA)

United Nations Population Fund (UNFPA)

Concepts and definitions

Definition:

The percentage of women of reproductive age (15-49 years) who desire either to have no (additional) children or to postpone the next child and who are currently using a modern contraceptive method.

Rationale:

The proportion of demand for family planning satisfied with modern methods is useful in assessing overall levels of coverage for family planning programmes and services. Access to and use of an effective means to prevent pregnancy helps enable women and their partners to exercise their rights to decide freely and responsibly the number and spacing of their children and to have the information, education and means to do so. Meeting demand for family planning with modern methods also contributes to maternal and child health by preventing unintended pregnancies and closely spaced pregnancies , which are at higher risk for poor obstetrical outcomes. Levels of demand for family planning satisfied with modern methods of 75 per cent or more are generally considered high, and values of 50 per cent or less are generally considered as very low.

Concepts:

The percentage of women of reproductive age (15-49 years) who have their need for family planning satisfied with modern methods is also referred to as the proportion of demand satisfied by modern methods. The components of the indicator are contraceptive prevalence (any method and modern methods) and unmet need for family planning.

Contraceptive prevalence is the percentage of women who are currently using, or whose sexual partner is currently using, at least one method of contraception, regardless of the method used. Unmet need for family planning is defined as the percentage of women of reproductive age, either married or in a union, who want to stop or delay childbearing but are not using any method of contraception.

For analytical purposes, contraceptive methods are often classified as either modern or traditional. Modern methods of contraception include female and male sterilization, the intra-uterine device (IUD), the implant, injectables, oral contraceptive pills, male and female condoms, vaginal barrier methods (including the diaphragm, cervical cap and spermicidal foam, jelly, cream and sponge), lactational amenorrhea method (LAM), emergency contraception and other modern methods not reported separately (e.g., the contraceptive patch or vaginal ring). Traditional methods of contraception include rhythm (e.g., fertility awareness-based methods, periodic abstinence), withdrawal and other traditional methods not reported separately.

Comments and limitations:

Differences in the survey design and implementation, as well as differences in the way survey questionnaires are formulated and administered can affect the comparability of the data. The most common differences relate to the range of contraceptive methods included and the characteristics (age, sex, marital or union status) of the persons for whom contraceptive prevalence is estimated (base population). The time frame used to assess contraceptive prevalence can also vary. In most surveys there is no definition of what is meant by "currently using" a method of contraception.

In some surveys, the lack of probing questions, asked to ensure that the respondent understands the meaning of the different contraceptive methods, can result in an underestimation of contraceptive prevalence, in particular for traditional methods. Sampling variability can also be an issue, especially when contraceptive prevalence is measured for a specific subgroup (according to method, age-group, level of educational attainment, place of residence, etc.) or when analysing trends over time.

When data on married or in-union women aged 15 to 49 are not available, information for the next most comparable group of persons is reported. Illustrations of base populations that are sometimes presented are: married or in-union women aged 15-44, sexually active women (irrespective of marital status), ever-married women, or men and women who are married or in a union. Notes in the data set indicate any differences between the data presented and the standard definitions of contraceptive prevalence or unmet need for family planning or where data pertain to populations that are not representative of all married or in-union women of reproductive age.

Methodology

Computation Method:

The numerator is the percentage of women of reproductive age (15-49 years old) who are currently using, or whose sexual partner is currently using, at least one modern contraceptive method. The denominator is the total demand for family planning (the sum of contraceptive prevalence (any method) and the unmet need for family planning). Estimates are with respect to women who are married or in a union.

Disaggregation:

Age, geographic location, marital status, socioeconomic status and other categories, depending on the data source and number of observations.

Treatment of missing values:

- **At country level**

  There is no attempt to provide estimates for individual countries or areas when country or area data are not available.

- **At regional and global levels**

  In order to generate regional and global estimates for any given reference year, the Population Division/DESA uses a Bayesian hierarchical model, described in detail in: Alkema L., V. Kantorova, C. Menozzi and A. Biddlecom (2013). National, regional and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. The Lancet. Vol. 381, Issue 9878, pp. 1642–1652.

Country-level, model-based estimates are only used for computing the regional and global averages and are not used for global SDG reporting of trends at the country level. The fewer the number of observations for the country of interest, the more its estimates are driven by the experience of other countries, whereas for countries with many observations the results are determined to a greater extent by those observations.

Regional aggregates:

The Bayesian hierarchical model is used to generate regional and global estimates and projections of the indicator. Aggregate estimates and projections are weighted averages of the model-based country estimates, using the number of married or in-union women aged 15-49 for the reference year in each country. Regional averages are provided only if data are available on contraceptive prevalence for at least 50 per cent of the women of reproductive age who are married or in union in the region. Details on the methodology are described in: Alkema L., V. Kantorova, C. Menozzi and A. Biddlecom (2013). National, regional and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. The Lancet. Vol. 381, Issue 9878, pp. 1642–1652.

Starting in 2017, the estimates presented are adjusted median values derived from the posterior distributions of the model. To perform the adjustments, the model-based medians of the Bayesian posteriors for total contraceptive prevalence (*CPany*), the ratio of modern contraceptive prevalence to total contraceptive prevalence (*CPmod/CPany*), and the ratio of unmet need to non-contraceptive users *UnmetNeed*/(1-*CPany*), were retained as estimated in the model. These values were used to adjust all the other median values, namely, that of *CPmod*, traditional contraceptive prevalence (*CPtrad*), *UnmetNeed*, the total demand for family planning (*TotalDemand*), and most importantly, indicator 3.7.1 itself, the ratio of prevalence of modern methods to the total demand for family planning (*DemandSatbyMod*). The mathematical operations performed were:

$$CPmod^* = CPany \times \left(\frac{CPmod}{CPany}\right)$$

$$CPtrad^* = CPany - CPmod^*$$

$$UnmetNeed^* = (1 - CPany) \times \left(\frac{UnmetNeed}{1 - CPany}\right)$$

$$TotalDemand^* = CPany + UnmetNeed^*$$

$$DemandSatbyMod^* = \left(\frac{CPmod^*}{TotalDemand^*}\right)$$

where the asterisked variable x^* represent the adjusted value of x. These adjustments ensure that the reported values conform to the identities required by their definitions, namely: *CPmod + CPtrad = CPany*; *CPany + UnmetNeed = TotalDemand;* and *DemandSatbyMod = CPmod/TotalDemand*.

Sources of discrepancies:

Generally, there is no discrepancy between data presented and data published in survey reports. However, some published national data have been adjusted by the Population Division to improve comparability. Notes are used in the data set to indicate when adjustments were made and where data differed from standard definitions.

Data Sources

This indicator is calculated from nationally-representative household survey data. Multi-country survey programmes that include relevant data for this indicator are: Contraceptive Prevalence Surveys (CPS), Demographic and Health Surveys (DHS), Fertility and Family Surveys (FFS), Reproductive Health Surveys (RHS), Multiple Indicator Cluster Surveys (MICS), Performance Monitoring and Accountability 2020 surveys (PMA), World Fertility Surveys (WFS), other international survey programmes and national surveys.

For information on the source of each estimate, see United Nations, Department of Economic and Social Affairs, Population Division (2017). World Contraceptive Use 2016 (POP/DB/CP/Rev2017).

Data Availability

Data for the percentage of women of reproductive age (15-49 years) who have their need for family planning satisfied with modern methods are available for 131 countries or areas for the 2000-2016 time period. For 86countries or areas, there are at least two available data points.

The regional breakdown of data availability is as follows:

World and SDG regions	Between 2000 and 2016	
	At least one data point	Two or more data points
WORLD	131	86
Northern America and Europe	13	6
Northern America	1	1
Europe	12	5
Latin America and the Caribbean	23	17
Central Asia and Southern Asia	13	6
Central Asia	4	1
Southern Asia	9	5
Eastern Asia and South-eastern Asia	11	10
Eastern Asia	3	2
South-eastern Asia	8	8
Western Asia and Northern Africa	17	10
Western Asia	11	7
Northern Africa	6	3
Sub-Saharan Africa	45	36
Oceania	9	1
Oceania excluding Australia and New Zealand	9	1
Australia and New Zealand	0	0
Landlocked developing countries (LLDCs)	31	22
Least Developed Countries (LDCs)	46	34
Small island developing States (SIDS)	26	11

Calendar

Data collection:

Data are compiled and updated annually in the first quarter of the year.

Data release:

Updated data on the indicator are released by the Population Division in the second quarter of each year. The next release is expected in the second quarter of 2017. A comprehensive compilation of data is published annually by the Population Division. These data are currently with reference to married or in-union women of reproductive age (15-49 years). See: United Nations, Department of Economic and Social Affairs, Population Division (2016). World Contraceptive Use 2017 (POP/DB/CP/Rev2017.

Data providers

Survey data are obtained from national household surveys that are internationally coordinated—such as the Demographic and Health Surveys (DHS), the Reproductive Health Surveys (RHS), and the Multiple Indicator Cluster Surveys (MICS)—and other nationally-sponsored surveys. Systematic searches of these international survey programmes, survey databases (e.g., the Integrated Household Survey Network (IHSN) database) and ad hoc queries in addition to utilization of the country-specific responses to questionnaires on data administered by UNICEF (Country Reporting on Indicators for the Goals (CRING)) and information from UNFPA field offices.

Data compilers

This indicator is produced at the global level by the Population Division, Department of Economic and Social Affairs, United Nations in collaboration with the United Nations Population Fund (UNFPA).

References

URL:

http://www.un.org/en/development/desa/population/; www.UnfpaOpendata.org

References:

World Contraceptive Use 2017 (POP/DB/CP/Rev2017), United Nations Publication, (website access forthcoming)

Alkema, LA and others (2013). National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: A systematic and comprehensive analysis. The Lancet, Volume 381, Issue 9878, pp. 1642-1652. See also webappendix with technical details available at http://www.un.org/en/development/desa/population/theme/family-planning/index.shtml

Bradley and others (2012). Revising Unmet Need for Family Planning. DHS Analytical Studies No. 25, Calverton, Maryland: ICF International. http://dhsprogram.com/pubs/pdf/AS25/AS25[12June2012].pdf

Handbook on Indicators for Monitoring the Millennium Development Goals, United Nations, http://mdgs.un.org/unsd/mi/wiki/MainPage.ashx

Monitoring progress in family planning. FP2020 core indicators. Glastonbury (CT): Track20 http://www.track20.org/pages/data/indicators

World Health Organization (2011). Monitoring maternal, newborn and child health: understanding key progress indicators. Geneva: WHO. http://www.who.int/entity/healthmetrics/news/monitoring_maternal_newborn_child_health.pdf

World Health Organization (2015). Global Reference List of 100 Core Health Indicators, 2015: Metadata, http://www.who.int/healthinfo/indicators/2015/chi_2015_74_family_planning.pdf?ua=1

World Health Organization (2011). Monitoring maternal, newborn and child health: understanding key progress indicators. Geneva: WHO. http://www.who.int/entity/healthmetrics/news/monitoring_maternal_newborn_child_health.pdf

World Health Organization (2015). Global Reference List of 100 Core Health Indicators, 2015: Metadata, http://www.who.int/healthinfo/indicators/2015/chi_2015_74_family_planning.pdf?ua=1

Related indicators

This indicator is linked to Target 3.8 (Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all) because the provision of family planning information and methods to all individuals who want to prevent pregnancy is an important component of achieving universal health coverage.

This indicator is also linked to Target 5.6 (Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences) because meeting the demand for family planning is facilitated by increasing access to sexual and reproductive health-care services, and also improves sexual and reproductive health and the ability to exercise reproductive rights.

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
Indicator 3.7.2: Adolescent birth rate (aged 10-14 years; aged 15-19 years) per 1,000 women in that age group

Institutional information

Organization(s):

Population Division, Department of Economic and Social Affairs (DESA)

United Nations Population Fund (UNFPA)

Concepts and definitions

Definition:

Annual number of births to females aged 10-14 or 15-19 years per 1,000 females in the respective age group.

Rationale:

Reducing adolescent fertility and addressing the multiple factors underlying it are essential for improving sexual and reproductive health and the social and economic well-being of adolescents. There is substantial agreement in the literature that women who become pregnant and give birth very early in their reproductive lives are subject to higher risks of complications or even death during pregnancy and birth and their children are also more vulnerable. Therefore, preventing births very early in a woman's life is an important measure to improve maternal health and reduce infant mortality. Furthermore, women having children at an early age experience a curtailment of their opportunities for socio-economic improvement, particularly because young mothers are unlikely to keep on studying and, if they need to work, may find it especially difficult to combine family and work responsibilities. The adolescent birth rate also provides indirect evidence on access to pertinent health services since young people, and in particular unmarried adolescent women, often experience difficulties in access to sexual and reproductive health services.

