VIRTUAL MPDSR CAPACITY-BUILDING WORKBOOK FOR LEARNERS

MOMENTUM Country and Global Leadership

USAID FROM THE AMERICAN PEOPLE | MOMENTUM A Global Partnership for Health and Resilience | Maternal and Child Survival Program | World Health Organization | UNFPA | unicef

MOMENTUM works alongside governments, local and international private and civil society organisations, and other stakeholders to accelerate improvements in maternal, newborn, and child health services. Building on existing evidence and experience implementing global health programmes and interventions, we help foster new ideas, partnerships, and approaches and strengthen the resiliency of health systems.

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ABBREVIATIONS

ANC antenatal care
ARR annual rate of reduction
CHC community health centre
C/S caesarean section
CVD cephalic vaginal delivery
ELBW extremely low birthweight
EmOC emergency obstetric care
ENAP Every Newborn Action Plan
HAART highly active antiretroviral therapy
HMIS Health management information system
ICU intensive care unit
IPT intermittent preventive treatment
IT information technology
LBW low birthweight
LMP last menstrual period
MCCD Medical Certificate of Cause of Death
MCH maternal and child health
MDSR Maternal Death Surveillance and Response
MPDSR Maternal and Perinatal Death Surveillance and Response
NICU neonatal intensive care unit
NMR neonatal mortality rate
NVP nevirapine prophylaxis
PDR perinatal death review
PDSA plan-do-study-act
PDSR Perinatal Death Surveillance and Response
PL parking lot
PM perinatal mortality
PPH postpartum haemorrhage
PPIP Perinatal Problem Identification Program
PPT PowerPoint
PROM premature rupture of the membranes
QI quality improvement
SMART "Specific, Measurable, Attainable, Relevant and Timely"
TBA traditional birth attendant
TT tetanus toxoid
USAID U.S. Agency for International Development
VDRL venereal disease research laboratory
VLBW very low birthweight
WHO World Health Organization

INTRODUCTION

The Virtual Maternal and Perinatal Death Surveillance and Response (MPDSR) Capacity-Building Workbook for Learners aims to enhance the capacity of district managers and facility providers to strengthen MPDSR processes when in-person training is not possible. This workbook for learners was adapted from the learner's guide of the maternal death surveillance and response (MDSR) and perinatal death review (PDR) capacity-building modules of the World Health Organization's (WHO's), Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation. The U.S. Agency for International Development (USAID) flagship Maternal and Child Survival Program (MCSP) supported the MDSR module, and UNICEF supported the PDSR module. Changes to the session outline to adapt the training to a virtual format include dividing some sessions into home-based assignments and interactive virtual sessions.

Countries implementing MPDSR could benefit from a leaner's workbook that combines MDSR and PDR components; hence, this Virtual MPDSR Workbook for learners was developed. While MPDSR training can be conducted on its own, countries should consider integrating MPDSR training into existing in-service and pre-service curricula. Doing so will improve ownership, accountability, and sustainability of MPDSR activities.

The following are some existing modules to support strengthening of MPDSR capacity at subnational and facility levels:

- Maternal and Perinatal Death Surveillance and Response Capacity-Building Materials: MDSR module (in-person)[1]
- Skill Building on Perinatal Death Reviews (in-person)2
- Virtual MDSR Capacity Building Module[3]
- Virtual MPDSR Capacity Building Module[4]
- Maternal and Perinatal Death Surveillance and Response Capacity-Building Materials: MPDSR module (in-person)[5]
  - Online MPDSR course[6] (available in Spanish, English, and French)

WORKSHOP GOAL

The goal of the virtual pre-workshop and workshop is to strengthen manager and provider skills to support strong MPDSR processes that contribute to facility and subnational efforts to improve the quality of maternal health care and eliminate preventable maternal and perinatal deaths.

[1] Maternal and Child Survival Program (MCSP)
[2] UNICEF
[3] World Health Organization (WHO) South-East Asia, MOMENTUM Country and Global Leadership
[4] WHO, MOMENTUM Country and Global Leadership, UNICEF, United Nations Population Fund (UNFPA)
[5] WHO, MOMENTUM Country and Global Leadership, UNICEF, UNFPA
[6] Pan American Health Organization, WHO, 2019

WORKSHOP OBJECTIVES

By the end of the workshop, learners will be able to:

- Identify and notify maternal and perinatal deaths
- Create and/or strengthen capacity of district/subnational and facility MPDSR committees to implement MPDSR processes
- Review maternal deaths, assign cause of death using the International Statistical Classification of Diseases-Maternal Mortality (ICD-10 MM), including COVID-19-related maternal deaths, and identify contributing factors
- Review perinatal deaths and assign cause of death using the ICD- Perinatal Mortality (PM)
- Define, implement, and monitor responses based on individual death audits
- Monitor and analyse trends in causes of maternal and perinatal death and findings of death reviews over time; define, implement and monitor a set of priority responses based on identified trends (at the facility and district/subnational levels)

WORKSHOP STRUCTURE

PRE-WORKSHOP

- Duration: Duration: Two hours and 30 minutes at least a week before the workshop
- Platform: Virtual using Zoom
- Purpose:
  - Introduce participants to the workshop format
  - Build rapport within the group ahead of the virtual MPDSR workshop and help create a positive learning environment
  - Familiarise participants with the Zoom platform
  - Acquaint participants with the session plan and home assignment for each day of the workshop

WORKSHOP

- Duration: Four days, three hours each day with additional 30 minutes on Day 4 for closing
- Platform: Virtual using Zoom
- Facilitators will serve as mentors before, during, and after the workshop using WhatsApp and email.
- Home assignments, as outlined in the Learner's Workbook, are crucial.

LEARNER SELECTION CRITERIA

- Health care providers, mainly doctors, nurses, and midwives, involved in the delivery of maternal and newborn health care
- Facility and district health managers involved in supervising the health care providers who are implementing MPDSR/quality improvement (QI) activities in the facility or district

MATERIALS NEEDED FOR THE WORKSHOP

- Virtual MPDSR Capacity-Building **Workbook** for Learners
- Individual learning plan
- MPDSR pre-course knowledge assessment
- Evaluation form

MPDSR REFERENCE MATERIALS

- National MPDSR guidelines
- WHO's Maternal Death Surveillance and Response: Technical Guidance (if national guidelines are unavailable)
- Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation
- The WHO application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD-10 MM
- Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19: Technical note, 7 June 2020
- The WHO application of ICD-10 to deaths during the perinatal period: ICD-10 PM
- Making Every Baby Count: Audit and review of stillbirths and neonatal deaths
- Link or video "Why Did Mrs. X Die?" https://www.youtube.com/watch?v=gS7fCvCIe1k&feature=youtu.be

AGENDA

Pre-workshop MPDSR Capacity-Building Workshop Duration: 2 hours, 30 minutes	
Welcome and introduction	
Session 1	• Overview of the workshop • MPDSR status in the region/country • Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation

Virtual MPDSR Capacity-Building Workshop Duration: 4 days (3 hours each day)	
Day 1	
Welcome to participants	
Session 2	MPDSR Individual Learning Plan and Pre-course Knowledge Assessment
Session 3	Understanding Pathways to Maternal and Perinatal Death
Comfort break	
Session 3	Understanding Pathways to Maternal and Perinatal Death
Session 4	Six-Step Mortality Audit Cycle
Comfort break	
Session 5	Identifying Maternal and Perinatal Deaths
Wrap up	

Day 2	
Session 6	Creating or Strengthening MPDSR Committees
Session 7	Review and Knowledge Check
Comfort break	
Session 8	Key Components of Maternal and Perinatal Death Case Review Forms
Session 9	Cause Assignment Using the ICD-10 MM
Comfort break	
Session 9	Cause Assignment Using the ICD-10 MM
Wrap up	
Day 3	
Session 10	Cause Assignment Using the ICD-10 PM
Comfort break	
Session 11	Identifying Modifiable Contributing Factors for a Maternal and Perinatal Death and Priority Responses to Implement and Monitor
Comfort break	
Session 11	Identifying Modifiable Contributing Factors for a Maternal and Perinatal Death and Priority Responses to Implement and Monitor
Wrap up	
Day 4	
Session 12	Monitoring and Analysing Trends in Causes of Maternal and Perinatal Deaths and Findings of Death Reviews to Prioritise Aggregated Responses
Comfort break	
Session 12	Monitoring and Analysing Trends in Causes of Maternal and Perinatal Deaths and Findings of Death Reviews to Prioritise Aggregated Responses
Comfort break	
Closing	

INSTRUCTIONS FOR LEARNERS

Please follow the instructions outlined in the invitation email and make the necessary preparations before joining the pre-workshop and workshop.

ADVANCE PREPARATION

TWO WEEKS PRIOR

- Check your email for the following documents, which are essential for the workshop. If you have not received an email, please contact the facilitators.
  - Reference materials
    - National MPDSR Guidelines/WHO Maternal Death Surveillance and Response Technical Guidance (if you do not have their national guidelines)
    - WHO: Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation
    - WHO application of ICD-10 to deaths during pregnancy, childbirth, and the puerperium: ICD-10 MM
    - Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19: Technical note, 7 June 2020
    - The WHO application of ICD-10 to deaths during the perinatal period: ICD-10 PM
    - Link or video "Why Did Mrs. X die?" https://www.youtube.com/watch?v=gS7fCvCIe1k&feature=youtu.be
  - Virtual MPDSR capacity-building materials for learners
    - Virtual MPDSR Capacity-Building Workbook for Learners
    - Individual learning plan
    - MPDSR pre-course knowledge assessment
- Note the pre-workshop date, time, and Zoom link provided in the invitation letter. Read the instructions regarding preparation for the workshop and the timeline for submitting the individual learning plan and pre-course knowledge assessment.
- Check your Internet connection.
- Complete the following:
  - Individual learning plan: Complete the individual learning plan form and send it to the facilitators via email by the date indicated in the invitation email.
  - Pre-course knowledge assessment: Complete the pre-course knowledge assessment and send it to the facilitators via email by the date indicated in the invitation email.

  Note: The individual learning plan and pre-course knowledge assessment will help both learners and facilitators focus on areas needing attention during the workshop.

- Use the reference materials as needed.
- Check your WhatsApp group and assigned facilitator.
- If you have any questions regarding the documents or need clarification prior to the workshop, please contact the facilitators.
- Prepare for the workshop following the guidance in this document.
- Make sure to have a laptop for the virtual pre-workshop/workshop and check your Internet connection.

ONE WEEK PRIOR

- Check your email for the Zoom link, date, and time of the workshop.
- Make sure to have a laptop available for the pre-workshop/workshop and check your Internet connection.
- Make sure you can connect with your assigned facilitator through email or WhatsApp before, during, and after the workshop.
- Please check email for the participant number and pre-course matrix sent to you by your facilitator.
- Prepare for the workshop following the guidance in this document.
- Check your Internet connection.

TWO DAYS PRIOR

- Confirm the Zoom link, date, and time for the workshop.
- Check your Internet connection.
- Prepare for the workshop following the guidance in this document.
- If you have any questions about the documents or need clarification, contact the facilitators via email or WhatsApp.
- Please check email for the participant number and pre-course matrix sent to you by your facilitator.

ONE DAY PRIOR

- Check your email or WhatsApp messages for any new information from the facilitators.
- Check your Internet connection.
- Please check email for the participant number and pre-course matrix sent to you by your facilitator.

DURING THE VIRTUAL MPDSR CAPACITY-BUILDING WORKSHOP

- Be an active participant in the sessions.
- Remember to follow Zoom etiquette (keep your microphone on mute unless speaking, use the raise hand function, use the chat box for questions, etc.).
- Use the chat box to send questions during the session and for "parking lot" questions (type "PL" next to questions that do not need to be addressed right away). Questions will be answered immediately if appropriate, or later in the day through email/WhatsApp.
- At the end of each day of the workshop, check WhatsApp for the reminders about the assignment for the next day.
- On the last day of the workshop, check your email for the post-course knowledge assessment. Complete the questionnaire and send it to the facilitator through email by the designated date.

DAY 4 OF THE VIRTUAL MPDSR WORKSHOP

- Please check email for the evaluation from and post-course knowledge assessment questionnaire document. Download both documents and send back to the assigned facilitator through email at the designated time. Please put the assigned number in the designated space of the MPDSR post-course knowledge assessment document. It is mandatory to score 85% for the completion of the workshop

PREPARATIONS TO COMPLETE BEFORE JOINING EACH DAY'S SESSIONS

Assignment to be completed and sent to facilitators prior to the workshop	
Learners to complete	**Learners to send**
Individual learning plan (ILP)	Within one week of receiving the ILP and pre-course assessment
MPDSR pre-course knowledge assessment	

Assignments for the four-day workshop		
Day 1		
Learners to review	**Learners to complete**	**Learners to watch**
National MPDSR Guidelines	Common Myths and Misconception Related to Maternal and Perinatal Death Review (Learner's Workbook, Annex II)	Why Did Mrs. X Die? at home: https://www.youtube.com/watch?v=gS7fCvCIe1k&feature=youtu.be
WHO Maternal Death Surveillance and Response Technical Guidance (if they do not have their national guide)	Exercise: Identifying maternal and perinatal deaths. Read your assigned scenarios in Annex IV and determine if the scenario described is a maternal death. If yes, determine whether the maternal death is due to direct or indirect causes. Fill the answers in the Learner's Workbook, Annex IV.	
WHO: Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation	Read the ICD-10 PM case studies and mark 1, 2, 3, 4, 5, 6, as answers on Figure 1: Defining stillbirths and associated pregnancy outcomes (ICD-10) (Annex V).	
Virtual MPDSR Capacity-Building Workbook for Learners		
Review Guiding Principles for Maternal and Perinatal Mortality Review (Learner's Workbook, Annex I).		
Transcript of Why Did Mrs. X Die? (Learner's Workbook, Annex III)		
Day 2		
1. Creating or Strengthening MPDSR Committees		
Learners to review	**Learners to complete**	**Reminders for learners**
Read the section of your national MPDSR guidelines that defines the membership and composition of MPDSR committees. If you do not have this, review Annex VI A.		
Review Sample Terms of Reference for Review Committee (Annex VI B) and Sample Meeting Code of Practice (Annex VI C).		

