Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.
eFigure 1. Severe Maternal Morbidity Surveillance Definition

ACOG DEFINITION
- ICU/CCU Admission
- AND/OR
- 4+ Units of RBCs Transfused

AND/OR
- Conception to 42 days postpartum

ADDED BY MDMOM WITH STAKEHOLDER CONSENSUS
- Emerging Public Health Threats
- Admission for Severe COVID-19 Infection

Notes: ICU, intensive care unit; CCU, critical care unit; RBC, red blood cell.
**eFigure 2. Timing of Severe Maternal Morbidity Events**

**a. All SMM Events (N=192)**

- **All SMM Events (N=192)**
- **ICU Admission (N=107)**
- **Blood Transfusion (N=92)**
- **COVID-19 Infection (N=60)**

**b. Excluding COVID-19 (N=134)**

Notes: ICU, intensive care unit. SMM events include patients during pregnancy or within 42 days postpartum who are (a) admitted to an intensive care unit or critical care unit; and/or (b) with 4 or more units of red blood cells transfused; and/or (c) admitted to hospital for treatment of COVID-19 infection. Data source: Maryland SMM Surveillance and Review Database.
eFigure 3. Gestational Age at the Time of Antepartum and Intrapartum SMM Events

a. All SMM Events (N=192)

b. Excluding COVID-19 (N=134)

Notes: ICU, intensive care unit. Four SMM events occurred prior to 20 weeks’ gestation. SMM events include patients during pregnancy or within 42 days postpartum who are (a) admitted to an intensive care unit or critical care unit; and/or (b) with 4 or more units of red blood cells transfused; and/or (c) admitted to hospital for treatment of COVID-19 infection.

Data source: Maryland SMM Surveillance and Review Database.


### eTable 1. Blood Loss and Transfusion in Patients With SMM by Primary Cause

|                              | All SMM Events (N=192) | Obstetric Hemorrhage (N=83) | COVID-19 Infection (N=57) | Hypertensive Disorder of Pregnancy (N=17) |
|------------------------------|-------------------------|----------------------------|---------------------------|------------------------------------------|
| Abnormal blood loss, n (%)   | 101 (53)                | 83 (100)                   | 4 (7)                     | 6 (35)                                   |
| QBL, mean (SD)               | 3,360.1 (2,131.9)       | 3,587.6 (2,155.7)          | 1,816.8 (1,180.3)         | 4,091.5 (2,252.7)                        |
| Units of blood products      | 9.4 (6.6)               | 9.9 (6.7)                  | 4.8 (5.0)                 | 8.7 (6)                                  |
| transfused, mean (SD)        |                         |                            |                           |                                          |
| Units of blood products      | 1-46                    | 3-46                       | 1-12                      | 4-16                                     |
| transfused, range            |                         |                            |                           |                                          |
| Massive Transfusion Protocol | 34 (35)                 | 33 (41)                    | 0 (0)                     | 1 (17)                                   |
| called, n (%)                |                         |                            |                           |                                          |

Notes: QBL, quantitative blood loss in milliliters. QBL and units of blood products transfused missing for 3 patients with abnormal blood loss.

Data source: Maryland SMM Surveillance and Review Database.
### eTable 2. Condensed Recommendations for Care Improvement Organized by the 5Rs

| Readiness: Ability to use an institution’s resources, protocols and procedures when needed | Enhance readiness for obstetric hemorrhage management  
Enhance readiness for blood transfusion  
Offer specific training to providers on the management of antepartum anemia  
Offer specific training to providers on the management of severe hypertension/preeclampsia  
Ensure availability of diagnostic services during nighttime hours and weekends |
| --- | --- |
| Recognition: Assessment and measurement | Timely assessment of, screening for, and diagnosis of complications  
Enhance vital sign monitoring during hospitalization  
Follow-up on abnormal test results |
| Response: Treatment and management | Timely initiation of treatment for patients with severe range blood pressure values  
Timely initiation of treatment for patients with abnormal bleeding  
Implement surgical care per clinical guidance  
Strengthen teamwork and communication within labor and delivery units  
Timely engagement with specialists  
Coordination of care within and across hospital systems and warm handoff of patient |
| Reporting and System Learning: Communication, debrief, and review | System learning to better manage obstetric hemorrhage events  
System learning to better manage blood transfusion events  
System learning to ensure safe anesthesia and surgical care |
| Respectful Care: Recognizing the patient’s right to be educated, informed, and supported | Consider patients’ individual circumstances when making discharge recommendations  
Implement implicit bias training across hospital departments |

Data source: Maryland SMM Surveillance and Review Database.
**eTable 3. Distribution of Primary Cause of Severe Maternal Morbidity in Surveillance and Non-Surveillance Hospitals, 2019**

| Primary Cause of SMM | Non-Pilot (N=47,825) | Pilot (N=16,031) |
|----------------------|----------------------|------------------|
|                      | No. | %    | No. | %    |
| Hemorrhage           | 176 | 49.2 | 64  | 42.7 |
| Respiratory conditions| 11  | 3.1  | 7   | 4.7  |
| Cardiac conditions   | 17  | 4.7  | 14  | 9.3  |
| Renal conditions     | 48  | 13.4 | 16  | 10.7 |
| Sepsis               | 43  | 12.0 | 11  | 7.3  |
| Other obstetric      | 41  | 11.5 | 23  | 15.3 |
| Other medical        | 22  | 6.1  | 15  | 10.0 |

Pearson $X^2$ = 11.6

$P$ = 0.072

Notes: Chi-square of difference in distribution of primary SMM cause between pilot and non-pilot hospital in 2019.

Data source: Maryland SMM Surveillance and Review Database; Agency for Healthcare Research and Quality's Maryland State Inpatient Databases during 2019.