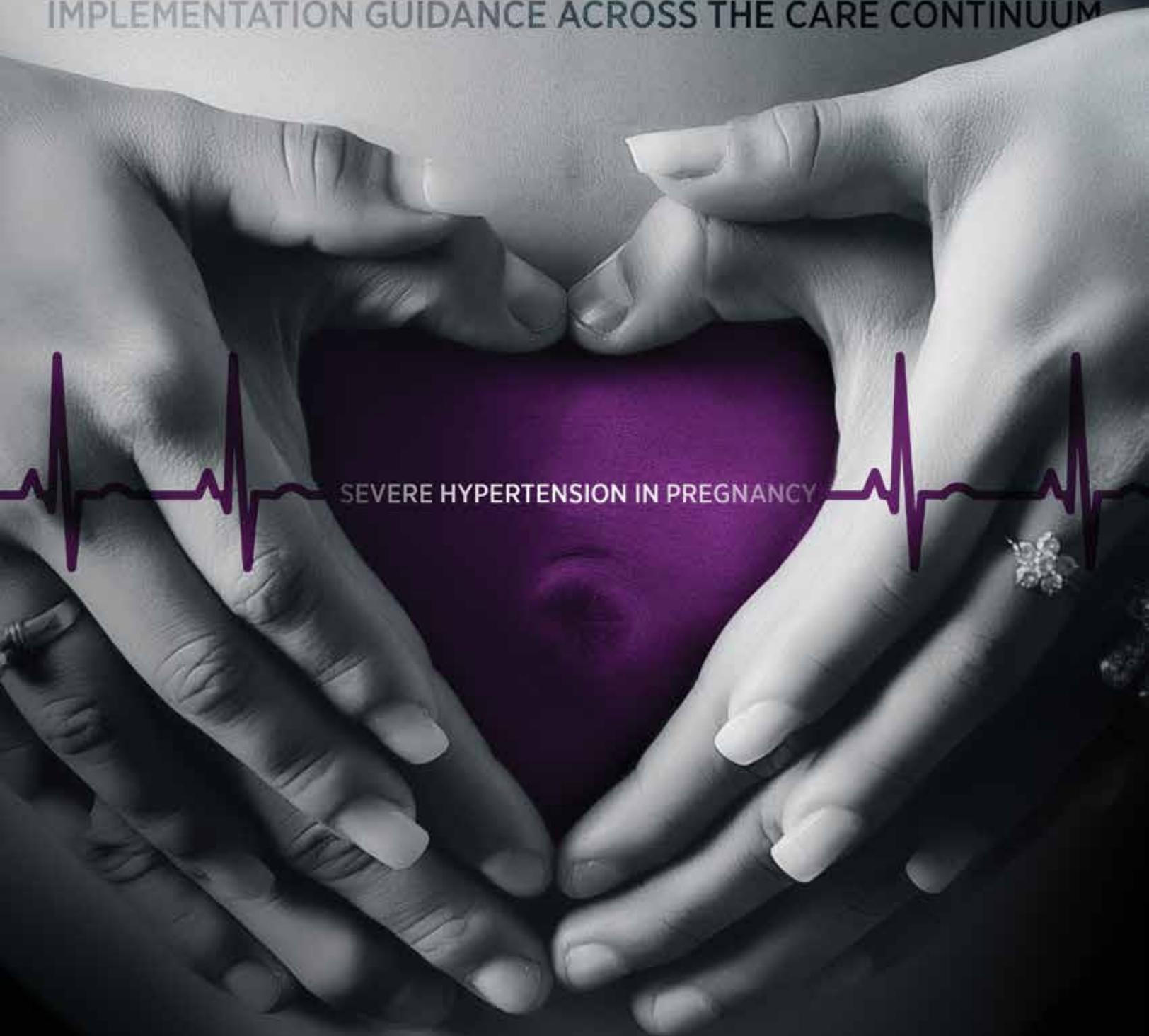


MISCOUURI

IMPLEMENTATION GUIDANCE ACROSS THE CARE CONTINUUM



SEVERE HYPERTENSION IN PREGNANCY

ACKNOWLEDGEMENTS

The Alliance for Innovation on Maternal Health is an initiative focused on reducing maternal morbidity and mortality in the U.S. through implementation and highly reliable use of standardized patient safety bundles. Each component of the patient safety bundle has been vetted by subject matter experts in the field of maternal health care and is supported, approved and promoted by The American College of Obstetricians and Gynecologists and funded by the Maternal and Child Health Bureau of the Health Research and Services Administration.

Missouri's AIM journey would not be possible without the collective vision, effort and collaboration of the Missouri Department of Health & Senior Services, Missouri Hospital Association, and March of Dimes Missouri. Additionally, multiple association and government agencies have committed support to reducing maternal morbidity and mortality, including the Missouri Section of ACOG; Missouri Chapter of the American Academy of Pediatrics; Missouri Department of Social Services MO HealthNet Division; Missouri Chapter of the Association of Women's Health, Obstetric and Neonatal Nurses; Nurse Practitioners in Women's Health Association; and MPCA.

The Missouri Maternal-Child Learning and Action Network launched in 2018 continues to be integral in driving momentum to improve maternal and infant health outcomes. Through peer-to-peer networks and passionate engagement, the current group of 55 subject matter experts provides guidance and oversight to deploy broad and sustainable evidence-based practices for all pregnant and postpartum patients in Missouri. The vision of healthy moms, healthy babies, healthy Missouri is a call to all stakeholders in women's health care to assess current practices, collaborate and innovate to improve care, and to close the gap on health care disparities. Through the AIM bundles, Missouri can achieve this vision.



Special thanks and recognition to Daniel Jackson, M.D., MFM; Karen Florio, D.O., MFM; and the members of the Missouri Maternal-Child Learning and Action Network Maternal Education Subcommittee for their contributions and editorial oversight to this guidance toolkit.

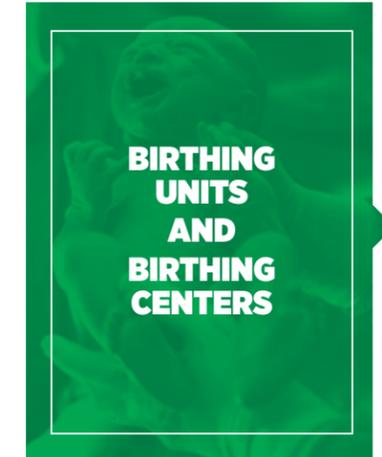
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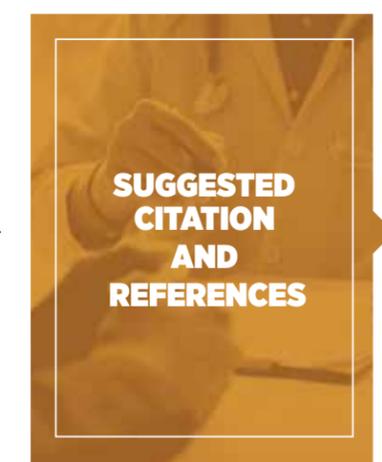
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PREGNANCY-RELATED MORTALITY: How does CDC define pregnancy-related deaths?

A pregnancy-related death is defined as the death of a woman while pregnant or within one year of the end of a pregnancy – regardless of the outcome, duration or site of the pregnancy – from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

THE EVIDENCE

Hypertensive disorders of pregnancy are a leading cause of maternal mortality, occurring in 12 to 22 percent of pregnancies. In the U.S., hypertensive disorders are responsible for approximately 17 percent of maternal mortality. In 2011, The American College of Obstetricians and Gynecologists convened the Task Force on Hypertension in Pregnancy to develop criteria related to the classification, diagnosis and management of maternal hypertensive disorders, including preeclampsia.