WHO: Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation. Module 5: Conducting joint maternal and perinatal death reviews		
WHO: Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation. Module 7: Recommending actions and implementing change		
2. Review and Knowledge Check: Kahoot! Game		
Learners to review	**Learners to complete**	**Reminders for learners**
Review Zoom Guide for Learners (Annex XXII: Online Kahoot! Game)		Bring both a laptop and smartphone.
3. Maternal and Perinatal Death Case Review Forms.		
Learners to review	**Learners to complete**	**Reminders for learners**
Maternal Death Review and Clinical Summary Form for Scenario A–Abortion (Annex VII)	Based on the Maternal Death Review A–Abortion, complete Scenario 1–PPH, Scenario 2–Uterine Rupture, Scenario 3–PE/E, Scenario 4–Anaesthesia and write a summary in the designated box for each scenario in the Learner's Workbook, Annex VII	
Stillbirth and Neonatal Death Case Review Form (Annex X)		
4. Cause Assignment Using the ICD-10 MM		
Learners to review	**Learners to complete**	**Reminders for learners**
ICD-10 MM Reference Aid (Annex VIII A)		
Definition of Cause Groups with Examples (Annex VIIIB)		
MCCD forms with two examples (Annex IX)		
Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19, Technical note, 7 June 2020		

Day 3		
1. Cause Assignment Using the ICD-10 PM		
Learners to review	**Learners to complete**	**Reminders for the learners**
• ICD-10 PM Reference Aids 1 and 2 (Annex XI A, XI B) • Maternal condition in ICD-10 PM (Annex XI C) • ICD-10 PM Tabulation for Perinatal Cause of Death and Maternal Cause by Timing of Death (Annex XII) • Cause assignment and final ICD-10 PM group (two examples case studies in Annex XIII) • Stillbirths and neonatal death review form filled up to section 4 for case study 1: Early neonatal death (Annex XIV)	Read case studies 2, 3, and 4 on perinatal mortality audit and complete the stillbirth and neonatal death review forms up to section 4 for each case study (Annex XIV).	
2. Preparing an Individual Death Review Response Plan		
Learners to review	**Learners to complete**	**Reminders for the learners**
• Maternal Death Review and Clinical Summary Forms, scenarios 1–4 • Use summaries for scenarios 1–4 to analyse the case, identify modifiable contributing factors, and prioritise responses to implement and monitor. • Review relevant response form(s) used in the country to record modifiable factors and priority responses, if available. • Understand modifiable factors that can lead to perinatal deaths: Review filled stillbirth and neonatal death case review form for case study 1 (section 5 and below) (Annex XIV)	• MPDSR Individual Death Review Response Plan (Annex XVI A) • Review and analyse case studies 2, 3 and 4 to identify modifiable contributing factors and complete section 5 and the section below of the Stillbirth and Neonatal Death Case Review Forms (Annex XIV)	

Day 4		
1. Monitoring and analysing trends in causes of maternal deaths and findings of death reviews to prioritise aggregated responses		
Learners to review	**Learners to complete**	**Reminders for the learners**
Review HMIS Data Availability Review Form (Annex XXI)	• Exercise A: Calculating Percentage of Maternal Deaths by Cause. Calculate the proportion of monthly maternal deaths due to specific causes (Annex XV). [Learners do NOT need to plot a bar graph as part of this exercise.] • Exercise B: Response review and analysis. Read the description of the exercise, review Table 13, and complete Table 14: Aggregate MDSR form: Common modifiable factors and aggregated priority responses to accelerate reduction of maternal deaths due to PPH (Learner's Workbook, Annex XVIB). • Exercise C in Annex XVII of the Learner's Workbook. Read the instructions and complete the exercise. The exercise is like Exercise A; however, instead of calculating the proportions for each cause, learners will plot the data on a bar graph to visualise trends. • Exercise: Perinatal mortality rate definitions and data sources. • Write the numerator, denominator and data sources for the indicators given for perinatal mortality (Learner's Workbook, Annex XVIII). • Exercise on how to calculate, and analyse perinatal mortality indicators (Annex XIX) • Calculate trends of perinatal mortality and tabulate antepartum cause and code the death as per ICD-10 PM Learner's Workbook, Annex XX	• Check email for the Virtual MPDSR Workshop post-course knowledge assessment in the morning of the workshop. If needed, download and make it easy to access for the session. • Complete and send workshop evaluation • Complete the online course after the workshop to reinforce understanding: https://www.paho.org/en/news/3-3-2020-free-course-maternal-and-perinatal-death-surveillance-and-response

ANNEX I: GUIDING PRINCIPLES FOR MATERNAL AND PERINATAL MORTALITY REVIEWS

- Adhere to a no blame policy. Health care providers are vulnerable to blame during mortality reviews and a blame culture may discourage honest reporting of events.
- No blame is NOT no accountability.
- Death reviews should focus on health systems and not on individuals.
- Data are anonymised and cannot be used for disciplinary purposes.
- Review meetings are a learning opportunity for all participants to improve quality of care and prevent deaths.
- Confidentiality and a culture of learning and improvement are essential for a well-functioning MPDSR system.
- Build on existing quality improvement (QI) committees and existing MPDSR work.
- Maternal and perinatal mortality reviews can be integrated.
- Response often involves a multisectoral approach.
- MPDSR should be incorporated into the curricula of medical, nursing, and midwifery programmes.
- Review teams should adopt a zero-reporting principle, which is an active process of notifying that no maternal deaths occurred. A “zero” is captured in the data collection system rather than nothing at all.
- Detailed patient histories are important since documentation of patient care is the main source of information for audits.

ANNEX II: COMMON MYTHS AND MISCONCEPTIONS RELATED TO MATERNAL AND PERINATAL DEATH REVIEW

IN THE ANSWER SECTION, WRITE YOUR EXPLANATION OF THE FOLLOWING "MYTHS."

1. Pregnancy and childbirth are no longer dangerous.

Answer:

2. There are no global targets focused on the reduction of stillbirths and neonatal deaths.

Answer:

IN THE ANSWER SECTION, WRITE YOUR EXPLANATION OF THE FOLLOWING "MISCONCEPTIONS."

1. Perinatal death reviews are impossible in my setting as there are too many neonatal deaths and stillbirths.

Answer:

2. Maternal and perinatal death reviews can expose providers to punitive or disciplinary action.

Answer:

3. Quality improvement plan-do-study-act (PDSA) cycles and maternal/perinatal death reviews are not linked.

Answer:

ANNEX III: WHY DID MRS. X DIE? TRANSCRIPT

This is the story of a mother called Mrs. X. Mrs. X could have come from anywhere, but she is most likely to have come from a low-income family in a poor country. Mrs. X represents a universal mother.

Mrs. X died in the small hospital when she was eight months pregnant. The doctor had no doubt about the cause of her death: a haemorrhage. Her placenta had been too low in her uterus and it hadn't been identified in time. The doctor recorded her death, closed her file, and added it to a growing stack of similar cases locked away in a cupboard. Over time, the stack grew and grew.

Some years later, worried about the high number of mothers dying in their hospital, the staff reviewed the cases to learn lessons and make improvements. They reopened and reviewed file after file. One of these was that of Mrs. X. When they read it, they found two striking points. First, Mrs. X had arrived at the hospital bleeding heavily, yet she only received half a litre of blood. This was all the hospital had available, and it was not enough. Second, Mrs. X and her baby needed a caesarean section, but resources were limited, and the operation took place three hours too late. Both Mrs. X and her unborn baby died.

The group then visited Mrs. X's village and spoke with her family, neighbours, and community leaders. They found that there were other reasons for her death. Mrs. X had a history of bleeding early in pregnancy but wasn't aware that this was a danger sign needing attention. She also had had only one antenatal visit. If she'd gone regularly, the problem may have been caught. She would have been referred to a specialist, and she and her baby could have survived. Mrs. X was also severely anaemic, so the loss of even a small amount of blood, as little as a cupful, could have tipped the balance between life and death. The team discovered that it had taken six hours to collect enough money to pay for her transport to the hospital.

As a result of these findings, the hospital improved their blood supplies, updated their emergency procedures, and caesarean sections could now be performed as soon as it was necessary. The local health department provided more midwives in more places to enable more women to have access to good maternity services throughout pregnancy and birth. Mrs. X's file was closed again.

A year later, a group of visiting health professionals came to the hospital as part of a national inquiry into maternal deaths. They wanted to understand what lay behind the statistics, beyond the numbers, and to discover the wider social and economic reasons for the deaths of women like Mrs. X and their babies and what could be done about it. The aim of their work was to recommend changes to national or regional policies and strategies, improve women's health, and save mothers' lives. When they reviewed all the data, common patterns emerged. They found most mothers' stories were similar to that of Mrs. X.

Like many women in developing countries, Mrs. X worked day and night to care and provide for her family. She was illiterate. She lived in poverty in a remote village. She was unable to choose when and if to become pregnant. Mrs. X was also weak and unhealthy. In her society, the male members of the family came first in the queue for food, for education, and for health care. Mrs. X often went without. For women like her, death or complications in pregnancy were, and still are, a real threat.

By uncovering the stories of women such as Mrs. X, the national team was able to put pressure on the government to provide more education for girls, more resources and staff for maternity care, and better reproductive health services. They also pushed for raising community awareness about health, nutrition, family planning, and the benefits of skilled maternity care.

Mrs. X started on the pathway of her pregnancy exhausted, with few physical reserves. She hadn't chosen to become pregnant. It was her destiny. The only value she had to her family and community was her ability to produce children. However, Mrs. X had been lucky, in a way. At least she'd had a childhood. In some societies, girls are married off while still children themselves, not physically or mentally prepared for childbirth or motherhood.

If Mrs. X had been treated as an equal to her brothers while she was growing up, she could have been healthier and better educated. If she'd had more control over her adult life, she may have been able to choose when to have children. As Mrs. X continued her walk through pregnancy, her prospects would have been better if she visited a skilled professional health worker, a midwife, or doctor. Even if Mrs. X had known the importance of antenatal care, her midwife was many miles walk away. If only Mrs. X's problems had been recognised and her anaemia treated. If only she'd had specialist care in time.

Because of tradition, poverty, and lack of knowledge, many women in Mrs. X's community gave birth at home. Some told stories of being treated harshly and disrespectfully by hospital staff. Some were expected to pay bribes. Mrs. X had also planned to give birth at home, but then she developed a life-threatening complication. She started to bleed.

If Mrs. X had been referred and had timely transport to a hospital with facilities for providing comprehensive emergency obstetric care, such as equipment, well-trained staff, and enough medicines and blood, her life and that of her baby might have been saved.

Mrs. X could have lived to raise her children.

After the long delay in finding transport, Mrs. X was eventually admitted to the hospital where, due to the lack of resources, she and her baby died.

Along the pathway of her pregnancy, Mrs. X faced barriers that prevented her from receiving the care she needed. Each could have been removed. And yet, many or all of these barriers remain along the roads taken by women today.

Mrs. X could be any woman. Your sister, your wife, your mother, your daughter, you. It is up to all of us, no matter where we live, who we are, or what we do, to help remove these barriers for Mrs. X and the millions of pregnant women like her. As individuals, we can lobby for better health care and equal rights for girls and women. As communities, we can make sure our pregnant women are informed and cared for. We can organise local education, support, and transport for our mothers. As health care workers, we can provide quality care in a respectful environment. And we can continue to open the files and learn the lessons from mothers like Mrs. X.

As local health planners, we can provide high-quality maternity and family planning services that reach out to more women. And as politicians and policymakers, we can strengthen human rights. We can improve education for girls and women. And we can provide the resources for better, more effective health care services across the world, wherever they're needed, now.

ANNEX IV: IDENTIFYING MATERNAL DEATHS

INSTRUCTIONS: Read each of the following scenarios and determine whether the scenario described is a maternal death. If it is a maternal death, determine whether the maternal death is due to direct or indirect causes. Write your answers in the space provided.

Scenario 1
A 21-year-old woman went into labour and delivered a healthy baby at home normally. One hour later, she was bleeding heavily. She was rushed to the health facility but died two hours after arrival.

Answer:

Scenario 2
A 30-year-old pregnant woman in her seventh month of pregnancy was on her way to the clinic when the vehicle she was travelling in overturned. She was severely injured and taken to the hospital but died a few hours later.

Answer:

Scenario 3
A 19-year-old woman was rushed to the outpatient department of a small hospital with a severe headache. Her husband said she was eight months pregnant and received regular antenatal care (ANC) at her local primary health care centre. It was her first pregnancy. She had severe seizures just prior to arriving at the hospital. She was admitted and died immediately.

Answer:

Scenario 4
A pregnant woman in her fourth month of pregnancy was having fever at night, with sweats and cough. She had not attended any ANC visits. She was HIV-positive. She was rushed to the hospital with shortness of breath and difficulty breathing. She was found to have pneumonia and started on treatment but died a few hours later.

Answer:

Scenario 5
A 21-year-old woman missed her periods and went for a pregnancy test. When she found out she was pregnant, she went to a local clinic and bought some medicine to try to end the pregnancy. She started bleeding heavily and died a few hours after arriving at the hospital.

Answer:

Scenario 6
A 35-year-old woman arrived at the health facility exhausted and pale. Her husband said she had been in labour for the last 12 hours at home. Since all her previous deliveries were at home and without problems, they had kept her at home. On examination, the midwife found that the infant's head was still high, but the cervix was fully dilated. They immediately prepared her for an emergency caesarean section, however, the woman died before the caesarean section could be performed.

Answer:

Scenario 7
A 29-year-old woman who was 30 weeks pregnant had fever, vomiting, and joint pain. She started having a high fever and was taken to the hospital and was put on antimalaria medication for 24 hours. However, her condition deteriorated overnight, and she died.

Answer:

Scenario 8
A 35-year-old woman was in her third pregnancy and had not had any problems. She went into labour and her husband kept her at home because her two previous babies had been born at home. She was attended by a local traditional birth attendant who performed repeated vaginal examinations to check her progress. After 24 hours, the woman had not delivered, so her husband took her to the hospital. The baby was breech. Assisted breech delivery was required. The woman did not receive any antibiotics after the assisted delivery but was kept for observation for eight hours in the hospital before being discharged and sent home. She returned to the maternity ward complaining of excessive foul-smelling discharge and high fever. She died a day later.

Answer:

Scenario 9

An asymptomatic woman who has a positive COVID-19 test dies of hypovolemic shock following massive postpartum hemorrhage and uterine atony.

Answer:

ANNEX V: ICD-10 PM CASE STUDIES

INSTRUCTIONS:

- Read the case studies below and fill in the answers.
- In Figure 1: Defining stillbirths and associated pregnancy outcomes (ICD-10), mark the answers as 1, 2, 3, 4, 5, and 6 in the respective areas.

Case Study 1
A 23-year-old primigravida patient, single, with no risk factors during pregnancy, referred from a lower-level health facility, history of amenorrhoea for the past three months, went to a traditional health worker wishing to terminate the pregnancy. Given some herbal medicines. Presents to the hospital with a history of bleeding with fleshy mass discharge. On admission complains of abdominal pain and mild fever. No foetal heart sound on auscultation. Ultrasonography reveals echogenic content suggesting product of conception, with free fluid in uterus and pelvic cavity. Diagnosis of incomplete septic abortion. What is the outcome of pregnancy?

Answer:

Case Study 2
A 21-year-old woman, gravida 5, para 2+2, haemoglobin 11 gm. /dl, venereal disease research laboratory (VDRL) ++, eight months since her last menstrual period, complains of decreased foetal movement for two days. No foetal heart rate on admission, labour induction started, delivered a stillborn baby weighing 1,100 grams with signs of maceration of the skin. What is the outcome of pregnancy?

Answer:

Case Study 3
A 28-year-old woman, primigravida, short stature, uneventful pregnancy history, labour diagnosed to be prolonged (foetus has failed to engage after two hours of complete dilation). Emergency caesarean section undertaken. Apgar score of 4 at one minute and 7 at five minutes. Baby placed under oxygen therapy, weak suckling reflex and could not breastfeed properly, started on cup feeding, showed progressive improvement and discharged from hospital after two weeks. Baby died at home on day 21. What is the outcome of pregnancy?

Answer:

Case Study 4

A 35-year-old pregnant woman with diagnosis of gestational diabetes with a gestational age of 42+ weeks of pregnancy complains of decreasing foetal movements. Foetal heart rate was found to be 190 per minute on auscultation. A decision to perform an emergency caesarean section was made. Baby showed no signs of life at birth and was covered with meconium. What is the outcome of pregnancy?

Answer:

Case Study 5

A 35-year-old woman, known to be at full term, with a history of four stillbirths and two live births delivers a live baby weighing 3.4 kg at the hospital. The baby takes a breath at birth but is floppy and makes no further attempt at breathing. Vigorous stimulation and resuscitation with bag and mask are unsuccessful. What is the outcome of pregnancy?

Answer:

Case Study 6

A 31-year-old woman, primigravida at 39.7 weeks gestation, comes to the emergency room. History of uneventful pregnancy except recent complaints of decreased foetal movements. Blood group is B Rh-positive, and she is positive for group B streptococcus. Contractions started when she was in the emergency room, but no foetal movements were identified. An external foetal monitor and ultrasound examination confirmed intrauterine foetal death. There was no evidence of physical abuse, nor was there evidence of abruption, either clinically or pathologically.

Answer:

FIGURE 1. DEFINING STILLBIRTHS AND ASSOCIATED PREGNANCY OUTCOMES (ICD-10)

Mark 1, 2, 3, 4, 5, and 6 for the six case studies presented in the area of the figure corresponding to the classification of the death.

Source: adapted from Lawn et al., 2011 *(23)*.

