



Counting what matters

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Maternal and Perinatal Death Surveillance and Response systems in Asia-Pacific during the COVID-19 pandemic 2020-2021



United Nations Population Fund
Asia Pacific Regional Office
May 2022

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This report was commissioned by UNFPA Asia Pacific Regional Office to the Burnet Institute. Special thanks to Kara Blackburn, Rachel Smith and Caroline Homer (Burnet Institute), Animesh Biswas (UNFPA Bangladesh) and Catherine Breen-Kamkong and Federica Maurizio (UNFPA APRO) for their work in the analysis and preparation of the report.

Executive Summary

The coronavirus disease 2019 (COVID-19) pandemic has significantly disrupted health services throughout the world, especially for maternal and newborn health. It is estimated that there will be significant increases in maternal and perinatal deaths due to the direct and indirect impacts of the pandemic. Addressing the impacts of the pandemic on sexual, reproductive, maternal, newborn, child and adolescent health has been a key focus of the United Nations Population Fund (UNFPA), with attention given to the protection of health personnel, the improvement of hygiene standards in facilities, and the maintenance of essential health services.

Maternal and perinatal death surveillance and response (MPDSR) is a key initiative to improve the quality of care for maternal and neonatal health and end preventable maternal and newborn deaths. Evidence suggests that, if maternal and perinatal death reviews are completed and recommendations implemented alongside training and development of local leadership, a 30–35 per cent reduction in maternal and perinatal mortality can be observed (1).

Given that many services and systems have been disrupted by the pandemic response, it is possible that the same has happened to MPDSR. The aim of this project was to understand if disruptions to MPDSR systems and processes had occurred during 2020–2021 compared with previous years' reporting. If the key system that is meant to record and respond to maternal and newborn deaths is not functioning to its full extent, then there is a risk that not all maternal and newborn deaths are being captured and the true impact on maternal and newborn mortality is then not fully understood. The findings, along with emerging evidence on the effects of the COVID-19 pandemic on maternal and newborn health outcomes, provide a current picture of where challenges lie, and where interventions need to be focused.

A rapid stocktaking process was undertaken to understand the impact of COVID-19 on MPDSR. Data were collected through a survey developed for this purpose. UNFPA sexual and reproductive health (SRH) focal points were asked to complete the survey in partnership with those responsible for MPDSR within the corresponding ministries of health. Questions sought to identify disruptions of general maternal and newborn services and of the specific MPDSR system (or reporting system in place, if not MPDSR), both prior to and after the commencement of the COVID-19 pandemic.

The survey was sent to 22 UNFPA country office SRH focal points, and 17 responses were received (77 per cent response rate) by the end of September 2021.

Overall, 13 of the 17 (76 per cent) countries surveyed use the current full MPDSR system. Two of the 17 (12 per cent) countries have implemented a previous version that did not include perinatal deaths, maternal death surveillance and review (MDSR), but these countries planned to implement the perinatal reporting component in the coming year.

All countries reported varying degrees of disruption due to COVID-19, particularly at the beginning of the pandemic, when health systems were overwhelmed. The most frequently reported issues were with lack of completion of mortality reviews. Facility deaths continued to be reported, with some countries reporting a closer focus on this, as concern grew about the effects of COVID-19 on pregnant women.

However, notification of community deaths was an issue, with a significant reduction in notifications. This is concerning, as anecdotal and some health management information systems data showed reductions in institutional deliveries, leaving mortality outcomes of pregnancy and deliveries potentially unreported. Numerous countries reported delays in receiving notifications, though, citing the redeployment of staff as the primary issue.

Eleven countries out of 13 (85 per cent) reported that the number of MPDSR review committee meetings reduced during 2020–2021, while only two out of 13 (13 per cent) reported that these continued as usual. One country reported that the number of MPDSR review committee meetings increased during the pandemic and involved representatives from universities and ministries meeting online to discuss the main issues found in maternal and perinatal death reports. Other countries reported decreases and delays in committee meetings, at both facility and provincial/capital levels, as facility staff were redeployed to COVID-19 activities, and provincial/capital staff were planning vaccination campaigns and health information for COVID-19 prevention campaigns.

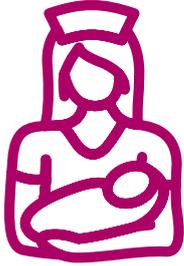
Most countries reported that there were limitations in recommendations being generated, disseminated and integrated into practice. Some reported the introduction of policies around reducing face-to-face meetings and the reduction of movement between capitals and provincial areas. Other issues identified focused on confidentiality concerns in an online environment where sensitive issues needed to be discussed.

Despite the major challenges that most countries reported with MPDSR processes during the pandemic, there were positive innovations and opportunities that arose during this time, including online training.

Countries in the earlier phases of MPDSR implementation may require further support, as interruptions from the COVID-19 pandemic have caused delays in setting it up. Even those countries that have well-established MPDSR systems reported disruptions at many levels and may require support to identify where the system failed and how to reinvigorate it.

This review makes a number of recommendations that may assist future strengthening of MPDSR.

Invest in MPDSR



Urgent investments are needed to strengthen and scale up subnational and national **MPDSR processes to ensure systems are resilient and will be minimally affected by disruptive events** such as natural disasters, humanitarian crises, disease outbreaks or pandemics.



Investments are needed to **strengthen national health management information systems** and online reporting systems, to include MPDSR data to improve the timely availability of information about all maternal and perinatal deaths from both facility and community levels.



Focus investments on **improving MPDSR reporting, investigation, assigning cause of death and response** when deaths occur in the community, including improving verbal autopsy implementation and, if required, addressing the current culture of blame, which decreases death reporting.



Invest in MPDSR capacity at provincial/capital level to support complete MPDSR framework implementation.



Consider codifying the establishment of a **comprehensive MPDSR system in a national legal or policy framework** in alignment with international, regional and national public health and human rights standards.



Strengthen support and training



Develop and deliver **accessible resources and training programmes to adequately prepare personnel** to accurately report and review deaths, assigning cause according to the 10th revision of the International Classification of Diseases, and develop response plans.



Support countries to **undertake gap analysis** of their current MPDSR guidelines and update them in line with new global guidelines.



Support local facilities with training and tools to continue MPDSR processes to review deaths, assign cause according to the International Classification of Diseases, and make and **implement recommendations at least every six months** while health system interruptions are occurring (i.e. while provincial/national review meetings are not occurring).



