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Maternal and Child Survival Program

What Data on Maternal and Newborn Health Do National Health Management Information Systems Include?

A review of data elements for 24 low- and lower middle-income countries

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MCSP is a global USAID initiative to introduce and support high-impact health interventions in 25 priority countries to help prevent child and maternal deaths. MCSP supports programming in maternal, newborn, and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment. MCSP will tackle these issues through approaches that also focus on household and community mobilization, gender integration, and digital health, among others.

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Acknowledgments

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Abbreviations

ANC	Antenatal care
ART	Antiretroviral therapy
HMIS	Health management information system
IPTp	Intermittent preventive treatment of malaria in pregnancy
ITN	Insecticide-treated bed nets
KMC	Kangaroo mother care
LBW	Low birthweight
L&D	Labor and delivery
MCHIP	Maternal and Child Health Integrated Program
MCSP	Maternal and Child Survival Program
PMTCT	Prevention of mother-to-child transmission of HIV
PNC	Postnatal care
PPH	Postpartum hemorrhage
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Introduction

Health management information systems (HMISs) provide essential information for national policymakers, district health managers, facility administrators, and health care workers across health system levels, serving as the backbone of national health service delivery programs. HMIS information can be used to provide accountability to communities; guide quality improvement efforts, program management decisions, and resource allocations; inform research and program priorities; and help measure progress toward national and subnational health goals and targets. HMIS data represent an accessible source of service delivery information in most low- to middle-income countries, especially because a majority of health services in these countries are provided through national government programs in which information is collected and aggregated across public sector facilities.

The Maternal and Child Survival Program (MCSP) sought to help determine whether these countries are currently positioned to calculate service utilization, health outcome, and quality of care measures for antenatal care (ANC), labor and delivery (L&D), and postnatal care (PNC), including recommended global maternal and newborn health (MNH) indicators. The Program reviewed the availability of key (MNH) data elements in HMIS facility registers and facility monthly reporting forms in 24 United States Agency for International Development (USAID) priority maternal and child health countries. The goal of this review was to systematically document key maternal and newborn data elements found in HMIS documents at facility and subnational levels in the USAID priority maternal and child health countries. This activity builds on a similar activity completed under the Maternal Child Integrated Program (MCHIP) in which data elements related to ANC and maternity care were reviewed from 13 USAID-supported countries.

Methodology

Key data elements related to important MNH outcomes, utilization of services, and provision of high-impact interventions at health facilities during the antenatal, intrapartum, and postnatal periods were selected and their presence or absence in the HMIS was assessed.

Standardized data abstraction templates created in Excel by type of care (ANC, L&D, and PNC) were used to abstract the final list of 286 data elements compiled, involving more than 100 tools from all 24 countries. During data abstraction, data elements were considered present if: 1) a specific section on the register or summary form was allotted for a particular data element, or 2) a standardized coding scheme was available that included the given data element. Absence or presence of a data element in facility ANC, L&D, and PNC registers and in facility summary forms was assessed for prioritized MNH health outcome, service utilization, and impact intervention indicators.

Findings

Institutional maternal and newborn mortality and cause of death

Except for Ghana, all 24 countries captured facility maternal deaths in the L&D or PNC registers, and all countries except Indonesia aggregated facility maternal deaths in a facility summary form, which combines all maternal deaths for all causes. A cause of maternal death was recorded in 16 countries' registers (67%) and 13 countries' facility summary forms (54%). All countries' registers indicated whether a baby was born alive or dead, and all countries except two, included this information in their summary forms.

On 17 countries' registers (71%) and 14 countries' summary forms (58%) stillbirths were disaggregated by fresh and macerated. The remaining countries recorded stillbirths as a combined category only (without aggregating as fresh or macerated.) Thus, a national institutional fresh stillbirth rate can be calculated from facility registers in only 17 countries (71%). However, at the district level, institutional fresh stillbirth rate can only be calculated (aggregating data from facility summary forms) in 10 of the 24 countries (42%.)

Eleven countries (46%) recorded newborn deaths that occurred within the first 7 days of life, and 17 countries (71%) recorded newborn deaths that occurred within the first 28 days of life in facility registers or summary forms. Six countries' registers (25%) and five countries' summary forms (20%) recorded cause of newborn death, while 3 countries report cause of newborn death in both register and summary forms.

Maternal and Newborn Complications: Diagnosis and Treatment Data Points

In about half of the countries, information on diagnosing maternal complications was recorded in an open-ended format in facility registers. About half of the countries had a standardized way of reporting complications in the register, summary form, or both. Postpartum hemorrhage (PPH) diagnosis was recorded distinctly in 12 countries' registers and 10 countries' summary forms.

Preterm birth diagnosis was recorded in nine countries' registers and in six countries' summary forms. Of these, five countries recorded preterm birth diagnosis both in register and summary form. Some countries disaggregated recording low birthweight (LBW) by weight category. In 18 countries' summary forms and in nine countries' registers, LBW was categorized as less than 2500 g. Four countries categorized LBW as less than 2000 g.

Less than half of countries recorded any of the most common newborn complications, such as preterm birth, low birthweight, asphyxia, congenital abnormality, or sepsis, indicating a significant data gap.

Antenatal Care

Many countries recorded in the register information on routine ANC best practices: gravidity, parity, gestational age estimation based on available information, estimated delivery date, blood pressure, weight, and presence of fetal heart tones.

Information on the first ANC visit was collected in the register by 21 countries and by 19 countries in the summary form. Hemoglobin measurement was reported in 17 countries, and data were available on iron and folate provision in 20 countries. Of the 13 countries that recorded anemia diagnosis, all except Haiti and Mali based the diagnosis of anemia on hemoglobin test results. Regarding malaria prevention, of the 14 countries with national intermittent preventive treatment of malaria during pregnancy (IPTp) guidelines, all had at least some IPTp-related data elements in the register: four countries recorded doses 1-4 of IPTp separately, three countries recorded only the first and second doses, and seven countries recorded doses 1-3. Distribution of insecticide-treated bed nets (ITN) was recorded in 16 countries; availability of this data element was also linked to malaria burden and country policies regarding ITN distribution.

Labor and Delivery Care for Woman and Newborn

Almost all (22) countries distinguished between vaginal deliveries, assisted deliveries, and cesarean section deliveries in the register, and 18 countries included a data element for cesarean section in the summary form. Fourteen countries clearly specified active management of the third stage of labor or immediate postpartum uterotonic for PPH prevention; in two countries uterotonic data points did not specify whether the uterotonic was for labor augmentation, PPH prevention, or PPH treatment.

Eleven countries had a data element in the register for recording blood pressure at admission to the facility in labor. Seven countries recorded cervical dilation, and six countries recorded pulse at admission. Gestational age was recorded either in the register or partograph in 17 of the surveyed countries. Birthweight was recorded in 20 countries in the maternity or PNC register or partograph. Only three countries recorded information about chlorhexidine use. In five countries, information about skin-to-skin care was recorded in the register or partograph.

PNC Care for Woman and Newborn

Of the recommended PNC clinical checks, only seven countries recorded the mother's blood pressure during PNC visits, and three countries had an indicator for the mother's hemoglobin level during PNC, all of which were at the register level. Only four countries had an indicator about the family planning (FP) method currently in use in the PNC register, and FP acceptance/distribution during PNC was most often recorded in an open-ended column. Data on routine newborn care were more limited in postnatal records than during the early pre-discharge postnatal period.

HIV Screening and Treatment

HIV screening and treatment results were stratified by those having HIV prevalence <1% (lower burden, 10 countries) and >1% (higher burden, 14 countries). Among higher burden countries, all except Mali recorded HIV testing during ANC, L&D and PNC either in the register or summary form, and the test result was generally recorded. Among the 10 lower burden countries, six tracked HIV testing for pregnant women during ANC, L&D and PNC either in the register or summary form. Testing of women's partners during ANC was noted in registers of two lower burden countries registers and eight higher burden countries. Information on ART provision during ANC or L&D was collected in two lower burden countries and 12 higher burden countries, but during PNC information on ART was rarely included. Similarly, cotrimoxazole use was seldom noted in lower burden countries, was included in eight higher burden countries' registers or summary forms, and was included in five countries' PNC forms.

Discussions and Conclusions

Institutional Maternal and Newborn Health Outcomes

- Deaths were counted as whole, but it was difficult to determine their timing and cause using summary form data.
- Most countries, but not all, captured fresh stillbirths, an important measure of the quality of intrapartum care.
- The underlying burden of maternal and newborn complications was often missing; this information would help target quality improvement efforts effectively.

Antenatal Care

- Utilization of services was being tracked at high levels.
- Information on preventative treatments in ANC, such as iron/folate supplementation, individual dose of IPTp, and deworming medication tended to be available in the register but was not always sent to higher levels to use in national and sub-national analysis.
- Information on tetanus toxoid immunization was an area of strength.
- Information on syphilis testing and treatment tended to be stronger in sub-Saharan African countries compared to South Asian countries.
- Screening for complications, such as routine checks blood pressure measurement, was often absent.

Malaria

- The difference in the number of doses of IPTp recorded in the HMIS of malaria-endemic countries with IPTp as the national policy likely represents the shift in recommendations by the World Health Organization from only two doses during pregnancy to a dose at every visit after 13 weeks gestation at least 1 month apart.

- One country was still not tracking IPTp2.
- Most countries tracked IPTp3, but not IPTp4.

HIV

- During ANC, HIV testing indicators were available in countries with higher HIV burden.
- During PNC, it was less likely to be recorded.

L&D

- Countries tracked utilization and volume of facility childbirth services and birth outcomes for the mother and newborn.
- Certain indicators that were highly relevant for measuring and improving quality of care and that were recommended for country and global monitoring were not consistently available in the HMIS in most countries. For example, provision of uterotonics immediately after birth for PPH prevention was still not widely tracked.
- Only one element of essential newborn care—breastfeeding within 1 hour after birth—was commonly captured in the HMIS.

PNC

- PNC registers had the fewest data elements.

Many countries did not have a postpartum FP register, or recorded little information about FP. MCSP is helping to guide efforts to advocate for postpartum FP registers.

Background

Health management information systems[1] (HMISs) provide essential information for national policymakers, district health managers, facility administrators, and health care workers across health system levels, serving as the backbone of monitoring service delivery programs (Kerr et al. 2007; Archangel 2007) and an essential component of a fully working national health information system (Hahn et al. 2013). HMIS information can be used to guide quality improvement efforts, program management decisions, and resource allocations; (AbouZahr et al. 2005) inform research and program priorities; and help measure progress toward national and subnational health goals and targets. HMIS data represent the least costly and most accessible source of service delivery information in most low- to middle-income countries, especially because most health services in these countries are provided through national government programs in which information is collected and aggregated across public sector facilities (WHO 2003).

Data elements, the building blocks that are collected and aggregated within an HMIS, are used to calculate the national indicators (i.e., the numerators and denominators) that allow countries to track their progress toward goals or allow for international comparisons and calculation of internationally recognized standard indicators. For example, without a data element on women attending antenatal care (ANC), coverage of ANC services cannot be calculated. The data captured at the facility level is then reported (typically monthly) and consolidated at the subnational and national levels to provide information on health services and health outcomes across facilities (Hahn et al. 2013).

This review characterizes the key maternal and newborn data elements that the USAID priority countries' HMIS collected, in what format, and discussed them within the context of country information needs and globally recommended indicators for maternal and newborn health.

[1] HMIS refers to both paper-based and electronic recordkeeping at the facility level and includes other components such as a community-based HMIS, laboratory and imaging information systems, disease surveillance information systems, routine supervisory information systems, financial management information systems, human resource information systems, logistics management information systems, and/or infrastructure and equipment management information systems.

Introduction

According to the guidance from the WHO and the Partnership for Maternal, Newborn, and Child Health, "high-priority quality of care measures should be integrated and monitored in facility information systems (e.g., records and registers), and sentinel quality measures should be defined and monitored in national information systems" (WHO 2014).

The Maternal and Child Survival Program (MCSP) conducted this review is to systematically document the key maternal and newborn health (MNH) data elements in HMISs at the facility and subnational levels in 24 United States Agency for International Development (USAID) priority countries[2]. This review would help determine whether these countries were positioned to calculate quality of care measures for ANC, labor and delivery (L&D), postnatal care (PNC), and child health, including recommended global MNH indicators. This review was conducted to understand the opportunities and challenges countries may face in calculating key maternal newborn indicators important for national and subnational managers, facility health workers, and global stakeholders.[3]

In 2016, in preparation for the current report, MCSP conducted a survey of health experts from the USAID priority countries about the extent to which HMIS data on maternal and newborn care are available electronically, as well as the perceived quality of the electronic data (MCSP 2017). Approximately three-fourths of country-level experts reported that key data are available electronically at the district level. All countries reported availability of electronic data on maternal newborn health at the national level. However, availability of specific indicators varied widely, and 13 of 22 countries rated data quality as poor.
It is only by understanding the building blocks of information available at country level that we can start to look at ways to improve measurement of progress towards both national and global maternal and newborn health goals and use of data for decision-making at different levels of the health system. The current report fills an important gap by providing an overview of the presence of key data elements related to maternal and newborn health in the national HMIS of USAID priority countries. From this expanded understanding, calculation of key internationally recommended indicators could be contextualized. The report is not meant to be a definitive inventory of which MNH data elements are included in individual countries' HMIS, since HMIS are revised periodically, and since the review entailed limitations such as availability of forms and translation. However, readers should come away from the review with a big picture understanding of the availability of key data elements needed to track internationally recommended maternal and newborn indicators, as well as the variability of format and placement of these data elements.

What parts of the HMIS were included in this report?

- Antenatal care, labor & delivery (maternity) and postnatal care facility registers
- Facility-based partographs or other intrapartum care records that remain at the facility
- Facility-level monthly summary forms or reporting forms related to aggregating facility antenatal care, labor & delivery, or/and postnatal care that are used to report aggregated data for a specific time period for reporting to higher levels of the health care system (e.g., district health managers).

Several global initiatives, including Ending Preventable Maternal Mortality, Every Newborn Action Plan, Every Woman Every Child, and metrics frameworks have issued recommendations for maternal and newborn health indicators to be tracked at global and/or national levels. Many of these indicators are population-based, therefore, they cannot be tracked through the HMIS. However, some could be feasible to track using HMIS. In 2017, the World Health Organization (WHO) launched the quality, equity, and dignity maternal and newborn network, a multi-country initiative to improve quality of maternal, newborn, and child health care, prioritizing a small number of process/output and health outcome indicators for monitoring in all facilities participating in the network in first-phase quality, equity, and dignity countries. To calculate internationally recommended maternal and newborn health (MNH) indicators, however, the requisite data elements need to be present in the national HMIS. Countries typically collect information on MNH using many different formats, units, denominators, and populations.

