Life expectancy at birth

Rationale for use

Life expectancy at birth reflects the overall mortality level of a population. It summarizes the mortality pattern that prevails across all age groups - children and adolescents, adults and the elderly.

Definition

Average number of years that a newborn is expected to live if current mortality rates continue to apply.

Associated terms

A life table presents a set of tabulations that describe the probability of dying, the death rate and the number of survivors for each age or age group. Accordingly, life expectancy at birth is an output of a life table.

Data sources

Vital registration, census and surveys: Age-specific mortality rates required to compute life expectancy at birth.

Methods of estimation

WHO has developed a model life table based on about 1800 life tables from vital registration judged to be of good quality.

For countries with vital registration, the level of completeness of recorded mortality data in the population is assessed and mortality rates are adjusted accordingly. Where vital registration data for 2003 were available, these were used directly to construct the life table. For countries where the information system provided a time series of annual life tables, parameters from the life table were projected using a weighted regression model, giving more weight to recent years. Projected values of the two life table parameters were then applied to the modified logit life table model, where the most recent national data provided an age pattern, to predict the full life table for 2003.

In case of inadequate sources of age-specific mortality rates, the life table is derived from estimated under-5 mortality rates and adult mortality rates that are applied to a global standard (defined as the average of all the 1800 life tables) using a modified logit model.

Disaggregation

By sex, location (urban/rural, major regions/provinces).

References

- Modified logit life table system: principles, empirical validation and application

Database

- WHO Mortality Database: Civil registration data (http://www.who.int/healthinfo/morttables)

Comments

The lack of complete and reliable mortality data, especially for low income countries and particularly on mortality among adults and the elderly, necessitates the application of modelling (based on data from other populations) to estimate life expectancy.
Healthy life expectancy (HALE)

Rationale for use

Substantial resources are devoted to reducing the incidence, duration and severity of major diseases that cause morbidity but not mortality and to reducing their impact on people’s lives. It is important to capture both fatal and non-fatal health outcomes in a summary measure of average levels of population health. Healthy life expectancy (HALE) at birth adds up expectation of life for different health states, adjusted for severity distribution making it sensitive to changes over time or differences between countries in the severity distribution of health states.

Definition

Average number of years that a person can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury.

Data sources

Death registration data reported annually to WHO: Mortality data for calculation of life tables. For countries without such data, available survey and census sources of information on child and adult mortality are analysed and used to estimate life tables.

WHO Global Burden of Disease (GBD) study, WHO Multi-Country Survey Study (MCSS) and World Health Survey (WHS). Estimation of prevalence data. The GBD study draws on a wide range of data sources to develop internally consistent estimates for the incidence, prevalence, duration and years lived with disability for 135 major causes. The World Health Survey, carried out by WHO in more than 70 countries, uses anchoring vignettes to maximize comparability of self-report capacities for a set of core health domains. It also includes a health state valuation module for assessing the severity of reported health states.

Methods of estimation

Since comparable health state prevalence data are not available for all countries, a four-stage strategy is used:

Data from the WHO GBD study are used to estimate severity-adjusted prevalence by age and sex for all countries.

Data from the WHO MCSS and WHS are used to make independent estimates of severity-adjusted prevalence by age and sex for survey countries.

Prevalence for all countries is calculated based on GBD, MCSS and WHS estimates.

Life tables constructed by WHO are used with Sullivan's method to compute HALE for countries.

Disaggregation

By age and sex.

References
- The world health report 2004 - changing history
(http://www.who.int/whr/2004/en)

- Health systems performance assessment: debates, methods and empiricism.

Database

- Burden of Disease: (http://www.who.int/entity/healthinfo/statistics/bodgbdddeathdalystimates.xls)
Statistical measures relating to the burden of disease. Includes: Healthy Life Expectancy (HALE); Life Expectancy; Discussion Papers. Also, this is where to find manuals, resources and software for carrying out national burden of disease studies.

Comments

The first challenge is lack of reliable data on mortality and morbidity, especially from low income countries. Other issues include lack of comparability of self-reported data from health interviews and the measurement of health-state preferences for such self-reporting.
**Probability of dying (per 1 000) between ages 15 and 60 years (adult mortality rate)**

**Rationale for use**

Disease burden from non-communicable diseases among adults - the most economically productive age span - is rapidly increasing in developing countries due to ageing and health transitions. Therefore, the level of adult mortality is becoming an important indicator for the comprehensive assessment of the mortality pattern in a population.

**Definition**

Probability that a 15 year old person will die before reaching his/her 60th birthday.

**Associated terms**

The **probability of dying** between the ages of 15 and 60 years (per 1 000 population) per year among a hypothetical cohort of 100 000 people that would experience the age-specific mortality rate of the reporting year.

**Life table** (see Life expectancy at birth).

**Data sources**

Civil or sample registration: Mortality by age and sex are used to calculate age specific rates.

Census: Mortality by age and sex tabulated from questions on recent deaths that occurred in the household during a given period preceding the census (usually 12 months).

Census or surveys: Direct or indirect methods provide adult mortality rates based on information on survival of parents or siblings.

**Methods of estimation**

Empirical data from different sources are consolidated to obtain estimates of the level and trend in adult mortality by fitting a curve to the observed mortality points. However, to obtain the best possible estimates, judgement needs to be made on data quality and how representative it is of the population. Recent statistics based on data availability in most countries are point estimates dated by at least 3-4 years which need to be projected forward in order to obtain estimates of adult mortality for the current year.

When no adequate source of age-specific mortality exists, the life table is derived as described in the life expectancy indicator.

**Disaggregation**

By sex, location (urban/rural, major regions/provinces) and socio-economic characteristics (e.g. education, wealth quintile). Censuses and surveys provide such detail; civil registration data usually does not include socio-economic variables but can provide the other disaggregations.

**References**

Database

- WHO Mortality Database: Civil registration data (http://www.who.int/healthinfo/morttables)

Comments

There is a dearth of data on adult mortality, notably in low income countries. Methods to estimate adult mortality from censuses and surveys are retrospective and possibly subject to considerable measurement error.
Probability of dying (per 1000) under age five years (under-five mortality rate)
Probability of dying (per 1000) under age one year (infant mortality rate)

Rationale for use

Under-five mortality rate and infant mortality rate are leading indicators of the level of child health and overall development in countries. They are also MDG indicators.

Definition

Under-five mortality rate is the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period.

Infant mortality rate is the probability of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates of that period.

Associated terms

Under-five mortality rate and Infant mortality rate, are strictly speaking, not rates (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 rate per 1000 live births.

Live birth refers to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born.

Data sources

Age-specific mortality rates among children are calculated from birth and death data derived from civil registration, census, and/or household surveys:

Civil registration: Number of deaths by age and numbers of births and children in each age group are used to calculate age specific rates. This systems provides annual data.

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 born and how many are still alive. The Brass method and model life tables are then used to obtain an estimate of under-five mortality.

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. To reduce sampling errors, the estimates are generally presented as period rates, for five or 10 years preceding the survey.

Methods of estimation

Empirical data from different sources are consolidated to obtain estimates of the level and trend in under-five mortality by fitting a curve to the observed mortality points. However, to obtain the best possible estimates, judgement needs to be made on data quality and how representative it is
of the population. Recent statistics based on data availability in most countries are point estimates dated by at least 3-4 years which need to be projected forward in order to obtain estimates of under-five mortality for the current year. Those are then converted to their corresponding infant mortality rates through model life table systems: the one developed by WHO for countries with adequate vital registration data; Coale-Demeny model life tables for the other countries. It should be noted that the infant mortality from surveys are exposed to recall bias, hence their estimates are derived from under-five mortality, which leads to a supplementary step to estimate infant mortality rates.

Disaggregation

By sex, location (urban/rural, major regions/provinces) and socio-economic characteristics (e.g., mother’s education, wealth quintile). Often disaggregated under-five mortality rates are presented for 10-year periods because of the rapid increase in sampling error if multiple categories are used. Censuses and surveys provide such detail; civil registration data usually does not include socio-economic variables but can provide the other disaggregations.

References


Database

- Demographic and Health Surveys (http://www.measuredhs.com)

- WHO Mortality Database: Civil registration data (http://www.who.int/healthinfo/mortables)

- UNICEF: statistics and Multiple Indicator Cluster Survey: (http://www.childinfo.org)

Comments

Even though many countries have collected information on child mortality in recent years, the high demand for very recent child mortality trend information is difficult to meet through household surveys. High quality of civil registration systems (completeness of registration) and high quality of survey or census data collection are crucial - WHO does estimate the level of underestimation of civil registration systems and there clearly is substantial variation in data quality and consistency across countries.
Neonatal mortality rate (per 1 000 live births)

Rationale for use

Neonatal deaths account for a large proportion of child deaths. Mortality during neonatal period is considered a useful indicator of both maternal and newborn health and care.

Definition

Number of deaths during the first 28 completed days* of life per 1 000 live births in a given year or period.

* Neonatal deaths may be subdivided into early neonatal deaths, occurring during the first seven days of life, and late neonatal deaths, occurring after the seventh day but before the 28 completed days of life.

Associated terms

The neonatal period commences at birth and ends 28 completed days after birth.

Live birth (see Probability of dying under age 5 years).

Data sources

Vital registration: The number of live births and number of neonatal deaths are used to calculate age specific rates.

Household surveys: Calculations are based on birth history - a series of detailed questions on each child a woman has given birth to during her lifetime. The estimates are generally presented as period rates for the five-year periods preceding the survey. The total number of births surveyed provides the denominator.

Methods of estimation

Empirical data are used. When no survey or registration data point is available, the neonatal mortality rate is estimated from the under-5 mortality using a regression adjusted for AIDS.

Disaggregation

By sex, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. mother’s education level, wealth quintile).

References

- WHO Mortality Database: Estimated completeness of mortality data for latest year. (http://www.who.int/healthinfo/morttables)


Database

- Demographic and Health Surveys (DHS): (http://www.measuredhs.com)
- WHO, European Office. HFA database: (http://www.euro.who.int/hfadb)

Comments

The reliability of the neonatal mortality estimates depends on accuracy and completeness of reporting and recording of births and deaths. Underreporting and misclassification are common, especially for deaths occurring early on in life.

Perinatal mortality, defined as number of stillbirths and deaths in the first week of life per 1 000 live births, is a useful additional indicator, since majority of neonatal births occur during the first week of life.
Maternal mortality ratio (per 100 000 live births)

Rationale for use

Complications during pregnancy and childbirth are leading causes of death and disability among women of reproductive age in developing countries. Maternal mortality ratio (MMR) represents the risk associated with each pregnancy, i.e. the obstetric risk. It is also an MDG indicator for monitoring goal 5 of improving maternal health.

Definition

Number of maternal deaths per 100 000 live births during a specified time period, usually one year.

Associated terms

Maternal death is 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 but not from accidental or incidental causes. To facilitate the identification of maternal deaths in circumstances in which cause of death attribution is inadequate, ICD 10 introduced an additional category: Pregnancy-related death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Live birth (see Probability of dying under age 5 years).

Data sources

Vital registration, household surveys, census, health service records and specific studies on reproductive age mortality (RAMOS).

Methods of estimation

Measuring maternal mortality accurately is difficult except where comprehensive registration of deaths and their causes exist. Elsewhere, censuses or surveys can be used to measure levels of maternal mortality. Data derived from health services records are problematic where not all births take place in health facilities because of biases whose dimensions and direction cannot be determined. Reproductive-age mortality studies (RAMOS) use triangulation of different sources of data on deaths of women of reproductive age including record review and/or verbal autopsy to accurately identify maternal deaths. Based on multiple sources of information, RAMOS are considered the best way to estimate levels of maternal mortality. Estimates derived from household surveys are usually based on information retrospectively collected about the deaths of sisters of the respondents and could refer back up to an average 12 years and they are subject to wide confidence intervals. For countries without any reliable data on maternal mortality, statistical models are applied. Global and regional estimates of maternal mortality are developed every five years, using a regression model.

