



Pre-Eclampsia/Eclampsia: Prevention, Detection and Management

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As maternal mortality ratios have declined globally, there have been accompanying shifts in the leading causes of maternal deaths, resulting in a higher proportion of maternal mortality due to eclampsia. Pre-eclampsia and eclampsia (PE/E) are now receiving focused attention from donors, governments and providers to further reduce maternal and newborn mortality.

If countries are to achieve the Millennium Development Goal (MDG) 4 (reducing child mortality) and MDG5 (reducing maternal mortality), donors and governments must develop comprehensive and innovative programs to address PE/E as public health priorities. This program guidance document outlines key steps, identifies available resources, and highlights lessons learned to date in the development and implementation of PE/E programs. In the coming years, a broader set of evidence and programmatic guidance will be created as global experience grows in preventing, detecting and managing PE/E.

STEP 1: ADVOCATE WITH EVIDENCE FOR ADDRESSING THE PROBLEM

Improving outcomes for women and their newborns with PE/E begins with gaining stakeholders' buy-in. It is often necessary to advocate for these lifesaving interventions to be introduced into the national public health system.

- **Demonstrate that PE/E is a public health priority:**
 - PE/E are major causes of maternal and perinatal morbidity and mortality.¹
 - PE/E complicate 2–8% of pregnancies.² Among pregnant women, 7–15% will develop PE and 1–3% will progress to develop eclampsia.³
 - PE/E disproportionately affect developing countries: a woman in a developing country is seven times more likely to develop PE, three times more likely for it to progress to eclampsia, and 14 times more likely to die of eclampsia.⁴
 - PE is a progressive condition that can lead to stroke, kidney or liver damage, blood-clotting problems, and pulmonary edema.
 - When PE is left untreated, it can progress to the more serious and life-threatening condition of eclampsia, which causes seizures, coma and even death of the mother and baby.
 - Eclampsia may occur in women previously undiagnosed with hypertension or proteinuria.
 - About 80% of eclamptic seizures occur intrapartum or within the first 48 hours following delivery.

- **Conduct a series of technical updates and develop national PE/E champions:** Providing technical updates to key stakeholders on global evidence from PE/E interventions and results from PE/E prevention, detection and management research and projects will provide stakeholders with the knowledge base to make informed decisions. Key stakeholders who can be powerful champions to support implementation of globally recognized best practices include members of professional associations, pre-service and in-service education personnel, and influential clinicians.

Section 1
[PE/E Program Brief, MCHIP 2011](#)
[PE/E Advocacy Presentation, MCHIP 2011](#)

Section 1
[PE/E Technical Brief, MCHIP 2011](#)
[PE/E Technical Presentation, MCHIP 2011](#)

- **Promote evidence-based interventions for PE/E prevention, detection and management:**
 - **Prevention** can reduce severe PE/E-related deaths. Preventive interventions include:
 - *Calcium supplementation during pregnancy*—reducing the incidence of PE by as much as 64% among population with low dietary calcium intake⁵
 - *Low-dose aspirin supplementation during pregnancy*—associated with a 17% reduction in PE⁶
 - *Family planning*—delaying pregnancies in teenaged and morbidly obese women, and preventing pregnancy in women who are older than 35 years
 - **Screening and early detection** can improve prognosis by increasing opportunities for **interventions** to prevent the progression of PE. Screening during every antenatal care (ANC) visit should include:
 - Blood pressure measurement and the detection of hypertension (diastolic blood pressure over 90 mmHg after 20 weeks gestation indicates gestational hypertension)
 - Simple urine testing for detection of protein in urine (protein levels 2+ and higher associated with diastolic blood pressure more than 90 mmHg after 20 weeks gestation indicates PE)
 - **Timely management at the appropriate level of care** can prevent mortality associated with severe PE/E. Treatment combines anti-convulsant therapy, anti-hypertensive treatment, timed delivery and careful monitoring of the mother and fetus. The anti-convulsant magnesium sulfate is inexpensive, very effective, and is the drug of choice for seizure prophylaxis in women with severe PE. The woman's prognosis can be greatly improved if magnesium sulfate is given before referral to a basic or comprehensive emergency obstetric and newborn care facility (BEmONC and CEmONC, respectively).
- **Discuss with government counterparts, global agencies, donors, educational institutions, professional associations, local NGOs and maternal health stakeholders to generate support.** Building commitment among technical leaders at the national level before beginning programming improves sustainability and increases the chances for scale-up of interventions. A national PE/E Technical Advisory Group (TAG) led by the Ministry of Health (MOH) can be effective in mobilizing stakeholders, identifying challenges and developing strategies.

