LOUISIANA PREGNANCY-ASSOCIATED MORTALITY REVIEW

2017-2019 REPORT

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We honor the women whose experiences we have attempted to understand and learn from, as well as their partners, children, families, and communities. We hope that the lessons learned from their deaths will help create new pathways to prevention, health, and equity.

We would like to recognize the Bureau of Family Health Regional Maternal and Child Health Coordinators who abstracted these medical records with care. We would also like to acknowledge the dedication of the Louisiana Maternal Mortality Review Committee, who volunteered their time, insight and expertise. We acknowledge the Louisiana Vital Records Office for its collaboration in providing the data used to identify cases of maternal deaths. We thank the health systems, healthcare providers, and coroners who provided the records that allowed for meaningful review to occur.

Table of Contents

Table of Contents

Gender Referencing

The Louisiana PAMR Review Committee strives to be inclusive of all birthing people and acknowledge that not all individuals who get pregnant or give birth identify as women. The use of terminology and language is reflective of current research and advocacy work to reduce overall maternal mortality and morbidity, as well as racial and ethnic health disparities in pregnancy and birth outcomes.

There is a need for increased awareness, medical assistance, and inclusion for individuals who do not identify as women in pregnancy and birth-related services.

Key Definitions

The following terms will be used throughout the report. All definitions come from the CDC, in collaboration with key partners in maternal mortality prevention, including the Association of Maternal and Child Health Programs (AMCHP).[1]

Pregnancy-Associated Deaths[1]

A death that occurs during pregnancy or within one year of the end of pregnancy, regardless of the cause. This term encompasses pregnancy-related deaths; pregnancy-associated, but not related deaths; and pregnancy-associated, but unable to determine relatedness deaths, as defined below.

This report focuses on all deaths that meet the criteria for this definition.

Pregnancy-Related	Pregnancy-Associated, but Not Related	Pregnancy-Associated, but Unable to Determine Relatedness
A death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by the pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.	A death during pregnancy or within one year of the end of pregnancy from a cause that is **not** related to pregnancy.	A pregnancy-associated death where the cause of death is unable to be determined as "pregnancy-related" or "pregnancy-associated, but not related."
Example Cause of Death*	**Example Cause of Death***	**Example Cause of Death***
Hypertensive disorders of pregnancy (uncontrolled and extreme high blood pressure during pregnancy leading to serious health complications, including possible organ damage)	Motor vehicle crash (unintentional)	Suicide

*Additional case-specific details beyond cause of death are required to determine which of the three subcategories a pregnancy-associated death falls into. The example causes presented here are not mutually exclusive to the categories they are paired with above.

Introduction
Maternal Mortality Overview

The United States has some of the most technologically advanced healthcare systems in the world, yet our maternal mortality rate is higher than any other developed country.[2] Most concerning are the significant racial disparities that exist. Women are dying during a period when they should have a lot of support, both in health care and in their communities. In order to prevent future deaths, we must understand why women are dying during pregnancy, childbirth, and their first year postpartum. Collecting, analyzing, and comparing maternal mortality data has been challenging to accomplish both nationally and locally due to a lack of standard definitions. Maternal mortality is defined slightly differently by several different health organizations (see Appendix B for a comparison of systems of maternal mortality surveillance in the United States).[3] Louisiana analyzes and reports on all pregnancy-associated deaths, a death that occurs during pregnancy or within one year of the end of pregnancy, regardless of the cause. This term encompasses pregnancy-related deaths; pregnancy-associated, but not related deaths; and pregnancy-associated, but unable to determine relatedness deaths.

While surveillance using vital statistics can capture general trends, it is recognized that local maternal mortality review committees are best positioned to comprehensively assess maternal deaths and identify what interventions will have the most impact at the patient, provider, facility, system, and community levels to prevent future deaths. The Centers for Disease Control and Prevention supports 31 states, including Louisiana, for the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) program. This funding directly supports agencies and organizations that coordinate and manage Maternal Mortality Review Committees (MMRCs) to identify, review, and characterize maternal deaths; and identify prevention opportunities. MMRCs have access to records beyond vital statistics, such as medical records, including physician and nurse's notes, mental and behavior health records, autopsy and police reports, and informant interviews. MMRCs are part of an ongoing quality improvement cycle, with an eye for prevention and the ability to make clinical and upstream recommendations to improve health outcomes and reduce health disparities.

In 2010, The Louisiana Department of Health, Office of Public Health, Bureau of Family Health (LDH-OPH-BFH) established the Louisiana Pregnancy-Associated Mortality Review (hereafter referred to as "PAMR") to understand and address maternal mortality in Louisiana. In 2018, PAMR launched its enhanced multidisciplinary review process, in full alignment with national best practices promoted by the CDC. The case review process was enhanced and the MMRC was expanded to ensure representation from a variety of geographic regions and fields of expertise (including expertise in addressing social determinants of health), as well as to increase inclusion of women and people of color.

The terms Maternal Mortality Review Committee and Pregnancy Associated Mortality Review (PAMR) Committee are used interchangeably throughout this report.

Note on Data Comparisons

This report summarizes the PAMR committee's review of all **pregnancy-associated deaths that occurred during pregnancy or within one year of the end of pregnancy** in 2017-2019. Methodology for this report and the 2017 and 2018 PAMR Reports are consistent, so comparisons can be made. However, this report is not comparable to the review that occurred for the 2011-2016 Report. The 2011-2016 Maternal Mortality Review **only included the review of pregnancy-related deaths occurring during pregnancy or within 42 days of the end of pregnancy**.[4]

Introduction
Louisiana Pregnancy-Associated Mortality Review (PAMR)

About
Louisiana Pregnancy-Associated Mortality Review (PAMR) works to quantify and understand pregnancy-associated deaths in order to create actionable, comprehensive recommendations to prevent future deaths. This is accomplished through epidemiological surveillance and multidisciplinary case review.

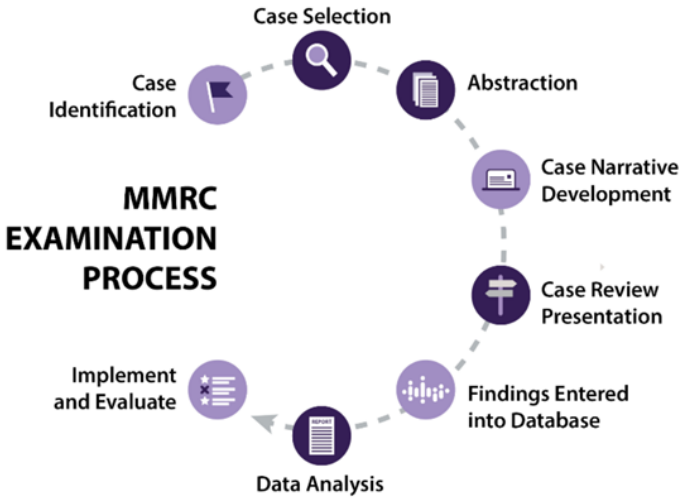
Statutory Authority
The Louisiana PAMR was established by the Louisiana Department of Health, Office of Public Health's Bureau of Family Health under the authorization of the Louisiana Commission on Perinatal Care and Prevention of Infant Mortality (Louisiana Perinatal Commission) in order to understand and address maternal mortality in Louisiana.

Scope
The Louisiana Maternal Mortality Review Committee (MMRC) reviews all pregnancy-associated deaths of Louisiana residents, regardless of the cause of death. A pregnancy-associated death is the death of a woman that occurs during pregnancy or within one year of the end of pregnancy, regardless of the cause. This term encompasses pregnancy-related deaths, pregnancy-associated, but not related deaths, and pregnancy-associated, but unable to determine relatedness deaths.

Mission Statement
LA-PAMR will protect and promote the health of women & families in Louisiana through surveillance, multidisciplinary case review, timely reports, and provision of actionable recommendations to understand and prevent pregnancy-associated deaths. We will accomplish this via supporting prevention, transformation, and innovation at the level of individuals, families, providers, birthing facilities, health systems, and communities.

Process Overview
Case review meetings occur two years after the death occurred. In 2019, the MMRC reviewed pregnancy-associated deaths that occurred in 2017. In 2020, the MMRC reviewed deaths that occurred in 2018, and in 2021 the MMRC reviewed deaths that occurred in 2019. Case review meetings occur 4-5 times a year and follow a standard and structured agenda.

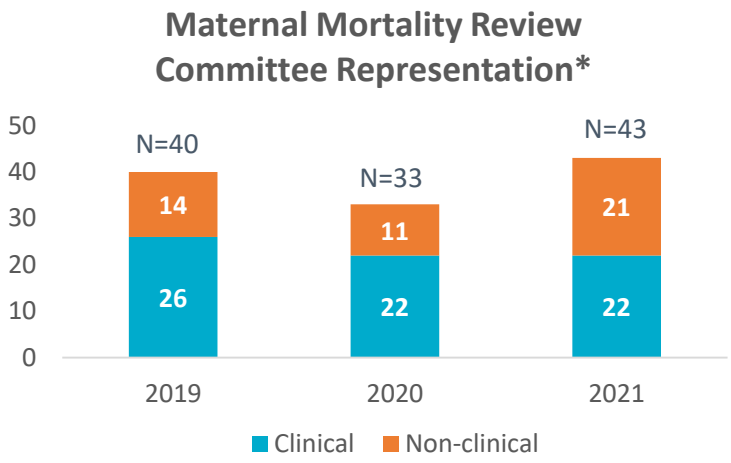
Vital records and/or hospital discharge data are used to identify pregnancy at or within one year of death, then medical records and/or coroner reports are used to verify pregnancy at the time of death or up to one year prior to death. After the verification process, Maternal and Child Health Coordinators abstract and prepare a narrative for case review (see Appendix C). Using the completed case narrative, the MMRC conducts an in-depth review of all pregnancy-associated deaths, a death that occurs during pregnancy or within one year of the end of pregnancy, regardless of the cause. Committee decisions are entered into the Maternal Mortality Review Information Application (MMRIA) database for analysis.



Case Review Process

Maternal Mortality Review Committee

The Louisiana Maternal Mortality Review Committee (MMRC) is a multidisciplinary committee, consisting of clinical and non-clinical members. To ensure that our review committee work is informed by individuals who know and understand the context in Louisiana, the team continues to recruit statewide representation from disproportionately impacted communities and survivors. This includes community-based organizations (New Orleans Breastfeeding Center, Birthmark Doula Collective, New Orleans Family Justice Center, Louisiana Coalition Against Domestic Violence), the Louisiana Perinatal Quality Collaborative (LaPQC) and Medicaid managed care organizations to ensure visibility of system issues to payers. The Louisiana MMRC continues to grow. In 2019, we had 43 active members from over 18 disciplines (see Appendix D for full list of committee members).



*The MMRC representation is reflected by the calendar year of case review.

Discussion of Pregnancy-Associated Deaths

During the case review process, MMRCs are asked to make several key decisions. Throughout the discussion, respect and justice for the decedent are maintained. Guiding questions used during individual case review include:

1. Was the death pregnancy-related? "If this woman was not pregnant, would she have died?"
2. What was the underlying cause of death?
3. Was the death preventable? Was there a chance to alter the outcome?
4. What were the factors that contributed to the death?
5. If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events?

A death is classified as ***pregnancy-related*** if it occurs during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. By contrast, a death is classified as ***pregnancy-associated, but not pregnancy related***, if it happens during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy. In the event the committee is unable to determine if the death occurred due to a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy, the death is classified as ***pregnancy-associated, but unable to determine relatedness.***

Implementing the Utah Tool
Identifying Pregnancy Relatedness for Overdoses and Suicides

Nationally, unintentional injuries, including drug poisoning and suicides, are the leading causes of death among women of reproductive age in the United States.[5-7] In Louisiana, drug-involved deaths have been consistently increasing.[8] Drug-involved deaths (sometimes called drug poisonings or drug overdoses) are not drug specific, and include legal and illicit drugs.

From 2017- 2019, accidental drug overdoses were the leading cause of pregnancy-associated deaths in Louisiana, defined as the death of a woman during pregnancy or within 1 year of the end of pregnancy, regardless of the cause. Nationally, MMRCs have voiced difficulty in categorizing accidental overdoses and suicides when committee members are asked to use their expertise to answer the question "Was the death pregnancy-related? If this woman was not pregnant, would she have died?"

The Utah Tool

The Utah Maternal Mortality Review Committee created a standardized tool to help MMRCs determine pregnancy relatedness for deaths due to accidental drug overdoses and suicides (see Appendix F for the Utah tool). After application of standardized criteria, the Utah Perinatal Mortality Review Committee determined that pregnancy itself was the inciting event leading to the majority of accidental drug-related deaths or suicides among pregnant and postpartum women. Many states, including Louisiana, have opted to use this tool during case reviews.

In 2021, Louisiana's PAMR introduced the Utah Tool into case reviews with deaths that occurred in 2019. Based on the Utah criteria, the committee determined five suicides and two accidental overdoses that occurred in 2019 to be ***pregnancy-related***.

Nationally, the disparity in maternal outcomes is not only tragic, but a call to action. In review of maternal mortality in the United States between 2007 – 2016, Black, American Indian and Alaska Native women disproportionately experienced maternal mortality.[9] The maternal mortality rate for Black, American Indian and Alaska Native women was 2-3 times higher than that of White women.[10] Findings from the 2017 and 2018 Louisiana PAMR report highlight this disparity in Louisiana. In 2017 and 2018, for all pregnancy-associated deaths, Black women were more than twice as likely (2.1 times) to die as White women in Louisiana. This disparity was even greater for pregnancy-related deaths. Recognizing the importance of the issue, the CDC added a discrimination checkbox to the MMRIA form with the intent to design a consistent approach to documenting and measuring discrimination as a contributing factor to maternal mortality.

The disparity in maternal mortality is complex due to many factors, including implicit bias, structural racism, and social determinants of health—which include, but are not limited to: lack of transportation, access to childcare, and poverty. Black and American Indian/Alaska Native women disproportionately experience social determinants of health which hinder their ability to achieve optimal health outcomes. While it is often difficult to determine if discrimination was a contributing factor in the death of a woman, the Louisiana PAMR committee is dedicated to improving our maternal mortality review process to ensure we are reviewing each death through a lens of equity.

Our PAMR committee continually reflects on the health inequities that exist in Louisiana and recognizes the need for an experienced and racially diverse group of individuals to discuss each case. The diversity of knowledge and experience is reflected in the recommendations focusing on addressing bias and social determinants of health. To better answer the question, “Did discrimination contribute to the death?”, we began using the Louisiana Bias or Racism and Social Determinants of Health (LABoRS) tool with the review of our 2018 cases.

The Louisiana Bias or Racism and Social Determinants of Health (LABoRS) Tool

The Louisiana Bias or Racism and Social Determinants of Health Tool, or “LABoRS Tool” was created by the LA-PAMR team to provide a standardized process to evaluate each case for the presence of bias, discrimination, and/or racism, as well as the impacts of social determinants of health as contributors to the death. The goal of the tool is to support the development of actionable recommendations that address contributing factors. This tool does not prove bias and/or racism were or were not contributing factors. It assists abstractors and committee members in identifying potential evidence of discrimination and inequity to enable the committee to make informed recommendations around these issues.

The LABoRS tool is comprised of four sections: Demographics, Social Determinants of Health, Geospatial Social Determinants of Health and the Case Findings Checklist (adopted from Texas MMRC) (see Appendix E for LaBoRs tool).

Data Summary
Maternal Mortality in Louisiana, 2017- 2019

Summary of Key Findings

This report summarizes PAMR's review of 2017-2019 pregnancy-associated deaths and resulting recommendations for prevention.

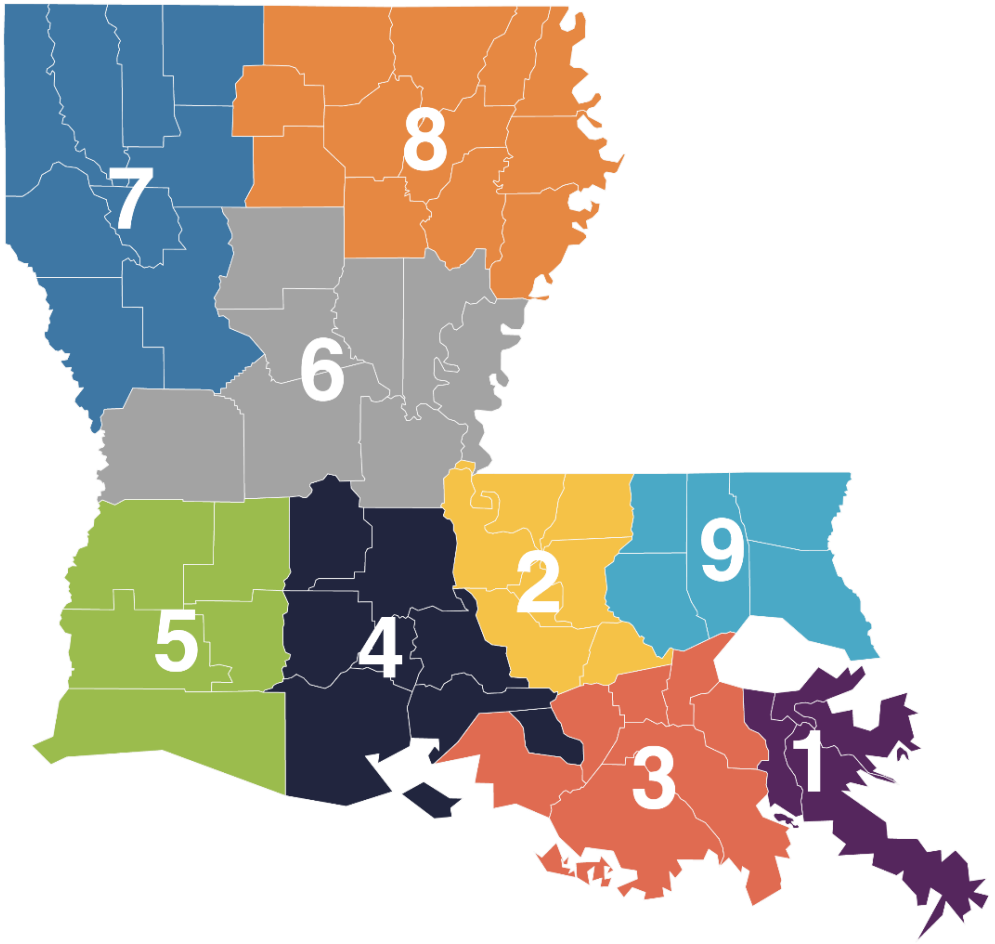
1. The committee reviewed 182 confirmed pregnancy-associated deaths of Louisiana residents which occurred in Louisiana and out-of-state from 2017 to 2019.
    - **44 deaths were *pregnancy-related***. The top cause of death in this category was **cardiovascular conditions**.
    - **114 deaths were *pregnancy-associated, but not related***. The top cause of death in this category were **accidental overdose.**
    - **24 deaths were *pregnancy-associated, but unable to determine relatedness***. The top cause of death in this category was **unknown**.
2. The overall ratio of all ***pregnancy-associated* deaths in Louisiana was 101.5 per 100,000 births**. The rate of ***pregnancy-related* deaths in Louisiana was 24.5 per 100,000 births**. The rate of ***pregnancy-associated but not related* deaths in Louisiana was 63.6 per 100,000 births**.
3. For **all *pregnancy-associated* deaths, Black women were almost twice as likely (1.9 times) to die as White women in Louisiana**. This disparity is more prominent in pregnancy-related deaths.
    - Among ***pregnancy-related*** deaths, over **2 Black women (2.5) in Louisiana died for every 1 White women**.
    - Among ***pregnancy-associated, but not related*** deaths, almost **2 Black women (1.7) in Louisiana died for every 1 White women.**
4. Women **ages 30-34 years and older were at an increased risk of *pregnancy-related* and *pregnancy-associated, but not related* death**. Women **less than 25 years old were at an increased risk of *pregnancy-associated, but unable to determine relatedness* death.**
5. The committee deemed **80% of *pregnancy-related* deaths to be potentially preventable**. **83% of *pregnancy-associated, but not related* deaths** and **88% of *pregnancy-associated, but unable to determine relatedness* deaths** were deemed to be potentially preventable.

Priority Areas for Prevention

Based on the 770 contributing factors identified through its review of 2017-2019 maternal deaths, Louisiana's PAMR committee consistently identified **eight overarching needs**. The broad needs below highlight areas of priority to inform maternal mortality prevention efforts.

1. Improve care coordination before, during and after pregnancy, including support for the 4th trimester.
2. Ensure women receive the appropriate level of care based on their medical issues and risk factors.
3. Expand the obstetric healthcare workforce through telehealth and inclusion of specialists.
4. Address racial and cultural bias.
5. Improve and expand identification of and treatment for substance use and mental health during pregnancy.
6. Address social determinants of health (SDoH) to improve maternal mortality and decrease disparities.
7. Increase awareness of Louisiana's MMRC to support the need for data sharing and access to medical records.
8. Contribute to the public health evidence base to increase capacity to understand and address root causes of pregnancy-associated mortality.

