# GOVERNMENT OF SIERRA LEONE
## MINISTRY OF HEALTH AND SANITATION

# Maternal
# Death
# Surveillance and
# Response

## National Technical Guideline
1st Edition, July 2015

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## Acronyms & Abbreviations

| | |
|---|---|
| AFP | Acute flaccid paralysis |
| ANC | Antenatal care |
| CBR | Crude birth rate |
| CDC | Centres for Disease Control and Prevention |
| CHWs | Community health workers |
| CoIA | Commission on Information and Accountability for Women's and Children's Health |
| CR/VS | Civil registration/vital statistics |
| DHS | District Health Sister |
| DMO | District Medical Officer |
| DSO | District Surveillance Officer |
| E4A | Evidence for Action |
| EmONC | Emergency obstetric and neonatal care |
| GIS | Geographical information systems |
| HMRI | Health Management and Research Institute |
| ICD-10 | 10th International Classification of Diseases |
| IDSR | Integrated Disease Surveillance and Response |
| M&E | Monitoring and Evaluation |
| MCH | Maternal and child health |
| MDG | Millennium Development Goal |
| MDR | Maternal death review |
| MDSR | Maternal death surveillance and response |
| MMR | Maternal mortality ratio |
| MoHS | Ministry of Health and Sanitation |
| MS | Medical Superintendent |
| NGO | Nongovernmental organisation |
| PNC | Postnatal care |
| RESCUER | Rural Extended Services and Care of Ultimate Emergency Relief |
| SMS | Short Message Service |
| SLMA | Sierra Leone Midwives' Association, |
| SLMDA | Sierra Leone Medical and Dental Association |
| SLNA | Sierra Leone Nurses' Association, |
| TBAs | Traditional birth attendants |
| UNFPA | United Nations Population Fund |
| UNICEF | United Nations Children's Fund |
| WHO | World Health Organisation |
| VA | Verbal autopsy |
| WRA | Women of reproductive age |

# Foreword

Sierra Leone shares the vision that 'No woman should lose her life when bringing life to the world'. As much as it is a normal natural process of life, getting pregnant in low and middle income countries is a risky business. In Sierra Leone, it is estimated that a woman faces a 1-in-7 lifetime risk of dying due to pregnancy or childbirth. Although there has been a reduction in maternal mortality since 2000, the 2013 Demographic and Health Survey put the Maternal Mortality Ratio (MMR) for Sierra Leone at 1,165 deaths per 100,000 live births. A number of countries with poor maternal health indices have employed Maternal Death Surveillance and Response (MDSR) strategy to reduce maternal deaths with significant success.

MDSR is a form of continuous surveillance that links the health information system and quality improvement processes from local to national levels, which includes the routine identification, notification, quantification and determination of causes and avoidability of all maternal deaths, as well as the use of this information to respond with actions that will prevent future deaths. This is possible because most maternal deaths are preventable if life-saving preventive and therapeutic interventions are provided at the right time. The Ministry of Health and Sanitation recognises the "three delays" as major barriers to improving chances of survival: 1) delay in recognising and seeking care when complications occur, 2) delay in reaching a health facility, and 3) delay in receiving appropriate care within the health facility.

What is still not clearly known is actual (numbers of) maternal deaths, which village, chiefdoms or district has most deaths, which are the most common conditions leading to death or complete data/information on causes of maternal deaths that could be prevented. The current Maternal Death Review (MDR) implementation has stopped short of implementing specific and targeted interventions and the impact of current interventions aimed at reducing maternal deaths is not known. Additionally, the level of community involvement in stopping mothers dying from preventable causes has been inadequate. All of the above contribute in one way or another to the poor maternal health outcomes in the country. It is time to do things differently to achieve the desired health outcomes for our nation.

The Ministry of Health and Sanitation remains committed to His Excellency, President Ernest Bai Koroma's vision which he showed his commitment to by launching the Free Health Care Initiative in 2010. The Ministry's commitment is evident in the post-Ebola Health Sector Recovery Plan where restoring of essential health services, in particular, maternal and child health services are prioritised. The Ministry is looking forward to working with partners to implement both strategic and high impact interventions that will help propel Sierra Leone to achieve the missed Millennium Development Goals (MDGs) and then follow on Sustainable Development Goals (SGDs). I believe that the MDSR will help the country's men and women by providing the roadmap on how to achieve those goals.

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# Acknowledgements

Implementing MDSR in Sierra Leone is a timely and much needed intervention to support the recovery processes and strengthen the health system. MDSR will contribute to strengthening vital registration and better counting of maternal deaths, and provide better information for action and monitoring improvements in maternal health.

These MDSR National Guidelines have been adapted by a Technical Working Group comprising MoHS,WHO, UNFPA and E4A. It provides practical guidance to move from the current maternal death reviews to surveillance and response. The adaption of the MDSR national guidelines follows a similar process that this country has undergone to adapt the Integrated Disease Surveillance and Response (IDSR) Guidelines and the Technical Working Group proposes integration of the MDSR into the IDSR processes. I wish to express my sincere gratitude to the many partners that supported the Ministry of Health and Sanitation to develop these guidelines. The commitment of both the partners and the Ministry of Health Sanitation officials to improving the maternal health in Sierra Leone is commendable. I would like to particularly thank the leadership of the Directors for Reproductive and Child Health and Disease Prevention and Control who provided strategic guidance to their teams as well as to partners as these guidelines were being developed.

Sincere gratitude goes to our technical UN partners, recognising the leadership roles of the UNFPA Representative, Dr. Bannet Ndyanabangi and that of the WHO Representative, Dr. Anders Nordstrom. The support of both UNFPA and WHO ensured that the guidelines are technically sound.

I would like to thank the World Bank for providing the financial support that enabled the development of these guidelines. I thank the World Bank for committing additional resources to the Ministry to support programmes that will reduce maternal and child mortality and look forward to even more support to ensure full implementation of the maternal death surveillance and response guidelines in Sierra Leone.

Many others have supported the development of the guidelines and the Ministry of Health and Sanitation appreciates their time and commitment. A full list of key partners and individuals who participated and contributed in the development and validation of the National MDSR Technical Guideline is in Appendix 1.

**Dr. Brima Kargbo**
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**Ministry of Health and Sanitation**

## Executive Summary

A number of countries with poor maternal health indices have employed Maternal Death Surveillance and Response (MDSR) strategy with positive results. Sierra Leone is among the first ten countries with the highest maternal mortality ratios (MMR) in the world and an estimated 2,400 women do not survive pregnancy and/or childbirth each year. According to the 2013 Demographic and Health Survey (DHS), the MMR for Sierra Leone was estimated at 1,165 deaths per 100,000 live births. Although nine in ten pregnant women attend ANC at least once, slightly over a half (54%) deliver at health facilities. Six in ten pregnant women are delivered by a skilled worker while the rest are still delivered by traditional birth attendants (TBAs), which increases chances of complications and likely deaths. Moreover, maternal deaths that occur within communities are not known or when obstetric complications occur, it is often too late to save the mother.

In 2012, the United Nations Commission on the Status of Women passed a resolution calling for the elimination of preventable maternal mortality. To accomplish this, it is essential to have a system that measures and tracks all maternal deaths in real time. This helps to understand the underlying factors contributing to the deaths, and stimulates and guides actions to prevent future deaths. MDSR is a form of continuous surveillance that links the health information system and quality improvement processes from local to national levels, which includes the routine identification, notification, quantification and determination of causes and avoidability of all maternal deaths, as well as the use of this information to respond with actions that will prevent future deaths.

**The primary goal** of MDSR *is to eliminate preventable maternal mortality* by obtaining and strategically using information to guide public health actions and monitoring their impact.

**The overall objectives of MDSR** are to provide *information that effectively guides immediate as well as longer term actions* to reduce maternal mortality; and to count *every maternal death*, permitting an assessment of the true magnitude of maternal mortality and the impact of actions to reduce it.

Knowledge of the magnitude of maternal mortality compels policy-makers and decision-makers to give the problem the attention and responses it deserves.

**Moving from maternal death reviews to MDSR**

The national MDSR Guideline builds on the work done to implement MDR in Sierra Leone and helps to understand the events surrounding maternal deaths. It stresses the need to respond to each maternal death with actions to prevent similar deaths in the future, and to collect data on all maternal deaths using clearly defined data sources and processes for identification and notification.

**Adapting the Technical Guideline for MDSR for Sierra Leone**

The Sierra Leone MoHS is committed to implementing MDSR piggybacking on IDSR processes. The importance of having the MDSR national guideline is to ensure improving the quantitative and qualitative information collected by existing Maternal Death Review that has been implemented in the country since 2009.

**Key components in the MDSR National Technical Guideline**

Since adapting the IDSR to the Sierra Leone context, maternal death is a notifiable event and has been incorporated in the notifiable disease reporting system of IDSR. The MDSR implementation comprises the following steps:

a) Identification and notification of maternal deaths
b) Maternal death review
c) Analysis – data aggregation and interpretation
d) Response to maternal deaths
e) Dissemination of results, recommendations and responses
f) Monitoring and Evaluation (M&E) for MDSR system
g) MDSR implementation plan

**Identification and notification of maternal deaths**

- The first step in MDSR implementation is identifying maternal deaths to assess all deaths in women of reproductive age (WRA) and identify those that occurred while a woman was pregnant or within 42 days of the end of a pregnancy (**suspected maternal death**)
- Any death of a WRA in a health facility shall trigger a review of her medical record to determine her pregnancy status. Suspected maternal deaths in the community may be reported by community health workers (CHWs), Traditional Birth Attendants, or other community resource persons; verbal autopsies should then be performed to determine the probable cause of death.
- Deaths occurring in health facilities shall be identified and verified by DSO or Maternal Death Investigator and then notified to the District MDSR Coordinator *within 24 hours;* and deaths occurring in communities shall be notified *within 48 hours*. Notification should include "zero reporting," an active process of notifying suspected maternal deaths, whether or not any occurred.
- The district's role in the identification and notification process is initially to receive all suspected maternal deaths, follow up and initiate the investigation to confirm the maternal deaths.
- Triangulating data sources will help to avoid duplicate notification of the same suspected maternal deaths.

**Maternal death reviews**

MDRs, an essential component of MDSR, are "qualitative, in-depth investigations of the causes of, and circumstances surrounding, maternal deaths" that occur in both health-care facilities and communities.

**Steps in the MDR process**

A written summary of each death, including key findings, shall be prepared and presented to a district multidisciplinary MDSR Committee that discusses the case, reviews all pertinent data, and completes a brief report on the medical cause of death (including probable causes of deaths that occurred in communities), contributing factors and avoidability. Findings will be coded and entered into the district database. The MDSR committee will issue recommendations, which may be broad or specific, to address avoidable factors noted by the review to prevent similar maternal deaths in the future.

**Key points related to MDR**

Sierra Leone shall define data elements and collect consistent data for action which are easy to compare across countries. The MDR process should include **all** probable maternal deaths and will be performed at all District Hospitals. The number and frequency of MDRs will depend on the number of cases identified and available resources. Local reviews shall be conducted immediately for facility deaths and within one month, if more information is needed, so that early actions can be instituted.

This National MDSR Guideline includes information on its processes, availability of data and tools, data transmission, frequency, required channels and feedback mechanisms. Local community leaders, facility staffs, and national or district entities should be involved at each step in the MDSR process.

**Analysis and interpretation of aggregated findings from reviews**

The aim of aggregated data analysis is to identify causes of death, population groups at highest risk, contributing factors, and emerging data patterns and to prioritise health problems to guide the public health response. The translation of MDSR data into meaningful information for decision-makers, the medical community and the public is important. The analysis is instrumental in monitoring and evaluating responses and detecting the impact of changes in health-care practices and health-seeking behaviours. Key points related to this step are:

a) A data management plan with a clear framework for data transmission, aggregation, processing, and storage shall be defined, along with an analytical plan that includes specified indicators. MDSR should include basic descriptive analyses by person, place and time.
b) Analysis should be performed at the level closest to the community with the appropriate analytical skills – at the minimum at district level.
c) Health facilities with large-volume deliveries (≥500 annually) should also perform descriptive analyses of facility-based maternal deaths. All district hospitals should know their facility-specific number of maternal deaths, calculate facility indicators, and report on causes of death in their facility.
d) Document the frequency of medical and nonmedical contributing factors in maternal deaths.
e) Grouping the findings from death reviews and reviewing them quantitatively provides information about which problems are most common and assists in prioritising responses.

**Response**

Findings from reviews shall lead to immediate actions to prevent similar deaths, at health facilities and in the community. In addition, responses may also be periodic or annual. Identification of patterns of particular problems contributing to maternal deaths or geographical areas where deaths occur in greater numbers should result in more comprehensive responses. Responses should be tailored to address the problems identified in the community, health-care facility, and health-care system, as well as at the inter-sectoral level. The type of action taken will depend on the level at which the decisions are being made, the findings of the analysis, and the stakeholders involved. Improving quality of care is an important element of response at the health facility. **Guiding principles for response** include:

- starting with the avoidable factors identified during the review process;
- using evidence-based approaches;

- prioritising actions (based on prevalence, feasibility, resources, health-system readiness);
- establishing a timeline (immediate, short, medium, and long term);
- deciding how to monitor progress, effectiveness, and impact;
- integrating recommendations within annual health plans and health-system packages;
- monitoring to ensure recommendations are being implemented.

**Dissemination of results, recommendations and responses**

At national and district levels, a plan for disseminating MDSR results should be determined in advance. Flexibility must be built in because the results will not be known until the review data are analysed. The team involved in undertaking the MDR should be fully involved in the review, developing the recommendations, planning and promoting their implementation, and acting as advocates for change. Data should be aggregated or de-identified so individual families or providers cannot be identified; recommendations should be fed back to the hospital, facility or community where the information was collected using language and dissemination methods tailored to the target audiences; and legal safeguards should be in place to prevent the use of the review findings in litigation. Key messages must get to those who can implement the recommendations and make a real difference towards saving mothers' lives.

**Monitoring and Evaluation (M&E) of the MDSR system**

- M&E takes place to improve the timeliness, quality and completeness of information and ensure that the major steps in the system are functioning adequately and improving with time. Monitoring of the MDSR system is carried out primarily at the national level.
- The framework for M&E includes standard indicators based on MDSR principles: maternal death as a notifiable event; Hospital, and district-level reviews; data quality; and percentage of recommended responses undertaken. Because the main purpose of MDSR is to take actions to eliminate preventable maternal deaths, the system is failing if this is not happening. In this case, a more detailed evaluation may be needed to assess how the system can function more effectively.

**MDSR implementation plan**

- MDSR implementation should consider local capabilities, limitations, logistical issues, budgetary realities, and legal requirements, and they must be adaptable and customisable.
- Prerequisites to implementation are intensive and inclusive of planning and development of system-wide linkages and processes. These foster communication and collaboration at all levels, enable agreement on the scale of coverage and design of the system, involve assessment of the current situation including mapping existing resources and identification of gaps, identify regulations and legal protections in place and identify opportunities for cost-saving and achieving wider benefits.
- After documenting the current status of the components of the MDSR system, realistic long-term (3- to 5-year) goals should be established, along with annual benchmarks for monitoring progress towards reaching the goals. Taking a phased approach to achieving key benchmarks will make the implementation seem less daunting and demonstrate progress towards reaching the final goal.

**Key messages of this guideline**

a) MDSR is a system aimed at preventing maternal deaths and improving the quality of care through the dissemination and use of information for appropriate decision-making.
b) Understanding the underlying factors leading to the deaths is critical for preventing future mortality.
c) Data collection must be linked to action. A commitment to respond, that is to act on findings, is a key prerequisite for success.
d) As a starting point, all maternal deaths in health facilities should be identified, notified, reported, reviewed and responded to with measures to prevent future deaths.
e) Improving the measurement of maternal mortality by working to identify all maternal deaths in a given area is imperative; without measuring maternal mortality ratios, we will not know if our actions are truly effective in reducing maternal deaths.

# 1. Introduction

Since 1990, Sierra Leone has had very poor child and maternal health indices. For instance maternal mortality ratios were estimated at 2,100 per 100,000 live births in 2002 (WHO, 2004) and 1,165 per 100,000 live births in 2013 (Demographic and Health Survey Statistics Sierra Leone, 2013).

A number of countries with poor maternal health indices have employed Maternal Death Surveillance and Response (MDSR) strategy with positive results. The Government of Sierra Leone, through the Ministry of Health and Sanitation, has prioritised improving maternal and child health services to achieve the MDGs 4 & 5. Various international and regional policies and strategies have been adopted to address the unacceptably high rates of maternal, infant and neonatal mortality including, Bamako Initiatives, Abuja Declaration, Basic Package of Essential Health Services (BPEHS), Reproductive Health Commodity Security, COMPACT, Joint Program of Work and Funding, Reproductive, Newborn and Child Health Policy and Strategy, Emergency Obstetric and Newborn Care (EmONC), Free Health Care Initiative, the Campaign for the Accelerated Reduction of Maternal Mortality in Africa (CARMMA), National Health Sector Strategies and approaches. However, various challenges still exist in the health systems, including a weak referral system, poor supervision, poor clinical governance, culminating to poor quality of maternal and child healthcare services even at a time when financial access to maternal and child healthcare services have been considerably reduced.

The death of a mother is a tragedy that has an immense impact on the wellbeing of her family. The survival and development of her children, especially infants, are adversely affected following her death. Nearly all maternal deaths are preventable and potential exists to drastically reduce and eventually eliminate them. Worldwide, reported maternal mortality ratios underestimate the true magnitude. Inadequate measurement contributes to a lack of accountability and, in turn, to a lack of progress.

**Maternal Death Surveillance and Response**

The Maternal Death Surveillance and Response (MDSR) model is a surveillance system that tracks the numbers of deaths and provides information about the underlying contributing factors and how they can be tackled. By investigating a woman's death, MDSR inherently places value on her life, an important form of accountability for families and communities. An MDSR system provides essential information needed to stimulate and guide actions to prevent future maternal deaths and improve how maternal mortality is measured.

MDSR is a continuous public health surveillance system linking the health information system and quality improvement processes from community, health facilities to national level. It is the routine identification, notification, quantification and determination of causes and avoidability of all maternal deaths, as well as the use of the information to respond with actions that will prevent future deaths. Surveillance is essential for the planning, implementation and evaluation of public health practice.

MDSR emphasises the link between information and response and addresses the critical need to respond to every maternal death that occurs. Each death when reported provides information that, if acted upon can prevent future deaths. In addition, the notification of every maternal death permits the accurate measurement of maternal mortality ratios and the real-time monitoring of trends that provide

countries with evidence about the effectiveness of interventions. It also helps provide accountability for results and compels decision-makers to give the problem the attention and responses it deserves.

### The Sierra Leone context for MDSR

The Ministry of Health and Sanitation (MoHS) began conducting maternal death reviews on an ad hoc basis since 2005, as a strategy to reduce maternal deaths in health facilities. Repeated attempts to institutionalise conduct of Maternal Death Reviews (MDRs) in district health facilities to improve on the quality of care have not been successful over time. According to the 2011 MDR Report from MoHS, 190, 299 and 224 women were reported dead in 13 major district maternity hospitals in the years 2009, 2010 and 2011 respectively. There is underreporting of maternal deaths. For example in 2011 2,070 deaths were expected and only 224 deaths were reported. Low capacity to coordinate MDR processes constrained progress and the legal policy framework required to establish and operationalise non-punitive and effective MDRs was not formulated and legislated.

MDSR responds to Millennium Development Goal 5, which aims to reduce the maternal mortality ratio by three quarters by 2015. Maternal and infant mortality rates remain very high and Sierra Leone is lagging behind; and unlikely to meet the targets for MDGs 4 and 5. Globally, to accelerate progress, the Secretary-General of the United Nations launched the Global Strategy for Women's and Children's Health in September 2010. The Commission on Information and Accountability (CoIA) was then formed to determine the most effective international institutional arrangements for global reporting, oversight, and accountability on women's and children's health. Among CoIA's key recommendations is a focus on getting better information for producing better results. The framework for implementing these recommendations, developed by the World Health Organisation, includes establishing MDSR systems and improving vital registration in each country. By providing information to guide corrective actions and monitoring real-time numbers of maternal deaths, MDSR is an essential element of a strategy for eliminating preventable deaths.

