AIM eModule 1: Maternal Early Warning System (MEWS)

Opening Slide (slide 1)
Welcome to the Alliance for Innovation on Maternal Health eLearning Module 1: Maternal Early Warning Signs.

Learning Objectives (slide 2)
Upon completion of this activity you will:
1. Identify value of an early warning system to recognize and respond to mothers with deteriorating conditions.
2. Consider the development of organizational solutions for recognizing and responding to women with deteriorating conditions using the Maternal Early Warning System (MEWS).
3. Facilitate organizational readiness through the development of written criteria to ensure timely bedside evaluation and treatment for women meeting Maternal Early Warning Criteria.

Maternal Early Warning System (slide 3)
Research has indicated that delays in recognition, diagnosis, and treatment precede a majority of maternal deaths from hemorrhage, hypertension, infection, and venous thrombosis. The early signs of life-threatening illness in pregnant women is challenging because of the relative rarity of such events. Normal changes in physiology associated with pregnancy can generate significant changes in maternal vital signs with healthy women having a substantial physiologic reserve to compensate.

Early recognition is essential because deterioration can be alarmingly rapid, with catastrophic consequences. The challenge is to balance the identification of women needing intervention without ‘over-medicalization’ of an otherwise normal physiological process.

The Joint Commission (slide 4)
One of the first organizations that publically stated the need for early warning criteria was the Joint Commission. In 2010, The Joint Commission published sentinel alert number 44 specific to preventing maternal death. This Provision of Care, Treatment and Services standard requires the hospital to:
- Have a process for recognizing and responding as soon as a patient’s condition appears to be worsening.
- Develop written criteria describing early warning signs of a change or deterioration in a patient’s condition and when to seek further assistance.
- Based on the hospital’s early warning criteria, have staff seek additional assistance when they have concerns about a patient’s condition and to
Inform the patient and family how to seek assistance when they have concerns about a patient’s condition.

**Contributing Factors** (slide 5)
Research conducted by the California Pregnancy Associated Mortality Review Project reviewed the Causes, Characteristics, and Improvement Opportunities of pregnancy associated deaths in California between 2002 and 2005. They identified that high rates of health care provider factors contributed to these outcomes. “In many cases outlined in this report, the early warning signs of impending maternal collapse went unrecognized.”

The most common health care provider factor was delayed response to clinical warning signs followed by ineffective care. Preeclampsia related death was deemed one of the most preventable, with high rates of delayed response to symptoms and vital signs, ineffective control of hypertension, inadequate staff knowledge around blood pressure management, misdiagnosis, and lack of continuity of care.

**What are early warning signs?** (slide 6)
What exactly are Early Warning Signs?

The development of early warning systems from simple bedside observation charts arose from the knowledge that physiological abnormalities precede critical illness.

Early warning signs are a set of predetermined criteria assigned weighted values to a number of physiological parameters according to their degree of deviation from the normal.

When the measurement reaches a defined threshold, a mandatory action is then initiated to expedite further assessment of the patient by a suitably qualified clinician.

It is thought that early intervention will result in improved patient outcome.

**Subcommittee on Vital Sign Triggers** (slide 7)
The National Partnership for Maternal Safety subcommittee on Vital Sign Triggers tested various examples of obstetric warning systems, to define considerations for local implementation, and to organize a list of differential diagnoses to facilitate timely and accurate diagnosis for women developing critical illness.

They have developed the Maternal Early Warning System so that “Every birthing facility in the United States could adapt tools which can identify maternal patients who require urgent bedside evaluation by a physician.”

**Maternal Early Warning Systems: Two Essential Components** (slide 8)
One of the first clear conclusions of this committee was that a Maternal Early Warning System has two essential components;

- The Maternal Early Warning Criteria and;
- A supporting Effective Escalation Policy.

Monitoring forms the cornerstone of timely diagnosis and treatment.

Monitoring, is “the ongoing assessment of a patient with the intention of [both] detecting abnormality and triggering a response if an abnormality is detected.”

Effective warning systems include clear expectations for observation, predefined criteria for an abnormality, and a protocol to trigger a response if an abnormality is detected.

**Maternal Early Warning Criteria** (slide 9)

This committee used an evidenced-based approach in conducting a synthesis of the evidence and created a list of critical factors called the Maternal Early Warning Criteria. The Early Warning Criteria is a list of abnormal parameters that indicate the need for urgent bedside evaluation by a clinician who also has the capacity to escalate care as necessary in order to pursue pre-designated diagnostic and therapeutic interventions.

The Maternal Early Warning Criteria is outlined on this slide and available in a downloadable format using the resources links provided within this module.

The frequency of vital sign monitoring should be based on the woman’s medical and obstetric condition, in accordance with existing clinical guidelines.

