February SCBOI Monthly Meeting

Alliance for Innovation on Maternal Health

SFY 2024 Data Update

February 2025

Sarah Gareau, DrPH, MCHES
Assistant Professor
Director of Health Services Research and Policy

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- Linga Murthy Kotagiri, MD, MPH; Research Associate/Policy Analyst

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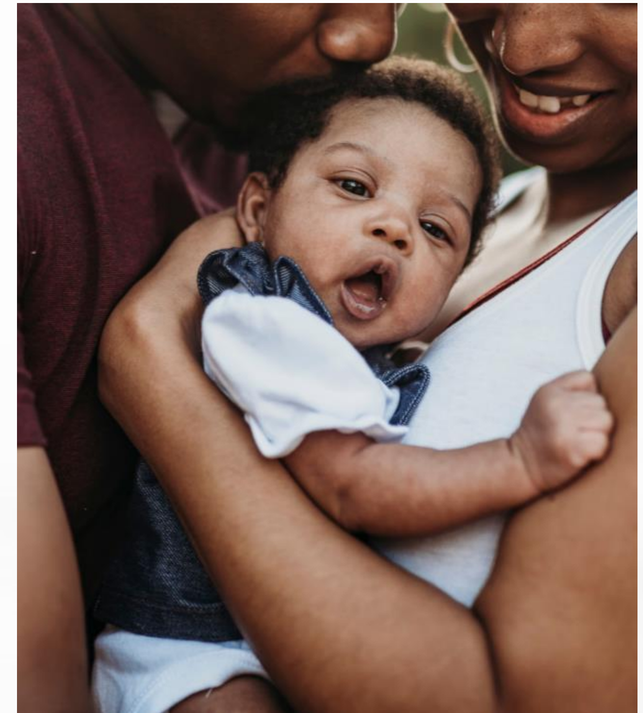

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Background

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Background

- In May 2019, SC officially became an Alliance for Innovation on Maternal Health (AIM) state. AIM is a national data-driven maternal safety and quality improvement (QI) initiative focused on improving maternal outcomes.
- In August 2021, AIM's first patient safety bundle (PSB) focused on obstetric hemorrhage (OB Hem) was introduced. October 2023 marked the last month of this bundle.
- **On November 8th, 2023, the severe hypertension (HTN) in pregnancy PSB was implemented in SC** as hypertensive disorders during pregnancy continue to be one of the leading known causes of preventable severe maternal morbidity and mortality.
- Like the obstetric hemorrhage PSB, this bundle includes a set of actionable steps, defined as **process** and **structure** measures, which can be adapted by facilities to improve **outcomes**.

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Background (cont.)

- According to AIM, **process measures** reflect evidence-based best practices adopted to improve outcomes, and **structural measures** are used to examine infrastructural capacity, systems, and processes. AIM requires reporting of these measures to assess bundle progress and eventual success.
- The University of South Carolina Institute for Families in Society (IFS) has led the AIM data collection for the state since its integration in the program.
- To provide the required reporting to AIM, IFS develops and administers a quarterly survey to facility AIM champions. Participation in the survey is essential in guiding data-driven policies which can impact labor and delivery practices statewide.
- The first severe HTN in pregnancy bundle survey was administered in January 2024 (76% response rate). This presentation will provide a summary of the most recent data and survey, launched September 2024, highlighting outcomes and process and structure measure results following AIM's bundle structure known as the 5 R's.

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AIM OUTCOME MEASURES

Data from State Fiscal Year (SFY) 2024

SMM represents unexpected outcomes of labor and delivery that can result in short or long-term consequences. It reflects 20 conditions of severity and near missed events as defined by AIM.

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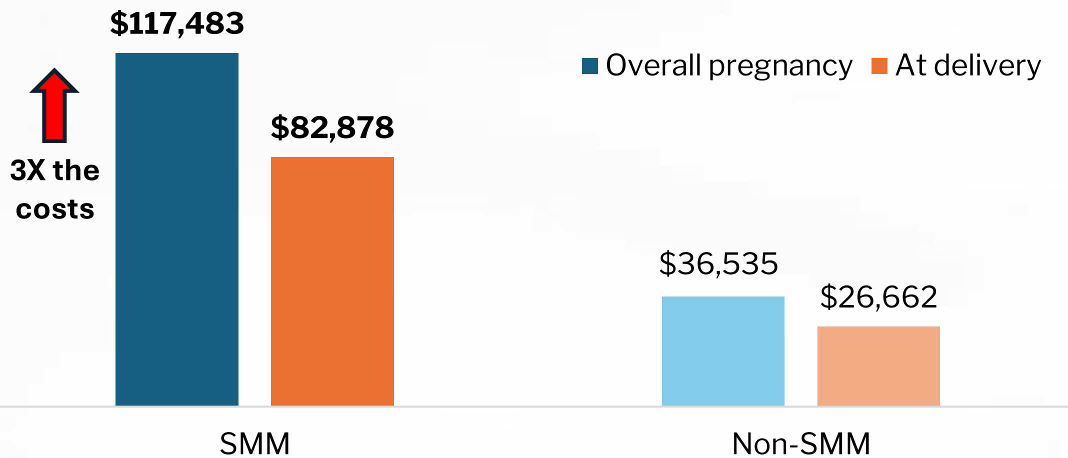
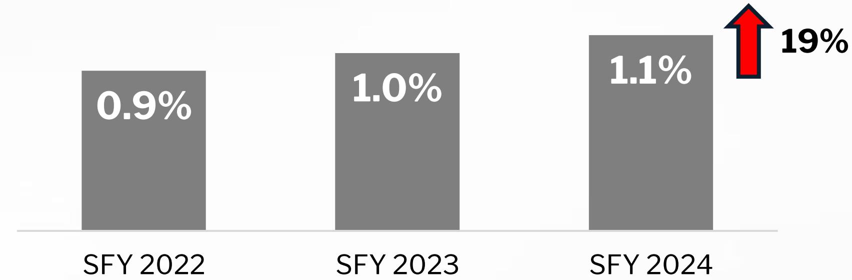
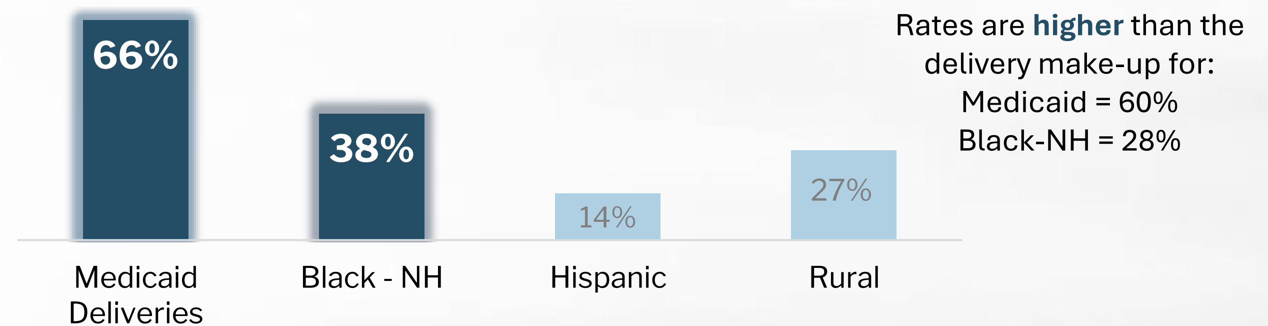
SMM VS. NON-SMM CHARACTERISTICS

(SFY 2024)





All SMM measures have increased over the last three SFYs with **statistically higher increases** in overall SMM **and SMM among those with perinatal mental health conditions (37%).**



Rates are **higher** than the delivery make-up for:
Medicaid = 60%
Black-NH = 28%

In a 2023 study, SC ranked 6th in the nation for SMM among individuals with Medicaid insurance.

(Admon et al.)

SMM deliveries are seen at a higher rate among Black-NH patients, those 35-54 years old, Medicaid beneficiaries, and those with co-existing physical and behavioral health conditions.