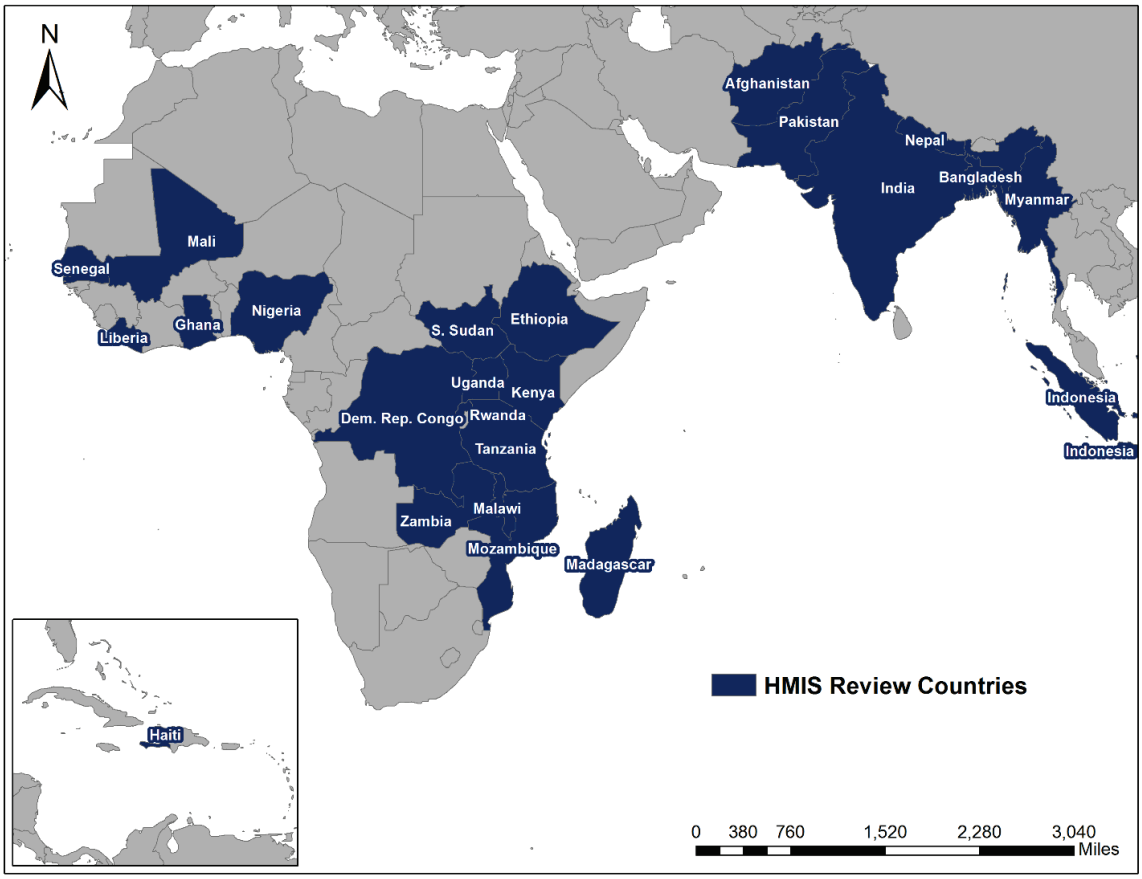
[2] In 2006, USAID's Office of Health, Infectious Disease and Nutrition identified 25 priority countries for US government maternal, newborn, and child health care support.
[3] This activity builds on a similar activity completed under the Maternal Child Integrated Program (MCHIP) in which data elements related to antenatal and maternity care were reviewed from 13 USAID-supported countries.

Methods

Countries included in the review

This review was conducted in Afghanistan, Bangladesh, Democratic Republic of Congo (DRC), Ethiopia, Ghana, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Nepal, Nigeria, Pakistan, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Zambia (Figure 1). Yemen was excluded because of political instability.

Figure 1. Countries included in the HMIS review



Identification of Key Data Elements to Review

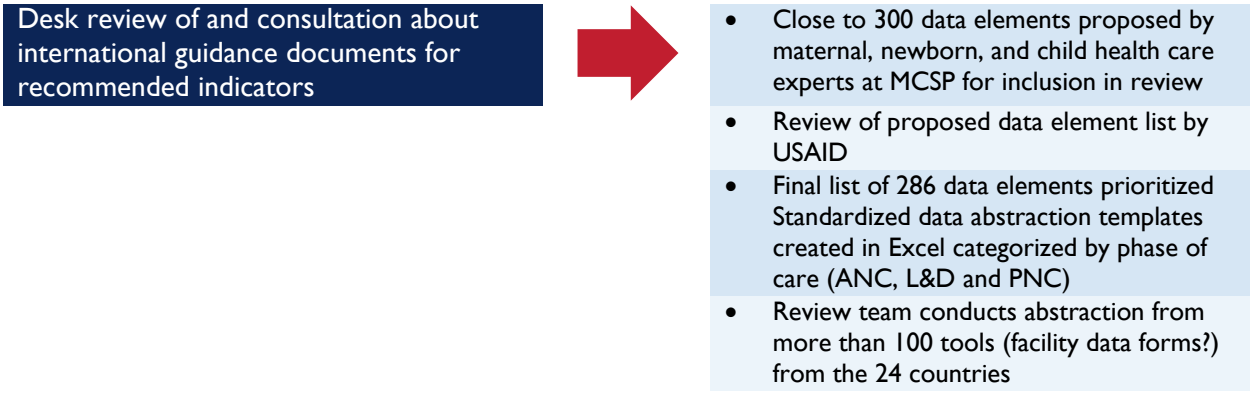
Data elements in this review are pieces of information that can be used as a standalone indicator, such as number of women diagnosed with a specific obstetric complication, or as the numerator or denominator for a percentage indicator, such as percentage of women who received four ANC visits. For this review, key data elements related to important MNH outcomes and associated high-impact routine and complications care interventions along the pregnancy, intrapartum, and PNC continuum were selected (Figure 2) and their presence or absence in the HMIS was assessed.

Based on internal and external expert consultation, the review team prioritized a list of more than 200 key data elements important during ANC, L&D, and PNC. This list was developed by referring to guidance from several global efforts to improve quality of maternal and newborn care, including the Every Newborn Action Plan, Ending Preventable Maternal Mortality, and the WHO Global Reference List of Care 100 Health Indicators. After the review was underway, the WHO released the guidance document *Standards for improving*

quality of maternal and newborn care in health facilities and last year it launched the Quality, Equity and Dignity Network. Guidance from these global efforts was used to refine the analysis and presentation of findings.

This list of predetermined data elements was checked against individual country MNH primary data documentation sources (primary-level facility registers and facility reporting forms) described further in the background section of this report. The list of prioritized MNH data elements was finalized after receiving feedback from USAID Washington.

Figure 2. Data element selection and review process



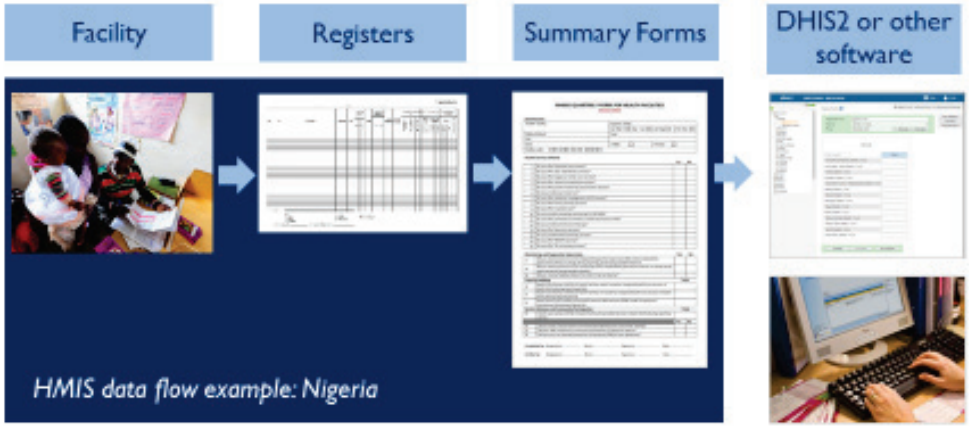
Levels and Format of HMIS

It was important to distinguish the presence of data elements in the HMIS, the level of each data element in the HMIS structure, and whether the data element was available in the facility monthly/quarterly summary reporting form that was usually sent to district health managers. Not all data recorded in facility registers were summarized and reported up to the next administrative level of the health system, meaning that the data element may not have been available at subnational and national levels. Indeed, it was important in all health information systems to determine what data were needed by which actors at which system level and to build HMIS structures and tools accordingly (Figure 3).

In this report, prioritized MNH data points were presented by whether the data element was available in a country's facility register or facility summary form. MNH workers in facilities had access to facility register data and benefit from the regular aggregation of priority data to guide analysis and decision-making (e.g., in summary forms.) Use of aggregated facility data at the district or regional level by a health management team depends on the systemic inclusion and reporting of priority data as part of standardized facility reporting forms.

The review team also noted whether registers recorded data **cross-sectionally** or **longitudinally**. When client data were recorded cross-sectionally (i.e., one row on the register per contact with a client), it was difficult to determine how many visits occurred or other pertinent data from visit to visit for the specific client. When client data were recorded longitudinally, the same row was used to capture information from multiple visits for each client, making it easier to track the health status of an individual client. Figure 3 illustrates the flow of information from client interaction to the highest level, DHIS2 or other software that manages HMIS data.

Figure 3. Example of types of forms and common data flows for service delivery



Cross-sectional versus Longitudinal Registers for Antenatal Care and Postnatal Care

We examined the format of ANC and PNC registers, both of which recorded services during which there are usually multiple visits by the same client (woman or newborn), to determine if the registers were cross-sectional or longitudinal (Table 1). L&D (maternity) registers were cross-sectional because admission in labor usually occurs only once.

Of the 24 countries' ANC registers, half recorded client data longitudinally, and half recorded client data cross-sectionally. For PNC registers, nine recorded client data longitudinally and the remaining 15 recorded it cross-sectionally. Longitudinal and cross-sectional register formats have unique advantages and disadvantages. Cross-sectional registers allow for quick computation of the total number of services of a specific type in the facility in a specific time period (e.g., total number of first ANC visits in October.) Longitudinal registers provide useful clinical information on repeated contacts over time at the individual client level to support care and could be used to calculate coverage. In many countries, individual women carry their own case notes to each ANC visit and at the time of birth, and the facility retains an abbreviated summary longitudinal individual client card for each pregnant woman enrolled in ANC, in which case there may be redundancies for facilities using a longitudinal ANC register.

Table 1. Format of antenatal care and postnatal care registers

	ANC Register	PNC Register
Afghanistan	L	L
Bangladesh	L	L
DRC	C	C
Ethiopia	L	L
Ghana	C	C
Haiti	L	C
India	L	L
Indonesia	C	C
Kenya	C	C
Liberia	C	C
Madagascar	C	C
Malawi	L	L
Mali	C	C

	ANC Register	PNC Register
Mozambique	L	L
Myanmar	C	C
Nepal	L	L
Nigeria	C	C
Pakistan	C	L
Rwanda	L	C
Senegal	L	L
South Sudan	L	C
Tanzania	C	C
Uganda	C	C
Zambia	L	C
Cross-sectional	12	15
Longitudinal	12	9

C= cross-sectional

L=longitudinal

Systematic Review and Analysis

From August 2015 through 2017, the review team collected client records, ANC, L&D, and PNC service delivery registers, and monthly/quarterly facility summary reporting forms from country-based maternal and newborn and monitoring & evaluation experts from MCSP, other implementing agencies and programs, ministries of health and non-governmental organization offices in the 24 priority countries (see Appendix, Table 13). All client level and aggregated national HMIS reporting tools for ANC, L&D, and PNC services were requested from countries and the data elements reviewed. However, for the data abstraction, only partographs, registers, and summary forms were included. Client-held records or cards were excluded because we were not able to obtain these forms from all countries and because these data would only be accessible by visiting individual households, which is costly and labor-intensive. Forms in other languages were translated into English or reviewed by a review team member who spoke the language.

The review team used a standardized data extraction spreadsheet to abstract the following information:

- Key data elements that were present in the HMIS (facility register or facility reporting forms),
- Data capture or reporting form in which the data element was present, and
- Format of recording data elements (numerical value, yes/no, checkbox, open ended column, etc.).

All forms from an individual country were reviewed by a single member of the review team who did an initial abstraction of the data points available in the country forms into a standard Excel template. Other members of the review team, as well as the MCSP country monitoring and evaluation team members from the specific countries, reviewed the data abstraction findings to ensure accuracy and completion. During data abstraction, we considered data elements to be present if a specific section on the register or form was allotted for a particular data element or a standardized coding scheme was available that included the given data element. After completion of the data abstraction into the country worksheet, all the worksheets from the countries were combined into a single dataset using an Excel macro.

We performed multiple checks of data quality and contacted country teams to review findings from their countries.

Boundaries to the Scope of this Review

This review examined the presence or absence of key data elements for maternal and newborn health services. As such, it did not include an analysis of country-level policies and strategies, reporting procedures, or quality, completeness or use of available data. We abstracted data from facility ANC, L&D, and PNC registers and reporting forms, used in almost all countries to record utilization of services, provision of high-impact interventions and maternal and newborn health outcomes. We did not abstract data elements from all available registers in a facility (such as standalone Helping Babies Breathe and Kangaroo Mother Care (KMC) registers supplemental to a country's routine HMIS) or supplementary data collection forms used in the ANC, L&D, and PNC service delivery areas. We made every effort to obtain the most current forms; however, changes to forms that occurred between 2015 and the publication of this report may not be reflected in the results presented here. Some of the interventions in this review, such as screening and control of malaria and HIV in pregnancy, are only applicable in selected countries based on national policy, local epidemiology, and global recommendations based on specific burden of disease.

Notes on Data Sources

In most countries, a subset of data from each of the three registers (ANC, L&D, and PNC registers) was incorporated into a single monthly reporting form, except for Malawi, Mozambique, Tanzania, and Uganda, which had multiple summary forms.

Availability of specific maternal and perinatal data elements in either a standardized register or summary reporting form is presented for each country categorized by type of data (health outcome, service coverage, high-impact interventions) and according to phase of care as relevant (antenatal, intrapartum or postnatal.)

Maternal and Newborn Health Outcomes

Institutional Maternal Mortality

Facility maternal mortality data points assessed included counting of maternal deaths, documenting cause of maternal deaths, and documenting whether a maternal death audit was conducted. Except for Ghana, all 24 countries captured facility maternal deaths in the L&D or PNC register, and all except Indonesia aggregated facility maternal deaths in the facility summary reporting form (Table 2). As expected, maternal deaths were usually recorded in the L&D register, which allows for the counting of intra- and early postpartum maternal deaths before discharge, an important indicator of facility quality of obstetric care. However, in the 23 countries that included maternal deaths in summary forms, these forms generally reported facility maternal deaths for all causes combined and at all points in time across the antenatal, L&D, and postnatal continuum. In some countries, facility summary forms combined both maternal deaths that occurred in the facility and that occurred in the community or en route to the facility. The lack of specificity in reporting time and place of maternal death in many summary forms may make it difficult for district managers to interpret and act on maternal death data aggregated within the district.

Table 2. Institutional maternal mortality data

	Maternal Death	
Afghanistan	◆	☐
Bangladesh	◆	☐
DRC	◆	☐
Ethiopia	◆	☐
Ghana		☐
Haiti	◆	☐
India	◆	☐
Indonesia	◆	
Liberia	◆	☐
Kenya	◆	☐
Madagascar	◆	☐
Malawi	◆	☐
Mali	◆	☐
Mozambique	◆	☐
Myanmar	◆	☐
Nepal	◆	☐
Nigeria	◆	☐
Pakistan	◆	☐
Rwanda	◆	☐
Senegal	◆	☐
South Sudan	◆	☐
Tanzania	◆	☐
Uganda	◆	☐

	Maternal Death	
Zambia	◆	☐

◆ Register ☐Summary Form

Institutional Stillbirths

All countries' L&D registers indicated whether the baby was born alive or stillborn. All but two countries recorded the total number of live births in summary forms as well. If countries recorded the number of all births and stillbirths, then the percentage of live births could be calculated, although this could be misleading if twins or other multiples were recorded as one birth. Stillbirths were recorded as disaggregated fresh or macerated or recorded as a combined "institutional" stillbirth category (Table 3). Seventeen countries' registers (71%) and 14 countries' summary forms (58%) disaggregate stillbirths by fresh and macerated respectively. Conversely, seven countries registers' (29%) and 10 countries' summary forms (42%) recorded stillbirths as a "combined" category only (without aggregating by fresh or macerated.)

Seventeen countries' registers (71%) included the necessary data to calculate an institutional fresh stillbirth rate, however, these data can only be aggregated in HMIS at the district level (via summary reporting forms) in 10 of the 24 countries (42%).

Table 3. Live births and stillbirths reported as combined or separately

	Live Births		Stillbirths		Stillbirths	
	Register	Summary Form	F&M	Combined	F&M	Combined
Afghanistan	◆	☐	◆		☐	
Bangladesh	◆	☐		◆		☐
DRC	◆	☐	◆		☐	
Ethiopia	◆	☐		◆		☐
Ghana	◆	☐	◆		☐	
Haiti	◆	☐		◆		☐
India	◆	☐		◆		☐
Indonesia	◆	☐	◆			☐
Kenya	◆	☐	◆		☐	
Liberia	◆	☐		◆		☐
Madagascar	◆	☐	◆		☐	
Malawi	◆	☐	◆		☐	
Mali	◆	☐	◆		☐	
Mozambique	◆	☐	◆		☐	
Myanmar	◆	☐		◆		☐
Nepal	◆	☐	◆			☐
Nigeria	◆	☐	◆		☐	
Pakistan	◆	☐		◆		☐
Rwanda	◆	☐	◆		☐	

	Live Births		Stillbirths		Stillbirths	
	Register	Summary Form	F&M	Combined	F&M	Combined
Senegal	◆	☐	◆		☐	
South Sudan	◆	☐	◆			☐
Tanzania	◆	☐	◆		☐	
Uganda	◆	☐	◆		☐	
Zambia	◆	☐	◆		☐	

F: Fresh, M: Macerated ◆ Register ☐Summary Form

INDICATOR: Institutional Stillbirth Rate	
Definition	Total Stillbirths at the health facility (categorized as fresh or macerated))
Numerator	Total Number of stillbirths at the health facility (fresh stillbirths and macerated stillbirths)
Denominator	Total number of births in the facility

All countries reported on the total number of births, in both registers and summary forms. Using summary form data, all countries reported on the institutional stillbirth rate, but only 14 captured fresh and macerated stillbirths separately to calculate the institutional fresh stillbirth rate. All countries calculated the institutional stillbirth rate from the registers, but only 17 captured fresh and macerated stillbirths separately to calculate the institutional fresh stillbirth rate. A total of 10 countries measured fetal heart tones during labor, which is of interest for helping to determine whether stillbirths occurred within the facility to permit calculation of a definite "intrapartum" stillbirth rate. Seventeen countries' registers (70%) included necessary data to calculate the institutional fresh stillbirth rate.

