2022 AIM Data Support Community of Learning

Wednesday, March 16, 2022, 1:00PM-2:30PM, EST
Welcome

- You are muted upon entry to the call
- You will have the ability to unmute yourself during Q&A times
- We encourage participants to remain muted in an effort to reduce background noise
- If you are experiencing technical difficulties, please chat an AIM staff member or email aimdatasupport@acog.org

This presentation will be recorded
Both Slides and Presentations will be available and sent via email.
## Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Facilitator/Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00PM-1:10PM</td>
<td>Welcome and Introductions</td>
<td>Inderveer Saini</td>
</tr>
<tr>
<td>1:10PM-2:00PM</td>
<td>Presentation: Severe Maternal Morbidity</td>
<td>SMM National Workgroup: Elliott Main, MD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ashley Hirai, PhD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lawrence Reid, PhD, MPH</td>
</tr>
<tr>
<td>2:00PM-2:15PM</td>
<td>Group Discussion and Q&amp;A Session</td>
<td>All</td>
</tr>
<tr>
<td>2:15PM-2:20PM</td>
<td>Report-Outs: Nebraska</td>
<td>Sydnie Carraher</td>
</tr>
<tr>
<td>2:20PM-2:25PM</td>
<td>Report-Outs: Colorado</td>
<td>Katie Breen</td>
</tr>
<tr>
<td>2:25PM-2:30PM</td>
<td>Upcoming Data COL Updates &amp; Closing</td>
<td>Inderveer Saini</td>
</tr>
</tbody>
</table>
AIM National Data Team

Inderveer Saini
AIM Data Specialist

Isabel Taylor
AIM Data Program Supervisor

David Laflamme
AIM Epidemiology Consultant

Please reach out to us with any questions related to the AIM Data Support COL at aimdatasupport@acog.org.
Elliott Main, MD
Medical Director, California Maternal Quality Care Collaborative

Lawrence Reid, Ph, MPH
Social Science Analyst, AHRQ

Ashley Hirai, PhD
Senior Health Scientist, HRSA MCHB
Severe Maternal Morbidity
Learning Objectives

- Describe the importance and evolution of SMM;
- Understand how to calculate SMM;
- Understand SMM measurement issues affecting trends and state comparisons.
Introduction to Severe Maternal Morbidity

Elliott K. Main, MD
Medical Director, CMQCC
Chair, California Maternal Mortality Review Committee
Clinical Professor of Ob/Gyn, Stanford University School of Medicine
AIM Director of Quality Assurance and Implementation
Total US Maternal Mortality rate is 17-20 per 100,000
Each cause of maternal death occurs 1-2 times per 100,000 births
The low frequency makes study of individual causes very challenging
# Maternal Mortality and Severe Morbidity

Approximate distributions, compiled from multiple studies

<table>
<thead>
<tr>
<th>Cause</th>
<th>Mortality (1-2 per 10,000)</th>
<th>ICU Admit (1-2 per 1,000)</th>
<th>Severe Morbid (1-2 per 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thromboembolism</td>
<td>10-15%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Infection</td>
<td>10-15%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>10-15%</td>
<td>30%</td>
<td>45%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>10-15%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Cardiac Disease</td>
<td>25-30%</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Severe Maternal Morbidity Among Delivery and Postpartum Hospitalizations in the United States

William M. Callaghan, MD, MPH, Andreea A. Creanga, MD, PhD, and Elena V. Kuklina, MD, PhD

OBJECTIVES: To propose a new standard for monitoring severe maternal morbidity, update previous estimates of severe maternal morbidity during both delivery and postpartum hospitalizations, and estimate trends in these events in the United States between 1998 and 2009.

METHODS: Delivery and postpartum hospitalizations were identified in the Nationwide Inpatient Sample for the period 1998–2009. International Classification of Diseases, 9th Revision codes indicating severe complications were used to identify hospitalizations with severe maternal morbidity and related in-hospital mortality. Trends

CONCLUSIONS: Severe maternal morbidity currently affects approximately 52,000 women during their delivery hospitalizations and, based on current trends, this burden is expected to increase. Clinical review of identified cases of severe maternal morbidity can provide an opportunity to identify points of intervention for quality improvement in maternal care.

(Obstet Gynecol 2012;120:1029–36)
DOI: http://10.1097/AOG.0b013e31826d60c5

LEVEL OF EVIDENCE: III
Definitions of CDC Severe Maternal Morbidity

- CDC SMM—Composite of specific severe complications
  - Divided into 21 categories (of quite variable frequency)
  - Used procedure or diagnosis codes:
  - Did not use traditional obstetric codes as they are largely nonspecific for severity (e.g. instead of PPH used complications from hemorrhage such as transfusion or hysterectomy)
  - Additional criteria was association with in-hospital mortality

- Current Refinements
  - Delivery admission only
  - No severity adjustment based on LOS
## Severe Maternal Morbidity Index (CDC)

<table>
<thead>
<tr>
<th>Diagnoses &amp; Procedures</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute myocardial infarction</td>
<td>Pulmonary edema/acute heart failure</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>Severe anesthesia complications</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>Sepsis</td>
</tr>
<tr>
<td>Adult respiratory distress syndrome</td>
<td>Shock</td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
<td>Sickle cell disease with crisis</td>
</tr>
<tr>
<td>Cardiac arrest, ventricular fibrillation/Conversion of cardiac rhythm</td>
<td>Air and thrombotic embolism</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation</td>
<td>Blood products transfusion</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>Hysterectomy</td>
</tr>
<tr>
<td>Heart failure or arrest during surgery or procedure</td>
<td>Temporary tracheostomy</td>
</tr>
<tr>
<td>Puerperal cerebrovascular disorders</td>
<td>Ventilation</td>
</tr>
</tbody>
</table>
# Rates of Severe Morbidity Indicators (US) per 10,000 Deliveries

<table>
<thead>
<tr>
<th>SMM Indicator Group</th>
<th>1993</th>
<th>2014</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transfusions</td>
<td>24.5</td>
<td>122.3</td>
<td>399.2</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>6.9</td>
<td>10.7</td>
<td>55.1</td>
</tr>
<tr>
<td>Ventilation/Temporary tracheostomy</td>
<td>4.1</td>
<td>7.9</td>
<td>92.7</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation</td>
<td>6</td>
<td>7.2</td>
<td>20</td>
</tr>
<tr>
<td>Adult respiratory distress syndrome</td>
<td>2</td>
<td>6.1</td>
<td>205</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>1.3</td>
<td>5.2</td>
<td>300</td>
</tr>
<tr>
<td>Sepsis</td>
<td>2.4</td>
<td>4.2</td>
<td>75</td>
</tr>
<tr>
<td>Shock</td>
<td>1.1</td>
<td>3</td>
<td>172.7</td>
</tr>
<tr>
<td>Cardiac arrest, fibrillation/Conversion of cardiac rhythm</td>
<td>0.4</td>
<td>1.1</td>
<td>175</td>
</tr>
<tr>
<td>Air and thrombotic embolism</td>
<td>0.8</td>
<td>0.9</td>
<td>12.5</td>
</tr>
<tr>
<td>Acute myocardial infarction/Aneurysm</td>
<td>0.1</td>
<td>0.2</td>
<td>300</td>
</tr>
</tbody>
</table>