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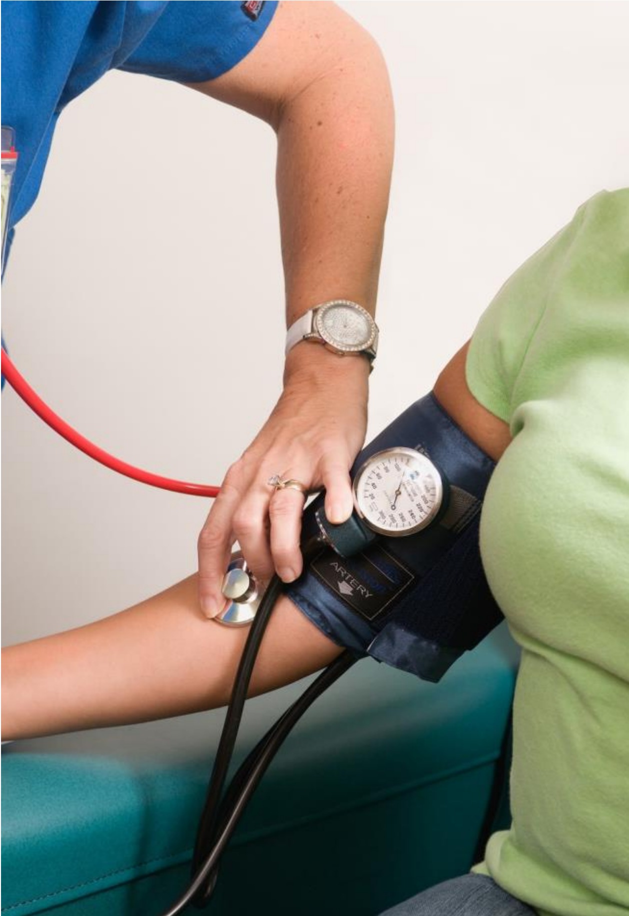
Definition: Severe Hypertension



Using ICD-10 and DRG codes, we analyzed deliveries from the state fiscal year 2024 (SFY 2024) to determine maternal severe hypertension characteristics and trends over time.

<u>Severe Hypertension (AIM definition):</u>

- Systolic blood pressure ≤ 160 mmHg, or diastolic blood pressure ≤ 110 mmHg at or after 20 weeks of gestation in a previously normotensive patient. This accounts for obstetric patients with a diagnosis code for severe preeclampsia, eclampsia, and preeclampsia superimposed on pre-existing hypertension.

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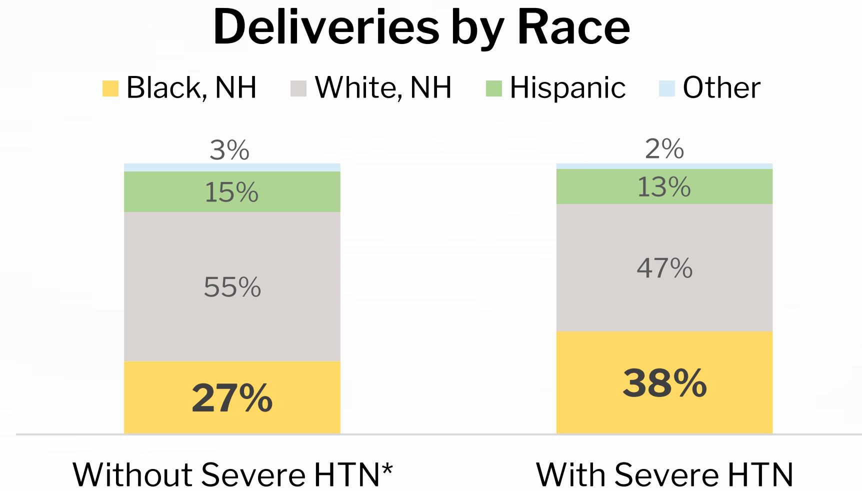
SFY 2024 Severe Hypertension (HTN) Delivery Characteristics

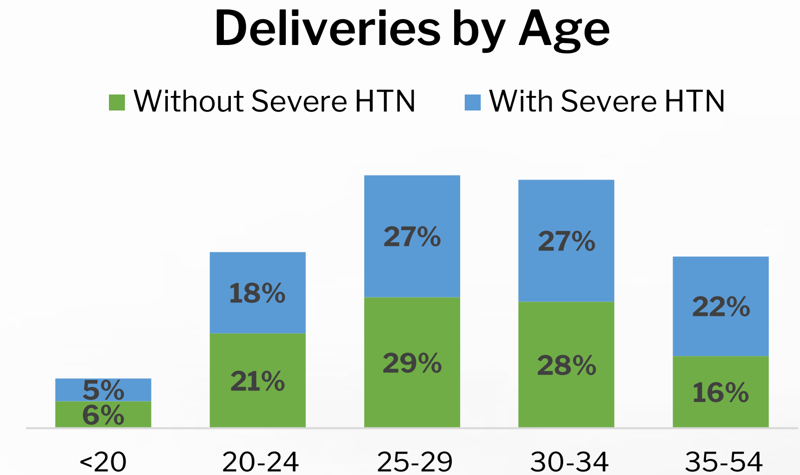
Severe HTN Deliveries
N = 3,178
(6.1%)

Results reflect those diagnosed with severe hypertension at delivery.

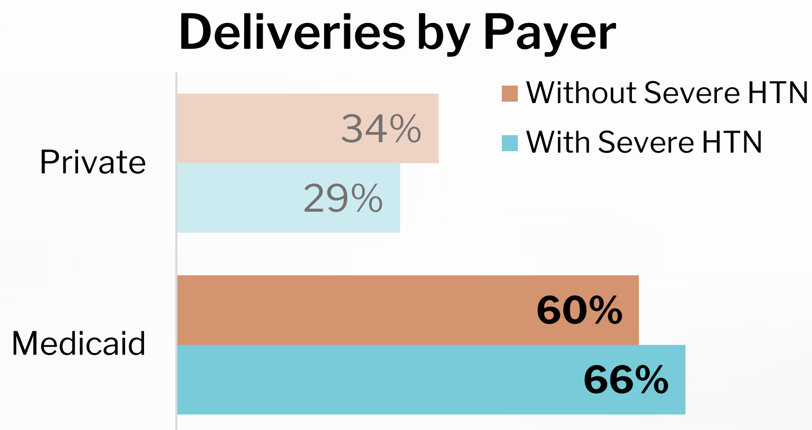
Deliveries by Race



Deliveries by Age



Deliveries by Payer



Perinatal Level III/IV Deliveries

Without Severe HTN	With Severe HTN
38%	57%

***NOTE:** Deliveries without severe hypertension are inclusive of chronic hypertension.

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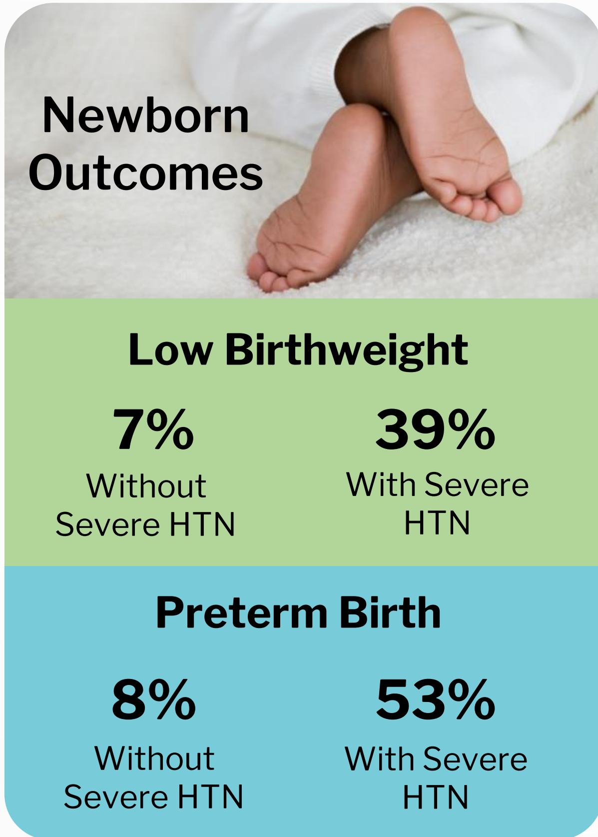
SFY 2024 Severe Hypertension (HTN) Delivery Characteristics (cont.)