### MDSR builds on Maternal Death Reviews (MDR) and other available systems

In Sierra Leone, vestige structures for national and district level MDRs exist. Previously, notification of maternal deaths from all levels and sources was challenging. With the advent of Ebola, a national Integrated Disease Surveillance and Response (IDSR) system which was started before 2010 with the support of the World Health Organisation (WHO) has now been revamped. The IDSR system will now provide the initiation of maternal deaths notification data, which the MDSR model will now ride on to conduct effective, coordinated and sustainable MDRs at national and district levels. The country is now presented with the best opportunity to institutionalise MDSR on the foundation of national IDSR that will sustain effective MDR processes.

MDR systems have led to local policy change and improvement in the quality of maternal health services, even in challenging settings elsewhere. Facility-based MDR systems are qualitative, in-depth investigations of the causes of, and circumstances surrounding maternal deaths which occur in health-care facilities. Community-based maternal death reviews (verbal autopsies) aim at finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the deaths in women who died outside of a medical facility.

MDSR builds on the work done to implement MDR and will promote understanding of the events surrounding maternal deaths and work to improve maternal death notification. MDSR also stresses the need to collect data on all maternal deaths that occurred in facilities as well as communities, and to use this information to provide a snapshot of weaknesses in the health-care delivery system as a whole – from the community through the various levels of referral to the tertiary care facility. Clearly defined data sources and processes for death identification and notification, regardless of the place of death, are emphatically required.

### Implementation of MDSR

Implementation of the MDSR model in Sierra Leone will be led and overseen by the Reproductive and Child Health (RCH) and Disease Prevention and Control (DPC) Directorates to garner the robust response, visibility and importance required. Programs of the RCH Directorates and District Health Management Teams (DHMTs) will serve as agents of implementation and drivers of change. The Directorate of DPC will lead notification in the IDSR system while the RCH Directorate will oversee MDR process in MDSR. The review process will generate recommendations for evidence based actions to prevent future deaths.

### Who is this national guideline for?

This technical guidance introduces critical concepts of MDSR, including goals, objectives, and specific instructions for implementing each surveillance component. Further, it explains how districts can set up MDSR processes to strengthen surveillance and response activities in respective districts. The intended readership includes health professionals, health-care planners and managers, those who measure maternal mortality and policy makers working in maternal health. The guideline will act as a resource material to develop a training package for planners and implementers of MDSR as well as generating standard operating procedures.

# 2. Goals and objectives of MDSR

**Goal: To eliminate preventable maternal mortality in Sierra Leone**

The primary goal of MDSR is to eliminate preventable maternal mortality by obtaining and using information on each maternal death to guide public health actions and monitor their impact. MDSR expands the ongoing efforts to provide information that can be used to develop programs and interventions for reducing maternal morbidity and mortality and improving access to and quality of care that women receive during pregnancy, delivery and the puerperium. MDSR aims to provide information that will lead to specific recommendations and actions and improve the evaluation of their effectiveness.

**Overall objectives**

1) To provide information that effectively guides actions to eliminate preventable maternal mortality at health facilities and in the community

2) To count *every maternal death*, permitting an assessment of the true magnitude of maternal mortality and the impact of actions taken to reduce it

**Why conduct MDSR**

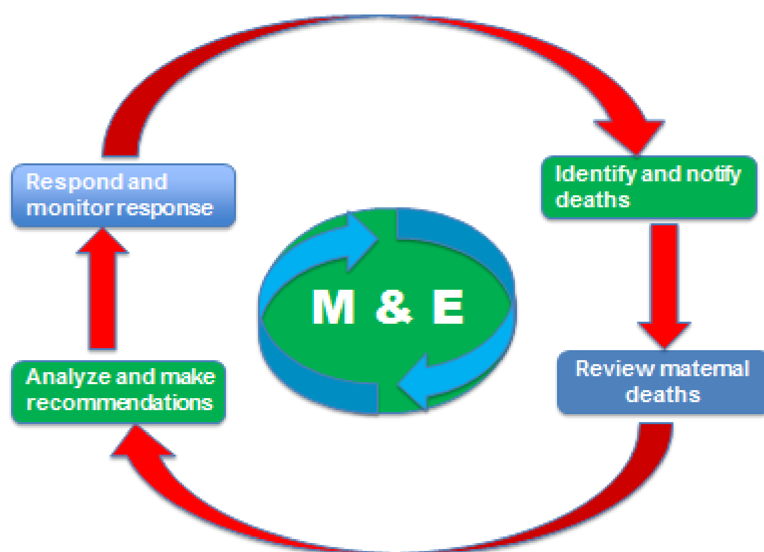
1. To collect accurate data on all maternal deaths, including:
   a) number – identify and report all maternal deaths;
   b) causes of death and contributing factors – review all maternal deaths (e.g. facility records, verbal autopsies, MDR).
2. To analyse and interpret data collected, including:
   a) trends in maternal mortality;
   b) causes of death (medical) and contributing factors (quality of care, nonmedical factors);
   c) avoidability of the deaths, focusing on those factors that can be remedied;
   d) risk factors, groups at increased risk, and maps of maternal deaths;
   e) demographic and socio-political contexts.
3. To use the data to make evidence-based recommendations for action to decrease maternal mortality. Recommendations may include a variety of topics, such as:
   a) community education and involvement;
   b) timeliness of referrals;
   c) availability, access to and delivery of services;
   d) quality of care;
   e) training needs of health personnel;
   f) development of protocols and SOPs;
   g) use of resources where they are likely to have an impact;
   h) regulations and policy.
4. To disseminate findings and recommendations to civil society, health personnel, decision-makers and policy-makers to increase awareness about the magnitude, social effects and preventability of maternal mortality.

5. To ensure actions take place by monitoring the implementation of recommendations.
6. To inform programmes on the effectiveness of interventions and their impact on maternal mortality.
7. To allocate resources more effectively and efficiently by identifying specific needs.
8. To enhance accountability for maternal health.
9. To improve maternal mortality statistics and move towards complete civil registration/vital statistics records.
10. To guide and prioritise research related to maternal mortality.

## 3. MDSR overview

The MDSR system is a continuous-action cycle designed to provide real-time, actionable data on maternal mortality levels, causes of death, and contributing factors, with a focus on using the findings to plan appropriate and effective preventive actions. While building on established approaches such as Integrated Disease Surveillance and Response and Maternal Death Reviews, it aims to identify, notify and review all maternal deaths in communities and facilities, thus providing information to develop effective, data-driven interventions that will reduce maternal mortality and permit the measurement of their impact. The MDSR cycle consists of four steps (Figure 3.1):

FIGURE 3.1 **Maternal Death Surveillance and Response (MDSR) system: a continuous-action cycle**



### Key steps

1. **Identification and notification on an ongoing basis:** Identification of suspected maternal deaths in facilities (maternity, theatre and other wards) and communities, followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.

2. **Review of maternal deaths by health facility and district maternal death review committees:** Examination of medical and nonmedical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.

3. **Analysis and interpretation of aggregated findings from reviews:** Reviews are made at the district level and reported to the national level; priority recommendations for district and national action are made based on the aggregated data.

4. **Respond and monitor response:** Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that recommended actions are being adequately implemented.

The cycle continues as cases are identified and reviewed, paying particular attention to monitoring whether recommended actions have been implemented and whether they are effective. Monitoring and evaluation of the MDSR system takes place to improve the quality and completeness of information.

#### Principles of MDSR

The information provided by MDSR can increase awareness of maternal mortality at the community, health-care system and inter-sectoral levels; lead to changes in practices by the public, communities and health-care providers; and foster the reallocation of resources to activities that more effectively prevent maternal deaths. MDSR needs an enabling environment – one of collaboration rather than blame – to make its findings and apply them towards action. The system should build on and strengthen existing maternal death information systems. For a successful MDSR, the following principles should be considered:

**Intensive and inclusive planning:** Establish a code of conduct and legal environment for setting up an MDSR system; establish standards for conducting MDRs; engage and orient all stakeholders, including communities and the private sector; and engage professional associations and identify champions.

**Sustained collective learning, for action at all levels:** Promote shared responsibility and teamwork; introduce MDSR principles and guidance in training curricula; and foster collective learning for action at different levels – from the community to the health care delivery system.

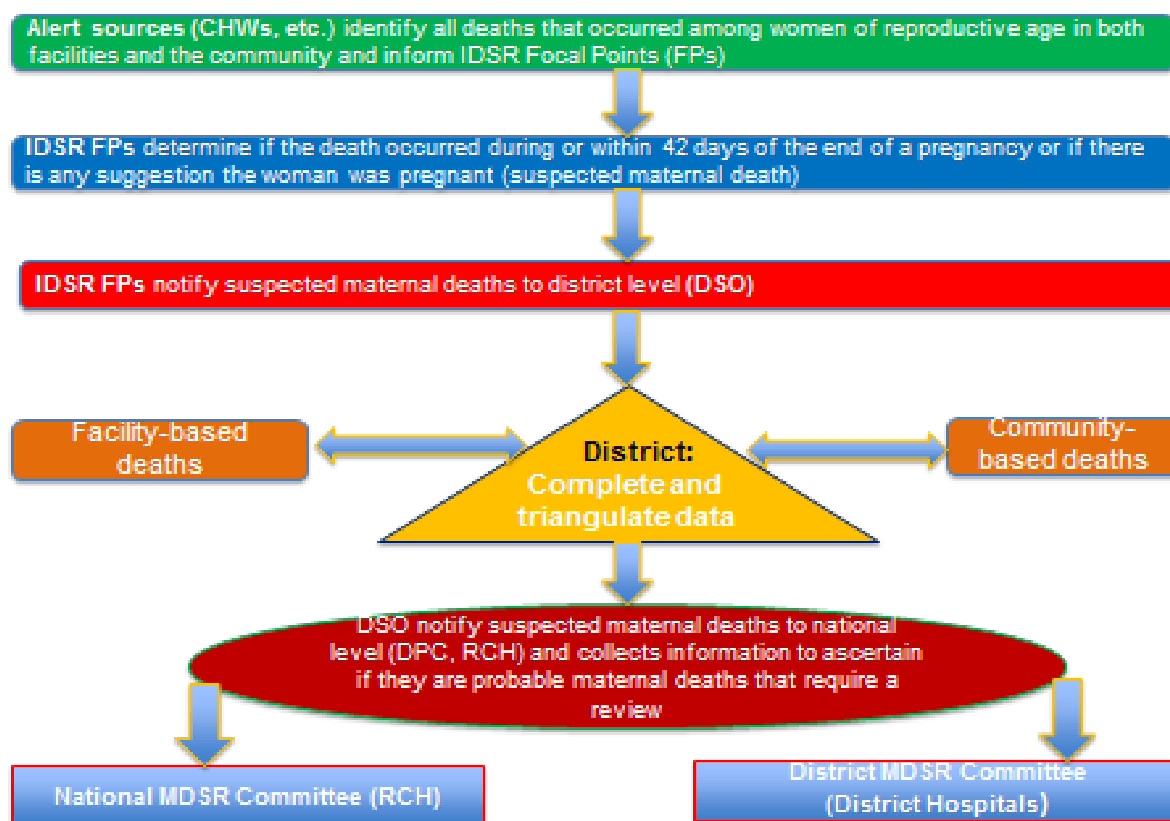
**Optimising opportunities for achieving wider benefits:** Develop a culture of accountability and quality of care centred on continuous improvement of health care and services; improve recordkeeping, data flow, data quality and health management information systems; strengthen existing systems, including vital registration and population/pregnancy surveillance; and focus on improved understanding of the burden and level of maternal deaths in the population.

## 4. Identification and notification of maternal deaths

The Integrated Disease Surveillance and Response (IDSR) System is a strategy for comprehensive public health surveillance and response. Supporting IDSR revitalisation is considered preferable to initiating a duplicate system for MDSR. IDSR advises that after determining the death of a woman occurred during pregnancy or within 42 days of its termination, the initial notification of the suspected maternal death should be done within 24 hours, by the fastest means possible. The health facility should contact the Disease Surveillance Officer (DSO) within the District Health Management Team (DHMT) and provide information about the case. The initial notification should be followed by a written report using a case-based reporting form (Appendix 1). The form is completed and submitted electronically where possible; or it is delivered by telephone or on paper. If no case of a maternal death has been identified during the epidemiological week, a “zero” report is submitted.

MDSR begins with identification of suspected maternal deaths. The IDSR system will identify and notify events of maternal deaths based on the standard case definition. The IDSR system collects and provides information on all notifiable events using a clearly defined reporting and feedback mechanism. The RCH Directorate will oversee conduct of maternal death reviews, including verbal autopsy, on all maternal deaths that occur within the community by IDSR. The DPC Directorate will ensure maternal deaths from facilities and communities are identified and notified within 24 hours to 48 hours respectively using IDSR structures and the appropriate communication channels/tools. Figure 4.1 provides an overview of the steps taken for the identification and notification of maternal deaths

**FIGURE 4.1** **Identify and notify all suspected maternal deaths**



## Case definitions

The 10th International Classification of Diseases (ICD-10) defines **maternal death** as "the death of a woman while pregnant or within 42 days of the 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". Maternal deaths can be categorised into direct obstetric deaths and indirect obstetric deaths (see Glossary).

A **suspected maternal death** is defined in this guideline as the death of any woman while pregnant or within 42 days of the termination of pregnancy. Any death where there is a suggestion of a pregnancy should be notified as a suspected maternal death.

The DSO is responsible for collecting additional information to help classify the death even if the death appears to be due to incidental or accidental causes (snake bite, road traffic accident or homicidal case).

**Probable maternal deaths** are deaths among women of reproductive age, not clearly due to incidental or accidental causes and should be submitted to the maternal death review committee for review. The maternal death review committee will review the circumstances and confirm maternal deaths (i.e. whether the death was "related to or aggravated by the pregnancy and its management").

The **Community case definition** of maternal death is the death of any woman of reproductive age in the community

### Maternal death – is a notifiable event

Generally, any **disease or event classified as notifiable means that it must be reported to the DPC Directorate within 24 hours** by the DSO and/or Maternal Death Investigator from facility level and this shall be followed up by a more thorough report of medical causes and contributing factors. The follow up should be done by an expert committee comprising DMO, Midwife, Obstetrics/Gynaecology Specialist and Epidemiologist/Surveillance Officer. Deaths occurring in health-care facilities should be notified within 24 hours and deaths in communities should be notified within 48 hours; this general rule strictly applies to this national MDSR guideline.

All suspected maternal deaths are herein classified as notifiable events and must be reported by the DSO simultaneously to district MDSR Committee. The chain of communication will be similar to that for other notifiable diseases, conditions and events, that is, immediate notification followed by a more thorough report.

Notification should be systematic, including absence of maternal death cases ("zero reporting"). Zero reporting means that there is an active process of notifying suspected maternal deaths, whether or not any occurred. If no maternal deaths occurred, a "zero" is captured in the data collection system rather than not reporting at all. If an entry is left blank, it is not clear that attention was paid to the entry.

## The Integrated Disease Surveillance and Response System and MDSR

## Sources of information

The two major sources of information for timely reporting of maternal deaths are **health-care facilities** (where women give birth and are attended to when they have pregnancy complications) and

**communities** (when women give birth at home or on the way to a health-care facility or die during pregnancy without receiving medical care). Only when every maternal death is identified, notified, and reviewed can the magnitude and causes of the maternal deaths be understood, more effective interventions implemented, and their impact be evaluated. Although vital records are an important source for formal maternal mortality reporting, they still need to be strengthened in order to assist reporting maternal deaths. Ideally, information from MDSR should feed into the formal vital registration process.

### Deaths among women of reproductive age

The first step in identifying maternal deaths is to assess all deaths in women of reproductive age, which requires questioning the family and community informants. Some suspected maternal death cases will be obvious (e.g. the woman died during childbirth or shortly afterwards, or she was in her third trimester and the pregnancy was evident). Other cases may be less obvious (e.g. a death from complications of an abortion, whether spontaneous or induced, an ectopic pregnancy, or a death that occurs many weeks after childbirth). A few screening questions will establish whether the family had any knowledge that the woman was pregnant at the time of death or if she had delivered in the past 6 weeks. To capture all postpartum maternal deaths, the screening questions for a suspected maternal death can include women who delivered 2–3 months previously or other questions that may be culturally appropriate in each district.

### Identification and notification of suspected and probable maternal deaths in health facilities

Suspected maternal deaths occurring in a hospital or other health facility are usually easier to identify. Nevertheless, to ensure that none are missed, designated Maternal Death Investigators have the responsibility to check death logs and other records from the previous 24 hours and collect a line listing of deaths of all WRA. The death logs review should include not only the obstetric ward but other areas where women may seek care or enter the facility (e.g. maternity unit or outpatient department). Any death of a WRA should trigger a review of her medical record to look for evidence that she could have been pregnant or within 42 days of the end of a pregnancy. This process should be documented by using either a paper or electronic questionnaire. The IDSR Focal Point (IDSR FP) will inform the DSO, who will notify the death as a suspected maternal death using the appropriate communication mechanism. The chain of communication should include national (DPC and RCH) and District MDSR Committee. The MDSR Committee will engage Maternal Death Investigators to collect the relevant information needed during MDR.

A more extensive review of the record should then be carried out at the district hospital to confirm if the death was probably maternal (due to or aggravated by a pregnancy or its management) or if it was due to accidental or incidental causes. A finding of probable maternal death should then trigger a more in-depth review of the case.

### Identification and notification of suspected maternal deaths in the community

The CHWs or other community representatives will identify deaths of all WRA, determine if the woman was pregnant or within 42 days after the end of a pregnancy when she died. Suspected maternal deaths in the community will be reported by community health workers (CHWs) or officers in charge of the nearest health facilities through MDIs to DSOs or Maternal Death Investigator. Traditional birth attendants (TBAs), adjunct community informants, are also an important source of

information and are mandated to participate in the MDSR system. Additionally, community leaders such as traditional, religious or women's group leaders are part of the process; they maintain lists of deaths among women of reproductive age and should report them to the DSO through the IDSR FPs.

To ensure that all maternal deaths are captured in communities where dates and times may not easily be ascertained, the 42 days shall be extended to 2–3 months, and take into consideration cultural appropriateness. Notification should include the name of the woman, where she resided, where she died, when she died, and the name of the person making the notification. The DSO and/or maternal death investigator will follow up to ascertain if it is a probable maternal death, which will prompt a notification and investigation.

### Methods of notifying deaths

Maternal death notification will be done initially through paper forms and telephone (texts or calls). Reporting of maternal deaths that occur at a health facility, notification will be done by completing the Maternal Reporting Form (see Appendix 1). These forms shall be in stock and available at health facilities to the IDSR focal person for that facility.

### Identification and notification of suspected and probable maternal deaths – district responsibilities

Data will flow from the community or facility to district and national levels. When a suspected maternal death occurs, the district either receives a notification form or fills out the form itself based on information provided by telephone or other medium. District personnel should assign case registry numbers and retain files in secured storage. The district's initial role in the identification and reporting process is to notify the national level about all suspected maternal deaths (along with other notifiable events and diseases as specified under IDSR). The district then follows up by reporting the number of probable or confirmed maternal deaths. Confirmed maternal deaths, that is, those that have been reviewed and confirmed to be maternal deaths, should be reported to the national level monthly, along with any other key information found during the review process.

The district also has the responsibility to provide training and supervision on MDSR to health workers; to monitor zero reporting and identify areas that are 'silent'; and to monitor the quality of the maternal mortality reporting (i.e. whether deaths reported as suspected or probably maternal are correctly classified).

### Using triangulation to avoid duplication

It is important to avoid duplicating notification of the same suspected maternal death from multiple sources, for example, from both a facility and community. Triangulation of data between sources using personal identifiers helps ensure each death is reported only once. Designating a focal point (DSO), usually someone at the chiefdom level or district, can ensure there is no duplication. After triangulating information, the focal point will notify the next level (district or national).

### Communication

When establishing MDSR system, effective communication is essential for ensuring accountability and the complete identification of maternal deaths. A communications plan should be prepared at the start that includes how results will be communicated, how crises communications will be managed (e.g. to avoid unintended consequences such as rebuttal, denial or denigration for political reasons), and how communications to promote advocacy and resource mobilisation for the system will be

conducted.