STEP 2: CREATE ENABLING POLICY ENVIRONMENT

To close the gaps in care for women with PE/E, an adequate enabling environment, including resources and policies, must be established.

- **Conduct a situational analysis on PE/E prevention, detection and management:** A situational analysis reviews current data, policies and practices related to PE/E services and will provide the MOH and the PE/E TAG with an understanding of challenges and gaps in provision of these services. This analysis will inform development of national plans to address PE/E Learning from the postpartum hemorrhage prevention experience. Focused national surveys can serve both as a powerful advocacy tool and as a tool for identifying gaps in policy, practice, logistics, and monitoring/evaluation.

Section 1

WHO
Recommendations for Prevention and Treatment of Pre-eclampsia and Eclampsia: Evidence Base, WHO, 2011

PE/E Annotated Bibliography, MCHIP 2010

Calcium and Prevention of Pre-eclampsia Summary of Current Evidence, M Carlough, 2010

Prevention and Management of Postpartum Hemorrhage and Pre-eclampsia/Eclampsia : Status Report on National Programs in Selected USAID Program-Supported Countries, MCHIP, 2011

We can Prevent Mortality and Morbidity from PE/E, Presentation, H Sanghvi, 2010

Section 1

Generic Terms of Reference: Technical Advisory Group (TAG) for Reducing PE/E

Africa Regional Meeting Report: Interventions for Impact in Essential Obstetric and Newborn Care, MCHIP, 2011

Section 2

Ensuring Access to PE/E Primary, Secondary, and Tertiary Prevention Interventions, MCHIP, 2011

Situational Analysis on PE/E Detection in Nepal, MCHIP, 2010

- **Develop a PE/E Plan of Action within national maternal and newborn health strategies:** A focused plan can help strengthen PE/E-relevant interventions and ensure integration into existing maternal and newborn health strategies. The Plan of Action must address any gaps identified in policy, pre- and in-service education programs, logistics (supplies, drugs and equipment), and monitoring and evaluation systems. Where possible, services for women and newborns should be integrated. Strategies should be comprehensive and address prevention, detection and management in a holistic way through the continuum of care from community up to the CEmONC level.

Section 2
Balancing the Scales: Expanding Treatment for Pregnant Women with Life-Threatening Hypertensive Conditions in Developing Countries, Engender Health, 2007

- **Test innovations and approaches:** In situations where the MOH does not have enough country-specific information on emerging technologies, interventions or approaches—such as calcium supplementation, initiating community-based treatment before referral, or distributing pre-packaged eclampsia kits—they can decide to test or pilot them before making policy changes or creating strategies for scale-up. Based on the national situation and local epidemiology, governments will make decisions about the type of approach to promote at each point of care (from the home to tertiary care facilities). For example: 1) In areas where women infrequently attend ANC, or ANC clinics are not able to routinely offer PE/E screening, the MOH can test if mobilizing CHWs to offer community-based screening along with counseling on the importance of ANC visits and giving birth with a skilled birth attendant (SBA) increases the number of women properly screened for PE/E during pregnancy and the postpartum period; 2) In areas where CEmONC services are not easily accessible, the MOH can test the feasibility, safety and efficacy of introducing community-based treatment for severe PE/E before referral; or 3) In areas where coverage of and compliance with iron supplementation during pregnancy is low, the MOH can test the feasibility of integrating calcium and iron distribution.