In September 2017, ACOG released [Committee Opinion Number 767](#), reconfirming that acute onset of severe systolic and/or diastolic hypertension during pregnancy or the postpartum period is a medical emergency requiring urgent antihypertensive therapy. Use of standardized, evidence-based clinical guidelines for the management of maternal hypertension and preeclampsia has been shown to reduce the incidence of adverse maternal outcomes. Clinicians and organizations caring for maternal patients during the pregnancy timeline, including through one year postpartum, should be able to initiate treatment with first-line agents as soon as possible – preferably within 30-60 minutes of confirmed severe hypertension – to minimize morbidity and mortality from stroke.

The Centers for Disease Control and Prevention released a [report](#), “Pregnancy-Related Deaths: Data from 14 U.S. Maternal Mortality Review Committees, 2008-2017,” outlining several compelling findings that change the perspective and approach to maternal mortality prevention. Key findings from the report include the following.

- Approximately one in three deaths among women during or within one year of pregnancy were pregnancy-related.
- Pregnancy-related deaths occurred during pregnancy, at time of delivery and up to one year postpartum.
- Leading causes of pregnancy-related deaths varied by race and ethnicity.
- Two out of three deaths were determined to be preventable.

Cardiovascular conditions, hemorrhage, infection, embolism, cardiomyopathy, mental health conditions and preeclampsia/eclampsia accounted for nearly 75 percent of pregnancy-related deaths. The report further states that between 2008 and 2017, 65.8 percent (N=233) of total deaths were considered preventable by states reporting maternal mortality review board findings.

With a large volume of maternal mortality occurring outside the birthing unit, the need for effective patient handoffs, care transitions and care coordination is critical to mortality prevention. Provider clinics, emergency departments and critical access hospitals are key partners in the mission to reduce Missouri’s maternal mortality rate – currently a staggering 40.7 deaths per 100,000 live births, with a state ranking of 44th in the nation. Organizations may find solutions to patient- and system-level issues by following the recommendation to ask *who should do what by when?*

RECOMMENDATIONS

To date, much emphasis has been placed on prevention of eclamptic seizures associated with preeclampsia, which have a significant associated risk of increased maternal and neonatal morbidity and mortality. However, less focus has been placed on controlling blood pressure to reduce the incidence of stroke and cardiovascular health issues. As outlined in ACOG's Committee Opinion Number 767, several studies support timely recognition, response and post-event patient management of acute hypertension for improved maternal health outcomes. The California Pregnancy-Associated Mortality Review confirmed that lack of timely treatment for hypertension was a consistent finding in patients dying of cerebrovascular accident in the context of a preeclampsia/eclampsia diagnosis.ⁱ

Five classifications of maternal hypertension currently are defined (Table 3). Regardless of cause, all episodes of acute hypertension are to be treated as a medical emergency. Preeclampsia is new-onset maternal hypertension with additional pregnancy-specific multiorgan effects. Without timely and adequate medical intervention, preeclampsia is likely to progress, increasing the odds of maternal morbidity and mortality.

Table 3: Maternal Hypertension Classifications^{vi}

Chronic hypertension — blood pressure of $\geq 140/90$ mm Hg diagnosed before pregnancy, before the 20th week of pregnancy, or that persists more than 12 weeks after delivery.

Chronic hypertension with superimposed preeclampsia — a woman with chronic hypertension who develops signs of preeclampsia after the 20th week of pregnancy.

Gestational hypertension — Women with gestational hypertension have all of the following.

- blood pressure of $\geq 140/90$ mm Hg diastolic measured on two occasions at least four hours apart
- without protein in the urine (proteinuria)
- pregnancy duration of at least 20 weeks
- no previous history of high blood pressure

Preeclampsia without severe features – new onset blood pressure $\geq 140/90$ mm Hg >20 weeks gestation, may have proteinuria based on 24 hour urine protein collection of >300 mg or urine protein to creatinine ratio (P:C) >0.3 .

Preeclampsia with severe features – meets criteria for preeclampsia without severe features with end organ involvement OR new onset blood pressure $>160/110$ mm Hg regardless of the presence of proteinuria, other symptoms or lab abnormalities. End organ involvement is indicated by any of the following: persistent headache, scotoma, epigastric pain, thrombocytopenia $<100,000$, liver function tests $>$ twice the upper limit of normal, serum creatinine >1.1 or twice the upper limit of normal.

The goal of antihypertensive therapy is not to normalize the maternal patient's blood pressure, but rather to achieve a range of 140-150/90-100 mm Hg to prevent repeated, prolonged exposure to severe systolic hypertension with subsequent loss of cerebral vasculature autoregulation.ⁱⁱⁱ

According to ACOG guidelines, the diagnosis of severe preeclampsia is no longer dependent on the presence of proteinuria.^{vi} Guidelines now focus on recognition and treatment of severe range maternal blood pressure, which is potentially life threatening to mothers and infants regardless of the presence or absence of urine protein. Clinicians should not delay management of preeclampsia in the absence of proteinuria. Evidence shows organ problems with the kidneys and liver can occur without signs of proteinuria, and the amount of protein in the urine does not predict disease progression. Massive proteinuria ($>5g$) has been eliminated from consideration of diagnosing severe preeclampsia.

Preeclampsia is diagnosed by new-onset of high blood pressure that develops after 20 weeks gestation and up to six weeks postpartum that can be associated with protein in the urine, new development of decreased blood platelets, kidney or liver dysfunction as defined through lab diagnostics, and pulmonary or cerebral edema causing potential seizures and/or visual disturbances. There is no single reliable, cost-effective screening test for preeclampsia. Also, there are no well-established measures for primary prevention, although studies on biomarkers show promise regarding early high-risk identification.ⁱⁱⁱ

Evidence shows that preeclampsia is a dynamic process. Diagnosing a woman's condition as "mild preeclampsia" is not helpful because it is a progressive disease, that progresses at different rates in different women. Appropriate care requires frequent reevaluation for development of severe features of the disease and appropriate actions outlined in the new guidelines.ⁱⁱⁱ

KEY CONSIDERATIONS FOR RECOGNITION AND TREATMENT OF MATERNAL HYPERTENSION AND PREECLAMPSIA^{iii,vi}

Mild to moderate high blood pressure (140-159 mm Hg systolic or 90-100 mm Hg diastolic measured on two occasions at least four hours apart) warrants close, ongoing evaluation and monitoring.

High blood pressure greater than or equal to 160 mm Hg systolic, or greater than or equal to 110 mm Hg diastolic on two measurements within 15 minutes, is a feature of severe preeclampsia and warrants immediate treatment to prevent stroke.

To prevent eclamptic seizures, magnesium sulfate should be given intravenously if blood pressure is 160/110 or higher, or if other severe symptoms that usually precede seizures are present.

One of the biggest changes in preeclampsia management relates to the timing of delivery in women with preeclampsia without severe features. Studies suggest that delivery at 37 weeks of diagnosed gestation is best for maternal/neonatal outcomes.

Patients with preeclampsia with severe features should be delivered no later than 34 weeks gestation with a neonatal care team present at delivery.

