



World Health  
Organization

Indicator Sheet

**BIRTHS ATTENDED  
BY SKILLED HEALTH  
PERSONNEL**

MoNITOR R

The MoNITOR logo icon is a green circle containing a white heartbeat line and a heart symbol.

## CONCEPT AND DEFINITION

### Concept

Most obstetric complications could be prevented or managed if women have access to a skilled birth attendant (SBA) or skilled health personnel who are able to adequately manage and provide quality care and lifesaving interventions during childbirth. The presence of a SBA is a measure of a health system's ability to provide adequate care for pregnant women during labour and childbirth.

Skilled health personnel provide effective, uninterrupted and quality care, and are defined as competent maternal and newborn health (MNH) professionals who are educated, trained, and regulated to national and international standards. All competent MNH professionals are able to: (a) provide and promote evidence-based, human rights-based, quality, socioculturally sensitive and dignified care to women and newborns; (b) facilitate physiological processes during labour and delivery to ensure a clean and positive childbirth experience; and (c) identify and manage or refer women and/or newborns with complications. In addition, as part of an integrated team of MNH professionals (including midwives, nurses, obstetricians, paediatricians and anaesthetists), they perform all signal functions of emergency maternal and newborn care to optimize the health and well-being of women and newborns. Within an enabling environment, health personnel trained to International Confederation of Midwives (ICM) standards can provide nearly all of the essential care needed for women and newborns. In different countries, these competencies are held by cadre with varying occupational titles (1). Not having access to a skilled attendant at the time of delivery is detrimental to a woman's health and empowerment because it could lead to the death of the mother or to her suffering a lifelong disability, especially in marginalized settings (2).

### Definition

The number of women of reproductive age with a live birth attended by skilled health personnel (generally doctors, nurses, or midwives) during delivery in a specified reference period is expressed as a percentage of women in the same age range with a live birth in the same period. Women should be attended by health personnel trained in providing lifesaving obstetric care, including giving the necessary supervision, care and advice to women during pregnancy, labour and the postpartum period, conducting deliveries on their own, and caring for newborns (3). Traditional birth attendants, whether trained or untrained, are not included in the definition of skilled health personnel (1–3).

**Unit of measurement:** Percentage (%)

**Level of indicator use:** Population-based at global, national and subnational (first or second administrative level)

**Monitoring and evaluation framework:** Outcome

**Domain:** Service coverage

**Continuum of care:** Intrapartum

# MEASUREMENT GUIDANCE

## Data sources

There are two common data sources for this indicator:

- a. Routinely collected administrative data
- b. Population-based household surveys.

## Routinely collected administrative data

Data from routinely collected and compiled administrative data sources will provide information as recorded in medical charts/ records or registers and are entered into national and/or subnational health management information systems (HMIS).

Data from health information systems may collect information on health personnel who assisted during delivery among all women who delivered at a health facility. Routinely collected administrative data and health facility statistics are the preferred data source in settings with a high utilization of health facility services and where data are recorded in a manner that ensures good data quality for both the public and private health sectors. The compiled data in the national HMIS or District Health Information System (DHIS2) should include data from both public and private health sectors, especially when the private sector is a substantial source of service provision to the population. In settings where utilization of health facilities is not high (e.g. settings with a high prevalence of births occurring at home), data may suffer from incompleteness if information about women delivering outside facilities is not captured. In addition, there are often challenges in accurately measuring the numerator and the denominator when routine HMIS data are used to measure this indicator.

**Key source of data:** Administrative data sources include health facility and health services data abstracted from obstetric and neonatal medical records, including health services registers. Relevant information is recorded by health personnel within health facilities on paper forms completed by health personnel and/or through an electronic medical record. Data from paper or electronic sources are entered or abstracted into a database or registry and are compiled and analysed within the national and/or subnational HMIS. The Ministry of Health (MoH) and/or National Statistical Offices (NSO) are usually responsible for the reporting of this indicator.