Disaggregation

By age and parity, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. education level, wealth quintile).

References


**Database**

None.

**Comments**

Maternal deaths are relatively rare events which makes them prone to measurement errors in addition to the problems in their accurate identification. Many low-income countries have no or very little data and modeling is used to obtain a national estimate.
- Estimated rate of adults (15 years and older) dying of HIV/AIDS (per 1,000)
- Estimated rate of children below 15 years of age dying of HIV/AIDS (per 1,000)

Rationale for use

Adult and children below 15 mortality rate are leading indicators of the level of impact of HIV/AIDS epidemic and impact of interventions specially scale up of treatment and prevention to mother to child transmission in countries.

Definition

Estimated mortality due to HIV/AIDS is the number of adults and children that have died in a specific year based on the modeling of HIV surveillance data using standard and appropriate tools.

Associated terms

Adult mortality rate and children mortality rate. are strictly speaking, rates, ie: the number of deaths divided by the number of population at risk during a certain period of time and expressed as rate per 100,000 people.

Data sources

Adult and children-specific mortality rates are calculated from HIV surveillance data derived from sentinel surveillance and or household surveys.

Methods of estimation

Empirical data from different HIV surveillance sources are consolidated to obtain estimates of the level and trend in adults and children mortality by using standard methods and tools for HIV estimates appropriate to the level of HIV epidemic. However, to obtain the best possible estimates, judgment needs to be made on data quality and how representative it is of the population. UNAIDS/WHO produce country specific estimates every two years.

Disaggregation

By sex for adults mortality.

References


Database

- Demographic and Health Surveys: (http://www.measuredhs.com)
- WHO Mortality Database: Civil registration data (http://www.who.int/healthinfo/morttables)
Comments

Even though many countries have collected information on adult and children mortality in recent years, many countries present underreporting systems due in part to stigma and lack of diagnosis. High quality of civil registration systems (completeness of registration) and high quality of survey or census data collection are crucial - WHO does estimate the level of underestimation of civil registration systems and there clearly is substantial variation in data quality and consistency across countries.
**Tuberculosis mortality**

**Rationale for use**

Prevalence and mortality are direct indicators of the burden of tuberculosis (TB), indicating the number of people suffering from the disease at a given point in time, and the number dying each year. Furthermore, prevalence and mortality respond quickly to improvements in control, as timely and effective treatment reduce the average duration of disease (thus decreasing prevalence) and the likelihood of dying from the disease (thus reducing diseasespecific mortality).

Millennium Development Goal 6 is "to combat HIV/AIDS, malaria and other diseases" [including TB]. This goal is linked to target 8 – "to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases" – and indicator 24 – "prevalence and mortality rates associated with TB". The Stop TB Partnership has endorsed the related targets of reducing per capuer TB prevalence and mortality by 50% relative to 1990, by the year 2015. There are few good data with which to establish TB prevalence and mortality, particularly for the baseline year of 1990. However, current best estimates suggest that implementation of the Global Plan to Stop TB 2006–2015 will halve 1990 prevalence and mortality rates globally and in most regions by 2015, though not in Africa and eastern Europe.

**Definition**

Estimated number of deaths due to TB in given time period. Expressed in this database as deaths per 100 000 population per year. Includes deaths from all forms of TB, and deaths from TB in people with HIV.

**Definition of associated terms**

**All forms**: pulmonary (smear-positive and smear-negative) and extrapulmonary tuberculosis.

**Sources**

Vital registration data where available (few countries with high burdens of TB have complete vital registration systems with good coverage). Elsewhere, mortality is estimated from incidence [please link to incidence page of compendium].

**Methods of estimation**

Estimates of TB incidence, prevalence and mortality are based on a consultative and analytical process in WHO and are published annually (see reference 5).

The methods used to estimate TB mortality rates are described in detail elsewhere (references 3–5). Country-specific estimates of TB mortality are, in most instances, derived from estimates of incidence [please link to incidence page of compendium], combined with assumptions about the case fatality rate. The case fatality rate is assumed to vary according to whether the disease is smear-positive or not; whether the individual receives treatment in a DOTS programme or non-DOTS programmes, or is not treated at all; and whether the individual is infected with HIV.

**Disaggregation**

Estimates are routinely disaggregated into smear-positive and other forms of disease, and by HIV status (in adults 15–49 yrs).
References


Database

- Global TB database: (http://www.who.int/tb/country/global_tb_database)

Comments

TB mortality can be measured directly only where there is a good vital registration system, with accurate coding of cause-of-death. The number of patients dying while on TB treatment (as reported in routine follow-up of cohorts of TB patients) is not an indication of true TB mortality, as it includes deaths from causes other than TB, and excludes deaths from TB among people not on treatment.

Mortality surveys and demographic surveillance systems using verbal autopsy to determine cause of death are a potential source of improved estimates of TB mortality.
Age-standardized death rates per 100,000 by cause

Rationale for use

The numbers of deaths per 100,000 population are influenced by the age distribution of the population. Two populations with the same age-specific mortality rates for a cause of death will have different overall death rates if the age distributions of their populations are different. Age-standardized mortality rates adjust for differences in population age distribution by applying the observed age-specific mortality rates for each population to a standard population.

Definition

The age-standardized mortality rate is a weighted average of the age-specific mortality rates per 100,000 persons, where the weights are the proportions of persons in the corresponding age groups of the WHO standard population.

Associated terms

None

Data sources

Death registration data for 112 WHO Member States, sample registration systems (India, China), available data on child and adult mortality from censuses and surveys, together with population-based epidemiological studies, disease registers and notifications systems for the estimation of mortality due to 21 specific causes of death.

Methods of estimation

Life tables specifying all-cause mortality rates by age and sex for 192 WHO Member States were developed for 2002 from available death registration data, sample registration systems (India, China) and data on child and adult mortality from censuses and surveys. Cause of death distributions were estimated from death registration data for 107 countries, together with data from population-based epidemiological studies, disease registers and notifications systems for selected specific causes of death. Causes of death for populations without useable death registration data were estimated using cause-of-death models together with data from population-based epidemiological studies, disease registers and notifications systems for 21 specific causes of death.

Disaggregation

By age and sex.

References


Database

- WHO Mortality Database: (http://www.who.int/healthinfo/statistics/mortality/en/index.html) The data available on this web site comprise deaths registered in national vital registration systems, with underlying cause of death as coded by the relevant national authority.

- Estimates of death rates for 2002 by cause for WHO Member States. The Excel spreadsheet contains estimates of numbers, crude rates and age-standardized rates, as well as information on data sources and levels of evidence. (http://www.who.int/entity/healthinfo/statistics/bodgbddaydeath Dalyestimates.xls)

Comments

Uncertainty in estimated all-cause mortality rates range from around ±1% for high-income countries to ± 15-20% for Sub-Saharan Africa, reflecting large differences in the availability and quality of data on mortality, particularly for adult mortality. Uncertainty ranges are generally larger for estimates of death rates from specific diseases. For example, the relative uncertainty for death rates from ischaemic heart disease ranges from around ±12% for high-income countries to ± 25-35% for Sub-Saharan Africa. The relatively large uncertainty for high-income countries reflects a combination of uncertainty in overall mortality levels, in cause of death assignment, and in the attribution of deaths coded to ill-defined causes.
Years of life lost (percentage of total)

Rationale for use

Years of life are lost (YLL) take into account the age at which deaths occur by giving greater weight to deaths at younger age and lower weight to deaths at older age. The years of life lost (percentage of total) indicator measures the YLL due to a cause as a proportion of the total YLL lost in the population due to premature mortality.

Definition

YLL are calculated from the number of deaths multiplied by a standard life expectancy at the age at which death occurs. The standard life expectancy used for YLL at each age is the same for deaths in all regions of the world and is the same as that used for the calculation of Disability Adjusted Life Years (DALY). Additionally 3% time discounting and non-uniform age weights which give less weight to years lived at young and older ages were used as for the DALY. With non-uniform age weights and 3% discounting, a death in infancy corresponds to 33 YLL, and deaths at ages 5 to 20 to around 36 YLL.

Associated terms

The Disability Adjusted Life Year or DALY is a health gap measure that extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of ‘healthy’ life lost by virtue of being in states of poor health or disability (1). DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition.

Data sources

Death registration data for 112 WHO Member States, sample registration systems (India, China), available data on child and adult mortality from censuses and surveys, together with opulation-based epidemiological studies, disease registers and notifications systems for the estimation of mortality due to 21 specific causes of death.

Methods of estimation

Life tables specifying all-cause mortality rates by age and sex for 192 WHO Member States were developed for 2002 from available death registration data, sample registration systems (India, China) and data on child and adult mortality from censuses and surveys. Cause of death distributions were estimated from death registration data for 107 countries, together with data from population-based epidemiological studies, disease registers and notifications systems for selected specific causes of death. Causes of death for populations without useable death registration data were estimated using cause-of-death models together with data from population-based epidemiological studies, disease registers and notifications systems for 21 specific causes of death.

Disaggregation

By age and sex.

References


Database

The data available on this website comprise deaths registered in national vital registration systems, with underlying cause of death as coded by the relevant national authority.

- Death and Disability Adjusted Life Years (DALY) estimates for 2002 by cause for WHO Member States. The Excel spreadsheet contains estimates of numbers, crude rates and age-standardized rates, as well as information on data sources and levels of evidence. (http://www.who.int/entity/healthinfo/statistics/bodgbddeathdalyestimates.xls)

Comments

Uncertainty in estimated all-cause YLL ranges from around ±1% for high-income countries to ±15-20% for Sub-Saharan Africa, reflecting large differences in the availability of data on mortality, particularly for adult mortality. Uncertainty ranges are generally larger for estimates of deaths from specific diseases. For example, the relative uncertainty for deaths from ischaemic heart disease ranges from around ±12% for high-income countries to ±25-35% for Sub-Saharan Africa. The relatively large uncertainty for high-income countries reflects a combination of uncertainty in overall mortality levels, in cause of death assignment, and in the attribution of deaths coded to ill-defined causes.
Causes of death among children under five years of age (percentage)

Rationale for use

MDG4 consists in the reduction of under-five mortality by two thirds in 2015, from its level in 1990. Child survival efforts can be effective only if they are based on reasonably accurate information about the causes of childhood deaths. Cause-of-death information is needed to prioritize interventions and plan for their delivery, to determine the effectiveness of disease-specific interventions, and to assess trends in disease burden in relation to national and international goals.

Definition

The causes of death (CoD) as entered on the medical certificate of cause of death in countries with civil (vital) registration system. The underlying cause of death is being analysed. In countries with incomplete or no civil registration, causes of death are those reported as such in epidemiological studies that use verbal autopsy algorithms to establish CoD.

Associated terms

Under-5 mortality rate 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 rate per 1 000 live births.

Underlying cause of death has been defined as “(a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury”.

Data sources

WHO regularly receives mortality-by-cause data from its Member States as recorded in national civil(vital) registration systems. Those statistics were therefore analysed to obtain the distribution of child deaths by cause in 72 countries where those systems are judged to be sound (based on reliable diagnostic procedures and standard application of cause coding which follows the rules of the International Statistical Classification of Diseases and Related Health Problems (ICD) as applied to death certificates) and have coverage rates of 85% or above. These are all from high- and middle-income countries. For countries with incomplete or no vital registration system, epidemiological studies and statistical modelling were extensively used.