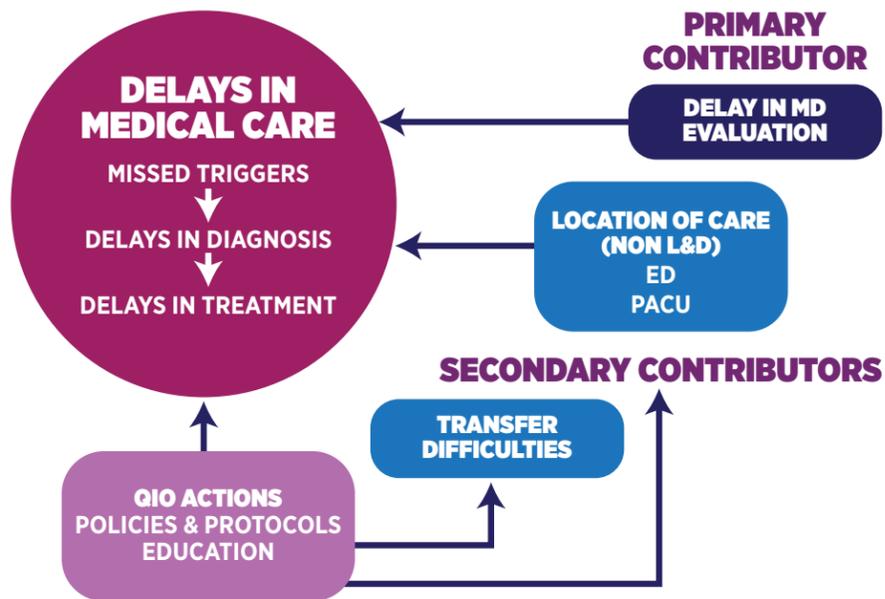
It has been known for many years that preeclampsia can worsen or become apparent for the first time after delivery. The guidelines include specific recommendations to improve outcomes for women who have postpartum preeclampsia and ongoing chronic hypertension issues.

Evidence firmly indicates that maternal hypertension and preeclampsia are associated with cardiovascular disease later in life, and the ACOG report calls for research to learn how to use this information to help patients mitigate risks.

Educate all pregnant and postpartum patients about the signs and symptoms of maternal hypertension and preeclampsia. [The Preeclampsia Foundation](#) has a wide variety of patient-centered education resources available.

Figure 1 highlights the Three Delays Model initially developed for under-resourced countries to address maternal mortality; unfortunately, these same delays in care are just as prevalent in the U.S.

FIGURE 1: The Three Delays (3-D) Model



Source: CQMCC¹¹

The three delays visually represented in the 3-D Model commonly are reported in maternal mortality reviews. Providers, patients and families often miss triggers or fail to adequately screen and assess the reported signs and symptoms. Failure to recognize triggers leads to both delays in diagnosis and treatment.

The task force developed clinical pearls to address the three delays commonly seen in care of maternal hypertension patients.¹

- Timely and accurate patient assessment, specifically of new-onset hypertension, recognizing that 40 percent of patients with these findings will develop preeclampsia.
- Acute treatment of hypertension based on critical, actionable algorithms and reliable systems of care as soon as possible within one hour.
- Robust, ongoing provider and patient education offered prenatally through one year postpartum.

It is critical for providers to understand and acknowledge new-onset severe maternal hypertension of 160/110 mm Hg or greater anytime in the pregnancy and postpartum period is a clinical emergency requiring time critical intervention to reduce risk of morbidity and mortality.

CARDIOVASCULAR DISEASE IN PREGNANCY AND CARE ACROSS THE CONTINUUM

Cardiovascular disease, including a spectrum of cardiac conditions with a high incidence of cardiomyopathy, has emerged as the leading cause of maternal mortality in the U.S. An in-depth review of maternal mortality in California between 2002 and 2006 indicated that only a small fraction of the women had a known diagnosis of CVD prior to death. However, most women who died had presented to care with symptoms either during pregnancy or shortly after childbirth. One-fourth of the deaths were judged preventable if heart disease had been included in the differential diagnosis, and timely diagnosis and treatment occurred.

Since patients with maternal hypertension, preeclampsia and CVD can present throughout the hospital and care continuum, implementing standardized, facilitywide care assessments, algorithms and treatments is an important consideration in settings outside of the traditional birthing unit. All staff and providers should have a clear understanding of maternal hypertension and preeclampsia criteria, and have the ability to initiate timely treatment protocols. Additionally, standardizing supplies, medications and locations of life-saving clinical items streamlines care and saves valuable time in an emergency situation. Use of drills and simulations are also recommended to ensure staff and providers are prepared to respond.^{vi} In particular, education and standardized medication boxes and protocols have been especially effective in the ED. Collaboration between the obstetrics and ED departments to identify and promptly care for maternal patients is a critical driver to improved maternal and neonatal outcomes.

This guidance document focuses on implementing the AIM patient safety bundle for severe maternal hypertension to reduce maternal morbidity and mortality, with emphasis on timely hypertension recognition and treatment to prevent stroke, and to promote adequate and frequent postpartum follow-up, as well as patient and family engagement. Key tasks are outlined to assist organizations with establishing and sustaining improved readiness, recognition, response and reporting with systems-based learning. Although the AIM bundles historically have focused on implementing practices in the birthing unit setting, the Missouri AIM project seeks to encourage all maternal care providers to be “OB Ready.” Subsections in this guidance toolkit are specific to how birthing center/centers, EDs, critical access hospitals and provider clinics may implement applicable tasks of the AIM Severe Hypertension in Pregnancy bundle.

TEAM-BASED PROCESS IMPROVEMENT

RECOMMENDATIONS

Establish the team, and identify roles and accountability.

- Multidisciplinary teams should, at a minimum, include the following.
 - » Unit director/manager
 - » Staff nurse(s) and patient care tech(s)
 - » Physician/clinician champion
 - » Executive leadership champion
 - » Emergency department staff
 - » OB clinic staff
 - » Patient and/or family member
- Determine roles during an initial meeting.
 - » Who is the team lead?
 - » Who is supporting data collection?
 - » Who will have peer discussions?
 - » Who will lead staff education?
- Accountability and expectations also should be determined during an initial meeting.
 - » The simple statement, “Who, what, by when?” will help outline the expectations before the end of each team meeting and create momentum for action.

Complete a gap analysis for maternal hypertension management.

- This task helps determine current bundle implementation within your area, and identifies “gaps” in the process and actions for the team.
- While components previously may have been implemented, it is important to measure and consider how reliable the process is and its impact on your outcomes.

Complete a rapid process improvement workshop with the team.

- The goal of an RPIW is to outline the process to ensure AIM bundle implementation and compliance.
- The team should review the process for opportunities to increase efficiency and effectiveness.
- Not sure if something is working or necessary? This is what you measure and how you intervene to improve the process.
- Cycle times should be determined and set by the team, i.e. clinician notification parameters, first-line medication administration and postpartum follow-up timelines.

Develop the action plan and timeline, and share it with the team.

- Your plan will be individualized, but will include all recommended and applicable AIM bundle components.
- Track action plan completion within your organization, and plan to report it quarterly to MHA for overall AIM program tracking.

Complete the data collection plan pertinent to your setting.

(see data tool handout)

- Review which metrics are reportable and how the organization will collect them monthly/quarterly as required. Required reportable AIM project data metrics are outlined in the data tool.
- Ensure access to the Hospital Industry Data Institute’s (HIDI) Quality Collections Portal by contacting Linda Bell at lbell@mhanet.com.
- Data for this project will not use average rates for process measures. Instead, upper specification limit parameters will be used in line with Lean Six Sigma goals.

PROJECT OVERVIEW

PROJECT GOAL

Reduce morbidity and mortality from severe maternal hypertension by implementing evidence-based practice criteria based on the AIM bundle for Severe Hypertension in Pregnancy.

