

Indiana Maternal Mortality Review Committee 2022 Annual Report



**Indiana
Department
of
Health**



LETTER FROM COMMISSIONER	3
SECTION 1: Dedication	5
SECTION 2: Foreword.....	6
SECTION 3: Acknowledgments.....	7
SECTION 4: Committee Members	8
SECTION 5: Executive Summary.....	11
SECTION 6: Introduction.....	12
SECTION 7: Background	13
SECTION 8: MMRC Findings	20
SECTION 9: Recommendations.....	44
SECTION 10: Conclusion	53
SECTION 11: Appendices	54

Dear Colleagues:

The Indiana Department of Health (IDOH) is pleased to share the third annual Indiana Maternal Mortality Report. This report shares the findings and recommendations of the Indiana Maternal Mortality Review Committee (MMRC) from its review and discussion of all 2020 pregnancy-associated deaths in Indiana.

The Indiana MMRC comprises volunteers from several disciplines, working tirelessly to identify statewide trends in maternal mortality and offer recommendations to improve the health and safety of Hoosiers. The committee honors those who have died and understands the impact on their families and communities.

MMRC members shared their expertise and knowledge to identify opportunities for prevention, with the hope that fewer Indiana families will have to suffer the tragic losses associated with maternal mortality. IDOH is committed to learning from their review processes and partnering with other state and local agencies to implement recommendations detailed in this report.

Many efforts are already underway.

Through the American Rescue Plan Act, Indiana was able to extend post-partum Medicaid coverage to 12 months. This became part of our state policy and permanently took effect in January 2022. This allows post-partum individuals to maintain their health coverage through the baby's first year. This will ensure they can access the medical care and medications they need to stay safe and healthy.

The Indiana Perinatal Quality Improvement Collaborative (IPQIC) has continued its work with prenatal care providers to implement screening for substance use disorder and interpersonal violence at the first prenatal appointment. IPQIC has developed a toolkit and will be improving clinicians' engagement with pregnant patients who may use alcohol or drugs or be in unsafe environments. IPQIC has established the Women's Health Task Force and is examining issues related to standardizing care provided to pregnant and post-partum patients.

We have joined the Alliance for Innovation on Maternal Health and have adopted safety bundles. My Healthy Baby, Indiana's OB navigator program, has continued to expand and will be in all but 10 counties by the end of 2022, providing local home visiting and family support to eligible women during their pregnancy and through the first year of their baby's life.

The ongoing impact of these programs will be reflected in the continued work of the Indiana MMRC, which is already identifying and reviewing maternal deaths that occurred in 2021. I fully believe that the cumulative data and recommendations that result from that review will benefit all Hoosiers.

I want to extend my sincere appreciation to the Indiana MMRC members and the leadership of Dr. Mary Pell Abernathy, chair of the MMRC. This group's members have contributed countless hours and incredible expertise to ensure that each maternal death is thoroughly reviewed so that we can prevent maternal mortality and improve the health of Indiana families.

Yours in health,

A handwritten signature in black ink, reading "Kristina M. Box, M.D., FACOG". The signature is written in a cursive, flowing style.

Kristina M. Box, M.D., FACOG
State Health Commissioner

SECTION 1: Dedication



The Indiana Department of Health dedicates this report to the 92 pregnant and postpartum women who died in 2020. Indiana acknowledges the review process is unable to take away grief experienced by family and friends; however, it is our hope that the information gleaned from these tragic experiences informs recommendations to decrease overall maternal mortality.

We would like to thank all of those who shared their time, expertise, and stories with us in our review process.

National guidance from the Centers for Disease Control and Prevention (CDC), Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM), and CDC Foundation has shown that “Informant interviews can provide rich contextual information to complement medical, first responder, and social service records, allowing Maternal Mortality Review Committee (MMRC) members to comprehensively assess contributors to the death and make more effective recommendations for prevention.”

To help ensure that a mother’s voice and experience are included in the review process, ERASE MM funds were used to build a framework for including informant/family interviews as part of the MMRC process. We hope that utilizing the family narrative to assist the MMRC in better understanding the factors that contribute to maternal mortality will improve the experience of pregnant and post-partum women and ultimately reduce the maternal mortality rate.

The Indiana MMRC was honored to have the opportunity to speak with several family members who had experienced a maternal loss. We are grateful for their bravery and willingness to share their loved one’s story with the hope that they might prevent future maternal deaths.

Maria’s Story

Maria, was a healthy 30-year-old black woman, who had an emergency cesarean section after developing pre-eclampsia at 35 weeks. Maria died 4 days after birth due to complications related to evolving Hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome. HELLP syndrome is a serious pregnancy complication that affects the blood and liver. When interviewed her husband stated, “EVERYDAY [my daughter] and I are reminded that she is not here, and we don’t get a second chance. This is a permanent tragedy in our lives. Please educate yourself.”

Maria, a healthy 31-year-old white woman, developed postpartum psychosis after delivery. She died by suicide seven days postpartum. When interviewed, her sister stated, “I want to raise awareness of postpartum psychosis, how serious it is, and how it can affect any woman. With this awareness, I hope that it can provoke change within our community’s healthcare professionals, organizations, lawmakers, and families to help close gaps within maternal mental healthcare.”

The Hear Her campaign seeks to raise awareness of potentially life-threatening warning signs during and after pregnancy, empower women to speak up and raise concerns and provide tools to improve communication between patients and their healthcare providers.

<https://www.cdc.gov/hearher/index.html>

This report was made possible through detailed review of maternal death cases by a volunteer review committee. We are deeply grateful to the members of this review committee for their insight, dedication, and generosity. We acknowledge the Indiana Department of Health Vital Records, Trauma and Injury Prevention, Maternal and Child Health, and Epidemiology Resource Center divisions for their collaboration in providing data analysis support in the identification of Indiana maternal deaths. We thank the health systems, healthcare providers, healthcare facilities, Indiana Hospital Association, Indiana Department of Child Services, Indiana Family and Social Services Administration, Division of Mental Health and Addiction, and coroners who provided records that allowed meaningful reviews to occur.

Our gratitude extends to the CDC for its technical support in this work as Indiana strives to honor Indiana mothers through expansion of our maternal mortality review program.

INDIANA DEPARTMENT OF HEALTH MATERNAL MORTALITY REVIEW STAFF

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Maternal mortality can be an indicator of the overall health of a community or state. Maternal Mortality Review committees identify and examine pregnancy-associated deaths to understand their causes and contributing factors and ultimately put forth recommendations for preventing them in the future.

Indiana began developing its MMRC in 2017. Legislation mandating its formalization took effect in July 2018, and the State Health Commissioner appointed members who began reviewing all pregnancy-associated deaths in the fall of 2018. The current multidisciplinary committee has completed the review of all pregnancy-associated deaths that occurred in 2020. The goal of the work is to better understand the causes and preventability of these incidents.

Identification of all deaths of Indiana women during and within one year of pregnancy resulted in maternal mortality statistics that differ greatly from those traditionally reported by the National Vital Statistics System (NVSS) and the Pregnancy Mortality Surveillance System (PMSS), respectively. NVSS relies exclusively on death certificate coding and includes only women up to 42 days post-partum. PMSS data includes women through one year from the end of pregnancy and establishes pregnancy-relatedness through review by CDC epidemiologists. A significant number of false positives were identified in the NVSS dataset and were ultimately excluded by the Indiana MMRC, and an equally significant number of cases were identified by the Indiana MMRC through matching, facility reporting, and other means that were not identified in the NVSS dataset (false negatives). The MMRC-derived data presented in this report reflect the burden of maternal mortality in Indiana more accurately and cannot be compared to other datasets.

Key Findings:

- In Indiana in 2020, a total of 92 pregnancy-associated deaths occurred during pregnancy or within one year of the end of pregnancy.
- 83% of pregnancy-associated deaths occurred postpartum, including 60% after 6 weeks.
- Substance use disorder was the most common contributing factor, contributing to 43% of all pregnancy-associated deaths in Indiana in 2020.
- Overdose, both accidental and undetermined intent, was overwhelmingly the leading cause of death, accounting for 30.4% of all pregnancy-associated deaths in 2020.
- The MMRC determined 79% of reviewed pregnancy-associated deaths in 2020 were preventable.

Key Recommendations:

- For Systems of Care
- For Facilities
- For Communities
- For Providers
- For Patients/Families

Section 6: Introduction



The Indiana Maternal Mortality Review Committee (MMRC) was formalized in July 2018 following passage of IC 16-50, which required the multidisciplinary review of pregnancy-associated deaths in Indiana and secured protections for the confidentiality of the process. The MMRC was developed with guidance from the Centers for Disease Control and Prevention (CDC) Division of Reproductive Health's Building U.S. Capacity to Review and Prevent Maternal Deaths program. The program is modeled after other well-established MMRCs in the United States. Coordination for the MMRC and related activities is under the purview of the Indiana Department of Health (IDOH) in the Division of Fatality Review and Prevention.

The Indiana MMRC includes representation from a broad range of physicians and nurses from multiple specialties (obstetrics and gynecology, cardiology, pulmonary medicine, anesthesiology, pathology, maternal-fetal medicine, public health, psychiatry), along with social workers, perinatal mood specialists, substance use treatment experts, coroners, health advocates, law enforcement, and other allied health professionals. These volunteers extensively review pregnancy-associated deaths to identify opportunities for prevention. As the goal of the review is identifying system-level changes and not assigning individual blame, the names of patients, medical providers, and involved institutions are not disclosed to MMRC members, nor are they included in this report.

The purpose of this report is to describe the state of maternal mortality in Indiana. Concrete recommendations about ways to prevent future negative outcomes for Indiana women were derived from the review of pregnancy-associated deaths that occurred among Indiana women during 2020. This includes an in-depth look at some of the social factors associated with poor maternal health outcomes and how data can inform effective actions toward improvement. When possible, aggregate data and findings from 2018, 2019, and 2020 pregnancy-associated deaths are combined and presented.

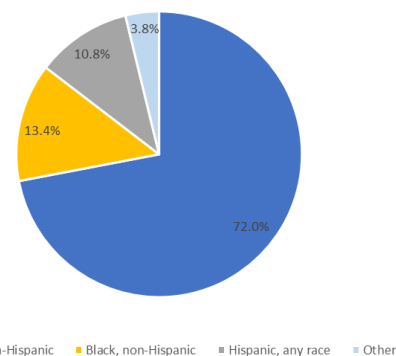
SECTION 7: Background

Maternal Health in Indiana

According to the most recent United States Census estimates, Indiana is the 17th most populous state in the United States, with 6.8 million residents, including almost 2.2 million women between the ages of 10 and 60 years. The Indiana MMRC reviews cases involving women between the ages of 10 and 60 years to ensure that all women of child-bearing age are included and no maternal deaths are missed. More than 78,500 live births occurred to Indiana women in 2020.

Among Indiana live births in 2020, the majority (72.0%) were to White, non-Hispanic women, followed by births to Black, non-Hispanic women (13.4%) and to Hispanic women of any race (10.8%) (Figure 1).

Figure 1: Indiana Live Births by Race of the Mother
Indiana Department of Health, Vital Records (2020)



The other 3.8% of live births were to mothers of another race (including women identifying as Asian, Pacific Islander, American Indian or Alaska Native and those who indicated multiple races on the birth certificate) or where race and ethnicity was unknown.

Figure 2

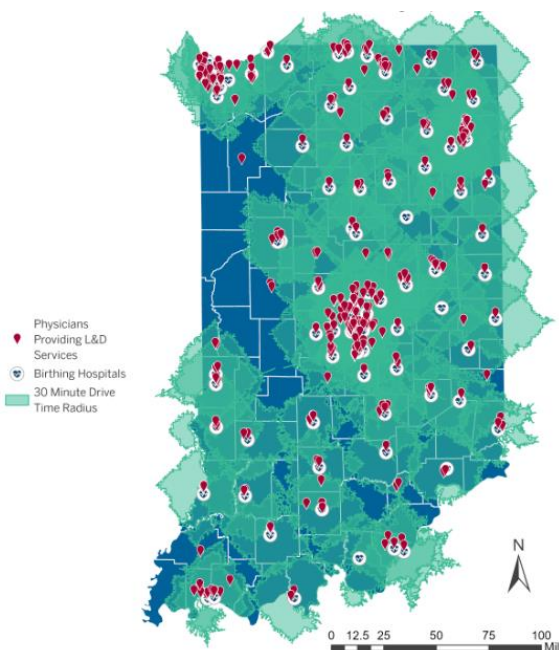
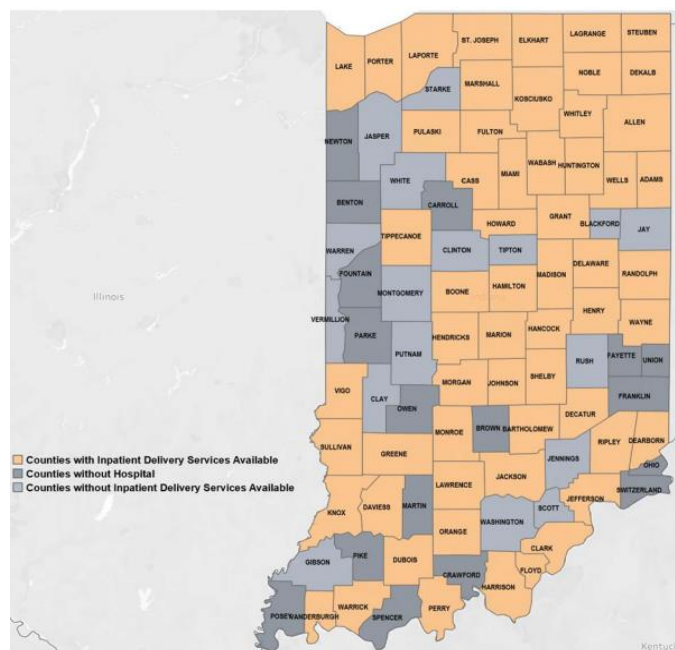


Figure 3



Indiana has geographic considerations that influence the availability of healthcare resources and impact health outcomes. The IDOH Division of Maternal and Child Health has mapped out

distances from residence to birthing facilities (Figure 2), displaying the geographic challenges associated with accessing the appropriate level of obstetric care for some Indiana women. In 2020, in cooperation with the Indiana Hospital Association (IHA), IDOH identified 34 counties in Indiana that lack a hospital with inpatient delivery services (Figure 3). Current initiatives, including My Healthy Baby, the IDOH obstetrical navigator program, aim to connect pregnant women in these low-resource regions with prenatal and obstetric care and other resources to improve health outcomes.

MATERNAL MORTALITY REVIEW IN INDIANA

In July 2018, [IC 16-50](#) was enacted and required IDOH to coordinate a multidisciplinary MMRC, whose goal is to determine risk and protective factors contributing to pregnancy-associated deaths, including pregnancy-related deaths. Resulting data is used to identify interventions aimed at improving systems of care and preventing future maternal morbidity and mortality in Indiana.

Establishing an MMRC has been encouraged as a feasible strategy to reduce pregnancy-associated deaths, but initial attempts to conduct effective reviews in Indiana were impeded by inconsistencies in reporting and death classification practices, lack of collaboration between stakeholders, and other challenges. In 2019, the IDOH Division of Fatality Review and Prevention (FRP) was awarded funding through the CDC project titled Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM). This grant and the associated technical assistance have allowed for the expansion of efforts already underway to systematically identify and collect relevant information pertaining to pregnancy-associated deaths, review the findings, and make data-driven recommendations.