Methods of estimation

Causes-of-death data from civil registration systems were evaluated for their completeness. Complete and nationally-representative data were then grouped by ICD codes into the cause categories and their proportions to total under-five deaths were then computed. For countries with incomplete data or no data, the distribution of deaths by cause was estimated in two steps. In the first step, a statistical model was used to assign deaths to one of three broad categories of causes: communicable diseases; non-communicable diseases; or injuries and external causes. In a second step, cause-specific under-five mortality estimates from Child Health Epidemiology Reference Group (CHERG), WHO Technical Programmes, and the Joint United Nations Programme on HIV/AIDS (UNAIDS) were taken into account in assigning the distribution of deaths to specific causes. A variety of methods, including proportional mortality and natural
history models, were used by CHERG and WHO to develop country-level cause-specific mortality estimates. All CHERG working groups developed comparable and standardized procedures to generate estimates from the databases.

Disaggregation

Country level, age groups (neonatal (0-27 days) and 28 days - 59 months)

References


Database


- Department of Child and Adolescent Health and Development (CAH) web site: (http://www.who.int/child-adolescent-health/OVERVIEW/CHILD_HEALTH/child_epidemiology.htm)

Comments

The under-five deaths were estimated for 8 cause categories only. There are still estimates of some of the major causes of child deaths (e.g. injuries) that have not yet been developed using the CHERG methods. Also, a better understanding of the indirect contributions of diseases to child deaths is needed in order to assess disease control priorities and evaluate interventions.
HIV prevalence among the population aged 15-49 years

Rationale for use

HIV and AIDS has become a major public health problem in many countries and monitoring the course of the epidemic and impact of interventions is crucial. Both the Millennium Development Goals (MDG) and the United Nations General Assembly Special Session on HIV and AIDS (UNGAS) have set goals of reducing HIV prevalence.

Definition

Percent of people with HIV infection among all people aged 15-49 years.

Associated terms

For surveillance purposes, HIV infection is diagnosed through the HIV testing, according to, the HIV surveillance testing strategies recommended by WHO/UNAIDS HIV/AIDS/STI surveillance working group.

Data sources

HIV surveillance: Generalized epidemics, antenatal clinic attendees as primary sources of information. In concentrated and low level epidemics (where HIV prevalence in the pregnant women is below 1%), surveillance among populations with high risk behaviors, e.g. injecting drug users, men who have sex with men and sex workers, should be the focus of surveillance.

Household surveys: Inclusion of HIV testing is being increasingly adopted by countries e.g. Demographic and Health Surveys (DHS), AIDS Indicator Surveys (AIS).

Methods of estimation

HIV prevalence data from HIV sentinel surveillance systems, which may include national population surveys with HIV testing, are used to estimate HIV prevalence using standardized tools and methods of estimation developed by UNAIDS and WHO in collaboration with the UNAIDS Reference Group on Estimation, Modelling and Projections. Tools for estimating the level of HIV infection are different for generalized epidemics, and concentrated or low level epidemic.

Disaggregation

By sex, location (urban/rural, major regions/provinces),

References


The main indicator proposed for monitoring progress towards achieving the international goals is HIV prevalence among young people aged 15-24 years which is a better proxy for monitoring HIV incidence than prevalence among ages 15-49 years. Although countries are moving towards collecting better data on young people, mainly by capturing data on young pregnant women attending antenatal clinics or national population based surveys, comparable data availability is still limited.
Incidence of tuberculosis

Rationale for use

Incidence (cases arising in a given time period) gives an indication of the burden of tuberculosis (TB) in a population, and of the size of the task faced by a national TB control programme. Incidence can change as the result of changes in transmission (the rate at which people become infected with M. tuberculosis, the bacterium which causes TB), or changes in the rate at which people infected with M. tuberculosis develop TB disease (e.g. as a result of changes in nutritional status or of HIV infection). Because TB can develop in people who became infected many years previously, the effect of TB control on incidence is less immediate than the effect on prevalence or mortality.

Millennium Development Goal 6, Target 8 is "have halted by 2015 and begun to reverse the incidence of" TB. WHO estimates that in 2004 the per capita incidence of TB was stable or falling in 5 out of 6 WHO regions, but growing globally at 0.6% per year. The exception was the African region, where incidence is apparently still increasing, but less rapidly each year. Implementation of the Stop TB Strategy, following the Global Plan to Stop TB 2006–2015, is expected to reverse the rise in incidence globally by 2015.

Definition

Estimated number of TB cases arising in a given time period (expressed as per capita rate). All forms of TB are included, as are cases in people with HIV.

Associated terms

All forms: pulmonary (smear-positive and smear-negative) and extrapulmonary tuberculosis.

Notification: the process of reporting diagnosed TB cases to WHO; the data collected by this process. (Here we are not referring to the systems in place in some countries to inform national authorities of cases of certain "notifiable" diseases.)

Annual case notifications (and other data on programme performance) are collected by WHO via an annual data collection form, distributed to national TB control programmes through WHO's regional and country offices.

Data sources

Estimates are based on annual case notifications (see "Associated terms", above), on special surveys of the prevalence of infection or disease and on information from death (vital) registration systems.


Methods of estimation

Estimates of TB incidence, prevalence and mortality are based on a consultative and analytical process in WHO and are published annually (see reference 5). Estimates of incidence for each country are derived using one or more of four approaches, depending on the available data:
(1) incidence = case notifications / proportion of cases detected
(2) incidence = prevalence / duration of condition
(3) incidence = annual risk of TB infection x Stýblo coefficient
(4) incidence = deaths / proportion of incident cases that die.

The Stýblo coefficient in equation (3) is taken to be a constant, with an empirically derived value in the range 40–60, relating risk of infection (% per year) to the incidence of sputum smear-positive cases (per 100 000 per year). Given two of the quantities in any of these equations, we can calculate the third, and these formulae can be rearranged to estimate incidence, prevalence and death rates. The available data differ from country to country but include case notifications and death records (from routine surveillance and vital registration), and measures of the prevalence of infection and disease (from population-based surveys).

For each country, estimates of incidence for each year during the period 1995–2004 have been made as follows. First a reference year is selected, for which there is a best estimate of incidence; this may be the year in which a survey was carried out, or the year for which incidence was first estimated. Then the series of case notifications is used to determine how incidence changed before and after that reference year. The time series of estimated incidence rates is constructed from the notification series in one of two ways: if the rate of change of incidence is roughly constant through time, an exponential trend is fitted to the notifications; if the rate varies through time (eastern Europe, central Europe and high-HIV Africa), a three-year moving average of the notification rates is used. If the notifications for any country are considered to be an unreliable guide to trend (e.g. because reporting effort is known to have changed; or because reports are clearly erratic, changing in a way that cannot be attributed to TB epidemiology), the aggregated trend for all other countries from the same epidemiological region that have reliable data is applied. For some countries (China, Indonesia and Nepal), the assessment of the trend in incidence is based on risk of infection derived from other sources (tuberculin surveys for China and Nepal; prevalence surveys for Indonesia). For those countries that have no reliable data from which to assess trends in incidence (e.g. for countries such as Iraq, for which data are hard to interpret) and which are atypical within their own regions, incidence is assumed to be stable. Further details are available in references 3 to 5.

Disaggregation

Estimates of incidence disaggregated by type of disease (smear-positive pulmonary vs. all other forms) and by HIV-status (among adults 15–49 yrs) are published annually (see reference 5 and Global TB Database).

National TB control programmes are requested by WHO to provide case notifications disaggregated by site of disease (pulmonary/extrapulmonary), laboratory confirmation (usually sputum smear), and history of previous treatment. New smear-positive cases are broken down by age and sex. Many control programmes are also able to disaggregate cases according to the presence of drug resistance. New recommendations for recording and reporting will include disaggregation of notified cases by HIV status.

References


Database

- Global TB database: (http://www.who.int/tb/country/global_tb_database)


Comments

Routine surveillance data provide a good basis for the estimate of incidence in countries where the majority of incident cases are treated and notified to WHO. Where the proportion of cases notified is consistent over time (even if it is low), trends in incidence can be judged from trends in notified cases. Where TB control efforts change over time it is difficult to differentiate between changes in incidence and changes in the proportion of cases notified.

A national surveillance system is an integral part of good TB control, and one of the components of DOTS, which forms the core of the Stop TB Strategy. As surveillance improves in countries implementing the strategy, so will estimates of TB incidence.
Prevalence of tuberculosis

Rationale for use

Prevalence and mortality are direct indicators of the burden of tuberculosis (TB), indicating the number of people suffering from the disease at a given point in time, and the number dying each year. Furthermore, prevalence and mortality respond quickly to improvements in control, as timely and effective treatment reduce the average duration of disease (thus decreasing prevalence) and the likelihood of dying from the disease (thus reducing diseasespecific mortality).

Millennium Development Goal 6 is "to combat HIV/AIDS, malaria and other diseases" [including TB]. This goal is linked to target 8 – "to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases" – and indicator 24 – "prevalence and mortality rates associated with TB". The Stop TB Partnership has endorsed the related targets of reducing per capita TB prevalence and mortality by 50% relative to 1990, by the year 2015. There are few good data with which to establish TB prevalence and mortality, particularly for the baseline year of 1990. However, current best estimates suggest that implementation of the Global Plan to Stop TB 2006–2015 will halve 1990 prevalence and mortality rates globally and in most regions by 2015, though not in Africa and eastern Europe.

Definition

The number of cases of TB (all forms) in a population at a given point in time (sometimes referred to as "point prevalence"). Expressed in this database as number of cases per 100 000 population. Estimates include cases of TB in people with HIV.

Associated terms

All forms: pulmonary (smear-positive and smear-negative) and extrapulmonary tuberculosis.

Data sources

Prevalence can be estimated in population-based surveys, and each year a small number of countries carry out such surveys. Where available, these surveys are used to estimate prevalence for those countries for the year in question. Elsewhere, prevalence is calculated from estimated incidence [please link to incidence page of compendium]. Prevalence estimates for years in which surveys are not available are derived from incidence, as described below.

Methods of estimation

Estimates of TB incidence, prevalence and mortality are based on a consultative and analytical process in WHO and are published annually (see reference 5).

The methods used to estimate TB prevalence and mortality rates are described in detail elsewhere (references 3–5). Country-specific estimates of prevalence are, in most instances, derived from estimates of incidence [please link to incidence page of compendium], combined with assumptions about the duration of disease. The duration of disease is assumed to vary according to whether the disease is smear-positive or not; whether the individual receives treatment in a DOTS programme, non-DOTS programmes, or is not treated at all; and whether the individual is infected with HIV.

Disaggregation
Estimates are routinely disaggregated into smear-positive and other forms of disease, and by HIV status (in adults 15–49 yrs).

References


Database

- Global TB database: (http://www.who.int/tb/country/global_tb_database)


Comments

Prevalence of disease surveys are costly and logistically complex, but they do provide a direct and accurate measure of bacteriologically confirmed, prevalent TB disease, and can serve as a platform for other investigations, e.g., the interactions between patients and the health system. Surveys are particularly useful where routine surveillance data are poor.
Number of poliomyelitis cases

Rationale for use

The 1988 World Health Assembly (WHA) called for the global eradication of poliomyelitis. The number of poliomyelitis cases is used to monitor progress towards this goal and to inform eradication strategies. Countries implement strategies supplementing routine immunization - e.g. national immunization days and sub-national campaigns - or more targeted mop-up activities, depending on the levels of poliomyelitis cases.

Definition

Suspected polio cases (acute-flaccid paralysis - AFP, other paralytic diseases, and contacts with polio cases) that are confirmed by laboratory examination or are consistent with polio infection.

Associated terms

None.

Data sources

Active case finding and reporting of AFP, communicable disease surveillance systems, national and regional laboratory reports*.