Figure 1. ICD-10 PM case studies with answers marked 1, 2, 3, 4, 5, and 6 for the respective questions from the following case studies

ANNEX VI A: ILLUSTRATIVE ROLES AND RESPONSIBILITIES OF AN MPDSR COMMITTEE

TABLE 1. ILLUSTRATIVE ROLES AND RESPONSIBILITIES[7]

Role	Responsibilities	Skills	Reports to/
	• Convene the MPDSR committee at regular intervals • Facilitate discussion and encourage respectful and open communication • Establish ground rules and remind participants of the code of conduct, including confidentiality and no blame principle • Lead review of previous meeting's recommendations and status updates	Facilitation, listening, impartiality	District manager, Ministry of Health
	Before the review meeting: • Identify maternal deaths • Gather all information relevant to the cases to be reviewed • Conduct the interviews with staff involved with the case **During the review meeting:** • Present summary of clinical cases under review at committee meetings • Complete MPDSR form and medical certificate of the cause of death • Follow committee code of conduct and ensure **no blame environment**	Tact, sensitivity, attention to detail	Secretary
	• Work with the chair to prepare the meeting agenda • In consultation with the presenter, ensure relevant documents are available for the review meeting • Summarise the case analysis • Send completed form to appropriate person/ focal point • Develop and share report of the review meeting • Follow committee code of conduct and ensure **no blame environment**	Writing, coordination of tasks	Moderator/ chair, presenter

[7] Adapted from: De Brouwere V, Zinnen V, Delvaux T (2013) How to conduct Maternal Death Reviews (MDR). Guidelines and tools for health professionals. London, International Federation of Gynaecologists and Obstetricians, FIGO LOGIC, http://www.figo.org/files/figo-corp/MDR_Guidelines_2013.pdf accessed January 2018

Role	Responsibilities	Skills	Reports to/ consults with
Data manager	• Periodically review data trends • Monitor data input quality • Input data into database • Send data to receiving parties (Ministry of Health, etc.) • Develop dashboard and data visualisation • Follow committee code of conduct and ensure **no blame environment**	Monitoring and evaluation, data management	Moderator/ chair, presenter, secretary
Members	• Participate in review of maternal deaths in the facility • Recommend and participate in implementation and follow-up of individual and aggregated death review responses • Ensure confidentiality of meeting proceedings • Follow committee code of conduct and ensure **no blame environment**		
Quality improvement (QI) team representative	• Participate in review of maternal deaths in the facility • Recommend and participate in implementation and follow-up of individual and aggregated death review responses • Transmit QI interventions developed by the MPDSR committee to the QI team • Coordinate and report on status of QI team's interventions to the MPDSR committee • Ensure confidentiality of meeting proceedings • Follow committee code of conduct and ensure **no blame environment**		

ANNEX VI B: SAMPLE TERMS OF REFERENCE FOR REVIEW COMMITTEE

PURPOSE

Reducing maternal and perinatal deaths is a priority for this health facility, in accordance with local, national, and global goals. Recognising that the primary aim of MPDSR is action that results in improved quality of care, the purpose of the MPDSR review committee is to coordinate an effective review of maternal deaths, stillbirths, and neonatal deaths, and to oversee implementation of the recommendations arising from these reviews.

AUTHORITY

The committee may decide or advise on appropriate corrective and other actions, which may be required to reduce mortality and improve quality of care.

MEMBERSHIP

Describe the core, ad hoc, and other members of the MPDSR review committee. Stress the importance of multidisciplinary membership.

DUTIES AND RESPONSIBILITIES

Coordinate meetings at a specified frequency. Ensure that all relevant health information and data are made available for such meetings:

- Monitor trends in births and deaths, and other relevant data.
- Ensure that actions arising from recommendations are implemented and communicated.
- Work collaboratively with other quality improvement mechanisms and other key partners within the facility.
- Promote a no blame environment for mortality review.
- Consider the relevance of MPDSR activities to other levels of the health system and share findings as mandated.
- Ensure attendance of key stakeholders.
- Ensure confidentiality.
- Coordinate the creation and dissemination of summary reports as required.

PROCEDURAL ISSUES

Describe decisions made in regards to:

- Frequency of meetings
- Meeting roles (e.g., chairperson, secretary)
- Quorum
- Adherence to a meeting code of conduct
- Completion and distribution of meeting minutes (maximum three working days)

REVIEW

The terms of reference and committee processes will be reviewed every year, or sooner should the need arise.

ANNEX VI C: SAMPLE MEETING CODE OF PRACTICE

CODE OF PRACTICE

To show respect for the women, babies, and families we are responsible for looking after, we, the staff of _____ [name of facility], agree to respect the rules of good conduct during meetings where cases of deaths that have occurred in our facility are reviewed.

We understand and appreciate that the results of these meetings will not result in punitive measures. The rules of our stillbirth and neonatal mortality audit meetings include:

- Arrive on time to the audit meetings.
- Participate actively in discussions.
- Respect everyone's ideas and ways of expressing them.
- Accept discussion and disagreement without resorting to verbal abuse.
- Respect the confidentiality of the discussions that take place during the meetings.
- Agree not to hide useful information or falsify information that could provide insight into the case(s) under review.
- Try as much as possible (recognising that it is not easy) to accept that your own actions can be questioned.

Signed: _____ Date: _____

Signed: _____ Date: _____

Signed: _____ Date: _____

Signed: _____ Date: _____

Signed: _____ Date: _____

Signed: _____ Date: _____

ANNEX VII: INTRODUCTION TO MATERNAL DEATH REVIEW AND CLINICAL SUMMARY FORMS[8]

SCENARIO A: ABORTION

TABLE 2. CLINICAL SUMMARY FORM: ABORTION

Date of MDR: 10 December 2017 **MDR session N°:** 000/example

Patient code: Patient001

Patient age: 23 years

Marital status: ☐ Married/cohabitant ☐ Divorced ☒ Single

Gravida: 1 **Para:** 0 **Live children:** 0

Number of previous caesarean sections: 0 **Date of last C/S:** N/A

Prior obstetric complications: None

Pre-existing medical problems: None

Number of antenatal care visits in this pregnancy: 0

Risk factor(s)/complications detected during this pregnancy/labour: None

If delivered/aborted before admission: None

Date: **Duration of amenorrhoea:** **Live baby:** ☐ Yes ☐ No

Place of birth/abortion: **Assisted by:**

Complications occurred: ☐ Yes ☐ No

If pregnant on admission:

Duration of amenorrhoea: 3 months

[8] Adapted from: De Brouwere V, Zinnen V, Delvaux T (2013) How to conduct Maternal Death Reviews (MDR). Guidelines and tools for health professionals. London, International Federation of Gynecologists and Obstetricians, FIGO LOGIC, https://www.figo.org/sites/default/files/uploads/projecpublications/LOGIC/VfinalEdited%20MDR%20Guidelines%20final%202014.pdf

Referred from another institution: ☒ Yes ☐ No

Type of institution? Health centre

Reason for coming to hospital: Severe lower abdominal pain, bleeding with passage of fleshy mass from the vagina

History of the referral/process of reaching the institution: The patient was unmarried and had wanted to terminate the pregnancy. A woman in the village gave her some herbs to insert into her vagina. After some days, she began bleeding and passed several small pieces of fleshy tissue from her vagina. She developed abdominal pain and a foul-smelling discharge and was rushed to the health centre, which referred her to the hospital.

What associated factors may have contributed to this death (e.g., woman's status in community)? She was a young woman unable to access safe abortion services.

Date and time of admission: 01 December 2017, 7:00 pm

Main reason for admission: Incomplete abortion (induced abortion)

Initial clinical assessment/ultrasound/laboratory findings at admission: General condition was poor. Ultrasound revealed echogenic content suggestive of product of conception, with free fluid in the uterus and pelvic cavity.

Diagnosis made at admission: Incomplete abortion

Summary of the case evolution if complication(s) occurred after admission: After failure of expulsion of the products of conception, she developed foul discharge and was rushed to the hospital where her condition worsened.

Sequence of events if abortion/delivery occurred: See summary above

Complications: Sepsis

Clinical assessment/ultrasound/laboratory findings: Incomplete septic abortion

Diagnosis: Incomplete septic abortion

How did the woman's status in the community affect the process after admission in this particular case?

Main treatment(s) given: IV fluids, antibiotics

Time between diagnosis of complication and appropriate treatment: 3 hours

Complementary tests and laboratory results after treatment:

Summary of case evolution and monitoring put in place (t°, BP, pulse, and bleeding): The woman was admitted and put on IV fluids and antibiotics and given a blood transfusion. Central venous catheterisation was also done. She was taken to the theatre for evacuation of the products of conception, which was found to be foul smelling. She developed persistent hypotension with BP 49/25 mmHg, pulse 120 bpm, temperature 36.6°C, haemoglobin: 6gm/dl, and was not responding to the fluids.

Date of death: 01 December 2017

Time elapsed between complication and death: 5 hours

Cause of death notified in records: Incomplete septic abortion

Pregnancy outcome (live birth, stillbirth, early death, miscarriage): Miscarriage

Other information available (from family, health centres, community, etc.)

Summary of the case, to be presented to the MPDSR team:

A 23-year-old woman was admitted to the hospital at 12 weeks' gestation in a general poor health with low blood pressure and tachycardia. She had blood pressure of 49/25 mmHg, tachycardia (120 beats/min), and body temperature of 36.6°C. She said she was given some herbs by a woman in the village to insert into her vagina to try to end the pregnancy. She was put on isotonic solution while further assessments were completed. Her haemoglobin was 6 grams/dL. Ultrasound revealed echogenic content suggestive of product of conception with free fluid in the uterus and pelvic cavity. She was taken to the theatre where an evacuation of the uterus was performed. Foul-smelling products of conception were removed. She was put on IV fluids and antibiotics. Despite aggressive hydration therapy including blood products, by central venous catheterisation, she had persistent bradycardia and hypotension. The woman died after five hours despite all the efforts.

SCENARIO 1: POSTPARTUM HAEMORRHAGE (PPH)

TABLE 3. CLINICAL SUMMARY FORM: PPH

Date of MDR: 25 July 2016 **MDR session N°:** 001

Patient code: Patient002

Patient age: 35 years

Marital status: ☒ Married/cohabitant ☐ Divorced ☐ Single

Gravida: 1 **Para:** 4 **Live children:** 4

Number of previous caesarean sections: 0 **Date of last C/S:** N/A

Prior obstetric complications: Retained placenta

Pre-existing medical problems: Anaemia

Number of antenatal care visits in this pregnancy: 3

Risk factor(s)/complications detected during this pregnancy/labour: Anaemia

If delivered/aborted before admission:

Date: **Duration of amenorrhea:** **Live baby:** ☐ Yes ☐ No

Place of birth/abortion: **Assisted by:**

Complications occurred: ☐ Yes ☐ No

If pregnant on admission:

Duration of amenorrhea: 38 weeks

Referred from another institution: ☐ Yes ☐ No **Type of institution?**

Reason for coming to hospital: Labour pains

History of the referral/process of reaching the institution: None

What associated factors may have contributed to this death (e.g., woman's status in community)? None

Date and time of admission: 17 July 2016, 12:00 am

Main reason for admission: Normal labour

Initial clinical assessment/ultrasound/laboratory findings at admission: Patient stable but has regular abdominal pains consistent with labour. Foetal heart sound 120 beats/min, BP 110/70 mmHg, Hb 9 grams/dl, urine examination normal. On examination, cervix dilated 8 cm; membranes intact.

Diagnosis made at admission: Normal labour

Summary of the case evolution if complication(s) occurred after admission: The woman was admitted to the labour ward for observation and to the delivery room where she delivered normally. However, after two hours she developed severe vaginal bleeding. She was taken back for evaluation and given IV oxytocin 20 IU.

Sequence of events if abortion/delivery occurred: See above

Complications: Bleeding after delivery

Clinical assessment/ultrasound/laboratory findings: None

Diagnosis: Postpartum haemorrhage

How did the woman's status in the community affect the process after admission in this particular case?

Main treatment(s) given: IV fluids, antibiotics, 20 IU of oxytocin

Time between diagnosis of complication and appropriate treatment: 4 hours

Complementary tests and laboratory results after treatment: None

Summary of case evolution and monitoring put in place (t°, BP, pulse and bleeding): After delivery, the woman was admitted to the ward for observation before discharge. After two hours, she complained of drowsiness and the midwife was called. She found that her vital signs were abnormal with blood pressure of 90/60 and a pulse rate of 100 per minute and temperature of 37°C. On examining the woman, the midwife found she had vaginal bleeding and her uterus was soft. The woman was immediately put on 1,000 ml of normal saline solution. The midwife re-examined her and found that her uterus was still soft and added 20 IU of oxytocin. When bleeding did not stop, she was rushed to the labour room for a full examination, which found no cervical tears and she was returned to the ward. The doctor ordered two pints of blood; however, blood was not available. The woman went into hypovolemic shock and died three hours later.

Date of death: 19 July 2016

Time elapsed between complication and death: 3 hours

Cause of death notified in records: Postpartum haemorrhage due to uterine atony

Pregnancy outcome (live birth, stillbirth, early death, miscarriage): A live baby weighing 2,200 grams.

Other information available (from family, health centres, community, etc.)

CLINICAL SUMMARY FORM: PPH

Summary of the case, to be presented to the MPDSR team:

SCENARIO 2: UTERINE RUPTURE

TABLE 4. CLINICAL SUMMARY FORM: UTERINE RUPTURE

Date of MDR: 14 September 2017 **MDR session N°:** 002

Patient code: Patient003 **Patient age:** 39 years

Marital status: ☒ Married/cohabitant ☐ Divorced ☐ Single

Gravida: 8 **Para:** 0 **Live children:** 7

Number of previous caesarean sections: 0 **Date of last C/S:** N/A

Prior obstetric complications: None

Pre-existing medical problems: None

Number of ANC visits in this pregnancy: 2

Risk factor(s)/complications detected during this pregnancy/labour: None

If delivered/aborted before admission: No

Date: **Duration of amenorrhea:** **Live baby:** ☐Yes ☐No

Place of birth/abortion: **Assisted by:**

Complications occurred: ☐ Yes ☐ No

If pregnant on admission:

Duration of amenorrhea: 38 weeks

Referred from another institution: ☒ Yes ☐ No **Type of institution?** Health centre

Reason for coming to hospital: Abdominal pains and vaginal bleeding

History of the referral/process of reaching the institution: The woman was in labour for 20 hours at the rural health centre. When she did not deliver and started to have vaginal bleeding, the midwife decided to refer her to the main hospital in the town using a pickup truck rented by the family because the community ambulance had no fuel.

What associated factors may have contributed to this death (e.g., woman's status in community)? None

Date and time of admission: 03 September 2017, 12:00 pm

Main reason for admission: Labour pains and vaginal bleeding

Initial clinical assessment/ultrasound/laboratory findings at admission: The woman was in pain and had vaginal bleeding**.** On examination, she was weak and pale and had a tender abdomen and no foetal heart sound could be heard. Her BP was 90/50 mmHg, pulse rate 110 per minute, and respiratory rate of 50 per minute. Haemoglobin was requested and found to be 4 grams/dl. An ultrasound scan revealed the foetus in the abdominal cavity and significant free fluid in the peritoneum.

Diagnosis made at admission:

Summary of the case evolution if complication(s) occurred after admission: The doctor immediately made a diagnosis of uterine rupture.

Sequence of events if abortion/delivery occurred: No delivery occurred

Complications: Abdominal pain, vaginal bleeding

Clinical assessment/ultrasound/laboratory findings: The woman appeared clinically dehydrated, with concentrated urine. On examination, there were no foetal heart sounds and there was generalised abdominal tenderness with distention. Ultrasound revealed significant free fluid in the peritoneum and the foetus in the abdominal cavity

Diagnosis: Ruptured uterus

How did the woman's status in the community affect the process after admission in this particular case?

Main treatment(s) given: IV antibiotics, 2 litres of IV normal saline, an ultrasound scan

Time between diagnosis of complication and appropriate treatment: 1 hour **Complementary tests and**

laboratory results after treatment: None

Summary of case evolution and monitoring put in place (t°, BP, pulse, and bleeding): A senior doctor was called but did not arrive. A junior doctor decided to conduct an emergency exploratory laparotomy. A posterior uterine rupture in a transverse direction was found, with blood-stained fluids visible on the intra-abdominal organs. A nonviable foetus was delivered from the abdominal cavity. A subtotal hysterectomy was performed by a junior doctor and the abdomen was washed out and closed. The woman's condition deteriorated in the recovery ward and she died two hours later.

Date of death: 03 September 2017

Time elapsed between complication and death: 5 hours

Cause of death notified in records: Ruptured uterus

Pregnancy outcome (live birth, stillbirth, early death, miscarriage): Stillbirth; 2,900 grams

Other information available (from family, health centres, community, etc.)

CLINICAL SUMMARY FORM: UTERINE RUPTURE

Summary of the case, to be presented to the MPDSR team:

SCENARIO 3: PRE-ECLAMPSIA AND ECLAMPSIA (PE/E)

TABLE 5. CLINICAL SUMMARY FORM: PE/E

Date of MDR: 10 June 2017 **MDR session N°:** 003

Patient code: Patient004 **Patient age:** 38 Years

Marital status: ☒ Married/cohabitant ☐ Divorced ☐ Single

Gravida: 1 **Para:** 0 **Live children:** 0

Number of previous caesarean sections: 0 **Date of last C/S:** N/A

Prior obstetric complications: Gestational hypertension

Pre-existing medical problems: None

Number of ANC visits in this pregnancy: 3

Risk factor(s)/complications detected during this pregnancy/labour: None

If delivered/aborted before admission: None

Date: **Duration of amenorrhea:** **Live baby:** ☐ Yes ☐ No

Place of birth/abortion: **Assisted by:**

Complications occurred: ☐ Yes ☐ No

If pregnant on admission:

Duration of amenorrhea: 36 weeks

Referred from another institution? ☐ Yes ☒ No **Type of institution?**

Reason for coming to hospital: Severe headache

History of the referral/process of reaching the institution:

What associated factors may have contributed to this death (e.g., woman's status in community)?

