Texas Maternal Mortality and Morbidity Review Committee and Department of State Health Services Joint Biennial Report 2024

As Required by
Texas Health and Safety Code, Section 34.015

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Executive Summary

As required by Texas Health and Safety Code, Section 34.015, the Texas Maternal Mortality and Morbidity Review Committee (MMMRC) and Department of State Health Services (DSHS) jointly submit their 2024 Biennial Report. This report contains DSHS and MMMRC findings and MMMRC recommendations to reduce the incidence of pregnancy-related death and maternal morbidity related to its review of 2020 cases. Pregnancy-related death is the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Maternal morbidity is any health condition attributed to and/or aggravated by pregnancy and childbirth that has negative outcomes to the woman's well-being.

The MMMRC's 2020 case review findings and statewide rates, ratios, and trends show opportunities to address the state's maternal mortality, morbidity, and disparity contributors.

Summary of MMMRC Recommendations

1. Improve access to comprehensive health services for all women of child-bearing age, including preconception, pregnancy, postpartum, and interpregnancy periods; facilitate continuity of care; implement effective care transitions; and promote safe birth spacing to reduce gaps and improve lifelong health.
2. Prioritize resources and treatments for pregnant and postpartum patients in future public health emergencies based on the consistent pattern of increased morbidity, mortality, and susceptibility in this population.
3. Engage Black communities and address health disparities in maternal and women's health program development.
4. Implement and amplify provider awareness of and participation in statewide maternal health and safety initiatives to reduce maternal mortality, morbidity, and health disparities.
5. Increase public awareness and community engagement to foster a culture of maternal health, safety, and disease prevention.
6. Improve integrated behavioral health care access for reproductive age women with mental health and substance use disorders.

7. Improve infrastructure and programs to address violence and intimate partner violence at state and community levels.
8. Foster safe and supportive community environments to help women achieve their full health potential.
9. Support emergency and maternal health service coordination and implement evidence-based, standardized protocols to prevent, identify, and manage obstetric and postpartum emergencies.
10. Improve postpartum care management, including education and health care coordination for those with mental health and/or high-risk medical conditions.
11. Prioritize continuing education, diversification, and increasing capacity of the maternal health workforce.
12. Apply continuous process improvement strategies for maternal mortality review protocols to support and increase case review capacity, quality, and recommendation development.

Introduction

Senate Bill (SB) 495, 83rd Texas Legislature, Regular Session, 2013, established the MMMRC within DSHS. For a current MMMRC member list, see the MMMRC webpage.

As required by Texas Health and Safety Code, Section 34.015, the MMMRC and DSHS submit a joint report on MMMRC and DSHS findings and the MMMRC's recommendations to the Governor, Lieutenant Governor, Speaker of the House of Representatives, and appropriate committees of the Legislature by September 1 of each even-numbered year.

Statute requires the MMMRC to:

- Study and review:
  - Cases of pregnancy-related death where the death of a woman was during pregnancy or within one year of the end of pregnancy from a pregnancy complication, involved a chain of events initiated by pregnancy, or an unrelated condition was aggravated by the physiologic effects of pregnancy;
  - Trends, rates, or disparities in pregnancy-related deaths and severe maternal morbidity (SMM), where unexpected outcomes of labor and delivery result in significant short or long-term health effects;
  - Health conditions and factors that disproportionately affect the most at-risk populations; and
  - Best practices and programs operating in other states with reduced pregnancy-related death rates.
- Compare pregnancy-related death rates based on the mother's socioeconomic status;
- Determine the feasibility of the review committee studying SMM cases; and
- Consult with the Perinatal Advisory Council when making recommendations to help reduce pregnancy-related deaths and SMM incidence in this state.

See the MMMRC webpage for technical term definitions used throughout this report.

Previous joint biennial reports provide findings and recommendations from the 2012, 2013 and 2019 cohorts. The 2013 and subsequent case cohorts consist of

confirmed death cases among Texas resident women that occurred during pregnancy or within one year of the end of pregnancy, including cancer deaths and accidental deaths and excluding cases outlined in Texas Health and Safety Code, Section 34.013, and external causes of injury involving transport accidents (e.g., motor vehicle crashes).[1] Beginning with the 2013 case cohort, DSHS implemented an enhanced four-step case method to better identify cases.[2]

Effective September 1, 2023, House Bill (HB) 852, 88th Texas Legislature, Regular Session, 2023, added six new MMMRC members, including physicians specializing in emergency care, cardiology, anesthesiology, and oncology; and a representative of a managed care organization. Additionally, the community advocate role was updated to include two community members with experience in a relevant health care field involving the analysis of health care data and representing an urban and rural area of the state, respectively. HB 852 also staggered MMMRC membership terms, making one-third of the terms expire every odd-numbered year.

During the 88th Texas Legislature, Regular Session, 2023, DSHS received funding to modernize the data systems that support its Maternal and Child Health (MCH) programs. One of these projects is the development of the Maternal Mortality Review System (MMRS), which will support MMMRC functions by allowing for more efficient and timelier case identification and better workflow tracking. The MMRS will also improve case sharing efficiencies, support case review documentation and reporting, and streamline data analytics.

The MMMRC determined 85 of the pregnancy-associated cases fit the definition of pregnancy related. This report discusses the findings and recommendations derived from analyses of these 85 pregnancy-related 2020 cases and statewide trends. From September 2022 to May 2024, the MMMRC reviewed the 203 pregnancy-associated cases of the final 2020 cohort to evaluate which of the cases were due to a pregnancy complication, a chain of events initiated by the pregnancy, or the physiologic effects of the pregnancy aggravated an unrelated condition.

The MMMRC Subcommittee on Maternal Health Disparities continued meeting and conducted the following activities:

[1] The case cohort included transport deaths involving homicide or suicide.
[2] Baeva, S., Saxton, D. L., Ruggiero, K., Kormondy, M. L., Hollier, L. M., Hellerstedt, J., Hall, M., & Archer, N. P. (2018). Identifying Maternal Deaths in Texas Using an Enhanced Method, 2012. Obstetrics and gynecology, 131(5), 762–769.

- Supporting case review and studying trends, rates, and disparities among 2020 pregnancy-related death cases and state Severe Maternal Morbidity data to provide recommendations; and
- Creating a Homicide Workgroup to assist the MMMRC in determining whether homicide cases are pregnancy related; for example, whether the pregnancy initiated a chain of events leading to the homicide. The workgroup is developing a standardized tool and will pilot the tool for evaluation by the MMMRC.