**Indicator definition and calculation:** The indicator is calculated as the percentage of births attended by skilled health personnel among all births in a health facility during a specified reference period. The indicator consists of the following numerator and denominator:

**Numerator:** Number of births attended by skilled health personnel<sup>1</sup> in a specified time period.

**Denominator:** Number of total births in the health facility in a specified time period.

Unless specified, the statistic may include any woman regardless of age and should include both live births and stillbirths, as defined by the health facility and/or national or subnational vital statistics offices. In many contexts, the definition of “skilled” and inclusion of health personnel in the numerator is based on individual health facility report, or is in accordance with the country-specific definition by the MoH and/or NSO.

**Frequency of measurement:** The indicator can be calculated on an annual basis or may be tracked on a more frequent and ongoing basis (e.g. monthly, quarterly), depending on facility, subnational and national processes for data entry, compilation and analysis. As a guide, the recommended frequency of measurement based on reporting level is outlined below:

- *Facility level:* Monthly, quarterly, or as needed based on the country and/or facility need
- *Subnational (first and second administrative) level:* Monthly or quarterly;
- *National level:* Annually (data can be aggregated to provide national-level data).

**Disaggregation:** By level of facility, location of facility (e.g. urban, rural), subnational administrative units (e.g. districts, provinces, regions) and type of health personnel.

**Missing values:** Missing values are usually “not known” or “not reported”.

### Population-based household surveys

The main source of data for this indicator has been through population-based household surveys collected through nationally or subnationally representative and structured questionnaires, such as:

- Demographic Health Surveys (DHS) (4)
- Multiple Indicator Cluster Surveys (MICS) (5)

<sup>1</sup> For universal and consistent measurement of this indicator, the definition of “skilled health personnel” providing care during childbirth should align with the 2018 joint statement by WHO, UNFPA, UNICEF, ICM, ICN, FIGO and IPA: <https://www.who.int/reproductivehealth/publications/statement-competent-mnh-professionals/en/>.

- Reproductive Health Surveys (RHS)
- Other household surveys with a similar methodological design.

Population-based household survey data are the preferred data source in settings where utilization of health facility services is not very high (e.g. settings with a high prevalence of births occurring at home) or where private health sector data are excluded from routinely collected administrative data sources.

**Key source of data:** Eligible women of reproductive age (15–49 years) are identified in the household survey for inclusion and interviewing using an individual women’s questionnaire. Women are considered eligible for survey interview if they are either usual residents or visitors of the household who stayed there the night before the interview.

All eligible and interviewed women (between 15 and 49 years old) who had a live birth during a specified reference period, typically 2–5 years prior to the time of the interview, are asked “*Who assisted with the delivery of (NAME)?*”, where “name” refers to the name of the live birth the individual woman had during the same reference period. Women are asked to identify all health personnel or other personnel that assisted during the delivery.

The MoH and the NSO typically conduct household surveys and compile, analyse and report the results for this indicator in collaboration with the survey programme (e.g. DHS, MICS, RHS) and funding agency.

**Indicator definition and calculation:** Depending on survey design, individual women of reproductive age (15–49 years old) are asked about assistance during delivery, either about (a) the most recent live birth, as done in the MICS; or (b) all live births, as done in the DHS.<sup>2</sup> These are asked irrespective of the child’s current living status (dead or alive) and are for live births that the woman had during a specified reference period, which is typically 2–5 years before the time of survey completion. The definition is as follows:

The percentage of women (aged 15–49 years) with a live birth whose most recent live birth was attended by skilled health personnel. The indicator consists of the following numerator and denominator:

*Numerator:* Number of interviewed women (aged 15–49 years) with a live birth in the 2–5 years prior to survey completion whose most recent live birth was attended by skilled health personnel.

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<sup>2</sup> The DHS Program (<https://dhsprogram.com/>) Model Women’s Questionnaire asks women about skilled attendance during delivery for all live births in the last five years. Reporting of the indicator may be tabulated and analysed either based on all live births or the most recent live birth.

*Denominator:* Total number of live births in the 2–5 years prior to survey completion.

The categories of health personnel included in the survey are customized with inputs from MoH and NSO, and all nationally applicable health personnel – both skilled and unskilled – that provide assistance during delivery are included. These surveys have consistently asked women to identify all mentioned health personnel, and encourage the interviewer to probe to ensure no health personnel or other adult present at the time of delivery is missed and that there is accuracy in the identification of the correct personnel. This may include special instruction to correctly identify the cadre and status of the provider to distinguish between skilled and unskilled providers, such as a midwife versus a traditional birth attendant. During the analysis stage the most highly skilled health personnel who assisted in the delivery is identified and included in the indicator calculation.