* Most countries conduct active case search for cases of acute flaccid paralysis among children less than 15 years of age. When possible (approximately 80% of cases) a stool specimen is obtained for laboratory investigation. A regional reference laboratory verifies cases with evidence of polio infection. The principle indicator for the quality of AFP/polio surveillance data is the use of the non-polio AFP rate. Studies have shown that the expected non-polio AFP rate is approximately 1 per 100 000 population under 15 years of age and an effective polio surveillance system should detect and report approximately one AFP case per 100 000 population under 15.

Methods of estimation

Estimates of polio cases are based exclusively on unadjusted surveillance data.

Disaggregation

By location (urban/rural, major regions/provinces).

References


Database

- Information on Vaccines, Immunization and Biologicals: (http://www.who.int/immunization_monitoring/en/diseases/poliomyelitis/case_count.cfm)


Comments
Many countries have eliminated indigenous polio and in some instances more than ten years have passed since the last reported case of polio. Intensive, high quality surveillance is difficult to maintain when effective interventions have eliminated the disease locally.
One-year-olds immunized with
-one dose of measles (%)
-three doses of diphtheria, tetanus toxoid and pertussis (DTP3) (%)
-three doses of Hepatitis B (HepB3 )(%)

Rationale for use

Immunization coverage estimates are used to monitor immunization services, to guide disease eradication and elimination efforts, and are a good indicator of health system performance.

Definition

Measles immunization coverage is the percentage of one-year-olds who have received at least one dose of measles containing vaccine in a given year. For countries recommending the first dose of measles among children older than 12 months of age, the indicator is calculated as the proportion of children less than 24 months of age receiving one dose of measles containing vaccine.

DTP3 immunization coverage is the percentage of one-year-olds who have received three doses of the combined diphtheria and tetanus toxoid and pertussis vaccine in a given year.

HepB3 immunization coverage is the percentage of one-year-olds who have received three doses of Hepatitis B3 vaccine in a given year.

Associated terms

None.

Data sources

Administrative data: Reports of vaccinations performed by service providers are used for estimates based on administrative data service providers (e.g. district health centres, vaccination teams, physicians). The estimate of immunization coverage is derived by dividing the total number of vaccinations given by the number of children in the target population, often based on census projections.

Household surveys: Survey items correspond to children’s history in coverage surveys. The principle types of surveys are the Expanded Programme on Immunization (EPI) 30-cluster survey, the UNICEF Multiple Indicator Cluster Survey (MICS), and the Demographic and Health Survey (DHS).

Methods of estimation

WHO and UNICEF rely on reports from countries, household surveys and other sources such as research studies. Both organizations have developed common review process and estimation methodologies. Draft estimates are made, reviewed by country and external experts and then finalized.

Disaggregation

By sex, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. mother’s education level, wealth quintile).

References
Comments

The principle challenges are to improve the quality (accuracy, validity, completeness and timeliness) of the data. Also, interpretation of available data needs to be improved by adjusting for possible biases for the most accurate estimate of immunization coverage possible.
Antenatal care coverage (%)

Rationale for use

Antenatal care coverage is an indicator of access and utilization of health care during pregnancy.

Definition

Percentage of women who utilized antenatal care provided by skilled health personnel for reasons related to pregnancy at least once during pregnancy as a percentage of live births in a given time period.

Associated terms

**Antenatal care** constitutes screening for health and socio-economic conditions likely to increase the possibility of specific adverse pregnancy outcomes, providing therapeutic interventions known to be effective; and educating pregnant women about planning for safe birth, emergencies during pregnancy and how to deal with them.

**Skilled birth attendant** (see Proportion of births attended by skilled health personnel).

**Live birth** (see Probability of dying under age 5 years).

**Data sources**

- **Household surveys**: Birth history - detailed questions on the last child or all children a woman has given birth to during a given period preceding the survey (usually 3 to 5 years), and women are asked about the use of antenatal care. The number of live births to women surveyed provides the denominator.

- **Routine health service statistics**: Number of women receiving antenatal care (numerator). Census projections or in some cases vital registration data are used to provide the denominator (numbers of live births).

Methods of estimation

Empirical data from household surveys are used. At global level, facility data are not used.

Disaggregation

By location (urban/rural, major regions/provinces) and socio-economic characteristics (e.g. women’s education level, wealth quintile).

References


Database

- Demographic and Health Surveys (DHS): (http://www.measuredhs.com)

Comments

A single antenatal visit does not give information about the components or quality of the care provided. Additional indicators such as the number of visits (at least four per pregnancy are
recommended) and the timing of the first visit may be more useful, although these also do not indicate the content of the care.
Births attended by skilled health personnel (%)

Rationale for use

All women should have access to skilled care during pregnancy and at delivery to ensure detection and management of complications. Moreover, because it is difficult to measure accurately maternal mortality and model-based maternal mortality ratio (MMR) estimates cannot be used for monitoring short-term trends, the proportion of births attended by skilled health personnel is used as a proxy indicator for this purpose.

Definition

Percentage of live births attended by skilled health personnel in a given period of time.

Associated terms

A skilled birth attendant is an accredited health professional—such as a midwife, doctor or nurse—who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns. Traditional birth attendants, trained or not, are excluded from the category of skilled attendant at delivery. In developed countries and in many urban areas in developing countries, skilled care at delivery is usually provided in a health facility. However, births can take place in a range of appropriate places, from home to tertiary referral centre, depending on availability and need, and WHO does not recommend any particular setting for giving birth. Home delivery may be appropriate for a normal delivery, provided that the person attending the delivery is suitably trained and equipped and that referral to a higher level of care is an option.

Live births (see Probability of dying under age 5 years).

Data sources

Household surveys: They constitute an important source of information on maternity care on an ad hoc basis and, for many countries, they are the main source of information on births attended by a skilled health personnel. When using survey data, absolute numbers and confidence intervals should be reported to indicate the reliability of the data and facilitate interpretation of trends and differentials.

Health services statistics: As the point of contact with women, this is the main and most obvious routine source of information for the numerator. However, health service information cannot provide accurate size of the denominator population. Census projections or in some cases vital registration data are used to provide the denominator (numbers of live births).

Methods of estimation

Empirical data from household surveys are used. At global level, facility data are not used.

Disaggregation

By place of delivery, type of skilled health personnel, location (urban/rural, major regions/provinces) and socio-economic characteristics (e.g. education level, wealth quintile)

References


**Database**

Under development.

**Comments**

While efforts are made to standardize definitions of skilled birth attendants, it is probable that these could differ in different countries. The information mainly from household surveys relies on women’s self-reports on who had helped them during delivery which may not always reflect the characteristics of the delivery attendant correctly. Moreover, skilled health workers’ ability to provide appropriate care in an emergency depends on the environment in which they work.
Contraceptive prevalence rate (%)

Rationale for use

Contraceptive prevalence rate is an indicator of health, population, development and women's empowerment. It also serves as a proxy measure of access to reproductive health services that are essential for meeting many of the Millennium Development Goals (MDGs), especially the child mortality, maternal health HIV/AIDS, and gender related goals.

Definition

Contraceptive prevalence rate is the proportion of women of reproductive age who are using (or whose partner is using) a contraceptive method at a given point in time.

Associated terms

Contraceptive methods include clinic and supply (modern) methods and non-supply (traditional) methods. Clinic and supply methods include female and male sterilization, intrauterine devices (IUDs), hormonal methods (oral pills, injectables, and hormone-releasing implants, skin patches and vaginal rings), condoms and vaginal barrier methods (diaphragm, cervical cap and spermicidal foams, jellies, creams and sponges). Traditional methods include rhythm, withdrawal, abstinence and lactational amenorrhoea.

Data sources

Household surveys [such as Demographic and Health Surveys (DHS), Multiple Indicators Cluster Surveys (MICS)], contraceptive prevalence surveys. Estimates can also be made from service statistics using census projections as a denominator. Such estimates however are often expressed in terms of couple years of protection and may not always be complete.

Methods of estimation

Empirical data only.

Disaggregation

By age (adolescence), marital status, method of contraception, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. education level, wealth quintile)

References


Database

- Demographic and Health Survey (DHS): (http://www.measuredhs.com)

- UNICEF: statistics and Multiple Indicator Cluster Survey: (http://www.childinfo.org)

Comments

Measures of contraceptive prevalence are usually derived from interviews with representative samples of women of reproductive age. In many surveys, questions on current contraceptive use are confined to married women, including those in consensual unions where such unions are common...
Children under five years of age sleeping under insecticide-treated nets (%)

Rationale for use

In areas of intense malaria transmission, malaria-related morbidity and mortality are concentrated in young children, and the use of insecticide-treated nets (ITN) by children under 5 has been demonstrated to considerably reduce malaria disease incidence, malaria-related anemia and all-cause under 5 mortality. Vector control through the use of ITNs constitute one of the four intervention strategies of the Roll Back Malaria Initiative. It is also listed as an MDG indicator.

Definition

Percentage of children under five years of age in malaria endemic areas who slept under an ITN the previous night, ITN being defined as a mosquito net that has been treated within 12 months or is a long-lasting insecticidal net (LLIN).

Associated terms

Malaria-risk areas include areas of stable malaria transmission (allowing the development of some level of immunity) and areas of unstable malaria transmission (seasonal and less predictable transmission impeding the development of effective immunity).

Data sources

Household surveys such as Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Malaria Indicator Surveys (MIS), and ‘rider’ questions on other representative population-based surveys, that include questions on whether children under five years of age slept under an ITN the previous night.

Methods of estimation

Empirical data only.

Disaggregation

By age, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. education level, wealth quintile)

References

- WHO/Roll Back Malaria site. (http://www.rbm.who.int)

Database

Comments

The accuracy of reporting in household surveys may vary. Also, seasonal influences related to fluctuations in vector and parasite prevalence may affect level of coverage depending on timing of the data collection.
People with advanced HIV infection receiving antiretroviral (ARV) combination therapy (percentage)

Rationale for use

As the HIV epidemic matures, increasing numbers of people are reaching advanced stages of HIV infection. ARV combination therapy has been shown to reduce mortality among those infected and efforts are being made to make it more affordable even in less developed countries. This indicator assesses the progress in providing ARV combination therapy to everyone with advanced HIV infection.

Definition

Percentage of people with advanced HIV infection receiving ARV therapy according to nationally approved treatment protocol (or WHO/Joint UN Programme on HIV and AIDS standards) among the estimated number of people with advanced HIV infection.

Data sources

Health facility reports are used to obtain the number of people on ARV therapy i.e. drugs received during the last month. External validation of country reported figures is carried out with data from pharmaceutical industry (if available).

Methods of estimation

The denominator of the coverage estimate is obtained from models that also generate the HIV prevalence, incidence and mortality estimates. The number of adults with advanced HIV infection who need to start treatment is estimated as the number of AIDS cases in the current year times two.

The total number of adults needing ARV therapy is calculated by adding the number of adults that need to start ARV therapy to the number of adults who are being treated in the previous year and have survived into the current year.

Disaggregation

By sex, age (children/adults), location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. education level, wealth quintile).

References


- 3 by 5 progress report
Comments

The accuracy of the reported number of people on ARV therapy needs improvement as programme monitoring systems are still developing.

Although this indicator allows trends to be monitored over time, it does not attempt to distinguish between the different types of therapy available nor does it measure the cost, quality or effectiveness of such treatment.

Therapies for preventing the mother to child transmission of HIV and post exposure prophylaxis are not included in this indicator.
Tuberculosis: DOTS case detection rate

Rationale for use

The proportion of estimated new smear-positive cases which are detected (diagnosed and notified to WHO) by DOTS programmes provides an indication of how effective national tuberculosis programmes are in finding people with tuberculosis and diagnosing the disease.