14 countries could report on the fresh stillbirth rate using **summary forms**.

17 countries could report on the fresh stillbirth rate using **registers**.

Institutional Newborn Mortality

All countries had a place to record newborn deaths on the L&D or PNC register. The timing of newborn deaths at the health facility is of interest because cause of death varies by timing. On the summary forms, 11 countries recorded newborn deaths that occurred within the first 7 days of life, and 17 countries recorded newborn deaths that occurred within the first 28 days of life.

Table 4. Newborn mortality data in labor and delivery and postnatal care registers and summary forms

	Newborn Deaths	Category for early deaths (<7 days)	Deaths <28 days
Afghanistan	◆		☐
Bangladesh	◆	☐	☐
DRC	◆	☐	☐
Ethiopia	◆	☐	
Ghana	◆	☐	☐
Haiti	◆		
India	◆		
Indonesia	◆	☐	☐
Kenya	◆		☐
Liberia	◆		☐
Madagascar	◆		☐
Malawi	◆		☐
Mali	◆	☐	☐
Mozambique	◆		
Myanmar	◆	☐	☐
Nepal	◆		☐
Nigeria	◆		☐
Pakistan	◆		☐
Rwanda	◆		☐
Senegal	◆	☐	☐
South Sudan	◆	☐	
Tanzania	◆		
Uganda	◆	☐	
Zambia	◆	☐	☐

◆ Register ☐ Summary Form

INDICATOR: Institutional Neonatal Mortality Rate

Quality Equity Dignity Network Monitoring Framework/Ending Preventable Maternal Mortality Monitoring Framework

Numerator	Number of children who died after being born live in the health facility and prior to discharge.
Denominator	Number of live births at the health facility.

In all 24 countries, newborn deaths were recorded in L&D and/or PNC register. In 22 countries, newborn outcomes were recorded in the maternity register, and thus it would be possible to track deaths that occur after facility births but before discharge, which is of interest for understanding the quality of intrapartum care for quality improvement. In the two other countries (Liberia and Rwanda), it was unclear whether specifically after facility birth and before discharge could be noted. In summary forms, establishing the numerator was more challenging because the number of newborn deaths could have included babies born outside the facility and who died after they were brought to the facility for care.

Institutional Maternal Deaths by Cause

Maternal cause of death information was included in a majority of countries' registers (67%) and 54% of the countries' summary forms (Table 5). The four countries that recorded in the summary form but not the register must have taken this information from another register or data source.

Maternal Death Audits

In seven countries' registers (29%) and six countries' summary forms (25%), a data element indicated whether a maternal death audit was conducted, with inclusion of this data point in both the register and summary form in five countries.

Table 5. Institutional maternal cause of death and audit data

	Cause of maternal death	Maternal death audit conducted	Cause of maternal death	Maternal death audit conducted
Afghanistan			☐	
Bangladesh	◆	◆		☐
DRC	◆	◆	☐	☐
Ethiopia	◆	◆		☐
Ghana			☐	☐
Haiti				
India	◆			
Indonesia				
Liberia	◆		☐	
Kenya		◆	☐	☐
Madagascar				
Malawi	◆	◆	☐	
Mali	◆		☐	
Mozambique	◆		☐	
Myanmar				

	Cause of maternal death	Maternal death audit conducted	Cause of maternal death	Maternal death audit conducted
Nepal	◆		□	
Nigeria		◆	□	□
Pakistan	◆		□	
Rwanda	◆		□	
Senegal	◆	◆		
South Sudan	◆		□	
Tanzania	◆			
Uganda	◆			
Zambia	◆			

◆ Register □ Summary Forms

Institutional Newborn Deaths by Cause

Although all but one country recorded newborn deaths, only eight countries identified and recorded causes of newborn deaths. Five countries listed newborn cause of death in the summary form, which could be based on either the L&D or PNC register in some countries, and six countries listed cause of death in the L&D, PNC or obstetric registers (Table 6).

In the L&D register, Ethiopia provided five options for cause of death (prematurity, infection, asphyxia, congenital malformation, or other); no death information was listed in the PNC register. India listed cause of death in the PNC register, with categories listed as asphyxia, low birthweight (LBW), fever, diarrhea, pneumonia, or other. In Indonesia, causes of newborn death were listed in the L&D register and summary form (LBW, asphyxia, birth trauma, tetanus, congenital causes, diarrhea, acute respiratory infection, and others.)

On the Malawi L&D register, there was a space to record newborn complications, including prematurity, asphyxia, sepsis, and other and to record whether the baby was alive or dead. The PNC register also captured newborn complications and whether the baby was alive or dead. In Pakistan, the obstetric care register listed the following possible causes of newborn death: birth trauma, birth asphyxia, bacterial sepsis, congenital abnormality, and prematurity; PNC included no causes of newborn death. In Zambia, the L&D register listed asphyxia, sepsis, or other as potential causes of newborn death.

Table 6. Institutional newborn death by cause in registers and summary forms

	Cause of newborn death		Cause listed
	Register	Summary Form	
Afghanistan			
Bangladesh			
DRC			
Ethiopia	◆		Prematurity, infection, asphyxia, congenital malformation, or other
Ghana			
Haiti			
India	◆	□	Asphyxia, LBW, fever, diarrhea, pneumonia, or other

	Cause of newborn death		Cause listed
	Register	Summary Form	
Indonesia	◆	☐	LBW, asphyxia, birth trauma, tetanus, congenital causes, diarrhea, acute respiratory infection, and others
Kenya			
Liberia			
Madagascar			
Malawi	◆		
Mali			
Mozambique			
Myanmar			
Nepal			
Nigeria		☐	Asphyxia, sepsis, prematurity, neonatal tetanus, diarrhea, congenital malformation, other
Pakistan	◆	☐	Birth trauma, birth asphyxia, bacterial sepsis, congenital abnormality, and prematurity
Rwanda		☐	Asphyxia, hypothermia, prematurity, congenital malformations, respiratory infections, meningitis, skin infections, urinary tract infections, neonatal tetanus, other infections
Senegal			
South Sudan			
Tanzania			
Uganda			
Zambia	◆		Asphyxia, sepsis, or other

◆ Register ☐ Summary Form

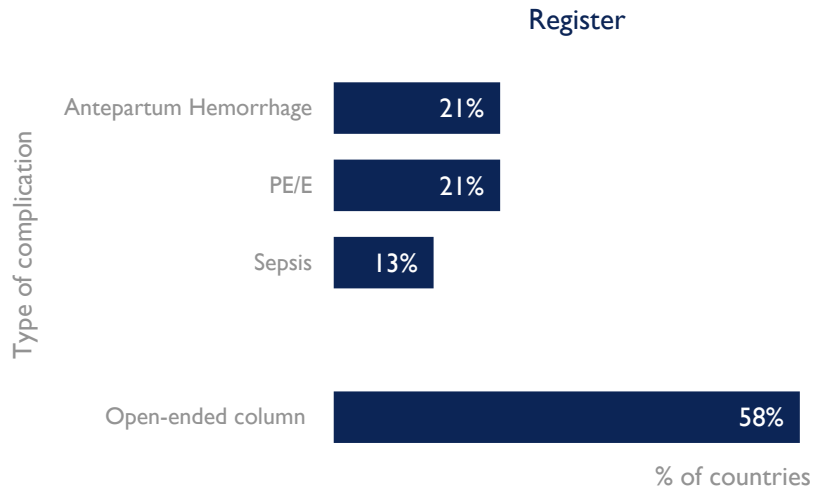
Maternal Complications

Maternal Complications and Treatment Recorded During Antenatal Care

Recording the identification, diagnosis, treatment, and referral of maternal complications during the antenatal period was critical for understanding local disease burden and quality of care in pregnancy. During data abstraction, we considered data elements related to specific complications to be present if: 1) a designated space on the register or form was allotted for a specific complication, or 2) a standardized coding scheme was available for recording complications (See Figure 4).

In over half of the countries' ANC registers (58%), information on complications in ANC was recorded in an open-ended format (a blank column where the complication can be written or indicated with a code.) Recording diagnosis of antenatal complications in the register was as follows: five countries with antepartum hemorrhage, five countries with pre-eclampsia/eclampsia, and three with sepsis (Table 22.) We abstracted data on treatment of malaria, TB, and syphilis (as described elsewhere) but not for antepartum hemorrhage, pre-eclampsia/eclampsia, or sepsis. In the register, seven countries recorded data about referral of complication (Table 25).

Figure 4. Diagnosis of complications during antenatal care



Below is an example of an open-ended column on an antenatal care register; we were unable to obtain a standardized code list.

Mother's condition	
	Well
	Complicated (specify complication)

Maternal Intrapartum Complications and Treatment

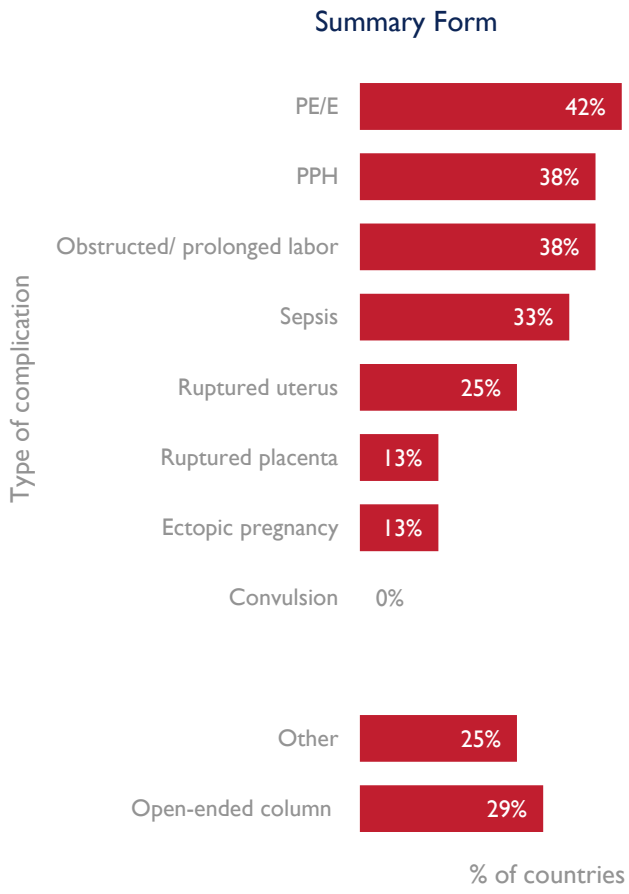
Maternal complications related to direct obstetric causes of maternal mortality (i.e., directly related to pregnancy state) included pre-eclampsia/eclampsia, postpartum hemorrhage (PPH), puerperal infection and sepsis, abortion, and obstructed labor (See Appendix, Table 25 for country-specific results on recording data points on diagnosis of maternal complications).

Twelve countries' L&D registers (50%) and 10 countries summary forms (42%) included a designated data point to record PPH diagnosis, with six countries including PPH diagnosis in both registers and summary form. Data points on diagnosis of other obstetric complications in the L&D period available in countries' registers included obstructed/prolonged labor (42%), ruptured uterus (29%), and maternal sepsis (33%) (Table 23).

An example of a maternity register with columns labeled for specific maternal complications.

Obstetric Complications **Circle only one leading complication**							
None	Antepartum hemorrhage	Postpartum hemorrhage	Obstetric/ Prolonged labor	Pre-eclampsia/ eclampsia	Sepsis	Ruptured uterus	Other
Non	APH	PPH	OPL	Ed	Sep	Rup	Oth

Figure 5. Diagnosis of L&D maternal complications



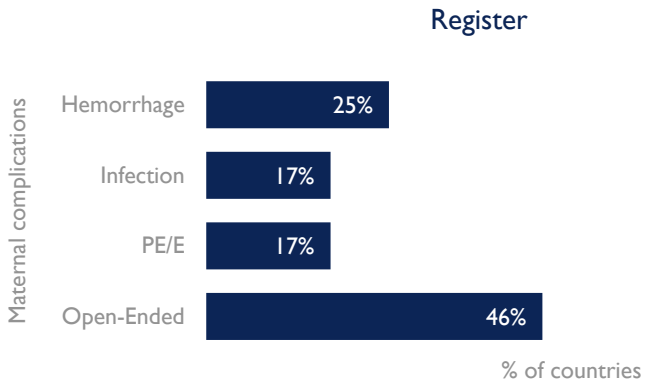
The provision of an anticonvulsant such as magnesium sulfate for the treatment of pre-eclampsia/eclampsia was recorded in the register of three countries and the summary form of seven countries (Table 25). No countries recorded antihypertensive treatments for pre-eclampsia. Only two countries (DRC and Malawi) recorded in the register the provision of an antibiotic for maternal fever and one country recorded it in the summary form (DRC). Two other primary treatments for PPH, uterotonic or blood transfusion, were not widely recorded in the registers and summary forms in many countries. Two countries captured uterotonic use for PPH treatment in the register and four in the summary form; blood transfusion was only recorded in three countries in the register (Malawi, Mozambique and Tanzania) and in the summary form in three countries as well (DRC, Mozambique, and Rwanda).

Maternal Postnatal Complications, Treatment, and Referral

Eleven of the country tools (46%) had an open-ended column for recording diagnosis of maternal complications in the PNC register (Figure 6). Few countries' PNC registers included designated data points on the specific obstetric complications (Table 22).

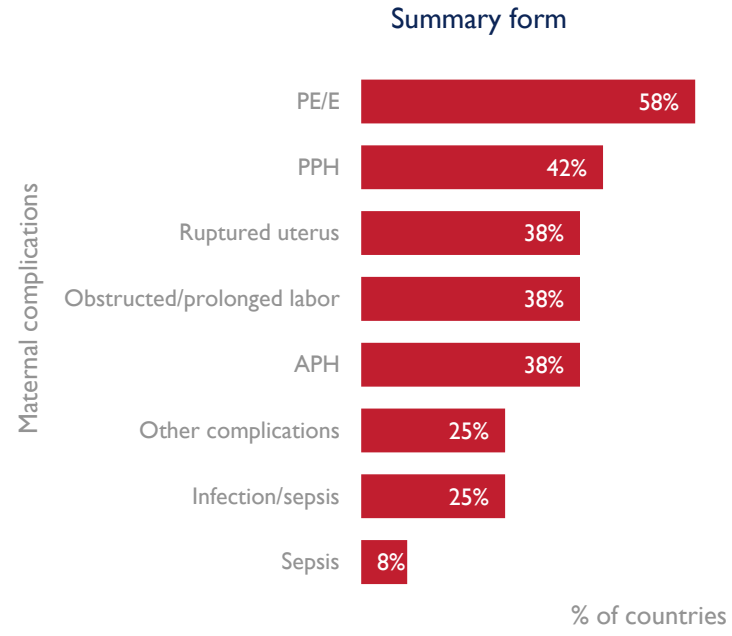
Five countries (Ethiopia, Indonesia, Malawi, Nepal, and Pakistan) had an indicator for pre-eclampsia or eclampsia in their PNC register. Five countries (Indonesia, Malawi, Nepal, Pakistan, and Zambia) (21%) had an indicator for PPH and six countries (Indonesia, Malawi, Mozambique, Nepal, Pakistan and Zambia) (25%) had an indicator for sepsis in their PNC register. No countries had an indicator for thromboembolism during the postnatal period. Fewer country tools recorded maternal complications treatment or referral of maternal complications during the postnatal period. No country forms reviewed had an indicator for antibiotic given for suspected infection during postnatal period.