Outcomes for ERASE MM and the Indiana MMRC include:

- Timely, accurate, and standardized information available about deaths of women during pregnancy and the year after the end of pregnancy, including opportunities for prevention within Indiana;
- Increased awareness of the existence and recommendations of the MMRC among the public, clinicians, and policy-makers;
- Implementation of data-driven recommendations, such as evidence-based practices, screenings, and patient education by providers

The Role of the MMRC

	National (CDC) – National Vital Statistics System (NVSS)	National (CDC) – Pregnancy Mortality Surveillance System (PMSS)	State and Local Maternal Mortality Review Committees (MMRCs)
Data Source	Death certificates	Death certificates linked to fetal death and birth certificates	Death certificates and linked birth or fetal death certificates, medical records, social service records, autopsy, informant interviews, etc.
Time Frame	During pregnancy – 42 days	During pregnancy – 1 year	During pregnancy – 1 year
Source of Classification	ICD-10 codes	Medical epidemiologists	Multidisciplinary committees
Terms	Maternal death	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 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 non-medical contributors to deaths, prioritize interventions that effectively reduce pregnancy-related deaths

Sourced from: St Pierre A, Zaharatos J., Goodman D, Callaghan W.M., Challenges and opportunities in identifying, reviewing, and preventing maternal deaths. *Obstetrics & Gynecology*, 2018. 131(1): p. 138-142.

The Indiana MMRC membership is continually reviewed by the Indiana MMR Program and the MMRC chairperson to ensure appropriate professional disciplines are represented, per IC 16-50 and the CDC's requirements. As Indiana has continued to observe mental health and substance use disorders as a significant contributor to many pregnancy-associated deaths, the diversity of our committee is pertinent. We continue to have social services, law enforcement, pharmacy, and experts in perinatal mood disorders, treatment, and recovery engaged in our MMRC. The engagement of a diverse committee has led to a deeper understanding of multiple aspects and determinants that may impact maternal health.

Indiana's MMRC is thankful for Governor Eric J. Holcomb's commitment to removing the stigma of mental health by creating easier access to people in need of services, building awareness and expanding education and growing the workforce in mental health. We continue to see an increase in pregnancy-associated deaths due to mental health and substance use disorder, and the Governor's focus on mental health will improve maternal health by ensuring access to mental health services across the state.

The work of the Indiana MMRC aligns with Indiana's health improvement priorities as well. Improving birth outcomes and addressing the opioid epidemic are among the goals listed in Indiana's 2022-2026 [State Health Assessment and Improvement Plan](#). The MMRC continues to align with Indiana Department of Health priorities by focusing on social determinants of health while reviewing cases. This is seen by our complete review of the economics, education, health care, environment, social and community, and mental health and wellness of our mothers.

Late last year, IDOH was awarded U.S. Department of Health and Human Services' Office of Women's Health funding focused on State, Local, Territorial, and Tribal (SLTT) Partnership Programs to Reduce Maternal Deaths due to Violence. Through this grant, IDOH will work to improve the data collected for deaths due to suicide, homicide and overdose and utilize data-driven, evidence-based interventions to improve outcomes and reduce deaths among pregnant and postpartum women due to violence. Recommendations to reduce these deaths will be posted in the annual MMRC report and will be critical guideposts for proposed project activities.

MATERNAL MORTALITY

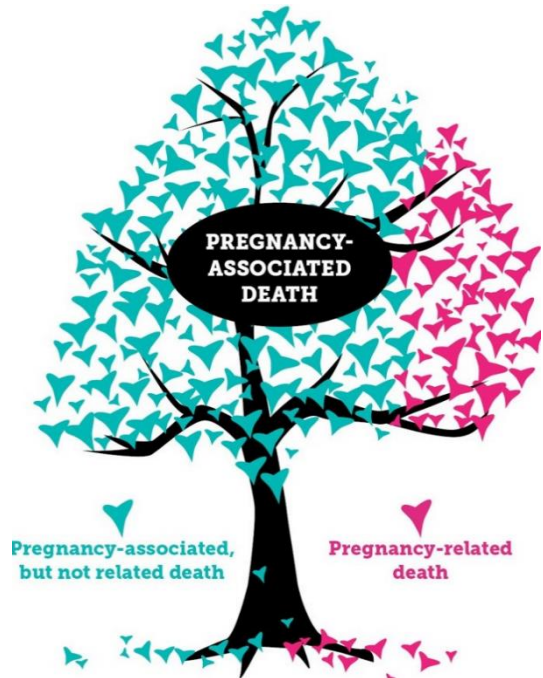
As an ERASE MM state, Indiana uses the following standard definitions defined by the CDC:

Pregnancy-Associated Death = A death **during** 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 the end of pregnancy, from a cause that is not related to pregnancy.

Pregnancy-Related Death = A death **during** pregnancy or **within one year** of the end of a 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.

These varying definitions can be a source of global debate and confusion. Throughout this report, deaths through one year of the end of pregnancy are included and referred to specifically as pregnancy-associated or pregnancy-related where appropriate. In addition, the word "maternal" is used generally to refer to women during pregnancy, childbirth, and the postpartum periods. Use of this broad definition ensures that causes leading to maternal death beyond 42 days postpartum are neither missed nor neglected.



IDENTIFYING AND COUNTING DEATHS

There are two essential phases for tracking and understanding maternal mortality in Indiana. The first phase is to identify all pregnancy-associated deaths. The second is reviewing those deaths to closely examine the cause of death, identify factors that influenced the death, and develop potential recommendations for preventing future deaths.

Indiana uses multiple methods simultaneously to ensure pregnancy-associated deaths are accurately identified and counted each year. The cases for 2020 were identified via a pregnancy check box on death certificates, causes of death listed on death certificate, assistance from the Indiana Hospital Association, matching death certificates to birth certificates and fetal death certificates, and facility notifications. After these women are identified, the abstraction staff obtain any records necessary to confirm or negate pregnancy status. These may include hospital records from death, birth, or prenatal care and autopsy reports, and communication with coroners. This process is critical to eliminate any false positives.

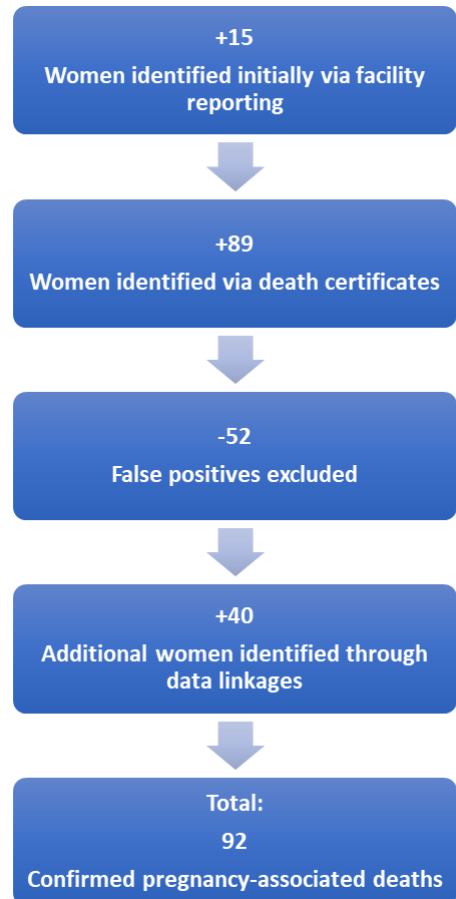
All Indiana hospitals are required by IC 16-50 to report any known pregnancy-associated deaths to IDOH, and a communication system exists for this purpose (Appendix A). Fifteen pregnancy-associated deaths that occurred in 2020 were reported by facilities for maternal mortality review.

For our 2020 cohort, 52 false positives and 48 false negatives were identified during the case identification process. These would not have been identified if the abstracting team had not utilized multiple abstracting methods to ensure the accuracy of the death records.

2020 CASE IDENTIFICATION PROCESS (FIGURE 4)

1. Direct facility reporting to the Indiana MMR staff initially identified 15 deaths. All 15 women also had death certificates that were marked to indicate they had been pregnant or recently pregnant at the time of death.
2. Subsequent case identification used the 2020 death certificates of women ages 10-60 years with a pregnancy checkbox on the death certificate indicating the woman was pregnant at the time of death or within one year of death. Also included were women with causes of death coded with ICD-10 codes starting with "O," as well as A34. Through this process, an additional 89 reviewable deaths were identified.
3. The abstraction team acquired medical records and autopsies, spoke with death certifiers to confirm pregnancy status, and excluded 52 falsely identified cases.
4. The Indiana MMR program matched all 2020 women's deaths in Indiana (ages 10-60 years) to all birth and fetal death records in Indiana between 2019 and 2020 to identify women with a recent birth or fetal death (within a year of death). An additional 40 pregnancy-associated deaths (not correctly marked on their death certificates) were identified.
5. The FRP Epidemiologist verified the established list via a SAS matching program created with IDOH's Office of Data and Analytics to validate the case identification process and confirm the number of positive identified cases. The list of deaths was also confirmed with the Indiana Hospital Association's known deaths.

Figure 4: 2020 Case Identification



REVIEWING AND ASSESSING PREGNANCY-ASSOCIATED DEATHS

Though information from death certificates and other public health records may help identify counts of pregnancy-associated deaths, these records cannot determine the preventability of cases, or the factors involved in the case. The CDC recommends gathering additional information (e.g., medical records, social service records, law enforcement records) to support comprehensive review of pregnancy-associated deaths by a multidisciplinary MMRC to determine how the woman died, whether the death was preventable, and opportunities for preventing future deaths.

Once all available records and interview data are obtained, the abstraction staff assembles a de-identified, **redacted** narrative and timeline and presents this to the MMRC for review. Following review of all the available information, the Indiana MMRC makes the following decisions for each case:

1. Was the death pregnancy-related?
2. What was the underlying cause of death?
3. Was the death potentially preventable?
4. What were the factors that contributed to the death?
5. What are the recommendations and actions that address those contributing factors?

All these questions are critical, but the last three highlight the unique role of the MMRC. Using a standardized decision form, each case is assessed for the following:

Chance to Alter Outcome: The MMRC determines if there was no chance, some chance, or a good chance “of the death being prevented by one or more reasonable changes to patient, family, community, provider, and/or systems factors.”

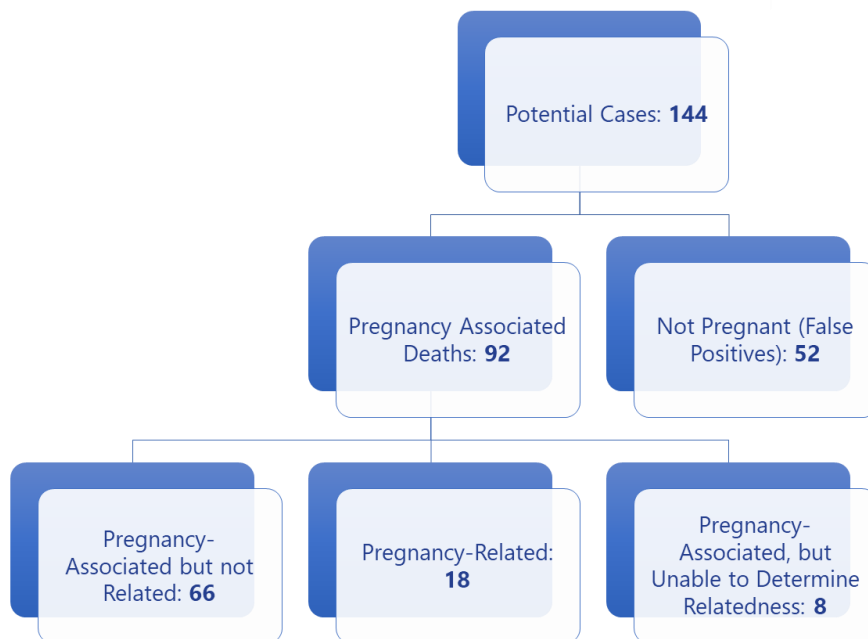
Preventability: A death was considered preventable if the MMRC determines that there was at least some chance of death being averted.

Contributing Factor: Factors identified by the MMRC that contributed to the death. These are steps along the way that, if altered, may have prevented the person’s death. The factors may be related to the patient, healthcare providers, facilities/hospitals where the individual sought care, or to the systems that influence the lifestyle, care, and health services for women.

2020 INDIANA MMRC FINDINGS

The Indiana MMRC identified 92 pregnancy-associated deaths among Indiana women in 2020 and convened 10 times between May 2021 and April 2022 to review each death. All discussions included determinations of pregnancy-relatedness, preventability, and contributing factors to the death. From these data, the Indiana MMRC created recommendations for prevention.

2020 Indiana MMRC Case Breakdown



The committee determined 18 deaths to be pregnancy-related. This means the Indiana MMRC could state with confidence that the deaths occurred as a *direct result of a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiological effects of pregnancy*. Examples of these causes of death included postpartum/peripartum cardiomyopathy, anxiety disorder (including post-traumatic stress disorder), and amniotic fluid embolism.

Another 66 deaths were determined to be pregnancy-associated, but NOT related. For the remaining eight deaths, the Indiana MMRC was unable to conclusively determine the relatedness from the available records and case narrative.

Using the pregnancy-associated deaths identified and the Indiana MMRC's decisions on relatedness, pregnancy-associated and pregnancy-related mortality ratios were calculated for 2020.

Whenever possible, the data presented here will be both for the 2020 cohort of deaths and the overall three-year analysis from 2018-2020. Single-year data can show how numbers and rates change from year to year, but the multi-year data offers better insight into the average rates or

numbers, allowing for a more accurate analysis of contributing factors, as single-year data often includes very small numbers.

The pregnancy-associated mortality ratio in 2020 was 117.1 per 100,000 live births. This is the overall ratio of death to live births to Indiana women ages 10-60 who died during or within one year of pregnancy due to any cause.

The pregnancy-related mortality ratio in 2020 was 22.9 per 100,000 live births. This is the specific ratio of death to live births to Indiana women ages 10-60 who died either during or within one year of pregnancy as a direct result of a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiological effects of pregnancy. The pregnancy-related mortality ratio is a subset of the overall pregnancy-associated mortality ratio.

Maternal Mortality Ratios for 2021

- **117.1 per 100,000 live births:** pregnancy-associated mortality ratio in Indiana in 2020
- **22.9 per 100 live births:** pregnancy-related mortality ratio in Indiana in 2020

The overall pregnancy-associated mortality ratio decreased slightly from 77.2 in 2018 to 74.2 in 2019, but then had a large increase to 117.1 in 2020 (Figure 5). On the other hand, the overall pregnancy-related mortality ratio increased from 12.2 in 2018 to 18.6 in 2019 and continued increasing to 22.9 in 2020 (Figure 6). These changes reflect the overall higher number of deaths in 2020 to women within one year of pregnancy or childbirth due to any cause. In addition, these rates indicate that the proportion and number of pregnancy-related deaths has been growing over the past three years.

