Activity Report on

"Validation of Ending Preventable Maternal Mortality (EPMM) Indicators for Improving Maternal Health Measurement Capacity"

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Key Words

Ending preventable maternal mortality, BEmONC, EmOC

TABLE OF CONTENTS

ACRONYMS

BEmONC	basic emergency obstetric and newborn care
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
EmOC	emergency obstetric care
EPMM	Ending Preventable Maternal Mortality
MDG	Millennium Development Goal
SDG	Sustainable Development Goal
WHO	World Health Organization

Background of the Ending Preventable Maternal Mortality (EPMM) Initiative:

The latest report of "Trends in Maternal Mortality: 1990-2015" notes the stark reality that, despite dedicated progress, maternal mortality was reduced by only 44% globally from 1990-2015, far short of the 75% target in the Millennium Development Goals (MDGs). As of 2015, 25 countries have a maternal M]mortality ratio of 420 per 100,000 live-births or greater. Ending preventable maternal mortality and correcting unacceptable levels of disparity are essential to achieving Sustainable Development Goal (SDG) 3, which focuses on ensuring healthy lives for all.

In 2015, World Health Organization (WHO) released "Strategies toward ending preventable maternal mortality (EPMM)" (EPMM Strategies), a direction-setting report outlining global targets and strategies for reducing maternal mortality in the 2015-2030 SDGs era. The targets and strategies, which are the result of extensive consultations with stakeholders worldwide, are grounded in research and a human rights approach to maternal and newborn health and focus on eliminating significant inequities that lead to disparities in access, quality, and outcomes of care within and between countries.

Following the launch of the EPMM Strategies report, the global EPMM working group initiated efforts to develop a comprehensive monitoring framework to track progress toward achievement of the EPMM strategic objectives and priority actions. It was determined a strong monitoring framework can aid national governments in making their strategic planning decisions and demonstrate the return on investment.

Supported by the Bill and Melinda Gates Foundation and led by the Women and Health Initiative (W&HI) at the Harvard T.H. Chan School of Public Health, on behalf of the EPMM working group, the Improving Maternal Health Measurement Capacity and Use (IMHM) project is working to advance maternal health measurement capacity through the development and validation of indicators to inform global standards and encourage the adoption and use of those indicators through targeted engagement and support to countries.

- The EPMM Strategies was a direction-setting report released in 2015 that outlines global targets and strategies for reducing maternal mortality in the SDG period.
- These strategies are unique in that they not only apply to the immediate causes of maternal death and disability but aim to address risk factors that begin long before delivery. This includes social determinants such as place of residence, socioeconomic status and family dynamics as well as institutional factors such as national resource allocation, data infrastructure and political accountability for evidence-based programming.
- The EPMM Strategies is comprised of 11 key themes: 1) empower women, girls, communities and families; 2) integrate maternal and newborn care, protect and support the mother-baby dyad; 3) prioritize country ownership, leadership, and supportive legal, regulatory and financial mechanism; 4) apply a human rights framework to ensure high quality reproductive, maternal and newborn health care is available, accessible and acceptable to all who need it; 5) improve metrics, measurement systems, and data quality; 6) prioritize adequate resources, and effective healthcare financing; 7) address inequities in access to and quality of sexual, reproductive, maternal and newborn health care; 8) ensure universal health coverage for comprehensive sexual, reproductive, maternal and newborn health care; 9) address all causes of maternal mortality, reproductive and maternal morbidities and related disabilities; 10) strengthen health systems to respond to the needs and priorities of women and girls; 11) ensure accountability to improve quality of care and equity.

- The EPMM key themes are organized into guiding principles, cross-cutting actions and strategic objectives (Table 1. EPMM Key Themes).

Table 1. EPMM principles, actions and objectives

Guiding Principles	Empower women, girls, and communities
	Integrate maternal and newborn health, protect and support the mother-baby dyad
	Ensure country ownership, leadership, and supportive legal, regulatory, and financial frameworks
	Apply a human-rights framework to ensure that high-quality reproductive, maternal, and newborn health care is available, accessible, and acceptable to all who need it
Cross-cutting Actions	Improve metrics, measurement systems, and data quality to ensure that all maternal and newborn deaths are counted
	Allocate adequate resources and effective health care financing
Five Strategic Objectives	Address inequities in access to and quality of sexual, reproductive, maternal, and newborn healthcare
	Ensure universal health coverage for comprehensive sexual, reproductive, maternal, and newborn healthcare
	Address all causes of maternal mortality, reproductive and maternal morbidities, and related disabilities
	Strengthen health systems to respond to the needs and priorities of women and girls
	Ensure accountability to improve quality of care and equity

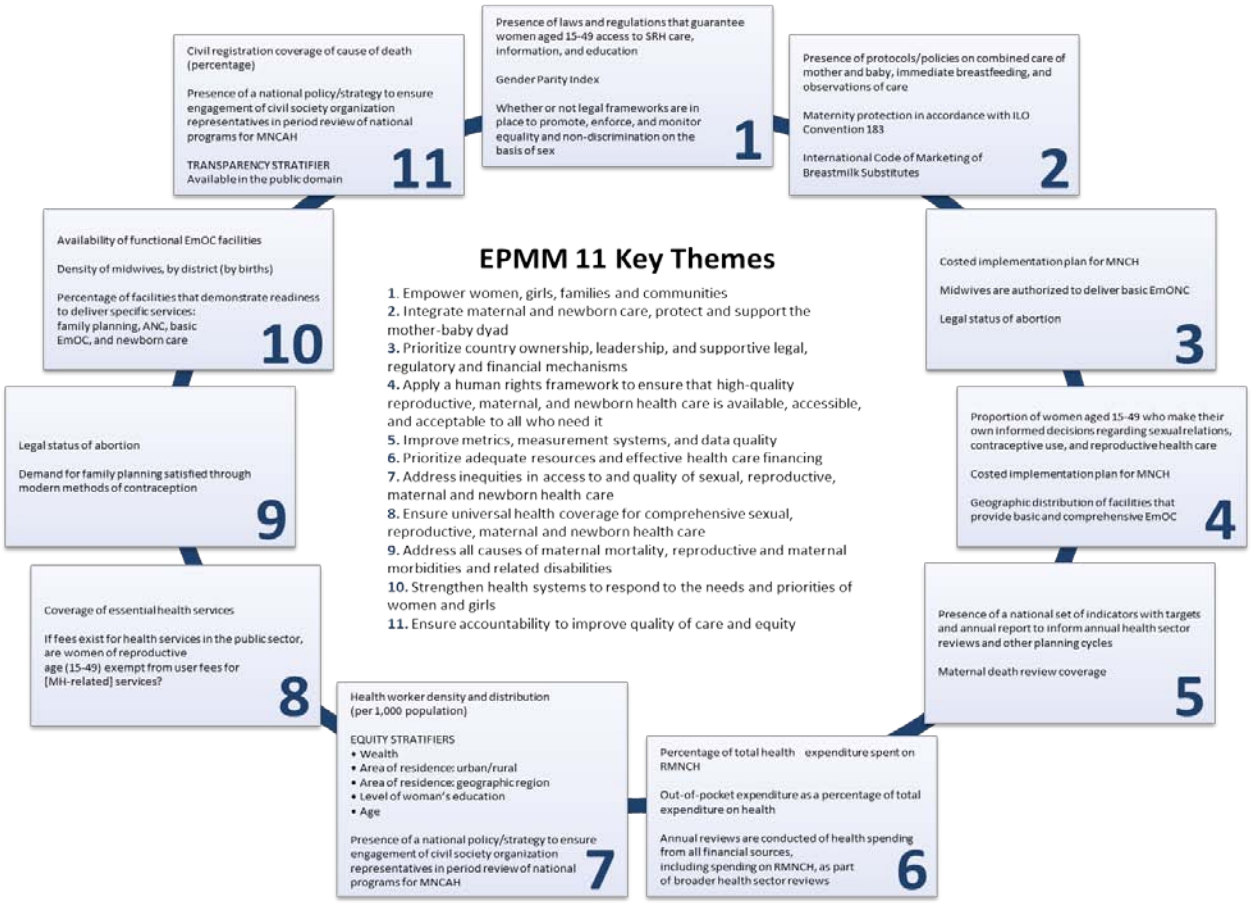
The Improving Maternal Health Measurement Capacity and Use project under the Women and Health Initiative at Harvard T.H. Chan School of Public Health has taken an initiative to develop a robust, research-validated, field-tested monitoring framework for the EPMM Strategies to support global and country level efforts to improve maternal health. This initiative is giving efforts to improve maternal health measurement capacity and use through the development and validation of indicators to inform global standards and support to countries for the adoption and use of research-validated indicators. The ultimate goal is to provide knowledge, research, and evaluation data, as well as validated measurement tools, to track progress towards ending preventable maternal mortality in the most effective and timely way possible.