Section 2
Magnesium Sulfate Administration for the Prevention and Treatment of Eclampsia, RTI, 2010

- **Create policies that ensure maximum access to PE/E services:** National policies that clearly define what PE/E-related care can be provided by each type of provider at all levels of the continuum of care should increase access to care. The situational analysis will provide the background for development of a national policy on PE/E-related care. For example, if the situational analysis shows that a large percentage of women do not reach the CEmONC level before their initial convulsion, the MOH can advance policies that promote the administration of a first intramuscular (IM) dose of magnesium sulfate and the first stat dose of an anti-hypertensive medication in peripheral settings prior to transfer, thereby increasing the likelihood of the woman’s survival.⁷ Where necessary, policies that promote task-shifting of certain interventions will also increase access to PE/E care.

Section 2
WHO Statement on Magnesium Sulfate, 2008

- **Update clinical care guidelines to ensure promotion of evidence-based, state-of-the art care:** Clinical care guidelines that promote evidence-based interventions will increase the likelihood that women receive the care they need. National service delivery guidelines should define appropriate PE/E-related care such as:
 - Prevention, counseling and screening during ANC services
 - First-line anti-convulsive and anti-hypertensive medications for treatment

Section 2
WHO
Recommendations for Prevention and Treatment of Pre-eclampsia and Eclampsia, 2011

- Management of mild and severe PE/E, including: timing and use of anti-convulsant and anti-hypertensive medications; frequency and point of care for monitoring the woman and fetus; protocols for induction of labor; and indications for caesarean delivery
- Management strategies at varied levels of the health system
- **Address logistics needs for drugs, supplies, instruments and equipment:** If updated policies and clinical guidelines are to result in high-quality services, health care providers must have the essential drugs, supplies and equipment. Comprehensive PE/E programs need to ensure that all needed drugs are on the national List of Essential Medicines (possibly including calcium tablets, magnesium sulfate, calcium carbonate, anti-hypertensives and others). At the policy and planning level, the national logistics management information systems (LMIS) need to project, procure, distribute and track sufficient quantities of these drugs throughout appropriate channels and to all levels of the health care system. Providers need to have sufficient quantities of magnesium sulfate, other medications and supplies for PE/E prevention, screening and treatment. Often magnesium sulfate is available in sufficient amounts for the loading dose but not to complete full maintenance. In addition to medicines, proteinuria tests and functional, well-maintained blood pressure cuffs/machines must be available at all sites where ANC is provided. Social marketing schemes for some supplements and medicines that are not easily available should be considered.

STEP 3: TRAIN PROVIDERS TO DELIVER EFFECTIVE CARE

Ensuring a steady supply of health care providers with updated knowledge improves the quality of the entire health care system.

- **Develop clinical champions and model service delivery sites for PE/E interventions:** To change clinical practices and attitudes, it is helpful to have clinical leaders at both the national and facility levels who are convinced of the evidence and can persuasively convince their peers during the implementation process. Physicians in particular can influence and empower other health care providers to improve care and make timely decisions. For example, in Nepal, the National Society of Obstetricians and Gynecologists implemented a project in 2009 at 22 facilities to improve diagnosis and treatment of severe PE/E. Through job aids, technical updates and on-site performance improvement coaching, quality of PE/E management was improved.
- **Conduct a training needs assessment:** A training needs assessment focused on PE/E can help identify gaps and inform the development of a training strategy.
- **Strengthen in-service training and pre-service education systems to teach evidence-based practices for PE/E care:** If updated policies and clinical guidelines are to result in high-quality services, pre- and in-service training materials and methodologies for all cadres need to be reviewed and updated. Courses and curricula may need to be updated to ensure all aspects of PE/E are addressed.