Regional Map of Louisiana



Region	Area	Parishes within Region
1	New Orleans	Jefferson, Orleans, Plaquemines, St. Bernard
2	Baton Rouge	Ascension, East Baton Rouge, East Feliciana, Iberville, Pointe Coupee, West Baton Rouge, West Feliciana
3	Houma	Assumption, Lafourche, St. Charles, St. James, St. John the Baptist, St. Mary, Terrebonne
4	Lafayette	Acadia, Evangeline, Iberia, Lafayette, St. Landry, St. Martin, Vermilion
5	Lake Charles	Allen, Beauregard, Calcasieu, Cameron, Jefferson Davis
6	Alexandria	Avoyelles, Catahoula, Concordia, Grant, La Salle, Rapides, Vernon, Winn
7	Shreveport	Bienville, Bossier, Caddo, Claiborne, DeSoto, Natchitoches, Red River, Sabine, Webster
8	Monroe	Caldwell, East Carroll, Franklin, Jackson, Lincoln, Madison, Morehouse, Ouachita, Richland, Tensas, Union, West Carroll
9	Hammond/ Slidell	Livingston, St. Helena, St. Tammany, Tangipahoa, Washington

From Data to Review

Maternal Mortality in Louisiana, 2017-2019

Verifying and Confirming Maternal Deaths
Review Process and Criteria

Use of Vital Records death data alone is not enough to identify true pregnancy-associated deaths

From 2017-2019, 262 potential pregnancy-associated deaths were identified using Vital Records data alone. Bureau of Family Health Regional Maternal and Child Health (MCH) Coordinators verified that 182 of the 262 identified deaths had a documented pregnancy at the time of or within one year of death. The remaining 80 deaths were classified as false cases and not considered eligible for review. The committee used the *Building U.S. Capacity to Review and Prevent Maternal Deaths* project's Maternal Mortality Review Information Application's (MMRIA) Committee Decisions Form to classify each case (see Appendix G).

262 Identified Deaths

Identified deaths met the following criteria:

- Louisiana resident at the time of death.
- Between the ages of 10 and 55 years at the time of death.
- Identified as having been pregnant at the time of death or within one year of death by linkage of the death certificate to a corresponding live birth or fetal death certificate or inpatient hospital discharge record, indication of pregnancy status on the death certificate through the pregnancy checkbox, or cause of death had an ICD-10 code of A34, O00-O99 (causes related to pregnancy, childbirth, or complications during the postpartum period).

Cases reviewed by Regional Maternal & Child Health Coordinators

80 False Cases

These cases met the definition of a potential pregnancy-associated death, but the MCH Coordinators found evidence that the decedent was not pregnant at the time of death or within the year prior to death through medical records, coroner reports, obituaries, and/or media. There was either no record of any pregnancy or there was a documented pregnancy that ended more than one year before death. See "Data Limitations" in Appendix C for more details.

STOP

These cases were ineligible for further review

182 Confirmed Deaths

Pregnancy-associated deaths met the below criteria:

- Documentation in medical records, coroner reports, obituaries, and/or media of a pregnancy at the time of death or within one year of death.

Cases abstracted by regional MCH Coordinators

Cases Reviewed by Committee

Committee determinations:

- 44 pregnancy-related cases.
- 114 pregnancy-associated, but not related cases.
- 24 pregnancy-associated, but unable to determine relatedness cases.

Key Findings

Maternal Mortality in Louisiana, 2017-2019

Snapshot of Pregnancy-Associated Deaths

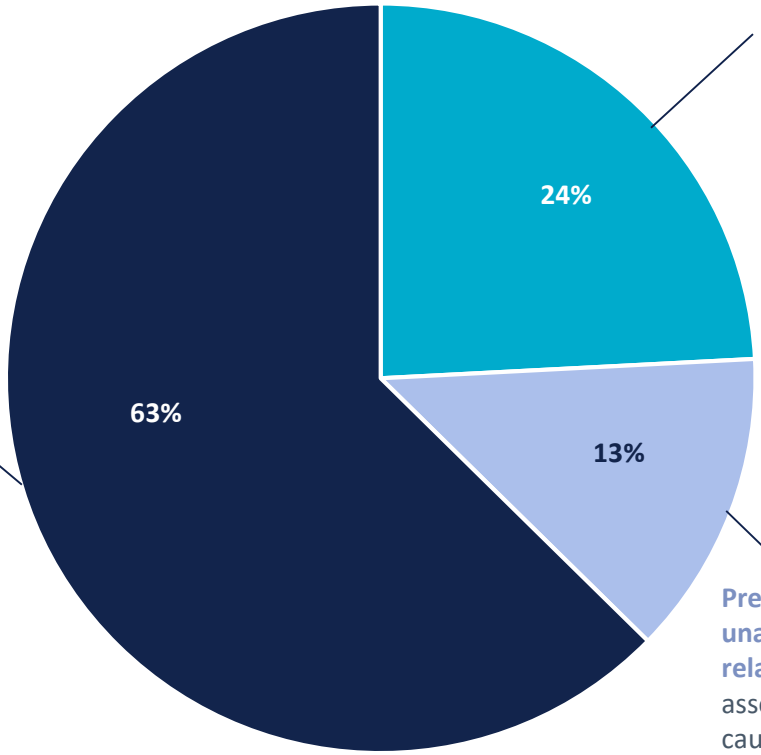
From 2017-2019, Louisiana had 182 confirmed pregnancy-associated deaths. This represents a pregnancy-associated mortality ratio of 101.5 deaths per 100,000 births.

Breakdown of Pregnancy-Associated Deaths

Of the **182** deaths reviewed, the committee determined:

- **44** deaths (24%) were classified as **pregnancy-related**.
- **114** deaths (63%) were classified as **pregnancy-associated, but not related**.
- **24** deaths (13%) were classified as **pregnancy-associated, but the committee was unable to determine relatedness**.

Pregnancy-related is a death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by the pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.



Pregnancy-associated, but not related is a death during pregnancy or within one year of the end of pregnancy from a cause that is NOT related to pregnancy.

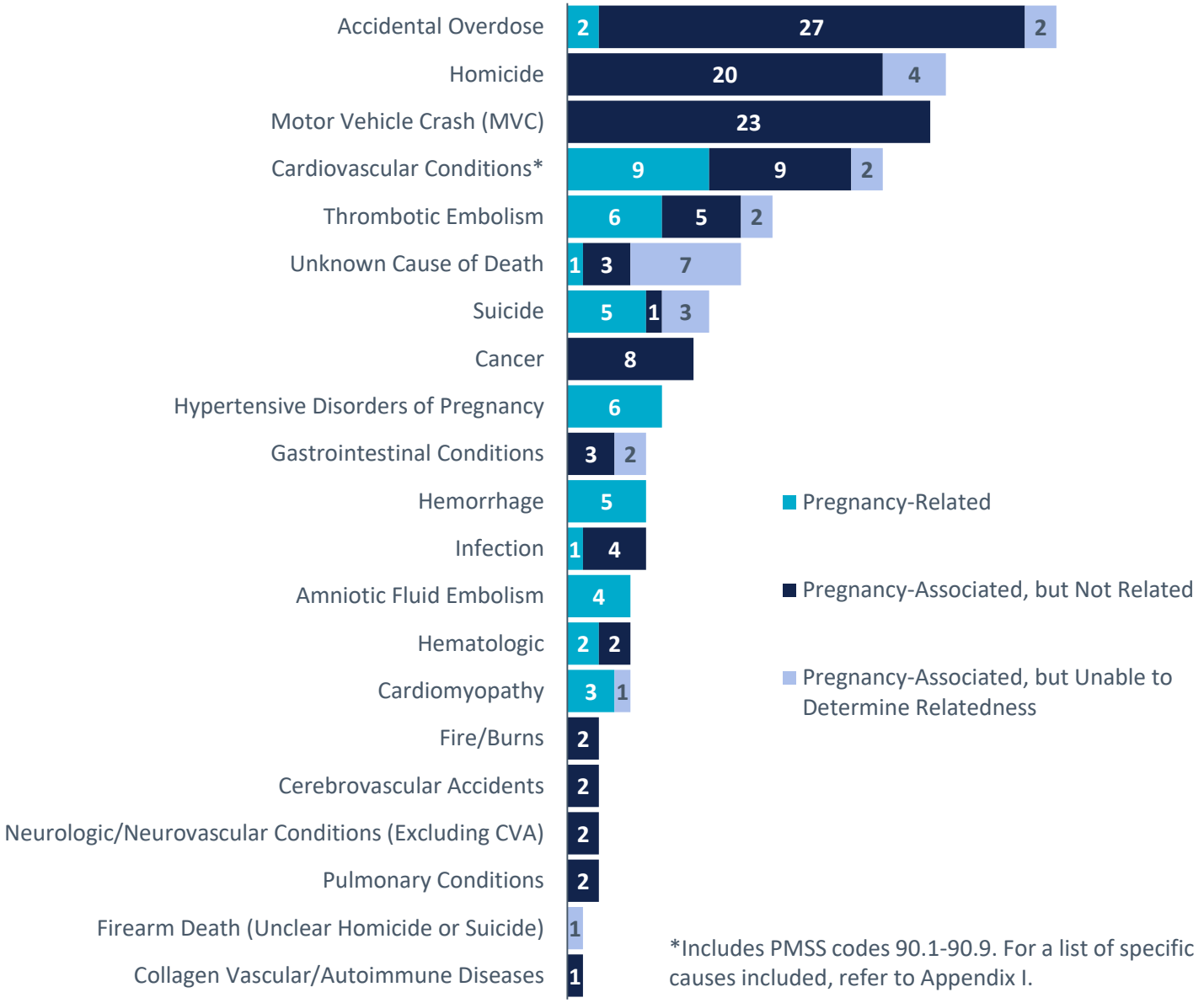
Pregnancy-associated, but unable to determine relatedness is a pregnancy-associated death where the cause of death is unable to be determined as "pregnancy-related" or "pregnancy-associated, but not related."

Key Points

- Nearly 1 in 4 (24%) deaths were determined to be ***pregnancy-related***.
- ***Pregnancy-associated, but not related*** deaths accounted for the majority of deaths (63%).

Causes of Pregnancy-Associated Deaths

Pregnancy-Associated Deaths by Relatedness and Cause of Death as Determined by the Committee, 2017-2019



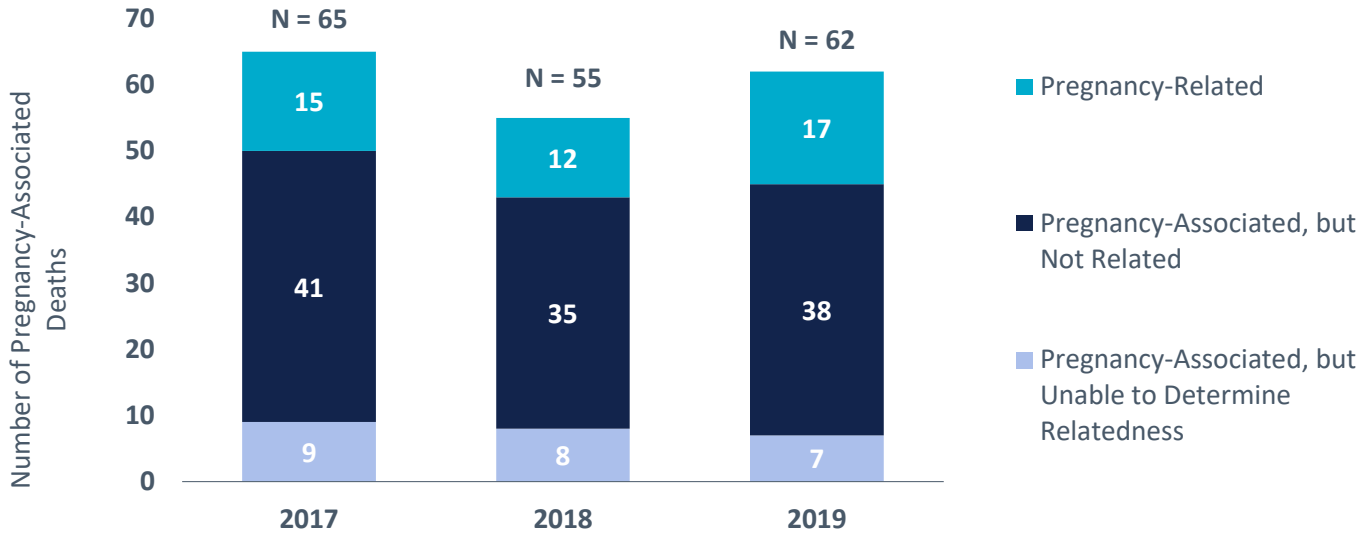
*Includes PMSS codes 90.1-90.9. For a list of specific causes included, refer to Appendix I.

Key Points

- The overall leading causes of pregnancy-associated deaths were accidental overdose (17%), homicide (13%), and motor vehicle crash (13%).
- The leading causes of pregnancy-related deaths were cardiovascular conditions (21%), thrombotic embolism (14%), and hypertensive disorders of pregnancy (14%).

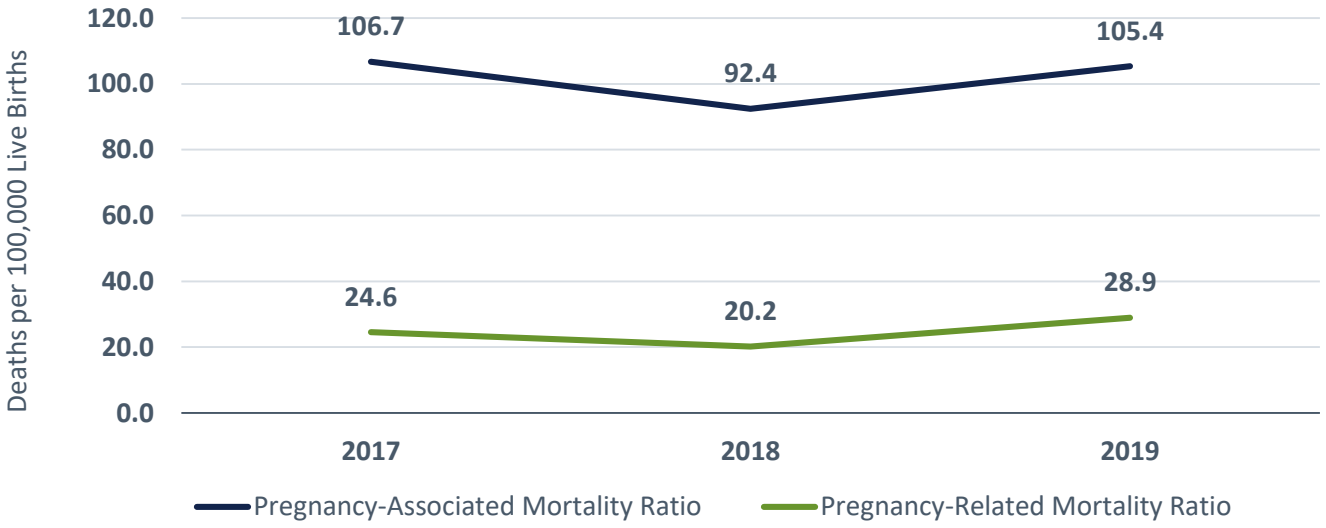
Trends in Pregnancy-Associated Deaths

Pregnancy-Relatedness by Year



Pregnancy-Associated Mortality Over Time

Louisiana's overall **pregnancy-associated mortality ratio** decreased 13.3% from 2017-2018, then increased 14.0% from 2018-2019. The **pregnancy-related mortality ratio** decreased 18.1% from 2017-2018, but rose 43.3% from 2018-2019. While there is an increase in the pregnancy-associated mortality and pregnancy-related mortality ratio, the absolute numbers in these categories are small. Therefore, more years of data are needed to establish trends.

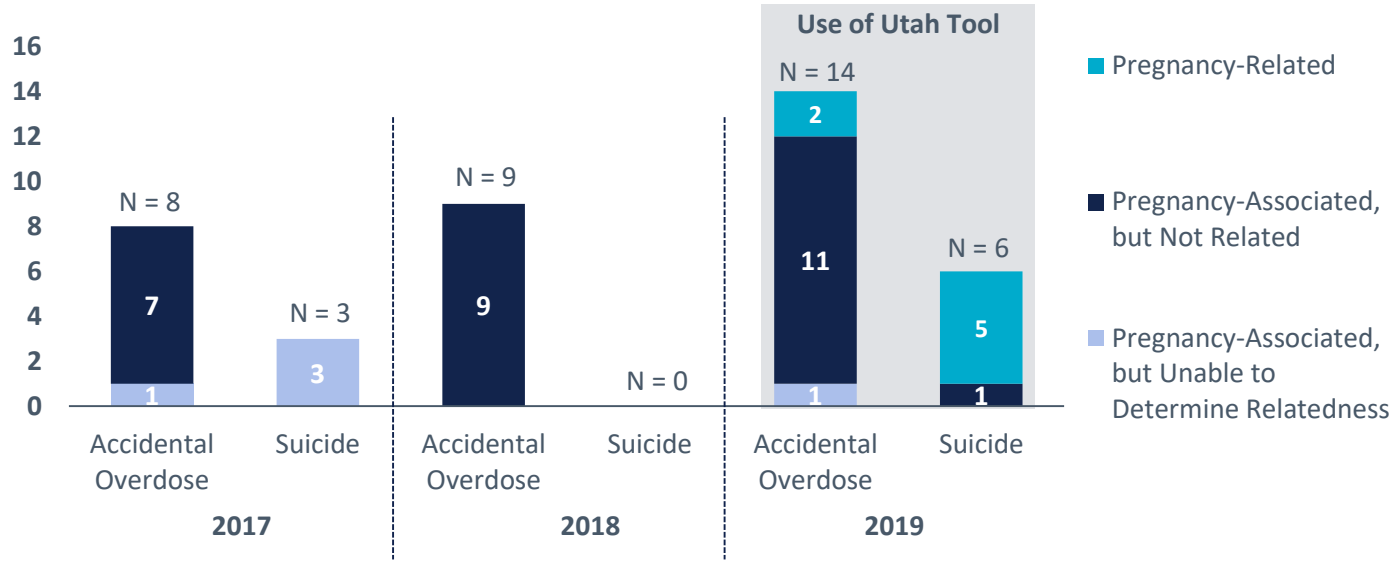


Key Points

- The year 2019 had the highest number and percentage of pregnancy-related deaths within the three-year period with 17 deaths (27%).
- From 2017 to 2019, the mortality ratio was 101.5 for all pregnancy-associated deaths among Louisiana residents and 24.5 for the subset of deaths that were pregnancy-related.

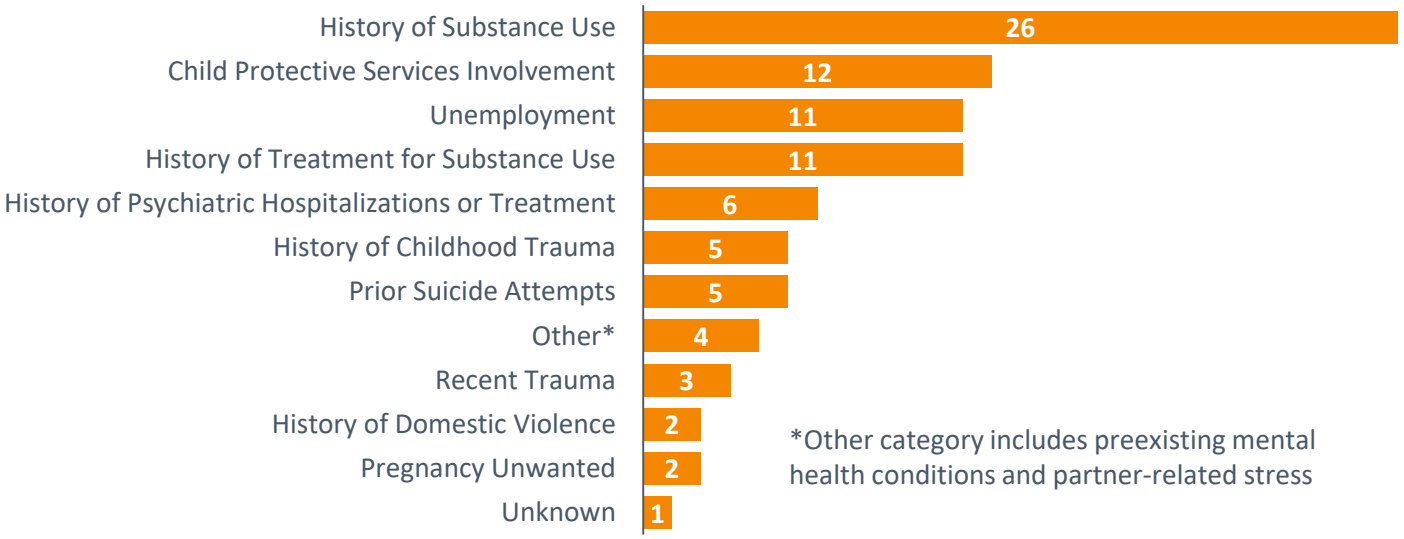
Accidental Overdose and Suicide

Based on the Utah Tool criteria, the committee determined two accidental overdoses and five suicides that occurred in 2019 to be pregnancy-related.



History of Social and Emotional Stress

From 2017 to 2019, there were 40 pregnancy-associated deaths due to accidental overdose or suicide. The graph below reflects the number of deaths that had a documented history of social and emotional stressors in the medical records and reports.



