2024

Division of Family Health Data and Fatality Prevention

Indiana Maternal Mortality Review Committee

2024 Annual Report

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Letter from Commissioner

Dear Colleagues:

The Indiana Department of Health (IDOH) is proud to release the fifth annual Maternal Mortality Report. This report shares the findings and recommendations of the Maternal Mortality Review Committee (MMRC) from its comprehensive review of all pregnancy-associated deaths among Indiana women. This report has five years (2018-2022) of data and single-year (2022) data to provide the most accurate description of the statewide burden of maternal mortality. The recommendations developed by the MMRC provide actionable strategies to decrease maternal mortality in Indiana.

In 2022, 72 women died during pregnancy or within one year of pregnancy, which was a decrease from 80 deaths in 2021. Reviews of these deaths have directly informed strategies and programs aimed at reducing the impact of maternal mortality. Below are just a few examples of successful programs that support healthy Hoosier mothers, babies, and families.

The **Indiana Pregnancy Promise Program** is a free program that offers support during the prenatal period and in the 12 months after an end of pregnancy. The program connects women with experienced nurses or social workers who help coordinate care through a partnership with Indiana managed health care plans. Women enrolled in this program are connected to prenatal care, sustainable treatment for substance use disorder, and postpartum care, all in a mother's local community.

The **Indiana Consultations for Healthcare Providers in Addiction, Mental Health, and Perinatal Psychiatry Program (CHAMP)** within the Indiana University School of Medicine is an innovative and free provider-to-provider consultation line. The program increases healthcare provider access to psychiatry experts to support behavioral healthcare in local communities. The CHAMP program supports all Hoosier adults but can specifically support pregnant and postpartum women by allowing providers to call and discuss mental health medication management during pregnancy, assessment or diagnosis of peripartum mood disorders, and treatment plans for any behavioral health disorders.

The **Lactation After Loss** program provides bereavement support to families who experience fetal or infant loss. Many families who experience a fetal or early infant loss are unaware that milk production may still occur as early as 16 weeks gestation. The Fetal Infant Mortality Review (FIMR) team in the South-Central Region (Brown, Greene, Lawrence, Monroe, Morgan, Orange, and Owen Counties) heard from families who were impacted by lactation after pregnancy loss or the death of an infant and reached out to IDOH for assistance in building a statewide program to address the gap in care. The Lactation After Loss program, created in partnership with Indiana FIMR, Indiana MMRC, The Milk Bank, and many other IDOH partners, supports providers in having conversations with families and allows bereaved families to regain their autonomy by educating them on all lactation options. Lactation options include milk suppression, milk expression, or milk donation in honor of their baby. Research shows that bereavement services

can have positive, long-term impacts on future pregnancies, improving the health of both mothers and babies.

Indiana has made investments in **home visiting** programs to support child and family development by building positive parent-child relationships and improving child and parent health and well-being. Home visiting programs serve families in all 92 counties in Indiana. Nationally recognized home visiting programs include Nurse-Family Partnership, Healthy Families Indiana, and Early Head Start.

Health First Indiana (HFI) is an investment in prevention to improve the health and well-being of all Hoosiers by empowering counties to address the unique needs of their communities. Local health departments select key performance indicators, collect data, and implement prevention initiatives. Counties throughout Indiana have already moved data to action, partnered with clinical and community partners, and helped create a stronger public health infrastructure across the state.

While I recognize the work done across the state, I know how important it is to also acknowledge the families, friends, and loved ones who are affected by the deaths presented in this report. I also share my appreciation for the IDOH staff who manage the MMRC and the committee members for volunteering their time to do this important work.

Yours in health,

Lindsay Weaver, M.D., FACEP

State Health Commissioner

Dedication and Acknowledgements

Dedication

The Indiana Department of Health (IDOH) dedicates this annual report to the 72 women who lost their lives in 2022 during or within one year of pregnancy. The fatality review process is an important step in creating prevention recommendations and decreasing maternal mortality in Indiana, but we recognize this does not remove any pain from those impacted. A moment of silence is taken prior to each review meeting to remember the women, their families and friends, and all they have been through. We would like to thank those who shared their stories and their time with us during this process.

Acknowledgements

This report is made possible through the commitment of the multidisciplinary volunteer committee that completes reviews of all maternal mortality cases in Indiana. Many IDOH divisions collaborate and support the Maternal Mortality Review Committee (MMRC) and the Division of Family Health Data and Fatality Prevention (DFP), including the Divisions of Maternal and Child Health, Vital Records, Trauma and Injury Prevention, and the Office of Data and Analytics. Thank you to the Indiana Hospital Association, Indiana Department of Child Services, Indiana Family and Social Services Administration, local hospitals, providers, and coroners for providing records and assisting in the review process. Thank you to the IDOH staff who help share the stories of every mother who dies and support the continued effort to prevent future deaths from occurring.

Lindsay Weaver, MD, FACEP- State Health Commissioner

Eden Bezy, MPH- Assistant Commissioner, Commission of Women, Children, and Families

Jamie Smith, MS, MPH- Director, Division of Family Health Data and Fatality Prevention

Cameron Willett, MPH- Maternal Mortality Programs Director

Caitlin Gandarilla, BSN, RNC- Nurse Abstractor

Shelby Howe, BSN, RN- Nurse Abstractor

Megan O’Day, BSN, RN- Nurse Abstractor

Maria Bukowska, MPH- Maternal Mortality Review Epidemiologist

Mallory Lown, BS- Epidemiologist

COMMITTEE CHAIR- Mary Pell Abernathy, MD, MBA- Maternal-Fetal Medicine, Union Hospital

Executive Summary

Maternal mortality is a key indicator of the overall health and well-being of a community. The MMRC identifies and reviews pregnancy-associated deaths to gain an understanding of the causes and contributing factors and to create recommendations for prevention.

The maternal deaths reviewed in Indiana are all pregnancy-associated and, after a complete committee review, are determined to be either pregnancy-associated, but not related or pregnancy-related.

Pregnancy-associated death: A death during pregnancy or within one year of pregnancy irrespective of the cause.

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

Pregnancy-related death: A death during pregnancy or within one year 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.

The data in this report do not identify any trends in maternal mortality in Indiana. The data presented are descriptive and should not be used to assume or assign mortality risk or infer correlations with any variables. Any rate or percentage with an asterisk is noted to be unstable and should be interpreted with caution. Indiana maternal mortality data cannot be compared to other states or national maternal mortality datasets or statistics as the data sources and methodology used may differ.

2022 Indiana MMRC Key Findings

- 72 pregnancy-associated deaths occurred during pregnancy or within one year of pregnancy.
- 12 (17%) pregnancy-related deaths occurred during pregnancy or within one year of pregnancy.
- 34 (47%) deaths occurred during pregnancy or within 42 days of pregnancy.
- 38 (53%) deaths occurred 43 days to one year of pregnancy.
- 83% of 2022 pregnancy-associated deaths were determined to have been preventable.
- In 2022, homicide was the second leading manner of death, accounting for 11% of the total deaths.
- In 2022, 7% of total deaths were suicides.
- Overdose, both accidental and undetermined intent, was the leading cause of pregnancy-associated deaths in each year from 2018 through 2022.