Section 3
Strengthening the Use of Magnesium Sulphate for Management of Severe Pre-Eclampsia and Eclampsia, ACCESS/Nepal, 2010
Detecting Pre-Eclampsia: A Practical Guide, WHO, 2005

Section 3
Prevention and Management of Pre-Eclampsia and Eclampsia Learning Resource Package, MCHIP, 2011
Managing Eclampsia, WHO, 2008
Maternal Survival—Programming Issues. Online USAID Global Health eLearning Center, 2008
The Evidence-Based Management of Pre-Eclampsia and Eclampsia, Online Course, University of Oxford, 2010
Best Practices in Maternal and Newborn Care Learning Resource Package, ACCESS Program, 2008

- **Develop a training strategy and strengthen training sites:** Based on the training needs assessment findings, any existing pre-service and/or in-service training strategy for birth attendants, BEmONC and CEmONC should be updated.
 - Training sites may need to be assessed and strengthened to ensure classroom teaching and clinical practices appropriately teach PE/E prevention and management.
 - Where appropriate and possible, develop alternate training approaches, such as on-site coaching and blended learning approaches, to reduce cost, increase effectiveness, increase access to training activities, and reinforce quality of care initiatives at facilities.
- **Link managers, pharmacists and clinicians to ensure that supplies, drugs, instruments and equipment are available to provide PE/E-related care** to increase the likelihood that training is transferred to the work site.
- **Develop innovative approaches to help providers maintain PE/E management skills:** Opportunities to manage severe PE or eclampsia can be limited for providers working at peripheral or low-volume facilities. Supervision systems should be strengthened to enable providers to periodically practice and maintain the skills and strategies learned in focused PE/E or EmONC courses. Clinical drills to practice emergency readiness and emergency procedures can be adapted to the local context and implemented during clinical supervision visits.

STEP 4: IMPROVE QUALITY OF CARE

A practical management approach for improving the performance and quality of health services leads to meaningful, sustainable improvements in health care. The process engages a country's key stakeholders, decision-makers and other leaders to ensure responsiveness to the country's needs and to foster the broad acceptance necessary for implementation by health care providers.

- **Set standards for quality of care (QoC) and use them to improve PE/E-related prevention, detection and management:** Within many countries, efforts are already underway to improve the quality of maternal and newborn care at all levels of the health care system. Standards can be set using international reference materials, such as the WHO's *Managing Complications in Pregnancy and Childbirth* (2003), and adapted for the local context. As policies and service delivery guidelines are updated to promote PE/E-related evidence-based practices, performance improvement processes can help translate them into clinical practice. For example, a number of countries have QoC tools to improve the management of obstetric and complications that address PE/E management with magnesium sulfate within larger BEmONC and CEmONC quality improvement processes. Approaches—such as Standards-Based Management and Recognition (SBM-R), Client-Oriented, Provider-Efficient (COPE®) Services, and Improvement Collaborative—can be used to set and achieve a standard of care for ANC, delivery and management of complications, and also to tackle challenges in supervision, infection prevention, laboratory services and logistics systems.

Section 4

Performance Standards: Management of Complications during Labor and Delivery, Malawi, 2010

MNH Performance Standards: Normal Labor and Delivery, 2011

Pregnancy, Childbirth, Postpartum and Newborn Care – A Guide for Essential Practice, WHO, 2006

Managing Complications in Pregnancy and Childbirth—A Guide for Midwives and Doctors, WHO, 2003

- Integrate PE/E-related QoC monitoring across sites/facilities:** While supervisors may initially focus on monitoring the implementation of PE/E interventions, key elements must be standardized and integrated into existing supervisory and monitoring systems to ensure the sustainability of the interventions. National QoC monitoring systems need to reflect key elements of PE/E prevention, detection and management. ANC monitoring can ensure all pregnant women are tested for high blood pressure and proteinuria at every visit. In addition, targeted QoC initiatives can focus on severe PE/E management in a number of facilities to measure improvements in care over several points in time. In a QoC project in Nepal in 2009, some findings that were identified and addressed included: frequent stock-outs of magnesium sulfate; nurses who were hesitant to diagnose severe PE and begin treatment; and monitoring for toxicity not routinely being done.
- Develop job aids to address providers' barriers to providing timely PE/E prevention, detection and management:** Job aids can greatly assist providers in transferring learning to their work site and maintaining standards of care. The national situational analysis, training needs assessment, and QoC activities job aids can greatly assist providers in transferring their learning to their work site and maintaining standards of care. Job aids can be developed to specifically address barriers and could include those for educating women about prevention, diagnosing PE, counseling women with PE and their families on options, and managing severe PE/E cases (including toxicity).
- Ensure relevant PE/E-related data are collected and analyzed for decision-making by facilities and within the national Health Management Information System (HMIS):** Data on selected PE/E indicators must be included in the national HMIS and logistics management information system (LMIS) to enable stakeholders to track PE/E-related data and make informed programmatic decisions. Data are needed at the facility as well as aggregated up to the district/provincial/regional level on key indicators such as: stock-outs of essential drugs needed for PE/E management; the number of women receiving ANC whose blood pressure was evaluated and urine was tested for protein; and the number of cases of severe PE identified and treated at the appropriate level of care.