This project aims to achieve two primary outcomes:

1. A well-developed and research-validated monitoring framework for ending preventable maternal mortality; and
2. Research-validated indicators for ending preventable maternal mortality incorporated into global and national monitoring frameworks.

The conventional maternal health indicators (Phase I indicators) are more focused on the proximal determinants of maternal health and survival, and are routinely collected and reported at national and global levels. However, there is less experience in tracking many of the broad range of social, political, economic and health system indicators of maternal health and survival, at national and global levels. Therefore, there was a strong demand of identifying a set of meaningful distal indicators of maternal health (Phase II indicators) that are important from social, political, political and health system perspectives for creating enabling environment for service availability, accessibility, affordability for reduction of maternal mortality. With that idea in mind, through a series of webinars, more than 150 experts discussed and debated, and ultimately agreed on a set of Phase II indicators and stratifiers that correspond to each of the 11 key themes outlined in the EPMM Strategies report (Figure 1). A complete list of Phase I and Phase II indicators are shown in **Annexure 1**.

Figure 1. Phase II indicators by key theme



The project sought to test and validate a subset of EPMM Phase II indicators by identifying a subset of additional EPMM indicators based-on national-level priorities. A global level stakeholder consultation in which Bangladesh also participated was held in June 2018 where brain storming was conducted for selecting a small list of indicators for validation from the broader list of Phase II indicators. Up to 10 measures (9 indicators and 1 stratifier) were planned to be tested and validated in four research settings through partnerships with the Instituto de Efectividad Clínica y Sanitaria (IECS, Argentina), icddr,b (Bangladesh), Population Council (PopCouncil, India), and the University of Ghana School of Public Health (Ghana). In accordance with the other research partners, there were five pre-determined core indicators to be validated in Bangladesh, including:

- If fees exist for health services in the public sector, are women of reproductive age (15-49) exempt from user fees for [MH-related health] services
- Health worker density and distribution (per 1,000 population)
- Density of midwives, by district (by births)
- Midwives are authorized to deliver basic emergency obstetric and newborn care
- Demand for family planning satisfied through modern methods of contraception

A workshop was planned to be conducted with key stakeholders to finalize a number of other indicators to be validated alongside the other five in Bangladesh from the followings:

- Presence of laws and regulations that guarantee women aged 15-49 access to sexual and reproductive health care, information, and education
- Presence of a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles
- Civil registration coverage of cause of death
- Availability of functional Emergency obstetric and newborn care (EmONC) facilities
- Geographic distribution of facilities that provide basic and EmONC
- Maternal death review coverage

With the above background, under the USAID's Research for Decision Makers (RDM) Activity implementd by icddr,b, a stakeholder meeting was conducted having the following objectives:

i. Sharing the 5 core indicators selected for validation in Bangladesh with the relevant stakeholders
ii. Seeking opinion of the stakeholders for choosing a number of additional indicators among the rest for validation in Bangladesh
iii. Discussing availability and accessibility to various data sources for the validation exercise
iv. Presenting the proposed research methodologies for validation of the selected indicators

Outcomes of the Workshop:

The workshop was organized on the 18th of March, 2019 at TRAction Conference Room of icddr,b. Among the 30 invited personnel, 21 attended. The participants who attended had represented the Directorate General of Health Services (DGHS), Directorate General of Family Planning (DGFP), Dhaka City Corporation, Urban Primary Health Care Project, National Institute of Population Research and Training (NIPORT), BRAC University, USAID, and several other organizations related to the topic.

At the beginning of the event, Dr. Quamrun Nahar, Acting Senior Director, Health Systems and Population Studies Division and Technical Coordinator of RDM, icddr,b welcomed the participants and shared the objective of the meeting. Following the introduction, Dr. Mahbub Elahi Chowdhury, Scientist and Principal Investigator (PI) of the activity gave a presentation that started with a brief background of the development process of the EPMM indicators as a global initiative to track progress in improvement of maternal health in the SDG period. He also mentioned his involvement with the Improving Maternal Health Measurement Project based in Harvard University for validation of selected EPMM Phase II indicators in Bangladesh and three other countries. After stating the background of the EPMM initiative, Dr. Chowdhury presented the Phase I and Phase II EPMM indicators to the participants. He also elaborately discussed the process of selecting the 5 core indicators for validation in 4 countries (Bangladesh, India, Ghana and Argentina). He explained about the requirements of inputs by the participants for selecting the additional 3-4 indicators from the list that are considered relevant for Bangladesh perspective for validation.

Then Dr. Chowdhury presented the methodologies for validation of the selected indicators those had been initially chosen for validation in Bangladesh. The validation methodologies of the indicators that had been presented are as follows:

- If fees exist for health services in the public sector, are women of reproductive age (15-49) exempt from user fees for [MH-related health] services
- Health worker density and distribution (per 1,000 population) and Indicator 13:
- Density of midwives, by district (by births)
- Midwives are authorized to deliver basic emergency obstetric and newborn care (BEmONC)
- Demand for family planning satisfied through modern methods of contraception
- Presence of a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles
- Availability of functional emergency obstetric care (EmOC) facilities
- Geographic distribution of facilities that provide basic and comprehensive emergency
- Maternal death review coverage

For each of the indicators, Dr. Chowdhury presented the study aim, definition of variable, validation approach, study design and methods, site selection and sampling plan, secondary data sources, data collection and analysis approach. The more details of the proposed research methodologies are in **Annexure 2.**

During and after the presentation, through interactive discussion the participants sought clarification as well as provided important feed-back that deemed important for further refinement of the methodologies. The key suggestions provided were as follows:

- Add operational definition of each of the indicators
- Select FP indicator 'demand for FP satisfied' as huge data in the related area is available

- Share the selected indicators with the high level program managers of the family planning department as their participation in the workshop was relatively low.