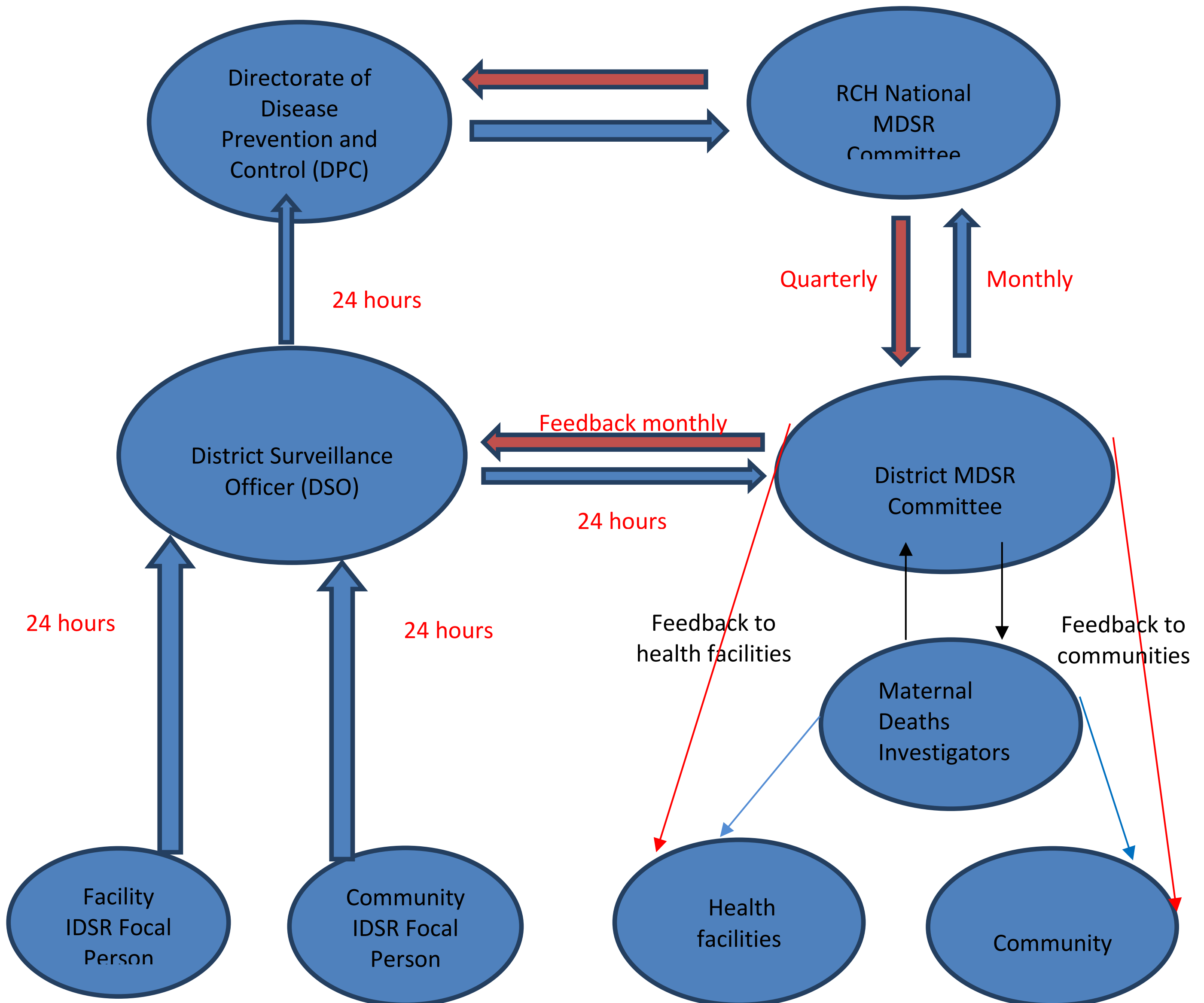
#### Connections between MDSR and vital registration systems

Mortality data are a critical component of the public health information infrastructure. Ultimately, all deaths, including maternal deaths, should be reported to a civil registration/vital statistics (Births and Deaths) system. In developed countries, maternal mortality ratios are derived from vital statistics. Currently, the CR/VS system is insufficient and the MDSR shall help contribute to its development. District Births and Deaths Registrars will participate in district MDR committees and duplicates of maternal deaths notification forms will remain in the custody of District Births and Deaths Registrars for the records of the CR/VS authority.

When vital registration is complete and computerised, deaths among WRA shall be linked to registered births and fetal death files. Such linkages are expected to increase the number of suspected maternal deaths by detecting women who died within 42 days after giving birth, thereby helping to ensure that all maternal deaths are identified.

# 5. Maternal death review

FIGURE 5.1 **Maternal Death Review**



**Overview**

Maternal Death Review (MDR) is defined as "qualitative, in-depth investigation of the causes of, and circumstances surrounding maternal deaths" and includes methods designed for reviewing deaths that occur in both health-care facilities and communities. Medical causes and contributing factors are determined as part of MDR with a view to finding out why maternal deaths are occurring and what can be done to prevent them. MDR prerequisites include confidential, participatory approaches that aim to improve quality of maternal health care rather than to blame or punish.

This national guideline emphasises that MDRs are an essential component of MDSR and highlights features of MDR implementation in the context of MDSR. In particular, these include the expansion of the MDR concept to include information on maternal deaths from the community, even when deaths occurred in health facilities; the necessity to conduct MDR for all suspected maternal deaths in both communities and facilities; the linkages of MDR with reporting, aggregated analyses and multilevel responses; and the importance of monitoring and improving case detection, data quality, and the quality of recommendations and their implementation.

Following the immediate notification of suspected maternal deaths by communities and/or facilities, a determination is made about whether it was a suspected maternal death (i.e. not due to incidental or accidental causes). Reports of suspected maternal deaths are then forwarded to MDR committees for maternal death review.

Data collection in facilities is done before the review and data from multiple sources, including patient records, are verified and compared. For example, data initially may be extracted from the Ob/Gyn admission and discharge register, and then complemented with information from the outpatient, labour and delivery ward register and theatre or minor surgery record books. Case notes, patient records, postoperative notes and laboratory results, are also valuable sources of information. Cross-checked data are used to compile summaries needed for the review.

Deaths occurring in the community and notified to the facility or district must also be reviewed. Although notification can be done by various key informants (e.g. traditional/community, religious or political leaders; youth groups; civil society organisations; police and other action groups) maternal deaths shall be confirmed only through a review. Therefore, community health workers, midwives, or other personnel from the health facility serving the community or designated personnel from the district are essential to this process. Review at the community level requires performing verbal autopsy; these are conducted with assistance from the family and other community members. Verbal and social autopsies help reviewers understand the circumstances of the death and to determine if it could have been avoided. Only cases of probable maternal deaths will be submitted for review. Reviews of all notified suspected maternal deaths will be conducted by a case reviewer, Maternal Death Investigator, nominated by the district Maternal Death Surveillance and Response Committee.

To identify the levels and determinants of maternal mortality and emphasise the message that no maternal death is acceptable, *all* maternal deaths must be reviewed. Reviews should be done at district level by MDSR district committees made up of health professionals and management staff.

MDR methodologies include facility-based and community-based reviews (i.e. verbal autopsies), depending on the place where the deaths occur (home, PHU or referral facility) and the availability of data sources. Often, a combination of methods may be considered to collect as much information as possible. For example, a maternal death that occurred in a facility or during transportation may be

further investigated at the community level. A review at the referral level may require investigation at a lower level and even at the community level to understand the woman's history and the path she followed. A maternal death at home may be complemented with information from medical records, for example, to find out if the woman had antenatal care or if death occurred soon after discharge from a health facility. The extent and quality of data collected will determine the organisational structure and cost required, the complexity of analyses that can be performed, what information can be given as feedback, and if and how the quality assurance strategies will be informed.

The primary purpose of maternal death review is action; recommendations cannot be turned into actions without the support of key stakeholders such as Ob/Gyn, Midwives and Nurses Association. Recommended actions may include community or facility-based interventions, guideline development and introduction, improving access to services or health system reform. Thus, the importance of having the support of local community leaders, Medical Superintendents/Matrons, facility directors, and national or local government entities for such reviews cannot be overemphasised. Also, to ensure sustainability, national ownership is critical. The Ministry of Health and other key stakeholders should be involved from the beginning of the review process, kept informed of progress, and invited to attend meetings or sit on steering committees as appropriate.

### The MDR process

The support and participation of relevant health-care workers (e.g. doctors, midwives, CHOs, nurses, etc.) is critical to the success of the maternal death review process. These workers frequently act as the primary catalyst for such reviews. Local ownership of the review process improves participation, data collection and quality and feedback. These health workers need to be assured that the sole purpose of the review process is to save lives and not to apportion blame. "**No name, no blame**" is a key principle of MDR. Health workers must believe that MDR provides a safe environment for discussing sensitive details about their professional practices without fear of provoking management sanctions or litigation.

While Sierra Leone is transitioning to MDSR, the process should build on and strengthen the current MDR structure and implementation. Reviews shall be performed on all confirmed maternal deaths that are reported to and at district hospitals. The reviews shall yield a pre-set, structured amount of information about each death that will be used for aggregated analyses and detailed response formulation.

## The structure for MDR

### MDR District coordinator

Coordination of the maternal death review process can significantly affect the quality of the data collected and the overall smooth operation of the review process, including the transmission and use of data at the district level. To improve communications and the review process, a designated coordinator with an in-depth understanding of the data collection process, instruments and flow of data should be in place. He or she should be able to relate well to other staff and be supportive, but should also have the authority to review data quality, triangulate data from multiple sites, coordinate focal points, assign work, and set schedules, including dates and times of review committee meetings. The national guideline recommends the MDR coordinator to be the District Health Sister (DHS) with

delegated powers from the District Medical Officer (DMO). She will receive data from focal points at the facility and community levels. This is expected to increase the likelihood that information is used at the district level. The scope of the MDR (e.g. number of facilities or geographical area covered, number of data collectors, amount of data collected per maternal death, facility deaths or community deaths) will determine the coordination structure, number of focal points needed and supervisory structure. Having a schedule of supervisory responsibilities and a protocol or checklist of tasks will make the role of coordinators more effective. The MDR Coordinators should be trained on the MDSR process.

### MDR committee

The MDR committees should be inclusive of DMO, DHSs, MS, Matron, B&D, DSO, M&E, Maternity in-charge, Council and CHO in-charge of the affected Chiefdom. It is recommended that each referral hospital and district-level hospital should set up committees and perform monthly reviews. The MDR review committee evaluates or assesses individual cases to identify problems that occurred and possible solutions. Collectively, the members of the review committee need to have the expertise to identify both the non-medical and medical causes that contributed to the maternal deaths. In addition, having the right mix of expertise in the MDR committee is critical when it is time to act on the review findings and help develop and implement the recommendations.

For the review process that focuses on deaths in the community, where there is greater interest in understanding social or nonmedical factors affecting maternal deaths, the review committee should include individuals with knowledge of the local customs and practices, community representatives and perhaps social scientists. A physician and a midwife or experienced nurse should also be on the committee to review any medical information, including findings from any verbal autopsy done as part of the community-based surveys.

### Data for MDR

Having a clear understanding of all aspects of the review is essential, including the information needed to identify problems leading to maternal death, what data analysis is anticipated, what feedback is needed, and what level of detail is required to develop solutions. This MDSR Guideline presents two frameworks; "**Three Delays model**" (Figure 5.2) and the "**Pathway to Survival**" (Figure 5.3) that are used to examine care-seeking, decision-making and quality of care during childbirth and obstetric emergencies. Both frameworks can help identify common delays associated with three components – seeking care, reaching care and receiving care at the facility.

FIGURE 5.2 **The Three Delay Model**

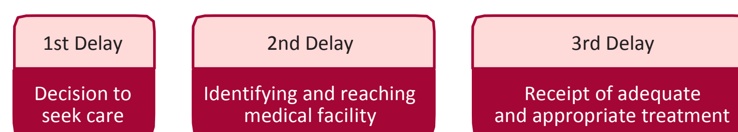
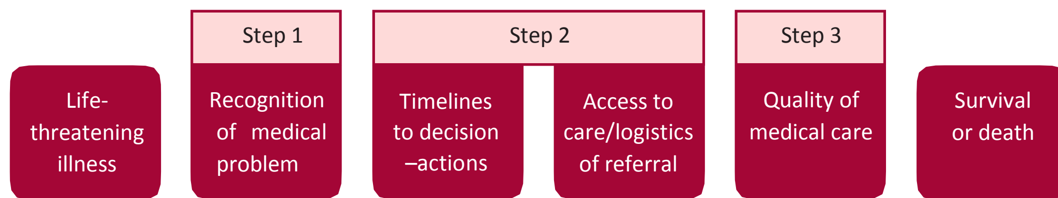


FIGURE 5.3 **The Pathway to Survival**




Specifically, data sources contributing to the MDR include pregnancy cards, vital records, antenatal care records, medical records and registers from health facilities, and interviews with family members, local community members, community health workers, midwives, nurses and doctors.

The basic content of an MDR conducted at the facility and community levels for action should be consistent in defining data elements that may be comparable across districts and possibly across countries (i.e. skilled birth attendance, emergency obstetric care); this should be the underlying principles.

Key information to collect, particularly for a facility-based review, includes 1) the condition of the mother on admission or the onset of labour (ante partum or intra-partum death),
2) events that occurred during her stay at the facility (including time and date), and 3) the date and time of delivery and death. In addition, community reviews explore the family's awareness of medical complications prior to death, attitudes towards health care, health-seeking behaviours, and barriers to care or referral. For both the facility and the community reviews, information on pregnancy-related care – antenatal care, skilled birth attendance, availability at birth of basic or comprehensive emergency obstetric and neonatal care (EmONC) and postnatal care – should always be collected. Including information on the availability and use of these services can help assess the presence or absence of optimal care as a key modifiable factor that can be addressed in developing future interventions.

### Development of data collection instruments

Data collection tools, instructions, operational procedures, and training materials should be developed in accordance with available data sources. Tools should be adapted to the Sierra Leone context and be culturally sensitive and easily understood. Tools and instructions should use the local language and terminology. They have to be pilot-tested and refined with careful attention to content, language, and format. Tests of the tools should be clearly documented to include the following: who will participate in the "test", how it will be carried out, when and where it will be conducted, what resources and preparation might be needed and how the feedback will be formulated and used. The pilot-testing should be quietly observed and the results should be used to further refine the tools as well as improve the work of the data collectors.

Most of the MDR content is based on structured questions that are suited for collecting information about variables for which much is already known, and potential responses can be listed. Open-ended or semi-structured questions are recommended when enquiring about reasons for behaviours or complex sequences of events. The instructions should be very clear about the interviewers' purpose and the necessity of accurately capturing complex responses. Text fields should allow adequate space to record information in a detailed narrative format. Later, these data can be coded for the qualitative

analysis.

Everyone involved in the review process also has to be fully involved in the collection of the best quality data required for the investigation. It is important to explain at the outset to all those involved in the data collection process why and for what purposes specific pieces of information must be collected. Depending on the number of deaths to be reviewed, the data abstraction and interviews may be done by the same or different people, as long as they meet the qualifications for performing both tasks. In case non-facility workers are used for local data abstraction and interviews, they should be literate, numerate, fluent in the local language, familiar with local terminology and have sufficient clinical background to be able to read and understand the medical information in the facility records or from the interview.

Training of data collectors should be, for the most part, practical. They should know the purpose of the review process, the importance of obtaining the information without bias, and the need to respect confidentiality. Most of the training should focus on the actual data collection skills. Training should include practice exercises with an emphasis on completing forms legibly and reviewing forms for completeness. The less structured the data collection tool, the more skilled the data collector will have to be.

**Data collection for MDR**

The main approach is a single-facility–based review that collects data from only that site. However, if a woman who died there had received care at any other facility, the additional records would ideally also be abstracted. Having additional information from the woman's family, although more difficult to obtain, is potentially extremely valuable, and every effort should be made to interview family members. The main sources of data in a community-based review are interviews with the family, neighbours, community health workers and any others who might have relevant information. If the mother had received any health care, health records should be reviewed to provide further insight. The data collected should include a summary of the chain of events that led to the maternal death, using corroborated information from facility records and family interviews.

**MDR data summaries**

The purpose of the MDR is to gain an understanding of the problems that led to a maternal death – knowledge that can be used for action. Achieving this will depend on the type and quality of data that have been collected, the care taken in preparing and reviewing the case summaries, and the insight provided by a brief analysis of each death. Data should be presented to the review committee in a qualitative fashion that describes the course of the mother's pregnancy and includes descriptions of where and how care was provided. Essential interventions that took place at all levels and any problems that may have contributed to the mother's death should be accurately described, that is, from the home to the community and at each point of health care.

A written summary of each death, including key findings, should be prepared for the review committee. This summary uses data from all sources and, although it is concise, it includes all relevant information, both medical and nonmedical, as well as standard demographic data. The case summary should begin with some common, defined variables, such as mother's age, tribe, education, and parity and the gestational age at death, if applicable. This information is usually followed by a narrative

describing the events that led up to the maternal death. Summary writers should have a strong medical background, particularly concerning pregnancy and neonatal health issues, as well as an appreciation of the roles medical and nonmedical factors may play in maternal deaths. An experienced physician, senior obstetrics nurse, or nurse midwife is the most appropriate person to perform this task.

Case summaries should present objective and de-identified information (i.e. without any identifying data regarding the patient, health care providers, or facilities). De-identification should be performed after data collection is complete. Although the identity of the facility is obvious for single-facility–based reviews and the identity of the patient and health-care workers who provided care may be known, this precept should be adhered to as much as possible.

**The review process**

As recommended by WHO, each case of maternal death has to be reviewed by the MDR committees at the facility, community, district and national levels. After receiving the mortality summary report, the committee at the district level should conduct the preliminary review: 1) to check the completeness and accuracy of the report and request additional information if needed; and 2) to determine causes of death, identify preventable conditions and associated factors, and suggest interventions. This national guideline mandates district and national MDSR committees to conduct the maternal death review on monthly basis. At district level, the MDSR Committee will review facility and community maternal deaths at the district referral hospital.

In strengthening the current MDR process, each district should assess its capacity to conduct reviews for all maternal deaths that have been identified and determine what additional resources may be needed. The district review team should have regularly scheduled meetings to review case summaries; their frequency should be based on the estimated number of maternal deaths in the district, availability of reviewers, and duration and complexity of the reviews. Ideally, local reviews should be conducted immediately for deaths in facilities, and within one month if more information is needed, so that early actions can be instituted to prevent future deaths. Ideally, reviews should take place as soon after the death as possible. However, this is not always possible and meetings are recommended to be held once monthly.

Case summaries to be discussed may be handed out at the beginning of the meeting or distributed in advance. The reviewers discuss the case, including the events that may have led to the mother's death, and clarify any details not included in the summaries by consulting the data forms brought to the meeting for this purpose. A rapporteur records the main points of the discussion without reference to specific persons or places to maintain confidentiality. A worksheet can be used to help ensure that the full range of possible problems is considered in the discussion. A brief report based on the committee worksheet should be completed for each reviewed death. The review committee's findings should then be coded and entered into the database with the rest of the data from that maternal death case.

In performing the review, the following **general principles** can help make the process more effective and efficient: 1) holistic thinking – the problems leading to maternal death are frequently not all medical; 2) focused review – only on those events that may have directly contributed to the maternal death; 3) normative review – care received by the mother is compared with explicit standards based on accepted local practice and best medical evidence; 4) synthetic review – grouping problems into general categories (e.g. lack of transportation to health-care facility) while keeping enough

information so that a specific preventive strategy can be developed.

The primary objectives of the MDR include identifying the medical cause of death, evaluating clinical care, and identifying nonmedical and avoidable factors. Looking further than just medical factors recognises that maternal deaths and actions required to prevent them are complex. For example, having access to clean water and sanitation practices in the household can prevent infection among mothers and their children; providing the mother or household members education could help prevent health complications; having quality care in communities can reduce the need for hospitalisation; and having sound primary-care referral systems can support appropriate and quality treatment in well-functioning and adequately equipped health facilities. Essential interventions addressing the problems affecting women and children therefore must take place at all levels: the family, the community, and the health-care system.

To examine trends and enable evaluations of the effectiveness of interventions across time and regions, obtaining cause-specific mortality data at various levels is recommended. Thus, MDRs should determine the medical or pathophysiological cause of death as specifically as possible and categorise it as a direct obstetric, indirect obstetric, or incidental (non-maternal) death. Whenever possible, causes of death should be encoded in accordance with ICD-Maternal Mortality classification. Precision in establishing the medical cause of death will depend on whether or not the woman was hospitalised.