Date and time of admission: 05 June 2017, 6:00 pm

Main reason for admission: Pregnancy with severe headache and high blood pressure

Initial clinical assessment/ultrasound/laboratory findings at admission: Blood pressure of 180/110, lower limb oedema, uterine fundus height of 30 cm, closed cervix, no uterine contractions, and foetal heart sound heard.

Diagnosis made at admission: Pre-eclampsia

Summary of the case evolution if complication(s) occurred after admission: Following assessment, the woman was transferred immediately to the delivery room where she had her first eclamptic fit. The nurses waited for the obstetrician before initiating the loading dose of magnesium sulphate. The obstetrician arrived one hour after the woman's first eclamptic fit and started management with magnesium sulphate and antihypertensive.

Sequence of events if abortion/delivery occurred: See above

Complications: Fits/seizures

Clinical assessment/ultrasound/laboratory findings:

Diagnosis: Eclampsia

How did the woman's status in the community affect the process after admission in this particular case?

Main treatment(s) given: A urinary catheter and intravenous line were placed; antihypertensive treatment and loading dose of magnesium sulphate. The woman was transferred to the intensive care unit.

Time between diagnosis of complication and appropriate treatment: 1 hour

Complementary tests and laboratory results after treatment: None. The ultrasound revealed a live foetus of 36 weeks.

Summary of case evolution and monitoring put in place (t°, BP, pulse, and bleeding): A caesarean section was performed in the central block at 8 pm. The obstetrician extracted a live male baby (Apgar 6), who was transferred to the paediatric ward. During the postoperative period, vital signs were hardly monitored at all (BP taken three hours after surgery). The woman went into a coma in the intensive care unit and died 16 hours after admission.

Date of death: 06 June 2017

Time elapsed between complication and death: 16 hours

Cause of death notified in records: Eclampsia

Pregnancy outcome (live birth, stillbirth, early death, miscarriage): A live infant weighing 2,300g

Other information available (from family, health centres, community, etc.)

CLINICAL SUMMARY FORM: PE/E

Summary of the case, to be presented to the MPDSR team:

SCENARIO 4: ANAESTHESIA

TABLE 6. CLINICAL SUMMARY FORM: ANAESTHESIA

Date of MDR: 16 March 2015 **MDR session N°:** 005

Patient code: Patient005 **Patient age:** 29

Marital status: ☒ Married/cohabitant ☐ Divorced ☐ Single

Gravida: 3 **Para:** 2 **Live children:** 1

Number of previous caesarean sections: 0 **Date of last C/S:** N/A

Prior obstetric complications: None

Pre-existing medical problems: Asthma

Number of antenatal care visits in this pregnancy: 3

Risk factor(s)/complications detected during this pregnancy/labour: None

If delivered/aborted before admission: No

Date: **Duration of amenorrhea:** **Live baby:** ☐ Yes ☐ No

Place of birth/abortion: **Assisted by:**

Complications occurred: ☐ Yes ☐ No

If pregnant on admission:

Duration of amenorrhea: 40 weeks

Referred from another institution: ☐ Yes ☒ No **Type of institution** Unknown

Reason for coming to hospital: Labour

History of the referral/process of reaching the institution: None

What associated factors may have contributed to this death (e.g., woman's status in community)? None

Date and time of admission: 04 March 2015, 4:00 am

Main reason for admission: Normal labour

Initial clinical assessment/ultrasound/laboratory findings at admission: On examination, the patient's BP was 120/80 mmHg, pulse rate was 80 beats per minute and the foetal heart sound was 120 per minute. Her haemoglobin and urine exams were normal. On vaginal examinations, the cervix was open 4 cm, the membranes were intact, and no discharge of fluids was seen.

Diagnosis made at admission: Normal labour

Summary of the case evolution if complication(s) occurred after admission: The patient was admitted in the labour room and her progress monitored by partograph/labour care guide. Four hours later, her membranes broke, which was meconium stained. The foetal heart sound was 90 beats per minute and the cervix was 8 cm dilated, but the head was still high. A decision was made to perform an emergency caesarean section due to foetal distress.

Sequence of events if abortion/delivery occurred: See summary

Complications: Foetal distress

Clinical assessment/ultrasound/laboratory findings:

Diagnosis: Foetal distress

How did the woman's status in the community affect the process after admission in this particular case? None

Main treatment(s) given: An emergency caesarean section was performed under general anaesthesia (because spinal anaesthesia failed). Anaesthesia was administered by an anaesthetic assistant with limited experience. A live foetus weighing 2,800 grams was delivered. After closure of the abdomen, the patient did not wake up from anaesthesia and had difficulty breathing on her own. Breathing was assisted by bag and mask, and she was put on IV fluids and taken to the ICU but died a few hours later.

Time between diagnosis of complication and appropriate treatment: 1 hour

Complementary tests and laboratory results after treatment: HB 10 grams/ld., urine normal

Summary of case evolution and monitoring put in place (t°, BP, pulse, and bleeding): Temperature 36°C, BP 90/60 mmHg, pulse 100 bpm, no vaginal bleeding

Date of death: 06 March 2015

Time elapsed between complication and death: 6 hours

Cause of death notified in records: Complications of anaesthesia (failed spinal anaesthesia)

Pregnancy outcome (live birth, stillbirth, early death, miscarriage): Live baby, male, weighing 2,800 grams

Other information available (from family, health centres, community, etc.):

The woman's first child, who was fully immunised, died of pneumonia at age two years.

CLINICAL SUMMARY FORM: ANAESTHESIA

Summary of the case, to be presented to the MPDSR team:

ANNEX VIII A: ICD-10 MM REFERENCE AID

FIGURE 2. GROUPS OF THE UNDERLYING CAUSE OF DEATH DURING PREGNANCY, CHILDBIRTH, AND PUERPERIUM

Definitions of Deaths

Death occurring during pregnancy, childbirth, and the puerperium is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

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

Late maternal death is the death of a woman from direct or indirect causes more than 42 days but less than one year after termination of pregnancy.

Underlying cause of death is defined as the disease or condition that initiated the morbid chain of events leading to death or the circumstances of the accident or violence that produces a fatal injury. The single identified cause of death should be as specific as possible (ICD-10).

ANNEX VIII B: DEFINITIONS OF CAUSE GROUPS WITH EXAMPLES

Categories of underlying causes of death are aggregated in nine groups of causes of death during pregnancy, childbirth, and the puerperium. These groups are clinically and epidemiologically relevant, mutually exclusive, and totally inclusive and descriptive of all causes of maternal and pregnancy-related deaths.

TABLE 7. GROUPS OF UNDERLYING CAUSES OF DEATH DURING PREGNANCY, CHILDBIRTH, AND THE PUERPERIUM IN MUTUALLY EXCLUSIVE, TOTALLY INCLUSIVE GROUPS[9]

Type	Group name/number	Examples of potential causes of death
Maternal death: direct	1. Pregnancies with abortive outcome	Abortion, miscarriage, ectopic pregnancy, and other conditions leading to maternal death and a pregnancy with abortive outcome
Maternal death: direct	2. Hypertensive disorders in pregnancy, childbirth and the puerperium	Hypertensive disorders of pregnancy, childbirth, and puerperium including pre-eclampsia, eclampsia and gestational hypertension[10]
Maternal death: direct	3. Obstetric haemorrhage	Obstetric diseases or conditions directly associated with haemorrhage
Maternal death: direct	4. Pregnancy-related infection	Pregnancy-related, infection-based diseases or conditions
Maternal death: direct	5. Other obstetric complications	All other direct obstetric conditions not included in groups 1–4
Maternal death: direct	6. Unanticipated complications of management	Severe adverse effects and other unanticipated complications of medical and surgical care during pregnancy, childbirth, or the puerperium

[9] Adapted from World Health Organization (2012) The WHO Application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD-MM. World Health Organization.

[10] World Health Organization and UNICEF (2017) Managing complications in pregnancy and childbirth: a guide for midwives and doctors. World Health Organization and UNICEF.

Type	Group name/number	Examples of potential causes of death
Maternal death: indirect	7. Non-obstetric complications	Non-obstetric conditions: • Cardiac disease (including pre-existing hypertension) • Endocrine conditions • Gastrointestinal tract conditions • Central nervous system conditions • Respiratory conditions • Genitourinary conditions • Autoimmune disorders • Skeletal diseases • Psychiatric disorders • Neoplasms • Infections that are not a direct result of pregnancy
Maternal death: unspecified[11]	8. Unknown/ undetermined	Maternal death during pregnancy, childbirth, and the puerperium where the underlying cause is unknown or was not determined
Death during pregnancy, childbirth, and the puerperium	9. Coincidental causes	Death during pregnancy, childbirth, and the puerperium due to external causes

[11] In some settings, teams mark the cause of death as unspecified to avoid litigation or disciplinary action. It is important to foster a no-blame atmosphere to promote learning and action as a result of a maternal death, a primary goal of MPDSR. The death should be marked as unspecified only when the cause of death truly cannot be ascertained.

ANNEX IX: MEDICAL CERTIFICATE OF CAUSE OF DEATH FORM

Review the two example MCCD forms and completed MCCD form for Scenario A: Abortion. Then, complete Tables 9–12 using the **clinical summaries** given for the four scenarios in Annex VII (PPH, uterine rupture, PE/E, anaesthesia).

MCCD EXAMPLES

EXAMPLE 1:

A woman who had anaemia during pregnancy and after delivery had a postpartum haemorrhage due to uterine atony and died as a result of hypovolaemic shock.

MEDICAL CERTIFICATE OF CAUSE OF DEATH

Cause of death *the disease or condition thought to be the underlying cause should appear in the lowest completed line of Part I*		Approximate interval between onset and death
1. Disease or condition leading directly to death	(a) hypovolaemic shock A contributory cause indicated in Part 1. This is assigned a code when multiple cause coding is undertaken	10 minutes
Antecedent causes: Due to or as a consequence of	(b) postpartum haemorrhage	30 minutes
Due to or as a consequence of	(c) uterine atony The underlying cause. This is the last condition noted in Part 1 and is a condition found in Annex B1	45 minutes
Due to or as a consequence of	(d)	
2. Other significant conditions Contributing to death but not related to the disease or condition causing it	Anaemia	pre-existing
The woman was: ☒ pregnant at the time of death ☐ not pregnant at the time of death (but pregnant within 42 days) ☐ pregnant within the past year		

If the deceased was a woman, was she pregnant when she died or within 42 days before she died? *Yes* (Part I shaded for purposes of the example.)

EXAMPLE 2:

A woman living with HIV who has a spontaneous abortion that becomes infected dies due to septic shock and renal failure.

MEDICAL CERTIFICATE OF CAUSE OF DEATH

Cause of death *the disease or condition thought to be the underlying cause should appear in the lowest completed line of Part I*		Approximate interval between onset and death
1. Disease or condition leading directly to death	(a) renal failure	2 hours
Antecedent causes: Due to or as a consequence of	(b) septic shock	24 hours
Due to or as a consequence of	(c) septic miscarriage	36 hours
Due to or as a consequence of	(d)	
2 . Other significant conditions Contributing to death but not related to the disease or condition causing it	HIV	pre-existing
The woman was: ☒ pregnant at the time of death ☐ not pregnant at the time of death (but pregnant within 42 days) ☐ pregnant within the past year		

A contributory condition, indicated in Part 1

The underlying cause. This is the last condition noted in Part 1 and is a condition found in Annex B

A contributory condition, indicated in Part IIB

If deceased was a woman, was she pregnant when she died or within 42 days before she died? *Yes* (Part I shaded for purposes of the example.)

If the death certificate has been completed correctly, the underlying cause of death should be the single condition that the certifier has written on the last completed line of Part 1(d).[12]

TABLE 8. MCCD FOR EXAMPLE A: ABORTION

Cause of death *(The disease or condition thought to be the underlying cause should appear in the last completed line of part I)*		**Approximate interval between onset and death**
Part I Disease or condition leading directly to death	a) Septic shock	5 hours
Antecedent causes: Due to or as a consequence of	b) Septicaemia	24 hours
Due to or as a consequence of	c) Septic incomplete abortion	72 hours
Due to or as a consequence of	d)	
Part II Other significant conditions contributing to death but not related to the disease or condition causing it		
The woman was: ☒ Pregnant at the time of death ☐ Not pregnant at the time of death (but pregnant within 42 days) ☐ Pregnant within the past year		

ICD-10 MM: Group 1

[12] World Health Organization (2012) The WHO Application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD-MM. World Health Organization.

MCCD FORMS TO BE COMPLETED FOR SCENARIOS 1–4

TABLE 9. MCCD FORM FOR SCENARIO 1: PPH

Cause of death *(The disease or condition thought to be the underlying cause should appear in the last completed line of part I)*		**Approximate interval between onset and death**
Part I Disease or condition leading directly to death	a)	
Antecedent causes: Due to or as a consequence of	b)	
Due to or as a consequence of	c)	
Due to or as a consequence of	d)	
Part II Other significant conditions contributing to death but not related to the disease or condition causing it		
The woman was: ☐ Pregnant at the time of death ☐ Not pregnant at the time of death (but pregnant within 42 days) ☐ Pregnant within the past year		

ICD-10 MM: _____

TABLE 10. MCCD FORM FOR SCENARIO 2: UTERINE RUPTURE

Cause of death *(The disease or condition thought to be the underlying cause should appear in the last completed line of part I)*		**Approximate interval between onset and death**
Part I Disease or condition leading directly to death	a)	
Antecedent causes: Due to or as a consequence of	b)	
Due to or as a consequence of	c)	
Due to or as a consequence of	d)	
Part II Other significant conditions contributing to death but not related to the disease or condition causing it		
The woman was: ☐ Pregnant at the time of death ☐ Not pregnant at the time of death (but pregnant within 42 days) ☐ Pregnant within the past year		

ICD-10 MM: _____

TABLE 11. MCCD FORM FOR SCENARIO 3: PE/E

Cause of death *(The disease or condition thought to be the underlying cause should appear in the last completed line of part I)*		**Approximate interval between onset and death**
Part I Disease or condition leading directly to death	a)	
Antecedent causes: Due to or as a consequence of	b)	
Due to or as a consequence of	c)	
Due to or as a consequence of	d)	
Part II Other significant conditions contributing to death but not related to the disease or condition causing it		
The woman was: ☐ Pregnant at the time of death ☐ Not pregnant at the time of death (but pregnant within 42 days) ☐ Pregnant within the past year		

ICD-10 MM: _____

TABLE 12. MCCD FORM FOR SCENARIO 4: ANAESTHESIA

Cause of death *(The disease or condition thought to be the underlying cause should appear in the last completed line of part I)*		**Approximate interval between onset and death**
Part I Disease or condition leading directly to death	a)	
Antecedent causes: Due to or as a consequence of	b)	
Due to or as a consequence of	c)	
Due to or as a consequence of	d)	
Part II Other significant conditions contributing to death but not related to the disease or condition causing it		
The woman was: ☐ Pregnant at the time of death ☐ Not pregnant at the time of death (but pregnant within 42 days) ☐ Pregnant within the past year		

ICD-10 MM: _____

ANNEX X: STILLBIRTH AND NEONATAL DEATH CASE REVIEW FORM

Section1: Identification					
1.1	ID# mother				
1.2	ID# baby				
1.3	Facility name				
1.4	Type of care available	**Comprehensive EmOC**	**Basic EmOC**	**First aid**	**Home delivery**
1.5	District name				
1.6	Referred	**Not referred**	**Referred in**		
			Referred out		

Section 2: Pregnancy progress and care								
2.1	Obstetric history							
		All pregnancies	All births	Total live births	Dead	Still-births	Neonatal deaths	Abortions
2.2	Mother's Age							
2.3	Type of pregnancy		Singleton	Twin		Higher multiple		Unknown
2.4	Antenatal care number of visits		4 or more	3	2	1	No visits	Unknown
Adjust as per local context								
2.5	Malaria prophylaxis							
	Not needed		IPT3+	IPT2	IPT1	Not received		Unknown
2.6	Tetanus toxoid vaccination		TT2+		TT1	Not received		Unknown
2.7	HIV status		HIV-negative	HIV-positive		Not done		Unknown
	2.7.1 HIV-positive action			NVP	HAART	Other, specify		
2.8	Syphilis test		Syphilis-negative	Syphilis-positive		Not done		Unknown