In response to the coronavirus disease 2019 (COVID-19) pandemic's impact on maternal health outcomes in Texas, the MMMRC established the Subcommittee on COVID-19 to investigate how factors related to COVID-19 may have contributed to maternal outcomes. Subcommittee activities included:

- Studying trends, rates, and disparities among 2020 pregnancy-related death cases to provide input on deaths caused by COVID-19;
- Developing the Texas Pregnancy Relatedness Criteria for Pregnancy-Associated Deaths due to COVID-19 tool to assist the MMMRC with recommendations for evaluating cases when the death occurred during the pandemic;
- Developing materials and adapting processes to augment review of cases where the death occurred during the pandemic; and
- Presenting a poster, "Texas Maternal Mortality and Morbidity Committee (MMMRC): Putting a Lens on COVID-19 Related Maternal Deaths," at the Center for Disease Control and Prevention (CDC) Enhancing Reviews and Surveillance to Eliminate Maternal Mortality Review Information Application (MMRIA) User Meeting in Atlanta, Georgia, in April 2024.

In 2024, the MMMRC also established a Research and Publication Subcommittee to develop and implement a strategy for identifying, organizing, and conducting research on maternal health topics, and executing a formalized process for developing subsequent MMMRC publications.

Findings

The following section presents findings from the MMMRC review of pregnancy-related deaths and analyses of statewide trends, rates, and disparities. Pregnancy-related death is the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. These findings inform the MMMRC's recommendations described later in this report.

DSHS Data Analytics Overview

In January 2024, DSHS published the 2022/2023 Healthy Texas Mothers and Babies Data Book (Data Book). In June 2024, DSHS converted the Data Book, and other data products related to infant and maternal health, into interactive dashboards now available on Texas Health Data.

The Texas enhanced maternal mortality ratio (MMR) is the number of maternal deaths per 100,000 live births. The MMR is created to help identify data trends and compare maternal mortality data sets across time periods. Maternal deaths are any deaths that occur during pregnancy or within 42 days of the end of pregnancy regardless of cause but excluding motor vehicle accidents. Maternal deaths represent a shorter time frame than pregnancy-associated deaths, which cover the duration of pregnancy and a full 365 days after the end of the pregnancy. The Texas MMR remained relatively stable between 2013 and 2017, fluctuating between 18.3 and 20.7 deaths per 100,000 live births, and decreased in 2018 and 2019 to 17.0 and 17.2 deaths per 100,000 live births, respectively. In 2020 and 2021, the MMR increased to 27.7 and 37.7 deaths per 100,000 live births, respectively, due in part to deaths related to COVID-19. If COVID-19 maternal deaths are excluded, the updated MMRs would be 24.2 per 100,000 live births in 2020 and 23.0 per 100,000 live births in 2021.

In August 2023, DSHS completed a cause and timing of death analysis for 407 linked pregnancy-associated deaths from 2016 to 2019, where the death of a woman was during pregnancy or within one year of the end of pregnancy, regardless of cause. Among these 407 pregnancy-associated deaths, the leading causes of death were cardiac events (including heart attack and chronic conditions), accidental drug poisoning, homicide, and suicide. Most of the 407 pregnancy-associated deaths took place between 61 days and one year postpartum (65

percent; n=265). The maternal death rate was highest among non-Hispanic Black women, women with a high school education or equivalent, and women ages 40 years and older.

Severe maternal morbidity, or SMM, is the unintended outcome of labor and delivery that results in significant consequences to a mother's health.[3] In 2021, the Texas SMM rate was 85.5 cases per 100,000 delivery hospitalizations, an increase from 72.7 cases per 100,000 delivery hospitalizations in 2020. Non-Hispanic Black women in Texas continue to experience the greatest burden of SMM. In 2021, the SMM rate for non-Hispanic Black women was 134.4 cases per 100,000 delivery hospitalizations, compared to:

- 82.6 cases per 100,000 delivery hospitalizations for non-Hispanic women of other races;
- 82.2 cases per 100,000 delivery hospitalizations for Hispanic women; and
- 72.6 cases per 100,000 delivery hospitalizations for non-Hispanic White women.

Additional data are available as interactive dashboards on Texas Health Data.

MMMRC 2020 Case Cohort Review Findings

The MMMRC studies conditions around each pregnancy-associated death (the death of a woman during pregnancy or within one year of the end of pregnancy, regardless of cause) to determine pregnancy-relatedness by answering the question, "*If she had not been pregnant, would she have died?*."

If the MMMRC determines the answer to that question was "no" and so the case was a pregnancy-related death, the MMMRC then determines the underlying cause of death, if the death was potentially preventable, the critical factors contributing to the death, and recommendations and actions that can address and meaningfully impact the contributing factors. The MMMRC used the CDC MMRIA form to document case review findings.

Finding #1 – 42 percent of pregnancy-associated deaths from the 2020 case cohort were pregnancy-related.

[3] Centers for Disease Control and Prevention (CDC, 2021, February). Severe Maternal Morbidity in the United States. Retrieved from https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/index.html [Accessed August 17. 2024].

The MMMRC determined that, of the 203 pregnancy-associated death cases (the death of a woman during pregnancy or within one year of the end of pregnancy, regardless of cause) in 2020, 85 (42 percent) were pregnancy related and were due to a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. 97 deaths (48 percent) were pregnancy associated, but not pregnancy related. The MMMRC was unable to determine pregnancy-relatedness for 21 (10 percent) of the 203 pregnancy-associated death cases.

Finding #2 – Most pregnancy-related deaths were preventable.

The MMMRC determines a pregnancy-related death is preventable if it finds there was at least some chance of averting the death by one or more feasible changes to the circumstances of the patient, provider, facility, systems, or community factors contributing to the death. The MMMRC determined there was at least some chance for preventability in 80 percent (n=68) of the 85 pregnancy-related deaths in 2020 that were due in some part to the pregnancy.[4]

Finding #3 – Six underlying causes of death accounted for 78 percent of all 2020 pregnancy-related deaths.

Among the 85 pregnancy-related cases in 2020, infections were the most frequently observed underlying cause of pregnancy-related death (25 percent; n=21), followed by cardiovascular conditions (excluding cardiomyopathy, hypertensive disorders of pregnancy, and cerebrovascular accidents) (14 percent; n=12), obstetric hemorrhage (excluding aneurysms and cerebrovascular accidents) (14 percent; n=12), non-cerebral thrombotic embolism (11 percent; n=9), cerebrovascular accident not secondary to hypertensive disorders of pregnancy (7 percent; n=6), and mental health conditions (7 percent; n=6).[5]

Finding #4 – Multiple underlying conditions contributed to pregnancy-related deaths due to infection, cardiovascular conditions, and obstetric hemorrhage.

[4] This report uses the lower case 'n' to show the numerator for a percentage and the upper case 'N' to show the denominator. For example, 68 (n) of 85 (N), or 80 percent, of pregnancy-related deaths in 2020 were preventable.
[5] According to the World Health Organization, the underlying cause of death is the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence that produced the fatal injury.

