

Severe Maternal Morbidity Disparities in Oklahoma

Bellantoni, Jenna, MHS¹; Kunnel, Binitha, MS¹; Nobles-Botkin, Jill, MSN, APRN-CNM¹

¹Oklahoma State Department of Health

No author disclosures

BACKGROUND

Rates of severe maternal morbidity (SMM) have been increasing in the last decade, and particularly increased during the COVID-19 pandemic.^{1,2} In Oklahoma, there were substantial increases in SMM from 2020 to 2021, with respiratory complications of Acute Respiratory Distress Syndrome (ARDS) and ventilation increasing by over 70%, with 60% of those events co-occurring with a COVID-19 diagnosis at delivery.

There are also notable racial disparities in SMM for American Indian/Alaska Native (AIAN) persons, at both the national and state level.^{2,3} Additionally, from 2020-2021, AIAN persons in Oklahoma experienced disparities related to COVID-19, with lower rates of vaccination and higher rates of cumulative hospitalization and mortality compared to White persons.^{4,5}

STUDY QUESTION

Examine the disparities in SMM between AIAN and White persons, which specific indicators have the largest disparities, and if those disparities are related to COVID-19.

METHODS

SMM is defined as severe complications during labor and delivery, based on a list of 21 diagnostic and procedural indicators.⁶ SMM is identified by applicable ICD-10 codes in inpatient hospital discharges at state-licensed facilities. Some tribal facilities which are not licensed through the state may be excluded. Disparities were assessed by estimating the crude relative risk of SMM overall and individual indicators both overall and excluding discharges with a COVID-19 diagnosis, comparing AIAN and White discharges from 2019-2021. Indicators with at least 10 events in each group were assessed, for increased rate stability and relative risk precision. Analysis was performed using SAS and statistical significance was assessed by computing 95% confidence intervals of the crude relative risk estimates.