Section 4
Site Assessment and Strengthening for MNH Programs, MNH, Jhpiego, 2004
Quality Improvement for Emergency Obstetric Care, Engender Health, 2003
Standards-Based Management and Recognition: A Field Guide, Jhpiego, 2005
Using PQI to Strengthen Skilled Attendance, MNH/Jhpiego, 2003

Section 4
The ABCCCD of Eclampsia Management Job Aid, ACCESS/Nigeria, 2007
Managing Severe PE/E with Magnesium Sulfate Job Aid, ACCESS/Nepal, 2009
Pre-eclampsia and Eclampsia Job Aids, MCHIP 2011
Obstetric Safety Protocols, WHO, 2003
Management of Severe Pre-eclampsia and Eclampsia, CREST, 2001

STEP 5: INCREASE AWARENESS AMONG WOMEN AND THEIR FAMILIES

Mobilizing families and communities increases demand for services, a vital step in improving care for mothers and newborns.

- Identify barriers among women, their families and their communities to recognizing PE/E danger signs, attending ANC for screening, and seeking timely care for severe PE/E:** For women, their families and communities to prevent PE/E-related complications and deaths, they need to have accurate information about prevention, detection, danger signs and care. National behavior change communication (BCC) or community mobilization strategies will likely address most barriers to recognizing, seeking and accessing care, but specific behaviors related to PE/E need to be explored and integrated.

Section 5
Literature Review: Educational Materials for PE/E Recognition, 2011
Calcium Supplementation BCC Materials, MCHIP/Nepal, 2010

- **Mobilize community health workers (CHWs) and communities for PE/E:** CHWs or other community health agents are the front-line health care providers who are the closest to women in communities, and are thus well suited to participate in community-based PE/E interventions. They are often involved in raising awareness about birth preparedness and complication readiness, which is essential for recognizing danger signs, planning for SBA-attended deliveries, and seeking care for complications if they occur. Depending on the PE/E activities planned for the community level, CHWs could, for example, distribute calcium and/or aspirin supplements or encourage multiple ANC visits for screening. For detection in areas where ANC visits are limited, CHWs can be trained to screen women at home or in the community. Community-oriented BCC messages, materials and activities can be developed and integrated into existing campaigns to reach pregnant women and their families.
- **Link communities and facilities to improve access and demand for care:** It is critical to ensure the continuum of care for PE/E, as women diagnosed with PE need to be monitored and referred depending on the severity of the illness and the gestational age of the pregnancy. Referral systems need to be in place to ensure that women and newborns can get to life-saving care when needed. Linking communities to nearby providers and facilities helps to improve communication, care-seeking and referrals. For example, if national policies support the administration of a first IM dose of magnesium sulfate and the first stat dose of anti-hypertensive medications in peripheral health care facilities prior to transfer, communities need to be mobilized to know where to seek this care.

STEP 6: MONITOR AND EVALUATE RESULTS

Monitoring and evaluation of programs to detect and treat severe pre-eclampsia/eclampsia during pregnancy is important for understanding program achievements and informing policy development and programmatic decision-making at the national, regional and district, health facility and community levels.

