OB Hemorrhage Outcome Measures

The focus of obstetric hemorrhage QI collaboratives to date has been to reduce maternal morbidity by early identification and a standardized and timely response. The two measures, total number of blood products used and the number of mothers who require large numbers (≥4) of transfusions, have been validated by several large multi-hospital obstetric hemorrhage QI collaboratives. These collaboratives have found that reduction by 20-30% is achievable. A concern with using blood transfusion rates as an indicator is a possible unintended consequence of discouraging use of needed blood transfusions. We feel that the focus on total number of units using for OB patients and the number of mothers who received ≥4 units minimizes this concern. Importantly, this measure is harmonized with the new Joint Commission definition of an Obstetric Sentinel event that includes transfusion of ≥4 units of blood products. This will reinforce the importance of and the collection of this measure. In general, real patient harm is observed in the population of mothers who receive higher number of transfusions and not a small number such as 1 or 2 units. Large numbers of units also can have significant impact on costs as these interventions are expensive. In addition, these measures are best interpreted when part of a comprehensive quality improvement project that includes process measures.

NOTE: these measures are for collaboratives and similar QI projects (such as Hospital Engagement Networks) that utilize time course designs (same hospital before and after). They are not designed or validated to be used as inter-hospital quality measures (comparing hospital A to B) or to compare practices of individual clinicians.

1. Total number of transfusions
   Short Description: Total number of blood products transfused per 1,000 mothers
   Denominator: All women giving birth ≥20 weeks (birth hospitalization) see DRG list in comment (1) below
   Numerator: Total number of units of blood products (RBCs, FFP, Plt packs, Cryo)
   Expected Baseline Rate: 40-60 units per 1,000 mothers
   Source: Hospital Blood bank data sets or ChargeMaster. Collection steps: identify maternity patients either by DRGs or obstetric ICD9/10 codes, then query the ChargeMaster (or blood bank data set) to determine the total number of blood products used.

2. Number of massive transfusions
   Short Description: Number of mothers receiving 4 or more units of blood products per 1,000 mothers
   Denominator: All women giving birth ≥20 weeks (birth hospitalization) see DRG list in comment (1) below
Numerator: Women who received ≥4 units of blood products (including RBCs, FFP, Platelet packs, Cryoprecipitate) (This is ALSO the new definition of an Obstetric Sentinel Event by The Joint Commission so it will be required to be captured by TJC accredited hospitals)

Expected Baseline Rate: 2-4 cases per 1,000 mothers (may be higher)

Source: Hospital Blood bank data sets or ChargeMasters. Collection steps: identify maternity patients either by DRGs or obstetric ICD9/10 codes, then query the ChargeMaster (or blood bank data set) to identify the women who received ≥4 units of blood products.

Comments:

(1) The typical maternity MS-DRGs (765, 766, 767, 768, 770,774,775) can be used to restrict the denominator to the typical labor and delivery population (≥20 weeks of gestation). While earlier pregnancies do have hemorrhages (e.g. ectopic and late miscarriages), these are quite uncommon and typically have different etiologies and would require a different QI project with a focus on different care venues (office, ER, OR). Furthermore, there is no good way of properly identifying the denominator population for earlier gestations—all pregnancies? or all pregnancies beyond 8 weeks? Etc.

(2) The numerator identifies all blood products rather than just RBCs. This is the definition used by the Joint Commission and supported by an ACOG/CDC/SMFM consensus committee (in press).

(3) Units of blood products is a reasonable measure to collect using Blood Bank databases or Charge Masters. A survey of California hospitals found that with little effort, an analyst can create a monthly report of patients transfused with the number of units per patient.

(4) The Joint Commission revised definition of ≥4 units of blood units transfused as an OB sentinel event (January 28, 2014) will be a powerful tool to help drive this quality initiative and it will be important to have coordinated outcome measures.

(5) Blood products are very expensive and most hospitals currently have projects underway to carefully scrutinize utilization. Therefore this project may be able to piggy-back on those efforts.

OB Hemorrhage Structure and Process Measures:

Structure and process measures are also important but are often quite dependent on the specific QI project so they will not be formally specified here. They are much more difficult to collect with administrative data so often require chart reviews (however this is usually able to be accomplished with a sample). Structure measures usually are a “check-off” yes or no for a list of key features that need to be implemented for the intervention to work.

Examples of OB Hemorrhage process measures that are being used in collaboratives include: a) Rate of mothers who had a hemorrhage risk assessment prenatally, on admission, and in late labor (chart review of
a sample); b) Rate of debriefs after a Stage 2 or 3 hemorrhage (chart review of a sample); c) Rate of adherence to the hospital hemorrhage protocol (chart review of a sample); d) the proportion of MD/CNM and nursing staff that have completed a course on OB hemorrhage, and e) Percent of staff who have participated in a hemorrhage drill.

Examples of structure measures include: Has the institution... Implemented a hemorrhage cart? Implemented a hemorrhage protocol? Implemented a massive transfusion protocol? Instituted drills based on the hemorrhage protocol?

**OB Hemorrhage References:**


**Preeclampsia**

Major obstetric complications from preeclampsia include pulmonary edema, liver injury, coagulation abnormalities, seizures and most dangerous, cerebral stroke (intracranial hemorrhage). Preeclampsia is now a major ACOG initiative with revised guidelines recently released (ACOG 2013). Severe cases may require adult ICU care and represent either the number one or the number two cause for ICU admissions during pregnancy (Panchal 2000, Hazelgrove, 2001). Review of severe cases (near misses) and maternal deaths from preeclampsia have identified delays in diagnosis and delays in treatment as important drivers for such complications (Druzin, 2014). ACOG has recently issued guidelines for the treatment of new-onset severe hypertension (systolic ≥160 or diastolic ≥110) within 60 minutes to reduce the chance for stroke (ACOG, 2011).
A current Preeclampsia Quality Collaborative in California has found a surprising performance gap for timely treatment with systems factors and lack of staff education being common issues.

