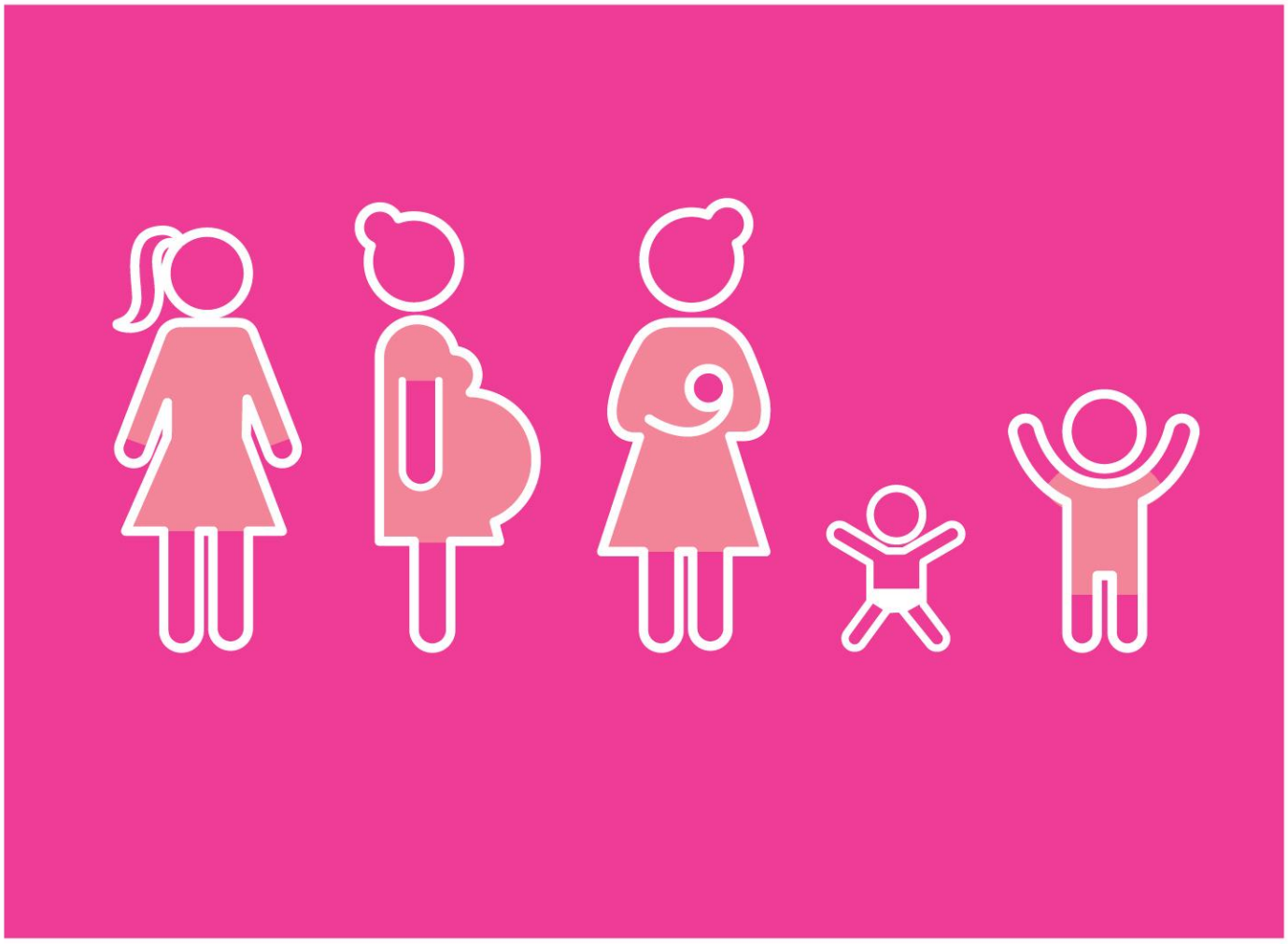

ANALYSIS AND USE OF HEALTH FACILITY DATA

Guidance for RMNCAH programme managers

WORKING DOCUMENT, OCTOBER 2019

unicef
for every child

World Health Organization

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MODULE 7
Guidance for RMNCAH programme managers

LEARNING OBJECTIVES

This module describes a core set of indicators for Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH) that can be captured through routine health management information systems (HMIS). It includes possible analyses and visualizations of the indicators, references on how to assess the quality of the data, and considerations for using the data for decision-making. By the end of this module, participants will be able to:

- Describe the core set of HMIS indicators for routine monitoring of RMNCAH programmes;
- Conduct basic analyses and data visualizations of these indicators to help monitor RMNCAH programmes;
- Interpret the indicator values and their implications for RMNCAH programme management.

AUDIENCE

This module is relevant for a range of stakeholders including:

- Ministry of Health staff working on reproductive, maternal, newborn, child and adolescent health programme(s), monitoring and evaluation activities, and the Health Management Information System at national and sub-national levels;
- Staff of partner organizations involved with supporting RMNCAH programme(s), monitoring and evaluation, and/or health system strengthening;
- Consultants and staff working at research institutes involved with the analysis of RMNCAH data and/or efforts to improve the quality of routine RMNCAH data.

SUGGESTED ADDITIONAL REFERENCES

- Indicator and Monitoring Framework for the Global Strategy for Women's, Children's and Adolescents' Health. Every Woman Every Child. Geneva; 2016. https://www.who.int/life-course/partners/global-strategy/en/
- Visualizing and Using Routine Reproductive, Maternal, Neonatal, and Child Health Data at Health Facilities: A Resource Package for Health Providers and District Managers. Maternal and Child Survival Program; Washington, D.C.; 2018. https://www.mcsprogram.org/resource/visualizing-and-using-routine-rmnch-data-at-health-facilities-a-resource-package-for-health-providers-and-district-managers/
- Data Quality Review: A toolkit for facility data quality assessment. World Health Organization. Geneva; 2017. http://apps.who.int/iris/handle/10665/259224

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Note on the document

This document will be reviewed and updated periodically to ensure that it remains aligned with the most recent guidelines and evidence. Feedback to the document will contribute to its evolution and improvement over time.

1. About the data

Health service delivery for reproductive, maternal, newborn, child and adolescent health (RMNCAH) follows a continuum of care which spans from pre-pregnancy, pregnancy and birth to the immediate postnatal period for women and newborns through to childhood and adolescence. The continuum of care approach recognizes that providing preventive, promotive and treatment interventions throughout the life course is the most effective way to reduce mortality and improve health outcomes for women, newborns, children and adolescents. Within the scope of the continuum of care are interventions for normal and complicated pregnancies, and for well and sick children and adolescents.

Figure 1. Continuum of care for RMNCAH

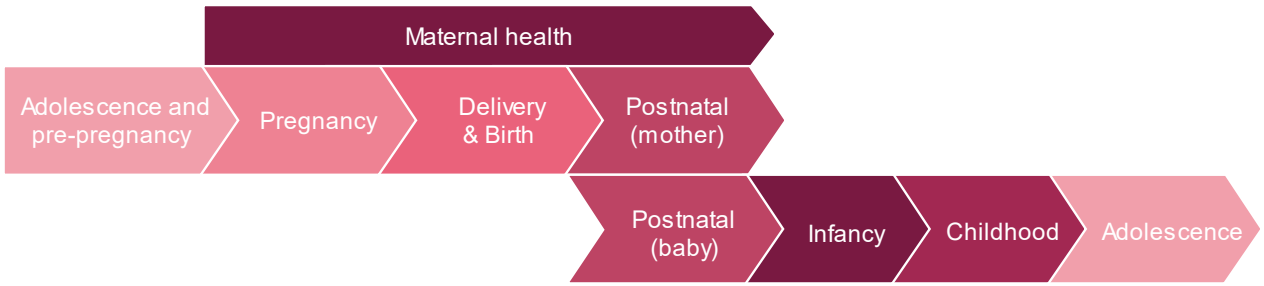

Figure 1 adapted from: Opportunities for Africa's Newborns: Practical data, policy and programmatic support for newborn care in Africa. The Partnership for Maternal, Newborn and Child Health. (http://www.who.int/pmnch/media/publications/oanfullreport.pdf)

In September 2015, the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030)[1] (GS) was launched to stimulate action and accountability. It includes a list of 'Survive, Thrive, and Transform' targets and a core set of indicators to track progress towards them. These indicators align with indicators included in the Sustainable Development Goal Framework (SDG).[2]

The Indicator and Monitoring Framework for the Global Strategy[3] recognizes routine health facility data as an important source of information on the readiness of a facility to provide key RMNCAH services (e.g., the 'inputs' such as availability of essential drugs, equipment and staff), utilization of services, and proxy measures for quality of care. However, in many settings, availability and quality of facility-based data still needs considerable improvement.

An advantage of using routine data is that they are continuously available for programme monitoring and provide more granular level of information to better understand the performance of health programmes. However, there are limitations to routine and health facility data, including representativeness and quality concerns. For example, health facility data capture information on individuals that seek care at the facility, not necessarily everyone who need specific services and are, therefore, generally not representative of the population. Also, not all data captured in health facilities are recorded in the health management information system. Other health service data, such as human resources or commodity stock levels, may be reported in a system with limited interoperability with the HMIS. Improving interoperability of different systems is an important goal that countries and their partners should consider. As data from health facilities are reported up through the health information system, they are further aggregated at each step which results in considerable loss of details that are important for understanding health system performance and equity considerations.