Concepts:

The adolescent birth rate represents the risk of childbearing among females in the particular age group. The adolescent birth rate among women aged 15-19 years is also referred to as the age-specific fertility rate for women aged 15-19.

Comments and limitations:

Discrepancies between the sources of data at the country level are common and the level of the adolescent birth rate depends in part on the source of the data selected.

For civil registration, rates are subject to limitations which depend on the completeness of birth registration, the treatment of infants born alive but die before registration or within the first 24 hours of life, the quality of the reported information relating to age of the mother, and the inclusion of births from previous periods. The population estimates may suffer from limitations connected to age misreporting and coverage.

For survey and census data, both the numerator and denominator come from the same population. The main limitations concern age misreporting, birth omissions, misreporting the date of birth of the child, and sampling variability in the case of surveys.

With respect to estimates of the adolescent birth rate among females aged 10-14 years, comparative evidence suggests that a very small proportion of births in this age group occur to females below age 12. Other evidence based on retrospective birth history data from surveys indicates that women aged 15-19 years are less likely to first births before age 15 than women from the same birth cohort when asked five years later at ages 20–24 years.

The adolescent birth rate is commonly reported as the age-specific fertility rate for ages 15-19 years in the context of calculation of total fertility estimates. It has also been called adolescent fertility rate. A related measure is the proportion of adolescent fertility measured as the percentage of total fertility contributed by women aged 15-19.

Methodology

Computation Method:

The adolescent birth rate is computed as a ratio. The numerator is the number of live births to women aged 15-19 years, and the denominator an estimate of exposure to childbearing by women aged 15-19 years. The computation is the same for the age group 10-14 years. The numerator and the denominator are calculated differently for civil registration, survey and census data.

In the case of civil registration data, the numerator is the registered number of live births born to women aged 15-19 years during a given year, and the denominator is the estimated or enumerated population of women aged 15-19 years.

In the case of survey data, the numerator is the number of live births obtained from retrospective birth histories of the interviewed women who were 15-19 years of age at the time of the births during a reference period before the interview, and the denominator is person-years lived between the ages of 15 and 19 years by the interviewed women during the same reference period. The reported observation year corresponds to the middle of the reference period. For some surveys without data on retrospective birth histories, computation of the adolescent birth rate is based on the date of last birth or the number of births in the 12 months preceding the survey.

With census data, the adolescent birth rate is computed on the basis of the date of last birth or the number of births in the 12 months preceding the enumeration. The census provides both the numerator and the denominator for the rates. In some cases, the rates based on censuses are adjusted for under-registration based on indirect methods of estimation. For some countries with no other reliable data, the own-children method of indirect estimation provides estimates of the adolescent birth rate for a number of years before the census.

If data are available, adolescent fertility at ages 10-14 years can also be computed.

For a thorough treatment of the different methods of computation, see Handbook on the Collection of Fertility and Mortality Data, United Nations Publication, Sales No. E.03.XVII.11, (http://unstats.un.org/unsd/publication/SeriesF/SeriesF_92E.pdf). Indirect methods of estimation are analyzed in Manual X: Indirect Techniques for Demographic Estimation, United Nations Publication, Sales No. E.83.XIII.2. (http://www.un.org/esa/population/publications/Manual_X/Manual_X.htm).

Disaggregation:

Age, education, number of living children, marital status, socioeconomic status, geographic location and other categories, depending on the data source and number of observations.

Treatment of missing values:

- At country level

  There is no attempt to provide estimates for individual countries or areas when country or area data are not available.

- At regional and global levels

  The regional or global aggregates of the adolescent birth rate for the age group 15-19 years are from the latest revision of World Population Prospects produced by the Population Division. Given cases when data are missing or assessed as unreliable, estimates for individual countries or areas are generated either through expert-based opinion reviewing and weighting each observation

analytically, or, in more recent years, using automated statistical methods, or by using a bias-adjusted data model to control for systematic biases between different types of data. See United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Methodology of the United Nations Population Estimates and Projections, Working Paper No. ESA/P/WP.242.
https://esa.un.org/unpd/wpp/Publications/Files/WPP2015_Methodology.pdf

Regional aggregates:

The adolescent birth rates reported for global and regional aggregates are based on the average of estimated adolescent birth rates for two, contiguous five-year periods (e.g., 2010-2015 and 2015-2020 for year 2015) published in United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.
http://esa.un.org/unpd/wpp/

The age-specific fertility rates for global and regional aggregates from World Population Prospects (WPP) are based on population reconstruction at the country level and provide a best estimate based on all the available demographic information. WPP considers potentially as many types and sources of empirical estimates as possible (including retrospective birth histories, direct and indirect fertility estimates), and the final estimates are derived to ensure as much internal consistency as possible with all other demographic components and intercensal cohorts enumerated in successive censuses.

Sources of discrepancies:

Estimates based on civil registration are only provided when the country reports at least 90 per cent coverage and when there is reasonable agreement between civil registration estimates and survey estimates. Small discrepancies might arise due to different denominators or the inclusion of births to women under 15 years of age. Survey estimates are only provided when there is no reliable civil registration. There might be discrepancies on the dating and the actual figure if a different reference period is being used. In particular, many surveys report rates both for a three-year and a five-year reference period. For countries where data are scarce, reference periods located more than five years before the survey might be used.

Data Sources

Description:

Civil registration is the preferred data source. Census and household survey are alternate sources when there is no reliable civil registration.

Data on births by age of mother are obtained from civil registration systems covering 90 per cent or more of all live births, supplemented eventually by census or survey estimates for periods when registration data are not available. For the numerator, the figures reported by National Statistical Offices to the United Nations Statistics Division have first priority. When they are not available or present problems, use is made of data from the regional statistical units or directly from National Statistical Offices. For the denominator, first priority is given to the latest revision of World Population Prospects produced by the Population Division, Department of Economic and Social Affairs, United Nations. In cases where the numerator does not cover the complete de facto population, an alternative appropriate population estimate is used if available. When either the numerator or denominator is missing, the direct estimate of the rate produced by the National Statistics Office is used. Information on sources is provided at the cell level. When the numerator and denominator come from two different sources, they are listed in that order.

In countries lacking a civil registration system or where the coverage of that system is lower than 90 per cent of all live births, the adolescent birth rate is obtained from household survey data and census data. Registration data regarded as less than 90 per cent complete are exceptionally used for countries where the alternative sources present problems of compatibility and registration data can provide an assessment of trends. In countries with multiple survey programmes, large sample surveys conducted on an annual or biennial basis are given precedence when they exist.

For information on the source of each estimate, see United Nations, Department of Economic and Social Affairs, Population Division (2015). World Fertility Data 2015 (POP/DB/Fert/Rev2015). http://www.un.org/en/development/desa/population/publications/dataset/fertility/wfd2015.shtml

Collection process:

For civil registration data, data on births or the adolescent birth rate are obtained from country-reported data from the United Nations Statistics Division or regional Statistics Divisions or statistical units (ESCWA, ESCAP, CARICOM, SPC). The population figures are obtained from the last revision of the United Nations Population Division World Population Prospects and only exceptionally from other sources.
Survey data are obtained from national household surveys that are internationally coordinated—such as the Demographic and Health Surveys (DHS), the Reproductive Health Surveys (RHS), and the Multiple Indicator Cluster Surveys (MICS)—and other nationally-sponsored surveys. Other national surveys conducted as part of the European Fertility and Family Surveys (FFS) or the Pan-Arab Project for Family Health (PAPFAM) may be considered as well. The data are taken from published survey reports or, in exceptional cases, other published analytical reports. Whenever the estimates are available in the survey report, they are directly taken from it. If clarification is needed, contact is made with the survey sponsors or authoring organization, which occasionally may supply corrected or adjusted estimates in response. In other cases, if microdata are available, estimates are produced by the Population Division based on national data.

For census data, the estimates are preferably directly obtained from census reports. In such cases, adjusted rates are only used when reported by the National Statistical Office. In other cases, the adolescent birth rate is computed from tables on births in the preceding 12 months by age of mother, and census population distribution by sex and age.

In addition to obtaining data and estimates directly from the websites of National Statistical Offices, the following databases and websites are utilized: the Demographic and Health Surveys (DHS) (http://api.dhsprogram.com/#/index.html), Demographic Yearbook database of the Statistics Division of the Department of Economic and Social Affairs of the United Nations Secretariat (http://data.un.org), internal databases of the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (see latest public release here: http://www.un.org/en/development/desa/population/publications/dataset/fertility/wfd2015.shtml), Eurostat (http://ec.europa.eu/eurostat/data/database), the Human Fertility Database (http://www.humanfertility.org), the Human Fertility Collection (http://www.fertilitydata.org), and the Multiple Indicator Cluster Surveys (MICS) (http://mics.unicef.org/). Survey databases (e.g., the Integrated Household Survey Network (IHSN) database) are also consulted in addition to searches for data on websites of National Statistical Offices and ad hoc queries.

Data Availability

Data for the adolescent birth rate for women aged 15-19 years are available for 219 countries or areas for the 2000-2014 time period. For 216 countries or areas, there are at least two available data points.

The regional breakdown of data availability is as follows:

Between 2000 and 2014

World and SDG regions At least one data point (first number) Two or more data points (second number)

WORLD 219 216
Developing Regions 167 164
Northern Africa 5 5
Sub-Saharan Africa 51 51
Latin America and the Caribbean 44 43
Eastern Asia 6 5
Southern Asia 9 9
South-eastern Asia 11 11
Western Asia 13 13
Oceania 20 19
Caucasus and Central Asia 8 8
Developed regions 52 52

Least developed countries (LDCs) 48 48
Landlocked developing countries (LLDCs) 32 32
Small island developing States (SIDS) 50 49"

Calendar

Data collection:

Data are compiled and updated annually in the first quarter of the year.

Data release:

Updated data on the adolescent birth rate are released by the Population Division in the second quarter of each year. The next release is expected in the second quarter of 2017.

Data providers

Name:

For civil registration data, data on births or the adolescent birth rate are obtained from country-reported data from the United Nations Statistics Division or regional Statistics Divisions or statistical units (ESCWA, ESCAP, CARICOM, SPC). The population figures are obtained from the last revision of the United Nations Population Division World Population Prospects and only exceptionally from other sources. Survey data are obtained from national household surveys that are internationally coordinated—such as the Demographic and Health Surveys (DHS), the Reproductive Health Surveys (RHS), and the Multiple Indicator Cluster Surveys (MICS)—and other nationally-sponsored surveys. Data from censuses are obtained from country-reported data from the United Nations Statistics Division or regional Statistics Divisions or statistical units (ESCWA, ESCAP, CARICOM, SPC) or directly from census reports.

Data compilers

This indicator is produced at the global level by the Population Division, Department of Economic and Social Affairs, United Nations in collaboration with the United Nations Population Fund (UNFPA).

References

URL:

http://www.un.org/en/development/desa/population/; www.UnfpaOpendata.org

References:

World Fertility Data 2015 (POP/DB/Fert/Rev2015), United Nations Publication, (http://www.un.org/en/development/desa/population/publications/dataset/fertility/wfd2015.shtml)

World Population Prospects: The 2015 Revision, DVD Edition United Nations Publication, (http://esa.un.org/unpd/wpp/)

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Handbook on Indicators for Monitoring the Millennium Development Goals, United Nations, http://mdgs.un.org/unsd/mi/wiki/MainPage.ashx

Handbook on the Collection of Fertility and Mortality Data, United Nations Publication, Sales No. E.03.XVII.11, (http://unstats.un.org/unsd/publication/SeriesF/SeriesF_92E.pdf)

Manual X: Indirect Techniques for Demographic Estimation, United Nations Publication, Sales No. E.83.XIII.2. (http://www.un.org/esa/population/publications/Manual_X/Manual_X.htm)

Indicator and Monitoring Framework for the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030), http://www.everywomaneverychild.org/images/content/files/EWEC_INDICATOR_MONITORING_FRAMEWORK_2016.pdf

Related indicators

Indicator is linked to Target 5.6 (Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences) because reductions in adolescent childbearing that can be brought about by increasing access to sexual and reproductive health-care services are also reflective of improvements in sexual and reproductive health and reproductive rights per se. Indicator is linked to Target 17.19 (By 2030 build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product and support statistical capacity-building in

developing countries) because the adolescent birth rate draws on in part birth registration and census data. Strengthened civil registration and vital statistics systems in countries that can reach 100 per cent registration coverage of births and timeliness of census data are relevant for measuring progress on target 3.7.

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

Indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)

Institutional information

Organization(s):
World Health Organization (WHO)

Concepts and definitions

Definition:
Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population).

