Severe maternal morbidity: screening and review

This document was developed by the American College of Obstetricians and Gynecologists and the Society for Maternal–Fetal Medicine in collaboration with Sarah K. Kilpatrick, MD, PhD; Jeffrey L. Ecker, MD; and the Centers for Disease Control and Prevention’s representative member William M. Callaghan, MD. The views do not necessarily represent those of the Centers for Disease Control and Prevention or the U.S. government.

The information reflects emerging clinical and scientific advances as of the date issued, is subject to change, and should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.

Introduction

This document builds upon recommendations from peer organizations and outlines a process for identifying maternal cases that should be reviewed. Severe maternal morbidity is associated with a high rate of preventability, similar to that of maternal mortality. It also can be considered a near miss for maternal mortality because without identification and treatment, in some cases, these conditions would lead to maternal death. Identifying severe morbidity is, therefore, important for preventing such injuries that lead to mortality and for highlighting opportunities to avoid repeat injuries. The two-step screen and review process described in this document is intended to efficiently detect severe maternal morbidity in women and to ensure that each case undergoes a review to determine whether there were opportunities for improvement in care. Like cases of maternal mortality, cases of severe maternal morbidity merit quality review. In the absence of consensus on a comprehensive list of conditions that represent severe maternal morbidity, institutions and systems should either adopt an existing screening criteria or create their own list of outcomes that merit review.


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Background

Like maternal mortality, severe maternal morbidity is increasing in the United States. Severe maternal morbidity is associated with a high rate of preventability, similar to that of maternal mortality. It also can be considered a near miss for maternal mortality because without identification and treatment, in some cases, these conditions would lead to maternal death. Identifying severe morbidity is, therefore, important for preventing such injuries that lead to mortality and for highlighting opportunities to avoid repeat injuries. The two-step screen and review process described in this document is intended to efficiently detect severe maternal morbidity in women and to ensure that each case undergoes a review to determine whether there were opportunities for improvement in care. Like cases of maternal mortality, cases of severe maternal morbidity merit quality review. In the absence of consensus on a comprehensive list of conditions that represent severe maternal morbidity, institutions and systems should either adopt an existing screening criteria or create their own list of outcomes that merit review.
morbidity is associated with a high rate of preventability, similar to that of maternal mortality.\textsuperscript{7} It also can be consid-ered a near miss for maternal mortality because without identification and treatment, in some cases, these conditions would lead to maternal death. Identifying severe morbidity is, therefore, important for preventing such injuries that lead to mortality and for highlighting opportunities to avoid repeat injuries. Responding to these concepts, multidisciplinary expert groups have called for all obstetric hospitals to review their cases of severe maternal morbidity to look for opportunities for improvement in care that could lead to improved maternal outcomes and fewer maternal deaths.\textsuperscript{8,9} These calls are supported by the College; SMFM; the Association of Women’s Health, Obstetric and Neonatal Nurses; the American College of Nurse-Midwives; and other groups.

Clinical considerations and management

What is severe maternal morbidity?

Severe maternal morbidity can be thought of as unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman’s health. To date, there is not complete consensus among systems and professional organizations as to what conditions should represent severe maternal morbidity. Developing such a list in the future has clear utility. In the absence of consensus on a comprehensive list of conditions that represent severe maternal morbidity, institutions and systems should either adopt an existing list of diagnoses, and outcomes involved; and to determine if an outcome is judged to have been potentially avoidable and, thus, present opportunities for system change and improved future performance. Not all cases that meet criteria for review will represent preventable severe morbidity; some cases of morbidity reflect the underlying health of a woman or her pregnancy and are thus unavoidable. The concept that not all cases meeting screening criteria will be true cases of severe maternal morbidity underscores the importance of reviewing each “screen-positive” case to identify those with true morbidity and, especially, those that may be deemed upon review to have been potentially avoidable.

When does severe maternal morbidity represent a sentinel event?

The Joint Commission defines a sentinel event as “a patient safety event (not primarily related to the natural course of the patient’s illness or underlying condition) that reaches a patient and results in any of the following: death, permanent harm, or temporary harm.” Simply screening positive for one of the two recommended screening criteria does not constitute a sentinel event. Instead, the Joint Commission noted that upon review of any case, the ultimate assessment may be that the case is not a sentinel event.\textsuperscript{14} For example, hemorrhage due to placenta previa would not qualify as a sentinel event because bleeding in this context is part of the natural
### TABLE 1
Example list of diagnoses and complications constituting severe maternal morbidity*