It is important to note that these triggers cannot address every possible clinical scenario that could be faced by an obstetric clinician and must not replace clinical judgment. As a core safety principle, bedside nurses should always feel comfortable to escalate their concerns at any point.

**Measurement Artifact** (slide 10)

Reviews have identified that that clinicians at times dismiss a single abnormal measurement in belief that is artifact, and unfortunately, actually miss early signs of decompensation.

For example: The rhythm strip displayed in this graph shows sinus tachycardia, and could reflect normal physiology, depending on what the HR has been, and if considered stable for this particular patient.

It is important to verify single abnormal measurements particularly for:
Urgent bedside evaluation is usually indicated if any of these values persist for more than one measurement, present in combination with additional abnormal parameters, or recur more than once.

Immediate action (slide 11)
There are some situations that require an urgent bedside evaluation without verification.

This happens when you start to see any of these values persist for more than one measurement, values which present in combination with additional abnormal parameters, or recur more than once.

The committee also recommends bedside evaluation with Oliguria of less than 30 ml/hr that persists for more than 2 hours as well as for the symptoms of:

- Maternal agitation, confusion, or unresponsiveness
- Patients with hypertension reporting a non-remitting headache and a
- Patient with preeclampsia or hypertension reporting shortness of breath

Clear institutional policies should include measurement artifact situations.

Effective Escalation Policy (slide 12)
The second component of the Maternal Early Warning System is the development and implementation of an effective escalation policy.

- The committee recommends that every hospital have established Maternal Warning Criteria with a supporting Escalation Policy that will work for their individual institution.
- Planning for and responding to emergencies is an integral part of the function of every hospital that provides services and all hospitals should anticipate and have a plan for known maternal emergencies, regardless of their size, resources or location.
- Every maternal admission is a multidisciplinary event, involving nursing, obstetricians, anesthesiologists, pediatricians and countless supporting personnel. Establishing a culture that promotes multidisciplinary team work is key for the development, maintenance and daily use of the maternal early warning system.
- Keeping a plan simple has proven to be critical for success, particularly in a crisis situation. It is important to keep your organizations escalation guidelines as simplistic as possible to ensure the success of implementation during an emergency.
Effective Escalation Policy (slide 13)
When developing an escalation policy be clear and ensure that any triggers with an abnormal parameter requires prompt bedside evaluation by a physician or other clinician with the ability to activate resources in order to initiate emergency diagnostic and therapeutic interventions as needed.

The expectation of the patient evaluation must be at the bedside, not by phone. Specific expectations for response times should be established at a local level based, on available resources and with agreement by the team on a plan that addresses clinical actions and expectations to prevent undesired consequences.

Local Escalation Plan (slide 14)
Critical components of an effective communication and escalation plan must define:
- Who to notify,
- How to notify them
- When and how to activate the clinical chain of command in order to ensure an appropriate response

It is important to create a back-up system to ensure timely evaluation for patients whose private clinician is not available and to empower bedside clinicians for activation of emergency response systems for a woman experiencing rapid deterioration.

The local escalation plan must be established based on the individual organization and how care is managed.

Evaluating Clinician (slide 15)
In an ideal world, the patient’s primary obstetric provider would be immediately available. In reality, and dependent on individual facility structure, the evaluating clinician can be any one of these people or even one that has not been identified on this slide.

For cases in which the patient's private clinician is not immediately available, a bedside evaluation by a designated available physician or other qualified clinician, is indicated in order to initiate appropriate diagnostic and therapeutic interventions and subsequently assemble additional staff as necessary.

Differential Diagnosis: Common vs. rare life-threatening diagnoses (slide 16)
To facilitate initial clinical evaluation, the committee developed a series of differential diagnoses for each of the physiologic derangements listed in The Maternal Early Warning Criteria. These lists are divided into common conditions, and rare but serious conditions that may be life-threatening.
For example, elevated blood pressure can be elevated and linked to common diagnosis such as chronic hypertension, preeclampsia, or medication reactions but also can be linked to rare but life-threatening conditions such as illicit drug use, endocrine disorders, or the effects from hypoventilation. The complete list of common and rare diagnosis that must be excluded with signs are presented in the link Appendix 2.

The optimal balance between sensitivity and specificity may vary between clinical environments and patient populations. The single parameter scoring system was selected to facilitate widespread implementation; however, no study has demonstrated that such a system improves outcomes for obstetric patients.

**What are appropriate outcomes for a bedside evaluation? (slide 17)**
When the bedside evaluation is non-diagnostic, or when clinicians suspect that a particular MEW criterion reflects normal physiology for that patient, the team should establish a tailored plan for subsequent monitoring, notification, and clinical review.

Even if thought to be normal, it is important to develop a plan to ensure these were not artifact and abnormal measurements.

