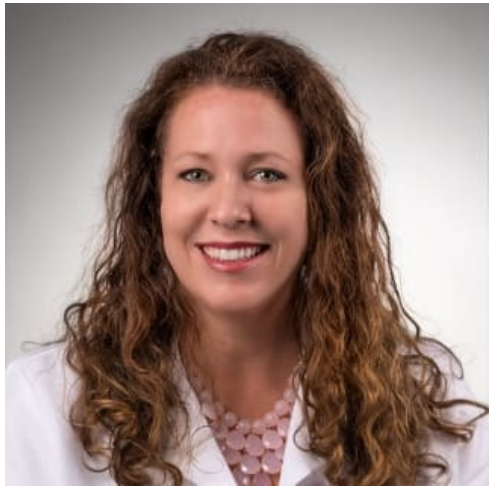
Maternal Morbidity and Mortality

Laura Carlson, MD
Assistant Professor
Division of Maternal Fetal Medicine
Department of OBGYN
Prisma Health - Upstate
USC School of Medicine - Greenville



Ashley Blackmon Jones, M.D.
Associate Professor of Clinical Psychiatry
Adjunct Associate Professor of Ob-gyn
Department of Psychiatry
Prisma Health Midlands
USC SOM -Columbia

Objectives

Maternal Mortality on a National Level

Maternal Mortality in South Carolina

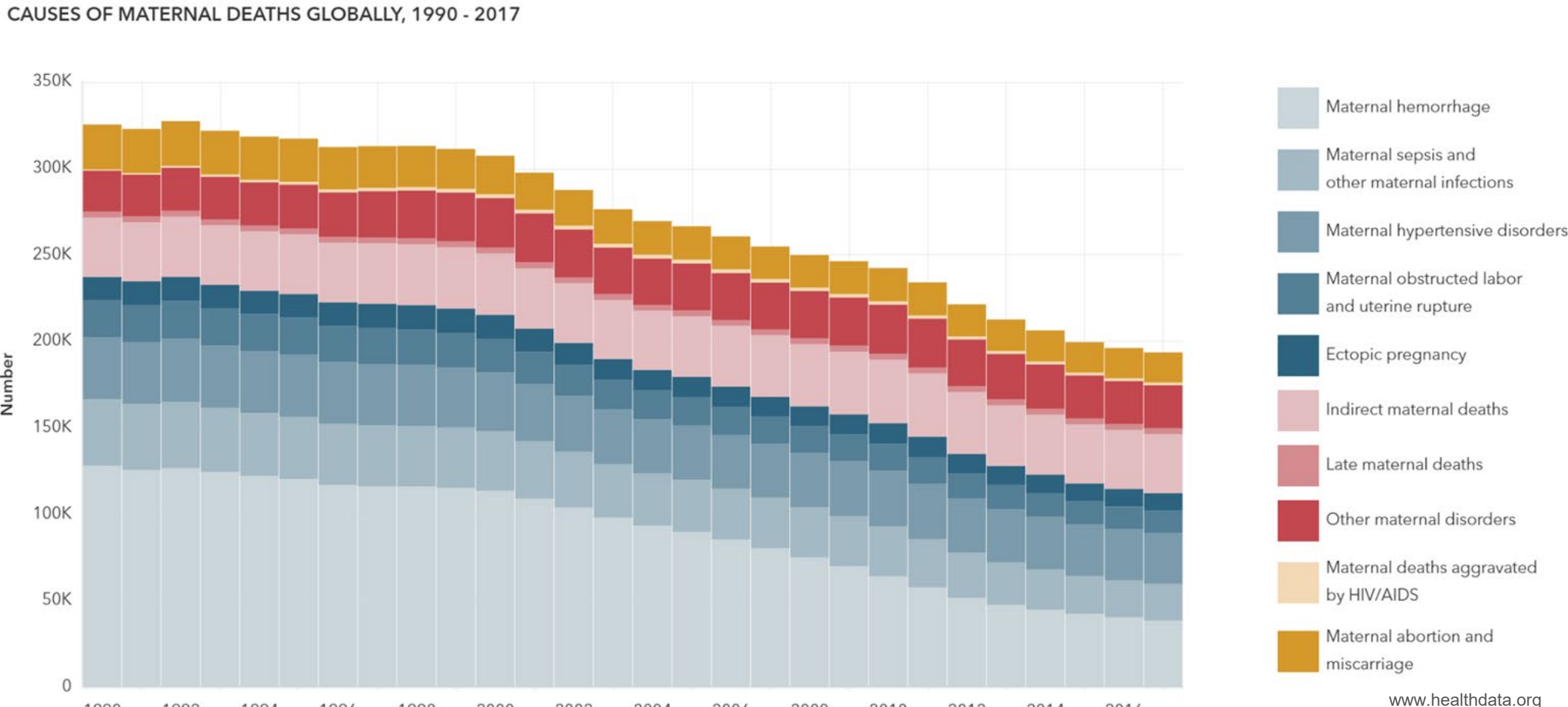
Mental Health and Substance Use Trends in Maternal Mortality in South Carolina

SCMMMRC Legislative Brief

Maternal Mortality

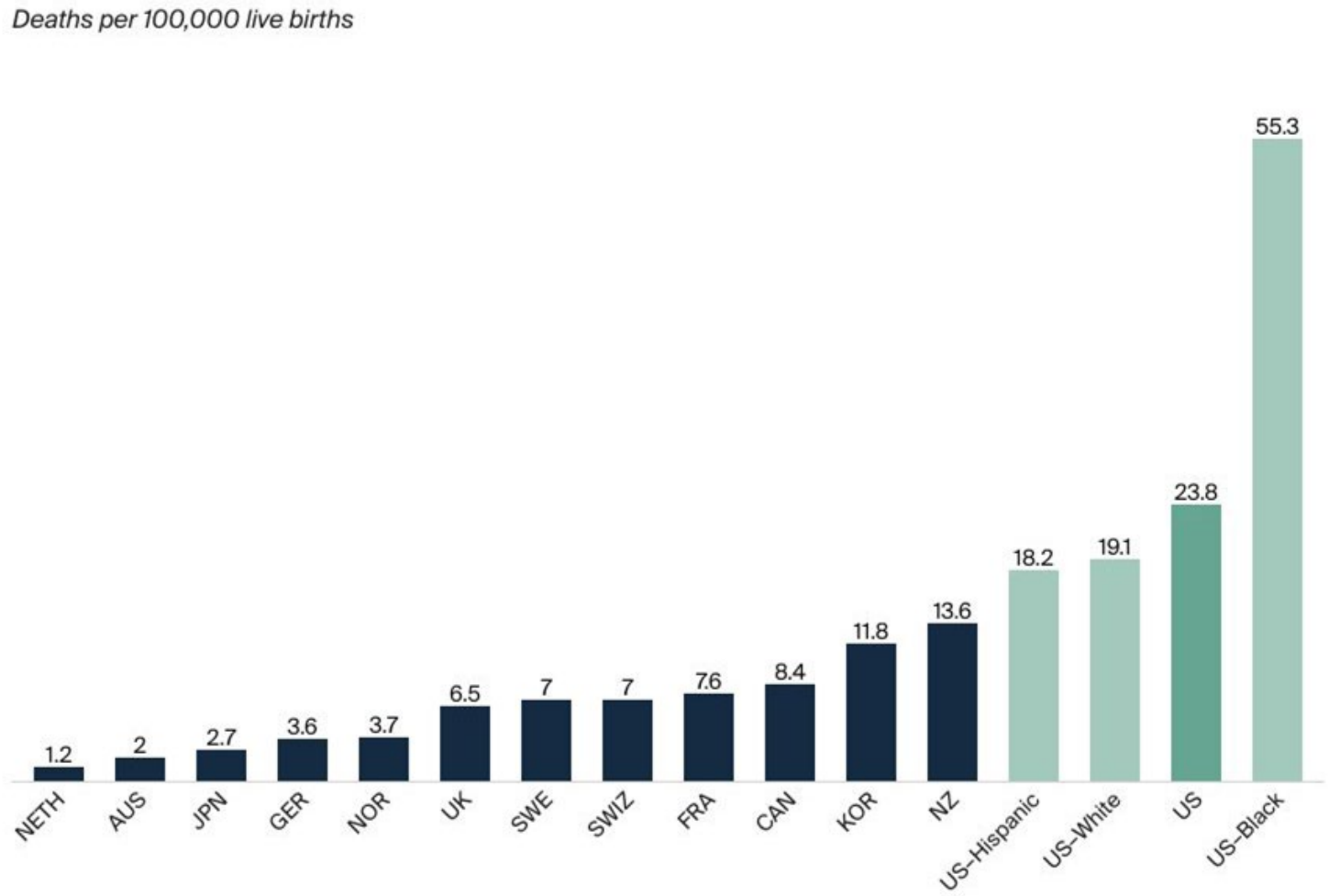
Laura Carlson, M.D.

Maternal Mortality Worldwide

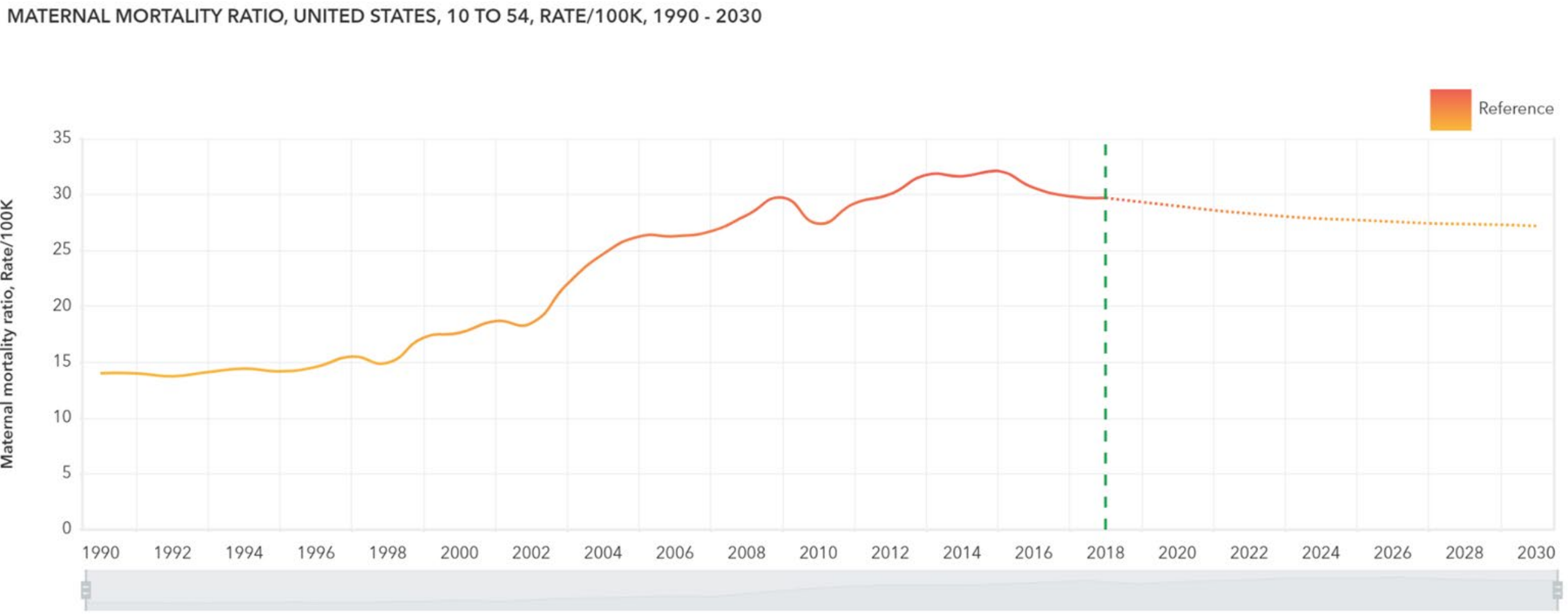


www.healthdata.org

Deaths per 100,000 live births, 2020



Maternal Mortality - United States



www.healthdata.org

Looking at the past trends, is United States doing better or worse than expected?

Short answer: United States is not meeting expectations.

Between 1990 and 2017, 13,251 fewer survived pregnancy and childbirth than expected in United States.

CNN health | Life, But Better | Fitness | Food | Sleep | Mindfulness | Relationships

US maternal death rate rose sharply in 2021, CDC data shows, and experts worry the problem is getting worse

By Jacqueline Howard, CNN

6 minute read · Updated 6:11 PM EDT, Thu March 16, 2023

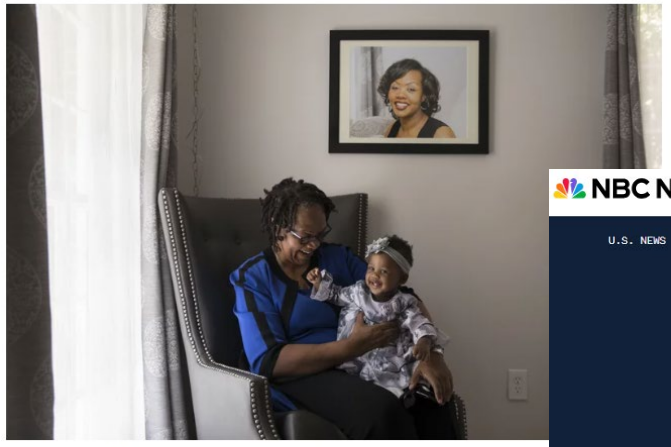
Maternal deaths in the U.S. spiked in 2021, CDC reports

MARCH 16, 2023 · 12:02 AM ET

HEARD ON MORNING EDITION

By Selena Simmons-Duffin, Carmel Wroth

3-Minute Listen + PLAYLIST



Wanda Irving holds her granddaughter, Soleil, in front of a portrait of Soleil's mother, Shalon in Sandy Springs, Ga., in 2017. Wanda is raising Soleil since Shalon died of complications due few weeks after giving birth.

Becky Harlan/NPR

Pregnancy can be risky in the US. In North Carolina, the threat of death is even higher.

BY TEDDY ROSENBLUTH AND TYLER DUKES

UPDATED MARCH 18, 2024 6:17 PM

A framed photograph of Atari Thomas, his daughter, Hannah Esquilin, and son, Braylon, sits atop a blanket featuring a photograph of his wife, Tiffany. Thomas had the blanket made for Tiffany to mark their seven-year anniversary in 2020. Tiffany was eight months pregnant when she died in 2021. KAITLIN MCKEOWN *kmckeown@newsobserver.com*

Maternal mortality rates are climbing

Jay King · November 2, 2023

NBC NEWS | Olympic sprinter Tori Bowie died from childbirth complications, autopsy finds | SHARE & SAVE

U.S. NEWS

Olympic sprinter Tori Bowie died from childbirth complications, autopsy finds

A medical examiner's report in Florida estimated that Bowie, 32, was 8 months pregnant and said she was undergoing labor when she died last month.

CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

US mater… death rate rose sharply in 2021, CDC data sho… getting w…

By Jacqueline Howar…
6 minute read · U…

Pregnancy can… Carolina, th…

BY T…

A framed photograph of Atari Thomas, his daughter, Hannah Esquilin, and son, Braylon, sits atop a blanket featuring a photograph of his wife, Tiffany. Thomas had the blanket made for Tiffany to mark their seven-year anniversary in 2020. Tiffany was eight months pregnant when she died in 2021. KAITLIN MCKEOWN *kmckeown@newsobserver.com*

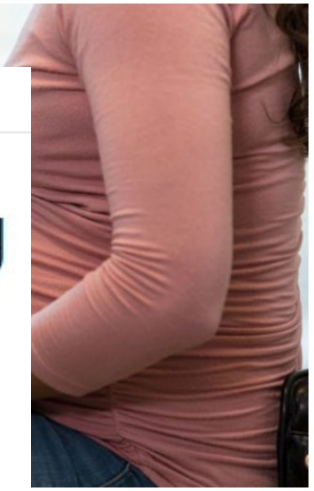
CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

Maternal mental health conditions drive climbing death rate in US, research says

By Mira Cheng, CNN
4 minute read · Updated 1:48 PM EST, Fri February 23, 2024

Maternal mortality rates are climbing

Jay King · November 2, 2023

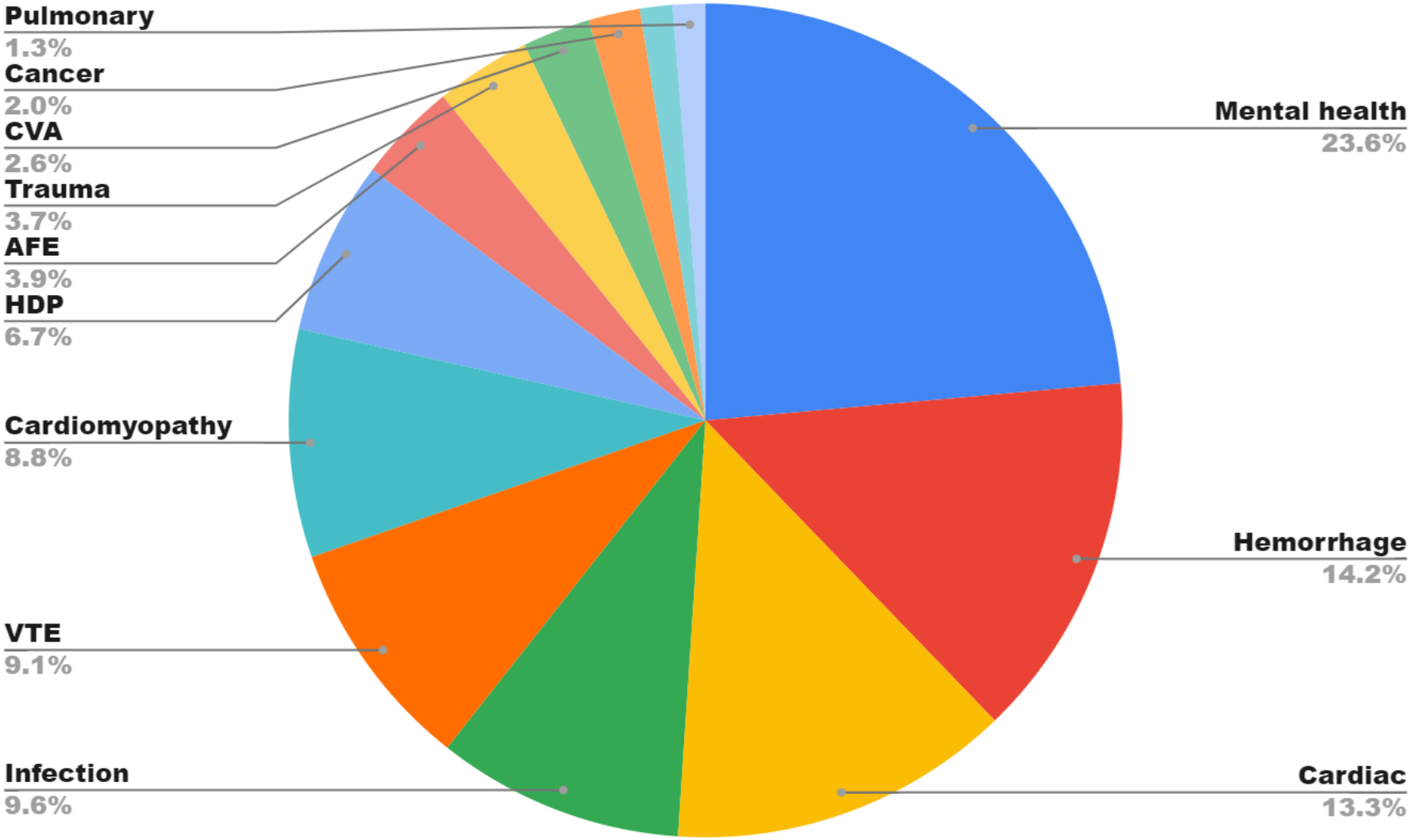


SHARE & SAVE –

…ied from …opsy finds

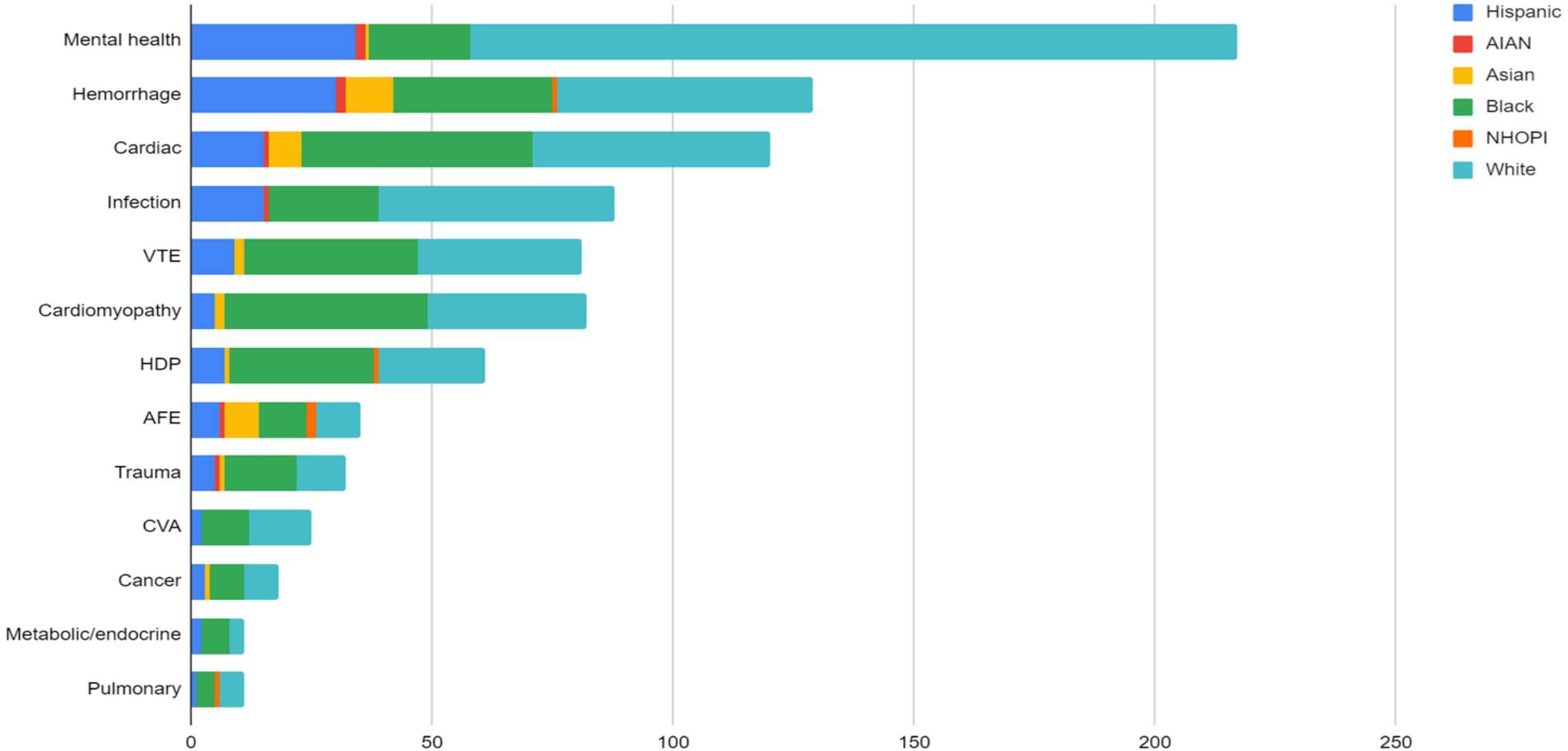
…2, was 8 months pregnant and said

Underlying causes of pregnancy-related deaths, 2017-2019



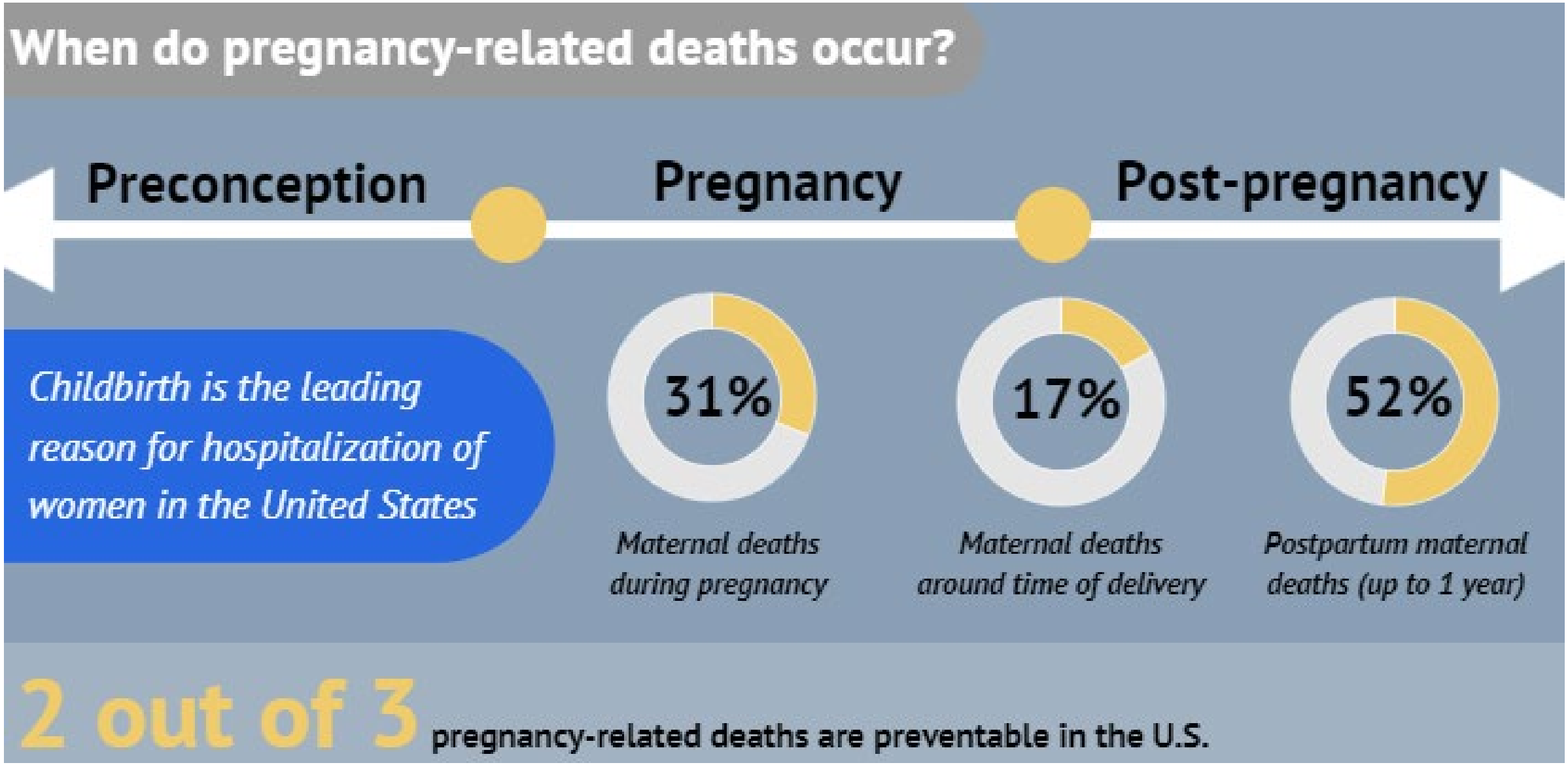
CDC

Underlying causes of pregnancy-related deaths, 2017-2019



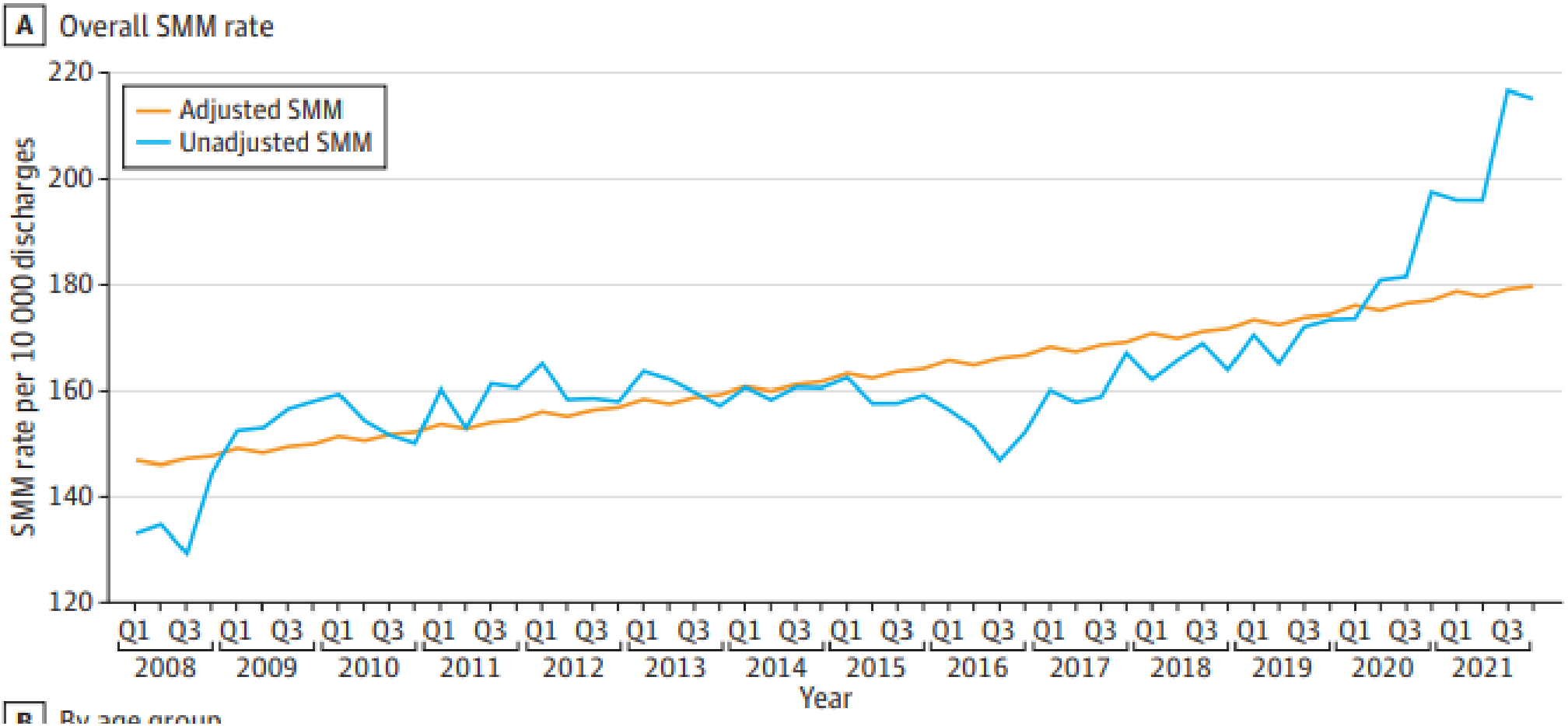
CDC

When do pregnancy-related deaths occur?