Figure 5: Pregnancy-associated mortality ratio in Indiana, per 100,000 live births
Indiana MMRC 2018-2020

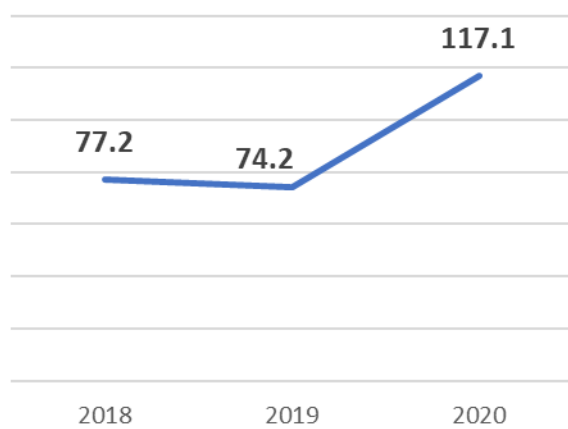
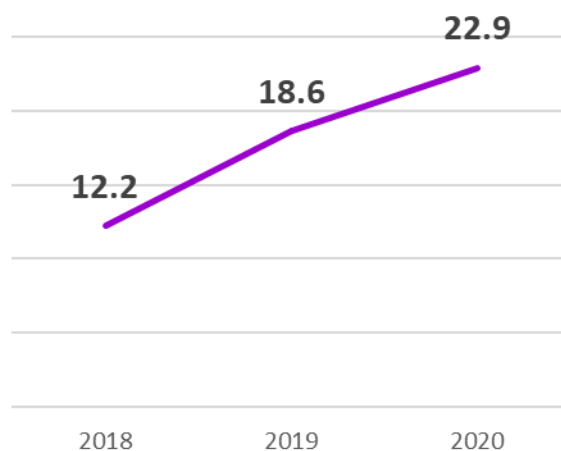


Figure 6: Pregnancy-related mortality ratio in Indiana, per 100,000 live births
Indiana MMRC 2018-2020



While the differences noted are not yet statistically significant with only three years of data, the Indiana MMR program will continue to evaluate the mortality ratios over time to identify trends.

The average three-year maternal mortality ratio reflects pregnancy-associated and pregnancy-related deaths that occurred in 2018, 2019, and 2020, and is the best estimate of the average rate of deaths per year.

COMPARISON TO PREVIOUS MATERNAL MORTALITY RATES OR OTHER SOURCES

Historically, Indiana and other states have used maternal mortality rates determined by the United States National Vital Statistics System (NVSS) at the CDC's National Center for Health Statistics. These maternal deaths are established exclusively via the death certificate O codes, including A34, and the pregnancy checkbox to determine the number and rate of maternal deaths. These numbers do not include late maternal deaths (defined as those occurring 43 days to one year after the end of the pregnancy).

Average Three-Year Maternal Mortality Ratios (2018-2020)

- **89.5 per 100,000 live births:** pregnancy-associated mortality ratio in Indiana in 2018-2020
- **17.9 per 100,000 live births:** pregnancy-related mortality ratio in Indiana in 2018-2020

As a result, the maternal deaths traditionally represented in nationally presented data differ greatly from and **cannot be compared** to those reviewed by the Indiana MMRC. The calculated pregnancy-associated and pregnancy-related mortality ratios are a much more accurate measure of the burden of maternal mortality in Indiana and should be used in place of PMSS and NVSS data where possible.

The 2020 mortality ratios presented in this report can be used for comparisons to the previously reported 2018 and 2019 mortality ratios ([Indiana MMRC 2020 and 2021 Annual Reports](#)). However, any ratios or numbers determined in this report (2019, three-year average rates from 2018-2020) **should not be used for comparisons** to any rates based on NVSS, ratios based on PMSS or other data.

MMRC Reviewed Pregnancy-Associated Deaths: Case Characteristics

Through the review of birth and death certificates, prenatal records, delivery records, mental health and social histories, family interviews, and any other records available, the abstraction team was able to identify and report to the Indiana MMRC any primary characteristics for 2020 pregnancy-associated deaths. These included demographics, geography, and some other possible contributing factors to maternal mortality in Indiana.

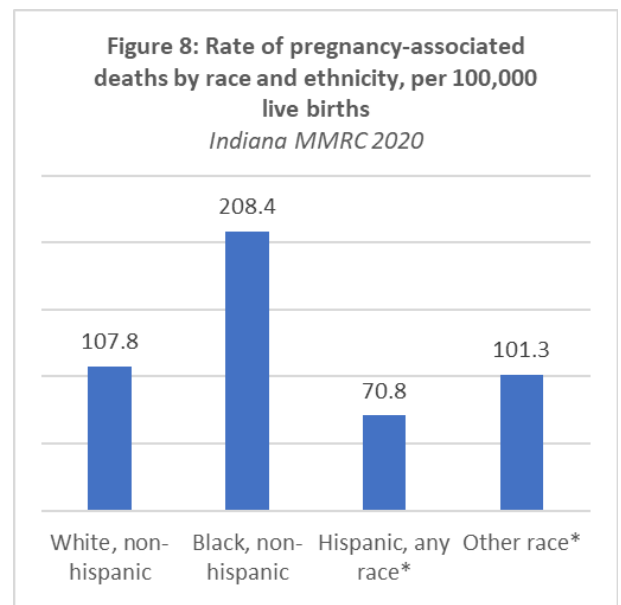
Data in this report is descriptive in nature and meant to illustrate the characteristics of the 2020 cohort of pregnancy-associated deaths. Because of the relatively low number of deaths (n=92) and having only a subset of those that were pregnancy-related (n=18), categorizing will result in small numbers and unstable rates. Numbers under five may be suppressed to ensure confidentiality in some situations. Unstable rates – or those under 20 – may not be accurate for comparisons, and they will be noted below.

The Indiana MMRC has reviewed a total of 215 pregnancy-associated deaths that occurred in 2018, 2019, or 2020. Where small numbers prohibit further analysis or create unstable ratios, this three-year cumulative data will be presented. As the Indiana MMRC continues to review pregnancy-associated deaths over the coming years, multiyear cumulative data will be presented, which should result in fewer unstable ratios.

(Figure 7). Because the proportion of births differs by race and ethnicity in Indiana, comparisons must be made between mortality ratios. Figure 8 shows there appears to be some differences in the ratio of death by race and ethnicity, with Black, non-Hispanic women experiencing the highest rate of death and Hispanic women experiencing the lowest in 2020.

The race-specific ratios differ between 2018, 2019, and 2020, with 2018 data showing about a 20% higher mortality ratio among Black, non-Hispanic women compared to White, non-Hispanic women, and 2019 data finding a slightly higher mortality ratio for White, non-Hispanic women. On the other hand, 2020 data show that the Black, non-Hispanic mortality ratio is about 93% higher than the White, non-Hispanic mortality ratio. While the 2020 Black, non-Hispanic pregnancy-associated maternal death count is large enough to be considered stable, this large difference in ratios between years is likely due to 2018 and 2019 ratios that are considered unstable because of small numbers in the one-year data. Because of small numbers and variations from year to year, disparity is best assessed using multiple years of data.

Figure 7: Race/ Ethnicity (2020)		
	N	%
White, non-Hispanic	61	66.3%
Black, non-Hispanic	22	23.9%
Hispanic, any race	6	6.5%
Other race	3	3.3%



The average mortality ratios using the data from all three years of review show disparities, with non-Hispanic Black women experiencing 128.8 pregnancy-associated deaths per 100,000 live births, compared to 91.6 for non-Hispanic White women. The three-year ratios for Hispanic women and women of other races are much lower, but they remain unstable (Figure 9). These ratios, in addition to non-Hispanic White and non-Hispanic Black ratios, will need to be reevaluated when more years of review data are available.

Figure 10 shows the average three-year ratio of pregnancy-related deaths by race. Of the deaths that have been determined to be pregnancy-related by the committee in the three years of review (n=43), 77% have been White, non-Hispanic women, followed by 16% Black, non-Hispanic Women, 5% Hispanic women of any race, and 2% for those listed as 'other' race. However, Black, non-Hispanic women had the highest ratio of pregnancy-related deaths to live births, about 14% higher than White, non-Hispanic women.

Only three-year data is being presented for the breakdown of pregnancy-related deaths, as the total sample size is so small. Take caution when interpreting these ratios, as they are still based on quite small numbers and are unstable ratios. These ratios may still fluctuate quite a bit from year to year, and the Indiana MMR program will continue to evaluate the average ratios as more review data is collected in the coming years.

In 2020, women 20 to 29 years of age accounted for 54.4% of all pregnancy-associated deaths and women 30 to 39 years of age accounted for another 38.1% (Figure 11). However, women in their 20s and 30s account for the largest number of births in Indiana. Due to the differences in pregnancy and childbirth

Figure 9: Average three-year ratio of pregnancy-associated deaths by race and ethnicity, per 100,000 live births

Indiana MMRC 2018-2020

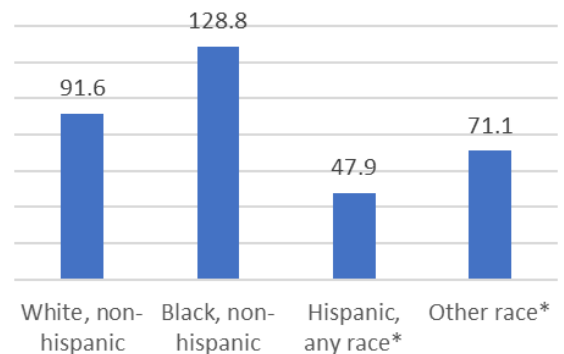
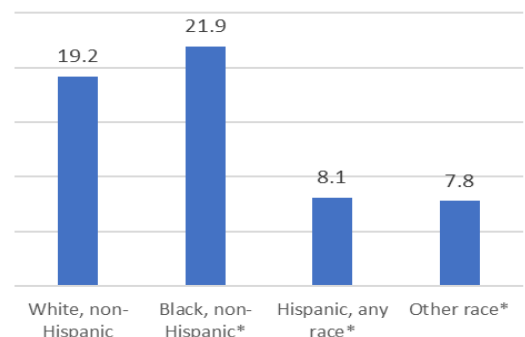


Figure 10: Average three-year ratio of pregnancy-related deaths by race and ethnicity, per 100,000 live births

Indiana MMRC 2018-2020



*The rates above are considered unstable because they are based on small numbers. Comparisons using these rates may not represent long-term differences. As the Indiana MMRC continues to collect additional years of data, the stability of rates will improve

Figure 11: Age at Death (2020)

	N	%	Rate
15-19 years	3	3.3%	72.7
20-24 years	19	20.7%	106.2
25-29 years	31	33.7%	123.5
30-34 years	19	20.7%	91.6
35-39 years	16	17.4%	181.8
40+ years	4	4.3%	214.9

rates among different age groups, disparity is best represented by age-specific mortality ratios, seen in Figure 12.

Compared to 2018 and 2019 data, the amount and ratio of pregnancy-associated deaths in 2020 were higher for every age group (other than the deaths among the 15- to 19-year age group in 2018). When looking at the previous average two-year ratios of pregnancy-associated deaths by age of mother at death, the largest increases are seen in the 25- to 29-year age group, jumping from 76.9 to 123.5 deaths per 100,000 live births, and the 35- to 39-year age group, jumping from 96.1 to 181.8 deaths per 100,000 live births. The 40+ year age group increased from 163.1 deaths to 214.9 deaths per 100,000 live births, but both ratios are highly unstable, making it difficult to draw any succinct conclusions. Figure 13 shows the average three-year ratios, with data collected from 2018, 2019, and 2020. These better represent the disparity in pregnancy-associated deaths by age of the mother.

Both the youngest and the oldest age categories (15-19 years and 40+ years) accounted for the smallest percentage of deaths. However, the ratio of deaths to births among women in these age groups differs.

Between 2018-2020, teen women had the lowest ratio of pregnancy-associated deaths and were about 34% less likely to die within a year of pregnancy or childbirth than women in their 20s. Women over the age of 40 had the highest pregnancy-associated mortality ratio and were approximately twice as likely to die within a year of pregnancy or childbirth as were women in their 20s.

Figure 12: Ratio of pregnancy-associated deaths, by age of mother at death, per 100,000 live births.
Indiana MMRC 2020

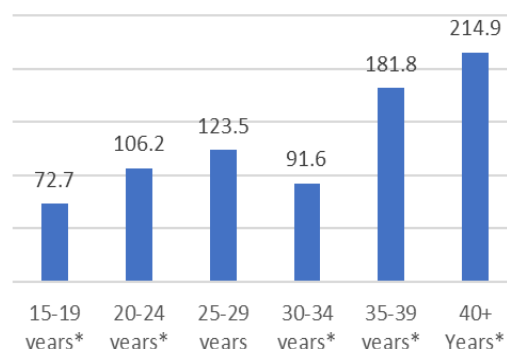


Figure 13: Average three-year ratio of pregnancy-associated deaths, by age of the mother at death, per 100,000 live births.
Indiana MMRC 2018-2020

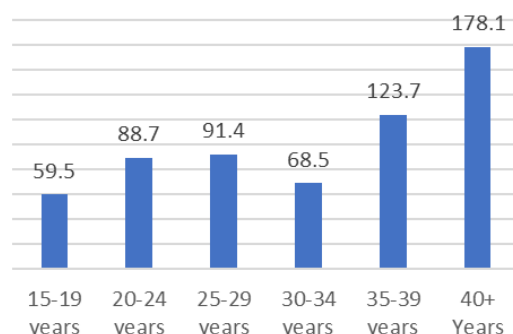
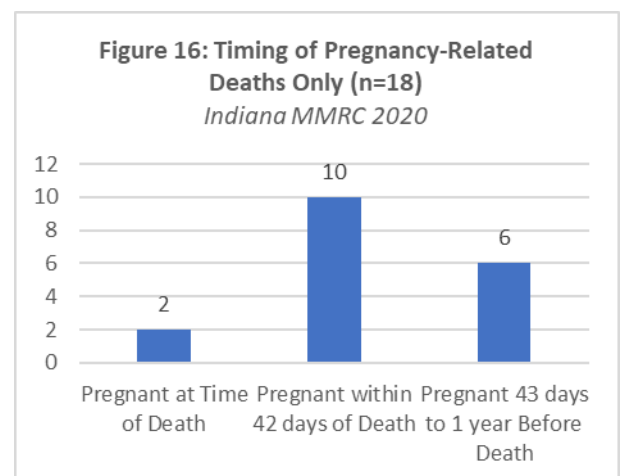
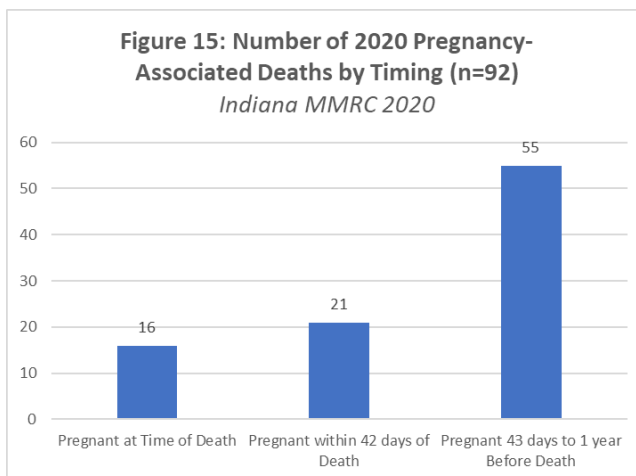
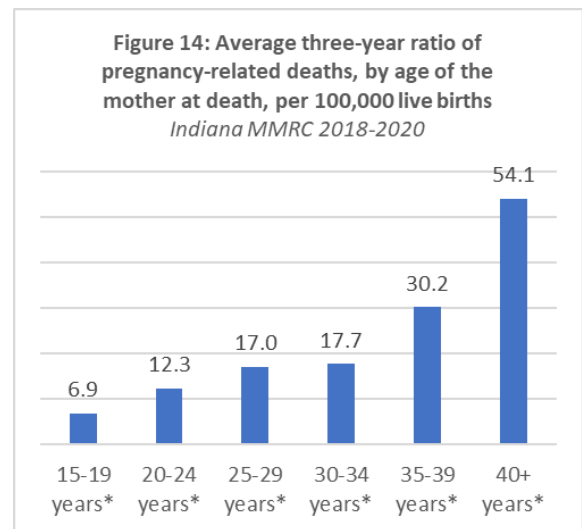
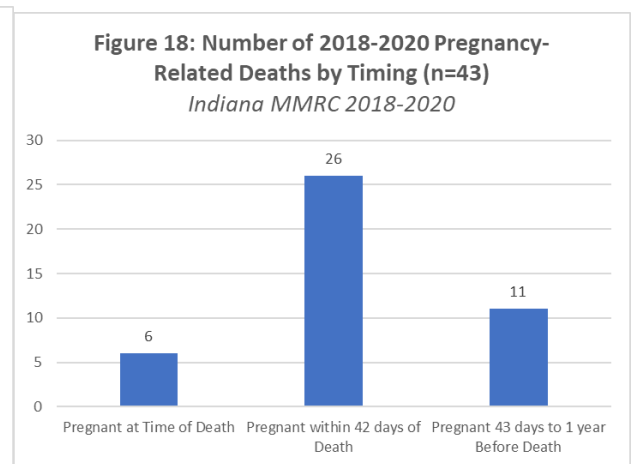
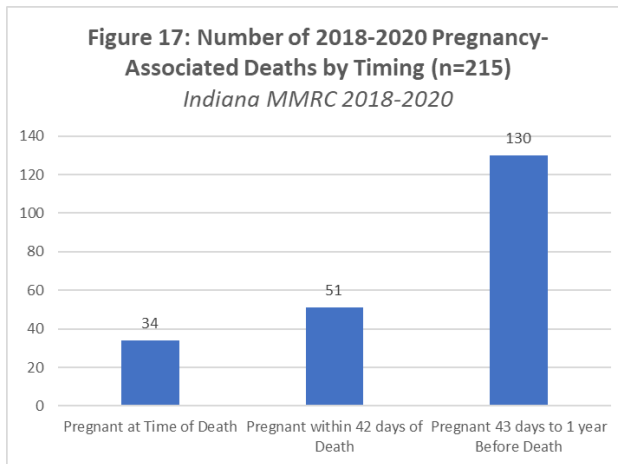


