GTR
Grupo de Trabajo Regional para la
REDUCCIÓN DE LA MORTALIDAD MATERNA

Guidelines for Maternal Death Surveillance and Response (MDSR): Region of the Americas

Maternal
Death
Surveillance and
Response

UNFPA | Organización Panamericana de la Salud | World Health Organization | USAID FROM THE AMERICAN PEOPLE | FAMILY CARE INTERNATIONAL | iniciativa salud mesoamérica

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Preface

Each year, of 5 million women who experience severe pregnancy complications, 303,000 die (WHO, 2015).[a] These global averages however mask vast inequities; 99% of deaths occur in developing countries, with marked heterogeneity within countries and social groups. The risk of death is greater among poor, rural women and those from selected ethnic or discriminated populations.

While the number of maternal deaths and the maternal mortality ratio (MMR) has decreased by 44% worldwide in the last 25 years, the Millennium Development Goal (MDG) 5 of reducing the MMR by 75% will not be attained. In Latin America and the Caribbean, total maternal deaths declined by 49% between 1990 and 2015 for a MMR of 68 per 100,000 LB (PAHO/WHO, 2015).[b] Thirteen countries however had MMRs above this average – Bahamas, Bolivia, Dominican Republic, Guatemala, Guyana, Haiti, Jamaica, Honduras, Nicaragua, Panama, Paraguay, Suriname and Venezuela (80–359/100,000 LB).[b]

Most maternal deaths can be averted if women and their families can recognize changes in their health status and seek care in a timely way. Health services must however be equitably accessible to all and address the needs identified by reliable maternal mortality information. The UN Commission on Information and Accountability for Women's and Children's Health (COIA) has identified the need for ***better information*** to have ***better results***. Developing evidence based care which responds to factual, timely and disaggregated information on how many women die, where, why and when in the reproductive process, are essential steps in an effective epidemiological surveillance cycle.

The first regional *Guidelines for Maternal Mortality Epidemiological Surveillance* (PAHO/WHO) were published in 1996. In 2013, WHO launched a global framework "Maternal death surveillance and response: technical guidance information for action to prevent maternal death" which emphasized the need for effective response and

a. WHO, UNICEF, UNFPA, World Bank Group & UNDP. Trends in maternal mortality: 1990 to 2015. WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division estimates. Geneva: World Health Organization, 2015. Available from: http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1. The MMEIG produces annual global estimates to monitor maternal deaths combining national official data, corrected for under-reporting, with best estimates used where none exist.

b. PAHO/WHO. Health Situation in the Americas: Basic Indicators 2015. Washington DC, USA, 2015.

improved accountability to surveillance findings. In response, the *Regional Task Force for Maternal Mortality Reduction*[c] accelerated its plans to update the 1996 publication. In adapting this framework, the 2015 *Guidelines for Maternal Death Surveillance and Response (MDSR): Region of the Americas* recognize the region's progress in reducing maternal mortality. It incorporates examples from the lessons learned by five of the region's countries with the most years of experience in maternal mortality surveillance, namely Brazil, Colombia, El Salvador, Jamaica and Mexico.

MDSR is a continuous action cycle of identification and mandatory notification of maternal deaths, their review and analysis to inform action at all health service levels (community, hospital, policy), to improve the quality of health care as well as strengthen other systems such as vital records. As the MDG era closes in 2015, and is replaced by the Sustainable Development Goals (SDGs), these guidelines seek to standardize MM surveillance and accountability systems in the Region of the Americas and strengthen maternal health efforts to effectively respond to the evidence.

GTR Executive Committee

c. GTR was created in 1998 to enables UN, bilateral and multilateral agencies; professional networks; and civil-society to work together to promote programmes and policies aimed at reaching the MDG5 targets and contribute to achieving MDG4.

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These maternal mortality guidelines were based on the recommendations of the Maternal Death Surveillance and Response – Technical Guidance Information for action to prevent maternal death (WHO, 2013) and five maternal mortality surveillance case studies commissioned by the GTR (GTR, 2012) and are an updated version of the Maternal Mortality Epidemiological Surveillance Guidelines (PAHO/WHO, 1996).

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Executive Summary

Maternal mortality (MM) is a sensitive barometer of inequality and inequity. It is not merely due to particular pathologies but has strong association with women's social determinants of health. In 2015, of 303,000 women worldwide who died from maternity-related causes, 7,300 died in Latin America and the Caribbean (LAC). While the 2015 MMR of 68/100,000 LB in LAC represents a 49% reduction from 1990 (140 per 100,000 LB) (OPS/WHO, 2015), it is far below the MDG5 target of a 75% reduction. Despite advances, these gains have been heterogeneous, with thirteen countries reporting MMRs above the regional average, while twelve were able to achieve rates of decline above 50%.

In response to efforts to improve the effectiveness of maternal health interventions to reduce maternal death, in 2013, WHO launched new guidelines to more sharply focus the surveillance process on action on the findings, by incorporating the **R** for **R**esponse into the maternal death surveillance framework. A more comprehensive Maternal Death Surveillance and Response (MDSR) system has been designed to identify and analyze maternal deaths and develop appropriate responses which should contribute to preventing future similar maternal deaths. This approach should improve the measurement of maternal mortality as well. The *Regional Task Force for Maternal Mortality Reduction* has incorporated the WHO guidelines into a revision of their 1996 *Guidelines for Maternal Mortality Epidemiological Surveillance* (PAHO). The result is the 2015 *Guidelines for Maternal Death Surveillance and Response (MDSR) in the Americas*. It adapts the WHO guidelines by including as examples the MM surveillance experience of five of the region's countries namely Brazil, Colombia, El Salvador, Jamaica and Mexico.

MSDR has two basic functions: (1) to provide information about the avoidable factors that contribute to MM and steer action to prevent similar deaths from occurring; and (2) to enable the accurate evaluation of the extent of MM to guide decision makers to focus on the problem as it deserves. Among the **new messages** in these Guidelines are that a maternal death must be seen as a mandatory reporting event. The review of every case must go beyond mere description to identify health system service gaps and propose appropriate interventions to correct them. Recommendations must be specific and target all levels in the system (micro, mid, and macro), and ensure that the identified actions

are carried out. To ensure that this happens, MDSR must be monitored and evaluated at all venues: local, sub-national and national.

Chapter 2 describes the **six MDSR stages**: (1) routine, continuous identification of maternal deaths and notification; (2) data collection and case review; (3) analysis and interpretation of the information on each case; (4) response and corresponding action; (5) monitoring and evaluation; and (6) dissemination and reporting to a wide audience, including women; civil society; the health team at the service, administrative, policy and planning levels and related social and NGO sectors.

Chapter 3 describes strategies for the **identification** and **notification** of **suspected maternal deaths** and distinguishes between the case definition of maternal death and the need for an **operational definition** to facilitate surveillance activities. In order to ensure that all cases are identified as soon as they occur, surveillance teams must actively look for cases and strategies to integrate MDSR into other routine surveillance are discussed. Case notifications should flow from the community or facility to the municipal or provincial/ parish/regional level to the national level. Reporting must be systematic and is most efficient if it coincides with the reporting of other notifiable diseases. The process should include "**zero reporting**" to indicate that no maternal deaths have occurred.

The development of case investigation tools is discussed in Chapter 4. These can be either paper-based or electronic but should be easy to use, culturally acceptable and provide the necessary information to classify the death, document the cause(s), identify avoidable factors and generate recommendations to prevent future similar deaths. Once collected, the data should be relatively easy to analyze. Data quality should be routinely monitored to ensure that they are valid and reliable. The **data collection tools** should make their completion straightforward by the most appropriate member of the health team. If divided into sections for different care providers, this will reduce the amount of missing data. Sections may include records of: (1) outpatient/emergency services; (2) primary care/antenatal care; (3) hospital/referral services including inpatient care; (4) post mortem findings; and (5) verbal autopsy/family interview with key informants – spouse, partner, family and friends. A sixth, Summary Report Form, should be completed on conclusion of the case review process.

The **case review process** (Chapter 5) should proceed on the basis of three principles: (1) each case review must be linked to a response; (2) it must include recommendations to prevent future deaths; and (3) the recommendations must be specific and linked to avoidable factors. Committees established explicitly for this purpose may vary in composition depending on the available resources. What is essential is that they aim for multi-disciplinary representation of investigative officers, care providers, management staff and community members. This mix is essential to ensure that everyone is committed to and owns the process from generating high quality data to actively participating in changing practice. The case review process must be confidential and should aim to

improve the quality of care without assigning blame to the individuals that took part in it. Potential areas for intervention include recommendations to address:

- Gaps in or revising/updating available clinical guidelines
- Knowledge or skills of service providers
- Capacity of the service level to comply with the guidelines due to resource constraints (human, material, supplies and equipment).

On conclusion of the review(s), the committee should recommend how to address the avoidable factors to prevent future deaths. While some may be immediately obvious and require urgent intervention at the local level, others may only emerge as data are compiled at the intermediate or national level. The **Case Summary Report** should summarize the conclusions on the case and outline related recommendations. Prior to transmission to the next level, it should be **de-identified**, so that neither the patient nor care provider details can be discerned. The Case Summary Report should be transmitted to the next level for data aggregation.

An **Action Sheet** may be generated from each review which summarizes the salient features and recommendations for each case or group of similar cases, and identify the person responsible for addressing each recommendation, along with a response time line. Actions Sheets should be reviewed at subsequent meetings as part of the routine MDSR monitoring.

Undertaking a good analysis of the data requires a clear framework for the transmission, consolidation, processing and storage of data inputs. Chapter 6 covers the analysis plan, evaluating data quality and completeness and approaches to aggregating data at various levels of the health system. The MDSR **data analyst** must understand the surveillance process (sources, tools, data quality, and validation) and the precision of the indicators to be measured. They should be up-to-date on changes in the timing, case definition and data collection methods and understand the limitations of the data (coverage, quality, timeliness). They will need access to external data, including total number of births; total number of women of childbearing age; population size and geographic location of existing health services to be able to calculate the selected surveillance indicators.

Aggregated analyses should be carried out on maternal deaths in **hospital**s or **jurisdictions with more than 2000 births** each year. While only a few deaths may occur in some areas, information on even one or two cases is important. The aggregated analysis should identify the leading causes of death, the sub-groups at highest risk and the contributing factors to guide the prioritization of interventions. Hospital-level analyses will have different functions and responses/actions than at the district or national level. All hospitals should know how many deaths occur each year and the causes of death. Indicators should include maternal and perinatal mortality rates and for larger facilities, cause specific case fatality rates.

Sub-national (district, municipal, state or regional) **analyses** are intended to identify any changes in the evolution and trends of MM, and identify geographical variations which may get lost when national data are merged. As data are aggregated for larger geographic areas, patterns emerge which may not be evident when individual or small numbers of cases are examined. Inherent system gaps become clearer which inform the national response.

National aggregated analyses in addition, should explore emerging data which may not be evident due to smaller numbers at the local level. The process should prioritize, for intervention, those health system problems that are needed to improve the response and highlight areas for policy interventions. Specific questions may arise from the analysis that informs more complex or customized analytic approaches. **Monitoring data input and output quality** should be done and routinely fed back to health teams. If real numbers of maternal deaths differ from expected numbers, the reasons why need to be understood.

The primary objective of MDSR is to provide recommendations for action. Chapter 7 shares approaches to prioritizing actions and managing the **response**. Recommendations cannot be turned into actions without the support of all interested parties, from local community leaders to hospital directors to national authorities. For changes to be sustainable, it is essential to have national-level buy-in. **Response actions** must be culturally appropriate and tailored to the problems (knowledge, practice, resources, communication) identified in the community, the health system, and at the inter-sectoral level. National actions may include improving resource inflows to the more affected areas and populations, as well as amending or updating policies, laws or standards. Community actions may include health promotion programmes; modifying service delivery to improve access and where necessary, improve the attitude and communication skills of health professionals. Infrastructure improvements may be needed to highways, bridges, and communications. Communities may be invited to develop acceptable and workable solutions, such as to address the transportation challenges many pregnant women face. These last actions related to the social determinants of health, may require inter-sectoral planning and broad governmental support.

In **setting priorities** one should consider the **prevalence** of the problem. How often a problem occurs and solving common recurrent problems may have a greater impact than episodic occurrences. **Feasibility** examines whether the solution is achievable technologically and financially; is there enough trained human resources or persons who can be trained to implement it and is the cost reasonable? Finally, **impact** asks what will be the intervention's effect, if successful? Of importance is how many women would benefit and how many lives would it save?

Response times may range from urgent or short term to medium or longer term depending on resource requirements. The more immediate actions would be of relatively low economic or administrative cost. Actions must be evidence-based and shown to improve health care processes and results, once adequately implemented. While not all

problems may have evidence-based solutions, finding acceptable, innovative and effective solutions are more likely when the community participates and offers ideas. Novel strategies should be pilot tested, evaluated, and if effective, rolled out on a phased basis.

It is critical to identify a **response coordinator** at each level (e.g., hospital, district, national) who will ensure that recommended measures are undertaken. This may not be a single person, however, depending on the problem. Their task is to develop a response plan which identifies the roles and responsibilities of persons who are best suited to address the problem and ensure that they get done. Because responses may change over time, it is important to allow for flexibility in the planning process.

Advocacy is a process where a person or group seek to influence behaviour, policies and decisions about resource allocation within political, economic or social systems and institutions. Effective advocacy requires rigorous investigation, careful planning and clear practical goals. Creative advocacy tools include media campaigns, community story-telling and school competitions to engage adolescents.

Monitoring and Evaluation (M&E) is discussed in Chapter 8. The M&E framework for MDSR should be envisaged from the outset with in-built indicators. It will also feed into keeping the system accountable to ultimately reduce maternal deaths. An effective M&E process ensures that recommendations are converted into implemented actions which are monitored and regulated to achieve concrete results and that these processes improve with time. The M&E must be mandatory and carried out at the highest possible level. National-level recommendations must be directly supervised by the Minister of Health, with precise deadlines established and a specific person assigned to the task. While MDSR monitoring is mainly conducted at the national level, some indicators are relevant at sub-national levels (Table 8.1). A more detailed quantitative and qualitative periodic evaluation should also be done, especially if indicators show that one or more steps in the surveillance process is not reaching expected objectives, or if MM is not decreasing. Given that the MDSR's main objective is to reduce MM, the system is failing if maternal deaths are not decreasing.

The **timeliness and completeness** of reporting of cases and adherence to the zero reporting policy should be routinely monitored. **Effectiveness** measures whether recommendations for action have been applied, if expected results have been attained and, if not, where problems lie. If evidence-based interventions fail to result in improvements, more in depth studies may be needed. **Periodic evaluations** are intended to examine how efficient the system is and should assess the key processes of: (1) identification and notification; (2) review; (3) analysis; (4) report submission and (5) response. If there are any obstacles to functioning along this pathway, these must be corrected.

The MDSR cycle ends with, at minimum, an **annual report** (Chapter 9) that provides detailed and accurate information. Computer programmes may be used to produce standardized analyses, tables, figures, and maps, which may improve the use of the information. The report should clearly identify the extent of the problem, its geographic distribution, cause of death, high-risk groups, and contributing factors, with indicators

of the effectiveness of the response in improving outcome. If incidence is relatively low, data may be analyzed over longer time frames. Comprehensive reports may be compiled every three years to provide sufficient cases to generate stable estimates and enable more detailed sub-group analyses.

When standard reports are produced, versions should be created for specific target audiences, from the community to the health team (health service planners, professionals, public health personnel) to policy makers and advocates. MDSR findings should be included in national annual health sector reports and budget presentations and can provide data for monitoring progress on reducing MM and reporting to international bodies, such as the WHO, UNFPA and UNICEF. Findings should be disseminated widely to institutional, local (district or municipal), and national political decision-makers, educators, and groups that promote the rights of women. The quicker a report is issued after the closing of the reference period, the more immediate will be its impact in local practice. Short summaries should be provided for busy policy makers and advocates. Professionals may be targeted through professional conferences and academic journals. The community may be reached at community meetings and via the media (e.g. press releases, radio, television, print, billboards). Health authorities may share findings on their websites or in other government publications.

The final chapter discusses approaches to integrating the new guidelines into existing surveillance strategies. This may begin with a situational analysis or in-depth evaluation, guided by these or other global best practice strategies with a view to developing a plan of action to address gaps identified by the process. In settings where incident maternal deaths are low either due to progress or small numbers of births, alternate strategies for monitoring the quality of maternal and new-born care are discussed (e.g. maternal morbidity surveillance, perinatal or neonatal mortality surveillance).

Acronyms[d]

ANC	Antenatal Care
COD	Cause of Death
COIA	United Nations Commission on Information and Accountability for Women's and Children's Health
CR/VS	Civil Registration/Vital Statistics System
GTR	Spanish acronym for the Regional Working Group for the Reduction of Maternal Mortality (Grupo de Trabajo Regional para la reducción de la mortalidad materna)
HDU/ICU	High Dependency Unit/Intensive Care Unit
HIS	Health Information System
ICD-MM	International Classification of Diseases (10)-Maternal Mortality
IDSR	Integrated Disease Surveillance and Response
IHME	Institute for Health Metrics and Evaluation (University of Washington, Seattle, USA)
LAC	Latin America and the Caribbean
LB	Live birth(s)
LMIC	Low and Middle Income Countries
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
MDR	Maternal Death Review
MDSR	Maternal Death Surveillance and Response
MM	Maternal Mortality
MMEIG	UN Maternal Mortality Estimation Inter-agency Group
MMES	Maternal Mortality Epidemiological Surveillance
MMR	Maternal Mortality Ratio

d. Acronyms were obtained from http://dd.dgacm.org/editorialmanual/ed-guidelines/style/abbreviations.htm#Principal

NGO	Non-governmental Organization(s)
NND	Neonatal Death
PAHO	Pan American Health Organization
PIS	Perinatal Information System
RAMOS	Reproductive Age Mortality Survey
RWG	Regional Working Group for the Reduction of Maternal Mortality
SB	Stillbirth(s)
SDG	Sustainable Development Goals
SMM	Severe Maternal Morbidity
SMR	Severe maternal results (maternal deaths + SMM cases)
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organization
WRA	Women of reproductive age (women aged 15–44, 15–49 or 10–49 years)

CHAPTER 1

Situational Analysis and Overview of the Guidelines

1.1 Maternal health in the Americas

Maternal mortality (MM) is a key indicator of social development for both developed and developing nations. It is a sensitive barometer of inequality and inequity between and within countries. High rates of occurrence jeopardize human rights and social justice, and damage the economic and social integrity of families and society. Maternal health must be approached broadly, not merely as the absence or presence of particular pathologies; but must address women's social determinants of health; with special attention to women as the targets of multiple forms of discrimination which contribute to MM and morbidity.[1]

Women's health, particularly those related to abortion, pregnancy, childbirth, and the puerperium have been addressed at various international fora beginning with the 1987 Safe Motherhood Conference (Nairobi, Kenya); the International Conference on Population and Development (Cairo, Egypt, 1994); the Fourth World Conference on Women (Beijing, China, 1995) and the Millennium Summit (New York, USA, 2000). The Millennium Declaration adopted the Fifth Millennium Development Goal – to Improve Maternal Health – with countries committing to avoid these unnecessary deaths.

By 2015 an estimated 303,000 women worldwide died from maternity-related causes, 7 300 in Latin America and the Caribbean (LAC).[2] The 2015 MMR of 68/100 000 LB in LAC represents a 49% reduction from 1990 (140 per 100,000 LB) (PAHO/WHO, 2015), far below the MDG5 target of a 75% reduction in MMR between 1990 and 2015. Despite advances, these gains have been heterogeneous. Thirteen countries have MMRs above the regional average Bahamas, Bolivia, Dominican Republic, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Suriname and Venezuela. While no country will meet the MDG target, twelve countries have rates of decline above 50%, namely Barbados, Bolivia, Brazil, Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Peru and Urguay (52–73%) with eight others between

40–49% (Annex 1, Table 2). Some settings have recorded variable increases in their MMRs, however, it is difficult to determine whether these are real increases or the result of improved surveillance (WHO, 2015).

Many efforts have contributed to the progress toward attaining MDG 5 (see Annex 2).[3] In 2011, the UN created the Commission on Information and Accountability for Women's and Children's Health (COIA) to develop an accountability framework to document the effectiveness of maternal and child health interventions. In applying COIA recommendations, WHO guided the establishment of MDSR systems and improvements to vital statistics registries in each country.[3,4] In 2012, the UN Economic and Social Council's Commission on the Status of Women focused on a more ambitious target, *The Elimination of Avoidable Maternal Mortality and Morbidity*.[4] This was envisioned as achievable through universal access to (1) contraceptive methods; (2) skilled attendance at birth; and (3) basic and comprehensive obstetric care services. MDSR represents an essential strategic element in the elimination of avoidable maternal mortality and morbidity as it provides information to guide corrective actions and enables the monitoring and response to the number of maternal deaths in real time.

Box 1.1: Maternal Mortality in Latin American & the Caribbean (LAC)

- Around 7,300 maternal deaths were recorded in 2015, a MMR of 68 per 100,000 live births.
- No country in the Region will reach the MDG 5 target of a 75% reduction in MM.
- The most frequent causes of maternal death are: gestational hypertension (26%), hemorrhage (21%), abortion (13%), obstructed labour (12%), sepsis (8%), and other direct causes (15%).
- MMR due to unsafe abortion is three times higher in LAC than in developed regions (10 per 100,000 LB compared to 3, respectively).
- Indirect causes account for at least 1 in 5 maternal deaths.
- Risk factors:
  - Violence against women
  - Unplanned pregnancies /restricted access to contraceptive methods
  - Poverty, rural residence
  - Belonging to an indigenous group or being of Afro-descent.
- Health care issues:
  - Inequitable access to care
  - Inadequacies in coverage and continuity of care
  - Limitations in the availability of inputs
  - Poor quality care.
- There are an estimated 20 cases of maternal morbidity for each registered maternal death.

When the 31 LAC countries are classified by their 2013 estimated MMR, into high MMR (≥ 200/100,000 LB), medium (100–199), low (50–99) and very low (<50), three, seven, 11 and 10 countries respectively fall in those categories. Countries with very low rates tend to have low fertility rates, good access to contraceptives, and relatively liberal policies regarding access to abortion. Their antenatal and skilled birth coverage rates are high and the C-section rates (with one exception) are not excessive. At the high to medium end of the scale, fertility rates are much higher, contraceptive use lower, adolescent birth rates high, with less antenatal and skilled birth care coverage (Annex 1, Table 3).

When all 33 countries in the Americas, including USA and Canada, are classified by their stage in the obstetric transition,[5] none was at Stage 1 in 1990. While two began in Stage 2, one remains. Most countries have improved within Stage 3, while the Stage 4 group now includes 14 countries, up from 8 in 1990 (Table 1.1). These stages will be important in determining what countries need to do to continue to improve toward Stage 4 for all.

Table 1.1: The Obstetric Transition in the Americas: 1990, 2000, 2015

Transition Stage	1990	2000	2015
Stage 1: MMR >1000	0	0	0
Stage 2: MMR 300–999	2	2	1
Stage 3: MMR 50–299	23	22	18
Stage 4: MMR <50	8	10	14

Source: Annex 1, Table 2

About 95% of MM in LAC could be prevented with knowledge countries already have. The most frequent causes of maternal deaths are gestational hypertension (26%), haemorrhage (21%), abortion (13%), obstructed labour (12%), sepsis (8%), and other direct causes (15%). Violence against women is an important risk factor for maternal death. WHO has shown that 15% to 71% of women are victims of physical and sexual violence perpetrated by their partners; which for pregnant women fluctuates between 4% and 32%.[6] The extent of this problem however is poorly documented, as violent deaths during pregnancy and the puerperium are not counted as maternal deaths. Evidence from low maternal mortality settings often report homicide as the leading cause of pregnancy related death.[7] Maternal suicide (a direct maternal death) and homicide are however sometimes misclassified.[8]

Many maternal deaths result from unwanted pregnancies and curtailed access to contraceptive methods. Unmet need for contraceptive methods fluctuates between 20% and 40% for the overall population but is higher for adolescents. Many countries have legislative frameworks that limit access to contraceptive methods; for example, the ban on emergency hormonal contraception.

Restrictive legislation regarding abortion in many LAC countries (Annex 1, Table 3), has been ineffective in persuading women not to terminate unplanned pregnancies. These restrictions expose women to unsafe conditions prior to, during, and after an abortion, given the clandestine nature of the practice.[9] The rate of unsafe abortion in LAC is 31/1,000 women 15–44 years old, contrasting with 22/1,000 women of reproductive age (WRA) in the rest of the world. The MMR due to unsafe abortion is three times greater in LAC than in developed regions (10/100,000 LB, compared to 3, respectively).