The indicator is an index reported on a unitless scale of 0 to 100, which is computed as the geometric mean of 14 tracer indicators of health service coverage.

Rationale:
Target 3.8 is defined as "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all". The concern is with all people and communities receiving the quality health services they need (including medicines and other health products), without financial hardship. Two indicators have been chosen to monitor target 3.8 within the SDG framework. Indicator 3.8.1 is for health service coverage and indicator 3.8.2 focuses on health expenditures in relation to a household's budget to identify financial hardship caused by direct health care payments. Taken together, indicators 3.8.1 and 3.8.2 are meant to capture the service coverage and financial protection dimensions, respectively, of target 3.8. These two indicators should be always monitored jointly.

Countries provide many essential services for health protection, promotion, prevention, treatment and care. Indicators of service coverage – defined as people receiving the service they need – are the best way to track progress in providing services under universal health coverage (UHC). Since a single health service indicator does not suffice for monitoring UHC, an index is constructed from 14 tracer indicators selected based on epidemiological and statistical criteria. This includes several indicators that are already included in other SDG targets, thereby minimizing the data collection and reporting burden. The index is reported on a unitless scale of 0 to 100, with 100 being the optimal value.

Concepts:

The index of health service coverage is computed as the geometric means of 14 tracer indicators. The 14 indicators are listed below and detailed metadata for each of the components are given online (http://www.who.int/healthinfo/universal_health_coverage/UHC_Tracer_Indicators_Metadata.pdf) and Annex 1.   The tracer indicators are as follows, organized by four broad categories of service coverage:

I. Reproductive, maternal, newborn and child health

1. Family planning: Percentage of women of reproductive age (15–49 years) who are married or in-union who have their need for family planning satisfied with modern methods (SDG indicator 3.7.1, metadata available here)

2. Pregnancy and delivery care: Percentage of women aged 15-49 years with a live birth in a given time period who received antenatal care four or more times

3. Child immunization: Percentage of infants receiving three doses of diphtheria-tetanus-pertussis containing vaccine

4. Child treatment: Percentage of children under 5 years of age with suspected pneumonia (cough and difficult breathing NOT due to a problem in the chest and a blocked nose) in the two weeks preceding the survey taken to an appropriate health facility or provider

II. Infectious diseases

5. Tuberculosis: Percentage of incident TB cases that are detected and successfully treated

6. HIV/AIDS: Percentage of people living with HIV currently receiving antiretroviral therapy

7. Malaria: Percentage of population in malaria-endemic areas who slept under an insecticide-treated net the previous night [only for countries with high malaria burden]

8. Water and sanitation: Percentage of households using improved sanitation facilities

III. Noncommunicable diseases

9. Hypertension: Age-standardized prevalence of non-raised blood pressure (systolic blood pressure <140 mm Hg or diastolic blood pressure <90 mm Hg) among adults aged 18 years and older

10. Diabetes: Age-standardized mean fasting plasma glucose (mmol/L) for adults aged 25 years and older

11. Tobacco: Age-standardized prevalence of adults >=15 years not smoking tobacco in last 30 days (SDG indicator 3.a.1, metadata available here)

IV. Service capacity and access

12. Hospital access: Hospital beds per capita, relative to a maximum threshold of 18 per 10,000 population

13. Health workforce: Health professionals (physicians, psychiatrists, and surgeons) per capita, relative to maximum thresholds for each cadre (part of SDG indicator 3.c.1, see metadata here)

14. Health security: International Health Regulations (IHR) core capacity index, which is the average percentage of attributes of 13 core capacities that have been attained (SDG indicator 3.d.1, see metadata here)

Comments and limitations:

These tracer indicators are meant to be indicative of service coverage, not a complete or exhaustive list of health services and interventions that are required for universal health coverage. The 14 tracer indicators were selected because they are well-established, with available data widely reported by countries (or expected to become widely available soon). Therefore, the index can be computed with

existing data sources and does not require initiating new data collection efforts solely to inform the index.

It is anticipated that in future years related SDG indicators will be used in lieu of some of the current tracer indicators (these are summarized here). It is also anticipated that indicators on cervical cancer screening and essential medicines will be included in the index calculations once they become available (Annex 2). The timing of these changes will depend on when comparable values for these indicators become available for the majority of countries, and will follow a consultation with all WHO member states, including nominated NSO focal points, and approval by the IEAG-SDGs.
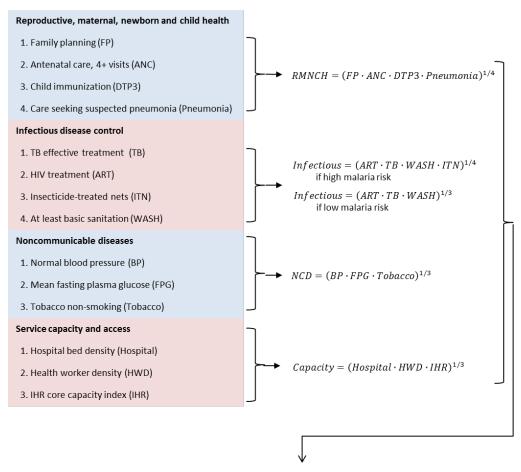
Methodology

Computation Method:
The index is computed with geometric means, based on the methods used for the Human Development Index. The calculation of the 3.8.1 indicator requires first preparing the 14 tracer indicators so that they can be combined into the index, and then computing the index from those values.

The 14 tracer indicators are first all placed on the same scale, with 0 being the lowest value and 100 being the optimal value. For most indicators, this scale is the natural scale of measurement, e.g., the percentage of infants who have been immunized ranges from 0 to 100 percent. However, for a few indicators additional rescaling is required to obtain appropriate values from 0 to 100, as follows:

- Rescaling based on a non-zero minimum to obtain finer resolution (this "stretches" the distribution across countries): prevalence of non-raised blood pressure and prevalence of non-use of tobacco are both rescaled using a minimum value of 50%.

    rescaled value = (X-50)/(100-50)*100

- Rescaling for a continuous measure: mean fasting plasma glucose, which is a continuous measure (units of mmol/L), is converted to a scale of 0 to 100 using the minimum theoretical biological risk (5.1 mmol/L) and observed maximum across countries (7.1 mmol/L).

    rescaled value = (7.1 - original value)/(7.1-5.1)*100

- Maximum thresholds for rate indicators: hospital bed density and health workforce density are both capped at maximum thresholds, and values above this threshold are held constant at 100. These thresholds are based on minimum values observed across OECD countries.

    rescaled hospital beds per 10,000 = minimum(100, original value / 18*100)
    rescaled physicians per 1,000 = minimum(100, original value / 0.9*100)
    rescaled psychiatrists per 100,000 = minimum(100, original value / 1*100)
    rescaled surgeons per 100,000 = minimum(100, original value / 14*100)

Once all tracer indicator values are on a scale of 0 to 100, geometric means are computed within each of the four health service areas, and then a geometric mean is taken of those four values. If the value of a tracer indicator happens to be zero, it is set to 1 (out of 100) before computing the geometric mean. The following diagram illustrates the calculations.

Reproductive, maternal, newborn and child health

1. Family planning (FP)

2. Antenatal care, 4+ visits (ANC)

3. Child immunization (DTP3)

4. Care seeking suspected pneumonia (Pneumonia)

$$RMNCH = (FP \cdot ANC \cdot DTP3 \cdot Pneumonia)^{1/4}$$

Infectious disease control

1. TB effective treatment (TB)

2. HIV treatment (ART)

3. Insecticide-treated nets (ITN)

4. At least basic sanitation (WASH)

$$Infectious = (ART \cdot TB \cdot WASH \cdot ITN)^{1/4}$$
if high malaria risk

$$Infectious = (ART \cdot TB \cdot WASH)^{1/3}$$
if low malaria risk

Noncommunicable diseases

1. Normal blood pressure (BP)

2. Mean fasting plasma glucose (FPG)

3. Tobacco non-smoking (Tobacco)

$$NCD = (BP \cdot FPG \cdot Tobacco)^{1/3}$$

Service capacity and access

1. Hospital bed density (Hospital)

2. Health worker density (HWD)

3. IHR core capacity index (IHR)

$$Capacity = (Hospital \cdot HWD \cdot IHR)^{1/3}$$

$$UHC\ service\ coverage\ index = (RMNCH \cdot Infectious \cdot NCD \cdot Capacity)^{1/4}$$

Note that in countries with low malaria burden, the tracer indicator for use of insecticide-treated nets is dropped from the calculation.

Disaggregation:
Equity is central to the definition of UHC, and therefore the UHC service coverage index should be used to communicate information about inequalities in service coverage within countries. This can be done by presenting the index separately for the national population vs disadvantaged populations to highlight differences between them.

For countries, geographic location is likely the most feasible dimension for sub-national disaggregation based on average coverage levels measured with existing data sources. To do this, the UHC index can be computed separately by, e.g., province or urban vs rural residence, which would allow for subnational comparisons of service coverage. Currently, the most readily available data for disaggregation on other dimensions of inequality, such as household wealth, is for indicators of coverage within the reproductive, maternal, newborn and child health services category. Inequality observed in this dimension can be used as a proxy to understand differences in service coverage across key inequality dimensions. This approach should be replaced with full disaggregation of all 14 tracer indicators once data are available to do so.

Treatment of missing values:

- At country level

The starting point for computing the index is to assemble existing information for each tracer indicator. In many cases, this involves using country time series that have been produced or collated by UN agencies in consultation with country governments (e.g., immunization coverage, access to sanitation, HIV treatment coverage, etc). Some of these published time series involve mathematical modelling to reconcile multiple data sources or impute missing values, and these details are summarized [here](#) and in Annex 1.

After assembling these inputs, there are still missing values for some country-years for some indicators. Calculating the UHC service coverage index requires values for each tracer indicator for a country, so some imputation is necessary to fill these data gaps. The current approach involves a simple imputation algorithm. For each indicator:

- If a country has missing values between two years with values, linear interpolation is used to fill missing values for the intervening years
- If a country has historical years with values, but no current value, constant extrapolation is used to fill missing values to the current year
- If a country has no values, a value is imputed with its regional median, which is computed based on World Bank regions

Given the timing and distribution of various health surveys and other data collection mechanisms, countries do not collect and report on all 14 tracer indicators of health service coverage on an annual basis. Therefore, the extent to which imputation has been used to fill missing information should be communicated along with the index value. And monitoring at country level is most suitably done at broader time intervals, e.g., every 5 years, to allow for new data collection across indicators. For now, only a SDG baseline value for 2015 has been computed by WHO.

- At regional and global levels

Any needed imputation is done at country level. These country values can then be used to compute regional and global ones.

Regional aggregates:
Regional and global aggregates are computed by using national population sizes to compute a weighted average of country-specific values for the index. This is justified on the grounds that UHC is a property of countries, and the index of essential services is a summary measure of access to essential services for each country's population.

Sources of discrepancies:
The service coverage index draws on existing, publicly available data and estimates for tracer indicators. These numbers have already been through a country consultation process (e.g., for immunization coverage), or are taken directly from country reported data. Country baseline values for year 2015 for the index were consulted with WHO Member States in 2017.

Data Sources

Description:
Many of the tracer indicators of health service coverage are measured by household surveys. However, administrative data, facility data, facility surveys, and sentinel surveillance systems are utilized for certain

indicators. Underlying data sources for each of the 14 tracer indicators are explained in more detail here and in Annex 1.

In terms of values used to compute the index, values are taken from existing published sources. This includes assembled data sets and estimates from various UN agencies. This is summarized in the above link.

Collection process:
The mechanisms for collecting data from countries vary across the 14 tracer indicators, however in many cases a UN agency or interagency group has assembled and analysed relevant national data sources and then conducted a formal country consultation with country governments to review or produce comparable country estimates. For the UHC service coverage index, once this existing information on the 14 tracer indicators is collated, WHO conducts a country consultation with nominated focal points from national governments to review inputs and the calculation of the index. WHO does not undertake new estimation activities to produce tracer indicator values for the service coverage index; rather, the index is designed to make use of existing and well-established indicator data series to reduce reporting burden.

Data Availability

Description:
Summarizing data availability for the UHC service coverage index is not straightforward, as different data sources are used across the 14 tracer indicators. Additionally, for many indicators comparable estimates have been produced, in many cases drawing on different types of underlying data sources to inform the estimates while also using projections to impute missing values. Based on the underlying data sources for each of the tracer indicators (i.e., ignoring estimates and projections), the average proportion of indicators used to compute the index with underlying data available since 2010 is around 70% across countries globally, with a SDG regional breakdown as follows:

Australia and New Zealand	65%	Northern America and Europe	64%
Central and Southern Asia	76%	Oceania	56%
Eastern and South-eastern Asia	73%	Sub-Saharan Africa	73%
Latin America and Caribbean	72%	Western Asia and Northern Africa	63%

Time series:
A baseline value for the UHC service coverage index for 2015 across 183 countries will be published in late 2017. As part of this process, data sources going back to 2000 were assembled, and future work will involve time trends in the index.