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Abbreviations

COVID-19: coronavirus disease 2019

DHS: Demographic and Health Survey

HMIS: health management information system

MDSR: maternal death surveillance and review

MMR: maternal mortality ratio

MPDSR: maternal and perinatal death surveillance and response

SDG: Sustainable Development Goals

SRMNCAH: sexual, reproductive, maternal, newborn, child and adolescent health

SRH: sexual and reproductive health

UNICEF: United Nations Children's Fund

UNFPA APRO: United Nations Population Fund Asia and the Pacific Regional Office

WHO: World Health Organization

Introduction

An extensive literature has been published, and continues to be, on the impact of the coronavirus disease 2019 (COVID-19) pandemic on health services throughout the world. Major disruptions to health and human services have been described, with direct and indirect impacts on individuals and populations. Chmielewska and colleagues (2) describe worsening maternal and fetal outcomes due to health service disruptions caused by public health responses, and observe that this is more pronounced in low-resource settings. Reports identify a decrease in institutional births, a subsequent increase in unattended births/births at home, and a rise in maternal and perinatal deaths, both in facilities and in the community (1, 3). A United Nations Children’s Fund (UNICEF) report from the beginning of 2021 projects that the disruptions to health services provision could in fact lead to an additional 12,200–56,700 maternal deaths globally. For South Asian countries (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan and Sri Lanka), this could result in an increase of 14–52 per cent in maternal mortality and an additional 89,434 stillbirths as a result of reduced coverage of essential sexual, reproductive, maternal, newborn, child and adolescent health (SRMNCAH) services (4).

The United Nations Population Fund (UNFPA) has identified that COVID-19 responses have made it challenging for countries to maintain high-quality essential maternal and newborn health services. Throughout 2020 and 2021, UNFPA supported and continued to implement initiatives in strengthening midwifery, provision of emergency obstetric and newborn care, implementing and strengthening maternal and perinatal death surveillance and response (MPDSR) systems, and prevention and treatment of obstetric fistula and other morbidities (5). UNFPA remains committed to prioritizing the implementation and strengthening of MPDSR systems. In many countries across the Asia and the Pacific region, MPDSR systems were fragile before the pandemic and have been further weakened by sustained pressure on health-care systems.

An MPDSR system seeks to assess all maternal and perinatal deaths in facilities and in the community (6). It is not known to what extent MPDSR systems have been affected by the pandemic. The aim of this project was to understand if disruptions to MPDSR systems and processes had occurred during 2020–2021 in comparison with previous years’ reporting. The findings, along with emerging evidence on the effects of the COVID-19 pandemic on maternal and newborn health outcomes, provide a current picture of where challenges lie and where interventions need to be focused.

Background

Before 2020, the global maternal mortality ratio (MMR) decreased by approximately 38 per cent in two decades, with reductions accelerating prior to the pandemic (7). High-burden countries were supported to focus on implementing strategies to reduce the MMR. However, very few countries with the highest MMRs attained the targets for Millennium Development Goal 5, Improve Maternal Health (8). In the Asia and the Pacific region, the average MMR is 127 deaths per 100,000 births. The Sustainable Development Goals' global target is fewer than 70 maternal deaths per 100,000 births by 2030, with no country above the threshold of 140 deaths per 100,000 birth. (9). Afghanistan, Bangladesh, Cambodia, India, Indonesia, Lao PDR, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines and Timor-Leste all have MMRs greater than 100 per 100,000 births (10), indicating the need for further focused support to reduce maternal deaths. Focusing interventions around the time of childbirth still has the highest impact on saving both maternal and newborn lives (1).

The COVID-19 pandemic has had a significant impact on attempts to improve the coverage and quality of maternal and newborn health services (2, 9, 11-12). While pregnant women affected by COVID-19 have significantly poorer health outcomes than non-pregnant women (13, 14), the most serious complications of the COVID-19 pandemic for women and children may, in fact, be indirect (1, 3), due to disrupted services and public health lockdowns limiting women's access to high-quality care. The World Health Organization (WHO) has identified MPDSR as an essential intervention to mitigate the indirect effects of COVID-19 on maternal and perinatal outcomes (1).

What is MPDSR and why is it used?

The MPDSR framework is a critical approach for improving the quality of care for maternal and neonatal health. MPDSR plays an instrumental role in improving advocacy, policy, planning, service delivery and accountability towards ending preventable maternal and neonatal mortality (6).

The MPDSR cycle promotes routine identification and timely notification of all maternal and perinatal deaths; review of maternal and perinatal deaths; implementation of actions based on recommendations from the death reviews; and monitoring of actions taken (6). These actions support linking quality improvement from local to national level, with the aim of preventing similar deaths in the future.

The new WHO document Maternal and Perinatal Death Surveillance and Response (MPDSR): Materials to Support Implementation (6) provides a roadmap for conducting MPDSR in clinical and policy settings. This framework is based on the following principles:

- **Maternal and perinatal deaths as notifiable events**
- **Timely review committee meetings**
- **Data quality**
- **Identification of causes of deaths and modifiable factors**
- **Recommendations for interventions to reduce deaths**
- **Implementation of recommendations**
- **Monitoring the progress and the effect/impact of recommendation implementation and adjusting where necessary**

As a concept, MPDSR functions at multiple levels of the health system: national, subnational, facility and community (15). The system for communication between different levels is an important component of MPDSR, with reporting moving continuously up and down the levels.

Countries can adapt their existing processes for maternal and perinatal death review to sit within the framework of MPDSR (6). In addition, the framework can complement national vital events registration systems or other health management information systems (HMISs).

Evidence suggests that, if maternal and perinatal death reviews are completed and recommendations implemented alongside training and development of local leadership, a 30–35 per cent reduction in maternal and perinatal mortality can be observed (1).

While there has been much positive feedback from countries about experiences with MPDSR, a review of the global literature shows that challenges and barriers to implementation were identified before the pandemic and included the following (16):

- **Lack of political buy-in and long-term strategic vision**
- **Underreporting of suspected maternal deaths due to inefficient and incomplete systems of notification**
- **A culture of blame that inhibits health professionals and other relevant parties from participating fully in the MPDSR process**
- **Incomplete or inadequate legal frameworks supporting death surveillance and review**
- **Inadequate human and other resources and health budgets to support full implementation and good quality of death review systems**
- **Presence of some cultural norms and practices that may inhibit the MPDSR processes**
- **Geography and infrastructure challenges that inhibit the implementation and operation of MPDSR**

Kinney and colleagues (17) undertook a scoping review to understand factors influencing MPDSR implementation in low- and middle-income countries and identified a blame culture as a key factor requiring addressing. The COVID-19 pandemic, with high workloads causing emotional fatigue and burnout of health workers, may further exacerbate this culture of blame whereby those who report or are involved in maternal death reporting or review feel threatened or fear repercussions. Moreover, in this new environment of seemingly more births (and therefore potentially more deaths) occurring at home without skilled attendants, difficulties in accurate reporting of perinatal and maternal deaths may also be exacerbated by fear of blame. This fear of blame often prevents reporting of deaths by family members, health workers or traditional birth attendants.