Introduction and Methods

Indiana Code (IC) 16-50 requires IDOH to establish a multidisciplinary committee to conduct confidential reviews of all pregnancy-associated deaths. The Indiana MMRC includes diverse subject matter experts and providers from various specialties (obstetrics and gynecology, cardiology, pathology, maternal-fetal medicine, psychiatry), along with perinatal mood disorder specialists, law enforcement, public health professionals, and other related health professionals. Appendix A provides a complete list of MMRC members. Case reviews are fully deidentified. Names of patients, medical providers, institutions, and locations remain confidential during the review process and are not included in this report. Recommendations are developed to improve health outcomes for pregnant and postpartum women in Indiana, not place blame on specific individuals or facilities.

IC 16-50-1-7 describes the goals of the MMRC, which include reviewing cases and determining factors that contributed to the deaths in addition to developing recommendations for the prevention of maternal morbidities and maternal mortalities. The DFP maternal mortality team works to identify public health and clinical interventions aimed at improving systems of care and enhancing coordination. The team also works to develop strategies for the prevention of maternal mortality. These goals are aligned with IDOH's overall mission, vision and, values and support the health and safety of all Hoosiers.

Methods

The Indiana MMRC reviews cases involving women between the ages of 10 and 60 years to ensure all who are of childbearing age are included. Identifying deaths is the first step in understanding the burden of maternal mortality in Indiana. DFP uses multiple methods to ensure pregnancy-associated deaths are accurately identified and counted each year. Cases are identified via death certificates and/or facility notifications. Death certificate identifications include being marked as pregnant within a year of death, dying due to an obstetric cause, or the matching of maternal death records to an infant birth or fetal death record within a year prior to the maternal death. All Indiana hospitals are required by IC 16-50 to report any known pregnancy-associated deaths to IDOH via the Maternal Mortality Notice of Death Form (Appendix B).

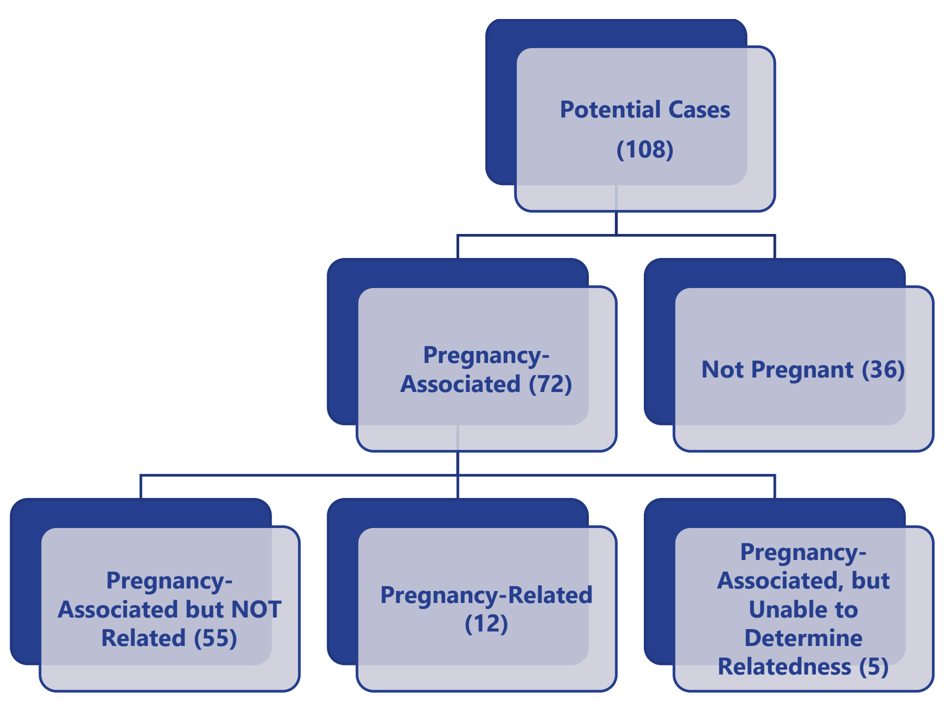
After these individuals are identified, DFP abstraction staff obtain any records necessary to confirm or negate pregnancy status. These may include hospital records from death, birth, or prenatal care, autopsy reports, and communication with coroners or local health officers. This process is critical to eliminate any false positives.

Through the identification process, 36 false positives (not actually pregnant) were identified and not sent to the committee for review. Twenty-nine cases for review were identified through the matching of maternal records to an infant birth or fetal death record. These would not have been identified if the abstraction team did not utilize multiple methods to ensure the accuracy

of the death records. Figure 1 shows the Indiana MMRC case identification counts, the false positives excluded from the review, and the categories of the 72 cases that received a comprehensive review.

Figure 1: 2022 Indiana MMRC Case Breakdown

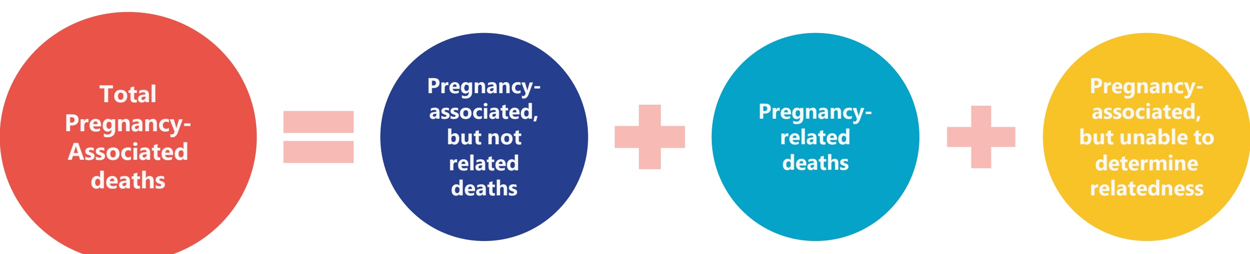
Indiana MMRC, 2022



DFP abstraction staff collects and compiles relevant medical and social information and creates a narrative for team review. Information may include medical records, social services records, autopsy and toxicology reports, police reports, and family interviews. The narrative tells the story of the woman's life and the events leading up to her death.

At the review meetings, the MMRC categorizes each death based on guidelines from the CDC. The committee uses the Maternal Mortality Review Information Application (MMRIA) committee decisions form for each case and creates prevention recommendations. Figure 2 shows the CDC and Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) definitions used by Indiana to categorize maternal deaths. All deaths during pregnancy or within one year of pregnancy are classified as pregnancy-associated. Those deaths are then subcategorized into pregnancy-associated, but not related or pregnancy-related. If relatedness is undeterminable, the death is categorized as pregnancy-associated, but unable to determine relatedness.

Figure 2: CDC and ERASE MM Maternal Mortality Definitions



Pregnancy-associated death- A death during pregnancy or within one year of pregnancy irrespective of the cause

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

Pregnancy-related death- A death during pregnancy or within one year 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

Data Analysis

Once a cohort, the review of all deaths that occurred in a calendar year, is complete, the MMR Epidemiologist analyzes the data to identify primary characteristics for five years (2018-2022) and single year (2022) pregnancy-associated deaths. These characteristics include cause of death, insurance status, timing of pregnancy, and other factors that are vital to understanding maternal mortality in Indiana.

The use of rates allows us to compare instances of maternal death between years and specific populations. A mortality rate is the frequency of death in a certain time period among a specified population. Five-year Indiana maternal mortality rates were calculated using 2018-2022 deaths and 2018-2022 live births. Single year maternal mortality rates were calculated using live births from the same year. The rates are the number of deaths per 100,000 live births.