**Frequency of measurement:** Household surveys are typically conducted every 3–5 years.

**Disaggregation at population level:** Type of health personnel, place of delivery (e.g. private or public health facility, community), mode of delivery, place of residence (e.g. urban, rural), subnational administrative units (e.g. districts, provinces, regions), sex of live birth, birth order, socioeconomic status (e.g. education level, household wealth quintile), age of woman at the time of delivery, total number of ANC visits, and timing of first ANC visit.

**Missing values:** Included in the distribution of all health personnel as “don’t know” or “missing”.

# INTERPRETATION AND USE

## Interpretation

This indicator helps programme management at global, national and subnational levels by monitoring and evaluating whether safe motherhood and MNH programmes are on target with the utilization of skilled personnel at the time of labour and childbirth. In addition, the proportion of births attended by skilled personnel is a measure of the health system's functioning and potential to provide adequate coverage for deliveries.

Conversely, this indicator is a measure of contact with the health system and does not take into account the content and quality of care received. This indicator has been proposed as a proxy indicator for monitoring progress towards the reduction of maternal mortality. It is highly correlated with maternal mortality levels, although such a correlation does not provide levels of causality.

Note that this indicator does not usually change rapidly as utilization of delivery services is dependent on broader factors, such as the training and deployment of additional health personnel, which may take considerable time to scale up.

Ambiguities and differences in the categorization of “skilled health personnel” between and within countries, and the inclusion of additional or different health personnel as skilled over time, and differences in measurement of SBA through administrative data and household surveys have compromised the accuracy, comparability and consistency of measurement of this indicator. The differences and inconsistencies in SBA definition and measurement methodology may often explain wide discrepancies between statistics from different data sources for the same population or between countries. Consideration for these differences should be considered when interpreting SBA at national, subnational, or health facility levels, as well as when determining trends.

## Common challenges

Data collected from administrative and other routine data systems

Administrative data may suffer from poor quality such as irregularities in report generation, data duplication and inconsistencies (6). Reporting challenges exist at the facility level given data quality issues, including incomplete, inaccurate and lack of timely data due to insufficient capacity in the health system – including untrained health personnel and lack of access to technology or infrastructure – and/or inadequate health system design.

Many HMIS databases or registries are event-based and only include women who delivered a birth at a health facility. In some instances, the denominator may include births delivered by women of an unspecified age range and include both live births and stillbirths. This underestimates the number of spontaneous or induced abortions, as well as ectopic and molar pregnancies. In addition, the definition of a stillbirth varies by country and context, such as differences in

inclusion for gestational age (e.g. 20–28 weeks) and birthweight (e.g.  $\geq 500$  grams). These differences in definitions compromise the ability to compare data between countries.

Administrative data should be interpreted with caution in settings where data quality is poor and the percentage of births at public and private sector health facilities is low, or where data from the private health sector are not compiled within the HMIS reporting.

In settings where routine HMIS data lack information on pregnancies and/or births that occur outside the public sector – for example, in homes or private sector facilities – the total number of births in the HMIS should not serve to estimate the denominator for this indicator. Where data on the total numbers of live births for the entire population for the denominator are unavailable, evaluators can calculate total estimated live births using census data for the total population and crude birth rates in a specified area (total expected live births = estimated population x the total crude birth rate).

#### Data collected through household surveys

Women may not be able to accurately recall details around childbirth when data are collected through household surveys (7). There is also a time lag as the recall period is up to 2–5 years before the survey data were collected.

The most commonly used denominator is the number of live births, which acts as a proxy for the number of pregnant women. However, inclusion of only live births underestimates the total number of pregnancies by excluding those that end in stillbirth or spontaneous or induced abortion, as well as ectopic and molar pregnancies. It also causes survivor bias in that only those women who are alive at the time of the interview would be included, and underestimates the total number of women requiring skilled care during pregnancy, labour and childbirth.