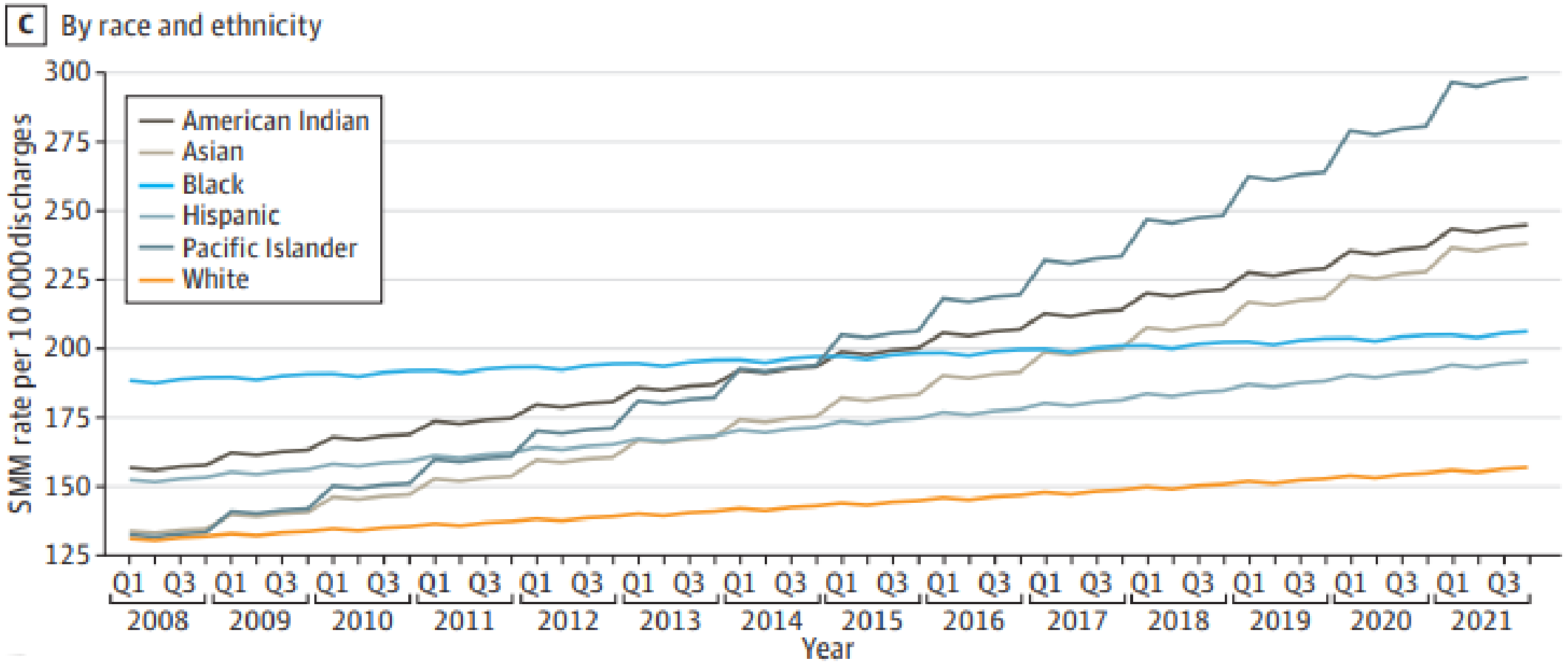
NIHCM

Severe maternal morbidity

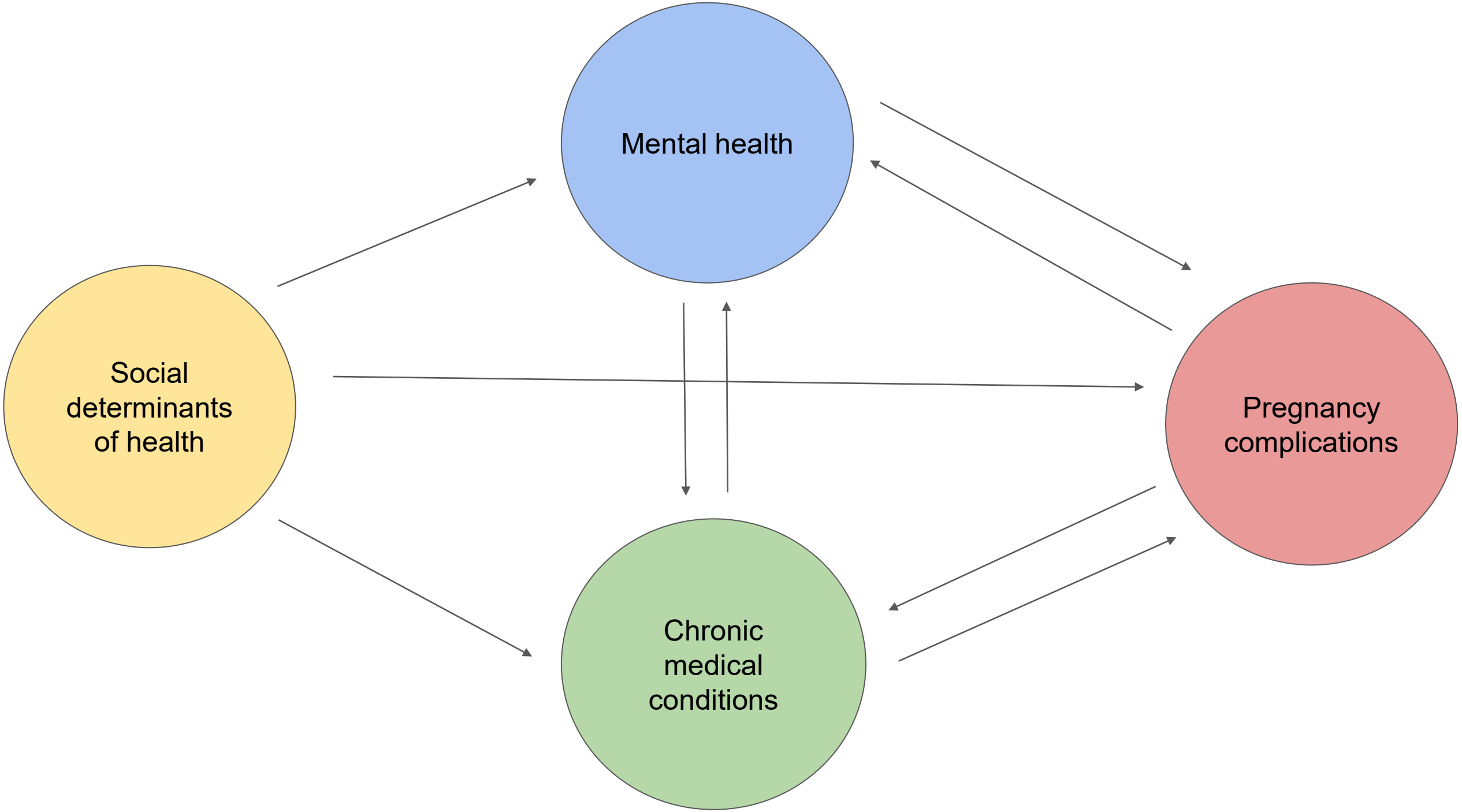


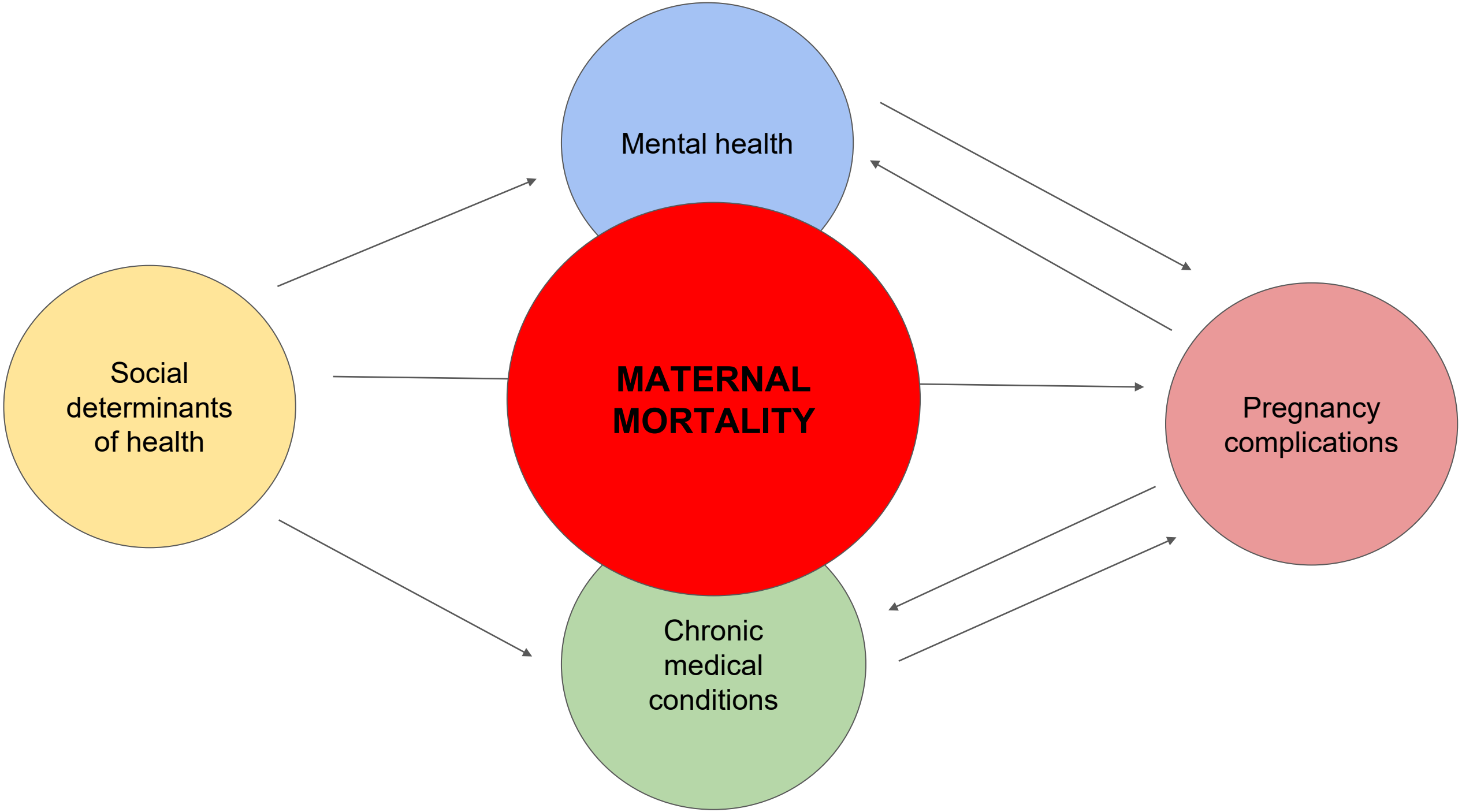
Fink 2023
fink_2023_oi_230531_1686842465.83087.pdf (silverchair.com)

Severe maternal morbidity, United States



Fink 2023
fink_2023_oi_230531_1686842465.83087.pdf (silverchair.com)


Mental health
Social determinants of health
Pregnancy complications
Chronic medical conditions


Mental health
Social determinants of health
MATERNAL MORTALITY
Pregnancy complications
Chronic medical conditions

Brown 2021

Data derived from National Inpatient Sample

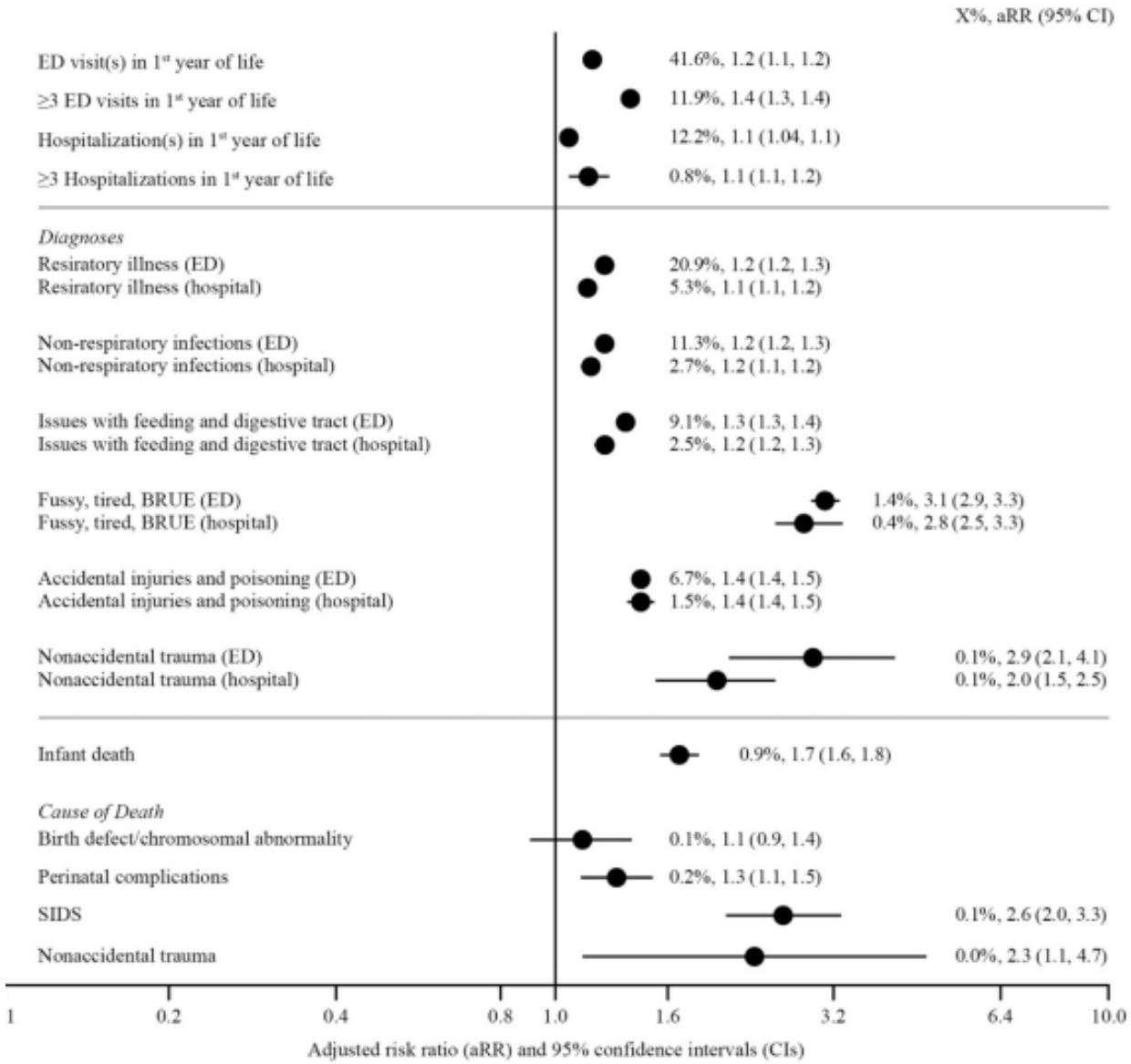
Presence of a MH diagnosis is associated with increased risk of severe maternal morbidity (by CDC/AIM indicators)

Mental Health Conditions Increase Severe Maternal Morbidity By 50 Percent And Cost $102 Million Yearly In The United States (nih.gov)

Abe 2023

Dataset from live singleton births in CA 2011-2017

Presence of a maternal MH diagnosis is associated with infant ED utilization, hospitalization, and death



gure. *Risk of adverse outcomes among infants born to mothers with mental health diagnosis during the study period.*

Maternal Mental Health Diagnoses and Infant Emergency Department Use, Hospitalizations, and Death (clinicalkey.com)