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[1] *Every Woman Every Child. Global strategy for women's, children's and adolescents' health 2016–2030. New York: Every Woman Every Child, 2015.*
[2] *UN. Sustainable development goals. New York: United Nations Department of Economic and Social Affairs, 2015. https://sustainabledevelopment.un.org/index.html.*
[3] *Every Woman Every Child. Indicator and monitoring framework for the global strategy for women's, children's and adolescents' health (2016–2030). New York: Every Woman Every Child, 2016.*

Data collected through surveys, such as behavior, knowledge and attitudes, and socioeconomic variables are not typically integrated into the HMIS. Integration of survey and routine data could provide additional benefits vis-à-vis data use, analysis, coverage validation, denominator estimation, and more. Similarly, there is growing interest in collecting community level data and integrating these data into the formal HMIS. Such efforts would help provide a more comprehensive assessment of the performance of the health system at all levels.

Programme managers must be aware of these advantages and disadvantages when using health facility data to guide programming or adapting/changing action plans during implementation.

USE OF FACILITY DATA

Each country has a unique process and system for collecting data from health facilities and reporting on health service delivery indicators. Information can either be recorded in paper-based registers or Electronic Medical Records (EMR) systems. Data are collected, collated, and reported at all levels of the health system, starting with the community and lowest level facilities, then aggregated at the next geographic or administrative unit of the country, and then eventually aggregated up to the national level further for the purpose of annual reviews.

Figure 2 presents an example of how data can be used for decision-making at each level. For example, at district level, district and health facility managers can review data on a routine basis, while at national level, these data may be reviewed on an annual basis.

Figure 2. Frequency of data sources and levels of data use

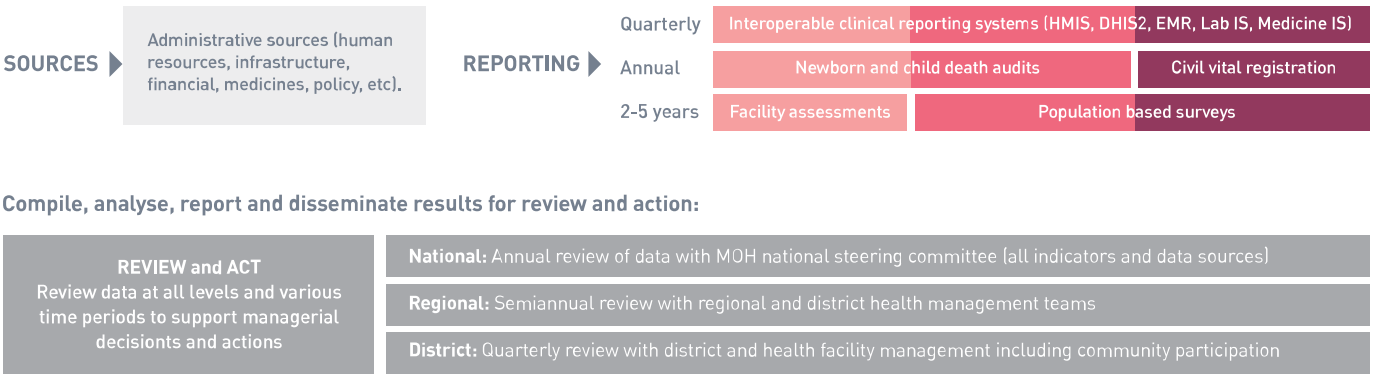


Figure 2 from: Diaz Theresa, Rasanathan Kumanan, Meribole Emmanuel, Maina Isabella, Nsona Humphreys, Aung Kyaw Myint et al. Framework and strategy for integrated monitoring and evaluation of child health programmes for responsive programming, accountability, and impact. BMJ. 2018;362:k2785.

GUIDING PRINCIPLES OF THIS DOCUMENT

- **Aggregated facility-based indicators**: This document focuses on aggregate data rather than individual patient-based longitudinal data.
- **Facility-based denominators:** Since this document focuses on information collected from health facilities, denominators in the core set of indicators are based on data collected from the facilities and will not be representative of the population. Population-based indicators are collected via nationally representative household surveys, where the denominator is based on a representative sample of the total population. Relevant RMNCAH population-based indicators are included in this document for consideration and may be used in conjunction with the recommended core facility indicators.
- **Indicators are evidence-based:** All indicators in the core set are adapted from evidence-based guidelines and recommendations.
- **Indicators are relevant across all levels of the health system:** Core indicators are relevant for all levels of the health system, from the lowest level health facility, to sub-national levels (2nd administrative level), national, and global level.

- **Applicable to women, children, and adolescents seeking care in health facilities:** Indicators in the core list are applicable to women, children and adolescents who seek care at a health facility. Indicators for those with specific needs or conditions for which they would be referred to higher level facilities (e.g. maternal complications, low birth weight babies, newborns in need of resuscitation or kangaroo mother care) are included as additional indicators in Annex 1.

- **Disaggregations of indicators are recommended:** Within the list of indicators are recommended disaggregations (e.g. age, treatment type, etc.), which may not be feasible for all settings depending on whether data collection tools, registers and social/political context allow for indicators to be reported or calculated this way. If it is not currently possible to disaggregate the indicators this way, please consider these recommendations as something to work towards in future updates of data collection tools.

STANDARD DEFINITIONS OF TERMS USED IN THIS DOCUMENT

Antenatal client 1st visit - First antenatal care contact by a pregnant woman to a health facility can be used as a proxy denominator for number of pregnant women using health-facility data when estimated number of pregnancies from the total population is not available. The timing of initiation of the first antenatal care visit is paramount for ensuring optimal care and health outcomes for women and children. The WHO antenatal care model[4] recommends that the first antenatal care visit takes place within the first trimester (i.e., gestational age of <12 weeks).

Delivery in facility – Delivery in a facility refers to childbirth that has taken place in a health facility[5]. To reduce maternal and newborn mortality, the optimal long-term objective is that all births take place in health facilities in which obstetric complications can be treated when they arise. In this document, deliveries refer to number of women who give birth in the health facility and not the number of births (live and stillbirths).

Live birth - Live birth refers to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born[6,7].

Still birth - Still birth is defined as infant born with no signs of life, weighing more than 1,000 g and older than 28 weeks gestation. An antepartum foetal death (stillbirth – macerated) refers to a foetus that has suffered an intrauterine death after the 28th week of gestation and before labour. An intrapartum foetal death (stillbirth - fresh), refers to a baby that has died after the onset of labour and before birth. Fresh stillbirths do not show any signs of maceration. Maceration describes the degenerative changes that occur in stillbirths retained in the utero after death, and the earliest signs are in the form of discolouration and peeling of the skin, leaving regions of raw tissue[7,8].

Health facility – Health facility refers to any facility at which health services are provided, including but not limited to: clinics, hospitals and other health service points (public/private/community-based).

[4] *World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: WHO, 2016.*
[5] *World Health Organization. WHO recommendations on intrapartum care for a positive childbirth experience. Geneva: WHO, 2018.*
[6] *World Health Organization. https://www.who.int/healthinfo/statistics/indmaternalmortality/en/*
[7] *World Health Organization. https://www.who.int/classifications/icd/ICD10Volume2_en_2010.pdf*
[8] *World Health Organization. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths. Geneva: WHO, 2016.*

2. Data quality

There are many issues that affect data quality ranging from using the appropriate tools for collecting and reporting on data, having adequately trained staff for data entry, and the ability of the person handling the data to understand and interpret it. As for all data sources, in addition to establishing systems and protocols to enhance good data collection and reporting for health facility data as described in this document, any analysis must consider whether the results are affected by data quality issues.

Five domains for periodic assessment of data quality are recommended for all core indicators: 1) Completeness, 2) Timeliness, 3) Internal consistency, 4) External consistency with other data sources, and 5) External comparison with population data. Except for annual comparisons with external sources of data, quality assessments of the HMIS data can be examined monthly when collated and reviewed before transmission to higher levels, as well as annually.

Domain	Data quality metric	Frequency
Completeness and timeliness	Completeness and timeliness of reporting (reporting form/data set completeness)	Monthly, annually
	Completeness of indicator data (data element completeness)	Monthly, annually
Internal consistency	Presence of outliers	Monthly, annually
	Consistency over time, i.e. plausibility of reported values compared to previous reporting	Monthly, annually
	Consistency between indicators, i.e. negative dropout rates	Annually
	Consistency between denominators i.e. pregnancies, live births, infants, etc.	Annually, or as needed
External consistency with other data sources	Consistency between routinely reported data and population-based surveys	Annually
External comparison of population data	Consistency between the population data used for calculating immunisation coverages and other sources of population estimates	Annually

WHO has developed a toolkit to support both a desk review and field investigations of data quality. This toolkit includes an Excel-based tool which, when populated with key data from health facilities and other sources, analyses the completeness, internal consistency and external consistency of the data. For countries using DHIS2 software to manage their routine data, WHO has also developed the Data Quality Review toolkit, an application which can be installed on the national DHIS2 system that automatically generates findings from a data desk review at either national or sub-national level.

3. Core facility indicators

Below is the core set of RMNCAH indicators that are recommended for collection, aggregation, and reporting for routine health information systems (N=numerator and D= denominator). All indicators shaded in light pink have more detailed descriptions in the Facility Analysis and Use Toolkits for other programme areas. This core set of indicators were selected based on the guiding principles of this document (described above) as well as from consultations with various expert groups. Information on time intervals for data collection for each indicator are not included because this will vary by country. This core indicator list will be updated as evidence changes and develops.