SRMNCAH indicators and services during disruptive events

Modelling during the COVID-19 pandemic has estimated reductions of 15 per cent in coverage of high-impact maternal and child health interventions. Globally, the estimated reduction in essential coverage could result in an additional 253,000 child deaths and 12,200 maternal deaths annually (12).

The Ebola epidemic in West Africa in 2014 saw major disruption to health services. Post-epidemic research found that fewer pregnant women accessed health care, and, among those who did, an increase in maternal mortality and stillbirth was observed (1). Jones and colleagues (14) also reported an 18 per cent decrease in the number of women attending antenatal care, a 22 per cent decrease in postnatal attendance, and an 11 per cent decrease in attending for birth at health-care facilities during the Ebola epidemic. Subsequently, a 34 per cent increase in the facility case fatality rate was identified. Suggested reasons for this were related to women accessing care late for fear of contracting Ebola infection in facilities and the fact that the quality of facility-based care was considered poor. In addition, difficulty in distinguishing Ebola from symptoms of other disease compromised patient triage and increased pressure on health facilities (1, 14).

A recent systematic review on the global effects of the COVID-19 pandemic on maternal and perinatal outcomes (2) found that, compared with pre-pandemic rates, maternal and fetal outcomes in low- and middle-income countries have worsened, with a significant increase in stillbirth and maternal deaths. Chmielewska and colleagues call for greater attention to the impacts of reduced access to care, and to the effects of redeployment of maternity staff to other COVID-19 activities. In addition, the reported increase in intimate partner violence, a leading cause of maternal death, during the pandemic may also contribute to increased maternal mortality (2).

A recently published scoping review of interventions to maintain essential services for maternal, newborn, child and adolescent health and older people during disruptive events (including the Ebola epidemic, severe acute respiratory syndrome, outbreaks of Zika fever, natural disasters, humanitarian emergencies and the COVID-19 pandemic) identified four consistent themes (1): decreased provision of health services; decreased use of health services; increased and emerging need for health care; and the need to adapt health service delivery to challenges. These four key themes have affected maternal and child health during the COVID-19 pandemic. Although often cited as an issue, staff shortages due to health workers being reassigned in response to COVID-19 were not cited as a reason for limiting health-care provision, the scoping review found.



Approach

A rapid stocktaking process was undertaken to understand the impact of COVID-19 on MPDSR. Data were collected through a survey developed for this purpose (see Appendix).

The survey used a qualitative format so that information could be collected and analysed quickly, to identify areas in need of timely intervention. The survey questions were developed in consultation with a core group, and a webinar was held with UNFPA country sexual and reproductive health (SRH)/MPDSR focal points to explain the purpose of the survey, ask for feedback on questions, and explain the expected process of data collection, analysis and reporting. Once the survey questions were defined and finalized, emails to SRH focal points (or delegates) were sent from the United Nations Population Fund Asia and the Pacific Regional Office (UNFPA APRO) SRH Advisor at the end of July 2021, with a link to the survey questions (SurveyMonkey™). Alternatively, they could complete it using a Word document. Respondents were given 6 weeks to complete it, and regular reminder emails were sent during this time.

Country representatives who had not responded by the end date were contacted directly and given the option of extra time to respond. SRH focal points were asked to complete the survey in partnership with those responsible for MPDSR. Questions sought to identify disruptions of general maternal and newborn services and of the specific MPDSR system (or reporting system in place, if not MPDSR), both prior to and after the commencement of the COVID-19 pandemic.

The survey used a Likert scale to measure respondents' agreement with various statements regarding MPDSR practices and service provision or disruptions. The scale used was from 'never' to 'always', and respondents had the opportunity to comment on all answers. In addition, some questions required written answers only. Quantitative data about maternal and perinatal deaths were not requested, because of delays in reporting and in processes for accessing verified data on deaths.

Results

The survey was sent to 22 UNFPA SRH focal points, and 17 responses were received (77 per cent response rate) by the end of September 2021. However, some questions were skipped by respondents. Reporting in the results section, the number of answers to the particular question are provided.

Overall, responses were received from:

- **Bangladesh**
- **Bhutan**
- **Cambodia**
- **China**
- **Indonesia**
- **Islamic Republic of Iran**
- **Lao PDR**
- **Mongolia**
- **Myanmar**
- **Nepal**
- **Pakistan**
- **Papua New Guinea**
- **Solomon Islands**
- **Sri Lanka**
- **Thailand**
- **Timor-Leste**
- **Vietnam**

UNFPA SRH focal points were assisted to complete the survey by MPDSR focal points in the countries. MPDSR focal points may be part of ministries of health, WHO, UNFPA and/or UNICEF.

Overall service disruptions

From the beginning of the pandemic in March 2020, 64 per cent (9 out of 14) of respondents reported maternity staff 'sometimes' being redeployed to other areas of the hospital, leaving maternity areas understaffed. Fourteen per cent (2 out of 14) of countries reported that this never happened, and 7 per cent (1 out of 14) that it was always happening. Unfortunately, the issue of health-care professionals being infected with COVID-19 and becoming sick was also given as a reason for human resource shortages.

In terms of interruptions to service delivery during the COVID-19 pandemic, 60 per cent (9 out of 15) of countries reported that they always had supplies of life-saving drugs, such as oxytocin, magnesium sulphate and antibiotics, but 33 per cent (5 out of 15) reported interruptions to life-saving drugs. For blood transfusion availability, 53 per cent (8 out of 15) of countries reported that blood was always available and 33 per cent (5 out of 15) reported that sometimes it was not available. One respondent provided the further comment that tertiary hospitals were warning of the lack of blood donations because donors could not attend as a result of social distancing requirements in hospitals. Seventy-three per cent (11 out of 15) of countries reported challenges some of the time in not having doctors, nurses and midwives and operating theatres available to perform life-saving operations, and 73 per cent (11 out of 15) of countries reported sometimes not having ambulances and staff to transfer maternity patients or newborn babies requiring life-saving care. Seven per cent (1 out of 15) of countries reported that there were always difficulties in accessing ambulances, with only 13 per cent (2 out of 15) reporting always having ambulances available when required.