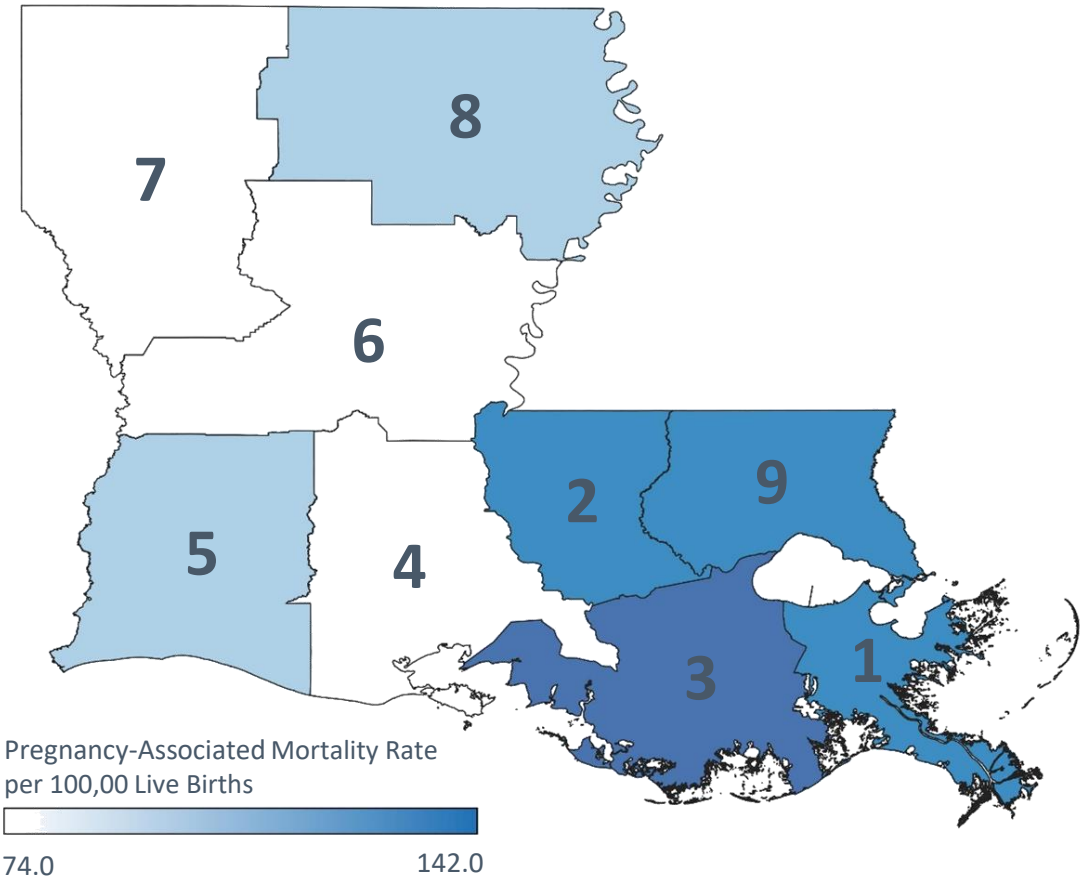
*Other category includes preexisting mental health conditions and partner-related stress

Key Points

- Accidental drug-related deaths and suicide can be extremely difficult to directly attribute to pregnancy, in part because of lack of details about circumstances surrounding the pregnancy and death. The Utah Tool has proven to facilitate more objective and consistent classification of these deaths as pregnancy-related.
- History of substance use was the most frequently documented stressor (26 deaths) among those who died due to accidental overdose or suicide.

Regional Data
Pregnancy-Associated Deaths, 2017-2019

Pregnancy-Associated Mortality by Region of Residence



Region	Area
1	New Orleans
2	Baton Rouge
3	Houma
4	Lafayette
5	Lake Charles
6	Alexandria
7	Shreveport
8	Monroe
9	Hammond/ Slidell

Pregnancy-Associated Deaths by Region (2017-2019)	1	2	3	4	5	6	7	8	9
Number of Deaths	34	29	21	18	12	10	17	13	28
Pregnancy-associated mortality ratio per 100,000 live births	100.8	110.0	141.6	74.0*	92.9*	83.5*	84.3*	99.7*	128.2

*Ratios based on fewer than 20 deaths should be interpreted with caution.

Key Points

- The pregnancy-associated mortality ratio by region of residence varied greatly in Louisiana, as shown by the map. Region 4 had the lowest rate (74.0) of pregnancy-associated mortality, while Region 3 had the highest ratio (141.6) of pregnancy-associated mortality. It should be noted that for Regions 4, 5, 6, 7, and 8 there were less than 20 deaths and thus their ratios should be interpreted with caution.
- The overall pregnancy-associated mortality ratio from 2017 to 2019 was higher for women living in the southeastern regions of the state.

Racial Disparities in Pregnancy-Associated Deaths

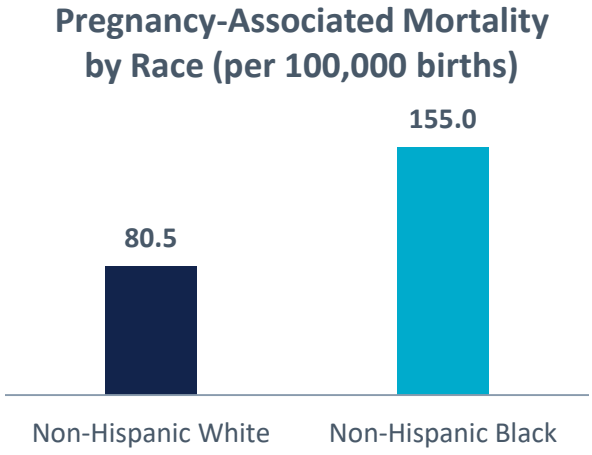
Pregnancy-Associated Mortality by Race

37% of all births in Louisiana from 2017 to 2019 were to **non-Hispanic Black women**.[6] However, non-Hispanic Black women accounted for **57% of all pregnancy-associated deaths** that occurred during the same three-year period.

*Other includes Multi-race and any race other than Black or White

Disparities in Pregnancy-Associated Deaths

The overall ratio of pregnancy-associated mortality deaths in Louisiana was 101.5 per 100,000 births. The figure below shows the overall pregnancy-associated mortality ratio by race.



Almost **2 Black women** in Louisiana died…

…for every **1 White woman**

Key Points

- Non-Hispanic Black women represent a disproportionate number of deaths. Racial disparities in maternal mortality are complex. Mortality is influenced by a wide range of economic, social, and clinical determinants. Some of those factors are directly related to pregnancy and birth itself, including health status prior to pregnancy and consistent access to quality healthcare during pregnancy and throughout the life course. Other, broader factors that contribute to adverse outcomes (including death), include social determinants of health such as racial bias and discrimination, lack of transportation or childcare, poverty, and racism in policies, practices, and systems.[9-14]

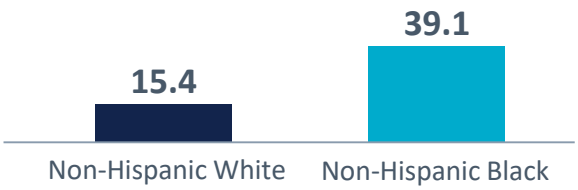
Racial Disparities
Pregnancy-Related and Pregnancy-Associated, But Not Related Deaths

Substantial racial disparities exist among all pregnancy-associated deaths. However, these disparities are more prominent in pregnancy-related deaths.

Disparities in Pregnancy-Related Deaths

The overall ratio of ***pregnancy-related*** deaths in Louisiana was 24.5 per 100,000 births. The figure below shows the pregnancy-related mortality ratio by race.

Pregnancy-Related Mortality by Race (per 100,000 births)



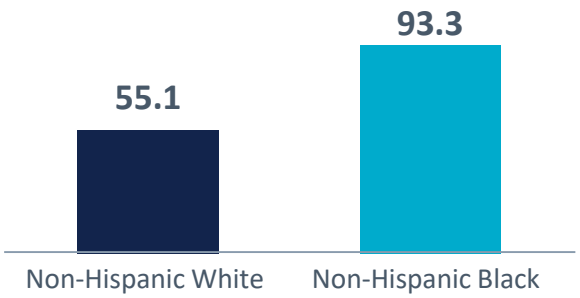
About **2.5 Black women** in Louisiana died…

…for every **1 White woman**

Disparities in Pregnancy-Associated, but Not Related Deaths

The overall ratio of ***pregnancy-associated, but not related*** deaths in Louisiana was 63.6 per 100,000 births. The figure below shows the pregnancy-associated, but not related ratio by race.

Pregnancy-Associated, but Not Related Mortality by Race (per 100,000 births)



Almost **2 Black women** in Louisiana died…

…for every **1 White woman**

Key Points

- For ***pregnancy-related*** deaths, Black women died at more than two (2.5) times the rate of White women. The top causes of ***pregnancy-related*** deaths among Black women were thrombotic embolism, cardiovascular conditions, and hypertensive disorders of pregnancy.
- For ***pregnancy-associated, but not related*** deaths, Black women died at almost twice (1.7 times) the rate of White women. Homicide was a top cause.
- Implicit bias and systemic racism drive racial disparities in health and healthcare.[10] Louisiana's health disparities demonstrate the need to continue efforts to address these issues at the provider and facility level to ensure equitable care.
- Social determinants of health such as food insecurity, intimate partner violence, lack of safe housing, and lack of educational support contribute to disparities in pregnancy-associated deaths.[8-12]

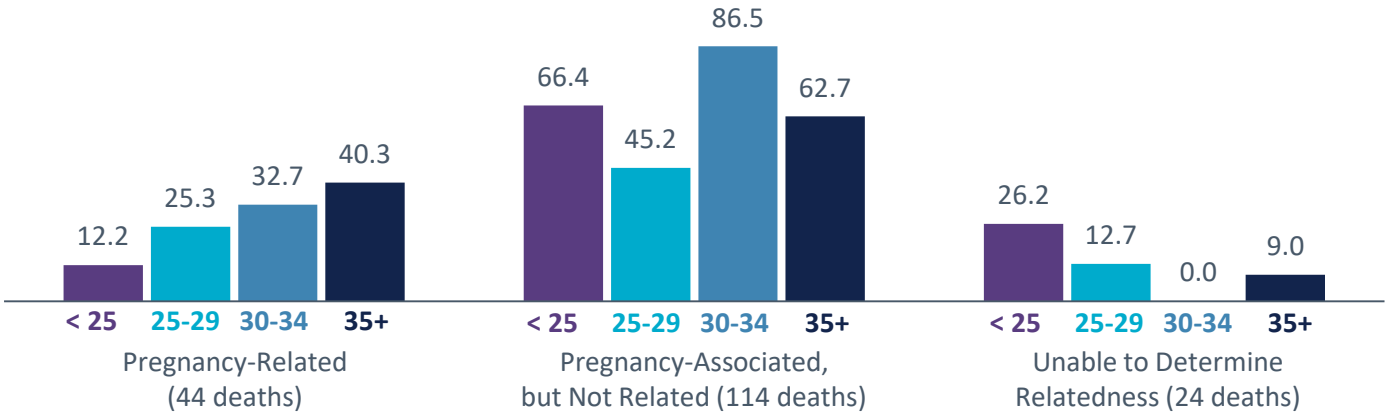
Maternal Demographics
Insurance Type, Age, and Education

Insurance Type

60% of women who died during or within a year of pregnancy had health insurance through **Medicaid**. The majority of Louisiana women (61%) gave birth from 2017 to 2019 had health insurance through Medicaid.

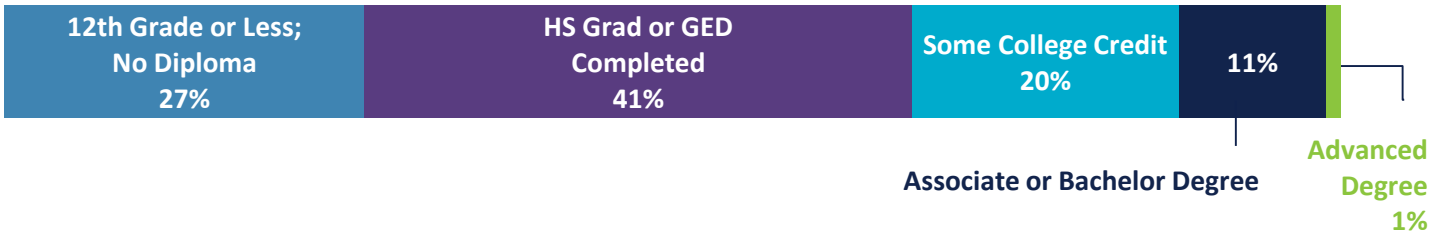
Mortality Ratios by Age

Mortality ratios below are deaths per 100,000 births from 2017-2019.



Education

Women with a **high school degree/GED or less** accounted for **68%** of all pregnancy-associated deaths. Almost half of Louisiana women (47%) who gave birth from 2017 to 2019 had a high school degree/GED or less.



Key Points

- Medicaid covers the majority of pregnancies and births in Louisiana.[11] There are no disparities in pregnancy-associated deaths by insurance type, however, these findings represent opportunities to optimize services covered by Medicaid to ensure quality healthcare before, during, and after pregnancies, and to provide coordinated care between pregnancies to prevent pregnancy-associated deaths.
- Women ages **30-34 years** had the highest rates of ***pregnancy-associated, but not related*** death. Accidental overdose was the top cause of death among this group.

Understanding Pregnancy-Associated Deaths
Timing of Deaths

The majority (84%) of pregnancy-related deaths occurred during or within 42 days of pregnancy.

Timing of *Pregnancy-Related* Deaths

23%
While pregnant

61%
Within 42 days of pregnancy

16%
43 days to 1 year after pregnancy

- There were **44 pregnancy-related** deaths.
- Deaths occurring **during pregnancy** were most frequently due to **hemorrhage.**
- Deaths occurring **within 42 days of pregnancy** were most frequently due to **cardiovascular conditions**.

Timing of *Pregnancy-Associated, but Not Related* Deaths

22%
While pregnant

4%
Within 42 days of pregnancy

74%
43 days to 1 year after pregnancy

- There were **114 pregnancy-associated, but not related** deaths.
- Deaths occurring **during pregnancy** were most frequently due **to motor vehicle crashes**.
- Deaths occurring **43 days to 1 year after pregnancy** were most frequently due to **unintentional overdose**.

Timing of *Pregnancy-Associated, but Unable to Determine Relatedness* Deaths

37%
While pregnant

21%
Within 42 days of pregnancy

42%
43 days to 1 year after pregnancy

- There were **24 pregnancy-associated, but unable to determine relatedness** deaths.
- Deaths occurring **during pregnancy** were most frequently due to **homicide.**
- Deaths occurring **43 days to 1 year after pregnancy** were most frequently due to **unknown** causes.

Key Points

- The majority (84%) of ***pregnancy-related*** deaths occurred during or within 42 days of pregnancy.
- 74% of ***pregnancy-associated, but not related*** deaths occurred 43 days to 1 year after pregnancy and were most frequently due to accidental overdose.
- More than one-third (37%) of ***pregnancy associated, but unable to determine relatedness*** deaths occurred during pregnancy and were most frequently due to homicide.

Understanding Pregnancy-Associated Deaths
Medical and Autopsy Records Available for Review

About 1 in 4 cases were missing at least some* records crucial to case review. Autopsies were performed in almost two-thirds (65%) of cases.

Understanding pregnancy-associated deaths requires information from multiple types of records including those from medical/health systems, law enforcement, mental/behavioral health providers and systems, and government or social service agencies. Records can be difficult to obtain due to:

- Lack of information or data sharing agreements and processes in place across and within these systems.
  Example: Medical record sharing across health networks can be limited.
- Legal restrictions and policies that regulate what information agencies can share.
  Example: It is difficult to obtain records related to a death that is part of an ongoing criminal investigation.
- Reluctance or hesitation to share copies of records obtained from external agencies.
- Staff turnover which hinders collaboration and information sharing between and across agencies or systems.

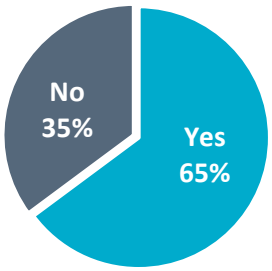
Completeness of Records for Review

Access to complete records is critical to determine factors that contributed to pregnancy-associated deaths, and to determine their preventability. **86 out of 182 cases (47%)** were determined by the committee to have **complete records available** for review.

***24% (44 cases)** were identified as having either **"somewhat complete"** or **"not complete"** records, meaning that **information crucial to the review of the case was not available** to the review committee *(see Appendix G for full definitions of complete, mostly complete, somewhat complete, and not complete).*

Autopsies

- Autopsies reveal information that helps establish cause of death. Without an autopsy, it is challenging to determine the immediate and underlying cause of death in certain scenarios.
- **Autopsies were performed on 65% of deaths**.



Key Points

- Data sharing across and within systems and agencies for the purpose of maternal mortality review would improve the review committee's access to needed records (e.g. records related to or from prenatal care, mental health, Medicaid, etc.). Access to records would allow for a more complete understanding of deaths.
- Improved understanding of the causes and circumstances surrounding pregnancy-associated deaths is needed to direct quality improvement efforts and ensure effective resource allocation to prevention efforts. Autopsies and the availability of complete records for review are vital to this process.

Pregnancy-Related Deaths
44 Deaths

The top underlying causes of pregnancy-related deaths were cardiovascular conditions (9 deaths), thrombotic embolism (6 deaths), and hypertensive disorders of pregnancy (6 deaths).

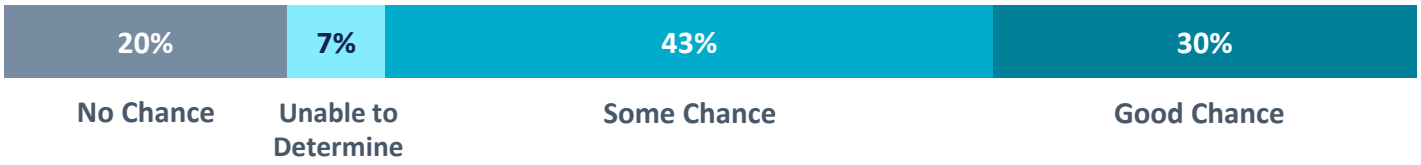
A ***pregnancy-related*** death refers to the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by the pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Preventability & Chance to Alter Outcomes

The committee reviewed all deaths and used the MMRIA Committee Decisions Form (see Appendix G) to determine their preventability and the chance to alter the outcome of each case. A death was considered preventable if the committee determined that there was any chance* the death could have been averted by making one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. "Unable to Determine Preventability" cases were considered preventable, but the degree of preventability was unable to be determined. None of the pregnancy-related cases fell into the "Unable to Determine" category.

80% of pregnancy-related deaths were considered potentially preventable.

Chance to alter outcome:

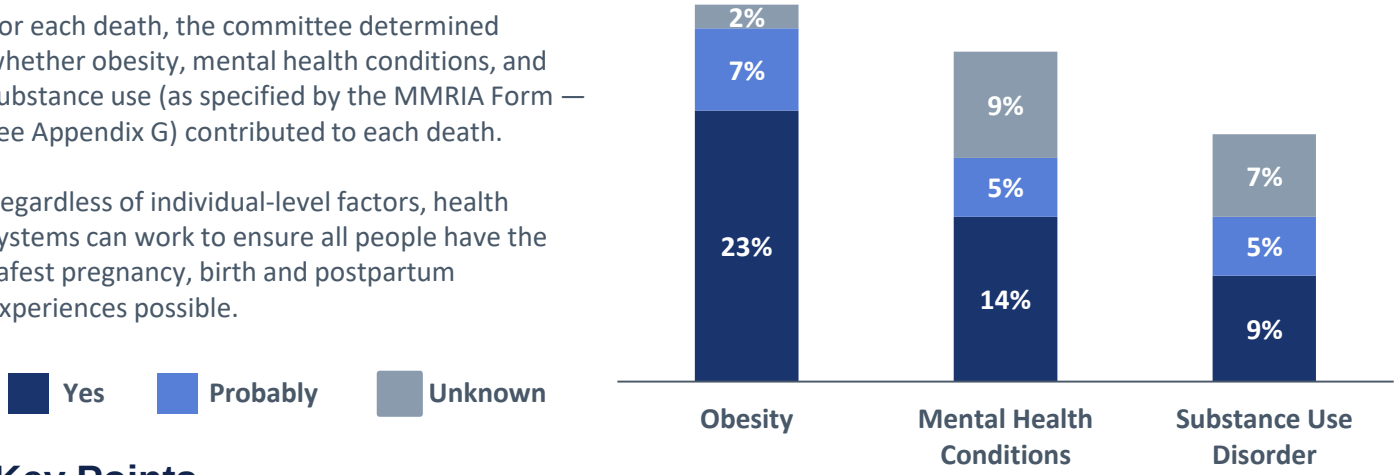


**Any chance to alter the outcome includes the MMRIA Committee Decisions Form categories: "Some Chance," "Good Chance" and "Unable to Determine."*

Did Obesity, Mental Health Conditions, and/or Substance Use Disorder Contribute to the Death?

For each death, the committee determined whether obesity, mental health conditions, and substance use (as specified by the MMRIA Form — see Appendix G) contributed to each death.

Regardless of individual-level factors, health systems can work to ensure all people have the safest pregnancy, birth and postpartum experiences possible.



Key Points

- The PAMR committee determined the majority of pregnancy-related deaths were preventable, a key assessment to assist in prioritizing future areas of intervention and action.

Pregnancy-Associated, but Not Related Deaths
114 Deaths

The top underlying causes of pregnancy-associated, but not related deaths were unintentional overdose (27 deaths) and motor vehicle crash (23 deaths).

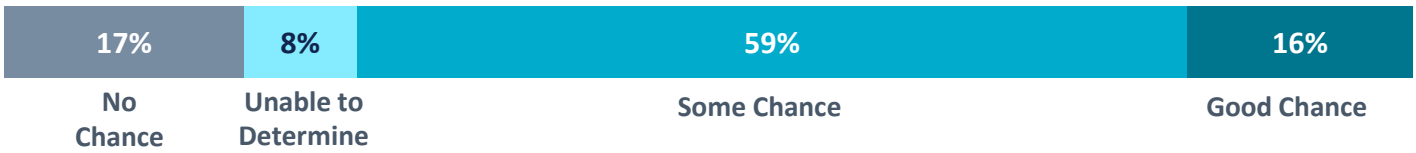
A ***pregnancy-associated, but not related*** death refers to the death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is **not** related to pregnancy.

Preventability & Chance to Alter Outcomes

The committee reviewed all deaths and used the MMRIA Committee Decisions Form (see Appendix G) to determine their preventability and the chance to alter the outcome of each case. A death was considered preventable if the committee determined that there was any chance* the death could have been averted by making one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. "Unable to Determine" cases were considered preventable, but the degree of preventability was unable to be determined.

83% of pregnancy-associated, but not related deaths were considered potentially preventable.

