Basic Emergency Obstetric Care: First Response

Technology Opportunity Assessment

Prepared for the Merck for Mothers Program
Basic Emergency Obstetric Care: First Response

Summary

Solutions to improve first response for women experiencing an obstetric emergency are not technologies but are strategies to ensure that the following are always available:

1. Essential equipment, medication, and supplies,
2. Skilled staff,
3. A clear system to respond to emergencies—including checklists,
4. Financial systems to reduce barriers to emergency care, and
5. Emergency transport to a facility able to provide comprehensive obstetric care.

Statement of Need

While most pregnancies and births are uneventful, all pregnancies are at risk. Around 15% of all pregnant women develop a potentially life-threatening complication that calls for skilled care, and some will require a major obstetrical intervention to survive. About 1,000 women die from pregnancy- or childbirth-related complications around the world every day; of these, 99% occur in low-resource countries. Improving maternal health is one of the eight Millennium Development Goals (MDGs) adopted by the international community in 2000. The fifth MDG is to achieve a 75% reduction in maternal mortality between 1990 and 2015. Emergency obstetric care (EmOC), access to family planning, and skilled attendance at birth are three key interventions that have been implemented globally to reduce maternal mortality.

EmOC is a package of medical interventions that has been developed to treat the five direct obstetric complications—obstetric hemorrhage, obstructed labor, septicemia, hypertensive disorders in pregnancy, and unsafe abortion—that cause 75% of maternal deaths. However, in spite of global efforts to reduce mortality, the World Health Organization (WHO) reports that the global maternal mortality ratio (i.e., the number of maternal deaths per 100,000 live births) declined by only 2.3% per year between 1990 and 2008. This is far from the annual decline of 5.5% required to achieve the fifth MDG.

In settings where maternal mortality is highest, three crucial delays are directly associated with elevated rates of maternal mortality: (1) delay in seeking health care (delay in recognizing the problem and making a decision to seek care), (2) delay in reaching a health facility, and (3) delay in obtaining appropriate care upon reaching a health facility. To improve obstetric outcomes, a woman must recognize that she is experiencing an obstetric emergency, her family must be supportive of her seeking care at a health facility, she must be able to access transportation and be successfully transported to the appropriate health facility, and she must receive the care that she needs. Many women experiencing an obstetric complication arrive at public hospitals in a critical state at admission. Outcomes of these emergencies
depend on a rapid and coordinated response to the problem. Unfortunately, although women may overcome the first two delays, they often die because they do not receive timely, appropriate care.

While important clinical interventions and technologies are available to manage obstetric emergencies, delay in diagnosis; outdated clinical protocols; inadequately trained staff; failure to employ sufficient medical and surgical staff; and lack of essential medications, equipment, and supplies all may contribute to suboptimal outcomes. In addition, lack of communication and teamwork within the obstetric and midwifery teams have frequently been identified as leading causes of maternal and perinatal deaths.

While the acceptable level for intrapartum and very early neonatal death rates has not been determined, case fatality rates from maternal and newborn emergencies remain high in most low-resource countries and are a measure of the quality of emergency obstetric and newborn care.

Standards and guidelines for implementing EmOC (see Table 1) have existed for decades, but countries have had enormous difficulties implementing them. Since 1997, experience in more than 40 countries has shown that while health systems often have at least one facility providing comprehensive EmOC per 500,000 population and sometimes more, fully functioning facilities providing basic EmOC are much less common (the WHO standard is four basic EmOC facilities for 500,000 population).