The medical cause of death can usually be established from data recorded in medical records, including the patient record, admission and discharge data from various wards, case notes, details on treatment administered, procedures performed, autopsy results and, when available, copies of the medical death certificates retained in the facility. Interviews of hospital personnel involved in the woman's care may provide additional information that corroborates facts in the hospital record. This is particularly important in situations where there are questions on quality of care.

When a woman dies outside a medical facility, the probable cause of death is determined by gathering information from a close caregiver about the signs and symptoms of the deceased's terminal illness (i.e. verbal autopsy, or VA); any medical information that can be located (e.g. antenatal care book, records of hospitalisation prior to her death) may complement information collected through verbal autopsies.

Probable cause of death is most commonly based on independent reviews of the VA data by local physicians who try to reach consensus. This process follows a model closely analogous to clinical practice in which history, signs and symptoms are used to construct a differential diagnosis. Concerns over physicians' agreement and variability of their methods of interpreting evidence make comparisons of cause-specific mortality between regions and over time difficult.

### Medical factors leading to death – the quality of medical care

The first referral level of care (District Hospital) should have the capacity to provide emergency obstetric care as defined by WHO. Having adequate capacity means that a facility has both the necessary resources and personnel with appropriate training. The investigation should include information about the medical management of the woman's condition so that the committee can determine if the recommendations and treatment were appropriate and the quality of care was adequate.

The quality of prenatal care – such as screening for risk factors or underlying conditions and education about the danger signs of pregnancy complications – also should be assessed. Likewise postnatal care if the death was after delivery. For both hospital and community deaths, the quality of care evaluation should include care given by CHWs, MCH Aides, nurses, midwifes, CHOs and physicians.

The investigation should determine whether a lack of resources or inadequate caregiver training contributed to the death. A complete investigation includes an assessment of whether norms or care protocols were available, followed and appropriate. Recommendations for changing or improving norms can be one result of maternal death surveillance and response.

When problems with medical care are identified, a clinical audit can be used to provide additional information on those particular areas. The audits seek to improve standards of care and patient outcomes by comparing current practice against agreed upon standards using explicit criteria. The audit's focus is on a particular component of clinical care or problem of interest. Quality of care criteria selected should represent a high level of standard of care. If criteria of best practice are set primarily in accordance with known current practices, the potential for improvements may be lost. At the same time, the criteria must be attainable and take into account the resources available. Several criteria that reflect best evidence-based practice should be selected. A chart review is then done to evaluate whether care given was in alignment with best practices.

Reviewing the care that women received should also be done in conjunction with a review of the level of expected service provision for the facility. For facilities that provide basic emergency obstetric care and experience a maternal death, the quality of care around administration of parenteral antibiotics, oxytocic drugs, and anticonvulsants for pre-eclampsia and eclampsia; performance of manual removal of placenta; removal of retained products; assisted vaginal delivery; and neonatal resuscitation should be evaluated closely where applicable to the maternal death context. For facilities that provide comprehensive emergency obstetric care, the same functions should be evaluated along with those for transfusion and obstetric surgeries. Reviewing maternal death cases in the context of the standard of service provision may highlight additional services that need improvement

**Nonmedical factors contributing to the death**

Interactions of several factors may contribute to a maternal death, particularly among the most vulnerable women. Nonmedical factors are often more important in determining whether a woman lives or dies than the medical cause of death itself. As previously mentioned, non-medical factors leading to death shall be examined along the '**Three Delays Model**'.

Most maternal deaths occur in the peri-partum period and may not be associated with pre-existing risk factors. Thus, women's knowledge of pregnancy-related danger signs and the health-care system's ability to diagnose a problem and refer women to appropriate facilities in a timely fashion when emergencies arise are paramount. In what condition did a woman arrive at the hospital? Was the referral timely or too late? If too late, what contributed to the delay? How long after her arrival did the woman die? Many deaths occur shortly after arrival at hospitals that provide appropriate emergency obstetrical care. These deaths are often associated with a late referral, including delays in recognising the problem, delays in making the decision to seek the appropriate level of care, and delays in reaching it.

Another approach is to examine the role of nonmedical factors and macro-structural determinants of health (e.g. health system factors, social and policy context).

**Determination of avoidability**

The assessment of causes of death, whether the death was avoidable and, if so, how it could have been prevented should be based on Sierra Leone's obstetric care norms and available resources, not on the standards used in more developed countries. Avoidability is a proactive concept, and any lessons learned should be applied to prevent future deaths from similar factors.

A maternal death can be classified as avoidable if it might have been avoided by a change in patient behaviour, provider/institutional practices, or health-care system policies. The determination of avoidability does not follow rigid criteria, and it is often open to interpretation. The MDR committee should discuss in detail all cases thought to be avoidable or potentially avoidable to identify the various factors that contributed to these deaths and issue appropriate recommendations. The following factors should be considered when assessing if a death was avoidable:

1. **Family/community level**

   Patient/family factors – did the woman and her family recognise that a problem existed, seek medical care – including antenatal care (ANC) and postnatal care (PNC) – and comply with any medical advice given? Community linkages – did the woman or her family have regular interactions with PHUs and CHWs?

2. **Formal health-care delivery system level**

   ***Focused ANC*** – determine whether the woman received ANC; if so, how many visit (at least 4 visits recommended), what content (according to Sierra Leone's guidelines) was included, if information on signs and symptoms of complications was given, and what risk factors and medical problems were correctly identified and addressed.

   ***Postnatal care*** – determine whether the woman received PNC according to the national guidelines.

   ***Hospital factors*** – determine whether infrastructure development is adequate, essential obstetric functions were available at the first referral level, appropriate protocols/norms were in place, resources and supplies were adequate, and care was available regardless of the ability to pay.

   ***Health-care provider factors*** – determine whether staff members were available and adequately trained, if the treatment was timely and done correctly, and if providers were sensitive to the social and cultural values of the patient and her family.

3. **Inter-sectoral level**

   ***Transportation factors*** – assess if transfer was hindered by availability of transport, adequacy of transport, road conditions, ability to travel at night, or lack of funding.

   ***Communication and IT factors*** – assess effectiveness of communication at community and facility levels (availability of telephones, toll-free telephone numbers, mobile telephones for CHWs, computers and computer training at facilities, etc.).

4. **Gender-related issues** – assess social and economic barriers related to the status of women, women's literacy level, and gender-based beliefs and practices that may be a root cause of poor

service utilisation.

Reviewed deaths can be classified into three categories: "**Not Avoidable**", "**Potentially avoidable**" and "**Undetermined**". For those that are potentially avoidable, a plan of action must be included for avoiding deaths in the future. This plan should detail actions to be taken in the ante partum, intra-partum and postpartum settings. It should include actions for the community, for care sites – antenatal care, facility care, emergency care – and for providers. Actions may focus on the systems in place and be broader than specific occurrences or providers.

### Recommendations

Every case review must include recommendations for preventing future deaths. Based on information obtained from the investigation, the committee makes recommendations to prevent future deaths. This link to action has been a weak point in the Sierra Leone MDRs and this guideline recommends maximum focus to ensure implementation of all MDR recommendations. Facility reviews will usually focus their recommendations on both the facility and, at some level, the community. District reviews may result in broader recommendations. While some recommendations for these two levels may overlap, usually they will be tailored to the specific location and appropriate for different stakeholders, depending on where decisions can be made and actions can be realistically taken. As cases accumulate and patterns emerge, especially at the regional and national levels, interventions can be prioritised according to which will have the greatest impact.

Recommendations should be specific and link with avoidable factors. More useful recommendations will focus on the type of response, its implementation, and how to improve the review process. For example, a facility-based response will be needed if the maternal death occurred after haemorrhage and the woman did not receive a transfusion because there was no blood available. The facility may not be able to store blood, and the recommendation could include ensuring safe blood is always available by establishing the capacity to store blood with screening on site.

Committees' recommendations on how to improve response implementation can be very useful. Committees should also provide feedback on how to improve the review process itself. They may suggest adding members or changing the frequency or location of the MDR. Their recommendations should be encouraged.

One person should be designated as responsible for each recommendation, and an implementation timeframe and measurable outcome should be defined. A response committee can be formed to work on implementation of recommendations to improve both the response and the review cycle. Some members of the MDR committee may also be part of the response committee. However, they should recognise that the roles differ and that the response committee's role is to ensure that recommendations are carried forward into actions.

### Debriefing and staff support

Maternal Death Review is an emotional experience for all involved parties. All health-care providers who have been involved in a maternal death case carry the burden of that death with them. Involved staff, whether as part of patient care or the review process only, may need time to process the review emotionally. Providing additional time and support, including counselling, is an appropriate intervention to allow staff to recover. Focusing on the positive aspects of the review can be helpful to those involved because it will help them see the benefits of preventing the next potential death.

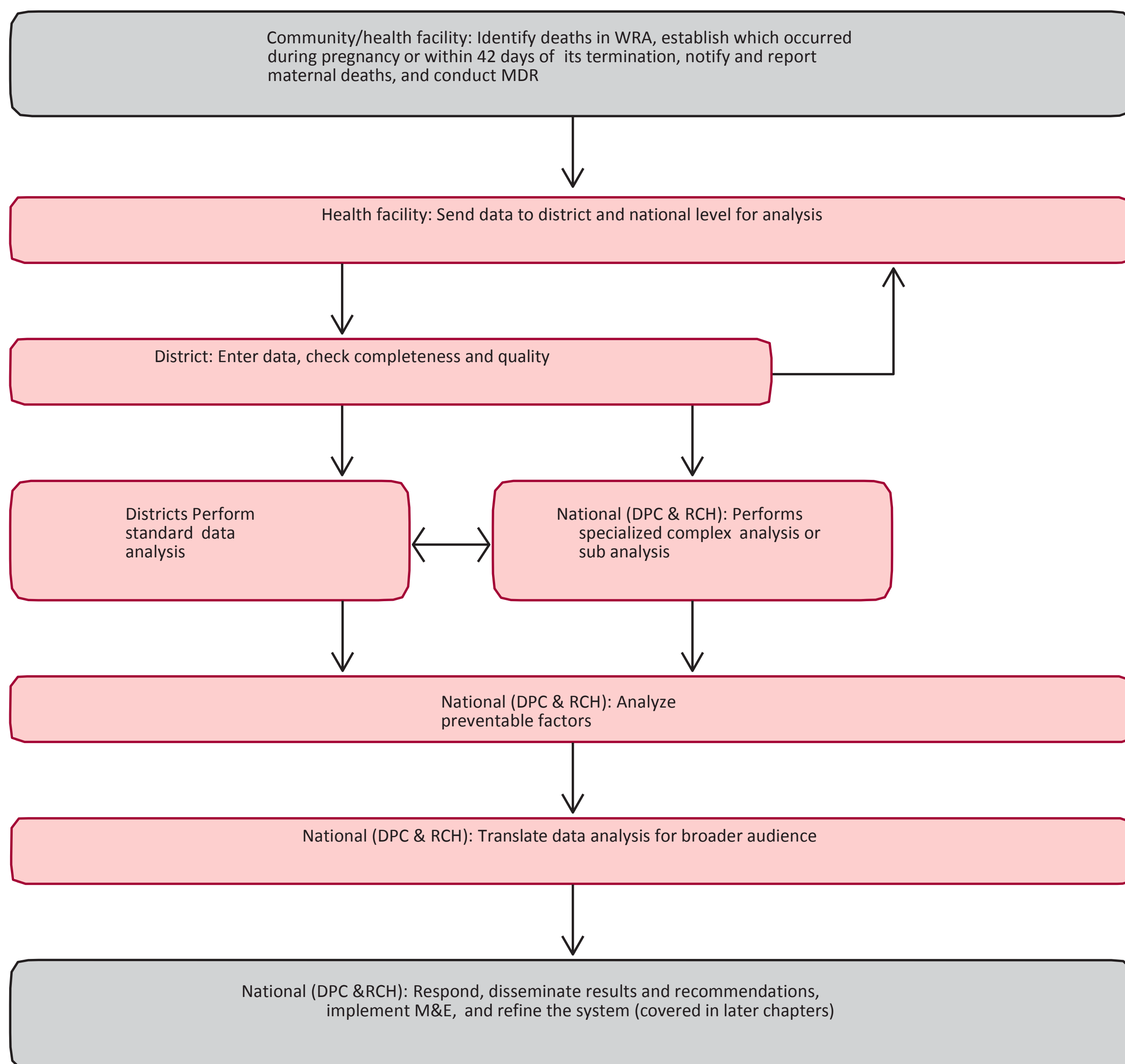
**Reporting**

Data files, instruments/tools, and review summaries stripped of personal identifiers are kept in locked storage spaces at the district level and given unique identifiers or case numbers. Findings and recommendations resulting from each review process should be abstracted and sent periodically to the national and community level. Transmission may be done by emails and text messages. Abstraction forms, definitions and instructions should be streamlined and aligned across all levels. Abstracted individual de-identified data are aggregated at the national level and analyses of levels, trends and contributing factors are performed.

# 6. Analysis – data aggregation and interpretation

Data analysis and interpretation of results are critical components of any surveillance system that guides and orients appropriate public health measures for prevention and health promotion. Figure 6.1 reviews the analysis process.

FIGURE 6.1 **Analyse and interpret MDSR**




## Data analysis

Team members involved in the analysis of aggregated data should have appropriate epidemiological skills. If these are lacking, trainings or other technical support to increase a local staff's skill levels

should be arranged in advance. The initial data analysis should be performed by those with appropriate analytical skills at the level closest to the community. This should occur, at a minimum, at the district level. Health facilities with a large volume of deliveries (500 or more annually) should also be able to perform descriptive analyses of facility-based maternal deaths. Analyses at the facility level will have different functions and corresponding responses than those at the district and national levels. All facilities should know their facility-specific number of maternal deaths, and each should be able to calculate indicators for the facility and report on the causes of deaths that occur there. Each maternal death should be considered a sentinel health event that automatically triggers the question, "Why did it happen?" and, when appropriate actions are available, immediate responses should be set in motion. The aim of aggregated data analysis should be to identify causes of death and subgroups at highest risk, identify factors contributing to maternal deaths, assess the emerging data patterns, and prioritise the most important health problems to improve the public health response. Standardised cause of death aggregations to improve data comparability are suggested in ICD-MM.

### Data entry, quality and completeness

In preparation for analyses, a clear framework for data transmission, aggregation, processing and storage must be defined. For example, it is suggested that the district will receive a maternal death notification form 24-48 hours of the occurrence. The district will then assign a maternal death number, retain files in secured storage with a password, and assemble the MD review team. A visit to the facility (or to the family in cases of community death) will be scheduled within 7 to 14 days of notification and will include the processes of a maternal death review as previously described. Each review will produce de-identified MD reporting forms (case summaries) that will be sent back to the district. Abstraction forms in hard copy will be entered at regular intervals in a maternal death database and compared with all maternal deaths reported through the maternal death notifications (from facilities, communities, or the IDSR system). Each summary form shall contain all detailed information obtained from the facility registers and records and health-care providers who had contact with the deceased. Summary forms based on verbal autopsies will be adapted to the content of the family questionnaires. At the national level, a database manager/M&E will check for completeness, individual item code validity, and inconsistencies between data items and will enter the summary forms in the maternal death database. The DMO/DHS will also verify coding and other database errors that may need to be corrected. The review team will be notified of any problems, if necessary, including inconsistencies or inadequate reporting of certain items. The maternal mortality review team will also be informed of any differences noted in the number of entries and asked to verify the counts or to determine the nature of the inconsistencies. The database will be used for analyses of all the reviewed maternal deaths. Access to the database will be password-protected, allowing only authorised personnel to perform analyses. Back-up files will be retained in secured, locked areas. Data from the maternal death database and de-identified case summaries will be kept and used in the analysis. The original notification and review forms may be destroyed within three months.

The following factors are **prerequisites for performing MDSR analyses:**

1. Knowledge of surveillance (sources, mechanisms, data collection instruments, completeness of reporting, abstraction, data entry and validation).
2. Good understanding of the indicators to be calculated and denominator issues.
3. Keeping up with changes over time in case definitions, detection or data collection methods.

4. Knowledge of the limitations of the data; factors such as incomplete coverage, poor data quality, or changes over time in data processing procedures may also influence the analysis.

Case detection changes (e.g. introduction of mandatory notification, active case detection and improvements in awareness of reporting) also influence surveillance findings. Modification of data collection instruments should also be taken into account when interpreting trend data.

### Analytical plan and indicators

Formulating an analytical plan in advance is important for guiding the analytical process and identifying problems in the health system that may contribute to maternal deaths, especially those that are amenable to change. The plan should include: the identification of appropriate and feasible indicators prior to data collection; guidelines to calculate rates, ratios, and proportions and how to display data in tables, graphs and charts; and methodological notes on how to compare rates with expected values, reference rates, and baseline rates and how to use statistical probability methods to determine whether apparent differences in rates are significant. Interpretation of the findings should focus on aspects that will lead to prevention. The ability to provide data for action depends on both the type and quality of data that have been collected and the completeness of the analysis. Obtaining external data, including total number of births, total number of WRA population size, and geographical location of existing health services (including EmONC), is essential for calculating selected surveillance indicators.

Indicators to be calculated and analysed by MDSR may include: 1) measures of magnitude, such as the number of maternal deaths, incidence (maternal mortality rate, maternal mortality ratio), maternal deaths as a proportion of deaths to WRA (i.e. proportional mortality rate among WRA), and lifetime risk of maternal death; 2) cause-specific mortality measures such as cause-specific mortality ratios, cause-specific proportionate maternal mortality, and case fatality rates; and 3) measures of preventability (proportion of maternal deaths due to avoidable factors).

TABLE 6.1 **MDSR indicators (adapted from MDSR Technical Guidance)**

| IMPACT INDICATORS | AVAILABILITY/ACCESS INDICATORS |
|---|---|
| Maternal mortality ratio | % of deaths that occurred within 24 hours of arrival at facility |
| Maternal mortality rate | % of deaths among women who were delivered by skilled birth attendant/facility delivery |
| Proportion of deaths to WRA that are maternal | % of deaths among women who had recommended prenatal care |
| Proportion of maternal deaths by medical cause of death (haemorrhage, eclampsia/pre-eclampsia, sepsis, abortion, obstructed labour, other direct cause, indirect causes) | % of deaths where limited drugs and/or supplies was a factor |
| | % of deaths where limited skilled staffing was a factor |
| | % of deaths where guidelines/protocols were not followed |
| Case fatality rate | % of deaths for a given complication |
| Proportion of maternal deaths with avoidable factors | % of deaths where lack of transport was a factor |
| | % of deaths where health-care costs were unaffordable |
| | % of deaths where lack of recognition at the community level was a factor |
| | % of deaths where delay in referral was a factor |
| | % of deaths where lack of transfusion services was a factor |
| | % of deaths where lack of life-saving drugs was a factor |

**Descriptive Analysis**

As in other mortality surveillance systems, MDSR should include basic descriptive analyses by **person, place and time**. In addition, other factors should be considered with data collection instruments that capture the related information.

**Analysis of medical causes, nonmedical contributing factors and preventability of deaths**

In Sierra Leone, 68% of all maternal deaths are due to haemorrhage (46%) and sepsis (22%) (MDR Report, 2014). Other maternal death causes include eclampsia, obstructed labour and unsafe abortion.

Documenting the frequency of health service and nonmedical factors that have contributed to the maternal deaths is a priority in MDSR analysis. Examination of these factors provides insight into the preventability of each death. Interviewing family and community members and health-care personnel and reviewing medical records can provide a clear picture of the circumstances both outside and inside the hospital that contributed to the death. Grouping the findings from death reviews, especially related to circumstances surrounding the death, and looking at them quantitatively provides information about which problems are most common. Grouping may include age, medical history socioeconomic and cultural factors, health status of the woman, health care behaviours, access to and availability of adequate health services, quality of care and availability of supplies.