NOTE: these measures are for collaboratives and similar QI projects (such as Hospital Engagement Networks) that utilize time course designs (same hospital before and after). They are not designed or validated to be used as inter-hospital quality measures (comparing hospital A to B) or to compare practices of individual clinicians.

3. **Timely Treatment for Severe Hypertension**
   - **Short Description:** Treatment of mothers with severe hypertension (either Systolic ≥160 OR Diastolic ≥110) within 60 minutes per 100 severe preeclamptic mothers
   - **Denominator:** All women giving birth ≥20 weeks (birth hospitalization) with a diagnosis of Severe Preeclampsia (Eclampsia (642.6x), Severe Preeclampsia (642.5x), or Preeclampsia superimposed on pre-existing HTN (642.7x)) AND who had severe hypertension (either Systolic ≥160 OR Diastolic ≥110)
   - **Exclusions:** women with gestational hypertension or chronic hypertension without superimposed preeclampsia (642.0x, 642.1x, 642.2x, or 642.3x)
   - **Numerator:** Those who are treated within 60 minutes with first-line medications (IV labetalol or IV hydralazine or PO nifedipine if IV access has not been established)
   - **Expected Baseline Rate:** The rate of severe hypertension is 5-20 cases per 1,000 total mothers, and baseline timely treatment rate can be as low as 30%
   - **Source:** Chart review of all severe preeclampsia cases (as noted these are not a large number) with assistance of pharmacy records for the use of IV hydralazine and labetolol.

4. **ICU Admissions and Days for Preeclampsia**
   - **Short Description:** A) ICU admissions, and B) Number of days of ICU care per 100 mothers with preeclampsia
   - **Denominator:** All women giving birth ≥20 weeks (birth hospitalization) with any diagnosis code for Preeclampsia (Mild or un-specified Preeclampsia (642.4x), Severe Preeclampsia (642.5x), Eclampsia (642.6x), or Preeclampsia superimposed on pre-existing HTN (642.7x))
   - **Exclusions:** women with gestational hypertension or chronic hypertension without superimposed preeclampsia (642.0x, 642.1x, 642.2x, or 642.3x)
   - **Numerator:** There are two numerators, one for each sub-measure. Among the denominator how many mothers were admitted to the ICU and secondly what was their total days of ICU care. If the mother was transferred to another hospital for intensive care either the days in intensive care at that facility are used or an arbitrary number of 4 days.

   **Note:** maternal ICU admission is one component of the new definition of an Obstetric Sentinel Event by The Joint Commission (as of January 2014) so that data element will be required to be captured by TJC accredited hospitals.

   **Expected Baseline Rate:** ICU admission is typically 2-4 cases per 1,000 births and approximately 2-3%
of all patients with preeclampsia. The total number of ICU days is estimated to be 6-10 per 100 patients with preeclampsia but will vary with hospital practices. As a reminder, this is a before and after study and this measure should not be used to compare hospitals.

Source: Charge Master (for ICU billing codes) and Discharge disposition (e.g. transfer to a higher level of care with chart review (this is anticipated to be rare) are used in most hospitals. The rare hospital that cannot identify ICU admission using administrative or charge data would need to review charts. The number of preeclampsia cases identified using those ICD9 codes is approximately 3% of births. Again, as maternal ICU admission is now also a Joint commission Sentinel Event, hospitals will need to put into practice a mechanism for identifying these cases for that purpose.

1. **Comments:**
   Using the ICD9/10 codes for preeclampsia restricts the denominator to ≥20 weeks of gestation as that defines the lower limit of gestational age for the diagnosis of preeclampsia. While earlier pregnancies and readmissions can have severe hypertension, these are quite uncommon and may have different etiologies and would require a different QI project with a focus on different care venues (e.g. the emergency department). Furthermore, there is no good way of properly identifying the denominator population for earlier gestations.

2. **The Joint Commission declaration of a maternal ICU admission as a sentinel event will be a powerful tool to help drive this quality initiative and it will be important to have coordinated outcome measures.**

3. **The reason to consider two related outcome measures for Maternal ICU care (using the same denominator) is that the admission rate is a smaller number and therefore harder to show change and the total number of days reflects the severity of the morbidity. On the other hand, a single very ill patient (outlier) may affect the entire year’s results. We feel that it would be advantageous to collect and show both views of maternal ICU admission, especially since they use the same data collection process and do not create extra burden.**

**Preeclampsia Structure and Process Measures:**

As noted in the discussion for hemorrhage, structure and process measures are also important but are often quite dependent on the specific QI project. We have listed one process measure, treatment of severe HTN because of its singular importance in reducing stroke. Examples of other Preeclampsia process measures that are being used in collaboratives include: a) Rate of mothers with severe HTN who had discharge education and follow-up appointment scheduled within 72hrs (chart review); b) Rate of debriefs after severe preeclampsia (chart review of a sample).

Examples of structure measures include: has the institution... Implemented a protocol for severe HTN? Implemented an order set for severe HTN? Implemented a standard discharge plan for preeclampsia? Implemented a protocol for ER evaluation of post-partum women with hypertension?

**Preeclampsia References:**


Druzin ML, Shields LE, Peterson NL, et. al. Improving healthcare response to preeclampsia, A California quality improvement toolkit. 2014: available online at www.CMQCC.org


Composed by Elliott K. Main, MD

Director, California Maternal Quality Care Collaborative

For questions, please contact me at: main@CMQCC.org