Indiana maternal mortality data cannot be compared to other states or national maternal mortality datasets or statistics as the data sources and methodology used may differ.

MMRC Findings

There were 72 pregnancy-associated deaths in the 2022 Indiana MMRC cohort. Of those deaths, 12 were pregnancy related. The 2022 pregnancy-associated rate was 90.4 deaths per 100,000 live births, and the 2022 pregnancy-related rate was 15.1 deaths per 100,000 live births. The pregnancy-related rate is a subset of the overall pregnancy-associated mortality rate. Figure 3 shows the maternal mortality rates for both pregnancy-associated and pregnancy-related deaths in Indiana from 2018-2022. This summary shows that the overall maternal mortality rate for both pregnancy-associated and pregnancy-related deaths peaked in 2020 and declined in 2021 and 2022. The pregnancy-related rates are based on counts less than 20 and should be interpreted with caution.

Figure 3: Pregnancy-Associated Mortality Rates, per 100,000 Live Births

Indiana MMRC, 2018-2022 (N=367)

Year	Pregnancy-Associated Mortality Rates	Pregnancy-Related Mortality Rates*
2018	77.2	12.2
2019	74.2	18.6
2020	117.1	22.9
2021	100.1	17.5
2022	90.4	15.1

Y-axis: Rate per 100,000 Live Births

*Rates based on counts less than 20 are considered unstable and should be interpreted with caution.

Table 1 shows the percentage of Indiana births and pregnancy-associated maternal deaths by Health First Indiana Districts. Pregnancy-associated deaths closely reflected births over the five-year (2018-2022) reporting period. District 5 shows the highest percentage of births per district and the highest percentage of pregnancy-associated deaths per district in the five-year period. A map of Health First Indiana Districts is shown as Figure C1 in Appendix C.

Table 1: Indiana Pregnancy-Associated Deaths by Health First Indiana District

Indiana MMRC, 2018-2022 (N=367)

District	% of Indiana Births	# of Pregnancy-Associated Deaths	% of Pregnancy-Associated Deaths
1	11%	38	10%
2	10%	36	9%
3	12%	35	9%
4	5%	24	7%
5	30%	120	32%
6	9%	43	12%
7	4%	14	4%*
8	5%	13	4%*
9	7%	28	8%
10	7%	16	4%*

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.

Table 2 shows Indiana pregnancy-associated and pregnancy-related deaths by race and ethnicity compared to births throughout the five-year period. The percentage of pregnancy-associated deaths closely reflects the percentage of births from 2018-2022 for White, non-Hispanic women, Hispanic, any race, and other. The other race and ethnicity category includes Indian, Chinese, Japanese, Hawaiian, other White, Filipino, other Asian or Pacific Islander, multiracial, and unknown. Black, non-Hispanic women represented 13% of births over the five-year period, 20% of pregnancy-associated deaths, and 23% of pregnancy-related deaths from 2018-2022. Race and ethnicity are collected from data sources that could be self-reported or reported by providers or other medical or social service staff without review by the mother or her family. This information is verified whenever possible but may have discrepancies.

Table 2: Indiana Pregnancy-Associated Deaths by Race and Ethnicity

Indiana MMRC, 2018-2022 (N=367)

Race/Ethnicity	% of Indiana Births	% of Pregnancy-Associated	% of Pregnancy-Related
White, non-Hispanic	71%	69% (255)	65% (45)
Black, non-Hispanic*	13%	20% (72)	23%* (16)
Hispanic, Any Race	11%	7% (24)	10%* (7)

Other/Unknown	5%	4%* (16)	2%* (1)

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.

Table 3 shows Indiana pregnancy-associated and pregnancy-related deaths by insurance status compared to live births. Insurance status for a maternal death is determined based on insurance status at the time of delivery. If a woman did not deliver, her insurance status is based on insurance status during prenatal care. It is important to note that insurance coverage can change over the course of pregnancy and the postpartum period, and a woman's coverage during pregnancy may not be the same as her coverage during her terminal event.

More than half (53%) of Indiana births throughout the five-year review period had private insurance, compared to 18% of pregnancy-associated and 26% of pregnancy-related deaths. Thirty-nine percent of Indiana births had Medicaid insurance, whereas 68% of pregnancy-associated and 45% of pregnancy-related deaths had Medicaid insurance in the five-year period.

Table 3: Indiana Pregnancy-Associated Deaths by Insurance Status

Indiana MMRC, 2018-2022 (N=367)

Insurance Status	% of Indiana Births	% of Pregnancy-Associated	% of Pregnancy-Related
Private Insurance	53%	18% (67)	26%* (18)
Medicaid	39%	68% (251)	45% (31)
Self-Pay/None	5%	4%* (14)	0% (0)
Other	3%	1%* (3)	1%* (1)
Unknown	<1%	9% (32)	28%* (19)

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.

Figure 4 shows a comparison of insurance status and first trimester prenatal care for pregnancy-associated deaths. Women with Medicaid insurance often enter care later and have fewer prenatal care visits when compared to women with private insurance. Among pregnancy-associated deaths, 51% of women with Medicaid entered care during the first trimester, whereas 70% of women with private insurance entered care during the same time. Both single year (2022) and aggregate data (2018-2022) show women with Medicaid entered prenatal care later than those with private insurance. The five-year data show 41% of all pregnancy-associated deaths had some known prenatal care.

Figure 4: Percentage of Indiana Pregnancy-Associated Deaths with First Trimester Prenatal Care by Insurance Status

Indiana MMRC, 2018-2022 (N=367)

80%
70%
60%
50%
40%
30%
20%
10%
0%

50%
51%
61%
70%

Medicaid
Private

2022
2018-2022

Figure 5 shows the timing of pregnancy-associated deaths in the five-year period. The majority (59%) of pregnancy-associated deaths occurred 43 days to one year after pregnancy. The majority (58%) of pregnancy-related deaths occurred within 42 days of pregnancy.

Figure 5: Indiana Pregnancy-Associated Death by Timing

Indiana MMRC, 2018-2022 (N=367)