Chance to alter outcome:



**Any chance to alter the outcome includes the MMRIA Committee Decisions Form categories: "Some Chance," "Good Chance" and "Unable to Determine."*

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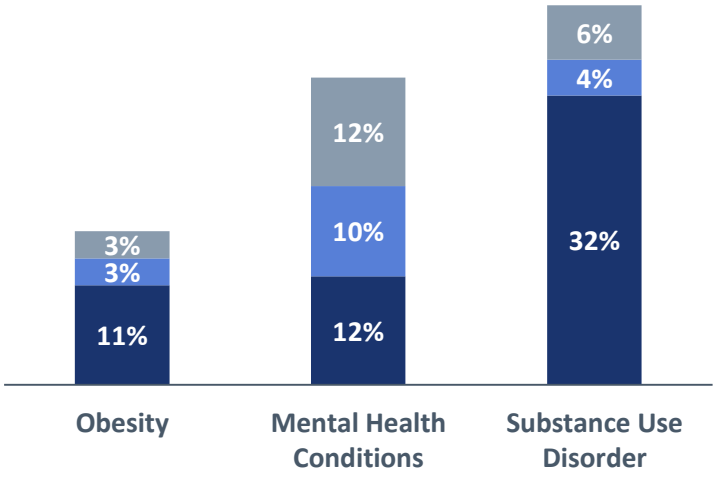
Regardless of individual-level factors, health systems can work to ensure all people have the safest pregnancy, birth and postpartum experiences possible.



Key Points

- Overdose and motor vehicle crashes were the leading causes of pregnancy-associated, but not related death.
- Substance use disorder contributed or probably contributed to more than 1 in 3 (36%) pregnancy-associated, but not related deaths. Universal screening for mental health issues and substance use disorders is recommended as a first step to identify women who need treatment and services.[14]

Unable to Determine Pregnancy-Relatedness
24 Deaths

The top underlying causes of pregnancy-associated, but unable to determine relatedness deaths were unknown (7 deaths) and homicide (4 deaths).

For 24 out of 182 pregnancy-associated deaths, the committee was unable to determine if the cause of death was related to pregnancy. It is unknown if the death occurred due to a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Preventability & Chance to Alter Outcomes

The committee reviewed all deaths and used the MMRIA Committee Decisions Form (see Appendix G) to determine their preventability and the chance to alter the outcome of each case. A death was considered preventable if the committee determined that there was any chance the death could have been averted by making one or more reasonable changes to patient, family, provider, facility, system, and/or community factors.

88% of pregnancy-associated, but unable to determine relatedness deaths were considered potentially preventable.

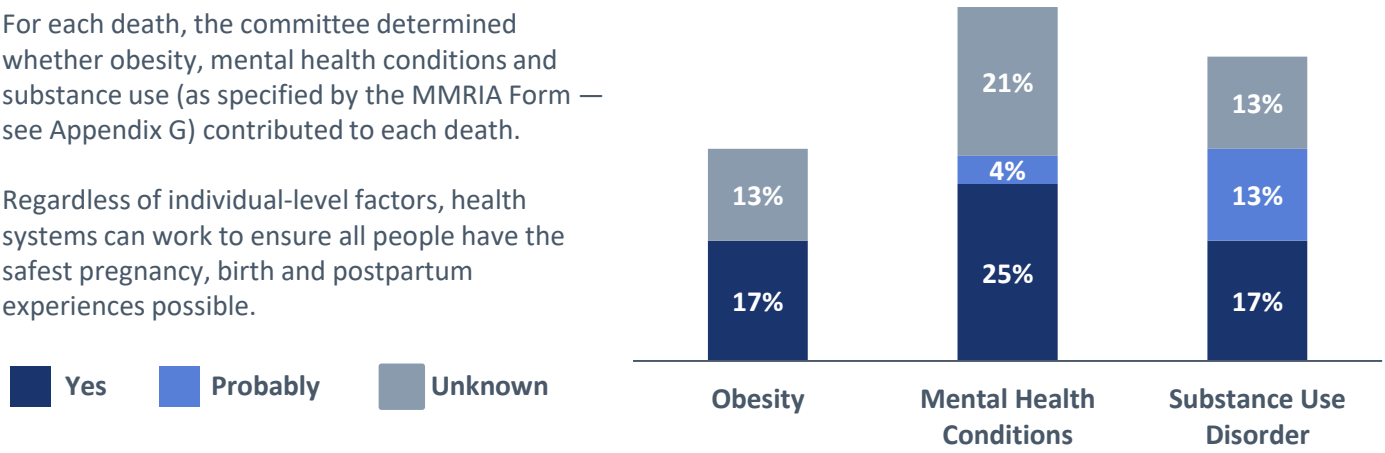
Chance to alter outcome:

**Any chance to alter the outcome includes the MMRIA Committee Decisions Form categories: "Some Chance," "Good Chance" and "Unable to Determine."*

Did Obesity, Mental Health Conditions, and/or Substance Use Disorder Contribute to the Death?

For each death, the committee determined whether obesity, mental health conditions and substance use (as specified by the MMRIA Form — see Appendix G) contributed to each death.

Regardless of individual-level factors, health systems can work to ensure all people have the safest pregnancy, birth and postpartum experiences possible.



Key Points

- Almost one in three (29%) pregnancy-associated, but unable to determine pregnancy-relatedness deaths were due to unknown causes, where the death was unable to be determined based on review of the medical information available. Other known causes of death included homicide, suicide, thrombotic embolism, and liver and gastrointestinal conditions.

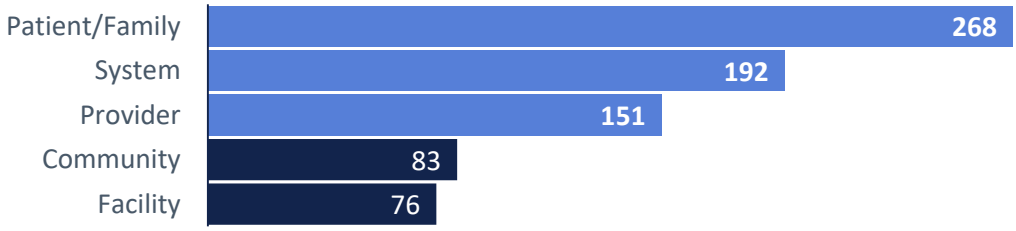
Contributing Factors
Among Pregnancy-Associated Deaths, 2017- 2019

Review committee members identified contributing factors to ***pregnancy-associated*** deaths using the MMRIA Committee Decisions Form (see Appendix G). Contributing factors included any behavior or systems issue which increased the severity of morbidity or the likelihood of mortality.[15] These factors did not necessarily cause the fatal outcome but may have been among a number of factors that led to the death. Contributing factors can be analyzed to develop and guide quality improvement efforts.

Each contributing factor identified through review committee discussion was categorized into 1 of 5 levels: patient/family, provider, facility, system and community, and further disaggregated by class (see Appendix E for more details). Contributing factors are not mutually exclusive — a death may have more than one of the following factors.

Contributing Factors by Level and Class

The committee identified **770** contributing factors across all levels for pregnancy-associated deaths, most of which were either **patient/family-, system-, or provider-related**. The top three classes within each of the top contributing factor levels, along with representative themes is shown below. The count refers to the number of times a contributing factor was identified at the corresponding level.



Contributing Factor Class	Count	Representative Themes
Patient/Family Level		
Adherence	35	Non-adherence with medical recommendations
Substance Use Disorder	35	Illicit drug use, alcohol use, multiple medications
Knowledge	31	Lack of knowledge of treatment or follow-up
System Level		
Continuity of Care/Care Coordination	40	Lack of or poor case coordination or management
Policies/Procedures	36	Lack of standardized policies or procedures
Access/Financial	23	Barriers to accessing care (e.g., insurance, transportation)
Provider Level		
Assessment	44	Failure to screen, inadequate assessment of risk
Clinical Skill/Quality of Care	40	Misdiagnosis, use of ineffective treatment
Referral	14	Failure to refer or seek consultation

The MMRC avoids victim blaming in the case review by understanding and framing recommendations as who has the power to prevent the factors that contributed to the death with the acknowledgement of structural barriers to accessing medical care and adherence to medical recommendations. The PAMR committee identified engaging patients and families in the care and treatment of the patient as an opportunity to improve outcomes.

Priority Areas for Prevention
Among Pregnancy-Associated Deaths, 2017- 2019

Based on the 770 contributing factors identified through its review of 2017-2019 pregnancy-associated deaths, Louisiana's PAMR committee consistently identified eight overarching needs. The broad themes below highlight areas of priority to inform maternal mortality prevention efforts. Specific, actionable recommendations are listed in the recommendations section.

Improve care coordination before, during and after pregnancy, including support for continued healthcare during the fourth trimester. Care coordination is defined by the Agency for Healthcare Research and Quality as "the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of healthcare services."[16] Existing medical conditions and social determinants of health can impact pregnancy outcomes, which means that women often require care from several providers, not just an obstetrician. Maternal care coordination requires all providers to communicate with each other about a patient's care and ensures patients are linked to non-medical resources such as supports for housing, education and economic stability. Maternal care coordination has been shown to reduce preterm births,[17] improve use of perinatal services[18] and improve contraception use for the purpose of healthy birth spacing.[19] The fourth trimester is the time-period from delivery through 12-weeks after delivery and is a critical period of time for women and infants. Services and supports should be ongoing, patient-centered and tailored to an individual's needs in order to optimize care and health outcomes, including access to comprehensive reproductive planning.[20]

Ensure pregnant people receive the appropriate level of care based on the complexity and severity (acuity) of their medical issues, and risk factors present. Health complications during labor, delivery and the year after birth are more likely to occur when medically high-risk patients are cared for at facilities designed to serve patients who do not experience severe illness or injury (i.e., low-acuity patients).[21] The PAMR Committee identified a lack of risk-appropriate care as a contributing factor in multiple deaths. Facilities at all levels can improve their readiness to care for patients who experience severe complications or illness by performing risk assessments on all patients and implementing evidenced-based practices to support patient safety. Best practices include the Alliance for Innovation on Maternal Health's Patient Safety Bundles focused on Obstetric Hemorrhage, Severe Hypertension in Pregnancy, Maternal Mental Health, Maternal Venous Thromboembolism, Reduction of Peripartum Racial/Ethnic Disparities, and Obstetric Care for Women with Opioid Use Disorder.[22]

Expand the obstetric healthcare workforce through telehealth and include specialists such as cardiologists, psychiatrists and behavioral/mental health specialists. Left untreated, cardiac, psychiatric and substance use disorders can negatively impact maternal and child health.[23,24] The PAMR committee identified lack of access to healthcare providers in these areas as a contributing factor to multiple deaths. Multidisciplinary teams are needed to address the multiple medical issues seen in maternity care. To improve maternal outcomes and decrease maternal mortality, the workforce must include non-obstetric providers.

Priority Areas for Prevention
Among Pregnancy-Associated Deaths, 2017- 2019

Address racial and cultural bias across the network of care that serves pregnant and postpartum people. This includes hospitals, Emergency Medical Services, physician offices, and community clinics, as well as the institutions that influence or coordinate with those network such as public health agencies, Medicaid, and coroners. Implicit bias and structural racism contribute to maternal mortality.[25] Implicit bias must be addressed at all levels of the healthcare system. Structural racism must be addressed within all systems that coordinate or impact care for women, including but not limited to public health agencies, health insurance providers/payers, and legislative or policymaking bodies.

Improve and expand identification of and unbiased treatment for substance use and mental health during pregnancy. The rate of Substance Use Disorder (SUD) among pregnant individuals diagnosed during labor and delivery admission quadrupled between 1999 – 2014.[26] The PAMR committee identified SUD as a leading contributing factor for multiple deaths. In particular, review of pregnancy-associated, but not related and pregnancy-associated, but unable to determine relatedness deaths reveal a lack of screening with a validated tool for SUD. Though Medication Assisted Treatment (MAT) for opioid use disorder is the standard of care,[27] case reviews indicated that women with SUD did not receive this course of treatment.

Address social determinants of health (SDoH) to improve maternal mortality and decrease disparities. Current research shows that social determinants of health, including health quality and healthcare access, education access and quality, social and community context, economic stability, and the neighborhood and built environment, impact maternal mortality.[27] Historical systemic racism has led to inequities in social determinants of health and are at the root of health disparities. [28] Included in the neighborhood and built environment is the level of violence. Pregnancy-associated deaths from violence and overdose are leading causes of death that require medical and public health attention.

Increase awareness of Louisiana's Maternal Mortality Review Committee and support the need for data sharing. Data sharing across and within systems and agencies for the purpose of maternal mortality review improves the review committee's access to needed records (e.g. records related to or from prenatal care, mental health, Medicaid, etc.). Access to and the availability of complete records, including autopsies, are vital to this process and allow for a more complete understanding of deaths. Improved understanding of the causes and circumstances surrounding pregnancy-associated deaths directs quality improvement efforts and supports effective resource allocation to prevention efforts.

Contribute to the public health evidence base to increase capacity and better understand and address pregnancy-associated mortality. Taking an evidence-based approach to reviewing pregnancy-associated deaths can result in higher-quality information that can inform best practices, prevention programs, and create more efficient use of resources to reduce maternal deaths. It is imperative that stakeholders review current and evidence-based approaches and implement clinical programs and data-driven solutions that have been shown to improve maternal health outcomes.

From Review to Action

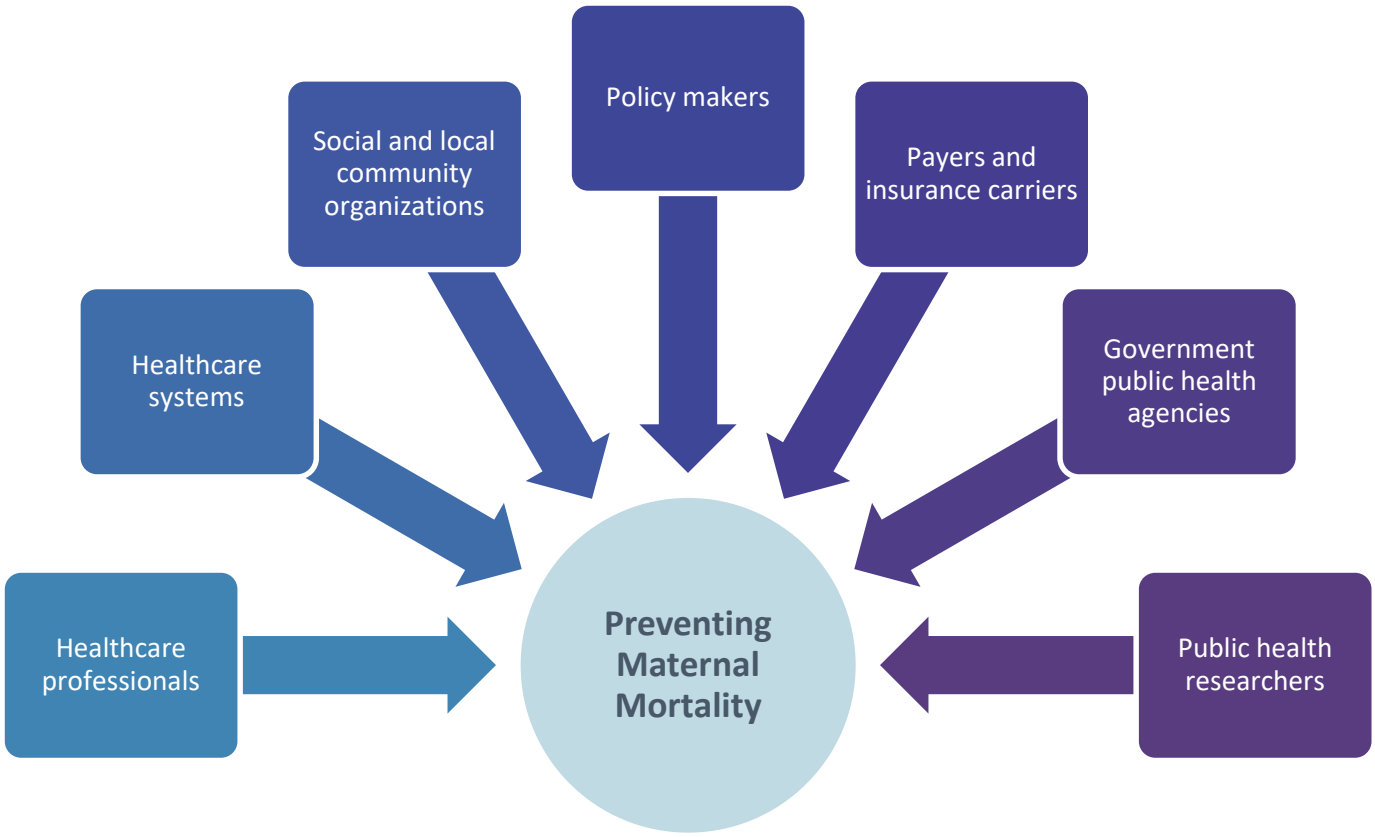
Maternal Mortality in Louisiana, 2017-2019

PAMR Committee Recommendations

Louisiana's PAMR committee generated more than 464 recommendations through its review of 2017-2019 maternal deaths. Committee reviews were guided by the CDC's Maternal Mortality Review Information Application's (MMRIA) Committee Decisions Form. This form asks committee members to use their expertise to answer the question "If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events?" (see Appendix G).

Throughout the review of maternal deaths, gaps in care were identified. However, in review of the records available, the reasons for those gaps were not always clear making it difficult to form recommendations for prevention. **Public Health Researchers** should investigate key drivers that prevent patients from accessing prenatal and postpartum care, as well as barriers to obtaining prescribed medications, especially for high-risk acute events. Knowledge of these drivers are crucial for making recommendations to improve outcomes.

Recommendations are organized based on "who" can implement changes: healthcare professionals, healthcare systems, hospitals, and birthing facilities, social and local community organizations and public outreach, policy makers, payers and insurance carriers, government public health agencies and public health researchers. All individuals and systems must work together to improve maternal outcomes and reduce mortality. Specific recommendations for each entity are listed on the following pages.



PAMR Committee Recommendations
For Everyone

While communities, facilities, healthcare professionals and policy makers working at each of these levels can use these recommendations to help inform and guide their efforts to improve maternal health outcomes, eliminating maternal deaths takes all of us. Every individual has a role to play in eliminating maternal mortality. Everyone can:

Support healthy behaviors such as daily exercise, smoking cessation, and healthy eating habits.	•The health of individuals entering pregnancy affects pregnancy outcomes. The preconception period provides a time to establish healthy living habits and optimized medical conditions. Establishing care with an obstetric care or primary care provider prior to pregnancy will improve the overall health and wellbeing pre-pregnancy, during pregnancy and after pregnancy.
Know when to seek help.	•Early recognition of the warning signs of severe issues is key to early treatment. Pregnant individuals and their families should be aware of the POST-BIRTH warning signs.[29]
Recognize that implicit bias and structural racism are at the root of the disparities we see in outcomes.	•Implicit bias built into the healthcare system leads to differences in the quality of care given to Black and brown individuals. Everyone can make effort to recognize their individual bias, identify how it affects their care, and take intentional actions to address their bias.
Understand the prevalence and impact of substance use disorder.	•The rate of substance use in the United States has steadily increased. Encourage adoption of standard procedures to screen and provide intervention during pregnancy. Increase education of the availability and use of naloxone including access through Louisiana's "standing order" which allows participating pharmacists to dispense naloxone to laypeople including caregivers, family, and friends of an opioid user.[30]
Address the conditions in which people live, learn, work, play and age.	•The Social Determinants of Health (SDoH), conditions in the environment where people live, learn, work, play and age, should be recognized as a factor that affects a wide range of health, functioning, risk, and quality of life outcomes. We will not eliminate health disparities and improve overall maternal health if we do not address SDoH.

Healthcare Professionals

The preconception period provides an opportunity for healthcare providers to assess an individual's risk for pregnancy and optimize any medical conditions to mitigate poor maternal outcomes, as well as offer counseling on which medications are safe to use during pregnancy. In review of maternal deaths from 2017-2019, obesity and mental health disorders were medical conditions that impacted maternal mortality. Obesity was found to contribute to 23% of all pregnancy-related deaths; 11% of pregnancy associated but not related; and 17% of all pregnancy associated but unable to determine relatedness deaths. Mental health disorders directly impacted 14% of pregnancy-related deaths; 12% of pregnancy-associated but not related; and 25% of pregnancy associated but unable to determine relatedness. Understanding their impact, the appropriate screening and treatment is crucial, not only for obstetric providers but also providers in emergency departments. A patient-centered, multi-disciplinary approach should be used to determine the best approach to care.[31]

During pregnancy, antenatal care, intrapartum, and postpartum care, adherence to best practices to ensure risk assessment and appropriate treatment is a key area of prevention. In review of the pregnancy-associated deaths from 2017 – 2019, failure to screen or inadequate assessment of risk at the provider level was commonly identified as a contributing factor. Examples of failure to screen include lack of screening for intimate partner violence, substance use disorder, or perinatal mood depression and anxiety. Additionally, healthcare providers should screen for social determinants of health as these affect the ability of patients to use health care.[32]

The postpartum period has traditionally been defined as the 6-weeks after delivery. However, being disconnected from care during that time opens patients to risk of complications. For the 2018 – 2019 review, 18% of pregnancy-related deaths occurred between birth and 42 days indicating the need to better educate patients and families on the warning signs and symptoms in the postnatal period. Healthcare providers have a role to play in improving this education during the discharge process. Additionally, according to the American College of Obstetricians and Gynecologists, only about 60% of patients attend their postpartum visit.[33] Healthcare providers should stress the importance of going to the postpartum visit as it is a crucial time for assessment of maternal mental health, reproductive planning, and provides an opportunity to transition into well-care.

Nationally, cardiovascular causes are the leading causes of pregnancy-related deaths across the United States and were the leading cause of pregnancy-related deaths in Louisiana from 2017 – 2019.[34] The American Heart Association recommends early involvement of a cardio-obstetric team to reduce maternal morbidity and mortality from cardiovascular disease. For those individuals who developed a hypertensive disorder of pregnancy, referral to cardiology is recommended due to the lifetime risk of cardiovascular disease.[35]

Accidental overdose was the leading cause of pregnancy-associated deaths in 2018 and 2019, and the 2nd leading cause of pregnancy-associated deaths in 2017. The stigma and bias patients with substance use disorder encounter in the healthcare system is a barrier to them seeking care. Healthcare providers have a role to play in preventing and reducing substance use disorder and bias in care. Universal screening, brief intervention, and referral to treatment are best practices for opioid use disorder.

