

## TECHNICAL NOTES

---

### Childhood immunization

#### Data sources

Health indicator and dimension of inequality data were sourced from publicly available Demographic and Health Surveys (DHS) – rounds three, four, five and six – and Multiple Indicator Cluster Surveys (MICS) – rounds three and four. DHS and MICS are large-scale, nationally representative household surveys that collect data through standardized, face-to-face interviews with women aged 15–49 years in low- and middle-income countries. Country income group was determined using the World Bank classification as of July 2014.

The disaggregated data are the product of a reanalysis of DHS and MICS micro-data by the International Center for Equity in Health based in the Federal University of Pelotas, Brazil, and can be freely accessed from the WHO Health Equity Monitor database ([www.who.int/gho/health\\_equity/en/](http://www.who.int/gho/health_equity/en/)).

The survey tools used by DHS and MICS permit direct comparisons between surveys, and it is assumed that the survey design and implementation quality are sufficiently similar between DHS and MICS, across countries and over time. The data were taken from rounds of DHS and MICS that were not conducted in the same year in all countries. In a few cases there may be minor differences between the data reported here and in previous DHS or MICS country reports due to small discrepancies in the time span, definition and/or calculation of some indicators.

#### Health indicators

Childhood immunization indicators include BCG immunization coverage among one-year-olds, measles immunization coverage among one-year-olds, polio immunization coverage among one-year-olds, DTP3 immunization coverage among one-year-olds and full immunization coverage among one-year-olds. Note that the reference age group used in the denominator (12–23 months) was adjusted to align with alternative immunization schedules adopted in certain countries (18–29 months or 15–26 months).

- **BCG immunization coverage among one-year-olds** is defined as the percentage of one-year-olds who have received one dose of Bacille Calmette-Guérin (BCG) vaccine.
- **Measles immunization coverage among one-year-olds** is defined as the percentage of one-year-olds who have received at least one dose of measles-containing vaccine.
- **Polio immunization coverage among one-year-olds** is defined as the percentage of one-year-olds who have received three doses of polio vaccine.
- **DTP3 immunization coverage among one-year-olds** is defined as the percentage of one-year-olds who have received three doses of the combined diphtheria, tetanus toxoid and pertussis (DTP3) vaccine.
- **Full immunization coverage among one-year-olds** is defined as the percentage of one-year-olds who have received one dose of BCG vaccine, three doses of polio vaccine, three doses of DTP3 vaccine, and one dose of measles vaccine.

Detailed information about the criteria used to calculate the numerator and denominator values for each indicator is available in the WHO Indicator and Measurement Registry, under the topic “Health Equity Monitor” ([www.who.int/gho/indicator\\_registry/en/](http://www.who.int/gho/indicator_registry/en/)).

## Dimensions of inequality

Health data were disaggregated by four dimensions of inequality: economic status, education level, place of residence and sex. Economic status was determined at the household level, using a wealth index. Country-specific indices were based on owning selected assets and having access to certain services, and constructed using principal component analysis. Within each country the index was used to create quintiles, thereby identifying five equal subgroups that each account for 20% of the population. Note that certain indicators have denominator criteria that do not include all households and/or are more likely to include households from a specific quintile; thus the share of the population for a given indicator may not equal 20%. Education level refers to the highest level of schooling attained by the mother. Three subgroups were defined: no education, primary school, and secondary school or higher. For place-of-residence classifications (that is, urban or rural), country-specific criteria were applied.

## Country selection

Countries were selected on the basis of data availability and survey year. When a survey was conducted over more than one calendar year, the year of survey was assigned based on the initial year of data collection. Low- and middle-income countries with surveys dating from the past 10 years were selected to illustrate the “latest situation” of inequality. Latest-situation analyses were possible for 82 low- and middle-income countries representing all WHO regions with the year of their most recent survey falling between 2005 and 2013.

“Change over time” was analysed for each study country that had surveys from two time points (a recent survey falling between 2005 and 2013 and an older survey falling between 1995 and 2004), and reflects the change in national averages and inequalities within countries over a period of about 10 years. Change-over-time analyses were possible for 41 low- and middle-income countries, representing all WHO regions. The number of years between surveys within countries ranged from 5 to 15 years, as per data availability. When more than one older survey was available, the survey closest to 10 years prior to the most recent survey was selected.

Study countries were excluded on a case-by-case basis if data about the relevant health indicator and/or the dimension of inequality were not available or if the sample size was too low to report a valid estimate for one or more of the relevant subgroups (that is, less than 25 cases). Situations of low sample size (that is, 25–49 cases) were noted.

In five MICS education was classified according to different criteria than applied to other surveys, and data could not be reasonably compared with those of other study countries; thus, data from these five countries were thus excluded from relevant disaggregation and analyses by education.

## Analysis

Micro-level DHS and MICS data were used to generate national average and disaggregated estimates for each indicator. Survey design specifications were taken into consideration in the estimation. The same methods of calculation were applied across all surveys to generate comparable estimates across countries and over time.

Point estimates of disaggregated data are presented alongside 95% confidence intervals (CIs), and the population share of the subgroup. The population share for each indicator is the percentage of the affected population – the indicator denominator – represented by the subgroup in a given country.