Figure 6. Diagnosis and referral of maternal complications in the postnatal period



Availability of data points on diagnosis (incidence) of specific obstetric complications in most facility summary forms were taken from ANC, L&D, PNC registers, and presumably other registers (e.g., in adult medicine, emergency department) (See Figure 7). Except for pre-eclampsia/eclampsia (58%), less than half of countries' facility summary forms included a standardized place to record diagnosis of common obstetric complications. It was beyond the scope of this assessment to review every data source for obstetric complications in facility reporting forms. In most countries, it was not possible to know the timing of pregnancy complications recorded in facility summary forms (e.g., pregnancy, intrapartum, postnatal.)

Figure 7. Incidence of specific maternal complications recorded (summary form)



Newborn Complications

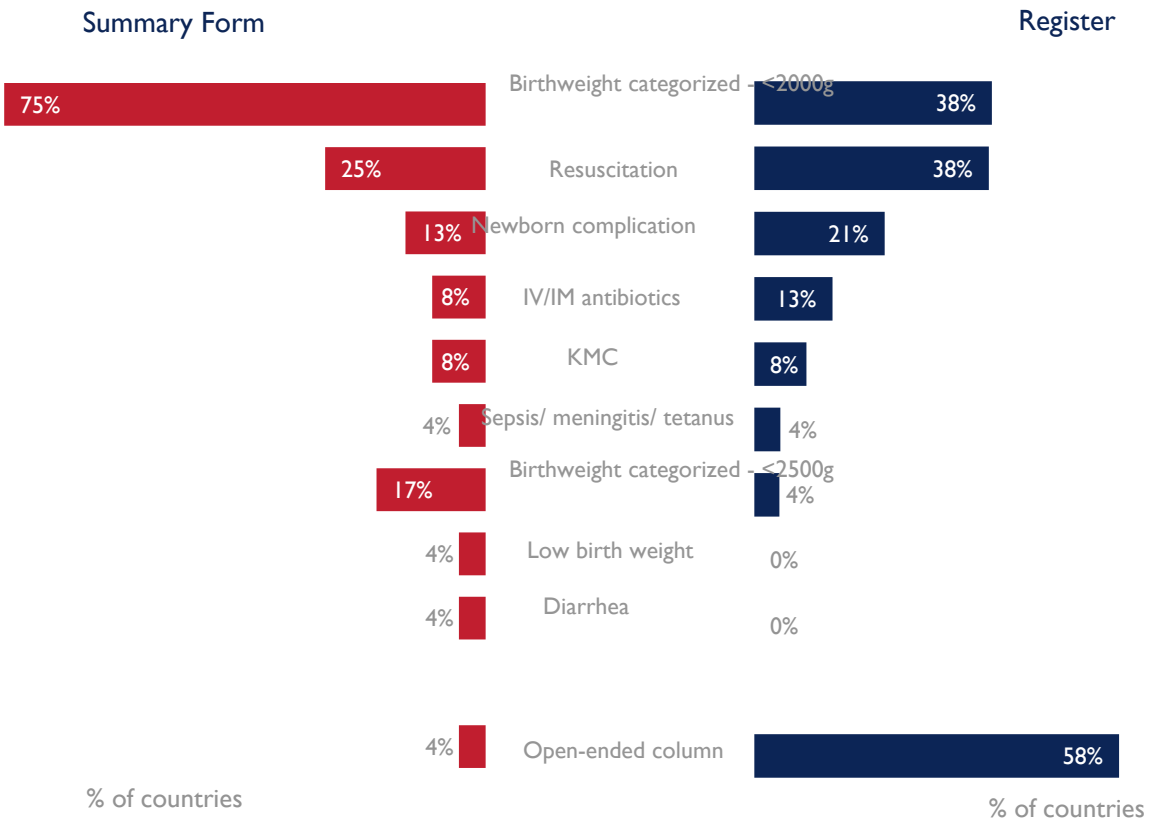
Because a large proportion of newborn deaths occur on the day of birth, it is important to track newborn complications that occur soon after birth (Table 29). Preterm birth diagnosis was recorded in nine countries in the register (37%), and in six countries in the summary form. Three countries had it only in the register and not in the summary form and only one country (Zambia) had it in the summary form but not in the register.

Study reviewers noted whether LBW was categorized as less than 2000 g or less than 2500 g. Four countries noted this information in both the register and summary form and three others counted these births in the summary form. For the categorization of LBW less than 2500 g, 18 countries captured the data in the summary form and nine in the register.

Seven countries recorded the diagnosis of asphyxia in the register and seven in the summary form. Three countries recorded sepsis in the register and five collected the data in the summary form. Therefore, with the

exception of low birth weight, most countries were not collecting detailed information about newborn complications immediately after birth. (Country-level results are presented in Table 29.)

Figure 8. Diagnosis of newborn complications in maternity or pre-discharge postnatal care register

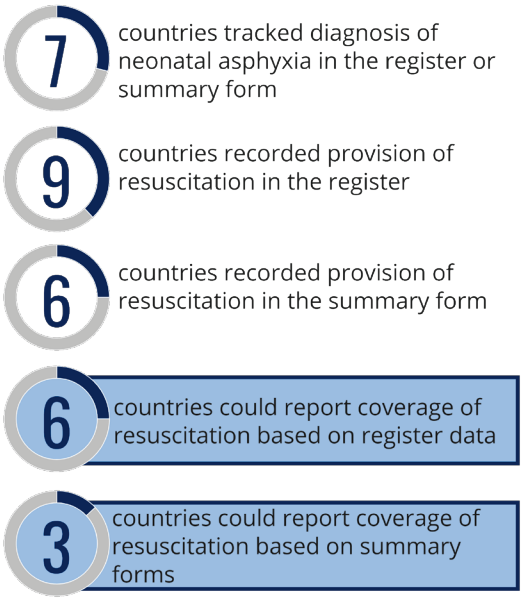


Newborn Complication Treatment before Discharge

Nine countries recorded the resuscitation provided in the register and six in the summary form (Table 29). Records of birth defects/congenital abnormalities were captured in the register in five countries and in the summary form in six countries (Table 29).

Example: Calculating Globally Recognized Indicators

INDICATOR: Provision of newborn resuscitation	
Numerator	Number of newborns who were not breathing spontaneously/crying at birth for whom bag and mask resuscitation was initiated
Denominator	Number of newborns not breathing at birth



Seven countries tracked diagnosis of newborn asphyxia in the register or summary form. Nine countries recorded provision of resuscitation in the register, and six in the summary form. Combining this information, six countries reported coverage of resuscitation based on register data, and three countries based on summary form data.

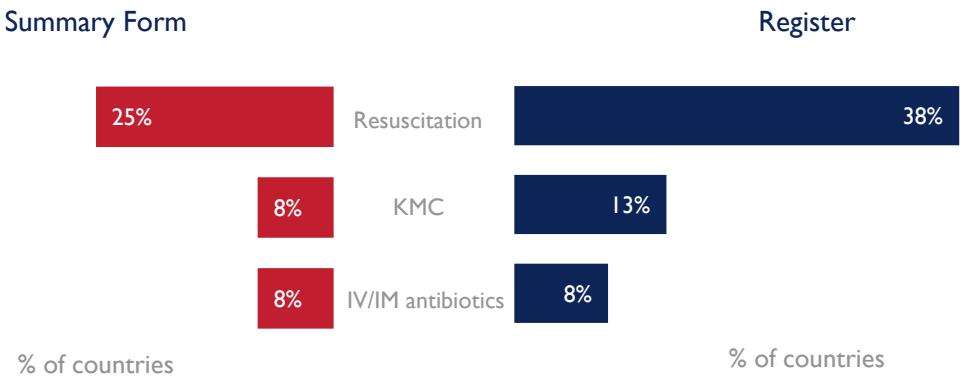
Both the numerator and denominator are shown in Table 29. Note that some countries recorded information for the Helping Babies Breathe program in a separate register, and these registers were not included in this review.

Newborn complications diagnosed, referred and treated during PNC

Few countries recorded complications in a structured manner in the PNC register (Table 31). About 25% of countries recorded newborn complications with open-ended columns in the registers. We considered countries to have data for specific complications if they had space to record specific complications or had a code list for recording data in a structured way in open-ended columns. Examples of countries that recorded specific complication are: Zambia, cord infection; Malawi and Rwanda, diarrhea; Nigeria, jaundice; and Ethiopia and Nigeria, sepsis. Multiple countries had an open-ended column (Bangladesh, DRC, India, Liberia, Rwanda, Senegal and Uganda).

Information about treatment of newborn complications generally was unavailable in the registers and summary forms (Table 32). Seven countries (Ethiopia, Ghana, India, Liberia, Mozambique, Rwanda, and Uganda) had indicators for newborns that were referred to another facility for complications during PNC. Four countries (Malawi, Nigeria, Rwanda and Tanzania) had an indicator for newborns referred for KMC, and six countries (Ethiopia, Haiti, Malawi, Nigeria, Rwanda and Tanzania) had an indicator for KMC follow-up. (However, some countries may have had separate KMC registers.) Only Haiti had an indicator for referrals due to LBW, and Nigeria and Tanzania had indicators for referrals due to sepsis, meningitis, or tetanus. Six countries (Bangladesh, DRC, Liberia, Malawi, Mozambique and Uganda) had an open-ended column for providers to indicate the treatment provided for newborn complications. Senegal's register had an indicator for "other."

Figure 9. Treatment of newborn complications



Service Utilization and Provision of High-Impact Interventions: Antenatal Care

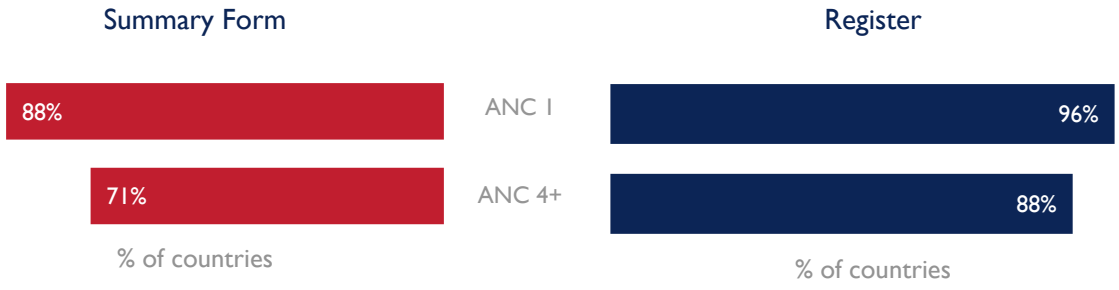
Pregnancy is a critical time to optimize maternal and perinatal health outcomes. ANC best practices include health promotion and health education alongside prevention, detection, and management of pregnancy-related or concurrent diseases. When delivered on time and with quality, evidence-based ANC interventions reduce maternal and newborn morbidity and mortality. Importantly, a woman's positive experience of pregnancy care increases the likelihood that she will deliver with a skilled birth attendant.

In 2016, one year after the data elements for this activity had been determined, WHO published updated ANC recommendations based on a systematic review of evidence and expert consultation.[4] The major difference is that eight antenatal contacts are now recommended during pregnancy, and these can occur in a combination of facility and community settings. This review looked at coverage of four ANC visits and did not include some services that are now recommended in some contexts, including ultrasound early in pregnancy, urine culture for asymptomatic bacteriuria, calcium supplementation, and vitamin A to prevent night blindness during pregnancy.

ANC Utilization at the individual level: Number of Antenatal Care Visits

All countries except Indonesia, Nigeria, and Zambia collected information on the first ANC visit in the register, and 19 countries recorded first ANC visit on the summary form as well. Fourteen countries captured information on a fourth ANC visit in both the register and summary form, five more in only the register, and one more in only the summary form. Four countries (Indonesia, Myanmar, Nigeria and Pakistan) did not capture any information on a fourth ANC visit (See Table 14).

Figure 10. Antenatal care utilization

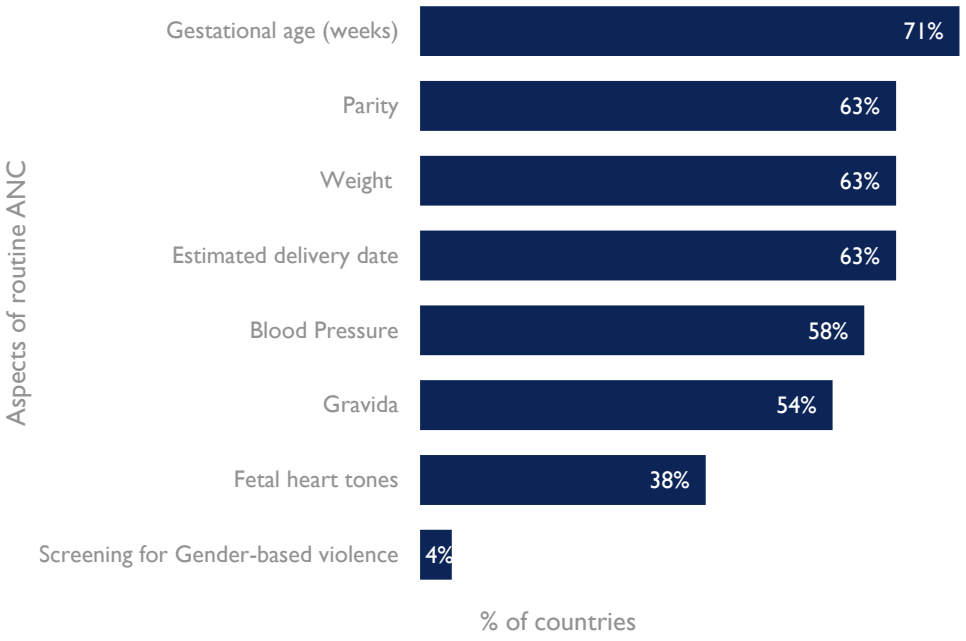


[4] WHO recommendations on antenatal care for positive pregnancy experience. World Health Organization. 2016. http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf[5] Listed among the "additional indicators" in the 2017 Global Reference List of 100 core health and SDG related indicators, August 2017 draft.

Antenatal Care High Impact Interventions

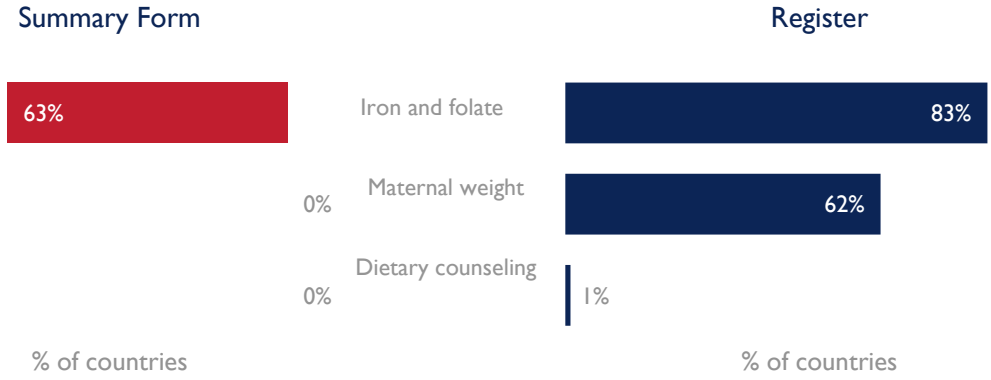
Important routine ANC best practices included recording gravidity and parity, estimating and re-estimating gestational age based on available information, calculating estimated delivery date (based on changing gestational age estimation as relevant), measuring blood pressure and weight, and measuring presence of fetal heart tones (once audible). In all countries, the registers had these data elements, but not in the summary form because they could not be aggregated without being converted into a categorical indicator. For example, recording of blood pressure would have to be changed to proportion of women whose blood pressure was measured (Table 18).

Figure 11. Countries that included aspects of routine antenatal care in registers



Nutrition Interventions: health promotion and prevention

Figure 12. Information related to nutrition



Infectious Disease prevention, screening, and treatment

Syphilis

Information on syphilis testing was available in both the ANC register and facility summary form in 11 countries and the test result was recorded in both the register and summary form in 13 countries. Provision of treatment for syphilis was recorded in fewer countries, seen in the register only in five countries and both in the register and summary form in four countries. Overall, 21 countries (87%) recorded testing and/or test result in either the register or summary form, and 10 countries (42%) recorded treatment given (five countries in the register only, one only in summary form, and four in both).