Figure 14 Shows the average three-year ratio of pregnancy-related deaths by age of the mother. Of the deaths the Indiana MMRC determined to be pregnancy-related in the last three years of review (n=43), women 40 years or older had much higher ratios of pregnancy-related deaths than any other age group. Additionally, the three-year ratio for women aged 35-39 years increased from 17.0 deaths from the previous average two-year ratio to 30.2 deaths per 100,000 live births. Because the total sample size of pregnancy-related deaths is so small, only three-year data is being presented, and caution is urged when interpreting the results. The ratios are all considered unstable and may continue to fluctuate widely in the coming years. However, the data collected to date suggest higher risk of pregnancy-related death for women over 40 or between 35-39 years old. The Indiana MMR program will continue to evaluate this potential risk factor and the average ratios as more review data is collected.



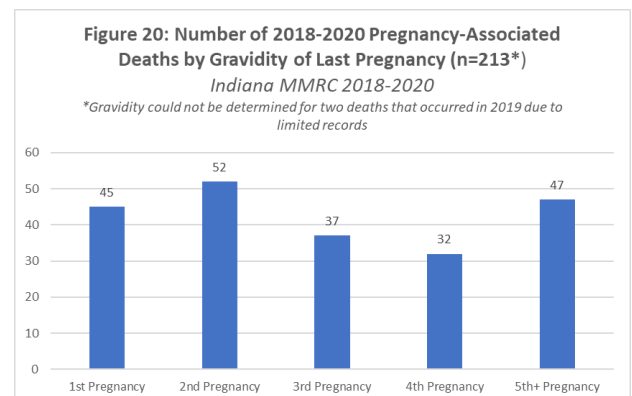
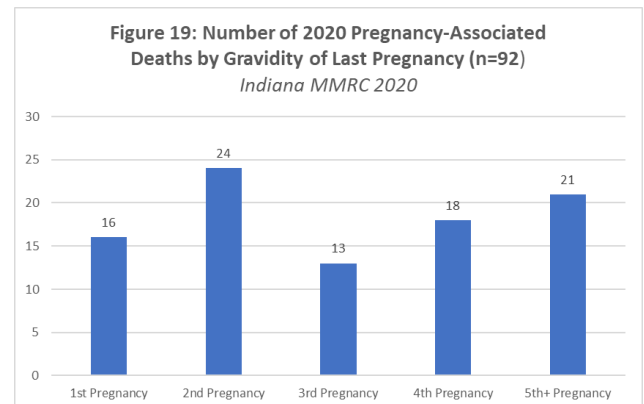
One of the main differences noted between the overall pregnancy-associated deaths and the subset of pregnancy-related deaths in 2020 was the timing of death relative to pregnancy, as seen in Figures 15 and 16. While most of the pregnancy-associated deaths (59.8%) occurred 43 days or more postpartum, 66.7% of the deaths determined to be pregnancy-related occurred either during pregnancy or within the first 42 days postpartum. These findings suggest women are most at risk of dying from a pregnancy complication or other condition aggravated by pregnancy either during pregnancy or in the first six weeks following childbirth. However, their risk of dying from other causes, including injury or other medical conditions, is highest more than six weeks after childbirth.



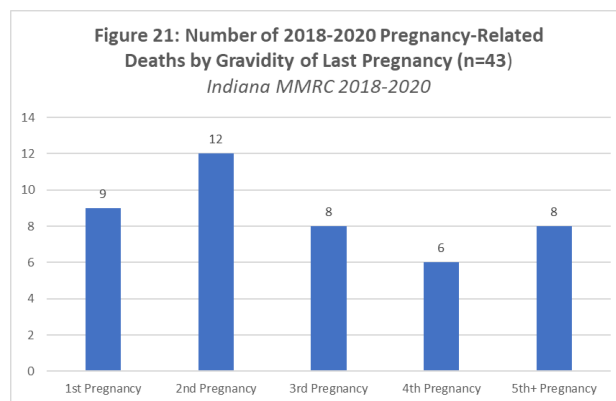
Similar trends are evident when examining the aggregate 2018-2020 Indiana MMRC data (Figures 17 and 18). While most pregnancy-associated deaths are occurring from 43 days to one year postpartum, deaths that are directly related to pregnancy complications more often occurred either during pregnancy or within the first six weeks of the end of the pregnancy. These findings suggest that prevention and maternal health initiatives for pregnancy-related deaths should be targeted to the specific risks experienced by women during pregnancy and the postpartum period.

Gravidity indicates the number of times a woman has been pregnant, regardless of the outcome, and includes current pregnancies. (Figure 19).

Looking at the overall distribution for 2018, 2019, and 2020 (Figure 20), the difference between gravidity is even less pronounced. The majority of women died during their second pregnancy, followed by about an equal number of those who died during either their first pregnancy or fifth or more. Fewer died during their third or fourth pregnancy, but they still accounted for a little less than a third of the pregnancy-associated deaths. Maternal mortality does not therefore affect only women during their first pregnancy or women with many previous pregnancies. Women at any gravidity can be at risk for pregnancy-associated mortality. Programs that are made to promote maternal health and reduce maternal mortality should thus not be limited to women in their first pregnancy but should be targeted at all women who are pregnant, looking to become pregnant, or recently postpartum.



Examining the gravidity of the sentinel pregnancy for pregnancy-related deaths from 2018-2019 (Figure 21) suggests women in their first or second pregnancies have a higher risk of pregnancy-related death. This data is based on a small number of deaths, so it should be examined with caution. This trend will continue to be monitored in the future years of MMRC work.



(Figure 22). Metropolitan counties contain an urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Micropolitan counties have at least one cluster of 10,000-50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Rural counties contain neither metropolitan nor micropolitan core areas.

Figure 22: Urban Status of Last Residence (2020)

	N	%
Metropolitan	69	67.4%
Micropolitan	15	16.3%
Rural	8	8.7%

The three-year data in Figure 23 show that these geographic trends were consistent, with over two-thirds of deaths occurring to women in metropolitan counties. The smallest share of deaths occurred among women from rural counties. Recognizing the geography and rurality of residence of women lost to pregnancy-associated death is important for assessing access to services and providers.

Figure 23: Urban Status of Last Residence (2018-2020)

	N	%
Metropolitan	154	71.6%
Micropolitan	36	16.7%
Rural	17	7.9%
Unknown	8	3.7%

Geography can reveal where to target interventions and services for pregnant women and new mothers. Examining maternal health outcomes related to identified counties without inpatient delivery services in Indiana can show the impact of obstetric resource access for Hoosier women. (Figure 3).

Of all pregnancy-associated deaths in 2020, 9.8% of those women had last resided in a county without inpatient obstetrical services. Of these cases, 6.5% occurred in counties without inpatient delivery services, and 3.3% occurred in counties without a hospital. For pregnancy-related deaths in 2020 specifically, this percentage was slightly lower, with 5.6% of those deaths occurring to women living in counties without inpatient obstetrical services. By comparison, in 2020, 9.4% of all births in Indiana occurred among women who resided in a county without

inpatient delivery services. To further break this down, 6.0% of live births occurred in counties without a hospital, and 3.4% occurred in counties with a hospital but without inpatient delivery services. While this is based on relatively small numbers, the preliminary data shows that women residing in counties without inpatient obstetrical services do make up a greater share of pregnancy-associated deaths than expected, given the share of births occurring in those counties. To address this disparity, any prevention or maternal health initiatives should consider women's access to obstetrical care or other specialized care during their pregnancy in these counties.

The addresses for the women's last residence, including the county, were accessed from vital records. However, it is important to note that a woman's place of residence at the time of death is not necessarily where she lived over the course of her pregnancy. This is especially true for women who, for any reason, were experiencing housing instability. The ability to access regular prenatal or other medical care is not limited just by a woman's address or county of residence. Unstable housing can make it difficult to access and maintain care with one provider throughout a woman's pregnancy, as she may be staying in multiple places. In addition, issues with access to transportation, time off from a job, or childcare can make prenatal or other medical care hard to access, even if it is available.

Social determinants of health, such as income level, education level, housing status, and employment status, are known to be upstream factors for many public health topics, including maternal and infant health. While individual or family income levels were not included in the review, other social factors below can be used as a best estimate of socioeconomic status. These measures provide insights as to what roles social determinants are playing in maternal mortality.

Figure 24: Education Level (2020)			Figure 25: Education Level (2018-2020)		
	N	%		N	%
Less than HS Grad	13	14.1%	Less than HS Grad	36	16.7%
HS Grad or GED	48	52.2%	HS Grad or GED	105	48.8%
Some College	18	19.6%	Some College	40	18.6%
Associate's or Bachelor's	10	10.9%	Associate's or Bachelor's	30	14.0%
Advanced Degree	2	2.2%	Advanced Degree	2	0.9%
Unknown	1	1.1%	Unknown	2	0.9%

(Figure 24). This proportion holds true when looking at the three-year data from 2018-2020 as well (Figure 25).

Figure 26: Occupation at Death (2020)	N	%	Figure 27: Occupation at Death (2018-2020)	N	%
Employed	57	62.0%	Employed	125	58.1%
Unemployed, or Listed as Homemaker	25	27.2%	Unemployed, or Listed as Homemaker	70	32.6%
Disabled	1	1.1%	Disabled	3	1.4%
Student	6	6.5%	Student	9	4.2%
Unknown	3	3.3%	Unknown	8	3.7%

Employment status is another important social determinant of health, as it has significant influence on income level, insurance access, and eligibility. Women who were unemployed or listed as homemaker accounted for 27.2% of all pregnancy-associated deaths in 2020. (Figure 26). This percentage was slightly higher in the three-year aggregate data, sitting at 32.6% of cases (Figure 27).

Additionally, while reviewing the deaths from 2020, the Indiana MMRC noted trends in the specific occupations of the women who had died. Using death certificate occupation and industry information, 13.0% of the women who died in 2020 were working in the food service industry, 10.9% were working in health care, and 10.9% were working in customer service. In the previous two years of data, food service and health care were also the most prevalent industries seen among their respective cohort. However, customer service data was not collected the past two years.

Prenatal care is crucial to ensure that women have a healthy and safe pregnancy and childbirth experience.

The American Congress of Obstetricians and Gynecologists (ACOG) recommends a first prenatal care visit at 8-10 weeks of pregnancy. By connecting with a prenatal care provider, pregnant women can monitor their health and become informed of steps they can take to protect their infant and themselves. Additionally, early prenatal care can identify high-risk pregnancies that may require a higher level of care.

For pregnancy-associated deaths in 2020 in Indiana, half (50%) of the women accessed prenatal care starting in the first trimester of their sentinel pregnancy (Figure 28). Another 21.7% of pregnancy-associated deaths in 2020 occurred among women who received prenatal care in the second trimester, and 15.2% received no prenatal care at all. In comparison, early prenatal care was noted for 69.3% of all Indiana births in 2020. This disparity suggests

Figure 28: Entry into Prenatal Care (2020)	N	%
Early Prenatal Care	46	50.0%
Second Trimester Prenatal Care	20	21.7%
Late Prenatal Care	7	7.6%
Unknown Start Time for Prenatal Care	4	4.4%
Unknown if Received Prenatal Care	1	1.1%
No Prenatal Care	14	15.2%

inadequate prenatal care is a contributing factor to maternal mortality in Indiana. The Indiana MMRC attempted to ascertain circumstances preventing women from entering prenatal care during the first trimester. All available records associated with each pregnancy-associated death were assessed, but reasoning for late entry to prenatal care or lack of prenatal care was often not available. The Indiana MMRC requests and receives records, but other records may exist that were not requested because the committee was not aware of them, or the records were unavailable at the time of fatality review. Additionally, it is challenging to document the absence of care, and it should be noted that there were instances among 2018, 2019, and 2020 pregnancy-associated deaths in which known barriers existed that affected women's access to prenatal care. These barriers included unstable housing, incarceration during pregnancy or recent release from incarceration, a lack of reliable transportation, and challenges associated with insurance enrollment and eligibility.

Timing of entry into prenatal care is critical, but quality of care is also an important factor. For a low-risk pregnancy, ACOG recommends visits with a provider every four weeks until 28 weeks' gestation, every two to three weeks until 36 weeks' gestation, and then every week after 36 weeks' gestation. The optimal number of prenatal visits depends on gestation, but for a woman who gives birth at 40 weeks, the recommended number of prenatal care visits is between 12 and 14. This may vary depending on specific needs.

For women who did not die while pregnant and had a documented history of prenatal care visits in 2020, the average was 9.5 prenatal visits – fewer than recommended. Logically, the number of visits varied greatly by which point in their pregnancy they entered care. Women entering prenatal care in their first trimester averaged 9.4 visits. Entry into prenatal care during the second trimester resulted in an average 7.9 visits.

Data aggregated for 2018, 2019, and 2020 has been consistent regarding entry into prenatal care, with little variation. Most notably, the overall percentage of pregnancy-associated deaths in 2018-2020 among patients who entered early prenatal care was 47.4%, which is slightly less than half of the overall total (Figure 29). For 2018, 2019, and 2020, 68.7% of all live births in Indiana received early prenatal care.