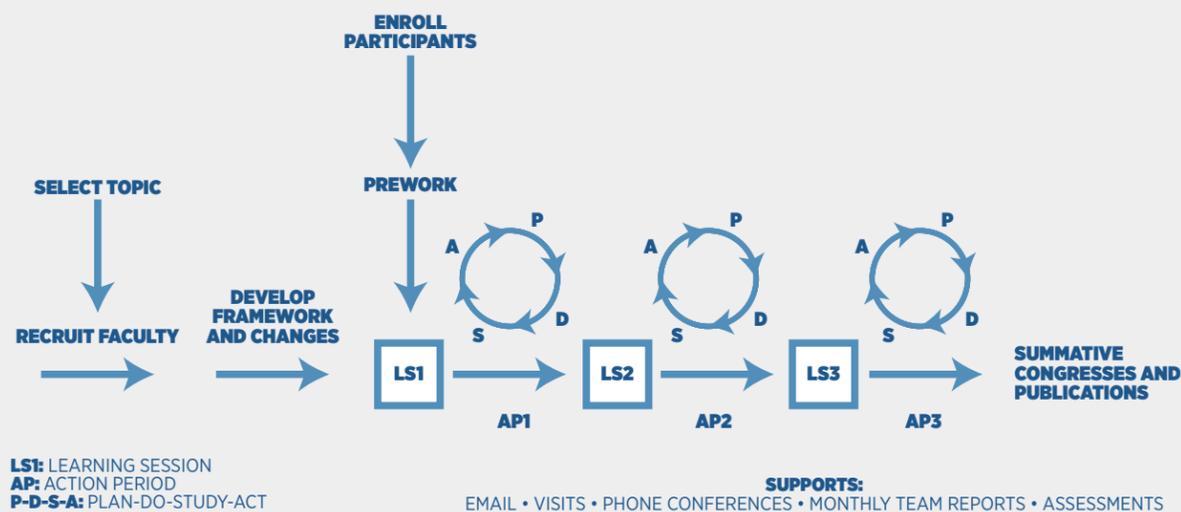
TIMELINE

12 months or less

METHODOLOGY

Rapid Process Improvement Model designed to seek incremental changes toward an end improvement goal. Ninety-day rapid process improvement cycles are recommended, along with learning and action components based on the Institute for Healthcare Improvement's Breakthrough Series Model (Figure 2).

FIGURE 2: IHI'S BREAKTHROUGH SERIES MODEL



Source: Institute for Healthcare Improvement's Breakthrough Series Model.

Participants are encouraged to follow the Lean Six Sigma DMAIC model of define, measure, analyze, implement and control to approach this bundle implementation. Resources and education on these process steps are included during the project webinars and through other recommended resources. Participants should approach the bundle with the goal of 100 percent implementation with minimal variation, and may work through implementing the tasks in whichever order is feasible and beneficial to the organization, and the patients and families served.

RECOMMENDED RESOURCES

The following is a list of recommended resources for treating severe hypertension in pregnancy.

- **The American College of Obstetricians and Gynecologists**
 - » [ACOG District II Safe Motherhood Initiative](#)
 - » [Task Force on Hypertension in Pregnancy Preeclampsia Report](#)
 - » [Preeclampsia and Hypertension in Pregnancy: Resource Overview](#)
 - » [Emergent Therapy for Acute-Onset, Severe Hypertension During Pregnancy and the Postpartum Period](#)
 - » [Practice Bulletin No. 202: Gestational Hypertension and Preeclampsia](#)
 - » [Severe Hypertension in Pregnancy Bundle Resources](#) (example algorithms, protocols, etc.)
 - » [ED Postpartum Preeclampsia Checklist](#)
- **California Maternal Quality Care Collaborative**
 - » [Improving Health Care Response to Preeclampsia: A California Toolkit to Transform Maternity Care](#)
- **Centers for Disease Control and Prevention**
 - » [Enhancing Reviews and Surveillance to Eliminate Maternal Mortality \(ERASE MM\)](#)
- **Council on Patient Safety in Women's Health Care**
 - » [AIM Severe Hypertension in Pregnancy Bundle](#)
 - » [Safety Action Series](#)
- **The National Partnership for Maternal Safety**
 - » [The Maternal Early Warning Criteria](#)
- **The Preeclampsia Foundation**

BIRTHING UNITS AND BIRTHING CENTERS

READINESS

Goal: The readiness phase involves reviewing current processes, recognizing gaps or inefficiencies in care, designing the AIM bundle process, and educating stakeholders. A multidisciplinary team is recommended to ensure broad stakeholder engagement, successful implementation and sustainability of the AIM bundle.

Task #1: Every unit develops and adheres to standards for early warning signs, diagnostic criteria, monitoring and treatment of severe hypertension, preeclampsia with severe features and/or eclampsia, to include applicable order sets and algorithms.

- Protocols should include the following.
 - » provider notification if systolic BP \geq 160 or diastolic BP \geq 110 for two measurements within 15 minutes
 - » initiate the protocol after the second acute BP within 60 minutes
 - » patient positioning and monitoring assessments/considerations
 - » medication administration subset with escalation steps
 - » reportable patient assessment criteria
 - » time period for reassessment of treatment and next steps
 - » criteria for notification of higher-level provider(s)
- Consider all stakeholders and hospital review committees the protocol must go through to be approved. What is the pathway to approval, and can this pathway be streamlined? What is the expected timeline for implementation?
 - » Consider implementation of the protocol into the EHR for documentation and ability to automate auditing of the bundles.
 - » Example acute hypertensive protocols are available in the California Maternal Quality Care Collaborative toolkit.
- Already have a protocol in place? Measure gaps in compliance, and provide additional training or review of opportunities for process and system-level improvements.

Task #2: Every unit provides staff and provider education on protocols, and unit-based drills with post-drill debriefs.

- Keep education visually appealing and simple.
- Select staff to help lead educational efforts and champion the care changes.
- Consider a project mascot to promote awareness and teamwork.
- Consider signage/poster/sticker options.
- Utilize drills and simulations for staff training.
 - » What drills and simulations will be used?
 - » Will simulation equipment be used?
 - » When will drills/simulations be completed? How often? By whom?
 - » What is the staff accountability for attending training(s)?
- Plan to educate on the following.
 - » diagnostic and treatment algorithms
 - » accurate and reliable blood pressure measurement
 - » fluid management in preeclampsia
 - » competent use of magnesium sulfate intravenously
 - » airway management for maternal patients
- Utilize debrief tools to review the drills/simulations and learn from them.

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Task #3: Every unit has a reliable process for timely triage and evaluation of pregnant and postpartum women with hypertension, including ED and outpatient areas.

- Include hospital ED staff on the process improvement team to provide input and help inform those departments of care bundles.
- Use a facilitywide standardized checklists, such as one provided by ACOG, to evaluate any pregnant patients or those less than six weeks postpartum.
- Assess every patient for signs and symptoms of preeclampsia/eclampsia and accurate BP measurement at triage, upon admission and according to ongoing patient assessment policies.

Task #4: Every unit has rapid access to medications used to treat severe hypertension and eclampsia. Medications and an administration guide should be stocked and immediately available on the unit, ED and outpatient areas where patients may be treated.

- Initiate treatment for blood pressure greater than or equal to 160 mm Hg systolic or 110 mm Hg diastolic due to increased risk of stroke.
- Educate staff on the use of antihypertensives in patients with chronic cocaine/amphetamine abuse.
- Understand the goal for blood pressure control in a preeclamptic/eclamptic patient is 140-150 over 90-100.
- Consider the need for anesthesiology for central-line insertion, ICU management for the maternal patient and need for transfer to a higher level of care.
- An example medication toolbox list is on page 127, Appendix S in the CQMCC toolkit.

Task #5: Every unit has a system plan for care escalation, and obtaining appropriate consultation and maternal transport to a higher level of care, as medically indicated.

- Determine an efficient plan for care escalation with parameters to initiate the escalation plan.
- Identify a network or common transport services, and next level of care partners.
- Connect with transferring organizations and transport services to align standard care protocols, transport expectations and patient hand-off communication to achieve efficiency and effective patient care coordination.

RECOGNITION & PREVENTION

Goal: The goal of the recognition phase is to recognize the direction of the work being completed. This is the time to assess the current state of processes being introduced, ensure all stakeholders are educated and compliant, and review data.

Task #1: Every pregnant and postpartum woman has accurate BP measurement and assessment of urine protein.