TB

TB screening during pregnancy was included as a recommendation in the updated 2016 WHO ANC recommendations in areas where TB prevalence in the general population was 100/100,000 persons or higher. Ten countries met this criterion: Bangladesh, DRC, Ethiopia, India, Indonesia, Kenya, Mozambique, Myanmar, Nigeria, Pakistan, and Tanzania. Of these 10 countries, four (40%) collected information related to TB screening, testing, or treatment (Indonesia, Kenya, Mozambique, and Myanmar). In addition, five countries with lower TB burden collected data on screening or treatment of TB during pregnancy (Afghanistan, Malawi, Rwanda, Uganda, and Zambia).

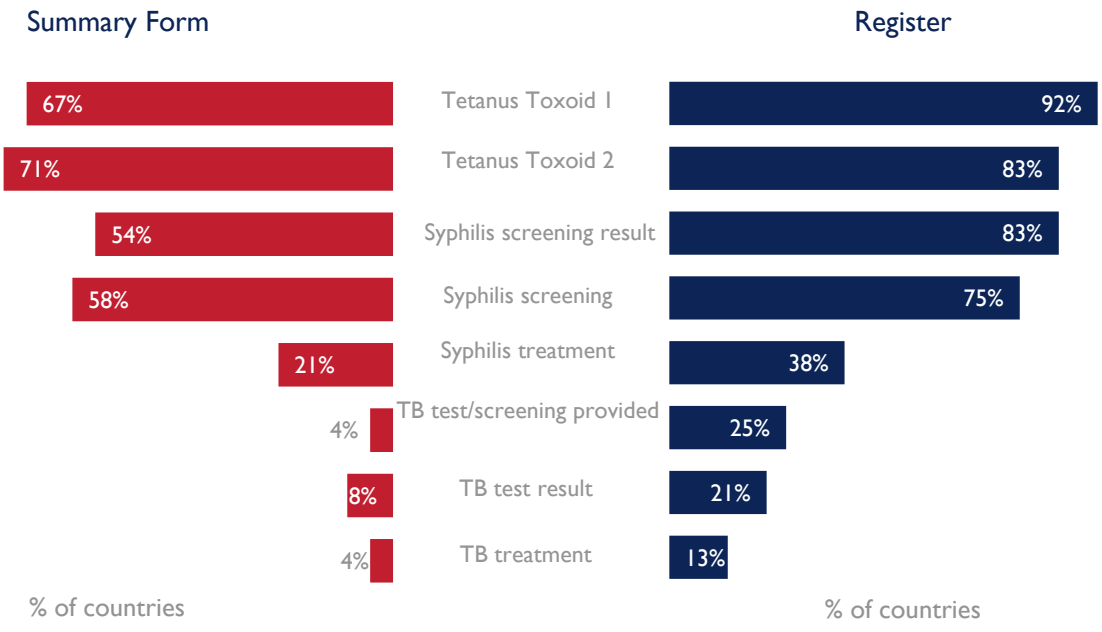
TB test result

TB treatment

Tetanus

Tetanus toxoid (TT) vaccination was usually recorded as first dose (TT1) and second dose (TT2). All countries except Bangladesh and Madagascar recorded TT1 in the register, and 17 recorded TT2 in both the register and summary form (Figure 13).

Figure 13. Information related to TB, syphilis, and tetanus



INDICATOR: Blood pressure measured during antenatal care	
Definition	Women who had blood pressure measured at last ANC visit
Disaggregators	Age, place of residence, socioeconomic status, type of facility

In the ANC register, 14 countries recorded blood pressure,[6] but no countries measured blood pressure in the summary forms. Only certain countries recorded ANC data longitudinally, which was needed to generate an accurate denominator (Table 1). Combining this information, only seven countries could have reported blood pressure measurement at the last ANC visit.

Malaria prevention, diagnosis, and treatment

Intermittent Preventive Treatment of malaria in pregnancy and Insecticide-Treated Nets

Fourteen countries had national policy specifying provision of intermittent preventive treatment of malaria during pregnancy (IPTp) to pregnant women (DRC, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nigeria, Senegal, South Sudan, Tanzania, Uganda, Zambia). All 14 of these countries had at least some IPTp-related data elements. Only in areas with moderate to high transmission of *Plasmodium falciparum*, WHO recommends IPTp at every ANC visit beginning at 13 weeks with a minimum of 1 month between doses; WHO does not stipulate a maximum number of doses. We looked at availability of data elements for recording up to four doses of IPTp. Only three countries recorded four doses of IPTp as a discrete data element. Four countries (Ghana, Mozambique, Malawi, and Tanzania) recorded doses 1-4 of IPTp separately. Three countries (Kenya, Nigeria, and Uganda) recorded only doses 1 and 2. Liberia recorded first dose of IPTp doses (data not shown). The remaining countries recorded doses 1-3.

Distribution of insecticide-treated bed nets (ITN) was recorded in 16 countries' registers and summary forms; of course, availability of this data element was also linked to malaria burden and country policies regarding ITN distribution.

Table 7. Intermittent preventive treatment of malaria in pregnancy and provision of insecticide-treated bed nets to pregnant women during antenatal care

	IPTp - 1	IPTp - 2	IPTp - 3	IPTp - 4	ITN Provided
Countries with IPTp as policy (14)					
DRC	◆ □	◆ □	◆ □		◆ □
Ghana	◆ □	◆ □	◆ □	□	◆
Kenya	◆ □	◆ □			◆ □
Liberia	◆ □				◆ □
Madagascar			◆ □		◆ □
Malawi	◆ □	◆ □	◆	◆	◆ □
Mali	◆ □	◆ □	□		◆ □
Mozambique	◆	◆ □	◆	◆ □	◆ □
Nigeria	◆ □	◆ □			◆ □
Senegal	◆	◆	◆		◆
South Sudan	◆	◆ □	◆ □		◆ □

[5] Listed among the "additional indicators" in the 2017 Global Reference List of 100 core health and SDG related indicators, August 2017 draft.
[6] Additional countries may have recorded this information in the client records, but these may not be accessible.

	IPTp - 1	IPTp - 2	IPTp - 3	IPTp - 4	ITN Provided
Tanzania	◆	◆ □	◆	◆ □	□
Uganda	◆ □	◆ □			◆ □
Zambia	◆ □	◆ □	◆ □		◆ □
Countries without IPTp as policy (10)					
Afghanistan					
Bangladesh					
Ethiopia					
Haiti					◆ □
India					
Indonesia					
Myanmar					
Nepal					
Pakistan					
Rwanda					◆ □

◆ Register □ Summary Form

Malaria Testing and Treatment

Malaria testing and treatment during ANC should be linked to the presence of malaria symptoms in a pregnant woman. Seven countries (29%) (Afghanistan, Haiti, Indonesia, Liberia, Mozambique, Nigeria, Tanzania, and Zambia) captured data on malaria in pregnancy in either the register or summary form. Four countries (Afghanistan, Indonesia, Mozambique, Tanzania) recorded the test result in the ANC register, and six (Afghanistan, Liberia, Mozambique, Tanzania and Zambia) recorded this in the summary form. Two countries (Mozambique and Zambia) recorded in both register and summary form whether a pregnant woman was given treatment for malaria, but Haiti collected this information only in the summary form and Indonesia in the register only.

Table 8. Antenatal care malaria testing and treatment

	Malaria Testing	Malaria Test result	Malaria Treatment Provided
Afghanistan		◆ □	
Bangladesh			
DRC			
Ethiopia			
Ghana			
Haiti			□
India			
Indonesia	◆	◆	◆
Kenya			
Liberia		□	
Madagascar			
Malawi			

	Malaria Testing	Malaria Test result	Malaria Treatment Provided
Mali			
Mozambique	◆	◆ □	◆ □
Myanmar			
Nepal			
Nigeria		□	
Pakistan			
Rwanda			
Senegal			
South Sudan			
Tanzania	□	◆ □	
Uganda			
Zambia	□	□	◆ □

◆ Register □ Summary Form

Anemia Testing and Diagnosis

A data element for hemoglobin measurement was included in 17 (63%) countries and for anemia diagnosis in nine (37%) countries. Of the 13 countries that recorded anemia diagnosis, all except three (Haiti, Mali, and Rwanda) based the diagnosis of anemia on hemoglobin testing results (Table 16). We did not abstract data separately for anemia treatment because diagnosis and treatment of anemia were often not clearly demarcated in registers and because there are many potential causes of anemia that require different treatments. For information on data availability for preventive interventions for common causes of anemia in low-resource settings including iron deficiency (IFA, dietary counseling), helminthic infections (deworming), and malaria (IPTp, ITNs).

Labor and Delivery Service Utilization and Provision of High-Impact Interventions

When a woman gives birth in a facility, she and her newborn benefit from health promotion and prevention interventions as well as timely provision of lifesaving interventions in the event of a complication for the woman or the newborn. This section summarizes availability of HMIS data elements related to provision of routine best practices for a woman, fetus, and newborn during labor, delivery, and the early postnatal period after birth in a facility.

This section summarizes data elements for PNC best practices relevant for pre-discharge and follow-up ambulatory PNC. In addition to providing essential information about delivery of key interventions during this period of elevated risk for mother and newborn, data on number of women admitted in labor and number of births provides important information for managers at the facility and district/regional levels to guide human resources, commodities, and other management decisions.

Information on treatment interventions for maternal and newborn complications (during any phase) are discussed separately because many of these complications span more than one phase along the pregnancy, intrapartum, and postnatal continuum (with the exception of newborn asphyxia).

Method of Delivery

The majority of countries documented method of delivery in both registers and summary forms. Nearly all countries distinguished between vaginal deliveries (22), assisted deliveries (21), and cesarean section deliveries in the register (20). In the summary form, a similar number indicated number of assisted deliveries (19) C-sections (18), and vaginal births (18) (Table 19).

Monitoring of Mother and Newborn for Danger Signs during Labor

In most of the surveyed countries, information recorded in labor was confined to registers or supplemental data forms such as the partograph. These intrapartum data elements were generally not reported up through the HMIS system; instead they were often recorded in a partograph for case management purposes (Table 20). Some intrapartum data elements would need to be revised slightly for reporting in summary forms. For example, blood pressure was recorded in the register or partograph as the value of the blood pressure reading. For a summary form, this information would need to be reframed, such as: 1) number of women for whom blood pressure was recorded at admission, or 2) number of women identified as hypertensive at admission.

Labor Data Elements: Vital signs such as blood pressure, cervical dilation, pulse, maternal temperature, and fetal heart sounds were recorded in the partograph or in the register, if they were recorded at all (Table 20). Gestational age was included in 13 countries' registers and an additional four countries' partographs.

Immediate postpartum uterotonic for mother for postpartum hemorrhage prevention

Countries were considered to have included uterotonic immediately after delivery in registers or summary forms if the forms included a designated space for an immediate postpartum intervention or active management of third stage of labor of which an immediate postpartum uterotonic can be the single intervention or one of 2-3 interventions, including controlled cord traction and uterine massage.

Fourteen countries' registers clearly recorded active management of third stage of labor or uterotonic for PPH prevention. A few countries, including South Sudan and Tanzania, recorded uterotonic use but it was unclear if the uterotonic use was for PPH prevention or treatment (or augmentation of prolonged labor).

Table 9. Uterotonic for postpartum hemorrhage prevention

	Uterotonic for PPH prevention
Afghanistan	
Bangladesh	◆
DRC	◆ ☐
Ethiopia	
Ghana	◆ ☐
Haiti	◆
India	
Indonesia	◆ ☐
Kenya	
Liberia	◆
Madagascar	
Malawi	
Mali	☐
Mozambique	◆ ☐
Myanmar	
Nepal	
Nigeria	◆
Pakistan	
Rwanda	◆ ☐
Senegal	
South Sudan	*
Tanzania	* ☐
Uganda	◆
Zambia	◆

◆ Register ☐ Summary Form

* Unclear whether uterotonic is for PPH prevention or treatment

Newborn Best Practices in the First Hour after Birth

Depending on the timing of the specific intervention, information about the newborn and care provided may have been recorded in the maternity register or a pre-discharge PNC register. This section summarizes data availability results for selected best practices for mother and newborn in the first hours after birth. The next section on postnatal care summarizes availability of data points for postnatal care best practices for mother and newborn during the pre-discharge period and as part of follow-up PNC.

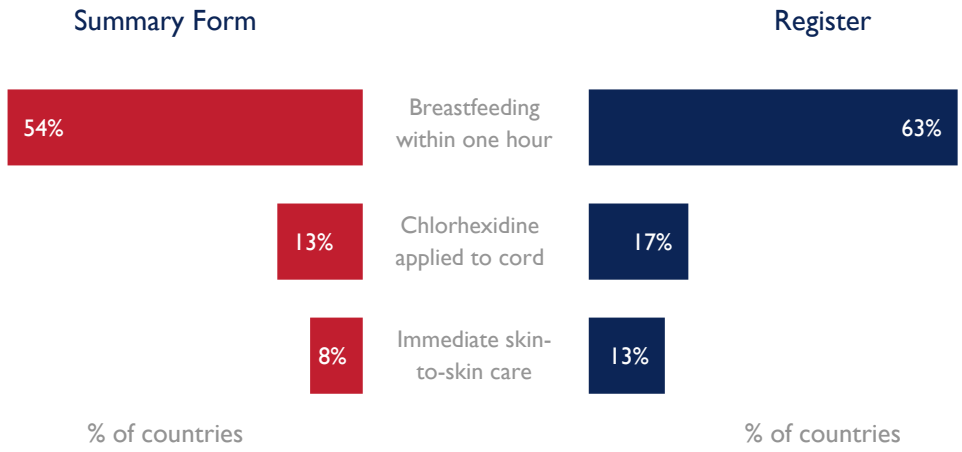
Measuring Birthweight and Essential Newborn Care

Measuring birthweight helps identify babies that may need extra care. In the maternity or PNC register, 19 countries had a designated place to record birthweight. This data element does not directly correlate to a summary form level data element.

The information collected about essential newborn care included: breastfeeding initiation within 1 hour, chlorhexidine applied to the umbilical cord, immediate drying, and immediate skin-to-skin care. The

information about breastfeeding within 1 hour was captured in 15 countries' registers and 13 countries' summary forms; 11 had the data in both register and summary form. Global data suggests that chlorhexidine use is being implemented in 11 countries and is being piloted in 10 others[7]. Except for Uganda, which uses chlorhexidine in the community only and Malawi for facility only, all other countries recommended its use in both facility and community. However, only three countries (Nepal, Bangladesh, and Madagascar) recorded information about chlorhexidine use: Nepal recorded only in the register and Bangladesh and Madagascar in both register and summary form. Four countries (Bangladesh, Haiti, Mozambique, and Uganda) recorded information about skin-to-skin care in the register and Rwanda recorded it in the partograph; of these, three countries also captured this in the summary form. No countries recorded delayed cord clamping or immediate drying (Table 28).

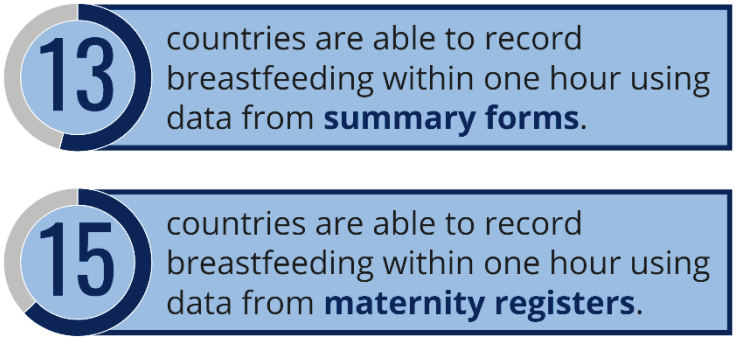
Figure 14. Recording of essential newborn care immediately after birth



Example: Calculating Globally Recognized Indicators

INDICATOR: Breastfeeding within one hour	
Numerator	Number of newborns breastfed within one hour of birth
Denominator	Number of live births in the facility

Thirteen countries (54%) recorded number of newborns breastfed within 1 hour of birth and number of live births on the summary forms, and 15 countries (62%) recorded that information in maternity registers. This showed that breastfeeding within 1 hour of birth, which was a common survey indicator, became a routine indicator in multiple countries.



[7] The data are from Healthy Newborn Network (HNN), an online community dedicated to addressing critical knowledge gaps in newborn health (https://www.healthynewbornnetwork.org/chlorhexidine-dashboard/).