**What are appropriate outcomes for a bedside evaluation? (slide 18)**
Recurrent abnormal Maternal Early Warning Criteria in a patient with normal baseline values, or an accumulation of more than one criterion, should prompt increases in the intensity and frequency of monitoring, as well as the frequency of clinical evaluation by a qualified clinician to initiate resuscitative and diagnostic interventions as indicated and carefully consider the appropriate differential until a diagnosis is confirmed, or until the criteria resolve.

**What are appropriate outcomes for a bedside evaluation? (slide 19)**
For women diagnosed as critically ill, and for those with a high likelihood of developing critical illness, a plan for initiation of appropriate and timely resuscitative, diagnostic, and therapeutic interventions may improve outcomes. Having trained and activated emergency response teams for obstetric emergencies is vital to bring necessary personnel to the bedside. The facility should have in their escalation plan an outline for transfer of critically ill patients to a higher acuity settings, such as the OR or ICU.

**Encouraging Patient & Family Activation** (slide 20)
Another important component to achieving optimal outcomes is empowering, patients and families to activate a response when they have concerns about their condition.

Patient activation is inextricably intertwined with patient safety.
Studies have shown that patients and families are often aware of physiological symptoms leading to deterioration several hours prior to decompensation, and these signs often go unreported due to lack of knowledge about their conditions or how to seek help when the patient’s condition appears to be worsening.

Patients and families who take part in their healthcare decisions are more likely to have better outcomes. Organizations can adopt a number of strategies to support and improve patient activation, including promoting a culture that ensures:

- Patients and Families are partners at every level of their care
- That Patient and Families have awareness of risks, signs and symptoms
- And that Patient and Families know how to seek help when they have concerns

**Teamwork and Communication** (slide 21)
The first step toward ensuring patient safety in clinical practice is creating an environment that supports teamwork and effective communication. Because patients are cared for by multidisciplinary teams rather than a single person, accurate and timely communication is central to optimal patient care and safety.

Communication protocols and training for all staff on formal emergency communication processes, using proven, standardized, communication tools such as ‘SBAR’, Closed Loop Communication, and other evidence-based techniques, will optimize a consistent and effective response to patient emergencies.

Even the briefest of meetings will help the patient safety team together achieve a culture of safety. Establishing safety briefings, huddles and post event debriefings will help to sustain patient safety as a regular topic of conversation in the organization.

You can find these and other proven teamwork strategies developed by the AHRQ TeamSTEPPS® Program, by accessing the resource links included in this module.

**Education, simulation and team training** (slide 22)
In addition to clear and effective communication, we know that our responses to patient emergencies are a measure of the team’s performance and ultimately determine how effective the team will be in achieving optimal patient outcomes. All clinical team members supporting a patient emergency are expected to come together as a team and perform flawlessly. However, rarely are members of these teams trained together, and often come from separate disciplines, diverse educational backgrounds and with individual expectations.

Multidisciplinary education, training and drills which follow established organizational protocols for the management of common obstetrical emergencies, will improve the
ability to respond to and mitigate an adverse outcome and to identify and correct common clinical errors made during emergencies.

Enhanced teamwork and communication that is assimilated in to each of the maternal patient safety bundles including the Maternal Early Warning System, will ultimately improve the “Readiness, Recognition, Response and Reporting” of the healthcare team and ensure optimal outcomes.

Culture of Safety (slide 23)
AIM is committed to promoting the culture of safety and high-reliability through the use of proven clinical processes, such as the Maternal Early Warning System, with a consistent focus on keeping the patient at the center of everything that we do.

Summary (slide 24)
In summary, studies have outlined that delays in diagnosis contribute to a large portion of preventable maternal deaths. The National Partnership for Maternal Safety recommends that every hospital have a Maternal Early Warning System appropriate for their organization that includes the Maternal Early Warning Criteria and Escalation Policy. The Escalation policy requires prompt reporting and bedside evaluation using established Maternal Early Warning Criteria, organizational planning for known maternal emergencies and multidisciplinary teamwork and collaboration. Local implementation of the escalation policy should outline who to notify, how to notify them along with when and how to activate the clinical chain of command in order to ensure an appropriate response and how rapidly to expect a response, and that Patients and Families are empowered to activate a response when they have concerns about their condition.

Resources and References (slide 25)
With every AIM eLearning Module you will be provided with links to resources and materials that will support the development of your teams journey to impact change. Please download these resources using the link at the top of this page before leaving the each of the eLearning modules.

AIM Program Contact (slide 26)
Please contact AIM directly with any questions on the materials provided or how we can better support your needs.

Quiz (slide 27)
Answer the questions the following MEWS Competency Quiz. You must print or save on your computer the completion certificate before closing this program.