Newborn Outcomes

Low Birthweight

7% Without Severe HTN

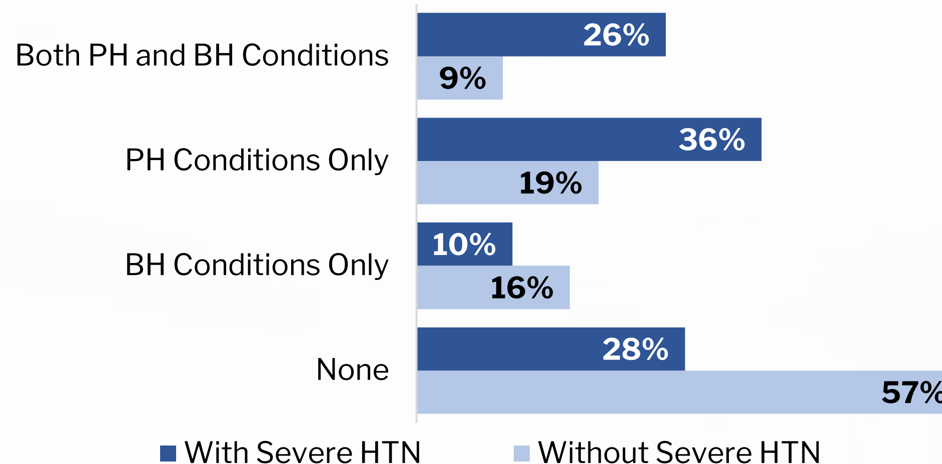
39% With Severe HTN

Preterm Birth

8% Without Severe HTN

53% With Severe HTN

Co-occurring Conditions Profile*



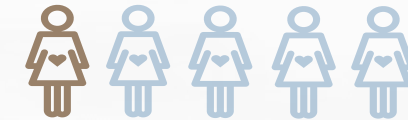
Potentially Avoidable Primary Cesarean

Without Severe HTN: 23%

With Severe HTN: 41%

For deliveries with or without severe hypertension:

1 in 5 had a high level of social vulnerability



Over 1/4 resided in rural areas

Up to 20% experienced inadequate prenatal care

NOTE: Behavioral health (BH) and physical health (PH) conditions: PH excludes severe hypertension. Chronic hypertension, obesity, cardiovascular disease, and diabetes are included.

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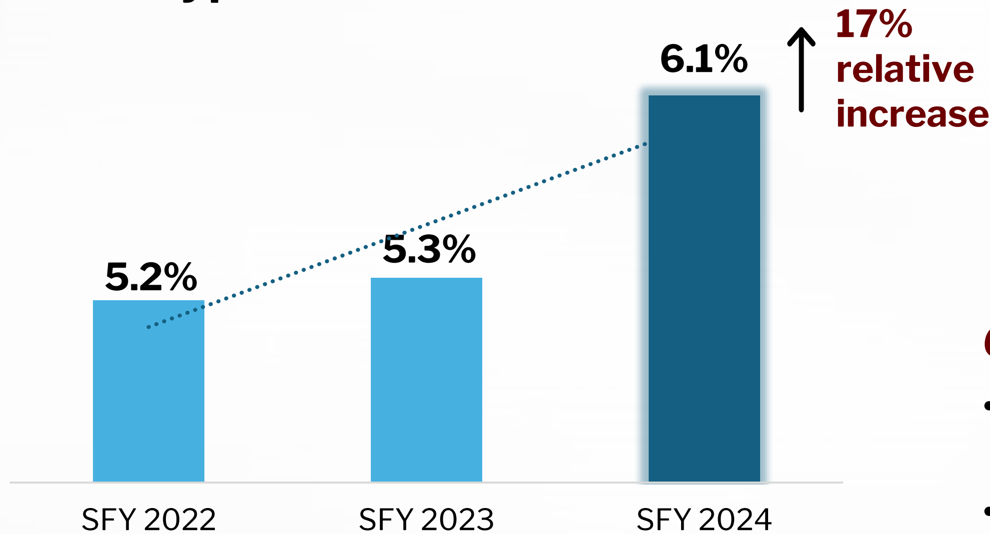
Trend: Severe Hypertension Deliveries



QUICK FACTS

- In the last quarter of SFY 2024, roughly **1 in 3** delivery patients had any hypertension*.
- Reflecting missed opportunities for prevention**, 1 in 4** chronic hypertensive patients* suffered a severe hypertensive event at delivery (N=1,190, 25%).
- As of the start of the bundle's implementation (Q4 2023), severe hypertension was at a three-year high with a rate of **6.6%.**

***Note:* Chronic Hypertension** is defined as a systolic blood pressure ≤ 140 mmHg, or diastolic blood pressure ≤ 90 mmHg prior to pregnancy or before 20 weeks of gestation. **Any Hypertension** is inclusive of any chronic hypertension (hypertensive disease, preexisting hypertension complicating pregnancy or postprocedural hypertension) or pregnancy induced hypertension (gestational hypertension, preeclampsia and eclampsia) identified during the 12 months prior to delivery and at the time of delivery using the ICD-10 codes, DRG codes and VR flags.

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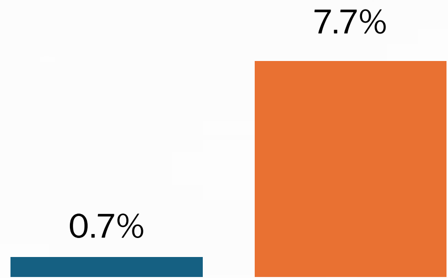
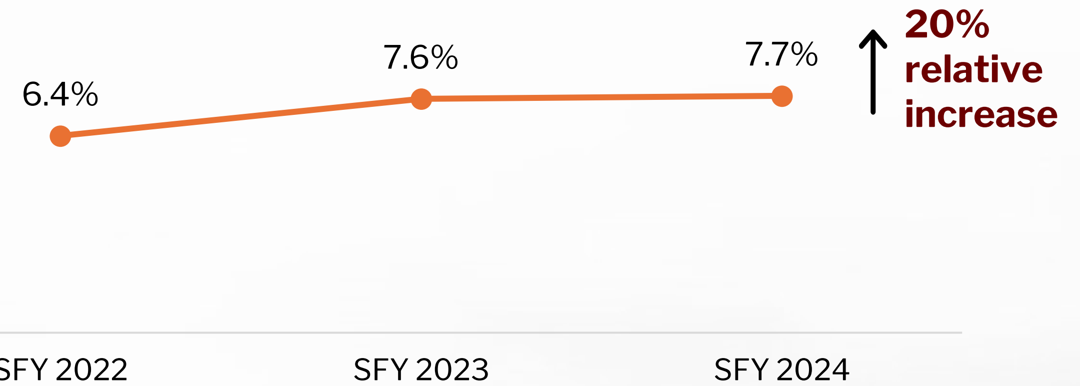
SMM Among Severe Hypertension Deliveries





TAKEAWAYS

- Higher prevalence of SMM among Severe HTN deliveries compared to those without severe HTN for SFY 2024 (167% higher) .
- Increasing trends were noted for SMM among Severe HTN deliveries.

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AIM Severe Hypertension in Pregnancy Survey Results

Launched September 2024

AIM PROCESS AND STRUCTURE MEASURES

IMPORTANT: Data collection for this survey is recognized as an outlier due to Hurricane Helene's statewide impact, resulting in limited comparison to the previous survey and lower than average rates.