Figure 29: Entry into Prenatal Care (2018-2020)		
	N	%
Early Prenatal Care	102	47.4%
Second Trimester Prenatal Care	50	23.3%
Late Prenatal Care	10	4.6%
Unknown Start Time for Prenatal Care	4	1.9%
Unknown if Received Prenatal Care	5	2.3%
No Prenatal Care	44	20.5%

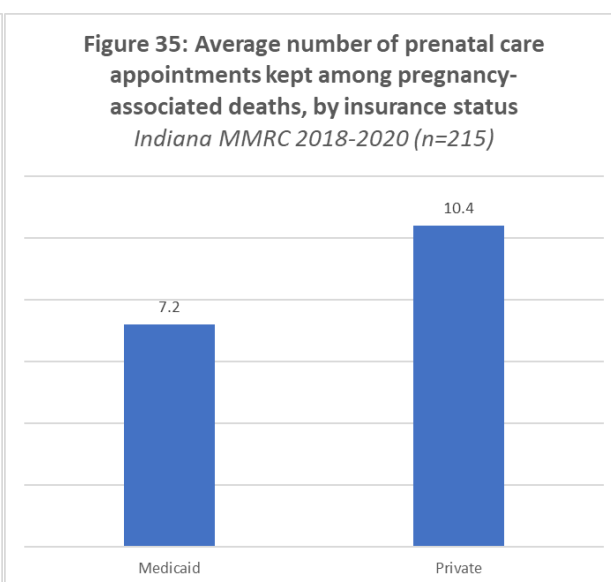
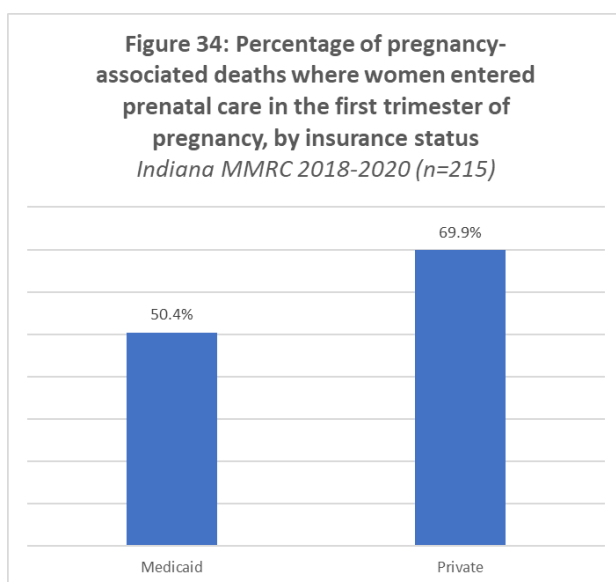
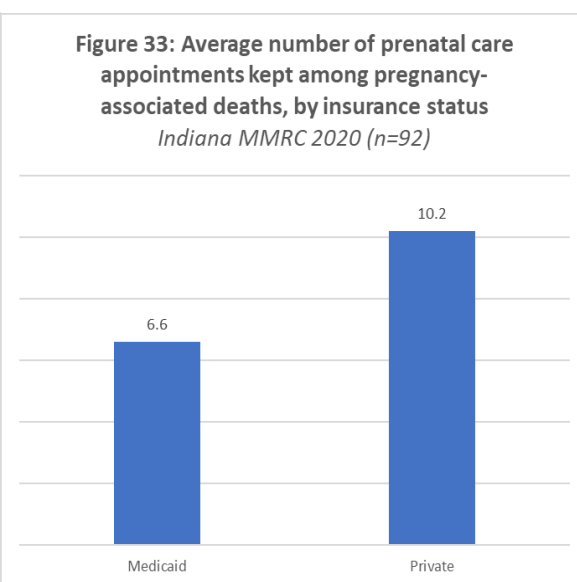
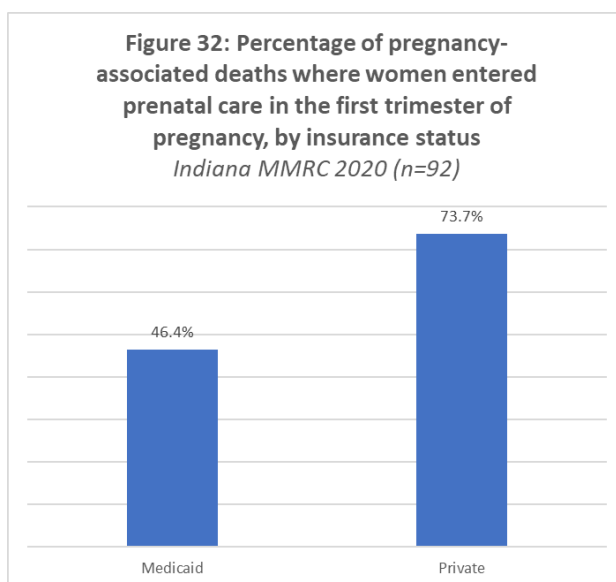
Access to health insurance is often a factor in the healthcare decisions of many Americans. In Indiana, pregnant women under a certain income level qualify for Medicaid. The insurance status of women who died from pregnancy-associated deaths was assessed through a variety of means, including birth certificates, prenatal care records, and medical records. Three-quarters of all women who died from a pregnancy-associated death in Indiana in 2020 were Medicaid enrolled, and 20.7% had private insurance (Figure 30).

Figure 30: Insurance Status (2020)	N	%
Medicaid	69	75.0%
Private	19	20.7%
Self-Pay/None	3	3.3%
Other	1	1.1%

Figure 31 shows relatively similar insurance coverage proportions in the three-year data collected so far, with slightly under two-thirds of all pregnancy-associated deaths occurring to women with Medicaid coverage. It is important to note that insurance coverage can change over the course of pregnancy and may not be equal to the woman's coverage during her terminal event. Further, the Indiana MMR program was unable to determine a woman's insurance coverage in 27 cases between 2018 and 2019. The completion of the MOU for Medicaid claims data will be integral for allowing the Indiana MMRC more complete benefits information and enrollment dates for all pregnancy-associated deaths reviewed.

Figure 31: Insurance Status (2018- 2020)	N	%
Medicaid	136	63.3%
Private	41	19.1%
Self-Pay/None	9	4.2%
Other	2	0.9%
Unknown	27	12.6%

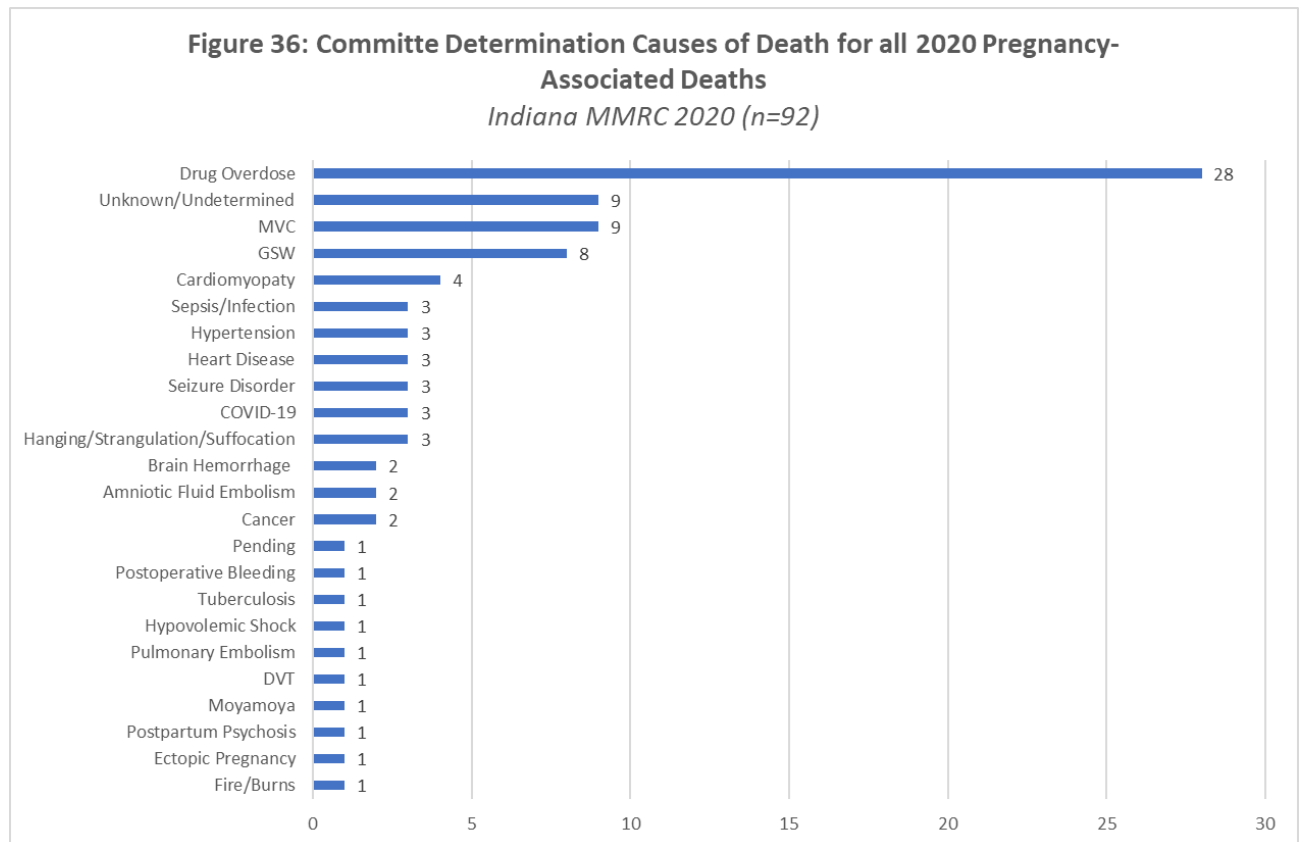
When examining types of care, as well as entry into prenatal services, stratified by the type of insurance coverage each woman had, there are some clear differences (Figures 32 and 33). In the cumulative data (Figures 34 and 35), the same trend holds true. Over the last three years, the majority of pregnancy-associated deaths have been among women insured by Medicaid. Women with Medicaid insurance were less likely to have early prenatal care and had on average fewer appointments kept.



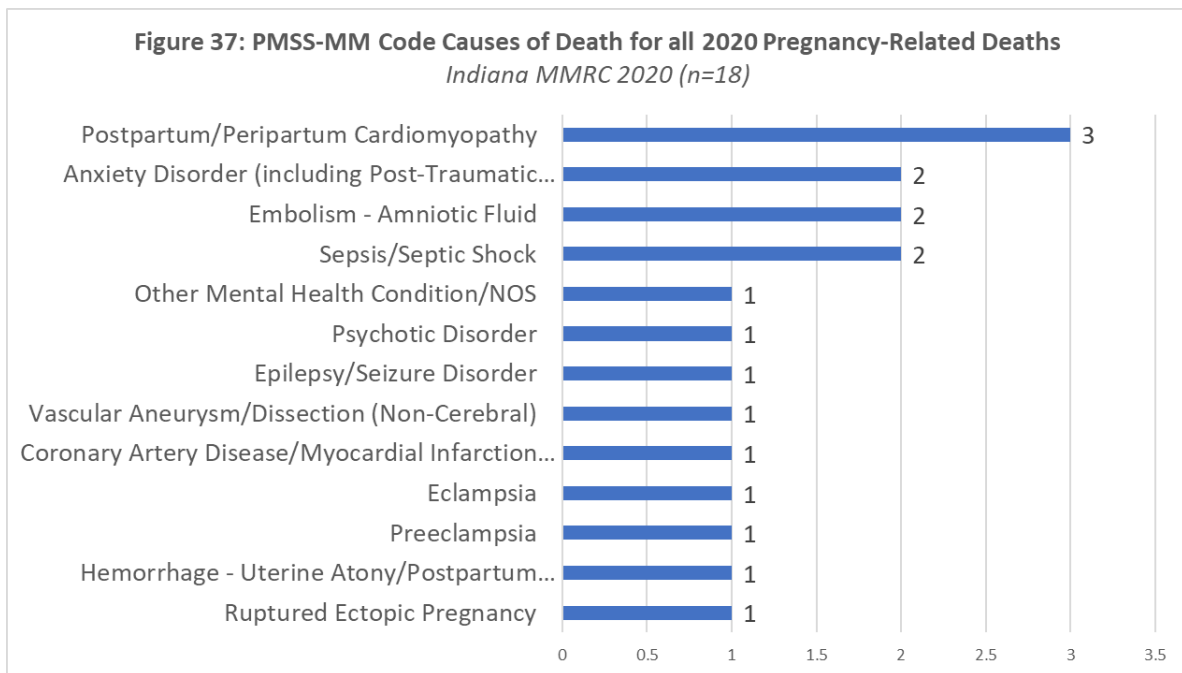
When looking at data from all live births in Indiana in 2020, these trends hold true. In 2020, 57.7% of live births to women on Medicaid had started prenatal care in the first trimester, compared to 80.8% of women on private insurance, based on birth certificate data (Indiana Vital Records, 2020).

Among the 92 pregnancy-associated deaths in 2020, overdose (both accidental and undetermined intent) was the leading cause of death, accounting for 30.4% of all pregnancy-associated deaths in 2020. Also, among the top causes of death, based on those listed on death certificates and decisions made by the MMRC, are other injury-related deaths, including motor vehicle collisions, gunshot wounds, and hanging/strangulation/suffocation (Figure 36). Injuries overall, including overdoses, and intentional or unintentional injuries, accounted for a total of 53.3% of pregnancy-associated deaths in 2020. The most common medical-related cause of death was cardiomyopathy, accounting for 4.3% of all pregnancy-associated deaths. Of the

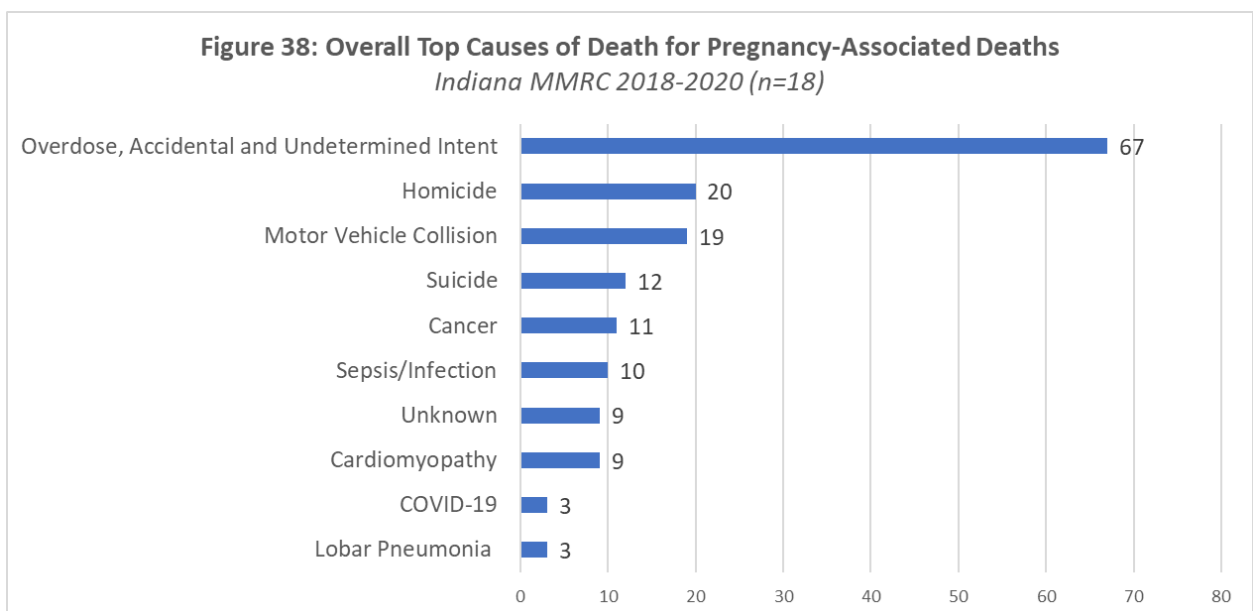
other medical conditions, COVID-19, seizure disorder, heart disease, hypertension, and sepsis/infection accounted for 3.3% of all pregnancy-associated deaths each. Of note, the committee was unable to determine the cause of death for 9.8% of cases.