1.2 Maternal death surveillance: Lessons learned from the LAC and global experience

Measuring MM is a complex task. Where systems exist they may need qualitative improvement in the process of certification, registration and coding of maternal deaths. Other countries may lack reliable mechanisms to identify, register, and account for maternal death. As a result, national statistics can yield significantly different estimates of the number of maternal deaths. For example, in Jamaica in 2008, of 50 known maternal deaths, 10 were not registered, four were certified without accounting for the pregnancy, and 24 were miscoded; resulting in only 12 being coded as maternal deaths in the vital register.[10] In LAC, official figures from national ministries of health yielded 5,670 maternal deaths for the region for 2008, substantially less than the 9,075 maternal deaths estimated by the MMEIG or 7,864 deaths estimated by the IHME for that year. MMEIG,[2] IHME[11], and others have designed models to estimate the MMR for many countries. These estimates are limited by the availability of information and the uniform application of assumptions across many countries which vary in reality, yielding estimates with considerable uncertainty. In addition, national MMR statistics average out significant differences for sub-regions and vulnerable groups, like adolescents and the poor; masking dramatic inequities. In order to advance toward reducing MM, programmes must address the needs of such groups.

Many countries have tried to monitor maternal mortality since 1990, but found routinely available data unreliable (Box 1.2). Having tried a range of strategies including actively checking death certificates (Colombia), biases in the registration of maternal deaths (Brazil, Colombia, Jamaica), especially non-institutional deaths (El Salvador), and those from specific high risk communities (Brazil, Peru) were unearthed. Voluntary reporting and review of deaths was dependent on interested champions whose absence led to data gaps. Jamaica sought a consistent data collection resource and focused on infectious disease surveillance officers who routinely monitored institutions for Class I

Box 1.2: Factors that Led to Maternal Mortality Surveillance in Five LAC Countries

Brazil:

- Inequities between the Northeast and the Southern regions
- Availability of studies on the under-registration of maternal deaths
- Programmes to increase antenatal care coverage and opportunities to initiate antenatal care visits

Colombia:

- Studies of under-registration of MM showed lack of a death certificate, and non-reporting of maternal deaths, especially in rural areas and among displaced populations
- Decline in under-registration after the 1998 inclusion of variables to identify maternal deaths on the death certificate

El Salvador:

- Compulsory reporting of maternal deaths in 2000
- Updating of technical guidelines for the surveillance of maternal and perinatal deaths
- Baseline study of MM identified non-institutional maternal deaths, poor classification of causes, under-reporting of MM, and the contribution of social determinants to poor maternal outcome

Jamaica:

- Alert regarding the reliability of vital MM data and research into the medical and social causes of MM
- Inability to implement voluntary reporting of maternal deaths led to the 1998 introduction of compulsory notification of MM, with active case finding by disease surveillance officers

Mexico:

- Studies of the under-registration of maternal deaths through confidential surveys and verbal autopsies
- Maternal deaths considered as an immediately notifiable event since 2004
- Establishment of professional rapid-action groups (supervision visits and improvement measures)

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico[12]

notifiable events. This led to a decision to add surveillance for maternal deaths to their portfolio beginning in 1998. This strategy has evolved into a global approach to monitoring maternal deaths in many countries and is incorporated in the WHO MDSR guidelines.[13]

Global response and regional action

Building on these early efforts, regional and international technical teams have developed and improved the tools to monitor the effectiveness of strategies to reduce maternal mortality. The realization that MDG5 is unlikely to be achieved by 2015 has focused international efforts on not only the accurate counting of maternal deaths, but improving the analysis and effective response to these findings to more sharply focus global efforts on how to truly save the lives of countless mothers and their children.

In 2013 a team, under the leadership of the WHO, added their voice to this new thrust by compiling a Technical Guidance entitled *Maternal Deaths Surveillance and Response (MDSR): Information for Action to Prevent Maternal Death.*[13] This response to the UN Commission on Information and Accountability for Women's and Children's Health (COIA) request for better information to guide action, led to the integration into the maternal death surveillance process of the response component, along with an accountability framework for ensuring effective action.

Given the region of the America's previous experience and actions in this arena, and earlier plans to update the 1996 *Guidelines for Maternal Mortality Epidemiological Surveillance*,[14] this was seen as an opportune time to integrate the global technical guidance into an updated regional tool. The revised tool recognizes our achievements in improving maternal health outcomes, while acknowledging the unique and emerging challenges faced by regional health providers. These included the relative increase in indirect maternal deaths which parallel the impact of non-communicable diseases and obesity in the general population. Challenges such as over-medicalization of care, as evidenced by C-section rates in excess of 40% in some settings, must also be addressed, even as other women still face restricted access to basic skilled care at birth or family planning methods to prevent unwanted pregnancy.

1.3 Purpose and objectives of the updated MDSR guidelines

Justification for new guidelines

One difficulty in reliably measuring the extent of MM, is that no national vital statistic system accurately measures MM. Alternative methods, such as censuses (recent deaths in the family) or household surveys (survival of siblings), rely on retrospective data, which may be imprecise due to the retrospective nature of the findings. Another drawback is that these data are often not available at the sub-national level to guide local responses or allocation of resources.

The primary purpose of the surveillance process is ACTION – not merely tallying cases. The basic surveillance cycle is designed to identify cases, collect and analyze information and formulate recommendations. Once applied in practice, the process must be evaluated to determine the results. A MDSR system (Box 1.3) is designed to identify,

Box 1.3: MDSR Definition

The MSDR system is a continuous action cycle designed to provide, in real time, information on the incidence of maternal deaths, the causes of death, and their contributing factors, with a focus on using the findings to plan appropriate and effective preventive actions.

Source: MDSR Technical Guidance: Information for Action to Prevent Maternal Death. WHO 2013[13]

notify and analyze maternal deaths and select appropriate responses tailored to the characteristics of the findings. The measures developed and applied should contribute to the prevention of future maternal deaths and also improve the measurement of MM.

MDSR: Definition and essential aspects

Traditionally, Maternal Mortality Epidemiological Surveillance (MMES) was defined as the health information system component aimed at the identification, notification, determination and quantification of the causes of maternal deaths and the probability of their prevention in geographic areas and periods, to help develop measures to prevent maternal deaths.[14] Two essential MMES functions (Box 1.4) are to:

a. Precisely evaluate the extent of MM
b. Investigate the causes of MM, to determine which necessary actions are needed at each level (community, inter-sectoral and health service) to avoid these deaths.

The new epidemiological surveillance and response approach to mortality (MDSR) incorporates and emphasizes the response/action component of classic epidemiological surveillance.[13] The "R" emphasizes response as part of the surveillance action. This

Box 1.4: MDSR has Two Basic Functions

1. To provide information about the avoidable factors that contribute to MM and to steer actions at community, formal health system, and inter-sectorial (that is, among other governmental and social sectors) levels to prevent similar deaths in the future.

2. To enable the accurate evaluation of the extent of MM to guide decision makers to focus on the problem as it deserves. It should also improve the capacity to evaluate the efficacy of interventions for reducing MM.

Source: MDSR Technical Guidance: Information for Action to Prevent Maternal Death. WHO 2013[13]

response includes accountability by providing feedback to partners who are part of the MDSR system. The process should include qualitative, in-depth, local-level analysis to guide the following actions:

- Accurate notification
- Identification of causes and/or preventable factors
- Determine actions to be implemented arising from recommendations of the review process
- Accountability to ensure that the response provides corrective action.

Aims and objectives of the MDSR guidelines

The revised guidelines represent the intent of the region and the global community to improve the effectiveness of maternal death surveillance to prevent avoidable maternal deaths (Box 1.5).

Box 1.5: What Motivated Countries to Modify their Maternal Death Surveillance Systems?

- Uncovering under-registration and poor classification of maternal deaths
- Coverage deficiencies in the analysis of MM
- Difficulties in going beyond a clinical analysis of cases to analyze MM determinants
- Weak commitment to advance proposed actions and recommendations
- Meager results in reducing maternal deaths despite efforts
- Persistence of inequities that affect particular social groups
- Availability of new information technologies
- Support from intergovernmental agencies
- Commitments undertaken regarding MDGs.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Aims

- To contribute to the reduction of MM by standardizing the gathering of information to guide public health actions and to monitor the impact of these actions to eliminate avoidable maternal deaths, regardless of where they occur.
- To enable member states to count every maternal death, accurately assess the true incidence of maternal mortality and evaluate the impact of actions taken to prevent these deaths.

Specific objectives

1. To collect precise data on all maternal deaths including:
   a. Quantity: identify and report every maternal death
   b. Medical causes of death and contributing factors: review all maternal deaths through a range of mechanisms including audits of institutional deaths, root-cause analyses, and verbal autopsies.

2. To analyze and interpret collected data, including:
   a. MM trends
   b. Causes of death (medical) and contributing factors (quality of care, barriers to access, socio-cultural factors)
   c. Avoidability of deaths, focusing on factors that can be improved among women, their community circumstances and the health delivery process
   d. Risk factors, identify groups with a disproportionate burden of risk and map geographical variations to target under-served communities
   e. Demographic, social and political contexts.

3. Utilize the data to develop evidence-based interventions designed to reduce MM. Recommendations may include:
   a. Health promotion and community education for action
   b. Timeliness of referrals
   c. Access and effective utilization of the health services
   d. Quality of care (e.g. clinical protocols, response to emerging disease affecting mothers)
   e. Training needs for health personnel, development and use of protocols
   f. Allocating resources, including personnel, new technology, where the possibility of impact is greatest
   g. Policies and regulations.

4. Disseminate findings and recommendations to civil society, health personnel and political decision makers to raise awareness and the level of alert about MMs extent, social effects and prevention actions.
5. Guarantee actions by monitoring the implementation of recommendations and evaluate the effectiveness of interventions.
6. Encourage research aimed at better understanding of the determinants and risk factors for maternal morbidity and mortality and develop efficacious interventions to prevent the adverse outcomes of pregnancy.
7. Promote accountability for proposed interventions designed to reduce avoidable maternal deaths and their results.

CHAPTER 2 Maternal Death Surveillance and Response (MDSR): An Overview

2.0 Introduction

A broad overview of the Maternal Death Surveillance and Response framework is presented outlining its key principles and describing the environmental conditions which will facilitate its introduction and integration into routine practice. The structure of the remainder of the document is summarized.

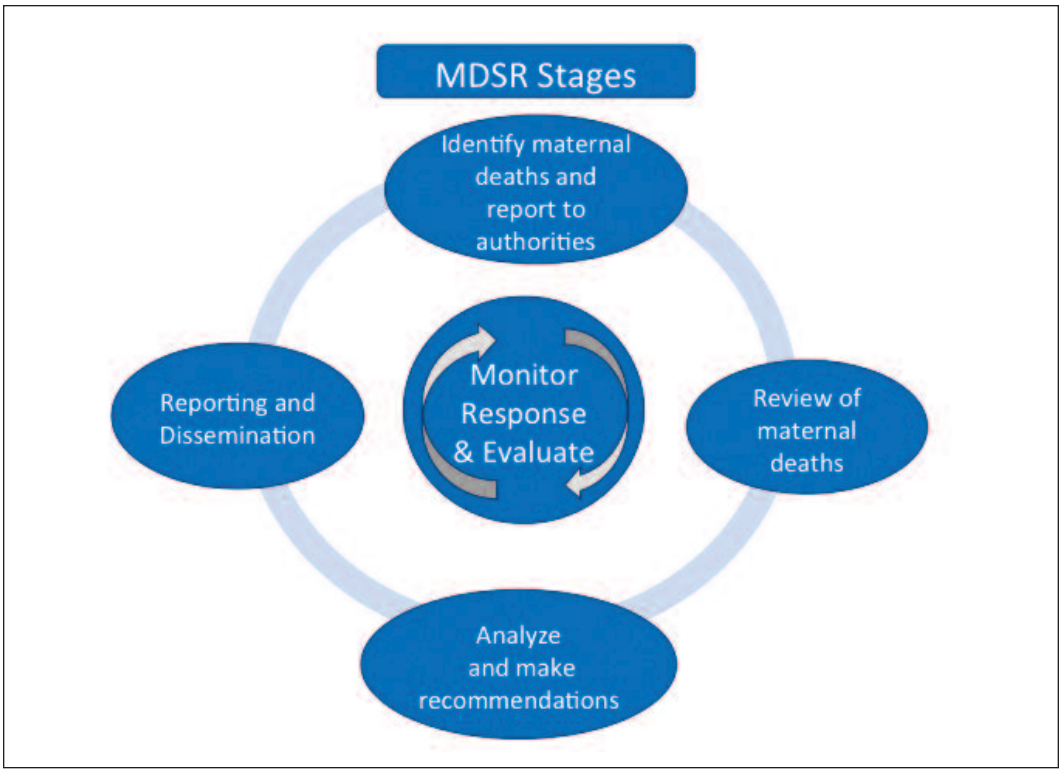
2.1 The MDSR stages

The MDSR system is a continuous cycle (Figure 2.1) intended to provide real time, actionable information on maternal mortality to guide improvement and delivery of services to pregnant and post-partum women based on identified needs. The intention is to identify each and every maternal death, notify an investigative team to review the circumstances of each death, and to inform an effective response. The review determines the medical, social and service related causes and contributory factors associated with the death. These findings should inform actions to address health system or social failures which may contribute to these and similar deaths. By sharing findings widely these interventions garner civil support. A monitoring and evaluation process ensures follow through on the recommendations.

The MDSR stages include:

1. **Routine and continuous identification** of maternal deaths and **notification**. Suspected maternal deaths occurring in facilities (maternity as well as other wards such as female medicine, female surgery, accident and emergency, HDU/ICU) and in communities, are identified and immediately notified (within 24–48 hours) to the appropriate authorities for a full investigation.
2. **Data collection** and **review** at the local level ("Maternal Death Review"). Each suspected death should be screened to ensure it meets the locally agreed case definition

Figure 2.1: Maternal Death Surveillance and Response (MDSR): Continuous action cycle



Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO 2013[13]

of a maternal death. For cases meeting the definition, data need to be assembled on the medical and non-medical contributing factors and reviewed. The process should include an assessment of avoidable factors. Data collection strategies include clinical case summaries, verbal and physical autopsies.

3. Local **analysis and interpretation** of the assembled information for each case should occur at either facility or district level. The review team should agree on the medical and non-medical causes and contributing factors and develop recommendations for preventing future deaths. Findings are then reported to the national or next level. Results should include prioritized recommendations for local action based on individual case findings, and regional/provincial or national action based on the aggregated data.
4. **Response** and corresponding **action**. The recommendations made by local and national review teams should be implemented. Depending on the nature of the recommendation, the response may be immediate or require a longer period of development in collaboration with key stakeholders. Actions can address problems at the community, facility and multi-sectoral level.

5. **Dissemination and reporting**. Findings should be appropriately formatted for use by and shared widely with women of reproductive age (WRA); advocates in civil society; health team members at the service, administrative, policy and planning levels and related social and NGO sectors.

6. **Monitoring and evaluation**. The process must be monitored to ensure that recommended actions are implemented. Periodic evaluations should assess strategic processes and outcomes to ensure that interventions are effective in reducing maternal morbidity and mortality.

2.2 Situational analysis – The enabling environment

For MDSR to be most effective, it needs to occur within a health system where there is buy-in at all levels (Box 2.1). It should build on existing health information systems, disease surveillance networks and feed into strategic planning and policy development processes, including budgetary activities. Prior to initiating specific surveillance activities, MDSR suggests conducting a situational analysis to inform planning, identify support mechanisms, obstacles to the successful implementation and areas for MDSR strengthening. This situational analysis will also guide the development of a monitoring and evaluation plan for the system. This exercise could become part of a strategy to engage various actors to invest in the system's development and motivate them to continue to participate in, and own the system.

The situational analysis may include, but should not be limited to:

- **Contexts outside health:** The legislative and regulatory framework; policies and programmes; demographic, socioeconomic and geographic situations.
- **Health information:** Indicators of care for pregnant women (antenatal, delivery, postnatal); maternal morbidity and mortality measures and activities pertaining to review of maternal deaths.
- **Available resources**, logistics and technology.
- **Maternal health priorities** within the country and sub-regions and MDSR plans already under way.

For a successful MDSR, special effort should be directed to exploring the following components:

- **Policy framework**: Examine the legal framework within which MDSR will operate; establish standards and cycles for conducting MDSR; include all relevant stakeholders within the public and private sectors, including NGOs providing care to women and communities; engage professional associations in data collection, dissemination and intervention activities; and identify champions who can help promote safe motherhood activities.

Box 2.1: Key Principles of MDSR (WHO, 2013)

1. **Action** is what makes the difference. The response to each identified problem is what will make it possible to avoid future maternal deaths.
2. **Intensive and inclusive planning** is needed to establish a code of conduct and regulatory environment for MDSR, and to establish standards for the review of maternal deaths. Include the community, private sector and professional associations to build natural support and advocacy for change.
3. **Sustained collective learning** that leads to action at every level promotes shared responsibility and team work and fosters learning that leads to action in the community and from health care providers.
4. **Avoid blame** by creating an environment where action is centered on preventing maternal deaths by collaboratively improving the system without attaching fault. By assigning responsibility to resolve problems, one will build trust and support for MDSR.
5. **Optimizing opportunities** to obtain broad benefits. In order to foster a culture of quality and accountability, actions should include improving multiple facets of the health information system (e.g. record keeping, morbidity measurement, vital registers). As confidence in the data grows, staff should be trained to routinely use this information to make better health care management decisions.
6. **Public domain information**. The community should have full access to the report containing the recommendations (all names of persons and institutions must remain confidential).

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO 2013[13]

- **Inclusive action at all levels:** Promote teamwork and shared responsibility for improving outcome at all levels of the health system; include MDSR principles and guidance in basic and continuing training curricula for professional and administrative personnel, including HIS staff; and encourage learning for action at all levels of the health system and within communities.
- **Take advantage of opportunities for development:** The lessons learnt from MDSR are applicable to other health outcomes and stakeholder groups, and can be used to encourage colleagues and communities to take an interest in the quality of care, surveillance, monitoring outcomes, adequate record keeping and data reporting; and strengthening health information systems, including vital registration, pregnancy surveillance and outcome reporting.

2.3 Structure of the remainder of the technical guidelines

The remaining chapters will describe the six steps in the MDSR cycle, detailing each stage of the process, namely the identification and notification of maternal deaths (Chapter 3); development of data collection tools and collecting the necessary information (Chapter 4); the case review process (Chapter 5); and then the data analysis and interpretation (Chapter 6).

The next section examines what one is expected to do with the information, from the response to individual and aggregated data (Chapter 7); to disseminating the finding and recommendations (Chapter 8); and how to monitor and evaluate the system to ensure its accountability (Chapter 9). Country experiences within the Region which are transforming their maternal death surveillance systems are used to illustrate MDSR in action.

As the region of the Americas has made great stride in reducing maternal mortality while wishing to maintain focus on continuous quality improvement in maternal health, the final Chapter (Chapter 10) discusses some next steps to move from preventing not only maternal death to improving maternal and perinatal health.

Box 2.2: What are the New Messages in these Guidelines?

1. MM must be a mandatory reporting event.
2. All maternal deaths (direct and indirect) must be identified and distinguished from late maternal deaths and coincidental pregnancy-related deaths.
3. MM case review must go beyond mere description to an exhaustive analysis that identifies service gaps in the health system and proposes appropriate interventions to correct them.
4. Recommendations must be specific and target all levels in the system (micro, mid and macro).
5. Response and accountability elements must be incorporated as essential stages.
6. The MDSR must be monitored and evaluated at all venues: local, subnational and national.

CHAPTER 3

The Identification and Notification of Suspected Maternal Deaths

3.0 Introduction

Chapter 3 describes strategies for the identification and notification of suspected maternal deaths which should be investigated and subjected to review. Case definitions of maternal death are presented along with the need for an operational definition to facilitate surveillance activities. The integration of MDSR into other routine surveillance is discussed as part of a mandatory notification process for all suspected deaths.

3.1 Case definition – What and who?

ICD 10 definitions – Maternal, late maternal and pregnancy related deaths

The International Classification of Diseases and Related Problems, 10th Revision (ICD-10[15]) defines a **maternal death** as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."

Maternal deaths are then subdivided into *direct* and *indirect* obstetric causes of death. **Direct deaths** arise from complications of the pregnancy itself. In such cases the death was directly related to the woman becoming pregnant. **Indirect deaths**, on the other hand, are due to medical conditions which are exacerbated by pregnancy. These medical conditions may have been recognized before pregnancy or were diagnosed during the pregnancy or the puerperium. The distinguishing feature of indirect deaths is that the woman could have died from these conditions without getting pregnant.

A **late maternal death** is "the death of a woman from direct or indirect obstetric causes more than 42 days and before 1 year after termination of pregnancy". The ICD-MM[16] clearly lays out which ICD-10 codes should be regarded as direct (Groups 1–6), indirect (Group 7), other/unknown (Group 8) and coincidental deaths (Group 9) (see Glossary).

The ICD-10 includes the concept of a **pregnancy related death**,[15] defined as the "death of a woman while pregnant or within the 42 days after pregnancy termination, irrespective of the cause of death". This alternative definition allows deaths during pregnancy to be accounted for when the underlying cause of death is not yet known or unknown. It is therefore potentially useful as an operational definition, for surveillance purposes, to identify cases and to initiate the notification and review process.

Operational definitions

In many places, pregnancy is not confirmed until the second trimester or until it is physically apparent. A **probable or suspected maternal death** may be defined as, "the death of a woman while pregnant or within the 42 days following the termination of the pregnancy", consistent with the definition of a pregnancy related death. Any death, in which there is any indication of pregnancy, should be reported as a suspected maternal death. Because the concept of "42 days or 6 weeks" is not easily understood, when setting up a notification system for suspected maternal deaths, this period should be extended to 2–3 months. Some countries also include late maternal deaths (a death up to one year after the end of pregnancy) in their notification, information and review processes (although these cases do not count in official MM statistics).

3.2 Active case finding for maternal deaths

A process is needed to ensure that cases are identified as soon as they occur. Surveillance teams therefore need to actively look for cases instead of relying on a passive process of case reporting by interested parties.

In Jamaica, **active case finding** is done by integrated disease surveillance officers who may or may not be midwives, necessitating a case definition which is easy to apply. Surveillance officers are instructed to review all facility deaths among women 10–50 years old and examine the medical record for evidence of pregnancy within one year of the death (Box 3.1). Any cases meeting the operational definition are reported. The review process determines the cause of death and whether it as a maternal, late maternal or coincidental death (see Glossary). The same guidelines are applied to deaths occurring in the community.

Box 3.1: Operational Definition – Suspected Maternal Death – Jamaica

Death of a woman 10–50 years of age, with evidence of pregnancy (ectopic pregnancy, gestational trophoblastic disease, termination, miscarriage, stillbirth, live birth) within one year of the death.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

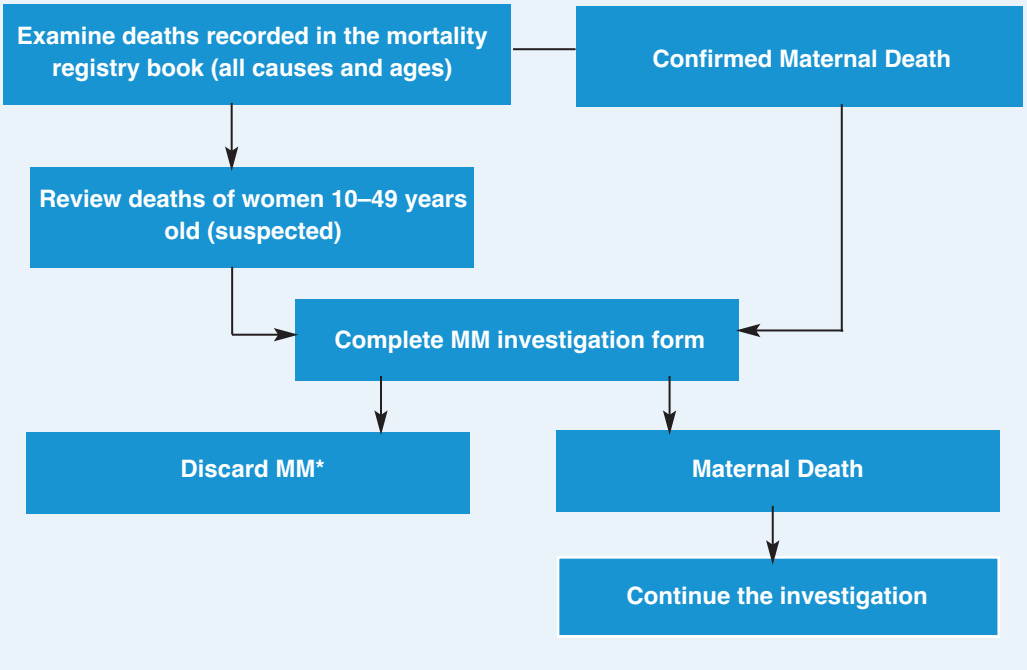
This precludes surveillance officers from having to decide which pregnancy related death is maternal. In Brazil, cases are actively sought by reviewing death certificates at health facilities, civil registries and cemeteries (Box 3.2) to ensure that all deaths in facilities, the community and any cases which may be missed otherwise, are identified. The El Salvador algorithm for search of MM cases (Figure 3.1), clearly establishes the criteria for how to decide whether to discard a suspected death in a WRA as not being due to maternal causes (a negative pregnancy test).