Service disruptions in focus – five Asia-Pacific countries

In March 2021, UNFPA APRO prepared a report for the Australian Department of Foreign Affairs and Trade on SRH service disruptions in selected Asia-Pacific countries in 2020 (18). Data from 2020 in seven Asia-Pacific countries demonstrated reductions in utilization of antenatal care services, institutional deliveries, postnatal care and visits for family planning. These reductions in access to care corresponded to rises in COVID-19 cases in each country. The report highlighted the urgent need to have systems in place for monitoring service disruptions and stock-outs of maternal health drugs and contraceptive supplies, and to ensure a functional MPDSR system to account for every maternal and perinatal death.

Survey findings on service disruptions in five selected countries are provided below, using comparative data from the UNFPA report on SRH service disruptions in selected Asia-Pacific countries in 2020 (18).



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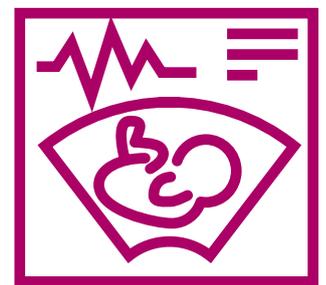
Bangladesh



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In the first wave of the pandemic, Bangladesh experienced a rapid increase in cases of COVID-19. In response, from February to May, a 57 per cent decrease was seen in first visits for antenatal care in facilities compared with the same time in 2019. Normal births occurring in institutional facilities also experienced a 35 per cent decrease, and postnatal care visits reduced by up to 50 per cent. With COVID-19 case numbers reducing towards the end of 2020, increases were seen in all these services again, but did not return to 2019 levels, except for institutional births.

Results from the survey showed that Bangladesh reported that facilities had maintained supplies of life-saving drugs, but that blood transfusion services had been interrupted in some facilities. There appeared to be fewer ambulances available, requiring patients to find their own ambulance transport from private services. The country also reported that there were some disruptions to staff and operating theatre availability to respond to maternity emergencies and that maternity staff were sometimes redeployed to other areas of the hospital for COVID-19-related activities, leaving maternity areas understaffed. In addition, personnel responsible for MPDSR were engaged in the COVID-19 response, being required to work in triage, on isolation wards, on COVID-19 wards and with vaccination programmes.



57%

decrease in first visits for antenatal care in facilities February to May 2020

Bhutan

The COVID-19 pandemic has had a relatively small impact in the Kingdom of Bhutan, which rapidly closed its borders to international travel and applied strict controls for Bhutanese nationals. The COVID-19 caseload has remained very low, with a peak in August 2020. During this time institutional births remained the same as in 2019, with decreases of around 25 per cent for services such as antenatal and postnatal care. Given this, the survey from Bhutan reported very little service disruption, with facilities always maintaining supplies of life-saving drugs and blood, and maternity staff and operating theatres available for life-saving operations. Maternity staff were not deployed to other areas of the hospital to perform other COVID-19 activities. The only disruption reported was that sometimes ambulances were not available for emergency transfers.



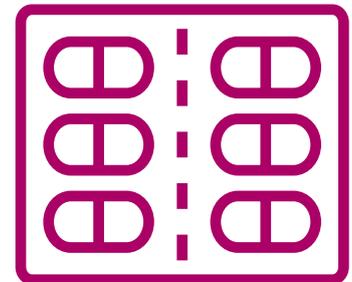
Ambulances were not available for emergency transfers



Nepal

Nepal reported a decrease in key SRMNCAH services ranging from 22 per cent to 34 per cent even before COVID-19 case numbers exponentially increased from September 2020. There were several factors that enabled the recovery of services even as case numbers grew, including a policy of the Government of Nepal to ensure continuity of SRMNCAH provision during the pandemic. Even so, a substantial number of facilities (up to 40 per cent) reported varying degrees of stock interruptions. Worryingly, 3–22 per cent of facilities surveyed in June 2020 reported no maternal and newborn health stock (this included life-saving drugs and equipment). Follow-up surveys in June 2021 showed a recovery, with up to 82 per cent having sufficient stock.

Survey results reported interruptions to health service provision including health workers being diverted to COVID-19 testing and treatment; spaces being reallocated for COVID-19 patients; decline in numbers of patients presenting to health facilities; insufficient personal protective equipment; and health-care workers' fear of contracting COVID-19. This means that sometimes there have been challenges in having health-care staff and operating theatres available for life-saving surgery, and ambulances for transfer of critical maternal and newborn cases. In addition, in tertiary hospitals, nurses responsible for MPDSR were reassigned to care for COVID-19 patients.



40%

of health facilities experienced stock disruptions during the pandemic



Pakistan



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Like many other countries, Pakistan experienced a rapid increase in COVID-19 cases from March 2020. A 41 per cent decrease in antenatal consultations, a 32 per cent decrease in institutional deliveries and a 33 per cent decrease in postnatal care within two days of birth were reported between April and August 2020 compared with the same period in 2019 (18). Survey results reported stock-outs of essential life-saving drugs and equipment in health facilities. Accessing ambulances and staff for transfer from primary health-care facilities to referral facilities was reported as difficult to manage. Common issues reported were the absence of anaesthetists and lack of access to blood when life-saving operations were required. It was also reported that personnel responsible for MPDSR were reassigned to work in COVID-19 wards.

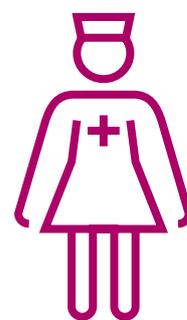


41%

decrease in antenatal consultations between April and August 2020

Papua New Guinea

With a rapid rise in COVID-19 cases in Papua New Guinea from June 2020, available data showed a significant decrease in utilization of SRMNCAH services. A 49 per cent decrease in fourth antenatal consultations was reported in August 2020 compared with August 2019. Worryingly, a 64 per cent decrease was reported in skilled birth attendance in these same periods. Results from the survey showed the country reporting disruptions in the availability of life-saving drugs and of blood for transfusion, and challenges in the availability of nurses, doctors and midwives for performing life-saving operations. Importantly, it was reported during the lockdown period that access to transport for maternal and newborn care was often not possible and potentially contributed to maternal and newborn deaths during this period (not verified, qualitative report only). In addition, it was reported that maternity areas were left understaffed, with maternity staff being reassigned to conduct COVID-19 screening, sometimes for as long as two weeks at a time.