Table 1. Signal functions for basic and comprehensive EmOC

<table>
<thead>
<tr>
<th>Basic EmOC Functions</th>
<th>Comprehensive EmOC Functions</th>
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<tbody>
<tr>
<td>Performed in a health center without the need for an operating theater</td>
<td>Requires an operating theater and is usually performed in district hospitals</td>
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<tr>
<td>Intravenous (IV) / intramuscular (IM) antibiotics</td>
<td>All six Basic EmOC functions PLUS:</td>
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<tr>
<td>IV/IM oxytoxics</td>
<td>Cesarean operation</td>
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<tr>
<td>IV/IM anticonvulsants</td>
<td>Blood transfusion</td>
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<tr>
<td>Manual removal of placenta</td>
<td></td>
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<tr>
<td>Assisted vaginal delivery</td>
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<tr>
<td>Removal of retained products</td>
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A promising intervention is the upgrading of health centers and other small facilities to enable them to provide basic EmOC. A health center that provides basic EmOC can prevent many maternal and perinatal deaths. For some conditions (e.g., some cases of postpartum hemorrhage [PPH]), basic care will be sufficient; for other complications (e.g., severe preeclampsia, obstructed labor), higher-level treatment is required. Even then, first aid can save lives because a woman’s condition can be stabilized before she is referred. There is a clear need to develop first-response systems for the two major maternal killers, PPH and preeclampsia/eclampsia (PE/E), that can be successfully implemented at the health center level and will be sustainable.

* For a facility to meet these standards, all six or eight functions must be performed regularly and assessed every three to six months.
Technology Solutions Landscape

Solutions to improve first response when women have PPH or severe PE/E are not technologies, per se, but are rather strategies to ensure that the following are always available in case of an obstetric emergency: (1) essential equipment, medication, and supplies, (2) skilled staff, (3) a developed system to respond to emergencies, (4) financial schemes to reduce barriers, and (5) emergency transport to the referral facility.

**Essential equipment, medication, and supplies**

WHO and the United National Population Fund (UNFPA) have developed standard lists of equipment and medications for basic EmOC services. The problem with these lists is that they are not organized by type of emergency but by type of commodity and may be part of different logistics systems (i.e., drugs versus supplies). When this occurs, all of the necessary equipment, supplies, and medications may not be available to respond to a particular emergency—for example, IV crystalloid solutions may be available but IV-giving sets are not, or syringes may be available but oxytocin is not.

There are examples of programs that have created kits to improve emergency response. For example, facilities participating in studies on magnesium sulfate (MgSO₄) developed “PE/E treatment packs”†, while other facilities have developed “PPH kits”‡ that providers found useful in responding to emergencies. These packs or kits are assembled in the facilities, and providers take responsibility for re-sterilizing any used equipment and replenishing any medications or supplies as soon as they are used. While findings about usefulness of “kits” are anecdotal, they conform to US and UK standards of having “crash” carts with essential emergency equipment and supplies strategically placed in sites where emergencies might occur to facilitate emergency response.

**Skilled staff**

Obstetric emergencies, while devastating, are fortunately relatively rare events in small health centers. This creates the challenge of maintaining skills that are used relatively infrequently. While supervision, monitoring, and formal programs for continuing education are designed to assist staff in maintaining skills, they are usually sporadic. Countries have used innovative approaches, such as mixed learning and distance learning, but the most important part of developing and maintaining clinical skills is the use of simulation.⁸

Simulation may refer to a device representing a simulated patient or part of a patient or to activities that mimic the reality of a clinical environment and that are designed for use in demonstrating procedures and promoting decision-making and critical thinking. The use of simulation as a teaching strategy can contribute to patient safety; optimize outcomes of care; and provide learners with opportunities to

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† The packs contained MgSO₄ (prepackaged for recommended standard dosing), calcium gluconate (an antidote for toxicity from MgSO₄), supplies for IV and IM administration, record sheets to record clinical monitoring findings, and a protocol sheet that also included guidelines for other aspects of relevant care.

‡ Anecdotal information from the experience of PATH staff person, Susheela Engelbrecht, working in hospitals in Ghana.
experience scenarios and intervene in clinical situations within a safe, supervised setting without posing a risk to a patient. Patient simulation is an instructional strategy that can be implemented in a variety of settings, is adaptable to most settings, and can give providers opportunities to practice skills that are not frequently used.