Calendar

Data collection:
Data collection varies from every 1 to 5 years across tracer indicators. For example, country data on immunizations and HIV treatment are reported annually, whereas household surveys to collect information on child treatment may occur every 3-5 years, depending on the country. More details about

individual tracer indicators are available here:
http://www.who.int/healthinfo/universal_health_coverage/UHC_Tracer_Indicators_Metadata.pdf

Data release:
The first release of baseline values for the UHC service coverage index is planned for December 2017.
After that, values will likely be reviewed and updated every two years.

Data providers

In most cases, Ministries of Health and National Statistical Offices oversee data collection and reporting
for health service coverage indicators.

Data compilers

The World Health Organization, drawing on inputs from other international agencies.

References

URL: http://www.who.int/healthinfo/universal_health_coverage/en/

References: http://www.who.int/healthinfo/universal_health_coverage/report/2017/en/
http://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(17)30472-2.pdf
http://www.who.int/healthinfo/universal_health_coverage/en/
For historical development of methods, see:
http://www.who.int/healthinfo/universal_health_coverage/UHC_WHS2016_TechnicalNote_May2016.pdf?ua=1 (superseded by this document)
http://www.who.int/healthinfo/universal_health_coverage/report/2015/en/
http://www.who.int/healthinfo/universal_health_coverage/report/2014/en/
http://collections.plos.org/uhc2014

Related indicators

The UHC service coverage index is designed to summarize existing indicators of health service coverage
to ensure consistency with the SDGs and other global initiatives and reduce duplication and reporting
burden. Currently, three other SDG indicators are included in the index (3.7.1, 3.a.1 and 3.d.1). As
comparable values become available, several additional SDG indicators will be incorporated, substituting
them into the index in place of currently used, related indicators. This includes 3.1.2, 3.b.1, 3.c.1, and
6.2.1. Therefore, 7 of the 14 current tracer indicators in the index are anticipated to be SDG indicators. In
addition, indicator 3.b.3 can be included in the index once data are available. The service coverage
indicators for HIV, tuberculosis and malaria are also closely tied to the disease incidence indicators in
Target 3.3 in terms of data collection and reporting mechanisms, and tracer indicators for the treatment
of hypertension and diabetes are related to NCD mortality as measured in 3.4.1. Future inclusion of SDG
indicators would be subject to consultation with Member States and approval by the IAEG-SDGs.

Indicator 3.8.1 should always be interpreted together with the other SDG UHC indicator, 3.8.2, which measures financial protection.

Annex 1: Metadata for tracer indicators used to measure the coverage of essential health services for monitoring SDG indicator 3.8.1.

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Please send any comments or queries to: uhc_stats@who.int

Tracer area	Family planning
Indicator definition	Percentage of women of reproductive age (15–49 years) who are married or in-union who have their need for family planning satisfied with modern methods.
Numerator	Number of women aged 15-49 who are married or in-union who use modern methods
Denominator	Total number of women aged 15-49 who are married or in-union in need of family planning
Main data sources	Population-based health surveys
Method of measurement	Household surveys include a series of questions to measure modern contraceptive prevalence rate and demand for family planning. Total demand for family planning is defined as the sum of the number of women of reproductive age (15–49 years) who are married or in a union and who are currently using, or whose sexual partner is currently using, at least one contraceptive method, and the unmet need for family planning. Unmet need for family planning is the proportion of women of reproductive age (15–49 years) either married or in a consensual union, who are fecund and sexually active but who are not using any method of contraception (modern or traditional), and report not wanting any more children or wanting to delay the birth of their next child for at least two years. Included are: 1. all pregnant women (married or in a consensual union) whose pregnancies were unwanted or mistimed at the time of conception; 2. all postpartum amenorrhoeic women (married or in consensual union) who are not using family planning and whose last birth was unwanted or mistimed; 3. all fecund women (married or in consensual union) who are neither pregnant nor postpartum amenorrhoeic, and who either do not want any more children (want to limit family size), or who wish to postpone the birth of a child for at least two years or do not know when or if they want another child (want to space births), but are not using any contraceptive method. Modern methods include female and male sterilization, the intra-uterine device (IUD), the implant, injectables, oral contraceptive pills, male and female condoms, vaginal barrier methods (including the diaphragm, cervical cap and spermicidal foam, jelly, cream and sponge), lactational amenorrhea method (LAM), emergency contraception and other modern

	methods not reported separately.
Method of estimation	The United Nations Population Division produces a systematic and comprehensive series of annual estimates and projections of the percentage of demand for family planning that is satisfied among married or in-union women. A Bayesian hierarchical model combined with country-specific data are used to generate the estimates, projections and uncertainty assessments from survey data. The model accounts for differences by data source, sample population, and contraceptive methods. See here for details: http://www.un.org/en/development/desa/population/theme/family-planning/cp_model.shtml
UHC-related notes	

Tracer area	Pregnancy and delivery care
Indicator definition	Percentage of women aged 15-49 years with a live birth in a given time period who received antenatal care four or more times
Numerator	Number of women aged 15–49 years with a live birth in a given time period who received antenatal care four or more times
Denominator	Total number of women aged 15–49 years with a live birth in the same period.
Main data sources	Household surveys and routine facility information systems.
Method of measurement	Data on four or more antenatal care visits is based on questions that ask if and how many times the health of the woman was checked during pregnancy. Household surveys that can generate this indicator include DHS, MICS, RHS and other surveys based on similar methodologies. Service/facility reporting systems can be used where the coverage is high, usually in higher income countries.
Method of estimation	WHO maintains a data base on coverage of antenatal care: http://www.who.int/gho/maternal_health/who_rhr_anc4_detailed_2017.xls
UHC-related notes	Ideally this indicator would be replaced with a more comprehensive measure of pregnancy and delivery care, for example the proportion of women who have a skilled provider attend the birth or an institutional delivery. A challenge in measuring skilled attendance at birth is determining which providers are "skilled". WHO and UNICEF are currently leading a process to come to agreement across countries about the definition of a skilled provider, after which a more comprehensive indicator of pregnancy and delivery care could be incorporated into the index. Once comparable values are available across countries, SDG 3.1.2 will be used.

Tracer area	Child immunization
Indicator definition	Percentage of infants receiving three doses of diphtheria-tetanus-pertussis containing vaccine
Numerator	Children 1 year of age who have received three doses of diphtheria-tetanus-pertussis containing vaccine
Denominator	All children 1 year of age
Main data sources	Household surveys and facility information systems.
Method of measurement	For survey data, the vaccination status of children aged 12–23 months is collected from child health cards or, if there is no card, from recall by the care-taker. For administrative data, the total number of doses administered to the target population is extracted.
Method of estimation	Together, WHO and UNICEF derive estimates of DTP3 coverage based on data officially reported to WHO and UNICEF by Member States, as well as data reported in the published and grey literature. They also consult with local experts - primarily national EPI managers and WHO regional office staff - for additional information regarding the performance of specific local immunization services. Based on the available data, consideration of potential biases, and contributions from local experts, WHO/UNICEF determine the most likely true level of immunization coverage. For details, see here: http://www.who.int/bulletin/volumes/87/7/08-053819/en/ http://www.who.int/immunization/monitoring_surveillance/routine/coverage/en/index4.html
UHC-related notes	There is variability in national vaccine schedules across countries. Given this, one option for monitoring full child immunization is to monitor the fraction of children receiving vaccines included in their country's national schedule. A second option, which may be more comparable across countries and time, is to monitor DTP3 coverage as a proxy for full child immunization. Diphtheria-tetanus-pertussis containing vaccine often includes other vaccines, e.g., against Hepatitis B and Haemophilus influenza type B, and is a reasonable measure of the extent to which there is a robust vaccine delivery platform within a country. The vaccine coverage indicator SDG target 3.b has recently been approved. Following the November, 2017 advice of the Strategic Advisory Group of Expert on Immunization, this indicator will be replaced with second dose of measles, which is one of the four components of 3.b.1. This change will be made after a country consultation process.

Tracer area	Child treatment (care-seeking for symptoms of pneumonia)
Indicator definition	Percentage of children under 5 years of age with suspected pneumonia (cough and difficult breathing NOT due to a problem in the chest and a blocked nose) in the two weeks preceding the survey taken to an appropriate health facility or provider.
Numerator	Number of children with suspected pneumonia in the two weeks preceding the survey taken to an appropriate health provider.
Denominator	Number of children with suspected pneumonia in the two weeks preceding the survey.
Main data sources	Household surveys
Method of measurement	During the UNICEF/WHO Meeting on Child Survival Survey-based Indicators, held in New York, 17–18 June 2004, it was recommended that acute respiratory infections (ARI) be described as "presumed pneumonia" to better reflect probable cause and the recommended interventions. The definition of presumed pneumonia used in the Demographic and Health Surveys (DHS) and in the Multiple Indicator Cluster Surveys (MICS) was chosen by the group and is based on mothers' perceptions of a child who has a cough, is breathing faster than usual with short, quick breaths or is having difficulty breathing, excluding children that had only a blocked nose. The definition of "appropriate" care provider varies between countries. WHO maintains a data base of country-level observations from household surveys that can be accessed here: http://www.who.int/gho/child_health/prevention/pneumonia/en/
Method of estimation	There are currently no internationally comparable estimates for this indicator.
UHC-related notes	This indicator is not typically measured in higher income countries with well-established health systems. For countries without observed data, coverage was estimated from a regression that predicts coverage of care-seeking for symptoms of pneumonia (on the logit scale), obtained from the WHO data base described above, as a function of the log of the estimated under-five pneumonia mortality rate, which can be found here: http://www.who.int/healthinfo/global_burden_disease/estimates_child_cod_2015/en/

Tracer area	Tuberculosis treatment
Indicator definition	Percentage of incidence TB cases that are detected and successfully treated in a given year
Numerator	Number of new and relapse cases detected in a given year and successfully treated
Denominator	Number of new and relapse cases in the same year
Main data sources	Facility information systems, surveillance systems, population-based health surveys with TB diagnostic testing, TB register and related quarterly reporting system (or electronic TB registers)
Method of measurement	This indicator requires three main inputs: (1) The number of new and relapse TB cases diagnosed and treated in national TB control programmes and notified to WHO in a given year. (2) The number of incident TB cases for the same year, typically estimated by WHO. (3) Percentage of TB cases successfully treated (cured plus treatment completed) among TB cases notified to the national health authorities. The final indicator = (1)/(2) x (3)
Method of estimation	Estimates of TB incidence are produced through a consultative and analytical process led by WHO and are published annually. These estimates are based on annual case notifications, assessments of the quality and coverage of TB notification data, national surveys of the prevalence of TB disease and information from death (vital) registration systems. Estimates of incidence for each country are derived, using one or more of the following approaches depending on available data: 1. incidence = case notifications/estimated proportion of cases detected; 2. incidence = prevalence/duration of condition; 3. incidence = deaths/proportion of incident cases that die. These estimates of TB incidence are combined with country-reported data on the number of cases detected and treated, and the percentage of cases successfully treated, as described above.
UHC-related notes	To compute the indicator using WHO estimates, one can access necessary files here: http://www.who.int/tb/country/data/download/en/, and compute the indicator as = c_cdr x c_new_tsr

Tracer area	HIV treatment
Indicator definition	Percentage of people living with HIV currently receiving antiretroviral therapy (ART)
Numerator	Number of adults and children who are currently receiving ART at the end of the reporting period
Denominator	Number of adults and children living with HIV during the same period
Main data sources	Facility reporting systems, sentinel surveillance sites, population-based surveys
Method of measurement	Numerator: The numerator can be generated by counting the number of adults and children who received antiretroviral combination therapy at the end of the reporting period. Data can be collected from facility-based ART registers or drug supply management systems. These are then tallied and transferred to cross sectional monthly or quarterly reports which can then be aggregated for national totals. Patients receiving ART in the private sector and public sector should be included in the numerator. Denominator: Data on the number of people with HIV infection may come from population-based surveys or, as is common in sub-Saharan Africa, surveillance systems based on antenatal care clinics.
Method of estimation	Estimates of antiretroviral treatment coverage among people living with HIV in 2015 are derived as part of the 2016 UNAIDS' estimation round or, in some limited instances, taken from data submitted to UNAIDS through the Global AIDS Response Progress Reporting tool. To estimate the number of people living with HIV across time in high burden countries, UNAIDS in collaboration with countries uses an epidemic model (Spectrum) that combines surveillance data on prevalence with the current number of patients receiving ART and assumptions about the natural history of HIV disease progression. Since ART is now recommended for all individuals living with HIV, monitoring ART coverage is less complicated than before, when only those with a certain level of disease severity were eligible to receive ART. Estimates of ART coverage can be found here: http://aidsinfo.unaids.org/
UHC-related notes	Comparable estimates of ART coverage in high income countries, in particular time trends, are not always available.