TABLE 6.2 **Contributing factors to maternal deaths**

| **Community-based factors** | **Health service factors** |
|---|---|
| Lack of awareness of danger signs of illness | No health service available or nearby |
| Belief in use of traditional remedies | No staff available when care was sought |
| Geographical isolation | Medicine not available at the hospital; dependence on family to provide it |
| Lack of transportation or money to pay for it | Lack of clinical care guidelines/protocols |
| Other family or household responsibilities | Woman not treated immediately after arriving at the facility |
| Cultural barriers | Lack of necessary supplies or equipment at the facility |
| Belief in fate controlling outcome | Lack of staff knowledge/skills to diagnose and treat the mother |
| Dislike of or bad experiences with health-care system | Long waiting time before qualified staff could see the mother |
| | No transport available to reach referral hospital |
| | Poor staff attitude |

Analyses may reveal patterns of problems that should be used to help group them into broader categories. For example, a large number of deaths may occur among mothers who had but did not appreciate warning signs of illness, such as infections, headaches or swollen legs. The intervention to prevent such deaths (i.e. education of the mother, family and community about the symptoms of illness at prenatal care visits and through community education) is the same no matter what the medical cause. Logically, there would be a problem called "lack of knowledge concerning danger signs." Contributing factors may be grouped as: 1) women and family factors (e.g. delay in recognising problems, delay in seeking medical care, unwanted pregnancy, no or inadequate use of ANC, lack of a birth plan); 2) service provider factors (e.g. substandard ANC or delivery care by type of provider); and 3) health facility factors (e.g. inadequate number or distribution of facilities with EmONC; lack of blood transfusion services, drugs, supplies and equipment, or anaesthesia; lack of transport for referrals).

Other contributing factors could be grouped around the "**Three Delays**" analysis framework adapted by Sierra Leone. The model proposes that pregnancy-related mortality is overwhelmingly due to delays in: 1) deciding to seek appropriate medical help for an obstetric emergency; 2) reaching an appropriate obstetric facility; and 3) receiving timely, adequate care when a facility is reached. Often, multiple delays contribute to maternal deaths, and responses should prioritise interventions to maximise impact. However, improving the quality and scope of care available at existing medical facilities will have the greatest impact on reducing needless maternal deaths. Reviewing data may lead policy-makers to target actions for each avoidable factor.

### Trend analysis

Ongoing maternal death surveillance can provide more detailed information about changes over time; reporting efficacy improved over time. District and national levels should generate trend analysis data on maternal deaths on annual basis.

### District- and national-level analysis

Specific analyses can be conducted at a district level to identify patterns and trends. These may be used to influence district action and response.

Similarly, a countrywide mapping of maternal deaths can help provide a national overview of the situation and be used to determine which districts are in greatest need and to monitor trends over time.

Maps can help answer various questions related to mortality-specific data ("where?", "what patterns in distribution exist?", "what has changed?") as well as how they relate to population settlements, existing social and health services, and the natural environment.

### More complex analyses

Specific questions that arise may require more complex or customised analytical approaches beyond those routinely performed. Time series analyses and analyses using Geographical Information System (GIS) are very valuable approaches that should be considered when appropriate resources exist.

At the facility, district and national levels, analyses should be performed regularly to identify changes in maternal death reporting. These analyses can be performed using standard approaches (e.g. tabulating reports manually and filling in a summary data sheet) or running a standard computer programme to generate a summary report. Findings should be reviewed regularly and fed back to medical providers and others in the community who are asked to report cases. Only small numbers of deaths may be found in some areas, but obtaining information for action from even one or two cases is important; this can be achieved through various strategies. Aggregating local data at the district level can provide adequate numbers for analysis. Data can also be collected over a greater period of time. In general, data should be tabulated at monthly, quarterly or annual intervals. Small numbers should be compared with calculations of the estimated number of expected maternal deaths. If actual numbers differ from expected, a closer examination should be done to determine why. Lower than expected numbers may indicate that there may be additional deaths not captured by the system.

### Automated analysis

Computer programmes can be designed to run analysis and produce standardised tables, graphs and maps, which may enhance the use and reporting of data. Although the system will require an initial time investment for designing the automated analysis, doing so will often save time in the longer run. A critical eye must review the data entered, as well as the output, to ensure that the data makes sense. Programme maintenance and plans for updating source data and programme codes should be integrated into the data management plan.

### Translation

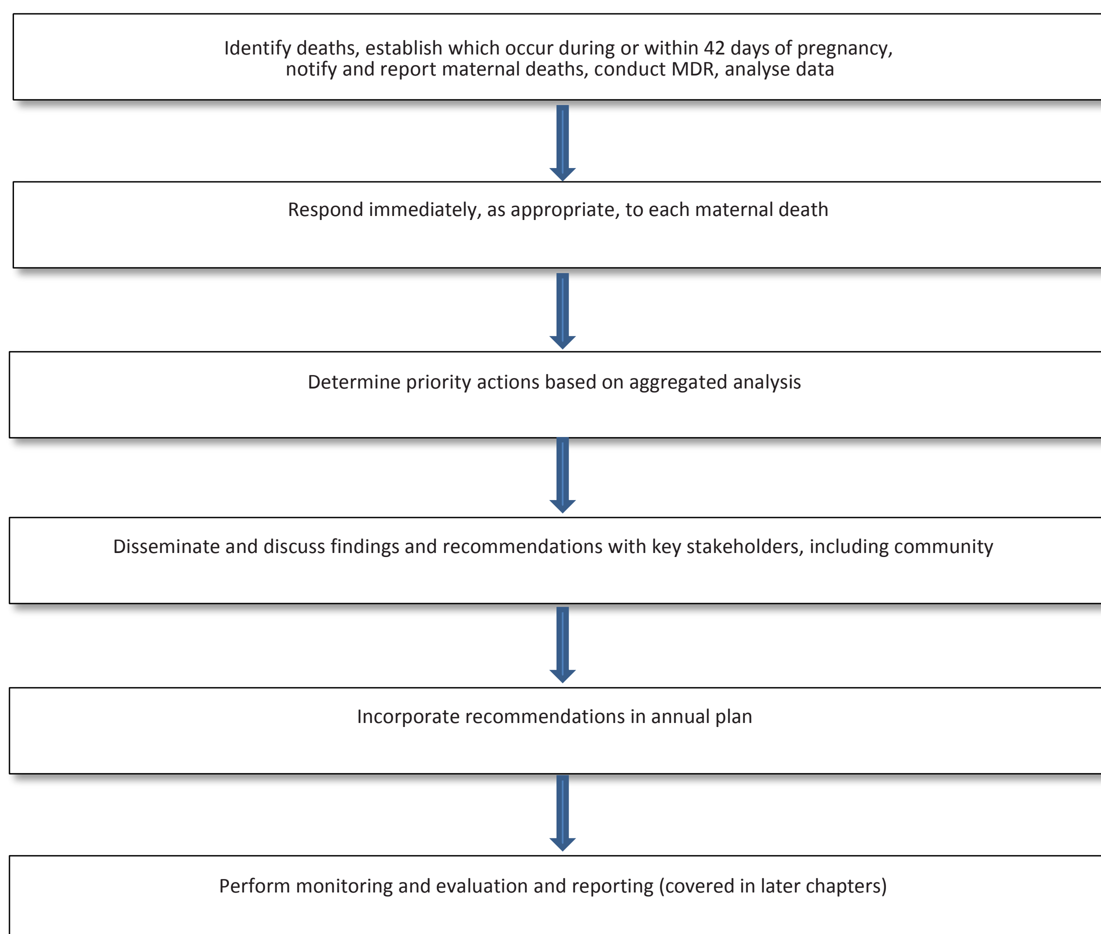
An important part of MDSR is the translation of surveillance data into information that is meaningful for decision-makers, the medical community, and the public. The interpretation of

MDSR data forms the basis for public health or policy action and requires clear presentation of often complex issues. In addition to identifying magnitude, geographical distribution, changes in cause of death, groups at high risk and contributing factors, the analysis is instrumental in monitoring and evaluating response and detecting the impact of changes in health-care practices and health-seeking behaviours.

# 7. Response

The primary objective is the ***Response*** to reduce maternal deaths due to preventable causes. This chapter describes types of responses that may be needed to address the problems found by MDSR approach. It discusses criteria that can be used to prioritise recommendations proposed by the MDSR committees. Although aggregated data provides robust information about problems shared by many facilities and districts, every maternal death provides information that can result in actions to prevent future deaths. Thus, the response steps for MDSR.

FIGURE 7.1 **MDSR Response**




## Timing of response

***Immediate response***

Findings from reviews of nearly every maternal death can lead to immediate actions to prevent similar deaths, especially those at health facilities, by identifying gaps that should be addressed quickly in both health facilities and communities. Maternal deaths in health facilities often indicate necessary improvements in quality of care, such as ensuring adequate coverage of emergency services by skilled providers, addressing the lack of essential obstetric medications or supplies, improving knowledge or skills of providers in the management of obstetric emergencies, or improving services such as antenatal care or family planning. Deaths in communities can also identify some actions that can be

implemented quickly. There is no need to wait for aggregated data to begin implementing actions.

#### *Periodic response*

Monthly, quarterly, or semi-annual reviews (depending on numbers) of aggregated findings should take place at larger health facilities and at the district level where a MDSR Committee will be established for this purpose. This committee should look out for a pattern of particular problems contributing to maternal deaths or particular geographical areas where they are occurring in greater numbers. Such observation should result in a more comprehensive approach to addressing the problem across multiple facilities or multiple communities. Where districts or chiefdoms at greater risk are identified, discussion with the involved communities and their leadership could be a priority to identify solutions.

#### Response at the health facility level – Improving quality of care

A maternal death in a health facility should be extremely rare. Each death, if properly reviewed, should identify systemic problems that contributed and can be corrected. These include *1) staffing levels* – whether the staff (including midwives, physicians, nurses, lab technicians, anaesthetists, administrators etc.) is sufficient to meet the demands for quality maternity health care, including EmONC; *2) knowledge and skills* – including those of all staff members who are involved in providing care or supportive services; and *3) deficiencies related to infrastructure and supplies* of blood, medications, equipment and other items that may have led to inadequate management of the woman's complications. Each facility-based death should prompt at least one immediate action to correct the contributory systemic problem(s) identified. The hospital-based MDSR system will contribute to the continuous quality assurance process.

### *Annual response – recommendations incorporated within annual maternal health plans*

#### Health facility

Every health facility should summarise its maternal mortality findings annually. In larger facilities where multiple deaths may have occurred, the findings should contribute to continuous quality improvement plans. Larger facilities should also assess the effectiveness of the implementation of MDSR recommendations and whether they are contributing to a reduction in maternal mortality.

#### District level

Findings from the analysis of aggregated data and the aggregated recommendations from maternal death reviews are incorporated in a district report that should be disseminated and discussed with key stakeholders, including those in the community. Actions are prioritised based on both their potential impact on reducing maternal mortality and their feasibility, including costs, resource requirements and ease of implementation. To increase equity and more efficient use of limited resources, actions are focused on specified risk groups. The recommendations for action are then included in an annual district maternal health plan.

Possible district-level actions include strengthening the health-system and retaining staff, mobilising resources, increasing community and institutional awareness of maternal mortality, fostering community–facility partnerships and building alliances with the private sector, and conducting advocacy activities.

### National level

Likewise, findings from the analysis of aggregated data and recommendations from maternal death reviews in all of the districts are incorporated in a national report that is then used to develop a national maternal health plan. At the national level, a longer-term strategic plan (3–5 years) often is developed to focus on key priorities identified in many districts or on key geographical areas where more women are dying or the risk of dying is greater. Actions may include allocating required resources to the most affected areas and populations. Actions at the national level may also include changing or updating national policies, laws or guidelines.

### Response actions

The response should be culturally appropriate and specifically tailored to address the problems identified in the community, health facility, health-care system (knowledge, practices, resources, communication), or inter-sectoral (or systems) level. The confidentiality of the deceased and their care providers is an important consideration. The type of action taken will depend on the level at which decisions are being made, the findings of the analysis, and the involvement of stakeholders. Interventions will be affected by the developmental level and resources of the country and the availability of technologies. These factors will determine which mixture of strategies will suit the particular circumstances.

BOX 7.1 **Guiding principles for response**

- Start with the avoidable factors identified during the review process
- Use evidence-based approaches
- Prioritise (based on prevalence, feasibility, costs, resources, health-system readiness, health impact)
- Establish a timeline (immediate or short-, medium-, or long-term)
- Decide how to monitor progress, effectiveness, impact
- Integrate recommendations within annual health plans and health-system packages
- Monitor to ensure that recommendations are being implemented

Possible actions include interventions in the community, within health services and in the public sector. Findings from the community may indicate the need for developing health promotion and education programmes as well as possible changes in community service provision; changing home practices or the attitudes of health-care providers; or improving infrastructure such as roads, bridges and communication technology.

Addressing some findings, such as the last mentioned, may require longer time for planning, obtaining the necessary government support, and implementing recommendations. Information from health-care facilities may point to the need for changes in clinical practice or modification of service provision. The required actions may be in the area of direct patient care, such as revising clinical guidelines for care or promoting management by protocol. They may be at the health system level, such as providing the necessary drugs and blood supplies or adding personnel at a health-care facility.

Information from the findings of aggregated data analysis can cover all these issues on a wider scale and be used at institutional, local, district and national levels by politicians, health service planners,

professionals, public health personnel, educators and women's advocacy groups. Such analysis should lead to stronger maternal health programmes.

### Importance of evidence-based interventions

The actions recommended for addressing identified problems should be evidence-based, thus providing a firm basis when advocating for the priority recommendations.

For example, if clinical guidelines or standards have to be developed, they should be based on the best available evidence. The WHO Integrated Management of Pregnancy and Childbirth (IMPAC) guidelines can be easily adapted for this purpose, particularly in resource-poor countries.

Interventions from WHO evidence based guidelines that can be used to prevent maternal deaths. These include facility (referral and first level) and community clinical interventions. Addressing preventable conditions should take priority. Using locally relevant strategies will increase the likelihood that the intervention will be successful.

### Evidence-based community actions to address avoidable factors

Community interventions like health education can also have a substantial impact on improving maternal health. For instance, health talks given to women, men, families and communities on key topics including sexual and reproductive health, nutrition, HIV, family planning and unwanted pregnancy, consequences for unsafe abortion, advice on labour, danger signs and emergency preparedness.

### Where evidence is lacking

Not all problems identified during the review and analysis have evidence-based solutions, particularly those related to family, community, transportation and access to care. Finding innovative solutions is more likely when the community participates and provides input. Ideally, actions taken that were not based on known evidence will be evaluated to ensure they are having the expected effect.

### Response prioritisation

Not all problems identified can be tackled simultaneously, so prioritising them is important. A range of characteristics should be considered when prioritising problems and their solutions. One important factor is prevalence – how common is a problem? Resolving common problems may have a greater impact than resolving unusual problems. Another factor is the feasibility of implementing the intervention. Is it technologically and financially possible? Are there sufficient human resources? What are the costs? Finally, what is the potential impact of the intervention? If it were successfully implemented, how many women could be reached and how many lives saved?

### Role of Response Coordinator

Identifying someone to facilitate responses at each level (e.g. facility, district, national) and ensure that action will be taken is helpful. Response coordinators are usually on the staff of the MCH Department involved in maternal health. Their work in implementing a response plan includes identifying roles and responsibilities (e.g. educating the community on signs of obstructed labour may best be done by a community health worker) and helping improve communications necessary for actions to be taken at multiple levels (e.g. improving the availability of obstetric medications will require involving hospital

management in coordination with those who are responsible for supply chains at the national level). Responses may change over time, so it is important to allow for flexibility during the planning process.

The response coordinator should also monitor the implementation of the actions that have been agreed upon and report progress back to the maternal mortality committee. Conducting regular, periodic all-stakeholder meetings is worthwhile at both the national and district levels. These meetings can be used to share information, particularly that related to response – what works, what does not – and to share new and innovative solutions that have been identified by providers and communities. Community health workers, such as traditional birth attendants, are important stakeholders. Their involvement is critical for successful translation of recommendations to the community.

### Advocacy

Successful advocacy requires rigorous, in-depth research; careful planning; and clearly-defined, practical goals. It must have a clear purpose, well-framed arguments, and sound communication with audiences. Effective advocates carefully survey the landscape (political, social and economic) before getting involved. The evidence and stories behind the maternal deaths are the ingredients for powerful and effective advocacy.

Influencing change through advocacy takes many different forms: simply exposing the extent of a problem; demonstrating patterns and trends and identifying their causes; describing education and training needs and bottlenecks (such as having poor access to drugs); identifying gaps in or absent protocols or policies; and showcasing improvements in health services and quality of care as a result of the MDSR process. Providing stories that support efforts to increase awareness of women’s needs is one way for the MDSR to support the case for more or different resources. Through media, stories can be used to create awareness. Advocacy efforts also can be multifaceted, such as those used by the Campaign for Accelerated Reduction of Maternal Mortality in Africa (CARMMA). There are many other advocacy methods. Choosing the best option depends on what changes are needed and the most effective route for making them.

# 8. Dissemination of results, recommendations and responses

Ensuring government accountability for improving maternal health requires the periodic and transparent dissemination and discussion of key results – particularly trends in maternal mortality – among stakeholders, including the civil society at large. Progress reports on improving maternal health are generally embedded in annual health sector reviews. MDSR can provide important data to monitor progress in reducing a country's maternal mortality ratio.

Annual national and district reports that summarise MDSR results, recommendations and the response actions taken are critical components of MDSR. An annual report is also a response in and of itself, because it feeds into the planning process and can contribute to changing how systems work and incorporate new interventions on a broad scale. An MDSR report is a critical element of programmatic plans for maternal health improvements at the national, district and sub-district levels.

The two main types of reports from the MDSR system are annual reports on maternal deaths and reports on the monitoring and evaluation (M&E) of the system itself. The first provide information on the analysis of the maternal deaths, include recommendations, document the adequacy of the response – that is whether the recommendations were implemented, and describe accomplishments and challenges.

The M&E reports assess and evaluate the MDSR system itself and its capacity to respond. Evaluation should take place after the system has been running after a few months and when system changes occur, but not necessarily every year.

### Annual reports

Publishing a report is one of the primary ways to disseminate the findings and recommendations of MDSR. The report should be written in simple language, be easy to follow, and include the standard sections. Its scope, depth and breadth may vary, depending on the chosen approach and the number of cases reviewed. Reports shall be prepared at the district and national levels.

- An annual ***district MDSR*** **report** may have broad audiences: all the facilities involved in the review, other facilities in the area (public and private), policy-makers, community-based organisations, NGOs and teaching institutions, as well as national authorities and the public. The ***district MDSR report*** should also be distributed to political leaders in the area of the review, and individuals involved in local programmes in the district.
- A ***national MDSR*** **report**

A comprehensive annual MDSR report should be prepared for health-care planners and policy-makers for distribution to health-care workers, community representatives and others.

Summary reports should take the form of a simple newsletter or short booklet, with an introduction written by the Ministry of Health. New technology can be used to disseminate the key messages, such as text messaging short lists of key findings and suggested interventions.

BOX 8.1 **Standard sections for the annual district/national MDSR report**

1. Background of area covered by review
2. Characteristics of women of reproductive age in area
3. Characteristics of births in area (number, live or stillborn (fresh vs. macerated), birth weight, gestational age)
4. Maternal deaths by area of residence, mother's age, place of death (home or facility), tribe (MMR for each if possible)
5. Proportion of maternal deaths by medical cause of death
6. Case fatality rate (for facility deaths)
7. Contributing factors (quality of care, nonmedical, social) and their frequencies
8. Avoidability of maternal deaths
9. Recommendations for preventing future deaths
10. Review of recommendations from previous year and lessons learned (including implementation challenges)

### Develop and disseminate findings and recommendations

The dissemination of results must follow three principles and can make use of several channels:

1. findings and recommendations should always be fed back to the hospital, peripheral health unit or community where the information was collected;
2. feedback should be in an aggregated or de-identified form so the individual families or health-care providers cannot be identified;
3. legal safeguards should be in place to prevent the use of the review findings in litigation.

During data analysis, factors contributing to maternal deaths often become apparent early on. Specific recommendations should be developed and linked with plans of action and timelines. A report that contains actual recommendations is more powerful than one that suggests these be developed in the future. The quicker a final report is generated after the end of the reporting period, the more immediate its impact will be on local practice.

A plan for disseminating the results of MDSR should be determined in advance, although flexibility should be built in, particularly because the results will not be known until the data from the review are analysed. A key principle of any report, published or other- wise, is that the team involved in undertaking the MDR be fully involved in reviewing the report, developing the recommendations, planning and promoting their implementation, and acting as advocates for change. Recommendations and dissemination methods should be tailored to the target audience.