- Validate staff competency to accurately obtain manual BPs – manual blood pressure measurement is the “gold standard” and should always be the method used for patients either known or suspected to have hypertension issues, or when monitor-obtained BPs are in question.
- Consider S.S.P.T. – size of the cuff, stimulation of the patient from tobacco and/or caffeine and movement, posture, and talking.
 - » Size of the cuff – the cuff bladder should cover 75-100 percent of the arm circumference.
 - » Stimulation – ideally, avoid tobacco and/or caffeine products for 30 minutes, and take BP after a five-minute rest period.
 - » Posture – patients should be sitting or slightly reclined, feet on the floor if sitting with ankles uncrossed, and the back supported with the arm relaxed and resting on a surface.
 - » Talking – the patient should not talk during measurement.
- Staff verbalize reportable BP criteria as part of competency review.
- Staff demonstrate appropriate urine sample collection and urine proteinuria testing.

Task #2: Every pregnant and postpartum woman through one year postpartum is provided a standard response based on assessment of maternal early warning signs to include listening to and investigating patient-reported symptoms and assessment of preeclampsia-related lab results.

- Due to increased maternal mortality rates in late postpartum timeframes, ask the following questions to every female patient upon triage, during office visits and upon admission.
 - » Have you been pregnant, had a miscarriage or delivered a baby within the last year?
 - » If yes, were you diagnosed with hypertension, preeclampsia or eclampsia?
- Interview and assess patients for signs and symptoms of preeclampsia/eclampsia.
- If severe hypertension and/or preeclampsia/eclampsia is suspected, initiate the facility’s severe hypertension management protocol and care escalation policy.
 - » Recommended tools include the California Maternal Quality Care Collaborative Preeclampsia Early Recognition Tool and the Council on Patient Safety in Women’s Health Care Maternal Early Warning Criteria.
- Consider how the response time will be measured with the goal of providing antihypertensive medications within one hour or less.

Task #3: Every pregnant and postpartum woman through one year postpartum is provided facilitywide, standardized education on signs and symptoms of hypertension and preeclampsia, including when/what to report to their provider, as well as what are urgent/emergent symptoms.

- The Preeclampsia Foundation is recommended for patient and family education resources.
- Who will give these resources to patients?
- At what points of care will these resources be given to patients?
- It is recommended to provide education to all maternal patients – prenatally through six weeks postpartum – on the signs and symptoms of preeclampsia/eclampsia.

RESPONSE

Goal: The goal of the response phase is to ensure high reliability in care delivery. Organizations should strive for minimal variation across patients and providers in use of standardized protocols and pathways. The focus is on the ability to demonstrate evidence-based practices accurately and timely while meeting individual patient needs.

Task #1: The organization demonstrates high reliability in deploying facilitywide, standard protocols with checklists and escalation policies for management and treatment of severe hypertension, eclampsia prevention and postpartum presentation of severe hypertension/preeclampsia and resulting sequelae, such as DIC, HELLP Syndrome, maternal seizures, etc.

- Measure reliability through reportable data metrics, tracking cycle times in real-time, and/or retrospective review of the patient's chart and timing of care.
- If opportunities are needed, note that those closest to the patient and performing the care are best positioned to offer solutions and design efficient and effective processes.
- Education opportunities are available through the online programming included with this project.
- MHA has an online toolkit to support organizations on the journey to high reliability.

Task #2: The organization demonstrates the presence and use of a support plan for patients, families and staff for maternal patients admitted to the ICU with serious complications of severe hypertension.

- Provide patients and families with an ICU guide that outlines what to expect in the ICU setting, equipment, participating in care planning and patient care, etc.
- Implement a team model of support among the ICU, OB, social services and chaplain staff to best support the patient and family.

Task #3: The organization demonstrates processes to ensure care transitions for patients diagnosed with a history of hypertension, current severe hypertension, preeclampsia and/or eclampsia to the OB provider within seven to 14 days postpartum.

- Medical literature notes increased propensity to keep a follow-up appointment if the organization or provider works with the patient's preferences and schedules the appointment.
- Additional increases in appointment adherence are noted when patient reminders, such as text message reminders, calendar invites or phone calls (personal or robocalls), are made.
- Provide discharge summaries to the accountable provider post-discharge within one to three days. For patients following up with a different provider than the delivering or discharging physician, a communication method to relay patient report and responsibility should be outlined and followed to ensure effective care transitions.
- Discussions with patients and family members regarding the importance of follow-up for severe hypertension, preeclampsia and/or eclampsia should be standard education.
- Implement a plan to make every effort to contact patients who miss the follow-up appointment.

REPORTING/SYSTEMS LEARNING

Goal: Establish standard reporting of data metrics to promote quality and safety improvement and maternal health outcomes. Engage in culture of safety and high reliability principles, and use case studies, near misses and events as opportunities for system learning and improvement.

Task #1: Every unit establishes use of huddles to review care plans for high-risk patients and use of post-event debriefs to identify successes and opportunities.

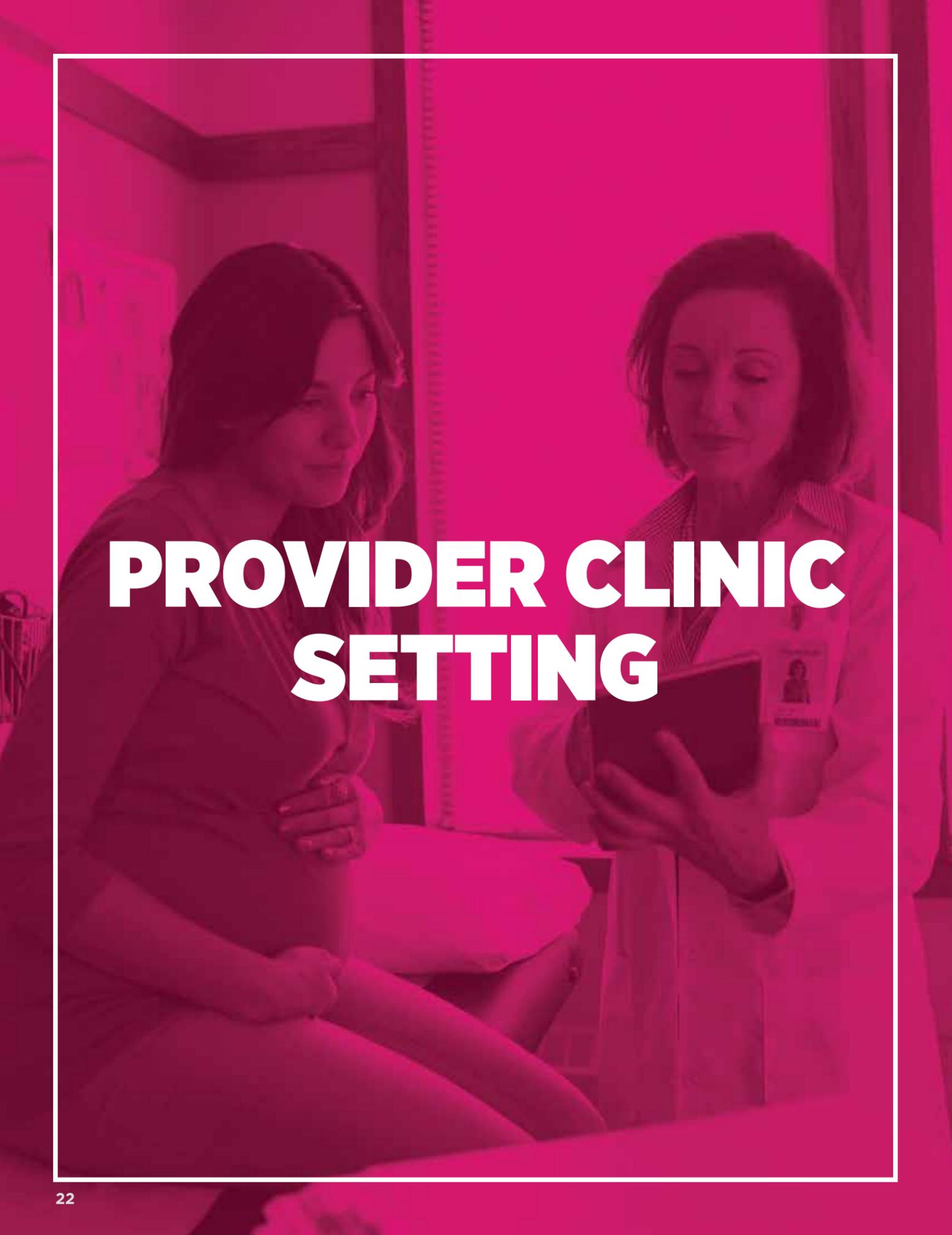
- Consider the use of visual cues to alert the care team. This is especially helpful for team members who aren't static on the unit, such as anesthesiology staff, but who need to be aware of potential escalating care situations.
 - » Example: Post a magnet or color code the patient assignment board to indicate patients at risk.
- Utilize team safety huddles to review patient status and ensure understanding of escalation plan for care as needed.
- Consider reviewing maternal risks during organizationwide leadership safety huddles to alert other care teams, such as the ICU.