Box 3.2: Brazil – Active Case Search of Three Sources to Identify MM

- Death certificates in health institutions
- Certificates in civil registries
- Cemetery registries

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Figure 3.1: El Salvador – Algorithm for Searching for MM Cases



*For every woman ages 10–49 years who has suicidal intentions or who has committed suicide, pregnancy must be confirmed or ruled out by a urine or blood pregnancy test; apply screening questionnaire to evaluate whether to do a verbal autopsy with the family (System for the surveillance of morbidity and mortality in the life cycle, MINSAL, 2012)

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

For each review period, surveillance officers should file a **zero report** if no or "zero" suspected maternal deaths are identified and notified, rather than providing no information. All suspected cases must be documented in hard copy or in an electronic questionnaire (Box 3.3).

Box 3.3: Web-based Surveillance for Maternal Deaths – Brazil, Colombia, El Salvador and Mexico

Brazil, Colombia, El Salvador, Mexico and other countries, have web-based surveillance systems for maternal deaths. The system is alerted to incorporate the results of cases if:

1. There is a "yes" answer to whether the woman had been pregnant in the year prior to death or
2. An ICD-10 obstetric cause (O00-O99) is coded.

The extent and timeliness of coverage varies by region; training of health agents and civil registrars; access to the internet and the system's capacity for use. These variations, notwithstanding the gradual progress toward proposed goals, makes it a cost-effective strategy.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Identifying hospital deaths

Hospital Registries: Facility death and discharge records must be checked every 24 hours to actively create a list of deaths among women of reproductive age (WRA). To find these cases, reviews must include not only those from the obstetrics ward, but also other hospital areas where women may seek and receive care (e.g. medical and surgical wards where re-admissions after delivery often occur, the emergency and outpatient department, the intensive care (ICU) or high dependency unit (HDU), the cardiac care unit, or the morgue).[10] Every death of a WRA must lead to a review of her clinical history to evaluate if there is any evidence or suspicion that the woman had been pregnant or died in the 42 days and/or up to one year after a pregnancy ended. Postpartum transfers are often missed when the birth and the mother's death occur in different locations.

Perinatal Information System (PIS) and other systems: Various existing information systems (PIS, public health insurance, monitoring of practice and benefits), must be integrated so they can alert about probable or confirmed maternal deaths. To this end, it is necessary to have these registries list the name of the deceased along with follow-up tracer variables (e.g. date pregnancy ended, date of death, maternal date of birth, age, place of death), to ensure follow-up regardless of the information source.

Deaths in the community

Suspected maternal deaths occurring in the community may be identified and notified by health personnel, health promoters, community agents or civil registrars. Where there are no community health workers, other community representatives may submit reports. Verbal autopsies must be conducted to determine the probable cause of death and establish if it meets the criteria for counting as a maternal death.

Primary care teams: Community health workers assigned to cover prescribed geographic areas often know the pregnant and post-partum women in their catchment area. As the death of a pregnant or recently delivered woman would generate community discussion and interest, including these workers in the surveillance and reporting network would ensure that such events are not missed.

Coroners/medical examiners: In some settings, a sudden death in the community precipitates a Coroner's review which would include a routine post mortem investigation. Medical examiner records can therefore provide useful information on maternal deaths in the community. Jamaican data show that deaths which were missed by the routine surveillance system but captured here, include first trimester deaths in which the pregnancy was either undiagnosed (e.g. ectopic pregnancy); or unknown to the family (e.g. complication of unsafe abortion). Other events which can occur precipitously at home include antenatal or postpartum eclampsia and sudden cardiac deaths (e.g. puerperal cardiomyopathy, rheumatic heart disease).[10]

Other community sources: The newspaper and church bulletins, especially the obituaries which announce the death of a young female; police reports of accidental or violent deaths; radio or other media reports of the death of a pregnant woman or mother of a newborn, can be followed up by health teams.

Morgues and cemeteries: Funerals are usually handled by morticians who often serve specific communities. The integration of community mortuaries and cemeteries into the surveillance process to share information on deaths among WRA (10–49 years) can alert teams to review the cause of death and determine if it was pregnancy related. While most cases would have been notified otherwise, missed community cases may be picked up here. Efforts, however, are needed to avoid duplicate reporting.

Vital records/death certificates: Death registration provides a potential gateway for identifying maternal deaths among WRA and has been actively used by countries such as Columbia and Brazil. Since the mid-1990s, findings from studies of the under-registration and improper classification of maternal deaths, have led many of the Region's countries to revise their death certificates to include questions about whether a WRA had been pregnant in the year prior to the death (Argentina, Ecuador, Honduras, Jamaica, Nicaragua, among others) (Box 3.4). Even though there are no reports on the coverage of this issue or its predictive value, countries state that its inclusion in death

Box 3.4: Pregnancy Check-box Questions for Death Certificates

If female, select the statement that best describes the decedent:

[ ] Not pregnant within the past year

[ ] Pregnant at the time of death

[ ] Not pregnant, but pregnant within 42 days of death

[ ] Not pregnant, but pregnant within 43 days to 1 year before death

[ ] Unknown if pregnant within the past year

Date last pregnancy ended (dd/mm/yyyy): _____/_____/_____

Gestation pregnancy ended: [ ] <22 weeks [ ] 22+ weeks

certificates has increased the alert about and commitment to the notification of maternal deaths.

3.3 Notifying suspected maternal deaths – Who and how quickly?

Maternal deaths as mandatory notifiable events

Timely reporting of suspected maternal deaths is the catalyst for change and is critical to a successful MDSR system. Information on the circumstances of these deaths are sometimes lost as time passes, as detailed recall diminishes and access to key family informants may be lost if families move away after a mother's death.

To ensure the success of the MDSR process, countries should develop policies which make the reporting of a suspected maternal death a **mandatory notifiable event**. This process will be strengthened by the integration of maternal death reporting into other Disease Surveillance and Response systems, such as what exists in most countries for selected infectious diseases. This includes adding maternal death surveillance to the portfolio of this workforce which is already in place.

Who and when?

MDSR begins with the identification of all suspected maternal deaths from among the deaths in WRA (10 to 49 years old). All cases should be screened to identify those which occurred in pregnant women, or within 42 (or 364) days following pregnancy termination (**probable maternal death**). It is recommended that the process also include the identification of all cases occurring between 43 days and 1 year after the end of preg-

nancy (regardless of how pregnancy ended). All non-viable pregnancy outcomes associated with a death such as abortion (spontaneous or induced), ectopic pregnancy and gestational trophoblastic disease, must be included among those pregnancies which ended prior to 22 weeks of gestation.

The reporting of maternal deaths must be compulsory. It is recommended that all (probable) maternal deaths be reported. Those in health institutions (maternity wards, intensive care units and others) should be reported within 24 hours; while deaths occurring in the community should be reported within 48 hours.

Depending on the circumstances of death, identifying a maternal death may be challenging – particularly maternal deaths due to indirect obstetric causes. Deaths of WRA from causes that are not clearly **coincidental** (ICD-MM and Glossary) or due to accidents or violence (except suicide) are probable maternal deaths and should be submitted to a MM review committee for evaluation. The MM review committee will examine the circumstances and confirm whether it is a maternal death, that is, if the death was "related to or aggravated by the pregnancy and its management".

3.4 Methods for notifying suspected maternal deaths – The how

Strategies for notifying the occurrence of a suspected maternal death depend on the sophistication of the health information system. It is advisable to build on existing systems to avoid duplication of effort. Where Communicable Disease Reporting Systems exist, they should be expanded into an Integrated Disease Surveillance and Response (IDSR) system, which monitors and reports on key conditions of epidemiological interest, including maternal and even perinatal deaths. Depending on the context, strategies can include the use of the internet, telephone (texts, facsimile or calls), radio and paper forms. What is needed is a reliable system. Integrating new technologies can improve the completeness of the reporting process.

Communication

In establishing a MDSR system, effective communication is critical to guaranteeing the complete identification of maternal deaths and their timely notification. A communications plan, prepared from the onset, should include the names of the persons responsible, how communication channels are to be established, through what means, and how information flows among the system's various levels. Where information is consolidated as well as where a report is produced, how often reports are produced also needs to be clear. How results are to be communicated and how communication will be handled in crisis situations (e.g. avoiding unwanted consequences such as complaints, rejections or discredit for political motivation), and how the dissemination of information is to be implemented to foster promotion activities and the mobilization of resources for the system, will ensure the effective transfer and use of generated information. Finally, the commu-

nication plan should include guidelines for tailoring messages to specific audiences, namely, the public or community, the health team, policy makers and advocates.

Case notifications

Case notifications should generally flow from the community or facility to the municipal or provincial/ parish/regional level to the national level. Responsible persons closest to where the suspected death occurs either receives or completes the notification form for transmission to the next level. This can be usefully completed in duplicate so that a copy stays at the local investigative level and the other is forwarded to the level where reconciliation of information and removal of duplicate notifications will occur.

After the initial identification and notification of the event, the investigation process can commence. The community or facility may again be called on to assist in the information gathering process. Countries can decide whether to report probable deaths to the national level before they are confirmed, or whether only confirmed cases are forwarded to the national level.

Zero reporting and frequency of reporting

Reporting must be systematic, for example, the report must be issued weekly and is most efficient if it coincides with the reporting of other notifiable diseases. The process should include use of a "zero report" to indicate that no maternal deaths have occurred, instead of failing to report when no suspected deaths occur. Generating a list of cases of death among WRA (10–49 years old) will ensure lack of duplication and that no maternal deaths are lost at the hospital or community levels.

Confirmed deaths, namely those that have been reviewed and classified as maternal, late maternal or coincidental, should be reported on a monthly or quarterly basis. Frequency will depend on the incidence of deaths and the regularity of the reviews. As with suspected deaths, "zero reporting" should also be observed. A differential reporting schedule by facility size may limit the reporting burden such that smaller facilities (e.g. <1000 births/month) report quarterly while larger sites report monthly or weekly. Community sites should report monthly.

Triangulation of information to avoid duplication

While multiple sources may notify the same probable case of maternal death, such as the originating and receiving hospital or the community, to avoid duplication it is essential that initial notifications utilize personal identifiers to make sure that each death is counted only once. These identifiers should be removed at some point, to be determined by the MM surveillance committee, to maintain confidentiality. A focal point should be designated – usually at the local level – to ensure that there is no duplication.

Connections among civil registry systems and the MDSR

Mortality data are a critical component of the public health information structure. Ultimately, all deaths, including maternal deaths, must be reported to a civil registry/vital statistics (CR/VS) system. In developed countries, maternal mortality ratios are calculated from vital statistics.[e] In those jurisdictions where the CR/VS system is deficient or nonexistent, MDSR can help to develop or strengthen it.

In many countries, death registration forms are generated in duplicate, with one copy sent to the health authority and another given to the CR/VS. Sending maternal death reports to the CR/VS system is simplified further if there is a web or digital system in place. Health institutions are a good starting point for ensuring that all deaths are reported to the CR/VS. Several countries have CR/VS offices within the hospitals to facilitate the registration of births and deaths. For example, Argentina, Bolivia and Uruguay have birth registration offices in maternity wards; Venezuela has had a birth registration office in its main hospitals since 2003[18] and Jamaica instituted bedside registration of births in 2007. Efforts should be directed to integrating these birth registration officers into maternal mortality surveillance activities, particularly to ensure that maternal deaths are accurately registered as such.

Completion of medical certificates of cause of death: Maternal deaths

Physicians need to be trained to guarantee that deaths in WRA, which are due to maternal causes, are adequately certified. The fact of pregnancy must be clearly documented on the medical certificate, and, where they exist, the pregnancy check-boxes must be completed. Certification errors are more likely to occur as the duration between the end of pregnancy and the death increases, if women do not die in the same place as where they gave birth, or the evidence of pregnancy is uncertain or unclear (transfers, home deaths, abortion or perinatal death). Coding errors are more likely as well for indirect obstetric deaths.

Box 3.5: Death Certificate Review: Women 10–49 years – Is there a Pregnancy Check-Box?

Country studies show that this is an extremely useful strategy, especially to verify that the death had been registered, and to alert to the need to analyze the death and validate the cause of death. Evaluations indicate that the effectiveness of this strategy depends on personnel qualifications, rotation policies and the complexity of the institution.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

e. WHO categorizes countries according to the quality of their vital statistics systems, and applies corrective factors to maternal mortality estimates at the country level and worldwide. For additional information see: Trends in maternal mortality: 1990 to 2013. Geneva, 2014.[2]

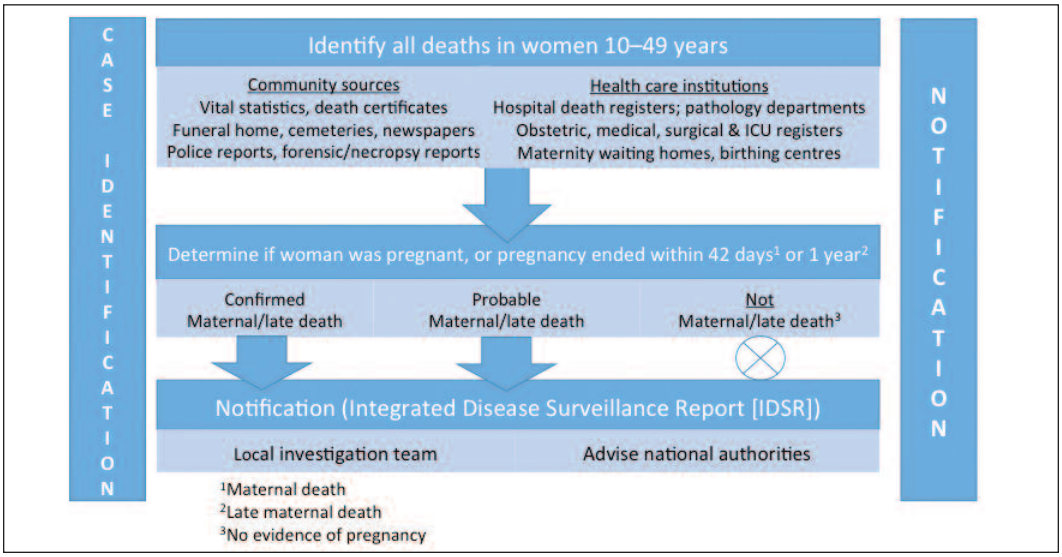
Validation of the case identification process

Where vital registration systems are computerized, the inclusion of unique identifiers such as a social security or national identification number will allow the objective linking of death certificates for WRA to live birth and foetal death (stillbirth) registrations. Where these numbers do not exist, probabilistic matching (based on at least 2 or 3 variables – e.g. maternal age, parity, address, date of delivery, place of delivery, place of death) may be used. This strategy can be employed both to routinely identify maternal deaths, or as a quality control mechanism to ensure that all potential maternal deaths are identified. It will also be a useful aid in differentiating maternal from late maternal deaths, based on the infant's birth/stillbirth registration record of when the pregnancy ended.

Person responsible

Someone at the local level must be assigned as the MM surveillance focal point. Their duties include compiling the notification lists, triangulating information from multiple sources to avoid duplicate reporting, and monitoring the inflow of additional information (clinical report, verbal autopsy, post mortem findings), to be used to classify the death, even if the death is due to external causes, such as an automobile accident or a homicide. After triangulating the information, the focal point or a coordinator should notify the next level up (regional or national) on the occurrence of the death, and ensure that completed case reports are unified in a single source. Where duplicates are identified, it is useful to review and merge the available data prior to discarding the duplicate record. At this point, personal identifiers may be removed to maintain confidentiality. Figure 3.2 summarizes the case identification and notification process. The case review process may now proceed.

Figure 3.2: Case identification and Notification of All Suspected Maternal and/or Late Maternal Deaths



Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

CHAPTER 4

Data Collection Tools: Lessons from Latin America and the Caribbean

4.0 Introduction

The development of case investigation tools is discussed, drawing on the experience of countries in Latin America and the Caribbean. Tools can be either paper or electronic depending on the sophistication of the health information system. They should be easy to use, culturally acceptable and provide the necessary information to classify the death, document the cause(s), identify avoidable factors and generate recommendations to prevent future similar deaths.

4.1 Developing MDSR data collection tools

Data collection tools should be designed as simple forms that provide clear information about the case and identify the underlying causes and contributing factors for MM. Tools (Boxes 4.1, 4.2) should be pilot tested and refined before full-scale use, taking into account existing capabilities of personnel and socio-cultural norms. There should be routine monitoring of data quality and periodic evaluation to ensure that the data generated are valid and reliable. There should be practical training of data collectors who should be able to read, write and do simple arithmetic; be fluent in the local language and be familiar with local terminology.

While the process will be determined by the sophistication of the health system, the tools should be characterized by their:

1. Ease of use
2. Availability of the required information
3. Willingness of informants to answer the requested questions
4. Ease of analysis and use in guiding areas for intervention
5. Capacity to provide information for monitoring and evaluation purposes.

Box 4.1: Brazil – Forms Designed to Reconstruct the Conditions that Led to the Woman's Death

- MM investigation form — Outpatient health care service
- MM investigation form — Hospital
- MM investigation form — Home interview
- MM investigation form — Verbal autopsy
- MM investigation form — Post-mortem information
- MM investigation form — Synthesis, conclusions and recommendations

When neither the information obtained from the health service investigation nor the verbal autopsy are sufficient to determine the cause of death, there is a form available for conducting a complementary interview to the verbal autopsy. A verbal autopsy is also recommended if the death has not been reported to the health system, if there is no death certificate, if the death certificate has not been signed by a physician, or, if the cause of death is ill-defined.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

4.2 Maternal death notification form

Where possible, the form used to report suspected cases should be the same as or similar to what is already in use for reporting other notifiable diseases. Where such a form exists, efforts should be made to adapt it to serve the dual process of notifying other diseases of interest as well as suspected maternal deaths.

At minimum it needs to identify:

- Demographic characteristics of the decedent (name, age/date of birth, address)
- Where the death occurred (specific facility or name of community)
- Date of death
- Date of notification
- Source of reporting (site, person).

Optional

- When in the reproductive process death occurred (during pregnancy or date pregnancy ended)
- Infant outcome (non-viable, stillborn, live born but died, live born and survived).

Box 4.2: Jamaica – Data Collection Forms for each Maternal Death, Assembled by the Local Health Team

Form	Type of information	Responsible staff member
Class 1 Reporting Form: Individual Notification (On Suspicion) – Annex 3	Demographic and clinical information of suspected maternal death cases	Person responsible for surveillance (public health nurse specialist/physician) (notification must be done within 24 hours of the death)
Form 1: Maternal Mortality Clinical Report – Annex 4	Medical history (hospital)	Obstetrician/resident/ consultant/ attending physician
Form 2: Maternal Mortality Home Visit and Antenatal Report (verbal autopsy) – Annex 5	Family interview and reproductive and antenatal history. A detailed narrative report on the family and household conditions may be attached	Person responsible for epidemiological surveillance (public health nurse or community midwife)
Form 3: Maternal Mortality Post Mortem Report – Annex 6	Autopsy to determine causes of death	Pathologist/person responsible for epidemiological surveillance
Form 4: Maternal Mortality Case Review Summary – Annex 7	Summary report of the case once it has been analyzed	Analysis group/physician epidemiologist responsible for surveillance at the regional level
Form 5: Maternal Mortality RGD Notification List* (maternal death) – Annex 8	Information on the case to be included in the vital statistics system (updated every three months)	Physician epidemiologist responsible for surveillance at the regional level
Form 6: Maternal Mortality Surveillance Monitoring Report – Annex 9	Summary of maternal deaths by region (updated monthly)	Epidemiologist responsible for regional surveillance or staff member in charge of epidemiological surveillance

*Not being implemented due to a lack of data sharing agreement between the Ministry of Health and the Vital Statistics Department.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

4.3 Case review forms

Consistent with the ease of use principle, Brazil and Jamaica have segmented their data collection tool into a series of forms to facilitate their comprehensive completion by the most appropriate member of the health team. This segmented approach ensures that swathes of the document will not be left blank because the person trying to complete it does not have access to particular items of information. The forms (Box 4.1 [Brazil] and Box 4.2 [Jamaica]) include tools for:

1. Outpatient/emergency service providers
2. Primary care/antenatal care providers
3. Hospital/referral service providers, including inpatient care
4. Report of post-mortem findings
5. Verbal autopsy interview of key informants – spouse, partner, family, friends
6. Summary report following the case review process.

Where forms are returned with high rates of non-response, key informants should be surveyed as to how to improve the instrument. As this will be mostly retrospective data, it may be necessary to omit certain data requests (see Box 4.3) if specific data items are not routinely available. Each data collection tool should clearly identify who will be responsible for its completion.

Box 4.3: Key Principles for Deciding What Information to Collect

- Decide what needs to be learnt and what information is needed before developing any data collection tools.
- Collect data that will provide information to identify problems that lead to maternal deaths and to develop solutions. Every step in the road to survival must be explored.
- Keep things simple — "more" or "bigger" is not always better.
- Examine existing data collection tools (e.g. MM reviews, WHO's verbal autopsy) for ideas on possible variables to include and to standardize data collection across different circumstances.

Source: Adapted from the *MDSR Technical Guidance Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Confidentiality of information

During the case notification and review process, it will be necessary to include the name of the mother on the notification and data collection forms to ensure that duplicate

reports are not submitted, and that all suspected cases are identified and investigated. Merge the available data prior to discarding any duplicate records. Once the case file is compiled, the decedent's name should be replaced by a case report number. The names of care providers should also be expunged from the case files.

4.4 The data collection process

Data should be collected at the local level by health personnel with access to facility records and the community. They should have been trained to use the tools, especially the verbal autopsy instrument. The requested information should be routinely available from clinical records, family interviews and post mortem findings to enable the review committee to objectively assess:

- The health seeking behaviour, care sought and accessed by the mother during pregnancy, childbirth and the puerperium.
- The diagnosis and management of any complications of pregnancy, childbirth and the puerperium.
- The causes of death (immediate, underlying and contributory factors).
- The quality of care received and strategic deficiencies in the care process including delays accessing care, availability, resource constraints and avoidable features.

Data collectors should also be available for the case review to clarify any findings.

4.5 The action sheet

In addition to the individual Case Summary which is specific to a particular case, an Action Sheet should be developed to summarize the recommendations of the review panel: (1) what corrective actions are needed; (2) identify the person responsible for completing each action; and (3) an agreed time frame within which it may reasonably be expected to be completed. Monitoring and evaluation tools will be discussed in Chapter 8.

The action sheet will enable the local team in particular to begin implementation and monitor their progress. This tool will be particularly useful if reviews examine similar cases which have common environmental or health system determinants which have a common solution. For example, if after reviewing more than one case of undiagnosed gestational diabetes, a solution may be to develop and implement guidelines for screening overweight or obese mothers. The action sheet will identify who is responsible for overseeing the change in practice, in what time frame, and may be used for monitoring purposes.

CHAPTER 5 The Case Review Process

5.0 Introduction

The main purpose of MDSR is to generate action to prevent future maternal deaths. For this to occur, cases must be objectively reviewed to determine the medical causes, social determinants, and avoidable features. This chapter provides guidance on creating the appropriate policy environment for MDSR to function effectively, with suggestions on how MM review committees could work toward these goals, by conducting case reviews and transmitting conclusions and recommendations to the next level.

5.1 Conceptual framework

Each maternal death should be seen as a sentinel health event that immediately should raise the question, "Why did it happen?" Responses must be concrete and feasible, and actions must be set in motion immediately, with established time frames and persons responsible according to their level of influence. The review process is intended to establish the medical and non-medical causes of each maternal death and determine which deaths could have been avoided. To this end, the analysis should be standardized, ideally through established procedures that show who should conduct the analysis (local, regional, or national-level MM committees), and issue recommendations for avoiding preventable causes (Box 5.1). Actions are concrete interventions in communities and/or institutions including at the inter-sectoral level, if indicated.

Box 5.1: Case Review Principles

- The review of cases must be linked to a response.
- Each review must include recommendations to prevent future deaths.
- Recommendations must be specific and must be linked to avoidable factors.

Recommended actions may include educational interventions for women; measures to improve access to health services; community consciousness-raising; or hospital interventions such as improving the capacity of health teams to develop and implement practical clinical guidelines. Some interventions may require medium-term objectives and inter-sectoral linkages to create regulatory reforms, implement agreements for new services by various sub-sectors in the health system or reform of the basic benefit package covered by the health system.

5.2 Preparatory activities

Policy framework

A sustainable MDSR process requires a policy framework which institutionalizes MDSR as routine practice. The policy should clearly outline the responsibilities of the review panels at the facility or local level, as well as at the intermediate (regional or provincial) level and at the national level. The development of guidelines and selection of a focal person at each level to lead the process will ensure health team support.

Local level – The teams closest to where deaths occur should be responsible for primary surveillance, case identification, notification and data collection. The initial review should occur here to establish what happened and identify local avoidable factors and areas for immediate local intervention.

The intermediate level(s) – This level, in addition to participating in local reviews, should assume an oversight function to:

- Ensure that all cases are identified
- Monitor reporting from inter-sectoral sources to limit/eliminate duplicate reporting
- Enable investigations which cross jurisdictions, such as when cases are transferred between various levels of care
- Ensure that recommendations are implemented at appropriate levels within the service delivery system
- Compile intermediate level data
- Share information across sectors, such as between service units and civil registrars, to ensure that maternal deaths are accurately certified and registered appropriately.