21 of 85 pregnancy-related deaths were due to infection in 2020 where the MMMRC determined the death was due in some part to the pregnancy. Of these 21 infection deaths, COVID-19 was the top underlying condition (67 percent; n=14), followed by sepsis or septic shock (24 percent; n=5),[6] postpartum genital tract infection (5 percent; n=1), and other non-pelvic infection (e.g., tuberculosis, meningitis, HIV) (5 percent; n=1).

Among the 12 pregnancy-related deaths due to cardiovascular conditions in 2020, vascular aneurysm or dissection (non-cerebral) was the top underlying condition (33 percent; n=4), followed by hypertensive cardiovascular disease (25 percent; n=3), conduction defects or arrhythmias and other cardiovascular conditions not otherwise specified (e.g., cardiomegaly, cardiac hypertrophy) (17 percent or n=2, each), and congenital or acquired valvular heart disease (8 percent; n=1).

Among the 12 pregnancy-related deaths due to obstetric hemorrhage in 2020, uterine atony or postpartum hemorrhage was the top underlying condition (36 percent; n=5), followed by ruptured ectopic pregnancy (25 percent; n=3), placenta accreta spectrum disorders (17 percent; n=2), and uterine rupture or other hemorrhages not otherwise specified (8 percent or n=1, each).

Finding #5 – The MMMRC has identified key circumstances surrounding death contributed to pregnancy-related deaths.

Through case review, the MMMRC identified the following circumstances surrounding death contributed to many of the 85 pregnancy-related deaths in 2020.

Pregnancy-related suicide or homicide deaths represented 9 percent of the 85 pregnancy-related deaths in 2020 (n=8) where a chain of events initiated by pregnancy contributed to the death.[7] The MMMRC found violence, including intimate partner violence, contributed to death. The most frequent means of fatal injury resulting in violent pregnancy-related death were firearms, followed by drug poisoning, falls, airway restriction, and sharp instruments.

In addition, obesity (26 percent, n=22), mental disorders other than substance use disorder (SUD) (8 percent; n=7), and SUD including SUD-associated with mental

[6] Among the five pregnancy-related deaths due to sepsis or septic shock, one had "COVID-19 Person Under Investigation (PUI)" listed as an "other significant" cause of death by the committee.
[7] The manner of death is the determination of how the injury or disease leads to death. There are five manners of death (natural, accident, suicide, homicide, and undetermined).

disorders (7 percent; n=6) all contributed to many of the 85 pregnancy-related deaths in 2020.

Finally, evidence was present in 16 of the 85 cases of pregnancy-related death in 2020 that women experienced additional barriers to care based on their individual circumstances. For these 16 cases, the underlying cause of death varied, with the leading cause of death being infection (n=6). The MMMRC determined there was at least some chance for preventability in 81 percent (n=13) of these 16 cases. Most of these 16 women died during pregnancy or within 42 days of the end of pregnancy and were Hispanic (n=6) or non-Hispanic Black (n=6) women. Specifically, the MMMRC found examples of:

- Inadequate care due to language barriers, mental health conditions, or other life course factors;
- Stigma toward people experiencing SUD;
- Barriers for these 16 cases included housing, safe living environments; and violence against women and pregnant women; and
- Barriers to accessing ongoing care during pregnancy and postpartum.

Finding #6 – A complex interaction of factors and characteristics contribute to preventable death.

Factors contributing to a pregnancy-related death may impact a woman over her entire life. The MMMRC identified 595 factors that contributed to the 68 preventable pregnancy-related cases in the 2020 cohort, with an average of 8.8 contributing factors per pregnancy-related case. These factors help cause or aggravate the conditions or events leading up to and surrounding the death of a woman during her pregnancy or up to one year of the end of her pregnancy. Contributing factors are categorized within domains that indicate targeted prevention action levels. Identified contributing factors for the 68 preventable pregnancy-related deaths were distributed among the systems of care (33 percent), the provider (31 percent), facility (20 percent), community (11 percent), and patient and family (5 percent) domains (see Appendix A).

Finding #7 – Compared to 2019, the 2020 Texas pregnancy-related mortality ratio increased, and disparities persisted, with non-Hispanic Black women, older women, and women with a high school education or less being most disproportionately impacted.

The Texas pregnancy-related mortality ratio (PRMR) calculates the number of deaths where the death was due in some part to the pregnancy per 100,000 live births. The PRMR is created to help identify data trends and compare pregnancy-related mortality data sets across time periods or different population groups. The PRMR for 2020 was 23.1 pregnancy-related deaths per 100,000 live births, an increase from 2019 (16.7 per 100,000 live births). If pregnancy-related deaths due to COVID-19 are excluded from the PRMR, the overall PRMR (19.3 per 100,000 live births) would still be greater in 2020 than in 2019. Similarly, the PRMRs for Hispanic women, non-Hispanic Black women, and non-Hispanic women of other races increased in 2020 (22.2, 39.0, and 32.2 deaths per 100,000 live births, respectively) compared to 2019 (13.4, 27.9, and 10.4 deaths per 100,000 live births, respectively). For non-Hispanic White women, the 2020 PRMR was 16.1 pregnancy-related deaths per 100,000 live births, which is a decrease from 2019 (18.8 per 100,000 live births).

Disparities persist in pregnancy-related mortality. In 2020, the PRMR was greatest among non-Hispanic Black women compared to all other race/ethnicity groups. The PRMR for non-Hispanic Black women was roughly 2.5 times greater than that for non-Hispanic White women in 2020. Also in 2020, the PRMR was highest among:

- Women ages 40 years or older (99.5 per 100,000 live births)[8] compared to women of other ages; and
- Women with a high school degree or equivalent (32.6 per 100,000 live births) and women with less than a high school degree (26.2 per 100,000 live births) compared to women with some college education or a college degree (see Appendix B).

PRMRs for 2013, 2019, and 2020 are available as interactive dashboards on Texas Health Data.

Finding #8 – Preventability varied by underlying cause of death and across years.

DSHS conducted analyses of pregnancy-related deaths that occurred in 2019 and 2020, alone and in combination, to observe patterns across these two consecutive years. Pregnancy-related death is the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events

[8] This rate has less than 20 counts and should be interpreted with caution. The PRMR for women ages 30 and older is 32.6 per 100,000 live births.

initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. See Appendix C for graphs related to these findings.

There were 148 pregnancy-related deaths in 2019 (n=63) and 2020 (n=85), combined. Most pregnancy-related deaths were preventable, regardless of the underlying cause. The committee determine that 125, or 84 percent, of 148 pregnancy-related deaths in 2019 and 2020 were preventable. The committee determined that 100 percent of deaths due to mental health conditions (n=20; N=20), 90 percent of deaths due to cardiomyopathy (n=9; N=10), 88 percent of deaths due to obstetric hemorrhage (n=22; N=25), 88 percent of deaths due to non-cerebral thrombotic embolism (n=15; N=17), 85 percent of deaths due to infections (n=22; N=26), and 81 percent of deaths due to cardiovascular conditions (n=13; N=16) were preventable (see Figure C-1).