Note: Chart highlights top 11 indicators with an increase from 1993 to 2014.  
Source: [https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html#anchor_trends](https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html#anchor_trends)
Figure 1. Trends in delivery hospitalizations involving severe maternal morbidity, 2006-2015

- Any severe maternal morbidity:
  - 2006: 101.3
  - 2015: 146.6
  - 45% increase

- Blood transfusion (with or without other indicators of severe maternal morbidity):
  - 2006: 78.9
  - 2015: 121.1
  - 54% increase

- Other severe maternal morbidity (with or without blood transfusion):
  - 2006: 33.8
  - 2015: 41.9
  - 24% increase
Severe Maternal Morbidity

All Cases
Excluding Transfusion Only Cases

160% Increase
64% Increase

Main EK, Leonard SA, Menard MK. Association of maternal comorbidity with severe maternal morbidity. Annals of Int Med 2020
Comorbidities of All Types are Rising Among Maternity Patients

Main EK, Leonard SA, Menard MK. Association of maternal comorbidity with severe maternal morbidity. Annals of Int Med 2020
SMM by Race/Ethnicity and Co-morbidities

Fig. 3. Incidence of severe maternal morbidity per 10,000 delivery hospitalizations by comorbidity and race and ethnicity, United States, 2012–2015 (N=2,523,528). All data are survey-weighted and represented as rate per 10,000 delivery hospitalizations (95% CI). Adjusted for age, income, payer, rural vs urban residence, and hospital region.

27 categories of medical comorbidities, comorbidities related to the current pregnancy, previous cesarean birth, and maternal age were evaluated for their independent prediction of SMM and SMM without transfusion.

Performance was evaluated using California data split into developmental and validation sets and confirmed using a national Optum Clininformatics data set.
Potential Comorbidities Considered for Index

- Conditions identified by ICD-10-CM codes (plus age) and verified by an obstetric medical billing coding expert

<table>
<thead>
<tr>
<th>Changed codes from Bateman</th>
<th>New condition beyond Bateman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic hypertension</td>
<td>Chronic renal disease</td>
</tr>
<tr>
<td>Gestational diabetes mellitus</td>
<td>Connective tissue or autoimmune disease</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Maternal age ≥ 35 years</td>
</tr>
<tr>
<td>Placenta previa, complete or partial</td>
<td>Substance use disorder</td>
</tr>
<tr>
<td>Preeclampsia with severe features</td>
<td>Anemia, preexisting</td>
</tr>
<tr>
<td>Preeclampsia without severe features or gestational HTN</td>
<td>Bariatric surgery</td>
</tr>
<tr>
<td>Preexisting diabetes mellitus</td>
<td>Economic or housing instability</td>
</tr>
<tr>
<td>Previous cesarean birth</td>
<td>Gastrointestinal disease</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>Major mental health disorder</td>
</tr>
<tr>
<td>Twin/multiple pregnancy</td>
<td>Neuromuscular disease</td>
</tr>
<tr>
<td>Asthma, acute or moderate/severe</td>
<td>Placental abruption</td>
</tr>
<tr>
<td>Bleeding disorder, preexisting</td>
<td>Placenta accreta spectrum</td>
</tr>
<tr>
<td>BMI ≥ 40 kg/m²</td>
<td>Preterm birth (&lt; 37 weeks)</td>
</tr>
<tr>
<td>Cardiac disease, preexisting</td>
<td>Thyrotoxicosis</td>
</tr>
</tbody>
</table>
## Face Validity: SMM Performance Among CA Hospitals (2018)

<table>
<thead>
<tr>
<th>Hospital Level</th>
<th>Obs Rate</th>
<th>RA Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Access Hospitals</td>
<td>1.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Nursery Level I &amp; Not CAH</td>
<td>1.5%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Nursery Level II</td>
<td>1.4%</td>
<td>1.5%</td>
</tr>
<tr>
<td>NICU Level III/IV</td>
<td>1.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Total Results</td>
<td>1.7%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University</th>
<th>Obs Rate</th>
<th>RA Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>2</td>
<td>4.1%</td>
<td>1.7%</td>
</tr>
<tr>
<td>3</td>
<td>4.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>4</td>
<td>4.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>5</td>
<td>5.4%</td>
<td>2.3%</td>
</tr>
<tr>
<td>6</td>
<td>1.3%</td>
<td>0.8%</td>
</tr>
<tr>
<td>7</td>
<td>2.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Average</td>
<td>3.5%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Co Hospital</th>
<th>Obs Rate</th>
<th>RA Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>2</td>
<td>4.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>3</td>
<td>7.3%</td>
<td>2.3%</td>
</tr>
<tr>
<td>4</td>
<td>1.8%</td>
<td>1.1%</td>
</tr>
<tr>
<td>5</td>
<td>1.5%</td>
<td>0.9%</td>
</tr>
<tr>
<td>6</td>
<td>1.4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>7</td>
<td>2.7%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Average</td>
<td>3.9%</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

(40-50 hospitals in each category)
In CA Nearly 60% of the Difference in Black:White SMM is related to Comorbidities

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>RR (95% CI)</th>
<th>Crude RR</th>
<th>Adjusted RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (ref)</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>2.1 (2.0-2.2)</td>
<td>1.14 (1.10-1.17)</td>
<td>1.28 (1.22-1.60)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.3 (1.2-1.3)</td>
<td>1.26 (1.23-1.29)</td>
<td>1.29 (1.26-1.32)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>1.2 (1.2-1.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska native</td>
<td>1.7 (1.5-1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid (ref)</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private insurance</td>
<td>0.8 (0.8-0.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What does this mean?