At the end of the meeting, the stakeholders endorsed all the 5 core indicators and 4 additional indicators for validation in Bangladesh as shown in Table 2.

Table 2: List of stakeholders endorsed by the stakeholders for validation in Bangladesh

Core indicators	Additional indicators
If fees exist for health services in the public sector, are women of reproductive age (15-49) exempt from user fees for [MH-related health] services	Maternal death review coverage
Midwives are authorized to deliver basic emergency obstetric and newborn care	Availability of functional (24/7) emonc facilities
Density of midwives, by district (by births)	Geographic distribution of facilities that provide basic and emonc
Health worker density and distribution (per 1,000 population)	Presence of a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles
Demand for family planning satisfied through modern methods of contraception	

All the participants expressed their interest to extend their support and co-operation during implementation of the planned validation study. The meeting ended with vote of thanks from Dr. Shams El Arifeen, Senior Director and Senior Scientist, Maternal and Child Health Division (MCHD), icddr,b and Chief of Party of RDM.

Annexure 1: EPMM Phase I and II Indicators

Phase I Indicators	Phase II Indicators
Coverage	
Four or more antenatal visits	Proportion of women ages 15-49 who make their own informed decisions regarding sexual relations, contraceptive use, and reproductive health care
Skilled attendant at birth	Maternal death review coverage
Maternal death registration	Coverage of essential health services
Early postnatal/postpartum care for woman and baby (within 2 days of birth)	Demand for family planning satisfied through modern methods of contraception
Met need for family planning	Civil registration coverage of cause of death (percentage)
Uterotonic immediately after birth	
Caesarean rate	
Health Systems Strengthening & Finance	
Availability of functional emergency obstetric care facilities	Availability of functional emergency obstetric care facilities
	Geographic distribution of facilities that provide basic and comprehensive emergency obstetric care
	Health worker density and distribution (per 1,000 population)
	Density of midwives, by district (by births)
	Percentage of facilities that demonstrate readiness to deliver specific services: family planning, antenatal care, basic emergency obstetric care, and newborn care
	Percentage of total health expenditure on reproductive, maternal, newborn, and child health
	Out-of-pocket expenditure as a percentage of total expenditure on health
Impact	
Maternal mortality ratio	
Maternal cause of death (direct/indirect) based on ICD-MM	

Adolescent birth rate	
Policy	
	Presence of laws and regulations that guarantee women ages 15-49 access to sexual and reproductive health care, information, and education
	Gender Parity Index
	Presence of legal frameworks to promote, enforce, and monitor equality and non-discrimination on the basis of sex
	Presence of protocols/policies on the combined care of mother and baby, immediate breastfeeding, and observations of care
	Maternity protection in accordance with ILO Convention 183
	International Code of Marketing of Breastmilk Substitutes
	Costed implementation plan for maternal, newborn, and child health
	Midwives authorized to deliver basic emergency obstetric and newborn care
	Legal status of abortion
	Presence of a national set of indicators with targets and annual report to inform annual health sector reviews and other planning cycles
	If fees exist for health services in the public sector, women of reproductive age (15-49) are exempt from user fees for maternal health-related health services
	Annual reviews are conducted of health spending from all financial sources, including spending on RMNCH, as part of broader health sector reviews
	Presence of a national policy/strategy to ensure engagement of civil society organization representatives in periodic review of national programs for maternal, newborn, child, and adolescent health
Equity and Transparency (Stratifiers)	
	Wealth
	Area of residence: urban/rural

	Area of residence: geographic region
	Level of education: women's education level
	Age
	Available in the public domain

Annexure 2: Methodologies for Validation of the Selected Indicators

Methodologies for validation of the above selected indicators are as follows**:**

<u>If fees exist for health services in the public sector, are women of reproductive age (15-49) exempt from user fees for [MH-related health] services</u>

Study Aims

To compare estimates from various relevant data sources regarding exemption from user fees for the indicated services (as defined in the WHO Policy Survey) and describe variance between these data sources. To stratify the results using the EPMM standard equity stratifiers to ascertain whether there is variance by these factors in the rate of fees charged for the maternal health-related services that are supposed to be exempt from user fees according to the policy in each setting. To triangulate the results of this indicator with those of the related indicator on out-of-pocket expenditure (on MH services) as a percent of total health expenditure in order to ascertain which measure better captures financial protection for women as a fundamental principle of Universal Health Coverage.

Validation Approach

Triangulation/Comparison

Definitions

*The definition for this indicator has changed in the WHO Policy Database since it was adopted into the EPMM Phase II framework. We need to verify current definition, which appears to be financial protection for women by understanding whether women aged 15-49 exempt from user fees for the following services:

- Family planning
- Antenatal care
- Childbirth (normal delivery)
- Postnatal care for mother
- Cesarean section
- Insecticide treated bednets
- Pharmaceutical products and /or other medical supplies if required for treatment or delivery

Yes =Yes, for all women;
Partial = Yes, for selected population groups;
No = No, for any women Unknown

For the purpose of this exercise, "user fees" include all charges, fees, and out-of-pocket expenditures, both formal and informal, that accrue to women in seeking the services included under this indicator.

For the purpose of this study, we have decided to remove any age limits for women of reproductive age.

Methods

Study Design and Methods

We will use a mixed method approach involving secondary data analysis, and primary data collection using qualitative and quantitative methods.

1. Review laws, regulations, and policies related to free care or exemptions from (user) fees in each country
2. Review reported results of this indicator in the available WHO Policy Survey data (two surveys have been conducted to date)
3. Collect primary facility client data from billing or medical records to document fees assessed to women for services included in the indicator definition (WHO Policy Survey) that should be exempted under the country laws, policies, and regulations
4. Conduct qualitative interviews with:
    - Relevant policy makers and officials tasked with oversight of the laws, policies, regulations
    - Facility-level administrators and providers
    - Women who accessed maternal health services at the facility
5. Quantitative survey:
    - Conduct exit interviews of women who accessed maternal health services from facilities. Women seeking different types of services will be interviewed, namely, ANC, PNC, normal delivery, C-section and family planning.
    - Community interviews (to assess for courtesy bias/recall bias) of women who accessed maternal health services in the past year.
    - Send trained "mystery clients" (wherever possible) to facilities to ascertain in real time whether they are assessed fees for exempt services in the course of their care encounter
6. Triangulate and compare results to estimate out-of-pocket expenditure on the same maternal health services through WHO National Health Account data.

Site Selection and Sampling Plan

Within the overall IMHM study settings selected in each country (district/ provinces) a multi-stage sampling plan is devised for the selection of facilities, selection of women for client exit interview and community based interview.