Personnel responsible for MPDSR were reassigned to work in COVID-19 wards



Use of the MPDSR system in the country

Overall, 13 out of 17 (76 per cent) countries surveyed use the current full MPDSR system. Two out of 17 (12 per cent) have implemented a previous version in which perinatal (newborn) deaths were not included – maternal death surveillance and review (MDSR) – but these countries planned to implement the perinatal reporting component in the year following the survey (Table 1). One country (1 out of 17; 6 per cent) uses the Demographic and Health Surveys (DHSs) to report mortality, and another (1 out of 17; 6 per cent) uses a national system for reporting maternal and perinatal deaths (Table 2).

Of the 13 countries using the full MPDSR, 7 (53 per cent) have implemented the system throughout the whole country, while 6 (46 per cent) have implemented it across some districts/divisions in the country.

Of the seven countries using MPDSR across the whole country, four (57 per cent) reported using MPDSR for more than five years, with one (14 per cent) using the system for four to five years and two (29 per cent) using it for two to three years (Table 1).

Table 1: Countries using MPDSR in the UNFPA APRO region

Country	Where it is used	Length of time used
Bangladesh	Some districts/divisions	More than 5 years
Bhutan	Whole country	2-3 years
Cambodia	Whole country	More than 5 years
Indonesia	Some districts/divisions	More than 5 years
Islamic Republic of Iran	Whole country	More than 5 years
Laos PDR (MDSR – Maternal deaths)	Whole country	Not reported
Myanmar	Some districts/divisions	More than 5 years
Nepal	Some districts/divisions	More than 5 years
Pakistan	Some districts/divisions	1-2 years
Solomon Islands	Whole country	2 years
Sri Lanka	Whole country	More than 5 years
Timor-Leste	Some districts/divisions	1-2 years (MDSR from 2014)
Thailand (MDSR – Maternal deaths -MDSR-only) *	Whole country	Not reported
Viet Nam	Whole country	More than 5 years

*Perinatal death reporting (i.e. MPDSR) being currently established.

Table 2: Countries not using MPDSR but collecting mortality data in another way

Country	What is used	Comment
China	<ul style="list-style-type: none"> • National Maternal and Child Health Statistics System • Maternal and Child Health Surveillance System • Provincial Maternal Mortality Surveillance System 	
Papua New Guinea	Demographic and Health Surveys	MPDSR being piloted

Across the different countries, there are various groups responsible for the MPDSR activities. These groups range from representatives of national ministries of health through to provincial and district departments of health, health facility managers, statisticians and clinicians. In most countries, MPDSR is usually led by government ministries, with support from WHO, UNICEF and/or UNFPA.

MPDSR committees and training status

All countries that use MPDSR (13 countries) reported that national MPDSR committees and subcommittees exist. All but one of these countries reported having MPDSR operational guidelines/manuals and tools to assist with implementation and ongoing training. Training was planned for 2020–2021 in 80 per cent (12 out of 15) of countries (countries using MDSR included here) but occurred to varying degrees, with some countries reporting a swift pivot to online training, and other countries reporting cessation of training.

Fourteen countries answered questions about reporting of maternal and perinatal mortality. Seven out of 14 (50 per cent) report on maternal and perinatal mortality annually, while 29 per cent (4 out of 14) report every 6 months and 21 per cent quarterly. One country reported that MPDSR is incorporated into an online system and the information is immediately accessible at national level and reviewed regularly to identify concerns. One country reported maternal mortality being reviewed every 5–10 years, whenever a DHS was carried out (this country was not currently using MPDSR).



MPDSR/Mortality Reporting prior to the COVID-19 pandemic

Countries such as Bangladesh, Iran, Myanmar, Nepal and Sri Lanka reported having strong MPDSR systems prior to the pandemic. China reported strong routine surveillance and data collection systems in place that effectively monitor maternal and child mortality. These countries reported that all deaths were notified within 24–72 hours, with verbal autopsies being completed within two weeks (of community-based deaths). The process of review at facility and central levels occurred regularly. Most countries reported difficulties with receiving regular information about deaths in the community, and with reporting of perinatal deaths where it had recently been introduced into the process. There were also reports of variations across districts, where deaths were routinely reported but a more irregular review process occurred. These examples of irregular processes were attributed to lack of commitment from local governments to implementing the full cycle of MPDSR. Where MPDSR was not implemented across the whole country, issues around the new implementation of perinatal death reporting and internal country conflicts (e.g. disputed zones) were mentioned, but it was generally unclear why MPDSR was not used throughout the whole country. This warrants follow-up, particularly as the pandemic may have stalled it further.

Eleven of the 13 (85 per cent) countries that used the MPDSR approach reported a process to follow when deaths occurred in the community. A commonly reported process was deaths being reported to the village midwife or village leader, who then reported to the divisional health managers or nearest health facility. Verbal and social autopsies were then undertaken by various people deemed responsible at community level.

MPDSR/Mortality Reporting during the COVID-19 pandemic

All countries reported varying degrees of disruption, particularly at the beginning of the pandemic, when health systems were overwhelmed. The most frequently reported issues were with lack of completion of mortality reviews. It seems that facility deaths continued to be reported, with some countries reporting a closer focus on them, as concern grew about the effects of COVID-19 on pregnant women. However, notification of community deaths was reported as an issue, with a significant reduction in notifications. Numerous countries reported delays in receiving notifications, though, citing the redeployment of staff as the primary issue.

Eleven countries out of 13 (85 per cent) reported that the number of MPDSR review committee meetings reduced during 2020–2021, while only 2 out of 13 (13 per cent) reported that these continued as usual. These meetings occur at facility and central levels and are a critical part of the MPDSR process. Meetings are where deaths are reviewed, diagnosis of deaths are confirmed, recommendations are made and plans for implementation are instigated.

One country reported that the number of MPDSR review committee meetings increased during the pandemic and involved representatives from universities and ministries meeting online to discuss the main issues found in maternal and perinatal death reports. Other countries reported decreases and delays in committee meetings, at both facility and provincial/capital levels, as facility staff were redeployed to COVID-19 activities, and provincial/capital staff were planning vaccination campaigns and health information for COVID-19 prevention campaigns.

Most countries reported that there were limitations in recommendations being generated, disseminated and integrated into practice. Some reported the introduction of policies around reducing face-to-face meetings and the reduction of movement between capitals and provincial areas. Other issues identified focused on confidentiality concerns in an online environment where sensitive issues needed to be discussed.