Finding #9 – Timing of death in relation to pregnancy varied by underlying cause of death.

Of the 148 pregnancy-related deaths in 2019 and 2020, combined, 73 percent of deaths due to infections (n=19; N=26), 53 percent of deaths due to non-cerebral thrombotic embolism (n=9; N=17), 55 percent of deaths due to cardiovascular conditions (n=9; N=16), and 60 percent of deaths due to cardiomyopathy (n=6; N=10), occurred within 42 days of the end of pregnancy.

Among the 25 pregnancy-related deaths due to obstetric hemorrhage, 48 percent of deaths occurred during pregnancy and within 42 days of the end of pregnancy, each (n=12, each).

Among the 20 pregnancy-related deaths due to mental health conditions, 85 percent (n=17; N=20) occurred 43 days to one year after the end of pregnancy (see Figure C-2).

Finding #10 – The leading causes of pregnancy-related death varied by race and ethnicity.

Among the 148 pregnancy-related deaths in 2019 and 2020, combined, 43 percent of deaths were Hispanic women (n=63), 28 percent were non-Hispanic White women (n=42), 21 percent were non-Hispanic Black women (n=31), and eight percent were non-Hispanic women of other races (n=12).

- Infections were the leading cause of death for Hispanic women (35 percent; n=22; N=63).
- Mental health conditions were the leading cause of death for non-Hispanic White women (31 percent; n=13; N=42).
- Non-cerebral thrombotic embolism was the leading cause of death for non-Hispanic Black women (23 percent; n=7; N=31).
- Cardiovascular conditions were the leading cause of death among non-Hispanic women of other races (25 percent; n=3; N=12) (see Figure C-3).

Finding #11 – Most pregnancy-related deaths occur in hospitals except for deaths due to mental health conditions.

Of the 148 pregnancy-related deaths in 2019 and 2020, combined, 76 percent occurred in hospitals. Across pregnancy-related deaths in 2019 and 2020, 100 percent of deaths due to infection (n=26; N=26), 92 percent of deaths due to obstetric hemorrhage (n=23; N=25), 88 percent of deaths due to non-cerebral thrombotic embolism (n=15; N=17), 80 percent of deaths due to cardiomyopathy (n=8; N=10), and 56 percent of deaths due to cardiovascular conditions (n=9; N=16) occurred in hospitals. In contrast, 65 percent of deaths due to mental health conditions occurred outside of hospitals (n=13; N=20) (see Figure C-4).

Finding #12 – A complex interplay of factors contribute to preventable pregnancy-related death.

The MMMRC identified 1,087 factors that contributed to the preventable pregnancy-related deaths in 2019 and 2020, combined (N=125). For these 125 deaths, the death was both due in some part to the pregnancy and also had some chance of preventability if feasible changes were implemented. Contributing factors for these 125 deaths were distributed among the provider (31 percent), systems of care (27 percent), facility (17 percent), patient and family (14 percent), and community (11 percent) action levels. Across both 2019 and 2020 combined, the committee assigned most contributing factors for preventable pregnancy-related deaths at the provider level, regardless of race or ethnicity and underlying cause of death (see Figure C-5). However, for preventable pregnancy-related deaths due to mental health conditions, most contributing factors were assigned at the systems of care action level (see Figure C-6).

MMMRC Recommendations

The MMMRC considered findings from their review of pregnancy-related death cases and additional analyses to apply their collective multidisciplinary expertise to make the following prevention and process improvement recommendations. Pregnancy-related death is the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

MMMRC Recommendation #1: Improve access to comprehensive health services for all women of child-bearing age, including preconception, pregnancy, postpartum, and interpregnancy periods; facilitate continuity of care; implement effective care transitions; and promote safe birth spacing to reduce gaps and improve lifelong health.

The MMMRC continues to find pregnancy-related deaths occurring up to 12 months postpartum, with 25 percent of pregnancy-related deaths in 2020 occurring 43 days to one year after the end of pregnancy. In line with previous recommendations, the Legislature passed and Governor Abbott signed into law HB 12, 88th Texas Legislature, Regular Session, 2023, which extended Medicaid for Pregnant Women coverage to 12 months after pregnancy beginning on March 1, 2024.

Data shows steady increases in the percentage of maternal hypertension and diabetes across all races and ethnicities from 2012 to 2021. Pre-pregnancy obesity also increased over this same period and is associated with diabetes and hypertension. In 2021, 25.1 percent of all mothers with pre-pregnancy obesity had hypertension, diabetes, or both. In 2020, 10.1 percent of women had an interbirth interval less than 18 months. (Additional data can be found at Texas Health Data).

Additionally, short interpregnancy intervals ranging from six to 18 months increase risk of maternal and neonatal morbidity and mortality.[9, 10]

[9] The American College of Obstetricians and Gynecologists (2018). Interpregnancy Care. Retrieved from https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2019/01/interpregnancy-care

[10] Ni, W., Gao, X., Su, X., Cai, J., Zhang, S., Zheng, L., & Zeng, F. (2023). Birth spacing and risk of adverse pregnancy and birth outcomes: A systematic review and dose–response meta-analysis. Acta Obstetricia et Gynecologica Scandinavica, 102(12), 1618-1633.

Non-Medical Drivers of Health (NMDOH) are conditions in places where people live, learn, work, and play that affect a wide range of health risks and outcomes.[11] The MMMRC identified NMDOH contributing factors for maternal mortality and morbidity included inadequate birth spacing, food insecurity, economic instability, safety, transportation, and childcare.

The MMMRC recommends:

- Optimizing health services programming, including Healthy Texas Women and Children's Health Insurance Program;
- Enhancing the geographic coverage of existing health services programs;
- Addressing barriers by increasing screening and programs that address NMDOH; and
- Bolstering contraceptive coverage for women of child-bearing age to support optimal birth spacing.

MMMRC Recommendation #2: Prioritization of resources and treatments for pregnant and postpartum patients in future public health emergencies based on the consistent pattern of increased morbidity, mortality, and susceptibility in this population.

The MMMRC found that COVID-19 was the leading underlying cause of pregnancy-related death for infection. Among the 21 pregnancy-related deaths due to infection in 2020, 14 of those deaths (67 percent) were COVID-19.

Common themes that emerged during case review included delay or lack of offering available standard of care treatments, managing pregnant women with additional high-risk factors for illness severity and with features of severe illness as an outpatient, and delay in diagnosis of COVID infection until illness severity was advanced.

The MMMRC recommends:

- Bolstering partnerships with local, state, and federal organizations to improve coordination of resources for pregnant and postpartum women;

[11] Non-Medical Drivers of Health, Texas Health and Human Services, last reviewed June 3, 2024, https://www.hhs.texas.gov/about/process-improvement/improving-services-texans/medicaid-chip-quality-efficiency-improvement/non-medical-drivers-health.