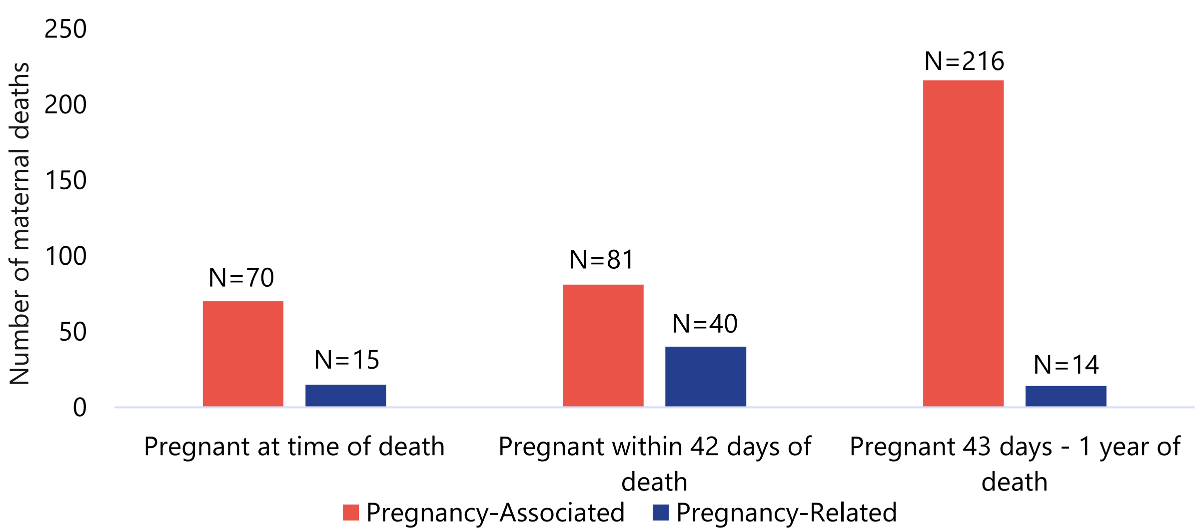


Figure 6 shows the leading causes and manners of death for Indiana pregnancy-associated cases in the five-year (2018-2022) period. The top cause of death is overdose (accidental and undetermined intents) at 30%. This is followed by homicide, motor vehicle crashes, and

cardiovascular conditions. Causes or manners are only presented for those with counts of five or higher.

Figure 6: Indiana Pregnancy-Associated Deaths by Top Cause and Manner of Death

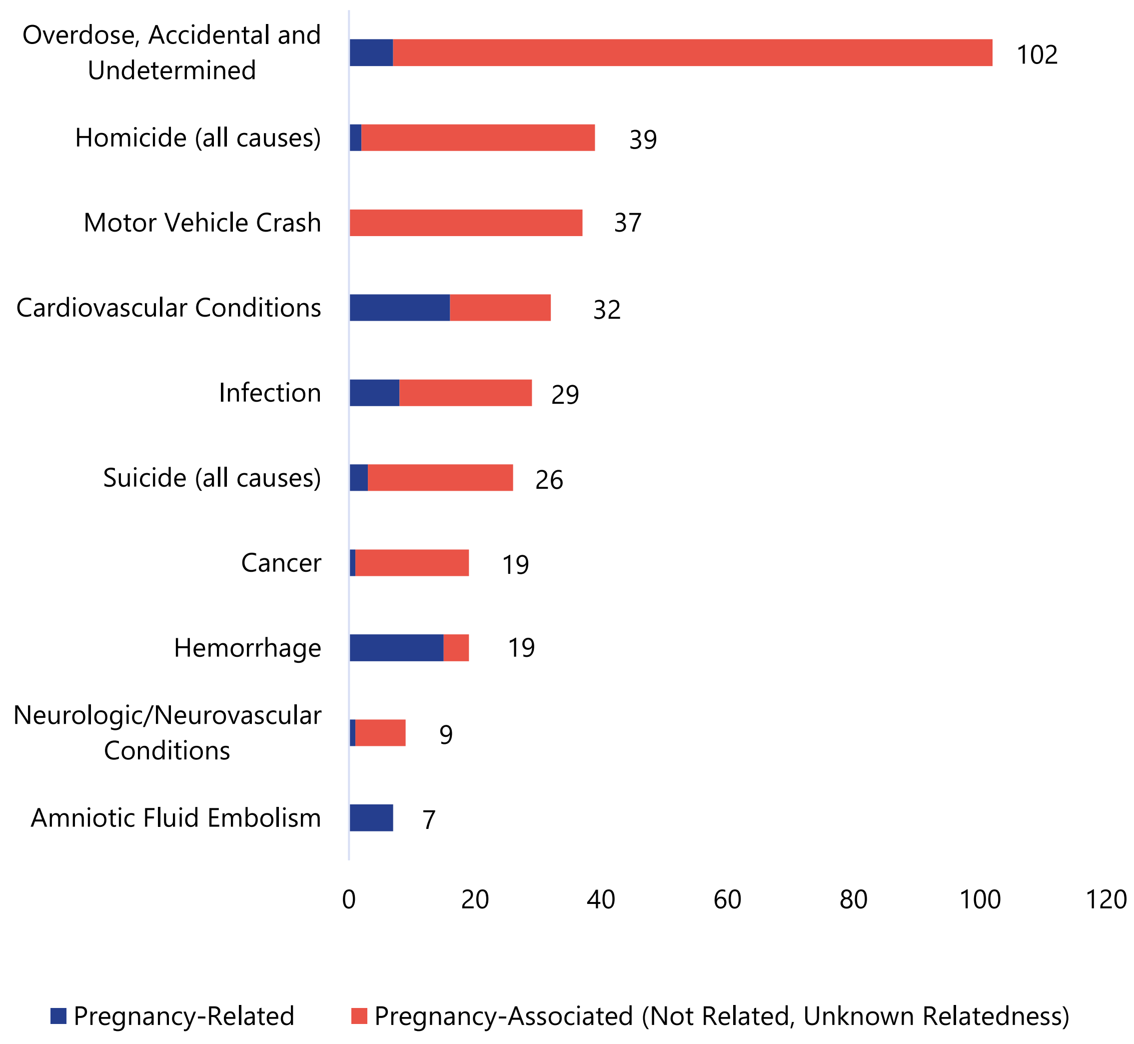
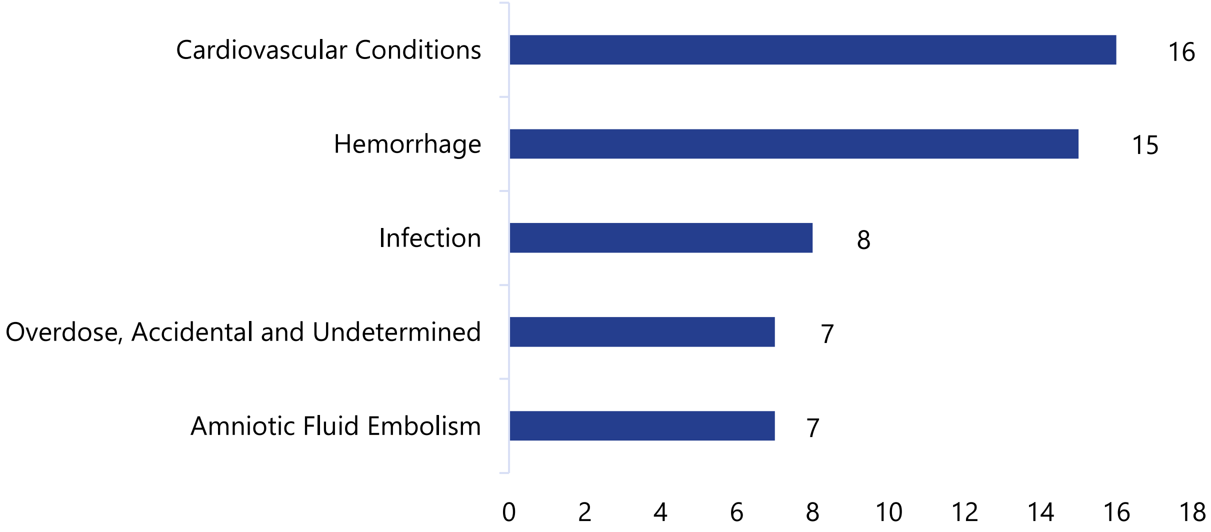


Figure 7 shows the leading causes of pregnancy-related deaths in the five-year (2018-2022) period. The leading cause of death is all cardiovascular conditions, including cardiomyopathy, closely followed by hemorrhage of various etiologies. Causes are only presented for those with counts of five or higher. A further breakdown of cardiovascular conditions and hemorrhages is shown in Figure D5 and Figure D6 in Appendix D. The Indiana MMRC has nothing to report pursuant to IC 16-50-1-8 (g) 1.