PAMR Committee Recommendations
For Healthcare Professionals

Issue	Recommendation
Management of medical conditions complicating pregnancy	Healthcare providers should be aware of the risk that obesity has for development of chronic medical conditions and refer patients to obesity management programs, ideally prior to pregnancy.
	Healthcare providers, including obstetricians, emergency, and primary care providers, should refer postpartum patients who experience hypertensive disorders of pregnancy to a cardiologist in the postpartum period.
	Healthcare providers should be aware of the risk factors for cardiovascular disease in pregnancy based on the modified World Health Organization classification and refer to a cardiology team if those risk factors are present.
	Healthcare providers should be aware of the national recommendations to assess for risk for thromboembolic events, including for individuals who have had multiple deep vein thrombosis and miscarriages. Providers should evaluate them for coagulation disorders and ensure they receive appropriate treatment.
	To decrease the overall Cesarean section rate, providers should offer appropriate candidates the ability to attempt a vaginal birth after Cesarean.
Awareness of postpartum warning signs	Members of the healthcare team should use a family-centered approach during discharge planning to ensure family members are aware of warning signs that indicate when the patient should seek medical care.
	Healthcare providers should create individualized postpartum discharge plans, especially for patients who are at increased risk for severe maternal morbidity, perinatal mood disorder or other adverse events. This may include visits before and/or after the traditional 6-week postpartum check-up.
	As part of prenatal care, during pregnancy, healthcare providers should educate pregnant patients on the purpose and importance of the postpartum visit.
Appropriate screening and treatment of maternal mental health mood disorders	Both obstetric and primary care providers should use a validated screening tool for perinatal mood disorders at appropriate intervals before, during, and after pregnancy; offer Brief Intervention; and Refer to Treatment (SBIRT) with mental health practitioners specifically trained in perinatal mental health.[36] This is especially important for those patients who are treated with pharmacotherapy.
	When individuals present to an Emergency Department (ED) experiencing acute mental health issues such as hallucinations, emergency providers should consult with psychiatrists. When in-person consultation cannot be achieved, telehealth systems of care should be established by health systems and utilized by providers.

PAMR Committee Recommendations
For Healthcare Professionals

Issue	Recommendation
Prevention and treatment of Substance Use Disorder (SUD)	When a history of trauma is identified, providers should refer patients to psychiatric services that use a trauma responsive approach.
	Providers should use risk reducing strategies to improve the substance use crisis. The Prescription Drug Monitoring Program (PDMP) is a state-level electronic database that tracks prescriptions for controlled substances among individual patients. Providers should always access the Prescription Monitoring Program (PMP) before prescribing controlled substances.
	Prescribing strategies, such as limiting prescriptions of controlled substances to 7 days and prescribing medications in blister packs, as recommended from the American Pharmacist Association are practices providers should use to decrease the risk of overdosing on prescribed medications.[37]
	Healthcare professionals at every level should receive training to recognize their implicit bias towards individuals using illicit substances to reduce stigma.
	Healthcare providers should screen for tobacco use and refer patients to smoking cessation programs.
	When providers are aware of substance use disorder during pregnancy they should offer or refer patients to Medication Assisted Therapy (MAT), which should be continued through at least one year postpartum.
	Healthcare providers and healthcare systems should ensure that patients receive substance use screening as part of a comprehensive prenatal and postpartum care. For patients who screen positive, treatment plans should be developed that include care from mental health providers who can work with them to develop safety plans that include risk mitigation strategies.
	During discharge planning, social workers within hospital facilities should provide resources for social services to patients who screen positive for SUD, including a warm handoff to substance treatment facilities.
	When pregnant or postpartum individuals present to the ED with signs of overdose, ED providers should consult with psychiatric providers. Upon discharge, ED providers should ensure a warm hand off to providers who treat SUD.
	When patients are seen in the ED for an overdose, providers should give those individuals Narcan take home kits and educate patients and their families on use of Narcan upon discharge.

PAMR Committee Recommendations
For Healthcare Professionals

Issue	Recommendation
Providers' role in addressing SDoH	When patients leave against medical advice on multiple occasions, the healthcare team should determine what barriers to care exist and connect those patients to resources. A catalog of resources should be built into electronic health record systems to facilitate referral for those who screen positive.
	Screenings for social determinants of health should include screening for not only domestic violence, but also community violence. For patients who screen positive, the healthcare team should help patients develop a safety plan.

Healthcare Systems, Hospitals, and Birthing Facilities

According to the March of Dimes, 34.9% of the parishes in Louisiana are maternity deserts defined as no hospitals and birthing centers and no obstetricians per 10,000 births, highlighting the need to expand the obstetric workforce.[38] Not surprisingly, pregnant and postpartum individuals often access care through Urgent Care and Emergency Department facilities. As such, emergency departments and urgent care facilities must be aware of best practices for screening and treatment of pregnant conditions that have the potential for severe maternal morbidity.

In review of the 2017-2019 pregnancy-associated deaths, we found lack of care coordination to be a top contributing factor at the system level, this included lack of coordination between providers, and between the emergency room and the obstetrics team. As part of coordination of care, emergency room and urgent care facilities should have a plan to coordinate care with and transfer to birthing facilities. In turn, birthing facilities must ensure plans to assist patient risk and facilitation of risk-level appropriate care. High-risk patients cared for at low acuity facilities have worse outcomes.[39] Birthing facilities providing care for high-risk patients with complex medical conditions must also improve coordination of care, including discharge planning.

Linkages to care through care coordination are also important in treating both substance use disorder and mental health disorders. Coordinated care at the birthing facility level for the substance exposed dyad is key to improving outcomes. Eat, Sleep, Console (ESC) is a family-centered approach to treating the newborns who were exposed to controlled substances during pregnancy. ESC has been shown to decrease length of stay of the newborn, decrease pharmacologic exposure, and increase family involvement. Understanding and removing barriers to implementation of ESC is the responsibility of the healthcare facility.

PAMR Committee Recommendations
For Healthcare Systems, Hospitals, and Birthing Facilities

Issue	Recommendation
Improve coordination of care	Birthing facilities should implement models of care that enhance care coordination and provide support for the medical and social needs of patients.[40]
	Healthcare systems and urgent care facilities should ensure coordination of care between the emergency department and the obstetrician.
	Healthcare systems should develop interdisciplinary care teams with multispecialty care conferences for women with complex mental health issues, to ensure coordination and promote optimal outcomes.
	When patients with complex medical illnesses are discharged from the facility, healthcare systems should provide bedside delivery of medications so that patients can have prescribed medications prior to discharge. Additionally, pharmacies should offer delivery services to patients.
	Healthcare systems should develop processes to ensure that when a patient is being discharged from the hospital, they receive a scheduled appointment for a postpartum visit prior to discharge.
	Birthing facilities should develop processes to ensure all postpartum patients and families receive the POST BIRTH warning signs upon discharge from the hospital.
	Healthcare systems should work with community organizations to explore different models of care, such as home visiting. This model may be particularly beneficial for patients who did not receive prenatal care.
	Health systems should implement innovative, family-centered approaches that combine the postpartum and newborn evaluations in a single visit.
	Inpatient psychiatric facilities should implement, The Zero Suicide Framework, a bundle of interventions informed by seven elements that has been shown to reduce suicide attempts at all in-patient psychiatric facilities.[41]
Emergency room and urgent care providers caring for obstetric patients	Urgent care and free-standing emergency departments should use standardized protocols for assessing patients for pregnancy or recent pregnancy status and then conduct appropriate management and consultation using standard checklists and algorithms to assess the risk for a Severe Maternal Morbidity.
Ensure preparedness for pregnancy conditions that have an increased risk of maternal morbidity	To ensure patients are cared for based on their level of risk, facilities, including emergency departments and birthing facilities, should ensure assessment of risk is performed early and often, and have transfer agreements in place to facilitate timely transfers of high-risk patients to appropriate care.
	Regardless of level of acuity, all facilities should implement patient safety bundles for High-Acuity, Low Occurrence (HALO) events and reinforce practices by implementing drills.

PAMR Committee Recommendations
For Healthcare Systems, Hospitals, and Birthing Facilities

Issue	Recommendation
Increase the obstetric care workforce	Health systems should increase resources to recruit practicing primary care physicians, obstetricians and gynecologists, cardiologists, and psychiatrists to work in rural and/or underserved areas.
Improve care and care coordination for substance use	Healthcare facilities should identify barriers that prevent mothers and newborns who were exposed to controlled substances during pregnancy from receiving coordinated care. These barriers should be addressed by having policies in place that support care coordination that minimizes separation from postpartum parents with substance use disorder. These policies optimize using the parent as "medicine," keeping the dyad together and optimizing non-pharmacologic methods for managing newborns exposed to substances who are at risk for neonatal abstinence syndrome/neonatal withdrawal syndrome.
	Healthcare facilities and health systems should provide a patient navigator to ensure a warm hand-off, closed loop referral for mental healthcare and treatment of substance use disorder, and follow-up when patient does not receive recommended care.
	Substance use facilities should develop or enhance processes to obtain medical clearance on site at the treatment facility.
	For pregnant individuals seeking care for substance use treatment at an inpatient facility, many barriers exist. Substance use treatment facilities should prioritize understanding and removing these barriers.

Social and Local Community Organizations and Public Outreach

Maternal mortality is a public health crisis. The ratio of maternal mortality in the United States is more than twice that of other developed countries. Public messaging is needed to improve the outcomes. In the review of 2017-2019 deaths, lack of knowledge of treatment and follow-up, substance use disorder, and community violence including homicide (2nd leading cause of death) were contributing factors that can be addressed at the patient/family level. Public messaging should be targeted to families and local communities on the causes and signs of severe maternal morbidity, risk mitigation for substance use overdose and suicide prevention, and violence prevention.

At the system level, the MMRC identified barriers to accessing care as a leading contributing factor. Healthcare providers and birthing facilities should leverage their relationships with community organizations to improve coordination in care, especially for populations at risk for experiencing barriers, such as homeless individuals.

Issue	Recommendation
Improve coordination of care	Community organizations that work with homeless individuals should connect those individuals to other services, including transportation, healthcare, and substance use treatment.
Create awareness for the public's role in preventing maternal mortality	Public health institutions and community organizations should create public health messaging campaigns to inform patients and families about the signs and symptoms of potential severe outcomes during pregnancy and the postpartum period.
	Public health institutions and community organizations should create public health messaging campaigns that emphasize the risks of taking medications that are not prescribed and/or purchased outside of a healthcare setting (e.g. "on the street").
	Public health institutions and community organizations should create public health messaging campaigns to educate individuals with SUD and their families on the use of naloxone. These efforts should target substance use prevention and recovery efforts in low resource and rural communities.
	Public messaging campaigns should be developed to educate families on how to recognize the signs of suicide and utilize resources such as Via Link[42] and Louisiana 211.[43]
	In addition to rehabilitation programs that address a history of violence, public health institutions and community organizations should create campaigns to increase awareness of the signs and symptoms of violent behavior, especially in adolescence.

Policy Makers

Policy makers have a role to play in supporting and improving systems of care from reinforcing best practices, to removing barriers to care and strengthening the obstetric workforce. From 2017-2019, accidental overdose was the leading cause of pregnancy-associated deaths. Legislative action is needed, both state and federal, to support evidenced-based practices that improve care for mothers and newborns exposed to controlled substances during pregnancy.

To address social determinants of health and barriers to care, state and federal policies that are created to address maternal mortality must be done so through an equity lens. Access to affordable childcare is a barrier to accessing healthcare.[44] State and federal support of affordable childcare, transportation, housing, and access to economic opportunities is needed to improve maternal mortality.

In review of pregnancy-associated deaths, women often leave *against medical advice* (a term used in health care institutions when a patient leaves a hospital against the advice of their doctor) due to childcare related barriers. If childcare is not accessible, mothers have to choose between their child and seeking care for themselves. State and federal support of affordable childcare, transportation, housing, and access to economic opportunities is needed to improve maternal mortality. Additionally, non-traditional entities such as community organizations should be recipients of state and federal funding to assist in addressing social determinants of health.

Pregnant and postpartum women who are incarcerated are not always afforded dignity and respect. Additionally, in review of the maternal deaths, inconsistency in best practices was observed. State legislation should support quality, evidence-based care for pregnant individuals in correctional facilities.

For the review of pregnancy-associated deaths, the committee determined less than half of the cases had complete records available. The process of maternal death review informs the interventions for prevention of future deaths. Access to data is imperative. Federal and state policy is needed to facilitate Maternal Mortality Review Committee's ability to access medical records for the purpose of case review. In 35% of the deaths from 2017-2019, an autopsy was not performed making not only the cause of the death but the conditions leading to the death difficult to identify. In most of these cases, an autopsy should have been performed per the National Association of Medical Examiners recommendations, cost is a barrier. Federal and state governments should increase funding for coroners' offices and ensure an autopsy is performed, even when a patient has been hospitalized.

According to the Robert Graham Center based on 2018 data from the American Medical Association, in underserved communities, which accounts for 40% of Louisiana residents, there is one Primary Care Physician for every 2,000 people.[45] Recognizing the shortage in primary care physicians, several programs have been developed to address the issue. An example is the Medicare Health Professional Shortage Area (HPSA) Bonus Payment program that incentivizes primary care physicians and psychiatrists through a 10% bonus payment when they deliver care in an HPSA geographic area.[46] Support and expansion of these programs should be increased. Rural areas may also benefit from expansion of telemedicine to increase access to specialty providers.

PAMR Committee Recommendations
For Policy Makers

Issue	Recommendation
Improve care coordination and reinforcing evidence-based practices to care	The federal government should establish a universal electronic medical record coordination system so that information can be shared across multiple systems to ensure coordination of care.
	Legislative action is needed to ensure that pregnant and postpartum individuals are not criminalized if they screen positive for substance use disorder.
Remove barriers to care	State and federal governments should provide subsidies to childcare centers and agencies to allow more parents access to childcare in order to seek healthcare when needed.
	State and federal policies should address social determinants of health including fair and accessible housing.
	Removing barriers includes support for community organizations working to address community violence. A community-based collaborative approach should be supportive as it is effective for supporting individuals who experience adverse events.[47]
	State legislation should be established to ensure all correctional facilities comply with the same standard of care for women including attending prenatal and postpartum visits and support equipment needed to promote breastmilk feeding.
	As state government develops legislation to increase access to doulas and midwives for pregnancy-related care, these policies should extend to women who are incarcerated.
Increase the obstetric care workforce	State and federal governments should increase funding for providers who practice in rural areas, especially in maternity deserts.
	Federal and state government should implement and financially support telemedicine systems to improve access to obstetric and subspeciality care for patients living in maternity care deserts.
	State and local government should support recruitment of healthcare professionals to undergo training for medical weight management and explore other strategies to increase the number of providers who offer these services.

Payers and Insurance Carriers

Insurance payers have a role to play in improving coordination of care, removing barriers to care, and expanding the obstetric care workforce to reduce maternal mortality. This has been demonstrated in other states through partnerships between payers and community-based organizations, and value-based incentives for providers to improve outcomes. Several insurance payers offer case managers to assist in coordination of care. However, there are still gaps in care. In review of some cases, even with insurance coverage, patients were unable to obtain their needed medications as they could not afford the associated co-pay. For patients with chronic conditions, such as diabetes and chronic hypertension, the need to obtain prior authorization for medications and supplies can delay care.

While there are proven benefits of telehealth, barriers to access remain for underserved and individuals in rural areas. Some payers provide basic cell phones, necessary equipment for communication and telehealth services. However, it is unclear if recipients understand this as a covered service. Access to additional equipment such as blood pressure cuffs, scales, and digital diabetic supplies are additional barriers to accessing telehealth.

Issue	Recommendation
Improve coordination of care	Insurance payers should provide patient navigators to improve care coordination that ensures patients have the resources (financial, social, and transportation) they need before leaving the hospital, especially for patients with medically complexities and issues related to mental health and domestic violence. Those patient navigators should also ensure closed loop referrals.
	Payers should develop metrics to ensure case managers are being used effectively, especially for high-risk maternal cases.
Remove barriers to care	Medicaid managed care organizations (MCOs) should have an adjusted co-pay for medications based on income.
	Insurance payers should cover supplies needed to manage chronic conditions based on provider guidance without requiring prior authorization, such as diabetic testing kits.
	Centers for Medicare and Medicaid Services (CMS) should consider basic cell phones as durable medical equipment to ensure individuals have access to communication and telehealth services.
	For patients, especially those with hypertensive disorders of pregnancy, insurance payers should provide coverage for digital blood pressure cuffs for home monitoring of blood pressures.
Expand the obstetric care workforce	Medicaid managed care organizations (MCOs) should expand the number of providers covered by insurance plans as well as increase reimbursement to improve access to psychiatric providers.

Government and Public Health Agencies

In review of the 2017-2019 pregnancy-associated deaths, failure to screen or inadequate assessment of risk and misdiagnosis or use of ineffective treatment were among the top contributing factors at the provider level. National accrediting bodies of higher education and licensing boards have a role in improving education for physicians and physicians in training on the recognition and treatment of the causes of severe maternal morbidity, as well as best practice for mental health disorders and substance use disorder.

Community health workers have been shown to have a positive impact on maternal and infant outcomes. They play an important role in coordinating care, especially for patients with complex health and social issues.[48] However, most insurance plans do not cover this service and most community health workers are privately funded. In 2021, in recognition of their impact as well as the financial challenges to sustain this model of care, the Centers for Disease Control and Prevention awarded more than $300 million to fund and support community healthcare workers to support efforts to fight COVID-19. Maternal mortality is also a pandemic and this model of care should be financially supported.

Government and public health agencies need to expand programs targeted at addressing trauma, reducing the use and impact of substance use disorder and addressing violence. Naloxone is an underutilized resource for individuals with SUD. Programs, such as the New Orleans Family Recovery Collaborative Program funded by the Department of Justice focused on ensuring pregnant mothers who use substances are identified and provided treatment and supportive services until the child is 3 years of age[49], need to be expanded. Trauma, either from the result of being in foster care or the event that caused a child to be in foster care, needs to be acknowledged and treated. Left untreated, trauma in childhood can lead to long-term negative health outcomes such as smoking and substance use disorder.[50] Families that support foster children often need additional supports to address multiple social determinants of health. Federal programs such as the Family First Prevention Services Act exist to enhance the support foster families need.[51] Regardless of socioeconomic status, due to racial residential segregation, minority communities are more likely to experience gun homicide.[52] Targeted programs are needed to address gun violence in those communities.

Issue	Recommendation
Expand the provider workforce	State public health organizations should develop targeted programs to expand the obstetric workforce through perinatal community health care workers, home visitors, and telehealth services. This is particularly key for low-resource areas and for patients with limited resources and multiple medical issues, such as chronic hypertension and diabetes.
	Federal and state governmental agencies should establish and fund programs to sustain community health workers as a model to improve maternal morbidity and mortality.

PAMR Committee Recommendations
For Government and Public Health Agencies

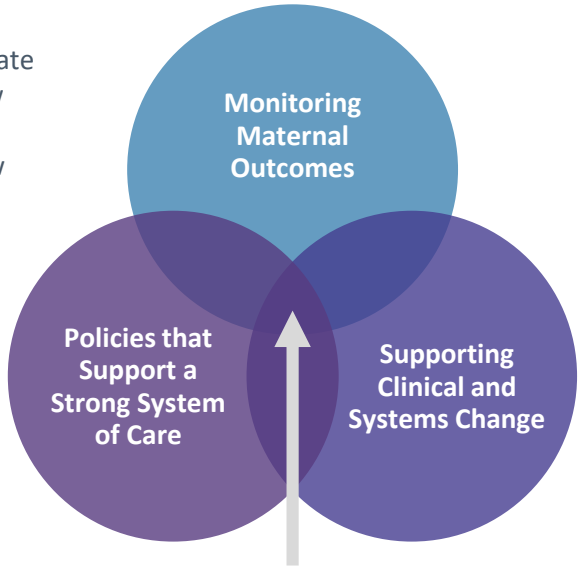
Issue	Recommendation
Reinforce evidence-based practices for treating mental health disorders and SUD	State licensing boards should require Emergency Department providers to complete annual education regarding recognition of signs and symptoms of severe maternal morbidity.
	The American College of Graduate Medical Education and the Resident Review Committee should require Emergency Medicine resident physicians to receive education on severe maternal morbidity recognition as part of their medical education.
	For all healthcare providers administering care to pregnant patients, as part of continuing medical education, licensing boards should require providers to participate in annual training on the importance of prescribing Naloxone and educating patients and their families on its use.
	Licensing boards should also require annual continuing medical education credits on the best practices for treating pregnant individuals with mental health disorders. This education should include not weaning pregnant individuals from mood stabilizing medications as a best practice as well as identifying other medications for treating mental health disorders that are safe for pregnancy.
Address trauma, substance use disorder, and violence	The Department of Children and Family Services should ensure all children in foster care receive psychiatric services that use a trauma responsive approach.
	State and local governments should expand programs like the Family Recovery Collaborative Program that work with pregnant individuals with SUD and their families to maintain the family nucleus through supportive services.
	State and local governments should increase financial resources for individuals in foster care to support linkages to healthcare, housing and mental health support.
	In communities where there are high levels of violence, crime cameras should be installed to monitor criminal activities.

State Level Efforts to Reduce Maternal Mortality

OPH-BFH acts as the hub for the Louisiana Department of Health's efforts to prevent maternal deaths. These efforts are linked to our state surveillance, informed by the Pregnancy Associated Mortality Review (PAMR) process, as well as national trends and the work from the Alliance for Innovation on Maternal Health (AIM) and the CDC. Below are selected state-level activities to reduce maternal mortality and morbidity and not inclusive of all ongoing community, facility and systems level efforts across the state.