The Joint Commission: 
Severe Obstetric Morbidity: PC-07e

- CDC SMM Definition (will be using updated codes)
- eMeasure requires EHR data submission, joint development with Yale CORE under contract from CMS
- Risk adjustment:
  - Using same co-morbidity factors (ICD-10) as in the Leonard article
  - Adding additional risk factors available using SNOMED codes: Hct, WBC, BP, Temp
SMM excluding transfusion only cases

- Under ICD-10 many hospitals are poorly coding transfusions (“not required”)
- States are very different in the availability of transfusion data
- Transfusions have risen much faster than other major complications
- Review of transfusion-only SMM cases indicate that they almost never result in maternal mortality
SMM Summary

- Composite complication measure affected by rate of comorbidities
- Updated ICD-10 code set
- Focus on SMM excluding transfusion
- Population-level Measure:
  - HRSA/AHRQ: State Rates (Title V-NOM)
  - CDC: National Rates
  - AIM: State rates / hospital comparisons
- Hospital-level Measure:
  - Risk adjusted: The Joint Commission/CMS; CMQCC
Calculating Severe Maternal Morbidity (SMM) with Hospital Discharge Data

Lawrence Reid, PhD
Agency for Healthcare Research and Quality | Division of Healthcare Data and Analytics

March 16, 2022
Overview

• Background hospital discharge data
• Calculating SMM
• SMM Resources
What is the Healthcare Utilization Project (HCUP)?

<table>
<thead>
<tr>
<th>Voluntary Partnership</th>
<th>Federal government, state data organizations, private data organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data types</td>
<td>Inpatient, emergency department, ambulatory surgery</td>
</tr>
<tr>
<td>Census of discharges/visits</td>
<td>Allows analysis of common and uncommon conditions and procedures</td>
</tr>
<tr>
<td>Multiple geographic levels</td>
<td>National, 4 regions, 9 divisions, 48 States plus D.C., local (county, ZIP code level, market level)</td>
</tr>
<tr>
<td>Discharge or visit data</td>
<td>Record-level data, relatively simple to use</td>
</tr>
<tr>
<td></td>
<td>Can look at episodes of hospital care in some states</td>
</tr>
<tr>
<td>Online query systems</td>
<td>HCUPnet: <a href="https://hcupnet.ahrq.gov/">https://hcupnet.ahrq.gov/</a></td>
</tr>
<tr>
<td></td>
<td>HCUP Fast Stats: <a href="https://datatools.ahrq.gov/hcup-fast-stats">https://datatools.ahrq.gov/hcup-fast-stats</a></td>
</tr>
<tr>
<td></td>
<td>Fasts Stats topic on Severe Maternal Morbidity: <a href="https://www.hcup-us.ahrq.gov/faststats/SMMMap">https://www.hcup-us.ahrq.gov/faststats/SMMMap</a></td>
</tr>
<tr>
<td>Support to researchers and policymakers</td>
<td>Tools, training, technical assistance, quick turn-around analyses to answer policy questions</td>
</tr>
<tr>
<td>Analytics and Research</td>
<td>HCUP data support wide variety of research on hospital care, including maternal morbidity and in-hospital mortality</td>
</tr>
</tbody>
</table>

Please visit HCUP-US for more information: [www.hcup-us.ahrq.gov/](http://www.hcup-us.ahrq.gov/)
HCUP Data Come Mostly From Community Hospitals

American Hospital Association Definition:
Non-Federal, short-term general, and other special hospitals, excluding hospitals not accessible by the general public (e.g., prison hospitals or college infirmaries)

<table>
<thead>
<tr>
<th>Included*</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multispecialty general hospitals</td>
<td>Non-Federal long-term care hospitals</td>
</tr>
<tr>
<td>OB-GYN</td>
<td>Psychiatric</td>
</tr>
<tr>
<td>Ear, nose, and throat</td>
<td>Alcoholism/chemical dependency</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>Long-term care rehabilitation</td>
</tr>
<tr>
<td>Pediatric</td>
<td>Department of Defense/Department of Veterans Affairs/Indian Health Service</td>
</tr>
<tr>
<td>Public</td>
<td>College infirmaries</td>
</tr>
<tr>
<td>Academic medical centers</td>
<td>Prison hospitals</td>
</tr>
</tbody>
</table>

*Sometimes this also includes short-term rehabilitation and long-term acute care hospitals. Availability varies across HCUP States.
### Differences between SID and NIS

<table>
<thead>
<tr>
<th>HCUP database</th>
<th>State Inpatient Databases (SID)</th>
<th>National Inpatient Sample (NIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>States</td>
<td>48 States + DC</td>
<td>48 States + DC</td>
</tr>
<tr>
<td>Hospitals</td>
<td>4,470</td>
<td>4,568</td>
</tr>
<tr>
<td>Inpatient discharges</td>
<td>34 million</td>
<td>7 million</td>
</tr>
<tr>
<td>Derived from</td>
<td>--</td>
<td>SID</td>
</tr>
<tr>
<td>Uses</td>
<td>Examine State and local market-area statistics on healthcare utilization, access, quality, patient safety, etc. Readmission analyses possible in some States.</td>
<td>Generate national and regional estimates of healthcare utilization, access, quality, patient safety, etc.</td>
</tr>
</tbody>
</table>
HCUP Data Supports Measures of Maternal Morbidity

▸ AHRQ Quality Indicators
  - Birth Trauma Rate – Injury to Neonate (PSI 17)
  - Obstetric Trauma Rate – Vaginal Delivery with Instrument (PSI 18)
  - Obstetric Trauma Rate – Vaginal Delivery without Instrument (PSI 19)
  - Cesarean Delivery Rate, Uncomplicated (IQI 21)
  - Vaginal Birth After Cesarean (VBAC) Delivery Rate, Uncomplicated (IQI 22)
  - Primary Cesarean Delivery Rate, Uncomplicated (IQI 33)
  - Vaginal Birth After Cesarean (VBAC) Rate (IQI 34)

▸ Other discharge-based indicators
  - In-hospital deaths among delivery hospitalizations
  - Substance use diagnoses among delivery hospitalizations
  - Non-medically indicated cesarean deliveries
How to Calculate SMM
Calculating SMM

• Inclusion criteria
  ▶ Female
  ▶ Aged 12-55 years at admission of delivery hospitalization

• Delivery hospitalizations excluded
  ▶ Missing age or sex
  ▶ Indication of an abortion

• Case
  ▶ A diagnosis or procedure indicating SMM
  ▶ A diagnosis, Medicare Severity-Diagnosis Related Group (MS-DRG), or procedure indicating an in-hospital delivery
  ▶ Coding algorithm differs for ICD-9-CM vs ICD-10-CM/PCS
  ▶ Delivery hospitalizations with only a blood transfusion are not included in the numerator