Section 3: Labour and birth								
3.1	Mother's LMP	DD	MM	YY	Unknown			
3.2	Date of birth	DD	YY	YY				
	3.2.1 Time of birth	h						
3.3	Gestational age			weeks	Unknown			
	3.3.1 Method of determination		Sure LMP dates		Unsure LMP dates		Other, specify	
			Early ultrasound		Late ultrasound			
3.4	Place of delivery			Facility	Home	Road	Other, specify	Unknown
	3.4.1 Attendant at delivery	Midwife	Nurse	Doctor	Other, specify		No one	Unknown
3.5	Onset of labour			Spontaneous	Induced	C/S before onset		Unknown
3.6	Foetal heart sounds on admission			No	Yes			Unknown
3.7	Partograph/labour care guide used			No	Yes			Unknown
3.8	Mode of delivery			CVD	Assisted vaginal	Caesarean	Other, specify	Unknown
3.9	Time between decision for action and birth		n/a	<30 mins	30–60 mins	>60 mins		Unknown
3.10	Apgar score		1 min =	4 or more	3 or less			Unknown
			5 min =	4 or more	3 or less			
3.11	Resuscitation Not needed			Bag + mask	Not done	Other, specify stillbirth		Unknown
3.12	Sex of baby		Male	Female				Unknown
3.13	Birth weight		g	≥2500g	1500–2499g	1000–1499g	<1000g	Unknown
					LBW	VLBW	ELBW	

Section 4: Details of the death													
4.1	Date of death	DD	MM	YY	4.2 Type of death (tick one)								
	4.1.1 Time of death	: H			Neonatal death	Intrapartum stillbirth	Antepartum stillbirth	Stillbirth unknown timing					
4.2	Enter the perinatal cause of death as per ICD-10 PM in the corresponding box												
4.3	Main maternal condition				Main maternal condition followed by the corresponding number. Use the reference below to write in the corresponding number. Include more than one if applicable.								Unknown
4.4	Cause of death(circle one)				**M1**	**M2**	**M3**	**M4**	**M5**	**Other**	**Unknown**		
	a. Congenital												
	b. Antepartum complication												
	c. Intrapartum complication												
	d. Complication of prematurity												
	e. Infection	Tetanus	Sepsis	Pneumonia	Meningitis								
		Syphilis	Diarrhoea	Other, specify if known									
	f. Other, specify												
	g. Unknown/unspecified												

Section 5: Critical delays and modifiable factors			
5.1	Critical delays	Delay 1: Not identified	1. Delay recognising need of care
		Delay 2: Not identified	2. Delay seeking care
		Delay 3: Not identified	3. Delay receiving care
5.2	Modifiable factors		
	Family related	None identified	Specify
	Late/no antenatal care; cultural inhibition to seeking care; no knowledge of danger signs; financial constraints; partner restricts care-seeking; use of traditional/herbal medicine; smoking/drug or alcohol abuse; attempted termination; etc.		
	Administration related	None identified	Specify
	Neonatal facilities; theatre facilities; resuscitation equipment; blood products; lack of training; insufficient staff numbers; anaesthetic delay; no antenatal documentation; etc.		
	Provider related	None identified	Specify
	Partograph/labour care guide not used; action not taken; inappropriate action taken; iatrogenic delivery; delay in referral; inadequate monitoring; delay in calling for assistance; inappropriate discharge; etc.		
	Other	None identified	Specify
Actions to address the critical delays and modifiable factors			
Form completed by		Date	
c/s: caesarean section; CVD: cephalic vaginal delivery; ELBW: extremely low birth weight; EmOC: emergency obstetric care; HAART: highly active antiretroviral therapy; HIV: human immunodeficiency virus; IPT: intermittent preventive treatment; LBW: low birth weight; LMP: last menstrual period; NVP: nevirapine prophylaxis; TT: tetanus toxoid; VLBW: very low birth weight			

Source: World Health Organization. 2016. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths.

ANNEX XI A: ICD-10 PM REFERENCE AID

FIGURE 3. DEFINING STILLBIRTHS AND ASSOCIATED PREGNANCY OUTCOMES (ICD-10)

Source: adapted from Lawn et al., 2011 *(23)*.

ANNEX XI B: ICD-10 PM REFERENCE AID

ANNEX XI C: MATERNAL CONDITION IN ICD-10 PM

ICD-10 PM maternal condition group	Main maternal condition included in group	ICD-10 PM maternal condition group	Main maternal condition included in group
M1: Complications of placenta, cord, and membranes	1. Placenta previa 2. Other forms of placental separation and haemorrhage 3. Placental dysfunction, infarction, insufficiency 4. Foetal-placental transfusion syndromes 5. Prolapsed cord, other compression of umbilical cord 6. Chorioamnionitis 7. Other complications of membranes	**M4: Maternal medical and surgical conditions**	1. Pre-eclampsia, eclampsia 2. Gestational hypertension 3. Other hypertensive disorders 4. Renal and urinary tract diseases 5. Infectious and parasitic disease 6. Circulatory and respiratory disease 7. Nutritional disorders 8. Injury 9. Surgical procedure 10. Other medical procedures 11. Maternal diabetes, including gestational diabetes 12. Maternal anaesthesia and analgesia 13. Maternal medication 14. Tobacco/alcohol/drug addiction 15. Nutritional chemical substances 16. Environmental chemical substances 17. Unspecified maternal condition
M2: Maternal complications of pregnancy	1. Incompetent cervix 2. Preterm rupture of membranes 3. Oligohydramnios/polyhydramnios 4. Ectopic pregnancy 5. Multiple pregnancy 6. Maternal death 7. Malpresentation before labour 8. Other complications of pregnancy		
M3: Other complications of labour and delivery	1. Breech delivery and extraction 2. Other malpresentation, malposition, and disproportion during labour and delivery 3. Forceps delivery/vacuum extraction 4. Caesarean delivery 5. Precipitate delivery 6. Preterm labour and delivery 7. Other complications of labour and delivery, including termination of pregnancy	**M5: No maternal condition**	1. No maternal condition identified (healthy mother)

Source: ICD-10 PM

ANNEX XII: ICD-10 PM TABULATION FOR PERINATAL CAUSE OF DEATH AND MATERNAL CONDITION SEPARATED BY TIMING OF DEATH

Perinatal cause of death	Maternal condition						
	M1: Complications of placenta, cord, and	M2: Maternal complications of pregnancy	M3: Other complications of labour and delivery	M4: Maternal medical and surgical conditions	M5: No maternal condition identified	Other	**Total (%)**
Antepartum death (A)							
A1: Congenital malformations, deformations, and chromosomal abnormalities							
A2: Infection							
A3: Antepartum hypoxia							
A4: Other specified antepartum disorder							
A5: Disorders related to foetal growth							
A6: Foetal death of unspecified cause							
Total (%)							
Intrapartum death (I)							
I1: Congenital malformations, deformations, and chromosomal abnormalities							
I2: Birth trauma							
I3: Acute intrapartum event							
I4: Infection							
I4: Other specified intrapartum disorder							
I5: Disorders related to foetal growth							
I6: Intrapartum death of unspecified cause							
Total (%)							

Perinatal cause of death	Maternal condition						
	M1: Complications of placenta, cord, and	M2: Maternal complications of pregnancy	M3: Other complications of labour and delivery	M4: Maternal medical and surgical conditions	M5: No maternal condition identified	Other	**Total (%)**
Neonatal death (N)							
N1: Congenital malformations, deformations, and chromosomal abnormalities							
N2: Disorders related to foetal growth							
N3: Birth trauma							
N4: Complications of intrapartum events							
N5: Convulsions and disorders of cerebral status							
N6: Infection							
N7: Respiratory and cardiovascular disorders							
N8: Other neonatal conditions							
N9: Low birthweight and prematurity							
N10: Miscellaneous							
N11: Neonatal death of unspecified cause							
Total (%)							

ANNEX XIII: ASSIGNING CAUSE OF DEATH FOLLOWING ICD-10 PM

EXAMPLE: CASE 1

A 19-year-old para 1, with a certain gestation of 38 weeks based on early clinical examination, presented in a healthy condition during labour with no significant history. A 2,450g baby was delivered after an eight-hour labour. On day 2 of life, the baby died from meconium aspiration syndrome. Clinical review of the case identified the following potentially modifiable factors in the early neonatal death: foetal distress not detected in labour and personnel too junior to manage the patient.

The neonatal cause of death is meconium aspiration syndrome. The maternal condition is no maternal condition identified at the time of perinatal death. The time of the death is neonatal.

The death certificate was completed by the clinicians, and subsequently coded as follows:

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant	Meconium aspiration syndrome	**N7, M5**
b) Other diseases of conditions in foetus or infant	Small for gestational age	
c) Main maternal disease or condition affecting foetus or infant	No maternal condition	
d) Other maternal diseases or conditions affecting foetus or infant		

Source: ICD-10 PM

This case highlights the need to have “no maternal condition” identified as the maternal code at the time of perinatal death, as the ability to predict this death antenatally is limited. It also highlights the need for personnel to continue to be trained in intrapartum care and obstetric emergencies.

EXAMPLE: CASE 2

A 30-year-old para 1 presented in labour at 39 weeks of gestation, based on a certain last menstrual period, with the foetus alive at admission. The woman was HIV-positive and on long-term antiretroviral therapy. There was poor progress in labour, with incorrect interpretation of the partograph/labour care guide. An acute intrapartum event occurred with a hypoxic intrapartum stillbirth. The foetus was delivered via caesarean section.

The intrapartum cause of death is intrapartum hypoxia, with the maternal condition of obstructed labour.

The death certificate was completed by the clinicians, and subsequently coded as follows:

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant	Intrauterine hypoxia	**13, M3**
b) Other diseases of conditions in foetus or infant		
c) Main maternal disease or condition affecting foetus or infant	Obstructed labour	
d) Other maternal diseases or conditions affecting foetus or infant	HIV	

Source: ICD-10 PM

This case highlights the need to capture maternal conditions other than HIV.

ANNEX XIV: CASE STUDIES ON PERINATAL MORTALITY AUDIT

Instructions: Read Case Study 1 and review the completed Stillbirth and Neonatal Death Review form.

CASE STUDY 1: EARLY NEONATAL DEATH

Zeinab Mohammed married one year ago and is a 17-year-old primigravida from a nearby district. Her husband Hassan is a rich businessman and she is his third wife. When she was 20 weeks pregnant, she noticed some foul-smelling vaginal discharge, and went to the antenatal clinic at the nearby hospital. It was her first antenatal care visit. At the booking visit, the midwife took her full history and filled in a card, measured her weight and blood pressure, checked her blood group and blood haemoglobin levels, palpated her abdomen, listened to the heart sounds of the foetus, and told her everything was fine with her and the child. The midwife gave Zeinab a tetanus injection, prescribed her iron and folic acid tablets, and gave her three antimalarial tablets to take at the clinic. When Zeinab mentioned her discharge, the midwife did not examine her but told her that that was normal during pregnancy and that she should not worry.

Zeinab went one more time to the antenatal clinic when she was 34 weeks pregnant, received the same treatment, and went home. When she was 38 weeks pregnant, she had labour pains and was taken by her mother in-law to the maternity ward in the hospital. On admission, she had moderate contractions, the fundal height corresponded to term, the baby was laying in longitudinal lie and cephalic presentation, and the head was 4/5 above the pelvis. The foetal heart rate was 130/min. On vaginal examination, she was 4 cm dilated and the membranes were intact. The midwife recorded the findings on the partograph/labour care guide. Zeinab was taken to the labour suite. Four hours later, her membranes ruptured spontaneously. The liquor was slightly meconium stained. The head was now 3/5 above the brim of the pelvis. Cervical dilatation at that time was 6 cm. Foetal heart rate was 120/min. Four hours later, the contractions were strong, four in 10 minutes, the foetal head 2/5 above the brim, and the cervix was 8 cm dilated. The foetal heart rate was 124/min. Zeinab was becoming tired and the contractions were very painful. Finally, after 11 hours of labour she was fully dilated. The midwife told her to push with each contraction. After pushing for more than one hour, she delivered a 3.8 kg male infant.

The baby was pale, did not immediately cry after birth, and was breathing irregularly. The midwife sucked out the nose and mouth and slapped the baby on its back. There was no Ambu bag and mask in the labour room. After some time, the baby improved, but was still grunting a bit while breathing. The Apgar score was 3 after one minute and 7 after five minutes. The midwife wiped the baby dry and wrapped it in a cloth. Then she administered 10 units of oxytocin to the mother and delivered the placenta by controlled cord traction. Blood loss during delivery was 300 ml. The perineum was intact. Later that day, the baby had improved and was able to suck the breast, but he was still grunting a bit when breathing. The next day the baby had a fever of 38.8 oC. The midwife called the doctor and he prescribed antimalarials and ordered tepid sponging and monitoring the baby's temperature every six hours. However, the temperature was only recorded twice that day. The next day, the baby still had a fever and was a bit greyish in colour and slightly jaundiced. He had a convulsion that lasted for two minutes and responded well to 1 mg diazepam rectally. The doctor ordered a complete blood count and prescribed Ampiclox syrup to be given every eight hours. The next day, the baby's condition worsened. He was unable to suck, looked lethargic, and had a vacant look in his eyes and slight twitching. The midwife inserted a nasogastric tube and expressed breast milk was given every three hours. The doctor reviewed the baby during ward rounds and prescribed phenobarbitone 5mg/kg, given in 12 hourly doses. That evening, the baby suddenly stopped breathing and passed away.

CASE STUDY 1: STILLBIRTH AND NEONATAL DEATH CASE REVIEW FORM (EXAMPLE)

Section1: Identification					
1.1	ID# mother	XXX (Case 1)			
1.2	ID# baby	XXX			
1.3	Facility name XXXX				
1.4	Type of care available	Comprehensive EmOC	√ Basic EmOC	First aid	Home delivery
1.5	District name				
1.6	Referred	√ Not referred	Referred in		
			Referred out		

Section 2: Pregnancy progress and care									
2.1	Obstetric history								
		All pregnancies	All births	Total live births		Dead	Still-births	Neonatal deaths	Abortions
2.2	Mother's Age		17Y						
2.3	Type of pregnancy		Singleton √	Twin		Higher multiple			Unknown
2.4	Antenatal care number of visits		4 or more	3	2 √	1	No visits		Unknown
Adjust as per local context									
2.5	Malaria prophylaxis								
	Not needed		IPT3+ √	IPT2	IPT1		Not received		Unknown
2.6	Tetanus toxoid vaccination		TT2+ √		TT1		Not received		Unknown
2.7	HIV status		HIV-negative	HIV-positive			Not tested		Unknown√
	2.7.1 HIV-positive action			NVP	HAART		Other (specify)		
2.8	Syphilis test		Syphilis-negative	Syphilis-positive			Not tested		Unknown√

Section 3: Labour and birth								
3.1	Mother's LMP	DD	MM	YY	Unknown√			
3.2	Date of birth	DD	YY	YY				
	3.2.1 Time of birth	h						
3.3	Gestational age			20 weeks	Unknown			
	3.3.1 Method of determination		Sure LMP dates		Unsure LMP dates√		Other (specify)	
			Early ultrasound		Late ultrasound			
3.4	Place of delivery			Facility√	Home	Road	Other (specify)	Unknown
	3.4.1 Attendant at delivery	Midwife√	Nurse	Doctor	Other (specify)		No one	Unknown
3.5	Onset of labour			Spontaneous √	Induced	C/S before onset		Unknown
3.6	Foetal heart sounds on admission			No	Yes√			Unknown
3.7	Partograph/labour care guide used			No	Yes√			Unknown
3.8	Mode of delivery			CVD√	Assisted vaginal	Caesarean	Other, specify	Unknown
3.9	Time between decision for action and birth	n/a		<30 mins	30–60 mins	>60 mins √		Unknown
3.10	Apgar score	1 min =		4 or more	3 or less√			Unknown
		5 min =		4 or more√	3 or less			
3.11	Resuscitation			Bag + mask	Not done √	Other, specify not available		Unknown
3.12	Sex of baby	Male		Female				Unknown
3.13	Birth weight	g		≥2500g√	1500–2499g	1000–1499g	<1000g	Unknown
					LBW	VLBW	ELBW	

