



# Severe Maternal Morbidity: Trends and Disparities

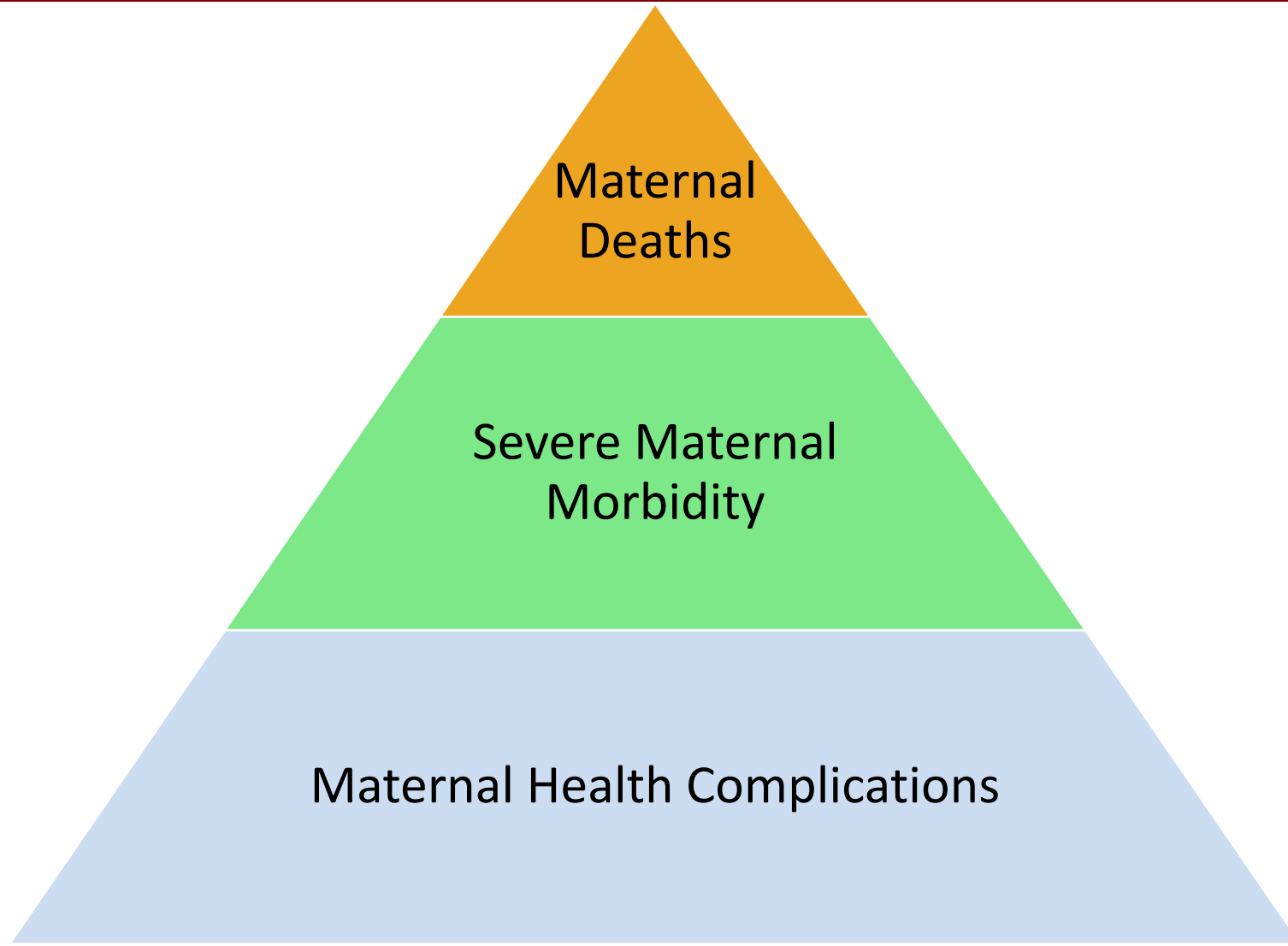
Advisory Committee on Infant and Maternal Mortality  
*March 20, 2023*

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Vision: Healthy Communities, Healthy People