MDG indicator 24 (under Goal 6, Target 8) is the "proportion of tuberculosis cases detected and cured under DOTS". The Stop TB Partnership has endorsed the targets, linked to the MDGs, to diagnose at least 70% of people with sputum smear-positive TB (i.e. under the DOTS strategy), and cure at least 85%, by 2005. These are targets set by the World Health Assembly of WHO.

In 2004, an estimated 53% of new smear-positive cases were treated under DOTS. This proportion, which increased steadily from 1995 to 2000, has increased more rapidly each year since 2001, and is likely to have exceeded 60% in 2005 – just short of the 70% target.

Definition

The term “case detection”, as used here, means that TB is diagnosed in a patient and is reported within the national surveillance system, and then to WHO. The case detection rate is calculated as the number of cases notified divided by the number of cases estimated for that year, expressed as a percentage.

Associated terms

Smear-positive: TB case where TB bacilli are visible in the patient's sputum when examined under the microscope. For exact definition see reference 5.

New case: TB in a patient who has never received treatment for TB, or who has taken anti-TB drugs for less than one month.

DOTS: the internationally recommended approach to TB control, which forms the core of the Stop TB Strategy (reference 1). The five components of DOTS are (a) political commitment with increased and sustained financing, (b) case detection through quality-assured bacteriology, (c) standardized treatment with supervision and patient support, (d) an effective drug supply and management system and (e) monitoring and evaluation system, and impact measurement. In countries which have adopted the DOTS strategy, it may be implemented in all or some parts of the country, and by all or some health-care providers. Only those TB patients notified by health-care facilities providing DOTS services are included in this indicator.

Notification: the process of reporting diagnosed TB cases to WHO; the data collected by this process. (Here we are not referring to the systems in place in some countries to inform national authorities of cases of certain "notifiable" diseases.)

Data sources

The number of new smear-positive cases detected by DOTS programmes is collected as part of the routine surveillance (recording and reporting) which is an essential component of DOTS. Quarterly reports of the number of TB cases registered are compiled and sent (either directly or via intermediate levels) to the central office of the national TB control programme. Annual case notifications (and other data on programme performance) are collected by WHO via an annual
data collection form, distributed to national TB control programmes through WHO's regional and country offices.

Estimated number of incident cases: see references 3–5, and description of estimation of incidence. [please link to incidence page of compendium]

Methods of estimation

Estimates of incidence [please link to incidence page of compendium] are based on a consultative and analytical process in WHO and are published annually (see reference 5).

The DOTS detection rate for new smear-positive cases is calculated by dividing the number of new smear-positive cases notified to WHO by the estimated number of incident smear-positive cases for the same year.

Disaggregation

Detection rates are routinely presented by WHO in four main ways: (i) for new smear-positive cases, (ii) for all new and relapse cases (i.e. all forms of TB), (iii) for DOTS programmes only, or (iv) for cases notified from all sources. It is the detection rate of new smear-positive cases for DOTS programmes which included in this database.

References


Database

- Global TB database: (http://www.who.int/tb/country/global_tb_database)


Comments

Sputum smear-positive cases are the focus of this indicator because they are the principal sources of infection to others, because sputum smear microscopy is a highly specific (if somewhat insensitive) method of diagnosis, and because patients with smear-positive disease typically suffer higher rates of morbidity and mortality than smear-negative patients. However,
national TB control programmes should aim to provide treatment to all patients, as set out in the Stop TB Strategy.
Tuberculosis: DOTS treatment success

Rationale for use

Treatment success is an indicator of the performance of national tuberculosis control programme. In addition to the obvious benefit to individual patients, successful treatment of infectious cases of TB is essential to prevent the spread of the infection.

Detecting and successfully treating a large proportion of TB cases should have an immediate impact on TB prevalence and mortality. By reducing transmission, successfully treating the majority of cases will also affect, with some delay, the incidence of disease.

MDG indicator 24 (under Goal 6, Target 8) is the "proportion of tuberculosis cases detected and cured under DOTS". The Stop TB Partnership has endorsed the targets, linked to the MDGs, to diagnose at least 70% of people with sputum smear-positive TB (i.e. under the DOTS strategy), and cure at least 85%, by 2005. These are targets set by the World Health Assembly of WHO.

Treatment success in the 2003 DOTS cohort of 1.7 million patients was 82% on average, edging closer to the 85% target. To reach the target of 85% treatment success globally, a special effort must be made to improve cure rates in the African and European regions.

Definition

The proportion of new smear-positive TB cases registered under DOTS in a given year that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed").

At the end of treatment, each patient is assigned one of the following six mutually exclusive treatment outcomes: cured; completed; died; failed; defaulted; and transferred out with outcome unknown. The proportions of cases assigned to these outcomes, plus any additional cases registered for treatment but not assigned to an outcome, add up to 100% of cases registered.

Associated terms

**Smear-positive**: tuberculosis case where TB bacilli are visible in the patient's sputum when examined under the microscope. For exact definition see reference 5.

**New case**: TB in a patient who has never received treatment for TB, or who has taken anti-TB drugs for less than one month.

**DOTS**: the internationally recommended approach to TB control, which forms the core of the Stop TB Strategy (reference 1). The five components of DOTS are (a) political commitment with increased and sustained financing, (b) case detection through quality-assured bacteriology, (c) standardized treatment with supervision and patient support, (d) an effective drug supply and management system and (e) monitoring and evaluation system, and impact measurement. In countries which have adopted the DOTS strategy, it may be implemented in all or some parts of the country, and by all or some health-care providers. Only those TB patients notified by health-care facilities providing DOTS services are included in this indicator.

Data sources
Aggregated reports on TB case treatment outcomes provided annually to WHO by national TB control programmes.

Because treatment for TB lasts 6–8 months, there is a delay in assessing treatment outcomes. Each year national TB control programmes report to WHO the number of cases of TB diagnosed in the preceding year, and the outcomes of treatment for the cohort of patients who commenced treatment a year earlier.

Method of estimation
- Disaggregation

Within a national programme, data should be analysed at the level of basic management unit (typically district health office), before aggregation.

Global targets for TB control refer to treatment success for new smear-positive cases treated under DOTS, the indicator included in this database. WHO also reports treatment success rates from non-DOTS programmes, and treatment success rates for patients who have been previously treated (see reference 5). Both sets of treatment success rates tend to be lower than those for new cases treated under DOTS.

It is also useful, where possible, to analyse treatment success rates disaggregated by drug resistance and HIV status.

References

Database
- Global TB database: (http://www.who.int/tb/country/global_tb_database)

Comments
Treatment success rates can be low for a number of reasons. Several factors affect the likelihood of treatment success, including the severity of disease (often related to the delay between onset
of disease and the start of treatment), HIV infection, drug resistance, malnutrition and the support provided to the patient to ensure that he or she completes treatment.

Even where treatment is of high quality, reported treatment success rates will only be high when the routine information system is also functioning well. If the outcome of treatment is not recorded for all patients (including those who transfer from one treatment facility to another), this will affect the treatment success rate.

Where treatment success rates are low, the cause of the problem can only be identified by determining which of the unfavourable treatment outcomes is particularly high.
Children under five years of age with acute respiratory infection and fever (ARI) taken to facility

Rationale for use

Respiratory infections are responsible for almost 20% of all under-five deaths worldwide. Under-fives with ARI that are taken to an appropriate health provider is a key indicator for both coverage of intervention and care seeking and provides critical inputs to the monitoring of progress towards the child survival related millennium development goals (MDGs) and strategies.

Definition

Proportion of children aged 0-59 months who had presumed pneumonia (ARI) in the last two weeks and were taken to an appropriate health provider.

Associated terms

Strictly speaking, ARI means acute respiratory infection. During the UNICEF/WHO Meeting on Child Survival Survey-based Indicators, held in New York, June 17-18, 2004, it was recommended that ARI be described as “presumed pneumonia” to better reflect the probable cause and the recommended interventions. The definition of ARI used 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.

Appropriate health care provider - the definition of "appropriate" care provider varies between countries.

Data sources

- Household surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS).

Methods of estimation

Empirical data.

Disaggregation

By age, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. mother's education level, wealth quintile).

References


Data base

- Demographic and Health Surveys (DHS). (http://www.measuredhs.com)

- Multiple Indicator Cluster Surveys (MICS). (http://www.childinfo.org/MICS2)

Comments

The framework for the review of child survival indicators during the UNICEF/WHO Meeting on Child Survival Survey-based Indicators was the set of prevention and treatment interventions outlined in the Lancet series on child survival.

These indicators are usually collected in DHS and MICS surveys; however the accuracy of reporting in household surveys varies and is likely to be prone to recall bias. Seasonality related to the prevalence of ARI may also affect the results and their comparability across and within countries.
Children under five years of age with diarrhoea who received ORT

Rationale for use

Diarrhoal diseases remain one of the major causes of under-five mortality, accounting for 1.8 million child deaths worldwide, despite all the progress in its management and the undeniable success of the oral rehydration therapy (ORT). Therefore, the monitoring of the coverage of this very cost-effective intervention is crucial for the monitoring of progress towards the child survival related millennium development goals (MDGs) and strategies.

Definition

Proportion of children aged 0-59 months of age who had diarrhoea in the last two weeks and were treated with oral rehydration salts or an appropriate household solution (ORT)

Associated terms

Diarrhoea - according to DHS, the term(s) used for diarrhoea should encompass the expressions used for all forms of diarrhea, including bloody stools (consistent with dysentery), watery stools, etc. It encompasses the mother's definition as well as the "local term(s)".

Treated - electrolyte solution received by the child.

Appropriate household solution - such definition may vary between countries.

Data sources

Household surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS).

Methods of estimation

Empirical data.

Disaggregation

By age, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. mother's education level, wealth quintile).

References


Data base

- Demographic and Health Surveys (DHS). (http://www.measuredhs.com)

- Multiple Indicator Cluster Surveys (MICS). (http://www.childinfo.org/MICS2)

Comments

The framework for the discussion and review of child health indicators in the UNICEF/WHO Meeting on Child Survival Survey-based Indicators was the set of prevention and treatment interventions outlined in the Lancet series on child survival. These indicators are usually collected in DHS and MICS surveys; however the accuracy of reporting in household surveys varies and is likely to be prone to recall bias. Also, seasonal influences related to the prevalence of diarrhoeal disease may affect the results of data collection for this indicator. Therefore, the comparability of results across countries and over time may be affected. Moreover, frequent changes in the definition of this indicator have seriously compromised the ability to reliably assess trends over time.

There are two specific limitations with some of the associated terms of this indicator: (i) discussions have been held on whether treated should be considered when the electrolyte solution was "given", "received", "ingested", or "offered" to the child; and (ii) comparability of data on appropriate household solution.
Children under five years of age with fever who received treatment with any antimalarial (percentage)

Rationale for use

Prompt treatment with effective anti-malaria drugs for children with fever in malaria risk areas is a key intervention to reduce mortality. In addition to be listed as a global MDG indicators under Goal 6, malaria effective treatment is also identified by WHO, UNICEF, and the World Bank as one of the four main interventions to reduce the burden of malaria in Africa: (i) use of insecticide-treated nets (ITNs), (ii) prompt access to effective treatments in or near the home, (iii) providing antimalarial drugs to symptom-free pregnant women in stable transmission areas, and (iv) improved forecasting, prevention and response, essential to respond quickly and effectively to malaria epidemics.

In areas of sub-Saharan Africa with stable levels of malaria transmission, it is essential that access to prompt treatment is ensured. This requires drug availability at household or community level and, for complicated cases, availability of transport to the nearest equipped facility. Reserve drug stocks, transport, and hospital capacity are needed to mount an appropriate response to malaria cases and prevent the onset of malaria to degenerate to a highly lethal complicated malaria picture.