Sampling plan for client exit interviews and facility surveys:

1. We will group the different types of maternal health services included in the indicator into five categories: (1) Cesarean section & Childbirth (normal delivery); (2) Family planning; (3) Antenatal care; (4) Postnatal care for mother; & (5) Insecticide treated bed-nets.
2. First, a mapping exercise will be undertaken to list all public health facilities in each of the study districts/ provinces and to document the types of maternal health services provided by each of those facilities. A list of all public health facilities, will be considered in the sampling frame. Thus, a sampling frame of facilities providing different types of services will be developed for each district/ province.
3. The selection of facilities will be conducted using three layers of stratification based on the following sampling frame: (1) facilities providing Comprehensive Emergency Obstetric and Newborn Care (CEmONC); (2) facilities providing Basic Emergency Obstetric and Newborn Care (BEmONC). (3) Facilities providing other services.
4. Participants of exit interviews for Cesarean section will be selected from all those facilities where CEmONC services are provided.

5. Participants for exit interviews for other types of services will be selected proportionately based on client load in the facility from the other two strata. Number of deliveries in the facility will be considered as client load for BEmONC facilities. Number of ANCs will be considered as the client load for facilities that provide other services.
6. Within each strata (i.e. facilities providing BEmONC services and facilities providing other services), based on the client load, the facilities will be classified as high or low load facilities.
7. Within high and low load facilities, 5 facilities each will be selected proportionately based on client load. In each of these facilities, 10 exit interviews will be conducted.
8. In these same facilities billing/ account records will be reviewed to assess if any payment taken from patients such as registration fee, and also to check for stock outs.

Qualitative interviews:
The respondents for the qualitative interviews will be selected from the same facilities where exit interviews will be conducted.

The sampling strategy to be used for selection of facility, client exit interviews, and community surveys is described in Figure 1.

Data Sources

- WHO Policy Survey data reported on this indicator for each country in two existing surveys (2016, 2018)
- Relevant laws, policies, and regulations in each country
- National health account or health financing survey data for each country
- Facility billing data
- Qualitative and quantitative data from structured in-depth interviews, checklists and/or surveys

Data Collection

Secondary data collection:
- Desk review: We will review publicly available information regarding fee exemption for MH services.
- Publicly available secondary data from the most recent surveys will be extracted and analyzed. Since these analyses will not be able to fully determine the costs for incidentals or costs for each service, we will collect primary data at the facility level.

Primary data collection:

- Data collection in all the four districts/ provinces will take place simultaneously. Data collection in each state will take 3-5 months.
- Data will be collected using an original survey questionnaire that will be translated, pretested, and will undergo cultural adaption in each research country.
- Prior to initiating data collection and once the eligible respondents are identified in the selected facility/HH, written consent will be sought at the time they are asked to participate in the survey.

Primary data will be collected at various levels:
- At the facility level:

- Qualitative interviews will be conducted with key district and sub-district health officials at the health facilities selected for study: doctors, hospital managers/administrators, nurses and ANMs providing maternal health services at the selected facilities (facility selection mentioned in the sampling plan section) will be interviewed;
- Facility billing and accounts records of past six months will be checked of selected facilities to assess if payments were made by patients for various services;
- Client exit interviews will be conducted among 250 women in the same facilities where the facility billing records review was undertaken. Women seeking different types of services will be interviewed, namely, ANC, PNC, normal delivery, C-section and family planning. These interviews will capture detailed expenses incurred for these services, including direct (e.g., purchase of delivery kit and drugs) and indirect costs (e.g., payments to providers).

- At the Community level:
  - A population-based household interview will be conducted among 250 women of reproductive age who accessed MH services (i.e. who gave birth in the last one year) from the public health facility in the past one year.

Data Analysis

Qualitative

- A comparison of what is mentioned in the policy with the views and perception of service providers and hospital managers/administrators, and clients accessing maternal health services will be undertaken.
- Tentative themes for coding are in the area of (1) respondent's views regarding payment of fees and out of pocket expenses incurred by clients while availing maternal health services, (2) their perception of the impact of the fees on accessibility and follow-up of treatment by the clients, (3) views on discrimination based on differential fees and expenses among patients in similar facility and context, (4) service provider's and client's awareness and understanding of the policy guidelines regarding fee exemption for maternal health services, (5) respondent's experience and reaction to informal fees charged during the entire course of accessing maternal health services, (6) types of services for which fees were paid, (7) challenges and limitations of the policy on fee exemption, (8) respondent's suggestion to improve implementation of policy guidelines.
- The analysis will be done using Atlas-ti 6.2 version based on the tentative themes subject to the interview and response pattern.

Quantitative

- Universal applicability of the policy implies that 0% or close to 0% of women pay fees for MH services in the public sector. Using client-level data, we will estimate the percent of women paying fees for each type of service.
- A comparison of the results from client level data will be done with estimates from other population-based surveys.
- Results will be stratified by type of service, as well as by demographic factors of the women using the set of EPMM standard equity stratifiers.

If fees exist for health services in the public sector, are women of reproductive age (15-49) exempt from user fees for [MH-related health] services

Study Aims:

To compare estimates from two indicators that aim to measure the same construct (density and distribution of midwives, and of nursing and midwifery professionals), in order to explore whether they are consistent/track reliably with each other, whether there is evidence that one measure gives a better estimate of the objective truth than the other or is a more efficient way to capture the construct, and finally whether adjusting these two indicators by linking the data sources and/or adjusting the numerator and denominator would give a better estimate of this construct.

Validation Approach:

Triangulation, and possible Indicator Adjustment

Definitions:

Indicator (12) disaggregates health workers into the following category: "nursing and midwifery professionals".

For the general purpose of this study, a "midwife" is defined according the International Confederation of Midwives (ICM) definition of a midwife.

ICM definition of a midwife:
"A midwife is a person who has successfully completed a midwifery education programme that is duly recognised in the country where it is located and that is based on the International Confederation of Midwives' (ICM) Essential Competencies for Basic Midwifery Practice and the framework of the ICM Global Standards for Midwifery Education; who has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery and use the title 'midwife'; and who demonstrates competency in the practice of midwifery." https://www.internationalmidwives.org/our-work/policy-and-practice/icm-definitions.html. This definition is also endorsed by WHO, see: https://apps.who.int/iris/bitstream/handle/10665/272818/WHO-RHR-18.14-eng.pdf?ua=1

For the purposes of this study "midwifery" is defined according to the definition in the Lancet series on Midwifery.

Lancet Midwifery series definition of midwifery:
In this Series, we define the practice of midwifery as the "skilled, knowledgeable, and compassionate care for childbearing women, newborn infants, and families across the continuum throughout pre-pregnancy, pregnancy, birth, post-partum, and the early weeks of life. Core characteristics include optimising normal biological, psychological, social, and cultural processes of reproduction and early life; timely prevention and management of complications; consultation with and referral to other services; respect for women's individual circumstances and views; and working in partnership with women to strengthen women's own capabilities to care for themselves and their families". https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)60789-3/fulltext

Many but not all midwives are nurses. Nurses who are not designated as midwives but who meet the definition of a midwife and/or practice as frontline midwifery professionals in accordance with the Lancet definition of midwifery are included in this study.