Fleszar 2023

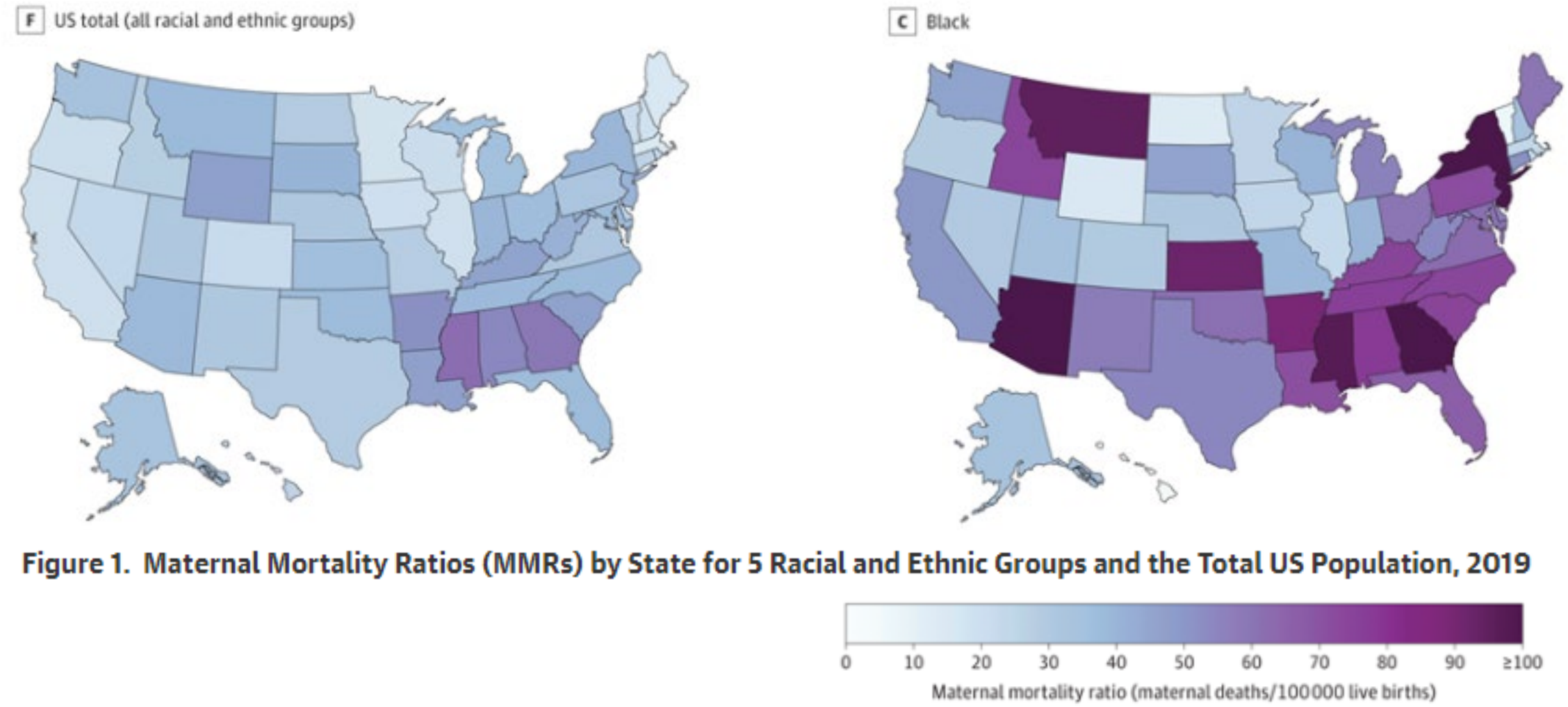
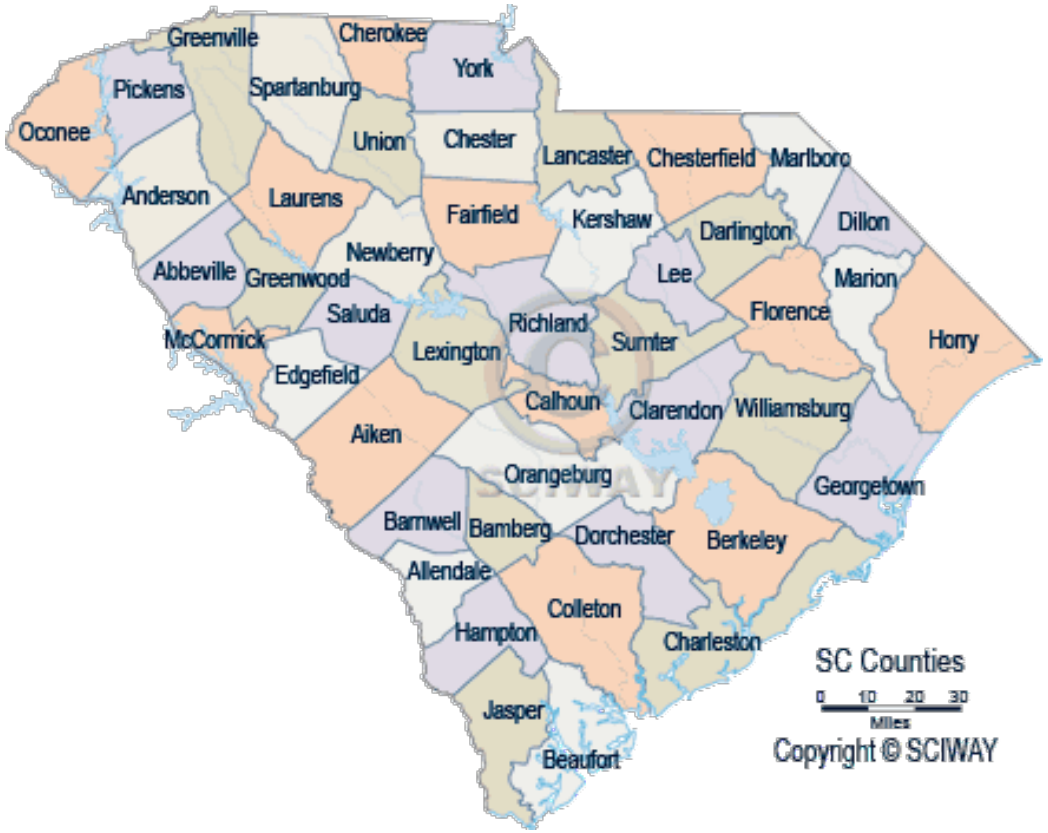


Figure 1. Maternal Mortality Ratios (MMRs) by State for 5 Racial and Ethnic Groups and the Total US Population, 2019

Trends in State-Level Maternal Mortality by Racial and Ethnic Group in the United States | Health Disparities | JAMA | JAMA Network

Mental Health (MH) and Substance Use (SUD) Trends in Maternal Mortality in South Carolina

Ashley Blackmon Jones, M.D.

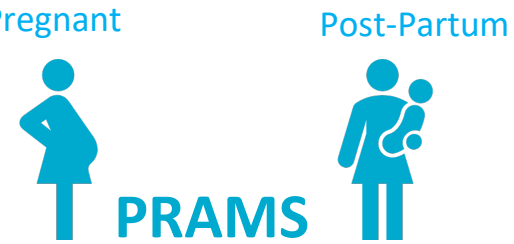


South Carolina Data:
Highlight on Mental Health and Substance Use

Referenced Data Sets

- SC Behavioral Risk Factor Surveillance System (BRFSS)

- SC Pregnancy Risk Assessment Monitoring System (PRAMS)



- SC Maternal Morbidity and Mortality Review Committee (MMMRC)

** A special thank you to the Division of Population Health Surveillance Bureau of Maternal and Child Health at SC DHEC*

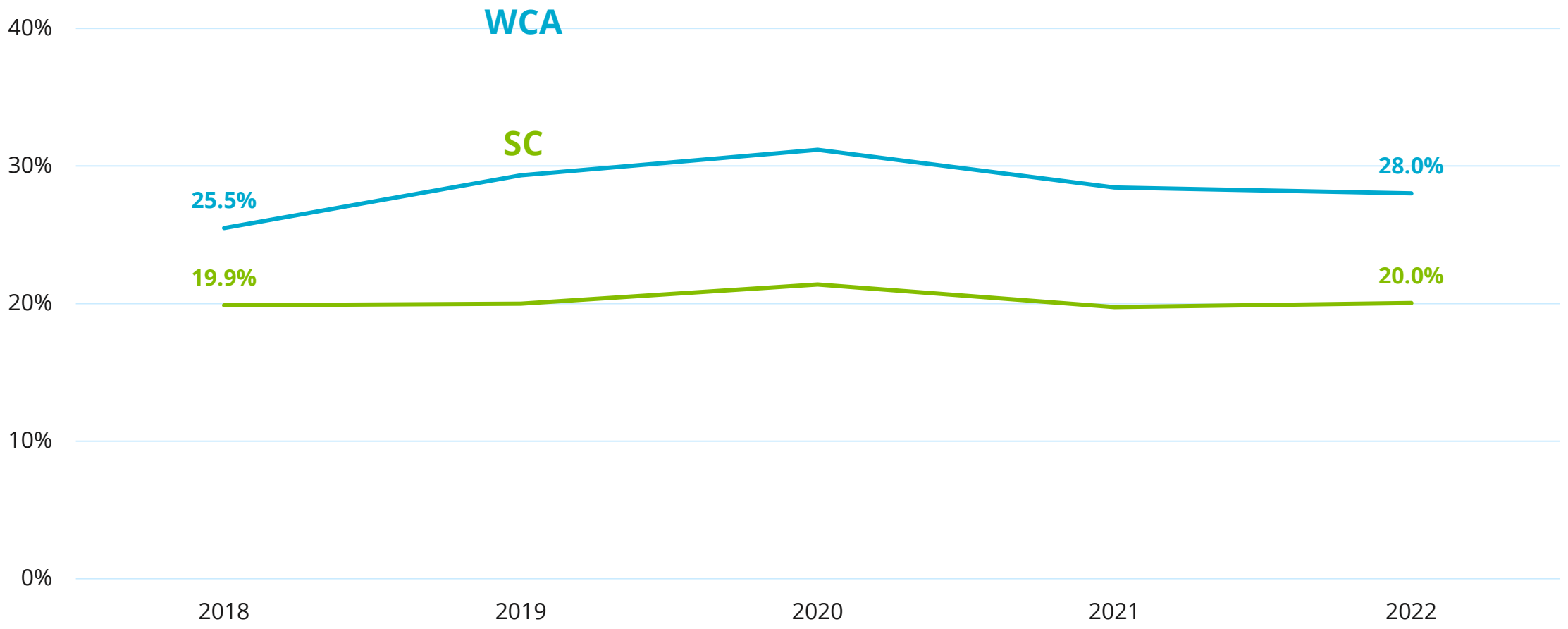
Behavioral Risk Factor Surveillance System (BRFSS)

- US health-related adult telephone surveys
  - World's largest random-digit-dialing survey
- Sponsored by several agencies including CDC and Federal (HRSA, VA, SAMHSA)
- Showing health indicators at the population-level and among women of childbearing age (WCA) (18-44)
- Health Indicators: Depression, Poor Mental Health Days, Smoking, Binge Drinking, Drug Problems
- Data Available for Income Group, Race/Ethnicity, Education, Insurance Status

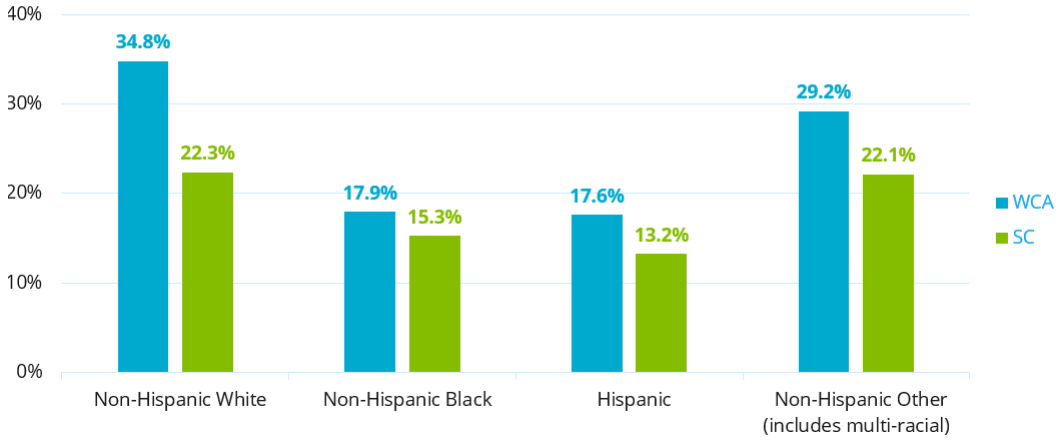
BRFSS™

The Behavioral Risk Factor Surveillance System (BRFSS) is the nation's premier system of health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. Established in 1984 with 15 states, BRFSS now collects data in all 50 states as well as the District of Columbia and three U.S. territories. BRFSS completes more than 400,000 adult interviews each year, making it the largest continuously conducted health survey system in the world. See More.

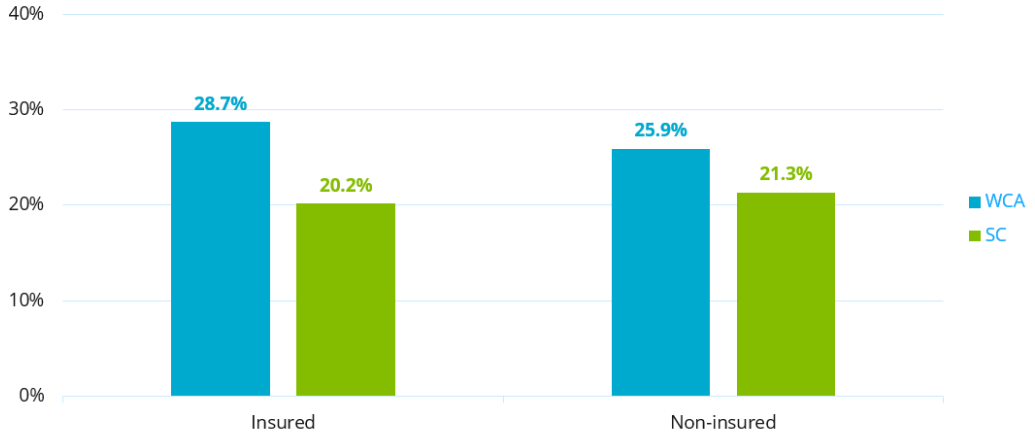
Reported Depression among Women of Childbearing Age and among Adults in SC



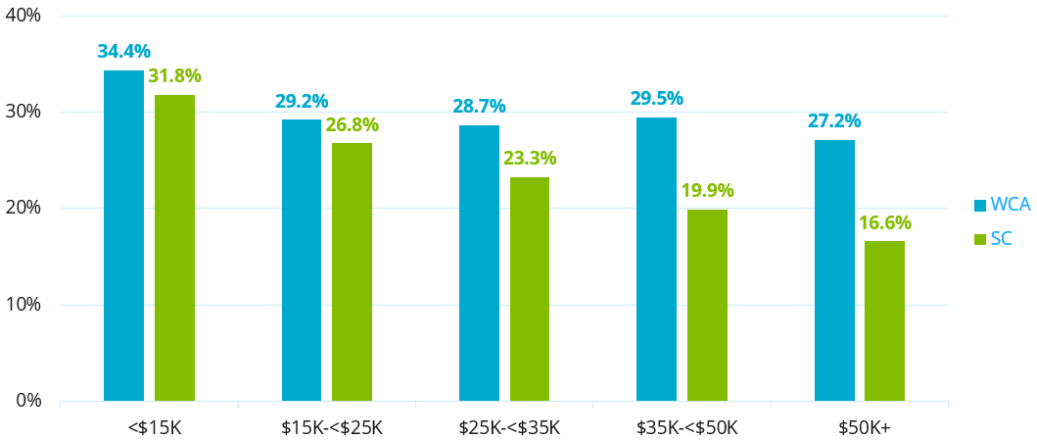
Reported Depression among Women of Childbearing Age and among Adults in SC, 2018-2022 by Race/Ethnicity



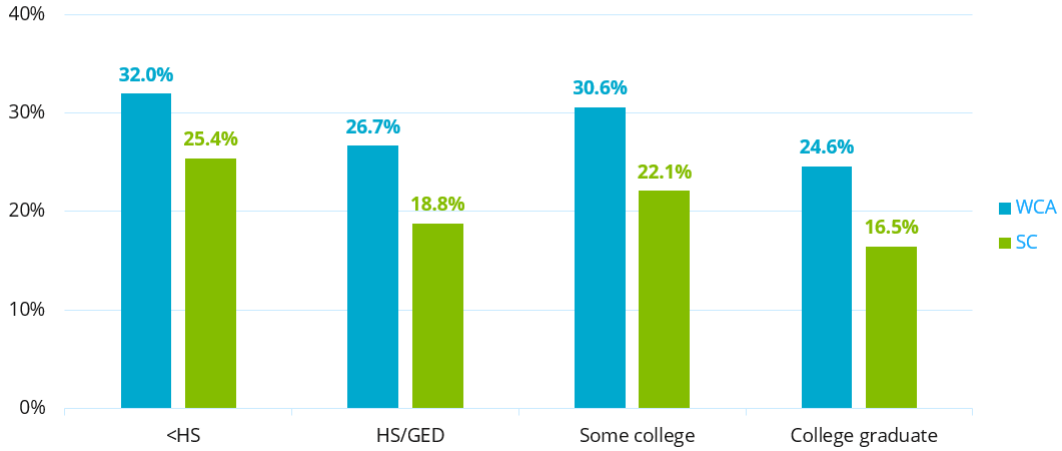
Reported Depression among Women of Childbearing Age and among Adults in SC, 2018-2022 by Insurance Status