The published reports of findings should focus on ways to improve the system rather than single out particular errors. Before publication, the contents should be carefully reviewed to avoid breaches in confidentiality and misuse of information.

The information is disseminated using a variety of channels (sensitisation workshop, media discussions) to enable a wide range of people to access it and to ensure that the information gets to the right audience – namely, those who can act on the recommendations (health

partners, line Ministries). If specific causes of deaths are identified as particularly frequent, conferences or seminars can be held to educate health-care staff on remedies. The shorter the document, the more widely read it is likely to be. Similarly, reports published solely in professional journals tend to be overlooked by other interested people. Potential recipients should be identified in advance and the recommendations written in such a way as to be easily understood by a wide audience.

### Whom to inform of the results

The type of groups or individuals to consider when disseminating the review findings depends on the scope and scale of the approach used. The general principle is to get the key messages to those who can implement the findings and make a real difference towards saving mothers' lives. They may include:

- Ministry of Health and Sanitation;
- local DHMTs, community, district and national health-care planners, policy-makers, decision makers and stakeholders including District Council Officials, Paramount Chiefs and politicians;
- professional organisations and their members, including obstetricians, Sierra Leone Medical and Dental Association (SLMDA), Sierra Leone Medical and Dental Council (SLMDC), Sierra Leone Nurses and Midwives Board (SLNMB), Sierra Leone Midwives Association (SLMA), Sierra Leone Nurses Association (SLNA), ethics committee, anaesthetists and pathologists who are involved at each level;
- leaders in other health-care systems, such as social security and the private sector;
- health promotion and education experts;
- public health or community health departments;
- academic institutions;
- local governments;
- national or local advocacy groups;
- relevant Civil Society Organisations
- the communications media;
- representatives of specific faith or cultural institutions or other opinion leaders who can promote and facilitate beneficial changes in local customs;
- all participants in the survey.

### Dissemination methods

Reports are one of the more common and useful means of information dissemination. If problems are identified in the community, it is important that the people whose lives are affected are involved as participants in the process and are kept informed of the findings. This is true whatever the level of the MMR.

Methods include:

- Dissemination meetings
- Emails/ websites
- DHMT monthly meeting, Partners meeting

- MoHS Quarterly and Annual Review Meetings
- Letters
- Epidemiological and other bulletin

# 9. Monitoring and Evaluation of the MDSR system

### Framework for monitoring and evaluation

Monitoring and evaluation (M&E) of the MDSR system itself is necessary to ensure that the major steps in the system are functioning adequately and improving with time. Assessing the timeliness of the information and the coverage of the system is also important. Monitoring of the MDSR system is carried out at all levels (health facility, district and national) of the health system. A monitoring framework with indicators should be agreed to and indicators assessed annually.

### Evaluate and improve the system so it has an impact

In addition to the monitoring indicators that provide a quick snapshot of whether the system is improving, a more detailed periodic evaluation is useful particularly if 1) the indicators demonstrate that one or more of the steps in the MDSR process is not reaching expected targets, or 2) if maternal mortality is not decreasing. Because the main purpose of MDSR is to lead to action to reduce maternal deaths, the system is failing if this is not happening. A more detailed evaluation can also be used to assess whether the system can function more efficiently. Ideally, there should also be a periodic evaluation of the quality of information provided. Surveillance system attributes that are particularly important to evaluate for MDSR include acceptability, completeness, timeliness, data quality and stability.

#### Efficiency

A periodic evaluation should examine the efficiency of the system. This includes an assessment of its key processes: identification and notification, investigation, review, analysis, reporting and response, dissemination and whether there are barriers to their operation that should be addressed. IT solutions at district and national levels can help reduce inefficiencies and will require trained staff.

#### Effectiveness

Evaluation of effectiveness determines if the correct recommendations for action have been implemented, if they are achieving the desired results and, if not, where any problems may lie. Exactly how this evaluation should be carried out will depend on the particular circumstances in each community, facility or health-care system. It starts with a determination of *if* and *how* the specific MDSR findings and recommendations have been implemented and whether they are having the expected impact on maternal mortality.

TABLE 9.1 **Example of MDSR monitoring indicators and targets**

| Indicator | Example Target |
|---|---|
| Overall system indicators | |
| Maternal death is a notifiable event | Yes |
| National maternal death review committee exists | Yes |
| – that meets regularly | At least quarterly |
| National maternal mortality report published annually | Yes |
| % of districts with maternal death review committees | 100% |
| **Identification and notification** | |
| Health facility: | |
| All maternal deaths are notified | Yes |
| – % within 24 | >90% |
| hours Community: | 100% |
| % of communities with 'zero reporting' monthly | >80% |
| **Review** | |
| Community: | |
| % of verbal autopsies conducted for suspected maternal deaths | >90% |
| % of notified maternal deaths that are reviewed by | >90% |
| district: | |
| % of districts with a review committee | 100% |
| District maternal mortality review committee exists | |
| – and meets regularly to review facility and community deaths | Yes |
| **Data Quality Indicators** | |
| Cross-check of data from facility and community on same maternal death | 100% of deaths cross-checked |
| Sample of WRA deaths checked to ensure they are correctly identified as not maternal | 100% of WRA rechecked |
| **Response** | |
| Facility: | |
| % of committee recommendations that are implemented | >80% |
| – quality of care recommendations | >80% |
| – (…) | >80% |
| **Reports** | |
| National committee produces annual | Yes |
| report District committee produces | Yes |
| annual report | Yes |
| **Impact** | |
| Quality of care (requires specific | |
| indicators) District maternal | Reduced by 10% annually |
| mortality ratio | Reduced by 10% annually |

# 10. Development of an MDSR implementation plan

The final structure and scope of MDSR depend on the local context and challenges. Sierra Leone MDSR Implementation strategies should therefore be adaptable and easily customised to ensure feasibility.

Planning efforts must consider political will, strong leadership, national capabilities, limitations, logistical issues, budgetary realities and legal requirements. The MDSR guideline and tools provide a basic structure on which the country can build, taking into consideration the local realities and needs. Prerequisites to implementation are: intensive and inclusive planning and development of system-wide linkages and processes that foster communication and collaboration at all levels; agreement on the scale of coverage (facility-based maternal deaths or all deaths, national and district) and design of the system; assessment of the current situation, including mapping existing resources and identifying gaps; and identification of opportunities for cost-saving and achieving wider benefits.

The current status of each of the MDSR components (identification and notification, review, analysis and recommendations, response, dissemination and reports, monitoring and evaluation) should be assessed and a plan elaborated to develop those components that are absent, strengthen those that are already established, and expand the system over time to achieve complete national coverage.

BOX 10.1 **Classic Steps in planning a surveillance system**

1. Establish objectives
2. Develop standard case definitions
3. Determine data sources and the data-collection mechanism
4. Determine data-collection tools
5. Determine investigation and confirmation methods
6. Field-test methods
7. Develop and test analytical approach
8. Identify dissemination mechanisms
9. Assure use of analysis and interpretation

### Ensure an enabling environment

Evidence from countries that have maternal death notification and review systems shows that implementation of MDSR requires coordination and collaboration among multiple stakeholders operating within the surveillance system. Support for MDSR from MoHS leadership (Directorates of Disease Prevention and Control and Reproductive and Child Health) is essential. MDSR must be recognised as an important component of any MoHS strategy to reduce or eliminate preventable maternal mortality. The development of an implementation plan will usually start at the national level with the convening of a group of experts to develop and monitor the implementation process, usually from within the RCH or Reproductive and Child Health Directorate. Under the stewardship of the MoHS, roles and responsibilities of various departments and ministries should be identified. Understanding the linkages and interfaces between ministries and their interaction with the private sector is critical to the development of multi-sectoral coordination and response.

Active involvement of and support from health-care providers (obstetricians, other clinicians, midwives and nurses, laboratory technicians, anaesthetists) is critical, particularly for understanding and identifying solutions for the problems that contribute to maternal deaths in health facilities. However, the participation of

other first-line specialists (hospital administrators, epidemiologists, information system specialists, health planners, M&E personnel) is also very important. Collaboration between various sectors within the health system and the engagement of households and communities as partners and beneficiaries of health care enhances the likelihood of success.

### Regulations and confidentiality

An MDSR system is more likely to be successful if certain regulations and legal protections are in place. First, notification of a maternal death should be mandatory. Second, a ministerial decree is usually needed to establish the MDSR system, including the national MDR committee and dissemination of results to government entities, civil society, professional organisations, NGOs, donors, etc. Third, legal provisions related to confidentiality and medical liability should be in place. In some areas fear of lawsuits has led to the abandonment of maternal death reviews. Exploring ways to increase legal protection and provide anonymity may encourage health-care workers to provide information and participate in the review process. Professional organisations can play an important role in ensuring medical practice is aligned with accepted standards and providing legal protection for their members. Implementers should also identify any legal regulations that may affect dissemination of findings. Reviewing patient health records, speaking with family members or friends, and interviewing health-care workers may also require the adoption of regulations.

### Assessment of current situation

An assessment of the current situation provides the starting point for an implementation plan. Sierra Leone has already implemented some components of MDSR (such as MDR). This is an opportunity to take stock of the current status of each of the MDSR steps – identify and notify, review, analyse, and respond to maternal deaths – and to assess successes and challenges for each one. This will include an assessment of the coverage of MDR (nationwide or only in certain districts, at facilities or community based), the quality of the information being produced, and its utilisation for actions that reduce maternal deaths. Information collection will also depend on the anticipated next steps. The MDSR monitoring indicators should be assessed and will serve as a baseline for monitoring progress.

After documenting the current status of the MDSR system components, realistic long-term (3–5 year) goals should be established, along with annual benchmarks for monitoring progress towards reaching the goals.

### Existing health information infrastructure

Information on maternal deaths is collected from health facilities and communities. It is important to understand the systems used in these two primary sources for providing information related to maternal death. Likewise, the flow of information to the district and national levels, and how data are aggregated, should be mapped. The coverage of the information system network for both facilities and communities should be assessed. Key questions include:

- What components of MDSR are already in place and where?
- Is maternal death a notifiable event?
- What percentage of deaths is estimated to be notified from health facilities and from the community?
- If more than one system that reports maternal deaths is currently in place, how do these systems interact?
- What is the status of the vital registration system and how does it interact with MDSR? Does the death certificate include a checkbox for pregnancy?

- Is IDSR in place and, if so, does it report the number of maternal deaths?

Assembling and examining all relevant, available data or other sources of information (such as informal surveys) on maternal events and health-care services in the proposed surveillance areas is also useful. Types of information that could be helpful include the approximate number of deliveries and maternal deaths, their distribution by place of occurrence (home; health centre; public, private, or other type of hospital [including level]), and estimates of distribution of deaths by cause. These resources will assist in the analysis phase.

### Resources, logistics and technology

Notifiable events should be reported quickly, ideally within 48 hours. Determining if this is feasible will require an assessment of the communications technology available in communities, at health facilities and districts. Cellular telephones are increasingly permitting communication with previously isolated communities. At health facilities, cellular telephones, radios or e-mail can be used. Likewise, data collection benefits from using computers, tablets or other hand-held digital devices. This can shape the communication mechanisms used for reporting deaths as well as the responses designed for intervention. Identifying the current state of resources (human, financial and technological) that are available for use and anticipated changes in resources is important.

For MDSR to be successful, specific people must be assigned to supervise the work and ensure the processes are working smoothly, data are of adequate quality, recommendations are being implemented, and reports are disseminated to the appropriate authorities, civil society, professional organisations, etc. Hiring an adequate number of people to carry out the required tasks is essential.

### Phased approach to MDSR implementation

Implementing an MDSR system can seem daunting. Using a phased approach that breaks the process into more manageable pieces can be helpful. Achieving key benchmarks will show that progress towards the final goal is being made. The exact steps in a phased general introduction of the system will depend on the situation in each country; for instance, some countries may prefer to start in urban areas, whereas others may prefer to start with a group of districts.

Figure 10.1 also shows a typical progression when scaling up a national system. The expansion can start with only government or other selected facilities to all facilities, and finally to complete coverage, including the community. Facility-based deaths are usually easier to capture than community-based deaths, and MDSR should be implemented in all health facilities and communities. However, the long-term goal should be to identify all deaths, and the upper arrow in the figure captures progression toward that goal. For geographical coverage of MDSR, the system starts in urban areas only, then expands to include a sample of entire districts and finally the entire nation. The review process can be from a superficial review of deaths to a deeper review of all deaths.

The M&E framework should provide a standardised approach for monitoring progress in the development of MDSR. Activities to expand the programme can be planned for each individual year, keeping in mind the many options for expansion. Before moving to the next planned stage, review of current data will help determine if the system is ready for expansion. If data are not of adequate quality, expanding the system will only provide more data of poor quality. Instead, the focus could be on improving both the quality and completeness of the information that is already being collected.

### Resource considerations

The scope of MDSR will depend on the availability of resources. Information about the number of births and deaths, where the women received care, and where the deliveries and deaths occurred will help determine the costs involved; influence whether all, or only a subset of the cases, can be reviewed; and determine where the review should concentrate. Countries have instituted a variety of approaches.

## Glossary

Definition of the following words, terms and concepts have been included here for clarity and ease of reference.

**Community** – First reporting level where there is a Community Health Worker responsible for conducting community surveillance and reporting to the nearest Peripheral Health Unit

**Maternal death** is defined as the death of a woman while pregnant or within 42 days of the 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 (ICD-9, ICD-10).

**Direct obstetric deaths** are maternal deaths resulting from obstetric complications of the pregnancy state (pregnancy, labour, or puerperium); from interventions, omissions or incorrect treatment; or from a chain of events resulting from any of the above.

**Indirect obstetric deaths** are maternal deaths resulting from previously existing disease or disease that developed during pregnancy. These deaths are not due to direct obstetric causes, but are aggravated by the physiological effects of pregnancy.

**Pregnancy-related death** is defined as all deaths of women during or within 42 days of pregnancy regardless of cause (ICD-10) This term is useful for two main reasons:

- Cause of death can be difficult to determine.
- In developing countries, a high percentage of deaths that occur during pregnancy and the postpartum period are due to the pregnancy and its complications.

**Late maternal death** is defined as a maternal death due to pregnancy (direct or indirect obstetric causes) which occurred more than 42 days but less than one year after the end of pregnancy (ICD-10). Some recent surveys show the importance of assessing maternal mortality during the year after birth when severe complication occurred. However, late maternal deaths are *not* included in the maternal mortality ratio.

**Skilled Health Worker** refers to an accredited health professional - such as a midwife, doctor or nurse - who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns

# Appendices

## APPENDIX 1 Participants in the meeting to validate MDSR Guideline

| | Name | Organisation | Designation |
|---|---|---|---|
| 1. | Santigie Sesay | MoHS RCH | Director, RCH |
| 2. | Roland M.Conteh | MoHS DPC | Disease Surveillance Program Manager |
| 3. | Felix B. Kanu | MoHS DPC | Data Officer |
| 4. | Asfaw Yonas Tadios | WHO Sierra Leone | Epidemiologist |
| 5. | Francis Smart | WHO/RH | NPO, FRH |
| 6. | Abibatu Kamara | MoHS DPC | Data Officer |
| 7. | Augustus Riddle | MoHS DPC | Data Analyst |
| 8. | Mr. Alimamy Kamara | MoHS RHFP | M&E Officer |
| 9. | M. M. Koroma | MoHS, PCMH | Anaesthetist |
| 10. | Lisa Thomas | WHO | Clinical Management |
| 11. | Foday Safiatu | UNFPA | SRH National Program Analyst |
| 12. | Sowo Lebbie | MamaYe | Advocacy Advisor |
| 13. | Bockarie Sesay | MamaYe | Evidence Advisor |
| 14. | Bashiru M. Koroma | Njala University | CHD Dean |
| 15. | James Mugume | UNFPA | EVD Surveillance Specialist |
| 16. | Harold Thomas | MoHS DPC | Communication Officer |
| 17. | J. N. Kandah | MoHS | Director, PHC |
| 18. | Florence M. Macarthy | MoHS DPC | Public Health Sister |
| 19. | Dorcas I. Koroma | UNFPA Sierra Leone | ASRH Analyst |
| 20. | Theresa M.Boima | MoHS NMCP | Public Health Sister |
| 21. | Amba RM.Coker | MoHS DPC | Principal Public Health Sister |

**Participants who took part to develop National MDSR Technical Guideline**

| | Name | Organisation |
|---|---|---|
| 1. | Foday Safiatu | UNFPA Sierra Leone |
| 2. | Theresa Boima | MoHS-Malaria Program |
| 3. | Mohammed Elhassein | UNFPA |
| 4. | Sowo Lebbie | MamaYe |
| 5. | Peter B. Samai | Bo Hospital |
| 6. | James Mugume | UNFPA Sierra Leone |
| 7. | Mohamed Vandi | DMO-Kenema |
| 8. | Mr. Alimamy Kamara | MoHS-M&E |
| 9. | Harold Thomas | MoHS-DPC |
| 10. | A. P. Koroma | PCM Hospital |
| 11. | Francis Smart | WHO/RH |
| 12. | Margaret Mannah | UNFPA Sierra Leone |
| 13. | Robert Musoke | WHO/IDSR |
| 14. | Ofosu Kwabi | WHO/IDSR |
| 15. | Santigie Sesay | MoHS-RCH |
| 16. | Michael Koroma | PCM Hospital |
| 17. | Anderson Latt | WHO/IDSR |
| 18. | Florence M. Macarthy | DPC |
| 19. | Sulaiman Conteh | MoHS-RHFP |
| 20. | Amber Coker | MoHS-DPC |
| 21. | Sylvia Kobbie | DHMT Kailahun |
| 22. | James Squire | Kailahun district |
| 23. | Judith Starkulla | WHO |
| 24. | Ms. Agnes Bangali | UNFPA Sierra Leone |

# APPENDIX 2 Facility data to be collected

| Maternal Death Reporting Form | | |
|---|---|---|
| *The form must be completed for all deaths, including abortions and ectopic gestation related deaths, in pregnant women or within 42 day after termination of pregnancy irrespective of duration or site of pregnancy* | | |
| **Questions / Variables** | | **Answers** |
| 1 | Country Code | |
| 2 | District Name/Code | |
| 3 | Chiefdom Name | |
| 4 | Reporting Site | |
| 5 | How many of such maternal deaths occurred cumulatively this year at this site? | |
| 6 | Date this maternal death occurred (day/month/year) | |
| 7 | Maternal death locality (village or Town) | |
| 8 | Record's unique identifier (Year-Country code-District-site-maternal death rank) | |
| 9 | Place of maternal death (Community, health facility, district hospital, referral hospital or private hospital, on the way to health facility or hospital) ………………………………………………………………………………………… | |
| 10 | Age (in years) of the deceased | |
| 11 | Gravida: how many times was the deceased pregnant? | |
| 12 | Parity: how many times did the deceased deliver a baby of 22 weeks/500g or more? | |
| 13 | Time of death (specify "During pregnancy, At delivery, during delivery, during the immediate post partum period, or long after delivery") | |
| **Maternal death history and risk factors** | | |
| 14 | Pregnancy an abortion? (Yes/No) | |
| 15 | Was the abortion induced? (Yes/No) | |
| 16 | Was the deceased receiving any antenatal care? (Yes/No) | |
| 17 | Did she have hypertension? (Yes/No) | |
| 18 | Type of Hypertension ………………….. | |
| 19 | Last BP measurement……………………. | |
| 19 | Did she have anaemia? (Yes/No) | |
| 20 | Did she have Abnormal lie? (Yes/No) | |
| 21 | Did she undergo any Previous Caesarean Section? (Yes/No) | |
| 22 | Caesarean sections and how many times…………………………. | |
| 23 | Date of last Caesarean Section (dd/mm/year) ………………….. | |
| 24 | What was her HIV Status? (choose "HIV+; HIV-; or Unknown HIV status") | |
| **Delivery, Puerperium and neonatal information** | | |
| 25 | How long (hours) was the duration of labour? | |
| 26 | What type of delivery was it? (choose one from "1= Vaginal non assisted delivery, 2=vaginal assisted delivery (Vacuum/forceps), or 3=Caesarean section") | |
| 27 | What was the baby status at birth? (Alive or Stillborn)……………………………………. | |

| | | |
|---|---|---|
| 28 | In case the baby was born alive, is he/she still alive or died within 28 days after his/her birth? (choose 1=Still alive, 2=neonatal death, 3=died beyond 28 days of age) | |
| 29 | Was the deceased referred to any health facility or hospital? (Yes/No/Don't know) | |
| 30 | If yes, how long did it take to get there? (hours) ……………………………………………… | |
| 31 | Did the deceased receive any medical care or obstetrical/surgical interventions for what led to her death? (Yes/No/Don't know) | |
| 32 | If yes, specify where and the treatment received* | |
| 33 | Primary cause of the Maternal Death | |
| 34 | Secondary cause of the Maternal Death | |
| 35 | Analysis and Interpretation of the information collected so far (investigator's opinion on this death) | |
| 36 | Remarks | |
| 37 | Maternal death notification date (day/month/year) | |
| 38 | Investigator (Title, name and function) | |
| | * Treatment received | |
| | I.V. Fluids; Plasma; Blood Transfusion; Antibiotics; Ocytocin; Anti-seizure drugs; Oxygen; Anti-malarial; Other medical treatment; Surgery; Manual removal of placenta; Manual intra uterine aspiration; Curettage, laparotomy, hysterectomy, instrumental delivery (Forceps; Vacuum), Caesarean section, anaesthesia (general, spinal, epidural, local) | |
| | Definitions Gravida: The number of times the woman was pregnant-<br>Parity: Number of times the woman delivered a baby of 22 weeks/500g or more, whether alive or dead | |

# APPENDIX 3 Summary form for maternal death in facility

## ADMINISTRATIVE

File Number……………………………….