Methods

Study Design and Methods:

A cross sectional study design shall be employed with mixed methods of data collection (quantitative – primary and data review and qualitative methods)

1. Compare estimates of the numerator for each indicator obtained from relevant data sources in each country. For indicator (12), our analysis will be limited to "nursing and midwifery professionals", who represent a portion of all health workers captured in this indicator.
2. Validate each of these estimates against a primary source of data that we collect (e.g. facility staffing records for a period of time from a representative sample of facilities in each study setting, or interviews with facility managers / supervisors)
3. Compare estimates of the denominators of each indicator obtained from relevant data sources in each country.
4. Validate each of these estimates by triangulating data sources.
5. Conduct statistical analysis to determine the significance of the variation observed in the two estimates.
6. Perform sensitivity analysis to explore whether adjusting the definition of a midwife in the numerator or using one or the other denominator (or a combination of both) gives a better estimate of the number and distribution of qualified frontline maternity care providers in each country

Site Selection and Sampling Plan:

The project sites will be maintained for validating this indicator.

A list of all facilities in the project districts will be obtained from the regional level of the project sites.

All facilities in the four project districts will be included in the survey (private and public facilities). At the facilities, the facility head and all health workers who perform midwifery duties shall be sampled.

Data Sources:

- National health workforce data in each country
- National, and district-level (if available), health professional association data in each country
- Health professional regulatory and licensure data in each country, by state if available
- Facility level staffing records
- Demographic data from population census (and other sources, e.g. GIS mapping?)
- Birth registration data from civil registration (or other sources, e.g. facility HMIS) by district

Data Collection

Facility Interviews

- At the facility level, the facility head will be interviewed on the total number of health workers who perform midwifery roles in the facility. The facility head interview will ensure that the survey does not miss any midwives or nurses performing midwifery roles in the facility.
- The personnel will then be interviewed on their qualifications, training and scope of work.
- Data review on the total number of births attended to in the past year shall be conducted from the records at every health facility visited.

Database Review

- Data on the total number of midwives in the study districts will be pooled from the database of the Nurses and Midwifery Council (NMC).
- Total number of births from the study districts in the past year shall also be pooled from the DHIS database
- The population of the project districts shall be extracted from the latest population census conducted and projecting the census population to the study period.

Data Analysis

Indicator (12)

- The density of health workers ("nursing and midwifery professionals") per 1000 population shall be estimated from survey results using the formula:
  Density of Health workers = Number of health workers in project districts * 1000
  Total population of women 15-49 years in districts
- This will be validated by comparing with the estimates using the NMC data. GIS maps will be used to show the density, scope and variations in the estimates obtained using survey data against the NMC data.
- Further, the indicator will be validated by comparing our survey results with the density of health workers calculated in any annual report or other sources in the country (GHS annual report/ maternal health survey). GIS will be used to show these variations where possible.

Indicator (13)

- The density of midwives by district by births shall be calculated;
- Similarly, density of midwives, by births estimated from our facility based survey data will be validated by comparing with the NMC and DHIMS data. The density of midwives by district by birth shall be calculated using the formula:

Number of midwives in district
Number of births in the district in the past year

- Chi square tests will be used to statistically test the significance of the differences in the estimates obtained from the surveys as compared to national body data estimates.
- The triangulation of data using these sources will provide a comprehensive understanding about the ways to measure density of health worker and this methodology will be taken as the gold standard for the indicator.

- Sensitivity analysis will be performed to explore whether adjusting the definition of a midwife in the numerator or using one or the other denominator (or a combination of both) gives a better estimate of the number and distribution of qualified frontline maternity care providers in each country.

Midwives are authorized to deliver basic emergency obstetric and newborn care (BEmONC)

Study Aim

To compare authorization of midwives and midwifery professionals to perform signal functions with evidence of education and training to perform signal functions, evidence of actual performance of signal functions and, possibly, evidence of competency

Validation Approach

Comparison

Definitions

For the general purpose of this exercise, a "midwife" is defined according the International Confederation of Midwives (ICM) definition of a midwife. "A midwife is a person who has successfully completed a midwifery education programme that is duly recognised in the country where it is located and that is based on the International Confederation of Midwives' (ICM) Essential Competencies for Basic Midwifery Practice and the framework of the ICM Global Standards for Midwifery Education; who has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery and use the title 'midwife'; and who demonstrates competency in the practice of midwifery."
https://www.internationalmidwives.org/our-work/policy-and-practice/icm-definitions.html

Also endorsed by WHO:
https://apps.who.int/iris/bitstream/handle/10665/272818/WHO-RHR-18.14-eng.pdf?ua=1

For the purposes of this study "midwifery" is defined according to the definition in the Lancet series on Midwifery. "In this Series, we define the practice of midwifery as the "skilled, knowledgeable, and compassionate care for childbearing women, newborn infants, and families across the continuum throughout pre-pregnancy, pregnancy, birth, postpartum, and the early weeks of life. Core characteristics include optimising normal biological, psychological, social, and cultural processes of reproduction and early life; timely prevention and management of complications; consultation with and referral to other services; respect for women's individual circumstances and views; and working in partnership with women to strengthen women's own capabilities to care for themselves and their families".
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)60789-3/fulltext

Many but not all midwives are nurses. In some countries, nurses who are not designated as midwives but who meet the definition of a midwife and/or practice as frontline midwifery professionals in accordance with the Lancet definition of midwifery are included in this study.

The signal functions of basic emergency obstetric and newborn care (BEmONC) are those listed in the WHO Manual: Monitoring Emergency Obstetric Care: A Handbook, 2009:
(1) Administer parenteral antibiotics
(2) Administer uterotonic drugs (i.e. parenteral oxytocin)
(3) Administer parenteral anticonvulsants for preeclampsia and eclampsia (i.e. magnesium sulfate).
(4) Manually remove the placenta
(5) Remove retained products (e.g. manual vacuum extraction, dilation and curettage)

(6) Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)
(7) Perform basic neonatal resuscitation (e.g. with bag and mask)

Methods:

Study Design and Methods

This study will use a mixed methods design with a concurrent triangulation strategy. Quantitative and qualitative data will be collected, analyzed and interpreted in the same time frame, and will be considered of equal importance.

We propose to:

1. Review national and subnational laws, policies, and regulations relevant to midwifery scope of practice and look for authorization to deliver all BEmONC signal functions
2. Review national and subnational professional association standards and core competencies to look for authorization to deliver all BEmONC signal functions
3. Review facility-level credentialing data to ascertain that midwives are authorized by the facilities in which they work to perform all BEmONC signal functions allowed by national or subnational law, regulation, or policy in each country
4. Review national and subnational education and training curricula for midwives to explore whether standard midwifery education includes didactic and skill-based training to deliver all BEmONC signal functions. We will review the curriculum for training midwives in available institutes that are producing the most midwives in the selected states.
5. Interview a sample of government national and subnational officials and facility administrators to compare their understanding of midwives' authorization to perform BEmONC signal functions with actual laws and policy documents
6. Interview a representative sample of midwives across study settings and administer surveys to capture whether midwives are aware of authorization to perform BEmONC signal functions, whether in practice they are performing BEmONC signal functions regardless of authorization, whether they received didactic and skill-based education and continuing education to do so, and other qualitative information on barriers and enablers (e.g., supportive supervision, skills and drills training, stockouts and availability of essential supplies and equipment, etc).

Site Selection and Sampling Plan

A two-stage sampling will be applied. The *first stage* will sample health care facilities that are currently employing midwives. The *second stage* will sample practicing midwives.