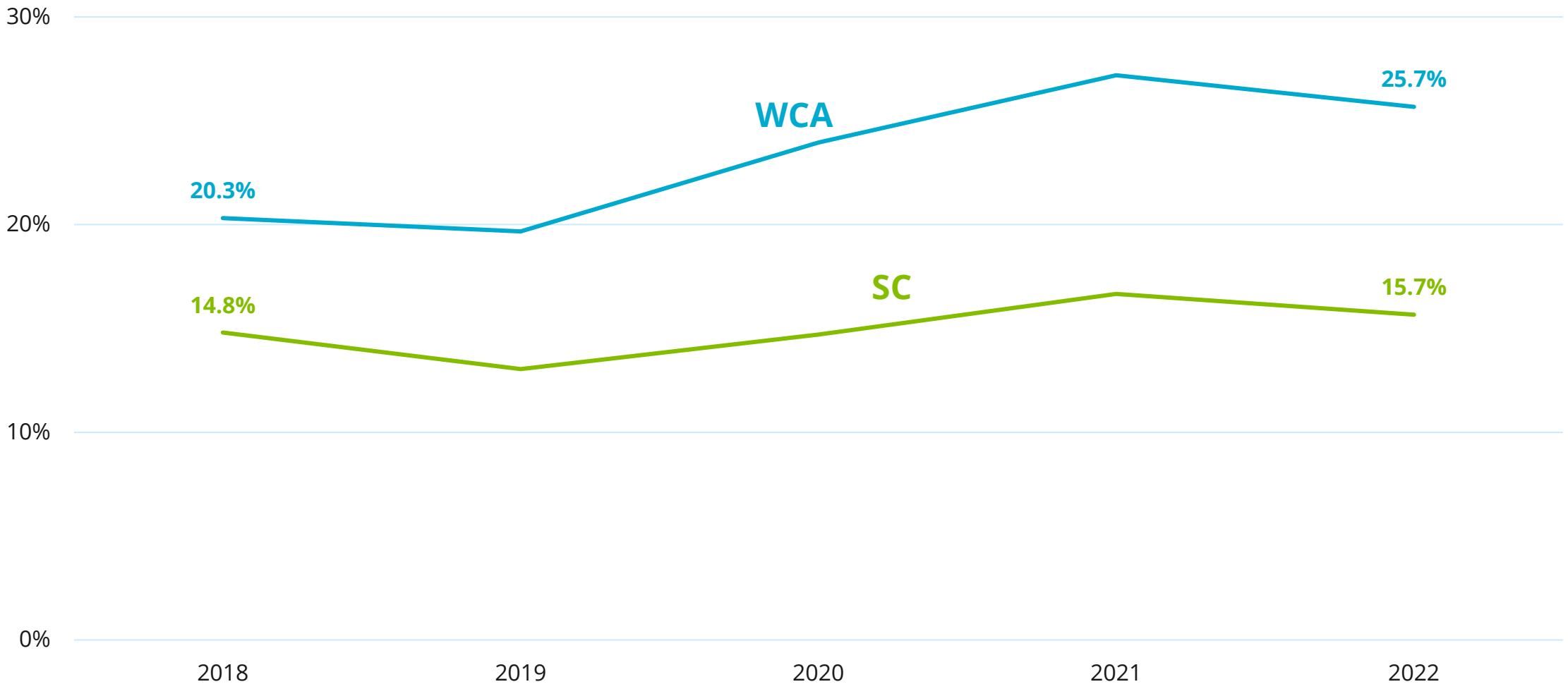
Reported Depression among Women of Childbearing Age and among Adults in SC, 2018-2022 by Income Group



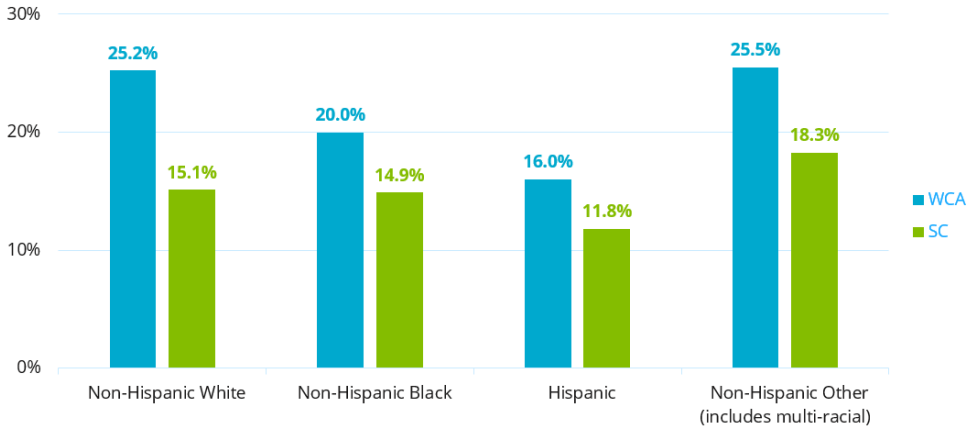
Reported Depression among Women of Childbearing Age and among Adults in SC, 2018-2022 by Education



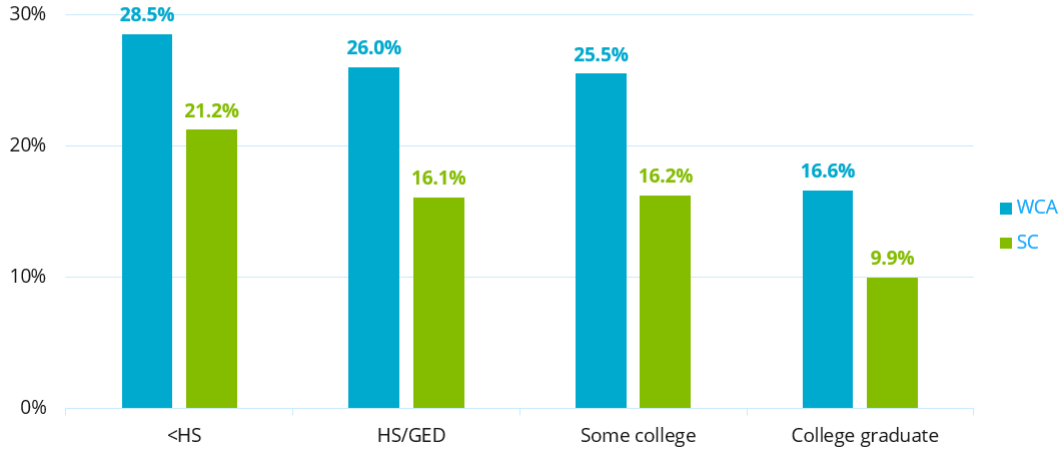
14+ days when mental health was not good



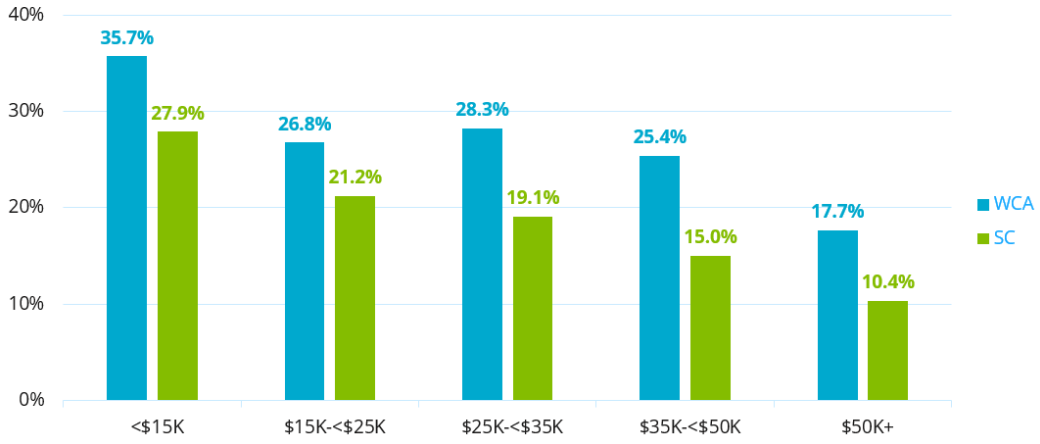
14+ days when mental health not good, 2018-2022 by Race/Ethnicity



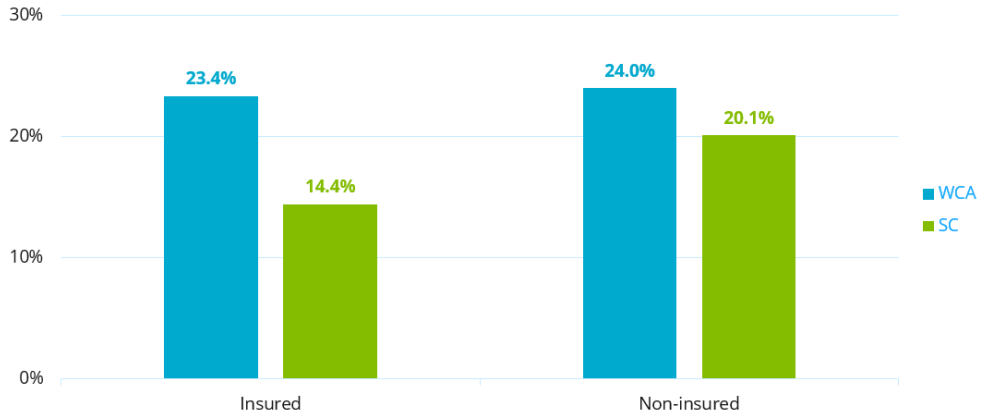
14+ days when mental health not good, 2018-2022 by Education