For deaths determined by the Indiana MMRC to be pregnancy-related, the MMRIA Committee Decisions Form guided the assignment of cause of death. The CDC provides clear criteria for selecting each diagnosis code. Figure 37 shows the committee decisions for the 18 pregnancy-related deaths from 2020. Cardiomyopathies were the most common cause of pregnancy-related death, followed by anxiety disorders, amniotic fluid embolisms, and septic shock. The list of pregnancy-related causes and PMSS-MM codes that the committee used for these determinations is available in Appendix D.



Looking at all the review data collected to date, the top causes of death seen overall among the pregnancy-associated deaths were similar in the 2018, 2019, and 2020 cohorts. Overdoses accounted for the largest share (31.2%), with other injury causes also among the top causes (motor vehicle collisions, homicide, and suicide).



The three-year data for pregnancy-related causes of death provides a more detailed picture than was available by looking at a single year (Figures 38 and 39). These are still small numbers, and a variety of causes of death have been seen for pregnancy-related deaths, but some trends are beginning to appear. Taken together, hemorrhages of various causes and etiologies (uterine,

rupture, primary DIC, ruptured ectopic pregnancy, and others) have accounted for 21% of pregnancy-related deaths in the last two years. Cardiomyopathies (peripartum, postpartum, and other/not specified) have accounted for another 14%. These pregnancy-related health issues can be a focus on prevention and intervention work for maternal mortality and morbidities in Indiana.

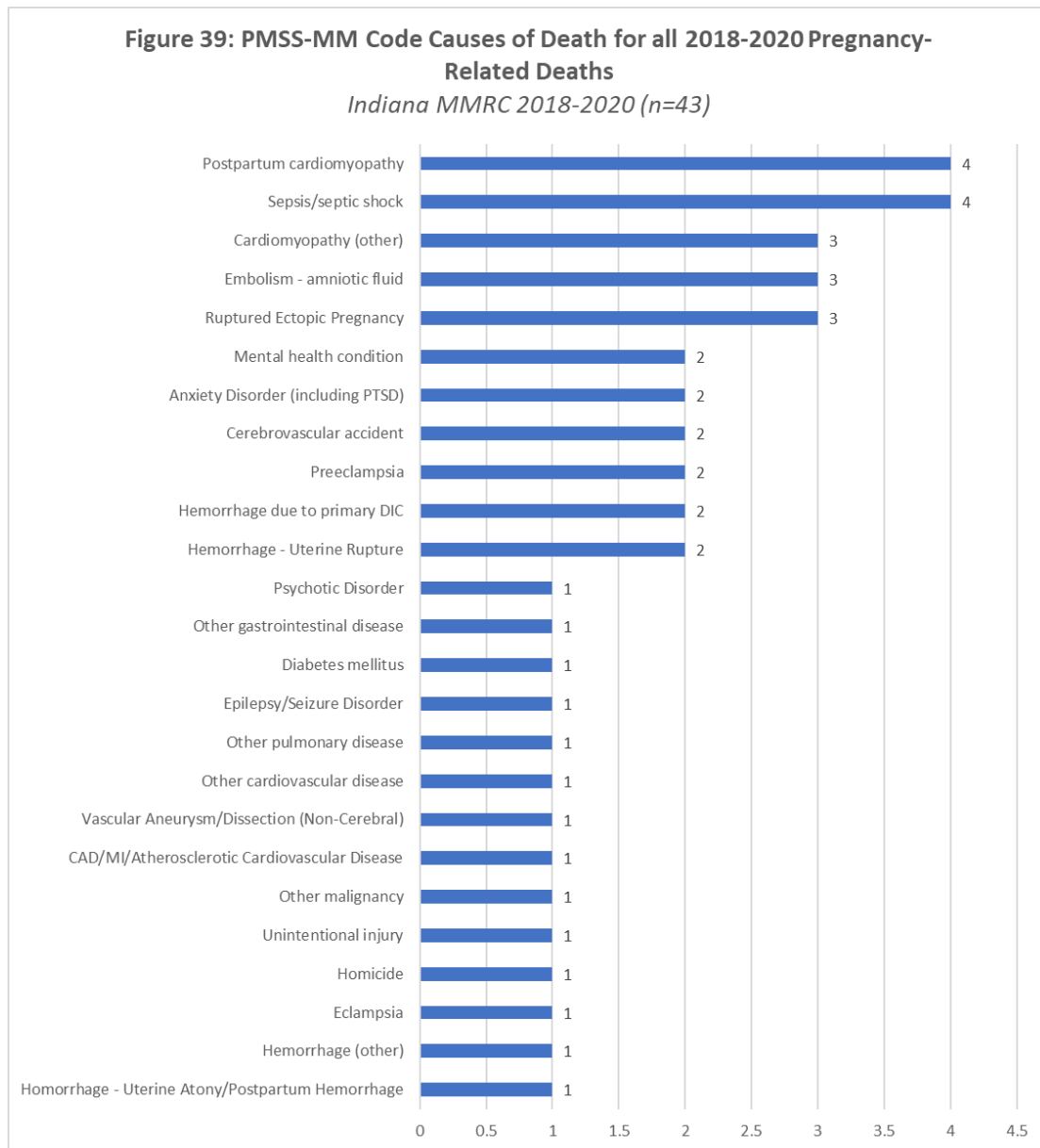
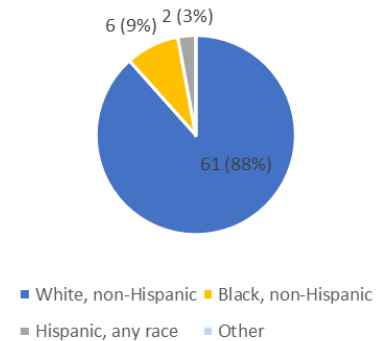


Figure 40: Race/Ethnicity of Pregnancy-Associated Deaths due to Overdose (2018-2020)	N	%
White, non-Hispanic	61	88.40%
Black, non-Hispanic	6	8.70%
Hispanic, any race	2	2.90%
Other	0	0%

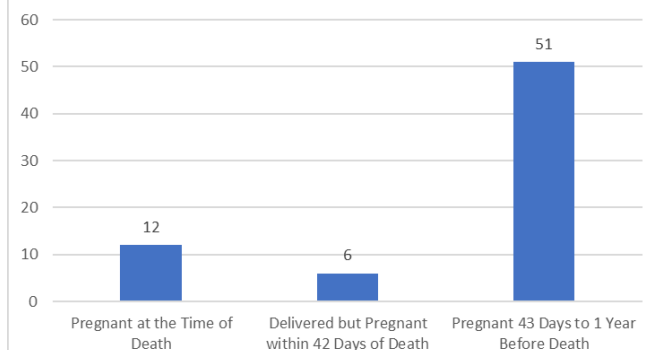
Figure 41: Distribution of Pregnancy-Associated Deaths due to Overdose by Race and Ethnicity
Indiana MMRC 2018-2020 (n=69)



Overdoses, both accidental and undetermined intent, were the top cause of pregnancy-associated deaths in 2018, 2019, and 2020. Figures 40 and 41 show the breakdown by race and ethnicity of all pregnancy-associated overdose deaths during this three-year period. White, non-Hispanic women have accounted for most of these deaths. White, non-Hispanic women accounted for 71.2% of all live births in 2018-2020 in Indiana (Figure 1) but made up 88.4% of the pregnancy-associated overdose deaths. Black, non-Hispanic women, and Hispanic women accounted for 11.6% of the overdose deaths. Each accounted for 13.2% and 10.3% of all live births for 2018-2020 in Indiana, respectively. These findings suggest overdose deaths are occurring most often among the White, non-Hispanic pregnant and postpartum populations, compared to other races and ethnicities.

Figure 42: Age of Pregnancy-Associated Deaths due to Overdose (2018-2020)	N	%
15-19 Years Old	0	0.0%
20-24 Years Old	13	18.8%
25-29 Years Old	29	42.0%
30-34 Years Old	16	23.2%
35-39 Years Old	8	11.6%
40+ Years Old	3	4.3%

Figure 43: Timing of Pregnancy-Associated Deaths due to Overdose
Indiana MMRC 2018-2020 (n=69)



Most of the pregnancy-associated overdose deaths occurred to women ages 20-34 years, accounting for a total of 84% of deaths (Figure 42). However, most Indiana births are occurring to women in this age group; between 2018, 2019, and 2020, 81.0% of all live births were to

women between the ages of 20 and 34. Pregnancy-associated deaths due to overdose do not appear to be occurring to women particularly younger or older than average.

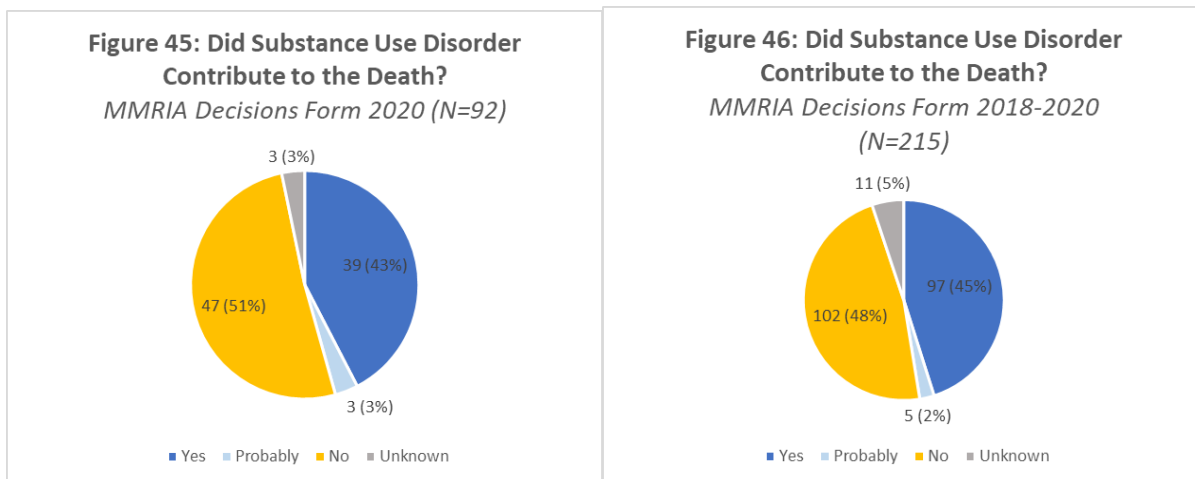
Figure 43 examines the timing of pregnancy-associated deaths due to overdose relative to the pregnancy or childbirth. While some deaths occurred during pregnancy or on the day of delivery, the majority (73.9%) of pregnancy-associated overdose deaths occurred in the late postpartum period, between 43 days and one-year postpartum. Interventions that aim to lower pregnancy-associated deaths due to overdose should target women in the late postpartum period.

When analyzing the type of insurance held by the women who died from pregnancy-associated overdoses (n=69), Figure 44 shows the majority of overdose deaths occurred to women insured by Medicaid (75.7%), followed by those with private insurance (6.8%). An almost identical share of women who died due to pregnancy-associated overdose were covered by Medicaid, compared to that proportion in the overall cohort of pregnancy-associated deaths. The women's insurance coverage was assessed through a variety of means, including prenatal care records, delivery records and birth certificates. In some cases, insurance coverage was unknown, especially in instances where there was no available prenatal record and no delivery. Additionally, insurance coverage is not a static measure and may not be the same during the prenatal period and the terminal event. The completion of the MOU for Medicaid claims data will be integral for allowing the Indiana MMRC more complete benefits information and enrollment dates for all pregnancy-associated deaths reviewed.

Figure 44: Insurance Status for Pregnancy-Associated Deaths due to Overdose (2018-2020)		
	N	%
Private	5	6.8%
Medicaid	56	75.7%
Self-Pay	4	5.4%
Unknown	8	10.8%
Other	1	1.4%

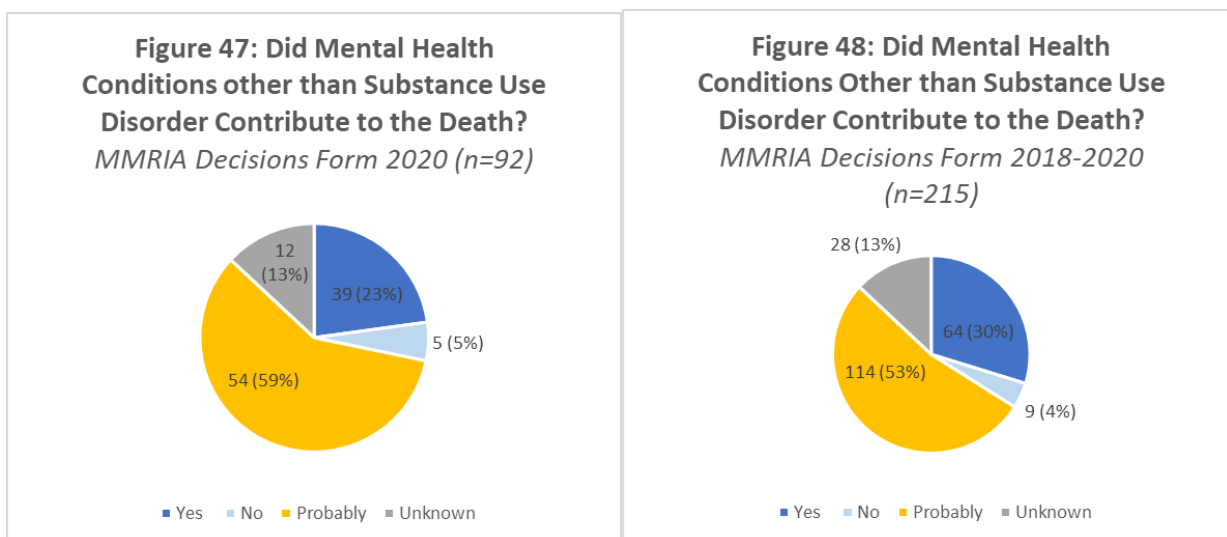
While the underlying cause of death among pregnancy-associated and pregnancy-related deaths provides an answer to HOW Indiana mothers die, it does not address WHY. Assessing and measuring circumstantial factors that contributed to pregnancy-associated deaths can exemplify issues affecting pregnant and postpartum women in Indiana and present avenues for intervention.

During each review of a woman's death, the Indiana MMRC determines whether substance use disorder (SUD), mental health conditions (other than SUD), obesity, or discrimination contributed to the death. Other contributing factors may be identified when making prevention recommendations.



The Indiana MMRC examined all available records for the 92 pregnancy-associated deaths from 2020 to determine whether SUD contributed in any way to each death (Figure 45). They determined that SUD either **definitely** or **probably** contributed to 46% of all pregnancy-associated deaths in 2020. Looking at the review data collected so far (2018-2020), that percentage is slightly higher at 47%. Between SUD, mental health conditions other than SUD, discrimination, and obesity, SUD has been found to be the factor that has contributed to the most pregnancy-associated deaths in Indiana (Figure 46).