Figure 7: Indiana Pregnancy-Related Deaths by Cause of Death

Indiana MMRC, 2018-2022



The Indiana MMRC determined that 83% of the 2022 deaths were preventable. Of the preventable deaths, Figure 8 shows the chance to alter the outcome of a case. In the five-year (2018-2022) period, 81% of Indiana pregnancy-associated deaths were determined to have had a good chance or some chance to alter the outcome.

Figure 8: Indiana Pregnancy-Associated Deaths by Chance to Alter Outcome

Indiana MMRC, 2018-2022 (N=367)

53% (194)
28% (102)
8% (30)
11% (41)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Good Chance | Some Chance | No Chance | Unable to Determine

MMRC's Recommendations for Prevention of Future Deaths

The MMRC encourages state and local agencies to play active, collaborative roles in Indiana's maternal mortality prevention and response efforts.

IC 16-50-1-7 directs the MMRC to develop recommendations for the prevention of maternal morbidities and maternal mortalities.

The following recommendations were provided by the MMRC during the 2022 cohort.

Medical Care and Hospital Support

- Create a mechanism for hospital systems to engage patients who do not attend substance use disorder recovery appointments.
- Utilize evidence-based screening, brief intervention and referral to treatment at trauma centers by all providers.
- Increase education for providers regarding mental health needs throughout a lifetime.
- Increase education surrounding timeliness of care for suicidal individuals.

Workforce Increase

- Implement trauma-informed education for people working in medication-assisted treatment programs.
- Identify strategies to increase the number of certified forensic pathologists in Indiana.
- Increase staffing to improve systems for patient handoff and discharge after experiencing grief and loss.

Transportation

- Create education campaigns surrounding the safe use of passenger restraints while pregnant.
- Increase education surrounding the risks of distracted and impaired driving.
- Increase visibility of all pedestrian crossing signals.
- Increase access to public transportation options statewide to decrease motor vehicle collisions.

Substance Use Disorder

- Educate all patients and families with a history of opioid use disorder on naloxone use upon discharge.
- Ensure all prenatal care patients receive substance use disorder verbal screening, which is mandated through legislation, including in emergency rooms and non-traditional care settings.
- Advocate for all medication-assisted treatment programs to have a licensed mental health provider.
- Increase access to harm reduction interventions for all people with substance use disorder, including naloxone, medication-assisted treatment, and fentanyl testing strips.
- Refer all eligible patients to the Indiana Pregnancy Promise Program.

Reproductive Care and Birth Support

- Increase access to long-acting reversible contraceptives, especially in the immediate postpartum period.
- Follow American College of Obstetricians and Gynecologists (ACOG) recommendations to increase the number of postpartum visits for all patients, specifically those with medical complications including hypertensive disorder, diabetes, mental health conditions, and substance use disorder.
- Increase access to reproductive care in underserved communities through community-based organizations and by utilizing available advanced practice registered nurses.
- Encourage that all pregnant and postpartum patients who call their physicians with hypertensive blood pressure and headache are seen for clinical blood pressure and laboratory tests.
- Provide referrals for all high-risk obstetric cases to the insurance-associated case managers.

Interpersonal Violence

- Encourage and train law enforcement to remove guns from all households with a history of interpersonal violence when they are responding to restraining orders and when red-flag laws are triggered.

- Mandate use of on-scene assessments by social workers, victims' advocates, or other support providers when there is a scene with suspected interpersonal violence.
- Increase resources and education surrounding Indiana's protective law for legal professionals and people encountering the legal system.
- Implement training for all healthcare providers on risk assessments related to interpersonal violence.
- Screen patients for interpersonal violence in private settings away from all partners and family.
- Increase use of subtle methods to discuss interpersonal violence around partners and family.

Social and Community Support

- Engage in warm handoffs and connect patients to community support networks when discharging from emergency services.
- Minimize gaps in care by using available community-based services.
- Ensure people leave services with their next scheduled appointments created. Increase the availability of wrap around services, engage in warm handoffs, and connect patients to community support.
- Create resource bundles in facilities for sexual assault patients and offer referrals to services upon discharge for patients who may be ready to engage in the future.

Conclusion

The Indiana MMRC was established to review all pregnancy-associated deaths in Indiana and remains the most comprehensive process to understand the true impact of maternal mortality in the state. Through the collection and analysis of data, the MMRC identifies opportunities to reduce future preventable maternal deaths.

Key takeaways:

- Overdose, both accidental and undetermined intent, was the top cause of pregnancy-associated deaths in 2018, 2019, 2020, 2021, and 2022.
- Both single year (2022) and five-year (2018-2022) data suggest that women insured through Medicaid start prenatal care later and keep fewer appointments when compared to women with private insurance.

Key recommendations from the committee for the 2022 cohort:

- Refer all eligible patients to the Indiana Pregnancy Promise Program.
- Ensure all prenatal care patients receive substance use disorder legislation mandated verbal screening including in emergency rooms and non-traditional care settings.
- Increase access to reproductive care in underserved communities through community-based organizations and by utilizing available advanced practice registered nurses.

Based on comprehensive review, the Indiana MMRC determined most maternal deaths in 2022 were preventable. It is vital to learn from these deaths and create actionable changes to improve health and well-being for all Hoosiers. IDOH and the Indiana MMRC are committed to lowering maternal mortality rates in Indiana.

Appendix A

Committee Members

Regina Adair, MD, MBA - Medical Director, TeamHealth

Olubunmi Amakor, MD, MSc - Emergency Medicine, IU Health

Camila Arnaudo, MD - Medical Director, Addictions Treatment and Recovery Center, IU Health

Darla Berry, MSN, CNM - Rural Health Outreach Lead, Lugar Center for Rural Health, Union Health

Michelle Brown, PharmD, BCPS - Clinical Pharmacy Specialist, Pain and Opioid Stewardship, Eskenazi Health

Caryn Burton, MS - Homicide Reduction Strategies Coordinator, Indiana Coalition Against Domestic Violence

MaryClare Clark, MSW - Prior President and CEO, Allen County Drug and Alcohol Consortium, Inc.