- Diversifying methods of communication with the public and health care providers for critical messaging and best practices during a public health emergency;
- Developing research protocols that collect and analyze data specific to pregnant women, including maternal and fetal outcomes, to generate more robust evidence and communicate transparently with healthcare providers; and
- Improving access to and prioritization for testing and reporting for those at highest risk during public health emergencies, including pregnant and postpartum women.

MMMRC Recommendation #3: Engage Black communities and address health disparities in maternal and women's health program development.

The MMMRC found persistent disparities in maternal health outcomes. As one of the five components of the Alliance of Innovation in Maternal Health (AIM) structure, TexasAIM promotes "Respectful Care" for women by encouraging providers to:

- Engage in open, transparent, empathic, and culturally competent communication with pregnant and postpartum women and their identified support network to understand diagnoses, options, and treatment plans;
- Develop plans to address reported cases of inequitable care, miscommunication, or disrespect;
- Include pregnant and postpartum women and their identified support networks as respected members of and contributors to the multidisciplinary care team;
- Disaggregate quality improvement data by race, ethnicity, and payor and apply frameworks for targeting maternal health disparities;
- Use informed, bidirectional, shared decision-making that incorporates pregnant and postpartum women's values and goals as the primary driver; and
- Offer trauma-informed support for patients and their identified support networks after serious complications.

The MMMRC recommends:

- Supporting implementation of TexasAIM maternal health and safety bundles with a focus on the respectful care arm of the program, especially:

    - Disaggregating hospital data based on race and ethnicity; and
    - Including the patient voice at the level of hospital quality assessment and process improvement.
- Programs fully engaging non-Hispanic Black mothers and their support networks in planning, developing, and evaluating maternal health and safety programs and services;
- Requiring obstetric care providers to complete training programs and e-learning curricula to help providers respond to patients' health care needs in a culturally and linguistically appropriate manner and incorporate a continuing education requirement into state licensure and hospital/birth center credentialling;
- Communities supporting Centering programs that serve mothers and communities to bring individual experiences and community-defined solutions to inform program development (see Appendix D for information on Centering); and
- Integrating causes of maternal health disparities in graduate medical education curriculum and promoting best practice training to reduce health barriers.

MMMRC Recommendation #4: Implement and amplify provider awareness of and participation in statewide maternal health and safety initiatives to reduce maternal mortality, morbidity, and health disparities.

The MMMRC found opportunities to improve clinical skill and quality of care at provider, facility, and systems of care action levels as a way to reduce preventable death. For the 2020 cohort, sepsis and cardiovascular conditions were the top two causes of pregnancy-related death due in some part to a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. The MMMRC determined that the leading cause of pregnancy-related death for Hispanic women across 2019 and 2020 cohorts was infection. In addition, most contributing factors related to sepsis and cardiovascular conditions were at the provider level.

TexasAIM continues to implement maternal safety bundles related to the top causes of preventable pregnancy-related death and SMM (severe maternal morbidity), where an unintended outcome of labor and delivery leads to short or long-term health impacts for the mother. Maternal safety bundles help providers and facilities implement a structure of achievable evidence-based interventions to improve

outcomes for pregnant women. Bundles focus on specific health issues impacting pregnant women and mothers. DSHS will be launching the Sepsis in Obstetric Care bundle in December 2024, followed by the Cardiac Conditions in Obstetric Care bundle.

The MMMRC recommends:

- Continuing coordinated efforts to expand maternal health and safety quality improvement initiatives through the DSHS TexasAIM Initiative and the Texas Collaborative for Healthy Mothers and Babies (TCHMB);
- Implementing evidence-based programs such as the federal Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) framework in health care settings to improve communication and teamwork;
- Implementing the multidisciplinary recommendations from the American Heart Association to prevent death and disability from cardiovascular disease; and
- TexasAIM continuing to support health systems with implementing evidence-based standards, guidelines, and best practices; integrating behavioral health care access for women with mental health and substance abuse disorders; conducting multidisciplinary team simulations; increasing patient and family engagement; and promoting health care quality improvement to reduce maternal mortality and morbidity.

MMMRC Recommendation #5: Increase public awareness and community engagement to foster a culture of maternal health, safety, and disease prevention.

The MMMRC continues to see opportunities for increased knowledge regarding the importance of a severe health event, treatment, or follow up at the patient or family, provider, facility, systems of care, and community action levels.

The MMMRC recommends:

- Increasing awareness about urgent maternal warning signs, risk factors, and circumstances that contribute to poor maternal health outcomes;
- Supporting DSHS, including the Hear Her Texas campaign, and other partners to continue to amplify critical messaging related to maternal health;
- Promoting awareness about healthy behaviors and preventive services;

- Fostering and building community awareness through strategic community partnerships and use of novel approaches to reach target audiences;
- Supporting statewide efforts to combat human trafficking and intimate partner violence; and
- Increasing naloxone awareness and access by providers, hospitals, and communities for women with SUD.

MMMRC Recommendation #6: Improve integrated behavioral health care access for reproductive age women with mental health and substance use disorders.

The MMMRC found mental health and substance use disorders contribute to pregnancy-related death and are often co-occurring. The MMMRC determined that 100 percent of the 20 pregnancy-related deaths due to mental health conditions in 2019 and 2020 were preventable. Also, the MMMRC found that 85 percent of pregnancy-related deaths due to mental health conditions occurred 43 days to one year after the end of pregnancy. Additionally, most contributing factors for preventable pregnancy-related deaths due to mental health conditions were at the systems level.

Providers should be trained on appropriate screening, diagnosis, referral, and treatment for perinatal mood and anxiety disorders (PMAD) and have access to behavioral health providers to help prevent pregnancy related deaths. Using social work, case management, and similar services can facilitate connections to appropriate community resources.

The MMMRC recommends:

- Supporting TexasAIM and its partners in statewide implementation of the mental health and SUD bundle;
- Expanding inpatient psychiatric care access for women in late pregnancy or early postpartum with the ability to keep mother and baby together;
- Supporting pilot programs that embed social and behavioral health service providers in community wellness emergency response teams;
- Supporting evidence-based home visiting programs such as Nurse-Family Partnership, postpartum doulas, and specially trained community health workers;

- Implementing the recommendations from the American College of Obstetricians Gynecologists (ACOG) Policy Statement: Substance Abuse Reporting and Pregnancy: The Role of the Obstetrician–Gynecologist to support mothers with SUD in pregnancy;
- Promoting Maternal Levels of Care and the National Maternal Mental Health Hotline;
- Encouraging payors to cover psychosocial support for pregnant and postpartum women who are at high-risk for psychiatric disorders;
- Working with public health organizations, campaigns, clinicians, and community organizations to normalize and destigmatize behavioral health disorders and seeking treatment;
- Promoting shared decision-making of continuing medication, and educating families and support networks of pregnant and postpartum populations at increased suicide risk on urgent warning signs and self-harm risk reduction strategies; and
- Supporting and identifying strategies to increase access and utilization of Perinatal Psychiatric Access Network (PeriPAN).