14+ days when mental health not good, 2018-2022 by Income Group

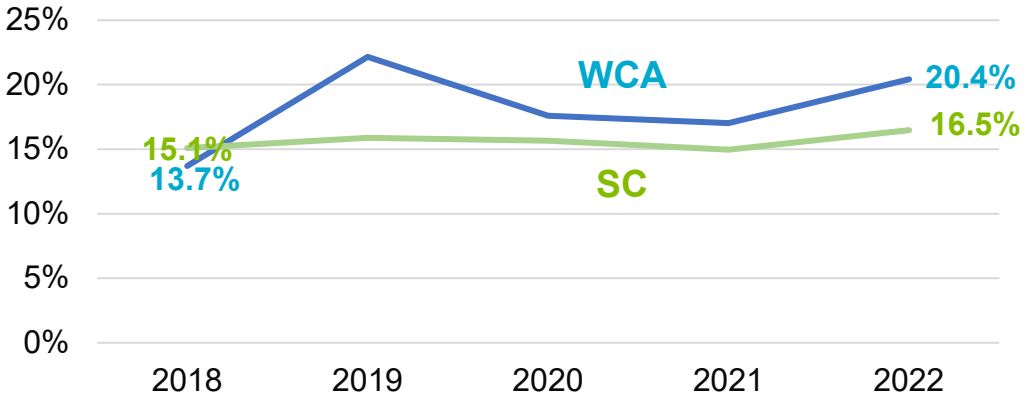


14+ days when mental health not good, 2018-2022 by Insurance Status

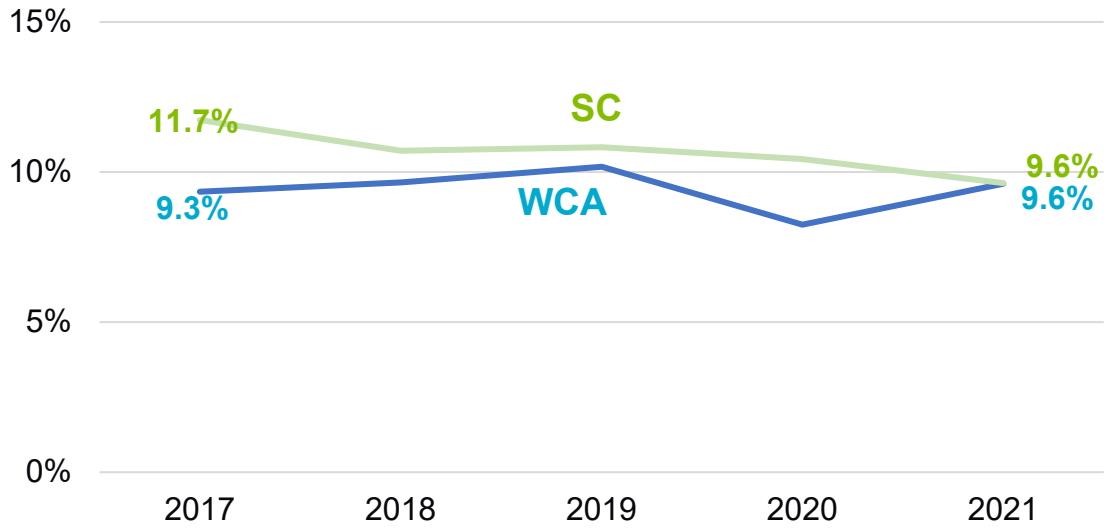


BPRSS: Non-Tobacco Substance Use

Binge Drinking

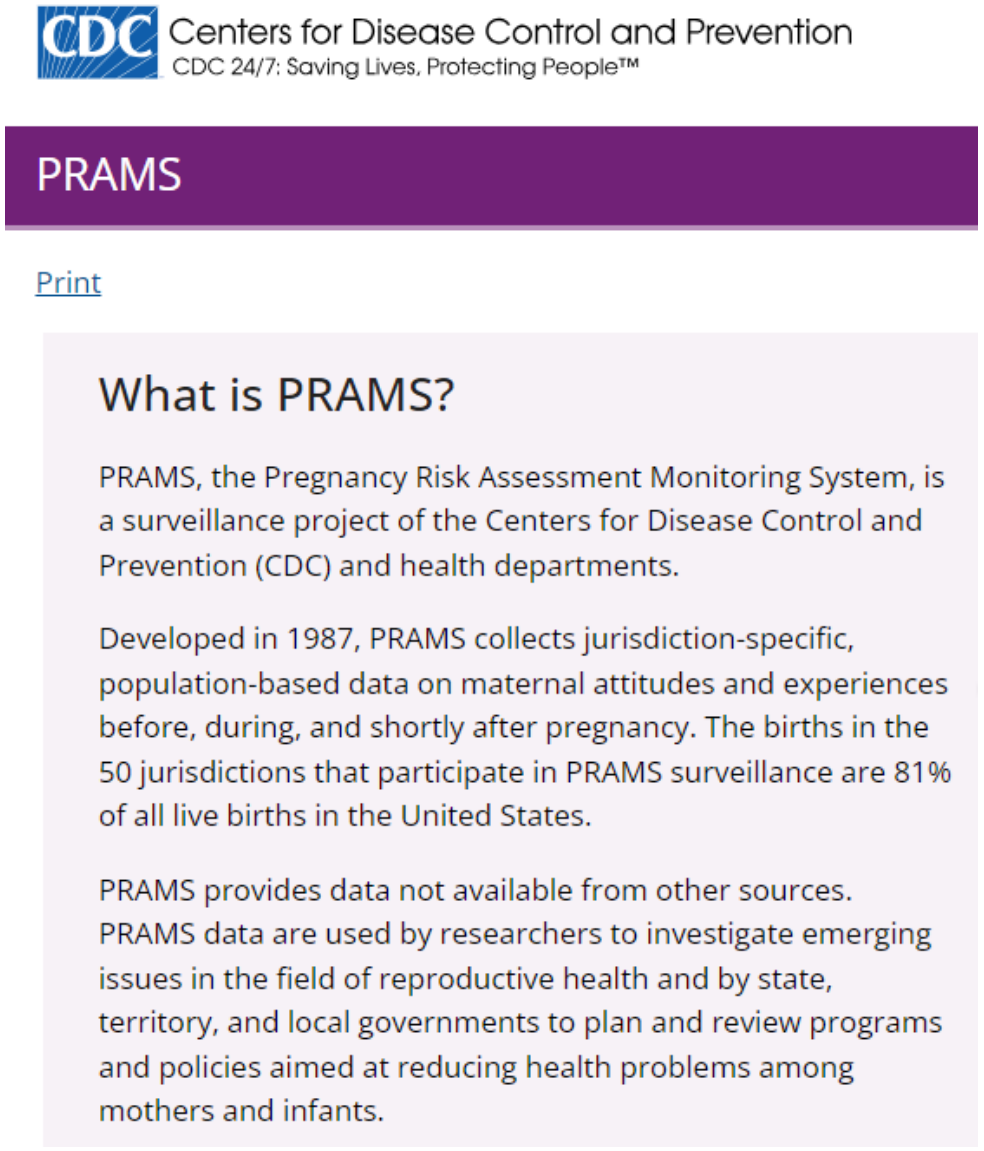


Reported Problems with Substance Use

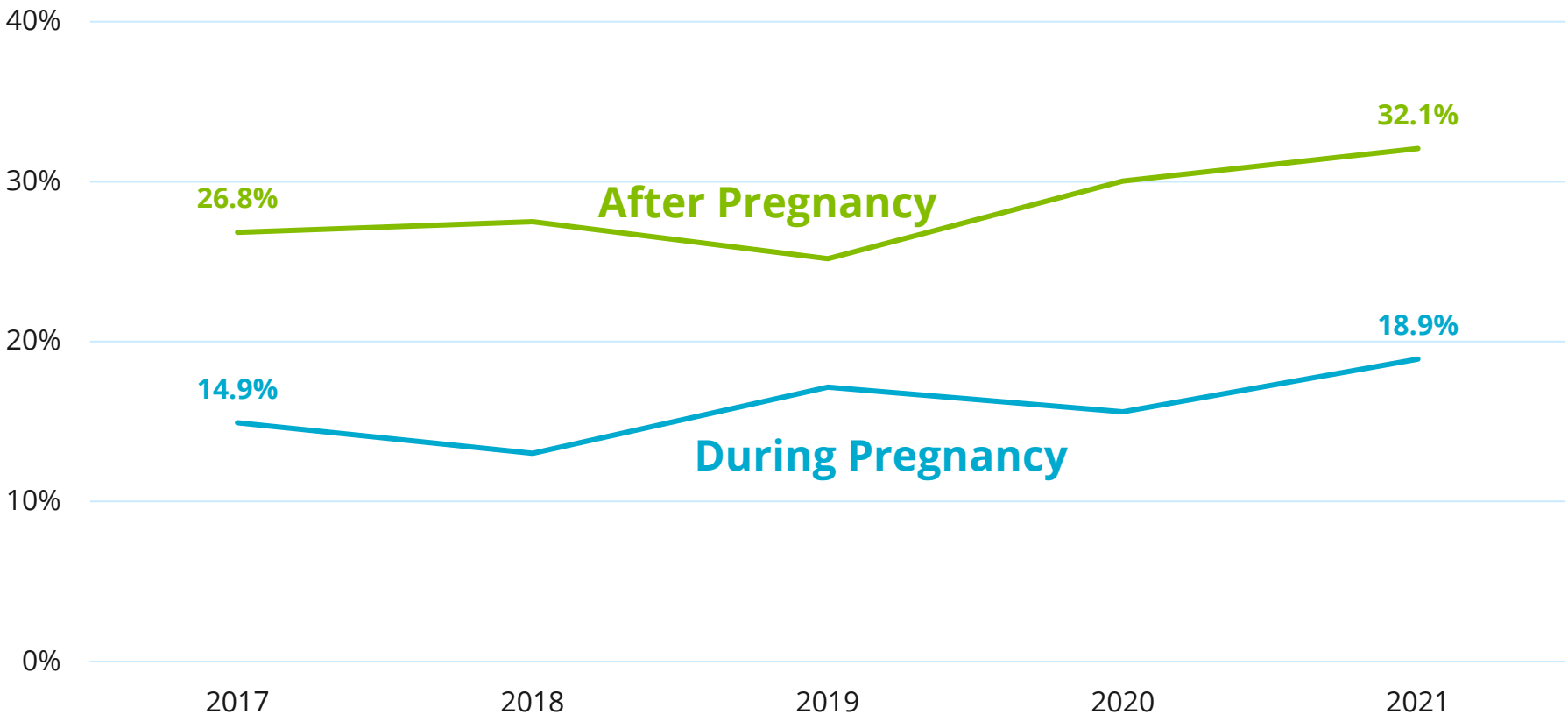


Pregnancy Risk Assessment Monitoring System (PRAMS)

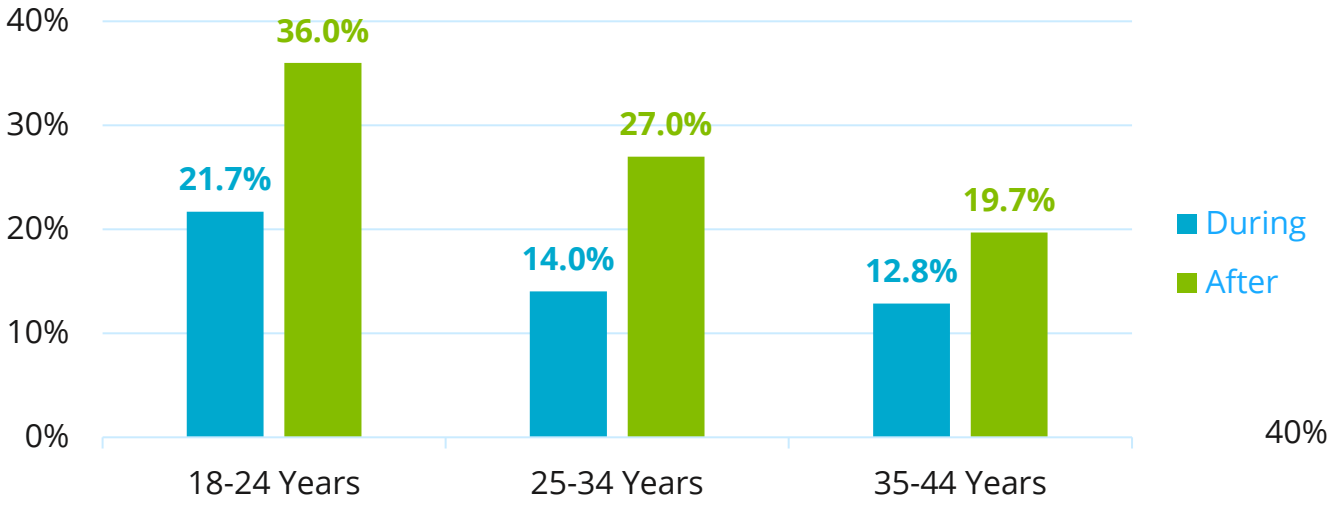
- CDC, Division of Reproductive Health and local agencies
- Surveys (mail, phone, internet); Population-based data
- Women who have recently given birth
- Prevalence of Depression During and After Pregnancy
- Prevalence of Prescription Opioid Use During Pregnancy



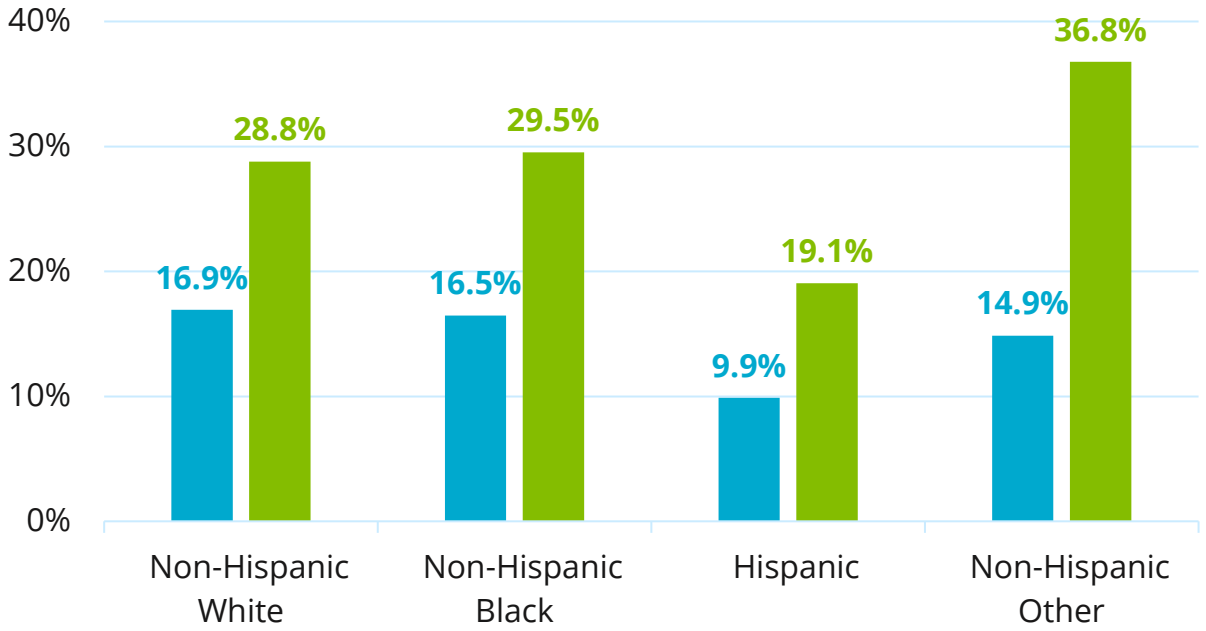
Depression During and After Pregnancy



Depression During and After Pregnancy, 2017-2021 by Age

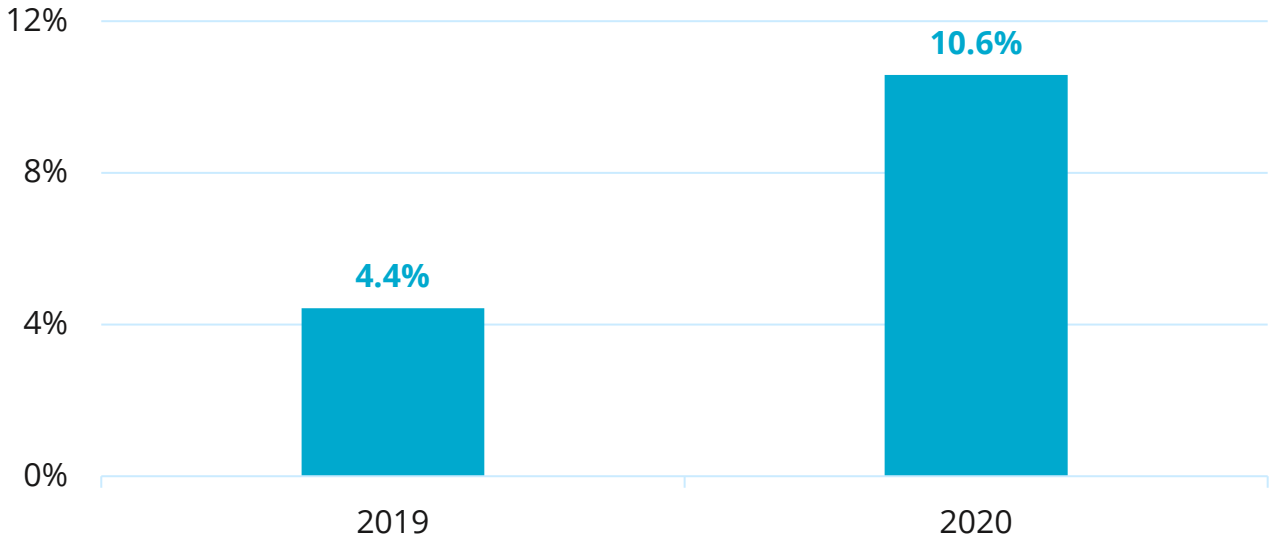


Depression During and After Pregnancy, 2017-2021 by Race/Ethnicity

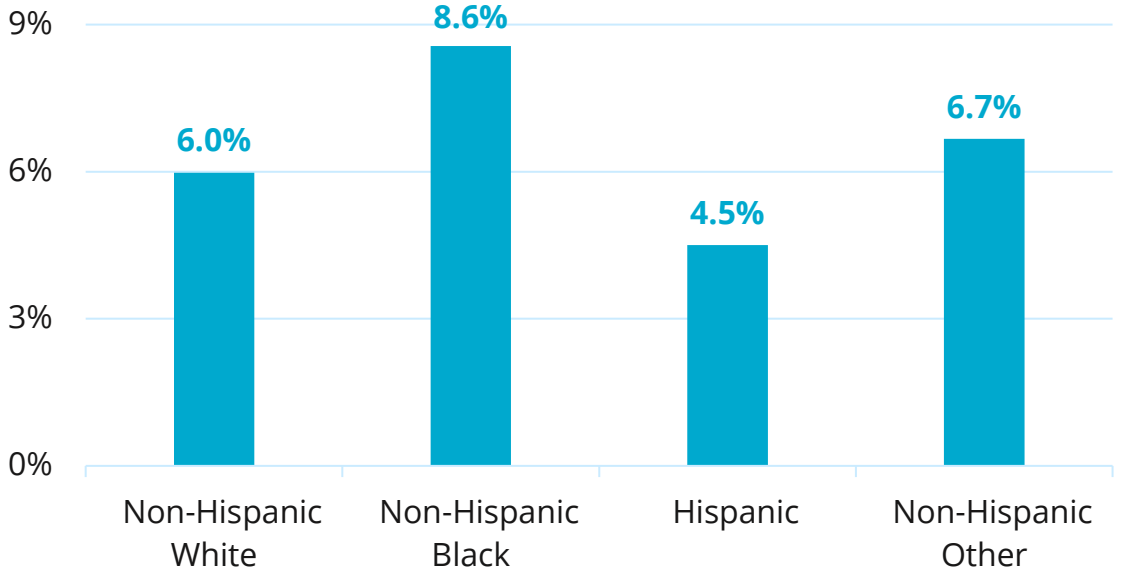


PRAMS

Opioid Use During Pregnancy



Opioid Use During Pregnancy, 2019-2020 by Race/Ethnicity



Maternal Mortality Review Committees

"Maternal Mortality Review Committees (MMRCs) are multidisciplinary committees that convene at the state or local level to comprehensively review deaths that occur during or within a year of pregnancy (pregnancy-associated deaths).

They include representatives from public health, obstetrics and gynecology, maternal-fetal medicine, nursing, midwifery, forensic pathology, mental and behavioral health, patient advocacy groups, and community-based organizations.

CDC works with MMRCs to improve review processes that inform recommendations for preventing future deaths"

South Carolina Morbidity and Mortality Review Committee

- Reviews SC deaths during or within 1 year of pregnancy.
- Leads to:
  - understanding of the drivers of a maternal death and
  - determination of what interventions will have the most impact at patient, provider, facility, system and community level to prevent future deaths

Disclosure: I am a member of the SCMMMRC and several subcommittees/workgroups

SCMMMRC: An Overview

- 2016: SCMMMRC established by state late
- Role: Standardized approach to review maternal deaths associated with pregnancy.
- Vision: *"Eliminate preventable maternal deaths, reduce maternal morbidities, and improve population health for people of reproductive age in South Carolina."*
- Data: reviews all pregnancy-associated deaths (deaths during pregnancy and within 365 days of delivery), vital records, voluntary reporting, CDC.
- Process: Determine pregnancy-related deaths.
- Action Items: identify risks, trends, and preventability and develop actionable items and recommendations.
- Members: Multiple medical disciplines, community

Reminder: MMMRC

Pregnancy Associated (but not related) Death

- Death during or within 1 year of the pregnancy.
- Death was not related to the pregnancy.