Depending on survey design, interviewed women are asked about either all live births or the most recent live birth during the survey reference period. Including all live births may overrepresent those women with shorter birth intervals and multiple births, which may be related to systematic differences in socioeconomic and demographic factors (e.g. education, wealth, rural or urban residence). However, only including the most recent live birth may impact sample size and may be challenging in surveys that have time or budgetary constraints.

With regard to data obtained from surveys, the validity of such data depends on correct identification by the woman of the credentials of the health personnel or other person(s) who assisted during the delivery, which may not be obvious in certain countries. The ability of the woman to correctly identify the type of health personnel may compromise the accuracy of this indicator.

## Validation studies

### Publications

Technical work to improve the specificity of this indicator has been conducted via the following:

Blanc AK, Diaz C, McCarthy KJ, Berdichevsky K. Measuring progress in maternal and newborn health care in Mexico: validating indicators of health system contact and quality of care. *BMC Pregnancy Childbirth*. 2016;16(1):255 (<https://doi.org/10.1186/s12884-016-1047-0>, accessed 21 October 2020).

Blanc AK, Warren C, McCarthy, KJ, Kimani J, Ndwiga C, RamaRao S. Assessing the validity of indicators of the quality of maternal and newborn health care in Kenya. *J Glob Health*. 2016;6(1):010405 (<http://www.jogh.org/documents/issue201601/jogh-06-010405.pdf>, accessed 21 October 2020).

Hobbs AJ, Moller AB, Kachikis A, Carvajal-Aguirre L, Say L, Chou D. Scoping review to identify and map the health personnel considered skilled birth attendants in low-and-middle income countries from 2000–2015. *PLoS One*. 2019;14(2):e0211576 (<https://doi.org/10.1371/journal.pone.0211576>, accessed 21 October 2020).

McCarthy KJ, Blanc AK, Warren CE, Kimani J, Mdawida B, Ndwidga C. Can surveys of women accurately track indicators of maternal and newborn care? A validity and reliability study in Kenya. *J Glob Health*. 2016;6(2):020502 (<https://dx.doi.org/10.7189/jogh.06.020502>, accessed 21 October 2020).

Munos MK, Stanton CK, Bryce J, the Core Group for Improving Coverage Measurement for MNCH. Improving coverage measurement for reproductive, maternal, neonatal and child health: gaps and opportunities. *J Glob Health*. 2017;7(1):010801 (<http://jogh.org/documents/issue201701/jogh-07-010801.pdf>, accessed 21 October 2020).

Radovich E, Benova L, Penn-Kekana L, Wong K, Campbell OMR. ‘Who assisted with the delivery of (NAME)?’ Issues in estimating skilled birth attendant coverage through population-based surveys and implications for improving global tracking. *BMJ Glob Health*. 2019;4:e001367 (<http://dx.doi.org/10.1136/bmjgh-2018-001367>, accessed 21 October 2020).

Wiley B, Waiswa P, Kajjo D, Munos M, Akuze J, Allen E, et al. Linking data sources for measurement of effective coverage in maternal and newborn health: what do we learn from individual- vs ecological-linking methods? *J Glob Health*. 2018;8(1):010601 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5823029/>, accessed 21 October 2020).

### Reports

Berdichevsky K, Diaz-Olavarrieta C, McCarthy K, Blanc A. Validating the indicators of the quality of maternal health care: Final report, Mexico. Mexico City: Population Council; 2014 ([https://www.popcouncil.org/uploads/pdfs/2014RH\\_MHTF-Mexico.pdf](https://www.popcouncil.org/uploads/pdfs/2014RH_MHTF-Mexico.pdf), accessed 21 October 2020).

Warren C, Kimani J, Kivunaga J, Mdawida B, Ndwiga C, McCarthy K, et al. Validating the indicators of the quality of maternal health care: Final report, Kenya. Nairobi: Population Council; 2014 ([https://www.popcouncil.org/uploads/pdfs/2014RH\\_MHTF-Kenya.pdf](https://www.popcouncil.org/uploads/pdfs/2014RH_MHTF-Kenya.pdf), accessed 21 October 2020).