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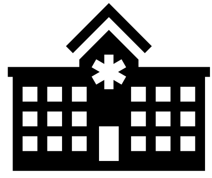


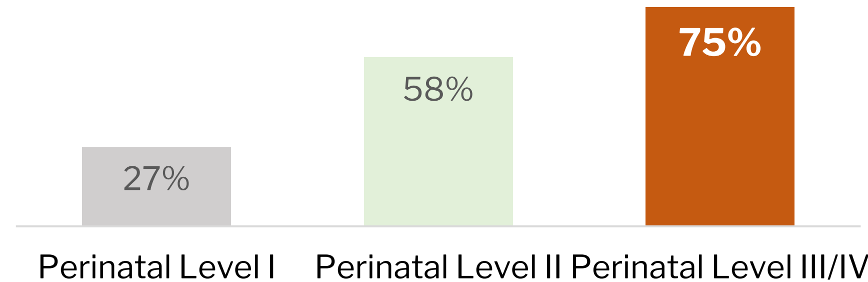
Respondent Demographics

23 of 38

AIM Champions

61% response rate

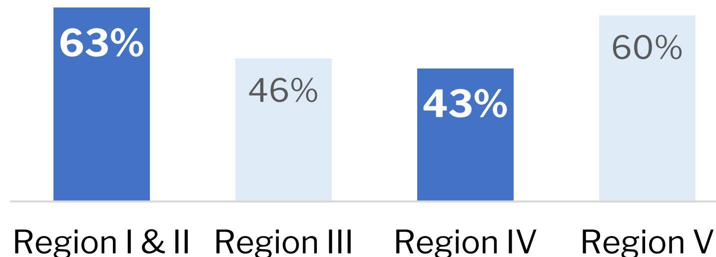
(-15% from baseline)



NEW! Demographic Questions

- Most held titles: Director, Nurse Manager, Quality Coordinator, and OB Educator
- **Over half** had more than 1 year experience with the AIM program
- **2 in 3** respondents reported playing a clinical role
- Most were also currently implementing the obstetric hemorrhage **(74%)** and safe reduction of primary cesarean **(70%)** bundles at their hospital at the time of the survey.

Response Rate by Perinatal Region



Non-Respondent Demographics

- Nearly 60% **of hospitals in the Pee Dee** did not respond.
- **Six (40%) were Perinatal Level II**, representing 32% of all Level II facilities and 16% of all birthing facilities participating in AIM.
- Non-respondents represented **32%** of all CY23 and Medicaid deliveries.*

****NOTE:*** One hospital not included as data reporting cannot be distinguished between its parent hospital.

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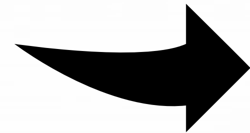
READINESS

Timely Treatment of Persistent Severe HTN (N/D)

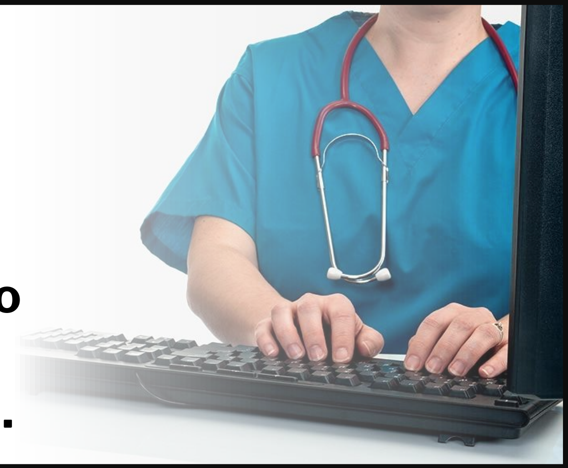
43% Unaware

of how many delivery patients with persistent severe HTN within their hospital were treated **within 1 hour** with IV Labetalol, IV Hydralazine, or PO Nifedipine.

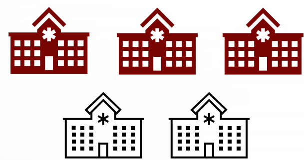


30%

identified this measure as unreportable due to challenges with measure collection.



Unit Standard Protocol



Roughly **60%** of hospitals reported having a "fully in place" standard protocol for early warning signs, diagnostic criteria, monitoring, and treatment of severe preeclampsia/eclampsia.

Unit Drills

1.5

Average number of unit drills (in Situ or Sim Lab) over the last quarter. Of those, 61% of hospitals had drills on severe hypertension and obstetric hemorrhage readiness.

Note: All survey measures were reported for the "last quarter", defined as April 1 through June 30, 2024.

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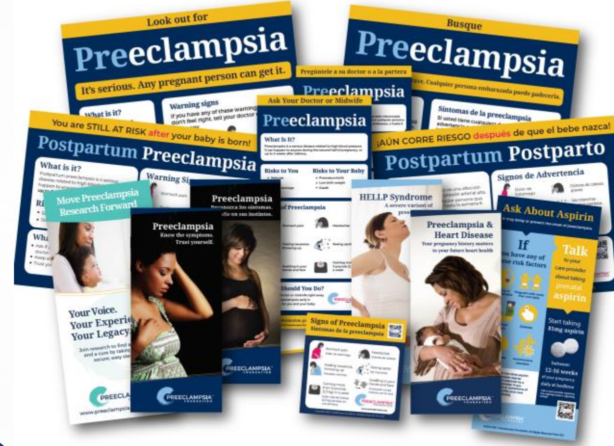
RECOGNITION AND PREVENTION

ED Screening

65%

of hospitals had a protocol "fully in place" for standardized verbal screening for current or past pregnancy in the past year as part of its triage process.



Patient Education

87%

of hospitals had a protocol "fully in place" for developing/curating patient education materials on urgent postpartum warning signs.

Highest benchmark (95%) for preeclampsia education among:

OB Physicians and Advanced Practice Clinicians: 100% (13/13)

OB Nurses: 91% (19/21)

Clinical ED Providers and Nursing Staff: 58% (7/12)

Roughly 48% of participating facilities marked these measures as "unknown".

IFS-led collection of hospital postpartum care discharge materials showed that of those who responded (21/38 hospitals) **half** potentially may not have included content on postpartum warning signs.

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RESPONSE

Scheduling of PP BP and Symptoms Checks (N/D)

10%

met the highest benchmark of delivery patients with **persistent severe HTN** having a blood pressure check scheduled within **3 days** after discharge.

55%

met the highest benchmark of delivery patients with a documented diagnosis of **other HTN** (excluding persistent) having a blood pressure check scheduled within **7 days** after discharge.

Roughly 52% of participating facilities did not respond to these measures.

Patient Event Debriefs

Exactly **1 in 2** hospitals reported having a protocol “fully in place” for patient event debriefs. However, that same proportion of hospitals also stated that they did not have the data capacity to report on how many delivery patients were verbally briefed.

Note: Denominators vary by measure due to skipped items. The highest benchmark equates to 90-100% of the respective population.

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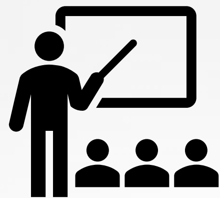

REPORTING AND SYSTEMS LEARNING

Multidisciplinary Case Reviews

73% of hospitals reported having a process "fully in place" to perform multidisciplinary systems-level reviews of cases of severe maternal morbidity.

Slight decrease (3%) from previous survey.

Clinical Team Debriefs

68% of hospitals reported having a system "fully in place" to perform regular formal debriefs with the clinical team after cases with major complications.

Slight increase (3%) from previous survey.