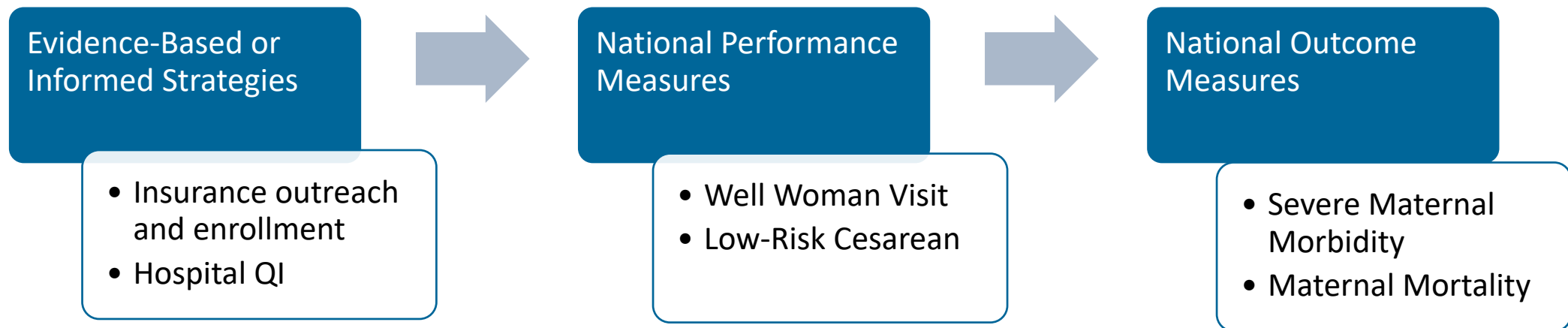


# Maternal Mortality and Morbidity



# Severe Maternal Morbidity (SMM) Surveillance

- HRSA collaborates with the Agency for Health Care Research and Quality (AHRQ; data purveyor) and the Centers for Disease Control and Prevention (CDC; measure developer) to pre-populate Title V Block Grant National Outcome Measure for SMM (NOM-2) from the Healthcare Cost and Utilization Project (HCUP) – State Inpatient Databases



# Outline

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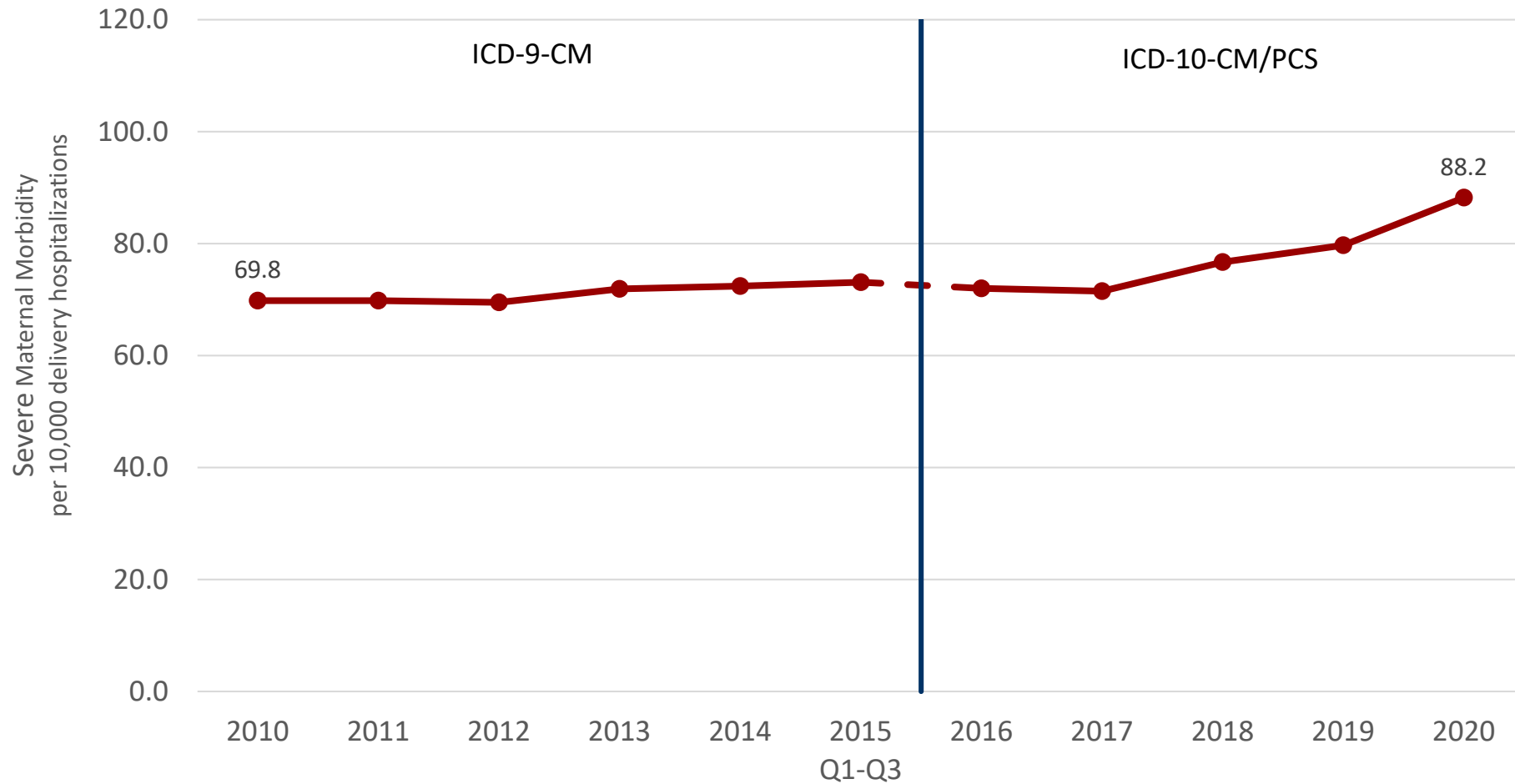
- Definition
- Trends
- Types
- Disparities
- Measurement Issues