Shamika Crowder, MPA, CCHW - Community Health Worker Engagement Coordinator, Indiana Department of Health

Kathleen Detweiler, MHL, BSN, RN - Director, Perinatal Center and Nurse Navigation, Parkview Health

Elizabeth Ferries-Rowe, MD, FACOG - Obstetrics and Gynecology, IU Health, Chair, Indiana ACOG

Lori Grimm, RN, MSN - Director of Perinatal Services, The Women's Hospital at Deaconess Hospital

Birdie Gunyon Meyer, RN, MA, PMH-C - Certification and Training Director, Postpartum Support International

Haley Hannant, MPH - Epidemiology Director, Indiana Department of Health

Tronya Hawkins, MD, FACOG - Obstetrics and Gynecology, Ascension St. Vincent

Linzi Horsely, MA - Fetal-Infant Mortality Programs Director, Indiana Department of Health

Captain Kevin Hunter - Administrative and Vice and Narcotics, Fort Wayne Police Department

Beth Keeney, DrPH, MBA, President and CEO, LifeSpring Health Systems

Roland Kohr, MD - Forensic Pathologist

Ashley Krumbach, MSW, LSW - Safe Systems Director, Indiana Department of Child Services

Spencer Kuper, MD, FACOG - Maternal-Fetal Medicine, The Women's Hospital at Deaconess Hospital

Cat Meyer, MSW, PMH-C, INHC - Maternal Mental Health and Substance Use Coordinator, Indiana Department of Health

Jessica Morse - Suicide and Overdose Fatality Review Public Health Associate, Centers for Disease Control and Prevention

Nanette Oscherwitz, MD - Cardio-Obstetrics, Community Health Network

Ashley Rainey, MSN, RNC-OB, IAP - Clinical Director, Indiana Department of Health

Jami Rayles, MD - Family Medicine, Decatur County Memorial Hospital

Caroline Rouse, MD - Maternal-Fetal Medicine, IU Health

Amy Rouse-Ho, MD - Maternal-Fetal Medicine, Artemis for Women LLC

Kate Schedel, MPH - Programs Director, Indiana Department of Health

Ashli Smiley, BSN, RN, SANE-A, SANE-P - Statewide SANE Coordinator, Indiana Department of Health

Ruthie Smith, LPN, LCCE, CCHW - Bereavement Coordinator, Community Health Anderson

Ayren Staten, BSN, RN - Director of Women's Service Line, Reid Health

Alexis Stewart, MPH - Maternal Intervention Coordinator, Indiana Department of Health

Stephanie VanderHorst, MSN, CNM - Owner, Auburn Birthing Center

Brittany Waggoner, MSN, RN, AGCNS-BC - Maternal and Infant Quality Improvement Advisor, Indiana Hospital Association

Elizabeth Wahl, MSW, LSW, IMH-E - Indiana Pregnancy Promise Program Director, Indiana Family and Social Services Administration

Michelle Washington, MSN - Director of Operations- Central Region, Goodwill Nurse Family Partnership

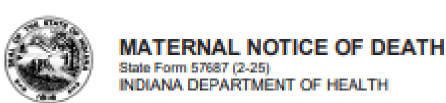
Jennifer Weida, MD - Maternal-Fetal Medicine, Medical and Molecular Genetics,

Cameual Wright, MD, MBA - Vice President, Market Chief Medical Officer, CareSource Indiana

Appendix B

Figure B1: Maternal Notice of Death

Reset Form



MATERNAL NOTICE OF DEATH
State Form 57687 (2-25)
INDIANA DEPARTMENT OF HEALTH

*INSTRUCTIONS: 1. PER **IC-16-50-1-6(A)** PLEASE SEND THIS REPORT IMMEDIATELY AFTER THE DEATH OF A WOMAN WHO WAS CURRENTLY PREGNANT OR WAS PREGNANT WITHIN 365 DAYS OF DEATH. REPORT THE EVENT REGARDLESS OF WHERE THE PATIENT DIED WITH AS MUCH DETAILS AS POSSIBLE.*

Name of Woman: ____________________
Last First Middle Maiden

Address: ____________________
Street City State ZIP-code

Date of Birth (MM/DD/YYYY): ____________________

Date of Death (MM/DD/YYYY): ____________________

Name of birth hospital (if known): ____________________

Name of Obstetric Provider (if known): ____________________

Place of Death
☐ Hospital (name of facility and city): ____________________

☐ Residence ☐ Other (Please specify): ____________________

Medical Record number: ____________________
☐ No Autopsy

☐ Autopsy Performed
Facility or address where autopsy was performed: ____________________

Autopsy performed by: ____________________
☐ Autopsy Pending

Cause of Death
Primary: ____________________

Contributing factors: ____________________

Manner of Death: ____________________

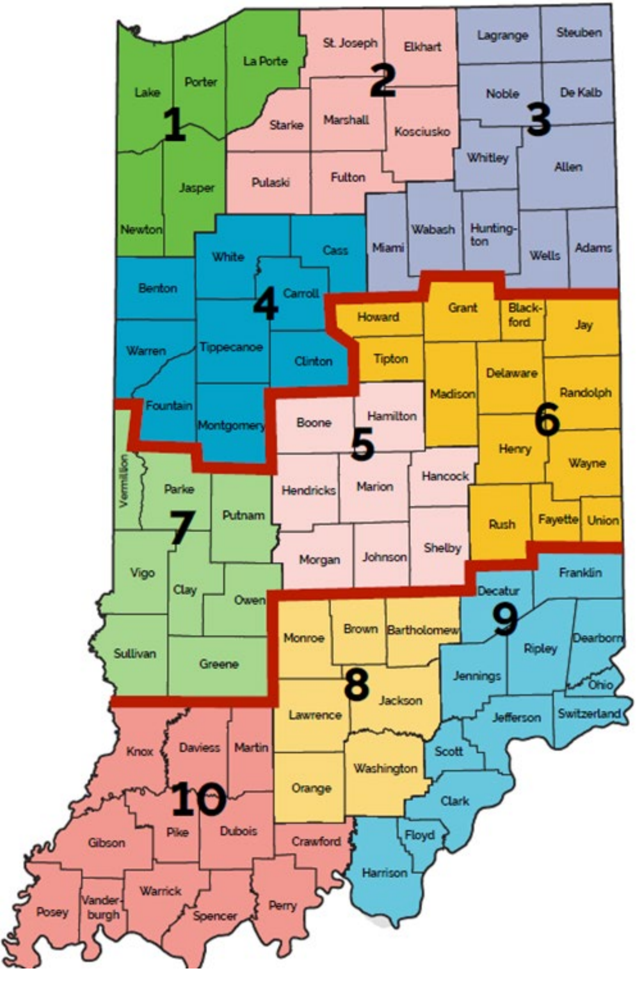
Report Prepared by: ____________________ Date: ____________________

Email: ____________________ Telephone Number: ____________________

Please send any questions and complete forms to MMR@health.in.gov

Appendix C

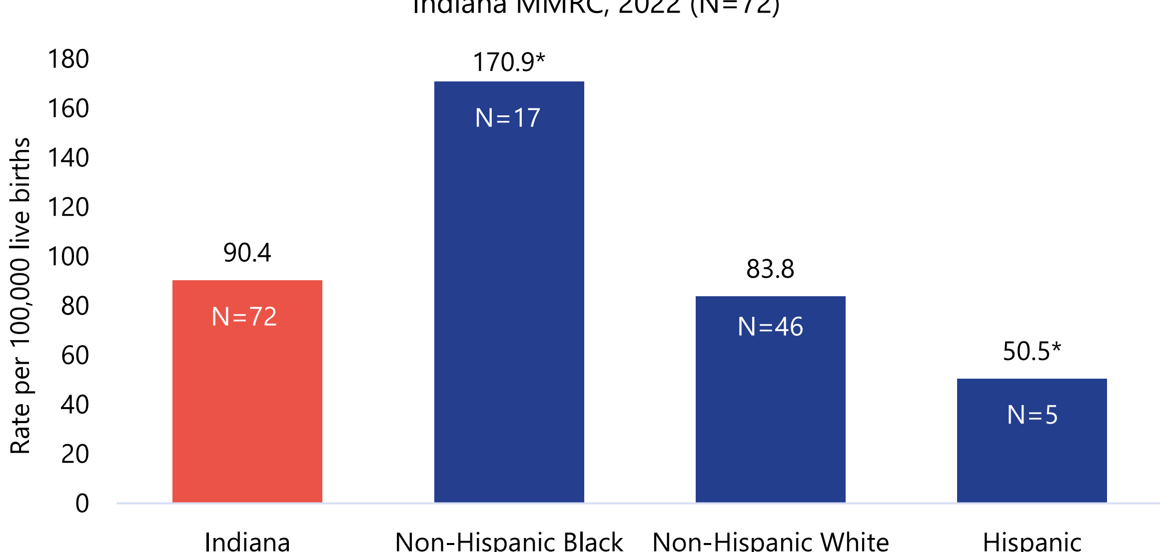
Figure C1: Health First Indiana Districts



Appendix D

The remaining single year (2022) and aggregate (2018-2022) data can be found in this appendix. Please note that any rate or percentage calculated with a count less than 20 is unstable and should be interpreted with caution.