Core indicators	Definition	Computation (e.g. numerator/denominator, number)	Disaggregation
Sexual and reproductive health			
Contraception first time user	Clients who accept for the first time in his/her life contraceptive method	Number of clients who accept a family planning method for the 1st time	• Age (10-14, 15-19, 20+) • Sex • Unit of contraceptive method
Postpartum family planning acceptor	Percentage of postpartum women delivering in facility initiating a contraceptive method before discharge *"Initiated"* refers to women who either leave with an FP method or intend to begin a method that day (e.g. fertility awareness method). It combines both those women who "leave with" a method and those who "accept" a method prior to discharge or leaving the facility.	N: Number of postpartum women who delivered in facility initiating contraceptive method before discharge D: Number of deliveries in facility	• Age (10-14, 15-19, 20+)
Maternal health			
Antenatal client 1st visit before 12 weeks gestation	Percentage of antenatal clients with 1st visit before 12 weeks	N: Number of antenatal clients 1st visit before 12 weeks D: Number of antenatal clients 1st visit	• Age (10-14, 15-19, 20+)
Antenatal client syphilis screening	Percentage of antenatal clients screened for syphilis	N: Number of antenatal clients screened for syphilis D: Number of antenatal clients 1st visit	
Antenatal client haemoglobin measured	Percentage of antenatal clients with haemoglobin level measured	N: Number of antenatal clients with haemoglobin level measured D: Number of antenatal clients 1st visit	
Antenatal client blood pressure measurement	Percentage of antenatal clients with blood pressure measured	N: Number of antenatal clients with blood pressure measured D: Number of antenatal clients 1st visit	
Prevention of mother-to-child transmission (PMTCT) - testing coverage rate	See *Analysis and use of health facility data - Guidance for HIV programme managers* for more details on PMTCT; numerator and denominator taken from this document.	N: Number of pregnant women attending ANC and/or who had a facility-based delivery who were tested for HIV during pregnancy or already knew they were HIV-positive D: Number of ANC attendees or number of facility-based deliveries	
Intermittent preventive therapy for malaria during pregnancy (IPTp)	See *Analysis and use of health facility data - Guidance for malaria programme managers* for more details on coverage of IPTp; numerator and denominator taken from this document.	N: Number of pregnant women given at least three doses of sulfadoxine/purimethamine for IPT D: Number of antenatal clients 1st visit	
Iron supplementation for pregnant women	See *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers*[†] for more details.	*Nutrition guidance document and indicator definitions under development*	
Caesarean section	Percentage of deliveries in health facilities by caesarean section	N: Number of caesarean sections in a facility D: Number of deliveries in facility	• Age (10-14,15-19, 20+) • Facility type
Uterotonic for prevention of post-partum haemorrhage	Percentage of women who gave birth in a facility who received a prophylactic uterotonic (e.g. Oxytocin) immediately after birth for prevention of postpartum hemorrhage *«Immediately»* ideally refers to within one minute	N: Number of women who gave birth in a facility who received a prophylactic uterotonic immediately after birth D: Number of deliveries in facility	

Core indicators	Definition	Computation (e.g. numerator/denominator, number)	Disaggregation
Postnatal			
Notification for birth registration	See *Collection, analysis and use of health facility and community data: Guidance for health programme managers on vital events data** for more details on notification for birth registration. Note: In many countries the health system has the mandate to notify births to the civil registry or to provide documentation to parents for registration.	N: Number of babies/ children for whom notifications are issued for birth registration within specified number of days after birth D: Number of live births in facility Note: The specified number of days after birth should be aligned with national policy/guidelines.	• Sex
Babies with documented birthweight	Percentage of babies born in a facility with documented birthweight before discharge	N: Number of babies born in a facility with documented birthweight before discharge D: Number of live births in facility	
Low-birth weight	See *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers*[†] for more details on low-birth weight	*Nutrition guidance document and indicator definitions under development*	
Newborns breastfed within one hour of birth	See *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers*[†] for more details on immediate breastfeeding	*Nutrition guidance document and indicator definitions under development*	
Postnatal care for women	Percentage of women with postnatal care (PNC) Note: The numerator includes both women who gave birth in the health facility and those who gave birth outside the health facility	N: Number of women with postnatal care D: Number of deliveries in facility	• Timing of PNC in accordance with national policy
Postnatal care for newborns	Percentage of newborns with postnatal care (PNC) Note: The numerator includes both newborns who were born in the health facility and those who were born outside the health facility	N: Number of newborns with postnatal care D: Number of live births in facility	• Timing of PNC in accordance with national policy
Note on timing of postnatal care for women and newborns[9] If birth is in a health facility, women and newborns should receive postnatal care in the facility for at least 24 hours after birth. If birth is at home, the first postnatal contact should be as early as possible within 24 hours of birth. At least three additional postnatal contacts are recommended for all mothers and newborns, on day 3 (48–72 hours), between days 7–14 after birth, and six weeks after birth.			
Childhood			
Pneumonia diagnosis	Percentage of children with acute respiratory illness (ARI) diagnosed as pneumonia	N: Number of cases of children diagnosed with pneumonia D: Number of children presenting with symptoms of ARI	• Age (0-4, 5-9)
Amoxicillin treatment for pneumonia	Percentage of children with pneumonia treated with amoxicillin	N: Number of children with pneumonia who received amoxicillin D: Number of children with pneumonia	• Age (0-4, 5-9) • Treatment type (dispersed tablet, oral syrup)
Diarrhoea treatment	Percentage of children with diarrhoea treated	N: Number of children who received treatment for diarrhoea D: Number of children with diarrhoea	• Age (0-4, 5-9) • Treatment type (ORS and Zinc/ORS/ Zinc)
Malaria treatment with ACT	See *Analysis and use of health facility data - Guidance for malaria programme managers* for more details on malaria testing and treatment; numerator and denominator taken from this document.	N: Number of malaria cases among children treated with ACT D: Number of malaria cases among children diagnosed	• Age (0-4, 5-9)
Vitamin A coverage	See *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers*[†] for more details on Vitamin A coverage.	*Nutrition guidance document and indicator definitions under development*	

[9] *World Health Organization.* ***WHO recommendations on Postnatal care of the mother and newborn****. Geneva: WHO, 2013.*

Core indicators	Definition	Computation (e.g. numerator/denominator, number)	Disaggregation
Tuberculosis notification	See *Analysis and use of health facility data - Guidance for tuberculosis programme managers* for more details on TB indicators.	Number of tuberculosis cases among children notified in a specified time period, usually one year	• Age (0-4, 5-9) • Treatment history (new and relapse (incident cases) or previously treated, excluding relapse)
Malnutrition	See *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers*[†] for more details on childhood malnutrition.	*Nutrition guidance document and indicator definitions under development*	
Mortality			
Maternal deaths in health facility	Number of women who die in the health facility either while pregnant or within the first 42 days of the end of pregnancy Note: This can include women who gave birth outside a facility but who died in the health facility.	Number of maternal deaths in facility	• By cause of death (Classified by ICD-MM) • Age (10-14, 15-19, 20+) • Facility type
Neonatal deaths in health facility	Number of newborns who die in the health facility in the first 28 days Note: This includes any neonatal death in a facility that occurred in the first 28 days – pre-discharge after birth or upon re-admission for an illness.	Number of neonatal deaths in facility	• By cause of death (Classified by ICD-PM) • Facility type
Child deaths in health facility	Number of children who die in the health facility Note: This includes deaths that occur between the ages of 1 month up to 9 years of age.	Number of child deaths in facility	• By cause of death (Classified by ICD10 or ICD11 in accordance with what is used in the country) • Age (1 month to 59 months, 5-9 years) • Facility type
Adolescent deaths in health facility	Number of adolescents who die in the health facility Note: This includes deaths that occur between the ages of 10 to 19 years of age	Number of adolescent deaths in facility	• By cause of death (Classified by ICD10 or ICD11 in accordance with what is used in the country) • Age (10-14, 15-19) • Sex • Facility type
Stillbirths in health facility	Stillbirth as a percentage of all births in health facilities (Baby born with no sign of life and weighing at least 1000g or after 28 weeks gestation)	N: Number of stillbirths in facility D: Number of live births and stillbirths in facility	• Fresh, macerated • Facility type
Maternal deaths reviewed	Percentage of maternal deaths reviewed	N: Number of maternal deaths in facility that were reviewed D: Number of maternal deaths in facility	• Facility type
Perinatal deaths reviewed	Percentage of perinatal deaths reviewed Note: Perinatal deaths include stillbirths and newborn deaths up to 7 days after birth	N: Number of perinatal deaths in facility that were reviewed D: Number of perinatal deaths in facility	• Facility type

[†] *Collection, analysis and use of health facility and community data – Guidance for nutrition programme managers will be available in 2020.*
* *Collection, analysis and use of health facility and community data – Guidance for health programme managers on vital events data will be available in 2019*

The core indicator list was developed in accordance with the Guiding Principles of this document, focusing on aggregate data and facility-based denominators. In some settings though, individual patient-based data may be available allowing for consideration of indicators which require tracking a patient over time, such as women attending multiple antenatal care visits. Additionally, some indicators can be calculated using estimated population-based denominators. Below are some additional indicators for consideration based on data availability and analytical capacity in countries.

IF INDIVIDUAL DATA ARE AVAILABLE

In some countries, individual patient-based data are available from electronic medical records or from paper-based forms. If individual level data are available, you may consider monitoring the indicators listed below.