# SMM Definition

- “Unexpected outcomes of labor and delivery that result in significant short or long-term consequences to a woman’s health” – CDC
  - 21 indicators (16 diagnosis and 5 procedures) from hospital discharge record codes
  - Recent analyses exclude blood transfusion only cases due to poor predictive value
    - HCUP Fast Stats <https://datatools.ahrq.gov/hcup-fast-stats>
    - Title V Federally Available Data Resource Document <https://mchb.tvisdata.hrsa.gov/Home/Resources>
    - Alliance for Innovation on Maternal Health <https://saferbirth.org/aim-data/resources/>
- Recent AHRQ, CDC, HRSA Publications
  - [Trends in Severe Maternal Morbidity in the US Across the Transition to ICD-10-CM/PCS From 2012-2019](#). JAMA Netw Open. 2022;5(7):e2222966.
  - [Associations Between State-Level Severe Maternal Morbidity and Other Perinatal Indicators](#). JAMA Netw Open. 2022;5(7):e2224621.
  - [Assessment of Incidence and Factors Associated With Severe Maternal Morbidity After Delivery Discharge Among Women in the US](#). JAMA Netw Open. 2021 Feb 1;4(2):e2036148.
- Forthcoming Publications
  - AHRQ analysis of COVID-related SMM increases
  - CDC analysis of SMM indicators accounting for in-hospital deaths