The work within OPH has focused in three interconnected areas:

- **Ensuring effective public health systems** to monitor maternal outcomes and system improvements.
- **Supporting change** within clinical care and related systems.
- **Development and implementation of policies** that enable or support a strong system of care.



Monitoring Maternal Outcomes

- **LA-PAMR launched its enhanced multidisciplinary review process in 2018**, in alignment with national best practices promoted by the CDC. In 2019, Louisiana was one of 25 states to receive funding under the CDC's Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program. The PAMR committee was expanded to ensure representation from a variety of geographic regions and fields of expertise and increased inclusion of women and people of color.
- **Louisiana Pregnancy Risk Assessment Monitoring System (PRAMS)** is an ongoing, population-based surveillance system designed to describe maternal behaviors and experiences that occur before, during, and immediately following pregnancy. Information collected by PRAMS is used by health professionals, policy makers, and researchers to develop and modify programs and policies designed to improve the health of women and infants. For more information, visit partnersforfamilyhealth.org/prams.
- **The Injury and Violence Prevention Program** works to prevent injuries and violence, which are the leading causes of death for residents ages 1–44 years. The program collects data on top causes of intentional and unintentional injuries across the state to inform program and policy initiatives. Priority areas include: traffic related crashes, sexual and Intimate Partner Violence (IPV), child abuse and neglect, traumatic brain injury (TBI), homicide, suicide, firearm, fire, drowning, older adult falls, and infant sleep-related injuries. For more information, visit partnersforfamilyhealth.org/injury.

Supporting Clinical and Systems Change

- **Louisiana Maternal, Infant and Early Childhood Home Visiting (LA MIECHV)** provides family support and coaching through two evidence-based home visiting models: Nurse-Family Partnership (NFP) and Parents as Teachers (PAT). These services pair families with registered nurses or parent educators who provide personalized education, support and coaching, and referrals to services to empower families to reach their goals. For more information, visit partnersforfamilyhealth.org/miechv.

State Level Efforts to Reduce Maternal Mortality

Supporting Clinical and Systems Change (continued)

- **The Louisiana Perinatal Quality Collaborative (LaPQC)** is an initiative of the Louisiana Department of Health's Bureau of Family Health under the authority of the Louisiana Commission on Perinatal Care and Prevention of Infant Mortality. It is a voluntary network of perinatal care providers, public health professionals, and patient and community advocates who work to advance equity and improve health outcomes for women, families, and newborns in Louisiana. Specific quality improvement initiatives are listed below. For further information, please visit: **ldh.la.gov/LaPQC**.
  - **Reducing Maternal Morbidity Initiative (RMMI)** — focus on hemorrhage and hypertension
  - **Safe Births Initiative —** focus on safe reduction of low-risk first-time Cesarean sections
  - **Louisiana Birth Ready Designation system —** focus on supporting maternal mortality work by ensuring maintenance of LaPQC best practices and structures that promote readiness
  - **Improving Care for the Substance-Exposed Dyad (ICSED) initiative** — focus on improving the identification, care and treatment of women and neonates affected by opioids and substance use
  - **Caregiver Perinatal Depression Screening-** The Caregiver Perinatal Depression Screening in Pediatric Clinics Pilot is a 12-18 month learning collaborative working to develop quality improvement strategies that support the implementation of perinatal depression screening in pediatric settings at 1, 2, 4, and 6-month well-child visits.
- **Louisiana Mental Health Perinatal Partnership (LAMHPP)** is a provider-to-provider consultation system for licensed healthcare clinicians serving pregnant and postpartum women and their families. LAMHPP supports healthcare clinicians to address the needs of their patients including perinatal depression, anxiety, substance use disorders, interpersonal violence, and related health risks and conditions. For more information, visit **lamhpp.org**.
- **Reproductive Health Program (RHP)** is the state's sole grantee of the Title X Family Planning Services Grant (Title X). Title X is the only federal program dedicated to providing access to high-quality contraceptive services, supplies and information to anyone who needs or wants them. RHP administers this program through a network of statewide service sites, including over 60 Parish Health Units and community health centers. All services are comprehensive and confidential, prioritizing patient autonomy, voluntary provision of services and patient-centered care. For more information, visit **HealthyChoicesLA.org**.

Policies that Enable or Support a Strong System of Care

- **Act 497 (2018 Legislative Session) created the Healthy Moms, Healthy Babies Advisory Council**. This council, authorized by Louisiana Revised Statute 40:2018.5 in 2018, was formed as a call to action to ensure that state initiatives addressing maternal mortality and severe maternal morbidity include an equity focus informed by community. Key findings and recommendations are summarized in the council's **final report** issued in March 2021. To view Act 497, visit **legis.la.gov**.
- **LDH hosted the inaugural Maternal Mortality Summit in August 2019.** The summit was part of the response to **House Resolution 294** of the 2019 Regular Session. The Maternal Mortality Summit convened public health professionals, providers, policymakers and community leaders focused on improving birth outcomes. Recommendations from the Summit can be found in the **report here**.

State Level Efforts to Reduce Maternal Mortality

Policies that Enable or Support a Strong System of Care (continued)

- **LDH is addressing the realignment of Hospital Licensing Standards for Maternal Levels of Care.** These efforts include a focus on updating the licensing standards for maternal care (in Louisiana Administrative Code Title 48 – Public Health Part I Subpart 3, Chapter 93, Subpart S) to more closely align within the context of available resources.
- **Act 320 (2021 Legislative Session) created a domestic violence fatality review within LDH**. The 2017 PAMR report identified homicide as one of the leading causes of pregnancy-associated, but not related deaths among women and IPV was identified as a leading contributing factor. To view Act 320, visit legis.la.gov.
- **Act No. 470 (2021 Legislative Session) established an income tax credit** for certain funeral and burial expenses for certain pregnancy-related deaths.
- **Act 182 (2021 Legislative Session) created a doula registry.** The Louisiana Doula Registry Board was established in January 2022 for the purpose of reviewing and approving doula registration to allow for health insurance reimbursement of doula services.

Appendices and References

A. Acronyms

Acronym	Definition
BFH	Bureau of Family Health
CDC	Centers for Disease Control and Prevention
ICD	International Classification of Diseases
LaHIDD	Louisiana Hospital Inpatient Discharge Database
LaPQC	Louisiana Perinatal Quality Collaborative
LDH	Louisiana Department of Health
MCH	Maternal and Child Health
MMRC	Maternal Morality Review Committee
MMRIA	Maternal Mortality Review Information Application
NCHS	National Center for Health Statistics
OPH	Office of Public Health
PAMR	Pregnancy-Associated Mortality Review
WHO	World Health Organization

B. Systems of Maternal Mortality Surveillance in the United States[3]

Data Source	National Vital Statistics System	Pregnancy Mortality Surveillance System	Maternal Mortality Review Committees
Timeframe	During pregnancy—42 d	During pregnancy—1 y	During pregnancy—1 y
Source of classification	ICD, 10th Revision codes	Medical epidemiologists, utilizing Pregnancy Mortality Surveillance System codes	Multidisciplinary committees
Terms	Maternal death	• Pregnancy-associated death • Pregnancy-related death • Associated but not pregnancy-related death	• Pregnancy-associated death • Pregnancy-related death • Associated but not pregnancy-related death
Measure	Maternal mortality rate (no. of maternal deaths/100,000 live births)	National pregnancy-related mortality ratio (no. of pregnancy-related deaths/100,000 live births)	State or local-level pregnancy-related mortality ratio (no. of pregnancy-related deaths/100,000 live births)
Purpose	Show national trends and provide a basis for international comparison	Analyze clinical factors associated with deaths, publish information that may lead to prevention strategies	Understand medical and nonmedical contributors to deaths; prioritize interventions that may reduce maternal deaths
Strengths	• Strongest source of historical data, dating back to 1900 • Reliable basis for international comparison • Relies on readily available data from death certificates	Most clinically relevant national measure of burden of maternal deaths	• Allows for the most accurate identification and comprehensive review of deaths • Allows specific recommendations for actions to inform local, state, and national prevention strategies informed by local context
Challenges	• Constrained by statistical accounting imposed by the limited codes in the ICD • Does not capture sufficient detail to inform prevention strategies	• Limited to information primarily derived from death and birth certificates • Does not capture detailed information on contributors to deaths	• Resource-intensive • Reliant on data from multiple sources, including medical records, social records, autopsy reports, and informant interviews • Requires review by multiple stakeholders • Currently, variations in processes across jurisdictions inhibit use of data for national surveillance

C. Data Sources and Methodology
Louisiana Pregnancy-Associated Mortality Review

Vital Records Data and Linkage Methodology

Louisiana Vital Records death certificates were used to identify deaths occurring from January 1, 2017 through December 31, 2019 to women ages 10-55 years old who were Louisiana residents at the time of death. All pregnancy-associated cases (see pg. 3 for definitions) were eligible for review.

Deaths were identified through a combination of linkages, the pregnancy check box on death certificates and obstetric code (O-code) causes of deaths. Deaths were identified in four steps:

1. **Data linkages:** Death certificates of women of childbearing age were linked to infant birth and fetal death certificates. Variables used to create these linkages include: mother's social security number, mother's date of birth, infant/fetal date of delivery, mother's first and last name, and child's last name (some linkages were made using Soundex, a phonetic algorithm for indexing names by sound so they can be linked despite minor differences in spelling). SAS version 8.3 was used in conjunction with the LinkPro macro to complete all linkages.
2. **Pregnancy checkbox:** Death certificates with the pregnancy check box filled in, indicating that the decedent was pregnant at the time of death or within one year of pregnancy, were identified as potential pregnancy-associated deaths.
3. **O-codes:** Deaths of women where the ICD-10 code for underlying cause of death was in chapter O were identified as potential pregnancy-associated deaths.
4. **LaHIDD linkages:** Linkages between death records and hospital discharge records were conducted to identify additional cases. All women between the ages of 10 and 55 who had any pregnancy-related ICD-10CM codes were included. Variables used to link the death file with the LaHIDD file included mother's social security number, mother's date of birth, and mother's first and last name. Women who were found to have a delivery, positive pregnancy test or an ectopic pregnancy were added to the list of potential pregnancy-associated deaths. LAHIDD linkages were conducted using Link Plus and Link King software.

Potential pregnancy-associated deaths identified using the pregnancy checkbox and O-codes required verification by BFH's Maternal and Child Health (MCH) Coordinators (see Appendix H). Validation requires individuals submitting data to verify that a decedent was indeed pregnant at the time of death, or within one year. Validation is designed to reduce the number of "false positive" identifications of pregnancy-associated deaths that result from the pregnancy check box being checked in error.

Confirmation of Eligibility and Record Abstraction

MCH Coordinators (registered nurses) received an Excel file of potential pregnancy-associated deaths identified through Vital Records data that occurred within their geographic coverage area. The file was posted to a secure server and contained each decedent's first and last name, date of birth, date of death, ICD-10 cause of death, location or hospital where the death occurred, and, where available, information related to the delivery of the fetus or infant. A death was considered "confirmed," and therefore eligible for review, if the MCH Coordinator confirmed a pregnancy within one year of death based on medical records or coroner reports. MCH Coordinators then abstracted available medical records, coroners' reports and/or other relevant documentation for all confirmed pregnancy-associated deaths using an abstraction form (see Appendix J).

Methodology & Guidelines for Reviewing Maternal Deaths

A multi-disciplinary Maternal Mortality Review Committee reviewed the 182 confirmed cases (see Appendix D). All committee members signed a confidentiality form prior to receiving de-identified case summaries. Anyone with personal knowledge of a particular case did not share details beyond the record abstraction. A summary of each case was presented by the review committee Chair, followed by open forum, then structured discussions. The committee used the *Centers for Disease Control and Prevention (CDC)'s Maternal Mortality Review* project's MMRIA Committee Decisions Form (version 21) to classify each case (see Appendix G).

Data Limitations

Methods to identify pregnancy-associated deaths on the Vital Records death certificate can lead to:

- Correct identification of a pregnancy-associated death.
- Incorrect identification of a pregnancy-associated death due to:
    - Reporting a pregnancy-associated death in error (false case): a recent pregnancy (*defined as either pregnant at the time of death; pregnant within 42 days of death; or pregnant within 43 days to 1 year prior to death*) on the death certificate that cannot be confirmed through medical records or coroner reports.
    - Failing to identify a true case (missed case): any individual who was pregnant or recently pregnant based on the definitions above at the time of death.

Potential reasons for missed cases include, but are not limited to:

- Early pregnancies that were not known or detected at the time of death.
- Recent miscarriages, other pregnancy terminations or fetal deaths that were not known or detected at the time of death.
- Failing to identify a live birth or fetal death record associated with an individual who was pregnant or had recently delivered at the time of death.
- Missing or delayed data linkage between pregnancy-associated deaths and live births for women whose infants were adopted.

Classification based on ICD-10 O-codes or the pregnancy check box alone, without full record review, are more likely to result in misclassification. The ability to classify these deaths relies heavily on the availability of medical and coroner records. Even a complete history from medical records and/or coroner reports does not guarantee that a determination can be made.

Aggregate data based on counts less than 20 are considered unstable and should be interpreted with caution; these numbers, percentages, ratios or rates may change considerably from one time period to the next.

D. Maternal Mortality Review Committee, 2019-2021

Name	Role and Organization	Year(s) Served
Alfred Robichaux, MD	Maternal Fetal Medicine, Ochsner Health System	2019
Angela Bradley-Byers, MSN, APRN, FNP-C	Maternal Fetal Medicine Perinatal Services	2019-2021
Arwen Podesta, MD	Psychiatry, Addiction Medicine, Podesta Psychiatry, Tulane University	2019
Bridget Gardner, RN	Director, Injury Prevention Program, University Medical Center	2019-2021
Cheri Johnson, RNC-OB, MSN	Perinatal Health and Nursing, Woman's Hospital	2019-2021
Dan Goodbee	Emergency Medical Services	2019-2021
Deborah St. Germain DNP, RN-CEN, SANE	Assistant Professor, LSU School of Nursing, Greater New Orleans Human Trafficking Task Force	2020-2021
Demetrice Smith, FNP-C, CNM	Nurse Practitioner/Certified Nurse Midwife Jefferson Parish WIC/Healthy Start	2019-2021
Devin George, MPA	Director, Vital Records, Louisiana Department of Health	2019-2021
Emily Stevens, MSW, MBA	Director of Care Management, Woman's Hospital	2019
Emma Moscardini, MA	Louisiana State University, Clinical Psychology	2021
Erin O'Sullivan, MD	Forensic Pathology, Orleans Parish Coroner's Office	2019-2021
Eva Lessinger, MSW	Director, New Orleans Family Justice Center	2019-2021
Floyd Roberts, MD	Clinical Affairs, Louisiana Hospital Association	2019-2021
Gabriella Pridjian, MD	Maternal Fetal Medicine, Tulane Hospital	2019-2021
Gavin Istre	State EMS Coordinator	2019-2020
Heather Olivier, MS, PLPC, NCC, CCTP, PMH-C	Perinatal Counseling, Present Hope Counseling	2020-2021
Helen Hurst, DNP, RNC, APRN	Director of Nursing, University of Lafayette	2019-2021
Ivory Wilson, MA	Behavioral Health, Louisiana Department of Health	2019-2021
Jane Martin, MD	Maternal and Fetal Medicine Fellow, Ochsner Health System	2019-2021
Jennifer Avegno, MD	Director, City of New Orleans Health Department Emergency Medicine, University Medical Center	2019-2021
Johnnay Benjamin, MPH	Patient Advocate and Representative	2020-2021
Jon Brazzel	Unit Commander QA/CQI Officer	2019-2020
Joseph Biggio, MD	Maternal Fetal Medicine, Ochsner Health System	2019

D. Maternal Mortality Review Committee, 2019-2021

Name	Role and Organization	Year(s) Served
Karli Boggs, MD	Obstetrics and Gynecology, Woman's Hospital	2019-2021
Kerrie Redmond, BSN, MSN	Louisiana Perinatal Quality Collaborative, Louisiana Department of Health	2019-2021
Kristin Phillips, RN	GRACE Program Case Manager	2021
Latona Giwa, BSN, MPH	Birthmark Doula Collective	2019
Lisa Freeman, JD	Director, Louisiana Highway Safety Commission	2019-2021
Mariah Wineski, MS	Director, LA Coalition Against Domestic Violence	2019-2021
Mary Alexander, MSW	Director of Healthy Start New Orleans	2019
Marshall St. Amant, MD	Maternal Fetal Medicine, Woman's Hospital	2019-2021
Mike Straney, MD	Emergency Medicine	2020-2021
Mitzi Alexander, LCSW	Licensed Clinical Social Worker	2021
Murtuza "Zee" Ali, MD	Cardiology, Louisiana State University	2019-2021
Natasha Seals, PharmD	Opioid Pharmacist Coordinator	2021
Nelson Hollings	Regional Safety Coalition Coordinator	2021
Nicole Deggins, CNM, MSN, MPH	Director, Sista Midwife	2019-2021
Nikki Greenway, MSN, IBCLC	NOLA Breastfeeding Center	2019-2021
Nikolai Terebieniec	Emergency Medical Services	2019-2021
Pooja Mehta, MD, MSHP	Obstetrics and Gynecology, Louisiana State University Health Sciences Center New Orleans	2019
Raymond Tucker, PhD	Louisiana State University, Clinical Psychology	2021
Robert Maupin, MD	Maternal Fetal Medicine, Louisiana State University Health Sciences Center New Orleans	2019-2021
Rodney Wise, MD	Medical Officer, AmeriHealth Caritas	2019-2021
Scott Barrilleaux, MD	Maternal Fetal Medicine, Louisiana Commission on Perinatal Care and Prevention of Infant Mortality	2019-2021
Shakira Herbert, MSW, RSW	Child Welfare Programs, Department of Children and Family Services	2019-2020
Stephen Phillipe, MS, EMT-P	State Emergency Medical Services	2019
Veronica Gillispie-Bell, MD, MAS	Louisiana Perinatal Quality Collaborative and Pregnancy Associated Mortality Review, Medical Director	2019-2021
Victoria Williams, LMSW, CBS	Birthmark Doula Collective	2019-2021

E. Louisiana Bias or Racism and Social Determinants of Heath (LABoRS) Tool

Demographics

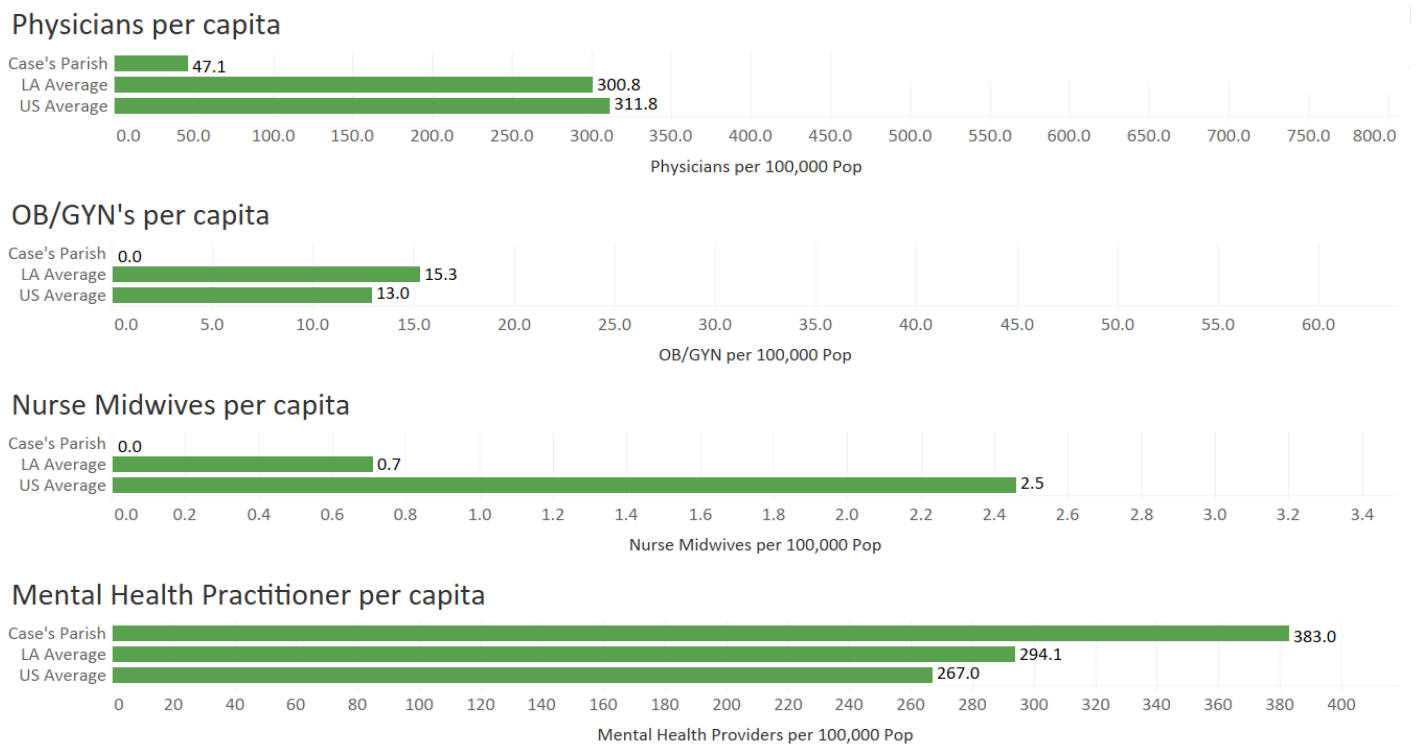
Race, citizenship/immigration status, preferred language, educational level, marital status, living arrangements ((living with friends, shelter, temporary housing, homelessness), type of insurance, WIC utilization, distance between place of birth/death from decedent's residence

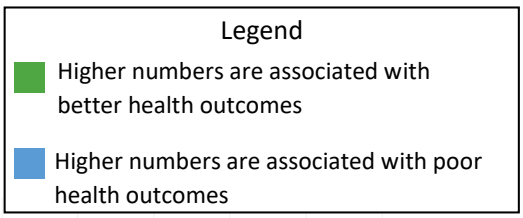
Social Determinants of Health

- **Barriers to healthcare**: child care, cultural norms, distance, financial, transportation, mobility
- **Barriers to communication:** hearing impaired, functional illiteracy, speech impaired, language differences, vision impaired, cultural differences
- **Social or emotional stress:** History of domestic violence, history of psychiatric hospitalizations or treatment, child protective services involvement, history of substance use, unemployment, pregnancy unwanted, recent trauma, prior suicide attempts, adverse childhood experiences, history of incarceration, housing instability, social support, chronic illness, short interpregnancy interval

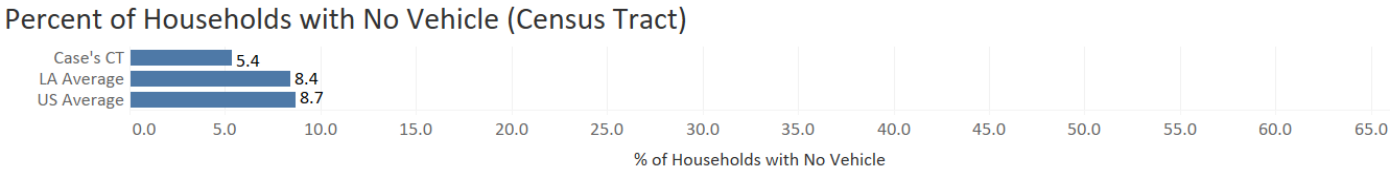
Geospatial Social Determinants of Health Data

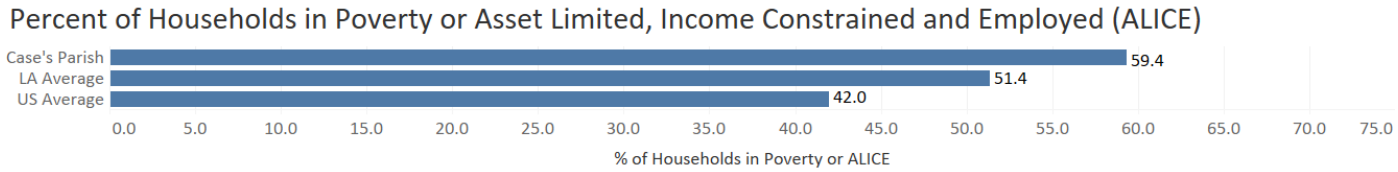
A total of ten indicators are analyzed based on the decedent's residence at the time of death. The tool displays data on the decedent's parish or census tract of residence, the Louisiana average, and the US average.