Task #2: Every unit completes multidisciplinary reviews of all severe hypertension/preeclampsia/eclampsia patients admitted to the ICU or transferred to a higher level of care to identify system issues and opportunities for improvement.

- Consider opportunities to share case studies to promote learning across all stakeholders. A case study template is an easy way to briefly outline the situation using the SBAR technique (Situation-Background-Assessment-Recommendation) while identifying successes and opportunities to improve/process changes.
- Remember the goal is reliable performance and reduced variation in care across patients and maternal health outcomes – it is not about blame or pointing out failures. Instead, the goal is about improving patient care and learning how to provide it more efficiently and effectively. This takes ongoing efforts and a workforce culture focused on always looking for ways to improve. One way to do this is by learning from defects.

Task #3: Every unit monitors and reports outcomes, process and structural measures outlined in the AIM bundle dataset – both internally and to MHA – for state-level aggregation and systems learning.

- Use a "learning from defects tool" to determine the root cause of any failures in the process improvement plan or interventions.
- Consider the need for ongoing staff and patient education.
- Are the triggers working effectively? What is your average time to first medication? How are outliers addressed?
- Consider use of the Just Culture algorithm to enhance accountability.
- Are there subsets of patients who are more at risk in your organization/community? What is being done to mitigate those risks?
- It is highly recommended to transparently share and post project data to create awareness and urgency to improve.
- Maintain situational awareness by reviewing data and observations in huddles, at staff meetings and during physician meetings.



PROVIDER CLINIC SETTING

READINESS

Goal: The readiness phase involves reviewing current processes, recognizing gaps or inefficiencies in care, designing the AIM bundle process, and educating stakeholders. A multidisciplinary team is recommended to ensure broad stakeholder engagement, successful implementation and sustainability of the AIM bundle.

Task #1: Every clinic develops and adheres to standards for early warning signs, diagnostic criteria, monitoring and treatment of severe hypertension, preeclampsia with severe features and/or eclampsia, to include applicable order sets and algorithms.

- A clinic-based protocol should include the following at a minimum.
 - » provider notification if systolic BP \geq 160 or diastolic BP \geq 110 for two measurements within 15 minutes
 - » a coordinated plan to transport the patient to the closest birthing unit for initiation of the acute hypertensive protocol and OB monitoring
 - » administration of antihypertensive medications at the provider's discretion, and as medications and supplies are available
 - » SBAR (Situation-Background-Assessment-Recommendation) format for notification of higher-level provider(s)
 - » consider implementation of the protocol into the EHR for documentation and ability to automate auditing of the bundles

Task #2: Every clinic provides staff and provider education on protocols and determines competency as part of the annual training record.

- Keep education visually appealing and simple.
- Select staff to help lead educational efforts and champion the care changes.
- Consider a project mascot to promote awareness and teamwork.
- Consider signage/poster/sticker options.
- Plan to educate on the following.
 - » accurate and reliable blood pressure measurement
 - » diagnostic and treatment algorithms
 - » transfer protocol to birthing unit
 - » medications for administration in the clinic environment
 - » location of medications and visual tools to support medical management

Task #3: Every clinic has a reliable process for timely triage and evaluation of pregnant and postpartum women with hypertension.

- Use a facilitywide, standardized checklist, such as one provided by ACOG, to evaluate pregnant patients or those less than one year postpartum.
- Assess every patient for signs and symptoms of preeclampsia/eclampsia and accurate BP measurement at triage and prior to visit end. Document assessments in the prenatal record.

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Task #4: Every clinic has rapid access to appropriate medications used to treat severe hypertension and eclampsia. Medications and an administration guide should be stocked and immediately available in areas where patients may be treated.

- Initiate treatment for blood pressure greater than or equal to 160 mm Hg systolic or 110 mm Hg diastolic due to increased risk of stroke.
- Educate staff on the use of antihypertensives in patients with chronic cocaine/amphetamine abuse.
- Understand the goal for blood pressure control in a preeclamptic/eclamptic patient is 140-150 over 90-100.
- Clinic setting medication administration may vary based upon staff skill, monitoring capacity, and capability and access to medications.

Task #5: Every clinic has a system plan for care escalation, obtaining appropriate consultation and maternal transport to a higher level of care, as medically indicated.

- Determine an efficient plan and parameters for care escalation.
- Identify a network or common transport services, and next level of care partners.
- Connect with transferring organizations and transport services to align standard care protocols, transport expectations and patient hand-off communication to achieve efficiency and effective patient care coordination.

RECOGNITION & PREVENTION

Goal: The goal of the recognition phase is to recognize the direction of the work being completed. This is the time to assess the current state of the processes being introduced, ensure all stakeholders are educated and compliant, and review data.

Task #1: Every pregnant and postpartum woman has accurate BP measurement and assessment of urine protein.

- Validate staff competency to accurately obtain manual BPs – manual blood pressure measurement is the “gold standard” and should always be the method used for patients either known or suspected to have hypertension issues, or when monitor-obtained BPs are in question.
- Consider SSPT – size of the cuff, stimulation of the patient from tobacco and/or caffeine and movement, posture, and talking.
 - » Size of the cuff – the cuff bladder should cover 75-100 percent of the arm circumference.
 - » Stimulation – ideally, avoid tobacco/caffeine products for 30 minutes, and take BP after a five-minute rest period.
 - » Posture – patients should be sitting or slightly reclined, feet on the floor if sitting with ankles uncrossed, and the back supported with the arm relaxed and resting on a surface.
 - » Talking – the patient should not talk during measurement.
- Staff verbalize reportable BP criteria as part of competency review.
- Staff demonstrate appropriate urine sample collection and urine proteinuria testing.

Task #2: Every pregnant and postpartum woman through one year postpartum is provided a standard response based on assessment of maternal early warning signs to include listening to and investigating patient-reported symptoms and assessment of preeclampsia-related lab results.

- Due to increased maternal mortality rates in late postpartum timeframes, ask the following questions to every female patient during every office visit.
 - » Have you been pregnant, had a miscarriage or delivered a baby within the last year?
 - » If yes, were you diagnosed with hypertension, preeclampsia or eclampsia?
- Interview and assess for signs and symptoms of preeclampsia/eclampsia
- If severe hypertension and/or preeclampsia/eclampsia is suspected, initiate the facility’s severe hypertension management protocol and care escalation policy.
- Consider how the response time will be measured with the goal of providing antihypertensive medications within one hour or less. How will the clinic coordinate with a birthing unit to ensure medications for transferred patients are given timely?

Task #3: Every pregnant and postpartum woman through one year postpartum, is provided facilitywide, standardized education on signs and symptoms of hypertension and preeclampsia, including when/what to report to their provider, as well as what are urgent/emergent symptoms.

- The Preeclampsia Foundation is recommended for patient and family education resources.
- Who will give these resources to patients?
- At what points of care will these resources be given to patients?
- It is recommended to provide education to all maternal patients – prenatally through six weeks postpartum – on the signs and symptoms of preeclampsia/eclampsia.