The national level – National epidemiologists would be responsible for compiling national summary statistics, derive progress and outcome indicators, and address policy issues such as those requiring:

- The development and use of clinical guidelines and improving the skills of service providers

- Change in practice modalities
- Upgrading of clinical facilities, including procuring new equipment
- Changes in health planning, budgeting, financing and administrative management to respond to review findings would have to emanate from this level.

Composition of the MDSR committees

The composition of committees at the various levels is essential for modifying practices, improving capabilities, eliminating punitive attitudes, fostering self-esteem and ensuring the best possible quality data. The committee's make-up will depend on the available resources, but should aim for multi-disciplinary representation of investigative officers, care providers, management staff and community members. This multi-disciplinary mix is essential to ensuring that everyone is committed to and own the process. This will increase their willingness to engage in all the phases from case identification to providing high quality data to actively participating in changing practice.

El Salvador has a formal process of appointing members to local committees. Depending on the institution's complexity, the committee may include the hospital director or his/her representative; heads of services; nursing/midwifery; statistics, information or epidemiology; maternal and child health care coordinators; and others who may be included on a temporary or permanent basis as needed. Appointments are made by the immediate supervisor for one year and all staff in the institution must be informed of the appointment.[12]

Local committees: As the primary review of a maternal death should occur in the jurisdiction where the death occurs, the local committee should include health providers (midwives, obstetricians, paediatricians, and pathologists), managers and epidemiology teams who understand the circumstances and can best identify the challenges, avoidable features and possible solutions. Brazilian guidelines clearly state that if the death occurs away from the woman's usual community of residence (Box 5.2), the review should be conducted by the team where the death occurs and findings shared with her community of origin. Civil representatives, where included, should be respected members of the community who can assist with health promotion activities which will enable behaviour change at the community level.

Intermediate and national committees: At these levels, consideration should be given to inter-sectoral representation and inclusion of policy makers, financial managers and possible advocates who can champion the identified activities, and assist with identifying financing and interventions to improve outcome. Researchers with international exposure could also be included here.

Box 5.2: Brazil – Who Conducts the Review of Maternal Deaths at Each Level?

A review of the death occurs once the investigation process has concluded and an evaluation has been conducted of the quality of the information entered into the different registration forms. The review examines the quality of care the woman received up to her death; the woman's social and economic circumstances and the care she received during pregnancy, childbirth and/or during any emergency.

This analysis is conducted by the Surveillance Committee, whose makeup varies depending on the local context. Wherever possible, this process should include health professionals who cared for the woman, members of the maternal mortality committee, and professionals from the epidemiology department at the hospital or institution where the woman received care.

If the maternal death occurs in an area other than the where the woman lived, the hospital investigation must be conducted by the epidemiology department in the hospital where death occurred. On completing the forms, copies should be sent to the Municipal Secretariat of Health and the State Secretariat of Health, which will forward them to the Municipal Secretariat of Health where the woman lived.

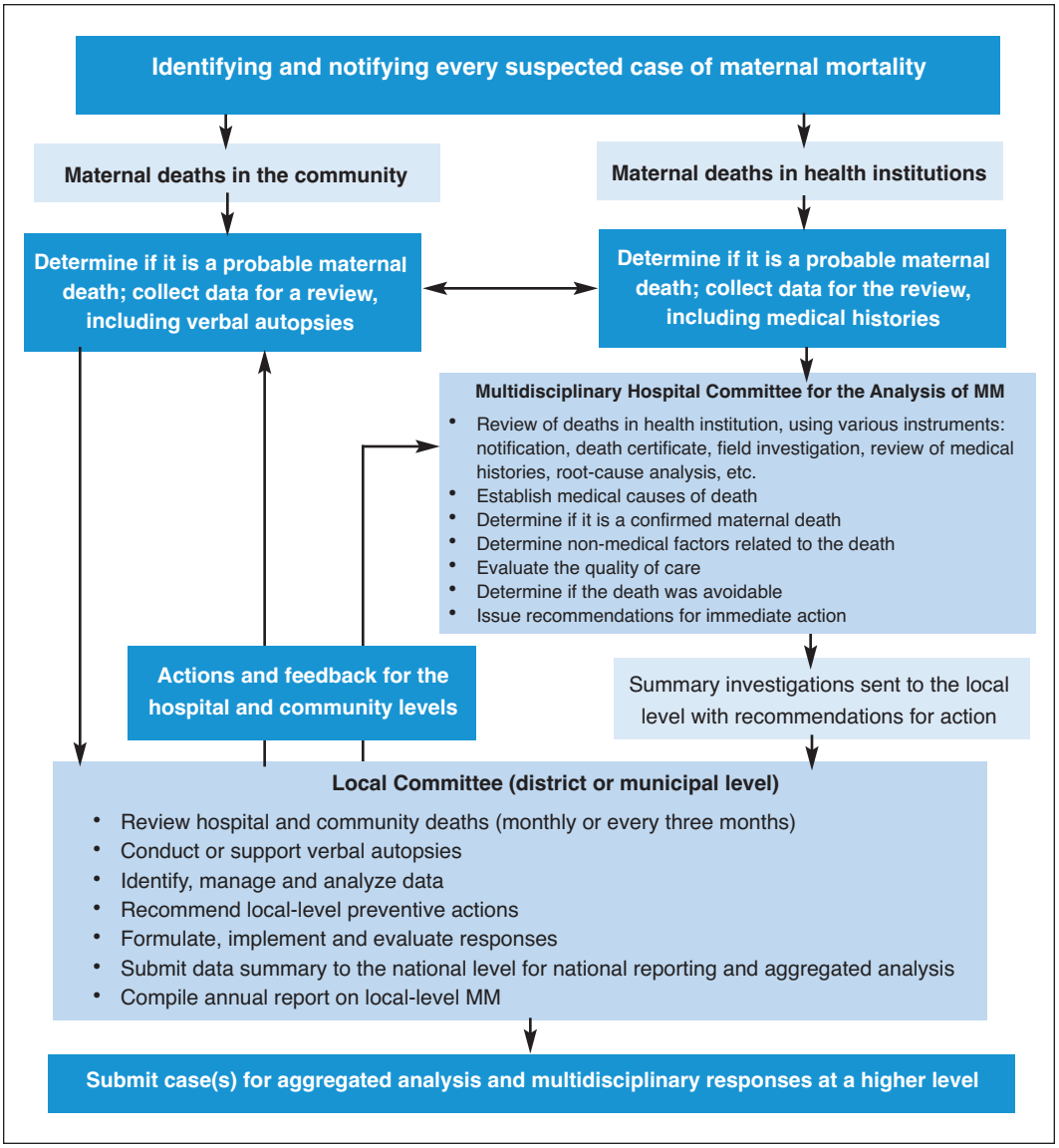
The recommendations from the case analysis included an evaluation of problems during the woman's care and the identification of avoidable factors. A recommendation in the city of Belo Horizonte is that the process should take no more than 2 weeks. This should allow time for the case findings to be submitted to the central level for discussion at the Central Municipal Committee. The State Surveillance Department will conduct the analysis only if the municipal level is unable to do so.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Training of committee members

Committee members at all levels should be trained to understand standard definitions, use the national data collection tools and apply a systematic methodology to analyze each case, including the identification of the cause(s) of death, and determine recommendations for action. Those responsible for the aggregated data analyses should have adequate demographic, epidemiological and statistical knowledge to compile the data and prepare the routine reports. Skills should include monitoring and evaluation capabilities to assess data quality, completeness and accuracy.

Figure 5.1: Case Review Process



Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Frequency of case review meetings

The objective of case review meetings is to assess all maternal deaths in the jurisdiction. The number of cases per meeting depends on the number of cases the team can manage at one sitting without team fatigue (e.g. no more than 10). This will determine the frequency of meetings. While selected cases may be prioritized, care must be taken to ensure that all cases are treated equally in the end. It is usually more efficient to review similar cases together, for example, all haemorrhage deaths, as this enables identification of common systematic threads in service gaps that may need attention. Monthly or Quarterly meetings tend to keep the team together and interested. One city in Brazil

however recommends that the review process should take no more than two weeks (see Box 5.2).

5.3 The review of each Maternal Death (MDR)

The Maternal Death Review is "a qualitative, in-depth investigation of the medical and underlying social causes of and circumstances surrounding maternal death" in health institutions and the community. The initial case analysis must be conducted at the local level, and include personnel closest to the community undertaking the individual analysis of each case. Medical causes and contributing factors[f] explore why maternal deaths occur and what can be done to prevent them (Figure 5.1). A prerequisite is that the process is confidential and aims to improve the quality of care without assigning blame to the individuals that took part in it. Every effort must be made to ensure the leadership and participation of health professionals. This is essential to fostering the use of a tool proven to be effective in improving health care at every level.

Inclusion criteria for cases to be reviewed

National Standards should clearly determine which deaths to include. Possible inclusion criteria include:

- **Classification of the death:** Any or all of the following – maternal only (direct, indirect; pregnancy to 42 days after pregnancy ends); late maternal (direct, indirect; 43–364 days after pregnancy ends); and coincidental (accident, violence, other pregnancy related deaths).
- **Place of death:** Hospital only, community only, both hospital and community.
- **Jurisdiction:** Mother's catchment area of residence and catchment area of death.
- **Other pregnancy outcomes (e.g. Mexico, El Salvador[12]):** Perinatal deaths (SBs, NNDs 0–6 days[25]); infant deaths; and severe acute maternal morbidity.[26]

At minimum all maternal deaths (ICD-10) should be reviewed. If MDSR is just being introduced, one could begin with facility deaths and add community, late maternal and coincidental deaths later. As maternal mortality declines, interest in monitoring the quality of maternal health care can be maintained by including selected perinatal deaths (e.g. full term [>2500 g] foetal and early NNDs), for example, Mexico and El Salvador. While deaths should be reviewed in the catchment area where they occur, deaths should be attributed to the mother's community of residence, if, for example, she was transferred and died outside of her usual community.

f. See Glossary and WHO guidelines (Application of ICD-10 to deaths that occur during pregnancy, childbirth, and the puerperium: ICD-MM) for the definition of medical causes and contributing factors.[16]

Preparation for review meetings

Case notification and investigation

As the district receives the maternal death notification, the focal person should assign a case identification number. The team should programme a visit to the hospital and/or the family if death occurred in the community. Family interviews should be considered for inclusion regardless of whether or not the death occurred in the community, as delays from the community and between levels of care may have been contributory (see Annex 5, Form 2 – Maternal Mortality Home Visit and Antenatal Report, Jamaica). While community deaths may have been notified by non-health informants (e.g. religious or civil society leaders; police; forensic pathologists), community health workers, especially a midwife or other primary care personnel from the health facility serving the community, should participate in the information gathering process. On conclusion of the case investigation, the focal person should safely store the case investigation files until the review team meets.

The local focal person should also monitor whether case finding and reporting is consistent with expected returns. Tables can be derived for this purpose outlining the numbers of cases expected from the areas under surveillance. For example, Table 5.1 outlines the expected deaths for a surveillance area based on varying maternal mortality ratios and occurrence of deaths in hospital. While the community deaths may be few, they are more likely to be missed. Even if most deaths occur in hospitals, those on non-obstetric wards (accident and emergency, ICU, medicine, surgery [re-admissions]) may be overlooked.

Table 5.1: Expected Maternal Deaths per Year, by Birth Occurrence for Varying MMRs

Jurisdiction and expected births	MMR 50		MMR 100		MMR 150		MMR 200	
	Hospital	Community	Hospital	Community	Hospital	Community	Hospital	Community
North 5,000§	2	0.5	4	1	6	1.5	8	2
South 10,000§	4	1	8	2	12	3	16	4
West 8,000*	3	1	6	2	9	3	8	4
South east 20,000*	7.5	2.5	16	4	22.5	7.5	30	10
Total	**16.5**	**5**	**34**	**9**	**49.5**	**15**	**62**	**20**

§ 80% of deaths in hospital; *75% of deaths in hospital

Pre-meeting activities

The local focal person should circulate ahead of the meeting, an agenda outlining the number of cases to be reviewed, and a summary list of the case identification number, age, parity, causes and place of death, so that participants know which and how many cases they should be prepared to discuss. Efforts should be made to ensure that the inputs are available to objectively review each case. This includes the relevant patient records (primary care/antenatal; inpatient/hospital; post mortem investigations) and findings from home visits/verbal autopsies. The verbal autopsy will help reviewers understand the antecedents of the death and help identify if it could have been avoided. Signs, symptoms, health seeking behaviour, prior interactions with the health team, family concerns regarding access to and responses to requests for care should be documented. The MM review team should be notified about any data collection problems, including inconsistencies and inadequate information.

Local or institutional level review process

Persons providing information and participants in the review need to be reassured that the only purpose of the review is to save future lives. The "no name, no blame" principle must be reinforced and adhered to. The environment within which the review occurs should be a safe one to share sensitive details of the cases, including identifying possible service failures without fear of disciplinary action or litigation. Cases may be presented by either or a combination of care providers and investigators. Case Summary Worksheets may ensure that all relevant issues are covered.

The WHO MDSR guidelines[13] outline general principles to help make the process more effective and efficient:

"1. Holistic thinking – The problems leading to maternal death are frequently not all medical
2. Focused review – Only on those events that may have directly contributed to the maternal death
3. Normative review – Care received by the mother is compared with explicit standards based on accepted local practice and best medical evidence
4. Synthetic review – Group problems into general categories (e.g. lack of transportation) while keeping enough information so that a specific preventive strategy can be developed (WHO, 2013)."

Medical causes of death

The medical causes of death may be determined from the medical records and post mortem investigations (Box 5.3). Care should be taken to distinguish the immediate

Box 5.3: Mexico – Review of Maternal Deaths at the Local Level

The Confidential Maternal Mortality Questionnaire captures the information to study the death and consists of the following documents:

1. Death certificate
2. Medical records
3. Autopsy results
4. Maternal Death Opinion Form

- Causes of death (direct or indirect obstetric cause; non-obstetric cause)
- Medical care processes
- The user's request for care, including time elapsed between request for service and provision of care, issuance of a diagnosis and the beginning of treatment
- Recommendations to avoid future deaths

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

from the underlying cause of death. Among women with pre-existing chronic conditions, the team must ensure if they died from complications of the pregnancy, i.e. obstetric causes such as puerperal sepsis or uterine atony and haemorrhage among HIV infected women, that the death is attributed to the obstetric and not the pre-existing medical condition. The pathophysiological cause should be categorized where possible into direct obstetric, indirect obstetric or incidental (non-maternal) death. Where possible, causes of death should be coded using the ICD-MM guidelines[16] (http://www.who.int/reproductivehealth/publications/ monitoring/ 9789241548458/en/).

For deaths which occur in the community, and for whom there was no post mortem investigation, the probably medical cause may be determined by triangulating information from the verbal autopsy[19] (interview of caregivers about the woman's signs and symptoms preceding death), with any available information from antenatal records and information from prior hospitalization either before, during or after delivery.

Medical and non-medical contributing factors

Identifying medical and socio-cultural determinants which increase women's risk of a poor outcome are important to inform, not only health system, but also community education interventions. The Three Delays model[20] may be a useful way to consider both medical as well as non-medical contributing factors. It considers whether avoidable features rest with the patient (failure to recognize the problem or seek care in a timely

fashion once the problem was identified), community or environment (cost, poor infrastructure such as roads, access to transportation, distance to care) and/or the health system. Annex 7, Form 4 (page 2) outlines the health system areas that Jamaican reviewers are asked to consider. These are related to the:

- *Providers of care* (e.g. training, availability, quality of care delivered)
- *Decision making process* (e.g. recognizing the problem, making correct diagnosis, consultation process)
- *Actions taken* (e.g. referral, emergency obstetric care, treatment provided)
- *Referral delays* (e.g. transport, money, permission to transfer)
- *Resource constraints* (e.g. availability of blood, functioning equipment, drugs, other supplies)
- *Socio-cultural risks* range across the reproductive cycle from early marriage or sexual initiation through to limited access to skilled care during pregnancy and childbirth.

Quality of medical care – contributing factors

Where countries have clinical guidelines or protocols for maternity care which incorporate evidence-based practices, these should be considered as the gold standard against which service delivery should be evaluated. Potential areas for intervention include recommendations to address:

- Gaps in or revising/updating available guidelines
- Knowledge or skills of service providers
- Capacity of the service level to comply with the guidelines due to resource constraints (human, material, supplies and equipment).

Where repeated problems with medical care are unearthed, these may require specific audits to understand and address the problem – these audits can be broadened to review, not just deaths, but survivors (near miss) with similar conditions. Performance expectations must be consistent with the level of care and resources available. Recommendations may therefore need to focus on when persons should be transferred to the next level. If many similar cases occur at a particular facility, and transferring persons to the next level would be a consistent challenge, then facility upgrading or improvement may need to be considered, along with the appropriate retraining and/or expansion of the resident health care team.

Recommendations and response

On conclusion of the review(s), the committee should recommend how to address the avoidable factors to prevent future deaths. Some may require urgent intervention at the

local level, while others require policy changes and input from other levels of the health system. Some issues and solutions will only emerge as data are compiled at the intermediate or national level. There should also be feedback on how to improve the review process.

The avoidable factors may be classified into the following categories:

- **Family/community factors**

  Patient and family – These should include factors amenable to health promotion interventions. These include helping women and families recognize and respond appropriately to pregnancy complications, including when and where to seek care; improving compliance with medical advice; and lifestyle modifications. These may include advice on making early arrangements on how to get to hospital from a special savings or an emergency community transportation solution.

- **Health service factors**

  ANC – Areas include need for new/revised guidelines with appropriate training; areas for health promotion; monitoring compliance through follow-up; and home visits to high-risk mothers.

  Hospital care – Gaps in service delivery and resource constraints; infrastructure needs, from small improvements to upgrading facilities from basic to comprehensive care; issues of procurement, management, distribution and control of resources, supplies, personnel; and management systems.

  Post-natal care – Examine how complications of labour and delivery were managed; and identify gaps in access to care and services; post puerperal referral of women with medical complications for continued medical care (e.g. diabetes, heart disease).

- **Health care providers**

  Explore availability, skills, training needs, attitudes and values; and sensitivity of staff to social and cultural norms which influence compliance with advice.

Case summary reports

The Case Summary Report, like the "Maternal Death Opinion Form" from Mexico (Box 5.3), should combine both the case summary and outline related recommendations. Prior to transmission to the next level, the Case Summary Report should be de-identified, so that neither the patient nor care provider details are included. The case number however should be retained.

Action sheet

It may be useful to include an Action Sheet from each review which summarizes the salient features and recommendations for each case or group of similar cases, and iden-

tifies the person responsible for addressing these recommendations, along with a response time line. These Actions Sheets should be reviewed at subsequent meetings as part of the routine MDSR monitoring. Any recommendations which are for local action should be transmitted to the local health teams as soon as possible.

Data transmission

The Case Summary should be transmitted to the next level for data aggregation. New technologies have allowed countries to move toward online systems for continuous reporting and access. These modalities have improved the system's timeliness and have allowed for sources and information to be validated. These files should however be password protected to safeguard confidentiality.

CHAPTER 6 Data Analysis and Aggregation

6.0 Introduction

To conduct a good analysis, one must establish a clear framework for the transmission, consolidation, processing and storage of data inputs. Data aggregation range from specific, local-level analyses intended to describe and uncover patterns and steer local action, and the corresponding response to monitoring national trends. This Chapter covers the process of developing an analysis plan, evaluating data quality and completeness, and approaches to aggregating data at various levels of the health system and preparation for reporting.

6.1 The MDSR analysis plan

Data analysis and the interpretation of results are two critical components in the design of any surveillance system intended to guide public health measures, to prevent disease and promote health. The data analysis team needs to have a clear understanding of the information they will be using, its sources, limitations and the requirements of the end users (Boxes 6.1 and 6.2). Team members should have the requisite statistical and epidemiological skills, and have access to the required demographic and health system denominator data. Where training is needed, technical support should be arranged to improve and expand the skills of those who will be required to analyse the data.

Selecting and calculating indicators

The analysis plan (see Figure 6.1) must include guidelines on how to calculate rates, ratios and proportions; how to present data in tables, figures and diagrams; methodological notes for comparing rates with expected values; reference rates and baseline values; and how to use statistical probability methods to determine if apparent differences in the rates are significant. External data, including total number of births, total number

Box 6.1: Requirements Prior to Conducting the MDSR Analysis

1. Knowledge about surveillance (sources, mechanisms, data collection tools, soundness of the data, data input and validation).
2. Precision of the indicators to be measured.
3. Being up-to-date on changes in the timing, case definition, detection and data collection methods.
4. Understand data limitations: incomplete coverage, poor quality and changes in the timing of data processing procedures.
5. Changes in case detection (e.g. introduction of compulsory notification, active case search, and improvements in filling out reports).
6. Modifications to the data collection tools should be considered in interpreting data on trends. For example, if countries have added a check box for verifying pregnancy in the death certificate, this should increase the detection of deaths during pregnancy.

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Box 6.2: Analysis of Maternal Deaths – El Salvador

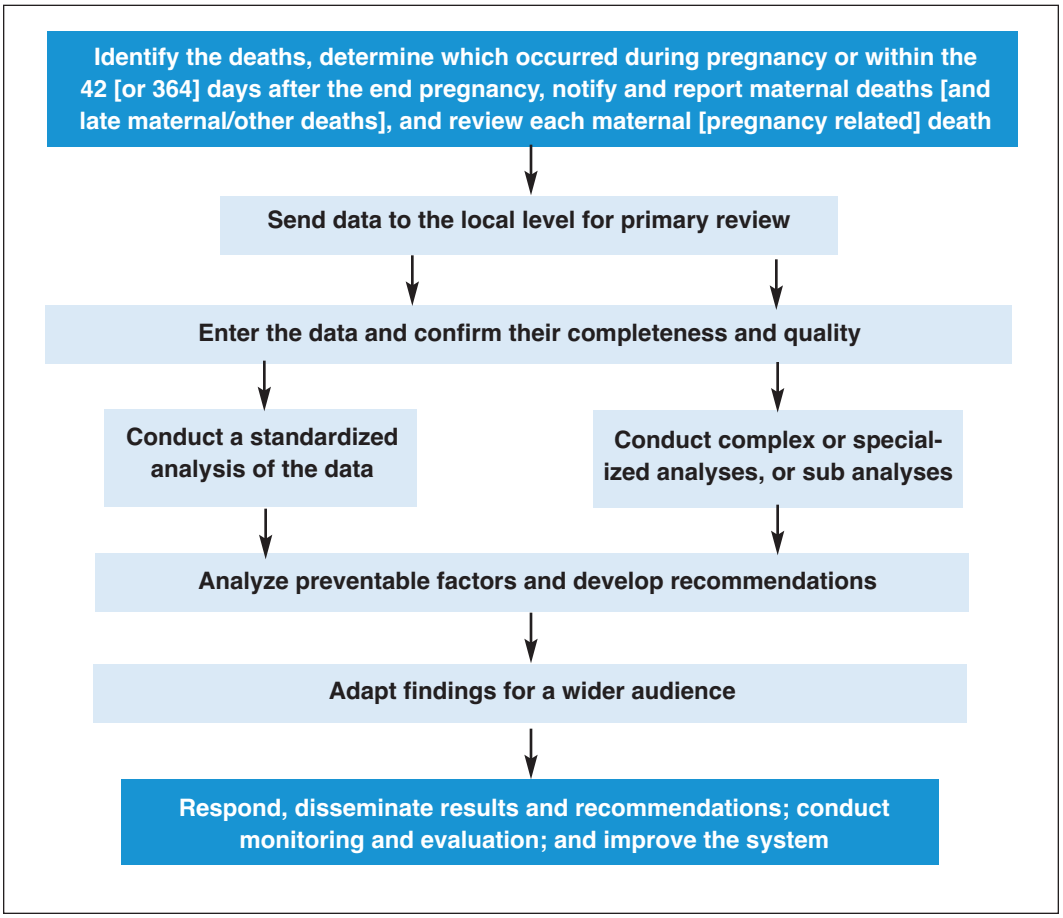
The analysis of deaths is guided by the Technical Guidelines for Surveillance of Maternal and Perinatal Morbidity and Mortality. Every Ministry of Health (MINSAL) facility must implement the mortality surveillance system to gather objective information on maternal deaths and help reduce under-registration in their area. The process includes the following procedures:

a) Identification of deaths including: (i) active search; and (ii) passive search
b) Notification, registration and processing
c) Investigation
d) Monitoring, evaluation and dissemination
e) Quality control.

Committees for Morbidity and Mortality Surveillance are established at the various levels of care and work as a network. They are responsible for the surveillance of maternal, perinatal, infant and childhood deaths; analysis of the medical and non-medical causes of death; the quality of care provided; and the extent to which a death or severe maternal and neonatal morbidity may have been predicted. The results should allow the leadership in health institutions to design and implement the necessary technical and administrative interventions to prevent similar cases in the future.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Figure 6.1: MDSR Analytical Framework



Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

of women of childbearing age, population size and geographic location of existing health services, are critical for calculating the selected surveillance indicators.