Indicator	Definition	Computation	Disaggregation
Maternal and Newborn Health			
Antenatal care 4th visit	Percentage of antenatal clients who had a 4th ANC visit	N: Number of antenatal clients with 4th ANC visit D: Number of antenatal clients 1st visit	
Antenatal care 8th visit	Percentage of antenatal clients who had a 8th ANC visit	N: Number of antenatal clients with 8th ANC visit D: Number of antenatal clients 1st visit	
Blood pressure measurement during third trimester	Percentage of antenatal clients who had a blood pressure measurement recorded in third trimester	N: Antenatal client with blood pressure measurement in third trimester D: Number of antenatal clients 1st visit	
Antenatal client treated for syphillis	Percentage of antenatal clients treated for syphillis	N: Number of antenatal clients treated for syphilis D: Number of antenatal clients syphilis seropositive	

USING AN ESTIMATED POPULATION-BASED DENOMINATOR

In some countries, you may wish to analyse some indicators using an estimated population-based denominator. Estimated population-based denominators need to be treated with care. When using these denominators, the following considerations should be noted:

- Estimates of target denominators (or a suitable proxy indicator) are available and sufficiently accurate for their intended use;
- Reporting from facilities that serve the target denominator population needs to have very high reporting rates (e.g. above 90%) and reflect all facilities serving that population;
- The quality of the data reported must be high and consistent over time

Indicator	Definition	Computation	Disaggregation
Sexual and Reproductive Health			
Couple year protection (CYP)	The estimated protection provided by family planning (FP) services based upon the volume of all contraceptives distributed among the female population 15-49 years. *See notes and example on CYP in Table 1*	The CYP is calculated by multiplying the quantity of each method distributed by a conversion factor, to yield an estimate of the duration of contraceptive protection provided per unit of that method. The CYPs for each method are then summed over all methods to obtain a total CYP figure	• Type of method by units
Cervical cancer screening	Percentage of women of reproductive age (15 to 49 years) who were screened for cervical cancer using any of the following methods: visual Inspection with acetic acid/vinegar (VIA), pap smear, human papilloma virus (HPV) test.	N: Number of women of reproductive age who were screed for cervical cancer D: Estimated number of women of reproductive age	

Indicator	Definition	Computation	Disaggregation
Maternal and Newborn Health			
Antenatal care 4th visit	Percentage of antenatal clients who had 4 ANC visits	N: Number of antental clients with 4th ANC visit D: Estimated number of pregnant women	
Antenatal care 8th visit	Percentage of antenatal clients who had 8 ANC visits	N: Number of antental clients with 8th ANC visit D: Estimated number of pregnant women	
Tetanus vaccination in antenatal client	Percentage of antenatal clients who received at least two doses of a tetanus containing vaccine	N: Number of Tetanus containing vaccine doses (TT or Td) D: Estimated number of pregnant women	• TT or Td
Intermittent preventive therapy for malaria during pregnancy (IPTp)	See *Analysis and use of health facility data - Guidance for malaria programme managers* for more details on coverage of IPTp; numerator and denominator taken from this document.	N: Number of pregnant women given at least three doses of sulfadoxine/purimethamine for IPTp D: Estimated pregnancies in areas at risk	
Institutional delivery	Percentage of women who gave birth in a health facility	N: Number of deliveries in facility D: Estimated number of live births	
Caesarean section	Percentage of deliveries by caesarean section	N: Number of caesarean sections in facility D: Estimated number of live births	
Childhood			
Immunization coverage rate	See *Analysis and use of health facility data - Guidance for immunization programme managers* for more details on immunization coverage rates; numerator and denominator taken from this document.	N: Number of children receiving the vaccine D: Estimated number of target population	

++ *List of methods and factors to be used are available at https://www.measureevaluation.org/prh/rh_indicators/family-planning/fp/cyp*

Facility-based vs. population-based denominators

It is important to note that the classification of indicators with facility-based vs. population-based denominators represents recommended configurations for this document. However, it is acknowledged that the best configuration of these indicators, and hence matching denominators, depends on different types users and their corresponding needs. For that reason, it is suggested that to the extent possible, facility-based information systems be designed to allow certain indicators to be calculated with either facility or population-based denominators, so they can be aligned to users' needs accordingly.

For example, the antenatal care 8th visit indicator, can be calculated with either a facility or population-based denominator where, in both cases, the numerator is the number of antenatal clients receiving 8 ANC visits.

Facility-based denominator for ANC 8 visits = *Number of clients presenting for antenatal care first visit*

Here, the indicator essentially shows retention in receiving ANC from the 1st visit to the 8th visit. This can be very useful for programme managers and care providers.

Population-based denominator for ANC 8 visits = *Estimated number of pregnant women*

Here, the indicator displays a measure of the overall all coverage of eight antenatal care visits within the population. This can be very useful for programme managers and policy makers.

Table 1. Notes on couple year protection

This table gives the type of method, the factor to be used, the resulting example calculation and the final score

Method	Factor to be used	Units issued (1 month)	Result
Oral contraceptives	Divide by 15	260	17.3
Condoms (male and female)	Divide by 120	1500	12.5
Depo Provera Injectable	Divide by 4	65	16.25
Noristerat Injectable	Divide by 6	72	12
Monthly Vaginal Ring/Patch	Divide by 15	88	5.8
Vaginal Foaming Tablets	Divide by 120	750	6.25
Cyclofem Monthly Injectable	Divide by 13	95	7.3
Copper-T 380-A IUCD	Multiply by 4.6	42	193.2
3 Year Implant (e.g. Implanon)	Multiply by 2.5	38	95
4 Year Implant (e.g. Sino-Implant)	Multiply by 3.2	29	92.8
5 Year Implant (e.g. Jadelle)	Multiply by 3.8	31	117.8
Emergency Contraceptive Pills	Divide by 20	290	14.5
Sterilization (male and female) *	Multiply by 10	18	180
Sum of Units with factors used			**770.7**
Population female 15-49 years = 26,000			**35.5%**
Divided by 12 to create denominator for 1 month = 2167			
CYPR = 770.7 X 100/2167			

4. Analysis of core set of indicators

Programme managers and analysts use routine health facility data to measure intervention coverage, monitor trends over time, and assess geographic (or facility) differences for a range of standard health indicators among women, newborns, children and adolescents attending health services. This section provides an overview, with examples, of the types of analyses that can and should be used to measure changes over time in services provided as well as the causes of illness and death seen in health facilities.

SEXUAL AND REPRODUCTIVE HEALTH

Purpose

Monitoring sexual and reproductive health is important to ensure the health of a population and to achieve universal access to sexual and reproductive healthcare. The core components of sexual and reproductive health are family planning, preventing unsafe abortion and sexually transmitted infections as well as preventing harmful practices such as Female Genital Mutilation (FGM). Some of the indicators are measures of health status (outcome or impact indicators), while others are intended to capture 'processes'.

CONTRACEPTION FIRST TIME USE

With growing trends in adolescent pregnancy and variance in fertility, it is important to track the number of new contraceptive users by age and sex as well as to monitor changes over time.

Analysis

Figure 3: Examine number of new contraceptive users by age and sex for a specified period.

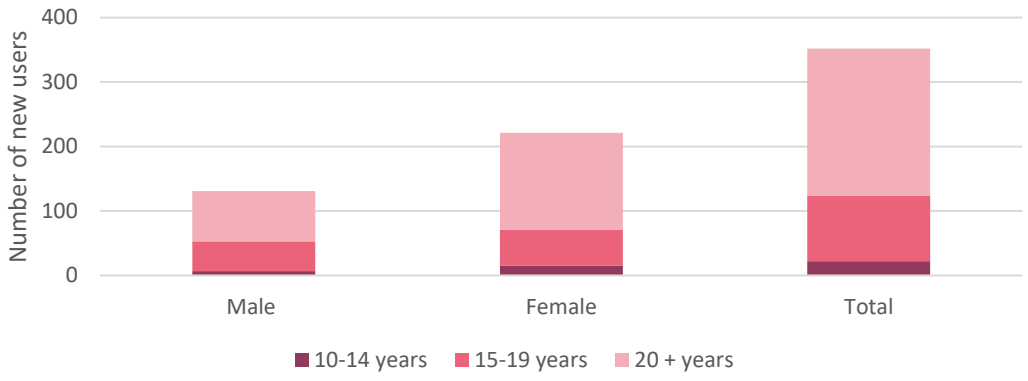
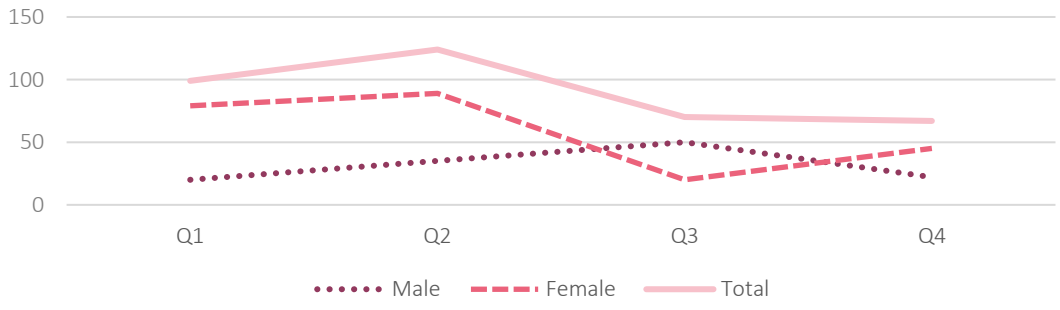


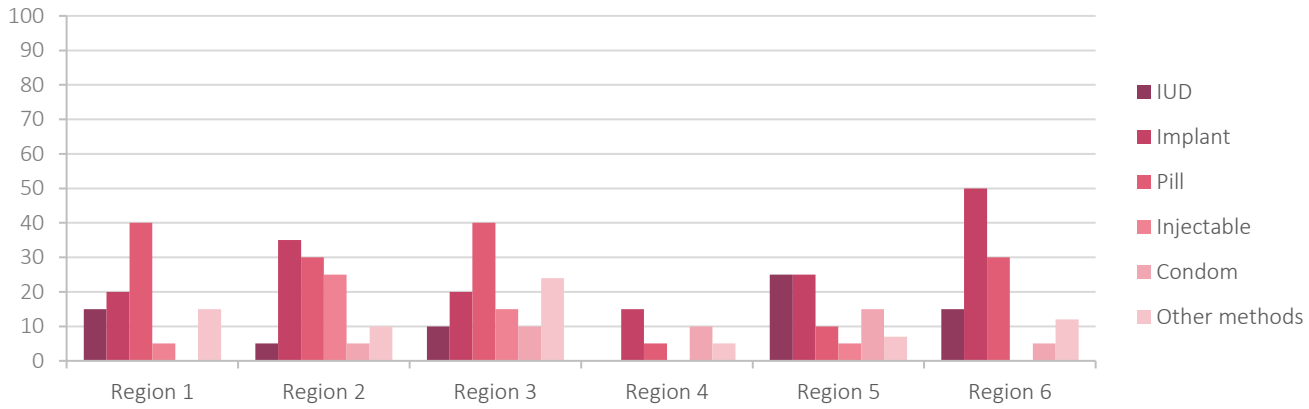
Figure 4: Examine number of new contraceptive users over time by sex.