MMMRC Recommendation #7: Improve infrastructure and programs to address violence and intimate partner violence at state and community levels.

The MMMRC found violence, including intimate partner violence (IPV), contributed to death and partners were most likely to be perpetrators of homicide. The MMMRC recommends providers and stakeholders increase competencies, skills, and prevention strategies for violence, IPV, and trauma-informed care. Per ACOG recommendations, providers should routinely screen for IPV at periodic intervals, offer ongoing support, and review available prevention and referral options.[12]

The MMMRC recommends:

- Supporting implementation of Texas Council on Family Violence recommendations and toolkit, raising awareness of and supporting publicly

[12] ACOG Committee Opinion No. 518: Intimate partner violence. (2012). Obstetrics and gynecology, 119(2 Pt 1), 412–417. Available at journals.lww.com/greenjournal/Citation/2012/02000/Committee_Opinion_No__518__Intimate_Partner.51.aspx.

available campaigns and programs that address violence, IPV, healthy relationships, self-esteem, and conflict resolution;

- Promoting universal screening and support for women experiencing IPV in all healthcare settings that care for women; and
- Providing trauma-informed care for women experiencing IPV.

MMMRC Recommendation #8: Foster safe and supportive community environments to help women achieve their full health potential.

To address NMDOH and improve maternal health outcomes throughout the first postpartum year and between pregnancies, the MMMRC recommends adopting evidence-based policies that support women's ability to protect and care for themselves and their newborns during pregnancy and recuperation from childbirth.[13, 14]

The MMMRC recommends:

- Promoting prenatal and postpartum referrals and participation in the Texas Special Supplemental Nutrition Program for Women, Infants, and Children Program;
- Bolstering care coordination services and referral systems to address risk factors and prevent harm;
- Increasing community capacity for programs that provide safe and secure housing with transitional services, access to comprehensive case management services, and housing assistance for unhoused pregnant and postpartum mothers and their families; and
- Strengthening access to paid sick and family and parental leave.

MMMRC Recommendation #9: Support emergency and maternal health service coordination and implement evidence-based, standardized

[13] ACOG Committee Opinion No. 736: Optimizing Postpartum Care. (2018). Obstetrics and gynecology, 131(5), e140–e150. Available at journals.lww.com/greenjournal/FullText/2018/09000/ACOG_Committee_Opinion_No__736__Optimizing.50.aspx.

[14] Dagher, R.K., McGovern, P.M., & Dowd, B.E. (2014). Maternity Leave Duration and Postpartum Mental and Physical Health: Implications for Leave Policies. Journal of Health Politics, Policy and Law, 39(2): 369–416. Available at doi.org/10.1215/03616878-2416247.

protocols to prevent, identify, and manage obstetric and postpartum emergencies.

The MMMRC found most pregnancy-related deaths were preventable. Pregnancy-related death is the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Interaction with emergency medical services is commonly observed during MMMRC case review and sometimes significant in the circumstances that preceded death. Emergency health care provider knowledge about maternal health, as well as communication and coordination with obstetric and women's health professionals, are critical factors in preventing pregnancy-related deaths.

The MMMRC recommends:

- Optimizing coordination between emergency and maternal health services;
- Incorporating emergency department (ED) representation in existing maternal health and safety programs;
- Implementing ED system algorithms as proposed by ACOG in "Identifying and Managing Obstetric Emergencies in Non-Obstetric Settings";
- Disseminating maternal early warning system (MEWS), obstetric hemorrhage, hypertension, sepsis, and venous thromboembolism educational materials to ED clinical teams and other units such as Intensive Care Units and Post Anesthesia Care Units;
- Identifying and triaging the high-risk status of pregnant and postpartum patients by ED providers and developing a system to access obstetric provider consultation;
- Implementing emergency medical service (EMS) and private transport team obstetric-specific training and simulations;
- Incorporating obstetric-specific training in trauma levels of care and emphasize obstetric hemorrhage, hypertension, sepsis, other cardiac conditions, and venous thromboembolism maternal safety initiatives; and
- Educating providers in freestanding EDs on postpartum warning signs, diagnosis, and treatment.

MMMRC Recommendation #10: Improve postpartum care management, including education and health care coordination for those with mental health and/or high-risk medical conditions.

Pregnancy-related deaths can occur during pregnancy, delivery, or within the year after pregnancy. Since most pregnancy-related deaths occur after pregnancy, health care systems should focus on patient-centered postpartum care.

The MMMRC recommends:

- Providing anticipatory guidance to women and their families about the postpartum period;
- Developing systems for identifying and appropriately assessing postpartum women's needs in ambulatory care settings; and
- Promoting best practices in postpartum care and use of maternal health and education services.

MMMRC Recommendation #11: Prioritize continuing education, diversification, and increasing maternal health workforce capacity.

To reinforce patient relatability and connection with providers and staff, the MMMRC recommends developing a workforce that reflects the diversity of Texas.[15, 16] As a result of HB 1575, 88th Texas Legislature, Regular Session, 2023, Medicaid increased access to existing support services by allowing community health workers and doulas to be reimbursed for providing services shown to improve maternal and infant health outcomes and increase self-sufficiency.

The MMMRC recommends:

- Expanding provider incentive programs to enhance coverage in rural and women's health care shortage areas;

[15] Jetty, A., Jabbarpour, Y., Pollack, J. et al. (2022) Patient-Physician Racial Concordance Associated with Improved Healthcare Use and Lower Healthcare Expenditures in Minority Populations. J. Racial and Ethnic Health Disparities, 9(1), 68–81. Available at link.springer.com/article/10.1007/s40615-020-00930-4.

[16] Shen MJ, Peterson EB, Costas-Muñiz R, Hernandez MH, Jewell ST, Matsoukas K, Bylund CL. (2018). The Effects of Race and Racial Concordance on Patient-Physician Communication: A Systematic Review of the Literature. J Racial Ethn Health Disparities. 2018 Feb;5(1):117-140. Available at pubmed.ncbi.nlm.nih.gov/28275996/.

- Enhancing coverage for birth doulas and postpartum doulas, community health workers, and home visiting programs to increase full spectrum maternal support during the pregnancy and postpartum period;
- Exploring incentives and alternative payment plans for health care providers to increase their participation in providing care for women who have Medicaid; and
- Requiring participation in team-based simulations and skills labs for ongoing maintenance of credentials for healthcare providers.

MMMRC Recommendation #12: Apply continuous process improvement strategies for maternal mortality review protocols to support and increase case review capacity, quality, and recommendation development.

The MMMRC found opportunities exist to improve maternal mortality tracking and analysis.