Section 4: Details of the death												
4.1	Date of death	DD	MM	YY	4.2 Type of death (tick one)							
	4.1.1 Time of death	: 72 H			Neonatal death √	Intrapartum stillbirth	Antepartum stillbirth	Stillbirth unknown timing				
4.2	Enter the perinatal cause of death as per ICD-10 PM to the corresponding box				N5							
4.3	Main maternal condition	None identified			Main maternal condition followed by the corresponding number. Use the reference below to write in the corresponding number. Include more than one if applicable.			Unknown				
4.4	Cause of death (circle one)				**M1**	**M2**	**M3**	**M4**	**M5**	**Other**	**Unknown**	
	a. Congenital											
	b. Antepartum complication											
	c. Intrapartum complication											
	d. Complication of prematurity											
	e. Infection	Tetanus	Sepsis	Pneumonia	Meningitis							
		Syphilis	Diarrhoea	Other specify, if known								
	f. Other (specify)						√					
	g. Unknown/unspecified											

Section 5: Critical delays and modifiable factors			
5.1	Critical delays	Delay 1: Not identified	1. Delay recognising need of care
		Delay 2: Not identified	2. Delay seeking care
		Delay 3: Not identified	3. Delay receiving care
5.2	Modifiable factors		
	Family related	None identified	Specify
	Late/no antenatal care; cultural inhibition to seeking care; no knowledge of danger signs; financial constraints; partner restricts care-seeking; use of traditional/herbal medicine; smoking/drug or alcohol abuse; attempted termination; etc.		
	Administration related	None identified	Specify
	Neonatal facilities; theatre facilities; resuscitation equipment; blood products; lack of training; insufficient staff numbers; anaesthetic delay; no antenatal documentation; etc.		Lack of trained human resources Lack of resuscitation equipment Lack of neonatal facilities
	Provider related	None identified	Specify
	Partograph/labour care guide not used; action not taken; inappropriate action taken; iatrogenic delivery; delay in referral; inadequate monitoring; delay in calling for assistance; inappropriate discharge; etc.		Partograph/labour care guide used but not interpreted well Inadequate monitoring of mother and baby Syrup was given as medication instead of IV
	Other	None identified	Specify
Actions to address the critical delays and modifiable factors:			
Trained human resources or capacity-building of the existing staff, equipment to be kept and checked regularly. Neonatal service need to be updated.			
Form completed by Dr. Shailee Karim		Date 2.16.2021	
c/s: caesarean section; CVD: cephalic vaginal delivery; ELBW: extremely low birth weight; EmOC: emergency obstetric care; HAART: highly active antiretroviral therapy; HIV: human immunodeficiency virus; IPT: intermittent preventive treatment; LBW: low birth weight; LMP: last menstrual period; NVP: nevirapine prophylaxis; TT: tetanus toxoid; VLBW: very low birth weight			

Source: World Health Organization. 2016. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths.

After a week, the case was reviewed at the perinatal death review meeting.

1. What was the most likely primary cause of death?

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant	Convulsion	**N5, M3**
b) Other diseases of conditions in foetus or infant	Sepsis, jaundice	
c) Main maternal disease or condition affecting foetus or infant	Prolonged labour	
d) Other maternal diseases or conditions affecting foetus or infant		

Source: ICD-10 PM

2. What potentially modifiable factors may have contributed to the death?

   PROVIDER-RELATED MODIFIABLE FACTORS:
   - Lack of proper ANC care (did not examine or even inspect for the complaint of foul-smelling discharge)
   - Meconium staining identified at 6 cm dilation but no action taken
   - Prolonged labour
   - Doctor called but infant was not admitted to neonatal unit/care or referred
   - Ordered to record temperature every six hours but recorded twice a day
   - Infant needed an injectable antibiotic but given syrup
   - No early referral made to a higher-level facility

   ADMINISTRATION-RELATED MODIFIABLE FACTORS:
   - No Ambu bag and mask in the labour room
   - Lack of trained and experienced human resources

3. What missed opportunities for good care or instances of substandard care can you identify?
   - Proper ANC, including counselling
   - Mismanagement of labour (partograph/labour care guide maintained but no action taken despite meconium staining at 6 cm dilation and prolonged labour)
   - No proper neonatal care
   - Lack of necessary equipment: no Ambu bag
   - Lack of trained human resources

4. What changes to the action plan would you recommend to improve quality of care?
   - Work on the identified modifiable contributory factors and make a response plan
   - Improve ANC and intrapartum care; ensure trained human resources; check emergency equipment
   - Implement the plan and review periodically

CASE STUDY 2: ANTEPARTUM STILLBIRTH

Instructions: Read Case Study 2 then complete the Stillbirth and Neonatal Death Review form.

Aisha Tukur is 21-year-old gravida 5, para 2+2. Her last two pregnancies ended in miscarriage. At 16 weeks' gestation, Aisha started ANC at the nearest community health centre (CHC), which was one hour away by minibus. At the booking visit, the midwife took her full history and filled in a card, measured her weight and blood pressure, palpated her abdomen, listened to the heart sounds of the foetus, and told her everything was fine with her and the child. She gave her a tetanus injection, prescribed iron and folic acid tablets, and gave her three antimalarial tablets to take at the clinic. Aisha was then sent to the laboratory for testing of Hb, urine for glucose and albumin and VDRL testing. Her Hb was 11gram/dl. The results of the VDRL test would only be available at the next ANC visit. After four weeks, Aisha went back to the clinic. The village health worker who received her checked her weight and blood pressure and recorded the findings on her antenatal card. He also checked the register for the results of the VDRL test, which was ++, and recoded the findings on the card.

Next Aisha was referred to the nurse/midwife, who examined her and told her everything was fine. She was counselled on danger signs of pregnancy and birth and emergency preparedness. She got her second dose of Fansidar (sulphadoxine and pyrimethamine) and was given iron/folic acid tablets for four weeks. At 34 weeks, she noticed a decrease in foetal movements. She went to the CHC but was told by the village health worker to come back in three days because on that day there was no antenatal clinic, only an immunisation clinic. Disappointed and worried about the condition of the child, she returned home.

Three days later, her husband was not around so she had no money for transport and had to wait until the next week to go to the antenatal clinic. When she finally went back to the antenatal clinic, she had not felt foetal movements for three days. The midwife examined her and could not hear the foetal heart. She was given a referral letter to the general hospital, which was three hours away by bus. She cried, went home, and told her husband. The next day, they went to the hospital together. Aisha was examined by the midwife, who also could not hear the foetal heart, even with the Sonicaid (foetal Doppler/ultrasound). She was referred to the doctor, who confirmed the intrauterine death. After admission, labour was induced with an IV drip with 2 U oxytocin, which was gradually increased every half hour. After two infusions, she delivered a macerated stillbirth, with a weight of 2.2 kg. The placenta looked abnormal and was bulky. Blood loss was 250 ml. Some tests were carried out in the hospital and she received two injections before discharge.

CASE STUDY 2: STILLBIRTH AND NEONATAL DEATH CASE REVIEW FORM

Section1: Identification					
1.1	ID# mother	XXXX (Case 2)			
1.2	ID# baby	XXXX			
1.3	Facility name XXXXXXX				
1.4	Type of care available	**Comprehensive EmOC**	**Basic EmOC**	**First aid**	**Home delivery**
1.5	District name				
1.6	Referred	**Not referred**	**Referred in**		
			Referred out		

Section 2: Pregnancy progress and care								
2.1	Obstetric history							
		All pregnancies	All births	Total live births	Dead	Still-births	Neonatal deaths	Abortions
2.2	Mother's Age		Y					
2.3	Type of pregnancy		Singleton	Twin		Higher multiple		Unknown
2.4	Antenatal care number of visits		4 or more	3	2	1	No visits	Unknown
Adjust as per local context								
2.5	Malaria prophylaxis							
	Not needed		IPT3+	IPT2	IPT1	Not received		Unknown
2.6	Tetanus toxoid vaccination		TT2+		TT1	Not received		Unknown
2.7	HIV status		HIV-negative	HIV-positive		Not tested		Unknown
	2.7.1 HIV-positive action			NVP	HAART	Other, specify		
2.8	Syphilis test		Syphilis-negative	Syphilis-positive		Not tested		Unknown

Section 3: Labour and birth								
3.1	Mother's LMP	DD	MM	YY	Unknown			
3.2	Date of birth	DD	YY	YY				
	3.2.1 Time of birth	h						
3.3	Gestational age			weeks	Unknown			
	3.3.1 Method of determination		Sure LMP dates		Unsure LMP dates		Other (specify)	
			Early ultrasound		Late ultrasound			
3.4	Place of delivery			Facility	Home	Road	Other (specify)	Unknown
	3.4.1 Attendant at delivery	Midwife	Nurse	Doctor	Other (specify)		No one	Unknown
3.5	Onset of labour			Spontaneous	Induced	C/S before onset		Unknown
3.6	Foetal heart sounds on admission			No	Yes			Unknown
3.7	Partograph/labour care guide			No	Yes			Unknown
3.8	Mode of delivery			CVD	Assisted vaginal	Caesarean	Other, specify	Unknown
3.9	Time between decision for action and birth		n/a	<30 mins	30–60 mins	>60 mins		Unknown
3.10	Apgar score		1 min =	4 or more	3 or less			Unknown
			5 min =	4 or more	3 or less			
3.11	Resuscitation	**Not needed**		Bag + mask	Not done	Other, specify stillbirth		Unknown
3.12	Sex of baby		Male	Female				Unknown
3.13	Birth weight		g	≥2500g	1500–2499g	1000–1499g	<1000g	Unknown
					LBW	VLBW	ELBW	

Section 4: Details of the death												
4.1	Date of death	DD	MM	YY	4.2 Type of death (tick one)							
	4.1.1 Time of death	: H			Neonatal death	Intrapartum stillbirth	Antepartum stillbirth	Stillbirth unknown timing				
4.2	Enter the perinatal cause of death as per ICD-10 PM to the corresponding box											
4.3	Main maternal condition				Main maternal condition followed by the corresponding number Use the reference below to write in the corresponding number Include more than one if applicable							Unknown
4.4	Cause of death (circle one)				**M1**	**M2**	**M3**	**M4**	**M5**	**Other**	**Unknown**	
	a. Congenital											
	b. Antepartum complication											
	c. Intrapartum complication											
	d. Complication of prematurity											
	e. Infection	Tetanus	Sepsis	Pneumonia	Meningitis							
		Syphilis	Diarrhoea	Other, specify if known								
	f. Other, specify intrauterine hypoxia											
	g. Unknown/unspecified											

Section 5: Critical delays and modifiable factors			
5.1	Critical delays	Delay 1: Not identified	1. Delay recognising need of care
		Delay 2: Not identified	2. Delay seeking care
		Delay 3: Not identified	3. Delay receiving care
5.2	Modifiable factors		
	Family related	None identified	Specify
	Late/no antenatal care; cultural inhibition to seeking care; no knowledge of danger signs; financial constraints; partner restricts care-seeking; use of traditional/herbal medicine; smoking/drug or alcohol abuse; attempted termination; etc.		
	Administration related	None identified	Specify
	Neonatal facilities; theatre facilities; resuscitation equipment; blood products; lack of training; insufficient staff numbers; anaesthetic delay; no antenatal documentation; etc.		
	Provider related	None identified	Specify
	Partograph/labour care guide not used; action not taken; inappropriate action taken; iatrogenic delivery; delay in referral; inadequate monitoring; delay in calling for assistance; inappropriate discharge; etc.		
	Other	None identified	Specify
Actions to address the critical delays and modifiable factors:			
Form completed by Dr Shyama Karna		Date 2.16.2021	
c/s: caesarean section; CVD: cephalic vaginal delivery; ELBW: extremely low birth weight; EmOC: emergency obstetric care; HAART: highly active antiretroviral therapy; HIV: human immunodeficiency virus; IPT: intermittent preventive treatment; LBW: low birth weight; LMP: last menstrual period; NVP: nevirapine prophylaxis; TT: tetanus toxoid; VLBW: very low birth weight			

Source: World Health Organization. 2016. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths.

The case was reviewed at the next perinatal death review meeting, where the following questions were addressed.

1. What was the most likely primary cause of death?

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant		
b) Other diseases of conditions in foetus or infant		
c) Main maternal disease or condition affecting foetus or infant		
d) Other maternal diseases or conditions affecting foetus or infant		

Source: ICD-10 PM

2. What potentially modifiable factors may have contributed to the death?

   FAMILY-RELATED MODIFIABLE FACTORS:

   ADMINISTRATION-RELATED MODIFIABLE FACTORS:

   PROVIDER-RELATED MODIFIABLE FACTORS:

3. What missed opportunities for good care or instances of substandard care can you identify?

4. What changes to the action plan would you recommend to improve quality of care?

CASE STUDY 3: INTRAPARTUM STILLBIRTH

Instructions: Read Case Study 3 then complete the Stillbirth and Neonatal Death Review form.

Funmi Okintade is a 17-year-old schoolgirl who accidentally became pregnant from her boyfriend, Mussah, a classmate. They had been having occasional sex for three months but never used contraceptives. When the pregnancy became obvious, Funmi was expelled from school. Her father was angry and told her she had brought shame on the family. To hide the situation, Funmi was sent to her grandmother in her mother's native village.

Funmi helped her grandmother in the garden and with household chores but did not go to the antenatal clinic because she felt embarrassed. Her feet gradually became swollen and later even her fingers. When she was 32 weeks pregnant, her grandmother took her to the nearby maternal and child health (MCH) clinic, where she was seen by the midwife at the antenatal clinic. The female health extension worker was not very nice to her and condemned her pregnancy as a result of her immoral behaviour. Apart from an elevated blood pressure of 130/90, nothing abnormal was found. No laboratory tests were conducted since the MCH had neither a laboratory nor dipsticks to test her urine. Funmi was advised to rest at home and come back after a week.

However, Funmi decided not to go back to the antenatal clinic because she did not like the judgemental attitude of the health extension worker and her moralistic talk.

When she was 36 weeks pregnant, she had sudden abdominal pain, which persisted. Later the same day, she started bleeding and felt weak. Her grandmother called the local traditional birth attendant (TBA), who examined her and told her something was wrong with the pregnancy and that she had to go to the hospital. Her grandmother took her in a minibus to the hospital in town, which was one hour away. On admission, Funmi was examined by the midwife in the maternity ward. Her pulse rate was 100/min, BP was 160/110, and temperature was 37°C. She looked slightly pale and had oedema of the hands and feet. Her face also looked slightly puffy. The fundus was at term, the uterus felt hard, and the foetus was difficult to palpate but was in cephalic presentation. The foetal heart rate was 120/min. There was slight vaginal bleeding. The cervix was soft and closed. She was admitted and reviewed by the doctor, who prescribed an injection of 5 grams magnesium sulphate in each buttock and an IV injection of 5 mg hydralazine, which was repeated after four hours. Later that day, the BP had gone down to 130/90. Her condition remained stable. In her patient notes, no information on the foetal heart rate had been recorded since admission. The afternoon of the next day, she went into labour, and at 11 pm she delivered a fresh female stillbirth weighing 2.5 kg. The placenta was delivered by controlled cord traction 15 minutes after delivery of the foetus, together with a large blood clot. Total blood loss was estimated at 500 ml. Magnesium sulphate was continued until 24 hours after delivery. The oedema gradually subsided and the BP returned to normal. Three days after delivery, Funmi was discharged in good condition.