Note that the contribution of SUD went beyond accidental overdoses, with substance use disorder contributing to and exacerbating other conditions that led to the death of the pregnant or recently pregnant women. Interventions aimed at helping pregnant women, recently pregnant women, and even non-pregnant women of reproductive age access treatment resources could help prevent about half of all pregnancy-associated deaths in Indiana.

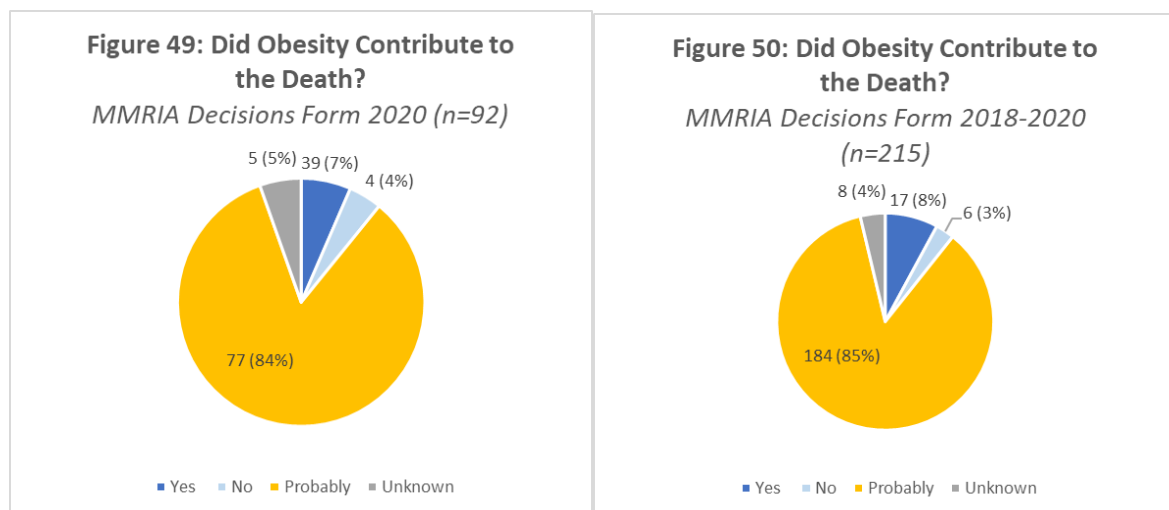


Mental health conditions other than substance use, such as depression, also contributed significantly to pregnancy-associated deaths. In 28% of the 2020 Indiana MMRC-reviewed deaths, mental health conditions (other than SUD) either **definitely** or **probably** contributed to

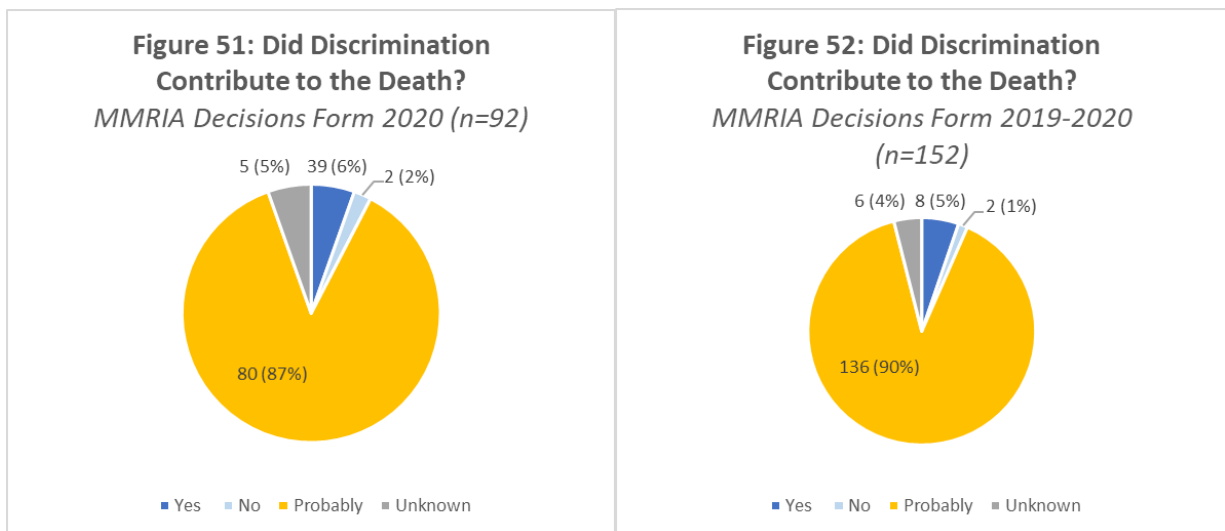
the death (Figure 47). That percentage was slightly higher between 2018-2020, with the committee determining that mental health conditions (other than SUD) either **definitely** or **probably** contributed to 34% of pregnancy-associated deaths in Indiana (Figure 48).

There is heavy overlap between the presence of SUD and other mental health conditions. Of the total number of pregnancy-associated deaths from 2018-2020 in which SUD was believed to be a contributing factor (n=97), 62.9% also had the presence of comorbid mental health conditions that contributed to the death. The high comorbidity of SUD and other mental health conditions reflects a need for these two prevalent contributing factors to be addressed in a comprehensive manner.

Obesity was another notable contributing factor to Indiana pregnancy-associated deaths. In 11% of 2020 deaths, obesity either **definitely** or **probably** contributed to the death (Figure 49). In the cumulative data resulting from 2018, 2019, and 2020 reviews, the percentage of deaths where obesity was **definitely** or **probably** a contributing factor was the same (Figure 50).



In 2020, the Indiana MMRC committee determined that discrimination was either **definitely** or **probably** a contributing factor in 8% of pregnancy-associated deaths (Figure 51). For the two-year aggregate data (discrimination data was not collected in 2018), discrimination either **definitely** or **probably** contributed to 6% of cases (Figure 52). Discrimination was defined for the review process as “treating someone less or more favorably based on the group, class, or category they belong to resulting from biases, prejudices, and stereotyping.” Therefore, discrimination noted in 2019 and 2020 was not limited to just racial discrimination, but also looked at discrimination due to a woman’s obesity, substance use or mental health history, or any other group or category.



The Indiana MMRC did note challenges in determining the effect of discrimination on pregnancy-associated deaths. Decisions about the contributory nature of discrimination are based on the review of all available records, but incidents or circumstances considered discriminatory are not often documented in records. In addition, discrimination through the absence of care is difficult to identify, as there is no documentation of these situations.

The Indiana MMR program is continuing to evaluate sources of information that can inform this question. Indiana MMRC began incorporating family interviews in the 2020 case review. This has led to Indiana MMRC seeing discrimination in more social factors, such as job titles, and how this may impact the way a hospital treats them. This allows for Indiana MMRC to have a broader knowledge of discrimination and dig deeper to the potential preventability through education and other sources.

Indiana Department of Child Services History

The Indiana Department of Child Services (DCS) collaborated with the Indiana MMRC to ascertain relevant DCS histories for the 2020 pregnancy-associated deaths by making records available for individuals who has previous involvement with DCS.

In 2020, 65.2% of the pregnancy-associated deaths occurred to women with a DCS history, either during their childhood or as an adult. Of these, 3.3% had a DCS history as a victim during childhood, 53.2% had histories with DCS as an adult, and 8.7% had dual history as a victim during childhood and as an alleged perpetrator as an adult. In comparison, in 2019, 67.7% of the pregnancy-associated deaths occurred to women with a DCS history as a child or adult, 20% of these had a DCS history as a victim during childhood, and 58.3% had history with DCS as an adult. Comparable data is not available for the 2018 cohort of pregnancy-associated deaths, as the Indiana MMR program began including **all** DCS histories for the women in the review process — rather than only recent DCS involvement — for the 2019 review. The value of these experiences as an indicator of adverse childhood experiences (ACEs) and intersections with social services helped the Indiana MMRC more fully understand the upstream approach to

creating recommendations that address generational trauma. The high prevalence of previous DCS involvement with people who died of pregnancy-associated causes suggests a possible avenue for connecting individuals and families with resources and referrals to services and has informed the creation of prevention recommendations.

Preventability

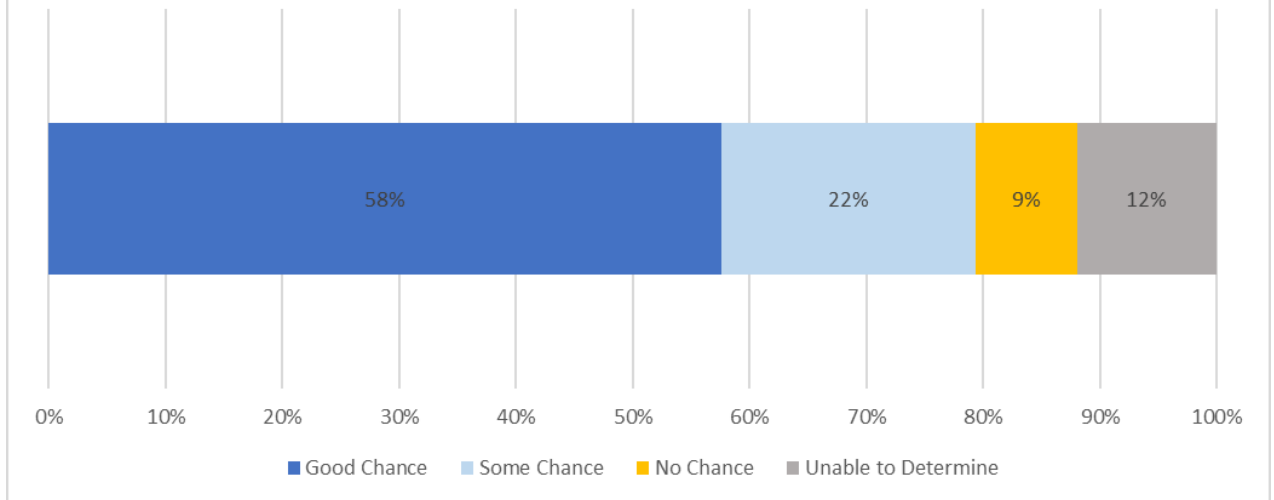
After reviewing all relevant obstetric, medical, and social histories of a pregnancy-associated death, the Indiana MMRC collectively discusses whether the death was preventable. A death is considered preventable “if the committee determines there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, and/or community factors,” according to the MMRIA Committee Decisions Form.

The Indiana MMRC found the majority (79.3%) of all 2020 pregnancy-associated deaths reviewed were preventable. Similarly, among just the deaths determined to be pregnancy-related, 77.8% were preventable. Both percentages are slightly lower than 2018 (87% and 90% for pregnancy-associated and pregnancy-related deaths, respectively), while the pregnancy-related percentage was slightly higher than 2019’s 73.3%. However, the pregnancy-associated percentage was slightly lower than the 80% seen in 2019. Based on these numbers, most of the pregnancy-associated deaths in Indiana could have been prevented.

Different pregnancy-associated death narratives present different opportunities for prevention, and some opportunities can be expected to have a larger chance to alter outcomes. Of the cases reviewed, 21.7% had some chance to alter the outcome and 57.6% had a good chance to alter the outcome. Stated another way, the majority (79.3%) of cases reviewed had some chance or good chance to alter the outcome (Figure 53).

- **79.3% of pregnancy-associated deaths** were deemed preventable by the Indiana MMRC in 2020
- **77.8% of pregnancy-related deaths** were deemed preventable by the Indiana MMRC in 2020

Figure 53: MMRC Determination of the Chance to Alter the Outcome of Pregnancy-Associated Deaths
Indiana MMRC 2020 (n=92)

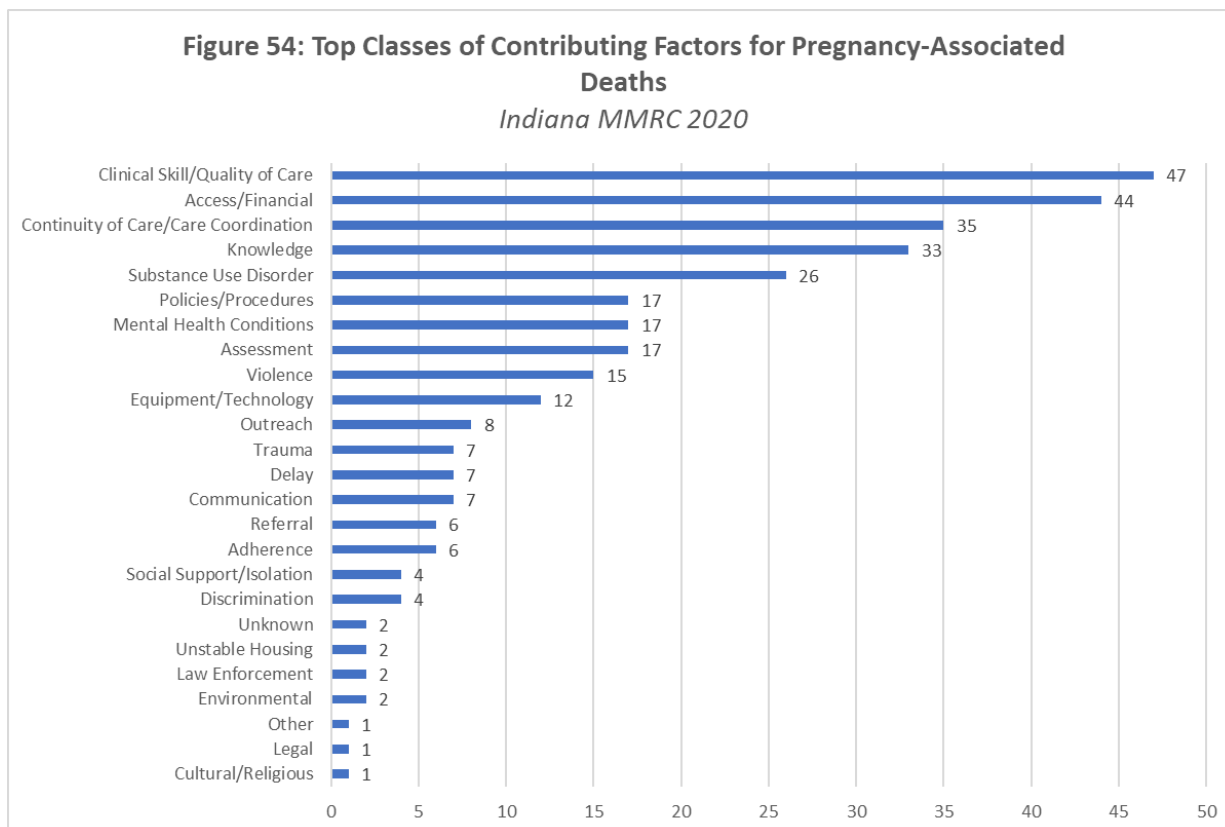


Section 9: Recommendations

The MMRIA Committee Decisions Form (Appendix E) assists MMRCs in a standardized process for documentation of identified contributing factors and recommendations. As part of the review of each death, the committee identifies recommendations, including strategies and action steps, that may address factors that contributed to the death. Organization of the recommendations by prevention level (primary, secondary, and tertiary), as well as the level in the continuum where the influence can be expected, guided the Indiana MMRC in producing impactful suggestions. It is critical for MMRCs to recognize that the levels of change will not often be at the provider/family level, but rather in larger systems and overarching policies.