Case Number ………………………………………………………… Primary cause of death (ICD-10)………………

District where death occurred………………………………… Final cause of death (ICD-10) ………………

Chiefdom where death occurred……..

Health facility where death occurred ………………………………………………………………………………… Autopsy ………………

Date received MDI #1 ……………………………………… Contributory (Antecedent) cause of death #1 (ICD-10) ………………

Date Return MDI #1 ………………………………………… Contributory (Antecedent) cause of death #2 (ICD-10) ………………

MDI #1 Signature Contributory (Antecedent) cause of death #3 (ICD-10) ………………

…………………………………………………………………………… Category of Death (Direct/Indirect)…..

……………………………………………………

Date received MDI #2 ……………………………………… Place of death (Type of facility)

………………………………………………………

Date received MDI #2 ……………………………………… ………………………………………………………………………………………

MDI #2 Signature Preventable (Avoidable) death (Yes/No)

…………………………………………………………………

…………………………………………………………………………

## MATERNAL

Mother's Date of Birth ……………………………………………………………… Age …………………… Gravidity ……………………

Parity ………………

Marital Status …………………………………………………………………… Live births ………………

Tribe …………………………………………………………………………… Stillbirths ………………
FSB/MSB

Religion …………………………………………………………………………… Spontaneous Abortions ………………

Educational Level (None, Primary, Secondary, Tertiary) ……………………………… Induced Abortions ………………

Literacy level ……………………………………………………………………………Ectopic pregnancies (Yes/No) ………

Occupation ……………………………………………………………………… Previous Caesareans (Yes/No) ………………

Employment ……………………………………………Previous pregnancy complications (Yes/No) ………………

Contraception use just prior to pregnancy (Yes/No)………………

What type of contraception (e.g. Pill, DMPA, IUD) …………………………………………………………………

## PREEXISTING MEDICAL PROBLEMS

Hypertension …………………………………………………………………… HIV positive ……………………………………………………………………

Diabetes …………………………………………………………………………… Tuberculosis …………………………………………………………………

Ebola………………………………………………………………….

Anaemia …………………………………………………………………………… Pre-existing medical problem (other)

Hepatitis…………………………………………………………………………… ………………………………………………………………………………

Heart Problem …………………………………………………………………… ………………………………………………………………………………

## DEATH AND ADMISSION INFORMATION

Date of admission ………………………………………………… Time of admission …………………………………………………
Date of delivery ………………………………………………… Time of delivery …………………………………………………
Date of death ………………………………………………… Time of death …………………………………………………
Day of death (week day – M, T, W, Th, Fr, Sa, Su) ……………………………………………………………………………
Did death occur on a holiday? ……………………………………………………………………………
Status of pregnancy on admission (Trimester 1, 2, 3)
……………………………………………………………………………
Condition on admission (Stable, critically ill, dead on arrival)
………………………………………………………………………………………………………………
Other condition specify ………………………………………………………………………………………………………………
Status of pregnancy at death (Delivered, undelivered) ………………………………………
Gestation at death or at delivery (weeks) if died after delivery …………………………………………………………
Days since pregnancy ended (either by delivery, miscarriage, ectopic) ……………………………………………
Reasons for admission
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
Referral (Yes, No) ………………………………… If referred from where
……………………………………………………………………………………………………
If referred, time from identification of a problem to transfer to health facility 1 ………………………
If referred from one facility to another, time from planned transfer from facility 1 to facility 2 ………………………
Comments about referral process – include comments about communication, transportation used and any problems noted:
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………

## ANTENATAL CARE

Received antenatal care (Yes/No)………………………………… If yes, number of antenatal visits …………………………………
If yes, where did she receive care? (list all) (…), health centre, district hospital, national referral hospital, private, other:
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………
If yes, who provided care? (list all) Ob/Gyn Specialist, medical officer/general practitioner, MCH Aide, midwife, SECHN, CHO, CHAs other:
…………………………………………………………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………………………………………………………

## ANTENATAL RISK FACTORS

Hypertension • Placenta Previa • Previous C/S • Multiple gestation • Abnormal lie •
Proteinuria • Antepartum Hospitalisation •
Glycosuria • If hospitalised, for what?
Anaemia • ………………………………………………………………………………………
Urinary tract infection • Other ante partum risk factors (specify)
HIV positive • ………………………………………………………………………………………
Malaria • ………………………………………………………………………………………
Ebola ………………………………………………………………………………………

Undesired pregnancy •

Comments on antenatal care – list any medications

.................................................................................................................................

## LABORATORY WORK-UP

Blood type and RH •

Haematocrit • Haemoglobin

Blood Chemistry

.................................................................................................................................

.................................................................................................................................

Urinalysis

.................................................................................................................................

.................................................................................................................................

Other

.................................................................................................................................

.................................................................................................................................

VDRL •

RPR •

HIV •

Rubella •

## PHYSICAL EXAM ON ADMISSION

## GENERAL PHYSICAL EXAM

.................................................................................................................................

.................................................................................................................................

.................................................................................................................................

.................................................................................................................................

.................................................................................................................................

## VITAL SIGNS

Heart rate ................. Systolic Blood Pressure ................. Respiratory rate ................. Any abnormality ................

Temp (Celsius) ............. Diastolic Blood Pressure .................

Height ................. Systemic examination (any abnormality found):

Weight ................. .................................................................................................................................

.................................................................................................................................

## ABDOMINAL EXAM

Fundal height (cm) ................. Fundal height to gestational age discrepancy:

Presentation ................ .................................................................................................................................

Other abdominal abnormalities:

.................................................................................................................................

.................................................................................................................................

## PELVIC EXAM

Stage of labour if in labour .................................................................................................................................

Any pelvic abnormality noted .................................................................................................................................

## ANTEPARTUM ADMISSION COMPLICATIONS

PROM • Abruption • Placenta praevia • Preterm labour • Pre-eclampsia •

Eclampsia • IUFD • Pyelonephritis • Sepsis • Malaria •

Other ante partum admission complications:

.................................................................................................................................

.................................................................................................................................

Differential diagnosis at admission:

.................................................................................................................................................................................................................

## DELIVERY, PUERPERIUM AND NEONATAL INFORMATION

Did labour occur (Yes/No)..............................

If labour occurred, was a partograph used? (Yes/No) .............................. If labour occurred, duration of labour:

Labour phase ...................... Active phase ...................... Second stage ...................... Third stage ..........................

Length of ruptured membranes ................................................ Was placenta complete? (Yes/No)................................................

## DELIVERY

Estimated gestational age at delivery .......................................

Intrapartum hemorrhage .................... Intrapartum infection .................... Intrapartum pre-eclampsia/eclampsia ....................

Obstructed labour ....................

Prolonged labour ……….

Comments on labour and delivery:

.................................................................................................................................................................................................................

.................................................................................................................................................................................................................

Was there active management of third stage of labour? ................................ Was there a retained placenta? ...............................

Postpartum hemorrhage ..................... Postpartum infection ..................... Postpartum pre-eclampsia/eclampsia .....................

Comments on puerperium:

.................................................................................................................................................................................................................

.................................................................................................................................................................................................................

## NEONATE

Outcome ......................... Birth weight (grams) ......................... Apgar (1 min) ......................... Apgar (5 min) ..........................

## INTERVENTIONS (MARK YES/NO)

| Early pregnancy | | Antepartum | | Intrapartum | | Postpartum | |
|---|---|---|---|---|---|---|---|
| Evacuation | yes · no · | Transfusion | yes · no · | Instrumental delivery | yes · no · | Evacuation | yes · no · |
| Laparotomy | yes · no · | Version | yes · no · | Symphysiotomy | yes · no · | Laparotomy | yes · no · |
| Hysterectomy | yes · no · | Labour induction | yes · no · | Caesarean | yes · no · | Hysterectomy | yes · no · |
| Transfusion | yes · no · | Magnesium Sulfate | yes · no · | Hysterectomy | yes · no · | Hysterectomy | yes · no · |
| | | Antibiotics | yes · no · | Transfusion | yes · no · | Transfusion | yes · no · |
| | | | | Magnesium Sulphate | yes · no · | Magnesium Sulphate | yes · no · |
| | | | | Antibiotics | yes · no · | Antibiotics | yes · no · |
| | | | | | | Oxytocin | yes · no · |
| | | | | | | Misoprostol | yes · no · |

**Other intervention**

| | |
|---|---|
| General Anaesthesia | yes · no · |
| Epidural | yes · no · |
| Spinal | yes · no · |
| Local | yes · no · |
| ICU ventilation | yes · no · |
| Invasive monitoring | yes · no · |

Other interventions

..................................................................................................................

..................................................................................................................

..................................................................................................................

..................................................................................................................

## CAUSE OF DEATH

Primary cause of death (ICD-10) ..............................................

Final cause of death (ICD-10) ..............................................

Autopsy ........................ If autopsy done, please attach report

Was the final cause of death confirmed by pathology? ..............................................

Contributory (Antecedent) cause of death #1 (ICD-10) ..............................................

Contributory (Antecedent) cause of death #2 (ICD-10) ..............................................

Contributory (Antecedent) cause of death #3 (ICD-10) ..............................................

Case Summary (supply a short summary of the events surrounding the death):

..............................................................................................................................................................................................

..............................................................................................................................................................................................

..............................................................................................................................................................................................

**Barriers to Care and Remediable Factors** (were any of these factors present (yes/no)

Did women or family recognise there was a problem? yes · no ·

Did health provider recognise there was a problem? yes · no ·

Was there a delay by the women seeking care? yes · no ·

If delay, why? Include personal, family oriented, and community oriented problems including social and financial:

..............................................................................................................................................................................................

..............................................................................................................................................................................................

..............................................................................................................................................................................................

Was there a delay in transport to care or between health facilities? yes · no ·

If delay, why? Include communication, access, transport to facility and between facility problems:

..............................................................................................................................................................................................

..............................................................................................................................................................................................

..............................................................................................................................................................................................

Was there a delay in receiving care at the facility? Yes · no ·

If delay why? Include lack or barriers at health facilities, lack of personnel or unskilled personnel, lack of equipment or supplies:

..............................................................................................................................................................................................

..............................................................................................................................................................................................

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..............................................................................................................................................................................................

Was there a problem in the medical care received at the facility? Yes · no ·

If yes, was the problem antenatal? Yes · no ·

If yes, was the problem intra-partum? Yes · no ·

If yes, was the problem postpartum? Yes · no ·

If yes, was the problem with resuscitation? Yes · no ·

If yes, was the problem with anaesthesia? Yes · no ·

If yes, was the problem unprofessional conduct? Yes · no ·

Comments on potential avoidable factors, missed opportunities and substandard care:

..............................................................................................................................................................................................

..............................................................................................................................................................................................

## ACTION ITEMS

Preventable (Avoidable) death yes · no ·

What have you and your facility learned from this case?

..............................................................................................................................................................................................

..............................................................................................................................................................................................

How will what you learned change your practice?

..............................................................................................................................................................................................

..............................................................................................................................................................................................

What recommendations and actions will you take in the future?

..............................................................................................................................................................................................

..............................................................................................................................................................................................

..............................................................................................................................................................................................

..............................................................................................................................................................................................

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# APPENDIX 4  Monthly Maternal Deaths Notification and Feedback Form at District Level

| | **MDSR Feedback and Data Sharing Log Form** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **District:………………………………** | **Month…………….** | | | | | | |
| No | **Reception Date of suspected maternal death notification by DSO** | **Reception Date of suspected maternal death notification by District MDSR committee** | **Reporting Site name(Facility/Co mmunity)** | **Reported Period *** | **MD Investigated? (Y/N)** | **MD Report received Timely (Yes/No)** | **Reported case is a confirmed MD (Yes/No)** | **Feedback sent to the reporting site (Facility/Community)? (Yes/No)** |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| | * (Use epidemiologic notation to record the reporting period, for example: M-2015-12 for monthly data = 2015 December) | | | | | | | |

# APPENDIX 5 Community Autopsy Tool for Maternal Deaths

## COMMUNITY BASED MATERNAL DEATH REVEIW FORM

***COMMUNITY BASED INVESTIGATION (Verbal Autopsy) QUESTIONNAIRE FOR INVESTIGATION OF MATERNAL DEATHS***

**Name of District:** ………………………………………………………… **Chiefdom:** ………………………………………………………

| **NAME OF WARD** | |
|---|---|
| **NAME OF THE VILLAGE** | |
| **NAME & AGE OF THE PREGNANT WOMAN/ MOTHER (DECEASED)** | |
| **ADDRESS** | |
| **NAME OF HUSBAND/OTHER (FATHER/MOTHER)** | |
| **PLACE OF DEATH (Home/Institution/In transit/Village/Town etc.) Specify:** | |
| **DATE & TIME OF DEATH** | |
| **NAME & DESIGNATION OF THE INVESTIGATOR (S) ALONG WITH MOBILE PHONE NUMBERS** | |
| | |
| | |
| **DATE OF INVESTIGATION** | |
| **PROBABLE CAUSE OF DEATH** | |

# MODULES

**MODULE - I** **Page No. 1 - 2**

Should be used for collection of general information for all maternal deaths irrespective of whether deaths occurred during antenatal or intra-natal or postnatal period or due to abortion.

**MODULE - II** **Page No. 3 - 4**

Should be used for the deaths occurring during the antenatal period including abortion

**MODULE - III** **Page No. 5 - 8**

Should be used for the deaths occurring during delivery or postnatal period

# GENERAL INSTRUCTIONS

1. *The Community Based Investigation (Verbal Autopsy) is a technique whereby family members, relatives, neighbours or other informants and care providers are interviewed to elicit information on the events leading to the death of the mother during pregnancy/ abortion/ delivery / after delivery in their own words to identify the medical and non-medical (including socio-economic) factors for the cause of death of the mother.*

2. *It is preferable to give advance information about the purpose of visit to the relatives of the deceased who were with the mother from the onset of complications till the death, and* to *obtain their consent.*

3. ***CONFIDENTIALITY:*** *After the formal introduction to the respondents, the investigating official should give assurance that the information will be kept **confidential**.*

4. *Throughout the interview, the interviewer should be very polite and sensitive questions should be avoided.*

5. *Make all the respondents seated comfortably and explain to them that the information that they are going to provide will prevent death of mothers in future.*

6. *Allow the respondents to narrate the events leading to the death of the mother in their own words. Keep prompting until the respondent says there was nothing more to say.*

7. *Wherever needed, the investigating official should encourage the respondents to bring out all information related to the event.*

8. *Please also write information in a **narrative form.***

9. ***NEUTRALITY AND IMPARTIALITY:*** *The interviewer should not be influenced by the information provided by the field health functionaries, doctors or by the information available in the mother care register, case sheets etc.*

10. ***Maternal Death*** *is defined as the death of a woman who dies from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy or child birth or within 42 days of termination of pregnancy, irrespective of duration and site of the pregnancy.*

# MODULE - I

**Contains general information and information about previous pregnancies wherever applicable. It should be used for all the maternal deaths irrespective whether occurred during antenatal, delivery or postnatal period including abortion)**

**I. BACKGROUND INFORMATION**

**Tick ( √ ) the correct answer for each question:**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | Resident / Visitor death | | | | | | | | | | |
| 1.2 | Type of death | Abortion | | Antenatal | | Delivery death | | Post natal | | | |
| 1.3 | Place of death | Home | | MCH Post | | | | | | | |
| | | CHC | | PHU | | | | | | | |
| | | Medical college Hosp. | | Dist. Hosp. | | | | | | | |
| | | Dist. Hosp. | | Pvt. Hosp. | | | | | | | |
| | | Transit/ on the way | | Others (specify) | | | | | | | |
| 1.4 | Specify the name and place of the institution or village where death occurred | | | | | | | | | | |
| 1.5 | Onset of fatal illness | Date / / | | Time __ __:__ __ _ _ | | | | | | | |
| 1.6 | Admission in final institution (if applicable) | Date / / | | Time __ __:__ __ _ _ | | | | | | | |
| 1.7 | Death | Date / / | | Time __ __:__ __ _ _ | | | | | | | |
| 1.8 | Gravida | **1** | | **2** | | **3** | | **4** | | **5 & more** | |
| 1.9 | Para (number of previous live births) | 0 | | 1 | | 2 | | **3** | | **4 & more** | |
| 1.10 | Abortions (induced or spontaneous) | 0 | | 1 | | 2 | | **3** | | **4 & more** | |
| 1.11 | Previous stillbirths | 0 | | 1 | | 2 | | **3** | | **4 & more** | |
| 1.12 | Living children | 0 | | 1 | | 2 | | **3** | | **4 & more** | |
| 1.13 | Weeks of pregnancy<br>If applicable | <16 weeks | | 16-28 weeks | | >28 weeks | | | | | |
| 1.14 | Age at death | | | | | | | | | | |

**2. FAMILY HISTORY**

| No. | Details | Deceased Mother | |
|---|---|---|---|
| 2.1 | Age at marriage | <18 Yrs | |
| | | 18-25 Yrs | |
| | | 26-30 Yrs | |
| | | **31-35 Yrs** | |
| | | **36 Yrs or more** | |
| | | Not Married | |
| 2.2. | Religion | Muslim | |
| | | Christian | |

| | | | |
|---|---|---|---|
| | | Others | |
| | | | |
| | | | |
| 2.3. | Tribe | Temne | |
| | | Limba | |
| | | Mende | |
| | | Sherbro | |
| | | Others | |
| 2.5. | Occupation | House Wife | |
| | | Agri. Labourer | |
| | | Cultivator | |
| | | Non-Agri. daily wages | |
| | | Govt. Employee Private | |
| | | Employee Self | |
| | | Employed Business | |
| | | Others (Specify) | |
| | | Un-employed | |
| 2.6 | Education | Illiterate | |
| | | Up to Primary | |
| | | Up to Secondary | |
| | | Tertiary | |

**3. INFANT SURVIVAL**

| 3.1 | Infant status: | **Still Birth** | **Live Birth** | **Died immediately after birth** | **Alive at 7 days** | **Alive at 28 days** |
|---|---|---|---|---|---|---|

**4. AVAILABILITY OF HEALTH FACILITIES, SERVICES AND TRANSPORT**

(4.1 & 4.2 to be filled by the investigator before the interview)

| | | | | | |
|---|---|---|---|---|---|
| 4.1 | Name and location of the nearest government / private facility providing Emergency Obstetric Care Services | | | | |
| 4.2 | Dist. (Km) of this facility from her residence | | | | |
| 4.3 | Number of institutions visited before death (in the order of visits) | | | | |
| 4.4 | Reasons given by providers for the referral | No explanation given | | Lack of blood | |
| | | Lack of staff | | Others (specify) | |
| 4.5 | Used Herbal Medicine Y/N | | | | |