Postnatal Care Utilization, Timing, and Provision of High-impact Interventions for Mother and Newborn

Reporting of postnatal care timing

Countries recorded PNC in registers in several ways. Some countries recorded the date of the visit and sometimes the date of birth was, making it possible to calculate the visit timing. Other registers had specific checkboxes for visit timing. Some count number of visits; this may be recorded instead of timing or in addition to timing. We looked for countries that recorded PNC at the following time points: day of birth, day 2, day 3, days 7-14, and 6 weeks after birth (Table 10). Other timing was recorded as "another reporting schedule." Nearly all countries took timing of PNC into account when reporting PNC. This was helpful because it created a more stable denominator. However, the schedule of reporting varied widely across countries, which complicated efforts to look at PNC coverage globally.

Table 10. Recording of postnatal care timing

	PNC By Timing			Register			Summary form		
	Day of birth	Day 2	Day 3	Days 7-14	6 Weeks	Open-ended column or date	Another reporting schedule	Another PNC schedule	Total count of PNC visits (no timing)
Afghanistan	◆	◆	◆	◆	◆	◆			
Bangladesh	◆	◆	◆	◆	◆	◆			□
DRC					◆		◆	□	
Ethiopia						◆		□	
Ghana		□				◆		□	
Haiti						◆		□	
India	◆		◆	◆	◆	◆		□	
Kenya						◆	◆	◆ □	
Liberia					□	◆			□
Madagascar					◆	◆	◆	□	
Malawi	◆	◆	◆	◆	◆	◆	◆	□	
Mali								□	
Mozambique	◆	◆ □	◆	◆	◆	◆	◆	□	
Nepal	◆	◆	◆	◆	◆	◆	◆	□	
Nigeria	◆ □		◆ □	◆ □				□	
Pakistan						◆			□
Rwanda	◆	◆	◆	◆	◆	◆		□	
Senegal	◆	◆	◆	◆	◆	◆	◆	□	
Tanzania		□	□	□	□	◆	◆	□	
Uganda	◆				◆ □	◆	◆	□	
Zambia					□	◆		□	

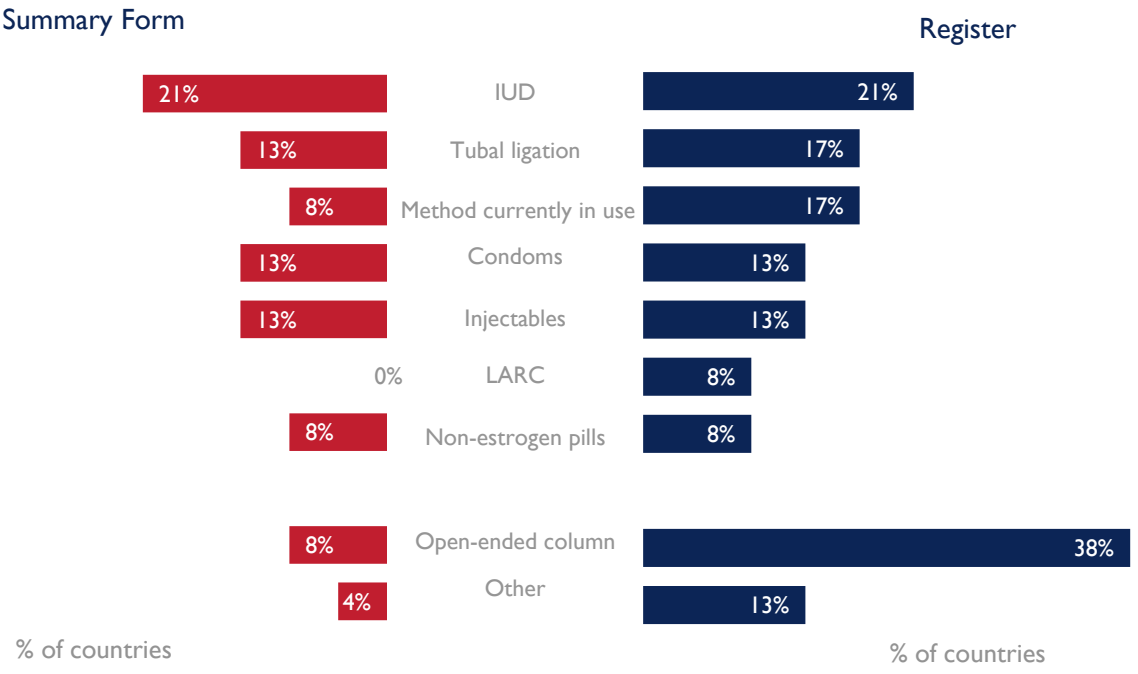
◆ Register □ Summary Form

PNC recommendations suggest routine clinical checks, counseling, and immunization. WHO does not universally recommend Vitamin A supplementation in postpartum women, but in settings where undernutrition is common postpartum women may have inadequate Vitamin A stores.[8] Only six countries (Ghana, Indonesia, Kenya, Mali, Tanzania, and Zambia) recorded the mother's blood pressure during post-discharge PNC visits, and three countries (Bangladesh, Kenya, and Zambia) had an indicator for the mother's hemoglobin level during PNC, all of which were at the register level. Indicators related to counseling during PNC visits were similarly sparse. The most common type of counseling indicator recorded on PNC forms related to birth spacing, family planning (FP), safer sex and transitioning to long-acting methods. Three countries (Bangladesh, Ethiopia and Uganda) had a counseling indicator related to newborn nutrition (breastfeeding). Kenya had a counseling indicator related to essential newborn care, Rwanda had one related to newborn immunization, and Senegal had an indicator for sleeping under insecticide-treated bed nets. Maternal vitamin A supplementation was recorded in 10 countries' in postnatal registers, and seven countries' summary forms (Table 21).

Postpartum Family Planning

Postnatal checks present an opportunity to counsel women regarding their future fertility intentions and to provide FP, if desired. Ideally, PNC and FP services are integrated to make them more convenient for women. Only Ethiopia had a space for postnatal counseling on FP, birth spacing, etc. Only Nepal, Rwanda, and Uganda included information about FP provision before discharge in the maternity register. Sixteen countries (67%) recorded some information about postpartum FP use (typically, provision of methods recorded in an open-ended column). Only four countries (DRC, Ethiopia, India, and Indonesia) had an indicator about the FP method currently in use. A minority of countries recorded specific methods separately (Table 27 and Figure 15).

Figure 15. Recording of family planning use and provision



[8] WHO. Vitamin A supplementation in postpartum women. (http://www.who.int/elena/titles/vitamina_postpartum/en/).

Routine Best Practices for the Newborn during Postnatal Care Checks/Visits

PNC presents an important opportunity to provide health promotion and prevention best practices for the newborn (e.g., immunization, exclusive breastfeeding counseling) and to assess the newborn for any complications by checking danger signs based on exam (vital signs and physical exam) or as reported by the family (e.g., not breastfeeding). Eight countries (DRC, Ethiopia, Ghana, Liberia, Malawi, Senegal, Tanzania, and Uganda) included BCG immunization data in their PNC registers. Three countries (Ghana, Mozambique, and Tanzania) had an indicator for HEP-0, but many countries did not have a policy for HEP-0 immunization, had not started implementing this immunization routinely, or both, according to the WHO immunization schedule website.[9] Eight countries (DRC, Ethiopia, Liberia, Malawi, Mali, Mozambique, Tanzania and Uganda) tracked the breastfeeding status of the newborn. Only two countries (Malawi and Nepal) had an indicator for chlorhexidine application. Regarding availability of data in the PNC register on routine checks of the newborn during the postnatal period, three countries (Ghana, Malawi and Zambia) had a data element for newborn breathing, three countries (Liberia, Malawi and Tanzania) had a data element for newborn feeding (by observation), six countries (Ghana, Malawi, Rwanda, Senegal, Tanzania and Zambia) had a data element for newborn temperature, and three countries (Ghana, Senegal and Zambia) had a data element related to the umbilical cord (CHX or dry care per country policy?). In summary, data about routine newborn care were even more limited in postnatal records than during the early pre-discharge postnatal period (Table 30).

[9] http://apps.who.int/immunization_monitoring/global/summary/schedules

HIV Testing, Diagnosis, and Treatment during ANC, L&D and PNC

Overview of HIV Information Reviewed

HIV information was reviewed for maternal and newborn services. Many countries, particularly those with higher HIV burden, had separate tools for capturing information on HIV testing that occurred in the antenatal, postnatal, or L&D services and linkage to care and treatment, which generally falls under tools specific to prevent of mother-to-child (PMTCT) services. Therefore, the information presented here may not reflect the total amount of information available in countries, particularly those with higher HIV burdens.

HIV Testing

Overall, HIV testing information was more likely to be available in countries with higher HIV prevalence, as would be expected (Table 11). For HIV testing that occurred in ANC services, many countries encouraged the male partner to be tested as well. For pregnant women, 15 countries (62%) recorded testing for HIV during ANC, and 17 (71%) noted this information in the summary form. Ten countries (33%) recorded in the register whether or not the male partner had been tested, and eight reported that information in the summary form. During both L&D and PNC, 14 countries reported HIV testing in the register, and 16 reported this in the summary; the higher number of summary forms was a result of many countries having a separate register for PMTCT indicators.

For ANC, L&D, and PNC, the number of countries that reported the test result of ANC clients and their partners was almost identical to the number that reported whether the test had been conducted.

Prevention of Mother-to-Child Transmission Indicators

Table 12 shows the recording and reporting of PMTCT indicators, which largely focused on treatment for the pregnant woman, mother, newborn, or infant, in ANC, L&D, and PNC registers and summary forms.

The three indicators reviewed in ANC registers and summary forms were whether antiretroviral therapy (ART) prophylaxis provided to woman (any); Option B+ (lifelong ART provided to woman) and whether the woman was on cotrimoxazole preventive therapy. Every country except for Tanzania recorded whether an ANC client was on ART; Tanzania reported that this was collected in a separate register. Roughly half reported this in the summary form. Fewer countries specified whether the ANC client was on lifelong ART, and of those Ethiopia and South Sudan reported it in the summary form. Less than half of the countries had indicators on whether ANC clients were on prophylactic cotrimoxazole to prevent opportunistic infections, and of those who included this in the HMIS, DRC, Liberia, Mozambique, and Uganda had this in their summary forms.

Almost all countries (except Tanzania) had an indicator in L&D registers on whether the woman who was admitted to the maternity ward was on ART. DRC, Ghana, Nigeria, Liberia, Mozambique, Uganda, and Zambia reported in their summary forms.

Provision of ART to the mother was captured in the PNC registers in Mozambique, Uganda, and Nigeria, and in all this was reported to the summary form. Provision of ART to the newborn was captured in the PNC tools in Mozambique, South Sudan, Tanzania, Uganda, Zambia, and Nigeria, and in all cases this was reported to the summary form. Provision of cotrimoxazole to the newborn was captured by DRC, Kenya, Tanzania, Uganda, Zambia and Nigeria, but only Zambia, Nigeria and Tanzania reported this in the summary form.

Table 11. HIV testing during antenatal, labor and delivery, and postnatal care

	HIV Prevalence		HIV Testing						
			ANC				L&D		PNC
	<1%	>1%	Test		Result		Test	Result	Result
			Maternal	Partner	Maternal	Partner	Maternal	Maternal	Maternal
Afghanistan	<0.1				◆			◆	◆
Bangladesh	<0.1								
Pakistan	<0.1								
Nepal	0.2		□	◆	□	◆	□	□	□
India	0.3		◆		◆		◆	◆	◆
Madagascar	0.4		◆□		◆□		◆□	◆□	◆□
Senegal	0.5		□				□		
Indonesia	0.5		◆		□		◆	□	□
Myanmar	0.8				□			□	□
DRC	0.8		◆□	◆□	◆□	◆□	◆□	◆□	◆□
Liberia		1.1	□	□	□	□	□	□	□
Mali		1.3							
Ghana		1.6	◆□		◆□		◆□	◆□	◆□
Haiti		1.7	□		◆□		□	◆□	◆□
Ethiopia		2.4	◆□	◆	◆□	◆	□	◆□	◆□
South Sudan		2.5	◆□		◆□		◆	◆	
Rwanda		2.9	◆□	◆	◆□	◆	◆□	◆□	◆□
Nigeria		3.1	◆□	◆□	◆□	◆□	◆□	◆□	
Tanzania		4.7	◆□	◆□	◆□	◆□	◆□	◆□	◆□
Kenya		5.9	◆□	◆□	◆□	◆□	◆□	◆□	◆□
Uganda		7.1	◆□	◆□	◆□	◆□	◆□	◆□	◆□
Malawi		9.1	◆□		◆□		◆□	◆□	◆□
Mozambique		10.5	◆□	◆□	◆□	◆□	◆□	◆□	◆□

	HIV Prevalence		HIV Testing						
			ANC				L&D		PNC
	<1%	>1%	Test		Result		Test	Result	Result
			Maternal	Partner	Maternal	Partner	Maternal	Maternal	Maternal
Zambia		12.9	◆□	◆□	◆□	◆	◆□	◆□	◆□

◆ Register □ Summary Form

Table 12. HIV treatment and prevention of mother-to-child transmission of HIV

	HIV Prevalence		ANC			Maternity care		PNC				
								ART			Cotrimoxazole. PMTCT	
	<1%	>1%	ART pro-phylaxis	Lifelong supplementation/ Option B+	On Cotrimoxazole	ART pro-phylaxis	On Cotrimoxazole	Existing cases (M)	New cases (M)	NB	NB	M
Afghanistan	<0.1											
Bangladesh	<0.1											
Pakistan	<0.1											
Nepal	0.2		◆									
India	0.3											
Madagascar	0.4											
Senegal	0.5											
Indonesia	0.5					◆						
Myanmar	0.8											
DRC	0.8		◆ □		◆ □	□	◆ □	◆	◆		◆	◆
Liberia		1.1	□		□	□	□					
Mali		1.2										
Ghana		1.6	◆ □			□						
Haiti		1.7	◆	◆		◆						
Ethiopia		2.4	◆ □	◆ □		◆			◆			◆
South Sudan		2.5	◆	□		◆				□		
Rwanda		2.9	◆	◆	◆	◆	◆					
Nigeria		3.1	◆ □			◆ □	◆ □	◆ □	◆ □	◆ □	◆ □	◆ □
Tanzania		4.7			◆ □		◆ □			◆ □		
Kenya		5.9	◆		◆ □	◆	◆ □	◆				◆
Uganda		7.1	◆ □		◆ □	◆ □	◆ □	◆ □	◆ □	◆ □		◆ □
Malawi		9.1	◆ □	◆	◆ □	◆ □	◆					

	HIV Prevalence		ANC			Maternity care		PNC				
								ART			Cotrimoxazole. PMTCT	
	<1%	>1%	ART pro-phylaxis	Lifelong supplementation/ Option B+	On Cotrimoxazole	ART pro-phylaxis	On Cotrimoxazole	Existing cases (M)	New cases (M)	NB	NB	M
Mozambique		10.5	◆ □	◆	◆ □	◆ □	◆ □	◆ □	◆ □	◆ □		
Zambia		12.9	◆ □		◆ □	◆ □	◆ □			◆ □	◆ □	◆

◆ Register □Summary Form; M: Mother; NB: newborn

Discussion

Having service delivery data and the ability to aggregate that data across facilities is vital in helping facility, district, regional managers use the data to manage and improve the provision of high-impact health care services. In the absence of high-quality individual client records, registers are often the only available source of information about facility services in low-resource settings.

> "Without good data, we're flying blind. If you can't see it, you can't solve it."
> –Kofi Annan, 2018

This review highlighted some areas in where data gaps exist as we work to reduce preventable maternal and newborn deaths and deliver high-quality, equitable care that ensures dignity for all. Data gaps identified by the review can help inform revisions by ministries of health to health facility registers, client records, and facility reports to capture essential data elements for calculating and using quality measures by facility health workers and district managers (including aggregation of key quality measures at the district level.) The results of this review can also support advocacy efforts for incorporating high-priority MNH data points and indicators into national HMISs. The findings of the review are summarized by content area.

Maternal and Newborn Health Outcomes

- Although deaths were being counted as whole, it is difficult to determine timing and cause.
- Most, but not all, countries captured fresh stillbirths, which is an important measure of the quality of intrapartum care.
- Data on cause of facility maternal and newborn death and diagnosis (incidence) of facility obstetric and newborn complications were generally not available; this information would be vital for district managers and facility teams to understand and address local burden of disease and monitor improvement efforts.