Definition

Percentage of population under five years of age in malaria-risk areas with fever being treated with effective antimalarial drugs:

Numerator (N): number of children under five years of age in malaria-risk areas with fever being treated with effective antimalarial drugs

Denominator (D): number of children under five years of age in malaria-risk areas

Associated terms

Malaria-risk areas include areas of stable malaria transmission (allowing the development of some level of immunity) and areas of unstable malaria transmission (seasonal and less predictable transmission impeding the development of effective immunity).

Data sources

Household surveys such as Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Malaria Indicator Surveys (MIS), and ‘rider’ questions on other representative population-based surveys, that include questions on whether children under five years of age slept under an ITN the previous night.
Effective antimalarial drugs 1: Consistent with WHO recommendations, malaria endemic countries which are experiencing high levels of resistance to currently-used antimalarial drugs such as chloroquine and sulfadoxine/pyrimethamine (SP) are changing treatment policies from monotherapies to combined therapies including available drugs (SP and amidioquine). The purpose of combined drugs is to produce a mechanism of action at different stages of the parasitic cycle. Artemisinin-based combination treatments (ACTs)2 are considered the most effective combinations. However they cannot be broadly recommended as artemisinin drugs are not necessarily available due to production limitation. ACTs combine an artemisinin compound with a partner antimalarial drug to which there is little or no resistance in the country or situation in which the ACT is to be deployed. The advantages of ACTs relate to the properties of artemisinin compounds, which include rapid reduction of the parasite biomass with fast resolution of clinical symptoms, effectiveness against multi-drug resistant falciparum malaria, resistance not being documented yet, and a good safety profile.

Data sources

Demographic and Health Survey (DHS), (DHS, www.measuredhs.com) for both indicators.

Multiple Indicator Cluster Survey (MICS), (MICS, www.childinfo.org) for both indicators.

Malaria stand-alone surveys (community component) for ITNs and access to treatment as well.

Methods of estimation

For prevention, the indicator is calculated as the percentage of children under five years of age who received effective anti-malaria drugs upon a fever episode. The information is obtained directly from household surveys. The empiric values are directly reported without further estimation.

Disaggregation

By age, sex, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. education level, wealth quintile)

References

- WHO/Roll Back Malaria site. (http://www.rbm.who.int)


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1 An update on Quality Assurance and Procurement through WHO for Improving Access to Artemisinin-based Combination Treatments (ACTs) for Malaria. Malaria Control Department. WHO, 2003.

Database


Comments

The accuracy of reporting in household surveys may vary.
Children 6-59 month of age who received vitamin A supplementation

Rationale for use

Vitamin A supplementation is considered a critically important intervention for child survival due to the strong evidence that exists of its impact on child mortality. Therefore, measuring the proportion of children who have received vitamin A in the last six months is crucial for monitoring coverage of interventions towards the child survival related goals (MDGs) and strategies.

Definition

Proportion of children 6-59 months of age who have received a high dose vitamin A supplement in the last 6 months

Associated terms

High dose vitamin A - The International Vitamin A Consultative Group (IVACG) definition is: "doses equal or greater than 25,000 IU"

Data sources

Household surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS).

Methods of estimation

Empirical data.

Disaggregation

By age, location (urban/rural, major regions/provinces), and socio-economic characteristics (e.g. mother's education level, wealth quintile).

References


Data base

- Demographic and Health Surveys (DHS): (http://www.measuredhs.com)

- Multiple Indicator Cluster Surveys (MICS): (http://www.childinfo.org/MICS2)

Comments

The framework for the discussion and review of child health indicators in the UNICEF/WHO Meeting on Child Survival Survey-based Indicators was the set of prevention and treatment interventions outlined in the Lancet series on child survival. These indicators are usually collected in DHS and MICS surveys; however the accuracy of reporting in household surveys varies and is likely to include recall bias. Therefore, the comparability of results across countries and over time may be affected. There are also significant discrepancies between data obtained through household surveys and those obtained from National Immunization Days and routine service statistics for this indicator, which are currently under investigation by a team from Emory University.
Births by caesarean section (%)

Rationale for use

Births by caesarean section is an indicator of access to and utilization of health care during childbirth.

Definition

Percentage of births by caesarean section among all live births in a given time period.

Associated terms

Live birth (see Probability of dying under age 5 years).

Data sources

Household surveys: Birth history - detailed questions on the last child or all children a woman has given birth to during a given period preceding the survey (usually 3 to 5 years), including characteristics of birth(s). The number of live births to women surveyed provides the denominator.

Routine health service statistics: Number of women having given birth by caesarean section (numerator). Census projections or in some cases vital registration data can be used to provide the denominator (numbers of live births).

Methods of estimation

Empirical data from household surveys are used.

Disaggregation

By location (urban/rural, major regions/provinces) and socio-economic and demographic characteristics (e.g. women’s education level, wealth quintile, age).

References


- Guidelines for monitoring the availability and use of obstetric services. UNICEF/WHO/UNFPA, 1997

Database

- Demographic and Health Surveys (DHS): (http://www.measuredhs.com)

Comments

This indicator does not provide information on the reason for undergoing caesarean section and includes caesarean sections that were performed without a clinical indication as well as those that were medically indicated. The extent to which caesarean sections are performed according to
clinical need, therefore, is not possible to determine. However, roughly a figure of less than 5% indicates that all women who are in need may not be receiving caesarean section at birth.
Children under five years of age

- stunted for age (percentage)
- underweight for age (percentage)
- overweight for age (percentage)

Rationale for use

All three indicators measure growth in young children. Child growth is internationally recognized as an important public health indicator for monitoring nutritional status and health in populations. In addition, children who suffer from growth retardation as a result of poor diets and/or recurrent infections tend to have greater risks of illness and death.

Definition

Percentage of children stunted describes how many children under five years have a height-for-age below minus two standard deviations of the National Center for Health Statistics (NCHS)/WHO reference median.

Percentage of children underweight describes how many children under five years have a weight-for-age below minus two standard deviations of the NCHS/WHO reference median.

Percentage of children overweight describes how many children under five years have a weight-for-height above two standard deviations of the NCHS/WHO reference median.

Associated terms

Severely underweight or stunting is defined as below minus three standard deviations of the weight-for-age or height-for-age NCHS/WHO reference median.

Data sources

National household surveys, sub-national nutritional surveys and national nutrition surveillance systems.

Methods of estimation

Empirical values are used. Several countries have limited data for recent years and current estimations are made using models that make projections based on past trends.

Disaggregation

By sex, age, and location (urban/rural, major regions/provinces)

References

Database

- WHO Global Database on Child Growth and Malnutrition. (http://www.who.int/nutgrowthdb)

Comments

Anthropometric values are compared across individuals or populations in relation to a set of reference values. The choice of the reference population has a significant impact on the proportion of children identified as being under-nourished and/or over-nourished. Since the late 1970s, WHO has recommended the NCHS/WHO international reference population, for the comparison of child growth data. An improved international growth reference for young children is expected to be available by April 27th, 2006.
Newborns with low birth weight (%)

Rationale for use

The low birth weight rate at the population level is an indicator of a public health problem that includes long-term maternal malnutrition, ill health and poor health care. On an individual basis, low birth weight is an important predictor of newborn health and survival.

Definition

Percentage of live born infants with birth weight less than 2,500 g* in a given time period.

* Low birth weight may be subdivided into very low birth weight (less than 1500 g) and extremely low birth weight (less than 1 000 g).

Associated terms

Birth weight is the first weight of the fetus or newborn obtained after birth. For live births, birth weight should ideally be measured within the first hour of life before significant postnatal weight loss occurs.

Low birth weight is defined as a weight of less than 2500 g (up to and including 2499 g) irrespective of the gestational age.

Live birth (see Probability of dying under age 5 years).

Data sources

- Health service statistics: Proportion of live births with low birth weight among births in health institutions.

- Household Surveys: Demographic and Health Surveys (DHS) include questions on birth weight as well as the mothers’ subjective assessment of the infant’s size at birth (i.e. very large, larger than average, average, smaller than average, very small), for births in the last 3-5 years.

Methods of estimation

Where reliable health service statistics with a high level of coverage exist ; “Percentage of low birth weight” births.

For household survey data different adjustments are made according to the type of information available (numerical birth weight data or subjective assessment of the mother).

Disaggregation

By location (urban/rural, major regions/provinces), sex, and socio-economic characteristics (e.g. mother’s education level, wealth quintile).

References


**Database**

- Demographic and Health Surveys (DHS): (http://www.measuredhs.com)
- WHO, European Office. HFA database: (http://www.who.dk/hfadb)

**Comments**

The large proportion of infants not weighed at birth and the estimates based on mothers’ subjective assessments constitute a significant impediment to accurate monitoring of low birth weight.
Prevalence of adults (15 years and older) who are obese (percentage)

Rationale for use

The prevalence of overweight and obesity in adults has been increasing globally. Obese adults (BMI =30.0) are at increased risk of adverse metabolic outcomes including increased blood pressure, cholesterol, triglycerides, and insulin resistance. Subsequently, an increase in BMI exponentially increases the risk of noncommunicable diseases (NCDs), such as coronary heart disease, ischaemic stroke and type-2 diabetes mellitus. Raised BMI is also associated with an increased risk of cancer.

Definition

Percentage of adults classified as obese (BMI = 30.0 kg/m²) among total adult population (15 years and older).

Associated terms

Adult overweight (BMI = 25.0 kg/m²)

Pre-obese (BMI 25.00-29.99 kg/m2)

Obesity (BMI = 30.00 kg/m2)

Data sources

Nationally representative household surveys, including Demographic and Health Survey (DHS).

Methods of estimation

Estimates are still under development and will be published later in 2006. Only nationally-representative surveys with either anthropometric data collection or self-reported weight and height (mostly in high income countries) are included in the 2006 World Health Statistics.

Disaggregation

By sex, age, location (urban/rural, major regions/provinces).

References


Database

- Demographic and Health Surveys (DHS). (http://www.measuredhs.com)

- WHO Global Database on Body Mass Index (BMI). (http://www.who.int/bmi)

Comments

The household surveys focus on different age ranges and sometimes on select samples (such as women of reproductive ages who have a child under five years of age), which affects comparability. Also, self-reported height and weight information are more likely to have problems than measured adult BMI. The existing data are under review and estimation methods are being developed. It is expected that a new set of data and metadata, and eventually estimates, will replace the currently available information.
Population with -sustainable access to an improved water source (%) -access to improved sanitation (%)

Rationale for use

Access to drinking water and improved sanitation is a fundamental need and a human right vital for the dignity and health of all people. The health and economic benefits of improved water supply to households and individuals (especially children) are well documented. Both indicators are used to monitor progress towards the MDGs.

Definition

Access to improved water source is the percentage of population with access to an improved drinking water source in a given year.

Access to improved sanitation is the percentage of population with access to improved sanitation in a given year.

Associated terms

**Improved drinking water** sources are defined in terms of the types of technology and levels of services that are more likely to provide safe water than unimproved technologies. Improved water sources include household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collections. **Unimproved water sources** are unprotected wells, unprotected springs, vendor-provided water, bottled water (unless water for other uses is available from an improved source) and tanker truck-provided water.

Reasonable access is broadly defined as the availability of at least 20 liters per person per day from a source within one kilometer of the user’s dwelling.

**Sustainable access** has two components with respect to water: one stands for environmental sustainability, the other for functional sustainability. The former insists on environmental protection through limiting extraction of water to a capacity below what is actually available. The latter reflects programme sustainability in terms of supply and management.