# SMM Trends, 2010-2020



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

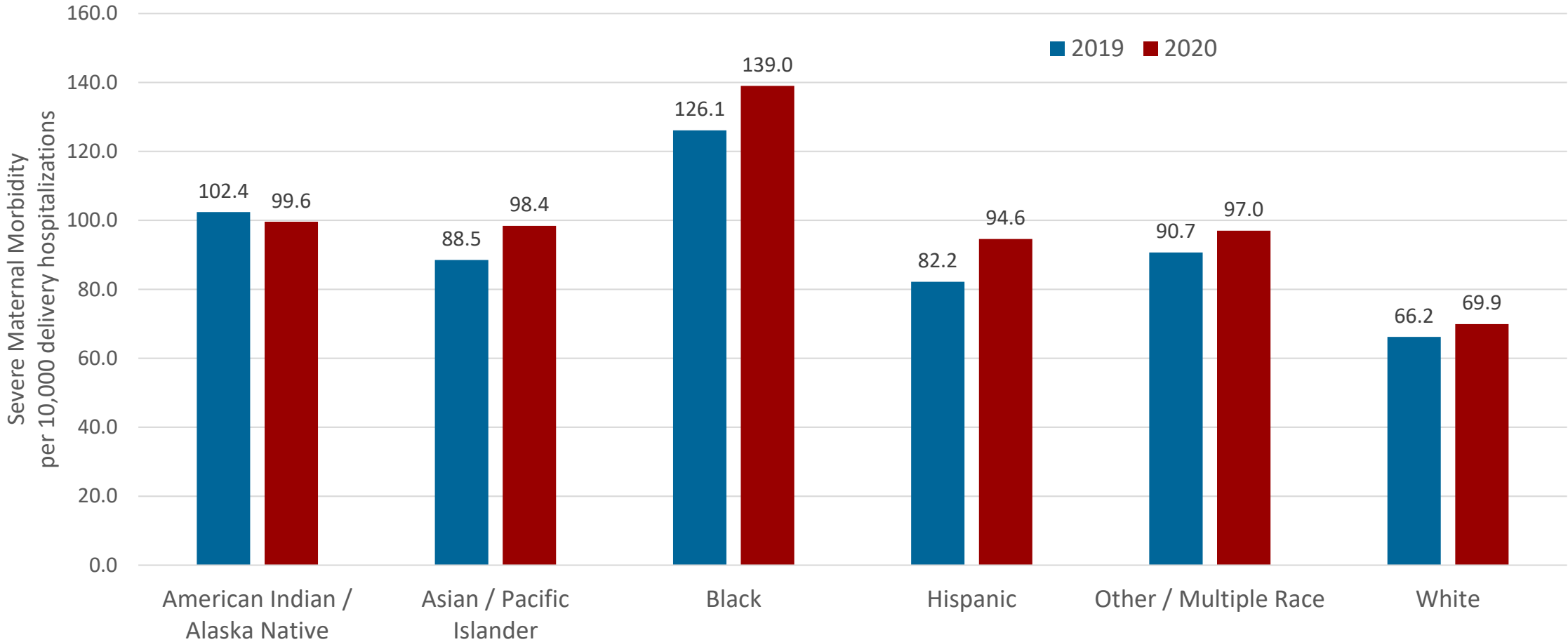


# SMM Indicator Grouping

Indicator Grouping	Indicators	2019 Rate per 10,000	2020 Rate per 10,000	Absolute Change	Relative Change
Hemorrhage	Disseminated intravascular coagulation Shock Hysterectomy	36.5	36.9	0.4	1%
Renal	Acute Renal Failure	15.7	19.2	3.5	22%
Respiratory	Adult respiratory distress syndrome Temporary tracheostomy Ventilation	11.6	15.7	4.1	35%
Sepsis	Sepsis	11.2	12.5	1.3	12%
Other Obstetric	Amniotic fluid embolism Eclampsia Severe anesthesia complications Air and thrombotic embolism	11.1	11.8	0.7	6%
Cardiac	Acute myocardial infarction Aneurysm Cardiac arrest/ventricular fibrillation Conversion of cardiac rhythm Heart failure/arrest during surgery Pulmonary edema / Acute heart failure	9.0	9.3	0.3	3%
Other Medical	Puerperal cerebrovascular disorders Sickle cell disease with crisis	4.6	5.0	0.4	9%