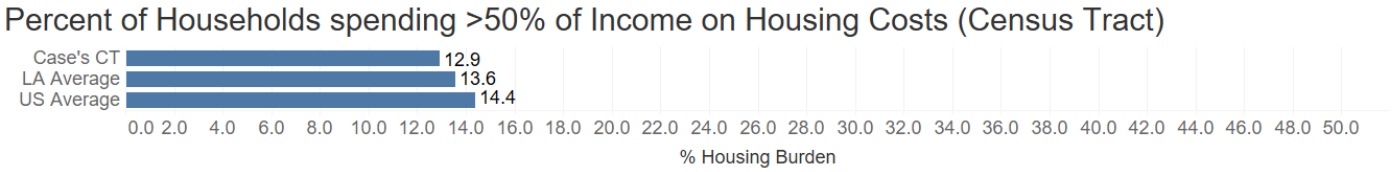




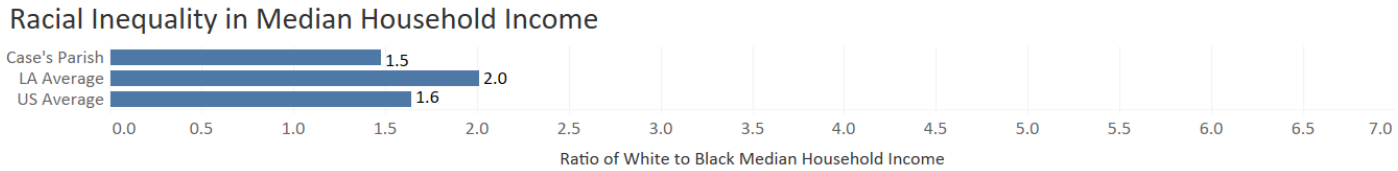
E. Louisiana Bias or Racism and Social Determinants of Heath (LABoRS) Tool

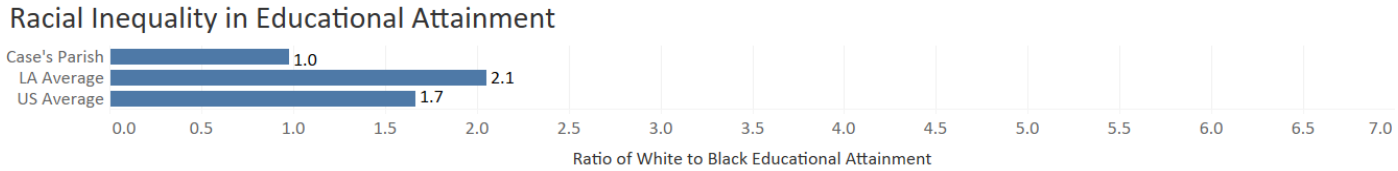


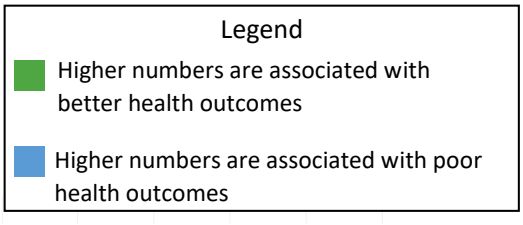




Structural Racism Indicators







E. Louisiana Bias or Racism and Social Determinants of Heath (LABoRS) Tool

Definitions of Geospatial Indicators used in LABoRS Tool

Indicator	Definition
Physicians per capita	Physicians per 100,000 population. Includes all M.D. and D.O. physicians with active status across specialties.
OB/GYN's per capita	OB/GYNs per 100,000 population. Includes all Obstetrics and Gynecology M.D. and D.O. physicians with active status.
Nurse Midwives per capita	Nurse midwives per 100,000 population. Includes Nurse Midwives with a National Provider Identifier (NPI) only.
Mental Health Practitioners per capita	Mental Health Practitioners per 100,000 population. Includes psychiatrists, psychologists, licensed clinical social workers, counselors, marriage and family therapists, and mental health providers that treat alcohol and other drug abuse, as well as advanced practice nurses specializing in mental health care.
Percent of Households with No Vehicle	Percent of households without a vehicle, based on data from the American Community Survey and the United States Census.
Percent of Households in Poverty or Asset Limited, Income Constrained and Employed (ALICE)	Percent of households who a) live below the Federal Poverty Level or b) live above the Federal Poverty Level but below the basic cost of living in their area.
Percent of Households spending >50% of Income on Housing Costs	Percent of households spending >50% of household income on housing costs, based on data from the American Community Survey and the United States Census.
Racial Inequality in Median Household Income	Ratio of white to black median household income. A higher number reflects greater racial inequality in household income.
Racial Inequality in Educational Attainment	Ratio of white to black educational attainment. A higher number reflects greater racial inequality in educational attainment.
Racial Inequality in Unemployment	Ratio of black to white unemployment. A Higher number reflects greater racial inequality in unemployment.

E. Louisiana Bias or Racism and Social Determinants of Heath (LABoRS) Tool

Case Record Findings on Potential Bias, Discrimination or Barriers to Care
(Includes all medical records and reports received by our MCH Coordinators for case review)

☐	1	**Negative patient/provider/facility interaction** *(Stigmatizing language, dismissing concerns, non-clinical patient-initiated transfers of care, case notes suggest provider/facility conflict, blaming, casting doubt)*	
☐	2	**Excessive gatekeeping** (*Inability to reach provider, lack of or delay in notification to provider, unanswered messages, leaving messages, etc.)*	
☐	3	**Diagnostic delays** *(Delays that appear to be inconsistent with best practice. Examples include: Delay in ordering or not ordering imagining and labs, delay in consults or case management assessment, delay in transfer of care (if diagnosis was known))*	
☐	4	**Leaving against medical advice**	
☐	5	**Repeated ED visits in short time frame (for urgent care)**	
☐	6	**Cultural incompetence** *(lack of translator, lack of awareness of other cultures)*	
☐	7	**Lack of access to health care before, during, and after pregnancy** *(structural bias)*	
☐	8	**Treatment decisions and recommendations that appeared to be inconsistent with best practices.** (Over-treatment, undertreatment, delay in treatment, inadequate pain management, provider assumptions about patient's adherence to treatment)	
☐	9	**Other**	

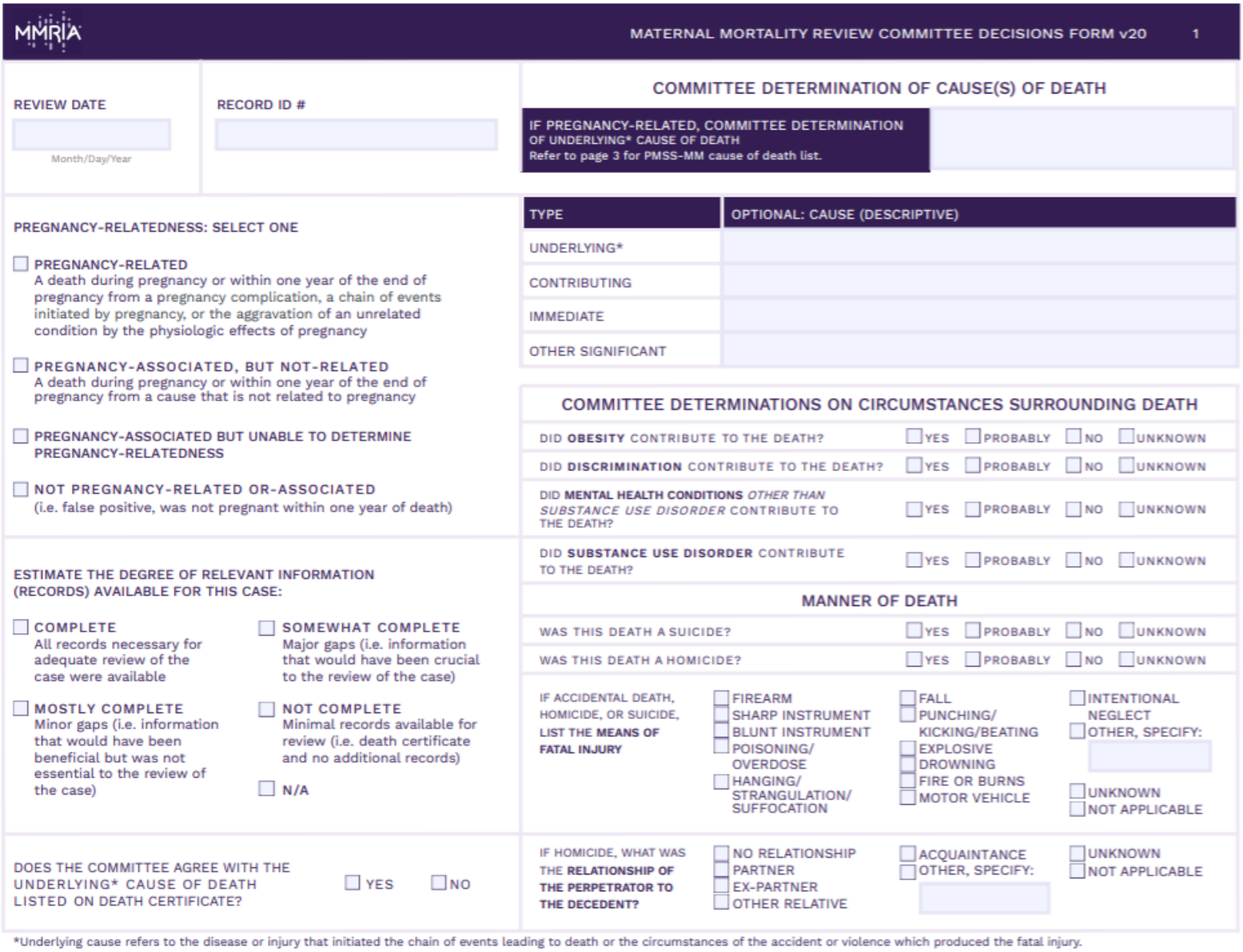
F. Utah Tool

Identified in PAMR Narrative	Criteria for Accidental Drug-Related Deaths and Suicides	Case Examples
	1. Pregnancy complication	
☐	a. Increased pain directly attributable to pregnancy or postpartum events leading to self-harm or drug use that is implicated in suicide or accidental death	Back pain, pelvic pain, kidney stones, cesarean incision, or perineal tear pain
☐	b. Traumatic event in pregnancy or postpartum with a temporal relationship between the event leading to self-harm or increased drug use and subsequent death	Stillbirth, preterm delivery, diagnosis of fetal anomaly, traumatic delivery experience, relationship destabilization due to pregnancy, removal of child(ren) from custody
☐	c. Pregnancy-related complication likely exacerbated by drug use leading to subsequent death	Placental abruption or preeclampsia in setting of drug use
	2. Chain of events initiated by pregnancy	
☐	a. Cessation or attempted taper of medications for pregnancy-related concerns (neonatal or fetal risk or fear of Child Protective Service involvement) leading to maternal destabilization or drug use and subsequent death	Substance use pharmacotherapy (methadone or buprenorphine), psychiatric medications, pain medications
☐	b. Inability to access inpatient or outpatient drug or mental health treatment due to pregnancy	Health care professionals uncomfortable with treating pregnant women, facilities not available that accept pregnant women
☐	c. Perinatal depression, anxiety, or psychosis resulting in maternal destabilization or drug use and subsequent death	Depression diagnosed in pregnancy or postpartum resulting in suicide
☐	d. Recovery or stabilization of substance use disorder achieved during pregnancy or postpartum with clear statement in records that pregnancy was motivating factor with subsequent relapse and subsequent death	Relapse leading to overdose due to decreased tolerance or polysubstance use
	3. Aggravation of underlying condition by pregnancy	
☐	a. Worsening of underlying depression, anxiety, or other psychiatric condition in pregnancy or the postpartum period with documentation that mental illness led to drug use or self-harm and subsequent death	Pre-existing depression exacerbated in the postpartum period leading to suicide
☐	b. Exacerbation, under treatment, or delayed treatment of pre-existing condition in pregnancy or postpartum leading to use of prescribed or illicit drugs resulting in death, or suicide	Under treatment of chronic pain leading to misuse of medications or use of illicit drugs, resulting in death
☐	c. Medical conditions secondary to drug use in setting of pregnancy or postpartum that may be attributable to pregnancy-related physiology and increased risk of complications leading to death	Stroke or cardiovascular arrest due to stimulant use

G. MMRIA Committee Decisions Form

Maternal Mortality Review Information Application (MMRIA)

Committee Decisions Form – Page 1



MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v20 1

REVIEW DATE

Month/Day/Year

RECORD ID #

COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING* CAUSE OF DEATH
Refer to page 3 for PMSS-MM cause of death list.

PREGNANCY-RELATEDNESS: SELECT ONE

☐ PREGNANCY-RELATED
A death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy

☐ PREGNANCY-ASSOCIATED, BUT NOT-RELATED
A death during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy

☐ PREGNANCY-ASSOCIATED BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS

☐ NOT PREGNANCY-RELATED OR-ASSOCIATED
(i.e. false positive, was not pregnant within one year of death)

TYPE	OPTIONAL: CAUSE (DESCRIPTIVE)
UNDERLYING*	
CONTRIBUTING	
IMMEDIATE	
OTHER SIGNIFICANT	

COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH

DID **OBESITY** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **DISCRIMINATION** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **MENTAL HEALTH CONDITIONS** *OTHER THAN SUBSTANCE USE DISORDER* CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **SUBSTANCE USE DISORDER** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN

ESTIMATE THE DEGREE OF RELEVANT INFORMATION (RECORDS) AVAILABLE FOR THIS CASE:

☐ COMPLETE
All records necessary for adequate review of the case were available

☐ SOMEWHAT COMPLETE
Major gaps (i.e. information that would have been crucial to the review of the case)

☐ MOSTLY COMPLETE
Minor gaps (i.e. information that would have been beneficial but was not essential to the review of the case)

☐ NOT COMPLETE
Minimal records available for review (i.e. death certificate and no additional records)

☐ N/A

MANNER OF DEATH

WAS THIS DEATH A SUICIDE?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
WAS THIS DEATH A HOMICIDE?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN

IF ACCIDENTAL DEATH, HOMICIDE, OR SUICIDE, **LIST THE MEANS OF FATAL INJURY**

☐ FIREARM
☐ SHARP INSTRUMENT
☐ BLUNT INSTRUMENT
☐ POISONING/ OVERDOSE
☐ HANGING/ STRANGULATION/ SUFFOCATION
☐ FALL
☐ PUNCHING/ KICKING/BEATING
☐ EXPLOSIVE
☐ DROWNING
☐ FIRE OR BURNS
☐ MOTOR VEHICLE
☐ INTENTIONAL NEGLECT
☐ OTHER, SPECIFY:
☐ UNKNOWN
☐ NOT APPLICABLE

DOES THE COMMITTEE AGREE WITH THE UNDERLYING* CAUSE OF DEATH LISTED ON DEATH CERTIFICATE? ☐ YES ☐ NO

IF HOMICIDE, WHAT WAS THE **RELATIONSHIP OF THE PERPETRATOR TO THE DECEDENT?**

☐ NO RELATIONSHIP
☐ PARTNER
☐ EX-PARTNER
☐ OTHER RELATIVE
☐ ACQUAINTANCE
☐ OTHER, SPECIFY:
☐ UNKNOWN
☐ NOT APPLICABLE

*Underlying cause refers to the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury.

Additional information about MMRIA can be found at reviewtoaction.org/implement/mmria#collapseThree-mmria

*NOTE: During 2017-2019 case reviews, the MMRIA Committee Decisions form was updated throughout 2017-2019 case reviews. This report displays the Committee Decision form used during 2019 case reviews.

G. MMRIA Committee Decisions Form

Maternal Mortality Review Information Application (MMRIA)

Committee Decisions Form – Page 2

MMRIA — MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v20 — 2

COMMITTEE DETERMINATION OF PREVENTABILITY

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 to patient, family, provider, facility, system and/or community factors.

WAS THIS DEATH PREVENTABLE?	☐ YES	☐ NO
CHANCE TO ALTER OUTCOME	☐ GOOD CHANCE	☐ SOME CHANCE
	☐ NO CHANCE	☐ UNABLE TO DETERMINE

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Entries may continue to grid on page 5)

CONTRIBUTING FACTORS WORKSHEET
What were the factors that contributed to this death?
Multiple contributing factors may be present at each level.

RECOMMENDATIONS OF THE COMMITTEE
If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events?

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	CONTRIBUTING FACTORS (choose as many as needed below)	LEVEL	COMMITTEE RECOMMENDATIONS [Who?] should [do what?] [when?] Map recommendations to contributing factors.	LEVEL	PREVENTION TYPE (choose below)	EXPECTED IMPACT (choose below)

CONTRIBUTING FACTOR KEY (DESCRIPTIONS ON PAGE 4)

- Access/financial
- Adherence
- Assessment
- Childhood abuse/ trauma
- Chronic disease
- Clinical skill/ quality of care
- Communication
- Continuity of care/ care coordination
- Cultural/religious
- Delay
- Discrimination
- Environmental
- Equipment/ technology
- Interpersonal racism
- Knowledge
- Law Enforcement
- Legal
- Mental health conditions
- Outreach
- Policies/procedures
- Referral
- Social support/ isolation
- Structural racism
- Substance use disorder - alcohol, illicit/prescription drugs
- Tobacco use
- Unstable housing
- Violence
- Other

DEFINITION OF LEVELS

- **PATIENT/FAMILY:** An individual before, during or after a pregnancy, and their family, internal or external to the household, with influence on the individual
- **PROVIDER:** An individual with training and expertise who provides care, treatment, and/or advice
- **FACILITY:** A physical location where direct care is provided - ranges from small clinics and urgent care centers to hospitals with trauma centers
- **SYSTEM:** Interacting entities that support services before, during, or after a pregnancy - ranges from healthcare systems and payors to public services and programs
- **COMMUNITY:** A grouping based on a shared sense of place or identity - ranges from physical neighborhoods to a community based on common interests and shared circumstances

PREVENTION TYPE

- **PRIMARY:** Prevents the contributing factor before it ever occurs
- **SECONDARY:** Reduces the impact of the contributing factor once it has occurred (i.e. treatment)
- **TERTIARY:** Reduces the impact or progression of what has become an ongoing contributing factor (i.e. management of complications)

EXPECTED IMPACT

- **SMALL:** Education/counseling (community- and/or provider-based health promotion and education activities)
- **MEDIUM:** Clinical intervention and coordination of care across continuum of well-woman visits (protocols, prescriptions)
- **LARGE:** Long-lasting protective intervention (improve readiness, recognition and response to obstetric emergencies/LARC)
- **EXTRA LARGE:** Change in context (promote environments that support healthy living/ensure available and accessible services)
- **GIANT:** Address social determinants of health (poverty, inequality, etc.)

Additional information about MMRIA can be found at reviewtoaction.org/implement/mmria#collapseThree-mmria

G. MMRIA Committee Decisions Form

Maternal Mortality Review Information Application (MMRIA)

Committee Decisions Form – Page 3

MMRIA MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v20 3

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING CAUSE OF DEATH* PMSS-MM

* PREGNANCY-RELATED DEATH: DEATH DURING PREGNANCY OR WITHIN ONE YEAR OF THE END OF PREGNANCY FROM A PREGNANCY COMPLICATION, A CHAIN OF EVENTS INITIATED BY PREGNANCY, OR THE AGGRAVATION OF AN UNRELATED CONDITION BY THE PHYSIOLOGIC EFFECTS OF PREGNANCY.