POSTPARTUM FAMILY PLANNING

The postpartum period is a good opportunity to counsel women on family planning. This indicator assesses the proportion of women who initiated family planning prior to discharge among women who gave birth in a health facility.

Figure 5: Examine coverage of postpartum family planning by contraceptive method and by region



Considerations/issues for interpretation

Figures 3 and 4 display the number of new contraceptive users by age and sex which allows the program manager to track uptake of contraception over time and by sex and identify gaps that need to be addressed. For example, in Q3 the number of female new users decreased, and the number of male new users increased, so it would be important to discuss the reasons for this change. The change may be due to stockouts, change in personnel, change in demand due to holiday travel or other reasons, or accessing contraceptives at other locations such as schools or in private clinics.

Figure 5 displays postpartum family planning initiation by region which allows managers to identify high performing and low performing areas and to assess patterns in performance for contraceptive use. For example, some geographic areas may show high coverage of certain contraceptive methods, such as injectables or pills, while other areas have higher coverage of different methods. Geographic areas can be arranged by region or by population size to give further insight into areas which require greater support or supervision.

MATERNAL AND NEWBORN HEALTH

Purpose

Routine facility-based data on maternal and newborn health (MNH) have three principle objectives:

1. To identify geographical locations and population groups with poor MNH outcomes. This permits managers to direct resources (e.g. training, supplies, supervision, infrastructure, etc.) to populations in greatest need.
2. To assess the effectiveness of interventions and refine policies. Using a framework that links MNH interventions coverage to MNH impact (MNH morbidity and mortality), programmes can assess the effectiveness of their interventions and refine their targeting or policies to optimize impact. These assessments can also be useful tools for advocating for additional resources.
3. To review progress in reducing maternal and newborn mortality among institutional/facility-based deliveries.

SERVICE COVERAGE FOR MOTHERS AND NEWBORNS

Analysis

Figure 6. Bar chart on coverage of antenatal care interventions among pregnant women attending ANC by year (percentage)

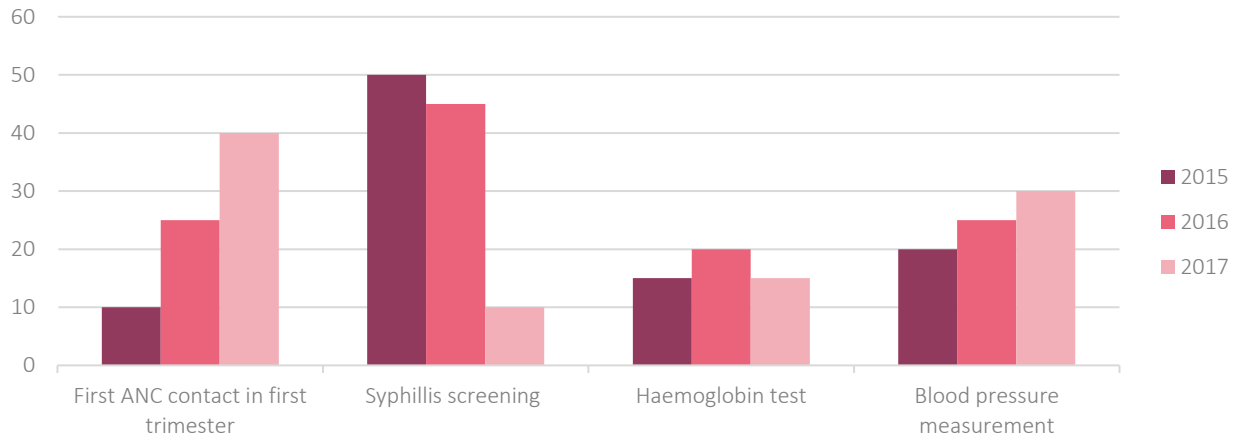


Figure 7. Bar chart on coverage of delivery and newborn care interventions by year (percentage)

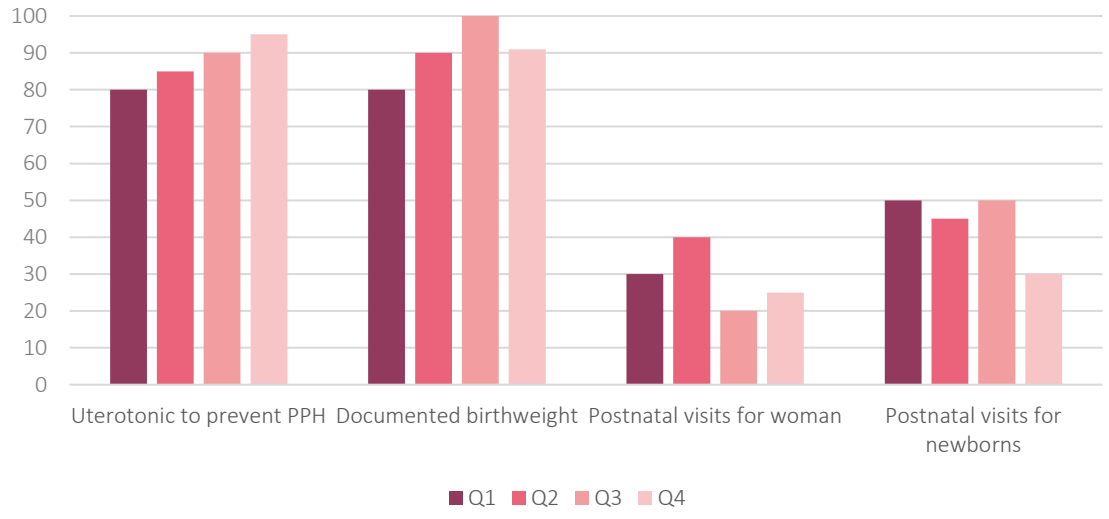


Figure 8: Line chart on coverage of first antenatal care during first trimester by age and over time (percentage)

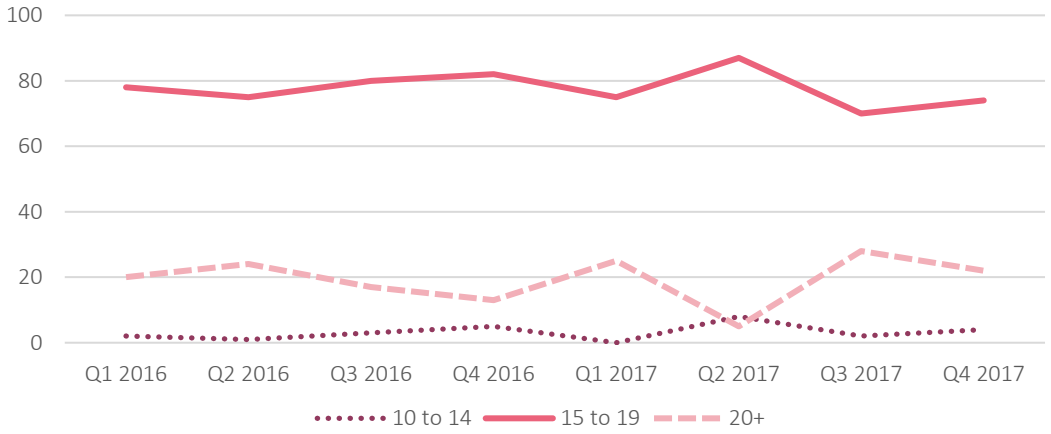
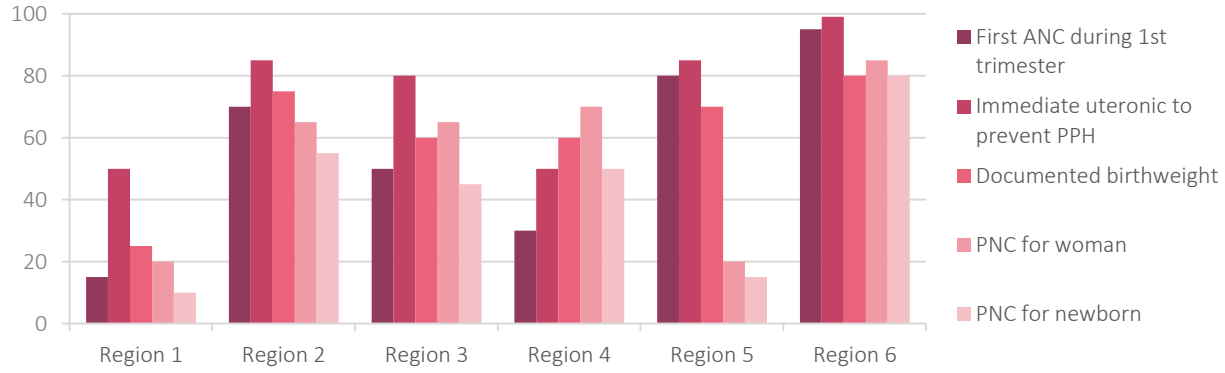


Figure 9: Bar chart showing annual coverage of key maternal and newborn interventions by region (percentage)



Considerations/issues for interpretation

The figures above demonstrate different ways to display key maternal and newborn interventions over time, by age, and in different geographic areas. Figures 6, 7 and 8 show a national overview, which can be replicated at regional, district and health facility level. At lower geographic levels, key interventions can be tracked over shorter periods of time, e.g. quarterly or monthly, rather than only annually (see Figure 8). This figure looks at the coverage of first antenatal care visit by age groups over time and demonstrates a change in Q2 2017, which will signal to managers to review the data for quality and if correct understand the reasons behind this change in the age pattern.