<table>
<thead>
<tr>
<th>Severe Maternal Morbidity</th>
<th>Not Severe Morbidity (insufficient evidence if this is the only criteria)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hemorrhage</strong></td>
<td></td>
</tr>
<tr>
<td>Obestetric hemorrhage with ≥4 units of red blood cells transfused</td>
<td>Obestetric hemorrhage with 2—3 units of red blood cells transfused ALONE</td>
</tr>
<tr>
<td>Obestetric hemorrhage with 2 units of red blood cells and 2 units of fresh frozen plasma transfused (without other procedures or complications) if not judged to be overexuberant transfusion</td>
<td>Obestetric hemorrhage with 2 units of red blood cells and 2 units of fresh frozen plasma transfused AND judged to be “overexuberant”</td>
</tr>
<tr>
<td>Obestetric hemorrhage with &lt;4 units of blood products transfused and evidence of pulmonary congestion that requires &gt;1 dose of furosemide</td>
<td>Obestetric hemorrhage with &lt;4 units of blood products transfused and evidence of pulmonary edema requiring only 1 dose of furosemide</td>
</tr>
<tr>
<td>Obestetric hemorrhage with return to operating room for any major procedure (excludes dilation)</td>
<td></td>
</tr>
<tr>
<td>Any emergency/unplanned peripartum hysterectomy, regardless of number of units transfused (includes all placenta accretas)</td>
<td>Planned peripartum hysterectomy for cancer/neoplasia</td>
</tr>
<tr>
<td>Obestetric hemorrhage with uterine artery embolization, regardless of number of units transfused</td>
<td></td>
</tr>
<tr>
<td>Obestetric hemorrhage with uterine balloon or uterine compression suture placed and 2—3 units of blood products transfused</td>
<td>Obestetric hemorrhage with uterine balloon or uterine compression suture placed and ≤1 unit of blood products transfused</td>
</tr>
<tr>
<td>Obestetric hemorrhage admitted to intensive care unit for invasive monitoring or treatment (either medication or procedure; not just observed overnight)</td>
<td>Any obestetric hemorrhage that went to the intensive care unit for observation only without further treatment</td>
</tr>
<tr>
<td><strong>Hypertension/Neurologic</strong></td>
<td></td>
</tr>
<tr>
<td>Eclamptic seizure(s) or epileptic seizures that were “status”</td>
<td></td>
</tr>
<tr>
<td>Continuous infusion (intravenous drip) of an antihypertensive medication</td>
<td></td>
</tr>
<tr>
<td>Nonresponsiveness or loss of vision, permanent or temporary (but not momentary), documented in physician’s progress notes</td>
<td></td>
</tr>
<tr>
<td>Stroke, coma, intracranial hemorrhage</td>
<td></td>
</tr>
<tr>
<td>Preecclampsia with difficult-to-control severe hypertension (&gt;160 systolic blood pressure or &gt;110 diastolic blood pressure) that requires multiple intravenous doses, persistent ≥48 hours after delivery, or both</td>
<td>Chronic hypertension that drifts up to severe range and needs postoperative medication dose alteration: preeclampsia blood pressure control with oral medications ≥48 hours after delivery</td>
</tr>
<tr>
<td>Liver or subcapsular hematoma or severe liver injury admitted to the intensive care unit (bilirubin &gt;6 or liver enzymes &gt;600)</td>
<td>Abnormal liver function requiring extra prolonged postpartum length of stay but not in the intensive care unit</td>
</tr>
<tr>
<td>Multiple coagulation abnormalities or severe hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome</td>
<td>Severe thrombocytopenia (&lt;50,000) alone that does not require a transfusion or intensive care unit admission</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td></td>
</tr>
<tr>
<td>Diagnosis of acute tubular necrosis or treatment with renal dialysis</td>
<td>Oliguria treated with intravenous fluids (no intensive care unit admission)</td>
</tr>
<tr>
<td>Oliguria treated with multiple doses of Lasix</td>
<td>Oliguria treated with 1 dose of intravenous fluids (no intensive care unit admission)</td>
</tr>
<tr>
<td>Creatinine ≥2.0 in a woman without preexisting renal disease OR a doubling of the baseline creatinine in a woman with preexisting renal disease</td>
<td></td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td></td>
</tr>
<tr>
<td>Infection with hypotension with multiple liters of intravenous fluid or pressors used (septic shock)</td>
<td>Fever &gt;38.5°C with elevated lactate alone without hypotension</td>
</tr>
<tr>
<td>Infection with pulmonary complications such as pulmonary edema or acute respiratory distress syndrome</td>
<td>Fever &gt;38.5°C with presumed choriometritis/endometritis with elevated pulse but no other cardiovascular signs and normal lactate</td>
</tr>
<tr>
<td></td>
<td>Positive blood culture without other evidence of significant systemic illness</td>
</tr>
</tbody>
</table>

course of the illness. As such, screen-positive cases or individual outcomes and diagnoses should not automatically be considered sentinel events. Context determined from detailed review is needed to determine if an individual case and outcome was correctly classified as a sentinel event. Just as the rate of ICU admission and transfusion of 4 or more units of blood should not automatically be labeled as sentinel events, their rates of occurrence should not be used as a quality metric. These screening criteria are the minimum recommended criteria and institutions may choose to incorporate additional screening criteria to highlight cases for detailed review at their own discretion.