- Stage 1: We will purposively select health facilities at different levels of care offering midwifery services (at least the primary care centers, district hospital and tertiary hospital). A list of all public health and private registered facilities will be obtained from the ministry. A total of 12-20 health care facilities will be included in this study: 3-5 facilities (1-2 public and 2-3 private for-profit/not-for-profit) with different levels of care per each province/district. Facilities that did not deploy at least one midwife (as per definition) within the last 6 months will not be included. The number of facilities included may be smaller if midwives are not being employed at all levels of care. Both public and registered private

facilities will be included in the study. Sampled facilities will be visited and a review of facility level records will be conducted.

- Stage 2: Within each facility we will select midwives to conduct semi structured in-depth interviews. Midwives will be selected by facility administrators and/or study coordinator to ensure that midwives represent diverse demographics and work in different types of facilities (i.e. age, working facility, seniority level).
  An intentional sample of 8-12 eligible midwives (2-3 from each participating province/district) that currently practice midwifery in health care facilities will be selected.
- We will also administrate a survey to all midwives within each participating facility.

Data Sources

Primary data

- Qualitative data from in-depth interviews with midwives
- Quantitative data: A structured questionnaire will be adapted from WHO Manual Monitoring Emergency Obstetric Care

Secondary data

- National and subnational laws policies, and regulations relevant to midwifery scope of practice acts
- National and subnational (if available) professional association standards and core competencies, and facility-level credentialing data
- National and subnational public and private education institutions and training curricula where participating midwives report to have received training.
- Facility-level credentialing data

Data Collection

Primary data

- Qualitative data from in-depth interviews with midwives: key informant interviews will be directed by purposely developed interview guides and administrated by an experience researcher in social science methods. The one-on-one interviews will be conducted in person at a convenient time and location for the interviewee. Interviews will last approximately 30-40min.
- Quantitative data: A structured questionnaire will be adapted from WHO Manual Monitoring Emergency Obstetric Care: A Handbook, 2009. We will distribute a self-administrated electronic anonymous survey to collect quantitative data on midwives' perspectives on authorization to perform BEmONC signal functions during the last three months on their working institutions. The questionnaire will be pretested and piloted to collect data on required adjustments related to clarity, cultural adaptation and appropriateness. We will approach all midwives currently working in the wards in maternity hospitals in each of the study settings. Eligible midwives will be identified by facility administrators and/or local coordinator, and then invited to participate in the study by trained researchers.

Secondary data

- Data sources will be reviewed and a specifically predesigned checklist will be filled to collect data on midwives' authorization to provide BEmONC. Consecutively, data will be entered in a safe electronic system.

Data Analysis

The strategy of data triangulation emphasizes the importance of using multiple estimation methodologies—qualitative, quantitative, direct and indirect—to enhance confidence in the final results.

We will be cross-checking the results of total number of midwives authorized to deliver all tasks basic emergency obstetric and newborn care (BEmONC) for consistency among different sources.

Qualitative data will be recorded, transcribed, and coded. It will be analyzed using a thematic analysis. Matrices will be developed to facilitate comparison among responses and to organize the data by analytical themes. Some textual responses will be selected and included in the final report.

Data from the survey will be used to compute proportions and 95% CI of midwives legally authorized to deliver BEmONC signal functions, and compared it to the proportion on midwives authorized by their institutions to actually deliver BEmONC signal functions. Comparisons will be made using two-proportions tests with a significance level at Alfa 0.05. We will also compare the proportion of midwives authorized by legal documentation with their training and competencies.

We will triangulate data from different sources (secondary data, quantitative and qualitative) to assess consistency on the data.

Demand for family planning satisfied through modern methods of contraception

Study Aims

To validate the DHS algorithm used to determine demand for family planning satisfied by comparing the results of the DHS survey for a sample of women to the gold standard of those women's own perceptions as to whether their demand for family planning was actually satisfied.

Validation Approach

Diagnostic-Style Validation against a gold standard
To validate the DHS algorithm used to determine demand for family planning satisfied by comparing the results of the DHS survey for a sample of women to findings from community survey using the same DHS approach.

Definitions

Demand satisfied: The percentage of women ages 15-49 years (or their partners) who desire either to have no additional children or to postpone the next child and who are currently using a modern contraceptive method. Women using a traditional method are assumed to have an unmet need for modern contraception (FP2020).

This indicator denominator is restricted to the sexually active women in need of contraception. Women are considered sexually active either if they are in a union or reported a sexual intercourse in the 4 weeks before the survey[1]. According to this definition, women in need of contraception are defined as those who are fecund and do not want to become pregnant within the next 2 years, or who are unsure about whether or when they want to become pregnant. Women are considered infecund if they a) are married for five or more years, never used contraception and had no children in the past 5 years; b) said that they cannot get pregnant; c) are menopausal, had a hysterectomy or never menstruated; or d) had last period more than 6 months ago and are not postpartum amenorrheic. Pregnant women with a mistimed or unwanted pregnancy are also considered in need of contraception. For the purpose of this study, and aligned with current standardized definitions, modern contraceptive methods include contraceptive pills, condoms (male and female), intrauterine device (IUD), sterilization (male and female), injectables, hormone implants, patches, diaphragms, spermicidal agents (foam/jelly), and emergency contraception. Lactational amenorrhea, abstinence, rhythm or calendar methods, and withdrawal are defined as traditional contraceptive methods.

Methods

Study Design and Methods

1. We will administer the series of questions from the DHS Women's questionnaire from which an algorithm is used to calculate this indicator through a community-based survey.

[1] Bradley SEK, Croft TN, Fishel JD, Westoff CF. Revising unmet need for family planning: DHS analytical studies no. 25. Rockville: ICF International; 2012.

2. We will ask the same women additional questions to assess if they themselves consider that their demand for FP is satisfied. The answers obtained will be used to validate the results of the survey algorithm to her actual perception and experience.
3. We will perform statistical analysis to evaluate the degree of correlation between these measures and/or significance of the difference between them.

The validation of this indicator will happen at two levels.

- First, the aggregate district/province level data on demand for family planning satisfied through modern methods will be compared with the survey estimates from the primary data collected at the district/province level.
- Second, the numerator and denominator of the indicator will be validated by examining the internal consistency in the questionnaire. For the purposes of estimating the unmet need, the DHS algorithm will be used as it is and all questions in the DHS Women's questionnaire will be asked to women in community-based survey. Additionally, the women will be asked a set of simple questions to assess the need for contraception and whether or not they are currently using contraception.

Site Selection and Sampling Plan

Within the pre-selected study settings (district/ provinces), a multi-stage sampling plan is devised for selection of women of reproductive age for community-based interview.

Sample size: a total of 250 women of reproductive age (15-49 years) per district/ province will be selected for community-based interview.

Data Sources

- Quantitative interviews with women from the community

Data Collection

Primary data collection at the Community level:

- A population-based interview will be conducted among 250 women of reproductive age per district/ province.
- Data collection in all the four districts/ provinces will take place simultaneously. Data collection in each state will take 3-5 months. Prior to initiating data collection and once the eligible respondents are identified in the selected facility/HH, written consent will be taken from all the participants. The research interviewers will read the consent form to the respondent describing the purpose of the study, what is expected in terms of their participation, the procedures of interviews, potential benefits and risks of the participation, measures to ensure confidentiality, and contact details of the study coordinators. All the data collection instruments and consent forms will be bilingual, in both the principal language of the state/region and English.
- Data will be collected by trained research interviewers. Prior to the start of the survey, the interviewers will receive a one-week training on conducting interviews. The training will cover a) the general aspects of the research including its objectives, design and protocol; b) a theoretical explanation and demonstration

of each interview procedure; and c) practice with one another and people in the field. A strict adherence to the standard interview procedure will be emphasized throughout the training.