• Rate
  ▶ Numerator: delivery hospitalizations with at least one SMM indicator on the record
  ▶ Denominator: delivery hospitalizations for women aged 12-55 years at community non-rehab hospitals
  ▶ Typically expressed per 10,000 delivery hospitalizations
# SMM Indicators

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Acute myocardial infarction</td>
<td>18: Blood transfusion (excluded)</td>
</tr>
<tr>
<td>2: Aneurysm</td>
<td>19: Hysterectomy</td>
</tr>
<tr>
<td>3: Acute renal failure</td>
<td>20: Temporary tracheostomy</td>
</tr>
<tr>
<td>4: Adult respiratory distress syndrome</td>
<td>21: Ventilation</td>
</tr>
<tr>
<td>5: Amniotic fluid embolism</td>
<td></td>
</tr>
<tr>
<td>6: Cardiac arrest/ventricular fibrillation</td>
<td></td>
</tr>
<tr>
<td>7: Conversion of cardiac rhythm</td>
<td></td>
</tr>
<tr>
<td>8: Disseminated intravascular coagulation</td>
<td></td>
</tr>
<tr>
<td>9: Eclampsia</td>
<td></td>
</tr>
<tr>
<td>10: Heart failure/arrest during surgery or procedure</td>
<td></td>
</tr>
<tr>
<td>11: Puerperal cerebrovascular disorders</td>
<td></td>
</tr>
<tr>
<td>12: Pulmonary edema / Acute heart failure</td>
<td></td>
</tr>
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<td>13: Severe anesthesia complications</td>
<td></td>
</tr>
<tr>
<td>14: Sepsis</td>
<td></td>
</tr>
<tr>
<td>15: Shock</td>
<td></td>
</tr>
<tr>
<td>16: Sickle cell disease with crisis</td>
<td></td>
</tr>
<tr>
<td>17: Air and thrombotic embolism</td>
<td></td>
</tr>
<tr>
<td>18: Blood transfusion</td>
<td></td>
</tr>
<tr>
<td>19: Hysterectomy</td>
<td></td>
</tr>
<tr>
<td>20: Temporary tracheostomy</td>
<td></td>
</tr>
<tr>
<td>21: Ventilation</td>
<td></td>
</tr>
</tbody>
</table>
Rate of SMM per 10,000 delivery hospitalizations by

8: Disseminated intravascular coagulation
   - 25.3

3: Acute renal failure
   - 11.3

14: Sepsis
   - 10.2

12: Pulmonary edema / Acute respiratory failure
   - 8.7

21: Ventilation
   - 8.0

17: Air and thrombotic embolism
   - 7.4

13: Severe anesthesia complications
   - 5.5

7: Conversion of cardiac rhythm
   - 5.2

10: Heart failure/arrest during anesthesia
   - 5.1

1: Acute myocardial infarction
   - 3.4

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample (NIS), 2012-2019
## SMM Indicator Groupings

<table>
<thead>
<tr>
<th>Grouping</th>
<th>SMM Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hemorrhage</strong></td>
<td>8: Disseminated intravascular coagulation, 15: Shock, 19: Hysterectomy</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td>4: Adult respiratory distress syndrome, 20: Temporary tracheostomy, 21: Ventilation</td>
</tr>
<tr>
<td><strong>Cardiac</strong></td>
<td>1: Acute myocardial infarction, 2: Aneurysm, 6: Cardiac arrest/ventricular fibrillation, 7: Conversion of cardiac rhythm, 10: Heart failure/arrest during surgery or procedure, 12: Pulmonary edema / Acute heart failure</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td>3: Acute renal failure</td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td>14: Sepsis</td>
</tr>
<tr>
<td><strong>Other Obstetrical</strong></td>
<td>5: Amniotic fluid embolism, 9: Eclampsia, 13: Severe anesthesia complications, 17: Air and thrombotic embolism</td>
</tr>
<tr>
<td><strong>Other Medical</strong></td>
<td>11: Puerperal cerebrovascular disorders, 16: Sickle cell disease with crisis</td>
</tr>
</tbody>
</table>
Calculating SMM


1. Subset dataset to only community non-rehab hospitals and set up array variables

   IF COMMUNITY_NONREHAB =1; * restrict to non-federal, non-rehab facilities;
   ARRAY DX(*) INSERT DIAGNOSIS CODES ;
   ARRAY PR(*) INSERT PROCEDURE CODES ;
   DO I=1 TO DIM(DX) ;

ICD-9-CM

2. Identify delivery hospitalizations

   IF YEAR<=2015 THEN DO;
   /*ANY V27 DELIVERY CODES*/
   IF DX(I)="V27" THEN DELIVERY_V27 =1;
   /*NORMAL DELIVERY*/
   ELSE IF DX(I)="650" THEN DELIVERY_650 =1;
   /*IDENTIFY ABORTIONS, ECTOPIC, HYDATIDIFORM MOLE FOR EXCLUSION*/
   IF DX(I) IN: ('630','631','632','633','634','635','636','637','638','639') THEN ABORT_DX =1;
   /*C-SECTION DELIVERY*/
   IF DX(I) IN: ('66970','66971') THEN CESAREAN_DX =1;

ICD-10-CM/PCS

   /*BEGIN MS-DRG*/
   /* ANY DELIVERY*/
   IF DRG IN (765:768,774,775,783:788,796:798,805:807) THEN DELIVERY_DRG =1; ELSE DELIVERY_DRG =0;
Calculating SMM