Conclusions
Screening for and detection of severe maternal morbidity is an important step toward promoting safe obstetric care. The two-step screen and review process described in this document is intended to efficiently detect severe maternal morbidity in women and to ensure that each case undergoes a review to determine whether there were opportunities for improvement in care.
Recommendations

- Like in cases of maternal mortality, cases of severe maternal morbidity merit quality review. (1C)
- Facilities should have a screening process in place to detect cases of severe maternal morbidity for review. (1C)
  - The College and SMFM recommend using two criteria to screen for severe maternal morbidity: 1) transfusion of 4 or more units of blood and 2) admission of a pregnant or postpartum woman to an ICU. (1B)
  - Institutions may choose to incorporate additional screening criteria to highlight cases for detailed review. (1C)
- Facilities should review all cases that meet at least one of these screening criteria to determine whether the case is truly a severe maternal morbidity; to characterize the events, diagnoses, and outcomes involved; and to determine if an identified morbidity is judged to have been potentially avoidable and, thus, present opportunities for system change and improved future performance. (1C)
- Not all cases that meet criteria for review will represent preventable severe morbidity; some cases of morbidity reflect the underlying health of a woman or her pregnancy and are thus unavoidable. Therefore, simply screening positive for one of the two recommended screening criteria does not constitute a sentinel event, and the rates of occurrence of either criterion (ICU admission and transfusion of 4 or more units of blood) should not be used as a quality metric. (1C)

For More Information

The American College of Obstetricians and Gynecologists and SMFM have identified additional resources on topics related to this document that may be helpful for ob-gyns, other health care providers, and patients. You may view these resources at www.acog.org/About-ACOG/News-Room/Statements/2015/Severe-Maternal-Morbidity.

These resources are for information only and are not meant to be comprehensive. Referral to these resources does not imply the American College of Obstetricians and Gynecologists’ endorsement of the organization, the organization’s web site, or the content of the resource. The resources may change without notice.

REFERENCES

## Obstetric Care Consensus documents will use the Society for Maternal–Fetal Medicine’s grading approach:  
http://www.ajog.org/article/S0002-9378%2813%2900744-8/fulltext. Recommendations are classified as either strong (Grade 1) or weak (Grade 2), and quality of evidence is classified as high (Grade A), moderate (Grade B), and low (Grade C)*. Thus, the recommendations can be one of the following six possibilities: 1A, 1B, 1C, 2A, 2B, 2C.

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Clarity of Risk and Benefit</th>
<th>Quality of Supporting Evidence</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A. Strong recommendation, high-quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Consistent evidence from well-performed randomized controlled trials or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.</td>
<td>Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1B. Strong recommendation, moderate-quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Evidence from randomized controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on confidence in the estimate of benefit and risk and may change the estimate.</td>
<td>Strong recommendation, and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1C. Strong recommendation, low-quality evidence</td>
<td>Benefits appear to outweigh risk and burdens, or vice versa.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
<td>Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.</td>
</tr>
<tr>
<td>2A. Weak recommendation, high-quality evidence</td>
<td>Benefits closely balanced with risks and burdens.</td>
<td>Consistent evidence from well-performed randomized controlled trials or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.</td>
<td>Weak recommendation, best action may differ depending on circumstances or patients or societal values.</td>
</tr>
<tr>
<td>2B. Weak recommendation, moderate-quality evidence</td>
<td>Benefits closely balanced with risks and burdens; some uncertainty in the estimates of benefits, risks, and burdens.</td>
<td>Evidence from randomized controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an effect on confidence in the estimate of benefit and risk and may change the estimate.</td>
<td>Weak recommendation, alternative approaches likely to be better for some patients under some circumstances.</td>
</tr>
<tr>
<td>2C. Weak recommendation, low-quality evidence</td>
<td>Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
<td>Very weak recommendation, other alternatives may be equally reasonable.</td>
</tr>
</tbody>
</table>

**Best practice**  
Recommendation in which either (i) there is enormous amount of indirect evidence that clearly justifies strong recommendation (direct evidence would be challenging, and inefficient use of time and resources, to bring together and carefully summarize), or (ii) recommendation to contrary would be unethical.

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