RESPONSE

Goal: The goal of the response phase is to ensure high reliability in care delivery. Organizations should strive for minimal variation across patients and providers in use of standardized protocols and pathways. The focus is on the ability to demonstrate evidence-based practices accurately and timely while meeting individual patient needs.

Task #1: The organization demonstrates high reliability in deploying facilitywide, standard protocols with checklists and escalation policies for management and treatment of severe hypertension, eclampsia prevention and postpartum presentation of severe hypertension/preeclampsia and resulting sequelae, such as DIC, HELLP Syndrome, maternal seizures, etc.

- Measure reliability through reportable data metrics, tracking cycle times in real-time, and/or retrospective review of the patient's chart and timing of care.
- If opportunities are needed, note that those closest to the patient and performing the care are best positioned to offer solutions, and design efficient and effective processes.
- Education opportunities to learn more about high reliability and Lean Six Sigma will be available through the online programming included with this project.
- MHA has an online toolkit to support organizations on the journey to high reliability.

Task #2: The organization demonstrates processes to ensure care transitions for patients diagnosed with a history of hypertension, current severe hypertension, preeclampsia and/or eclampsia to the OB provider within seven to 14 days postpartum.

- Medical literature notes increased propensity to keep a follow-up appointment if the organization or provider works with the patient's preferences and schedules the appointment.
- Additional increases in appointment adherence are noted when patient reminders, such as text message reminders, calendar invites or phone calls (personal or robocalls), are made.
- Discussions with patients and family members regarding the importance of follow-up for severe hypertension, preeclampsia and/or eclampsia should be standard education.
- It is recommended that clinic staff make every effort to contact patients prior to appointments to support strong care provider-patient relationships.
- Implement a plan to follow-up with patients who miss appointments to connect them to care and promote follow-up.
- Participation in Admission Discharge Transfer alerting software opportunities allows clinic staff and providers to be notified when maternal patients present to the ED or birthing unit setting. ADT alerts support care coordination and patient follow-up.
- For patients with a history of or currently diagnosed with hypertension disorders, preeclampsia and/or eclampsia, or with a known cardiac disorder, care after six weeks postpartum should be planned in coordination with the patient, OB provider and/or primary care provider.

REPORTING/SYSTEMS LEARNING

Goal: Establish standard reporting of data metrics to promote quality and safety improvement and maternal health outcomes. Engage in culture of safety and high reliability principles, and use case studies, near misses and events as opportunities for system learning and improvement.

Task #1: Every clinic establishes use of huddles to review care plans for high-risk patients and use of post-event debriefs to identify successes and opportunities.

- Consider the use of visual cues to alert the care team. In the clinic setting, this may be through flagging the physical or electronic chart, and using alerting features and algorithms to increase prenatal and postpartum care visits when patients meet criteria.

Task #2: Every clinic completes multidisciplinary reviews of all severe hypertension/preeclampsia/eclampsia patients admitted to the ICU or transferred to a higher level of care to identify system issues and opportunities for improvement.

- Consider opportunities to engage in shared learning with the birthing center to learn from case studies to promote learning across all stakeholders. A case study template is an easy way to briefly outline the situation using SBAR while identifying successes and opportunities to improve/process changes.
- Remember the goal is reliable performance, reduced variation in care across patients and maternal health outcomes – it is not about blame or pointing out failures. Instead, the goal is about improving patient care and learning how to provide it more efficiently and effectively. This takes ongoing efforts and a workforce culture focused on always looking for ways to improve. One way to do this is by learning from defects.
- Consider ways to improve transfer/transport processes to decrease time to medication administration.

Task #3: Every clinic monitors and reports outcomes, process and structural measures outlined in the AIM bundle dataset – both internally and to MHA – for state-level aggregation and systems learning.

- Use a “learning from defects tool” to determine the root cause of any failures in the process improvement plan or interventions.
- Consider the need for ongoing staff and patient education.
- Are the triggers working effectively? How are outliers addressed?
- Consider use of the Just Culture algorithm to enhance accountability.
- Are there subsets of patients who are more at risk in your organization/community? What is being done to mitigate those risks?
- It is highly recommended to transparently share and post project data to create awareness and urgency to improve.
- Maintain situational awareness by reviewing data and observations in huddles, at staff meetings and during physician meetings.



EMERGENCY DEPARTMENTS AND HOSPITALS WITHOUT OB SERVICES

IMPLEMENTATION GUIDANCE

Emergency departments and hospitals without birthing units often are the first line of care for pregnant and postpartum women, particularly for patients living in maternal care deserts and without health insurance. Since global pregnancy health insurance coverage ends at sixth days postpartum, many at-risk women seek care and treatment in an ED setting. Serving as safety nets, EDs are uniquely positioned to impact the growing number of women dying of pregnancy-related issues in the late-postpartum period (up to one year postpartum). Implementing the AIM bundle and the ED algorithm for care of the severe hypertensive/preeclamptic/eclamptic patient positions the ED team to rapidly identify at-risk patients, initiate lifesaving treatment, and coordinate transfer and referral to obstetric care providers. Acute hypertensive crisis is a medical emergency. Similarly, patients who present with persistent headache, right upper quadrant/epigastric pain or have urine proteinuria should be further evaluated for preeclampsia and receive an OB and/or maternal-fetal medicine consultation.

The following outlines the applicable tasks for EDs to implement in the Severe Hypertension AIM bundle, along with an example algorithm that outlines care decisions from triage to referral and transfer. EDs are encouraged to collaborate with birthing units or providers from higher levels of care to align medical treatment, education and handoff communication requirements.

READINESS

Goal: The readiness phase involves reviewing current processes, recognizing gaps or inefficiencies in care, designing the AIM bundle process, and educating stakeholders. A multidisciplinary team is recommended to ensure broad stakeholder engagement, successful implementation and sustainability of the AIM bundle.

Task #1: Every ED develops and adheres to standards for early warning signs, diagnostic criteria, monitoring and treatment of severe hypertension, preeclampsia with severe features and/or eclampsia, to include applicable order sets and algorithms.

- Protocols should follow the recommended ED algorithm located in the resource section.
- Partner with the OB department to align protocols and pathways, and to ensure timely communication.
- Consider implementing the protocol into the EHR for documentation and ability to automate auditing of the bundles.
- Already have a protocol in place? Measure gaps in compliance, and provide additional training or review of opportunities for process and system-level improvements.

Task #2: Every ED provides staff and provider education on protocols, and unit-based drills with post-drill debriefs.

- Keep education visually appealing and simple.
- Select staff to help lead educational efforts and champion the care changes.
- Consider a project mascot to promote awareness and teamwork.
- Consider signage/poster/sticker options.
- Utilize drills and simulations for staff training.
 - » What drills and simulations will be used?
 - » Will simulation equipment be used?
 - » When will drills/simulations be completed? How often? By whom?
 - » What is the staff accountability for attending training(s)?
- Plan to educate on the following.
 - » diagnostic and treatment algorithms
 - » accurate and reliable blood pressure measurement
 - » fluid management in preeclampsia
 - » competent use of magnesium sulfate intravenously
 - » airway management for maternal patients
- Utilize debrief tools to review the drills/simulations and learn from them.

Task #3: Every ED has a reliable process for timely triage and evaluation of pregnant and postpartum women with hypertension.

- Use a facilitywide, standardized checklist, such as one provided by ACOG, to evaluate any pregnant patients or those less than one year postpartum.
- Assess every patient for signs and symptoms of preeclampsia/eclampsia and accurate BP measurement at triage, upon admission and according to ongoing patient assessment policies.

Task #4: Every ED has rapid access to medications used to treat severe hypertension and eclampsia. Medications and an administration guide are stocked and immediately available in the ED.