RESULTS

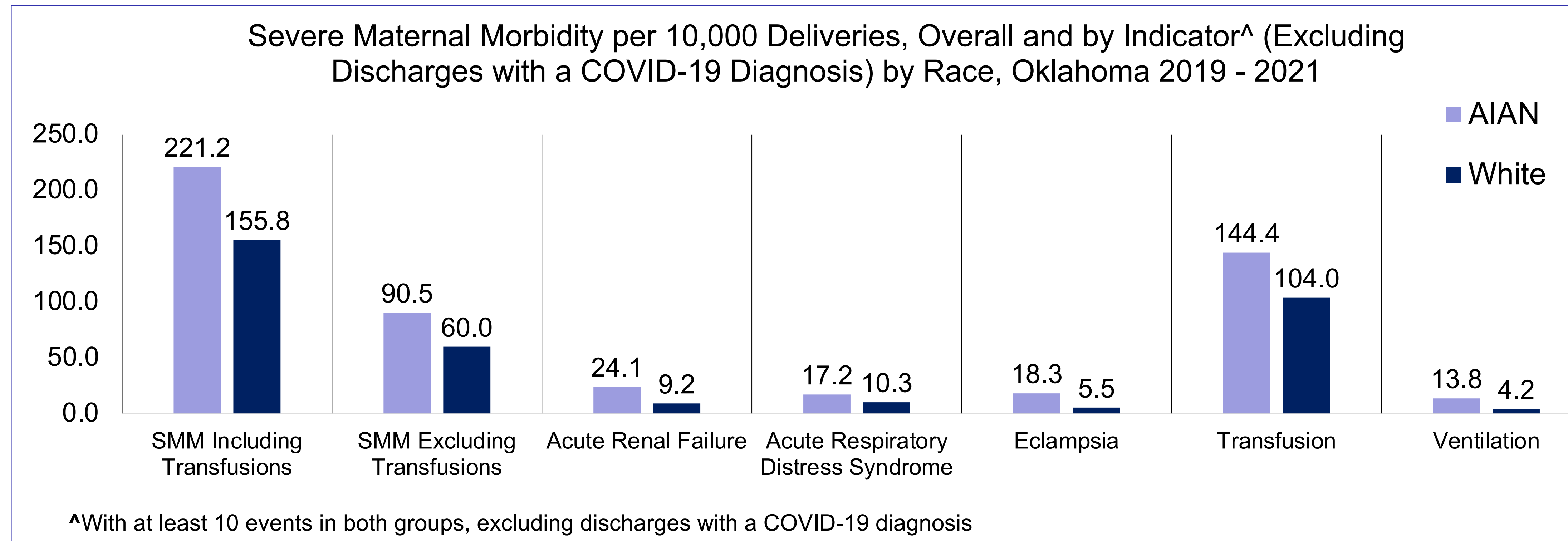
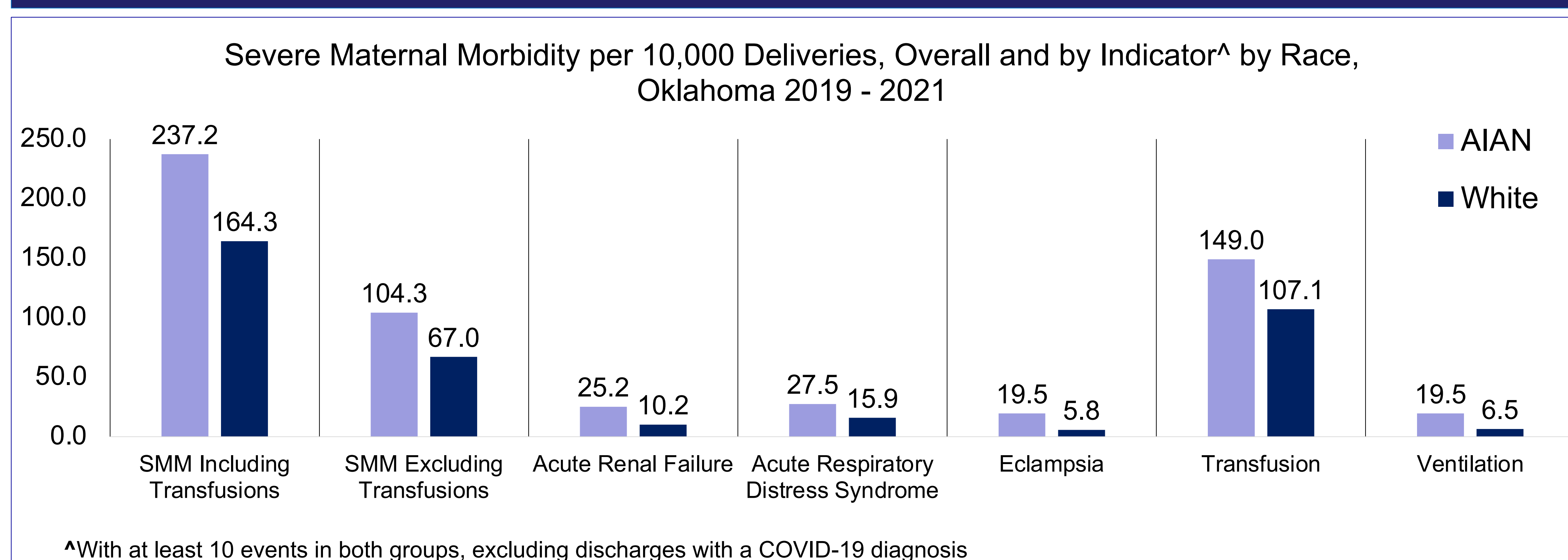


Table 1: Relative Risk of SMM Overall and by SMM Indicator for AIAN Persons, Oklahoma 2019 – 2021

Indicator	Relative Risk [^]	95% Confidence Interval
Severe Maternal Morbidity Overall		
SMM Including Transfusions	1.4*	1.3 - 1.7
SMM Excluding Transfusions	1.6*	1.3 - 1.9
Specific SMM Indicators (with at least 10 events, excluding discharges with a COVID-19 diagnosis)		
Acute Renal Failure (ARF)	2.5*	1.6 - 3.9
Acute Respiratory Distress Syndrome (ARDS)	1.7*	1.1 - 2.7
Eclampsia	3.4*	2.0 - 5.9
Transfusion	1.4*	1.2 - 1.7
Ventilation	3.0*	1.8 - 5.2

[^]Reference group: White persons
*Statistically significant at p<0.05

Table 2: Relative Risk of SMM Overall and by SMM Indicator for AIAN Persons, Excluding Discharges with a COVID-19 Diagnosis, Oklahoma 2019 – 2021