Tracer area	Malaria prevention
Indicator definition	Percentage of population in malaria-endemic areas who slept under an ITN the previous night.
Numerator	Number of people in malaria-endemic areas who slept under an ITN.
Denominator	Total number of people in malaria endemic areas.
Main data sources	Data on household access and use of ITNs come from nationally representative household surveys such as Demographic and Health Surveys, Multiple Indicator Cluster Surveys, and Malaria Indicator Surveys. Data on the number of ITNs delivered by manufacturers to countries are compiled by Milliner Global Associates, and data on the number of ITNs distributed within countries are reported by National Malaria Control Programs.
Method of measurement	Many recent national surveys report the number of ITNs observed in each respondent household. Ownership rates can be converted to the proportion of people sleeping under an ITN using a linear relationship between access and use that has been derived from 62 surveys that collect information on both indicators.
Method of estimation	Mathematical models can be used to combine data from household surveys on access and use with information on ITN deliveries from manufacturers and ITN distribution by national malaria programmes to produce annual estimates of ITN coverage. WHO uses this approach in collaboration with the Malaria Atlas Project. Methodological details can be found in the Annex of the World Malaria Report 2015: http://www.who.int/malaria/publications/world-malaria-report-2015/report/en/.
UHC-related notes	WHO produces comparable ITN coverage estimates for 40 high burden countries. For other countries, ITN coverage is not included in the UHC service coverage index due to data limitations. However, future research will focus on estimating ITN coverage among those at risk in countries outside of Africa with (potentially localized) malaria burden.

Tracer area	Water and sanitation
Indicator definition	Percentage of households using improved sanitation facilities
Numerator	Population living in a household with: flush or pour-flush to piped sewer system, septic tank or pit latrine; ventilated improved pit latrine; pit latrine with slab; or composting toilet.
Denominator	Total population
Main data sources	Population-based household surveys and censuses
Method of measurement	Household-level responses, weighted by household size, are used to compute population coverage.
Method of estimation	The WHO/UNICEF Joint Monitoring Programme has produced regular estimates of coverage of improved sanitation for MDG monitoring. After compiling a database of available data sources, for each country, simple linear regressions are fitted to the country's data series to obtain an in-sample estimate, as well as to produce a 2-year extrapolation beyond the last available data point, after which coverage is held constant for 4 years and then assumed missing. This is done separately for urban and rural regions, and then combined to obtain national coverage estimates. Details of the methodology and most recent estimates can be found here: http://www.wssinfo.org/
UHC-related notes	The SDG indicator for sanitation (SDG 6.2.1) is an expanded version of the MDG indicator, incorporating the quality of sanitation facilities. Once country data and estimates are available for this new indicator, it could be used for UHC monitoring in lieu of the MDG indicator definition described above. A joint indicator that identifies the proportion of households with access to both safe water and sanitation could also be considered.

Tracer area	Prevention of cardiovascular disease
Indicator definition	Age-standardized prevalence of normal blood pressure among adults aged 18+, regardless of treatment status
Numerator	Number of adults aged 18 or older with systolic blood pressure <140 mm Hg and diastolic blood pressure <90 mm Hg (regardless of treatment status)
Denominator	Number of adults aged 18 or older
Main data sources	Population-based surveys and surveillance systems
Method of measurement	Data sources recording measured blood pressure are used (self-reported data are excluded). If multiple blood pressure readings are taken per participant, the first reading is dropped and the remaining readings are averaged.
Method of estimation	For producing comparable national estimates, data observations of prevalence defined in terms of alternate SBP and/or DBP cutoffs are converted into prevalence of raised blood pressure, defined as systolic blood pressure >=140 mm Hg or diastolic blood pressure >=90 mm Hg using regression equations. A Bayesian hierarchical model is then fitted to these data to calculate age-sex-year-country specific prevalences, which accounts for national vs. subnational data sources, urban vs. rural data sources, and allows for variation in prevalence across age and sex. Age-standardized estimates are then produced by applying the crude estimates to the WHO Standard Population. Details on the statistical methods are here: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31919-5/fulltext WHO and the NCD Risk Factor Collaboration (NCD-RisC) has produced comparable estimates for this indicator up through year 2015, which are available here: http://apps.who.int/gho/data/node.main.A875STANDARD?lang=en
UHC-related notes	Prevalence estimates are converted to the prevalence of normal blood pressure for incorporation into the UHC index, so that a value of 100% is the optimal target. This is computed as: normal blood pressure prevalence = 1 – raised blood pressure prevalence. The above estimates are done separately for men and women; for the UHC tracer indicator a simple average of values for men and women is computed. Normal blood pressure is the sum of the percentage of individuals who do not have hypertension, and the percentage of individuals whose hypertension is controlled by medication. The absence of hypertension is a result of prevention efforts via promotion of physical activity and healthy diets, as well as other factors. Hypertension controlled with medication is a result of effective treatment. This indicator is thus a proxy for both effective health promotion and effective medical services. As more data become available, this indicator will likely be replaced by the fraction of population with hypertension receiving treatment.

Tracer area	Management of diabetes
Indicator definition	Age-standardized mean fasting plasma glucose for adults aged 25 years and older
Main data sources	Population-based surveys and surveillance systems
Method of measurement	Fasting plasma glucose (FPG) levels are determined by taking a blood sample from participants who have fasted for at least 8 hours. Other related biomarkers, such as hemoglobin A1c (HbA1c), were used to help calculate estimates (see below).
Method of estimation	For producing comparable national estimates, data observations based on mean FPG, oral glucose tolerance test (OGTT), HbA1c, or combinations therein, are all converted to mean FPG. A Bayesian hierarchical model is then fitted to these data to calculate age-sex-year-country specific prevalences, which accounts for national vs. subnational data sources, urban vs. rural data sources, and allows for variation in prevalence across age and sex. Age-standardized estimates are then produced by applying the crude estimates to the WHO Standard Population. Methodological details can be found here: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60679-X/abstract
UHC-related notes	An individual's FPG may be low because of effective treatment with glucose-lowering medication, or because the individual is not diabetic as a result of health promotion activities or other factors such as genetics. Mean FPG is thus a proxy for both effective promotion of healthy diets and behaviors and effective treatment of diabetes. As more data become available, this indicator will be replaced by the fraction of population with diabetes under treatment. The above estimate are done separately for men and women; for the UHC tracer indicator a simple average of values for men and women is computed.

Tracer area	Tobacco control
Indicator definition	Age-standardized prevalence of adults >=15 years not smoking tobacco in last 30 days
Numerator	Adults 15 years and older who have not smoked tobacco in the last 30 days
Denominator	Adults 15 years and older
Main data sources	Household surveys
Method of measurement	"Current tobacco smoking" includes cigarettes, cigars, pipes or any other smoked tobacco products used in the past 30 days. Data are collected via self-report in surveys.
Method of estimation	WHO estimates prevalence of current tobacco (non) smoking with a negative binomial meta-regression model, which generates comparable estimates by adjusting for differences in age groups and indicator definition across national surveys included in the analysis. These estimates are done separately for men and women. Methodological details can be found here: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60264-1/supplemental. WHO estimates of the prevalence of tobacco smoking are published here (see "current smoking of any tobacco product"): http://www.who.int/tobacco/global_report/2017/en/
UHC-related notes	Prevalence of not smoking tobacco is computed as 1 minus the prevalence of tobacco smoking.

Tracer area	Hospital access
Indicator definition	Hospital beds per capita, relative to a maximum threshold of 18 per 10,000 population
Numerator	Number of hospital beds (should exclude labor and delivery beds)
Denominator	Total population
Main data sources	Administrative systems / Health facility reporting system
Method of measurement	Country administrative systems are used to total the number of hospital beds, which are divided by the total estimated population, and multiplied by 10,000. WHO regional offices and other groups collect information on national hospital bed density, including the following online resources: WHO EMRO regional observatory: https://rho.emro.who.int/rhodata/node.main.A36 WHO AFRO regional observatory: http://www.aho.afro.who.int/en/data-statistics/hospital-beds-10-000-population WHO SEARO country profiles: http://www.searo.who.int/entity/health_situation_trends/data/hsp/hsp_2014/en WHO EURO European Health Information Gateway: http://gateway.euro.who.int/en/data-sources/european-database-on-human-and-technical-resources-for-health/ OECD: http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-asia-pacific-2014_health_glance_ap-2014-en
Method of estimation	Using available data, the indicator is computed relative to a threshold value of 18 hospital beds per 10,000 population. This threshold is below the observed OECD high income country minimum (since year 2000) of 20 per 10,000 and tends to correspond to an inpatient hospital admission rate of around 5 per 100 per year. This indicator is designed to capture low levels of hospital capacity; the maximum threshold is used because very high hospital bed densities are not necessary an efficient use of resources. The indicator is computed as follows, using country data on hospital bed density (x), which results in values ranging from 0 to 100: • Country with a hospital bed density $x < 18$ per 10,000 per year, the indicator = x/18*100. • Country with a hospital bed density $x >= 18$ per 10,000 per year, the indicator = 100.
UHC-related notes	An alternative indicator could be hospital in-patient admission rate, relative to a maximum threshold. However, that indicator is currently not reported widely across regions, in particular the African Region. In countries where both hospital beds per capita and in-patient admission rates are available, they are highly correlated.

Tracer area	Health workforce
Indicator definition	Health professionals (physicians, psychiatrists, and surgeons) per capita, relative to maximum thresholds for each cadre
Numerator	Number of physicians, psychiatrists and surgeons
Denominator	Total population
Main data sources	National database or registry of health workers, ideally coupled with regular assessment of completeness using census data, professional association registers, or facility censuses.
Method of measurement	The classification of health workers is based on criteria for vocational education and training, regulation of health professions, and activities and tasks of jobs, i.e., a framework for categorizing key workforce variables according to shared characteristics. The WHO framework largely draws on the latest revisions to the internationally standardized classification systems of the International Labour Organization (International Standard Classification of Occupations), United Nations Educational, Scientific and Cultural Organization (International Standard Classification of Education), and the United Nations Statistics Division (International Standard Industrial Classification of All Economic Activities). Methodological details and data can be found here: http://www.who.int/hrh/statistics/hwfstats/en/
Method of estimation	Using available data, the indicator is computed by first rescaling, separately, health worker density ratios for each of the three cadres (physicians, psychiatrists and surgeons) relative to the minimum observed values across OECD countries since 2000, which are as follows: physicians = 0.9 per 1000, psychiatrists = 1 per 100,000, and surgeons = 14 per 100,000. This rescaling is done in the same way as that for the hospital bed density indicator described above, resulting in indicator values that range from 0 to 100 for each of the three cadres. For example, using country data on physicians per 1000 population (x), the cadre-specific indicator would be computed as: • Country with x < 0.9 per 1000 per year, the cadre-specific indicator = x /0.9*100. • Country with x >= 0.9 per 1000 per year, the cadre-specific indicator = 100. As a final step, the geometric mean of the three cadre-specific indicator values is computed to obtain the final indicator of health workforce density.
UHC-related notes	The "physicians" category would ideally be expanded to include all "core health professionals", such as nurses and midwives. However, no internationally comparable data base exists that uses consistent definitions of non-physician core health professionals to allow for fully accurate cross-country comparisons. Work on measuring SDG indicator 3.c.1 could resolve this issue and allow for a more comprehensive indicator.

Tracer area	Health security
Indicator definition	International Health Regulations (IHR) core capacity index, which is the average percentage of attributes of 13 core capacities that have been attained at a specific point in time.
	The 13 core capacities are: (1) National legislation, policy and financing; (2) Coordination and National Focal Point communications; (3) Surveillance; (4) Response; (5) Preparedness; (6) Risk communication; (7) Human resources; (8) Laboratory; (9) Points of entry; (10) Zoonotic events; (11) Food safety; (12) Chemical events; (13) Radionuclear emergencies.
Numerator	Number of attributes attained
Denominator	Total number of attributes
Main data sources	Key informant survey
Method of measurement	Key informants report on attainment of a set of attributes for each of 13 core capacities using a standard WHO instrument, as described here: http://apps.who.int/iris/bitstream/10665/84933/1/WHO_HSE_GCR_2013.2_eng.pdf Capacity-level indicator values can be found here: http://www.who.int/gho/ihr/monitoring/legislation/en/index1.html
Method of estimation	The indicator is computed by averaging, across the 13 core capacities, the percentage of attributes for each capacity that have been attained.
UHC-related notes	

Annex 2: Metadata for tracer indicators which can be included once data become available

Future inclusion of these tracer indicators would be subject to consultation with Member States and approval by the IAEG-SDGs.