**Improved sanitation** facilities are defined in terms of the types of technology and levels of services that are more likely to be sanitary than unimproved technologies. Improved sanitation includes connection to a public sewers, connection to septic systems, pour-flush latrines, simple pit latrines and ventilated improved pit latrines. Not considered as improved sanitation are service or bucket latrines (where excreta is manually removed), public latrines and open latrines.

Data sources

Household surveys and assessment questionnaires to complement survey data or to provide estimates where survey data are not available. The latter also captures information related to usage and breakdown of self-built water facilities of which service providers may be unaware.

Methods of estimation
Estimates are generated through analysis of survey data and linear regression of data points. Coverage estimates are updated every two years.

Disaggregation

By location (urban/rural).

References


- Meeting the Millennium Development Goals Drinking water and sanitation target. (http://www.wssinfo.org)

Database

- WHO/UNICEF Joint Monitoring Programme web site: (http://www.wssinfo.org)

Comments

Information is missing from many developed countries. More needs to be done to address the issues of sustainability and safety in drinking water provision.
Population using solid fuels (%)

Rationale for use

The use of solid fuels in households is associated with increased mortality from pneumonia and other acute lower respiratory diseases among children as well as increased mortality from chronic obstructive pulmonary disease and lung cancer (where coal is used) among adults. It is also a Millennium Development Goal indicator.

Definition

Percentage of population using solid fuels.

Associated terms

Solid fuels include biomass fuels, such as wood, charcoal, crops or other agricultural waste, dung, shrubs and straw, and coal.

Data sources

Household surveys and national censuses.

National energy statistics on the proportion of population using solid fuels are based either on data from surveys or censuses, or on modelling where no survey or census data are available.

Methods of estimation

The data from surveys and censuses are used as reported in the surveys and censuses.

All countries with a Gross National Income (GNI) per capita above US$ 10,500.- are assumed to have made a complete transition to cooking with non-solid fuels.

For low- and middle-income countries with a GNI per capita below US$ 10,500.- and for which no household solid fuel use data are available, a regression model based on GNI, percentage of rural population and location or non-location within the Eastern Mediterranean Region is used to estimate the indicator.

Disaggregation

By location (e.g. urban/rural, major regions/provinces) and socio-economic characteristics (e.g. education level, wealth quintile).

References


Database

- Global indoor air pollution database:
  (http://www.who.int/indoorair/health_impacts/databases_iap/en/index.html)

Comments

For 93 countries solid fuel use data were compiled from recent censuses or household surveys. For the 36 countries, where no data were available, the indicator was modelled. For 52 upper-middle or high-income countries the indicator was assumed to be less than 5%.
Prevalence of current tobacco use in adolescents (13-15 years of age)

Rationale for use

The risk of chronic diseases starts early in childhood and such behaviour continues to adulthood. Tobacco is an addictive substance and smoking often starts in adolescence, before the development of risk perception. By the time the risk to health is recognized, the addicted individuals find it difficult to stop tobacco use.

Definition

Prevalence of tobacco use (including smoking, oral tobacco and snuff) on more than one occasion in the 30 days preceding the survey, among adolescent 13-15 year olds.

Data sources

Global Youth Tobacco Survey (GYTS) and Global School Health Survey (GSHS). GYTS started in 1998 and is ongoing. Few countries have repeated surveys. This is a school based self-administrated questionnaire.

Methods of estimation

Adjustments and standardizations are made as necessary.

Disaggregation

By sex.

References

- GYTS: (http://www.who.int/tobacco/surveillance/gyts/en)
- GSHS: (http://www.who.int/school_youth_health/assessment/gshs/en)

Database


Comments

Some of the surveys were conducted in small sub-national populations and therefore may not accurately reflect the national picture.
Prevalence of current (daily or occasional) tobacco smoking among adults (15 years and older) (percentage)

Rationale for use

Prevalence of current tobacco smoking among adults is an important measure of the health and economic burden of tobacco, and provides a baseline for evaluating the effectiveness of tobacco control programmes over time. While a more general measure of tobacco use, including both smoked and smokeless products, would be ideal, data limitations restrict the present indicator to smoked tobacco. Occasional tobacco smoking constitutes a significant risk factor for tobacco-related disease, and is therefore included along with daily tobacco smoking.

Definition

Prevalence of current tobacco smoking (including cigarettes, cigars, pipes or any other smoked tobacco products). Current smoking includes both daily and non-daily or occasional smoking.

Associated terms

The specific definition of non-daily or occasional smoking is not necessarily consistent across surveys.

Data sources

The WHO Survey Programme and World Health Survey compile comprehensive baseline information on the health of populations and on the outcomes associated with the investment in health systems.

The WHO Global InfoBase collects all country-level data on important non-communicable disease risk factors for all WHO Member States. It acts as a repository for all survey information relevant to 8 risk factors, including tobacco use.

Methods of estimation

Empirical data only. World Health Survey methods can be consulted here. The methods underlying WHO Global InfoBase data vary according to the source, and additional data may have been obtained from communications with authors. Metadata for all surveys contained in the WHO Global InfoBase can be found here.

Disaggregation

Varies by survey; includes disaggregation by sex, age, location and socio-economic characteristics.

References

World Health Survey: [http://www.who.int/healthinfo/survey/en](http://www.who.int/healthinfo/survey/en)
Database

Cross-country comparisons are problematic as survey methods and definitions may vary across sources. Footnotes indicate those surveys that were conducted in sub-national populations, among adult sub-groups, or for a sub-sample of smoked tobacco products (e.g. cigarettes only).
Condom use at higher risk sex among young people aged 15-24 years (percentage)

Rationale for use

Consistent correct use of condoms within non-regular sexual partnerships substantially reduces the risk of sexual HIV transmission. This is especially important for young people who often experience the highest rates of HIV infection. Condom use is one measure of protection against sexual transmission of HIV; others include delaying age at first sex, reducing the number of non-regular sexual partners, being faithful to one uninfected partner, avoidance of concurrent sexual partnerships and high-risk sexual practices such as unprotected anal sex.

Definition

Percentage of young people aged 15-24 years reporting the use of a condom during the last sexual intercourse with a non-regular partner among those who had sex with a non-regular partner in the last 12 months.

Associated terms

A non-regular sexual partner is a non-marital and non-cohabiting partner.

Data sources

Household surveys such as Demographic and Health Surveys (DHS), Multiple Indicators Cluster Survey (MICS), Behavioural Surveillance Surveys.

Methods of estimation

Empirical data only. Survey respondents aged 15-24 years are asked whether they have commenced sexual activity. Those who report sexual activity and have had sexual intercourse with a non-regular partner in the last 12 months, are further asked about the number of non-regular partners and condom use the last time they had sex with a non-regular partner.

Disaggregation

By sex, location (urban/rural, major regions/provinces), and socio-economic characteristics (education level).

References

- Measure Demographic and Health Surveys (DHS): HIV/AIDS database: (http://www.measuredhs.com/hivdata)
Number of

- physicians per 1,000 population
- nurses per 1,000 population
- midwives per 1,000 population
- dentist per 1,000 population
- pharmacists per 1,000 population
- public and environmental health workers per 1,000 population
- community health workers per 1,000 population
- laboratory health workers per 1,000 population
- other health workers per 1,000 population
- health management and support workers per 1,000 population

Rationale for use

The availability and composition of human resources for health is an important indicator of the strength of the health system. Even though there is no consensus about the optimal level of health workers for a population, there is ample evidence that worker numbers and quality are positively associated with immunization coverage, outreach of primary care, and infant, child and maternal survival.

Definition

**Physicians:** includes generalists and specialists.

**Nurses** includes professional nurses, auxiliary nurses, enrolled nurses and other nurses, such as dental nurses and primary care nurses.

**Midwives:** includes professional midwives, auxiliary midwives and enrolled midwives. Traditional birth attendants, who are counted as community health workers, appear elsewhere.

While much effort has been made, caution must be exercised in using the data for nurses and midwives; for some countries the available information does not distinguish clearly between the two groups.

**Dentists:** includes dentists, dental assistants and dental technicians.

**Pharmacists:** includes pharmacists, pharmaceutical assistants and pharmaceutical technicians.
Laboratory health workers: includes laboratory scientists, laboratory assistants, laboratory technicians and radiographers.

Environment and public health workers: includes environmental and public health officers, sanitarians, hygienists, environmental and public health technicians, district health officers, malaria technicians, meat inspectors, public health supervisors and similar professions.

Community health workers: includes traditional medicine practitioners, faith healers, assistant/community health education workers, community health officers, family health workers, lady health visitors, health extension package workers, community midwives, institution-based personal care workers and traditional birth attendants.

Other health workers: includes a large number of occupations such as dieticians and nutritionists, medical assistants, occupational therapists, operators of medical and dentistry equipment, optometrists and opticians, physiotherapists, podiatrists, prosthetic/orthotic engineers, psychologists, respiratory therapists, speech pathologists, medical trainees and interns.

Health management and support workers: includes general managers, statisticians, lawyers, accountants, medical secretaries, gardeners, computer technicians, ambulance staff, cleaning staff, building and engineering staff, skilled administrative staff and general support staff.

Associated terms

The above classification of health workers is based on education, regulation, activities and tasks criteria (combined WHO and ILO classification system).

The 2004 Joint Learning Initiative report on human resources for health used three categories too identify low, medium and high density of health workers: less than 2.5, 2.5-5.0 and 5.0 or more health workers respectively per 1 000 population.

Data sources

The indicators needed to describe the characteristics of the health workforce and monitor its development over time are often generated from a multitude of sources and cover many areas (such as profession, training level and industry of employment). The data provided were compiled from four major sources: establishment surveys, household and labour force surveys, population and housing censuses and records from professional and administrative sources.

The diversity of sources meant that harmonization had to be undertaken to arrive at comparable estimates of the health workforce for each Member State. The harmonization process was based on internationally standardized classification systems, mainly the International Standard Classification of Occupations (ISCO), but also the International Standard Classification of Education (ISCED) and the International Standard Industrial Classification of all Economic Activities (ISIC).

Some difficulties of harmonizing data based on a variety of definitions and classification systems could not be solved through the application of the ISCO. For example, in order to include country-specific types of workers, many ministries of health apply their own national classification system. Community health workers and traditional birth attendants are not captured through the standard ISCO system, but sometimes account for up to a third of the health workforce and form an important part of the infrastructure for service delivery.
Apart from harmonization of health workforce categories, an additional challenge was the triangulation of various data from different sources in one country. Generally, when data were available from more than one source, we chose censuses because they provide information on both health service providers and health management and support workers. However, not many recent censuses with sufficiently detailed ISCO coding were both available and accessible.

The present data set includes recent and sufficiently detailed census data from 12 countries: Australia, Bolivia, Brazil, Costa Rica, Honduras, Mexico, Mongolia, New Zealand, Panama, Paraguay, Thailand and Turkmenistan.

For a further three – Estonia, the United Kingdom and the United States of America – the data presented are from representative labour force or household surveys that are part of the Luxembourg Income (or Employment) Study. These surveys were as detailed as census data in terms of the occupational categories they provided and at the same time were based on the ISCO classification system (in the case of Estonia) or a national system with equivalent detail (in the cases of the United Kingdom and the United States surveys).

For most countries in the African Region as well as for many countries in the South-East Asia Region and the Eastern Mediterranean Region, the data presented were obtained through a special survey developed by WHO and executed through its regional and country offices. As much as possible, the survey attempted to obtain information on both health service providers and health management and support workers; it was based mainly on the ISCO system but maintained some country-specific classifications for selected occupations. The survey was implemented in the following countries:


For the following countries, which were not included in the WHO special survey, data were obtained from records of departments of health, lists maintained by public service commissions or other administrative sources:

Argentina, Belize, Brunei, Cambodia, Chile, China, Colombia, Cook Islands, Cuba, Dominican Republic, Ecuador, El Salvador, Fiji, Finland, Jamaica, Malaysia, Nicaragua, Uruguay, Venezuela, Papua New Guinea, Philippines, Tonga, Tuvalu, Viet Nam.