The MMMRC recommends:

- DSHS, professional organizations, and death certifier training programs should continue to promote practices for increased accuracy of pregnancy-associated death certification for deaths that occur during pregnancy or within one year of the end of pregnancy, regardless of cause. The practices should continue training death certifiers and establishing processes to accurately assess whether deaths occurred during pregnancy or within a year of the end of pregnancy;
- Supporting DSHS in quality improvement initiatives focused on death certificate data quality;
- Requiring an autopsy with toxicology be performed in a case where there is a death during pregnancy or within one year;
- Exploring and engaging in opportunities to incorporate informant interviews, eliminate the redaction requirement, and share information and best practices with other states and organizations to support case review, recommendation development, and program implementation;
- Including formal maternal facility designation level of care for all maternal deaths occurring at hospital facilities as part of the case review process; and
- Evaluating the ongoing impact of system changes, such as HB 12 and HB 1575, on maternal morbidity and mortality in Texas.

Conclusion

The MMMRC brings together multidisciplinary professionals from across the state to comprehensively study how and why Texas mothers have died and to identify opportunities to prevent future deaths. Maternal mortality and morbidity contributing factors are complex and occur over the life course, and the MMMRC focuses its findings and recommendations on factors that impact maternal health at the individual, family, provider, facility, systems of care, and community action levels.

While this report's findings and MMMRC recommendations represent priority opportunities to reduce preventable maternal mortality, multiple factors impact maternal health population outcomes and the protection of mothers must be a combined effort across entities, levels, and systems. The MMMRC encourages stakeholders to review these findings and recommendations to identify where they can contribute to efforts to eliminate health disparities and foster a culture of maternal health and safety. Strengthening stakeholder communications, outreach, and cross-sector and disciplinary partnerships will continue to help move MMMRC recommendations into action.

Healthier women become healthier mothers, who contribute to healthier infants, families, and communities. The MMMRC and DSHS recognize the loss of even one mother is one too many and remain deeply committed to improving maternal health and safety for Texans and those forever impacted by the loss of a mother.

Appendix A. Contributing Factors by Action Level for Preventable, Pregnancy-Related Deaths, 2020

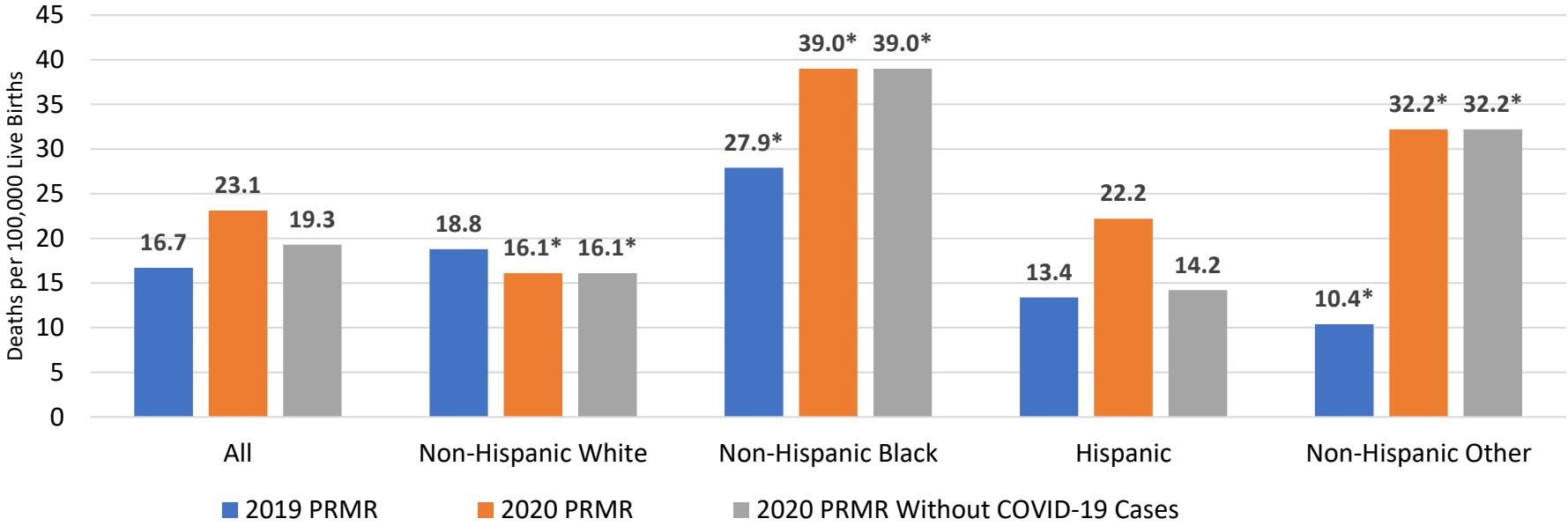
Table A-1. Percent of Contributing Factors by Action Level for Six Leading Causes of Pregnancy-Related Death[17], 2020.

	Systems of Care	Provider	Facility	Community	Patient/ Family
All Causes (N=85)	33% (195)	31% (187)	20% (121)	11% (64)	5% (28)
Infection (n=21)	38% (50)	30% (39)	23% (30)	7% (9)	2% (2)
Cardiovascular Conditions (n=12)	30% (29)	41% (40)	13% (13)	10% (10)	5% (5)
Obstetric Hemorrhage (n=12)	34% (38)	29% (32)	32% (35)	4% (4)	2% (2)
Embolism (n=9)	29% (20)	36% (25)	21% (15)	4% (3)	10% (7)
Cerebrovascular Accidents (n=6)	31% (12)	26% (10)	15% (6)	18% (7)	11% (4)
Mental Health Conditions (=6)	27% (14)	31% (16)	8% (4)	27% (14)	8% (4)