Figure 9 displays intervention coverage of a limited set of services, comparing performance in different geographic areas. This figure allows managers to identify high performing and low performing areas and to assess patterns across the continuum of care. For example, some areas may show strong performance in coverage of maternal health interventions but not neonatal health interventions, while other areas perform consistently in both areas. Geographic areas can be arranged by region or by population size to give further insight into areas which require greater support or supervision.

MATERNAL AND NEWBORN HEALTH OUTCOMES

Analysis

Figure 10: Pie chart showing annual percent distribution of institutional neonatal mortality by cause (percentage)

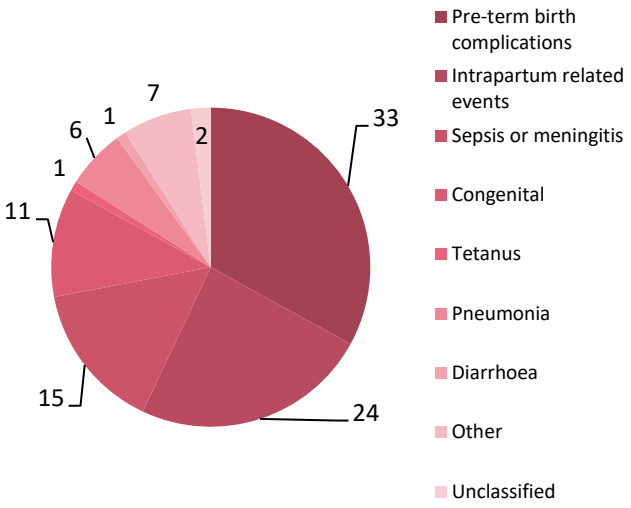


Figure 11: Bar chart showing annual numbers of stillbirth by type of stillbirth (numbers)

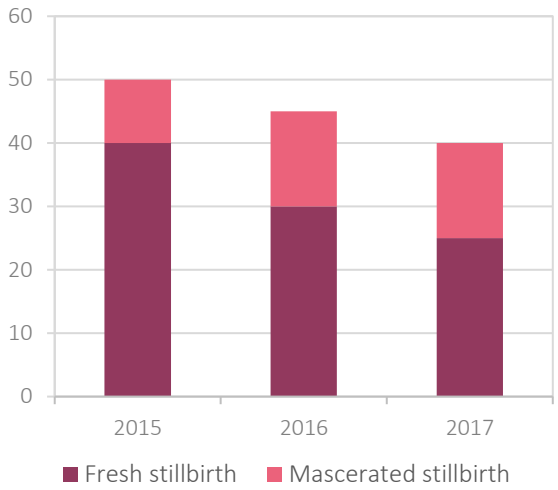


Figure 12: Table of maternal mortality and maternal/perinatal death reviews among deaths reported in HMIS, number of deaths and percentage of deaths audited.

Indicator	2015	2016	2017
Total number of maternal deaths reported in HMIS	1200	1150	1125
Total number of institutional maternal deaths	950	950	945
% of maternal deaths audited	65	70	60

Considerations/issues for interpretation

Displaying data such as in Figures 10, 11 and 12 help managers assess progress in critical outcomes of maternal and newborn health occurring in the context of an institutional delivery. Figure 10 displays the causes of neonatal death, which is essential to track over time as this information is critical for developing policies and programs. Figure 12 displays the total number of stillbirths disaggregated by fresh and macerated stillbirths, which is important to track as an outcome of quality of labour and delivery care.

Figure 12 reviews the total number of maternal deaths reported in the health facility as well as the proportion of those deaths and perinatal death that were audited. In some countries, data captured in an HMIS may include community-based deaths; therefore, the number of maternal deaths in HMIS may be higher than the total number of institutional maternal deaths. If these two numbers are not the same, then they may include reporting of non-institutional deliveries, or maternal and neonatal deaths related to non-institutional deliveries. The examples shown here provide a national overview on an annual basis, however all figures and tables can be presented at subnational level, down to the facility level for more granular assessment of performance.

Figure 12 also captures the proportion of facilities in the geographic area which conduct maternal death audits. These indicators measure the extent to which facilities attempt to identify preventable factors contributing to deaths which can be addressed by the health system. Among facilities which conduct maternal and perinatal death audits, the median and range of numbers of such deaths can be calculated. Over time, the number of deaths should decline or stabilize as a result of continuous improvements in care stimulated by these audits.

There are a wider range of indicators that can and should be used to ensure quality of care for women and newborns in health facilities, such as availability of health workers, commodities and drugs and population-based coverage of key interventions. However, these types of measures are more accurately collected via health facility surveys or population-based surveys.

SERVICE COVERAGE AND HEALTH OUTCOMES FOR CHILDREN

Purpose

To review progress towards coverage of critical interventions that will reduce the burden of disease and prevent avoidable deaths among infants, children under 5 years old and the older child aged 5 to 9 years

Analysis

The charts below allow examination of trends in and distribution of child health service coverage and outcomes for essential services and for diagnosis and treatment of the leading causes of childhood disease and death.

Figure 13. Line chart showing coverage of treatment for diarrhea among children 0-9 years of age over time, by treatment type

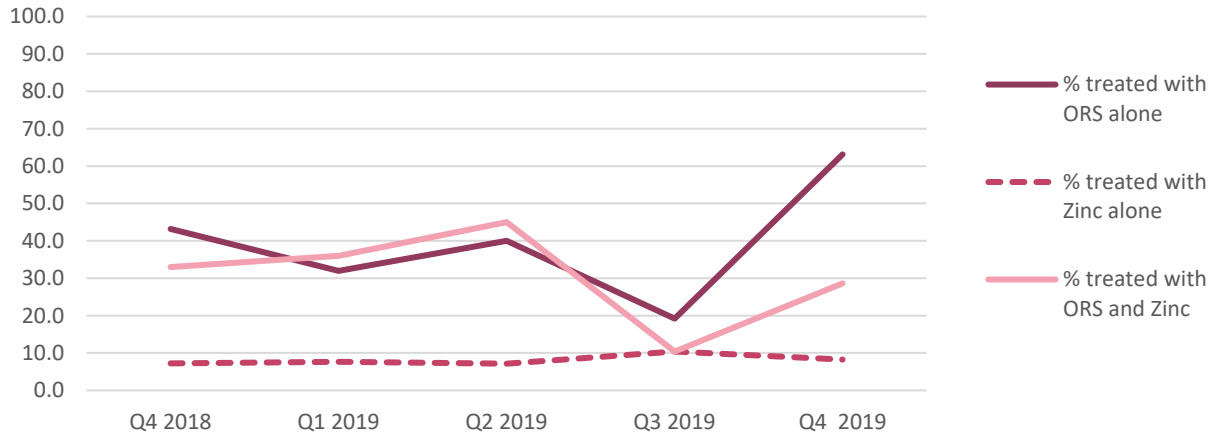


Figure 14. Number of children 0-9 years diagnosed with pneumonia, per facility and with district total during a specified period

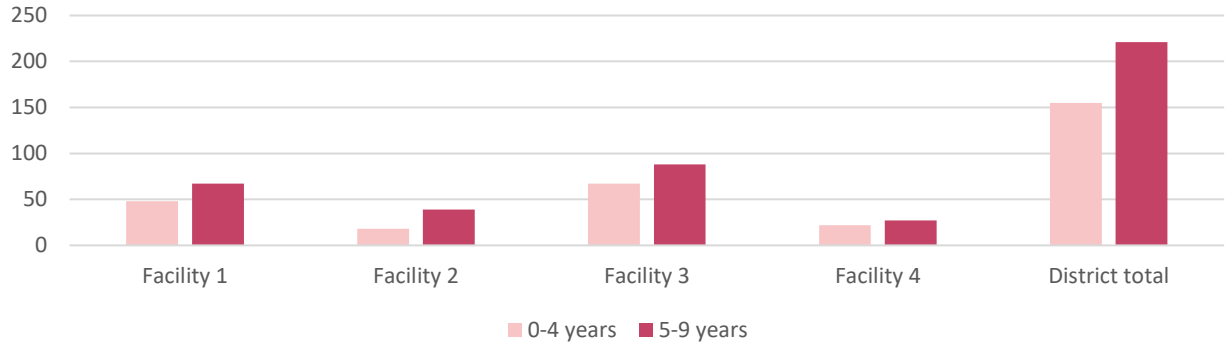


Figure 15. Percentage of children 0-9 years diagnosed with pneumonia that were treated with amoxicillin in facilities over time, by facility

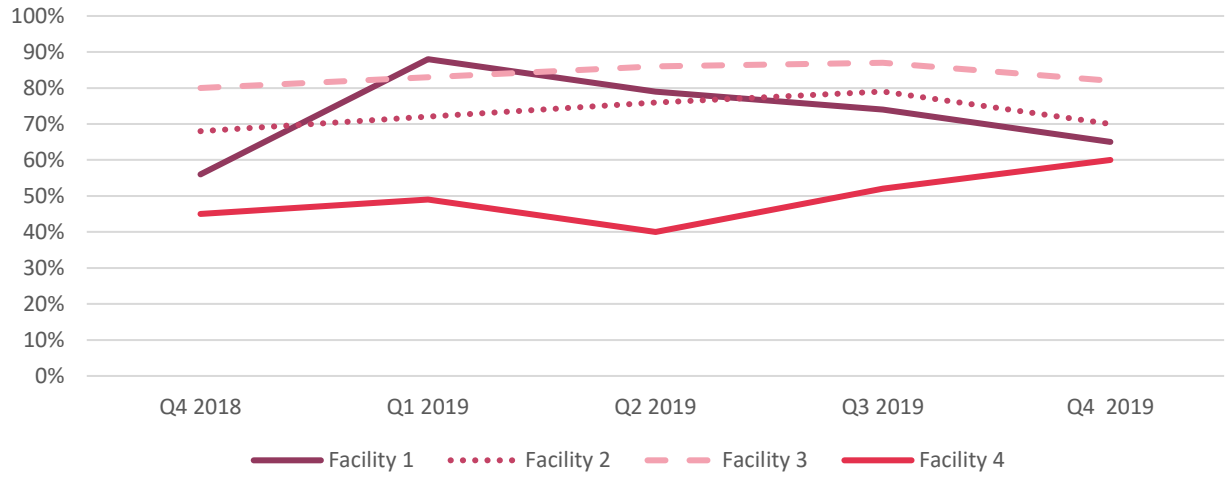


Figure 16. Distribution of deaths in children 0-4 years by cause, (% of under-5 deaths in facilities)