For the remaining countries, the relevant data were compiled from the OECD Health Data database, the European Health for All database or the previous version of WHO’s Global Atlas for the Human Resources for Health. These data were the least detailed of all, containing information on only four to five occupations and almost always containing no information on health management and support workers.

The countries for which data was obtained from these sources are the following:

Afghanistan, Albania, Andorra, Angola, Antigua and Barbuda, Armenia, Austria, Azerbaijan, Bahamas, Barbados, Belarus, Belgium, Bosnia and Herzegovina, Canada, Croatia, Cyprus, Czech Republic, Denmark, Dominica, France, Georgia, Germany, Greece, Grenada, Guatemala,
Guyana, Haiti, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kazakhstan, Kiribati, Korea, Rep.,
Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Latvia, Libya, Lithuania, Luxembourg,
The former Yugoslav Republic of Macedonia, Malta, Marshall Islands, Micronesia (Federated
States of), Moldova, Monaco, Nauru, Netherlands, Niue, Norway, Palau, Peru, Poland, Portugal,
Qatar, Romania, Russian Federation, Samoa, San Marino, Serbia and Montenegro, Slovakia,
Slovenia, Solomon Islands, Somalia, Spain, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and
the Grenadines, Suriname, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Trinidad and
Tobago, Turkey, Ukraine, United Arab Emirates, Uzbekistan, Vanuatu.
Country reports to WHO regional offices or headquarters, based on administrative records such as databases of registered physicians/nurses in the country. In some countries data are obtained from the census, labour force or other surveys that include questions about occupations of the household members. Data on physicians and nurses data are generally the best human resource information available.

Methods of estimation

No methods of estimation have been developed.

Disaggregation

- References


Database


Comments
- Total expenditure on health as percentage of GDP
- General government expenditure on health as percentage of total general government expenditure
- Per capita total expenditure on health at international dollar rate

Rationale for use

Health financing is a critical component of health systems. National health accounts (NHA) provide large set of indicators based on the expenditure information collected within a internationally recognized framework. NHA are a synthesis of the financing and spending flows recorded in the operation of a health system, from funding sources to the distribution of funds across providers and functions of health systems and benefits across geographical, demographic, socioeconomic and epidemiological dimensions.

Definition

Total health expenditure as percentage of Gross Domestic Product (GDP).

Percentage of total general government expenditure that is spent on health.

Per capita total expenditure on health at international dollar rate.

Associated terms

**Total expenditure on health** is the sum of general government health expenditure and private health expenditure in a given year, calculated in national currency units in current prices.

**GDP** is the value of all goods and services provided in a country by residents and non-residents without regard to their allocation among domestic and foreign claims. This corresponds to the total sum of expenditure (consumption and investment) of the private and government agents.

**General government expenditure** includes consolidated direct outlays and indirect outlays (e.g. subsidies to producers, transfers to households), including capital of all levels of government, social security institutions, autonomous bodies, and other extrabudgetary funds.

**General government expenditure on health** comprises the direct outlays earmarked for the enhancement of the health status of the population and/or the distribution of medical care goods and services among population by the following financing agents: central/federal, state/provincial/regional, and local/municipal authorities; extrabudgetary agencies, social security schemes; parastatals. All can be financed through domestic funds or through external resources.

**International dollars** are derived by dividing local currency units by an estimate of their Purchasing Power Parity (PPP) compared to US dollar, i.e. the measure which minimizes the consequences of differences in price levels between countries.

Data sources & Methods of estimation

Only about 95 countries either have produced full national health accounts or report expenditure on health to OECD. Standard accounting estimation and extrapolation techniques have been used to provide time series. The principal international references used are the International Monetary Fund (IMF) Government finance statistics and International financial statistics; OECD health data and International development statistics; and the United Nations National accounts
statistics. National sources include: national health accounts reports, public expenditure reports, statistical yearbooks and other periodicals, budgetary documents, national accounts reports, statistical data on official websites, central bank reports, nongovernmental organization reports, academic studies, and reports and data provided by central statistical offices and ministries.

Disaggregation

By public and private components and subcomponents is not presented here but is available on the website: (http://www.who.int/nha)

References


Database

- National Health Accounts, World Health Organization: (http://www.who.int/nha)

Comments

Estimated health expenditure are collected by triangulating information from several sources to ensure that the outlays constitute the bulk of the government/private expenditure on health. Some figures may be underestimated when it is not possible to obtain local government, nongovernmental organizations and insurance expenditures data.
- General government expenditure on health as percentage of total expenditure on health
- General government expenditure on health as percentage of total government expenditure
- External resources for health as percentage of total expenditure on health
- Social security expenditure on health as percentage of general government expenditure on health
- Out-of-pocket expenditure as percentage of private expenditure on health
- Private prepaid plans as percentage of private expenditure on health
- Per capita total expenditure on health at average exchange rate (US$)
- Per capita government expenditure on health at average exchange rate (US$)
- Per capita government expenditure on health at international dollar rate

Rationale for use

Health financing is a critical component of health systems. National health accounts (NHA) provide a large set of indicators based on the expenditure information collected within an internationally recognized framework. NHA are a synthesis of the financing and spending flows recorded in the operation of a health system, from funding sources to the distribution of funds across providers and functions of health systems and benefits across geographical, demographic, socioeconomic and epidemiological dimensions.

Definition

Key indicators for which the data are available:

Level of total health expenditure (THE) as % of GDP, and per capita health expenditures in US dollars and in international dollars.

Distribution of public and private sectors in financing health and their main components, such as:

- Extent of social and private health insurance
- Burden on households' through out of pocket spending
- Reliance on external resources in financing health

Associated terms

Gross domestic product (GDP) is the value of all goods and services provided in a country by residents and non-residents. This corresponds to the total sum of expenditure (consumption and investment) of the private and government agents of the economy during the reference year.

General government expenditure (GGE) includes consolidated direct outlays and indirect outlays, such as subsidies and transfers, including capital, of all levels of government social security institutions, autonomous bodies, and other extrabudgetary funds.

Total expenditure on health (THE) is the sum of general government health expenditure and private health expenditure in a given year, calculated in national currency units in current prices.
It comprises the outlays earmarked for health maintenance, restoration or enhancement of the health status of the population, paid for in cash or in kind.

**General government expenditure on health** (GGHE) is the sum of outlays by government entities to purchase health care services and goods. It comprises the outlays on health by all levels of government, social security agencies, and direct expenditure by parastatals and public firms. Expenditures on health include final consumption, subsidies to producers, and transfers to households (chiefly reimbursements for medical and pharmaceutical bills). It includes both recurrent and investment expenditures (including capital transfers) made during the year. Besides domestic funds it also includes external resources (mainly as grants passing through the government or loans channelled through the national budget).

**Social security expenditure on health** (SSHE) includes outlays for purchases of health goods and services by schemes that are mandatory and controlled by government. Such social security schemes that apply only to a selected group of the population, such as public sector employees only, are also included here.

**External resources** (ExtHE) includes all grants and loans whether passing through governments or private entities for health goods and services, in cash or in kind.

**Private health expenditure** (PvtHE) is defined as the sum of expenditures on health by the following entities:

- **Prepaid plans** and risk-pooling arrangements (PrepaidHE): the outlays of private insurance schemes and private social insurance schemes (with no government control over payment rates and participating providers but with broad guidelines from government)

- **Firms’ expenditure on health**: the outlays by private enterprises for medical care and health-enhancing benefits other than payment to social security or other pre-paid schemes.

- **Non-profit institutions serving mainly households** (NGO's): outlays of those entities whose status do not permit them to be a source of financial gain for the units that establish, control or finance them. This includes funding from internal and external sources.

- **Household out-of-pocket spending** (OOPs): the direct outlays of households, including gratuities and in-kind payments made to health practitioners and to suppliers of pharmaceuticals, therapeutic appliances and other goods and services. This includes household direct payments to public and private providers of health care services, non-profit institutions, and non-reimbursable cost sharing, such as deductibles, copayments and fee for services.

**Exchange rate**: the annual average or year end number of units at which a currency is traded in the banking system.

**International dollars** are derived by dividing local currency units by an estimate of their Purchasing Power Parity (PPP) compared to US dollar, i.e. the measure which minimizes the consequences of differences in price levels between countries.

**Data sources & Methods of estimation**

About 100 countries either have produced full national health accounts or report expenditure on health to OECD. Standard accounting estimation and extrapolation techniques have been used to provide time series (1998-2004). Ministries of Health have responded to the draft updates sent for their inputs and comments.
The principal international references used are the International Monetary Fund (IMF), Government finance statistics and International financial statistics; OECD health data; and the United Nations National accounts statistics. National sources include: national health accounts reports, public expenditure reports, statistical yearbooks and other periodicals, budgetary documents, national accounts reports, central bank reports, nongovernmental organization reports, academic studies, reports and data provided by central statistical offices and ministries and statistical data on official web sites.

For details on sources and methods see annex notes to the WHR on the website www.who.int/nha.

Disaggregation

By providers and functions are not available here but could be accessed from individual NHA reports of the countries.

References


Database

- National Health Accounts, World Health Organization: (http://www.who.int/nha)

Comments

Estimated health expenditure are collected by triangulating information from several sources to ensure that the outlays constitute the bulk of the government/private expenditure on health. Some figures may be underestimated when it is not possible to obtain local government, nongovernmental organizations and insurance expenditures data.
Coverage of vital registration of deaths

Rationale for use

Health information is an essential component of health systems. The registration of births and deaths with causes of death, called “civil registration (vital registration)”, is an important component of a country health information system.

Definition

Percentage of estimated total deaths that are ‘counted’ through civil registration system.

Associated terms

None.

Data sources

Country reports of coverage and WHO assessment of coverage.

Methods of estimation

Expected numbers of deaths by age and sex are estimated from current life tables, based on multiple sources. Reported numbers are compared with expected numbers by age and sex to obtain an estimate of coverage of the vital registration system.

Disaggregation

None.

References


Database

- WHO mortality database website: (http://www.who.int/whosis/mort/en)

Comments

Though sample registration systems only partially cover deaths in a country, they can be an important intermediate solution to obtain mortality and causes of death information about the country.
**Number of hospital beds per 10 000 population**

**Rationale for use**

Service delivery is an important component of health systems. To capture availability, access and distribution of health services delivery a range of indicators or a composite indicator is needed. Currently, there is no such data for the majority of countries. In-patient beds density is one of the few available indicators on a component of level of health service delivery.

**Definition**

Number of in-patient beds per 100 000 population.

**Associated terms**

*Hospital beds* include in-patient and maternity beds. Maternity beds are included while cots and delivery beds are excluded.

**Data sources**

Administrative records, based on reported data by in-patient facilities; censuses of health facilities.

**Methods of estimation**

Empirical data only with possible adjustment for underreporting (e.g. missing private facilities).

**Disaggregation**

By location (urban/rural) though limited availability.

**References**


**Database**

- Human Resources for Health Information: [http://who.int/globalatlas/autologin/hrh_login.asp](http://who.int/globalatlas/autologin/hrh_login.asp)

- Regional Core Health Data Initiative: [http://www.paho.org/English/SHA/coredata/tabulator/newTabulator.htm](http://www.paho.org/English/SHA/coredata/tabulator/newTabulator.htm)

**Comments**

There is a need for further work to better capture the level and distribution of health services in a country. This would be the first step towards assessing inequity in access to health services.