Tracer area	Cancer detection and treatment
Indicator definition	Percentage of women aged 30–49 years who report ever having been screened for cervical cancer
Numerator	Number of women aged 30–49 years who report ever having had a screening test for cervical cancer using any of these methods: VIA, pap smear and HPV test.
Denominator	All women aged 30-49 years
Main data sources	Population-based surveys
Method of measurement	Self-reported data on respondents' cervical cancer screening history are collected through surveys.
Method of estimation	There are currently no comparable estimates of cervical cancer screening coverage.
UHC-related notes	There are currently few countries with recent data for this indicator and it is therefore excluded from the UHC service coverage index calculations. An additional challenge for international comparability is that data sources may use different time periods (ever screened vs. screened in past 5 years) and different age groups.

Tracer area	Access to essential medicines
Indicator definition	Percentage of health facilities with essential medicines
Numerator	Number of facilities with essential medicines in stock
Denominator	Total number of health facilities
Main data sources	Special facility surveys or, potentially, routine facility information systems
Method of measurement	Data on the availability of a specific list of medicines are collected from a survey of a sample of facilities. Availability is reported as the percentage of medicine outlets where a particular medicine was found on the day of the survey. If routine facility reporting on stocks is accurate and complete, it may also be possible to use data from the routine system. Regular independent verification is required.
Method of estimation	This indicator is still under development, both in terms of the core list of medicines to be monitored and data collection strategies. The Service Availability and Readiness Assessment (SARA) surveys have collected data for a limited number of countries, see here: http://www.who.int/healthinfo/systems/sara_methods/en/.
UHC-related notes	There are currently about 30 countries with recent data on access to essential medicines, and it is therefore excluded from the UHC service coverage index calculations. Importantly, the SDG-IAEG has recently recommended that, under target 3.b, there be separate indicators for vaccines and access to essential medicines. If adopted by the UN Statistical Commission in March 2017, a definition and metadata for an SDG indicator on access to essential medicines will be completed. Once reporting on this indicator begins, it can be used in the UHC index.

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

Indicator 3.8.2: Proportion of population with large household expenditures on health as a share of total household expenditure or income

Institutional information

Organization:

World Health Organization (WHO)

Concepts and definitions

Definition:

Proportion of the population with large household expenditure on health as a share of total household expenditure or income.

Two thresholds are used to define "large household expenditure on health": greater than 10% and greater than 25% of total household expenditure or income.

Rationale:

Target 3.8 is defined as "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all". The concern is with all people and communities receiving the quality health services they need (including medicines and other health products), without financial hardship. Two indicators have been chosen to monitor target 3.8 within the SDG framework. Indicator 3.8.1 is for health service coverage, which is operationalized with an index that combines 16 health service coverage indicators for reproductive, maternal and child health, infectious diseases, non-communicable diseases, and service capacity and access into a single summary metric. Indicator 3.8.2 focuses on health expenditures in relation to a household's budget to identify financial hardship caused by direct health care payments. Taken together, indicators 3.8.1 and 3.8.2 are meant to capture the service coverage and financial protection dimensions, respectively, of target 3.8. These two indicators should be always monitored jointly.

Indicator 3.8.2 derives from methodologies dating back to the 1990s developed in collaboration with academics at the World Bank and the World Health Organization. Indicator 3.8.2 is about identifying people that need to devote a substantial share of their total household expenditure or income to health care. The focus is on payments made at the point of use to get any type of treatment, from any type of provider, for any type of disease or health problem, net of any reimbursements to the individual who made the payment but excluding pre-payments for health services; for example, in the form of taxes or specific insurance premiums or contributions. Such direct payments are the least equitable way to finance the health systems given that they determine the extent of care received.

This is clearly against the spirit of the target, which calls for granting access based on health needs not a household's capacity to pull together all its financial resources to meet the health needs of its members. Some direct payments might be needed but indicator 3.8.2 is underpinned by the conviction that no one, at whatever income level, should have to choose between spending on health and spending on other basic goods and services such as education tuitions, food necessities, housing and utilities. One way of assessing the extent to which health systems lead to financial hardship is to calculate the proportion of the population with large household expenditures on health as a share of household total consumption or income.

Concepts:

Indicator 3.8.2 is defined as the "Proportion of the population with large household expenditure on health as a share of total household expenditure or income". In effect it is based on a ratio exceeding a threshold. The two main concepts of interest behind this ratio are household expenditure on health (numerator) and total household consumption expenditure or when unavailable income (denominator).

Numerator

Household expenditure on health is defined as any expenditure incurred at the time of service use to get any type of care (promotive, preventive, curative, rehabilitative, palliative or long-term care) including all medicines, vaccines and other pharmaceutical preparations as well as all health products, *from any type of provider and for all members of the household*. These health expenditures are characterized by a direct payments that are financed by a household's income (including remittances), savings or loans **but do not include any third-party payer reimbursement.** As such they only grant access to the health services and health products individuals can pay for, without any solidarity between the healthy and the sick beyond the household[1] and solely based on the willingness and ability of the household to pay. Direct health care payments are labelled Out-Of-Pocket (OOP) payments in the classification of health care financing schemes (HF) of the international Classification for Health Accounts (ICHA). OOP health expenditures are the most unequitable source of funding for the health system.

The components of a household's health care consumption expenditure so defined should be consistent with division 06 of the UN Classification of Individual Consumption According to Purpose (COICOP)[2] and include expenditures on medicines and medical products (06.1), outpatient care services (06.2) and inpatient care services (06.3).

Further information on definitions and classifications (for example by provider, by beneficiary characteristics) of health expenditures should be consistent with the international classification for health accounts and its family of classifications. ICHA results from collaboration between OECD, Eurostat and the World Health Organization.

Denominator

Expenditure on household consumption and household income are both monetary welfare measures. Household consumption is a function of permanent income, which is a measure of a household's long-term economic resources that determine living standards. Consumption is generally defined as the sum of the monetary values of all items (goods and services) consumed by the household on domestic

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[1] http://www.oecd-ilibrary.org/social-issues-migration-health/a-system-of-health-accounts/classification-of-health-care-financing-schemes-icha-hf_9789264116016-9-en

[2] http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=5&Lg=1&Co=06.1

account during a reference period. It includes the imputed values of goods and services that are not purchased but procured otherwise for consumption. Information on household consumption is usually collected in household surveys that may use different approaches to measure 'consumption' depending on whether items refer to durable or non-durable goods and/or are directly produced by households.

The most relevant measure of income is disposable income as it is close to the maximum available to the household for consumption expenditure during the accounting period. Disposable income is defined as total income less direct taxes (net of refunds), compulsory fees and fines. Total income is generally composed of income from employment, property income, income from household production of services for own consumption, transfers received in cash and goods, transfers received as services[3].

Income is more difficult to measure accurately due to its greater variability over time. Consumption is less variable over time and easier to measure. It is therefore recommended that whenever there is information on both household consumption and income the former is used (see data sources).

Threshold

It is recommended to use two thresholds for global reporting to identify large household expenditure on health as share of total household consumption or income: **a lower threshold of 10% and a higher threshold of 25%**. With these two thresholds the indicator measures financial hardship (see section on comments and limitations).

Comments and limitations:

It is feasible to monitor indicator 3.8.2 on a regular basis using the same household survey data that is used to monitor SDG target 1.1 and 1.2 on poverty[4]. These surveys are also regularly conducted for other purposes such as calculating weights for the Consumer Price Index. These surveys are conducted typically by NSOs. Thus, monitoring the proportion of the population with large household expenditures on health as a share of total household consumption or income does not add any additional data collection burden so long as the health expenditure component of the household non-food consumption data can be identified. While this is an advantage, indicator 3.8.2 suffers from the same challenges of timeliness, frequency, data quality and comparability of surveys than SDG indicator 1.1.1. However, indicator 3.8.2 has its own conceptual and empirical limitations.

First, indicator 3.8.2 attempts to identify financial hardship that individuals face when using their income, savings or taking loans to pay for health care. However, most household surveys fail to identify the source of funding used by a household who is reporting health expenditure. In countries where there is no retrospective reimbursement of household spending on health this is not a problem. If a household does report any expenditure on health, it would be because it is not going to be reimbursed by any third-party payer. It is therefore consistent with the definition given for direct health care payments (the numerator).

For those countries on the other hand where there is retrospective reimbursement – for example, via a contributory health insurance scheme - the amount reported by a household on health expenditures might be totally or partially reimbursed at some later point, perhaps outside the recall period of the household survey.

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[3] http://www.ilo.org/public/english/bureau/stat/download/17thicls/r2hies.pdf
[4] http://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf

Clearly, more work is needed to ensure that survey instruments gather information on the sources of funding used by the household to pay for health care, or the household survey instrument always specifies that health expenditures should be net of any reimbursement.

Second, indicator 3.8.2. relies on a single cut-off point to identify what constitutes 'large health expenditure as a share of total household expenditure or income'. People just below or above such thresholds are not taken into account, which is always the problem with measures based on cut-offs. This is simply avoided by plotting the cumulative distribution function of the health expenditure ratio behind 3.8.2. By doing so, it is possible to identify for any threshold the proportion of the population that is devoting any share of its household's budget to health.

Third, indicator 3.8.2. is based on measures of ex-post spending on health care. Low levels of spending could be driven by measurement errors due to both non-sampling errors such as a very short recall period that does not allow the collection of information on health care requiring an overnight stay; or sampling errors such as over-sample of areas with a particularly low burden of disease. No spending could also be due to people not being able to spend anything on health which, at least for the services that are included in 3.8.1, should result in low levels of coverage.

There are other indicators used to measure financial hardship. Specialized agencies such as WHO use a broader framework which includes a definition of large health expenditure in relation to non-subsistence spending in addition to indicator 3.8.2[5,6,7,8,9,10].

Methodology

Computation Method:

Population weighted average number of people with large household expenditure on health as a share of total household expenditure or income

$$\sum_i w_i 1\left(\frac{household\ health\ expenditure}{total\ household\ expenditure} > \tau\right)$$

Where *i* denotes a household, 1() is the indicator function, w_i corresponds to the household's sample weights multiplied by the household size to obtain representative numbers per person, τ is a threshold identifying large household expenditure on health as a share of total household consumption or income (i.e. 10% and 25%). Household health expenditure and household expenditure or income are defined as explained in the "concept" section.

Disaggregation:

[5] Xu, K., Evans, D. B., Carrin, G., Aguilar-Rivera, A. M., Musgrove, P., and Evans, T. (2007), "Protecting Households From Catastrophic Health Spending," *Health Affairs*, 26, 972–983. Xu, L., Evans, D., Kawabata, K., Zeramdini, R., Klavus, J., and Murray, C. (2003), "Households Catastrophic Health Expenditure: A Multi-Country Analysis," *The Lancet*, 326, 111–117. Wagstaff, A. and van Doorslaer, E. (2003), "Catastrophe and Impoverishment in Paying for Health Care: with applications to Vietnam 1993-98," *Health Economics*, 12, 921–934.
[6] http://www.who.int/healthinfo/indicators/2015/en/; http://www.who.int/healthinfo/universal_health_coverage/en/
[7] http://www.euro.who.int/en/health-topics/Health-systems/health-systems-financing/publications/clusters/universal-health-coverage-financial-protection
[8] http://www.paho.org/hq/index.php?option=com_content&view=article&id=11065%3A2015-universal-health-coverage-latin-america-caribbean&catid=3316%3Apublications&Itemid=3562&lang=en
[9] http://applications.emro.who.int/dsaf/EMROPUB_2016_EN_19169.pdf?ua=1
[10] http://apps.searo.who.int/uhc

The following disaggregation is possible in so far the survey has been designed to provide representative estimates at such level:

- Gender and age of the head of the household
- Geographic location (rural/urban)
- Quintiles of the household welfare measures (total household expenditure or income)

Treatment of missing values:

At the country level there is no intention at present to treat missing values in the absence of any previous information on this indicator. Work is underway jointly between the World Health Organization and the World Bank on the treatment of missing values at the regional and global level on the same premise that no imputation will be done in the absence of any previous information at that level.

Regional aggregates:

Regional and global aggregates will be based on population-weighted median values of the proportion of people with large household expenditure on health as a share of total household expenditure or income.

The World Bank and the World Health Organization will use their own regional grouping, in addition to the regional breakdown proposed for the SDG by UNSD.