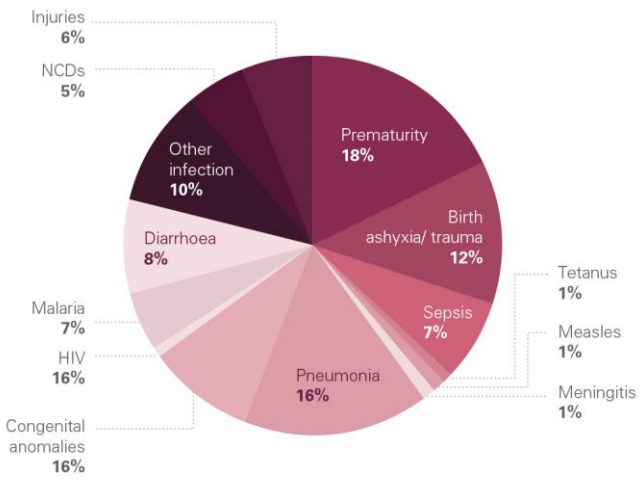
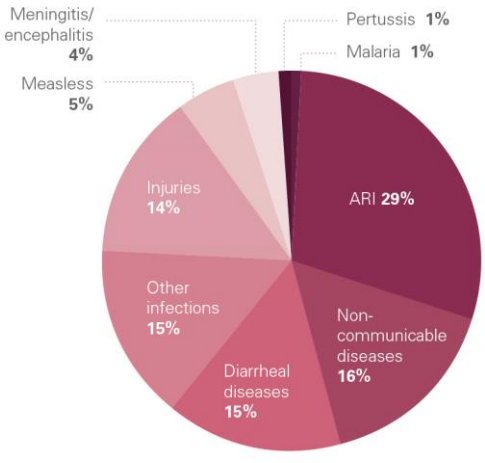


Figure 17. Distribution of deaths in children aged 5 to 9 years by cause (% of deaths 5 to 9 years in facilities)



Considerations/issues for interpretation

The core facility indicators for children in this document represent a minimum set focusing on what can be collected at the facility level and assume aggregation of data across facilities for analysis. Ideally, the indicators presented here should be disaggregated by age groups (0 to 4 years and 5 to 9 years) to identify more specific patterns in causes of illness and death in children. The selected indicators for the example analyses above focus on the age groups under-5 years and 5 to 9 years, however adolescents aged 10 to 19 years are a key demographic that should be considered where data are available by this age disaggregation.

There are a wider range of indicators that can and should be used to ensure quality of care for children and adolescents in health facilities. Many of these are most appropriately captured in health facility surveys or other population-based surveys. Examples related to the health of children include use of pulse oximetry measurements in children presenting with symptoms of acute respiratory illness (ARI) and presence of key life-saving diagnostics, medicines and medical devices with information on shelf-life and availability of these essential health products.

In Figure 13 treatment for diarrhoea among children under nine years of age is tracked over five quarters. From Q2 to Q3, there is a drop in coverage of children treated with both oral rehydration salts (ORS) and Zinc and a corresponding increase in children treated using ORS alone. This could be due to a stock out of ORS during this time period.

Figure 14 displays the number of children who were diagnosed with pneumonia in different facilities and in total for the district during a specific period of time. This chart also shows variation between the diagnosis of pneumonia among children 0 to 4 years of age and children 5 to 9 years of age. Please note that accurate diagnosis pneumonia can be challenging. Depending on what is recorded in health facilities, children presenting with ARI can be classified as:

- Chest indrawing or fast breathing pneumonia
- Severe pneumonia or very severe diseases
- Cough and cold – no pneumonia

The pneumonia diagnosis indicator as defined in the core facility indicator list above refers to chest indrawing or fast breathing pneumonia.

Figure 15 display the percentage of children under nine years of age with pneumonia who were treated with amoxicillin. Again, it is worth noting that accurate measurement of treatment for pneumonia should be handled with caution as it relies on a correct diagnosis of pneumonia.

Displaying the coverage of treatment over time in a several facilities, such as in Figure 15, allows managers to monitor any trends in treatment coverage for children diagnosed with pneumonia. If there is a large drop or increase in coverage in a short period of time, this could be due to the quality or accuracy of the data recorded or due to a stock out in Amoxicillin. This figure does not denote the type of amoxicillin (syrup or dispersible tablet), however should that information be available, it could prove helpful in understanding the cause of differences in coverage over time.

In Figures 16 and 17 the leading cause of death in children under-5 and in older children (5 to 9 years) in health facilities during a given year are summarized. These pie charts should be interpreted along with data on numbers of deaths among these age groups that occurred in the facilities.

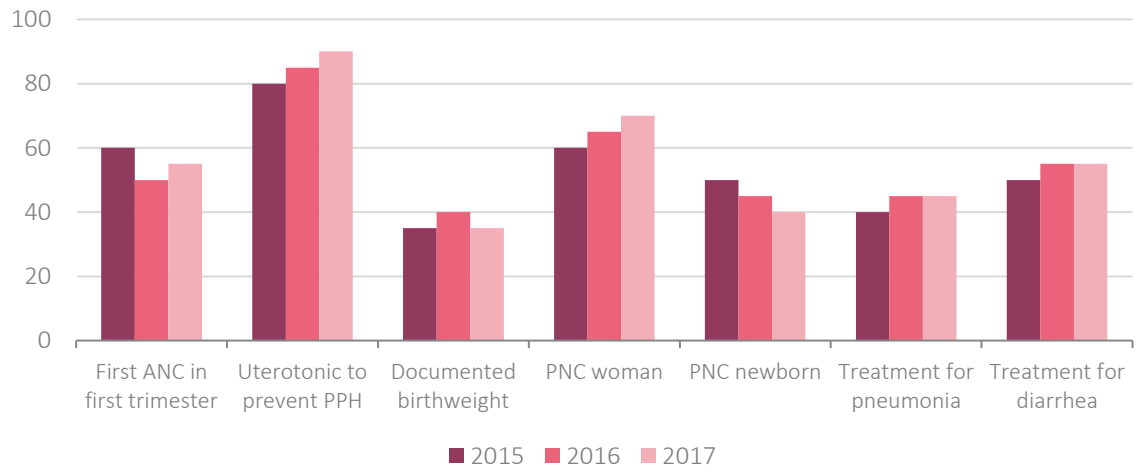
OVERALL CONTINUUM OF RMNCAH CARE

Purpose

To identify the most significant drop offs in coverage along the maternal, newborn, and child under-5 continuum of care in health facilities.

Analysis

Figure 18. Bar graph showing key interventions along the RMNCAH continuum of care by year (percentage)



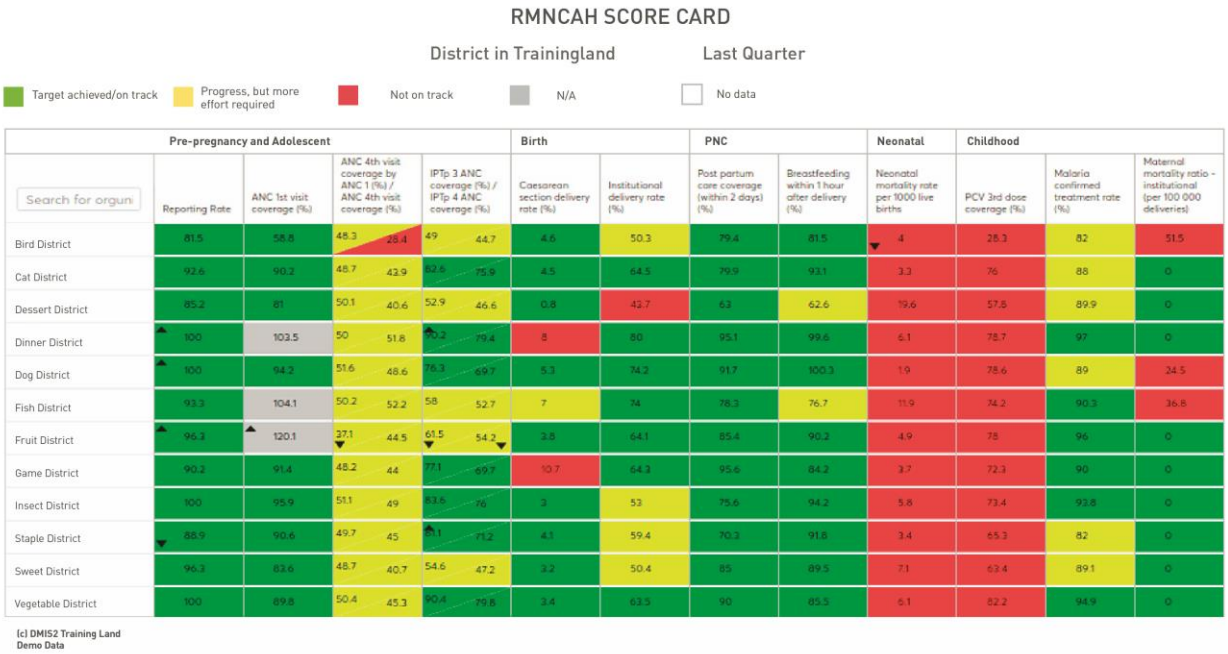
Considerations/issues for interpretation

Figure 18 displays coverage of key RMNCAH interventions. When displayed together, a snapshot of the poorest performing indicators locations can be identified. In addition to identifying interventions with low coverage that require additional resources, one can analyse interventions with strong performances from which to draw best practices that could be replicated.