<table>
<thead>
<tr>
<th>ICD-9-CM</th>
<th>ICD-10-CM/PCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Identify SMM indicators</td>
<td></td>
</tr>
<tr>
<td>/<em>SEVERE MATERNAL MORBIDITY INDICATORS</em>/</td>
<td>/<em>ACUTE MYOCARDIAL INFARCTION</em>/</td>
</tr>
<tr>
<td>IF DX(I) IN: ('410') THEN SMM1=1;</td>
<td>IF DX(I) IN: ('I11', 'I12') THEN SMM1=1;</td>
</tr>
<tr>
<td>/<em>ANEURYSM</em>/</td>
<td>/<em>ANEURYSM</em>/</td>
</tr>
<tr>
<td>IF DX(I) IN: ('441') THEN SMM2=1;</td>
<td>IF DX(I) IN: ('171', '179') THEN SMM2=1;</td>
</tr>
<tr>
<td>/*ACUTE RENAL FAILURE */</td>
<td>/*ACUTE RENAL FAILURE */</td>
</tr>
<tr>
<td>IF DX(I) IN: ('S845', 'S846', 'S847', 'S848', 'S849', '6693') THEN SMM3=1;</td>
<td>IF DX(I) IN: ('N17', 'N994') THEN SMM3 =1;</td>
</tr>
<tr>
<td>/<em>ACUTE RESPIRATORY DISTRESS SYNDROME</em>/</td>
<td>/<em>ACUTE RESPIRATORY DISTRESS SYNDROME</em>/</td>
</tr>
<tr>
<td>IF DX(I) IN: ('5185', '51881', '51882', '51884', '7991') THEN SMM4=1;</td>
<td>IF DX(I) IN: ('J80', 'J951', 'J962', 'J963', 'J964', 'J965', 'J966', 'B0603', 'B0605') THEN SMM4=1;</td>
</tr>
<tr>
<td>/*ANEMIC FLUID EMBOLISM */</td>
<td>/*ANEMIC FLUID EMBOLISM */</td>
</tr>
<tr>
<td>IF DX(I) EQ: '6731' THEN SMM5=1;</td>
<td>IF DX(I) IN: ('088110', '088113', '088119', '088120', '08813') THEN SMM5=1;</td>
</tr>
<tr>
<td>/<em>CARDIAC ARREST/VENTRICULAR FIBRILLATION</em>/</td>
<td>/<em>CARDIAC ARREST/VENTRICULAR FIBRILLATION</em>/</td>
</tr>
<tr>
<td>IF DX(I) IN: ('42741', '42742', '42755') THEN SMM6=1;</td>
<td>IF DX(I) IN: ('146', '1490') THEN SMM6=1;</td>
</tr>
</tbody>
</table>
Calculating SMM


4. Combine flags into delivery and SMM variables

```sas
ARRAY SMMVARS(*) SMM1-SMM17 SMM19-SMM21;

IF (DELIVERY_V27=1 OR DELIVERY_650=1 OR DELIVERY_DRG=1 OR DELIVERY_PR=1 OR CESAREAN_DX=1) AND ABORT=0
    AND FEMALE=1 AND 12 LE AGE LE 55 THEN DO;
    SMM=0;
    DO I=1 TO DIM(SMMVARS);
        IF SMMVARS(I)=1 THEN SMM=1;
    END;
    DELI_FLAG=1;
END;
```
SMM Resources
SMM Resources: HCUP

Fast Stats SMM path: https://www.hcup-us.ahrq.gov/faststats/SMMMap

• National and State-level statistics on SMM
  ► States are hospital state or delivery, not patient residence state
• Interactive map of rate of SMM per 10,000 in-hospital deliveries
• Figures showing 10-year trends in the number and rate of deliveries with SMM
  ► 2010–2019 for States
  ► 2010–2018 nationally (2019 NIS later this year)
• Rates also will be stratified by:
  ► Patient characteristics: age, race/ethnicity, expected payer, community-level income, and patient location
  ► Hospital characteristics: safety-net hospital status, hospital location/teaching status, hospital ownership, and hospital delivery volume
• SMM Diagnosis and Procedure Code set for ICD-9-CM and ICD-10-CM/PCS available in methodology section

### SMM Resources: HRSA

- Title V Information System (TVIS) and FAD
  - [https://mchb.tvisdata.hrsa.gov/](https://mchb.tvisdata.hrsa.gov/)
  - SMM is National Outcome Measure #2
  - National data represent pooled SID
  - State data represent patient’s residence state

### Stratifiers
- SMM Grouping
- Expected payer (insurance)
- Age group
- Median income of residence ZIP code
- Race/ethnicity
- Urban/rural residence
Difference in Fast Stats vs TVIS

SMM Rates per 10,000 delivery hospitalizations by resource type, 2010-2018

National

Maryland

SMM per 10,000 delivery hospitalizations


Fast Stats TVIS
Alliance for Innovation on Maternal Health (AIM) Data Resources
https://safehealthcareforeverywoman.org/aim/resources/aim-data-resources/
Questions?

Please email me:
lawrence.reid@ahrq.hhs.gov
Severe Maternal Morbidity: Measurement Issues Affecting Trends and State Comparisons

Ashley Hirai, PhD
MCHB Office of Epidemiology and Research
Overview

1) Trends across the transition to ICD-10-CM/PCS
   • Code comparisons and revisions through bi-directional code mapping and translation
   • Visual examination of rates over time through line graphs
   • Regression analysis overall and by indicator and state

2) State variation and comparisons
   • State trend variation
   • Correlations with other perinatal indicators
   • Maps to examine geographic patterning
SMM and ICD-10-CM/PCS Transition

- HRSA collaborates with AHRQ to pre-populate Title V National Outcome Measure for SMM (NOM-2) from Healthcare Cost and Utilization Project (HCUP) – State Inpatient Databases
  - ICD-10-CM/PCS (Q4 of 2015) represented a major change and general expansion of codes
  - Completed analysis of the impact of ICD-10-CM/PCS transition; excluding blood transfusion alone

- Incorporates recent coding revisions from formal bi-directional code mapping of diagnosis and procedure codes (ICD-9-CM to ICD-10-CM/PCS and vice versa)
  - Some codes added that were previously missed or part of Clinical Classification Software Refined
  - Some codes deleted that were conceptually inconsistent or implausible at delivery (e.g., 1st trimester)
  - Some codes reclassified (i.e., shock due to sepsis and anesthesia moved from shock to respective indicators as primary cause)

<table>
<thead>
<tr>
<th></th>
<th>ICD-9-CM</th>
<th>ICD-10-CM/PCS</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Additions</td>
<td>23</td>
<td>82</td>
</tr>
<tr>
<td># of Deletions</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td># Reclassified</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Final # of Codes</td>
<td>244</td>
<td>437</td>
</tr>
</tbody>
</table>
Effect of Coding Revision

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample

At indicator level:
- Increases for Adult Respiratory Distress Syndrome, Disseminated Intravascular Coagulation, Puerperal Cerebrovascular Disorders, Ventilation
- Decreases for Shock
Analytic Methods to Examine ICD Transition

1) Code mapping (ICD-9-CM v ICD-10-CM/PCS) to determine concordance/translation by indicator
   • 1 to 1 (exact)
   • 1 to Many (detail expansion)
   • Many to 1 (detail removal)
   • Many to Many (convoluted)

2) Visual examination of rates over time through line graphs

3) Segmented regression in linear binomial models

\[ Y_i = \beta_0 + \beta_1 ICD10 + \beta_2 Time + \beta_3 TimeAfter + \beta_4 Q1 + \beta_5 Q2 + \beta_6 Q3 + \varepsilon_i \]