Sources of discrepancies:

In some cases, consumption expenditures are produced following a common standardization process designed to make the data comparable across countries. Regional teams from the World Bank for example produce harmonized versions of raw datasets following common regional procedures. This might result in discrepancies between the expenditure variables generated using the raw data, and the expenditure variables generated using the harmonization procedures. The ECAPOV collection of data are based on LSMS or household budget surveys (HBS) survey data collected in the Europe and Central Asia region, while the SHIP collection focuses on the Africa region. A detailed documentation describing the harmonization procedures is available from the accompanying pdf documents.

WHO is currently undertaking a country consultation to inform about the country estimates, data sources and methods used to monitor SDG 3.8.2. This should enable to gain a better understanding regarding possible sources of discrepancies.

Data Sources

Description:

The recommended data sources for the monitoring of the "Proportion of the population with large household expenditure on health as a share of total household expenditure or income" are household surveys with information on both household consumption expenditure on health and total household consumption expenditures, which are routinely conducted by national statistical offices. Household budget surveys (HBS) and household income and expenditure surveys (HIES) typically collect these as they are primarily conducted to provide inputs to the calculation of consumer price indices or the

compilation of national accounts. Another potential source of information is socio-economic or living standards surveys; however, some of these surveys may not collect information on total household consumption expenditures – for example, when a country measures poverty using income as the welfare measure[11]. The most important criterion for selecting a data source to measure SDG indicator 3.8.2 is the availability of both household consumption expenditure on health and total household consumption expenditures.

When socio-economic or living standards surveys are used to measure SDG indicator 3.8.2, any challenge for cross-country comparability of SDG Indicator 1.1.1 also applies to the monitoring of SDG indicator 3.8.2. For any type of household survey, given the focus on household health expenditure there is a need to improve the current survey instruments for cross-country comparability. The World Health Organization is collaborating with different UN agencies and other important stakeholder to ensure this happens[12].

Collection process:

WHO obtains household survey data from national statistical offices where the denominator and numerator of the health expenditure ratio is constructed following their own guidelines either directly by them or by WHO consultants. WHO works through its regional offices or country offices to support Ministries of Health. No systematic adjustment is undertaken.

The World Bank also typically receives data from National Statistical Offices (NSOs) directly. In other cases it uses NSO data received indirectly. For example, it receives data from Eurostat and from LIS (Luxemburg Income Study), who provide the World Bank NSO data they have received / harmonized. The Universidad Nacional de La Plata, Argentina and the World Bank jointly maintain the SEDLAC (Socio-Economic Database for Latin American and Caribbean) database that includes harmonized statistics on poverty and other distributional and social variables from 24 Latin American and Caribbean countries, based on microdata from household surveys conducted by NSOs. Data is obtained through country specific programs, including technical assistance programs and joint analytical and capacity building activities. The World Bank has relationships with NSOs on work programs involving statistical systems and data analysis. Poverty economists from the World Bank typically engage with NSOs broadly on poverty measurement and analysis as part of technical assistance activities.

The World Health Organization and the World Bank generate indicator 3.8.2 following the same approach. Both institutions combined estimates at the meso-level. Eligibility of the estimates included in a joint final database for the production of regional and global estimates is based on the following quality checks:

For the denominator of the health expenditure ratio

- Check whether log per capita consumption is normally distributed
- Compare the logarithm per capita consumption with available figures in PovcalNet
- Compare the poverty headcount at $1.90 a day with PovcalNet figure.

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[11] http://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf

[12] One example is the WHO engagement in the ongoing revision of COICOP by UNSD http://unstats.un.org/unsd/class/intercop/expertgroup/tor_tsg-coicop-2013.pdf. Another example is a BMGF project WHO is supporting to improve the measurement of household health expenditures http://www.indepth-network.org/projects/ihope

For the numerator of the health expenditure ratio

- Compare the average health expenditure ratio in the survey to the average budget share constructed as the ratio of the macroeconomic measure of household out-of-pocket expenditures in current local currency; this is available from the [Global Health Expenditure Database](#) (GHED) through the [World Development Indicators Database](#) (WDI) and household final consumption expenditure in current local currency also extracted from WDI.

These benchmarks are also used to decide between two estimates for those countries and those years for which both institutions have the same data source. This work is ongoing, and further quality checks may be added.

At country level WHO and the World Bank assemble non-duplicated estimates of the proportion of the population following the approach described under 'regional aggregates'; and the World Health Organization undertakes a country consultation process. Following a WHO Executive Board resolution (EB107.R8) WHO is requested to do this before publishing estimates at country level on behalf of member states. For any given indicator, this process starts with WHO sending a formal request to ministries of health to nominate a focal point for the consultation on the indicator. Once member states nominate focal points, WHO then sends draft estimates and methodological descriptions to them. The focal points then send WHO their comments, often including new data that are used to update the country estimates.

In addition to this consultation, the World Health Organization and the World Bank regularly undertake training events on the measurement of lack of financial protection coverage, which involves participants from the Ministry of Health as well as from the National Statistical Office.

Data Availability

Description:

This indicator relies primarily on the same data sources that are used to monitor SDG indicator 1.1.1 with the additional requirement of the availability of information regarding health expenditures. Taking this into account, the World Bank and WHO have identified 1526 potentially suitable household survey datasets from 151 countries. 168 of these datasets are currently inaccessible to either the World Bank or WHO, and 450 do not yet have all the key variables required for the analysis. The remaining 911 datasets have been analysed. Data availability measured in terms of the number of countries that WHO and the World Bank have currently reviewed and retained for the estimation of the "proportion of the population with large household expenditures on health as a share of total household expenditure or income" is as follows for the most recent year:

SDG regional breakdown	Number of WHO Member States	selected by WHO and the World Bank for the estimation of the "proportion of the population with large household expenditure on health as a share of total household expenditure or income" as of February 2017			
		1995-2004	2005-2015	total	Total as a share of number of countries per SDG region
Australia and New Zealand (M49)	2	0	1	1	**50.0%**
Central Asia (M49) and Southern Asia (MDG=M49)	14	0	10	10	**71.4%**
Eastern Asia (M49) and South-eastern Asia (MDG=M49)	16	1	11	12	**75.0%**
Latin America & the Caribbean (MDG=M49)	33	6	8	14	42.4%
Northern America (M49) and Europe (M49)	44	7	25	32	**72.7%**
Oceania (M49) excluding Australia and New Zealand (M49)	14	1	0	1	7.1%
Sub-Saharan Africa (M49)	48	8	27	35	**72.9%**
Western Asia (M49) and Northern Africa (M49)	23	1	10	11	47.8%
	194	24	92	116	**59.8%**

Data availability covers at least 50% of all WHO member States in all M49 regions except for those Latin America & the Caribbean (42.4%) , Oceania (7.1%), Western Asia and Northern Africa. WHO is currently holding a country consultation process ending on April 2nd, 2017. The World Bank is also going to conduct a consultation with World Bank country staff in March. Through this process, it is expected that more data will be identified.

For more information, please consult http://www.who.int/health_financing/topics/financial-protection/monitoring-data/en/

Time series:

The frequency of such data is similar to the frequency of the data used to produced SDG indicator 1.1.1. It varies across countries but on average, this ranges from an annual 1 year basis to 3 to 5 years.

Calendar

Data collection:

Data collection follows a country's plan to conduct household consumption expenditure surveys, household budget surveys and household income and expenditure survey.

Data release:

Estimates on the proportion of the population with large household expenditure on health as a share of total household expenditure or income will be released by July 2017. Going forward, new data will be added as more information is received from nominated focal points (see collection process). Updates of regional and global estimates are planned every two years.

Data providers

National Statistical Offices in collaboration with Ministries of health. See data sources for further details.

Data compilers

The World Health Organization and the World Bank.

References

URL: http://www.who.int/health_financing/topics/financial-protection/monitoring-sdg/en/

References:
On underlying approaches behind the current definition of large health expenditures as a share of total household consumption or income:
- Chapter 18 of "Analysing health equity using household survey data". Washington, DC: World Bank Group; 2008, http://www.worldbank.org/en/topic/health/publication/analyzing-health-equity-using-household-survey-data

For the definition of health expenditures
- http://www.oecd-ilibrary.org/social-issues-migration-health/a-system-of-health-accounts/classification-of-health-care-financing-schemes-icha-hf_9789264116016-9-en

For the components of health expenditures
- division 06 of the UN Classification of Individual Consumption According to Purpose (COICOP) http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=5&Lg=1&Co=06.1

Related indicators

SDG indicators: 3.8.1; 1.1.1 and 1.2.1

For more information on these indicators, please consult the following web-page
http://unstats.un.org/sdgs/iaeg-sdgs/metadata-compilation/

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The mortality attributable to the joint effects of household and ambient air pollution can be expressed as: Number of deaths, Death rate. Death rates are calculated by dividing the number of deaths by the total population (or indicated if a different population group is used, e.g. children under 5 years).

Evidence from epidemiological studies have shown that exposure to air pollution is linked, among others, to the important diseases taken into account in this estimate:

- Acute respiratory infections in young children (estimated under 5 years of age);
- Cerebrovascular diseases (stroke) in adults (estimated above 25 years);
- Ischaemic heart diseases (IHD) in adults (estimated above 25 years);
- Chronic obstructive pulmonary disease (COPD) in adults (estimated above 25 years); and
- Lung cancer in adults (estimated above 25 years).

Rationale:

As part of a broader project to assess major risk factors to health, the mortality resulting from exposure to ambient (outdoor) air pollution and household (indoor) air pollution from polluting fuel use for cooking was assessed. Ambient air pollution results from emissions from industrial activity, households, cars and trucks which are complex mixtures of air pollutants, many of which are harmful to health. Of all of these pollutants, fine particulate matter has the greatest effect on human health. By polluting fuels is understood as wood, coal, animal dung, charcoal, and crop wastes, as well as kerosene.
Air pollution is the biggest environmental risk to health. The majority of the burden is borne by the populations in low and middle-income countries.

Concepts:

The mortality resulting from exposure to ambient (outdoor) air pollution and household (indoor) air pollution from polluting fuels use for cooking was assessed. Ambient air pollution results from emissions from industrial activity, households, cars and trucks which are complex mixtures of air pollutants, many of which are harmful to health. Of all of these pollutants, fine particulate matter has the greatest effect

on human health. By polluting fuels is understood kerosene, wood, coal, animal dung, charcoal, and crop wastes.

Comments and limitations:

An approximation of the combined effects of risk factors is possible if independence and little correlation between risk factors with impacts on the same diseases can be assumed (Ezzati et al, 2003). In the case of air pollution, however, there are some limitations to estimate the joint effects: limited knowledge on the distribution of the population exposed to both household and ambient air pollution, correlation of exposures at individual level as household air pollution is a contributor to ambient air pollution, and non-linear interactions (Lim et al, 2012; Smith et al, 2014). In several regions, however, household air pollution remains mainly a rural issue, while ambient air pollution is predominantly an urban problem. Also, in some continents, many countries are relatively unaffected by household air pollution, while ambient air pollution is a major concern. If assuming independence and little correlation, a rough estimate of the total impact can be calculated, which is less than the sum of the impact of the two risk factors.

Methodology

Computation Method:

Attributable mortality is calculated by first combining information on the increased (or relative) risk of a disease resulting from exposure, with information on how widespread the exposure is in the population (e.g. the annual mean concentration of particulate matter to which the population is exposed, proportion of population relying primarily on polluting fuels for cooking).

This allows calculation of the 'population attributable fraction' (PAF), which is the fraction of disease seen in a given population that can be attributed to the exposure (e.g in that case of both the annual mean concentration of particulate matter and exposure to polluting fuels for cooking).

Applying this fraction to the total burden of disease (e.g. cardiopulmonary disease expressed as deaths), gives the total number of deaths that results from exposure to that particular risk factor (in the example given above, to ambient and household air pollution).

To estimate the combined effects of risk factors, a joint population attributable fraction is calculated, as described in Ezzati et al (2003).

The mortality associated with household and ambient air pollution was estimated based on the calculation of the joint population attributable fractions assuming independently distributed exposures and independent hazards as described in (Ezzati et al, 2003).

The joint population attributable fraction (PAF) were calculated using the following formula:
PAF=1-PRODUCT (1-PAFi)
where PAFi is PAF of individual risk factors.

The PAF for ambient air pollution and the PAF for household air pollution were assessed separately, based on the Comparative Risk Assessment (Ezzati et al, 2002) and expert groups for the Global Burden of Disease (GBD) 2010 study (Lim et al, 2012; Smith et al, 2014).