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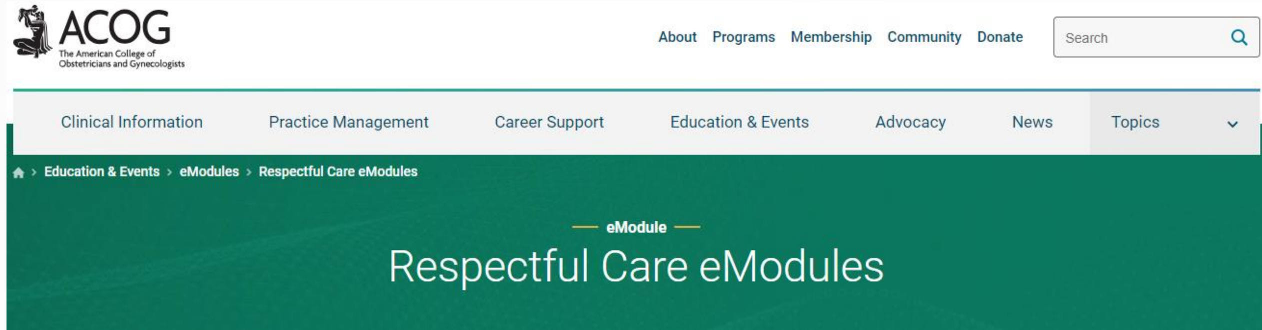
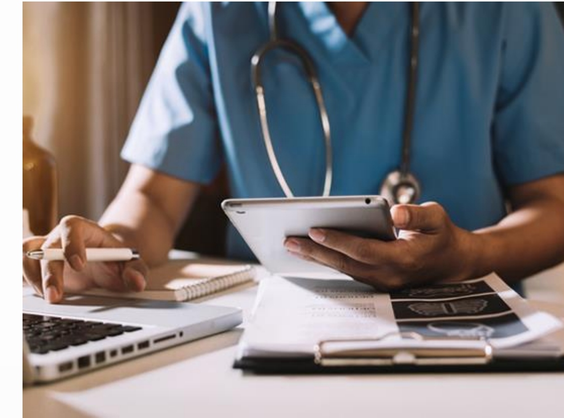
RESPECTFUL, EQUITABLE, AND SUPPORTIVE CARE



In the SC Maternal Morbidity and Mortality Review Committee 2024 Legislative Brief **discrimination was recognized as a contributing factor in more than one third of the pregnancy-related deaths reviewed**.

The American College of Obstetricians and Gynecologists has free eModules dedicated to race and equity in OB/GYN, which focus on the following topics:

- Race and equity
- Historical foundations
- Respectful care



Over 55% of hospitals reported that they did not know what proportion of OB physicians and advanced practice clinicians had received education on respectful and equitable care.

On the contrary, education among OB nurses is widely reported with upwards of **94% (17/18) meeting the highest benchmark proportion** (95%) of nurses receiving this training.

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NEW!
Open-Ended Items

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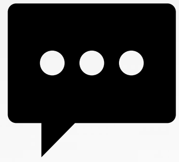

NEW! OPEN-ENDED ITEMS

For this second AIM Severe Hypertension in Pregnancy survey, we chose to add **four new open-ended items** to learn more about the hospital's priorities and challenges related to the bundle and recommendations for the work of the Quality and Patient Safety Workgroup.

1. Now that you have completed the survey, please rank your hospital's three highest needs for future bundle implementation.

1. Timely treatment of persistent severe hypertension (43%)
2. Scheduling of postpartum BP and symptoms checks (43%)
3. Provider, ED, and nursing education on severe HTN (24%)

2. What barriers does your hospital face in providing timely response to severe hypertension/preeclampsia?

Limited staff

"Small unit with limited staff, often heavy assignments for each nurse which may delay care."

Poor and untimely recognition

"We just implemented color-coded recognition, but the barrier is immediate recognition."

"Some delays in recognition in ED."

Not following set algorithms

"Many of our providers are not following best practices or safety bundles."

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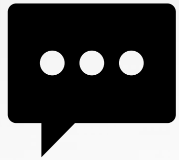


NEW! OPEN-ENDED ITEMS (cont.)

3. Please describe any challenges your hospital faced with submitting the measures in this survey.

Unable to pull data, no software to assist, and accuracy.

"We do not have measures in place to collect the necessary data to report our performance of the measures that are being tracked."

"We do not have reporting capabilities for the questions. It is a manual pull."

"Building the software to pull accurate data was the biggest barrier."

---

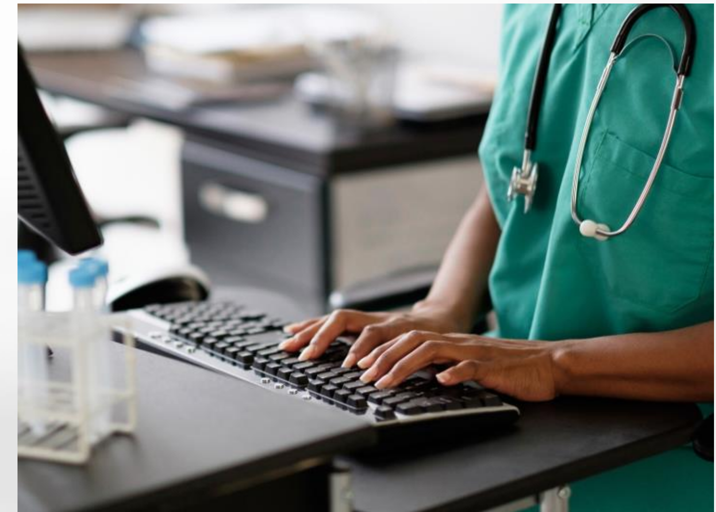
4. In what ways can the Quality and Patient Safety Workgroup leadership support your efforts to address severe hypertension?

Increase education among providers and nurses, advocate for a quality manager assigned to perinatal measures and reporting.

"Focused efforts on education of ED physicians and nurses."

"Continue to support and address the process and implementing new evidence-based practice."

"Support and advocacy for a quality manager assigned to perinatal measures to keep up with timely data and give immediate feedback to staff."



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Thank You!

Ana López-De Fede, PhD

Distinguished Research Professor Emerita

Associate Director

USC Institute for Families in Society

adefede@mailbox.sc.edu

Sarah Gareau, DrPH

Assistant Professor

Director of Health Services Research and Policy

USC Institute for Families in Society

gareau@mailbox.sc.edu

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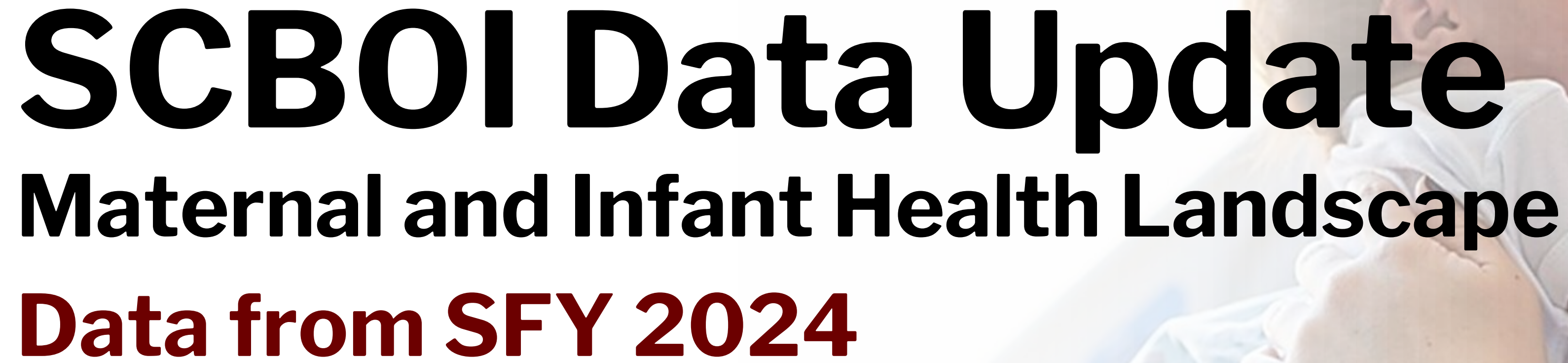