- **Conduct nationally representative household or facility surveys that include PE/E-related indicators:** Periodic household and facility surveys that address PE/E screening, counseling and management can highlight the challenges to improved care and also capture improvements over time. National surveys help document current practice, raise awareness and generate support for PE/E focused programs. For example, ICF Macro's Demographic and Health Surveys (DHS), conducted every five years, and UNICEF's Multi-Indicator Cluster Surveys (MICS), conducted in select countries every two years, collect population-based data on ANC services received by pregnant women including blood pressure (BP) and urine testing. ICF Macro's Service Provision Assessment (SPA) and WHO's Service Availability Mapping (SAM)¹ facility surveys collect health facility-level information on health care provider training and drugs, supplies and equipment to detect and manage severe PE/E. The SPA also includes direct observation of antenatal care visits and ANC client exit interviews.

Section 6

Suggested PE/E Indicators, 2011

Bangladesh Maternal Health Services and Maternal Mortality Report, 2001

¹ WHO is also currently working on a new set of facility survey tools, the Service Availability and Readiness Assessment², or SARA.

- **Include PE/E-related indicators in the national government health sector M&E plan:** Depending on the range and scale of interventions, the national M&E plan for maternal and newborn health programs can be reviewed to ensure it will measure changes in PE/E outcomes. For example, the plan should: assess PE/E program baseline; determine key indicators to measure progress (outputs, outcomes and impact); and review existing data collection systems. Any additional M&E requirements should be integrated into existing government HMIS. Complementing the M&E plan, a documentation plan needs to be developed to ensure the PE/E program will capture sufficient information from activities to answer all key programmatic questions and capture lessons learned.
- **Revise routine government health information systems to capture PE/E related indicators:** Government health management information systems should be an important source of data for program management and decision making. These systems collect and compile data more frequently than special household and facility surveys and can thus help to monitor service quality and utilization trends. Logistics management information systems, which are part of the larger HMIS, can track stockouts of key PE/E drugs and supplies, such as MgSO₄, as well as supplies such as urine protein test strips and BP equipment.

Section 6

*Monitoring
Emergency Obstetric
Care: A Handbook.*
WHO, 2009

*Health Facility
Assessment
Methods. MEASURE,*
2009

*Needs Assessments
for Emergency
Obstetric and
Newborn Care.*
AMDD, 2010

*Services Availability
and Readiness
Assessment (SARA)
Core Questionnaire,*
WHO, 2010

STEP 7: SCALE-UP FOR NATIONAL IMPACT AND SUSTAINABILITY

Scaling up capacity building, community outreach and demand generation for maternal and newborn health interventions is critical for sustaining program improvements. However, as programs move from initial introduction to having a national reach, certain challenges may arise, such as: insufficient equipment in ANC to take blood pressure and test urine; lack of provider knowledge/skills; low community awareness of danger signs and need for referral; and facilities without evidence-based protocols and medications.

- **Plan for scale-up and sustainability considering national priorities, areas of highest need and capacity:** Depending on the national strategy, expansion of PE/E initiatives may be phased but should be developed with a long-term vision of routine delivery of these services through existing systems nationwide. Eclampsia management using magnesium sulfate or urine testing for proteinuria are frequently in policies but not in practice; therefore, scale-up through the health care system remains a necessity. New innovations in particular need to consider sustainability in the initial design and implementation.

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- 2 Ibid.
- 3 Balancing the Scales: Expanding Treatment for Pregnant Women with Life-Threatening Hypertensive Conditions in Developing Countries, Engender Health, 2007 (<http://www.engenderhealth.org/files/pubs/maternal-health/EngenderHealth-Eclampsia-Report.pdf>)
- 4 Ibid.
- 5 Hofmeyr GJ et al. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. *Cochrane Database Syst Rev.* 2010 Aug 4;(8)(8):CD001059.
- 6 Bujold et al. Prevention of preeclampsia and intrauterine growth restriction with aspirin started in early pregnancy: a meta-analysis. *Obstetrics & Gynecology.* 2010;Volume 116 - Issue 2, Part 1 - pp 402–414.
- 7 Beguma R et al. A low dose (Dhaka) Magnesium Sulphate regime for eclampsia. *Acta Obstetrica et Gynaecologica Scandinavica.* 2001;998–1002.