**5. CURRENT PREGNANCY** (To be filled from the information given by the respondents)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5.1 | Pregnancy Registration | YES | | | NO | | |
| | Antenatal Care | YES | | | NO | | |
| 5.2 | If yes, Place of Antenatal checkup | MCH Centre | | | CHC | | |
| | | Govt. Hosp. | | | Pvt. Hospital | | |
| | | PHU | | | Govt. & Pvt. Hospital | | |
| 5.3 | Number of antenatal check ups | Nil | | 4 and above | 1-3 | Not known | |

| 5.4 | Hb Level | | 5.5 | High Risk category: Y/N | | 5.6 | Told About Risk Factors: Y/N | |
|---|---|---|---|---|---|---|---|---|
| 5.7 | Name & phone no. of concerned NOK | | | | | | | |

# MODULE - II

**6. DEATHS DURING THE ANTENATAL PERIOD**

(This module to be filled for the maternal deaths that occurred during the antenatal period (including deaths due to abortion). In addition to module-II, module-I should also be filled for all maternal deaths)

| | | | | | |
|---|---|---|---|---|---|
| 6.1 | Did mother have any problem during antenatal period? | Not known | | No | |
| | | Yes | | | |
| 6.2 | If yes, was she referred anytime during her antenatal period? | YES | | NO | |
| | | Don't know | | | |
| 6.3 | What was the symptom for which she sought care? | Headache | | | |
| | | Oedema | | | |
| | | Anaemia | | | |
| | | High Blood Pressure | | | |
| | | Bleeding p/v | | | |
| | | No foetal movements | | | |
| | | Fits | | | |
| | | Sudden excruciating pain | | | |
| | | High fever with rigor | | | |
| | | Others (specify) | | | |
| 6.4 | If YES, did she attend any hospital? | YES | | NO | |
| | | Don't know | | | |
| 6.5 | In case of not seeking care from the hospital is it due to | Severity of the complications not known | | Institution far away | |
| | | No attendant available | | No money | |
| | | Beliefs and customs | | Lack of transport | |
| | | Others(specify) | | | |

**7. FOR ABORTION DEATHS FILL THE FOLLOWING QUESTIONS**

| | | | | | |
|---|---|---|---|---|---|
| 7.1 | Did she die while having an abortion or within 6 weeks after having an abortion? | While having an abortion | Within 6 weeks after having an abortion | | Don't Know |
| 7.2 | If abortion, was the abortion spontaneous or induced, including MTP? | Spontaneous | Induced | MTP | Don't know |
| 7.3 | If the abortion was induced, how was it induced? | Oral medicine | Traditional vaginal herbal | Instrument application | Don't know |
| 7.4 | If the abortion was induced, where did she have the abortion? | Home | Government hospital (specify level) | Private clinic | Don't know |
| 7.5 | If the abortion was induced, who performed the abortion? | Doctor | Nurse | Others (specify) | Don't know |
| 7.6 | If induced, what made family seek care? | Bleeding started spontaneously | | Wanted to terminate the pregnancy | |
| 7.7 | If the abortion was spontaneous, Where was the abortion completed | Home | Govt. Hospital (Specify level) | Private Clinic | Don't Know |
| 7.8 | How many weeks of pregnancy completed at the time of abortion | | | | |
| 7.9 | Whether she had any of these symptoms after abortion? | High fever | Foul smelling discharge | Bleeding | Shock |
| 7.10 | After developing complications following abortion, did she seek care? | | | | |
| 7.11 | If yes, whom/where did she seek care? | Government hospital (specify level) | Private clinic/centre | Quack | Don't know |
| 7.12 | In case of not seeking appropriate care, is it due to | Severity of complications not known | Beliefs and customs | No money | |
| | | No attendant available | Institution far away | Lack of transport | |
| | | Not applicable | Others, Please specify | | |
| 7.13 | Date of spontaneous abortion/ date of termination of pregnancy | | | | |
| 7.14 | Date & time of death | | | | |

# MODULE - III

(To be used for the deaths occurring during delivery. For these deaths, Module-I should also be filled)

**8. INTRANATAL SERVICES (Tick ' √ ' wherever applicable)**

| | | | | | |
|---|---|---|---|---|---|
| 8.1 | Place of delivery | Home | | MCH Post | |
| | | CHC | | PHU | |
| | | Medical College | | District Hospital | |
| | | Prvt Maternity Home | | Private Hospital | |
| | | Transit | | Any other place (specify): | |
| 8.2 | Admission (not applicable for home delivery and transit) | Date / / Time __ __:__ __ _ _ | | | |
| 8.3 | Delivery | Date / / Time __ __:__ __ _ _ | | | |
| 8.4 | Time interval between onset of pain and delivery (in hours) | Hours: __ ____ __ _ _ | | | |
| 8.5 | Who conducted the delivery- if at home or in private institution (Not applicable for transit delivery) | TBA | | Staff Nurse / M. Asst. | |
| | | Doctor | | Midwife | |
| | | Quack | | Others | |
| 8.7 | Type of delivery | Normal vaginal | | Assisted | |
| | | Caesarean | | | |
| 8.8 | Outcome of the delivery | Live birth | | Still birth | |
| | | Multiple births | | | |
| 8.9 | During the process of labour/delivery, did the mother have any problems? | Prolonged labour Primi >12 hrs Subsequent deliveries >8 hrs | | Severe bleeding/ bleeding with skirt soaked (=500ml) | |
| | | Labour pain which disappeared suddenly | | Inversion of the uterus | |
| | | Retained placenta | | Convulsions | |
| | | Severe breathlessness /cyanosis/ oedema | | Unconsciousness | |
| | | High fever | | Others (specify): | |
| 8.10 | Did she seek treatment, if yes by whom and what was the treatment given by the TBA/Nurse/MV/ MO/others ? (give details) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 8.11 | Was she referred? | YES | | NO | |
| | | Not known | | | |
| 8.12 | Did she attend the referral centre? | YES | | NO | |
| | | Not known | | If yes, time interval between admission & delivery (if delivered) | |
| 8.13 | In case of noncompliance of referrals, state the reasons | Intensity of complications not known | | Institution far away | |
| | | No attendant available | | No money | |
| | | Beliefs & customs | | Lack of transport | |
| | | Others | | | |
| 8.14 | Was there delay in | Decision making | | Mobilising funds | |
| | | Arranging transport | | Others | |
| 8.15 | Any information given to the relatives about the nature of complication from the hospital | Yes | | No | |
| 8.16 | If yes, describe | | | | |
| 8.17 | Was there any delay in initiating treatment | Yes | | No | |
| 8.18 | If yes, describe | | | | |

**9. POST NATAL PERIOD (Tick ' √ ' wherever applicable)**

| | | | | | |
|---|---|---|---|---|---|
| 9.1 | No. of Postnatal check-ups | Nil | | < 3 check-ups | |
| | | >/= 3 check-ups | | Don't know | |
| 9.2 | Did the mother have any problem following delivery | YES | | NO | |
| | | Not known | | | |
| 9.3 | Time interval between detection of complication & death (in hours/minutes) | | | | |
| 9.4 | Specific problem during Post Natal period | Severe bleeding | | Severe fever and foul smelling discharge | |
| | | Sudden chest pain & collapse | | Unconsciousness/ visual disturbance | |
| | | Bleeding from multiple sites | | Severe leg pain, swelling | |
| | | Abnormal behaviour | | Severe anaemia | |
| | | Others (specify) | | | |

| 9.5 | Did she seek treatment | Yes | | No | | | |
|---|---|---|---|---|---|---|---|
| 9.6 | If yes, by whom | TBA | | Nurse | | | |
| | | Midwife | | Med. Offc | | Others (specify) | |
| 9.7 | What was the treatment given (give details) | | | | | | |
| 9.8 | Was she referred? | Yes | | No | | | |
| | | Not known | | Not applicable | | | |
| 9.9 | Did she attend the referral centre? | Yes | | No | | | |
| | | Not known | | Not applicable | | | |
| 9.10 | In case of non compliance of referrals, state the reasons | Intensity of complications not known | | Institution far away | | | |
| | | No attendant available | | No money | | | |
| | | Beliefs & customs | | Lack of transport | | | |
| | | Others (specify): | | | | | |

**10: REPORTED CAUSE OF DEATH**

| 10.1 | Did a doctor or nurse at the health facility tell you the cause of death? | Yes | | No | |
|---|---|---|---|---|---|
| | | Don't know | | | |
| 10.2 | If yes, what was the cause of death? | | | | |

## 11. OPEN HISTORY (In narrative form): (explore)

| 11.1 | Name and address of the facilities she went – decisions and time taken for action | |
|---|---|---|
| | 11.2 How long did it take to make the arrangements to go from first centre to higher centres Why those referrals were made<br>How much time was spent at each facility? Time spent at each facility before referrals were made and<br>Difficulties faced throughout the process | |
| 11.3 | Transportation method used | |
| 11.4 | Transportation cost? (at each stage of referral) | |

| | | |
|---|---|---|
| 11.5 | Travel time – at each stage | |
| 11.6 | Care received at each facility? | |
| 11.7 | Total money spent by family | |
| 11.8 | How did the family arrange the money? | |
| 11.9 | Any other | |

**<u>Investigator – 1</u>**

(Signature)

Name:

Designation:

Place of posting:

**Mobile Phone Number:**

Date:

**<u>Investigator – 2</u>**

(Signature)

Name:

Designation:

Place of posting:

**Mobile Phone Number:**

Date:

**<u>Investigator – 3</u>**

(Signature)

Name:

Designation:

Place of posting:

**Mobile Phone Number:**

Date:

## Committee Worksheet

**Case number ........................................................................................................................................**

### CASE SUMMARY

1. Age ...............................
2. Tribe ..........................................................................................................................................
3. Gravidity, parity, pregnancy outcome, gestational age, birth weight

   ........................................................................................................................................................
4. Date of birth and date of death

   ........................................................................................................................................................
5. Synopsis of events leading to death

   ........................................................................................................................................................

   ........................................................................................................................................................

### QUESTIONS TO CONSIDER:

**Prior to pregnancy**

6. Did the mother have a serious pre-existing condition?
7. Was the pregnancy planned?
8. Was she using birth control? If not, why not?

**During pregnancy**

9. Did the mother receive appropriate and timely antenatal care?
10. If she had problems, were they appropriately treated? Did she comply with medical advice? If no, why not?

**Intrapartum**

11. Was the mother's labour monitored? Prolonged?
12. If she had any problems in labour or delivery, did she receive correct care in a timely fashion?
13. Did she deliver with a skilled birth attendant? At a health facility?
14. Did she need to be transferred before labour? During labour? After labour?

    If yes, was she transferred? If not, why not?

**Postnatal**

15. Was the mother appropriately resuscitated?
16. Was she appropriately cared for in the postnatal period?
17. Did she need to be transferred to appropriate level of care? If yes, was she transferred? If no, why not?
18. When she became ill, was she taken to care in a timely fashion? Was she treated?

**Committee Opinion**

19. Principal medical cause of death:

    ........................................................................................................................................................

    ........................................................................................................................................................
20. Was the death avoidable?

    ........................................................................................................................................................

    ........................................................................................................................................................
21. What factors could have been changed to decrease the risk of death from occurring?

    ........................................................................................................................................................

    ........................................................................................................................................................
22. Recommendations to reduce deaths from similar causes or circumstances:

    ........................................................................................................................................................

    ........................................................................................................................................................

# APPENDIX 6a Terms of Reference for District MDSR Committee

The District Maternal Death Surveillance and Response Committee are district stakeholders who oversee MDSR planning, implementation and evaluation in their respective districts. Their responsibilities include but are not limited to the following:

- Plan and implement MDSR in the district
- Review and discuss all facility and community maternal deaths from investigators and provide feedback
- Design and implement recommendations to improve health system factors related to maternal death based on their review findings
- Discuss and recommend to the national MDSR committee changes in the survey tools and guidelines and bring any other issues or problems to their attention
- Disseminate MDSR findings at the district level
- Identify target audience for advocacy and use MDR findings to advocate at the national level for the required resources for change. This could as well target other ministries outside of health ministry
- Compile and report to the national MDSR team monthly
- Participate to evaluate the MDSR system

**Composition of the District MDSR Committee**

The MDSR committees comprise health professionals at the district level. The committee have key positions within the committee, which includes the chair, vice chair and secretary. The committee should include:

- District Medical Officer – Chair
- Hospital Medical Superintendent
- Hospital Matron
- DHMT M & E Officer
- Representative from Private hospitals
- NGO Representative
- Council Health Committee Chairperson
- District Health Sister - District MDSR Coordinator
- Hospital board members
- Traditional and Religious leaders (Inter-religious Council): When the committee needs support from other health professionals or partners, invitation should be extended for their participation in meetings as and when necessary.

**Meeting Duration**

The DMDSR Committee meets monthly primarily to review maternal deaths, recommend actionable solutions that could prevent future maternal deaths and follow up on actions to improve quality of care and other MDSR related issues. The committee can also meet when there are emergency issues to be addressed.

**Who will host the District MDSR Committee meetings?**

The NMDSR meetings can be primarily hosted by DHMT but on the other hand can be rotational in offices of other committee members.

# APPENDIX 6b Terms of Reference for National MDSR Committee

National MDSR task force is sited at the Directorate of the Reproductive and Child Health of the Ministry of Health and Sanitation and plays a strategic role in overseeing the overall MDSR planning, implementation and evaluation processes. The roles and responsibilities include but are not limited to the following:

**Roles and responsibilities of the National MDSR Committee:**

- Coordinate the overall MDSR process in the country and make sure it is working as planned.
- Compile all district MDSR summaries monthly data and develop action points at a national level.
- Facilitate the dissemination of MDSR technical guidelines, Standard Operating Procedures, tools and other relevant documents at all levels
- Coordinate the involvement of stakeholders from planning to implementation of the MDSR at national and in districts.
- Identify target audience for advocacy and use MDR findings to advocate at the national level for the required resources to effect change. This could as well target other ministries.
- Follow up actions from national review meetings and document them
- Provide quarterly regular monitoring and supportive supervision in the implementation of MDSR in the country
- Facilitate the evaluation of the MDSR system and disseminate findings at all levels

**Composition of the National MDSR Committee**

The committee will be composed of national level health professionals including development partners. The committee has key positions which include the chair, vice chair and a secretary who ensures the functioning of the committee. The committee should include:

- The Directorate of Reproductive and Child Health - Chair
- Directorate of Disease Prevention and Control – Vice Chair
- Directorate of Health Systems, Policy, Planning and Information
- Directorate of Drugs and Medical Supplies
- Directorate of Primary Health Care
- Reproductive and Family Planning Programme - Secretary
- Development Agencies – WHO, UNFPA, UNICEF, World Bank,
- Other agencies involved in reproductive health e.g. E4A/Options,
- Chief Nursing Officer
- Academia (College of Medicine, School of Nursing, School of Midwifery)

When the committee needs support from other health professionals or partners, invitation should be extended for their participation in meetings as and when necessary.

**Meeting Duration**

The NMDSR Committee meets once every quarter but may also meet when there are emergency MDSR issues to be discussed.

**Who will host the MDSR Committee meetings?**

The MDSR Committee meetings shall be primarily hosted by the Directorate of Reproductive and Child Health Directorate but, on the other hand, could be rotational in offices of other members.

APPENDIX 7 Community identification for suspected maternal deaths

# MATERNAL MORTALITY SURVEILLANCE
# COMMUNITY LISTING OF DEATHS TO WOMEN OF REPRODUCTIVE AGE

DISTRICT NAME: ..........................................................................................

Chiefdom NAME: ..........................................................................................

| Village/Town NAME: | CKI NAME: | DSO NAME: | |
|---|---|---|---|
| Has there been any death of a woman aged 12–49 years since **1st January 201..** in this community?<br>(NOTE: THIS FORM CAN BE ADAPTED FOR COMPILING INFORMATION AT THE HOUSEHOLD LEVEL) | | 1. Yes<br>2. No<br>3. Does not know | How many deaths to WRA?<br>• • |

## Deaths in the community

| Line # | Name | How old was (NAME) when she died? | In what Month and Year did she die? | Where did she die? Did she die at: (READ OPTIONS 1–4) | Was (NAME) pregnant when she died? | Did she die during childbirth? | Did she die within two months after the end of a pregnancy or childbirth? | When did the pregnancy end? (Month and Year) | Where did the pregnancy end? Did it end at: (READ OPTIONS 1-4) | Did any other woman die since 1st January 2011? |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |
| 02 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |
| 03 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |
| 04 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |
| 05 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |
| 06 | | • • | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES ➔ (NEXT LINE)<br>2. NO | 1. YES<br>2. NO | MONTH • •<br>YEAR 201 | 1. Home ............<br>2. Hosp. .............<br>3. Health C. ........<br>4. Other ............ | 1. YES ➔ (NEXT LINE)<br>2. NO |

# APPENDIX 8 MDSR Implementation planning tool

| | PHASED IMPLEMENTATION | | | | |
|---|---|---|---|---|---|
| COMPONENT | SITUATION ANALYSIS | YEAR 1 | YEAR 2 | YEAR 3 | PROPOSED FINAL TARGETS |
| OVERALL SYSTEM INDICATORS | | | | | |
| MDSR policy in place | | | | | Yes |
| Maternal death is a notifiable event (24 hours) / national policy requires notification | | | | | Yes |
| MDSR guidelines, standards developed or updated, and implemented | | | | | Yes |
| Financial resources available | | | | | Yes |
| National maternal mortality report published annually | | | | | Yes |
| Designated lead person responsible for MDSR identified at all levels | | | | | Yes |
| National maternal death review committee meets regularly | | | | | Yes |
| – multi-disciplinary representation | | | | | yes |
| % of districts with maternal death review committees | | | | | 100% |
| % of districts with someone responsible for MDSR | | | | | 100% |
| IDENTIFICATION AND NOTIFICATION | | | | | |
| Guidelines to enhance detection | | | | | Yes |
| – Guidelines define information channels and flow | | | | | Yes |
| Facility: | | | | | |
| All maternal deaths are notified | | | | | Yes |
| % within 24 hours | | | | | >90% |
| Community: | | | | | |
| All maternal deaths are notified | | | | | Yes |
| % within 24 hours | | | | | >90% |
| % of communities with “zero reporting monthly” | | | | | 100% |
| Electronic devices are used to get faster and more complete notification from communities | | | | | Yes |
| District | | | | | |
| % of expected maternal deaths that are notified | | | | | >90% |
| Electronic devices are used to get faster and more complete notification from communities | | | | | Yes |

| Review | | | | | |
|---|---|---|---|---|---|
| District | | | | | |
| District maternal mortality review committee exists | | | | | Yes |
| – and meets regularly to review facility and community deaths | | | | | At least quarterly |
| – % of reviews that included community participation and feedback | | | | | 100% |
| Electronic devices are used to get faster and more complete notification from communities | | | | | Yes |
| DATA QUALITY | | | | | |
| Guidelines on Cause of Death (COD) exist | | | | | yes |
| – Guidelines use ICD10 coding | | | | | Yes |
| Completeness of data collection | | | | | yes |
| Cross check data from facility and community on same maternal death | | | | | 5% of deaths cross-checked |
| Sample of WRA deaths checked to ensure they are correctly identified as not maternal | | | | | 1% of WRA rechecked |
| ANALYSIS | | | | | |
| Analysis plan developed | | | | | Yes |
| Calculate hospital maternal mortality ratio (usually for high volume deliveries) | | | | | yes |
| Calculate hospital case fatality rates (may be done at facility level or district level) | | | | | Yes |
| Analysis can produce district maternal mortality ratios | | | | | yes |
| Analysis provides data for action for all stakeholders | | | | | Yes |

| RESPONSE | | | | | |
|---|---|---|---|---|---|
| Plan for response developed | | | | | Yes |
| Facility | | | | | |
| % of committee recommendations that are implemented | | | | | >80% |
| – quality of care recommendations | | | | | >80% |
| – other recommendations | | | | | >80% |
| District | | | | | |
| % of committee recommendations that are implemented | | | | | >80% |
| REPORTS | | | | | |
| National Committee produces annual report | | | | | Yes |
| – Annual report available publically | | | | | Yes |
| District committee produces annual report | | | | | Yes |
| – Discusses with key stakeholders including communities | | | | | Yes |
| REVIEW OF THE SYSTEM | | | | | |
| The maternal death surveillance and response system is reviewed annually in terms of completeness of surveillance and quality of the response, including actions to improve quality of care | | | | | Yes |
| QUALITY OF CARE | | | | | |
| Quality of care assessments are conducted in a sample of maternity facilities on a regular basis | | | | | Yes |
| – Indicators are used to measure quality of care | | | | | Yes |