\( \beta_1 \) is the “jump” or intercept change after ICD-10-CM/PCS transition

Primary focus controlling for trends before and after

\( \beta_2 \) is the time trend or slope

\( \beta_3 \) is the change in slope after ICD-10-CM/PCS transition

\( \beta_4-6 \) are quarter differences to control for potential seasonality
<table>
<thead>
<tr>
<th>SMM Indicator</th>
<th># ICD-9-CM Codes</th>
<th># ICD-10-CM/PCS Codes</th>
<th>Mapping Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acute myocardial infarction (DX)</td>
<td>30</td>
<td>17</td>
<td>Many to Many</td>
</tr>
<tr>
<td>2. Aneurysm (DX)</td>
<td>12</td>
<td>13</td>
<td>1 to Many</td>
</tr>
<tr>
<td>3. Acute renal failure (DX)</td>
<td>8</td>
<td>6</td>
<td>Many to 1</td>
</tr>
<tr>
<td>4. Adult respiratory distress syndrome (DX)</td>
<td>7</td>
<td>17</td>
<td>1 to Many</td>
</tr>
<tr>
<td>5. Amniotic fluid embolism (DX)</td>
<td>5</td>
<td>5</td>
<td>1 to 1</td>
</tr>
<tr>
<td>6. Cardiac arrest / Ventricular fibrillation (DX)</td>
<td>3</td>
<td>5</td>
<td>1 to Many</td>
</tr>
<tr>
<td>7. Conversion of cardiac rhythm (PR)</td>
<td>6</td>
<td>2</td>
<td>Many to Many</td>
</tr>
<tr>
<td>8. Disseminated intravascular coagulation (DX)</td>
<td>8</td>
<td>29</td>
<td>1 to Many</td>
</tr>
<tr>
<td>9. Eclampsia (DX)</td>
<td>5</td>
<td>6</td>
<td>1 to Many</td>
</tr>
<tr>
<td>10. Heart failure/arrest during surgery (DX)</td>
<td>1</td>
<td>6</td>
<td>1 to Many</td>
</tr>
<tr>
<td>11. Puerperal cerebrovascular disorders (DX)</td>
<td>54</td>
<td>198</td>
<td>Many to Many</td>
</tr>
<tr>
<td>12. Pulmonary edema / Acute heart failure (DX)</td>
<td>13</td>
<td>20</td>
<td>1 to Many</td>
</tr>
<tr>
<td>13. Severe anesthesia complications (DX)</td>
<td>17</td>
<td>25</td>
<td>1 to Many</td>
</tr>
<tr>
<td>14. Sepsis (DX)</td>
<td>23</td>
<td>27</td>
<td>1 to Many</td>
</tr>
<tr>
<td>15. Shock (DX)</td>
<td>12</td>
<td>10</td>
<td>Many to Many</td>
</tr>
<tr>
<td>16. Sickle cell disease with crisis (DX)</td>
<td>5</td>
<td>12</td>
<td>1 to Many</td>
</tr>
<tr>
<td>17. Air and thrombotic embolism (DX)</td>
<td>25</td>
<td>29</td>
<td>1 to Many</td>
</tr>
<tr>
<td>19. Hysterectomy (PR)</td>
<td>6</td>
<td>4</td>
<td>Many to Many</td>
</tr>
<tr>
<td>20. Temporary tracheostomy (PR)</td>
<td>1</td>
<td>3</td>
<td>1 to Many</td>
</tr>
<tr>
<td>21. Ventilation (PR)</td>
<td>3</td>
<td>3</td>
<td>1 to 1</td>
</tr>
</tbody>
</table>

The majority of SMM indicators have increased coding complexity in ICD-10-CM/PCS.
Impact of ICD Transition – National SMM Overall

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample

Overall increase 2012-2019
10.2 (5.8, 14.6)

No significant change across ICD transition
-3.2 (-6.9, 0.6)
Impact of ICD Transition – National SMM by Indicator

Disseminated Intravascular Coagulation (DIC)

Overall decrease 2012-2019
-10.2 (-12.8, -7.5)

Mostly due to ICD transition
-7.9 (-10.2, -5.6)

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample
Impact of ICD Transition – National SMM by Indicator

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample

Increases across ICD Transition
- Eclampsia: 4.3 (3.4, 5.3) slope decrease, now back to ICD-9-CM levels
- Pulmonary Edema/Acute Heart Failure: 1.0 (0.2, 1.8)
- Air and Thrombotic Embolism: 1.2 (0.6, 1.7)
- Acute Myocardial Infarction: 0.2 (0.0, 0.3)

Decreases across ICD Transition
- Puerperal Cerebrovascular Disorders: -1.0 (-1.6, -0.4) slope increase, now back to ICD-9-CM levels
- Severe Anesthesia Complications: -0.7 (-1.0, -0.3)
- Heart Failure/Arrest during Surgery: -0.6 (-0.8, -0.4)
Impact of ICD Transition – State SMM Overall

8 state decreases (driven by DIC), ranging from -7.7 (TX) to -22.5 (NV)

However, 5 states (*) had decreases not fully consistent with ICD transition: non-linear patterns (decreasing before 2016) or single anomalies (2015 spikes)

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases
Impact of ICD Transition – State SMM Overall

4 state increases, ranging from 10.0 (WI) to 44.4 (RI)

However, 1 state (*) had an increase not fully consistent with ICD transition: single anomaly (2016 spike)

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases
Summary of ICD Transition Impact

• Overall national SMM (excluding blood transfusion) is generally comparable across the ICD-10-CM/PCS transition

• However, certain indicators are not comparable across coding systems
  ▪ Sustained decreases for DIC, severe anesthesia complications, heart failure/arrest during surgery
  ▪ Sustained increases for pulmonary edema/acute heart failure, air and thrombotic embolism, acute myocardial infarction
  ▪ Changes for heart failure/arrest during surgery (decrease) and acute myocardial infarction (increase) may be counterbalancing

• Certain states may have been affected in either direction

• Efforts are needed to understand overall SMM increases and state variation
State SMM Variation

• Changes from 2012 to 2019
• Correlations with other perinatal indicators
• Map to examine geographic patterns
State SMM Changes, 2012 to 2019

Substantial variability in changes 2012-2019
- Increases (21)
- Decreases (1)
- No change (23)

Low correlation between 2012 and 2019 rates (r=0.47)

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, National Inpatient Sample and State Inpatient Databases
### State-level SMM Correlations with Perinatal Indicators