# SMM by Race and Ethnicity



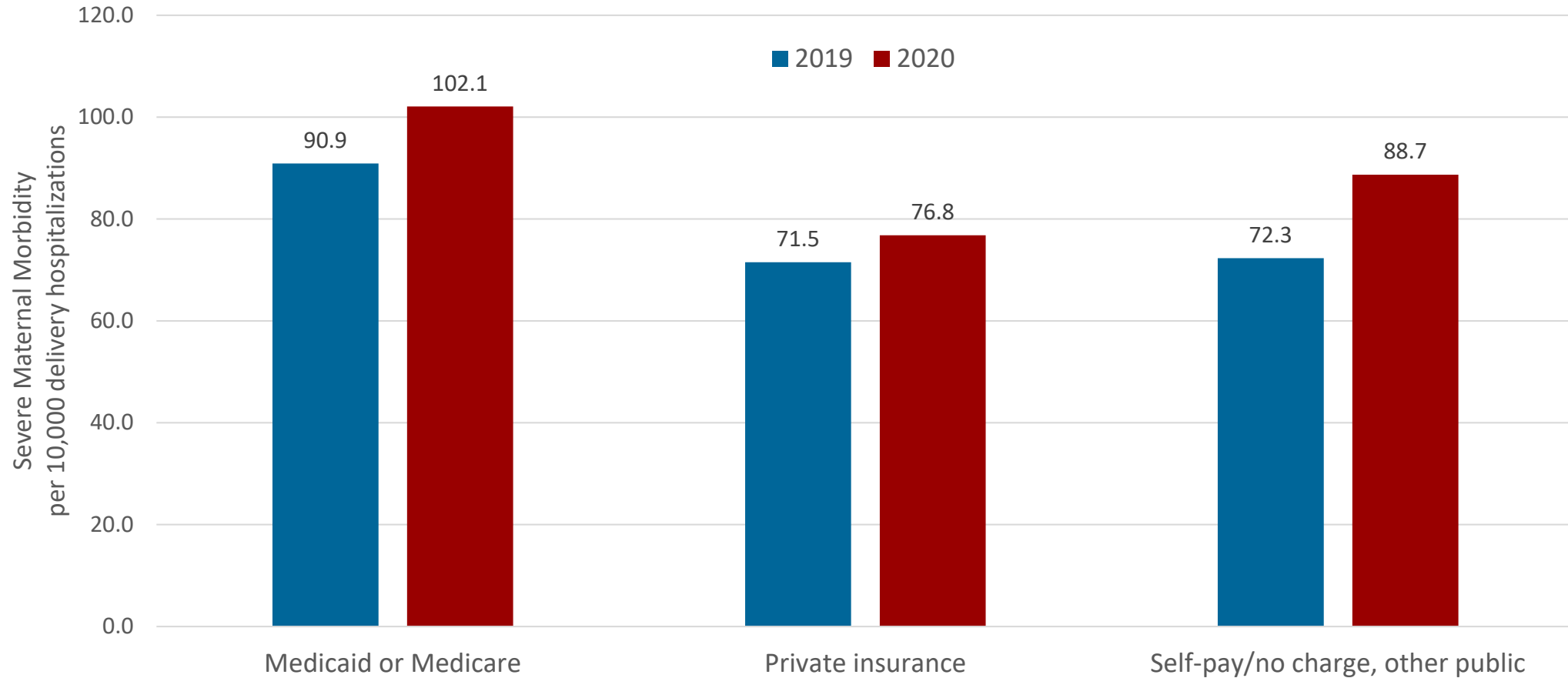
From 42 states with adequate reporting of race and ethnicity