Data Analysis

- Comparison will be done between the demand for family planning satisfied through modern methods of contraception computed using DHS algorithm and women's responses to a set of simple questions to know whether or not they have a demand and if the demand is satisfied through modern methods of contraception. Correlation testing and Matched t- tests would be used to ascertain the significance of the differences.

Presence of a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles

Study Aim

To compare indicator reporting to objective data on:

- Existence of a national set of indicators
- Inclusion of targets and current point estimate for each indicator
- Evidence of annual reporting on each indicator
- Evidence of annual review in the last 3 years
- Evidence of use of the review findings in planning

Validation Approach

Verification

Definitions

This indicator does not exist exactly as defined in the EPMM set (where it was derived from a WHO report of recommendations on Health Information Systems). Instead, WHO has several related standards/indicators that together approximate this construct. Measure Evaluation has two indicators that together approximate this construct.

For the purpose of this exercise, we will adapt the EPMM indicator to align with the two Global Health Observatory indicators:

- **Indicator 1 - National set of indicators with targets:** a comprehensive national health sector policy/strategy/plan with goals and targets updated within last 5 years.
- **Indicator 2 - Annual reporting to inform annual health sector reviews:** Regular monitoring of progress of national health policy/strategy/plan.

We will operationalize the definition using the WHO MNCAH Policy Survey Indicator to explore whether the study country developed a national target for any of the following indicators:

- Maternal mortality ratio
- Under five mortality
- Neonatal mortality rate
- Stillbirth rate
- Adolescent morality rate
- Stunting among children under five
- Proportion of births attended by skilled health personnel
- Demand satisfied/met for family planning
- Total fertility rate
- Adolescent birth rate
- Proportion of women making their own informed decisions regarding sexual relations, contraceptive use and reproductive health care

Methods:

Study Design and Methods

The methods will consist of document review at national and subnational policy and programmer levels to verify the reporting of indicators as newly defined to harmonize with WHO measures. We will collect data on reporting characteristics –frequency, presence of targets, periodicity- and its revision and use for planning. Additionally, we will administrate qualitative interviews to key informants to explore barriers and uptake and use of data for planning.

We suggest the following plan:

- Review data reported by Bangladesh to WHO Global Health Observatory and MNCAH Policy Survey 2016 and 2018
- Document the analysis and report on the set of indicators: reporting frequency, where published, coverage, levels of analysis – at national and provincial level.
- Verify presence of target for each WHO MNCAH Policy Survey Indicator
- Verify that an annual review has been conducted in the last three cycles
- Document usage of the indicator by the National Minister of Health and other international organizations (UNICEF, CLAP / PAHO / WHO)
- Conduct interviews with key informants to explore barriers and facilitators and describe how the set of indicators is analyzed and used. We will target key maternal and child policy and decision-makers at the national and provincial level. Detailed information will be collected about the programmatic action taken based on the review recommendations particularly for the low or non-performing indicators. The barriers in action taking will be documented along with suggestions to overcome the barriers.

Site Selection and Sampling Plan

This study includes both national and subnational policy and program level reports/documents, and their Maternal and Child Health policy and decision makers. The provinces have been selected by applying the Index specifically developed to sites selection of this study. Document reviews will be extensive at both national and subnational level.

For the selection of key informants, we will purposively select two high rank policy and decision makers – Director of Mother and Child Health and Director of Reproductive Health - in each participating province and at the national level.

Data Sources

- Data reported by WHO Global Health Observatory and MNCAH Policy Survey 2016 and 2018
- Documentary evidence of periodic reporting and review of data and use for strategic and programmatic planning and improvement
- Strategic planning and policy official documents from national and subnational ministries of health
- Qualitative data from in-depth interviews to key informants

Data Collection

Data will be collected at National and Provincial/State level

- Desk review of all policy documents:
    - Desk review of existence of a comprehensive national health sector policy/strategy/plan with goals and targets (set of indicators with targets maternal and perinatal health collected and reported) and collect data about:
        - What indicators are collected, core indicators
        - How they are collected, data collection method, digital architecture, health system performance, coverage
        - Data quality assurance mechanisms in place
        - Analysis process and review process of collected data, roles, responsibilities
        - Use of data for policy and planning
        - Plan of dissemination
    - Desk review of reports of set of indicators
        - Quality of analytical reports on progress and performance reproduced
        - Trends, frequency of reports
        - Indicators included in the progress reports
        - Coverage of report, national, subnational, hospitals included
    - Key informant interviews with key stakeholders.

All online and paper-based documents will be systematically reviewed, and data will be extracted in a predesigned form. Per each WHO MNCAH Policy Survey Indicator we will register:

- What is the target
- Last three years of reporting
- Name of document where is reported
- Level of availability (publicly available, available by request, only internal use)
- Documentation of review, such as mid-term and annual reviews, discussion forum, dialogues, meetings
- Use: reference of last point estimate in reports, presentations, management dashboards

In depth interviews will be conducted following an interview guide and will be performed by a trained interviewer. Prior to the interview, the interviewers will introduce themselves and inform the participants about the general objectives of both the study and the interview. If inform consent is provided, the one-on-one interviews will be conducted in person at a time and location that would be convenient for the interviewee. Interviews will last approximately 40 min. In agreement with each interviews will be audio recorded, or if interviewed refuse, notes will be taken.

Data Analysis

Data from desk review will be consolidated in a matrix to record outcomes data on each indicator characteristics: reporting of point estimate, periodicity, presence of target, availability, frequency of revision, usability. A summary measure (score) will be develop to assess the overall performance of each indicator. In

addition to the review of the list of the indicators, the Bangladesh component will specifically focus on implications of the review i.e. programmatic action taken based on the review recommendations.

For qualitative data analysis, interviews will be transcript and s coded according to themes and categories based on the interview guide questions and study objectives. Matrices will be developed to facilitate comparisons across the transcripts material. Finally, interpretation of data will be performed and reported. Related barriers and suggestions to overcome the barriers will be documented.

Availability of functional emergency obstetric care (EmOC) facilities and Geographic distribution of facilities that provide basic and comprehensive emergency

Study Aim

To compare two estimates of the availability of facilities providing emergency obstetric care that are based on different models and different data sources in order to explore their external consistency, and whether linking them or adjusting one or both could obtain a more valid estimate, for example by adding a measure of functionality of facilities to the measure of geographic distribution of facilities.

Validation Approach

Triangulation/Comparison

Definitions

For the purposes of this study we define basic and comprehensive EmOC facilities as those demonstrating performance of all corresponding signal functions within the past three months, in accordance with the 2009 WHO Handbook for Monitoring Emergency Obstetric Care:

"A basic emergency obstetric care facility is one in which all functions 1–7 are performed.
A comprehensive emergency obstetric care facility is one in which all functions 1–9 are performed."