Other challenges reported include:

- **Health-care worker exhaustion and burnout**
- **Verbal autopsies being halted because of reluctance of families to accept health-care professionals into their homes**
- **Reluctance of personnel to perform autopsies if COVID-19 suspected or confirmed due to lack of personal protective equipment**
- **Less human resources available because of COVID-19 illness or need for quarantine**
- **Lack of timely collection of complete, high-quality information**
- **Strict movement restrictions, with some parts of country completely inaccessible**
- **Reduced MPDSR leadership and governance due to priority shift to pandemic response**
- **Other burdens including political and/or civil unrest**

For most countries, application of MPDSR was affected at all levels: there were delays in reporting deaths, delays in reviewing deaths and making recommendations, and delays in implementing those recommendations at all levels.

Even where MPDSR was well integrated (having operated for more than five years), parts of the review cycle such as reviews of deaths at central/national level were severely delayed. In some countries, death reviews were often completed in the health facilities, and recommendations implemented without a district- or central-level review, as these meetings had completely stopped. In countries in the early phases of implementation, MPDSR activities ceased altogether.

Of the countries using the MPDSR system, 61 per cent (8 out of 13) reported that people responsible for MPDSR were reassigned to other duties during the pandemic. Countries reported that reassignment was for COVID-19-related duties such as staffing facility quarantine centres, airport screening centres, fever clinics and COVID-19 wards. All countries reported that these were additional duties to MPDSR responsibilities.

Contributors to maternal and perinatal deaths during the pandemic

Overall, it appears that routine mortality reports from the beginning of the pandemic, when health systems were overwhelmed, either were not done or are still being undertaken. Furthermore, reports completed during that time are unclear about cause of death, and about whether the death was related to COVID-19. Many deaths were reported as “unknown cause”. It is mostly unknown what reporting was undertaken relating to maternal and perinatal deaths in the community.

Countries were asked for their views on potential reasons for the increase in maternal and perinatal deaths. Several countries reported that deaths had been unable to be reviewed as data were not complete or available, so the cause of death was unclear. Where there was a review of a death, COVID-19 was not listed as a cause of death in most reports; however, a few reported COVID-19 as an indirect cause of mortality.

Delay in seeking care for antenatal care, postnatal care and institutional birth was highlighted numerous times in mortality reports, and this was attributed to the family’s fear of contracting COVID-19 in hospital. Confusion of presenting symptoms was reported, with one country reporting that a delay in treatment and inappropriate management once a patient presented in hospital caused a catastrophic situation. Overcrowding in health services and the fear of contracting COVID-19 in such situations was reported, with early self-discharge of patients potentially contributing to deaths. One country reported creating a data registry specifically for COVID-19-positive or suspected positive cases and their outcomes at the beginning of the pandemic. It reported findings of increased iatrogenic caesarean section rates and preterm birth. Reporting also showed increased rates of abortion (miscarriage) and stillbirth in pregnant women with COVID-19. That country is now able to compare outcomes of COVID-19-vaccinated and unvaccinated mothers, and plans to release findings soon.

Innovations and new opportunities as a result of the pandemic

Despite the major challenges that most of the countries reported with MPDSR processes during the pandemic, there were positive innovations and opportunities that arose during this time. These included:

- **Online verbal autopsy training courses**
- **Online protocol development (including COVID-19 in pregnancy protocols)**
- **Support from partner agencies to collect information at local level**
- **Online MPDSR training by WHO South-East Asia Regional Office**
- **Planning and designing online capacity development and monitoring system to track MPDSR implementation**
- **Establishment of online population-based stillbirth register**
- **Linkages to HMISs being explored**
- **Online antenatal care telehealth consultations**
- **Establishment of 24-hour maternal health hotlines**
- **Enhanced use of online platforms for information sharing and consultation with specialists**
- **Increased focus on infection prevention and protective personal equipment for maternity staff**
- **Increased familiarity with online tools, enhancing digital literacy and increasing willingness to use these formats**
- **Increased laboratory capacity of health facilities, making them more responsive to the needs of advanced maternal and newborn care**
- **Safe online transfer of death investigation documents through digital platforms, making reporting easier**



Discussion

Some countries used the MPDSR system fully. Cambodia, the Islamic Republic of Iran, Sri Lanka and Vietnam reported the use of the full MPDSR system in the entire country for more than five years. Overall, these countries described a functioning MPDSR system, but not operating at an optimal level, with delays mostly described in the response component of MPDSR. Examples of delays in the response component were delays in conducting district and national committee meetings. These four countries all reported movement of resources to the pandemic response as reasons for interruption to the MPDSR system.

Lao PDR and Thailand reported using the older MDSR system but with plans to integrate perinatal deaths in the near future. Lao PDR reported ongoing use of the MDSR system throughout the pandemic, but with delays in death reviews and training for MPDSR. Thailand reported the MDSR system continuing alongside support from UNFPA to establish perinatal death surveillance and response in the last six months before the survey.

Bangladesh, Indonesia, Myanmar and Nepal reported the established (more than five years) use of MPDSR in some districts/provinces. Indonesia reported implementation delays, attributed to COVID-19, in those districts planning to implement MPDSR. Bangladesh has implemented MPDSR in 55 out of 64 districts and reported a robust system in those districts; however, it also reported delays in notifications, and some death reviews only being partly done. Delays and incomplete reports were mostly when deaths occurred in community settings. Myanmar reported that MPDSR had been implemented in the majority of the country except for non-government-controlled areas and special regions, and reported that it could capture and report all maternal deaths before the pandemic. However, Myanmar reported disruptions to MPDSR since the pandemic began. These disruptions relate to delays in reporting, regular committee meetings, analysis and responses. In 2021, UNFPA was able to expand the MPDSR system in one of the non-government-controlled areas of Kachin State. There are plans to expand MDSR in the non-government-controlled area of Kayin State in 2022. Nepal reported that, since the beginning of the pandemic, maternal deaths have been reported across the country, including in districts that had not previously reported them, through the use of a modified death-reporting system.

Bhutan, Mongolia and Solomon Islands reported the full MPDSR being in use across the entire countries for between two and five years. Solomon Islands reported that MPDSR guidelines and tools were drafted in 2019 and staff training was under way. Clinical audits had begun on maternal deaths in only tertiary hospitals of the Solomon Islands, and it reported that work on establishing MPDSR system has ceased since the pandemic began. Bhutan has been using MPDSR for approximately three years and reported a robust system that has mostly continued during the pandemic, except that annual death reviews at national level have not been taking place.