# GLOBAL MONITORING

## Global database

The United Nations Children’s Fund (UNICEF) and WHO jointly maintain a database for global monitoring and reporting of the percentage of births attended by a skilled health personnel. These agencies obtain data from nationally representative household surveys or routinely collected administrative data/services statistics. Before data can be included in the global databases, UNICEF and WHO undertake a process of data verification that includes correspondence with field offices to clarify any questions regarding the reported statistics. For example, some household survey reports may present the total percentage of live births attended by a type of health personnel that does not conform to the internationally agreed-upon definition (e.g. total includes personnel who are not considered skilled, such as community health workers or traditional birth attendants). In these instances, the national categories of skilled health personnel are verified and data for some countries may include additional categories of trained personnel beyond doctors, nurses and midwives. More information about the joint UNICEF/WHO database of skilled health personnel can be found at the following link: <https://data.unicef.org/topic/maternal-health/delivery-care/>.

## Key initiatives

Countdown to 2030 – Women’s, Children’s and Adolescents’ Health: <http://countdown2030.org/>

Ending Preventable Maternal Mortality (EPMM): [http://who.int/reproductivehealth/topics/maternal\\_perinatal/epmm/en/](http://who.int/reproductivehealth/topics/maternal_perinatal/epmm/en/)

Every Newborn Action Plan (ENAP): [http://apps.who.int/iris/bitstream/10665/127938/1/9789241507448\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/127938/1/9789241507448_eng.pdf)

Global Reference List of 100 Core Health Indicators (plus health-related SDGs), 2018: <https://www.who.int/healthinfo/indicators/2018/en/>

Global Strategy for Women’s, Children’s and Adolescents’ Health (2016–2030): <http://www.who.int/life-course/partners/global-strategy/en/>

United Nations Sustainable Development Goals (SDGs): <https://sustainabledevelopment.un.org>

## ADDITIONAL RESOURCES

Global Health Observatory (GHO) Data – World Health Statistics: [http://www.who.int/gho/publications/world\\_health\\_statistics/en/](http://www.who.int/gho/publications/world_health_statistics/en/)

Sustainable Development Goals (SDGs) Indicators – Metadata repository: <https://unstats.un.org/sdgs/metadata/>

UNICEF Data: Monitoring the situation of children and women: Delivery care: <https://data.unicef.org/topic/maternal-health/delivery-care/>

Multiple Indicator Cluster Surveys (MICS): <http://mics.unicef.org>

The DHS Program: <http://www.dhsprogram.com/>

MEASURE Evaluation: Family Planning and Reproductive Health Indicators Database: Percent of deliveries attended by skilled health personnel: [https://www.measureevaluation.org/prh/rh\\_indicators/womens-health/sm/percent-of-deliveries-attended-by-skilled-health](https://www.measureevaluation.org/prh/rh_indicators/womens-health/sm/percent-of-deliveries-attended-by-skilled-health)

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2. Making pregnancy safer: the critical role of the skilled attendant: A joint statement by WHO, ICM and FIGO. Geneva: World Health Organization; 2004 ([https://www.who.int/maternal\\_child\\_adolescent/documents/9241591692/en/](https://www.who.int/maternal_child_adolescent/documents/9241591692/en/), accessed 21 October 2020).
3. Metadata for Goal 3: Ensure healthy lives and promote well-being for all at all ages. In: Metadata for the proposed global indicators for the review of the 2030 Agenda for Sustainable Development [website]. New York: United Nations Statistics Division; 11 May 2016 (<http://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-3.pdf>, accessed 21 October 2020).
4. The DHS Program [website]. Rockville: ICF International; 2020 (<http://www.dhsprogram.com/>, accessed 21 October 2020).
5. Multiple Indicator Cluster Surveys (MICS) [website]. New York: UNICEF; 2020 (<http://mics.unicef.org>, accessed 21 October 2020).
6. Abouzahr C, Boerma T. Health information systems: the foundations of public health. Bull World Health Organ. 2005;83(8):578–83 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2626318/>, accessed 22 October 2020).
7. Blanc AK, Diaz C, McCarthy KJ, Berdichevsky K. Measuring progress in maternal and newborn health care in Mexico: validating indicators of health system contact and quality of care. BMC Pregnancy Childbirth. 2016;16(1):255 (<https://doi.org/10.1186/s12884-016-1047-0>, accessed 21 October 2020).