- Initiate treatment for blood pressure greater than or equal to 160 mm Hg systolic or 110 mm Hg diastolic due to increased risk of stroke.
- Educate staff on the use of antihypertensives in patients with chronic cocaine/amphetamine abuse.
- Understand the goal for blood pressure control in a preeclamptic/eclamptic patient is 140-150 over 90-100.
- An example medication toolbox list is on page 127, Appendix S in the CQMCC toolkit.

Task #5: Every ED has a system plan for care escalation, and obtaining appropriate consultation and maternal transport to a higher level of care, as medically indicated.

- Have criteria in place for notification and referral to an OB/GYN or MFM provider.
- Determine an efficient plan for care escalation with parameters to initiate the escalation plan.
- Identify a network or common transport services, and next level of care partners.
- If the organization has a birthing unit, partner to coordinate the timed response and ongoing care needs of the patient and family.
- Connect with transferring organizations and transport services to align standard care protocols, transport expectations and patient hand-off communication to achieve efficiency and effective patient care coordination.

RECOGNITION & PREVENTION

Goal: The goal of the recognition phase is to recognize the direction of the work being completed. This is the time to assess the current state of the processes being introduced, ensure all stakeholders are educated and compliant, and review data.

Task #1: Every pregnant and postpartum woman has accurate BP measurement and assessment of urine protein.

- Validate staff competency to accurately obtain manual BPs – manual blood pressure measurement is the “gold standard” and should always be the method used for patients either known or suspected to have hypertension issues, or when monitor-obtained BPs are in question.
- Consider SSPT – size of the cuff, stimulation of the patient from tobacco and/or caffeine and movement, posture and talking.
 - » Size of the cuff – the cuff bladder should cover 75-100 percent of the arm circumference.
 - » Stimulation – ideally avoid tobacco/caffeine products for 30 minutes, and take BP after a five-minute rest period.
 - » Posture – patients should be sitting or slightly reclined, feet on the floor if sitting with ankles uncrossed, and the back supported with the arm relaxed and resting on a surface.
 - » Talking – the patient should not talk during measurement.
- Staff verbalize reportable BP criteria as part of competency review.
- Staff demonstrate appropriate urine sample collection and urine proteinuria testing.

Task #2: Every pregnant and postpartum woman through one year postpartum is provided a standard response based on assessment of maternal early warning signs to include listening to and investigating patient-reported symptoms and assessment of preeclampsia-related lab results.

- Due to increased maternal mortality rates in late postpartum timeframes, ask the following questions to every female patient upon triage in the ED setting.
 - » Have you been pregnant, had a miscarriage or delivered a baby within the last year?
 - » If yes, were you diagnosed with hypertension, preeclampsia or eclampsia?
- Interview and assess patients for signs and symptoms of preeclampsia/eclampsia.
- If severe hypertension and/or preeclampsia/eclampsia is suspected, initiate the facility’s severe hypertension management protocol and care escalation policy.
- Consider how the response time will be measured with the goal of providing antihypertensive medications within one hour or less.

Task #3: Every pregnant and postpartum woman through one year postpartum, is provided facilitywide, standardized education on signs and symptoms of hypertension and preeclampsia, including when/what to report to their provider, as well as what are urgent/emergent symptoms.

- The Preeclampsia Foundation is recommended for patient and family education resources.
- Who will give these resources to patients?
- At what points of care will these resources be given to patients?
- Provide education to all maternal patients – prenatally through six weeks postpartum – on the signs and symptoms of preeclampsia/eclampsia.

RESPONSE

Goal: The goal of the response phase is to ensure high reliability in care delivery. Organizations should strive for minimal variation across patients and providers in use of standardized protocols and pathways. The focus is on the ability to demonstrate evidence-based practices accurately and timely while meeting individual patient needs.

Task #1: The ED demonstrates high reliability in deploying facilitywide, standard protocols with checklists and escalation policies for management and treatment of severe hypertension, eclampsia prevention and postpartum presentation of severe hypertension/preeclampsia and resulting sequelae, such as DIC, HELLP Syndrome, maternal seizures, etc.

- Measure reliability through reportable data metrics, tracking cycle times in real-time, and/or retrospective review of the patient’s chart and timing of care.
- If opportunities are needed, note that those closest to the patient and performing the care are best positioned to offer solutions, and design efficient and effective processes.
- Education opportunities are available through the online programming included with this project.
- MHA has an online toolkit to support organizations on the journey to high reliability.

Task #2: The organization demonstrates processes to ensure care transitions for patients diagnosed with a history of hypertension, current severe hypertension, preeclampsia and/or eclampsia in a timeframe recommended by the OB provider.

- Provide discharge summaries to the accountable provider post-discharge within one to three days. For patients following up with a different provider than the delivering or discharging physician, outline and follow a communication method to relay patient report and responsibility to ensure effective care transitions.
- Discussions with patients and family members regarding the importance of follow-up for severe hypertension, preeclampsia and/or eclampsia should be standard education.
- EDs should consider participation in Admission Discharge Transfer alerting software opportunities, allowing clinic staff and providers to be notified when maternal patients present to the ED or birthing unit setting. ADT alerts support care coordination and patient follow-up.
- For patients with a history of or currently diagnosed with hypertension disorders, preeclampsia and/or eclampsia, or with a known cardiac disorder, care after six weeks postpartum should be planned in coordination with the patient, OB provider and/or primary care provider. Ongoing patient care and follow-up has the potential to prevent late postpartum mortality events.

REPORTING/SYSTEMS LEARNING

Goal: Establish standard reporting of data metrics to promote quality and safety improvement and maternal health outcomes. Engage in culture of safety and high reliability principles, and use case studies, near misses and events as opportunities for system learning and improvement.

Task #1: Every ED establishes use of huddles to review care plans for high-risk patients and use of post-event debriefs to identify successes and opportunities.

- If EMS transport is involved, plan to huddle with the care team prior to the patient's arrival to expedite the care algorithm, similar to managing other time critical diagnoses.
- Utilize team safety huddles to review patient status and to understand the escalation plan for care as needed.
- Coordinate post-event debriefs with collaborating departments as able to gain further insights into ways to improve, i.e. EMS, OB staff, ICU staff, anesthesiology, social work, etc.

Task #2: As applicable, EDs should engage in multidisciplinary reviews of all severe hypertension/preeclampsia/eclampsia patients admitted to the ICU or transferred to a higher level of care to identify system issues and opportunities for improvement.

- Consider opportunities to share case studies to promote learning across all stakeholders. A case study template is an easy way to briefly outline the situation using the SBAR (Situation-Background-Assessment-Recommendation) technique while identifying successes and opportunities to improve/process changes.
- Remember the goal is reliable performance, reduced variation in care across patients and maternal health outcomes – it is not about blame or pointing out failures. Instead, the goal is about improving patient care and learning how to provide it more efficiently and effectively. This takes ongoing effort and a workforce culture focused on always looking for ways to improve. One way to do this is by learning from defects.

Task #3: Every ED monitors and reports outcomes, process and structural measures outlined in the AIM bundle data for ED's dataset – both internally and to MHA – for state-level aggregation and systems learning.

- Use a "learning from defects tool" to determine the root cause of any failures in the process improvement plan or interventions.
- Consider the need for ongoing staff and patient education.
- Are the triggers working effectively? What is your average time to first medication? How are outliers addressed?
- Consider use of the Just Culture algorithm to enhance accountability.
- Are there subsets of patients who are more at risk in your organization/community? What is being done to mitigate those risks?
- It is highly recommended to transparently share and post project data to create awareness and urgency to improve.
- Maintain situational awareness by reviewing data and observations in huddles, at staff meetings and during physician meetings.

SUGGESTED CITATION AND REFERENCES

SUGGESTED CITATION

Williams, A. (2019). *Missouri AIM: Severe Hypertension in Pregnancy Guidance for Implementation Across the Care Continuum*. Missouri Hospital Association.

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