**A developed system to respond to emergencies**

Emergencies often happen suddenly and can progress quickly to a negative outcome if appropriate and immediate action is not taken. In England and Wales, the National Confidential Enquiries into Maternal Deaths and the Confidential Enquiries into Stillbirths and Deaths in Infancy have repeatedly highlighted the lack of communication and teamwork within the obstetric and midwifery teams as a leading cause of maternal and perinatal deaths.4 Responding to an emergency promptly and effectively requires two things: (1) clinical protocols that provide clear guidance on decisions and criteria regarding diagnosis, management, and treatment and (2) clear roles and responsibilities for each member of an emergency response team.

Clinical protocols are based on the highest quality evidence and most current data and identify all possible decision options and their outcomes. When systematically applied, clinical guidelines help to standardize medical care, to raise quality of care, and to reduce risk for the patient and the health care provider. Checklists can be developed from established clinical protocols and contain the individual steps or tasks required to perform a skill or activity in a standardized way. They are designed to help providers learn, to establish a baseline of providers’ clinical skills and competencies in delivery of care and treatment services, to identify gaps and areas in which additional training and support is needed, and to guide when carrying out complex medical and surgical interventions involving more than one provider. Results from a WHO study found that using a surgical checklist9 nearly doubled the likelihood that patients received proven standards of surgical care and significantly reduced complications and number of deaths.10 These findings have implications beyond surgery; the use of checklists could likely increase the safety and reliability of EmOC but will require development and careful testing in the real world.11

Developing a functional emergency team requires that members know their roles and responsibilities and know how the team should function in order to respond most effectively to emergencies. The medical emergency team (MET) system is used worldwide to improve patient outcomes, and an opinion of the American College of Obstetricians and Gynecologists (ACOG) committee emphasizes the importance of crisis response teams for clinical obstetric emergencies.12 A systematic review of research available on obstetric METs13 identified three publications that documented experiences with implementation of an obstetrics rapid response team.14-16 While limited, these experiences had positive results measured in response time and maternal and perinatal outcomes.

Use of checklists and obstetric METs have the potential to improve maternal and neonatal outcomes, reduce maternal and neonatal morbidity and mortality, and reduce health care costs but will require additional operational research to identify best practices.
Financial schemes to reduce barriers

One of the major barriers to maternal health care is limited financial resources. Women seeking obstetric services will usually have to pay for drugs, various registration fees per visit or per day, and treatment charges, even in emergencies. As most families have no medical insurance, they must pay from the household budget, which is usually stretched to the limit. This has led to delays in seeking and receiving care. A number of strategies have been developed to address the problem of financial access to obstetric care in low-resource settings. Strategies that have been employed in low-resource, rural settings include community emergency loans, insurance schemes, and subsidized or free obstetric and/or emergency obstetric services, including cesarean operations.

Of these, insurance schemes and subsidization of services can potentially be managed at the health care facility level. Insurance schemes charge a fixed prepayment for some or all elements of an obstetric care package that includes routine care during pregnancy, labor, childbirth, and postpartum; care for any complication of pregnancy and delivery, including a cesarean operation; ambulance transportation to a higher level of health care; and hospital care if transferred. Mauritania instituted an obstetric risk insurance scheme that successfully increased access to emergency obstetric services.17

Some countries in sub-Saharan Africa have adopted a national policy to either subsidize or remove user fees for deliveries and EmOC, including cesarean operations. In countries where costs are subsidized rather than removed, the poorest are usually fully exempted. Results from this strategy have been mixed and are complicated by lack of preparation for fee removal, poor design, and factors that might constrain the policy’s implementation, such as poor service quality or informal supplemental charges.18 While these strategies can spare families from the potentially catastrophic financial impact of obstetric complications, further studies to assess the impact of insurance schemes and subsidization/removal of user fees on maternal health care access and outcomes are needed, as is operational research to identify best practices to administer these schemes.19