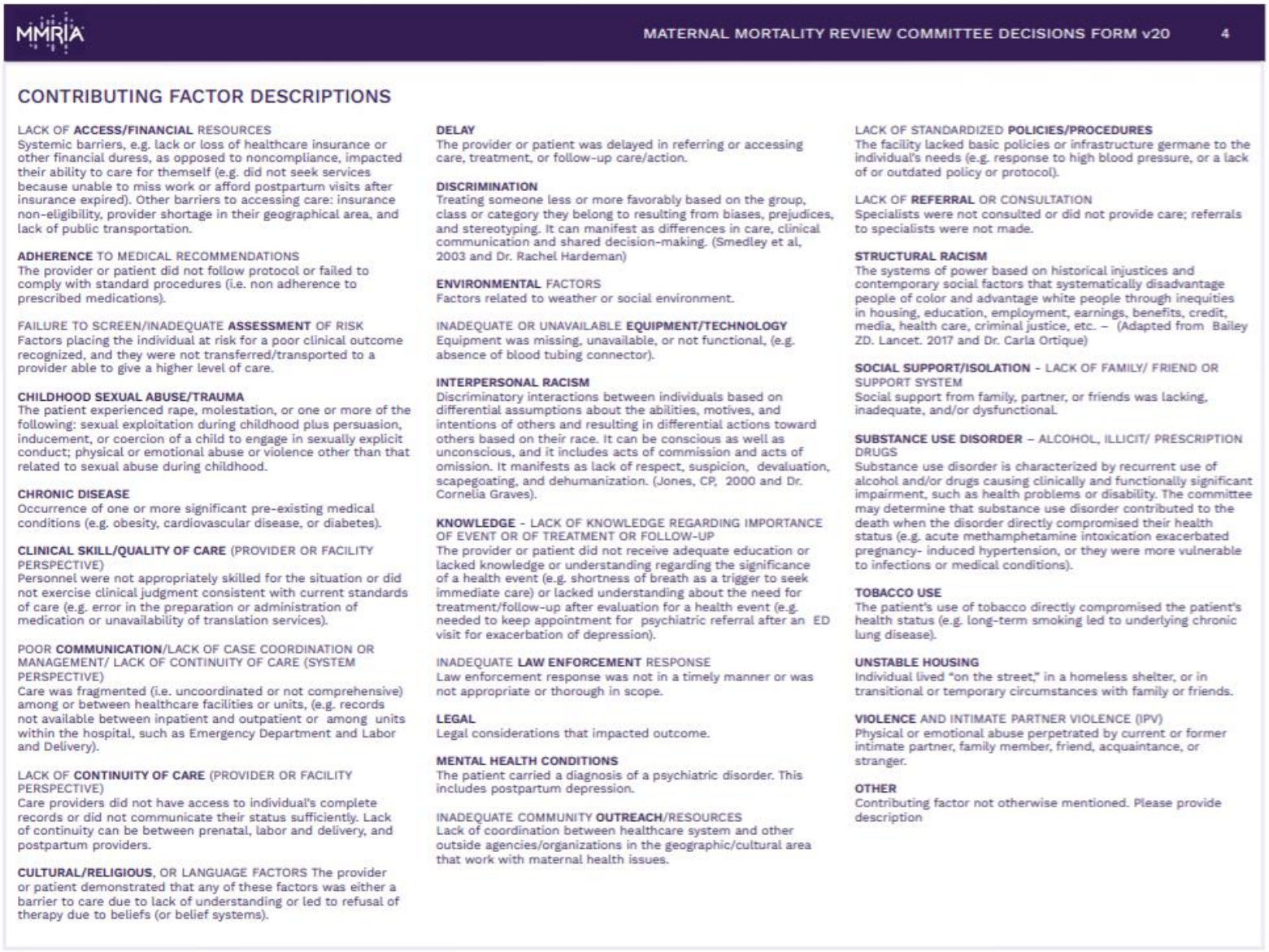
10	Hemorrhage (excludes aneurysms or CVA)
10.1	Hemorrhage – rupture/laceration/ intra-abdominal bleeding
10.2	Placental abruption
10.3	Placenta previa
10.4	Ruptured ectopic pregnancy
10.5	Hemorrhage - uterine atony/postpartum hemorrhage
10.6	Placenta accreta/increta/percreta
10.7	Hemorrhage due to retained placenta
10.8	Hemorrhage due to primary DIC (obsolete)
10.9	Other hemorrhage/NOS
20	Infection
20.1	Postpartum genital tract (e.g. of the uterus/ pelvis/perineum/necrotizing fasciitis)
20.2	Sepsis/septic shock
20.4	Chorioamnionitis/antepartum infection
20.5	Non-pelvic infections (e.g. pneumonia, TB, meningitis, HIV)
20.6	Urinary tract infection
20.9	Other infections/NOS
30	Embolism - thrombotic (non-cerebral)
30.9	Other embolism/NOS
31	Embolism - amniotic fluid
40	Preeclampsia
50	Eclampsia
60	Chronic hypertension with superimposed preeclampsia
70	Anesthesia complications
80	Cardiomyopathy
80.1	Postpartum/peripartum cardiomyopathy
80.2	Hypertrophic cardiomyopathy
80.9	Other cardiomyopathy/NOS
82	Hematologic
82.1	Sickle cell anemia
82.9	Other hematologic conditions including thrombophilias/TTP/HUS/NOS
83	Collagen vascular/autoimmune diseases
83.1	Systemic lupus erythematosus (SLE)
83.9	Other collagen vascular diseases/NOS
85	Conditions unique to pregnancy (e.g. gestational diabetes, hyperemesis, liver disease of pregnancy)
88	Injury
88.1	Intentional (homicide)
88.2	Unintentional
88.9	Unknown/NOS
89	Cancer
89.1	Gestational trophoblastic disease (GTD)
89.3	Malignant melanoma
89.9	Other malignancies/NOS
90	Cardiovascular conditions
90.1	Coronary artery disease/myocardial infarction (MI)/atherosclerotic cardiovascular disease
90.2	Pulmonary hypertension
90.3	Valvular heart disease congenital and acquired
90.4	Vascular aneurysm/dissection (non-cerebral)
90.5	Hypertensive cardiovascular disease
90.6	Marfan Syndrome
90.7	Conduction defects/arrhythmias
90.8	Vascular malformations outside head and coronary arteries
90.9	Other cardiovascular disease, including CHF, cardiomegaly, cardiac hypertrophy, cardiac fibrosis, non-acute myocarditis/NOS
91	Pulmonary conditions (excludes ARDS-Adult respiratory distress syndrome)
91.1	Chronic lung disease
91.2	Cystic fibrosis
91.3	Asthma
91.9	Other pulmonary disease/NOS
92	Neurologic/neurovascular conditions (excluding CVAs)
92.1	Epilepsy/seizure disorder
92.9	Other neurologic diseases/NOS
93	Renal disease
93.1	Chronic renal failure/End-stage renal disease (ESRD)
93.9	Other renal disease/NOS
95	Cerebrovascular accident (hemorrhage/thrombosis/aneurysm/ malformation) not secondary to hypertensive disorders of pregnancy
96	Metabolic/endocrine
96.1	Obesity
96.2	Diabetes mellitus
96.9	Other metabolic/endocrine disorders
97	Gastrointestinal disorders
97.1	Crohn's disease/ulcerative colitis
97.2	Liver disease/failure/transplant
97.9	Other gastrointestinal diseases/NOS
100	Mental health conditions
100.1	Depression
100.9	Other psychiatric conditions/NOS
999	Unknown COD

Additional information about MMRIA can be found at reviewtoaction.org/implement/mmria#collapseThree-mmria

G. MMRIA Committee Decisions Form

Maternal Mortality Review Information Application (MMRIA)

Committee Decisions Form – Page 4



MMRIA MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v20 4

CONTRIBUTING FACTOR DESCRIPTIONS

LACK OF **ACCESS/FINANCIAL** RESOURCES
Systemic barriers, e.g. lack or loss of healthcare insurance or other financial duress, as opposed to noncompliance, impacted their ability to care for themself (e.g. did not seek services because unable to miss work or afford postpartum visits after insurance expired). Other barriers to accessing care: insurance non-eligibility, provider shortage in their geographical area, and lack of public transportation.

ADHERENCE TO MEDICAL RECOMMENDATIONS
The provider or patient did not follow protocol or failed to comply with standard procedures (i.e. non adherence to prescribed medications).

FAILURE TO SCREEN/INADEQUATE **ASSESSMENT** OF RISK
Factors placing the individual at risk for a poor clinical outcome recognized, and they were not transferred/transported to a provider able to give a higher level of care.

CHILDHOOD SEXUAL ABUSE/TRAUMA
The patient experienced rape, molestation, or one or more of the following: sexual exploitation during childhood plus persuasion, inducement, or coercion of a child to engage in sexually explicit conduct; physical or emotional abuse or violence other than that related to sexual abuse during childhood.

CHRONIC DISEASE
Occurrence of one or more significant pre-existing medical conditions (e.g. obesity, cardiovascular disease, or diabetes).

CLINICAL SKILL/QUALITY OF CARE (PROVIDER OR FACILITY PERSPECTIVE)
Personnel were not appropriately skilled for the situation or did not exercise clinical judgment consistent with current standards of care (e.g. error in the preparation or administration of medication or unavailability of translation services).

POOR **COMMUNICATION**/LACK OF CASE COORDINATION OR MANAGEMENT/ LACK OF CONTINUITY OF CARE (SYSTEM PERSPECTIVE)
Care was fragmented (i.e. uncoordinated or not comprehensive) among or between healthcare facilities or units, (e.g. records not available between inpatient and outpatient or among units within the hospital, such as Emergency Department and Labor and Delivery).

LACK OF **CONTINUITY OF CARE** (PROVIDER OR FACILITY PERSPECTIVE)
Care providers did not have access to individual's complete records or did not communicate their status sufficiently. Lack of continuity can be between prenatal, labor and delivery, and postpartum providers.

CULTURAL/RELIGIOUS, OR LANGUAGE FACTORS The provider or patient demonstrated that any of these factors was either a barrier to care due to lack of understanding or led to refusal of therapy due to beliefs (or belief systems).

DELAY
The provider or patient was delayed in referring or accessing care, treatment, or follow-up care/action.

DISCRIMINATION
Treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Smedley et al, 2003 and Dr. Rachel Hardeman)

ENVIRONMENTAL FACTORS
Factors related to weather or social environment.

INADEQUATE OR UNAVAILABLE **EQUIPMENT/TECHNOLOGY**
Equipment was missing, unavailable, or not functional, (e.g. absence of blood tubing connector).

INTERPERSONAL RACISM
Discriminatory interactions between individuals based on differential assumptions about the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization. (Jones, CP, 2000 and Dr. Cornelia Graves).

KNOWLEDGE - LACK OF KNOWLEDGE REGARDING IMPORTANCE OF EVENT OR OF TREATMENT OR FOLLOW-UP
The provider or patient did not receive adequate education or lacked knowledge or understanding regarding the significance of a health event (e.g. shortness of breath as a trigger to seek immediate care) or lacked understanding about the need for treatment/follow-up after evaluation for a health event (e.g. needed to keep appointment for psychiatric referral after an ED visit for exacerbation of depression).

INADEQUATE **LAW ENFORCEMENT** RESPONSE
Law enforcement response was not in a timely manner or was not appropriate or thorough in scope.

LEGAL
Legal considerations that impacted outcome.

MENTAL HEALTH CONDITIONS
The patient carried a diagnosis of a psychiatric disorder. This includes postpartum depression.

INADEQUATE COMMUNITY **OUTREACH**/RESOURCES
Lack of coordination between healthcare system and other outside agencies/organizations in the geographic/cultural area that work with maternal health issues.

LACK OF STANDARDIZED **POLICIES/PROCEDURES**
The facility lacked basic policies or infrastructure germane to the individual's needs (e.g. response to high blood pressure, or a lack of or outdated policy or protocol).

LACK OF **REFERRAL** OR CONSULTATION
Specialists were not consulted or did not provide care; referrals to specialists were not made.

STRUCTURAL RACISM
The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage white people through inequities in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc. – (Adapted from Bailey ZD. Lancet. 2017 and Dr. Carla Ortique)

SOCIAL SUPPORT/ISOLATION - LACK OF FAMILY/ FRIEND OR SUPPORT SYSTEM
Social support from family, partner, or friends was lacking, inadequate, and/or dysfunctional.

SUBSTANCE USE DISORDER – ALCOHOL, ILLICIT/ PRESCRIPTION DRUGS
Substance use disorder is characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised their health status (e.g. acute methamphetamine intoxication exacerbated pregnancy- induced hypertension, or they were more vulnerable to infections or medical conditions).

TOBACCO USE
The patient's use of tobacco directly compromised the patient's health status (e.g. long-term smoking led to underlying chronic lung disease).

UNSTABLE HOUSING
Individual lived "on the street," in a homeless shelter, or in transitional or temporary circumstances with family or friends.

VIOLENCE AND INTIMATE PARTNER VIOLENCE (IPV)
Physical or emotional abuse perpetrated by current or former intimate partner, family member, friend, acquaintance, or stranger.

OTHER
Contributing factor not otherwise mentioned. Please provide description

Additional information about MMRIA can be found at reviewtoaction.org/implement/mmria#collapseThree-mmria

H. Regional Maternal and Child Health Coordinators and Mortality Surveillance Team

Region	Staff
Region 1	Rosa Bustamante-Forest, APRN, MPH (2014-2020) Kristy Ferguson, BSN, RN (current)
Region 2	Kelly Bankston, BSN, RN (2013-2019) Rachel Purgatorio, BSN, RN (2020-current)
Region 3	Nicole Soudelier, BSN, RN (2013-2020) Danielle Mistretta, BSN, RN (current)
Region 4	Debra Feller, BSN, RN
Region 5	Jade Marler, RN, CIC
Region 6	Lisa Norman, BSN, RN (2003- 2021) Kayla Livingston (2021- current)
Region 7	Shelley Ryan-Gray, BSN, RN
Region 8	Sara Dickerson, RN
Region 9	Martha Hennegan, RN
PAMR Coordinator	Rachel Hyde, BSN, RN, MPH *(Current Maternal and Child Health Mortality Surveillance Manager)*
Maternal Morbidity and Mortality Epidemiologist	Katharine Bruce, MPH (2019-2022) Imani Evans, MPH (2021-current)
Perinatal Projects Coordinator	Keshia Holmes, MA
Statewide Surveillance Manager	Rosaria Trichilo, MPH (2018-2021)
Louisiana Perinatal Quality Collaborative and Pregnancy Associated Mortality Review, Medical Director	Veronica Gillispie-Bell, MD, FACOG

I. Pregnancy Mortality Surveillance System (PMSS) Cause of Death Categorizations

PMSS Cause of Death	Explanation / Included Conditions
Amniotic Fluid Embolism	Embolism - Amniotic Fluid
Anesthesia Complications	Anesthesia Complications
Cancer	Gestational trophoblastic disease, Malignant melanoma, Other malignancies/Not otherwise specified
Cardiomyopathy	Postpartum/peripartum cardiomyopathy, Hypertrophic cardiomyopathy, Other cardiomyopathy/Not otherwise specified
Cardiovascular Conditions	Coronary artery disease/Myocardial infarction/Atherosclerotic cardiovascular disease, Pulmonary hypertension, Valvular heart disease, Vascular aneurysm/Dissection, Hypertensive cardiovascular disease, Marfan's syndrome, Conduction defects/Arrhythmias, Vascular malformations outside the head and coronary arteries, Other cardiovascular disease, including congestive heart failure, cardiomegaly, cardiac hypertrophy, cardiac fibrosis, and non-acute myocarditis/Not otherwise specified
Cerebrovascular Accidents not Secondary to Hypertensive Disorders of Pregnancy	Cerebrovascular accident (Hemorrhage/ Thrombosis/Aneurysm/ Malformation) not secondary to Hypertensive disorders of pregnancy
Collagen Vascular/Autoimmune Diseases	Systemic lupus erythematosus (SLE), Other collagen vascular diseases/Not otherwise specified
Conditions Unique to Pregnancy	Conditions unique to pregnancy (e.g, Gestational diabetes, Hyperemesis, Liver disease of pregnancy)
Embolism - Thrombotic (Non-Cerebral)	Thrombotic (non-cerebral), Other embolism/Not otherwise specified
Gastrointestinal Disorders	Crohn's disease/Ulcerative colitis, Liver disease/failure/transplant, Other gastrointestinal diseases/Not otherwise specified
Hematologic	Sickle cell anemia, Other hematologic conditions including thrombophilias/Thrombotic thrombocytopenic purpura/Hemolytic uremic syndrome/Not otherwise specified
Hemorrhage (Excludes Aneurysms or CVA)	Rupture/Laceration/Intra-abdominal bleeding; Placental abruption, Placenta previa, Ruptured ectopic pregnancy, uterine atony/ postpartum hemorrhage, Placenta accreta/increta/percreta, due to retained placenta, due to primary disseminated intravascular coagulation, Other hemorrhage/not otherwise specified

I. Pregnancy Mortality Surveillance System (PMSS) Cause of Death Categorizations

PMSS Cause of Death	Explanation / Included Conditions
Hypertensive Disorders of Pregnancy	Preeclampsia, Eclampsia, Chronic Hypertension with superimposed preeclampsia
Infection	Postpartum genital tract (e.g., of the uterus/pelvis/perineum/ necrotizing fasciitis), Sepsis/septic shock, Chorioamnionitis/ antepartum infection, Influenza, COVID-19, Pneumonia, Other Non-pelvic infection (e.g., TB, meningitis, HIV), Urinary tract infection, Other infections/Not otherwise specified
Injury	Intentional (homicide), Unintentional, Unknown intent/Not otherwise specified
	Depressive disorder, Anxiety disorder (including Post-Traumatic Stress Disorder), Bipolar disorder, Psychotic disorder, Substance use disorder, Other psychiatric condition/Not otherwise specified
Metabolic/Endocrine	Obesity, Diabetes mellitus, Other metabolic/Endocrine disorders/Not otherwise specified
Neurologic/Neurovascular Conditions (Excluding CVA)	Epilepsy/seizure disorder, Other neurologic diseases/Not otherwise specified
Pulmonary Conditions (Excluding Adult Respiratory Distress Syndrome)	Chronic lung disease, Cystic fibrosis, Asthma, Other pulmonary disease/Not otherwise specified
Renal Disease	Chronic Renal Failure/End-Stage Renal Disease (ESRD), Other renal disease/Not otherwise specified
Unknown	Unknown COD

PMSS Cause of Death Categorizations available at: reviewtoaction.org/sites/default/files/national-portal-material/Report%20from%20Nine%20MMRCs%20final%20edit.pdf

J. Data Abstraction Guide

Health Prior to Sentinel Pregnancy
Height/Weight/ BMI
Medical history (including duration of preexisting conditions and medications prescribed)
Surgical and obstetric history (including any complications during prior pregnancies and/or deliveries)
Social history (use of alcohol, tobacco, illicit drugs)
Screenings (domestic violence/IPV, suicide risk, depression)
Family history
Antepartum Course
Gestational age decedent entered prenatal care
Number of prenatal appointments
Reasons for any missed appointments
Screenings during pregnancy (substance use, domestic violence/IPV, risk of pulmonary embolism, suicide, glucose)
High risk factors
Labs and imagining (relevant bloodwork, urinalysis, glucose, ultrasound)
Placental location
Complications and/or patient complaints during pregnancy
Consults and/or referrals during pregnancy
Interventions during pregnancy (evacuation, laparotomy, D&C, cervical cerclage, hysterectomy, transfusion)
Hospital admissions, urgent care and/or emergency room visits during pregnancy
Medical specialist(s) seen during pregnancy
Labor & Delivery
Gestational age and APGAR score
Type of labor (spontaneous, augmented, induced, no labor, no specified)

Route and method of delivery (instrument delivery, cesarean, hysterectomy, vaginal)
Birth attendant
Complications and/or patient complaints during delivery
Medications administered prior to and during delivery (general anesthetic, epidural, spinal anesthetic, local anesthetic)
Relevant laboratory tests and imaging results
Number of days admitted to hospital
Discharge and follow-up instructions
Post Partum Care (up to 365 days post delivery, or Termination of Pregnancy (TOP)
Attendance to post partum appointment/follow-up
Complications and/or complaints during postpartum period (up to one year after delivery/TOP)
Hospital Admissions, urgent care & emergency department visits during postpartum period (up to one year after delivery/TOP)
Medical specialist(s) seen during postpartum period
Relevant laboratory tests and imaging results
Referrals and consults during the postpartum course
Details on terminal event (circumstances surrounding death)
Autopsy Report
Cause of death
Microscopic and gross findings
Medical Examiner/Coroner's investigative narrative
Toxicology report
Demographics
Race
Ethnicity

Immigration status
Preferred language
Educational level
Martial status
Members of household
Type of insurance
Utilization of WIC and/or social support services
Distance between place of birth/death from decedent's residence
Social Determinants of Health (Prior to pregnancy, during pregnancy and post-partum period)
Source(s) of income
Barriers to healthcare: child care, cultural norms, distance, financial, transportation, mobility, availability of services
Barriers to communication: hearing impaired, functional illiteracy, speech impaired, language differences, vision impaired, cultural differences
Social or emotional stress: history of domestic violence/IPV, history of psychiatric hospitalizations or treatment, child protective services involvement, history of substance use, unemployment, pregnancy unwanted, recent trauma, prior suicide attempts, adverse childhood experiences, history of incarceration, housing instability, social support
Additional Sources of Information
Medical transport (ambulance, helicopter, other)
Police reports/interviews
Crash report for motor vehicle deaths
Vital records (birth certificate, death certificate, fetal death certificate)
Media
Maternal level of care of facility where services were obtained

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