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases





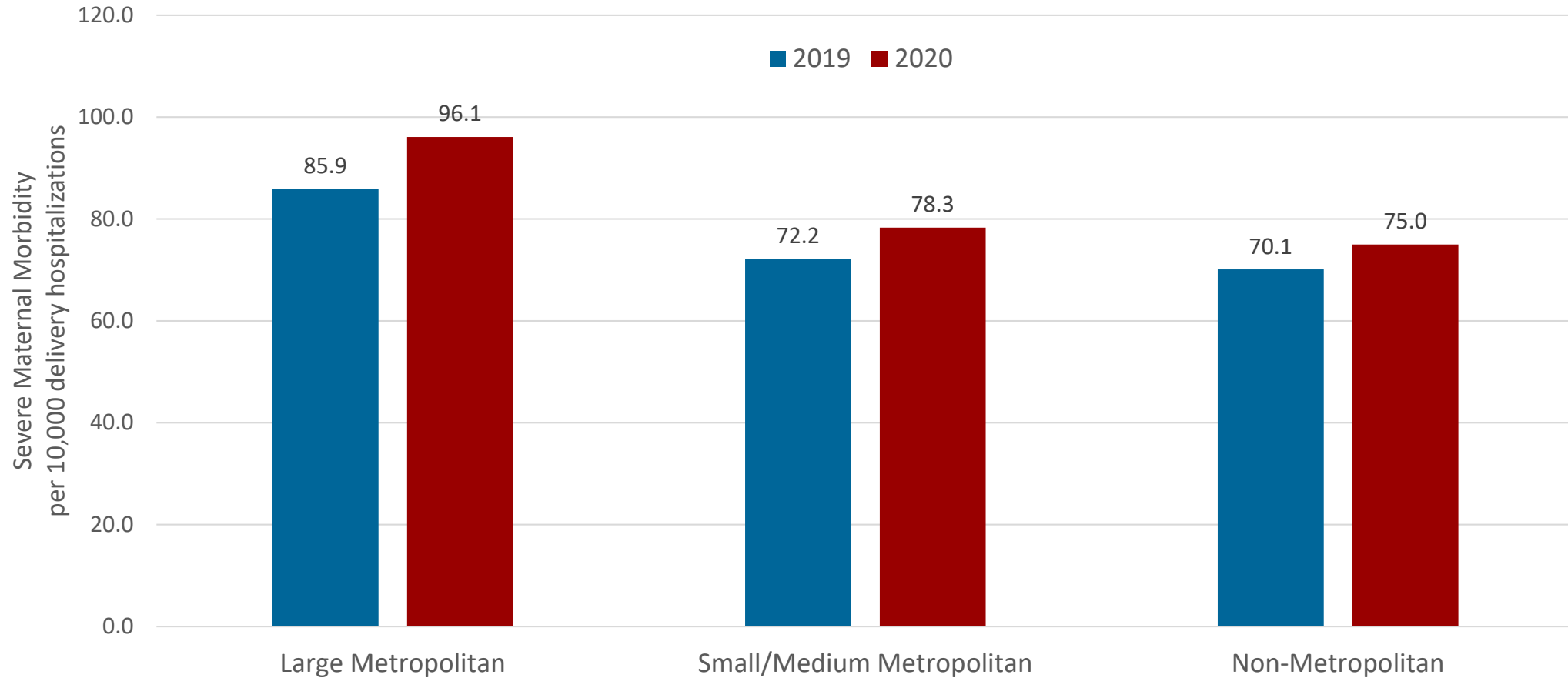
# SMM by Expected Payer



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



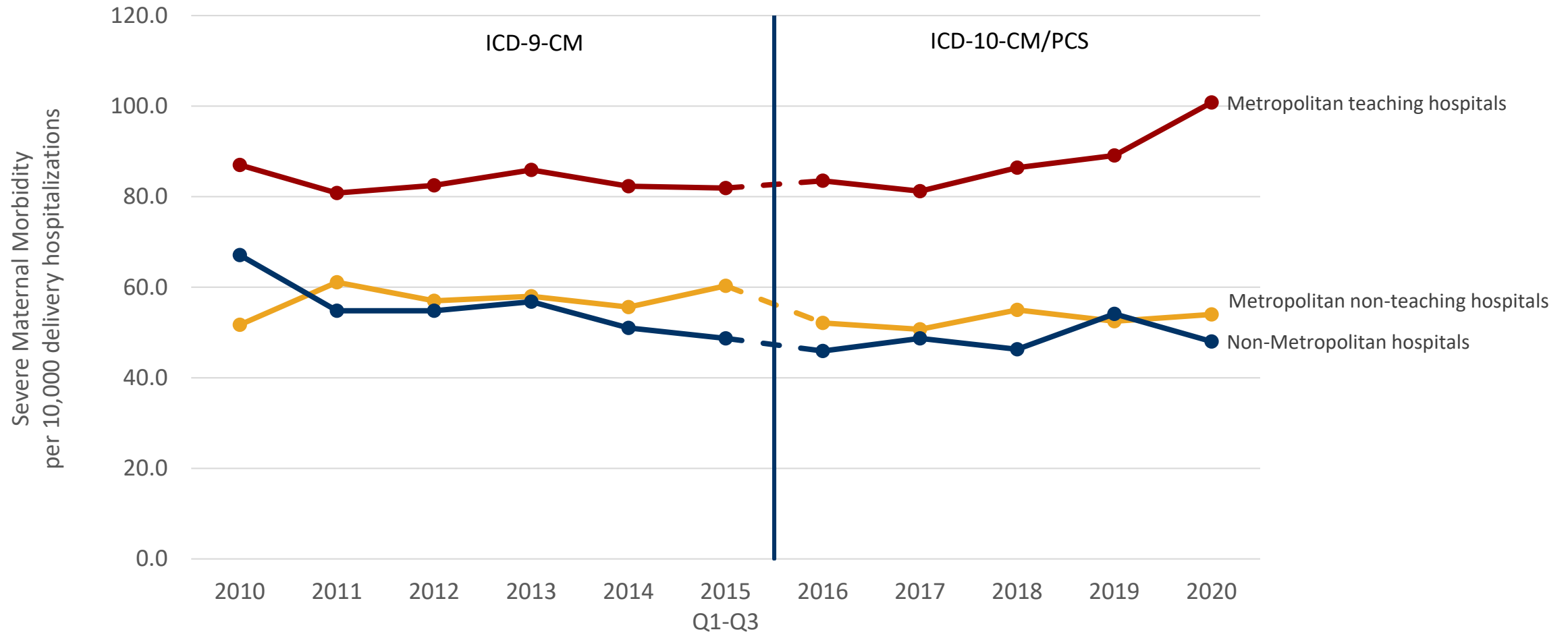