CASE 3: STILLBIRTH AND NEONATAL DEATH CASE REVIEW FORM

Section1: Identification					
1.1	ID# mother				
1.2	ID# baby				
1.3	Facility name				
1.4	Type of care available	**Comprehensive EmOC**	**Basic EmOC**	**First aid**	**Home delivery**
1.5	District name				
1.6	Referred	**Not referred**	**Referred in**		
			Referred out		

Section 2: Pregnancy progress and care								
2.1	Obstetric history							
		All pregnancies	All births	Total live births	Dead	Still-births	Neonatal deaths	Abortions
2.2	Mother's Age		Y					
2.3	Type of pregnancy		Singleton	Twin		Higher multiple		Unknown
2.4	Antenatal care number of visits		4 or more	3	2	1	No visits	Unknown
Adjust to local context								
2.5	Malaria prophylaxis							
	Not needed		IPT3+	IPT2	IPT1		Not received	Unknown
2.6	Tetanus toxoid vaccination		TT2+		TT1		Not received	Unknown
2.7	HIV status		HIV-negative	HIV-positive			Not done	Unknown
	2.7.1 HIV-positive action			NVP	HAART		Other, specify	
2.8	Syphilis test		Syphilis-negative	Syphilis-positive			Not done	Unknown

Section 3: Labour and birth								
3.1	Mother's LMP	DD	MM	YY	Unknown			
3.2	Date of birth	DD	YY	YY				
	3.2.1 Time of birth	h						
3.3	Gestational age			weeks	Unknown			
	3.3.1 Method of determination		Sure LMP dates		Unsure LMP dates		Other (specify)	
			Early ultrasound		Late ultrasound			
3.4	Place of delivery			Facility	Home	Road	Other (specify)	Unknown
	3.4.1 Attendant at delivery	Midwife	Nurse	Doctor	Other (specify)		No one	Unknown
3.5	Onset of labour			Spontaneous	Induced	C/S before onset		Unknown
3.6	Foetal heart sounds on admission			No	Yes			Unknown
3.7	Partograph/labour care guide			No	Yes			Unknown
3.8	Mode of delivery			CVD	Assisted vaginal	Caesarean	Other, specify	Unknown
3.9	Time between decision for action and birth		n/a	<30 mins	30–60 mins	>60 mins		Unknown
3.10	Apgar score		1 min =	4 or more	3 or less			Unknown
			5 min =	4 or more	3 or less			
3.11	Resuscitation	**Not needed**		Bag + mask	Not done	Other, specify not available		Unknown
3.12	Sex of baby		Male	Female				Unknown
3.13	Birth weight		g	≥2500g	1500–2499g	1000–1499g	<1000g	Unknown
					LBW	VLBW	ELBW	

Section 4: Details of the death													
4.1	Date of death	DD	MM	YY	4.2 Type of death (tick one)								
	4.1.1 Time of death	:	H		Neonatal death	Intrapartum stillbirth	Antepartum stillbirth	Stillbirth unknown timing					
4.2	Enter the perinatal cause of death as per ICD-10 PM to the corresponding box												
4.3	Main maternal condition	None identified			Main maternal condition followed by the corresponding number. Use the reference below to write in the corresponding number. Include more than one if applicable.			Unknown					
4.4	Cause of death(circle one)				**M1**	**M2**	**M3**	**M4**	**M5**	**Other**	**Unknown**		
	a. Congenital												
	b. Antepartum complication												
	c. Intrapartum complication												
	d. Complication of prematurity												
	e. Infection	Tetanus	Sepsis	Pneumonia	Meningitis								
		Syphilis	Diarrhoea	Other, specify if known									
	f. Other, specify												
	g. Unknown/unspecified												

Section 5: Critical delays and modifiable factors			
5.1	Critical delays	Delay 1: Not identified	1. Delay recognising need of care
		Delay 2: Not identified	2. Delay seeking care
		Delay 3: Not identified	3. Delay receiving care
5.2	Modifiable factors		
	Family related	None identified	Specify
	Late/no antenatal care; cultural inhibition to seeking care; no knowledge of danger signs; financial constraints; partner restricts care-seeking; use of traditional/herbal medicine; smoking/drug or alcohol abuse; attempted termination; etc.		
	Administration related	None identified	Specify
	Neonatal facilities; theatre facilities; resuscitation equipment; blood products; lack of training; insufficient staff numbers; anaesthetic delay; no antenatal documentation; etc.		
	Provider related	None identified	Specify
	Partograph/labour care guide not used; action not taken; inappropriate action taken; iatrogenic delivery; delay in referral; inadequate monitoring; delay in calling for assistance; inappropriate discharge; etc.		
	Other	None identified	Specify
Actions to address the critical delays and modifiable factors:			
Form completed by		Date	
c/s: caesarean section; CVD: cephalic vaginal delivery; ELBW: extremely low birth weight; EmOC: emergency obstetric care; HAART: highly active antiretroviral therapy; HIV: human immunodeficiency virus; IPT: intermittent preventive treatment; LBW: low birth weight; LMP: last menstrual period; NVP: nevirapine prophylaxis; TT: tetanus toxoid; VLBW: very low birth weight			

Source: World Health Organization. 2016. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths.

The case was reviewed at the next perinatal death review meeting, where the following questions were addressed.

1. What was the most likely primary cause of death?

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant		
b) Other diseases of conditions in foetus or infant		
c) Main maternal disease or condition affecting foetus or infant		
d) Other maternal diseases or conditions affecting foetus or infant		

Source: ICD-10 PM

2. What potentially modifiable factors may have contributed to the death?

   FAMILY-RELATED MODIFIABLE FACTORS:

   ADMINISTRATION-RELATED MODIFIABLE FACTORS:

   PROVIDER-RELATED MODIFIABLE FACTORS:

3. What missed opportunities for good care or instances of substandard care can you identify?

4. What changes to the action plan would you recommend to improve quality of care?

CASE STUDY 4: BIRTH ASPHYXIA/MODERATELY PRETERM BABY

Instructions: Read Case Study 4 the complete the Stillbirth and Neonatal Death Review form.

Nura Abubakar, who is married to Ishmael Mohammed, is 21 years and gravida 2, para 1. At 20 weeks' gestation she started attending the antenatal clinic at the nearby MCH clinic. No abnormalities were found. At 28 and 32 weeks, she attended the ANC clinic again. At gestation 33 weeks, her membranes ruptured and she started draining liquid, but there were no contractions. She realised that the foetus was still quite small to be born. When her husband came home from work at 4 pm, she informed him and the next day he arranged transport and took her to the general hospital.

At the hospital, she was admitted to the maternity area with a diagnosis of threatened premature labour and put on complete bed rest, with vital signs, contractions, and foetal heart rate monitored every four hours. The draining of liquid diminished, but after four days she had slight contractions. She was prescribed a salbutamol intravenous infusion of 10 mg/1 litre normal saline, but she still went into labour the next day. During admission, her vital signs and the foetal heart rate were only recorded every 12 hours. On the day she went into labour, a temperature of 38°C was recorded in the morning. At 3 pm, Nura gave birth to a premature male infant of 1.8 kg with an Apgar score of 6 after one minute and 9 after five minutes. The cord was clamped after three minutes. The baby was wiped dry and wrapped in a cloth, received 1 mg vitamin K1 intramuscularly, and was put on the mother's chest. After Nura received 10 units of oxytocin, the placenta was delivered by controlled cord traction.

The baby was treated with kangaroo mother care and initially did well apart from occasional apnoea attacks, which responded well to tactile stimulation. However, by the second day, the baby developed more severe breathing difficulties, had an increased respiration rate of 60/min, had chest-indrawing, and looked slightly cyanotic. The newborn was unable to suck and was put on nasogastric tube feedings of expressed breast milk every three hours and received ampicillin 100 mg BD (twice a day) and gentamicin 5 mg OD (once daily). Unfortunately, the maternity had run out of oxygen cylinders, so oxygen could not be given. The baby stopped breathing that night.

CASE 4: STILLBIRTH AND NEONATAL DEATH CASE REVIEW FORM

Section1: Identification					
1.1	ID# mother				
1.2	ID# baby				
1.3	Facility name				
1.4	Type of care available	**Comprehensive EmOC**	**Basic EmOC**	**First aid**	**Home delivery**
1.5	District name				
1.6	Referred	**Not referred**	**Referred in**		
			Referred out		

Section 2: Pregnancy progress and care								
2.1	Obstetric history							
		All pregnancies	All births	Total live births	Dead	Still-births	Neonatal deaths	Abortions
2.2	Mother's Age		Y					
2.3	Type of pregnancy		Singleton	Twin		Higher multiple		Unknown
2.4	Antenatal care number of visits		4 or more	3	2	1	No visits	Unknown
Adjust as per local context								
2.5	Malaria prophylaxis							
	Not needed		IPT3+	IPT2	IPT1		Not received	Unknown
2.6	Tetanus toxoid vaccination		TT2+		TT1		Not received	Unknown
2.7	HIV status		HIV-negative	HIV-positive			Not done	Unknown
	2.7.1 HIV-positive action			NVP	HAART		Other, specify	
2.8	Syphilis test		Syphilis-negative	Syphilis-positive			Not done	Unknown

Section 3: Labour and birth								
3.1	Mother's LMP	DD	MM	YY	Unknown			
3.2	Date of birth	DD	YY	YY				
	3.2.1 Time of birth	h						
3.3	Gestational age			weeks	Unknown			
	3.3.1 Method of determination		Sure LMP dates		Unsure LMP dates		Other, specify	
			Early ultrasound		Late ultrasound			
3.4	Place of delivery			Facility	Home	Road	Other, specify	Unknown
	3.4.1 Attendant at delivery	Midwife	Nurse	Doctor	Other (specify)		No one	Unknown
3.5	Onset of labour			Spontaneous	Induced	C/S before onset		Unknown
3.6	Foetal heart sounds on admission			No	Yes			Unknown
3.7	Partograph/labour care guide			No	Yes			Unknown
3.8	Mode of delivery			CVD	Assisted vaginal	Caesarean	Other, specify	Unknown
3.9	Time between decision for action and birth		n/a	<30 mins	30–60 mins	>60 mins		Unknown
3.10	Apgar score		1 min =	4 or more	3 or less			Unknown
			5 min =	4 or more	3 or less			
3.11	Resuscitation	**Not needed**		Bag + mask	Not done	Other, specify not available		Unknown
3.12	Sex of baby		Male	Female				Unknown
3.13	Birth weight		g	≥2500g	1500–2499g	1000–1499g	<1000g	Unknown
					LBW	VLBW	ELBW	

Section 4: Details of the death													
4.1	Date of death	DD	MM	YY	4.2 Type of death (tick one)								
	4.1.1 Time of death	: H			Neonatal death	Intrapartum stillbirth	Antepartum stillbirth	Stillbirth unknown timing					
4.2	Enter the perinatal cause of death as per ICD-10 PM to the corresponding box												
4.3	Main maternal condition	None identified			Main maternal condition followed by the corresponding number. Use the reference below to write in the corresponding number. Include more than one if applicable.			Unknown					
4.4	Cause of death (circle one)				**M1**	**M2**	**M3**	**M4**	**M5**	**Other**	**Unknown**		
	a. Congenital												
	b. Antepartum complication												
	c. Intrapartum complication												
	d. Complication of prematurity												
	e. Infection	Tetanus	Sepsis	Pneumonia	Meningitis								
		Syphilis	Diarrhoea	Other, specify if known									
	f. Other, specify												
	g. Unknown/unspecified												

Section 5: Critical delays and modifiable factors			
5.1	Critical delays	Delay 1: Not identified	1. Delay recognising need of care
		Delay 2: Not identified	2. Delay seeking care
		Delay 3: Not identified	3. Delay receiving care
5.2	Modifiable factors		
	Family related	None identified	Specify
	Late/no antenatal care; cultural inhibition to seeking care; no knowledge of danger signs; financial constraints; partner restricts care-seeking; use of traditional/herbal medicine; smoking/drug or alcohol abuse; attempted termination; etc.		
	Administration related	None identified	Specify
	Neonatal facilities; theatre facilities; resuscitation equipment; blood products; lack of training; insufficient staff numbers; anaesthetic delay; no antenatal documentation; etc.		
	Provider related	None identified	Specify
	Partograph/labour care guide not used; action not taken; inappropriate action taken; iatrogenic delivery; delay in referral; inadequate monitoring; delay in calling for assistance; inappropriate discharge; etc.		
	Other	None identified	Specify
Actions to address the critical delays and modifiable factors:			
Form completed by		Date	
c/s: caesarean section; CVD: cephalic vaginal delivery; ELBW: extremely low birth weight; EmOC: emergency obstetric care; HAART: highly active antiretroviral therapy; HIV: human immunodeficiency virus; IPT: intermittent preventive treatment; LBW: low birth weight; LMP: last menstrual period; NVP: nevirapine prophylaxis; TT: tetanus toxoid; VLBW: very low birth weight			

Source: World Health Organization. 2016. Making Every Baby Count: Audit and review of stillbirths and neonatal deaths.

The case was reviewed at the next perinatal death review meeting, where the following questions were addressed.

1. What was the most likely primary cause of death?

Causes of death	Clinical details	ICD-10 PM
a) Main disease or condition in foetus or infant		
b) Other diseases of conditions in foetus or infant		
c) Main maternal disease or condition affecting foetus or infant		
d) Other maternal diseases or conditions affecting foetus or infant		

Source: ICD-10 PM

2. What potentially modifiable factors may have contributed to the death?

   FAMILY-RELATED MODIFIABLE FACTORS:

   ADMINISTRATION-RELATED MODIFIABLE FACTORS:

   PROVIDER-RELATED MODIFIABLE FACTORS:

3. What missed opportunities for good care or instances of substandard care can you identify?

4. What changes to the action plan would you recommend to improve quality of care?

ANNEX XV: CALCULATING PERCENTAGE OF MATERNAL DEATHS BY CAUSE

EXERCISE A

Complete rows H through L in the table below to calculate the proportion (%) of deaths by cause for each month.

	January	February	March	April	May	June
A. Total number of deliveries (including stillbirths)	713	644	589	630	558	540
B. Total number of maternal deaths	18	19	20	17	17	14
C. Deaths due to PPH	8	8	8	7	7	6
D. Deaths to PE/E	5	5	4	5	4	3
E. Deaths due to pregnancy-related infection	2	3	4	2	2	1
F. Deaths due to malaria complications	1	2	1	2	2	2
G. Deaths due to other causes	2	1	3	1	2	2
H. Proportion of deaths due to PPH *(row C divided by row B)*						
I. Proportion of deaths due to PE/E *(row D divided by row B)*						
J. Proportion of deaths due to infection *(row E divided by Row B)*						
K. Proportion of deaths due to malaria *(row F divided by row B)*						
L. Proportion of deaths due to other causes *(row G divided by row B)*						

What are the first and second leading causes of maternal deaths in your facility over the past six months?

- First leading cause of death:
- Second leading cause of death:

ANNEX XVI A: [SAMPLE] MPDSR INDIVIDUAL DEATH REVIEW RESPONSE PLAN

MPDSR FORM: MODIFIABLE FACTORS (FAMILY RELATED, ADMINISTRATION RELATED, PROVIDER RELATED)

District:	Health facility:	Meeting date (MM/DD/YY): ___/___/___
Maternal death event date (MM/DD/YR):	Address of the deceased	
Place of death:	Date form completed (MM/DD/YY)	
Case summary *(can be pasted in, if completed during a previous meeting)*		

Modifiable contributing factors *(organised within the Three Delays Model)*	
First delay: Recognition and decision to seek care (home/family/community)	
Second delay: Transport to care, delays reaching an appropriate facility	
Third delay: Quality of care received in the health facility	

MPDSR PRIORITY RESPONSES TO IMPLEMENT AND MONITOR

Common modifiable contributing factors	Action (what to do)	Person responsible for completing action (specify facility and/or district)	Target completion date	Follow-up progress notes (completed/ongoing/failed)

ANNEX XVI B: RESPONSE REVIEW AND ANALYSIS

EXERCISE B

In Exercise A (Annex XV), you determined that PPH is the current leading cause of maternal death in your facility. Given this finding, you decide to review the last eight response plans for deaths of women due to PPH in your facility. You want to understand if there are common modifiable factors where you can focus your efforts. Table 13 lists modifiable factors and responses identified in the death review response actions for deaths due to PPH for the last eight death reviews.