<table>
<thead>
<tr>
<th></th>
<th>Pre-pregnancy Hypertension</th>
<th>Pre-pregnancy Diabetes</th>
<th>Pre-pregnancy Obesity</th>
<th>Low-Risk Cesarean</th>
<th>Preterm Birth</th>
<th>Infant Mortality</th>
<th>Maternal Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMM</strong></td>
<td>0.39</td>
<td>-0.28</td>
<td>0.36</td>
<td>-0.37</td>
<td>0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-pregnancy Hypertension</td>
<td>0.56</td>
<td>0.48</td>
<td>0.51</td>
<td>0.68</td>
<td>0.65</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>Pre-pregnancy Diabetes</td>
<td>0.57</td>
<td>•</td>
<td>0.52</td>
<td>0.50</td>
<td>0.50</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Pre-pregnancy Obesity</td>
<td>0.19</td>
<td>0.56</td>
<td>0.66</td>
<td>0.31</td>
<td>0.32</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Low-Risk Cesarean</td>
<td>0.49</td>
<td>0.31</td>
<td>0.82</td>
<td>0.59</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm Birth</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant Mortality</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td></td>
</tr>
</tbody>
</table>

**SMM Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases, 2017-2019

**All Other Source:** National Center for Health Statistics, National Vital Statistics System, Birth and Mortality Files, 2017-2019 (2016-2020 for MMR)

- SMM only correlated with pre-pregnancy hypertension
- Stronger and more consistent correlations for all other perinatal indicators
SMM and Maternal Mortality

SMM shows little geographic patterning with the highest rates in certain states on both coasts.

Maternal mortality is highest in the southeast.

Correlation: -0.25
Summary of State SMM Variation

• Substantial state variation in recent SMM trends
• State SMM lacks geographic patterning and is not correlated with other perinatal indicators
• Exercise caution when comparing SMM across states
• Efforts are needed to improve SMM coding and standardization (engage PQC s, HENs, etc.)
Acknowledgments

• Collaborators
  ▪ Pamela Owens, PhD – Agency for Healthcare Research and Quality (ARHQ)
  ▪ Lawrence Reid, PhD – Agency for Healthcare Research and Quality (ARHQ)
  ▪ Catherine Vladutiu, PhD – Health Resources and Services Administration (HRSA)
  ▪ Elliott Main, MD – Stanford University

• 49 Healthcare Cost and Utilization (HCUP) Partner Organizations that contributed data
  [https://www.hcup-us.ahrq.gov/partners.jsp](https://www.hcup-us.ahrq.gov/partners.jsp)
Contact Information

Ashley Hirai, PhD
Senior Scientist, Office of Epidemiology and Research
Maternal and Child Health Bureau (MCHB)
Health Resources and Services Administration (HRSA)
Email: ahirai@hrsa.gov
Phone: 240.472.2783
Web: mchb.hrsa.gov
Group Discussion/Q&A Session

STOP THE RECORDING!! 😊
Report-Outs: Nebraska

-Sydney Carraher
Nebraska Perinatal Quality Improvement Collaborative

- Formed February 2015
- Staff: (1.5 FTE)
  - Program Administrator
  - Project Coordinator
- 100% of 49 birthing facilities participate in PQC
  - 31 critical access
  - 17 non-critical access
  - 1 birth center
- 23,000 – 25,000 annual births
- Hospitals range from 10 – 5,000 birth/year
Nebraska Birthing Facilities
Improvement Initiatives

• AIM Bundle: Severe Hypertension in Pregnancy
• Nulliparous, Term, Singleton, Vertex (NTSV) Cesarean Birth Rate
• Exclusive Breastmilk and Breastfeeding Initiation Rates
• Perinatal Depression Referrals
Data Collection

- AIM Data Portal
  - 27 of 49 birthing facilities
- REDCap
  - Quarterly reporting by all 49 birthing facilities
- Excel
- Department of Health and Human Services
  - Birth certificate data
- Nebraska Hospital Association
  - Provides SMM data for AIM facilities
Current Challenges

• Delays in getting SMM data
  • NE Hospital Association using new vendor
• Ability to get disaggregated data
• Data abstraction and analysis
• COVID-19
  • Facilities overwhelmed, taking longer to get data entered
Goal

• Gain knowledge by participating in this Community of Learning
• Identify current and future needs of our PQC
Report-Outs: Colorado

-Katie Breen
Colorado is implementing the new SUD bundle measures

What’s staying the same from 2021:

- Brief monthly qualitative data (e.g. challenges, 30/60/90 day plans) used for coaching
- SBIRT Readiness survey at pre-, mid-, and post-year
- All quantitative* measures from 2021 “OUD Bundle” remain

What’s changing (in part due to hospital capacity):

- Less frequent quantitative* data - quarterly!
  - Will first begin collecting for April - June 2022
  - First submission is July 15
- NEW Measures from the SUD Bundle (in addition to 2021’s OUD measures)
  - Differentiate between SUD and OUD
  - Analyze what happens after positive screen - screening is just the first step, but what matters MORE is what happens after.
- NEW Culture change survey for RNs

*Note: we know that bundle measures are not strictly “quantitative” but this is a simplification for teams
## Data Cadence

### Unit Self-Assessment of SBIRT Readiness
*pre, mid, and post-program*

- Submitted with registration for program each year; completed again at mid-point (July) and end (January 2023)

### NEW: Culture Change Survey of RNs *(Pre- and post-program)*

- Pre- and post-assessment to determine if the info provided to Champions is impacting care throughout unit
  - Nurse manager to distribute to all RNs who are NOT Project Champions
  - If participants complete both pre and post surveys, entered to win a $50 gift card

  Pre-test due March 10; Post-test distributed again in December 2022

### Monthly Qualitative Reporting
*SurveyMonkey*

- Survey due first day of month, beginning March 1

### Quarterly Quantitative Data Reporting
*REDCap (CPCQC will then clean data and upload to AIM Data Center on behalf of hospitals)*

- July 15 (April - June data)
- Oct 15 (July - September data)
- Jan 15 (Oct - December data)

*Although the data is due quarterly, we recommend setting an internal deadline to collect data monthly for quality control!
*Only hospital teams submit quant data (not outpatient clinics)
Patient Level-Data - THESE ARE THE NEW QUANT SUD MEASURES

Extremely difficult to automate in EMR!