The MDSR analysis plan (qualitative and quantitative) should include indicators of:

- **Magnitude**: Number of maternal deaths; incidence (MM ratio [maternal deaths per 100,00 live births]; MM rate [maternal deaths as a percentage of deaths in women of childbearing age]) and maternal death risk.
- **Cause specific mortality**: Mortality ratio (per 100,000 live births) from specific causes and proportional rates of mortality by cause.
- **Premature mortality**: For example, years of potential life lost.
- **Avoidability**: Percentage of maternal deaths due to avoidable factors and sources of delay.

6.2 Handling the data: Confirming the completeness of notification and data quality

Once Case Summary Forms are received by the district or next level in the system, a database administrator must check the data's completeness, validity and consistency; ensure that cases are de-identified but include a case number; and upload the information into the MM database. If necessary, the review team will be notified of any problems including inconsistencies or inadequate information in some entries.

The database to be used in the analysis is critical. Access should be password-protected and the password should only be known to authorized personnel while they work on the analysis. Back-up files should be kept in a secure closed area. Security copies should be generated as a matter of course.

6.3 Analysis and reporting

Figure 6.1 details the steps in the analysis and interpretation process. Computer programmes can be developed to conduct analyses and produce standardized tables, figures and maps, which may improve the data use and communication. Designing these programmes will require an initial investment in time, but in general, they will save time in the long-term. It is important to have a critical eye when reviewing data input and output to ensure that the information makes sense. Updating source data and programme codes must be incorporated into the management of the data handling plan. The ICD-MM should be used to standardize the reporting of MM causes and code the underlying factors to improve data comparability.[16]

Aggregated analysis should identify the leading causes of death (see ICD-MM),[16] sub-groups at highest risk and what are the contributing factors. All of these findings should guide the prioritization of interventions toward the most effective responses. As data are aggregated, efforts should focus on identifying system errors and finding programmatic and political solutions to the question "why did this death happen?"

Local level analysis and data aggregation

Aggregated analyses should be carried out of maternal deaths in hospitals or jurisdictions with more than 2,000 births each year. While only a few deaths may occur in some areas, information on even one or two cases is important. The aggregation of local and district level data may sometimes provide sufficient numbers to conduct a substantive analysis. These areas should be able to do simple descriptive reports of the deaths in their institutions or geographic areas and enable monitoring of trends. For smaller jurisdictions or where incidence is relatively low, data may be analyzed over longer time frames such as quarterly, trimestral or annually. Comprehensive reports may be compiled every three years to provide stable estimates and sufficient cases to enable more detailed sub-group analyses.

Hospital-level analyses will have different functions and responses/actions than at the district or national level. All hospitals should know how many deaths occur there each year and the causes of death. Indicators should include maternal and perinatal mortality rates. For larger facilities, case fatality rates for the leading causes may be appropriate.

Sub-national (district, municipal, regional) versus national analyses

The analysis and corresponding responses will have different functions depending on whether they are applied to the hospital level than if they are targeted to the local (district or municipality) or the national level (see Box 6.5). Sub-national (district, municipal, state or regional) analyses are intended to identify any changes in the evolution and trends of MM, and identify geographical variations which may get lost when national data are merged. As data are aggregated for larger geographic areas, patterns emerge which may not be evident when individual or small numbers of cases are examined. Inherent system gaps become clearer which inform the national response. National aggregated analyses summarize medical and non-medical causes; contributing factors and avoidable factors; and discern the subgroups at greatest risk. Attention should be paid to evaluating emerging data, and prioritizing the health system problems that are needed to improve the response. Areas for policy interventions should be highlighted.

Quantitative analysis: Descriptive summary

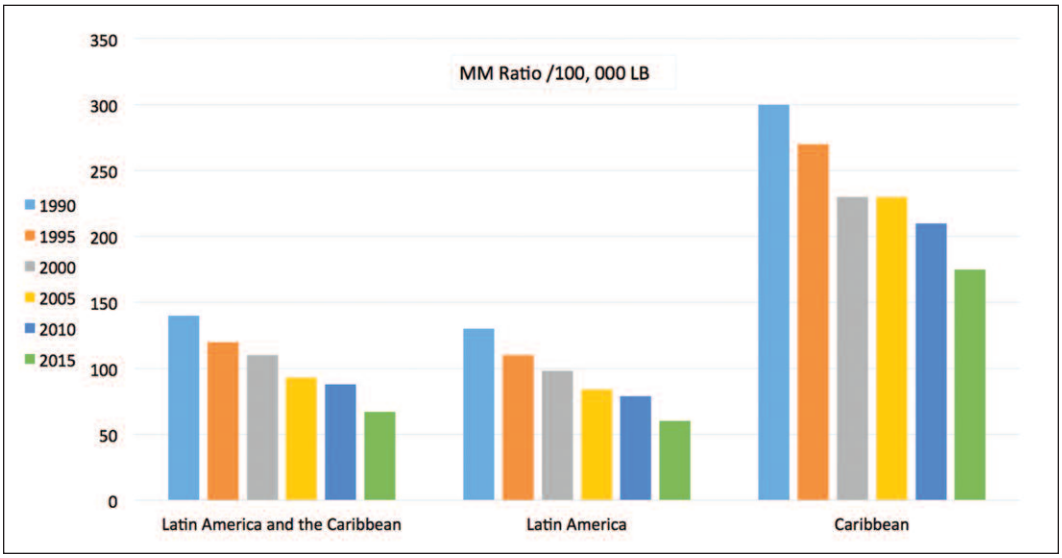
Basic descriptive analyses summarize the person, place, time and how variables (see Box 6.3). Current and temporal series analyses may be presented in tables or graphs; the choice of display form will depend on the audience and the detail required by end users. Graphs (Figures 6.2–6.4) provide visual images of either trends or the current situation. Use of geographic information systems (GIS) are valuable approaches to consider if resources permit (Figure 8.1).

For the person (age group, gravidity/parity, race/ethnicity, pregnancy outcome); place (residence, location of delivery, where the death occurred), and time (distribution of absolute number or cumulative number of deaths per month, trimester or year); and time trends (days from delivery to death), the analyst should consider whether the pattern of causes is evolving, such as from mostly direct to more indirect deaths; when in the reproductive process (pregnancy, delivery, first week or later in the puerperium) deaths occur; has the pattern changed and are there noticeable trends for demographic and social determinants? Are there more or fewer adolescents or older, high parity women or specific ethnic groups? Are there differences among selected geographic areas or urban versus rural patterns? Is there quality of care differences by health regions, level of facility, or skill of care provider?

Box 6.3: Requirements Prior to Conducting the MDSR Analysis

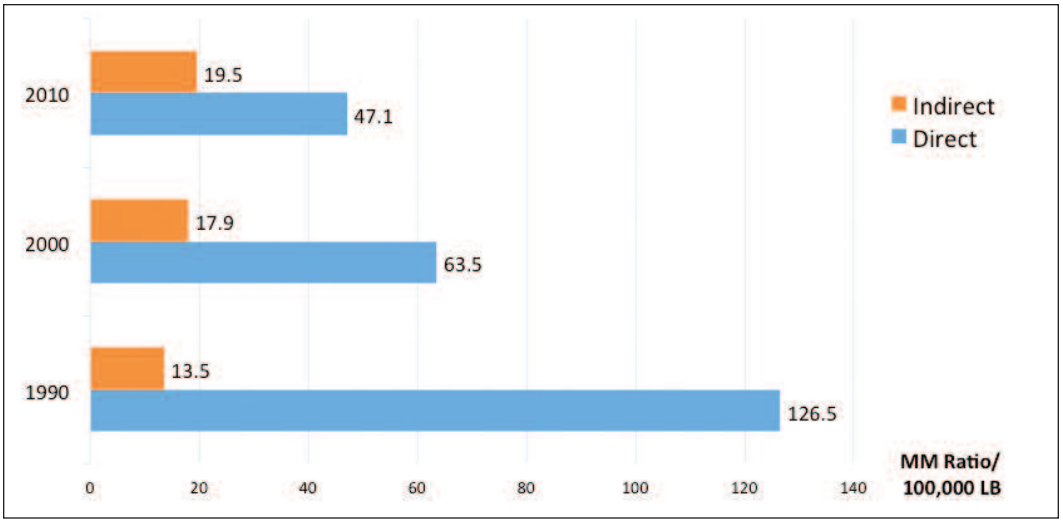
- **Woman:** Age group, race/ethnicity, gravidity/parity, gestational age at the time of death, pregnancy outcome (undelivered, abortion, foetal death, live birth), family's socioeconomic level, education.
- **Place:** Family place of residence (urban or rural, neighbourhood/sub-district, city or town), location of last hospitalization, place of delivery, where the woman's death occurred.
- **Time:** Date of death (day, month, year), hour of death, weekday or weekend, when in the reproductive process death occurred (pregnancy, childbirth, days after pregnancy ended; trimester of pregnancy).
- **Antenatal care:** Weeks pregnant at first antenatal care visit; total antenatal visits; referral; measures of compliance; distance from the residence to the institution.
- **Delivery:** Date and hour of the abortion/birth, day of the week, where the delivery took place, type/level of place (home, basic, comprehensive, tertiary), personnel in attendance, type of delivery (vaginal, forceps/assisted, caesarean).
- **Data source:** Notification only, hospital clinical history, verbal autopsy only, post mortem.
- **Medical cause of death:** Direct, indirect, incidental, accidents, violence.
- **Contributing factors** and determination whether the death could have been avoided.

Figure 6.2: Trends in MM Ratio per 100,000 live births in Latin America and the Caribbean, 1990–2015



Source: WHO. Trend in Maternal Mortality: 1990–2015. Geneva, 2015[2]

Figure 6.3: Incidence and Major Causes of Maternal Death, Brazil – 1990, 2000 and 2010

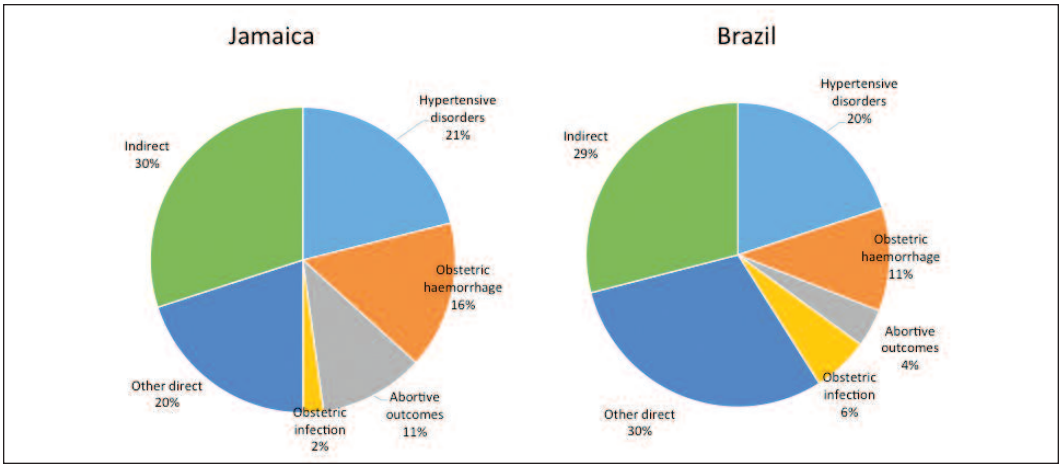


Source: Country studies requested by the GTR in 2012 from Brazil, Colombia, El Salvador, Jamaica and Mexico[12]

Medical causes of maternal death

The ICD-MM[16] provides guidelines which summarize the underlying medical causes of maternal death broadly into direct, indirect (Figure 6.3) and other (coincidental, incidental) deaths. Where countries monitor late maternal deaths, additional categories of late direct and late indirect may be included. The standard ICD-MM groups should be reported (abortive outcomes, hypertensive disorders, obstetric haemorrhage, obstetric infection and indirect causes). Due to small numbers, unanticipated complications of management may be combined with other obstetric complications (Figure 6.4). If the unknown group is high (≥2%), it may be included.

Figure 6.4: Causes of Maternal Death (%), Jamaica (2010–12) and Brazil (2010)



Source: Country studies requested by the GTR in 2012 from Brazil, Colombia, El Salvador, Jamaica and Mexico[12]

Qualitative Analysis – Medical and non-medical causes of death, contributing and avoidable factors

Documenting the frequency of medical and non-medical problems that have contributed to maternal deaths is a priority in the MDSR analysis, as these factors provide clues to whether each death could have been avoided. Grouping results from case reviews quantitatively, shows the most common problems or system gaps which are in need of correction. In order to systematize this approach, a double-entry table (such as Table 6.1) for examining a problem tree and the health system levels may be used. This approach makes it possible to systematize problems and prepare different and specific responses for each type of problem and targeting the level in which it was detected. The philosophy of this approach can be integrated into national MDSR policies (see Box 6.4).

Table 6.1: Problem Areas and Health Care System Levels

Problem areas	Community	Formal health care system	Intersectoral
Attitudes			
Knowledge/skills			
Resources			
Access to care			
Quality of care			

Box 6.4: Mexico – Method for Detecting Critical Links

This method shifts the report of patho-physiological causes – such as haemorrhage – to detail failures in the health services and in health care processes (UNICEF, 2009). In response to a directive from the Secretary of Health to count maternal deaths one by one, and recognizing that "one maternal death is one death too many", the Fair Start in Life programme of the National Institute of Public Health, contracted a researcher who developed the "Method for detecting critical links in the health care processes to identify actions leading to improvements" (Núñez-Urquiza, 2004).

The method was applied in 14 state health systems for analyzing 325 MM cases. Results were disseminated via an electronic publication and through workshops in every state health system. The Rapid Response Group used the process to notify maternal deaths and to evaluate cases and the performance of the health services. The method is particularly useful in a system such as Mexico, where health care is fragmented among health centres and hospitals. It is therefore critical to be able to determine whether this structure supports a woman's continuity of care from one unit to another.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Contributing factors to maternal deaths can be grouped into a roadmap towards survivability: from acknowledging a medical problem to decision-making periods; then access to care/referral logistics and quality of medical care. By identifying medical and non-medical preventable factors, distinguishing specific community-level issues from those in the formal health care system, and those requiring an inter-sectoral approach to resolution, an effective response becomes more likely. Keep in mind that among contributing conditions are medical co-morbidities (e.g. HIV, obesity) which have both short-term, more immediate medical responses (more screening, better treatment) and long-term inter-sectoral solutions (lifestyle solutions like more green spaces for exercise, health promotion in schools and communities, etc.) (see Box 6.5).

Box 6.5: Analysis of Maternal Deaths – Colombia

The analysis model proposed by the National Institute of Health is the PAHO four delays "Road to Survival".

Each maternal death is analyzed differently at various levels:

- Institutional level: Each health institution that provided health care to the deceased woman must identify those quality-of-care factors that may have contributed to her death and develop plans of action to change those factors. Simultaneously, insurance companies handling benefit plans must analyze maternal deaths among their insured population.
- Municipal level: A comprehensive analysis of the case at this level takes into account institutional inputs and information from family interviews and aims to identify both contributing factors that affect quality of care, but also those whose correction may require inter-sectoral intervention.
- Departmental level: At this level, institutional and municipal findings are reviewed. Basic and direct causes and whether the death could have been avoided are established by consensus. Contributing factors that require an intervention are determined and institutions commit themselves to the plans of action. The resulting report is sent to the national level (National Institute of Health) with a copy of the medical history, institutional analyses, corresponding improvement plans and the plans for follow-up.

The National Institute of Health reports that at the departmental level review, participants include representatives from the departmental and municipal secretariats of health; health institutions that provided care to the deceased; health promotion companies which provide health insurance for the population; and other health . . . and social sectors as the case may require. For each case, improvements are determined by the findings in the health care path within the health sector. Improvement actions are consolidated into an improvement plan for each institution involved in the case."

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Finally, in order for results to detect real changes in incidence, data analysis and interpretation must consider shifts in the population structure and characteristics; changes in or improvements to detection procedures and case definition; and interventions to improve case reports and information. In addition to determining the extent and geographic distribution; changes in the structure of the causes of death, the identification of high-risk groups and of contributing factors; the analysis must include a process review. This is intended to evaluate the follow-up and the response efforts to detect if the inputs to enable the desired impact or behavioural changes in health care practice have occurred.

More complex analyses

Specific questions may arise from the analysis that inform more complex or customized analytic approaches than those done routinely. Temporal series analysis or geographic information systems (GIS) analyses are promising approaches to consider if the resources are available. GIS technology, introduced in the 1990s, has rapidly become an essential complement to the epidemiological analysis of surveillance data, which allows policy developers to easily visualize problems by geographical location, and identify target areas that have greater needs. This improves the capacity to plan interventions accordingly, efficiently mobilize resources and monitor the situation.

Monitoring data input and output quality

Results should be checked periodically and fed back to health teams and others in the community who are involved in identifying cases. If real numbers of maternal deaths differ from expected numbers (see Table 5.1), a more detailed examination must be undertaken to determine why this is so. Maternal death numbers that fall below expectations should trigger an investigation into whether these are real improvements, or if additional deaths were not captured by the system, and why. When notification improves, the MMR also tends to increase. While this may spark an alert to the system, this situation should be considered, and need not be a matter of concern. Reviewers however must be alert to emerging diseases, such as HIV/AIDs and the more recent H1N1 epidemics.

6.4 Reporting: Interpretation and translation of the data into information for action

The most important phase of the MDSR process is the translation of surveillance data into useful information to guide decision makers, the medical community and the public. The cycle ends with a report that provides detailed and accurate information on

each maternal death which will serve to inform subsequent steps. Computer programmes can also be developed to produce standardized analyses, tables, figures and maps, which may improve the timely access to and use of data and information.

Because the interpretation of MDSR data is the foundation of public health policy and political action, it requires clear presentation of issues that respond to complex situations. It should not only identify the extent of the problem, its geographic distribution, changes in the causes of death, high-risk groups and contributing factors, it should also include indicators of the effectiveness of the response in improving outcome.

When standard reports are produced, versions should be created for specific target audiences from the community to the health team to policy makers and advocates. Care should be taken however when reporting the MMR by type or level of hospital facility. As more complex cases are managed at higher levels of care, there is an added mortality risk at these facilities. Decisions can be made whether data released to a more general audience are aggregated in such a way as to represent a range or mix of levels of care (low to tertiary), as institutional returns may be misinterpreted. For example, few deaths should occur at low levels of care because they cater to low risk women. High risk patients may mistakenly think that with low mortality rates, these are relatively safer places to deliver if they have a pregnancy complication.

CHAPTER 7

The Response

7.0 Introduction

MDSR's primary objective is to provide recommendations for action. This Chapter describes the types of responses that may be necessary to address the problems uncovered. Different response times and actions; possible criteria that may be used to prioritize actions; and approaches to managing the response are described.

7.1 Response and corresponding action

The primary goal of the MDSR process is to develop recommendations for translation into interventions to prevent future maternal deaths (see Box 7.1). As such, the committees must be comprised of persons trusted by the community of professionals as well as health service users. It is important to reiterate that, while aggregated data provide solid information on problems common to many hospitals and districts, each maternal death has information to offer that could result in actions to prevent future deaths where it occurred. Recommendations cannot be turned into actions without the support of all interested parties. It is therefore critical to have the support of local community leaders, hospital directors, programme administrators and national authorities to make the desired changes a reality. In addition, it is essential to have national-level buy-in of these changes to ensure sustainability. Ministries of health and other key interested parties must participate in the review process from the onset, must continue to be informed of progress and should be included in meetings to evaluate progress.

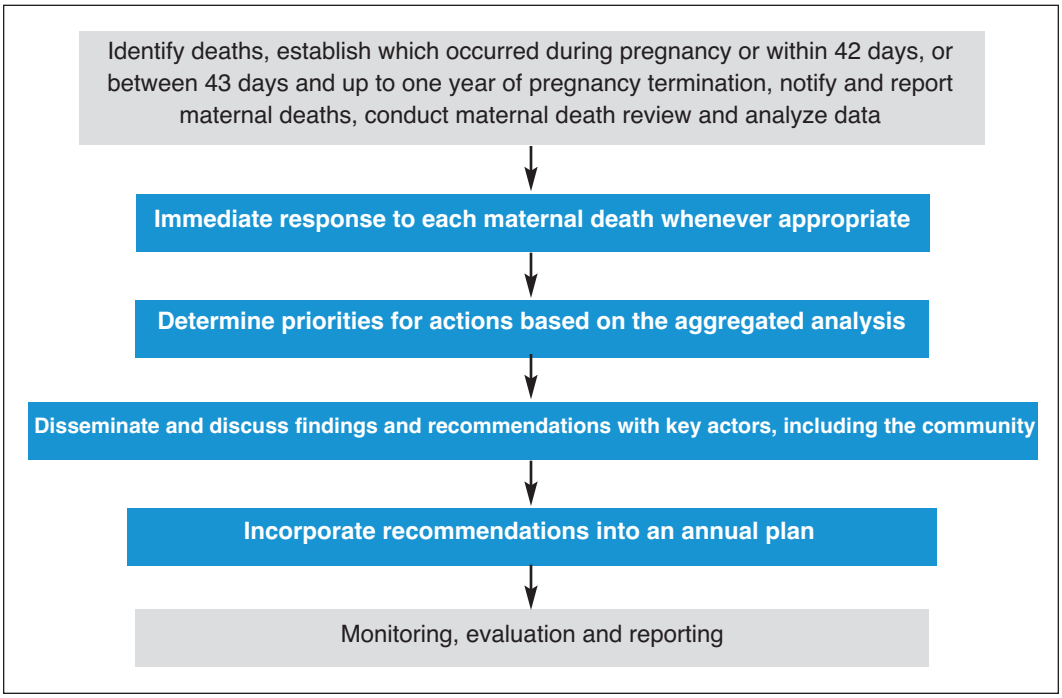
Response times may be immediate or periodic. Review findings should lead to immediate actions to avoid similar deaths in health institutions and in the community. In addition, there may be periodic or annual responses. Patterns in the problems that contribute to MM or in the geographic areas where more maternal deaths occur, may be translated into a more comprehensive response for reducing maternal deaths. Responses should prioritize actions by their potential impact on reducing MM, as well as their viability, including costs, necessary resources and feasibility of implementation. Figure 7.1

Box 7.1: Some Key Aspects for Response Actions

- To be able to act at any level, a review committee needs members which officially represent the various actors. This is essential so that committee members can communicate findings to their organizations and promote their collaboration in the development of proposed actions.
- Determining if the death could have been avoided is the first step in deciding which actions to propose. Contributing factors must be keenly observed in order to avoid other deaths.
- Decide which methodology to use to prioritize problems and establish which actions will be undertaken first. Criteria should include the frequency of the problem and the feasibility of action. (Are there enough resources to bring about change?)
- Begin with a few actions that can be achieved. In the United States of America, the states that have been most successful in developing and implementing beneficial interventions have been those that have looked at their data, have identified an important problem and have worked on it. Those states that list all their problems and issue 20 or 30 recommendations end up doing NOTHING.

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Figure 7.1: MDSR Response Steps



Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

outlines the steps in the response process. The strategy for implementing the recommendations of local-level committees must be clearly defined and corresponding responses arrived at and prioritized.

Responses must be tailored to problems identified in the community, in the health system and at the inter-sectoral level. The actions undertaken will depend on the level at which decisions are made, the review findings and on the protagonists. Improving the quality of health care is an important response at the hospital level. Most countries, however, report that the response process has been the most difficult component of the MDSR process to operationalize (see Boxes 7.2 and 7.3). Nonetheless, these recommendations have resulted in quantitative and qualitative improvements in maternal health care as they have guided infrastructure development, skills training and institutional linkages, the latter of which has been the most difficult (Table 7.1).

Box 7.2: El Salvador – Improvement Plans

Once a maternal death occurs, the surveillance system is activated and a specific investigation of that case unfolds. The case analysis generates an Improvement Plan designed to prevent another such death in the same circumstances.

The follow-up of these improvement plans and the monitoring of health institutions, however, is deficient. There is a leadership vacuum at the level of the guidelines that prevents these plans from having the desired effect, with little support for the follow-up processes for the recommendations at various levels.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Box 7.3: Colombia – Recommendations and Decision-making Process

The ultimate objective of a maternal death analysis is to develop improvement plans and interventions to control the identified contributing factors. These plans must clearly establish activities deadlines, persons responsible and indicators to enable the follow-up of compliance with the improvement plans.

The roadmap for these recommendations is clearly defined:

- "Findings from the individual case analysis will become recommendations to be included in improvement plans of health provider institutions, for later . . . evaluation in terms of the community, the institutions, and the user and her family; based on the recommendations for each scenario."
- "Recommendations from the global case analysis are incorporated into the Health Situation Analysis and is an input to the municipal-level planning process leading to the Development Plan and Local Health Plan. These proposed strategies are based on prioritized lines of action."

Box 7.3 continues on next page

Box 7.3: Colombia – Recommendations and Decision-making Process

Despite these formal processes being in place, those interviewed unanimously stated that there are difficulties in the follow-up process and in wrapping up improvement plans:

- "There are difficulties in following up improvement plans and a lack of commitment from the health promotion/insurance companies and health provider institutions in implementing improvement plans that truly improve their processes and procedures."
- "After the analysis unit has examined the causes of the maternal death, the health institutions involved propose improvement actions. The improvement plans are submitted to departmental or district secretariats of health for evaluation and follow up. This last process of epidemiological surveillance remains poor due to weak links between areas in the departmental or district secretariats of health responsible for leadership, inspection, surveillance and control functions for the health system. Difficulties in having enough professionals in the secretariats of health to perform the above functions and political will is not equal in all the regions."

Plans of action:

- Plans of action encompass consensually arrived actions designed to diminish conditions the committee determined were associated with the maternal death. These conditions focus on: the woman, the family, the community and the health system, as defined in the Web-based Epidemiological Surveillance System for Maternal Mortality. This module makes it possible to prioritize activities such as the follow-up of compliance with proposed activities through quantitative and qualitative indicators.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

7.2 Response Actions

Responses must be culturally appropriate and tailored to the problems identified (knowledge, practice, resources, communication). The type of actions will depend on the level at which decisions are made and the participation of all interested parties. Interventions also will be influenced by the country's available resources and technology. While many problems may be identified, it is important to establish priorities. Prioritizing interventions based on impact will help to optimize results with limited budgets (see Box 7.4).

Actions may include improving resource inflows to more affected areas and populations, as well as amending or updating policies, laws or standards. Actions in the community may include development of education and health promotion programmes;

Table 7.1: Jamaica – Selected recommendations implemented and advocacy actions that emerged from maternal mortality reviews

Sector	Implemented recommendation	Advocacy Action
Infrastructure	• Improvement to obstetric wards at three of four regional referral hospitals • Upgrading of two hospitals from basic to comprehensive obstetric care facilities	• A proposal developed to construct five High-Dependency Units has been funded by the European Union • Advocacy for infrastructural development – e.g. ultrasound units
Quality management	• Development of maternal death surveillance guidelines (national level) • Refresher courses for midwives, public health nurses, medical records staff, clinicians and staff in non-maternity wards to improve case identification (North-East region) • Development of an antenatal care curriculum	• A proposal has been developed to audit complications of the hypertensive disorders of pregnancy to determine why cause specific mortality has increased
Skills training	• Regional surveillance systems training has been conducted by the Ministry of Health • Continuing medical education for managing shock (in Western region)	• A proposal has been developed to train health teams to apply antenatal care guidelines to improve the identification, referral and follow-up of high risk women in the community
Service delivery	• Increase in outreach and high-risk clinics in the community to improve access and reduce burden on secondary care (South-East region) • Increased health promotion efforts targeting high-risk women – chronic diseases, sickle cell disease	
Strengthening institutional and inter-sectoral linkages	• Improving the referral system between primary and secondary care (South) • Reducing unnecessary referrals fostered the involvement of a consultant to review and recommend cases for transfer (West)	• Implement data sharing agreements between the Ministry of Health and: – The Ministry of Justice (to share post mortem reports on community deaths) – Civil Registrar to enable two-way sharing of mortality data for case validation – implement Form 5 (Annex 8)

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Box 7.4: Guiding Principles for the Response

- The design must be based on avoidable factors identified during the review process.
- Approaches must be evidence based.
- Prioritize actions on prevalence, viability, resources and conditions in the health system.
- Establish a timeline (immediate, short-term, medium-term and long-term responses).
- Decide how to monitor progress, efficacy, and impact.
- Recommendations must be integrated into annual health plans and budgeted for, and into the health system's interventions packages.
- A monitoring and evaluation system, along with accountability, must be established to ensure that recommendations will be implemented.

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

modifying service delivery to improve access, acceptability and compliance with advice, and where necessary, improving the attitude and communication skills of health professionals. Infrastructure improvements may be needed such as to highways, bridges and communications. Communities may be invited to develop acceptable and workable solutions, such as those that address the transportation challenges many pregnant women face. These last actions related to social determinants in health, may require inter-sectoral planning and broad governmental support.

7.3 Prioritization of responses

Not all problems identified during the MDSR process can be dealt with at once, thus setting priorities is necessary, guided by those actions that will have the greatest effect on avoidable maternal deaths. Several characteristics must be considered in prioritizing problems and their solutions:

- **Prevalence:** How often does the problem occur? Solving common recurrent problems may have a greater impact than episodic occurrences.
- **Feasibility of the intervention:** Is the solution feasible technologically and financially? Are there enough human resources who are either trained or who can be trained to implement it? Is the cost reasonable?
- **Impact:** What is the intervention's potential impact? If successfully implemented, how many women would benefit and how many lives would it save?

Identifying the response coordinator

It is critical to identify a person at each level (e.g. hospital, district, national) who will ensure that recommended measures are undertaken. The response coordinator may not necessarily be a single person, as local needs and circumstances may require more than one coordinator. Most response coordinators are based in maternal and child health departments or sections and have responsibility for maternal health. Their task is to develop a response plan which, among other things, identifies the roles and responsibilities of persons who are best suited to address the problem(s). Thus, if specific drugs are not available, she/he would ensure that the local procurement officer works with those responsible for the national-level supply chain. Because responses may change over time, it is important to allow for flexibility in the planning process.

The response coordinator should also monitor implementation of agreed actions and report to the MM committee. The coordinator should participate in regular meetings with others at the local and national levels to share information, improve the teams understanding of what works and what doesn't, and share innovative and effective solutions. This interaction will ensure the successful translation of what works into improved maternal health outcomes. Support and commitment from the highest political authorities at each level (mayor, minister of health, president/prime minister) is also essential to a truly effective response.

7.4 Response times

Findings from the review of individual maternal deaths may result in recommendations of an urgent or short-term nature, while others will require a medium to longer term, depending on whether resources will need to be identified and how much time and cost would be involved in implementing these solutions. The more immediate actions would be those of relatively low economic or administrative cost, such as specific supervision to ensure that existing guidelines are adhered to. Longer term interventions include those that require the development/adaptation of evidence-based guidelines; recruitment of new or retraining of existing staff; procurement of equipment; addition of new services; changing laws or policy directives, or identifying new funds and implementing new strategies in sustainable ways.

Immediate responses address problems unearthed by the review which do not need one to wait for data to be aggregated before actions can begin to be executed. These require quick correction, either in health institutions or the community. At the health service level, these actions may address quality of care gaps (e.g. ensure that qualified personnel manage obstetric emergencies; address availability of essential obstetric medicines or inputs; and improve access to antenatal care or contraceptive services).

Periodic responses will emerge from monthly, quarterly or six-month reviews of aggregated results. These may identify a particular pattern of problems that contribute

to MM or are unique to specific geographic areas which may not be apparent from the individual case reviews. These periodic reviews and responses should be integrated into what constitutes standard practice in larger hospitals and districts, through a committee established for this purpose. These results should lead to a broader approach to addressing the problem and may cover many hospitals or communities. Once high-risk areas are identified, discussions with these communities must be a priority so that feasible and acceptable solutions are found.

Responses incorporated within annual maternal health plans

Actions must be prioritized by their potential to reduce MM and their feasibility of implementation. This will be guided by cost, needed resources and ease of implementation. Annual maternal health plans should be detailed at hospital, local and national levels:

- **Hospital Level:** Each institution must summarize, on a yearly basis, its conclusions about maternal deaths in the facility. For larger hospitals where several deaths may occur, results must be incorporated into ongoing quality improvement plans. Large hospitals must also evaluate the efficacy of the MDSR recommendations to contribute to reducing MM. In addition to monitoring the MMR and its causes, institutions should evaluate other indicators such as the perinatal mortality rate, the case fatality rate for specific high impact conditions (e.g. pre-eclampsia, obstetric haemorrhage, abortion, gestational diabetes) and to identify other areas for quality improvement which impact maternal and perinatal health.
- **Local Level (region, district or municipality):** Results of the aggregated analyses and recommendations should be presented in a local report for dissemination to and discussion with key **stakeholders, including community members**. Possible local-level actions may include strengthening of the health system; staff training and retention; mobilization of resources; increased awareness about MM and relevant interventions in the wider community and specifically households with WRA; and promotion of partnerships between the health services, the community and other sectors including the private health sector. Community health/primary care facilities may also consider the causes and contributing factors influencing deaths among their target population to identify which antenatal, postnatal and community care services may need attention. Reducing adolescent pregnancy could be one such service area for intervention.
- **National Level:** Results from the national aggregated analyses and recommendations from the lower levels (districts, regions, municipalities) must be consolidated into a national report to inform the development of a **national maternal health plan**. New or emerging patterns should be highlighted and efforts made to reverse or limit neg-

ative developments. At the national level, a long-term (3–5 years) strategic plan may be proposed, and should prioritize those neighbourhoods or geographic areas where the risk of maternal death exceeds the national average.

7.5 Importance of evidence-based Interventions

Identified problems and recommended actions/interventions must be evidence-based (WHO's Integrated Management of Pregnancy and Childbirth guidelines may be used).[21] These interventions have been shown to improve health care processes and results, once they are adequately implemented. The use of sexual and reproductive health intervention packages must be promoted across the continuum of antenatal, pregnancy, childbirth, the puerperium and newborn care – particularly contraception, safe abortion, and care of pregnant women and neonates. Packages should nonetheless be evaluated to identify possible barriers limiting their effectiveness under local conditions.

Not all problems identified may have evidence-based solutions, particularly those dealing with the family, the community, infrastructure and access to health services. Finding acceptable innovative and effective solutions is more likely when the community participates and offers ideas. Ideally, any adopted measures that were not evidence-based, should be evaluated to ensure that they are having the desired effect. Novel strategies may be pilot tested, evaluated and, if effective, rolled out on a phased basis.

7.6 Advocacy

Advocacy is a process whereby a person or a group seeks to influence the behaviour, policies and decisions about resource allocation within political, economic and social systems and institutions. Changes in behaviour and clinical practice are often difficult to achieve without broad promotion and visible support from social leaders or trend-setters, who are highly regarded by professionals and professional organizations.

Effective advocacy requires rigorous in-depth investigation, careful planning and clear practical goals. There must be clear well framed arguments which enable excellent communication with the public. The evidence and history behind maternal deaths make for powerful and effective advocacy in a variety of ways, such as:

- exposing the scope of a problem, showing patterns and trends, causes and social determinants;
- describing needs and barriers (e.g. deficient or restricted access to inputs);
- promote professional and community education, awareness and training;
- highlight gaps in protocols or policies; and
- disseminate MDSR successes in improving the health services and quality of care.

Creative strategies can be used as advocacy tools. These may include media campaigns, community storytelling and school competitions to engage adolescents in SRH teaching and learning. Professional organizations and service clubs can be engaged in a variety of ways. The methods available are many, and the avenue selected will depend on the message, the desired outcome and evidence regarding what works.

CHAPTER 8

Monitoring, Evaluation and Accountability

8.0 Introduction

In order to ensure that a system performs as designed, it is necessary to build-in, from the outset, methodologies to routinely monitor and episodically evaluate its performance. If the maternal health team is to be held accountable for improving maternal health, all levels of the health system should be assessed. This Chapter covers strategies to assess the MDSR process, its outputs and impact on improving maternal health information and reducing maternal deaths.

8.1 Monitoring and evaluation

The establishment and implementation of a monitoring and evaluation framework for the MDSR system is intended to ensure that the system's main steps are functioning properly and will improve over time. Included in this process are reviews of both the timeliness of the information and the system's coverage (see Box 8.1). The process also feeds into keeping the system accountable to ultimately reduce maternal deaths.

Box 8.1: Key Messages for an Effective Monitoring and Evaluation Process

- It is not enough merely to issue recommendations and to formulate actions.
- Recommendations and actions must be monitored and regulated to achieve concrete results.
- Short- and medium-term actions must be proposed. Short-term actions are important in that they show concrete results.
- The monitoring and evaluation process must be mandatory and carried out at the highest possible level.
- National level recommendations must be directly supervised by the Minister of Health, with precise deadlines established and a specific person assigned to the task.

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Monitoring of the MDSR system is mainly conducted at the national level. It should be noted, however, that some indicators also are relevant at sub-national levels (see Table 8.1). It is important to agree on a frame of reference for selecting indicators for monitoring the process as well as indicators for the annual evaluation. Monitoring indicators should provide a quick view on whether the system is functioning and improving. It will also be useful to conduct a more detailed quantitative and qualitative periodic evaluation, especially if indicators show that one or more steps in the surveillance process is not reaching expected objectives, or if MM is not decreasing.

Given that the MDSR's main objective is to implement actions to reduce MM, the system is **failing** if maternal deaths are not decreasing. A more detailed evaluation may also be used to determine how the system could function more efficiently. Ideally, a periodic evaluation on the quality of the information provided also should also be conducted. Other aspects of the MDSR system that are important to evaluate include acceptability, timeliness, data quality and stability.[22,23]

Table 8.1: Evaluation of the MDSR Systems – Examples of Indicators and Goals

Indicator	Examples of goals
General system indicators	
Maternal mortality is a mandatory reporting event	Yes
National maternal death review committee exists and meets periodically	At least quarterly
A maternal death report is published yearly	Yes
% of districts that have a maternal death committee	100%
% of districts with persons responsible for reviewing maternal deaths	100%
Identification and notification	
Health institution:	
All maternal deaths are reported	Yes
% within 24 hours	>90%
Community:	
% of communities with monthly "zero reporting"	100%
% of communities that report maternal deaths within 48 hours	>80%
District:	
% of expected maternal deaths that are notified	>90%
Review	
Health institution:	
% of hospitals that have a review committee	100%
% of institutions that review maternal deaths	100%
% of reviews that include recommendations	100%

Table 8.1 continues on next page

Table 8.1: Evaluation of the MDSR Systems – Examples of Indicators and Goals (*cont'd*)

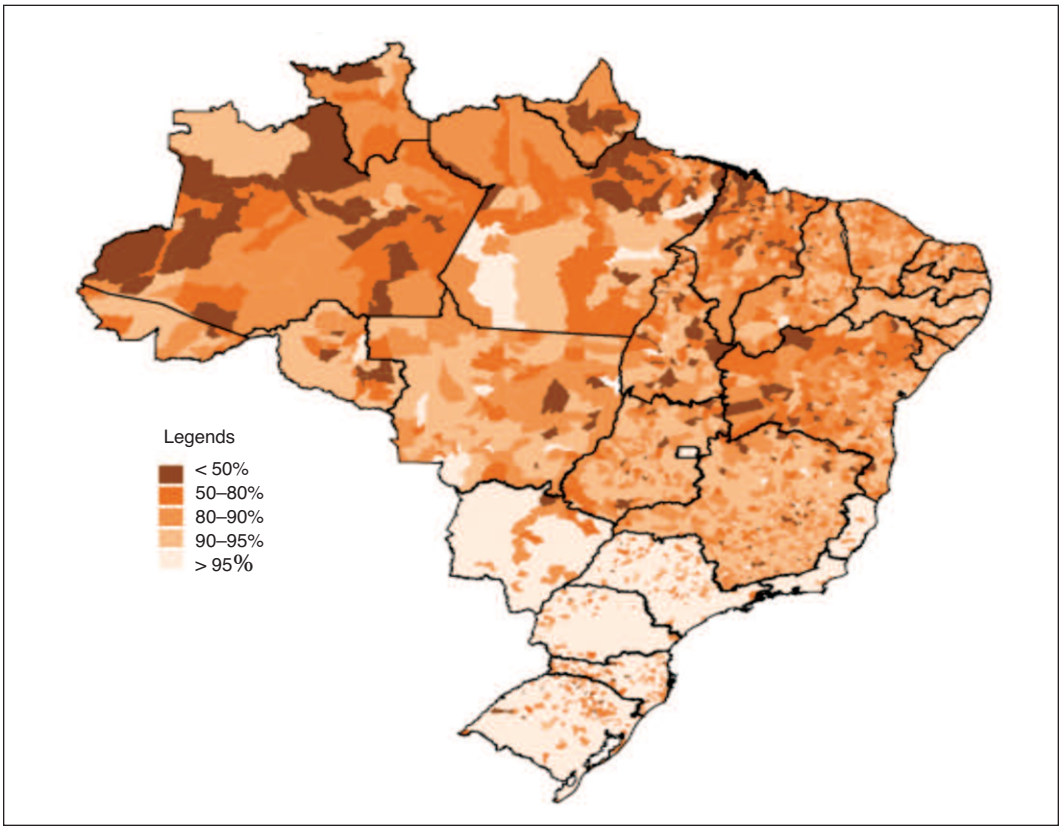
Indicator	Examples of goals
Review *(cont'd)*	
Community:	
% of verbal autopsies conducted in probable maternal deaths	>90%
% of maternal deaths reported that are reviewed by the district	>90%
District:	
A district-level maternal death review committee is in place	Yes
Meets periodically to review facility and community deaths	At least quarterly
% of reviews include community participation and feedback	100%
Information quality	
Cross-check hospital and community information on the same maternal death	5% deaths cross-checked
Sample of deaths in WRA verified to ensure that they are properly identified as not maternal deaths	1% WRA deaths verified
ICD-10 code on death certificate same as COD in MDSR database	25% deaths verified
Response	
Health institution:	
% of committee's recommendations that are implemented	>80%
Recommendations on quality of care	>80%
Other recommendations	>80%
District:	
% of the committee's recommendations that are implemented	>80%
Reports	
The national committee produces an annual report	Yes
The district committee produces an annual report	Yes
Report discussed with key players, including the community	Yes
Impact	
Quality of care (requires specific indicators):	
District-level maternal mortality ratio	10% annual decrease
Institutional maternal mortality rate/fatality rate	10% annual decrease

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

8.2 Timeliness and coverage

A strategy is needed to routinely monitor the timeliness and completeness of reporting of cases and adherence to the zero reporting policy. Options may be as simple as Annex 9 (Form 6: Maternal Mortality Surveillance Monitoring Report, Jamaica), where reporting units are asked to update their reports of case identification and submission; or may include a more in-depth geo map of reporting as used in Brazil (Figure 8.1). This visual map pinpoints areas in need of intervention. In Brazil that is important as under-reporting is higher in the regions with relatively higher MMRs.

Figure 8.1: Coverage of Information on Maternal Deaths by Municipality, Brazil: 2008



Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

8.3 Periodic evaluations

Periodic evaluations are intended to examine how efficient the system is. This includes evaluating the system's key processes: (1) identification and notification; (2) review; (3) analysis; (4) submission of reports; and (5) response. If there are any obstacles to functioning along this pathway, these must be addressed and corrected. Ideally, the system should be automated, at least at the district level.

El Salvador includes a routine six-monthly evaluation meeting in which a mix of stakeholders participate. They examine actions from community interventions to preventive activities intended to prevent unintended pregnancies and to improve the management of obstetric emergencies (see Box 8.2). Jamaican evaluations, on the other hand, occur less frequently, and include an in-depth review of sources of under-reporting of cases, evaluation of implementation of previous recommendations and validation of data quality (see Box 8.3). These findings and new developments will inform the training of surveillance teams and the need for improvements to the system.

Box 8.2: El Salvador – Monitoring and Evaluation

A six-month evaluation is conducted at the central level in which national-level hospital administrations, heads of health and social security, external cooperation agencies and NGOs participate. During the evaluation meeting, information is presented regarding the national budgetary allocations for:

- A basic package of contraceptive methods emphasizing methods used among adolescents.
- Pre-conception care as a way to influence indirect maternal mortality by identifying and diminishing reproductive risks.
- Improvements to and equipping maternity wards to better handle emergency obstetric conditions.
- Training volunteer leaders who can identify maternal risk factors and can issue timely referral.
- Changing the role of traditional midwives and strengthening alliances for supporting women in institutional deliveries.

"One of the more serious problems in the current surveillance system, is changing the paradigm to a surveillance system that goes beyond simple formulation of indicators, to one that can be translated into plans and, in turn, can become actions (in other words, the execution of plans). The foundation of this system is the monitoring of plans, in which the local directorates [of health] play key roles, as do the established committees."

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

Box 8.3: Jamaica – Monitoring and Evaluation

Data quality-control mechanisms make it possible to monitor the system. Periodic efforts to improve quality include:

a) Periodic evaluations of the surveillance system – RAMOS method

b) Updating epidemiological surveillance guidelines

c) Periodic validations

d) On-going surveillance training (e.g. to incorporate ICD-MM).

Two validation studies of the national surveillance system have been undertaken: one, conducted in 1998–2003 was designed to monitor the system's implementation; the second in 2008 assessed the recommendations from the first evaluation. The first resulted in the inclusion of community deaths and broadened the case definition to include late maternal deaths and associated deaths.

The identification of information gaps regarding deaths outside the maternity services, resulted in mechanisms to monitor emergency departments, medical and surgery wards for re-admissions as well as intensive care units for transfers.

The 2008 evaluations showed that deaths outside health institutions remained a problem, with a high percentage of under-registration. This problem has been broached with the Forensic Medicine Department. While coverage remains below 100%, there have been improvements in the indicators.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

8.4 Effectiveness

An evaluation of effectiveness determines whether the appropriate recommendations for action have been applied, whether expected results are being attained and, if not, where the problems lie. How this evaluation is to be carried out depends on the specific circumstances in each community, hospital or health system. It begins with a determination of whether and how specific MDSR conclusions and recommendations have been applied and whether they are having the expected effect on MM. If evidence based interventions are failing to result in improvements, more in-depth studies, such as audits of the management of specific conditions, may be needed to identify and then address system failures in care. Some of the special studies can be undertaken by academic researchers (see Box 8.4).

Box 8.4: Mexico – Accountability

The MM epidemiological analysis is periodically described during state meetings of committees for the study and prevention of maternal mortality at the health jurisdiction level and in the state health systems. However, its potential as an input for renovating actions has not been equally systematized in all states.

The epidemiological analysis, coverage analysis and case studies, may be useful monitoring tools that can issue alerts to channel immediate actions to the population or to improve the system.

By the same token, there is a critical mass of researchers connected to the National Center for Gender Equity and Reproductive Health, who continually provide guidance on necessary strategies and at-risk populations. The Committee for a Safe Pregnancy is a good example; its technical secretariat rotates and often is in charge of an NGO. Another example is the Observatory on Maternal Mortality – created on 3 April 2011. The Observatory, supported by UNFPA and PAHO, has broad institutional representation and provides technical assistance to the Maternal Health Directorate.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

CHAPTER 9

Disseminating Results, Recommendations and Responses

9.0 Introduction

Government accountability for plans and actions to improve maternal health, require transparent and periodic dissemination and discussion, particularly of MM trends among interested parties including civil society. MDSR findings should be included in national annual health sector reports and budget presentations. They can provide data for monitoring a country's progress on reducing MM and reporting to international bodies, such as the PAHO/WHO, UNFPA and UNICEF.

The findings should be disseminated for use on a broad scale to institutional, local (district or municipal), and national political decision-makers; health service planners; professionals; public health personnel; educators and groups that promote the rights of women. This analysis should lead to maternal health programmes that are increasingly prominent and efficient. This Chapter discusses strategies for information dissemination to create the greatest impact.

9.1. Reports

Annual national and local reports that summarize MDSR results, recommendations and response measures adopted, constitute in and of itself a response, as these feed the planning process, help document the evolution and functioning of systems, and may promote the incorporation of new interventions on a wider scale (see Boxes 9.1 and 9.2). An MDSR report should contribute to improving maternal health at the sub-national, district and facility levels.

The two main types of MDSR reports include:

a) Annual reports on maternal deaths

b) Monitoring and evaluation reports of the system.

Box 9.1: Ten Suggested Sections to be Included in an MDSR Annual Report

1. Background of the area covered by the review.
2. Characteristics of the women of childbearing age in the area under review.
3. Characteristics of births in the area (number [live or stillborn], birth weight, gestational age).
4. Maternal deaths by residence, maternal age, place of death (home or hospital), ethnicity (calculate MMR for each, if possible).
5. Percentage of maternal deaths by cause of death.
6. Case fatality rate (for deaths in hospital).
7. Contributing factors (quality of care, non-medical factors) and their frequency.
8. Avoidability of maternal deaths.
9. Recommendations for preventing future deaths.
10. Review of the previous year's recommendations and lessons learned (including barriers to implementation).

Source: Adapted from the *MDSR Technical Guidance: Information for Action to Prevent Maternal Death*. WHO, 2013[13]

Box 9.2: Brazil – Disseminating Information and Plans

The objective in disseminating reports is for the analysis to reach each level in the health system through the appropriate channels of communication. Dissemination is important to the social control of the health system by health teams and by the community, and must be encouraged at every level.

Monitoring maternal deaths is done through the Central Committee for the Surveillance of Deaths and the regional committees. The back-and-forth of information is continuous. Reports are debated in various fora of professional associations (of physicians and nurses), judicial system representatives, NGOs, health teams and others.

Results have had a positive impact on debates on the quality of care for pregnant women, and the adoption of deadlines for investigating cases, which has made the process more dynamic. Positive results also have been seen in the coordinated work between regional areas and health units in MM analysis and response.

The weakest link continues to be research at the family level, due to a lack of qualified human resources, and a resistance to changing the health care model. Many services also resist conducting critical analyses.

Source: Country studies requested in 2012 by the GTR from Brazil, Colombia, El Salvador, Jamaica and Mexico.[12]

The *annual* reports catalogue the analysis of the maternal deaths and recommendations; documents the appropriateness of the responses and describes achievements and challenges. *Monitoring and evaluation* reports make it possible to estimate and assess the MDSR system and its response capability. The evaluation must be contemplated from the onset, and the first measurement may be conducted after the system has been operational for a few months. Measurements must also be conducted whenever there are changes in the system, but not necessarily every year.

9.2 Development and Dissemination of Conclusions and Recommendations

The dissemination of results should follow three principles:

1. There must always be feedback of findings and recommendations to the hospital and/or the community from which the information was obtained.
2. The information presented should be aggregated without identification details, so that families and health professionals cannot be identified.
3. Legal safeguards should be in place to prevent the use of the review findings in lawsuits.

During the data analysis, factors that often contribute to maternal deaths are manifested early. Specific recommendations must be linked to plans of action and deadlines. A report with recommendations "to be done now" is more powerful than one with recommendations "to be developed sometime in the future".

9.3 Who should get the results

The form that the report takes will depend on the intended audiences and efforts should be made to ensure different stakeholders can access the results in ways that make the findings useful. Thus, short summaries of key findings should be provided for busy policy makers and advocates, while findings which are easy for the community to assimilate should also be prepared. Reports should be differentiated by recipient. The following must be included:

- Policy:
  - Ministries of health
  - Relevant politicians – local, regional, and/or national health planners, local governments.
- Health Service Delivery:
  - Health administrators or local supervisors
  - Professional organizations and their members, including paediatricians, general practitioners, obstetricians, midwives, anaesthetists, and pathologists from each level

- Health promoters and education experts
- Public health departments or community health departments.

- Other Stakeholders:
  - Administrators of other health systems, such as social security and the private sector
  - Academic institutions
  - Local or national civil rights groups
  - The media
  - Religious representatives or representatives of cultural institutions and opinion leaders who can promote and facilitate beneficial changes in local customs.
- All who participated in drafting the report.

9.4 Dissemination strategies

A mix of methods should be used to disseminate findings. Professionals should be targeted through meetings where they work, at professional conferences and through academic journals; while the community may be reached through community meetings and the media (e.g. press releases, radio, television, print, and advertising). Regional health departments and national ministries of health should provide findings through websites, statistical publications and incorporate them in annual health sector reports and budget presentations. Reports are the most common and useful means to disseminate information. If problems are identified in the community, it is important that those persons whose lives are affected participate in the process and remain informed of the results. This is valid no matter the level of the MMR.

Hospital or community level

- Team meetings
- Thematic seminars in hospitals
- Community meetings
- Radio and television programmes
- Printed reports
- Training programmes
- Posters
- Text messages
- Video clips
- Smart phone applications

National or sub-national level

- Printed reports for decision makers
- Statistical publications
- Scientific articles
- Professional conferences
- Training programmes
- The media
- Articles in the press
- Websites
- Newsletters, bulletins, leaflets, posters
- Video clips

CHAPTER 10

The Next Steps Toward Ending Preventable Maternal Deaths

10.0 Introduction

The final Chapter discusses how countries may approach integrating the new guidelines into existing surveillance strategies. These include: assessing the current situation; considering adapting new best practices to improve the effectiveness and impact of the MDSR process; and where the incidence of maternal deaths is low, to consider including perinatal mortality or maternal near miss audits into routine surveillance activities.

10.1 Assessment of current situation

The primary aim of MSDR is to strategically obtain and use the findings from maternal death reviews to eliminate preventable maternal deaths and simultaneously monitor the effectiveness of, and if necessary, correct intervention strategies.

With many countries in the Americas already having the basics of a maternal death surveillance system already in place, the next step is more likely to be a gap analysis using these guidelines as the gold standard against which your system will be measured. The implementation plan would then focus on addressing those gaps and improving the effectiveness of the existing system.

For those countries without a surveillance system, a phased approach could include:

1. A reproductive age mortality survey to assess the incidence and causes of maternal (and perinatal) deaths.
2. The development and field testing of tools (see Box 10.1)[24] for the surveillance system. These may be first introduced in a demonstration area, starting with those government hospitals that attend most births, probably in an urban setting and then expand to other geographical areas and facilities.

Box 10.1: Steps in the Planning of a Maternal Death Surveillance System

Activities	Specific actions
Data collection	1. Establish objectives
	2. Develop case definition
	3. Determine data sources and the data collection mechanism
	4. Develop data collection instruments
	5. Field-test methods and refine
	6. Train surveillance officers to use data collection instruments
Data analysis and reporting	7. Develop and implement case review process
	8. Develop and test analytical approach
	9. Identify dissemination mechanisms
	10. Adapt reports to target audiences and provide feedback
	11. Provide training in the use of findings to inform policy and practice
Monitoring and evaluation	12. Establish systems to monitor implementation of recommendations
	13. Undertake routine monitoring and period evaluations
Accountability	14. Ensure findings are integrated in national reports, health planning activities and annual budgeting exercises
	15. Ensure health system is accountable for the effectiveness of the interventions (i.e. maternal deaths must decline).

Source: Adapted from the MDSR Technical Guidance: Information for Action to Prevent Maternal Death. WHO, 2013[13]

3. Once the logistical challenges are worked out, surveillance should expand beyond public hospitals to include other government facilities (e.g. health centres, maternity waiting homes), private/NGO facilities and the community, in order of incidence of maternal deaths.

10.2 MDSR best practices in the region of the Americas

Given the experience of countries in the region of the Americas in developing and implementing maternal death surveillance system, Table 10.1 summarizes the best practices

which countries could consider as new systems are developed or existing systems are reviewed and updated to align them to these MDSR strategies. The process begins with mandatory reporting of suspected deaths; a well-defined strategy for case investigation, reviewing and reporting and compilation of confirmed cases preferably via an electronic platform. There must be a clear process which ensures that recommendations are converted into implementation plans and integrated in the routine national budgetary activities, so that improvements are supported not only in principle but in practice. A monitoring and evaluation framework which operates both from the local and the national level is critical to measuring the effectiveness of the strategies which are developed to address the identified problems.

Table 10.1: MDSR Strengths, Solutions to Observed Weaknesses and Best Practice Experiences in the Region of the Americas

Area of focus	Specific activities
Legal/policy framework	• Require mandatory reporting of maternal deaths • Implement data sharing agreements to enable transfer of information on suspected maternal deaths across critical sectors, namely: public health facilities, private institutions, community sources especially forensic/legal medicine, police, vital registration, statistical departments • Implement unique identifier (e.g. national identification number, social security number, national health record number) which will be used on all vital records and enable record linkage across databases • Integrate MDSR into Sexual and Reproductive Health and general Health Policy.
Health Information System	• Common strategy for notification of conditions/diseases of interest into the surveillance system • Electronic notification of suspected (maternal, foetal, neonatal) deaths within 24–72 hours of occurrence • Electronic system for uploading completed mortality case review information between various levels of the health system • Generate regular bulletin (weekly, monthly) which documents the reporting of suspected and confirmed maternal deaths.

Table 10.1 continues on next page

Table 10.1: MDSR Strengths, Solutions to Observed Weaknesses and Best Practice Experiences in the Region of the Americas (*cont'd*)

Area of focus	Specific activities
Validation of case reporting	• Routine (monthly, quarterly, bi-annually) linkage across vital and health databases to ensure that all cases are identified, notified and reviewed • Schedule episodic evaluations of the completeness and coverage of the MDSR system, with appropriate corrective measures to address reporting gaps.
Data quality	• Ensure that registrars and their quality control officers are adequately trained to identify and correctly code (ICD-MM)[16] maternal deaths • Develop process to address coding errors in the maternal mortality database and the vital register • Consider the inclusion of registrars on mid-level and national committees • Develop process to ensure that unreported deaths are registered, e.g. "epidemiological death certificate." • Include family interviews/verbal autopsies to ensure inclusion of information on social determinants and health seeking behaviour.
Have routine (monthly, quarterly) case review meetings	• Set aside specific day of the month (e.g. 3rd Tuesday) for MDSR meetings • Include item in the MDSR meeting agenda, even when there are no cases for review, to engage in monitoring and evaluation (M & E) activities • If the incidence of maternal deaths is low, expand the function of the MDSR committee to include review of all or select (e.g. ≥2500 g) foetal and neonatal deaths as they have common clinical and social determinants with MM.
Administrative processes	• Identify at each administrative level, a leader in sexual and reproductive health and maternal mortality surveillance to coordinate MSDR activities • Ensure that administrative representatives are part of the local MDSR committees • Develop process to enable notification of suspected deaths from private and NGO facilities attending births or caring for post-natal women.

Table 10.1 continues on next page

Table 10.1: MDSR Strengths, Solutions to Observed Weaknesses and Best Practice Experiences in the Region of the Americas (*cont'd*)

Area of focus	Specific activities
Human resource development	• Develop distance education courses to train and certify MDSR investigators and committee members • Ensure routine training of MDSR investigators to address the challenge of staff turnover, maintain interest and grow confidence in the process • Ensure that MDSR committees include advocates able to address human rights, gender and social inclusion issues.
Response management	• Develop strategies to ensure the transformation of identified problems into potential solutions, implementation plans, with appropriate indicators for monitoring and evaluation • Reserve at least two meetings per year to assess response implementation • Ensure that interventions which have not been implemented, and which are due to resource constraints, are prioritized and included in the next budget cycle • Provide routine feedback of findings and recommendations, especially to persons providing data, so that they can actively engage in the change process.
Promoting improvements and effective change	• Ensure that recommendations are transformed into implementation plans which are prioritized and included in the next budget cycle • Impact (fewer maternal deaths) occurs when the surveillance system is supported by health policies designed to: – Improve household living conditions – Improve access to contraceptive methods – Ensure access to antenatal care and hospital delivery – Ensure transportation/transfer of at-risk patients – Improve quality of obstetric care – Improve access to blood and blood products – Improve availability of intensive care units/high dependency units – Certify skilled birth attendants – Train critical staff in advanced life support in obstetric care.

Table 10.1 continues on next page

Table 10.1: MDSR Strengths, Solutions to Observed Weaknesses and Best Practice Experiences in the Region of the Americas (*cont'd*)

Area of focus	Specific activities
Promote inter-sectoral linkages	• Develop strategy to include non health care workers on MDSR committees. These include lay representatives, vital registration personnel, administrators, gender and human rights advocates • Develop processes for sharing findings with the wider community • Ensure data and information sharing agreements exist between critical government, private and NGO agencies who care for mothers and children and handle health related information, e.g. social security, health insurance, vital registration, legal medicine, local government, political representatives, clergy, morticians, cemeteries.

Source: Country studies by the GTR in 2012 from Brazil, Colombia, El Salvador, Jamaica, Mexico and Peru[12]

10.3 Alternate strategies for monitoring the quality of antenatal, intrapartum and neonatal care

In settings where the number of maternal deaths is small due to either a relatively low incidence rate, low fertility or small population size, alternate strategies for monitoring the quality of maternal and newborn care is to either monitor perinatal (stillbirths and early neonatal deaths) or neonatal mortality[25] or severe acute maternal morbidity (SAMM).[26] The added value of perinatal and maternal morbidity audits, is that they allow one to interview women who have survived life threatening complications. They can then provide key inputs on how the system could be improved to better serve their needs.

Remember, the philosophy is to start with what is manageable and then expand as the skills, competence and confidence grows. The British Confidential Enquiry into Maternal Deaths[27] has evolved and expanded to cover perinatal and under five deaths and probably contributed to developing national audits of other outcomes in other population groups.[28] Monitoring and evaluation are essential to ensuring the activities are well implemented and conform to evidence based standards. Patience will be key as behaviour change is difficult. Humans thrive on maintaining the status quo. Paradigm shifts are challenging and require strategic investments of effort before they begin to bear fruit, but the evidence is there that unnecessary maternal, foetal and neonatal deaths can be and must be avoided.

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Glossary

Maternal death: Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (ICD-9, ICD-10).

- **Direct obstetric deaths**: Maternal deaths from obstetric complications during pregnancy (pregnancy, labour, or the puerperium) or from interventions, omissions, or improper treatment, or resulting from a chain of events from any of the above.
- **Indirect obstetric deaths**: Maternal deaths resulting from existing diseases or disease that developed during pregnancy. These deaths are not due to direct obstetric causes, but are aggravated by the physiological effects of pregnancy.

Pregnancy-related death: Death of a woman while pregnant or within 42 days of pregnancy termination, independent of cause (ICD-10). This term is useful for two main reasons:

- The cause of death may be difficult to determine, especially if the woman died without receiving skilled care.
- In developing countries, a high percentage of deaths occurring during pregnancy or the puerperium are due to pregnancy and its complications.

Late maternal death: Death due to direct or indirect obstetric causes that occurred more than 42 days but less than one year after the pregnancy ended (ICD-10).

- Some recent surveys show the importance of evaluating maternal mortality during the year following the birth when there has been a serious complication.
- Late maternal deaths are not included in the maternal mortality ratio, however.

Government levels: Given the diversity of governmental structures in which countries in the Region of the Americas implement MDSR programs, the document's authors used the following categories:

- **Local:** some countries refer to this level as district, municipality, or county.
- **Regional:** some countries refer to this level as department, state or province.
- **National:** in general, the Ministry of Health fulfils this function.

- **Latin America and the Caribbean:** All independent states in Central and South America and the Caribbean
- **Region of the Americas:** All countries in North, South and Central America and the Caribbean.

Annexes

GTR
Grupo de Trabajo Regional para la
REDUCCIÓN DE LA MORTALIDAD MATERNA

Annex 1: Summary Data

Table 1: Summary Measures of Global Progress on Reducing Maternal Mortality

Region	MMR	Number of Maternal Deaths		Annual Decline		
	2015	2015	1990	1990–2015	1990–2000	2005–2015
World	216	303,700	532,000	-2.3	-1.2	-3.0
Developed Regions	12	1,700	3,500	-2.6	-3.3	-2.2
Developing Regions	239	302,000	529,000	-2.4	-1.3	-3.1
Latin America & the Caribbean	67	7,300	16,000	-2.8	-3.1	-2.6
• Latin America	60	6,000	14,000	-2.9	-3.1	-2.8
• Caribbean	175	1,300	2,300	-1.8	-2.5	-1.4

Source: WHO *MMEIG – Trends in maternal mortality, 1990 to 2015*, Geneva: 2015[2]

Annex 1: **Table 2**: Progress of Latin American and Caribbean Countries on MDG5: 1990 to 2015, Ranked by 2015 MMR

Country	MMR					% change		M Deaths
	1990	2000	2005	2010	**2015**	1990–2015	Status	**2015**
South America								**4139**
Bolivia	425	334	305	253	**206**	-51	IP	520
Paraguay	150	158	159	139	**132**	-12	NP	190
Venezuela	94	90	93	99	**95**	+1	–	570
Peru	251	140	114	92	**68**	-73	MP	420
Ecuador	185	103	74	75	**64**	-65	MP	210
Colombia	118	97	80	72	**64**	-46	IP	480
Argentina	72	60	58	58	**52**	-28	–	390
Brazil	104	66	67	65	**44**	-58	MP	1300
Chile	57	31	27	26	**22**	-61	–	52
Uruguay	37	31	26	19	**15**	-60	–	7
Central America								**1818**
Honduras	272	133	150	155	**129**	-53	MP	220
Nicaragua	173	202	190	166	**150**	-13	NP	180
Panama	102	82	87	101	**94**	-8	NP	71
Guatemala	205	178	120	109	**88**	-57	MP	380
El Salvador	157	84	68	59	**54**	-66	MP	57
Mexico	90	77	54	45	**38**	-58	MP	890
Belize	54	53	52	37	**28**	-48	–	2
Costa Rica	43	38	31	29	**25**	-42	–	18
Latin Caribbean								**1201**
Haiti	625	505	459	389	**359**	-43	NP	950
Dominican Republic	198	79	64	75	**92**	-54	MP	200
Cuba	58	43	41	44	**39**	-33	–	45
Puerto Rico	26	22	19	16	**14**	-46	–	6
Other Caribbean								**113**
Guyana	171	210	232	241	**229**	+34	NP	34
Suriname	127	259	223	169	**155**	+22	NP	15
Jamaica	79	89	92	93	**89**	-13	–	43
Trinidad & Tobago	90	62	62	65	**63**	-30	–	12
Bahamas	46	61	74	85	**80**	+74	–	5
St Vincent & the Grenadines	58	74	50	50	**45**	-22	–	1
Barbados	58	48	40	33	**27**	-53	–	1
Saint Lucia	45	54	67	54	**48**	+7	–	1
Grenada	41	29	25	27	**27**	-34	–	1
Developed Countries								**577**
United States of America	12	12	13	14	**14**	+17	–	550
Canada	7	9	9	8	**7**	0	–	27

Note: MP = Making progress; IP = Insufficient progress; NP = No progress

Source: WHO *MMEIG – Trends in maternal mortality, 1990 to 2015*, Geneva: 2015[2]

Annex 1: **Table 3:** Access to Reproductive Health Care, Region of the Americas

Access to Care								
Country (MMR 2013)	Fertility Indicators			Maternal Health Care Indicators				
	TFR	CPR	ABR	Safe abortion care	4+ ANC visits	C-section rate	Skilled birth attendance	Hospital birth rate
HIGH MMR (≥200)								
Haiti (359)	3.2	35%	66	Prohibited	67%	6%	37%	38%
Guyana (229)	2.6	43%	97	No restriction	79%	13%	92%	89%
Bolivia (206)	3.2	61%	89	Preserve physical health	72%	19%	71%	68%
MEDIUM MMR (100–199)								
Suriname (155)	2.3	48%	66	Prohibited	67%	19%	91%	92%
Nicaragua (150)	2.5	80%	92	Prohibited	78%	25%	74%	86%
Paraguay (132)	2.9	79%	63	To save ♀'s life	91%	33%	82%	85%
Honduras (129)	3.0	73%	99	Prohibited	89%	19%	83%	83%
LOW MMR (50–99)								
Venezuela (95)	2.4	n.r.	101	To save ♀'s life	n.r.	n.r.	95%	95%
Panama (94)	2.5	52%	81	To save ♀'s life	n.r.	n.r.	89%	88%
Dominican Republic (92)	2.5	72%	96	Prohibited	96%	42%	98%	98%
Jamaica (89)	2.3	72%	72	Preserve mental health	87%	15%	98%	97%
Guatemala (88)	3.8	54%	92	To save ♀'s life	n.r.	16%	52%	51%
Bahamas (80)	1.9	45%	40	Preserve physical health	n.r.	n.r.	99%	n.r.
Peru (68)	2.4	74%	67	Preserve physical health	94%	10%	87%	87%
Ecuador (64)	2.6	73%	100	Preserve physical health	58%	26%	98%	85%
Trinidad & Tobago (63)	1.8	43%	36	Preserve mental health	n.r.	n.r.	98%	97%
Colombia (64)	2.3	79%	85	Preserve mental health	89%	44%	99%	99%
El Salvador (54)	2.2	73%	63	Prohibited	78%	25%	96%	85%
Argentina (52)	2.2	78%	70	Preserve physical health	89%	n.r.	97%	99%

Table 3 continues on next page

Annex 1: **Table 3:** Access to Reproductive Health Care, Region of the Americas (*cont'd*)

Access to Care								
Country (MMR 2013)	**Fertility Indicators**			**Maternal Health Care Indicators**				
	TFR	**CPR**	**ABR**	**Safe abortion care**	**4+ ANC visits**	**C-section rate**	**Skilled birth attendance**	**Hospital birth rate**
VERY LOW MMR (≤ 49)								
Saint Lucia (48)	1.9	n.r.	50	Preserve mental health	n.r.	n.r.	100%	n.r.
St Vincent & the Grenadines (45)	2.0	48%	70	SE grounds	n.r.	n.r.	n.r.	n.r.
Brazil (44)	1.8	81%	65	To save ♀'s life	97%	50%	97%	98%
Mexico (38)	2.2	73%	85	To save ♀'s life	86%	46%	96%	80%
Belize (28)	2.7	55%	93	SE grounds*	83%	28%	94%	94%
Cuba (39)	1.5	74%	54	No restriction	100%	n.r.	100%	100%
Grenada (27)	2.2	54%	53	Preserve physical health	n.r.	n.r.	99%	n.r.
Barbados (27)	1.8	n.r.	49	SE grounds*	99%	n.r.	100%	n.r.
Costa Rica (25)	1.8	82%	67	Preserve physical health	86%	21%	99%	99%
Chile (22)	1.8	58%	52	Prohibited	n.r.	n.r.	n.r.	100%
Uruguay (14)	2.1	78%	60	Preserve physical health	90%	34%	100%	n.r.
USA (14)	2.0	76%	34	n.r.	n.r.	31%	n.r.	n.r.
Canada (7)	1.7	74%	14	n.r.	99%	26%	100%	99%

Sources: WHO *MMEIG* – Trends in maternal mortality, 1990 to 2015, Geneva: 2015; UNICEF. State of the World's Children Report 2015; Statistical Tables 8 & 11. http://data.unicef.org/resources.html; https://www.guttmacher.org/pubs/IB_AWW-Latin-America.pdf (safe abortion access)

TFR	–	Total fertility rate
CPR	–	Contraceptive prevalence rate
ABR	–	Adolescent birth rate
Safe abortion care	–	Availability of abortion care by a skilled provider (from least (1) to most accessible (6): 1. Prohibited; 2. To save a woman's [♀] life; 3.To preserve physical health; 4. To preserve mental health; 5. On socioeconomic [SE] grounds; 6. No restriction)
4+ ANC visits	–	Percent of women who make four or more antenatal visits
C-section rate	–	Percent of births delivered by Caesarean section (norm = 15%)
Skilled birth attendance	–	Percent of births attended by a midwife, nurse or doctor
Hospital birth rate	–	Percent of births in a medical facility able to provide basic obstetric care
n.r.	–	Not reported

Annex 2: Political and Inter-sectoral Policies to Improve Maternal Health

1987	–	The International Safe Motherhood Conference held in Nairobi (Kenya).
1990	–	The 23rd Pan American Sanitary Conference adopted a resolution supporting the Regional Plan of Action to Reduce Maternal Mortality.
1992	–	Experts on maternal mortality surveillance from 9 countries, PAHO, the CDC and the Carter Center met in Atlanta, Georgia and issued the document "Maternal Morbidity and Mortality in the America: Guidelines for Maternal Mortality Epidemiological Surveillance."
1994	–	The International Conference on Population and Development held in Cairo (Egypt).
1995	–	The IV Global Conference on Women held in Beijing (China)
1995–1996	–	Experts on maternal mortality surveillance from 12 countries, PAHO, the CDC, UNFPA/Latin America, the Caribbean, and Mother Care met in Atlanta, Georgia (USA). Based on the work of the Scientific and Technical Advisory Group for the Plan of Action to Reduce Maternal Mortality, the Guidelines for Maternal Mortality Epidemiological Surveillance were updated and issued in 1996.
1998	–	The 25th Pan American Sanitary Conference adopts a resolution on Population and Reproductive Health.
2000	–	The Millennium Summit held in New York City (USA) in 2000. The Millennium Declaration included the fifth millennium goal (MDG5: improve maternal health).
2002	–	The 26th Pan American Sanitary Conference adopted the resolution supporting the regional strategy to reduce maternal morbidity and mortality.
2002 and 2004	–	The World Health Assembly approved two resolutions dealing with reproductive health; WHO's Executive Board, in turn, approved Resolution EB113.R11, which "endorses the strategy to accelerate progress towards the attainment of international development goals and targets related to reproductive health, and urges Member States, as a matter of urgency, to adopt and implement the strategy as part of national efforts to achieve the development goals of the United Nations Millennium Declaration, and to mobilize political will and financial resources for that purpose".

2007 – First Women Deliver Global Conference to End Maternal Deaths held in London (UK). The gathering sought to make public policies and investments in the health of women and girls a priority (Invest in Girls and Women – It Pays!).

2008 – 48th Directing Council of PAHO/WHO supported the Regional Strategy and Plan of Action for Neonatal Health within the Continuum of Maternal, Newborn and Child Care.

2009 – 49th Directing Council of PAHO/WHO supported the Plan of Action on Adolescent and Youth Health. It also included attention to providing safe hospitals and integrated networks of health services.

2009 – The United Nations Human Rights Council adopted Resolution R11/8 (2009). This acknowledges that preventable maternal mortality and morbidity encompasses a wide range of determinants tied to health, development, human rights and fundamental freedoms, and urges States to adopt measures to guarantee these rights consistent with international norms to contribute to reducing maternal deaths.

2010 – 50th Directing Council of PAHO/WHO provided new impetus to the "Safe Motherhood" initiative which sets out actions and advocacy in critical areas for attaining MDG5. This effort aims to promote and protect the rights of women, mothers and the newborn to enjoy the highest possible level of health including:

- Ensure access to comprehensive reproductive health services including family planning, prevention of and/or care for gender violence and care after abortion.
- Increased social protection, especially for adolescent and marginalized women, to enable maternal and neonatal care.
- Improve the quality of prenatal, childbirth, and post-partum care through investments in and training for providers.
- Decrease unsafe abortion.
- Incorporate contraceptives, including emergency contraceptives, in the list of essential medicines.
- Review legislation on sexual and reproductive health.
- Empower and support women to exercise their right to make their own decisions about their reproductive lives, while involving their families and communities.
- Foster the participation of fathers and men, families and the entire community in these efforts.

2010 – The Regional Conference of Women Leaders and the Women Deliver II conference (Washington DC) – emphasized how little had been invested to date in preventing maternal mortality. The G-8 also added their voice with the Muskoka Initiative (Canada) on Maternal, Newborn and Child Health.

2010 – The United Nations Secretary General promoted the Global Strategy for Women and Children's Health to enhance strategic and innovative actions, increase the political will, and augment resources to accelerate progress toward attaining the MDGs. This strategy focuses on the 49 lowest-income countries where maternal and under-5 mortality rates are highest.

2011 – The Commission on Information and Accountability (COIA) for Women's and Children's Health was created "to determine the most effective international institutional arrangements for ensuring global reporting, oversight, and accountability on women's and children's health." The Commission underscored the lack of reliable data to monitor progress and highlighted issues concerning quality of care. It published 10 recommendations in September 2011, which focused on strengthening accountability in the countries and worldwide. Countries were urged to:

- Improve their health information systems
- Adopt effective measures for developing civil registration systems
- Introduce innovative methods to count all maternal deaths
- Study and monitor progress on reducing maternal deaths.

A key element in the recommendations involves gathering better information to get better results. They recommended establishing health information systems that combined hospital data and information from administrative and survey sources. The framework for applying COIA recommendations, developed by WHO, includes establishing Maternal Deaths Surveillance and Response (MDSR) systems and improving civil registries in each country.

2011 – The 51st Directing Council of PAHO/WHO unanimously approved the Plan of Action to Accelerate the Reduction of Maternal Mortality and Severe Morbidity (through Resolution CD51.R12). This establishes four strategic areas of action for implementing effective interventions:

1. **Prevention of unwanted pregnancies and resulting complications**
    - Increase contraceptive coverage (including emergency contraceptive methods)
    - Providing family planning counselling prior to conception and after an obstetric event.
2. **Universal access to affordable, high-quality maternity services within the coordinated health care system**
    - Access to affordable, high-quality preconception, antenatal, childbirth, and post-partum care, by level of maternal and

perinatal care considering a regionalized approach within the framework of the regionalization of maternal and perinatal care
- Maternity waiting homes, as appropriate
- Use of evidence-based practices
- Timely referral and counter-referral
- Prevention and detection of intra-family violence during pregnancy.

3. **Skilled human resources**
   - Increase the availability of skilled health workers for preconception, antenatal, childbirth, and postpartum care in basic and emergency obstetric units
   - Increase the 24-hour availability of staff to attend births and handle obstetric complications.

4. **Strategic information for action and accountability**
   - Institute and consolidate perinatal and maternal information and monitoring systems
   - Establish committees with community participation to analyze maternal mortality and provide remedies, as appropriate.

2012 – The United Nation's Economic and Social Council's Commission on the Status of Women set the ambitious goal to eliminate avoidable maternal mortality and morbidity. Strategies included:
- Universal access to basic and comprehensive obstetric care
- Establishing MDSR to provide information to steer corrective actions
- To monitor, in real time, the number of maternal deaths.

The 2012 report of the United Nations Office of the High Commissioner for Human Rights included in its "Technical Guidance on the Application of a Human-rights Based Approach to the Implementation of Policies and Programmes to Reduce Preventable Maternal Morbidity and Mortality" the need for data collection and monitoring as critical dimensions of accountability. This should include examination of quantitative and qualitative indicators.

CLASS I REPORTING FORM - INDIVIDUAL NOTIFICATION (ON SUSPICION)

Date of Report: ____ / ___ / _____ (DD/MM/YY) NEW CASE / PREVIOUSLY REPORTED CASE (Circle One)

Diagnosis: _____ _____

Case Demographic Information

Name (including pet name): _____ Sex: ____ Age: _____ D.O.B ___ / ___ / ____(dd/mm/yy)

Address: Lot #: _____ Street: _____ Street Type: _____

Include landmark) (Name) (Drive, Road, Close etc)

Community: _____ Neighbouring Community/District: _____ Parish: _____

Workplace/School: _____ Occupation: _____

(H) Phone #.: _____ (Wk) Phone #: _____ History of overseas travel in past 4-6 weeks? Y / N

Specify area/country: _____

Name of NOK/Parent: _____ Relationship to case: _____

Address of NOK/Parent: _____ Phone No.: _____

Clinical Information:

Symptoms: _____ Hosp./Facility Name: _____

_____ Medical Record # _____

Date of onset: ___ / ___ / _____ d/mm/yy) Date seen: ___ / ___ / _____ (dd/mm/yy) Case admitted to Hosp?: Y / N (Circle one)

Specimen Taken Y / N Type: _____ Date of Admission: _____ / ___ / _____ (dd/mm/yy)

Specimen Date: ___ / ___ / _____ (dd/mm/yy) Laboratory: _____ Ward: _____

Result(s): _____ If dead, Date of Death: _____ / ___ / _____ (dd/mm/yy)

Notifier Information

Name of notifier: _____ Phone #: _____ Received by MO(H) _____ / ____ / _____ (dd/mm/yy)

Address: _____ Email: _____ Parish MO(H) Signature _____

Comments : _____ Forwarded to R.S.O. _____ / ____ / _____ (dd/mm/yy)

_____ Forwarded to Surveillance Unit _____ / ____ / _____ (dd/mm/yy)

Annex 4: Form 1 of 6 (page 1 of 2)

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY CLINICAL REPORT

Data will be collected on all deaths that occur during pregnancy or within one year after termination of pregnancy

DEMOGRAPHIC INFORMATION

HOME/HOSPITAL_____ DOCKET NO._____

PATIENT'S INITIALS_____ RESIDENCE _____
DISTRICT / PARISH

DATE OF DEATH ___/___/___ AGE AT DEATH _____ DATE OF DELIVERY ___/___/____
Day mon yr day mon yr

TIME OF DEATH_____ am/pm

PLACE OF DELIVERY (circle **ONLY ONE**)

Type A public hospital [1] Type B public hospital [2] Type C hospital [3]

Cottage hospital [4] Public maternity centre [5] Private maternity centre [6]

Private hospital [7] Home [8] Other [9] (specify) _____

AUTOPSY REQUESTED: Yes [1] No [2] Unknown [9]

AUTOPSY REPORT AVAILABLE: YES [1] NO [2] DATE AUTOPSY PERFORMED:___/___/____

WHERE AUTOPSY PERFORMED: _____

DATE OF ADMISSION (1) _____ Reason: [1] delivery [2] other specifiy_____

DATE OF DISCHARGE (1)_____ DISHCARGE DIAGNOSIS_____

DATE OF ADMISSION (2) _____ Reason: [1] delivery [2] other specifiy_____

DATE OF DISCHARGE (2)_____ DISHCARGE DIAGNOSIS_____

DATE OF ADMISSION (3) _____ Reason: [1] delivery [2] other specifiy_____

DATE OF DISCHARGE (3)_____ DISHCARGE DIAGNOSIS_____

DATE OF ADMISSION (4) _____ Reason: [1] delivery [2] other specifiy_____

DATE OF DISCHARGE (4)_____ DISHCARGE DIAGNOSIS_____

COMPLICATION/RISK FACTOR 1_____

COMPLICATION/RISK FACTOR 2_____

COMPLICATION/RISK FACTOR 3_____

WAS PATIENT TRANSFERRED [1] NO [2] YES SPECIFY FROM WHERE _____

DATE TRANSFERRED _____ TIME OF ARRIVAL _____

PLACE OF DEATH: [1] ICU [2]TYPE A HOSPITAL [3]TYPE B HOSPITAL [4]TYPE C HOSPITAL

[5] PRIVATE FACILITY [6] HOME [7] OTHER, SPECIFY_____

PREGNANCY HISTORY (enter number of events; if none, enter zero "0")

Number of **previous** pregnancies (**excluding** current pregnancy) ____

Outcomes 1. Full term live births ____ 2. Premature live births (<2500g) ____ 3. Stillbirths ____

4. Spontaneous abortions ____ 5. Induced abortions ____ 6. Ectopic pregnancies ____

7. Trophoblastic diseases ____

PREVIOUS COMPLICATIONS OF PREGNANCY_____

_____

Annex 4: Form 1 (page 2 of 2)

DELIVERY INFORMATION

DATE ADMIITED FOR DELIVERY ____/____/____ DATE THIS PREGNANCY TERMINATED ____/____/____

ATTENDANT AT DELIVERY (**ONLY ONE** Or the Most Highly Trained Attendant IF MORE THAN ONE)

Nana[h]/self [1] District midwife[2] Registered nurse/midwife [3] Obstetrician [4]

Other med. pract. [5] (specify)_____ Other trained personnel [6] (specify)_____

_____

31. METHOD OF DELIVERY (_ **ONLY ONE**)

Vaginal-spontaneous [1] Vaginal-induced [2] Caesarean-emergency [3] Caesarean-elective [4] Undelivered [5]

32. PRESENTATION: Cephalic [1] Breech [2] Other [3] (specify)_____ Not Known [9]

33. BIRTHWEIGHT: _____LBS/KG 34. SEX: Male [1] Female [2] Not Known [9]

35. WAS ANAESTHETIC USED: No [0] Yes, local [1] Yes, general [2]

36. IF YES, WHO ADMINISTERED IT: Nurse anaesthetist [1] Resident [2] Specialist [3]

25. GESTATION AT PREGNANCY TERMINATION/MATERNAL DEATH:_____ Weeks from LMP [99] not known

26. OUTCOME OF THIS PREGNANCY (_ **ONLY ONE**)

Died undelivered [0] Full term live birth [1] Premature live birth [2] Stillbirth [3]

Spontaneous abortion [4] Induced abortion [5] Ectopic pregnancy [6] Trophoblastic disease [7]

Multiple gestation (specify all outcomes using code numbers from above) [8] Twin 1 _____ [9] Twin 2 _____

27. If liveborn, did infant survive: Yes [1] No [2] 28. If no, date of death_____

CLINICAL SUMMARY

_____

_____

_____

_____

_____

_____

_____

_____

SIGNED (PHC RM) _____ POSITION_____ DATE____/____/____

SIGNED (SHC RM)[1]_____ POSITION_____ DATE____/____/____

h. Traditional birth attendant

Annex 5: Form 2 of 6 (page 1 of 2)

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY HOME VISIT AND ANTENATAL REPORT

INSTRUCTIONS: To be completed by a PHN, community midwife covering the decedent's community of residence or hospital midwife[g] by visiting with next of kin of the deceased to determine what occurred prior to the patient's death.

Offer your condolences and explain to the relatives that in an effort to prevent maternal deaths we visit the relatives of all women who died during pregnancy and childbirth to better understand what problems the patient had and how the health services can better provide for these needs so that these problems can be avoided in the future.

DEMOGRAPHIC INFORMATION

PATIENTS NAME_____ RESIDENCE_____
DISTRICT / PARISH

DATE OF DEATH ___/___/___ AGE AT DEATH _____ DATE OF DELIVERY _____/___/_____
day mon yr day mon yr

MARITAL STATUS (_ **ONLY ONE**)

[1] Married [2] Common-law [3]Visiting [4] Other, specify _____ [9] Unknown

PLACE OF DEATH _____ HOME [ ]
District/Parish

NEXT OF KIN INTERVIEWED:(CHECK ALL THAT APPLY)

[1] spouse/consort [2] mother [3] father [4] sibling [5] other relative, specify _____

[6] other non relative, specify_____ [8] relationship not stated

Respondents knowledge:

a. Were you present when the patient died? [1] Yes [2] No

b. If no, How long before death did you see her? _____

c. Who told you about her death? [1] spouse/consort [2] relative [3] doctor [4] nurse
[5] other_____

d. Was this person with her when she died? [1] Yes [2] No

e. How long after her death did you hear about it? _____

f. Before (name) was pregnant for the last time, was she generally well? [1] Yes [2] No [9] Not known
If no, what problems was she having_____
_____

Antenatal care:

1. Did (name) attend antenatal clinic [1] Yes [2] No [9] Not Known

2a. If no, do you know why she did not go? no [1] not known [9] yes [2](specify)_____
_____

2b. If yes, where did she attend, specify name of:
a)_____ health centre b)_____ hospital c)_____ private doctor

3. How many visits did she make _____ 4. Date of last visit _____

5. Did (name) have a maternal record card: [1] Yes [2] No [9] Not Known

6. Had (name) been referred elsewhere to see a doctor: [1] Yes [2] No [9] Not Known

7. If yes, where was she referred _____

8. Did she go [1] Yes [2] No [9] Not Known

[g]To complete antenatal care record of women seen in the high risk antenatal clinics at hospital

Annex 5: Form 2 of 6 (page 2 of 2)

9. Was she seen by a doctor when she went	1] Yes	[2] No	[9] Not Known
10. Was she advised to enter hospital	[1] Yes	[2] No	[9] Not Known
11. Was she admitted to hospital	[1] Yes	[2] No	[9] Not Known
12. If Yes, where admitted _____			
13. Was she told that she had high blood pressure	[1] Yes	[2] No	[9] Not Known

Prior to going into hospital (if died in hospital) or prior to the most recent illness, did the patient complain of any of the following symptoms:

before going into labour or before delivery (antepartum)(_ ALL THAT APPLY)

[01] severe headaches	[02] visual disturbance (seeing spots, seeing double, blindness)	
[03] epigastric pain (stomach aches)	[04] fits (seizures)	[05] severe abdominal pain
[06] swelling of face or hands	[07] high fever	[08] extremely short of breath
[09] yellow skin or eyes	[10] vaginal bleeding	[11] severe chest pain
[12] long labour (more than 12 hours)	[13] coughing up blood	[14] severe pain in calves or legs

if died after delivery, ask about (_ ALL THAT APPLY)

[15] severe bleeding	[16] bad smelling discharge	[17] if c-section, reopened wound
[18] red, swollen wound	[19] severe abdominal pain	

INFORMATION FROM THE ANTENATAL CARE PROVIDER(S) IDENTIFIED BY THE RELATIVES

[1] HEALTH CENTRE: date 1ST visit ___/___/___ date last visit___/___/___ gestat 1st visit _____ no. visits _____

Blood Pressure (Last on Record)_____/_____ Oedema: [1] Yes [2] No [9] Not known

Albuminuria (Highest Level) _____

Other complications:_____

Was patient referred for additional care: [1] Yes [2] No [9] Not known

If yes, date referred _____/____/____

Reason for referral_____

Was patient followed up to ensure attendance: [1] Yes [2] No [9] Not known

[2] PRIVATE MD: date 1ST visit ___/___/___ date last visit___/___/___ gestat 1st visit _____ no. visits _____

Blood Pressure (Last on Record)_____/_____ Oedema: [1] Yes [2] No [9] Not known

Albuminuria (Highest Level) _____

Other complications:_____

Was patient referred for additional care: [1] Yes [2] No [9] Not known If yes, date referred _____/____/____

Reason for referral_____

Was patient followed up to ensure attendance: [1] Yes [2] No [9] Not known

[3] HOSPITAL/high risk ANC: date 1ST visit __/__/___ date last visit___/___/___ gestat 1st visit _____ no. visits ___

Blood Pressure (Last on Record)_____/_____ Oedema: [1] Yes [2] No [9] Not known

Albuminuria (Highest Level) _____

COMPLICATIONS AND OTHER MEDICAL PROBLEMS (IF ANY):

_____

_____

SCREENING TEST RESULTS

HB: _____ [9] not known/not done

HIV test result:	[1] positive	[2] negative	[9] not k known/not done
VDRL test result:	[1] positive	[2] negative	[9] not known/not done

SIGNED (PHC RM) _____ POSITION_____ DATE____/____/____

Annex 6: Form 3 of 6

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY POST MORTEM REPORT

INSTRUCTIONS: To be completed by pathologist or regional surveillance officer from the post mortem findings on any death investigated of a female 10-50 years of age whose death is suspected as being pregnancy related.

DEMOGRAPHIC INFORMATION

PLACE OF DEATH_____ DOCKET NO._____

PATIENT'S INITIALS_____ DATE OF DEATH ____/ ___ / ___ AGE AT DEATH _____
dd mon yr

CLINICAL INFORMATION

Complications

_____

_____

_____

Other Medical Problems/Risk Factors present

_____

_____

_____

CAUSE OF DEATH

IMMEDIATE CAUSE_____

INTERMEDIATE CAUSE_____

INTERMEDIATE CAUSE_____

UNDERLYING CAUSE_____

Other significant conditions_____

_____

AUTOPSY DONE BY:

[1] DM PATHOLOGIST – MINISTRY OF HEALTH/UHWI [2] DM PATHOLOGIST – MINISTRY OF JUSTICE

[3] DMO [4] OTHER MEDICAL OFFICER DATE OF AUTOPSY ____/____/ ____
dd mm yr

REPORT COMPLETED BY:

[1] INVESTIGATING OFFICER [2] SURVEILLANCE OFFICER [3] OTHER, SPECIFY _____

SIGNATURE _____ DATE COMPLETED ____ /____ /_____
dd mm yr

Annex 7: Form 4 of 6 (page 1 of 2)

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY CASE REVIEW SUMMARY

INSTRUCTIONS: To be completed on all deaths during pregnancy or within one year after termination of pregnancy once case review has been completed. The summary, with supporting documents are then shared with:
(1) institution in which the death occurred (2) parish of residence of the mother (3) the Ministry of Health.

DEMOGRAPHIC DATA

PATIENT'S INITIALS_____ AGE AT DEATH _____ TOTAL PREGNANCIES, INCL THIS ONE _____

DATE OF DEATH __ / __ / __ (day mon yr) DATE OF DELIVERY __ / __ / __ (day mon yr) DAYS DELIVERY-DEATH _____

PARISH OF RESIDENCE_____ PLACE OF DEATH _____ / _____ (DISTRICT / PARISH) HOME [ ]

ANTENATAL INFORMATION

SOURCE OF ANTENATAL CARE: [1] HEALTH CENTRE [2] HOSPITAL [3] PRIVATE DOCTOR [9] NOT KNOWN

TOTAL NUMBER OF ANTENATAL VISITS, ALL SITES _____ (ENTER ZERO IF NO ANTENATAL CARE)

Was patient referred to high risk clinic? [1] yes [2] no NUMBER OF VISITS TO HIGH RISK CLINIC_____

REASON FOR REFERRAL _____

CLINICAL INFORMATION

PLACE OF DELIVERY (CHECK **ONLY ONE**)

[1] Type A public hospital [2] Type B public hospital [3]Type C hospital
[4] Cottage hospital [5] Public maternity centre [6] Private maternity centre
[7] Private hospital [8] Home [9] Other (specify) _____

METHOD OF DELIVERY (CHECK **ONLY ONE**)

[1] Vaginal-spontaneous [2] Vaginal-induced [3] Caesarean-emergency [4] Caesarean-elective [5] Undelivered

WAS ANAESTHETIC USED: [0] No [1] Yes, local [2] Yes, general

OUTCOME OF THIS PREGNANCY (CHECK **ONLY ONE**)

[0] Died undelivered [1] Full term live birth [2] Premature live birth [3] Stillbirth
[4] Spontaneous abortion [5] Induced abortion [6] Ectopic pregnancy [7] Trophoblastic disease
[8] Multiple gestation (specify all outcomes using code numbers from above) [8] twin 1 _____ [9] twin 2 _____
If liveborn, did infant survive: [1] Yes [2] No If no, date of death_____

WAS PATIENT ADMITTED BEFORE GOING INTO LABOUR: [1] Yes [2] No

REASON FOR ANTEPARTUM ADMISSION _____

DATE OF MOST RECENT ADMISSION (1) _____

Reason: [1] delivery [2] other specifiy_____

DISHCARGE DIAGNOSIS_____

COMPLICATION/RISK FACTOR 1_____

COMPLICATION/RISK FACTOR 2_____

COMPLICATION/RISK FACTOR 3_____

WAS PATIENT TRANSFERRED [1] NO [2] YES, SPECIFY FROM WHERE _____

DATE TRANSFERRED _____ TIME OR ARRIVAL _____

PLACE OF DEATH: [1] ICU [2] TYPE A HOSPITAL [3] TYPE B HOSPITAL [4] TYPE C HOSPITAL
[5] PRIVATE FACILITY [6] HOME [7] OTHER, SPECIFY_____

Annex 7: Form 4 of 6 (page 2 of 2)

CAUSE OF DEATH

TIME OF DEATH [1] MATERNAL (pregnant – 42 days post partum) [2] LATE MATERNAL DEATH (43-364 days)

SOURCE OF INFORMATION (_ALL THAT APPLY) Death Certificate [1] …. Autopsy Report [2] …. Clinical Diagnosis [3]

UNDERLYING CAUSE_____

INTERMEDIATE CAUSE_____

IMMEDIATE CAUSE_____

CLASSIFICATION OF DEATH [1] DIRECT [2] INDIRECT [3] CO-INCIDENTAL [9] Not classified

QUICK CODES – DIRECT DEATHS

[11] GESTATIONAL HYPERTENSION [12] HEMORRHAGE [13] EMBOLISM [14] ABORTION

[15] INFECTION [16] OTHER DIRECT (specify)_____

QUICK CODES – INDIRECT DEATHS

[21] CARDIAC DISORDER [22] SICKLE CELL DISEASE [24] DIABETES MELLITUS [25] HIV/AIDS

[26] RESPIRATORY DISORDER [27] SUICIDE [28] OTHER INDIRECT (specify)_____

QUICK CODES – CO INCIDENTAL DEATHS

[31] HOMICIDE [32] MVA [33] OTHER CO-INCIDENTAL including non pregnancy related medical complications

EVALUATION OF THE ASSESMENT TEAM

AVOIDABLE FACTORS PRESENT: [1] NO [2] YES , IF YES, SPECIFY ALL THAT APPLY

[1] DELAY 1 (PATIENT DID NOT RECOGNIZE PROBLEM)

_____

[2] DELAY 2 (PATIENT DELAY SEEKING CARE)

_____

[3] DELAY 3 (DELAYED ACCESS TO CARE – COST, TRANSPORTATION, OTHER COMMUNITY ISSUES)

_____

[4] DELAY 4 (DELAY RECEIVING APPROPRIATE CARE ONCE IN THE INSTITUTION)

_____

DETAIL SOURCES BELOW IF DELAY 4

[41] Providers of care at time of death (training, quality, availability)

_____

[42] Decision making process (recognition of serious problem, correct diagnosis, consultation process)

_____

[43] Actions taken (e.g. referral, emergency obstetric care, appropriate treatment)

_____

[44] Delays in referral (e.g. transport, money, permission, physical environment)

_____

[45] Facilities (e.g. quality, blood, anaesthesia, supplies, drugs)

_____

REVIEW TEAM DATE OF REVIEW _____/_____/_____

Obstetrician _____ [1] Midwife_____ [2]

Epidemiologist_____ [3] MO(H)_____ [4]

MO(H)_____ [5] Other_____ [6]

Other_____ [7] Other_____ [8]

DATE SUMMARY SENT TO MO(H) PARISH OF RESIDENCE _____/_____/_____

DATE SUMMARY SENT TO HOSPITAL OF DEATH _____/_____/_____

DATE SUMMARY SENT TO MINISTRY OF HEALTH _____/_____/_____

Annex 8: Form 5 of 6

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY RGD NOTIFICATION LIST

INSTRUCTIONS: To be completed by regional surveillance officer from the CASE REVIEW SUMMARY and forwarded to the CEO, REGISTRAR GENERAL'S DEPARTMENT on a quarterly basis

[1] FIRST QUARTER [2] SECOND QUARTER [3] THIRD QUARTER [4] FOURTH QUARTERR

REGION REPORTING	**[1]SE [2] NE [3] W [4]S**		**DATE REPORT**
NAME OF DECEDENT	DATE OF DEATH	PLACE OF DEATH	CAUSE OF DEATH Immediate Intermediate Underlying

Annex 9: Form 6 of 6

MINISTRY OF HEALTH, JAMAICA

MATERNAL MORTALITY SURVEILLANCE MONITORING REPORT

INSTRUCTIONS: Record to be maintained for each hospital in the region; report updated monthly to reflect revised status of cases from preceding month(s).

Name of Hospital: _____ Date: _____

Monthly report for: _____ Year:_____

Compiled by: _____

Reviewed by: _____

Month	Deaths identified in women 10-50 years	Records retrieved and inspected	Evidence of pregnancy in preceding 12 months	Records of pregnancy related deaths reviewed	Reports completed			Case review meeting held	Final summary report sent to Ministry of Health
					Hospital summary (form 1)	Home visit (form2)	Post mortem report (form 3)		
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
Total (current YTD)									
Total (previous YTD)									