Antenatal Care

- Utilization of services is being tracked at high levels.
- Preventive interventions in ANC, such as iron/folate supplementation, individual doses of IPTp to control malaria in pregnancy, and deworming medication, tended to be available in the register but not always disseminated to higher levels for use in national and subnational analysis.
- Information on TT immunization was an area of strength.
- Information on syphilis testing and treatment tended to be stronger in sub-Saharan African countries compared to South Asian countries.
- Information on treatment of identified infections and conditions (e.g., syphilis, TB, anemia, in pregnancy was generally lower than information on screening interventions.
- Screening and recording of complications in pregnancy was generally low (e.g., routine blood pressure measurement during ANC, diagnosis of pre-eclampsia.)

Malaria

- In malaria-endemic countries that had IPTp as the national policy, the variety in the number of IPTp doses recorded in the HMIS likely reflected the shift in WHO recommendations from only two doses of IPTp during pregnancy to a dose at every visit after 13 weeks gestational age at least 1 month apart. However, two countries were still not tracking IPTp2. Although most countries were tracking IPTp3, most countries were not tracking IPTp4.

Labor and Delivery

- Countries tracked utilization and volume of facility childbirth services and birth outcomes for the mother and newborn.
- Certain indicators that are highly relevant for measuring and improving quality of care and that are recommended for country and global monitoring were not consistently available in HMIS in most countries. For example, provision of uterotonics immediately after birth for PPH prevention was still not widely tracked.
- Only one element of essential newborn care—breastfeeding within 1 hour after birth—was commonly captured in the HMIS.

Postnatal Care

- PNC registers had the fewest data elements, although the postnatal period is a critical time for providing health promotion and prevention interventions and ensuring timely identification and management of problems for mother and newborn.
- Information on pre-eclampsia/eclampsia diagnosis in PNC was low; this is of concern given that 30% of cases of pre-eclampsia/eclampsia develop during the postpartum period.
- Many recorded little information on FP in the postnatal care register. MCSP is making efforts to advocate for integration of FP services in postnatal care and improvements to related recordkeeping. MCSP has also undertaken an HMIS review related to FP services which is being reported separately.

HIV

- During ANC, L&D and PNC, HIV testing indicators were integrated into MNH registers in countries with HIV burden of 1% or higher, including recording of partner testing information in 10 countries.

This review did not discuss disaggregators, which are useful for further understanding how well services are reaching different sectors of the population. For example, some countries looked at provision of services by maternal age or by ethnic group. Geographical disaggregation is crucial for targeting services to populations most in need, and this should be part of any electronic system for storing HMIS data, such as DHIS2. Ensuring equitable coverage of services by socioeconomic status is essential but may be beyond the scope of HMISs. Similarly, experience of care is a key aspect of quality that cannot be captured in registers and summary forms.

Conclusion

Health systems need to make the most of their HMISs by collecting data that are actionable, that monitor important health outcomes (e.g., cause of death, case fatality), and that capture the delivery of essential routine interventions and lifesaving interventions for complications. Different types of information are needed at different levels of the health system.

Managers and frontline health workers need this data to monitor the performance of vital health system functions and to guide the continuous improvement of health care services for women and newborns. Beyond discussing the difference between registers and summary forms, it was beyond the scope of this activity to understand which information was available at which level of the health system. The purpose of this report is not to discuss about what data elements and indicators countries should report. More data elements may not be better; more data create a burden on health care workers. Indicators serve different functions: some may drive quality at the facility level, others may have more national or global relevance.

This review identified many challenges related to availability of essential MNH data in facility and district HMISs to guide program management and quality improvement. Forms and registers were difficult to access in many countries. Some countries, including India and Indonesia, had no standard national ANC, L&D, or PNC register. Instead, subnational units (regions) created and used their own registers and forms. Some countries had no standardized register for specific facility types. For example, at the time of the assessment, regional hospitals in Madagascar did not have a standardized L&D register in place (although efforts had started to create a standardized regional hospital register.) In some countries, including Ghana, Liberia, and Rwanda, we were unable to obtain an electronic version of the official government register and instead took photographs of actual registers in use at health facilities. It is possible that these registers were not the most current version.

Another challenge, for the team reviewing the forms and registers and potentially for the health workers themselves, in some cases it was difficult to interpret how forms were supposed to be completed, and we were unable to obtain instructions for completing the forms. Just as the global health community is moving toward greater open data, it would be interesting to explore countries' attitudes toward sharing forms and registers and potential mechanisms for developing source sharing of data collection instruments and systems for standardizing data entry.

For some indicators, subtle differences exist, and it can be difficult to discern these from reviewing the registers. Data quality was largely beyond the scope of this review, but is known to be a concern in HMIS systems. Designing forms that are detailed yet clear and not overly burdensome presents an ongoing task in low- and middle-income countries. More testing needs to be done to determine which recording formats are most easily understood and completed by health workers.

It is important to note that the registers and forms reviewed are not static, and these findings represent a snapshot in time. For example, we know that Pakistan, Ethiopia, Rwanda, and Nigeria have all been undertaking facility register and summary form revisions since 2017 when data abstraction was completed for this assessment. In addition, global guidance evolves over time. For example, some countries included the three aspects of active management of the third stage of labor in their registers, but global guidance now focuses only on uterotonic provision immediately after birth. Some countries recorded the fourth ANC visit, but WHO guidelines now recommend eight contacts.

Outside of this review, indicator testing work was implemented under several MCSP supported countries, with results becoming available by the end of the global project. After introduction of indicators during program implementation, interviews with providers and other stakeholders are taking place to better understand the collection, analysis, and use of the data and whether or not the indicators should be integrated into the national HMIS. The results of these activities will complement this review and will help inform the standardization of global indicators and provide information for other countries seeking to introduce indicators in their health systems.

Appendix

Table 13. Registers and forms reviewed by country

	Registers	Summary Form	Client Form (Stay at Facility)
Afghanistan	ANC, MCH, Hospital Newborn, Hospital Delivery	Monthly Activity Report- Health Post	Partograph
Bangladesh	ANC, Delivery Register, PNC, maternal and newborn care register	Monthly Report of Maternity Department, Maternal, Child Health & FP Services Monthly Progress Report of Upazila G0B and nongovernmental organization; maternal newborn care register	Partograph
DRC	REGISTRE DE MATERNITE (OBSTETRIQUE), Prenatal Consultation, Postnatal Consultation (CPoN)	Canevas mensuel	Missing
Ethiopia	Hospital/Health Center/ANC, Hospital/Health Center/Delivery Clinic, Hospital/Health Center/PNC Clinic, ANC Health Post, Delivery Health Post, PNC Health Post	Hospital/health center monthly reporting form, Health post Monthly Reporting form	Integrated Antenatal, Labor, Delivery, Newborn and PNC Card
Ghana	GANC, Delivery and PNC	Monthly Midwives Summary Form for ANC and L&D (DHIMS2 Form A)	Missing
Haiti	Prenatal, 2-Prenatal Service, Maternity, Postnatal	Rapport Statistique Mensuel Des Services de Sante	Partograph
India	MCH, RCH – Section II (tracking pregnant women)	Monthly Format for CHC-SDH-DH-PHC (ANC, L&D, PNC)	Partograph
Indonesia	KOHORT ANTENATAL CARE/Register Antenatal Care, 5.Persalinan & BBL 0-6 JAM, 6. PNC, MCH Kohort, MCH Register	Formulir RL 3.4 -KEGIATAN KEBIDANAN, 6.PNC, Maternal Summary Sheet	Partograph
Kenya	ANC, Maternity, PNC	Have but not reviewed (See Kenya HMIS SOP) Health Facility Monthly Form (ANC, L&D)	Partograph - 2012
Liberia	ANC, Maternity, PNC	Liberia Health Facility: Comprehensive Monthly Report (ANC, L&D, PNC)	Missing
Madagascar	Hospital/Health Center/Clinic: ANC, L&D, and PNC; Health Post: ANC, L&D, and Postnatal	Basic Health Center monthly reporting form (ANC, L&D, PNC)	Missing
Malawi	ANC, Maternity, PNC	Facility Monthly Report – Antenatal, Maternity, Postnatal	Missing
Mali	CPN, d'Accouchement, Surveillance Preventive des Enfants, PNC, Consultation post-natale	Quarterly Activity Report, Registre d'ouverture et de cloture des fiches Operationelles de Prenatales	Fiche de Suivi Grossesse, Partogramme, Fiche d'Admission
Mozambique	Livro Registo CPN, Livro Registo Maternidade, Livro de Registos de Ginecologia (Gynecological Register)	*Livro Registo Consulat Saude Reprodutiva-Planeamento Familiar* [Monthly Summary of RH/FP], *Resumo*	Partograma F

	Registers	Summary Form	Client Form (Stay at Facility)
		Mensal CPN [ANC Monthly Summary], *Resumo Mensal CCR* [Pediatric Complication Monthly Summary], *Resumo Diário de Admissões da Maternidade* [Maternity Ward Daily Report], *Resumo Mensal Da Urgência de Ginecologia* [Gynecological Emergency Monthly Report], *Resumo Mensal da Consulta Pos-Parto* [PNC Summary Form]	
Myanmar	ANC, L&D, PNC	Forms included in *Data Dictionary For Health services Indicators* published by Ministry of Health Department of Health Planning Health management Information System in 2012	Missing
Nepal	ANC, Maternity, PNC	MANM/MHCW/VHW Monthly Reporting Form and PHCC/HP/SHP Monthly Reporting Form (Safe Motherhood, PNC)	Partograph
Nigeria	ANC L&D PNC Daily Register	National HMIS Monthly Summary Form for Health Facilities	Missing
Pakistan	Maternal Health, L&D, Obstetric	Primary Health Center (PHC) Facility Monthly Report, Secondary Hospital Monthly Report	Partograph
Rwanda	ANC, Maternity and PNC register	Hospital and health center monthly reporting forms	Partograph
Senegal	Consultation Prenatale, Accouchement, Consultation Post-Natale (ANC, L&D, PNC)	RAPPORT DU CENTRE DE SANTE	Missing
South Sudan	HANC, L&D	Hospital/health center monthly reporting form	Missing
Tanzania	AANC, Maternity, PNC	ANC, Maternity,	Partograph (Record of Labor)
Uganda	HANC, Maternity, PNC	HANC, Maternity, PNC Tally Sheet	Partograph
Zambia	ANC, L&D, Maternity, and PNC Registers	Health Centre Form Health Service Delivery Aggregation Form (HIA2), Hospital Health Service Delivery Aggregation Form (HIA3), Antenatal/Postnatal Services Delivery Sheet, Obstetric care activity sheet, PMTCT Activity Sheet	Partograph

Table 14. Antenatal Care Utilization

	First ANC Visit	4+ ANC Visits
Afghanistan	◆ □	◆
Bangladesh	◆	◆
DRC	◆ □	◆ □
Ethiopia	◆ □	◆ □
Ghana	◆	◆ □
Haiti	◆ □	◆ □
India	◆	◆
Indonesia		
Kenya	◆ □	◆ □
Liberia	◆ □	◆ □
Madagascar	◆ □	◆ □
Malawi	◆ □	◆ □
Mali	◆ □	◆
Mozambique	◆ □	◆ □
Myanmar	◆ □	
Nepal	◆ □	◆ □
Nigeria		
Pakistan	◆ □	
Rwanda	◆ □	◆ □
Senegal	◆	◆
South Sudan	◆ □	◆ □
Tanzania	◆ □	◆ □
Uganda	◆ □	◆ □
Zambia	□	□

◆ Register □Summary Form

Table 15. Nutrition Interventions during the antenatal period

	Iron + Folate supplements given	Maternal weight recorded	Diet counseling
Afghanistan	◆	◆	
Bangladesh		◆	
DRC	◆ ☐		
Ethiopia	◆		◆
Ghana	◆ ☐	◆	
Haiti	◆ ☐		
India	◆ ☐	◆	
Indonesia	◆	◆	
Kenya	◆ ☐	◆	
Liberia	◆ ☐	◆	
Madagascar	◆ ☐		
Malawi	◆	◆	
Mali	◆ ☐	◆	
Mozambique	◆ ☐	◆	
Myanmar		◆	
Nepal			
Nigeria	◆ ☐		
Pakistan			
Rwanda	◆ ☐		
Senegal	◆ ☐	◆	
South Sudan	◆	◆	
Tanzania	◆ ☐		
Uganda	◆ ☐	◆	◆
Zambia	◆ ☐	◆	

◆ Register ☐ Summary Form

Table 16. Anemia screening and diagnosis and anthelminthic treatment during antenatal care

	Hemoglobin level	Anemia diagnosed	Deworming medication given
Afghanistan			
Bangladesh	◆		
DRC			◆ □
Ethiopia			
Ghana	◆ □		◆
Haiti		◆ □	
India	◆ □	□	
Indonesia	◆	◆	◆
Kenya	◆		◆
Liberia	◆	□	◆ □
Madagascar			◆ □
Malawi	◆	◆ □	◆ □
Mali	◆	□	□
Mozambique	◆		◆ □
Myanmar	◆ □	◆	◆
Nepal			◆
Nigeria	◆	◆	
Pakistan	◆ □	◆	
Rwanda		◆ □	□
Senegal	◆		
South Sudan	◆		◆
Tanzania	◆	◆ □	◆ □
Uganda	◆	◆	◆
Zambia	◆	□	◆ □

◆ Register □ Summary Form

Table 17. Syphilis, TB and tetanus data collected during antenatal care

	Syphilis			TB		Tetanus		
	Screening	Screening result	Treatment	Test/ screening provided	Test result	Treatment	TT - 1	TT - 2
Afghanistan	◆	◆		◆ □	◆ □		◆ □	
Bangladesh								
DRC	◆ □	◆ □	◆				◆ □	◆ □
Ethiopia	◆ □						◆	
Ghana	□	◆ □					◆	◆ □
Haiti	◆ □	◆ □	◆				◆ □	◆ □
India	◆	◆					◆ □	◆ □
Indonesia	◆	◆	◆	◆	◆	◆	◆ □	◆ □
Kenya	◆ □	◆ □		◆			◆	◆
Liberia	□		□				◆ □	◆ □
Madagascar	◆ □	◆ □	◆ □					◆
Malawi	◆	◆ □			□		◆	◆ □
Mali	◆	◆					◆ □	◆ □
Mozambique	◆ □	◆ □	◆ □			◆ □	◆ □	◆ □
Myanmar		◆			◆		◆	
Nepal	◆	◆	◆				◆ □	◆ □
Nigeria	◆ □	◆ □	◆ □				◆ □	◆ □
Pakistan							◆	◆ □

	Syphilis			TB		Tetanus		
	Screening	Screening result	Treatment	Test/ screening provided	Test result	Treatment	TT - 1	TT - 2
Rwanda	◆ ☐	◆ ☐	◆	◆			◆ ☐	◆ ☐
Senegal	☐	◆ ☐					◆ ☐	◆ ☐
South Sudan	◆	◆					◆ ☐	◆ ☐
Tanzania	◆ ☐	◆ ☐	◆ ☐				◆ ☐	◆ ☐
Uganda	◆ ☐	◆ ☐		◆	◆	◆	◆ ☐	◆ ☐
Zambia	◆ ☐	◆ ☐		◆	◆		◆ ☐	◆ ☐

◆ Register ☐ Summary Form. Countries in **bold** have TB prevalence in the general population of 100/100,000 persons or higher.