TABLE 13. SUMMARY OF MODIFIABLE FACTORS AND RECOMMENDED ACTIONS FROM AUDITS OF THE EIGHT MOST RECENT MATERNAL DEATHS DUE TO PPH

Number	Modifiable contributing factors (from past individual review of maternal deaths due to PPH)	Summary of prioritised responses
1	• No uterotonic for prevention and management of PPH in the labour ward • Provider did not know how to manage PPH	• Ensure availability of oxytocin in the labour ward 24/7 • Develop a log to track availability of oxytocin • Ensure that providers know how to manage uterine atony and other causes of PPH
2	• Immediate postpartum prophylactic uterotonic not administered (active management of the third stage of labour) • Woman not monitored for bleeding after delivery	• Ensure that all providers are competent and understand the importance of providing active management of the third stage of labour • Introduce a systematic written protocol, with assigned staff, to monitor all women for bleeding and other danger signs after birth
3	• Delayed identification of PPH in the postnatal ward • Lack of blood and/or blood products	• Ensure that providers conduct regular postnatal checks in the postnatal ward • Ensure that providers document regular postnatal checks in the client file • Ensure existence and implementation of log/system to monitor and document availability of blood and blood products • Ensure blood and blood products are always available and stored properly at the facility blood bank • Introduce a written communication protocol for maternity and blood bank staff to ensure immediate release of blood to the maternity ward in an emergency
4	• Delay in getting to the health facility due to lack of timely, affordable transportation	• Work with district and community leaders to establish a system for emergency transport of pregnant women with complications from the community to the hospital • Orient community health workers and health facility staff to the transportation system • Purchase ambulance to transport pregnant women from the community to the health facility

Number	Modifiable contributing factors (from past individual review of maternal deaths due to PPH)	Summary of prioritised responses
5	• Provider did not know how to manage PPH • Lack of blood and/or blood products	• Strengthen providers' skills to manage atonic uterus and other causes of PPH • Ensure the existence of a log/system to monitor and document availability of blood and blood products • Introduce team-based PPH simulation drills to strengthen coordination and performance of all relevant staff in an emergency (midwives, nurses, auxiliary assistants, doctors, laboratory technicians, pharmacists, housekeepers, etc.)
6	• Severe anaemia not diagnosed in pregnancy (no ANC screening of haemoglobin) • Iron and folate supplements not given • No packed cells available	• Post a written protocol for ANC screening and treatment of anaemia • Monitor availability and distribution of iron supplementation during ANC visits • Monitor anaemia screening and results as part of ANC visits • Ensure packed cells are always available and stored properly at the facility blood bank
7	• Delay in getting to the health facility due to lack of timely, affordable transportation • No triage protocol for rapid assessment and treatment of pregnant, labouring, and postnatal women • Skilled provider not available to triage women in the maternity	• Work with district and community leaders to establish a system for transportation of pregnant women from the community to the hospital • Review and revise maternity triage protocols; post the written protocol in the maternity area • Ensure a skilled provider is always available to triage women • Review delays in the usual patient pathway from arrival at the hospital gate to the maternity triage area and develop a written plan to address gaps and monitor
8	• Delayed identification of PPH in the postnatal ward • No uterotonic available in the postnatal ward	• Ensure that providers conduct regular postnatal checks in the postnatal ward • Ensure that providers document regular postnatal checks in the client file • Ensure availability of oxytocin in the postnatal ward 24/7 • Develop a log to track availability of oxytocin

SMALL GROUP DISCUSSION

In your small group, review Table 13 and discuss the following:

- What patterns do you see, if any, in the modifiable factors identified in the last eight audits of deaths of women due to PPH?
- What are the most important and common modifiable factors contributing to PPH that your team should prioritise?
- Based on these common modifiable factors and the recommended responses, discuss how your committee will prioritise aggregate responses to accelerate the reduction of deaths of women due to PPH in your facility.
- If time allows, begin to fill out the **Aggregate MPDSR Form** (Table 14) based on your prioritised responses. Be as specific as possible and be prepared to discuss in plenary.
- Table 14 may be a useful tool for MPDSR committees working to address common and persistent modifiable factors that have led to multiple deaths in previous months.

TABLE 14. AGGREGATE MPDSR FORM: COMMON MODIFIABLE FACTORS AND AGGREGATED PRIORITY RESPONSES TO ACCELERATE REDUCTION OF MATERNAL DEATHS DUE TO PPH

Common modifiable contributing factors	Action (what to do)	Person responsible for completing action (specify facility and/or district)	Target completion date	Follow-up progress notes (completed/ongoing/failed)

ANNEX XVII: VISUALISING TRENDS IN CAUSES OF MATERNAL DEATHS

EXERCISE C

Six months later you have implemented the priority responses you identified in Exercise B (Annex XVI B) to address the key factors contributing to PPH deaths at your facility. To track your progress, you decide to review the causes of maternal deaths once again in your facility over the past six months. The results of your data review are presented in the table below. To visualise the changes over the past six months, **create a bar graph** that displays the monthly proportion of specific causes of maternal deaths from July to December 2017.

TABLE15. MONTHLY NUMBER OF MATERNAL DEATHS AND PROPORTION (%) OF DEATHS BY CAUSE (JULY–DECEMBER 2017)

	July	August	Sept	Oct	Nov	Dec
A. Total number of deliveries (including stillbirths)	713	558	690	589	570	651
B. Total number of maternal deaths	17	13	13	9	11	10
C. Deaths due to PPH	4	3	2	2	2	2
D. Deaths to PE/E	5	4	4	3	3	3
E. Deaths due to pregnancy-related infection	4	3	3	1	2	2
F. Deaths due to malaria complications	2	1	1	1	2	2
G. Deaths due to other causes	2	2	3	2	2	2
H. Proportion of deaths due to PPH *(row C divided by row B)*	24%	23%	15%	22%	18%	20%
I. Proportion of deaths due to PE/E *(row D divided by row B)*	29%	31%	31%	33%	27%	30%
J. Proportion of deaths due to infection *(row E divided by Row B)*	24%	23%	23%	11%	18%	20%
K. Proportion of deaths due to malaria *(row F divided by row B)*	12%	8%	8%	11%	18%	20%
L. Proportion of deaths due to other causes *(row G divided by row B)*	12%	15%	23%	22%	18%	20%

EXERCISE C: CALCULATING THE PROPORTIONS FOR EACH CAUSE GIVEN IN TABLE 15, PLOT THE DATA ON A BAR GRAPH TO VISUALISE TRENDS.

1. Click inside the chart area.
2. Click “Edit Data.”
3. You will get a chart with categories in the column and series in the row.
4. In place of categories, type months as January to December.
5. In place of series, type PPH, PE/E, infection, malaria, and other causes.
6. Enter the relevant percentages.

ANNEX XVIII: MORTALITY RATE DEFINITIONS AND DATA SOURCES

Instructions: Write the numerator, denominator, and data sources for the following indicators for various mortality indicators.

1. STILLBIRTH RATE

- Numerator:
- Denominator:
- Data Sources

2. NEONATAL MORTALITY RATE

- Numerator:
- Denominator:
- Data Sources

3. PERINATAL MORTALITY RATE

- Numerator:
- Denominator:
- Data Sources

ANNEX XIX: CALCULATE AND ANALYSE PERINATAL MORTALITY INDICATORS

Group work: Using the data in Table 16, calculate the following and enter your answers below:

1. Stillbirth rate	(D/B) * 1,000	
2. Percentage of stillbirths that are antepartum	(F/D) * 100%	
3. Early neonatal mortality rate	(G/C) * 1,000	
4. Perinatal mortality rate	((D+G)/B) * 1,000	
5. Neonatal mortality rate	(H/C) * 1,000	
6. Maternal mortality ratio	(I/C) * 100,000	
7. Caesarean section rate (all deliveries)	(J/A) * 100%	
8. Assisted delivery rate (for deliveries)	(K/A) * 100%	
9. Low birthweight rate (live births)	(L/C) * 100%	
10. Preterm rate (live births)	(M/C) * 100%	

TABLE 16. DUMMY DATA FOR GROUP WORK

Serial No.	Indicator	Number
A	Number of deliveries	970
B	Number of births	1,000
C	Number of live births	980
D	Number of stillbirths	20
E	Number of intrapartum stillbirths	12
F	Number of antepartum stillbirths	8
G	Early neonatal deaths (1–7 days)	14
H	Neonatal deaths (1–28 days)	18
I	Maternal deaths	2
J	Number of caesarean section deliveries	150
K	Number of assisted deliveries	100
L	Number of babies born weighing <2,500 g	200
M	Number of babies born <37 weeks gestational age	140

ANNEX XX: CALCULATING TRENDS IN PERINATAL DEATHS

Complete calculations for the following indicators for the six months to see trends at the health centre.

TABLE 17. SIX MONTHS TRENDS AT THE HEALTH CENTRE

	Jan	Feb	Mar	Apr	May	Jun	Total
A. Number of deliveries	14	22	16	20	26	14	112
B. Number of births	16	24	18	22	26	18	124
C. Number of live births	16	18	18	24	26	14	117
D. Number of stillbirths	2	2	1	0	0	2	7
E. Number of intrapartum stillbirths	1		0		0	0	1
F. Number of antepartum stillbirths	1	2	1	0	0	2	6
F. Number of early neonatal deaths (1–7 days)	2	4	0	0	0	4	10
Stillbirth rate							
Percentage of stillbirths that are antepartum							
Percentage of stillbirths that are intrapartum							

Of the six antepartum stillbirths, three were due to infection as a result of chorioamnionitis in the mother, one was due to a congenital anomaly, and two were due to hypoxia as the mother had eclampsia. Tabulate the antepartum cause according to ICD-10 PM, enter your response in Table 18, and formulate an aggregated response plan.

TABLE18. ASSIGN THE CAUSE OF PERINATAL DEATHS

Perinatal cause of death	Maternal condition						
	M1: Complications of placenta, cord, and	M2: Maternal complications of pregnancy	M3: Other complications of labour and delivery	M4: Maternal medical and surgical conditions	M5: No maternal condition identified	Other	**Total (%)**
Antepartum death (A)							
A1: Congenital malformations, deformations, and chromosomal abnormalities							
A2: Infection							
A3: Antepartum hypoxia							
A4: Other specified antepartum disorder							
A5: Disorders related to foetal growth							
A6: Foetal death of unspecified cause							
Total (%)							

ICD-10 PM:

Response Plan:

ANNEX XXI: HMIS DATA AVAILABILITY FORM

TABLE 19. HMIS DATA AVAILABILITY REVIEW FORM

Your role/title					
Where do you work?	☐ Health centre ☐ District hospital ☐ District health office ☐ Other (please specify)				
Check the HMIS forms you use on a regular basis and complete the answers below (leave blank for forms you do not use).	☐ Patient record (partograph /labour care guideor other individual chart/ record)	☐ Hospital register	☐ Health centre register	☐ HMIS monthly summary reporting form	☐ Other forms or data sources (specify)
For each type of form you use, check if there is a designated space (standard data element) to record **individual (or cumulative)** maternal deaths (leave blank for forms you do not use).	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
For each type of form, check if there is a designated space to record the **cause** of maternal deaths (leave blank for forms you do not use).	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

If **YES,** indicate how the **cause** of maternal deaths is documented/captured in each form (leave blank for forms you do not use).	☐ Open-ended space (to write in cause)	☐ Open-ended space (to write in cause)	☐ Open-ended space (to write in cause)	☐ Open-ended space (to write in cause)	☐ Open-ended space (to write in cause)
	☐ Designated data elements (e.g., box to check for individual causes of death)	☐ Designated data elements (e.g., box to check for individual causes of death)	☐ Designated data elements (e.g., box to check for individual causes of death)	☐ Designated data elements (e.g., box to check for individual causes of death)	☐ Designated data elements (e.g., box to check for individual causes of death)
	☐ Not applicable	☐ Not applicable	☐ Not applicable	☐ Not applicable	☐ Not applicable
IF there is a designated data element for individual causes of maternal deaths, please check **which causes of maternal death are listed**.	☐ PPH ☐ APH ☐ PE/E ☐ Sepsis ☐ Obstructed labour	☐ PPH ☐ APH ☐ PE/E ☐ Sepsis ☐ Obstructed labour	☐ PPH ☐ APH ☐ PE/E ☐ Sepsis ☐ Obstructed labour	☐ PPH ☐ APH ☐ PE/E ☐ Sepsis ☐ Obstructed labour	☐ PPH ☐ APH ☐ PE/E ☐ Sepsis ☐ Obstructed labour

ANNEX XXII: ZOOM GUIDE FOR LEARNERS

1. General instructions
2. Renaming in Zoom
3. How to raise hand
4. Whiteboard
5. Group Work: Discussion Rooms
6. Online Kahoot! game

GENERAL INSTRUCTIONS

- Select the “Mute” button to mute yourself. Remain muted to minimise background noise unless you are commenting or have questions.
- To share your screen, select “Share Screen” on the bottom menu bar.
- To chat with other participants, select “Chat.”

RENAMING IN ZOOM

To change your name after entering a Zoom meeting, click on the “Participants” button at the top of the Zoom window.

Hover your mouse over your name in the “Participants” list on the right side of the Zoom window. You will see “Unmute” and “More” alongside your name. Click on “More” then click “Rename” and enter the name you want to be called during the workshop.

HOW TO RAISE HAND

Click on the “Participants” button and click “Raise Hand”; similarly, to lower hand, click on “Lower Hand.”

WHITEBOARD

When the facilitator shares their screen, you should see a blank whiteboard. Move your mouse to the top of the screen, and the following menu should appear:

Select "View Options" and then "Annotate."

Use the Text tool **(T)** to write on the board.

GROUP WORK: DISCUSSION ROOMS

During breakout sessions, participants will be automatically moved into breakout rooms. When a breakout session is announced, you should see the following message on your screen:

If you need help from the facilitators during breakout sessions, select "Ask for Help" as shown below. The facilitator will be notified to join the room.

When the breakout session is over, all participants will be automatically moved back to the main meeting.

ONLINE KAHOOT! GAME

Participants should download the Kahoot! app in advance of the training. To play the game, you will need a smartphone to enter your answers and a laptop to see the questions.

The host (workshop facilitator) will provide the game PIN.

1. Type www.kahoot.it in your smartphone browser to download the application.
2. Click “Play”.

3. Enter the Game PIN and click “Enter”.

4. Next, type your name and click “OK, go!” to enter the game.

5. Questions will appear on your laptop.

6. Each response is associated with a color and shape.

7. Use your smartphone to answer questions by clicking the box with the color/shape that corresponds to your response.

Points are awarded based on how quickly and accurately players answer.

ANNEX XXIII: ZIPPED FILES FOR THE WORKSHOP

THE ZIPPED FILE WILL CONTAIN THE FOLLOWING:

1. Virtual MPDSR Capacity-Building Workshop reference materials:
   i. National MPDSR Guidelines
   ii. WHO Maternal Death Surveillance and Response Technical Guidance (for learners who do not have their national guide)
   iii. WHO: Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation
   iv. The WHO application of ICD-10 to deaths during pregnancy childbirth and puerperium: ICD-10 MM
   v. The WHO application of ICD-10 to deaths during the perinatal period: ICD-10 PM
   vi. Medical certification, ICD-10 mortality coding, and reporting mortality associated with COVID-19, Technical note, 7 June 2020
   vii. Link or video: Why Did Mrs. X die? https://www.youtube.com/watch?v=gS7fCvCIe1k&feature=youtu.be

2. Virtual MDSR Capacity-Building Workshop Workbook for Learners

3. Individual learning plan, MPDSR pre-course knowledge assessment

ANNEX XXIV: MPDSR CAPACITY-BUILDING WORKSHOP EVALUATION FORM

INSTRUCTIONS: Please rate the MPDSR workshop using the following scale by highlighting:

1-Disagree 2-No Opinion 3-Agree

SN	Course Component	Course Rating
1	The workshop objectives were clearly presented	1 - - - - - - - 2 - - - - - - - 3
2	The workshop was presented in a helpful sequence	1 - - - - - - - 2 - - - - - - - 3
3	The workshop was well-balanced between presentations and practice exercises	1 - - - - - - - 2 - - - - - - - 3
4	The length and timing of sessions was appropriate for the workshop	1 - - - - - - - 2 - - - - - - - 3
5	The workshop enhanced my understanding of the goals of MPDSR	1 - - - - - - - 2 - - - - - - - 3
6	The workshop enhanced my understanding of the Six-Step Mortality Audit Cycle	1 - - - - - - - 2 - - - - - - - 3
7	I feel confident about my skills in identifying maternal deaths	1 - - - - - - - 2 - - - - - - - 3
8	The workshop improved my ability to differentiate between direct and indirect obstetric deaths	1 - - - - - - - 2 - - - - - - - 3
9	The workshop improved my ability to complete maternal death review forms accurately	1 - - - - - - - 2 - - - - - - - 3
10	The workshop improved my ability to complete Perinatal death review forms accurately	1 - - - - - - - 2 - - - - - - - 3
11	The workshop improved my ability to prepare a case summary	1 - - - - - - - 2 - - - - - - - 3
12	After the workshop, I feel confident assigning the cause of maternal death using the ICD-10 MM	1 - - - - - - - 2 - - - - - - - 3
13	After the workshop, I feel confident assigning the cause of Perinatal death using the ICD-10 PM	1 - - - - - - - 2 - - - - - - - 3

14	The workshop enhanced my understanding of creating/strengthening an MDSR/MPDSR team	1 - - - - - - - 2 - - - - - - - 3
15	I feel confident about my ability to develop MDSR/MPDSR responses	1 - - - - - - - 2 - - - - - - - 3
16	I feel confident about my ability develop a process for tracking an MDSR response	1 - - - - - - - 2 - - - - - - - 3
17	After the workshop, I am comfortable identifying trends and commonalities within a collection of maternal/Perinatal death data	1 - - - - - - - 2 - - - - - - - 3

PLEASE PROVIDE ANY ADDITIONAL FEEDBACK ON THE STRUCTURE AND CONTENT OF THE WORKSHOP.

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