Among the 92 pregnancy-associated deaths that occurred in 2020, the Indiana MMRC recognized and documented a total of **323** unique circumstantial contributing factors and created recommendations in response to each. For each death reviewed, an average of **3.5** recommendations were created, with the guidance of the MMRIA Committee Decisions Form.

Looking specifically at the contributing factors, many contributing factors identified were at the patient/family level. These contributing factors were classified into different classes, identified in Figure 54. Clinical skill/quality of care was the most identified class of contributing factor, with access/financial, continuity of care/care coordination, and knowledge also among the most frequent.



When creating recommendations to prevent future pregnancy-associated deaths, the MMRC assigns categories based on who could act on that recommendation. While patient/family level factors accounted for most contributing factors, the individual does not necessarily have control over the factors at that level. Often, external factors or systems must be addressed to improve the patient-level concerns. Figure 55 shows that the largest share of

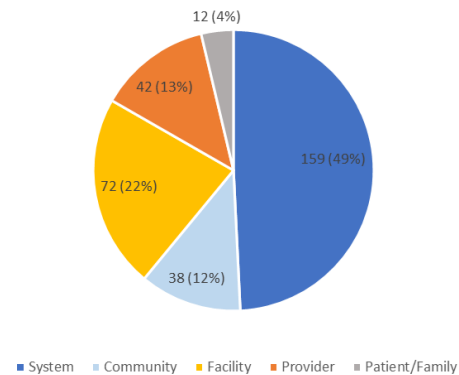
recommendations made were at the level of the system. Together, recommendations for action for facilities and systems of care accounted for 73% of all recommendations. Note that providers and facilities are not limited to only medical providers or hospitals. Mental health providers and providers of social services can also fall into this category. Recommendations for the community accounted for 12% of recommendations, and those for the patient or family accounted for 2%.

All recommendations are developed in response to each pregnancy-associated death and are documented in accordance with the MMRIA Committee Decisions Form. The full list of 323 recommendations for the 2020 cohort was then prioritized based on feasibility and impact. Based on the themes woven throughout these cases, Indiana MMRC made recommendations that are specifically tailored toward systems of care, communities, facilities, providers, and the patient and their families. The Indiana MMRC would be remiss if it were not to mention the efforts already being made. We want to acknowledge that although we are providing recommendations, there are ongoing efforts in prevention for maternal mortality. Indiana MMRC wishes to acknowledge those efforts and provide recommendations to continue to further prevention in Indiana. These acknowledgments can be found in the **Indiana Work Already Underway** sections throughout the recommendations.

RECOMMENDATIONS FOR SYSTEMS

Preventing infant and maternal death is a priority for Indiana. Policymakers and healthcare systems should seek to provide system-level solutions and policy options. Policy makers have the unique authority to align resources and enact laws for statewide application. Health systems and social service networks have a significant opportunity to prevent maternal mortality. Integrating standardized practices, provider education, safe prescribing practices, and coordinated support for Indiana women during the pre-, ante, and post-partum periods can improve health outcomes and patient satisfaction and reduce costs for providers.

Figure 55: 2020 Categories of Committee Recommendations for Prevention of Pregnancy-Associated Deaths in Indiana
Indiana MMRC 2020



Indiana should ensure policies support data-driven, coordinated strategies that foster healthy families. Participating state and local agencies should be encouraged to play active, collaborative roles in Indiana’s maternal mortality prevention and response efforts.

Indiana’s MMRC discussions reflect the need for upstream policy improvements as they relate to current health outcomes and disparities, specifically those identified in the data analysis. The presence of persistent population-level disparities in maternal mortality suggests recommendations should include not only individual-level factors that distinguish “high risk” from “low risk” women, but also social contextual factors that systematically expose populations of women to higher- or lower-risk environments (Review to Action).

Among the pregnancy-associated deaths reviewed by the Indiana MMRC in 2020, many could be linked to circumstances that could have been avoided by increases in publicly funded improvements to maternal health. The recommendations provided by the MMRC that directly related to these were:

- Publicly funded childcare, beginning in infancy
- Comprehensive, evidence-based sexual education
- Universal access for Long-Acting Reversible Contraception
- Medicaid and insurance coverage for medical procedures
- Access to public transportation and funding for medically necessary vehicle modifications, such as seatbelt extenders for people living with obesity, to ensure driver safety

Indiana MMRC also found that public funding, specific to behavioral health care, could prevent many maternal deaths. These recommendations included:

- Funding for access to mental health providers, increase credentialed providers for mental health and substance abuse
- Increase funding for social services, including Department of Child Services (DCS) and other social service agencies that provide touchpoints where prevention of maternal mortality can be put in place
- Resources for those transitioning out of care with DCS
- Adequate funding and education on conducting death investigations, including complete and accurate autopsies

Indiana Work is Already Underway

In July 2019, Governor Holcomb signed new legislation making Indiana the third state in the nation to extend Medicaid coverage to include doulas. Doula services can provide additional support for pregnant and birthing people through emotional support, educational benefits, and advocacy.

For the review of the 2020 cases, Indiana MMRC provided many recommendations that involved a focus on substance use disorder and injury prevention, as well as broadening the

focus on maternal care while working with patients. Recommendations focusing on substance use disorder and injury prevention were:

- Increased focus on substance use disorder and injury prevention:
 - Increase implicit bias training with modules or content related to discrimination/bias toward substance use and mental health to all providers who see women of reproductive age
 - Increase funding, education and access to evidence-based harm reduction strategies related to substance use disorder
 - Increase requirements for injury prevention pertaining to domestic and/or intimate partner violence, including:
 - Perform lethality assessments upon first instance of domestic violence
 - Conduct firearm and domestic violence screenings during pediatric appointments
 - Make forensic nurses, as well as specially trained volunteers for supportive services, available in all hospital and non-hospital designated medical facilities to provide specialized medical treatment for acute and long-term care needs for individuals who present with conditions or injuries related to domestic and/or intimate partner violence to achieve optimal outcomes

Recommendations focused on broadening the focus on maternal care when working with patients included:

- Decrease barriers to treatment, including delays due to identification or insurance
- Increase access to wrap-around services, ensuring high-risk patients are connected to the appropriate level of care management
- Connect pregnant patients with community-based services such as My Healthy Baby and the Indiana Pregnancy Promise Program.

RECOMMENDATIONS FOR FACILITIES

Many opportunities for preventing maternal morbidity and mortality exist within facilities. Examples of facilities include hospitals, care centers, and other clinical sites. Delivering facilities and emergency departments were frequent points of interaction for the women who died from pregnancy-associated causes in 2019. By implementing standardized policies and education to address the social, emotional, and physical health needs of pregnant and postpartum women, care providers in facilities of all levels could reduce maternal mortality in Indiana.

Indiana Work Already Underway

IPQIC is currently revising its existing PSU Practice Bundle to integrate the newest AIM bundle Care for Pregnant and Postpartum Persons with Substance Use Disorder. IPQIC has developed a toolkit for this work, aimed at standardizing care, providing guided interview questions, and resources for providers and patients for substance use and mental health treatment options.

Indiana MMRC again found that a focus on substance use disorder and mental health was imperative when operating in facilities, as well as increasing clinical capacities for pregnancy and post-partum patients. Recommendations for facilities focused on substance use disorder and mental health were:

- Provide inpatient care for those with SUD and comorbidities
- Initiate medication-assisted treatment in the emergency department and ensure patients on methadone maintenance treatment have regular follow-up appointments
- Implement screening tools to identify patients who are experiencing post-partum PTSD, suicidal ideations, and domestic violence
- Create bed space/inpatient treatment space that is properly equipped for newly postpartum mothers
- Ensure social workers and other healthcare providers follow up with patients in the community, not just when they are in the hospital

Indiana MMRC recommendations focused on increasing clinical capacities for pregnant and post-partum patients were:

- Hospitals should review AMA/eloping protocols with a risk management or legal team to ensure all medical staff are aware of what constitutes leaving AMA
- Machines/cuffs should be made available to discharged patients with a high risk of postpartum cardiac complications related to hypertension. Patients with cardiomyopathy should be seen by a cardiologist on admission

RECOMMENDATIONS FOR COMMUNITIES

Indiana MMRC found that the mezzo level work of communities was especially beneficial to pregnant and post-partum women. Recommendations created by the Indiana MMRC for communities were:

- Increase availability of fentanyl testing strips and harm reduction programs and ensure education is provided on proper use
- Increase education within communities to decrease mental health stigma in Black, Indigenous, and Persons of Color (BIPOC) communities
- Ensure community is aware of resources surrounding mental health and postpartum depression
- Ensure adequate transportation systems are in place, to provide access to necessary medical services
- Ensure community is aware of the Pregnancy Help Hotline and is knowledgeable on how to use it

- Education on necessity for unredacted information and compliance with Indiana MMR

Indiana Work Already Underway

The Perinatal Center and Affiliate Structure became operational in November 2021 and is specifically designed to improve outcomes for both parent and baby. The Centers work collaboratively to address provider education, quality improvement initiatives, and care standardization. A data dashboard is being developed to track these efforts and to determine their usefulness in improving perinatal outcomes.

Pregnancy Help Hotline (800) 672-2296

The American Pregnancy Association hosts a hotline to deliver counsel and answers about reproduction/pregnancy health; plus, access to health resources when women need them most. (American Pregnancy Association).

RECOMMENDATIONS FOR PROVIDERS

Healthcare and social services providers, particularly those in outpatient settings, are critical interaction points for women during and after pregnancy. By addressing women's health needs in a coordinated, holistic manner, providers can address chronic conditions that may contribute to poor maternal health. Adherence to best practice recommendations, standardized screening protocols, and appropriate referral and follow up can help minimize barriers to appropriate healthcare for pregnant and recently pregnant women. Recommendations created by Indiana MMRC for providers were:

- Ensure contact information for a peer recovery coach is provided in discharge instructions for those with SUD and an appointment is scheduled
- Refer patients with SUD to mental health professionals to ensure a full screening is performed
- Educate pediatricians and providers who treat post-partum women on post-partum depression and how to implement services such as screens
- Increase clinical care, including:
 - Follow-up and proper care for cardiac diagnoses in pregnant and post-partum women

- Ensure that women taking antipsychotic medication continue to do so, if possible, during pregnancy

Indiana Work is Already Underway

FSSA/ Pregnancy Promise

The Indiana Pregnancy Promise Program (PROMISE = Promoting Recovery from Opioid use, Maternal Infant Support and Engagement) is a statewide initiative implemented by the Family and Social Services Administration since July 1, 2021.

The Pregnancy Promise Program is a free, voluntary program that aims to identify pregnant Medicaid beneficiaries with OUD as early as possible in their pregnancy. The program offers comprehensive case management and care coordination services and connects participants with prenatal and postpartum care, mental health services, and OUD treatment/recovery services and addresses health-related social needs, such as housing, nutrition, transportation, and other safety needs.

Anyone can make a referral to the Pregnancy Promise Program by visiting www.pregnancypromise.in.gov and completing the brief online referral form or by calling the toll-free number at 888-467-2717 or locally at 317-234-5336.

RECOMMENDATIONS FOR PATIENTS AND FAMILIES

The Indiana MMRC emphasized recommendations addressing resources and service delivery to pregnant and recently pregnant women. Many of the challenges or experiences of women and their support system should be addressed upstream, removing the responsibility of systems improvements from the patients and clients entirely.

However, some opportunities can be communicated to women and families to increase their awareness of risks associated with maternal morbidity and mortality. Recommendations for these were:

- Patients/families with SUD should have access to Naloxone and understand how to properly use it.
- Patients/families should understand the signs and symptoms of PPD and know how/when to seek medical care.
- Remove access to firearms in homes where individuals have expressed suicidal thoughts or ideation.

- Seek early prenatal care, especially if the patient has an accompanying chronic condition.
- Avoid riding in vehicles with an impaired driver.
- Always wear a seatbelt.
- Be aware of signs/symptoms of pre-eclampsia. Seek medical care immediately if needed.

FUTURE OF INDIANA MMR PROGRAM

The technical assistance offered by the CDC, through the ERASE MM project, has allowed IDOH to evaluate opportunities to strengthen Indiana's process for reviewing maternal deaths. Indiana MMR program staff has visited the CDC, as well as similar teams, for guidance on best practices for MMR, including procedures and processes, from case identification through data quality assurance measures.

Several key opportunities for improving Indiana's MMR processes were identified and will be addressed as the MMRC begins its review of pregnancy-associated deaths from 2021.

The MMRC membership is regularly evaluated by IDOH and the committee chairperson to ensure appropriate professional disciplines are represented, per IC 16-50, as well as to structure a team with a racial and geographic representation of the Indiana population. As it has continued to be increasingly clear, mental health and substance use disorders were a significant contributor to many of the 2018, 2019 and 2020 pregnancy-associated deaths. Social services, law enforcement, and experts in treatment and recovery have continued to be engaged and asked to provide insights to the landscape of behavior health services in Indiana. Other experts continue to be added to the committee, including a member of the Office of the State Fire Marshal, with a focus on Emergency Medical Services and Mobile Integrated Health.

Additionally, many MMRCs are identifying implicit biases within the MMRC membership and program staff that could be impacting the review process and discussions therein. ERASE MM technical assistance has strongly encouraged the adoption of implicit bias training as part of the continuing education of the committee. IDOH continues to examine options for structuring and offering this resource.

The matching of all death records with birth certificates and fetal death records has uncovered a significant number of pregnancy-associated deaths in which the woman died in Indiana but was a legal resident of another state. The ERASE MM guidance stresses the necessity for all states to review pregnancy-associated and/or pregnancy-related deaths for their residents, so the Division of Fatality Review & Prevention has begun entering formal collaborative relationships with neighboring states for reciprocal case notification and records sharing. Guidance by the IDOH legal team is being sought for establishing these relationships.

Identifying opportunities for process improvement is essential for the Indiana MMRC to meet the ever-changing needs of childbearing women. Technical support from CDC, as well as other

states' MMRC staff, will ultimately help Indiana most effectively operate its maternal mortality review program.

Section 10: Conclusion



The Indiana Maternal Mortality Review Committee was established to comprehensively review pregnancy-associated deaths in Indiana and, based on an assessment of the compiled data, identify means and opportunities to reduce or eliminate future preventable maternal loss. This process is resource-intensive and often emotionally challenging work. It remains the most comprehensive process to understand the true burden and impact of maternal mortality in Indiana.

The Indiana Department of Health and the Indiana MMRC determined an overwhelming majority of the pregnancy-associated deaths from 2020 were preventable and provided recommendations toward eliminating these. As the committee continues its work into the 2021 cohort, it is imperative that Indiana learns from these findings and looks for actionable steps to improve the health of Hoosiers.

Section 11: Appendices



MATERNAL DEATH REPORTING FORM

Maternal Death Report Indiana Department of Health



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

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 _____ phone _____

When complete, please scan and email to MMR@ISDH.in.gov

For any [questions](#) please call ISDH Maternal Mortality Review Coordinator 317-232-4300

MMRIA COMMITTEE DECISIONS FORM

MMRIA		MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v21		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		TYPE ☐ UNDERLYING* ☐ CONTRIBUTING ☐ IMMEDIATE ☐ OTHER SIGNIFICANT		
		OPTIONAL: CAUSE (DESCRIPTIVE)		
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:		
☐ 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:		

*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.
 **Encompasses Discrimination, Interpersonal Racism, and Structural Racism as described on page 4.



MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v21

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

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.)