Pregnancy Related Death

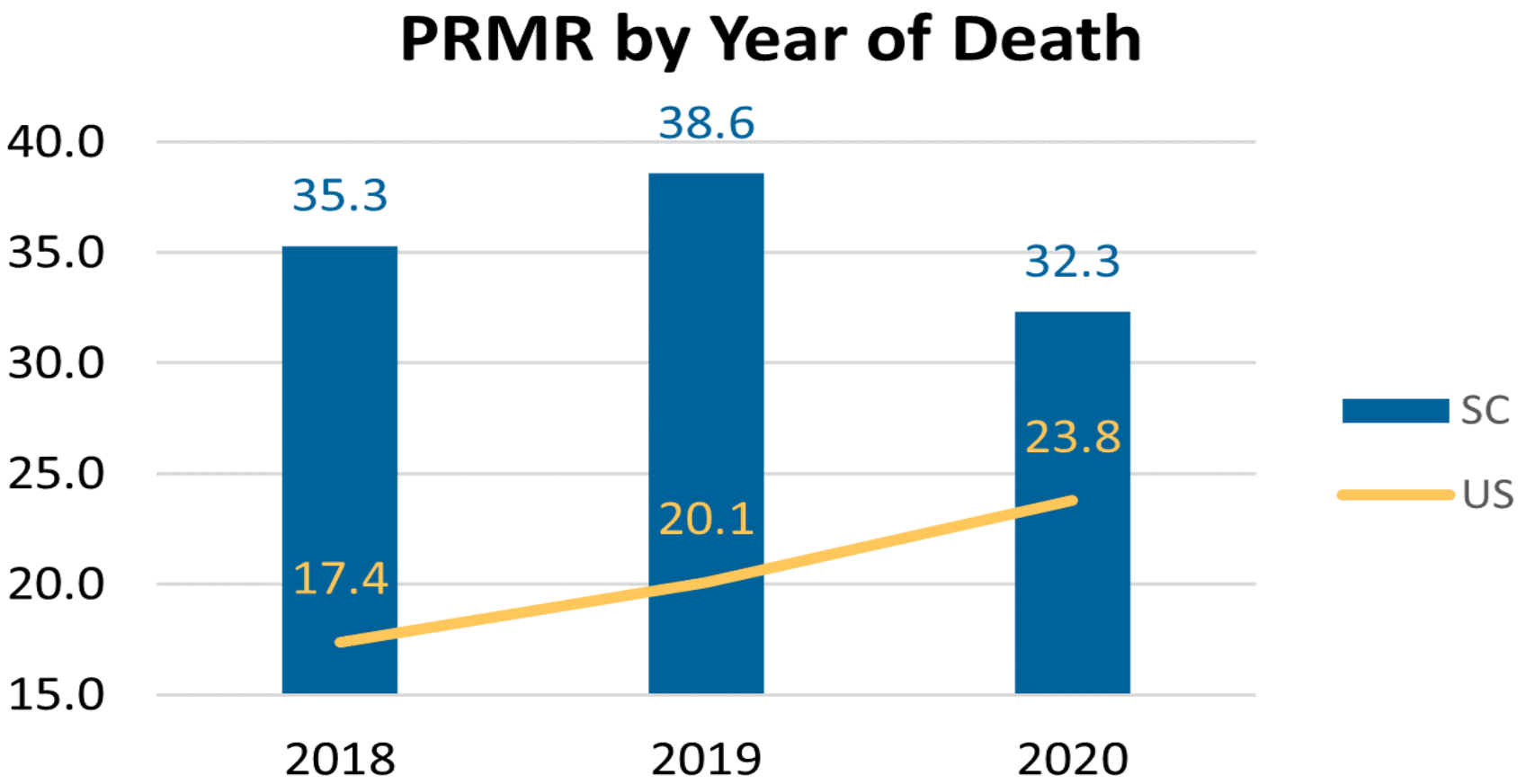
- Death during or within 1 year of pregnancy.
- Death was related to the pregnancy
  - pregnancy complication
  - condition made worse by pregnancy
  - chain of events initiated by the pregnancy

Legislative Brief Data is for Pregnancy-Related Deaths

SCMMMRC: Data

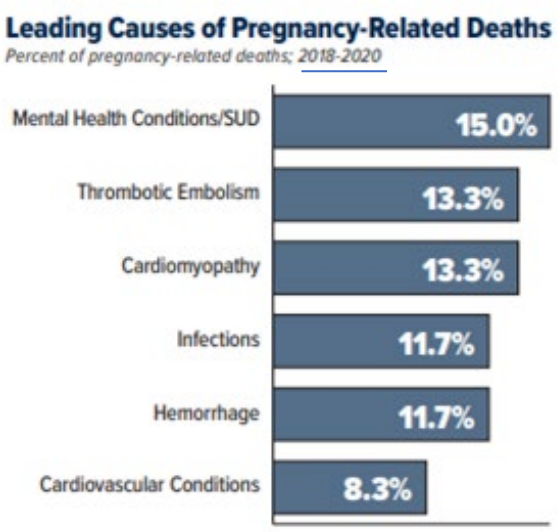
The following data is *Pregnancy-Related*.

The term “Mental Health Conditions” includes data for ***both*** substance use disorders and mental health conditions.



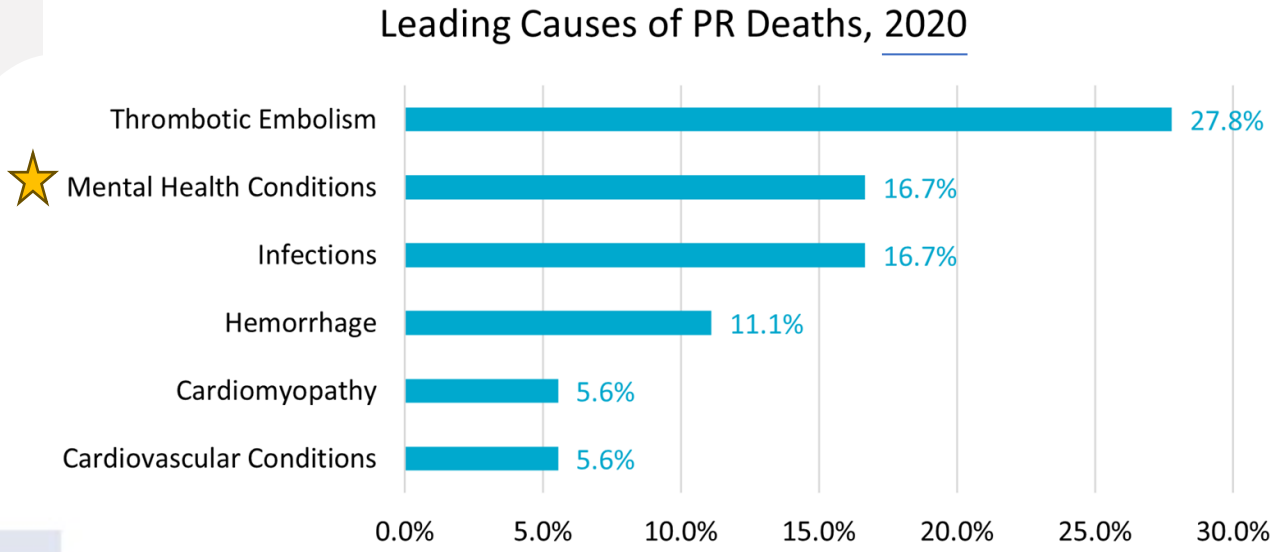
PRMR (pregnancy related mortality ratio)-the number of deaths per 100,000 live births.

SC: Leading Cause of Pregnancy Related Deaths

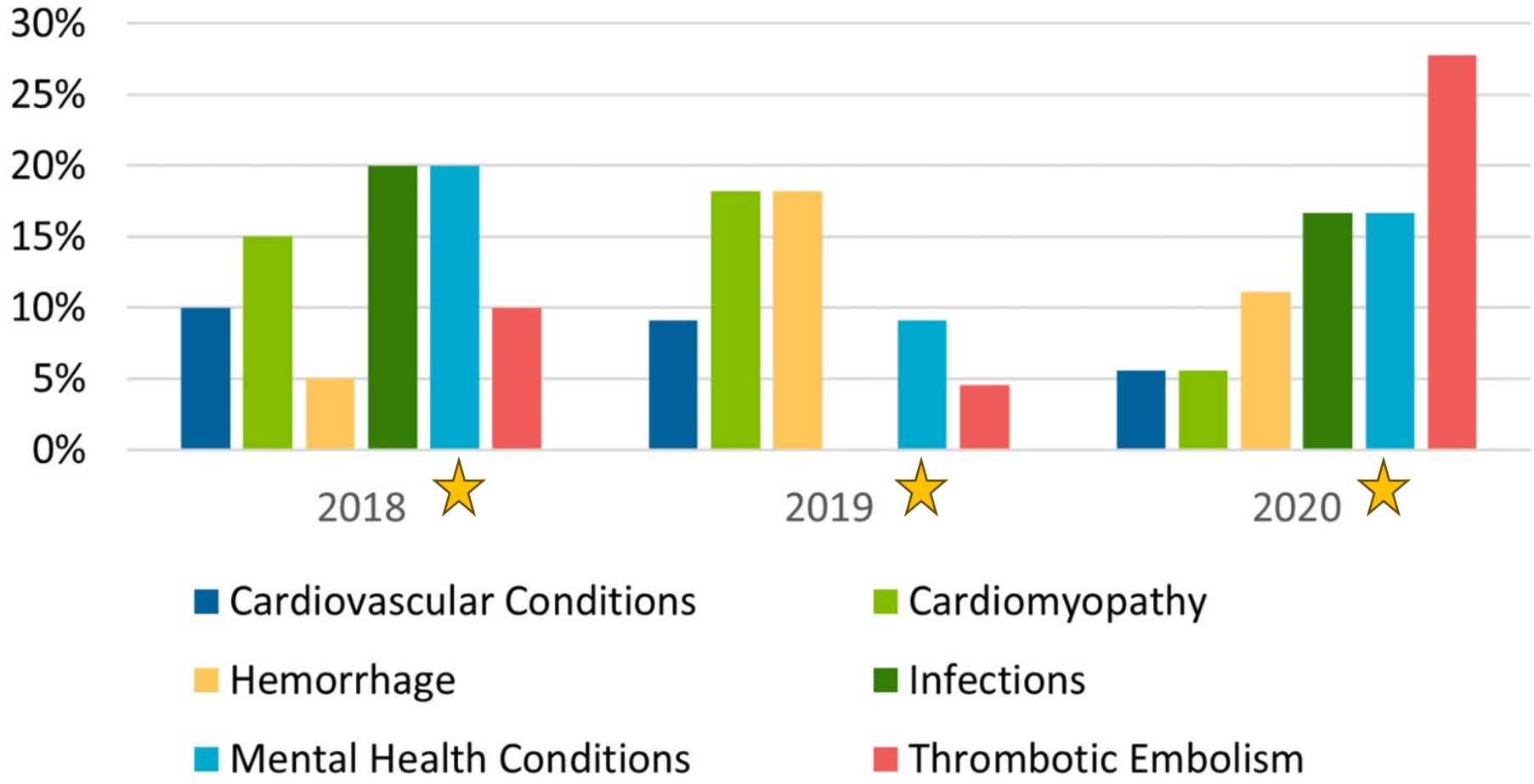


Pregnancy-Related Deaths in 2020

- ⚠ **Mental Health Conditions/ Substance Use Disorder (SUD) continue to be a leading cause of death.**
- ⚠ **Cardiomyopathy, the leading cause of death in 2019, declined in 2020.**
- ⚠ **Thrombotic Embolism became a leading cause of death in 2020.**

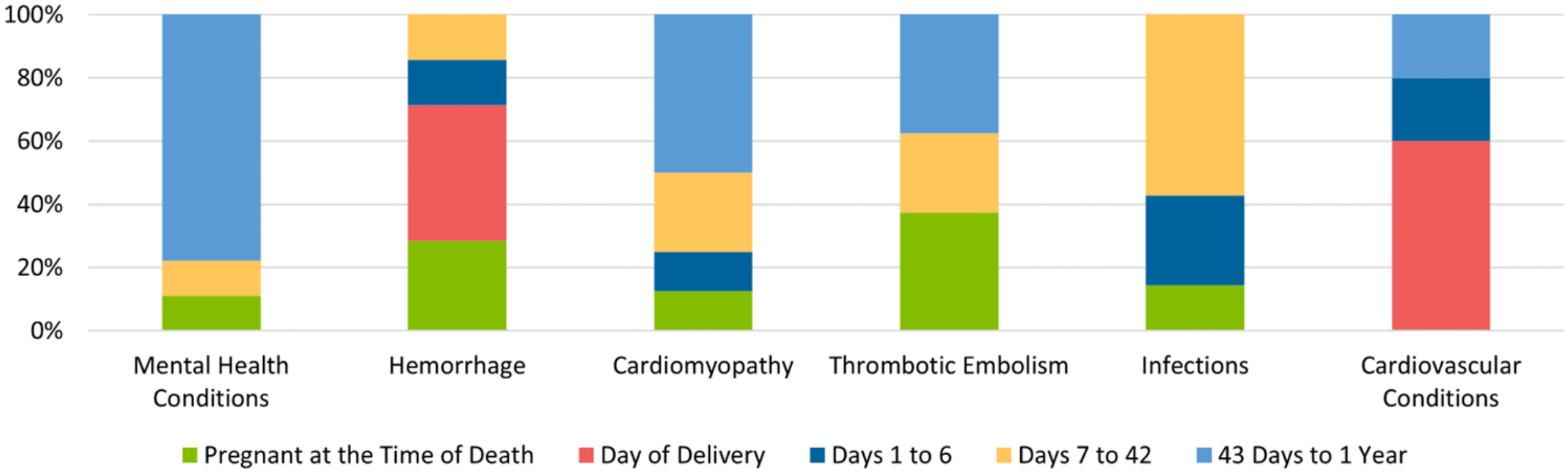


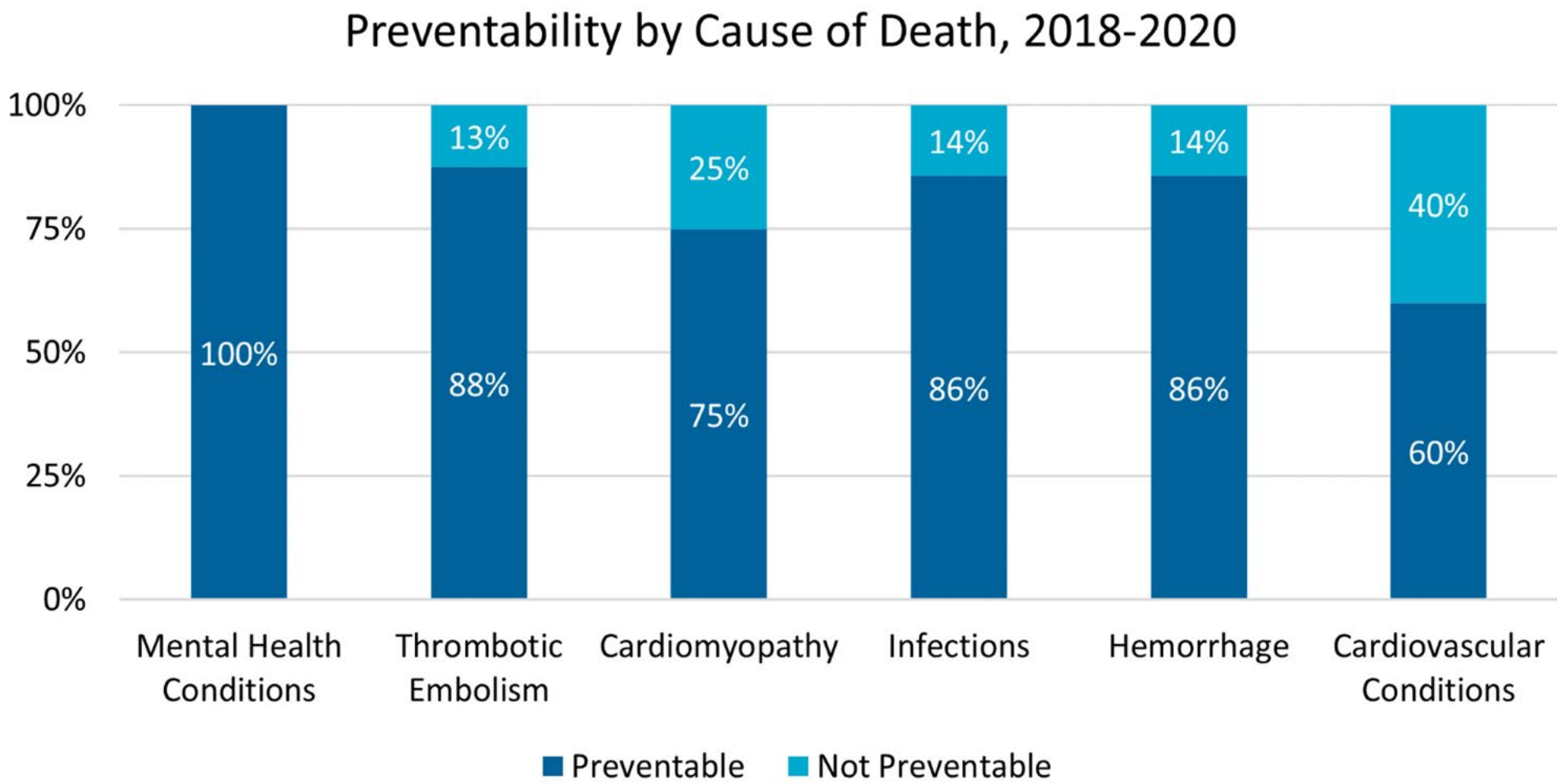
Leading Causes of PR Deaths by Year



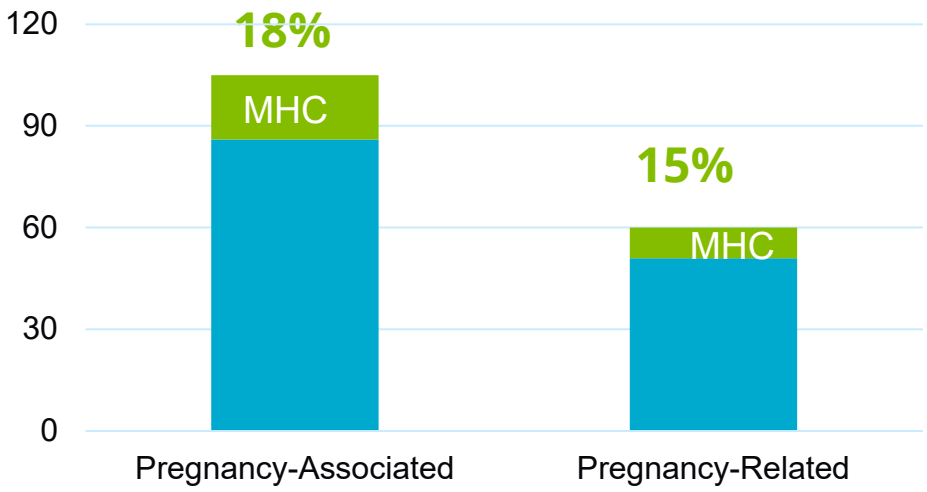
South Carolina Department of Health and Environmental Control