Figure D1: Indiana Pregnancy-Associated MMRs by Race and Ethnicity



*Rates based on counts less than 20 are considered unstable and should be interpreted with caution.

Figure D2: Indiana Pregnancy-Associated MMRs by Age

Indiana MMRC, 2022 (N=72)

Rate per 100,000 live births

120
100
80
60
40
20
0

90.4
N=72
57.6*
N=10
108.2
N=27
95.8
N=21
104.9*
N=10

Indiana
20-24 years
25-29 years
30-34 years
35-39 years

*Rates based on counts less than 20 are considered unstable and should be interpreted with caution.

Figure D3: Indiana Pregnancy-Associated Deaths by Timing

Indiana MMRC, 2022 (N=72)

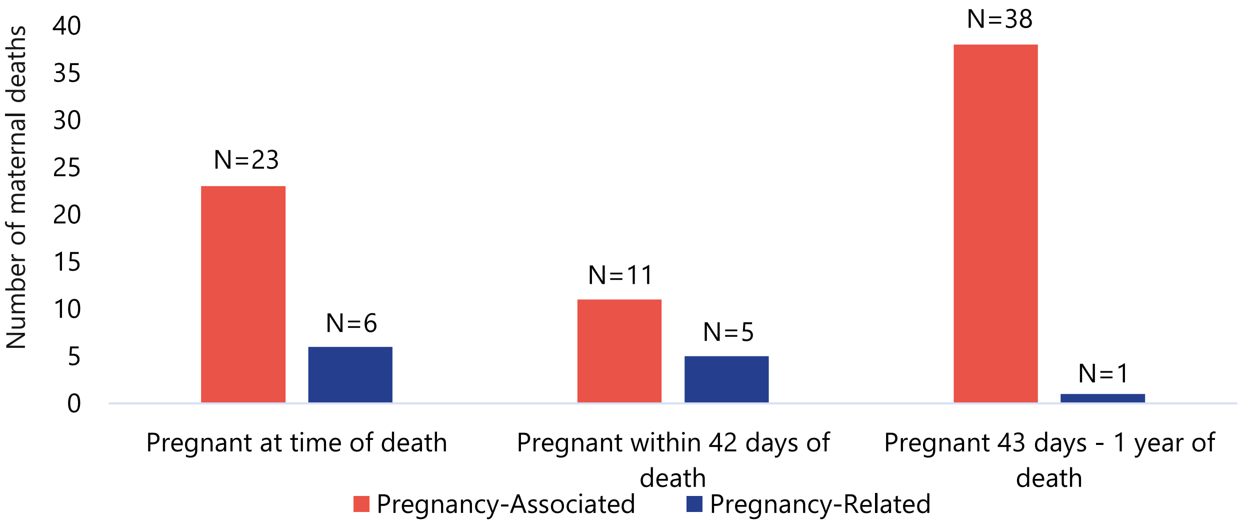
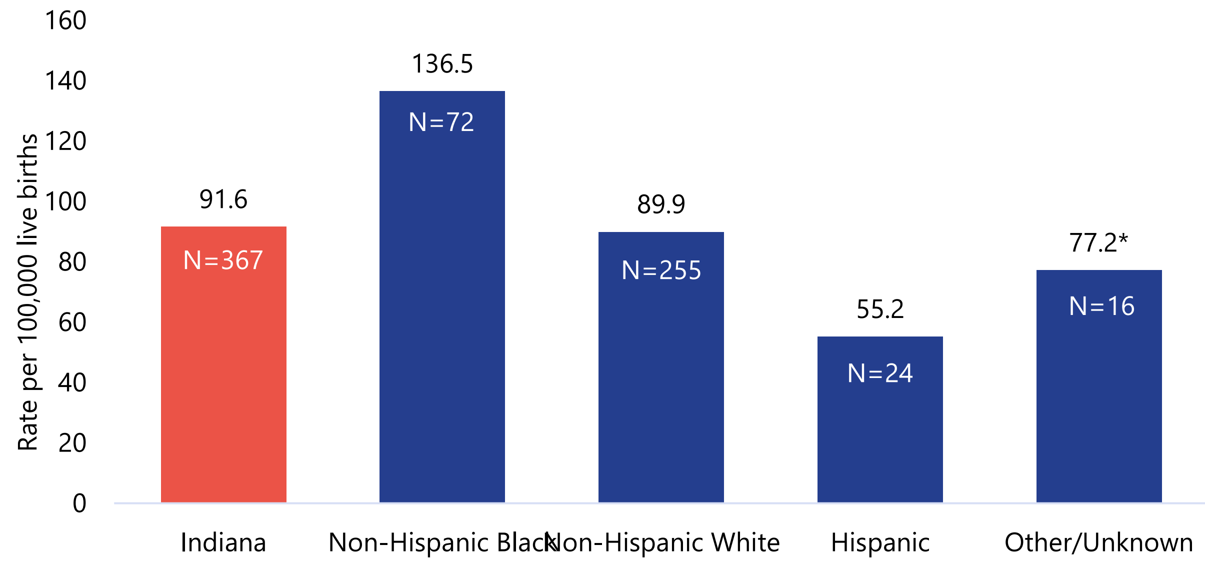


Figure D4: Indiana Pregnancy-Associated MMRs by Race and Ethnicity

Indiana MMRC, 2018-2022 (N=367)



*Rates based on counts less than 20 are considered unstable and should be interpreted with caution.