Timor-Leste and Pakistan reported less experience with MPDSR, although Timor-Leste has used MDSR since 2014 and reported implementation of the full MPDSR in 2019. Timor-Leste reported both maternal and perinatal deaths being identified and reported during the pandemic; however, perinatal deaths have not been integrated into all systems, and reviews of deaths have been delayed. Over the last one to two years, Pakistan has implemented MPDSR in seven districts throughout the country. Pakistan reported that mortality reporting was not yet fully implemented in all participating facilities and that MPDSR implementation was not being supported at national level.

Two countries describe using alternative systems to MPDSR. China has established a system of routine surveillance and data collection over 40 years and has been monitoring maternal deaths during the pandemic, with reports of no higher numbers of deaths than in previous years. Papua New Guinea reported maternal mortality being reviewed every 5–10 years, whenever a DHS was carried out. Prior to 2016, the DHS measured all deaths during pregnancy, during child birth or within two months of delivery or end of pregnancy regardless of the cause of death. The key criterion was the timing of the death. Given this, DHSs prior to 2016 do not give us meaningful data on maternal mortality. WHO defines maternal deaths as deaths of women while pregnant, during childbirth or within 42 days of delivery or termination of pregnancy due to the pregnancy. Although the DHS has been modified since 2016 to include questions that enable filtering out of deaths due to non-pregnancy-related causes, the vital events registration systems and MPDSR systems in countries provide a more real-time and localized data source to analyse maternal deaths and respond with local solutions to prevent similar deaths in the future and improve quality of care.

Countries in the earlier phases of MPDSR implementation may require further support, as interruptions from the COVID-19 pandemic have caused delays in setting it up. Even those countries that have well-established MPDSR systems reported disruptions at many levels and may require support to identify where the system failed and how to reinvigorate it. In addition, one third of countries that have implemented MPDSR reported it not being used throughout the country (even before the pandemic). Reasons for this lack of countrywide implementation were not provided; therefore, support may be required in these countries to understand the reasons and advocate whole-of-country implementation.

A critical issue facing MPDSR systems since the pandemic is the low number of deaths being reported from the community. As reported earlier, facility births are decreasing alongside an increase in community births without skilled birth attendants, so it is likely that deaths are occurring but not being captured in reporting systems. A further issue is the increase in reporting of domestic/intimate family violence since the start of the pandemic, and this could be contributing to deaths in the community. Increased support for ensuring that deaths from intimate family violence are reported needs to be considered, as does focused support for verbal/social autopsies.

Major service disruptions, interruptions to SRMNCAH services and disruptions to the MPDSR system were more common in countries with high burdens of COVID-19 cases. However, governments that prioritized SRMNCAH and had policies and preparations for disruption in place early in the pandemic reported fewer service interruptions. In addition, countries in this region continue to experience challenges from COVID-19. Many also face other challenges, including political unrest and other prevalent health issues, which burden health systems too. Furthermore, redeployment of health-care personnel (including those working on MPDSR) to pandemic response activities needs to be further investigated, as findings from this survey suggest this to be a major issue in maintaining functional MPDSR systems.



Recommendations

Invest in MPDSR

- 1** Urgent investments are needed to strengthen and scale up subnational and national MPDSR processes to ensure systems are resilient and will be minimally affected by disruptive events such as natural disasters, humanitarian crises, disease outbreaks or pandemics.
- 2** Investments are needed to strengthen national health management information systems and online reporting systems, to include MPDSR data to improve the timely availability of information about all maternal and perinatal deaths from both facility and community levels.
- 3** Focus investments on improving MPDSR reporting, investigation, assigning cause of death and response when deaths occur in the community, including improving verbal autopsy implementation and, if required, addressing the current culture of blame, which decreases death reporting.
- 4** Invest in MPDSR capacity at provincial/capital level to support complete MPDSR framework implementation.
- 5** Consider codifying the establishment of a comprehensive MPDSR system in a national legal or policy framework in alignment with international, regional and national public health and human rights standards.

Strengthen support and training

- 6** Develop and deliver accessible resources and training programmes to adequately prepare personnel to accurately report and review deaths, assigning cause according to the 10th revision of the International Classification of Diseases, and develop response plans.
- 7** Support countries to undertake gap analysis of their current MPDSR guidelines and update them in line with new global guidelines.
- 8** Support local facilities with training and tools to continue MPDSR processes to review deaths, assign cause according to the International Classification of Diseases, and make and implement recommendations at least every six months while health system interruptions are occurring (i.e. while provincial/national review meetings are not occurring).

Conclusion

Decreased levels of access to and engagement in SRMNCAH services and service disruptions, including disruptions to MPDSR processes and standard practices, during the COVID-19 pandemic were identified. Alongside evidence from other epidemics/disruptions and emerging evidence about the global impact of the COVID-19 pandemic on maternal and newborn outcomes, the survey results indicate continued disruptions to essential maternal and newborn services. Furthermore, as countries open up and with prospects of further outbreaks continuing, health systems and services will continue to be placed under pressure or be completely overwhelmed. Unfortunately, this includes continued disruptions to MPDSR systems.

MPDSR, when adequately funded and appropriately implemented, has the capacity to mitigate the risk of increasing mortality for mothers and newborns in the region during the COVID-19 pandemic, and its use must be supported. Evidence is clear that a robust MPDSR system is the way forward to ensure that the gains made in tackling maternal and perinatal death will not be undone by the current pandemic or future major disruptions to health systems.

Recommendations from the analysis of survey responses focus on ensuring continued investment and support for the implementation and embedding of MPDSR as a robust system for recording maternal and perinatal deaths and addressing country-specific gaps that are identified through local and national review processes. Further integration and embedding of MPDSR into existing systems, policies and laws will assist in ensuring the continuation of death reporting, surveillance and response.

Results from the survey demonstrate the commitment to the work being undertaken to mitigate the effects of COVID-19 on individuals and health systems, and we congratulate all personnel and institutions who work so tirelessly in extremely challenging situations to ensure the safety of mothers and babies. We appreciate the time taken to complete this survey, and we hope the compiled results of the comprehensive answers will assist clinicians and managers in ongoing efforts to continue the work of MPDSR.

Ending preventable maternal mortality and morbidity remains a critical challenge in the Asia and the Pacific region. A system that protects the rights of women, and fosters accountability, includes enabling laws, policies, programmes, health systems, and a favourable social and political environment (19–22). The development, implementation and monitoring of such a system is an imperative towards which we must all work.