Leading Causes of PR Deaths by Timing of Death, 2018-2020

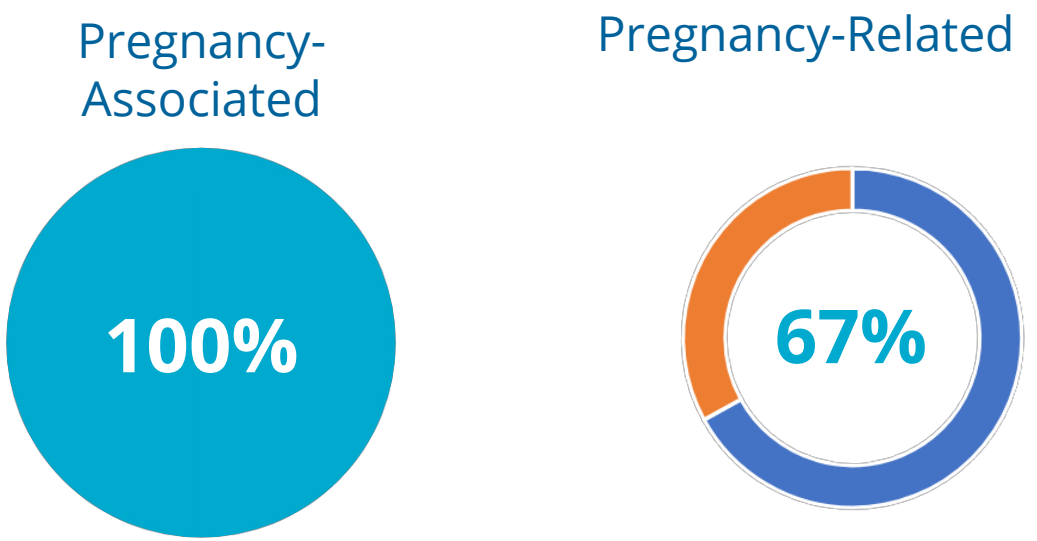



Preventability by Cause of Death, 2018-2020
100%
75%
50%
25%
0%
100%
13%
88%
25%
75%
14%
86%
14%
86%
40%
60%
Mental Health Conditions
Thrombotic Embolism
Cardiomyopathy
Infections
Hemorrhage
Cardiovascular Conditions
Preventable
Not Preventable

Mental Health Conditions by Case Designation, 2018-2020

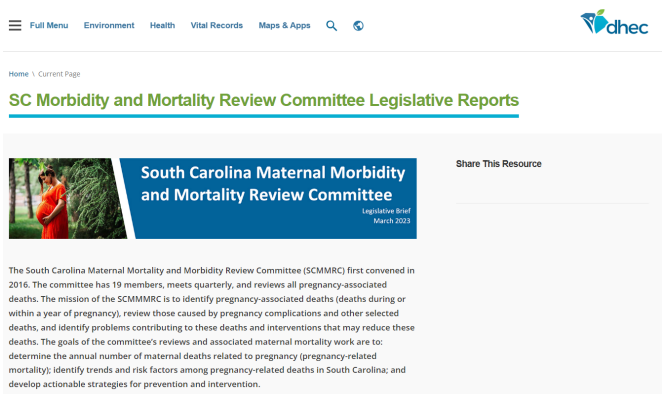


Proportion of Deaths Due to Mental Health Conditions Identified as Substance Use Disorder, 2018-2020



Successes

- Medicaid coverage extended 12 months postpartum
- Staff for family interviews
- Increased medical specialties participating on the committee
- Increased members from community groups
- Gathered data related to COVID and made recommendations
- Work groups established



2024 SCMMMRC Legislative Brief

2024 SCMMMRC Legislative Brief Components

Overview and Goals of SCMMMRC

Pregnancy-Related Mortality Rates By

- Year
- Race
- Rurality
- Payor Source
- Age

Pregnancy-Related Deaths

- Cause
- Timing
- Preventability
- Circumstances

Key Points

Recommendations

Legislative Brief Data is for Pregnancy-Related Deaths

South Carolina Maternal Morbidity and Mortality Review Committee

2024 LEGISLATIVE BRIEF

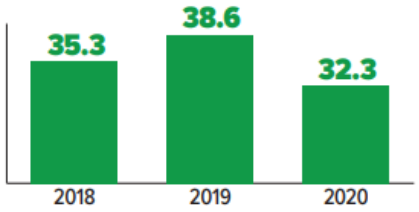
South Carolina Maternal Morbidity and Mortality Review Committee (SCMMMRC) reviews all maternal deaths that occur during pregnancy and up to 365 days following the end of the pregnancy regardless of the cause of death. Each death is reviewed using a standardized approach that includes investigating underlying causes of death, pregnancy-relatedness, preventability, circumstances and contributing factors surrounding the death.

Goals

- Determine the annual number of pregnancy-associated deaths that are pregnancy-related.
- Identify trends and risk factors among preventable pregnancy-related deaths in SC.
- Develop actionable recommendations for prevention and intervention.

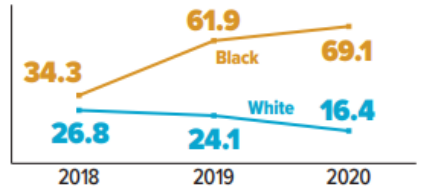
Pregnancy-Related Mortality Rate, by Year

Rate per 100,000 live births



Pregnancy-Related Mortality Rate, by Race

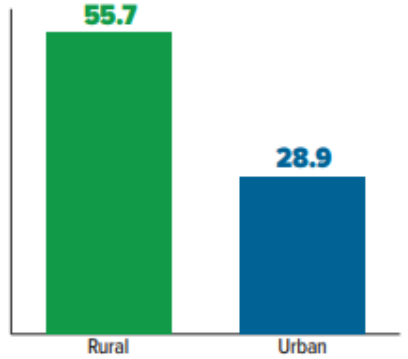
Rate per 100,000 live births



There are several factors that lead to delays in reviews of maternal death records, such as receiving records in a timely manner. **In 2023, the SCMMMRC completed the review of 79 deaths occurring in 2020; 18 of the deaths were determined to be Pregnancy-Related (PR).** A PR death occurs when a person dies from a pregnancy complication, a chain of events initiated by the pregnancy, or a condition made worse by the pregnancy. **In 2020, the SC Pregnancy-Related Mortality Rate (PRMR) was 32.3 PR deaths per 100,000 live births, a 16.3% decrease from 38.6 in 2019. In 2020, Black women were 4.2 times more likely to die than White women.** SC ranks 8th highest for maternal mortality when compared to other states.

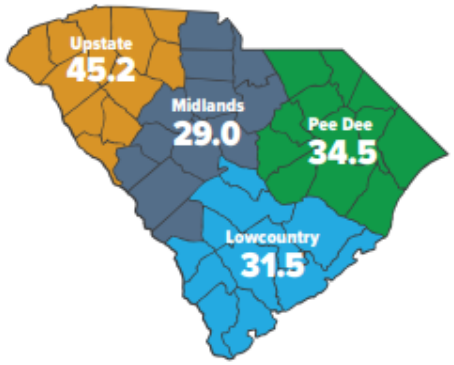
Pregnancy-Related Mortality Rate, by Rurality

Rate per 100,000 live births; 2018-2021



Pregnancy-Related Mortality Rate, by Region

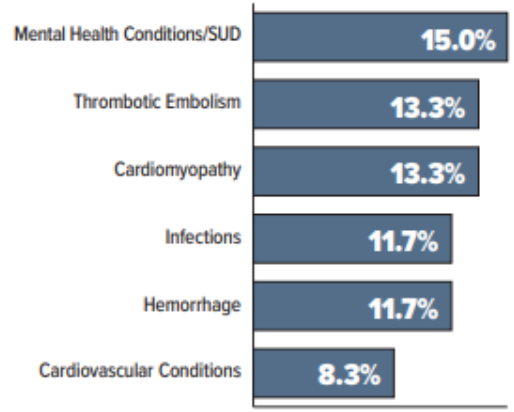
Rate per 100,000 live births; 2018-2020



The **Upstate region saw the highest rate of pregnancy-related deaths**. Additionally, PRMRs in **rural counties were nearly twice as high as those in urban counties.**

Leading Causes of Pregnancy-Related Deaths

Percent of pregnancy-related deaths; 2018-2020

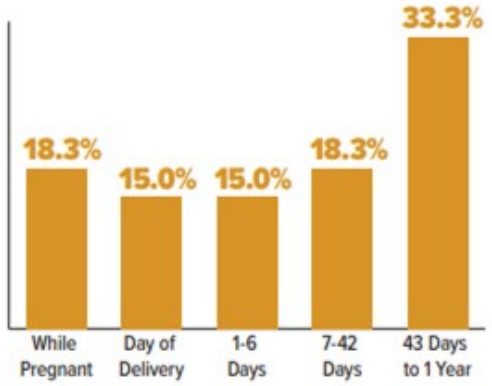


Pregnancy-Related Deaths in 2020

- **Mental Health Conditions/ Substance Use Disorder (SUD) continue to be a leading cause of death.**
- **Cardiomyopathy, the leading cause of death in 2019, declined in 2020.**
- **Thrombotic Embolism became a leading cause of death in 2020.**

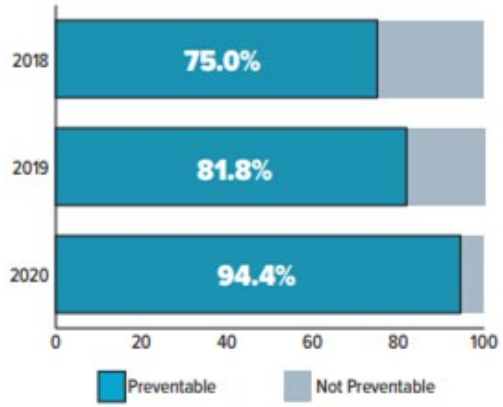
Timing of Pregnancy-Related Deaths

Percent of pregnancy-related deaths; 2018-2020



Preventability of Pregnancy-Related Deaths

Percent of pregnancy-related deaths; 2018-2020



Among pregnancy-related deaths, 51.6% occurred between 7-365 days postpartum. The causes of death most likely to occur during this period were: mental health conditions, cardiomyopathy, and thrombotic embolism.

A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes. These changes may occur at the patient/family, provider, facility, system, or community level and may be associated with various contributing factors.[1]

The causes of death determined most likely to be preventable were mental health conditions/substance use disorder (100%) and thrombotic embolism (88%).

Circumstances of Pregnancy-Related Deaths

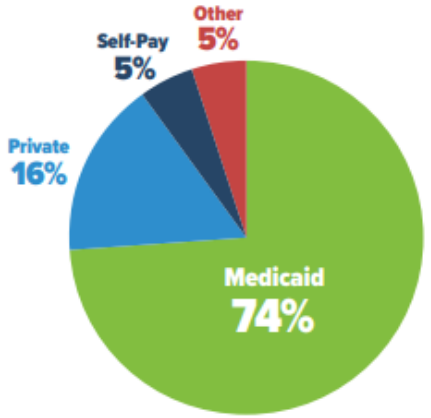
Percent of pregnancy-related deaths; 2018-2020

Discrimination

The possibility of discrimination is described as treating someone less or more favorably based on the group, class, or category they belong to resulting from biases, prejudices, and stereotyping. It can

Pregnancy-Related Deaths, by Payor Source

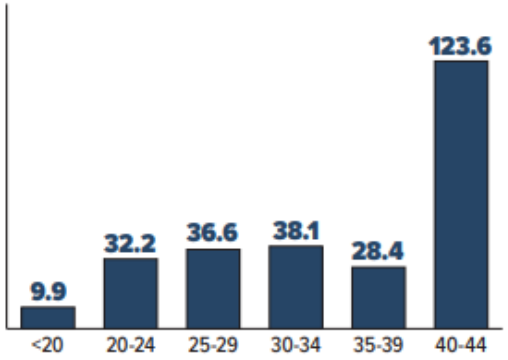
Percent of pregnancy-related deaths; 2018-2020



During the time of this data collection, through 2020, Medicaid coverage ended at 60 days post-partum. With over 50% of PR deaths occurring in the post-partum period, we expect the 2022 extension of Medicaid until 365 days post- partum to enhance coverage for these women.

Pregnancy-Related Mortality Rate, by Age

Rate per 100,000 live births; 2018-2020



Key Takeaways

- **Pregnancy-related deaths declined**
- **Racial disparities widened**
- **Majority of pregnancy-related deaths occurred in the post-partum period**

Summary

In 2020, South Carolina saw a **16.3% decrease** in the overall pregnancy related mortality ratio, however the gap in **racial disparities widened with Black women** dying 4 times more than White women. The SCMMMRC is committed to improving maternal health outcomes and eliminating preventable

2024 Legislative Brief Recommendations

Recommendations from the SCMMMRC are strategies to improve maternal outcomes.

Access: Access to obstetrical care should be improved in rural areas/counties. 11 out of the 31 rural counties do not have an OB provider.

Care Coordination: Providers should collaborate with behavioral health specialists when caring for pregnant/postpartum women with mental health/substance use disorders.

Clinical Assessment: All Obstetric and Emergency Department providers and staff and family practitioners should receive regular training and frequent updates on recognition and treatment of thrombotic embolism, cardiomyopathy, cardiovascular conditions, mental health conditions, hemorrhage, and substance use disorder in the setting of the obstetrical and post-partum patient.

Knowledge: Providers and facilities should provide education to pregnant and postpartum women, and their families about the urgent maternal warning signs and when to seek medical attention.

Policy and Procedure and Adherence: Providers and facilities should ensure that women have a scheduled post-partum follow up appointment within 1-3 weeks to assess for chronic and mental health conditions. Women should be strongly encouraged to attend their post-partum appointments.

Discrimination: SC Hospitals and Providers should mandate cultural competency training for providers and staff.

Policy and Procedure: All facilities are expected to have a DVT prevention protocol which includes DVT assessment and treatment in the pregnant and postpartum patient.

Referral: If a pregnant or postpartum patient does not have a primary care provider, a referral should be placed. Primary care providers can address chronic diseases such as obesity and hypertension that are associated with negative maternal health outcomes.

Coroner Recommendation: Autopsies should be ordered in compliance with the Ann Purdue Act of 2009-2010.

Citations:

1. Pregnancy Related Death: Data from Maternal Mortality Review Committees in 36 States, 2017-2019. Retrieved from https://reviewtoaction.org/tools/resourcecenter
2. Smedley et al, 2003 and Dr. Rachel Hardeman

CR-013357 2/24

References

- South Carolina Department of Health and Environmental Control (SC DHEC)
  Division of Population Health Surveillance Bureau of Maternal and Child Health
  Maternal and Mental Health in South Carolina Joshua Sellner, MSPH, PhD
- SC Morbidity and Mortality Review Committee Legislative Reports | SCDHEC
  - https://scdhec.gov/sc-morbidity-mortality-review-committee-legislative-reports
  - SCDHEC SCMMMRC Legislative Brief 2023
  - SCMMMRC Legislative Brief 2024
- A special thanks to the staff at SCMMMRC and DHEC
- PRAMS https://www.cdc.gov/prams/index.htm
- BRFSS https://www.cdc.gov/brfss/
- South Carolina | Review to Action
  - https://reviewtoaction.org/tools/networking-map/south-carolina