# SMM by Rural/Urban Residence



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



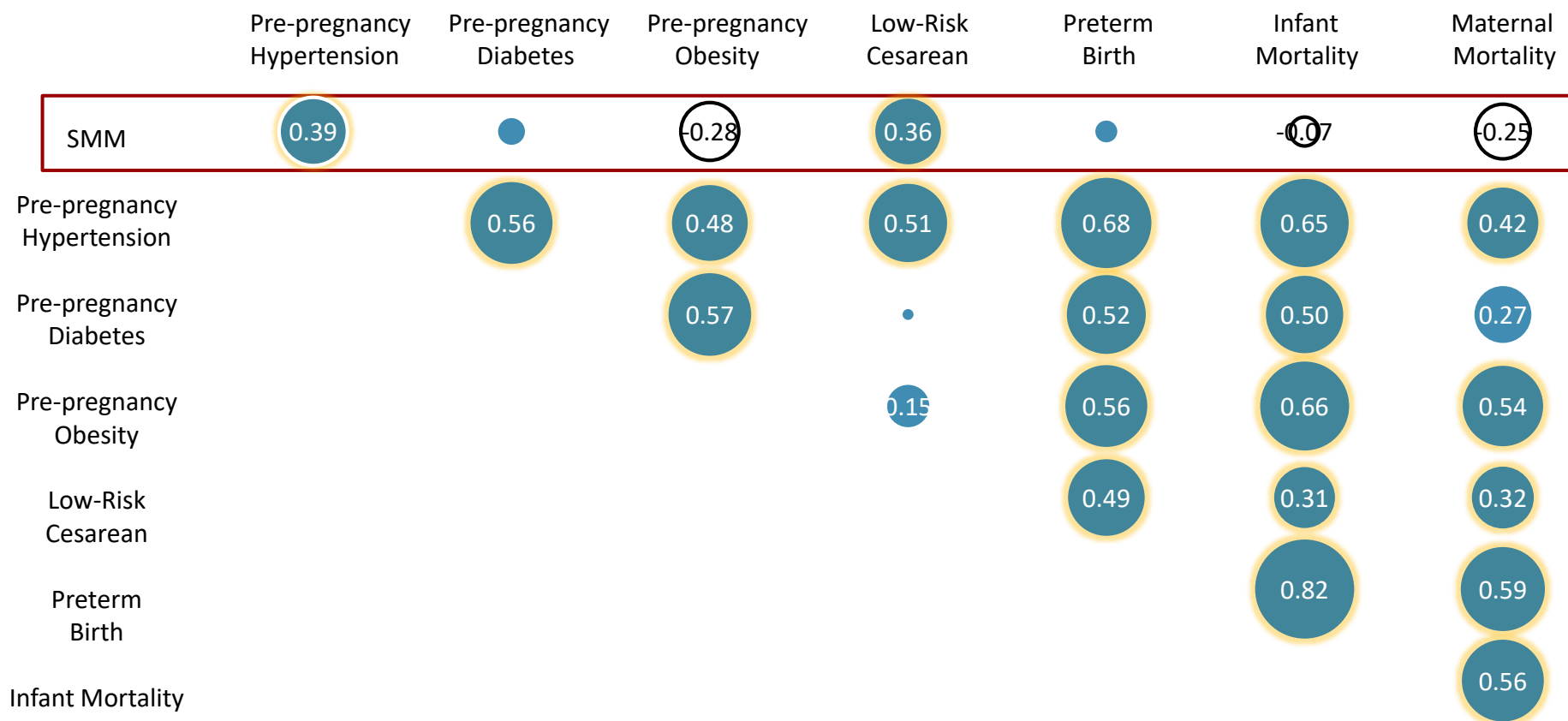
# SMM Trends by Hospital Location and Teaching Status