Indicator	Relative Risk [^]	95% Confidence Interval
Severe Maternal Morbidity Overall		
SMM Including Transfusions	1.4*	1.2 - 1.7
SMM Excluding Transfusions	1.5*	1.2 - 1.9
Specific SMM Indicators (with at least 10 events, excluding discharges with a COVID-19 diagnosis)		
Acute Renal Failure (ARF)	2.6*	1.6 - 4.3
Acute Respiratory Distress Syndrome (ARDS)	1.7	1.0 - 2.9
Eclampsia	3.3*	1.9 - 5.9
Transfusion	1.4*	1.2 - 1.7
Ventilation	3.3*	1.7 - 6.3

[^]Reference group: White persons
*Statistically significant at p<0.05

CONCLUSIONS

AIAN persons had significantly higher rates of SMM compared to White persons. Though COVID-19 contributed to SMM overall and specifically ARDS and ventilation, the **disparities persisted even when excluding COVID-19 diagnoses**, suggesting that disparate effects of COVID-19 did not drive the disparities in SMM.

The indicators with the largest significant disparities (eclampsia, ventilation, and ARF) have **risk factors** which **include infections** like flu or COVID-19, as well as **chronic conditions** such as hypertension, diabetes, and higher BMI⁷⁻¹⁰, all of which were significantly more prevalent in AIAN persons giving birth from 2019 – 2021.

Access to routine preconception, prenatal, and postpartum care may allow for more comprehensive prevention, management, and treatment of chronic and pregnancy-related conditions contributing to morbidity and mortality. Improving **preconception health** and promoting chronic disease management, receiving important **vaccinations**, and accessing **prenatal care** and resources during and after pregnancy are a priority in working to reduce these disparities. Specialized care and public awareness campaigns with culturally competent messaging are vital tools in this endeavor. **State partners, nongovernmental partners, and communities have been and should continue collaborating to create and sustain programs to address the pressing contributors to disparities in maternal morbidity.**

References:

1. HCUP Fast Stats. Healthcare Cost and Utilization Project (HCUP). December 2022. Agency for Healthcare Research and Quality, Rockville, MD. Accessed July 6, 2023. <https://datatools.ahrq.gov/hcup-fast-stats/>
2. Oklahoma Maternal Mortality Review Committee Annual Report 2023. Oklahoma State Department of Health.
3. Kozhimannil KB, Interrante JD, Tofte AN, Admon LK. Severe Maternal Morbidity and Mortality Among Indigenous Women in the United States. *Obstet Gynecol*. 2020 Feb;135(2):294-300. doi: 10.1097/AOG.0000000000003647. PMID: 31923072; PMCID: PMC7012336.
4. Oklahoma State Department of Health (OSDH), Acute Disease Service and Center for Health Statistics 2020 to 2021, on Oklahoma Statistics on Health Available for Everyone (OK2SHARE). Accessed at <http://www.health.ok.gov/ok2share> on 13FEB2024;13:24:13.
5. Oklahoma State Department of Health. Acute Disease Service. COVID-19 Weekly Report: Weekly Epidemiology and Surveillance Report December 26, 2021 – January 1, 2022. Accessed July 6, 2023. <https://oklahoma.gov/content/dam/ok/en/covid19/documents/weekly-epi-report/2022/2022.01.05%20Weekly%20Epi%20Report.pdf>
6. Severe Morbidity Indicators and Corresponding ICD-9-CM/ICD-10- CM/PCS Codes during Delivery Hospitalizations. Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. Accessed July 6, 2023. <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm>
7. Preeclampsia and Pregnancy. The American College of Obstetricians and Gynecologists (ACOG). December 2021. <https://www.acog.org/womens-health/infographics/preeclampsia-and-pregnancy>
8. Bartsch, E., Medcalf, K. E., Park, A. L., & Ray, J. G. (2016). Clinical risk factors for pre-eclampsia determined in early pregnancy: Systematic review and meta-analysis of large cohort studies. *BMJ*, 11753. <https://doi.org/10.1136/bmj.i1753>
9. Lapinsky SE. Acute respiratory failure in pregnancy. *Obstet Med*. 2015 Sep;8(3):126-32. doi: 10.1177/1753495X15589223. Epub 2015 Jun 10. PMID: 27512467; PMCID: PMC4935019.
10. Shah, S., Meganathan, K., Christianson, A. L., Harrison, K., Leonard, A. C., & Thakar, C. V. (2020). Pregnancy-related acute kidney injury in the United States: Clinical outcomes and health care utilization. *American Journal of Nephrology*, 51(3), 216–226. <https://doi.org/10.1159/000505894>