Basic services	Comprehensive services
(1) Administer parenteral[2] antibiotics	Perform signal functions 1–7, plus:
(2) Administer uterotonic drugs[3] (i.e. parenteral oxytocin)	(8) Perform surgery (e.g. caesarean section)
(3) Administer parenteral anticonvulsants for preeclampsia and eclampsia (i.e. magnesium sulfate).	(9) Perform blood transfusion
(4) Manually remove the placenta	
(5) Remove retained products (e.g. manual vacuum extraction, dilation and curettage)	
6) Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	
(7) Perform basic neonatal resuscitation (e.g. with bag and mask)	

[2] Injection or intravenous infusion.
[3] Uterotonic drugs are administered both to prevent and to treat postpartum hemorrhage.

Indicator (17) is defined as: The number of basic and comprehensive EmOC service facilities per 500,000 population. This definition is based on the WHO Handbook for Monitoring Emergency Obstetric Services.

Indicator (18) is defined as: The number and distribution of basic and comprehensive EmOC service facilities per subnational district, calculated using maps or a GIS mapping system for each district. This definition is based on the MEASURE Evaluation indicator.

Methods

Study design and Methods

We will compare the estimate of the number of EmOC facilities per 500,000 population to the estimate of the number of EmOC facilities by subnational district to validate the results and ascertain whether one measure is more accurate or more meaningful. If possible we will validate these estimates by direct ascertainment.

Having validated the denominators of each indicator, we will ascertain the validity of the numerators, by comparing available secondary data on functionality (defined as performance of all signal functions within the last 90 days) to record review or direct observation; then cross-tabulating evidence of EmOC service readiness/functionality across facilities identified using both measures.

Site selection and Sampling Plan

As for the other indicators, regions and provinces/districts were selected according to their performance with the index our research team developed for this purpose. Within those study settings, all public and private facilities in each participating province/district that provide maternity services will be included in the study.

Data Sources

- Facility assessment surveys and reports
- Health system administrative data/facility census
- HMIS data/record review
- Geographic Information System (GIS) mapping data

We will review and extract information from the most updated and complete formal list of public and private facilities registered for the participating provinces/districts. To identify the facilities that currently provide emergency obstetric care (EmOC), countries will review facility assessment surveys and reports or District-Level Household Survey - 4 (DLHS-4, 2012-13). Finally, we will review facility records to assess evidence of administration of basic and comprehensive emergency services within the last 90 days before data collection.

Data Collection

We will extract data from health system administrative data to quantify the number and distribution of facilities. Researchers will extract data from each source of information using predesigned data collection

forms on the provision of each signal functions for basic and comprehensive emergency services in each facility of the participating provinces/states.

We will also review HMIS reports for the public health facilities to assess the functionality & uptake of EmOC services.

Finally, we will check for the provision of signal functions in the last three months by reviewing facility records that document that these interventions have been administrated to women within the last 90 days. If facility records are not available, investigators will validate the findings by visiting the facilities and using a facility checklist to directly observe provision of signal functions.

Demographic data will be extracted from the most recently available national census projections of each country.

Data will be entered into a safe electronic system. We will review data available at the national and subnational level.

Data Analysis

We will estimate the number of facilities providing EmOC services per 500,000 populations. This indicator will be compared with the number of functional EmOC per 500,000 calculated using facility surveys and reports.

We will compare data sources: facility survey facility records that provide evidence of signal function administration, or data reported on facility visits.

Data will be plotted in GIS maps.

Maternal death review coverage

Study Aim

The aim of this study is to validate the coverage of facility-based maternal death reviews as reported at national level via this indicator against objective evidence of the number of maternal death reviews that took place as a proportion of all maternal deaths recorded in a (representative) sample of facilities

Validation Approach

Diagnostic-style validation against a gold standard/objective measure

Definitions

Maternal death**:** is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO)[4].

Maternal death review**:** Percent of maternal deaths occurring in the facility that were audited[5]

Methods

Study Design and Methods

This indicator will be validated using retrospective review of secondary data supplemented with primary data collection in the form of in-depth interviews and the establishment of a facility-based surveillance mechanism. It focuses on the following aspects of maternal death review coverage: (1) measuring the number of maternal deaths in study health facilities & district; (2) examining the magnitude of maternal death reviews and their completeness.

Retrospective study

1. Government policy on maternal death review and reporting will be reviewed.
2. HMIS data would be reviewed for the number of maternal deaths and the number of reviews undertaken.
3. Access will be obtained to records at the district/ province level on number of maternal deaths and number of reviews conducted both at the facility by facility-type and at the community.
4. In the facilities, a review of the past one-year hospital client registers/death review committee records for maternal deaths will be undertaken.
5. We will conduct qualitative interviews with hospital staff across the facility that were involved in the management of these cases to get a clearer understanding of barriers and facilitators to reviewing all maternal deaths. We will also use this opportunity to understand the process of data collection, data reporting, death review coverage, technology and tools used for review, sufficiency of the findings, and utilization of the review findings. The IDIs and review of death registers will enable us to calculate the maternal deaths reported in a facility and the number of deaths reviewed.

[4] https://www.who.int/healthinfo/statistics/indmaternalmortality/en/
[5] https://www.measureevaluation.org/rbf/indicator-collections/structural-indicators/maternal-death-reviews

Site Selection and Sampling Plan

Using the states/districts selected for all validation exercises in the IMHM research study:

1. A mapping and listing exercise will be undertaken for all public and private registered facilities in each of the study districts/ provinces.
2. During the listing exercise, information will be gathered regarding maternal deaths in the past one year. All those facilities where maternal deaths were reported would be selected for further review.
3. In all these facilities hospital death registers will be reviewed / efforts will be made to retrieve death review reports of all the maternal deaths that were reported in the past year in these facilities.

Data Sources

- National or District level data on maternal death reviews, by facility
- Health facility level reports of maternal death reviews (client registers, HMIS data, maternal mortality and morbidity review committee reports)
- Qualitative data from IDIs

Data Collection

Secondary and primary data collection:

- Government guidelines on maternal death review and reporting will be reviewed.
- We will gain access to district/sub-district level data on number of maternal deaths and number of reviews conducted both at the facility by facility-type and at the community.
- HMIS data will be retrieved and analyzed for the number of maternal deaths in each district/ facility type and the magnitude of maternal deaths reviewed.

At the facility:

- Hospital registers/committee review records of maternal deaths for the past year will be retrieved from the facilities that reported maternal deaths during the listing exercise.
- Contextual information will be collected through qualitative interviews with hospital staff across the facility that were involved in the management of these cases.
- Data will be collected regarding the process of data collection on maternal deaths and review, data reporting, death review coverage, technology and tools used by interviewing the data managers at the district/ sub-district level.

Data collection in all four districts/provinces will take place simultaneously in each country. Prior to initiating data collection and once the eligible respondents (service providers responsible for managing the case) are identified in the selected facilities, written consent will be sought at the time they are asked to participate in the qualitative interview. Consent will also be obtained from the facility supervisor prior to the listing process. All instruments and consent forms will be bilingual, in both the principal language for the state and in English.

Data Analysis

- We will compare the maternal death review coverage from district records with facility-based data and report sensitivity and specificity.

- We will undertake an evidence synthesis of the qualitative data using thematic analysis and developing a narrative summary of contextual findings
- We will compare the maternal death review coverage from district records with our retrospective findings.