SCBOI Data Update

Maternal and Infant Health Landscape

Data from SFY 2024

APPENDIX

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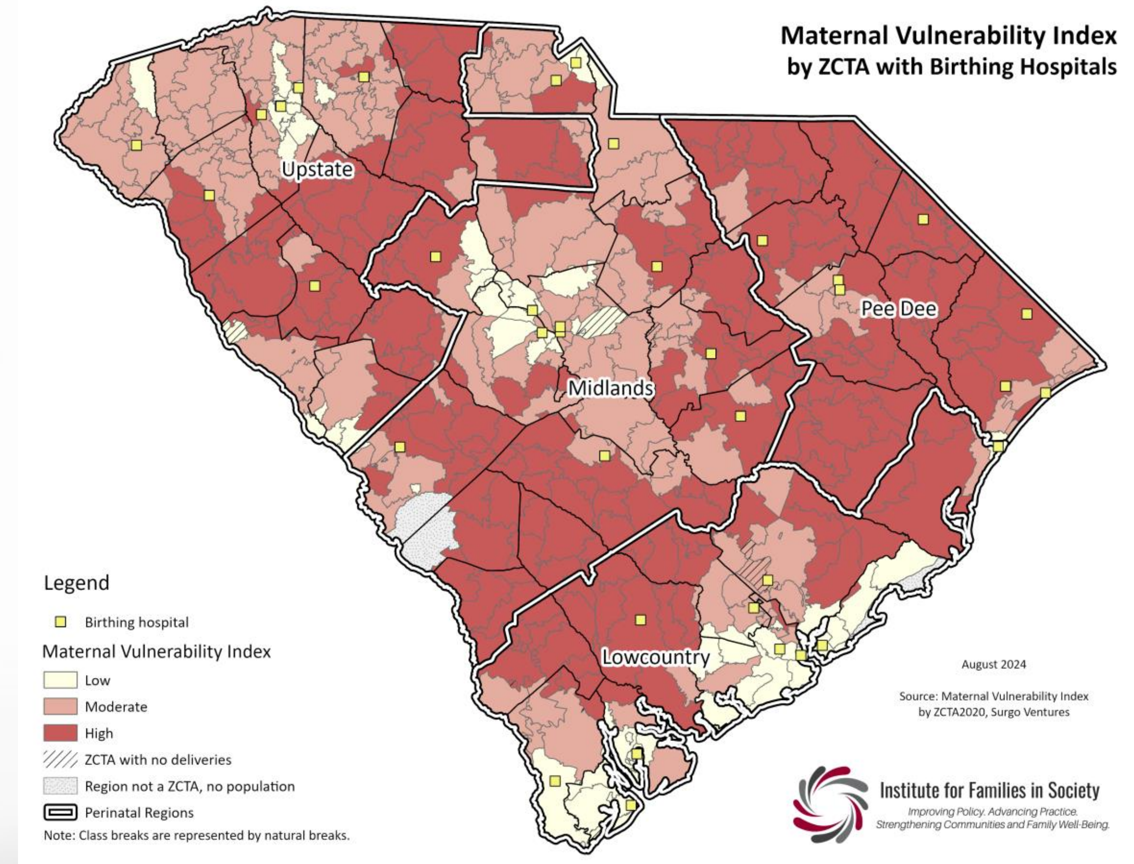
SC MATERNAL & INFANT HEALTH LANDSCAPE

- Since 2012, **13** labor and delivery units have closed with **1 in 4** hospitals (25%) currently not a birthing facility.
- Over half of counties in SC represent a medically underserved area (MUA).
    - Nearly 2 in 5 counties in SC had low access to maternity care or were a **maternity care desert** (March of Dimes, 2023).
- SC has one of the **top 5 highest maternal vulnerability** rates in the nation driven by high physical health and SES needs. Many high MVI areas have no birthing facility.
- Among publicly reported states, SC **ranks 8th nationally** in maternal mortality.
- Results of a recent SC AIM survey administered by IFS with the support of SCDHHS, in which 76% of birthing facilities responded (January-February 2024), report lack of **ED provider training, low staffing, limited resources, and physician buy-in** as barriers to care.



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MATERNAL VULNERABILITY INDEX SNAPSHOT

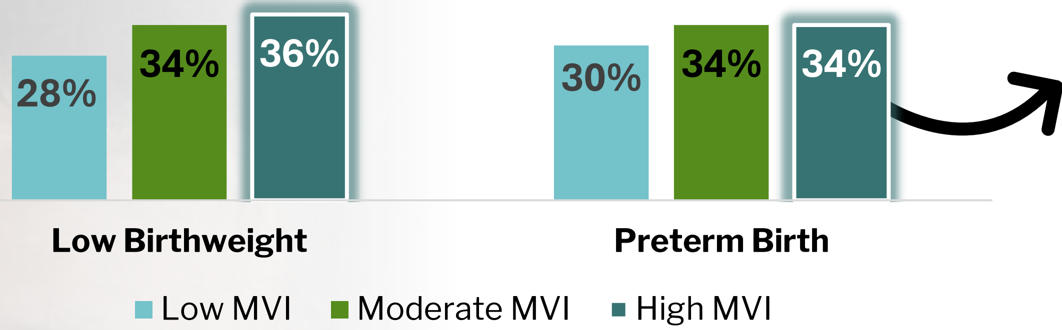
What is the Maternal Vulnerability Index?

The US Maternal Vulnerability Index (MVI) measures vulnerability for adverse maternal health outcomes across reproductive, physical, mental health/substance abuse, and general healthcare, socioeconomic determinants, and physical environment.

Top Three Factors with a High Distribution among the High MVI Group

- Residing in a rural area (64%)
- Having less than a high school education (42%)
- Being younger <20 (45%)

Low Birthweight and Preterm Birth by MVI (SFY 2024)



High MVI had **4%** higher odds of **preterm birth** (aOR=1.04), and **6%** higher odds of **low birthweight** (aOR=1.06) compared to low MVI.

SMM at Delivery or Postpartum by MVI (SFY 2024)

When assessing maternal outcomes by vulnerability, **those with high MVI had higher rates of SMM** during delivery or postpartum. This trend was **also seen when observing rates of ICU** (N=118 for high MVI vs. N=70 for low MVI) **and postpartum inpatient stays** (3.3% for high MVI vs. 2.8% for low MVI).

NOTE: aOR= Adjusted Odds Ratio. Logistic regression models adjusted for: age, race, residence, payer, education, prenatal care, BMI, and chronicity profile. Chi square p- value of <.05 is defined as statistically significant. CY22 data was used for the MVI maternal outcome analysis as postpartum data for CY23 is not yet complete.

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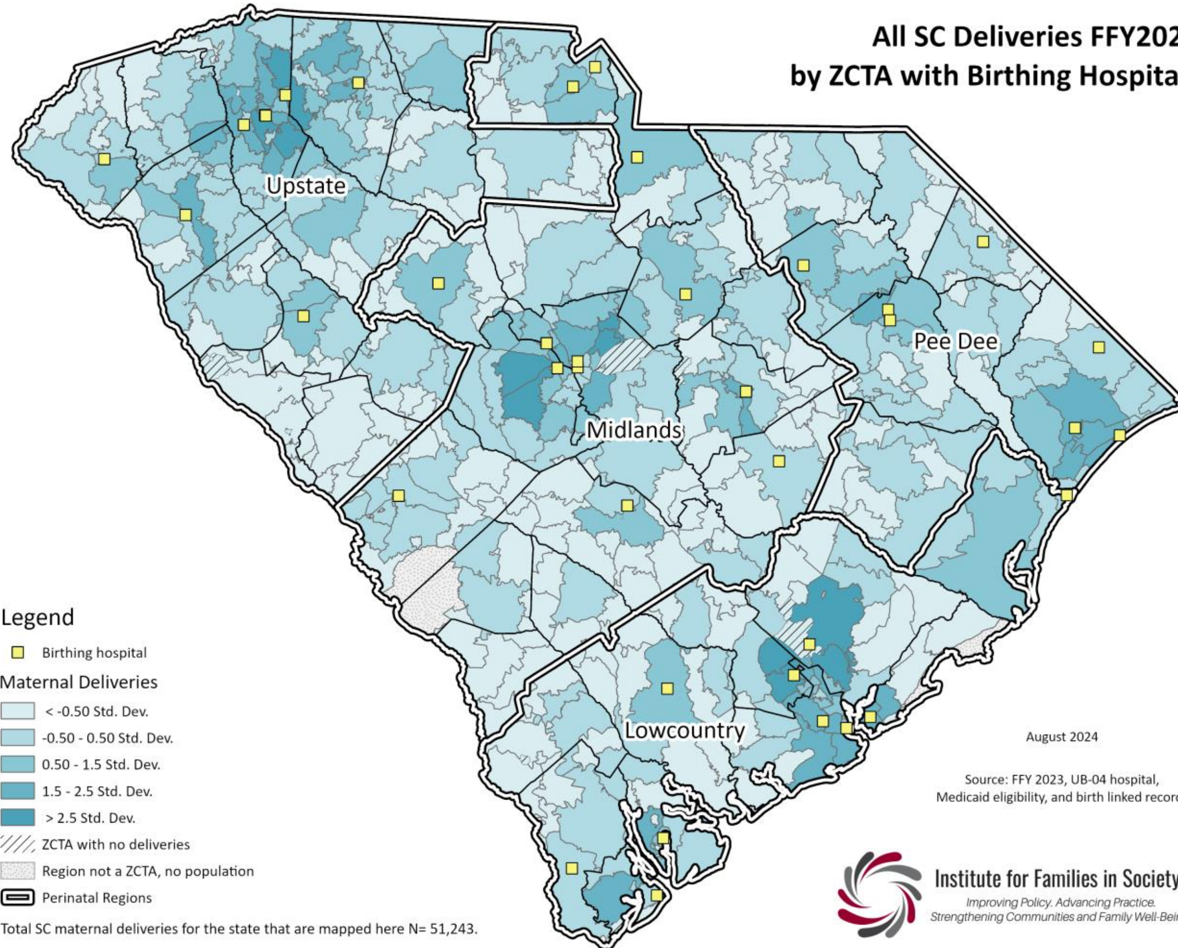
DELIVERIES ACROSS COMMUNITIES IN SOUTH CAROLINA