Table D1: Indiana Pregnancy-Associated Deaths by Age

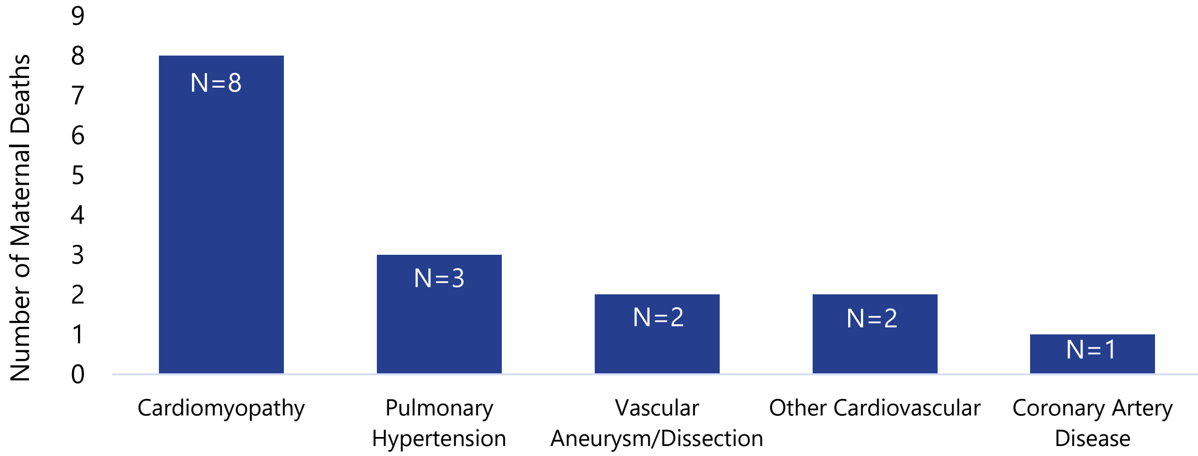
Indiana MMRC, 2018-2022 (N=367)

Age at Death	% of Indiana Births	% of Pregnancy-Associated	% of Pregnancy-Related
15-19 years	5%	3%* (12)	1%* (1)
20-24 years	22%	21% (77)	13%* (9)
25-29 years	32%	33% (120)	29% (20)
30-34 years	26%	23% (84)	30% (21)
35-39 years	11%	16% (59)	19%* (13)
40+ years	2%	4%* (15)	7%* (5)

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.

Figure D5: Indiana Pregnancy-Related Cardiovascular Condition Deaths

Indiana MMRC, 2018-2022 (N=16)



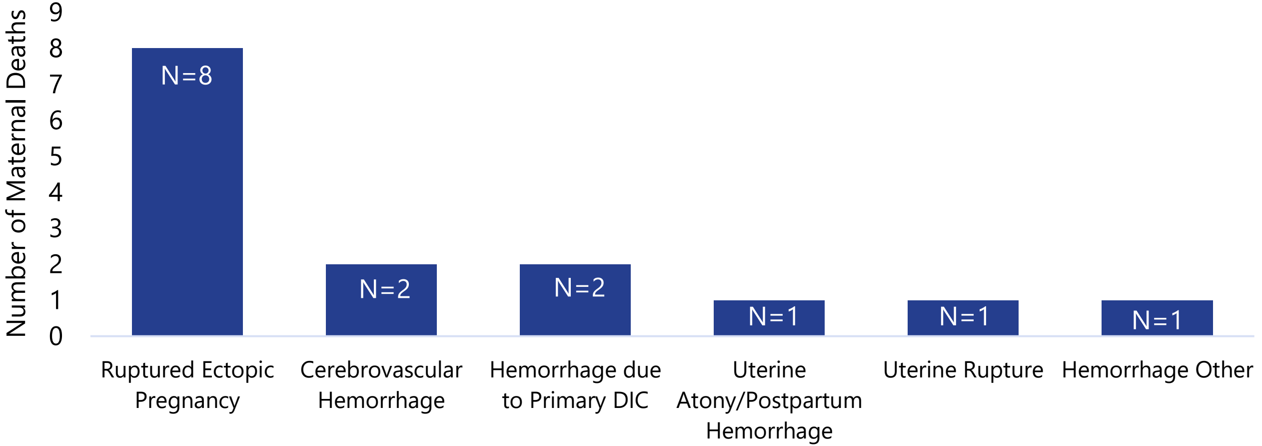


Figure D6: Indiana Pregnancy-Related Hemorrhage Deaths
Indiana MMRC, 2018-2022 (N=15)
Number of Maternal Deaths
9
8
7
6
5
4
3
2
1
0
N=8
N=2
N=2
N=1
N=1
N=1
Ruptured Ectopic Pregnancy
Cerebrovascular Hemorrhage
Hemorrhage due to Primary DIC
Uterine Atony/Postpartum Hemorrhage
Uterine Rupture
Hemorrhage Other

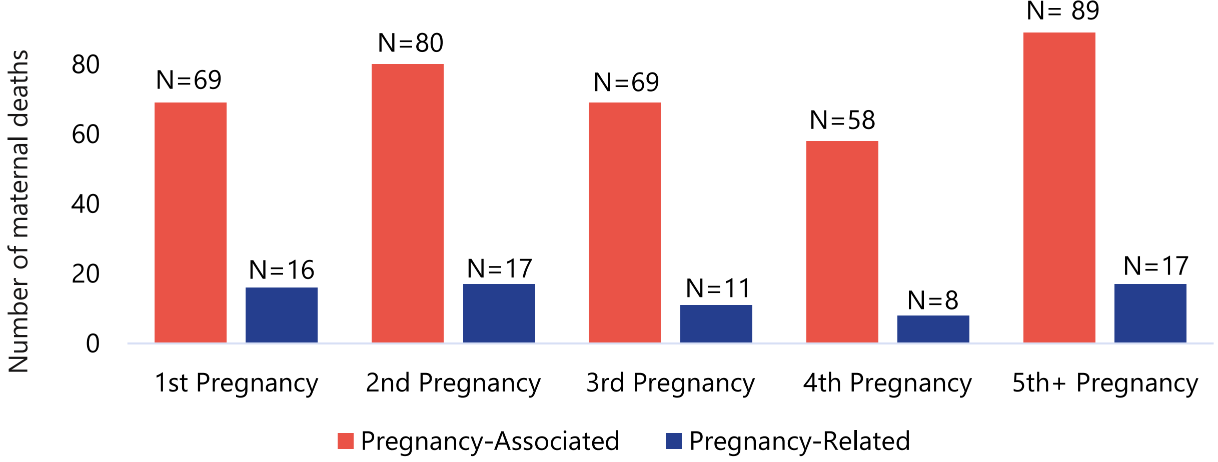


Figure D7: Indiana Pregnancy-Associated Deaths by Gravidity
Indiana MMRC, 2018-2022 (N=367)
Number of maternal deaths
80
60
40
20
0
N=69
N=16
N=80
N=17
N=69
N=11
N=58
N=8
N= 89
N=17
1st Pregnancy
2nd Pregnancy
3rd Pregnancy
4th Pregnancy
5th+ Pregnancy
Pregnancy-Associated
Pregnancy-Related

Table D2: MMRC Determined Contributing Factors for Indiana Pregnancy-Associated Deaths

Indiana MMRC, 2018-2022 (N=367)

Contributing Factor	% Yes	% Probably	% No	% Unknown
Substance Use	46% (170)	2%* (6)	47% (171)	5% (20)
Mental Health Conditions	26% (97)	5%* (17)	55% (203)	14% (50)
Obesity	8% (29)	2%* (7)	87% (320)	3%* (11)
Discrimination	6%* (19)	1%* (4)	88% (266)	5%* (15)

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.

Table D3: Indiana Pregnancy-Associated Suicide and Homicide Data

Indiana MMRC, 2018-2022 (N=367)

	% Yes	% Probably	% No	% Unknown
Was This Death Considered a Suicide?	7% (26)	2%* (7)	79% (290)	12% (44)
Was This Death Considered a Homicide?	11% (39)	1%* (1)	82% (300)	7% (27)

*Percentages based on counts less than 20 are considered unstable and should be interpreted with caution.