For exposure to ambient air pollution, annual mean estimates of particulate matter of a diameter of less than 2.5 um (PM25) were modelled as described in (WHO 2016, forthcoming), or for Indicator 11.6.2.

For exposure to household air pollution, the proportion of population with primary reliance on polluting fuels use for cooking was modelled (see Indicator 7.1.2 [polluting fuels use=1-clean fuels use]). Details on the model are published in (Bonjour et al, 2013).

The integrated exposure-response functions (IER) developed for the GBD 2010 (Burnett et al, 2014) and further updated for the GBD 2013 study (Forouzanfar et al, 2015) were used.

The percentage of the population exposed to a specific risk factor (here ambient air pollution, i.e. PM2.5) was provided by country and by increment of 1 ug/m3; relative risks were calculated for each PM2.5 increment, based on the IER. The counterfactual concentration was selected to be between 5.6 and 8.8 ug/m3, as described elsewhere (Ezzati et al, 2002; Lim et al, 2012). The country population attributable fraction for ALRI, COPD, IHD, stroke and lung cancer were calculated using the following formula :

$$PAF=SUM(Pi(RR-1)/(SUM(RR-1)+1)$$

where i is the level of PM2.5 in ug/m3, and Pi is the percentage of the population exposed to that level of air pollution, and RR is the relative risk.

The calculations for household air pollution are similar, and are explained in detailed elsewhere (WHO 2014a).

Disaggregation:

The data is available by country, by sex, by disease, and by age.

Treatment of missing values:

- At country level

  Countries with no data are reported as blank.

- At regional and global levels

  Countries with no data are not reported in the regional and global averages.

Regional aggregates:

Number of deaths by country is summed and divided by the population of countries included in the region (regional aggregates) or by the total population (global aggregates).

Sources of discrepancies:

Underlying differences between country produced and internationally estimated data may due to :
- Different exposure data (annual mean concentration of particulate matter of less than 2.5 um of diameter, proportion of population using clean fuels and technology for cooking)
- Different exposure-risk estimates
- Different underlying mortality data

Data Sources

Exposure: Indicator 7.1.2 was used as exposure indicator for household air pollution.

Annual mean concentration of particulate matter of less than 2.5 um was used as exposure indicator for ambient air pollution. The data is modelled according to methods described for Indicator 11.6.2.

Exposure-risk function: The integrated exposure-response functions (IER) developed for the GBD 2010 (Burnett et al, 2014) and further updated for the GBD 2013 study (Forouzanfar et al, 2015) were used.

Health data: The total number of deaths by disease, country, sex and age group have been developed by the World Health Organization (WHO 2014b).

Data Availability

Data is available by country, sex, disease and age.

Calendar

NA

Data providers

Ministry of Health, Ministry of Environment.

Data compilers

WHO

References

URL:

www.who.int/gho/phe

References:

Bonjour et al (2013). Environ Health Perspect, doi:10.1289/ehp.1205987.

Burnett et al (2014). Environ Health Perspect,Vol 122, Issue 4.

Ezzati et al (2003). The Lancet, 362:271-80.

Ezzati et al (2002). The Lancet. 360(9343):1347-60.

Forouzanfar et al (2015). The Lancet, 386:2287-323.

Lim et al (2012). The Lancet, 380(9859):2224-60.

Smith et al (2014). Annu.Rev.Public Health, Vol 35.

WHO (2014a). Methods description for the burden of disease attributable to household air pollution. Access at : http://www.who.int/phe/health_topics/outdoorair/database/HAP_BoD_methods_March2014.pdf?ua=1

WHO (2014b). Global Health Estimates 2013: Deaths by Cause, Age and Sex, by Country, 2000-2012 (provisional estimates). Geneva, World Health Organization, 2014.

WHO (2016, forthcoming). Air pollution: a global assessment of exposure and burden of disease, WHO Geneva.

Related indicators

11.6.2:
Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

7.1.2:
Proportion of population with primary reliance on clean fuels and technology
Comments:

Goal 3: Ensure healthy lives and promote well-being for all at all ages
Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
Indicator 3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services) as defined as the number of deaths from unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe WASH services) in a year, divided by the population, and multiplied by 100,000.

Rationale:

The indicator expresses the number of deaths from inadequate water, sanitation and hygiene (with focus on WASH services) which could be prevented by improving those services and practices. It is based on both the WASH service provision in the country, as well as the related health outcomes, and therefore provides important information on the actual disease caused by the risks measured in 6.1, 6.2 and 6.3.

Concepts:

Deaths attributable to unsafe water, sanitation and hygiene focusing on inadequate WASH services, expressed per 100,000 population; The included diseases are the WASH attributable fractions of diarrhoea (ICD-10 code A00, A01, A03, A04, A06-A09), intestinal nematode infections (ICD-10 code B76-B77, B79) and protein-energy malnutrition (ICD-10 code E40-E46).

Comments and limitations:

Data rely on (a) statistics on WASH services (6.1, 6.2 and 6.3), which are well assessed in almost all countries, and (b) data on deaths. Data on deaths are also widely available from countries from death registration data or sample registration systems, which are certainly feasible systems. Such data are crucial for improving health and reducing preventable deaths in countries. The main limitation is that not all countries do have such registration systems to date, and data need to be completed with other type of information.

Methodology

Computation Method:

The methods with agreed international standard have been developed, reviewed and published in various documents:

http://www.who.int/water_sanitation_health/gbd_poor_water/en/

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4255749/

Disaggregation:

Since this indicator is population-based, geographic location is the most natural disaggregation. Data also exists for age group and sex. Similar to JMP's work on disaggregation by income groups (wealth quintile), data can further be disaggregated by wealth quintile.

Treatment of missing values:

- At country level

  Data are available for practically all countries. They are, however, sometimes based on health statistics provided by international agencies as the national data are incomplete, which have been interpolated/ extrapolated, adjusted, and completed by additional data and cause-of-death models. A more detailed description of the methods is provided in http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2012.pdf

- At regional and global levels

  NA

Regional aggregates:

Country estimates of number of deaths by cause are summed to obtain regional and global aggregates.

Sources of discrepancies:

WHO is required by World Health Assembly resolution to consult on all WHO statistics, and seek feedback from countries on data about countries and territories. Before publishing, all estimates undergo country consultations.

Data Sources

Description:

Data is compiled mainly from country and other databases directly. To maximize the data for robust estimates, as well as to reduce duplication of data collection to avoid further data reporting burden on countries, complementary data are used from various databases.

Collection process:

WHO conducts a formal country consultation process before releasing its cause-of-death estimates.

Data Availability

Description:

Data are available for practically all countries. They are, however, sometimes based on health statistics provided by international agencies as the national data are incomplete.
Actual country data for 2010 onwards period
Asia and Pacific - 27% of countries (16 out of 59 countries, including China and India sample systems)
Africa - 6% of countries (3 out of 54 countries)
Latin America and the Caribbean - 56% of countries (19 out of 34 countries)
Europe, North America, Australia, New Zealand and Japan -
94% of countries (44 out of 47 countries, missing are mainly very small countries)

For the period 2000-2009
Asia and Pacific - 27% of countries (16 out of 59 countries, including China and India sample systems)
Africa - 6% of countries (3 out of 54 countries)
Latin America and the Caribbean - 56% of countries (19 out of 34 countries)
Europe, North America, Australia, New Zealand and Japan - 94% of countries (44 out of 47 countries, missing are mainly very small countries)

Web link to the database:
http://apps.who.int/gho/data/node.home

The indicator has been established and available for more than a decade.
http://apps.who.int/gho/data/node.main.INADEQUATEWSH?lang=en
http://www.who.int/water_sanitation_health/gbd_poor_water/en/

WHO has been collating country figures and has been using these to produce global and regional estimates against this indicator.

Time series:

Limited time series data is available (comparable series for years 2012 and soon 2015; data for 2002 are also available but have more limited comparability)

Calendar

Data collection:

Ongoing

Data release:

2017, first quarter

Data providers

National statistics offices, Various line ministries and databases covering civil registration with complete coverage and medical certification of cause of death.

Data compilers

WHO

References

URL:

http://www.who.int/water_sanitation_health/gbd_poor_water/en/

References:

1. WHO indicator definition http://apps.who.int/gho/data/node.imr.SDGWSHBOD?lang=en http://www.who.int/water_sanitation_health/gbd_poor_water/en/

2. WHO methods and data sources for global causes of death, 2000–2012 (http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2012.pdf?ua=1).

Related indicators

Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Indicator 3.9.3: Mortality rate attributed to unintentional poisoning

Institutional information

Organization(s):

World Health Organization (WHO)

Concepts and definitions

Definition:

The mortality rate attributed to unintentional poisoning as defined as the number of deaths of unintentional poisonings in a year, divided by the population, and multiplied by 100 000.

Rationale:

Measuring how the mortality rate from unintentional poisonings provides an indication of the extent of inadequate management of hazardous chemicals and pollution, and of the effectiveness of a country's health system.

Concepts:

Mortality rate in the country from unintentional poisonings per year. The ICD-10 codes corresponding to the indicator includes X40, X43-X44, X46-X49.

Comments and limitations:

Data on deaths are widely available from countries from death registration data or sample registration systems, which are feasible systems, but good quality data are not yet available in all countries. Such data are crucial for improving health and reducing preventable deaths in countries. For countries that do not have such registration systems, data need to be completed with other types of information.

Methodology

Computation Method:

The methods with agreed international standards have been developed, reviewed and published in various documents.

The methods used for the analysis of causes of death depend on the type of data available from countries.

For countries with a high-quality vital registration system including information on cause of death, the vital registration that member states submit to the WHO Mortality Database were used, with adjustments where necessary, e.g. for under-reporting of deaths.

For countries without high-quality death registration data, cause of death estimates are calculated using other data, including household surveys with verbal autopsy, sample or sentinel registration systems, special studies and surveillance systems. In most cases, these data sources are combined in a modelling framework.

Complete methodology may be found here:
http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2012.pdf?ua=1

Disaggregation:

Data can be disaggregated by age group, sex and disease.

Treatment of missing values:

- At country level

  Data for missing country-years are interpolated or extrapolated, according to the data available. For countries with missing data, they are being provided by international agencies, which have been interpolated/ extrapolated, adjusted, and completed by additional data and cause-of-death models. A more detailed description of the methods is provided in http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2012.pdf

- At regional and global levels

  NA

Regional aggregates:

Country estimates of number of deaths by cause are summed to obtain regional and global aggregates

Sources of discrepancies:

WHO is required by World Health Assembly resolution to consult on all WHO statistics, and seek feedback from countries on data about countries and territories. Before publishing all estimates undergo country consultations.

Data Sources

Description:

Data inputs to the estimate include (a) data on WASH services and practices, and (b) cause-of-death data, of which the preferred data source is death registration systems with complete coverage and medical certification of cause of death. Other possible data sources include household surveys with verbal autopsy, sample or sentinel registration systems, special studies and surveillance systems.

Collection process:

WHO collects data directly from country sources, and following established method, estimates are shared with countries to receive their feedback before publication. See Indicator 6.1 above for more details.

Data Availability

Description:

Data availability for period 2010 onwards:
Asia and Pacific - 27% of countries (16 out of 59 countries, including China and India sample systems)
Africa - 6% of countries (3 out of 54 countries)
Latin America and the Caribbean - 56% of countries (19 out of 34 countries)
Europe, North America, Australia, New Zealand and Japan - 94% of countries (44 out of 47 countries, missing are mainly very small countries)

Data Availability (2000-2009)
Asia and Pacific - 27% of countries (16 out of 59 countries, including China and India sample systems)
Africa - 6% of countries (3 out of 54 countries)
Latin America and the Caribbean - 56% of countries (19 out of 34 countries)
Europe, North America, Australia, New Zealand and Japan - 94% of countries (44 out of 47 countries, missing are mainly very small countries)

Web link to the database:

The latest global, regional and country-level cause-specific mortality estimates, including unintentional poisonings, for the year 2000 and 2012 (published in 2014) are available for download from the WHO website. http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html The estimates can also be accessed interactively through the Global Health Observatory http://www.who.int/gho/mortality_burden_disease/en/

Time series:

Limited time series data is available (comparable series for years 2012 and soon 2015; data for 2000 are also available but have more limited comparability)

Calendar

Data collection:

Ongoing

Data release:

End of 2016

Data providers

National statistics offices, various line ministries and databases covering civil registration with complete coverage and medical certification of cause of death.

Data compilers

WHO

References

URL:

http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html

References:

WHO indicator definition (http://apps.who.int/gho/data/node.imr.SDGPOISON?lang=en)

WHO methods and data sources for global causes of death, 2000–2012 (http://www.who.int/healthinfo/global_burden_disease/GlobalCOD_method_2000_2012.pdf?ua=1)

Related indicators

Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology