A study on the implementation of maternal death review in Sri Lanka
A study on the implementation of maternal death review in Sri Lanka
WHO Library Cataloguing-in-Publication data

World Health Organization, Regional Office for South-East Asia.

Maternal death review in selected countries of South-East Asia Region.


© World Health Organization 2014
All rights reserved

Requests for publications, or for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – can be obtained from SEARO Library, World Health Organization, Regional Office for South-East Asia, Indraprastha Estate, Mahatma Gandhi Marg, New Delhi 110 002, India (fax: +91 11 23370197; e-mail: searolibrary@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers’ products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

This publication does not necessarily represent the decisions or policies of the World Health Organization.

Printed in India
# Table of Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbreviations</td>
<td>iv</td>
</tr>
<tr>
<td>Executive summary</td>
<td>vii</td>
</tr>
<tr>
<td>1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2 Background</td>
<td>1</td>
</tr>
<tr>
<td>2.1 Health system and maternal health in Sri Lanka</td>
<td>2</td>
</tr>
<tr>
<td>2.2 Maternal death review in Sri Lanka – a historical perspective</td>
<td>2</td>
</tr>
<tr>
<td>3 Objectives and methodology</td>
<td>3</td>
</tr>
<tr>
<td>3.1 Objectives</td>
<td>3</td>
</tr>
<tr>
<td>3.2 Methodology</td>
<td>3</td>
</tr>
<tr>
<td>4 Findings</td>
<td>3</td>
</tr>
<tr>
<td>4.1 The review/audit methods</td>
<td>3</td>
</tr>
<tr>
<td>4.2 Sources of data and maternal death surveillance system</td>
<td>4</td>
</tr>
<tr>
<td>4.3 Processes and procedures of maternal death review</td>
<td>5</td>
</tr>
<tr>
<td>4.4 Follow-up actions taken and outcome of maternal death review</td>
<td>10</td>
</tr>
<tr>
<td>4.5 Strengths and weaknesses</td>
<td>11</td>
</tr>
<tr>
<td>5 Discussion</td>
<td>12</td>
</tr>
<tr>
<td>6 Recommendations</td>
<td>14</td>
</tr>
<tr>
<td>7 Conclusions</td>
<td>15</td>
</tr>
</tbody>
</table>
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 delays</td>
<td>first delay: decision to seek care; second delay: difficulty in obtaining care, especially getting to a health facility; third delay: once at a health facility, inadequate, improper or no care given</td>
</tr>
<tr>
<td>Adolescent</td>
<td>Individual between the age of 10–19 years</td>
</tr>
<tr>
<td>BCC</td>
<td>behaviour change communication</td>
</tr>
<tr>
<td>BHT</td>
<td>bed head ticket</td>
</tr>
<tr>
<td>CEMD</td>
<td>confidential enquiries into maternal deaths</td>
</tr>
<tr>
<td>DDG-PHS</td>
<td>Deputy Director General of Public Health Services</td>
</tr>
<tr>
<td>DGHS</td>
<td>Director General of Health Services</td>
</tr>
<tr>
<td>DHS</td>
<td>Demographic Health Survey</td>
</tr>
<tr>
<td>DMRR</td>
<td>District Maternal Mortality Review</td>
</tr>
<tr>
<td>FHB</td>
<td>Family Health Bureau</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GNP</td>
<td>gross national product</td>
</tr>
<tr>
<td>HMIS</td>
<td>Health Management Information System</td>
</tr>
<tr>
<td>JMO</td>
<td>Judicial Medical Officer</td>
</tr>
<tr>
<td>MCH/FP</td>
<td>maternal and child health/ family planning</td>
</tr>
<tr>
<td>MDG</td>
<td>millennium development goals</td>
</tr>
<tr>
<td>MDR</td>
<td>maternal death review</td>
</tr>
<tr>
<td>MMR</td>
<td>maternal mortality ratio</td>
</tr>
<tr>
<td>MNH</td>
<td>maternal and newborn health</td>
</tr>
<tr>
<td>MO-H</td>
<td>Medical Officer of Health</td>
</tr>
<tr>
<td>MO-MCH</td>
<td>Medical Officer of Maternal and Child Health</td>
</tr>
<tr>
<td>NMMR</td>
<td>National Maternal Mortality Review</td>
</tr>
<tr>
<td>NNMR</td>
<td>neonatal mortality rate</td>
</tr>
<tr>
<td>NPM</td>
<td>national programme manager</td>
</tr>
<tr>
<td>PDHS</td>
<td>Provincial Director of Health Services</td>
</tr>
<tr>
<td>PHI</td>
<td>public health inspector</td>
</tr>
<tr>
<td>PHM</td>
<td>public health midwife</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>PHNS</td>
<td>public health nursing sister</td>
</tr>
<tr>
<td>RDHS</td>
<td>Regional Director of Health Services</td>
</tr>
<tr>
<td>RGD</td>
<td>Registrar General’s Department</td>
</tr>
<tr>
<td>RHCS</td>
<td>Reproductive Health Commodity Security</td>
</tr>
<tr>
<td>TFR</td>
<td>total fertility rate</td>
</tr>
<tr>
<td>UMN</td>
<td>unmet need (for contraception or family planning)</td>
</tr>
<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WWC</td>
<td>Well Woman Clinic</td>
</tr>
</tbody>
</table>
Executive summary

The achievement of Sri Lanka as a developing country in attaining a good status for mothers and children is acknowledged worldwide. The decline in the maternal mortality ratio (MMR) over the last decades has been impressive. One of the approaches taken was to understand better the factors and causes of maternal deaths through a maternal death audit, which started in the 1980s and has since undergone gradual strengthening.

**Objectives and methodology:** The overall objective of the study was to review the implementation of maternal death reviews (MDR) in Sri Lanka, and specifically to describe the processes, recommend steps for strengthening the MDR and draw lessons and share Sri Lanka’s experience with other countries in the South-East Asia Region. The methodologies used were an in-depth desk review of the literature, a stakeholder workshop and key informant interviews.

**Findings and discussion:** The MDR in Sri Lanka has been well established since the 1980s, with a single unified system implemented nationwide. The main method used is the facility-based review of maternal deaths with assured confidentiality; however investigations of these deaths often also use verbal autopsy and clinical audits. There is as yet no formalized system of audit of severe maternal morbidity or “near-miss” cases.

The sources of maternal death data are vital registration and health information systems, which are the basis of the maternal death surveillance system. Notification of maternal death is required by law; similarly all such deaths are required to undergo autopsy examination. There are clearly structured processes for an immediate investigation of every maternal death at facility or community level, and an MDR conducted every six months at district level, and every year at national level.

There is also a clear organizational and managerial structure to guide the system and processes, with strong governance at all levels and the Family Health Bureau in the Ministry of Health at the apex of this structure. Recommendations are made and acted upon following every review. Some of the products and outcomes include human resource strengthening such as cadre increase of public health midwives (PHM), improved blood bank facilities, wider use of the partogram, improved emergency obstetric care, rapid communication systems and development of several guidelines. In terms of impact, it is reasonable to assume that strong maternal death surveillance has contributed to the decline in the overall MMR.

The strengths of the system include the unified single model involving public and private sectors, solid governance and clearly defined processes and procedures, the strong maternal and child health service delivery system backed by a well developed vital registration health information system. Weaknesses include data gaps and problems of under-reporting; the need for better quality in autopsy examinations; the lack of legal immunity and the need for more accountability and commitment at provincial and district levels.
Conclusions and recommendations: MDR in the form of facility-based reviews is well established in Sri Lanka, and positive outcomes have accrued. It is reasonable to suggest that this initiative has contributed to the decline in maternal mortality. The recommendations from this study are to: continue the current work on MDR; ensure that investigations and review meetings are conducted regularly as scheduled; disseminate minutes rapidly for implementation of recommendations; address areas of weakness; systematize surveillance of maternal deaths in real time without waiting for the annual national MDR; strengthen cooperation and linkages between curative and preventive health services; institutionalize audit of severe maternal morbidity (near misses) to ensure the range of cases and experiences; and take all possible actions to ensure that the current system of MDR and surveillance is sustained.
1. Introduction

The achievement of Sri Lanka as a developing country in attaining a good status for mothers and children is acknowledged worldwide. The decline in the maternal mortality ratio (MMR) over the last decades has been impressive. The low MMR makes it difficult for further decline, although Sri Lanka continues to make every effort to attain this. One of the strategic steps was to understand better the factors and causes of maternal deaths in depth, to enable the formulation of appropriate interventions in a challenging environment. Therefore it was not unexpected that Sri Lanka embarked on a maternal death review (MDR) earlier than other countries in the South-East Asia Region. The guide Beyond the Numbers – Reviewing Maternal Deaths and Complications to make Pregnancy Safer (WHO, 2004), describes five specific methods for conducting an MDR:

- Facility-based maternal death audits/reviews;
- Community-based verbal autopsy;
- Confidential enquiry into maternal deaths;
- Clinical audits; and
- Audits of severe maternal morbidity or near-miss cases.

The approach used in the Sri Lanka study differed substantially from the other four studies in India, Indonesia, Myanmar and Nepal, largely because there is only one unified system throughout the country, which led the researcher to focus in depth on the evolution of this well-established system and to describe its processes and procedures in considerable detail.

The status of MDR in Sri Lanka as reported at the Regional Workshop on Strengthening Capacity for Facility-based Maternal Death Reviews, held in 2007, was as follows.

“All maternal deaths since 1985 are required to be notified. The results of the field and institutional investigations are reviewed by a multi-disciplinary expert panel at the national maternal mortality review meetings. The analysis of maternal deaths produced vast information related to causes of death, place, time, type of delays and other related factors. Follow-up actions of the review are identified at the community and facility level at the time of investigation, at the district level on a quarterly basis and at the national level on an annual basis. Findings of the review are broadly disseminated and follow-up is reported regularly at the district and national levels. Strengthening maternal death surveillance through improving notification and follow-up at the local and ministerial levels and by conducting near-miss enquiries are among the plans for the future.”

2. Background

Because the study on the implementation of MDR in Sri Lanka placed considerable focus on the development and evolution of the system, and the researcher has given
an elaborate description of the review process, much of this will be dealt with as
findings of the study. Background information is thus only given on the health system,
maternal health situation, and the fundamental features of the evolution of the MDR
in the country.

2.1 Health system and maternal health in Sri Lanka

With a well-established health system providing free health services to all Sri Lankans,
and universal free education supplemented by several other welfare measures, Sri
Lanka has achieved significant gains in the area of human development. In comparison
with countries with similar economic background, Sri Lanka has achieved relatively
high levels of health and social indicators despite a gross domestic product (GDP) per
capita of US$ 2399 (Central Bank 2011) and nearly 9% of the population living below
the standard poverty line (Department of Statistics 2010). The life expectancy of Sri
Lankans for both sexes is 74 years, and 90% of women are literate. This achievement
is in spite of the civil war that raged for more than 30 years. With the recent end of
the war, the Government has put in place several strategies to improve further the
health delivery system, especially in the areas most affected by the war, and this
improvement includes services for maternal and child health (MCH).

In 2010, the MMR was 31.6 per 100 000 live births, and the infant mortality rate
was 8.5 per 1000 live births. Much of this success is attributed to the strong political
commitment and robust health system in the country. The Government health-care
delivery system forms a dense, integrated network with more than 15 000 doctors both
in the curative and preventive sectors. There is one doctor for every 1462 population.
Most Sri Lankans live within 3 km of a public facility (Rannan-Eliya and Sikurajapathy,
2008). What makes this achievement even more impressive is the relatively low level
of spending on health care – health expenditure does not exceed 3% of GDP and
the health budget is 8% of the national budget. Another feature of the strong health
system is a solid health information system that includes maternal death surveillance.
This is enhanced by a robust vital registration system.

2.2 Maternal death review in Sri Lanka – a historical perspective

Revitalization of the MDR system at national level took place under the leadership of
the Director of Health Services in the 1980s. MDRs were conducted together with
the Expanded Programme for Immunization (EPI) reviews. The Family Health Bureau
(FHB) took the initiative to organize these with the relevant field staff. This reflects
the commitment of high-level officials of the Ministry of Health (MoH) to probe and
understand the causes of maternal deaths and their attempt to avert them. The role
of the FHB as the central organization responsible for MDR was made clear in the
early 1980s with the revision of the MCH information system. This strengthened
the collaboration between the FHB and regional public health teams at various levels
of the health-care delivery system, and the hospital system was also strengthened
with the Director playing a major and direct role. Collaboration was forged with key
stakeholders including the Sri Lanka College of Obstetrics and Gynaecology.

In 1985, a maternal death investigation format was introduced with maternal deaths
being reported directly to the FHB. The Safe Motherhood Initiative, launched in Sri
Lanka in 1987, spearheaded advocacy and brought focused attention on maternal mortality to the local public health agenda. Maternal deaths were made notifiable in 1989 since when structured maternal death investigations started covering the entire country. Between 1994 and 2008, several improvements were made to the system in terms of methodology and process, data collection, processing and dissemination, and follow-up action including policy changes and advocacy. Other positive steps taken to strengthen the MDR are described in the section on findings of the study.

3. Objectives and methodology

3.1 Objectives

The overall objective of the study was to review and draw lessons from the implementation of MDRs in Sri Lanka. The specific objectives were:

• to describe the processes of the MDR;
• to recommend steps for strengthening the MDR in the country; and
• to share Sri Lanka’s experience with other countries in the Region.

3.2 Methodology

The following methodologies were adopted in compiling information for this document:

• an in-depth desk review of the literature (documents/reports/Internet search);
• a stakeholder workshop; and
• key informant interviews.

More than 20 professionals participated in the stakeholder workshop. These included the former Secretary of Health (who pioneered MDRs in Sri Lanka), former directors of the FHB, provincial administrators, clinicians, representatives of professional colleges, national programme managers (NPM) and representatives from international nongovernmental organizations. Key informant interviews were conducted with selected stakeholders by the NPM – maternal mortality surveillance based on an unstructured question template to gather historical perspectives.

4. Findings

4.1 The review/audit methods

Four of the five methods described in the guide Beyond the Numbers (WHO, 2004) are used in Sri Lanka. However, these are not separate initiatives, but rather four methods conducted within a unified nationally-led MDR system, which essentially uses in-depth facility-based reviews with assured confidentiality. A verbal autopsy (community level) is carried out as a field investigation by all relevant field health-care
workers as a method of identifying the medical causes of death and ascertaining personal, family and community factors that may have contributed to the death. A facility-based MDR is conducted as an in-depth investigation of the causes and circumstances surrounding maternal deaths occurring in health facilities, with the participation of all the health-care workers involved in the management of the deceased woman including the forensic pathologist who conducted the postmortem. There is as yet no formal or institutionalized review or audit of severe maternal morbidity or “near-miss” cases.

4.2 Sources of data and maternal death surveillance

The system is backed by two sources of information – vital/civil registration, and a health information system – which form the basis of a maternal death surveillance system.

4.2.1 Vital/civil registration

The vital registration system plays a major role in generating maternal mortality data. Collection and compilation of data on vital events is the responsibility of the Registrar General’s Department (RGD). A voluntary civil registration system of births and deaths began in 1867. This was later made compulsory under a Government law in 1887. In 1951, the Birth and Death Registration Act was enacted which required that every live birth had to be registered within 42 days and death within 5 days. Civil registration activities have been decentralized to the Divisional Secretariat level and accordingly a District Registrar has been established in every Divisional Secretariat. A survey conducted in 1981 assessed the completeness of birth and death registration to be 98.8% and 94.0%, respectively. Annual estimates of vital statistics are compiled by RGD based on monthly mortality returns sent by Registrars of Births and Deaths all over the country. This includes maternal mortality estimates.

4.2.2 Health information system

Improvements in maternal health services described above have been matched by improvements in the health information system. A Health Management Information System (HMIS) for MCH and family planning operated by the FHB in the Ministry of Health aims to generate quality MCH information. The HMIS captures maternal death statistics from all hospitals on a monthly basis, but there is room for improvement for a more complete reporting. The vital registration and health information system are the foundation of maternal death surveillance.

4.2.3 Maternal death surveillance

The FHB set up an island-wide surveillance system of maternal deaths in 1989. A single surveillance system operated at national level ensures smooth implementation and complete coverage of the country. All important variables of maternal mortality information are entered into the National Maternal Mortality Database maintained at the Maternal and Child Morbidity and Mortality Surveillance Unit. A computerized database in Microsoft Access® was
developed and maintained at FHB. A new record is created with each maternal
death notified to FHB with a unique identification number. A thorough check is
done for duplication with identifiable variables such as name, address, age, and
hospital in-charge. Upon receipt of the Maternal Death Investigation form (field or
institute), the database is updated with new information. A medical officer with
public health experience and trained in maternal mortality surveillance oversees
the data entry and data quality.

The cause and category of maternal death, preventability and “three delays” that
have been worked out at the National Maternal Mortality Review (NMMR) are
entered in the database. The underlying cause of death is determined based on the
World Health Organization (WHO) draft proposal on maternal death classification.
All reported deaths are categorized as: direct maternal deaths, indirect maternal
deaths, late maternal deaths, non-maternal deaths (pregnancy-related deaths), or
reproductive-age female deaths.

Several mechanisms are adopted to assure the quality of the maternal mortality
surveillance. Completeness of investigation reports are ensured at institutional
level by the head of the institute, at peripheral level by the MCH medical officer (MO-MCH) and at FHB level by the District MCH Officer and the NPM. A well-
structured reminder system has been introduced, which has improved the
completeness of investigations. Steps have been taken recently to streamline
postmortem examinations, and the conduct of autopsies of maternal deaths has
increased from 62% in 2007 to 99% in 2011.

4.3 Processes and procedures of maternal death reviews

There are two levels of MDR in Sri Lanka: a maternal death once notified is investigated
within a week at the community/field, and institution (hospital) level. In addition, every
six months the district health authority carries out a review of all maternal deaths
investigated in that period, and every year a national review is conducted. The
half yearly and annual reviews assess and make further recommendations on the
investigations already done at local levels.

4.3.1 Investigation of a maternal death (institutional and field)

Regardless of whether a death occurs in an institution (public or private hospital)
or outside of a facility (as in a clinic, the home or during transportation), the
investigation is carried out in the hospital as well as in the field/community
(including in the tea estate), where the woman was resident and where she may
or may not have used the health service. In the extremely rare instance of the
death of a woman who had not at all used hospital services, the investigation
is only in the field setting. The first step of a maternal death investigation is
notification.

Maternal death notification

As seen earlier, the strong health system in Sri Lanka includes a robust health
information system that incorporates formal maternal death surveillance. This is
further supported by well-established vital registration. The MDR is an integral component and an active form of surveillance in maternal death surveillance. One of the features of maternal death surveillance in Sri Lanka is the notification of all maternal deaths, initiated in 1989, when a gazette notified that all practitioners providing care to women in the country, both at institutional and field levels, were legally bound to notify maternal death events to the FHB, the focal point in maternal death surveillance. Notification involves informing of all deaths that fulfil the criteria to the relevant authorities, in a uniform manner and without delay, for necessary action. The criteria for notification are all deaths (irrespective of cause) of women of reproductive age (15–49 years) during pregnancy and until one year after termination of pregnancy. This includes all confirmed maternal, late maternal, pregnancy-related and other reproductive age female deaths. Such a wide notification range will ensure that all probable maternal deaths are captured by the surveillance system. The procedure for notification is described as an integral part of the MDR which in turn is an integral part of maternal death surveillance.

**Institutional (hospital) investigation of maternal deaths**

As soon as a maternal death occurs in an institution (government or private hospital), or outside the hospital if the deceased had used its services, the head of the institution takes custody of the bed head ticket (BHT) and all documents related to the management of the deceased. All the pages are numbered and the original document is made available for relevant officers/review meetings for the investigation procedure. The BHT is not allowed to be reproduced or taken out of the office of the head of the institution, and extraction of information from the BHT is only permitted within the office premises.

It is compulsory to conduct a postmortem in all cases of maternal deaths as per the circular issued in 2008 by the Secretary to the Ministry of Justice and Law Reforms to all coroners, and the circular issued by the Director General of Health Services (DGHS) in 2011. A copy of the postmortem report is issued by the Judicial Medical Officer (JMO) to the DGHS, Director FHB and head of the hospital where the maternal death occurred. Coroners are requested to notify such deaths to the Regional Director of Health Services (RDHS) and the head of the institution after inquiry into sudden deaths.

The head of the institution then notifies the death within 24 hours by telephone, fax or e-mail to the following officers: Director MCH (FHB), provisional and regional directors of health services (where the institution is located), the Medical Officer of Health (MO-H) (where the deceased resided), and head/s of the institution/s that had been involved in the management of the woman.

Investigations are performed by each institution involved in the management of the deceased woman. This is conducted within 14 days of occurrence of a maternal death to facilitate acquiring fresh information, and is the responsibility of the head of the institution. The investigation is carried out by a team comprising the head of the institution as the team leader, the consultant obstetrician and gynaecologist or the relevant specialist of the hospital unit in which the death
occurred, and any other relevant consultant who managed the woman (physician, surgeon, anaesthetist, psychiatrist etc.), medical officer/s who attended the deceased woman, and a JMO. When relevant, the following may also be involved: MO in the blood bank, grade I nursing officer/nursing officer in charge of the ward/labour room, head of the institution of hospitals where the patient was managed before transfer, MO-MCH of the district where the woman was resident and where the hospital is situated, MO-H from the woman’s area of residence, and the PHM from the area of residence.

The death is discussed in detail to identify precisely the circumstances that led to the death. The consultant obstetrician and gynaecologist or a senior clinician presents the clinical case management scenario. The area PHM, MO-H and -MCH supplement information related to the field health service provision to provide the total picture and to explore the factors that may have led to the three delays. Deficiencies in the management of the deceased woman are identified, discussed in detail and addressed with feasible preventive measures both at institutional and field level. No-name, no-blame policy and confidentiality are strictly maintained at the review.

A structured generic report of maternal death investigation at institutional level is prepared, covering all information as well as views/comments and follow-up activities carried out. The consultant obstetrician and gynaecologist or the relevant specialist of the hospital unit in which the death occurred, and the head of the institution are responsible to ensure the completeness of the report and relay it to specific health officials in the hierarchy of the health system. The head of the institution also ensures that these deaths are reported through the prescribed formats (Monthly Report on Maternal Statistics and Quarterly Indoor Morbidity and Mortality Return). For every death, it is ensured that pregnancy and/or childbirth is mentioned as an underlying cause in the death certification/declaration. The head of institution is responsible to ensure that all actions recommended by the investigation team are carried out.

**Field (including estate) investigation of a maternal death**

When a maternal death occurs, whether in or out of a hospital, the area PHM where the deceased was resident (where she may or may not have used the services) immediately notifies the MO-H. The MO-H may receive a maternal death notification directly from the head of the institution where the death occurred or from the RDHS/MO-MCH of the district to whom the death was notified. However, notification by the PHM can be considered the single most important step in maternal death surveillance as it is likely to be the highest notification rate.

The MO-H informs the relevant authorities that it is compulsory to conduct a postmortem on all maternal deaths as per legal requirements. If a copy of the postmortem is necessary, the MO-H informs the Director of MCH and can obtain postmortem details from the JMO. All relevant records are maintained and kept safely in the office of the MO-H until the investigations and review meetings are over.
The MO-H notifies maternal deaths to the FHB, Provincial Director of Health Services (PDHS) and RDHS within 24 hours by telephone, fax or e-mail using a standard format. The telephone message is confirmed by a letter containing the following information: name of the deceased, her mother, address, PHM area, MO-H area, RDHS area, date of death, place of death, estimated cause of death, name and designation of the informant, and date informed. If the woman was temporarily resident in an MO-H area, the officer also notifies the death to the MO-H area of the mother (and where the deceased was registered as an eligible female). In cases of deaths within one week of discharge from a hospital, the MO-H notifies the death to head/s of the relevant institution/s. All deaths are reported through the Quarterly Maternal and Child Health Return, a component of the HMIS.

In Sri Lanka, a significant proportion of the population resides in estates. If a maternal death occurs in an estate it is notified to the PDHS, RDHS, the MO-H and the Regional Health Manager of the Plantation Trust. The MO-H will in turn notify the death to the Director MCH as described earlier. The MO-H and MO-MCH jointly investigate maternal deaths with the participation of a Public Health Nursing Sister, area PHM and the Regional Health Manager. The team visits the residence of the woman and proceeds with the field investigation, as reported below.

4.3.2 Review of investigated maternal deaths (district and national level)

District Maternal Mortality Reviews

Half yearly district reviews are organized by MO-MCH on behalf of the RDHS in January and July. The District Maternal Mortality Review team comprises relevant officers and health staff chaired by the PDHS/RDHS. The circumstances that led to each death investigated are identified at the district level and reviewed using the three-delays model; remedial measures are identified to improve the availability, accessibility, utilization and quality of field health-care services and essential obstetric services. At the end of the review the MO-MCH records the deficiencies identified and actions taken/to be taken and forwards these to the PDHS/RDHS (MCH). Minutes of the district review are prepared by the MO-MCH and sent to the PDHS, Director (MCH) and the relevant ministry/ institutions. These minutes are discussed at the next district review of maternal deaths.

National Maternal Mortality Review

A review of all deaths investigated and discussed at district level is conducted annually at the national level, with the participation of experts from a broad constituency. The Director (MCH) in the Department of Health and the PDHS organize this annual review in a district with the participation of representatives from professional colleges including the Sri Lanka College of Obstetricians and Gynaecologists, Sri Lanka College of Anaesthetists, College of Physicians, Sri Lanka College of Community Physicians and Sri Lanka College of Forensic Pathologists. The DGHS (if unavailable, the PDHS) chairs this meeting. The
participation of specific categories of health staff is mandatory at the National Maternal Mortality Review (NMMR) including those who were involved in the management of the deceased, as well as representatives of the district hospitals and peripheral units (whether or not maternal deaths occurred in their institutions).

A case scenario or summary compiled at national level is presented by the NPM to initiate the discussion. This includes information received both from the field and institutions. All cases are studied in detail and pertinent issues are highlighted. Individual maternal deaths are presented by the MO-H (field part) and the visiting obstetrician/gynaecologist or the relevant specialist (institutional part). It is the responsibility of the head of the institution and the specialist of the unit where the woman was managed to ensure that a detailed presentation is made at the NMMR.

All deaths are discussed according to the three-delays model (to assess whether there was a deficiency in seeking medical care, reaching a health facility or treatment at the health institution or point of service). This is conducted as a modified clinical audit evaluating the care the deceased woman received against locally applicable protocols on clinical conditions. Due consideration is given to availability of logistics and health-care facilities. The final decisions regarding the category of maternal death, preventability and measures that should have been taken are made by the NMMR panel of experts. Following the review, minutes are prepared by the NPM for Director MCH and sent to the relevant district and provincial officers. The RDHS duplicates these minutes and sends copies to the relevant curative institutions and the MOH. Following the NMMR, the national statistics on maternal mortality are issued by the FHB before the end of the next year (Figure 1).

Figure 1. The processes involved in the investigation of maternal deaths in Sri Lanka
4.4 Follow-up actions taken and outcome of maternal death reviews

One of the clearest outcomes of the MDR has been the overall improvement in health care for women in pregnancy and childbirth by addressing the factors for the three delays, which in turn contributes to reducing maternal mortality. Although the decline in MMR is attributed to a host of factors and initiatives, it is reasonable to assume that the MDR and maternal surveillance system has played a significant part in this success. MMR for Sri Lanka declined from 41.6 per 100 000 live births in 2009 to an estimated 16.7 per 100 000 in 2011. Based on the findings of the MDR, besides ensuring emergency obstetric care, effective interventions have been introduced to prevent morbidity and mortality due to induced abortions.

The MDR revealed that, in spite of the impressive decline in maternal mortality, the majority of deaths remained preventable, and therefore remedial and preventive measures need to be further improved. Some of the issues raised in the MDR were:

- the need to go beyond the pregnant state and introduce an effective programme of pregnancy education and counselling, as a part of pregnancy preparedness;
- many nutritional indicators of women of reproductive age do not meet minimum standards, with iron deficiency anaemia and malnutrition common problems among pregnant women;
- inequitable distribution of services;
- deficiencies in quality of care;
- competing interests for health resources; and
- increasing costs of health care.

Following the reviews at various levels, and especially the NMMR, changes are implemented at individual, team or service level (sub-national and national) for identified service deficiencies.

After the NMMR, the MO-MCH organizes a meeting at district level for all MO-H/heads of institution and other relevant officers to implement the corrective actions decided at the NMMR. This meeting is chaired by the RDHS. The head of the institution calls for a separate meeting at the institutional level to discuss these minutes with the consultants/blood banks and other relevant staff in order to implement the highlighted activities.

At national level, three committees are formed to support the policy implementation:

- National Committee on Family Health, chaired by the Secretary of Health, meets every three months.
- Advisory Committee on Maternal Health and Family Planning, chaired by the Deputy Director General Public Health Services (DDG-PHS), meets every two months.
• Technical Advisory Committee on Newborn and Child Health, chaired by the DDG-PHS, meets every two months.

Some of the products and outcomes of the MDR include:

• human resource strengthening such as an increase in PHW, appointment of an additional medical officer, and a visiting obstetrician and a gynaecologist for a station to cover weekends;
• improved blood bank facilities;
• wider use of the partogram;
• improved emergency obstetric care;
• collaboration with the Registrar General to improve reporting of a maternal death, by including information on her pregnancy and childbirth in the death declaration;
• rapid communication system between field and hospital health-care workers;
• introduction of a modified three-delays model for a more detailed analysis of each death, and incorporation of more variables to suit the local context such as non-use of family planning and antenatal care services as part of the first delay;
• a simple electronic database to facilitate cross-tabulation for a more in-depth analysis;
• heightened awareness of maternal health through circulars, wall charts, etc.;
• development of several guidelines, e.g. for pregnant mothers leaving the hospital against medical advice, management of H1N1 infection, management of dengue haemorrhagic fever;
• evidence generated at the NMMR and the lessons learnt were incorporated in the Revised Maternal Care Package compiled and disseminated in 2012; and
• multiple strategies were launched to prevent maternal suicides, and innovative mechanisms introduced to promote contraception, especially emergency pills and lipid resuscitation therapy under local anaesthesia.

4.5 Strengths and weaknesses

Some of the strengths revealed in this study are listed below.

(1) A single system covers the entire country, including both the public and private sector, with a very clear role of the professional associations.

(2) Strong governance exists through departmental policies, mandates and regulations including clearly defined processes and procedures, exemplified by the mandatory notification and autopsy examination of all maternal deaths. Maternal mortality surveillance is an integrated process governed by the DGHS, who oversees health-care service delivery both in the state and the private sector. The general circular
issued in 1996 on maternal mortality surveillance is under review to take account of changes in maternal care service delivery.

(3) The maternal death investigations, review and resulting surveillance capitalize on and optimize the strong MCH service delivery system, which is backed by a well-developed vital registration health information system.

(4) The MDR is recognized as a continuous quality improvement process of maternal and newborn health services. A “no-name no-blame” approach to ensure total confidentiality and that the process is not a fault-finding exercise is adopted in all the steps of maternal mortality surveillance in the country. It has inculcated a culture of accountability among health providers.

(5) This approach has also nurtured a strong spirit of team work, with collaboration among many stakeholders in the health sector.

(6) The model of an action-oriented process that makes recommendations and ensures follow-up actions has shown tangible results that are motivating for all parties concerned.

(7) As the only centrally mandated maternal death audit, it has been given strong visibility and priority, and resources are provided accordingly.

(8) It has been highly accepted by politicians, administrators, professional colleges, all categories of health-care workers and the general public.

Some of the weaknesses and challenges that need to be addressed are the following:

(1) There are still gaps in the data and problems of under-reporting in the vital registration system (which have since been addressed).

(2) There is a need for better quality in autopsy examinations and reporting.

(3) The lack of legal immunity has also been cited as a weakness.

(4) There should be more accountability and commitment at provincial and district levels to conduct maternal death investigations and implement recommendations.

5. Discussion

Sri Lanka has taken impressive positive steps to institutionalize the process of MDR, introducing facility-based maternal death reviews with assured confidentiality as early as the 1980s and incrementally improving its quality and scope. The approach to cover the whole country with a single system is an advantage, and when compared with countries such as India, Indonesia and Nepal, there is less disparity in implementation. In this regard, the experience of Sri Lanka is comparable to that of Malaysia, which is not surprising as there are some common characteristics – both are middle-income, medium-sized countries with a strong health system, who have successfully reduced
maternal mortality in the past several decades; and both have been used as examples for developing countries to emulate. The achievement of Sri Lanka is remarkable considering the 30 years of strife it underwent due to the civil war.

The use of three MDR methods is appropriate in the context of this single nationwide model; facility-based maternal death reviews represent the overall method, supported during the investigation stages by verbal autopsy, and clinical audits. All methods feature confidentiality: information is collected at the local level confidentially and then assessed by a highly qualified, multidisciplinary independent group at the national level, involving the private sector (usually represented through a professional association). Needless to say, this highly organized and sophisticated model incurs considerable costs, in addition to good governance and management support.