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



# State-level SMM Correlations with Perinatal Indicators



SMM only correlated with pre-pregnancy hypertension and low-risk cesarean

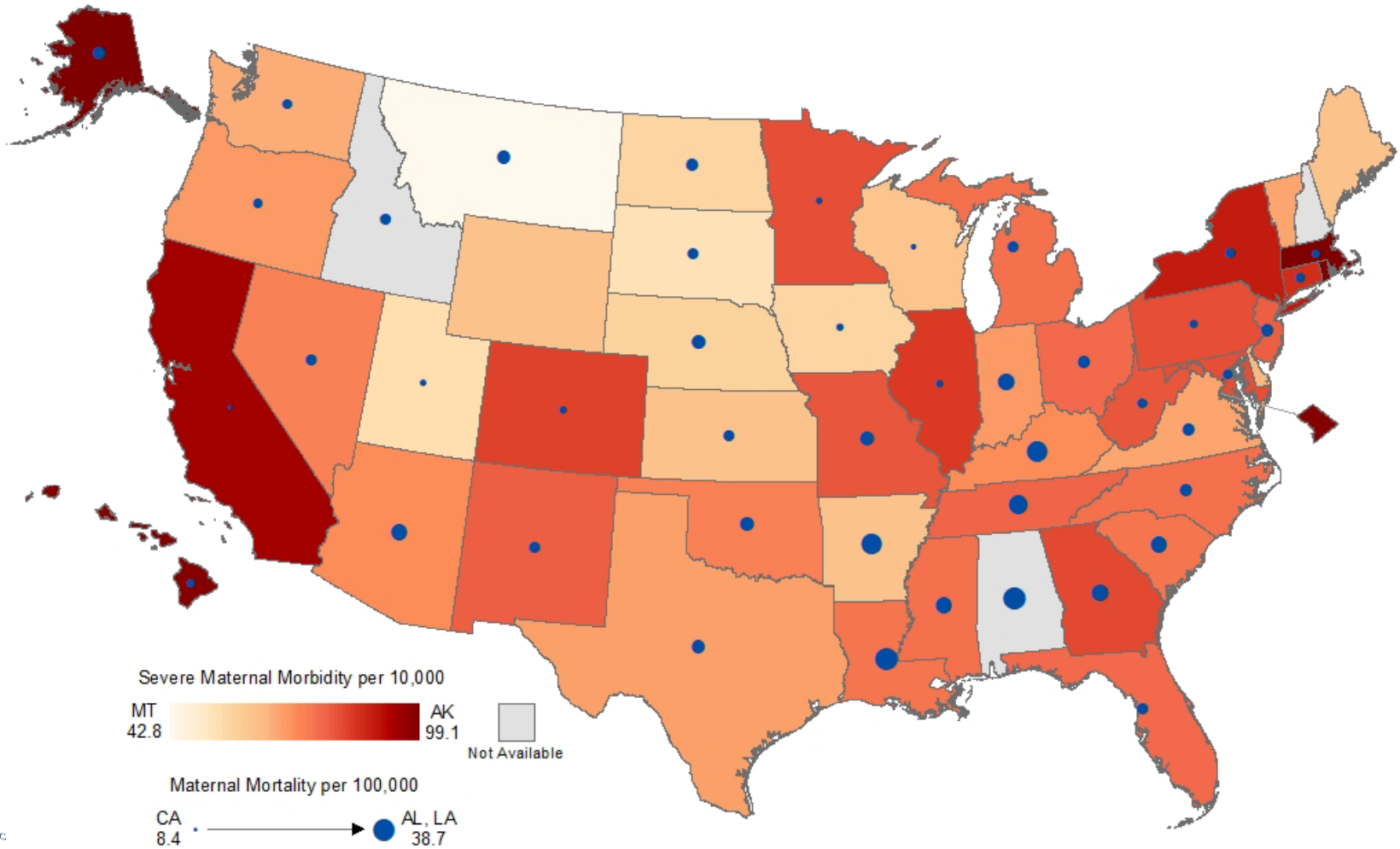
Stronger and more consistent correlations for all other perinatal indicators



**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 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



**SMM Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases, 2017-2019  
**MMR Source:** National Center for Health Statistics, National Vital Statistics System, Birth and Mortality Files, 2016-2020



# SMM Timing



- Recent analysis of IBM MarketScan data showed ~15% of de novo SMM occurred in the postpartum period



Chen J, Cox S, Kuklina EV, Ferre C, Barfield W, Li R. [Assessment of Incidence and Factors Associated With Severe Maternal Morbidity After Delivery Discharge Among Women in the US](#). JAMA Netw Open. 2021 Feb 1;4(2):e2036148.



# Contact Information

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