Table 18. Selected routine best practices during antenatal care

	Blood Pressure - Maternal	Estimated delivery date	Fetal heart tones/ sounds	Gestational age (in weeks)	Gravida	Parity	Weight - Maternal
Afghanistan		◆	◆				◆
Bangladesh	◆	◆	◆		◆		◆
DRC				◆			
Ethiopia		◆		◆			
Ghana	◆	◆	◆			◆	◆
Haiti		◆		◆	◆	◆	
India	◆	◆	◆		◆	◆	◆
Indonesia				◆			◆
Kenya	◆	◆		◆	◆	◆	◆
Liberia	◆	◆	◆	◆	◆	◆	◆
Madagascar							
Malawi	◆	◆	◆	◆	◆	◆	◆
Mali	◆		◆	◆		◆	◆
Mozambique	◆			◆			◆
Myanmar	◆	◆	◆	◆	◆		◆
Nepal		◆			◆	◆	
Nigeria				◆		◆	
Pakistan		◆					
Rwanda		◆		◆	◆	◆	
Senegal	◆		◆	◆	◆	◆	◆
South Sudan	◆			◆	◆	◆	◆
Tanzania	◆			◆		◆	
Uganda	◆	◆		◆	◆	◆	◆
Zambia	◆	◆		◆	◆	◆	◆

◆ Register

Table 19. Method of delivery

	Assisted (vacuum and/or forceps)	Cesarean Section	Vaginal
Afghanistan	◆ □		◆ □
Bangladesh	◆ □	◆	◆ □
DRC	◆ □	◆ □	◆ □
Ethiopia	◆	◆	◆
Ghana	◆ □	◆ □	◆ □
Haiti	◆ □	◆ □	◆ □
India	◆	◆ □	◆
Indonesia	◆ □	◆ □	◆ □
Kenya	◆ □	◆ □	◆ □
Liberia	◆ □	□	◆
Madagascar			
Malawi	□	◆ □	◆ □
Mali	◆	◆	◆
Mozambique	◆ □	◆ □	◆ □
Myanmar			
Nepal	◆ □	◆ □	◆ □
Nigeria	◆ □	◆ □	◆ □
Pakistan	◆ □	◆ □	◆ □
Rwanda	◆ □	◆ □	◆ □
Senegal	◆ □	◆ □	◆
South Sudan	◆ □	◆ □	◆
Tanzania	◆ □	◆ □	◆ □
Uganda	◆ □	◆ □	◆ □
Zambia	◆ □	◆ □	◆ □

◆ Register □ Summary Form

Table 20. Maternal and fetal information and vital signs recorded during labor and delivery

	Blood pressure	Cervical Dilation	Gestational age (weeks)	Pulse		Temperature	Fetal heart sounds
				At admission	During labor	(At any time)	
Afghanistan	⊙		◆⊙			⊙	
Bangladesh	⊙	⊙	⊙	⊙	⊙	◆⊙	⊙
DRC			⊙				
Ethiopia	⊙	⊙			⊙	⊙	⊙
Ghana			◆				
Haiti	⊙	⊙	◆		⊙	⊙	⊙
India			◆				
Indonesia	⊙		◆⊙			⊙	
Kenya			◆⊙		⊙		
Liberia			◆				
Malawi			◆	◆		◆	
Mali	⊙				⊙	⊙	
Mozambique[1]	⊙	⊙	◆⊙	⊙	⊙	⊙	◆⊙
Myanmar			◆				◆
Nepal			⊙				⊙
Pakistan	⊙	⊙			⊙	⊙	⊙
Rwanda	⊙	⊙	◆⊙		◆⊙	⊙	◆⊙
South Sudan			◆				
Tanzania[1]	⊙	⊙	⊙	◆⊙	⊙	◆⊙	⊙
Uganda				⊙			
Zambia	⊙		◆	⊙		⊙	⊙

◆ Register ⊙ Partograph

Table 21. Routine postnatal care services and counseling

	Maternal blood pressure	Hemoglobin	Vitamin A	Counseling		
				Essential newborn care (cord care, thermal care)	Mother and Baby Kept in Same Location for 24 Hours	Open-ended column
Afghanistan	◆		◆		◆	
Bangladesh		◆			◆	
DRC			◆ □		◆	
Ethiopia			◆		◆	
Ghana	◆				◆	
Haiti			◆ □		◆	□
India					◆	
Indonesia	◆		◆			
Kenya	◆	◆	◆	◆	◆	
Liberia			◆ □		◆	
Madagascar						
Malawi			◆ □			
Mali	◆		□			□
Mozambique			◆ □			
Myanmar					◆	□
Nepal			◆		◆	
Nigeria						
Pakistan					◆	
Rwanda						
Senegal			□		◆	
South Sudan						
Tanzania	◆					
Uganda				◆		
Zambia	◆	◆				◆

◆ Register □ Summary Form

Rwanda included counseling on newborn immunization (register). Bangladesh (summary form) and Ethiopia (register) included information on counseling related to newborn nutrition or breastfeeding. Senegal (register) recorded information about sleeping under an ITN.

Table 22. Diagnosis of maternal complications: antenatal care and postnatal care registers

	ANC Register					PNC Register		
	(Open-ended column)	APH*	PE/E**	Sepsis	PE/E	PPH	Sepsis	Open-ended column
Afghanistan	◆		◆					■
Bangladesh	◆							
DRC	◆							■
Ethiopia	◆				■			
Ghana								
Haiti	◆	◆						
India	◆							■
Indonesia		◆		◆	■	■	■	■
Kenya	◆		◆			■		
Liberia	◆							■
Madagascar								
Malawi			◆		■	■	■	
Mali	◆							
Mozambique							■	■
Myanmar								
Nepal	◆	◆	◆	◆	■	■	■	■
Nigeria								
Pakistan								
Rwanda	◆	◆				■		■
Senegal								■
South Sudan		◆	◆	◆				
Tanzania	◆							■
Uganda	◆							■
Zambia	◆					■		

◆ ANC Register ■ PNC Register; *APH: Antepartum hemorrhage; **PE/E: pre-eclampsia/eclampsia

Table 23. Diagnosis of maternal complications: labor and delivery registers and partograph

	APH*	PPH	PE/E **	Obstructed/ prolonged labor	Ruptured uterus	Infection/ Sepsis	Other
Afghanistan	◆ ⊙	◆ ⊙	◆ ⊙	◆ ⊙			◆ ⊙
Bangladesh	⊙		⊙				
DRC	◆	◆	◆	◆	◆		◆
Ethiopia	◆ ⊙	◆ ⊙	⊙	⊙	⊙		
Ghana							
Haiti	◆	◆	◆	◆			
India							
Indonesia	⊙	◆	◆ ⊙			◆ ⊙	◆
Kenya		◆	◆				
Liberia	⊙		⊙			⊙	
Madagascar	◆		◆	◆		◆	
Malawi	◆	◆	◆ ⊙	◆	◆	◆	◆
Mali		⊙					
Mozambique	◆	◆	◆	◆	◆	⊙	◆
Myanmar							
Nepal		⊙	◆	◆ ⊙	◆	◆	◆ ⊙
Nigeria							
Pakistan	◆	◆ ⊙	◆	◆	◆	◆ ⊙	◆
Rwanda	⊙	◆ ⊙				⊙	
Senegal							
South Sudan		◆	◆	◆	◆		
Tanzania		⊙					
Uganda							
Zambia		◆					

◆ Register ⊙ Partograph; * APH: Antepartum hemorrhage; **PE/E: pre-eclampsia/eclampsia

Table 24. Reporting of maternal complications in summary forms

	Antepartum hemmorhage (APH)	PE/E	PPH	Sepsis	Obstructed/ prolonged labor	Ruptured uterus	Infection/ Sepsis	Other complications
Afghanistan	☐	☐			☐			☐
Bangladesh								
DRC		☐	☐		☐	☐		☐
Ethiopia		☐						
Ghana								
Haiti								
India		☐						
Indonesia	☐		☐				☐	☐
Kenya								
Liberia	☐	☐	☐	☐	☐			
Madagascar	☐	☐			☐		☐	
Malawi	☐	☐	☐		☐	☐	☐	☐
Mali			☐					
Mozambique	☐	☐	☐		☐	☐	☐	☐
Myanmar								
Nepal	☐	☐	☐				☐	
Nigeria								
Pakistan	☐	☐			☐	☐		
Rwanda	☐	☐	☐	☐	☐	☐	☐	☐
Senegal		☐						
South Sudan							☐	
Tanzania		☐	☐		☐	☐		
Uganda								
Zambia		☐	☐					

☐ Summary Form

Table 25. Treatment and referral of maternal complications noted in the registers

	ANC Register	L&D Register		PNC register	
	Any referral occurred	Treatment of specific complications	Any referral occurred	Open-ended column for treatment	Treatment of specific complications (listed)
Afghanistan		Manual removal of placenta			Thrombo-embolism
Bangladesh		Other treatment		■	
DRC		Antibiotic for fever, other treatment		■	
Ethiopia		Other treatment		■	
Ghana					
Haiti	◆		O		
India					PPH
Indonesia					
Kenya	◆		O		
Liberia		Other treatment		■	
Madagascar					
Malawi		Antibiotic for fever, anticonvulsant, blood transfusion, manual removal of placenta			PE/E, PPH
Mali	◆		O		
Mozambique		Anticonvulsant, blood transfusion, uterotonic treatment for PPH, other treatment		■	
Myanmar	◆		O		
Nepal					
Nigeria	◆		O		
Pakistan					
Rwanda	◆		O		
Senegal					
South Sudan					
Tanzania	◆	Anticonvulsant, blood transfusion, manual removal of placenta, uterotonic treatment for PPH	O		
Uganda				■	
Zambia					

◆ ANC Register O L&D Register ■ PNC Register No countries recorded antihypertensive for PE/E.

Table 26. Referral of maternal complications recorded in summary forms

	Any referral occurred	Specific complications noted
Afghanistan	☐	
Bangladesh	☐	
DRC	☐	Anticonvulsant, antibiotic for fever
Ethiopia	☐	
Ghana		
Haiti		
India	☐	Anticonvulsant uterotonic treatment for PPH
Indonesia	☐	
Kenya	☐	
Liberia		
Madagascar		
Malawi	☐	Anticonvulsant, blood transfusion, manual removal of placenta uterotonic treatment for PPH, other treatment
Mali	☐	
Mozambique		Anticonvulsant, blood transfusion, uterotonic treatment for PPH
Myanmar	☐	
Nepal		
Nigeria		
Pakistan		Uterotonic treatment for PPH, other treatment
Rwanda		Antibiotics for preterm premature rupture of membranes, Anticonvulsant, blood transfusion, manual removal of placenta
Senegal		
South Sudan		Other treatment
Tanzania	☐	Antibiotics for preterm premature rupture of membranes, Anticonvulsant
Uganda	☐	
Zambia		Anticonvulsant

☐ Summary Form

Table 27. Postpartum family planning use: availability of data elements in PNC registers and forms

	Current FP method	FP method provided							
		Condoms	Injectables	IUD	LARC	Non-estrogen pills	Tubal ligation	Open-ended column	Other
Afghanistan		◆	◆	◆	◆		◆	◆ □	
Bangladesh								◆	
DRC	◆ □	□	□	□			□		
Ethiopia	◆								
Ghana								◆	
Haiti									
India	◆ □							◆	
Indonesia	◆	◆	◆	◆	◆	◆			◆
Kenya		◆	◆	◆	◆	◆	◆		◆
Liberia									
Madagascar									
Malawi				◆ □			◆ □	◆ □	
Mali		□	□	□		□			
Mozambique				◆ □					◆ □
Myanmar		□	□	□		□			
Nepal								◆	
Nigeria									
Pakistan									
Rwanda									
Senegal									
South Sudan									
Tanzania							◆ □	◆	
Uganda								◆	
Zambia								◆	

◆ PNC Register □ Summary Form

Table 28. Essential newborn care immediately after birth data elements available in labor and delivery and/or pre-discharge postnatal care register

	Birthweight	Essential newborn care		
		Breastfeeding within one hour	Chlorhexidine applied to cord	Immediate skin-to-skin
Afghanistan	◆ ⊙			
Bangladesh	◆ ⊙	◆ □	◆ □	◆ □
DRC	⊙	⊙		
Ethiopia	◆ ⊙	◆		
Ghana		□		
Haiti	◆	◆ □		◆ □
India	◆ ⊙	◆ □ ⊙		
Indonesia	◆ ⊙			
Kenya	◆	◆ □		
Liberia				
Madagascar		◆ □	◆ □	
Malawi	◆	◆		
Mali	◆ ⊙	□ ⊙		
Mozambique	◆ ⊙	◆ □		◆ □
Myanmar	◆			
Nepal	◆ ⊙		◆	
Nigeria				
Pakistan	◆			
Rwanda	◆ ⊙	◆ □ ⊙		⊙
Senegal	◆	◆		
South Sudan	◆			
Tanzania	◆ ⊙	◆ □		
Uganda	◆ ⊙	◆ □ ⊙		◆
Zambia	◆	◆ □		

◆ L&D and/or pre-discharge PNC Register □ Summary Form ⊙ Partograph

Table 29. Newborn complications

	Preterm	LBW	Birthweight category		Asphyxia		Congenital abnormality	Sepsis	Tetanus	Other	Open-ended
			<2000g	<2500g	Diagnosed	Resuscitation					
Afghanistan						⊙	◆ □ ⊙				
Bangladesh	◆ □					◆ □					
DRC	◆ □	◆ □		◆ □	◆ □	◆ □	◆ □	◆ □		◆ □	
Ethiopia	◆ ⊙			◆	◆	◆	◆	□		□	
Ghana		◆		□	□		□	□		□	
Haiti		□	□	□							
India				□			◆				◆
Indonesia				□							◆
Kenya	◆	◆		□			◆				
Liberia				◆ □							
Madagascar		◆ □		◆ □			◆ □			◆ □	
Malawi	◆ □			◆ □	◆ □	◆		◆ □		◆ □	□
Mali	◆			□ ⊙		□ ⊙					
Mozambique	◆ □	◆ □		◆ □	◆ □ ⊙	◆ □ ⊙	◆ □	◆ □		◆	
Myanmar											
Nepal					◆	⊙	◆ ⊙				
Nigeria			◆ □	◆ □							
Pakistan		□		◆ □							◆
Rwanda	◆ □	◆ □		◆ □	◆ □ ⊙	◆ □ ⊙	□ ⊙				

	Preterm	LBW	Birthweight category		Asphyxia		Congenital abnormality	Sepsis	Tetanus	Other	Open-ended
			<2000g	<2500g	Diagnosed	Resuscitation					
Senegal						◆					
South Sudan	◆	◆	☐	☐			◆				
Tanzania		☐	☐	☐		◆ ☐ ⊙	◆				⊙
Uganda	⊙			☐	◆ ☐	◆	⊙				◆ ☐
Zambia	☐			☐	☐			☐	☐		

◆ L&D and/or pre-discharge PNC Register ☐ Summary Form ⊙ Partograph

Table 30. Routine newborn care

	BCG	Breastfeeding status	Chlorhexidine applied to cord	Routine Checks			
				Breathing	Feeding (by observation)	Temperature	Umbilical Cord
Afghanistan							
Bangladesh							
DRC	◆	◆					
Ethiopia	◆	◆					
Ghana	◆			◆		◆	◆
Haiti							
India							
Indonesia							
Kenya							
Liberia	◆	◆			◆		
Madagascar							
Malawi	◆ □	◆ □	◆ □	◆	◆	◆	◆
Mali		◆					
Mozambique		◆ □					
Myanmar							
Nepal			◆				
Nigeria							
Pakistan							
Rwanda						◆	
Senegal	◆					◆	◆
South Sudan							
Tanzania	◆ □	◆ □			◆ □	◆	
Uganda	◆ □	◆ □					
Zambia				◆		◆	◆

◆ Register □ Summary Form

Table 31. Newborn complications in postnatal care register

	Cord Infections	Diarrhea	Jaundice	Sepsis	Other	Open-ended column
Afghanistan						
Bangladesh						◆
DRC						◆
Ethiopia				◆	◆	
Ghana						
Haiti						
India						◆
Indonesia						
Kenya						
Liberia						◆
Madagascar						
Malawi		◆				
Mali						
Mozambique						
Myanmar						
Nepal						
Nigeria			◆	◆		
Pakistan						
Rwanda		◆				◆
Senegal						◆
Tanzania						
Uganda						◆
Zambia	◆					

◆ PNC Register

Table 32. Referral and treatment of newborn complications

	Complication - referred			Complication - treated			
	Specific complication (listed)	Open-ended column	Open-ended column	Other	Sepsis	Antibiotic given	KMC follow-up provided
Afghanistan							
Bangladesh			◆				
DRC			◆			□	
Ethiopia		□					◆
Ghana		◆					
Haiti	Diarrhea ◆, LBW □						◆
India		□					
Indonesia		◆					
Kenya							
Liberia		□	◆				
Madagascar							
Malawi	KMC ◆		◆ □		◆ □		
Mali							
Mozambique		◆	◆				
Myanmar							
Nepal		◆					
Nigeria	KMC ◆ □						◆
Pakistan							

	Complication - referred			Complication - treated			
	Specific complication (listed)	**Open-ended column**	**Open-ended column**	**Other**	**Sepsis**	**Antibiotic given**	**KMC follow-up provided**
Rwanda	KMC ◆ ☐	◆ ☐					☐
Senegal				◆			
South Sudan							
Tanzania	Newborn Sepsis/ Meningitis/Tetanus ◆ ☐						◆ ☐
Uganda		☐	◆				
Zambia							

◆ Register ☐ Summary Form

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