Emergency transport to the referral facility

Once a woman receives immediate emergency care for an obstetric complication, she may require definitive care at a referral facility, such as the district hospital. Transfer from one level of the health system to another is usually financed by the ministry of health (MOH). The Averting Maternal Death and Disability (AMDD) project is currently researching referral systems in developing countries to help MOHs make informed decisions about effective mechanisms for referral. Research includes identifying gaps in the management of referral systems, training for drivers, the use of clinical protocols, a monitoring system for referral, and the availability of communication and transportation. Needs assessment tools have been developed to assist MOHs in analyzing referral readiness and determining where emergency transport vehicles should be prioritized.20 Because of the heterogeneity of settings, it is difficult to recommend strategies or solutions for the transport problem. However, the AMDD tools have been used successfully in more than 15 African countries to shape policy and develop strategies to address gaps in obstetric care, and these tools and experiences can help define an emergency transport system that is both appropriate and effective.
Gap Analysis

WHO, UNFPA, and AMDD have spent considerable effort developing tools to assess needs and monitor EmOC in low-resource countries. These efforts have resulted in global awareness of gaps in use and availability of both basic and comprehensive EmOC services and the development of international and national plans to address these gaps. While health systems have made some progress in making comprehensive EmOC facilities more available, fully functioning facilities providing basic EmOC continue to be much less common. Reasons for this may include lack of political commitment, budgetary constraints, and belief that comprehensive EmOC services are more important than basic EmOC services. In addition, donors have traditionally provided vertical interventions that focus on only one part of the comprehensive intervention, such as updating clinical skills or working on a financial scheme, rather than trying to provide the comprehensive package.

PPH and severe PE/E are two of the biggest maternal killers globally. Improving health centers and other small facilities’ ability to provide basic EmOC will ensure that women receive lifesaving first aid for PPH and PE/E and should theoretically improve maternal and, most likely, fetal outcomes. While implementing any one of the five interventions will no doubt make some difference in maternal mortality, the comprehensive package should be implemented as a whole to maximize results.

Upgrading health centers and other small facilities to improve first response to PPH and PE/E will require:

- Garnering political support.
- Selecting sites for the intervention based on agreed upon criteria.
- Conducting a detailed needs assessment.
- Developing a strategy and agreement on cost sharing.
- Reviewing and updating clinical protocols.
- Developing checklists for EmOC.
- Purchasing essential equipment.
- Purchasing a “seed” stock of essential medications and supplies.
- Strengthening existing supervision, monitoring, quality assurance, and continuing education activities.
- Purchasing simulators for teaching which reinforce clinical skills.
- Providing a clinical update for staff.
- Developing an obstetric emergency team.
- Choosing and implementing a financial scheme for obstetric care.
- Choosing and purchasing a means for transporting women to the hospital from the health center.
- Developing, implementing, and managing the referral system.
Investment Opportunity

To understand the individual and cumulative impact and cost-effectiveness of each of the five strategies: (1) essential equipment, medication, and supplies, (2) skilled staff, (3) a developed system to respond to emergencies, (4) financial schemes to reduce barriers, and (5) emergency transport to the referral facility, operations research in representative countries and settings in sub-Saharan Africa and south Asia is recommended. This research should compare selected indicators for use of services for obstetric emergencies and maternal and perinatal outcomes from PPH and severe PE/E by type of intervention. Centers could be randomized as follows:

- Centers with a training intervention.
- Centers provided with essential equipment and a “seed” stock of essential medications and drugs.
- Centers with an intervention to address financial barriers.
- Centers with an intervention to improve the referral system.
- Centers with an intervention to use checklists for emergency obstetric care and train obstetric METs.
- Centers with the comprehensive package.

An alternative would be to pair different interventions—such as pairing training interventions with provision of equipment and commodities to carry out recently trained skills—and compare the results at the different centers.

Careful documentation of implementation, disruptions, sustainability, lessons learned, and financial and service costs will help inform decisions to scale up. Finally, feedback could be collected from women, family members, providers, and managers on perceptions of quality of care and impact of the intervention on maternal morbidity and mortality that should also assist with decisions regarding if and how to scale up the interventions.
References