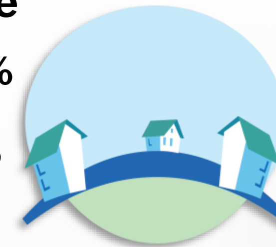
RURAL HEALTH TAKEAWAY

Urban areas and higher designation hospitals see the greatest volume of deliveries. Key facts regarding delivery patients residing in rural areas include:

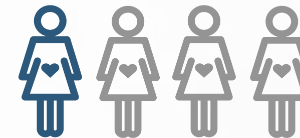
Residence

Urban: 73%

Rural: 26%



Women of color comprised roughly **41%** of deliveries among rural residents.



Represented 1 in 4 severe maternal morbidity events.

1,797

Babies born prematurely to mothers in rural areas.

Medicaid paid **70%** of rural deliveries (vs. 60% statewide).

19% had a perinatal mental health diagnosis.

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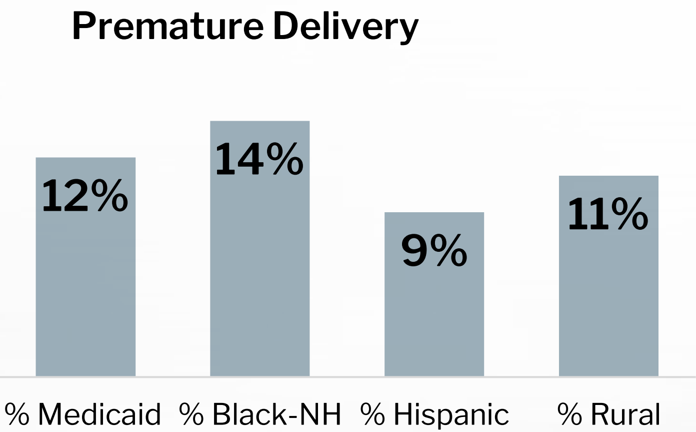
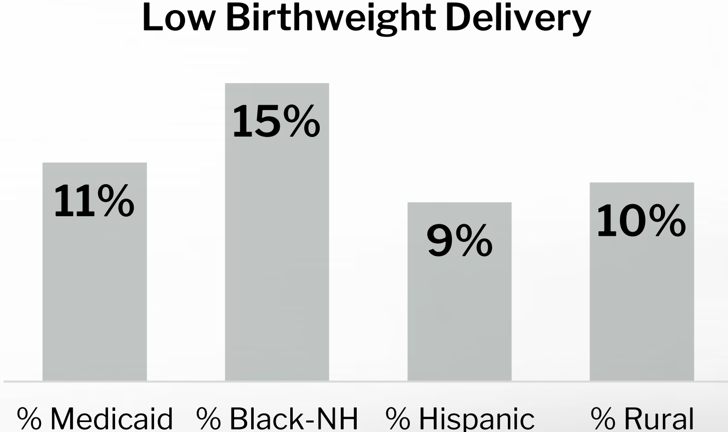
DELIVERY CHARACTERISTICS
(SFY 2024)

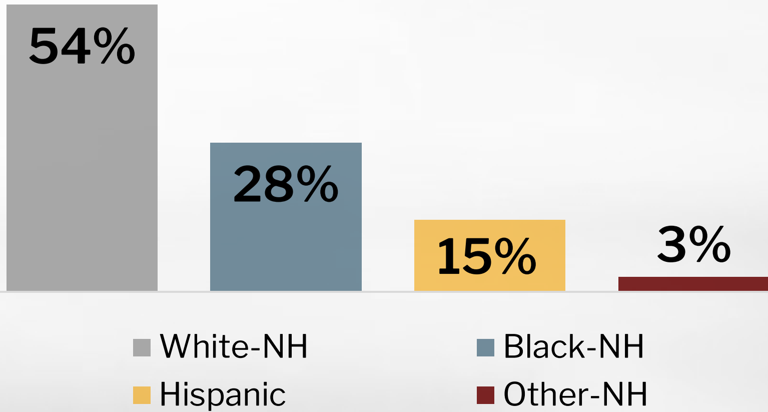
SC QUICK FACTS

- 3 out of every 5 deliveries was paid for by Medicaid.
- 1 in 5 women received inadequate prenatal care.
- Approximately 1 in 10 delivered premature or had a low birthweight baby.
- Roughly 1 in 4 had a potentially avoidable cesarean.
- Nearly 1 in 5 were ages 35 or older.

~38% High School/ GED or less







Rate differences in premature and low birthweight deliveries were predominantly seen among Black-NH patient and Medicaid beneficiaries.

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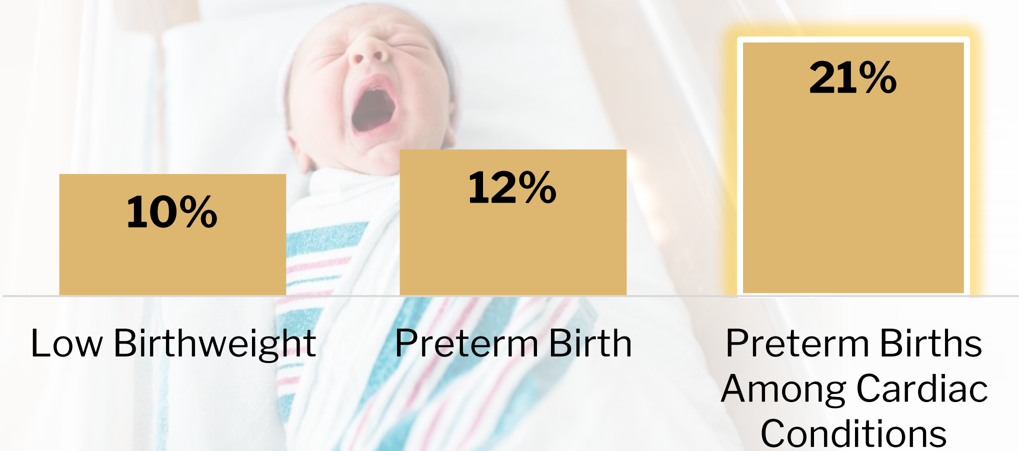
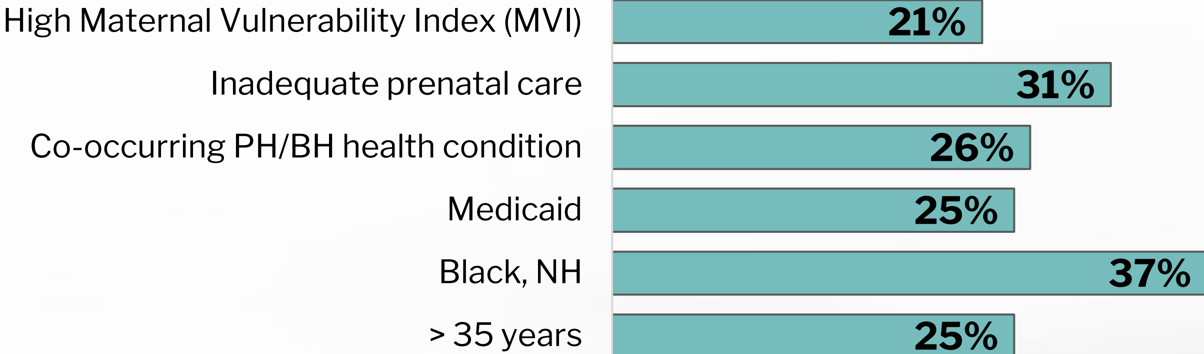
NEWBORN OUTCOMES



Differences were present for all newborn outcomes, with the highest rates seen for **preterm births among cardiac conditions**.