- Of patients who screened positive for SUD or OUD:
  - # who were counseled on recovery treatment services
  - # who received recovery treatment services
  - # who did not receive recovery treatment services but were referred to them
  - # who received naloxone counseling
  - # who were prescribed Naloxone prior to delivery discharge
  - # who received Naloxone prior to delivery discharge
  - # of newborns exposed to substances in utero who go home to either birth parent
  - # who had a postpartum visit scheduled before or within 24 hours of discharge from birth hospitalization

- Of patients who screened positive for OUD:
  - # who were counseled on medication for opioid use disorder (MOUD)
  - # who received medication for opioid use disorder (MOUD)
  - # who did not receive MOUD but were referred to it

*ALL disaggregated by race and by payor

Data Definitions
Patient Level-Data - THESE ARE THE NEW QUANT SUD MEASURES

Extremely difficult to automate in EMR!
Only apply to patients who screen positive for SUD/OUD

Because these are so hard to automate via EMR reports, we created a patient-level data sheet to be completed for any patient who screens positive for SUD/OUD...
## Patient Data Sheet

*use for patient-level data for each positive SUD screen; also serves as clinical care checklist [this doc is not final]*

### CPCQC Substance Use Disorder Data Collection Sheet

Complete for any pregnant person admitted for delivery with any substance use (including OUD), regardless of infant outcome.

### DEMOGRAPHICS

<table>
<thead>
<tr>
<th>GA: Weeks</th>
<th>Days</th>
<th>Date of Delivery:</th>
<th>Maternal Age:</th>
</tr>
</thead>
</table>

**Type of Insurance:**
- [ ] Medicaid/Medicaid Plans (i.e. CHIP and Medicare)
- [ ] Private
- [ ] Other public insurance (i.e. Tricare, Indian Health Service, other state or federal source)
- [ ] Uninsured (i.e. self-pay, not charged for service, or other payor not listed)

**Returning Parent’s Race:** (check all that apply)
- [ ] White
- [ ] Black
- [ ] Asian
- [ ] American Indian/Alaskan Native

**Was/were their newborn(s) discharged to either birth parent?**
- [ ] Yes
- [ ] No
- [ ] Unknown

### SCREENING

Substances used by patient, prescribed or illicit - learned from patient history or positive lab confirmation: (check all that apply)

**OPIOIDS**
- [ ] Heroin
- [ ] Fentanyl
- [ ] Methadone

**SUBSTANCES**
- [ ] Suboxone (Buprenorphine)
- [ ] Subutex
- [ ] Other opioid (i.e. OxyContin, Vicodin)

**STIMULANTS**
- [ ] Methamphetamine
- [ ] Amphetamines (i.e. Adderall)
- [ ] Cocaine
- [ ] Tobacco (includes e-cigarettes/vape pen)

**OTHER**
- [ ] Cannabis
- [ ] Anti-Psychotic
- [ ] Other illicit drug(s)
- [ ] Other prescribed drug(s)

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**TREATMENT**

- [ ] Did the patient receive recovery treatment services at any point prenatally or during birth admission? (Includes those who received recovery treatment services at any point during their pregnancy regardless of current utilization.)
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] If the patient received recovery treatment services during pregnancy, were they referred to recovery treatment services prior to delivery discharge?
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] NALOXONE

- [ ] Was the patient counseled on Naloxone prenatally or during birth admission?
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] Was the patient prescribed Naloxone prior to delivery discharge? (Includes Naloxone prescription but not necessarily in hand. Does not include Naloxone administered to patient for overdose reversal.)
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] Did the patient receive Naloxone to take home prior to delivery discharge? (Patient must have Naloxone in hand, does not include Naloxone administered to patient for overdose reversal.)
  - [ ] Yes  [ ] No  [ ] Unknown

**COMPLETE THE FOLLOWING QUESTIONS IF PATIENT SCREENED POSITIVE FOR OPIOID USE**

- [ ] Did patient receive MOUD prenatally or during birth admission? (Includes those who received OUD at any point during their pregnancy regardless of current utilization.)
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] If the patient received MOUD, was it initiated during the birth admission?
  - [ ] Yes  [ ] No  [ ] Unknown

- [ ] If the patient did not receive MOUD during pregnancy or birth admission, were they referred to MOUD prior to delivery discharge?
  - [ ] Yes  [ ] No  [ ] Unknown

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**NOTES (OPTIONAL)**
Data Collection Options for Patient-Level Data

Option 1: Use the Patient Data Sheet (optional but highly recommended - probably 100% of our teams will use this)
For any patient that screens positive for SUD, submit a patient-level data form in REDCap
  - De-identified
  - CPCQC aggregates for you (no need to count)
  - Complete forms as you go (e.g. right before discharge - recommended) or in batches
  - Can input directly into REDCap
  - OR can complete on paper and input electronically later

Option 2: Self-Aggregate - Unlikely that teams will choose this
Collect data throughout quarter and aggregate when submitting in REDCap, ideally via EMR automations.
Data Recommendations Given to Teams

Use the time between now and April 1 to strategize with your staff on how you will collect **quantitative** data

- Try out the patient data sheet
- Decide how often data will be collected and submitted (we recommend collecting monthly for quality control and to reduce burden at end of quarter)
- Consider utilization of physical logbooks; flagging patient charts when SUD is identified
- Work with EMR stakeholders to automate as much as possible
  - Create cues/utilize dot-phrases to ensure all needed info will be in the chart (referrals, MOUD, counseling, etc.)
- **Utilize small tests of change** (PDSA cycles) to experiment with data collection before April
- **Meet with our team before April 1 to strategize**
Bundle Measure Data Collection Begins April 1

We will let you know how it goes!

Questions?
Email info@cpcqc.org
Upcoming Data COL Events and Due Dates
Office Hours: Severe Maternal Morbidity

- Expert Group: National Perinatal Information Center
- For one-on-one technical assistance, please sign up for office hours.
  - Share your questions in advance.
- Date and Time: March 21, 2022 @ 2:00PM-3:30PM (EST)
- Registration closes: March 18, 2022 @ 12:00PM (EST)

Registration Link: https://us02web.zoom.us/meeting/register/tZ0vduGoqT4pHdUFHnfhW3K1Bp81khjHkUGz
# Upcoming Educational Offerings

<table>
<thead>
<tr>
<th>Topic</th>
<th>Educational Offering Data and Time</th>
<th>Guest Speaker/Faculty member</th>
</tr>
</thead>
</table>
| Data Quality: Hospital Records vs. Administrative Data | Session: April 05, 2022 (3:00PM-4:30PM) (EST) | Rebekah Gee, MD, MPH, MS  
Clinical Associate Professor, LSU Schools of Public Health and Medicine |
|                                                    | Office Hour: April 29, 2022 (2:00PM-3:30PM) (EST)           |                                                                                               |

The registration links for all the upcoming sessions and office hours has been posted on the [AIM Data Resources Webpage](#).
Any Questions?

aimdatasupport@acog.org

After the meeting ends, please take a moment to fill out a brief survey to share your experience.