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Appendix: Survey Questions

1. Your details:

Country:

Completed by:

Who provided assistance to complete this form (eg. Ministry of Health, development partners, others):

Date completed:

2. Does your country use the MPDSR system?

Yes	<input type="checkbox"/> Please go to question 3
No, we do not collect/report on maternal/perinatal deaths	<input type="checkbox"/> Please go to question 19
Unsure	<input type="checkbox"/> Please go to question 19
Other, we report maternal and/or perinatal deaths in another way. <i>Please document which system and how it is used</i>	<input type="checkbox"/> Please go to question 11

3. Where is MPDSR used in your country?

Whole country	<input type="checkbox"/>
Some Provinces	<input type="checkbox"/>
Some Districts/Divisions	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>

4. How long has MPDSR been used in your country?

Less than 1 year	<input type="checkbox"/>
1-2 years	<input type="checkbox"/>
2-3 years	<input type="checkbox"/>
3-4 years	<input type="checkbox"/>
4-5 years	<input type="checkbox"/>
Greater than 5 years	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
Other (please comment)	<input type="checkbox"/>

5. Who is MPDSR led by (eg MoH)?

Please comment _____

6. Who are the key partners in undertaking MPDSR in your country (eg UNFPA/WHO/UNICEF)

Please comment _____

7. Who works on MPDSR response?

Please comment

8. Do MPDSR national committees/sub-committees exist?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Some	<input type="checkbox"/>
Other	<input type="checkbox"/>
<i>Please comment</i> _____	

9. Do you have MPDSR operational guidelines/manuals/tools?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Some	<input type="checkbox"/>
Other	<input type="checkbox"/>
<i>Please comment</i> _____	

10. Does the country have MPDSR for deaths occurring in the community?

Yes <i>Please comment if community deaths are notified and also if community verbal autopsy and social autopsy are undertaken</i>	<input type="checkbox"/>
No	<input type="checkbox"/>

11. Does your country report both maternal and perinatal mortality?

Both maternal and perinatal mortality	<input type="checkbox"/>
Maternal deaths only	<input type="checkbox"/>
Perinatal deaths only	<input type="checkbox"/>
Don't know	<input type="checkbox"/>
Other	<input type="checkbox"/>
<i>Please comment</i> _____	

12. How often does your country report maternal and perinatal mortality?

Quarterly	<input type="checkbox"/>
Every 6 months	<input type="checkbox"/>
Yearly	<input type="checkbox"/>
Don't know	<input type="checkbox"/>
Other	<input type="checkbox"/>
<i>Please comment</i>	

13. Please comment how consistently the MPDSR system/mortality reporting was used in your country prior to the COVID-19 pandemic?

You may like to comment here about where you were in the process of MPDSR and how effective it was at capturing all deaths. You could also comment here if there were other factors impacting MPDSR/death reporting.

14. How has the MPDSR system (or the way that your country reports mortality) been impacted since the beginning of the pandemic?
Were deaths identified? Were notifications received? Was a cause of death identified? Was an analysis done of the key contributors? Did the system break down in any way and where did it break down?
-

15. Please list if there are any key barriers to implementing recommendations/actions based on death review findings since the beginning of the pandemic?
This relates to barriers at all levels-implementation at the facility level through to the central level receiving reports of implementation
-

16. Have MPDSR review committee meetings reduced since the beginning of the pandemic?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
We never held MPDSR review committee meetings	<input type="checkbox"/>
We don't use MPDSR	<input type="checkbox"/>
Other <i>Please comment</i>	<input type="checkbox"/>

17. If meetings have not occurred as normal, what are the main reasons? If possible, please comment on each of the levels of committees (national/divisional/district/subdistrict)?
18. In MPDSR reports/mortality reports, were there any specific reasons listed about the impact of COVID-19 on deaths? If yes, what was the reason?
Additionally, is it likely more deaths were attributed to COVID-19 when they were more likely a direct or indirect cause?

The following questions are about specific disruptions to services during the COVID-19 time. Please respond as much as you know or are aware of and please comment where the disruption occurred (hospitals/health services etc)

19. Did facilities maintain supplies of life-saving drugs (for example, oxytocin, Magnesium Sulphate, antibiotics)?

Yes, always	<input type="checkbox"/>
Yes, sometimes	<input type="checkbox"/>
No, never	<input type="checkbox"/>

Not sure	<input type="checkbox"/>
<i>Please comment</i>	

20. Did facilities report challenges in having doctors/nurses/ midwives/operating theatre/theatre staff to perform life saving operations (such as emergency caesarean section/manual removal of placenta/dilation and curettage/MVA)?

Yes, always	<input type="checkbox"/>
Yes, sometimes	<input type="checkbox"/>
No, never	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
<i>Please comment</i>	

21. Was there sufficient blood supply available in referral facilities?

Yes, always	<input type="checkbox"/>
Yes, sometimes	<input type="checkbox"/>
No, never	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
<i>Please comment</i>	

22. If applicable, were there any limitations in accessing ambulances and staff to transfer maternity patients or newborn babies requiring life-saving care?

Yes, always	<input type="checkbox"/>
Yes, sometimes	<input type="checkbox"/>
No, never	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
Not applicable	<input type="checkbox"/>
<i>Please comment</i>	

23. Were maternity staff from facilities redeployed to other areas of the hospital (for COVID-19 screening, care of COVID-19 patients etc) leaving maternity areas understaffed?

Yes, always	<input type="checkbox"/>
Yes, sometimes	<input type="checkbox"/>
No, never	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
<i>If yes, please comment on where they were redeployed to and for how long/how often</i>	

24. Do you know if people responsible for MPDSR were reassigned to other duties during the pandemic?

Yes <i>Please comment on where they were reassigned to and what work they were required to do</i>	<input type="checkbox"/>
No	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

Other <i>Please comment</i>	<input type="checkbox"/>
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25. Was training/support for MPDSR planned during 2020-2021?

Yes <i>Please specify if the training happened, what level of training was provided and who was the target audience</i>	<input type="checkbox"/>
No	<input type="checkbox"/>
Not sure	<input type="checkbox"/>
Not applicable	<input type="checkbox"/>

26. In your opinion, what has been the hardest part of MPDSR/mortality surveillance/data collection during the pandemic
Please comment _____

27. Are there any innovations created for MPDSR/mortality surveillance/data collection during the pandemic that will continue (such as on-line meetings/trainings; on-line reporting; links to HMIS etc)?
Please comment: _____

28. Has the COVID -19 pandemic created new opportunities that hadn't been thought of before (eg staff working in new ways/system improvements)?
Please comment: _____

29. What are your recommendations to ensure MPDSR/mortality surveillance/data collection continues effectively during this pandemic and in our "new normal" situation?
Please comment: _____

30. Do you have any other comments about MPDSR/mortality surveillance/data collection during this time?
Please comment: _____



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