Another option is to use a scorecard, such as the RMNCAH Score Card app in DHIS2 (Figure 19) to display progress on key RMNCAH indicators by sub-national level. The different colours indicate if an indicator is on track, in process, or not on track in each sub-national area, which allows for policy makers to quickly assess identify underperforming geographic areas as well as underperforming interventions in the RMNCAH continuum of care. Arrows to the left of the data values indicate progress in comparison to the previous reporting period and can help to assess whether indicator performance is improving or worsening over time

In addition to the Score Card app, there are other data use and analysis apps that are under further development. The Bottleneck Analysis app allows users to analyse the determinants of coverage (commodities, human resources, geographic access, initial utilization, continuity and quality/effective coverage) for RMNCAH interventions in order to identify bottlenecks in the supply, demand and quality of an intervention and the complementary Action Tracker app allows users to identify corrective actions for identified bottlenecks, specify next steps for addressing those bottlenecks and monitor the reduction of bottlenecks. The Bottleneck Analysis app has been developed and is available for download in the DHIS2 App Store. The Action Tracker app is undergoing testing and validation and is expected to be available by early 2020.

Figure 19. RMNCAH scorecard



RMNCAH SCORE CARD

District in Trainingland Last Quarter

Target achieved/on track | Progress, but more effort required | Not on track | N/A | No data

	Pre-pregnancy and Adolescent				Birth		PNC		Neonatal	Childhood		
Search for organi	Reporting Rate	ANC 1st visit coverage (%)	ANC 4th visit coverage by ANC 1 (%) / ANC 4th visit coverage (%)	IPTp 3 ANC coverage (%) / IPTp 4 ANC coverage (%)	Caesarean section delivery rate (%)	Institutional delivery rate (%)	Post partum care coverage (within 2 days) (%)	Breastfeeding within 1 hour after delivery (%)	Neonatal mortality rate per 1000 live births	PCV 3rd dose coverage (%)	Malaria confirmed treatment rate (%)	Maternal mortality ratio - institutional (per 100 000 deliveries)
Bird District	81.5	58.8	48.3 28.4	49 44.7	4.6	50.3	79.4	81.5	4	28.3	82	51.5
Cat District	92.6	90.2	48.7 42.9	82.6 75.9	4.5	64.5	79.9	93.1	3.3	76	88	0
Dessert District	85.2	81	50.1 40.6	52.9 46.6	0.8	42.7	63	62.6	19.6	57.8	89.9	0
Dinner District	100	103.5	50 51.8	90.2 79.4	8	80	95.1	99.6	6.1	78.7	97	0
Dog District	100	94.2	51.6 48.6	76.3 69.7	5.3	74.2	91.7	100.3	1.9	78.6	89	24.5
Fish District	93.3	104.1	50.2 52.2	58 52.7	7	74	78.3	76.7	11.9	74.2	90.3	36.8
Fruit District	96.3	120.1	37.1 44.5	61.5 54.2	3.8	64.1	85.4	90.2	4.9	78	96	0
Game District	90.2	91.4	48.2 44	77.1 69.7	10.7	64.3	95.6	84.2	3.7	72.3	90	0
Insect District	100	95.9	51.1 49	83.6 76	3	53	75.6	94.2	5.8	73.4	93.8	0
Staple District	88.9	90.6	49.7 45	81.1 71.2	4.1	59.4	70.2	91.8	3.4	65.3	82	0
Sweet District	96.3	83.6	48.7 40.7	54.6 47.2	3.2	50.4	85	89.5	7.1	62.4	89.1	0
Vegetable District	100	89.8	50.4 45.3	90.4 79.6	3.4	63.5	90	85.5	6.1	82.2	94.9	0

(c) DMIS2 Training Land Demo Data

Figure 19 from: Interactive scorecard implementation guide, Version 0.1. UNICEF, HISP UiO, HISP Uganda & HISP Tanzania.

5. Limitations of facility-based data

A key limitation to analysis of aggregate data on RMNCAH from HMIS is that the data often are representative of only the services provided through the health facility and/or individuals who seek care. This may lead to under-reported or biased coverage data. An example of this would be the absence of outcome data on births and deaths which occur in non-institutional settings. Similarly, pregnant women who do not receive any prenatal care or children who do not receive any child health services are not captured by HMIS and are more prone to poor maternal and child health outcomes.

A related limitation of health facility data is that they often collect and report only indicators for service utilization, continuity and quality, but are commonly unable to provide key information on human resources, accessibility, commodity availability, knowledge, attitudes and practices. For these reasons, periodic triangulation between analysis from HMIS sources and information from household surveys and health facility assessments can uncover which segments of the population are missing in routine analysis of HMIS data and it is also recommended to work towards an interoperable health information system, which can allow the exchange of data between otherwise disparate systems.

Several of the core analyses in this module include mortality data, which also exclude deaths which occur outside of health facilities and may not be reported to vital registration systems. Different facility types provide different levels of care, so any analysis of data in terms of service delivery or performance must be based on an understanding of the population served if a referral facility, or any changes in the population catchment area and other demographic shifts.

There are other indicators that capture important information about the health facilities and the quality of care provided to women, newborns, children and adolescents. Because these indicators capture the details of care provided, they are best used as part of health facility assessments and reviews. They can be used in conjunction with the routine data collected by the health facilities to triangulate results and provide nuanced insight into the cause of successes and failures of the health service delivery at facility level.

Annex 1. Additional indicators

The core list of indicators represents the tracer indicators recommended for RMNCAH programme monitoring. However, countries may wish to track additional indicators depending on their priority interventions and programs. Below are other relevant indicators for consideration. Please note that these indicators are for aggregate data. These additional indicators are relevant for Health Information Systems that have the capacity and desire to report on a wider range of indicators.

Additional indicators	Definition	Computation (e.g. numerator/denominator, number)	Disaggregation
Sexual and Reproductive Health			
Female genital mutilation (FGM)*	Percentage of women with females genital mutilation (FGM)	N: Number of women with FGM (reported or observed) D: Number of antenatal clients 1st visit	• Age (15-19, 20+)
Gynaecology abortion care	Percentage of women presenting for gynecological indications related to abortion	N: Number of women presenting for gynecological indications related to abortion D: Number of women presenting for gynecological indications	• Age (10-14, 15-19, 20+) • Inpatient vs Outpatient • Induced or spontaneous versus complications
Maternal and Newborn Health			
Postpartum family planning counselling	Percentage of women delivering at facility counseled on postpartum family planning prior to discharge	N: Number of postpartum women counselled on family planning prior to discharge D: Number of deliveries in facility	
Women with pre-eclampsia/ eclamspsia treated with loading dose of MgSO4	Percentage of women with severe pre-eclampsia/eclampsia who receive the initial dose of MgSO4 (loading dose) in health facility	N: Number of woman with severe pre-eclamspia/eclampsia who receive the initial dose of MgSO4 (loading dose) in facility D: Number of deliveries in facility	
Newborns on kangaroo mother care (KMC) **	Percentage of newborns initiated in KMC (or admitted to KMC unit if separate unit exists)	N: Number of newborns initiated on KMC (or admitted to KMC unit if separate unit exists) N: Number of live births in facility	• Birthweight (<2000 g, ≥2000g)
Newborns resuscitated with bag and mask **	Percentage of newborns resuscitated with bag and mask	N: Number of newborns resuscitated with bag and mask D: Number of live births in facility	
Newborns treated for neonatal infection **	Percentage of newborns treated for neonatal infection	N: Number of newborns treated for neonatal infection D: Number of live births in facility	
Pre-term birth	Percentage of births in health facility that are pre-term (less than 37 weeks gestation)	N. Number of newborns born under 37 weeks gestation D: Number of live births in facility	

*Female genital mutilation (FGM) is a traditional harmful practice that includes procedures that intentionally alter or cause injury to the female genital organs for non-medical reasons. It has no medical benefits and is associated with increased risk of adverse reproductive, maternal, neonatal, adolescent and child health outcomes, including physical and mental health complications that can occur at the time that girls are cut or in the long-term. However, women's FGM status is often not recorded in medical records nor discussed during consultations. WHO has developed evidence based clinical guidelines and clinical tools as part of a health sector response to preventing FGM and improving treatment and care. Within these documents, WHO recommends the recording of FGM as "a fundamental step towards improving the quality of health care, with the additional benefit of strengthening the capacity of monitoring FGM" (https://www.who.int/reproductivehealth/topics/fgm/management-health-complications-fgm/en/). In addition, the clinical handbook on FGM provides practical advice on why and how to record FGM status in medical records, including a job aid that shows health care providers how to indicate FGM status through drawings of female genitalia (https://www.who.int/reproductivehealth/publications/health-care-girls-women-living-with-FGM/en/).

- Chapter 2.7 "Recording FGM in the patient's medical record" pages 78-79
- Chapter 5.2.4 "Visual recording of FGM" explains how to illustrate FGM status simply in the medical record, pages 166-167
- Job aid 2 shows how to draw in medical record

** NOTE: There is ongoing work to test different denominators for treatment of newborn complications. Additional guidance on appropriate denominators will be available in the next version of this document. In the meantime, we recommend using all births as the denominator assessing against a benchmark of expected cases.

Annex 2. Additional resources

Below is a list of additional resources that were consulted in development of this module.

- Every Woman Every Child. Indicator and Monitoring Framework for the Global Strategy for Women's, Children's and Adolescents' Health. Geneva; 2016.
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