The strong governance in the MDR in Sri Lanka is evident from the solid role and authority vested in the FHB, and the direct and committed role played by the director and other high-level officials. Such strong governance with mandates and regulations may not be unique to Sri Lanka, but two of its policies/rules deserve special mention as they are unique, at least in the South-East Asia Region: mandatory notification of maternal deaths and mandatory autopsy examination. In contrast, in the Malaysian experience, religious and cultural constraints make autopsies difficult to conduct although the committee on confidential enquiries into maternal deaths has recommended that they become mandatory.

The effective health system in Sri Lanka, established over several decades, is clearly an excellent context for the MDR. Included in the health system is the crucial building block of the HMIS, which will be gradually improved for maternal health and MDR. This is further supported by a robust vital registration system; indeed Sri Lanka is one of the few countries in the Region (Thailand is another) that has good coverage of both birth and death registration. This study has highlighted how these two elements, along with mandatory notification of every maternal death, form the central components of the national maternal death surveillance system.

The fact that there are various levels of review conducted for each maternal death depicts the detail and depth of the MDR in Sri Lanka, which is also the approach used in Malaysia. In Sri Lanka, the levels are termed differently: a “maternal death investigation” is conducted at the local level (which may be community/field level or in a facility, usually a hospital); every such investigated death is again subjected to a “maternal death review” at district level every six months, and every year at national level. Such a comprehensive system is another factor for the high costs of this approach.

The confidentiality of the MDR has been an advantage, and cited by all countries and institutions conducting such MDRs. Besides lending credibility, it also motivates the health staff and therefore ensures as complete a report as possible. The study revealed that the lack of legal immunity is a weakness. One reason why countries do not include a representative of the lay community is the fear of litigation. While no cases of litigation related to MDR were cited, legal immunity does not appear to be a feature of any MDR.
As in the experiences of countries and states that implement MDRs and CEMD (such as South Africa, Malaysia and Kerala in India), the multidisciplinary team to conduct the MDR has been found to be a crucial feature. In the context of Sri Lanka, with mandatory autopsy for all maternal deaths, the forensic pathologist and judicial medical officer have an important place in the MDR team or committee. The representation of a professional association through the College of Obstetricians and Gynaecologists is another strong feature, and this is also the case in Kerala.

It is surprising that there is as yet no institutionalized or formal system for audit of severe maternal morbidity or “near-miss” cases, since Sri Lanka is clearly ready to embark on this given its relatively small number of maternal deaths. It is however reasonable to assume that near-miss audits are carried out in some hospitals on the initiative of the specialists or the MDR committee. In countries such as the United Kingdom, South Africa and Malaysia, CEMD has been expanded to “near-miss” audits because the number of maternal deaths is not adequate to gain lessons to prevent future deaths from the same causes and under similar circumstances.

Like other countries, Sri Lanka has strengths as well as weaknesses in its implementation of MDR. While many of the problems encountered are likely to be similar in other countries, the problems of a single system that uses a sophisticated and comprehensive approach will be related mainly to uniformity of processes, costs and sustainability. This study found that the Sri Lanka’s greatest advantage was its strong health system with clear and strong governance.

6. Recommendations

From this study, the following recommendations are made.

(1) Continue the current work on MDR, and ensure that the investigations and review meetings are conducted regularly as scheduled, and that the minutes are disseminated promptly for implementation of recommendations.

(2) Study and address areas where there are weaknesses.

(3) The FHB to create a system of surveillance of maternal deaths in real time (as they occur) and not wait for the annual NMMR.

(4) Strengthen cooperation and linkages between the two main arms of the Ministry of Health – curative and preventive health services – so that a maternal death in a hospital is made known with the least possible delay by the responsible officers in preventive services, and so that better coordination of actions taken in follow-up to the review can be achieved.

(5) Start/institutionalize audits of severe maternal morbidity (near misses) to ensure that the range of cases and experiences cover as complete a profile as possible (especially medical causes, but also contributing factors) since the number of maternal deaths is too small to ensure this.
(6) Take all possible actions to ensure that the current system of MDR and surveillance is sustained.

7. Conclusions

In summary, the efforts made by Sri Lanka to institutionalize MDR are commendable. There is evidence that the system is working well, and it is reasonable to assume that this has contributed to the objectives of the MDR, i.e. to identify the cause of death, analyse in depth the circumstances that led to the death, and take remedial action to avert similar deaths in future.

Effective maternal health services and the system of MDR are part of Sri Lanka’s overall remarkable health status. This has been made possible through policies that ensure easy access to medical services for the whole population, mass education for women and mothers to make use of these services, and a continuous policy-driven process of behavioural change that has made Sri Lankans highly aware of illness, for which readily seek care.

The experience of Sri Lanka in MDR can be used as an example by other countries that wish to embark on a nationwide system that uses facility-based reviews with assured confidentiality.
A study on the implementation of maternal death review in Sri Lanka