PC-06 Unexpected Newborn Complications

1 in 7

SC newborns have unexpected newborn complications

Compared to the SFY 2024 statewide rate (14%), **rates were higher** among those:

- >35 years of age (15%)
- who delivered via cesarean (19%)
- with perinatal obesity (16%)
- with co-occurring PH/BH health conditions (19%)

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SMM STATEWIDE ANNUAL TREND

(SFY 2022 – SFY 2024)

Measure (%) *(w/o transfusion)*	SFY 2022 %(n)	SFY 2023 %(n)	SFY 2024 %(n)	Relative Change
Severe Maternal Morbidity (SMM)	**1.0% (487)**	**1.0% (539)**	**1.1% (584)**	↑ 19%*
SMM/Maternal Hemorrhage	6.4% (197)	6.8% (243)	7.3% (269)	↑ **14%**
SMM/Severe Hypertension	**6.4% (169)**	**7.6% (210)**	**7.7% (243)**	↑ **20%**
SMM/Cardiac Conditions	11.0% (79)	12.3% (98)	12.5% (104)	↑ **14%**
SMM/Perinatal Mental Health Conditions (PMHC)	**1.4% (120)**	**1.6% (156)**	**1.9% (182)**	↑ 37%*
Sepsis Cases	0.1% (34)	0.1% (44)	0.1% (50)	↑ **43%**

Note: Yearly measure percentages are rounded to 1 decimal, therefore hand calculated relative change will vary from presented.
Trend analysis was conducted using the Cochran–Armitage test. Arrows represent the direction of the trend. * Indicates statistically significant trend ($p \leq 0.05$).
The COVID pandemic officially ended in Q2 2023. These results should be framed within that context.

TAKEAWAY

From SFY 2022 to SFY 2024, deliveries statewide saw **significant increases in SMM overall** and among those with **perinatal mental health conditions. It is important to note that the increase among PMHC may represent improved statewide efforts to expand screening and treatment.** Non-significant increases were noted among those with maternal hemorrhage, severe hypertension, cardiac conditions and sepsis.

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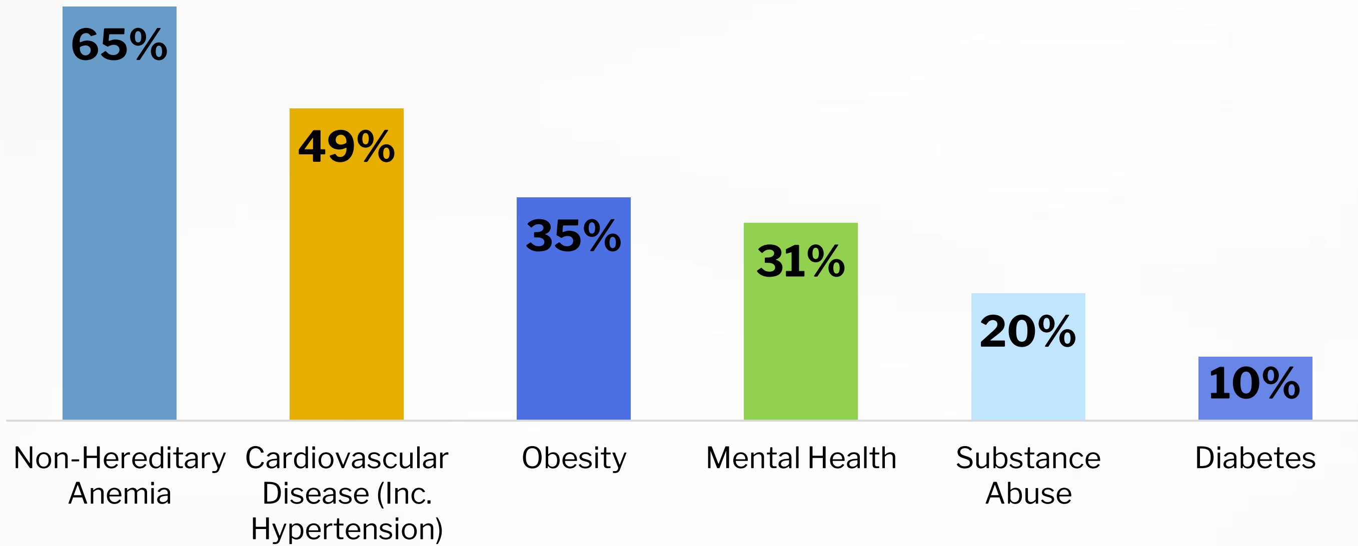
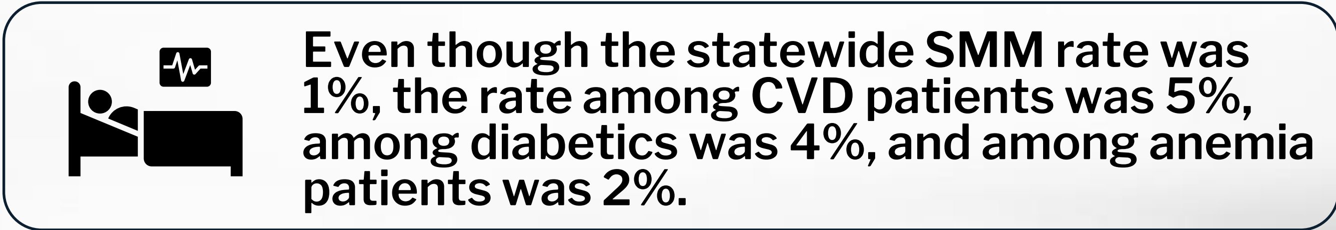
CLINICAL DRIVERS OF SMM

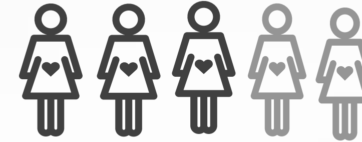
(SFY 2024)



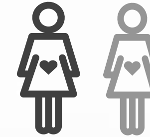


AMONG SMM DELIVERIES:

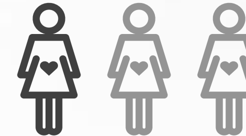
About 3 in 5 had **non-hereditary anemia.**



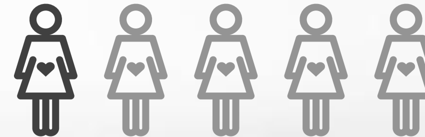
Nearly 1 in 2 had **cardiovascular disease.**



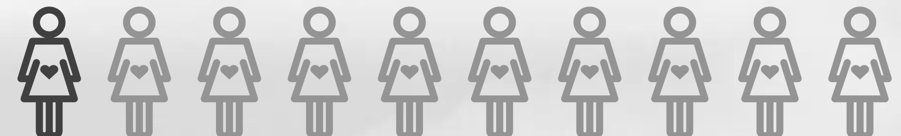
About 1 in 3 had **obesity** or a **mental health condition.**



About 1 in 5 had **substance use disorder.**



About 1 in 10 had **diabetes.**



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