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

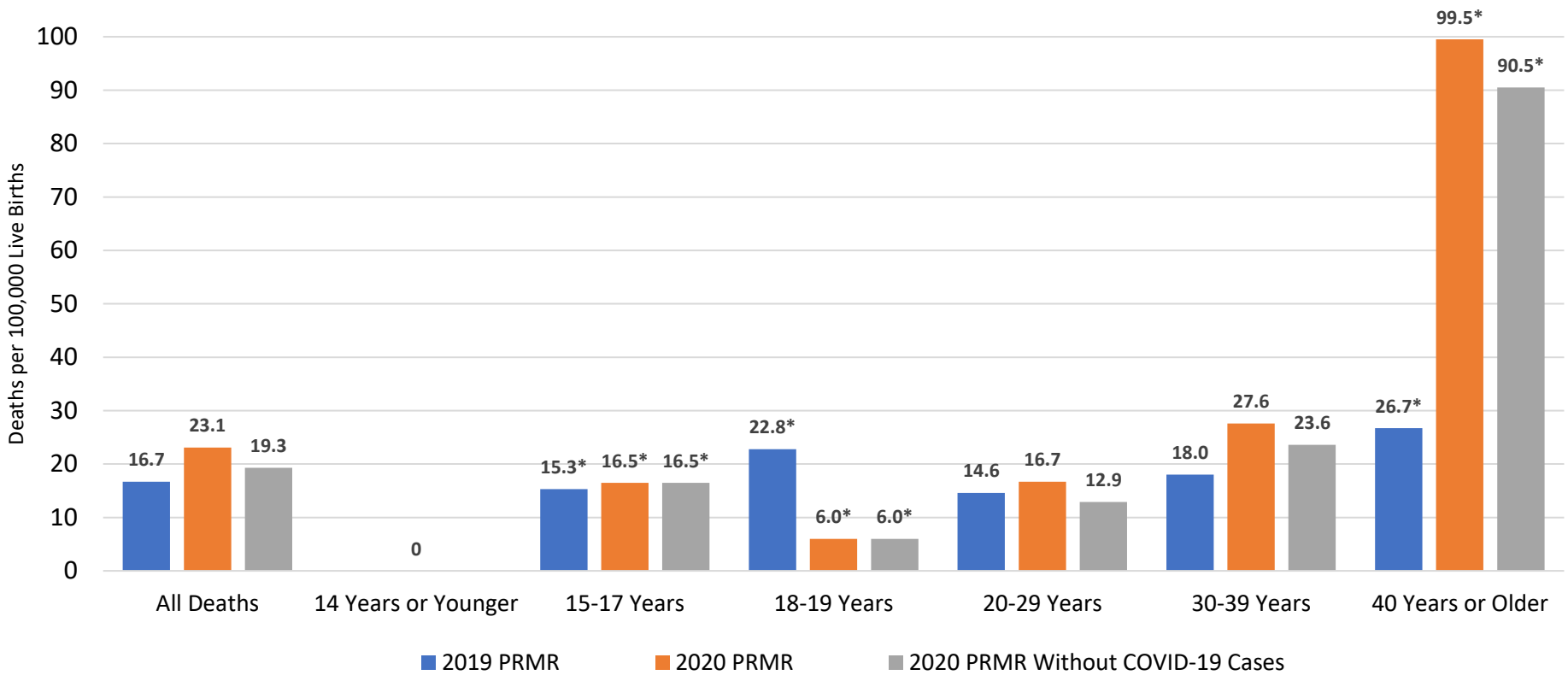
Appendix B. Pregnancy-Related Mortality Ratios (PRMRs), 2019 and 2020

Figure B-1. Pregnancy-Related Mortality Ratios by Race and Ethnicity, 2019 and 2020.



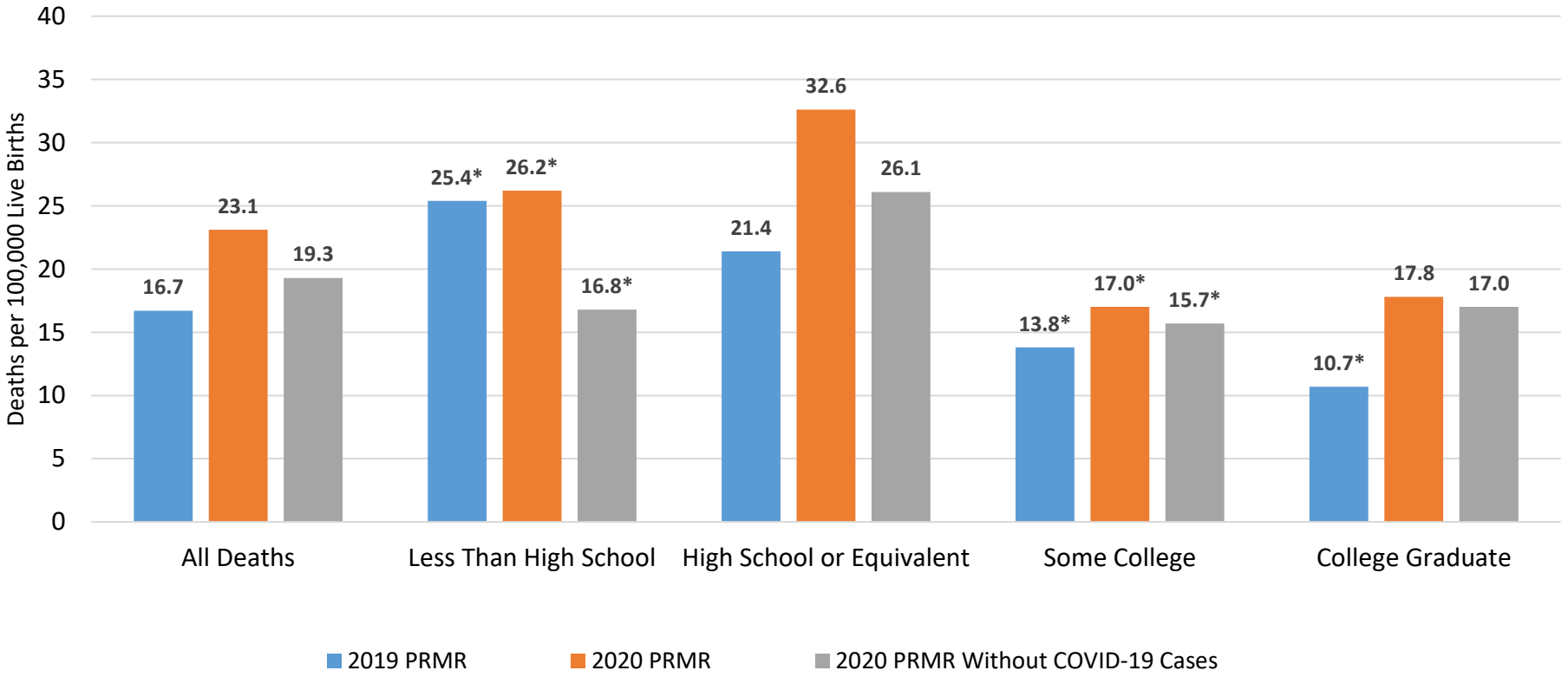
PREPARED BY: Matarnal and Child Health Epidemiologists (MCHE), Community Health Improvment (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Rates marked with * have counts less than 20 and should be interpreted with caution.
In 2019 N= 63; 2020 with COVID-19 N = 85, 2020 without COVID-19 N= 71. Ratios are expressed as the number of deaths per 100,000 live births.
PRMRs are used to standardize counts and enable comparisons between groups.

Figure B-2. Pregnancy-Related Mortality Ratios by Age, 2019 and 2020.



PREPARED BY: Matarnal and Child Health Epidemiologists (MCHE), Community Health Improvment (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Rates marked with * have counts less than 20 and should be interpreted with caution.
In 2019 N= 63; 2020 with COVID-19 N= 85, 2020 without COVID-19 N= 71. Ratios are expressed as the number of deaths per 100,000 live births.
PRMRs are used to standardize counts and enable comparisons between groups.

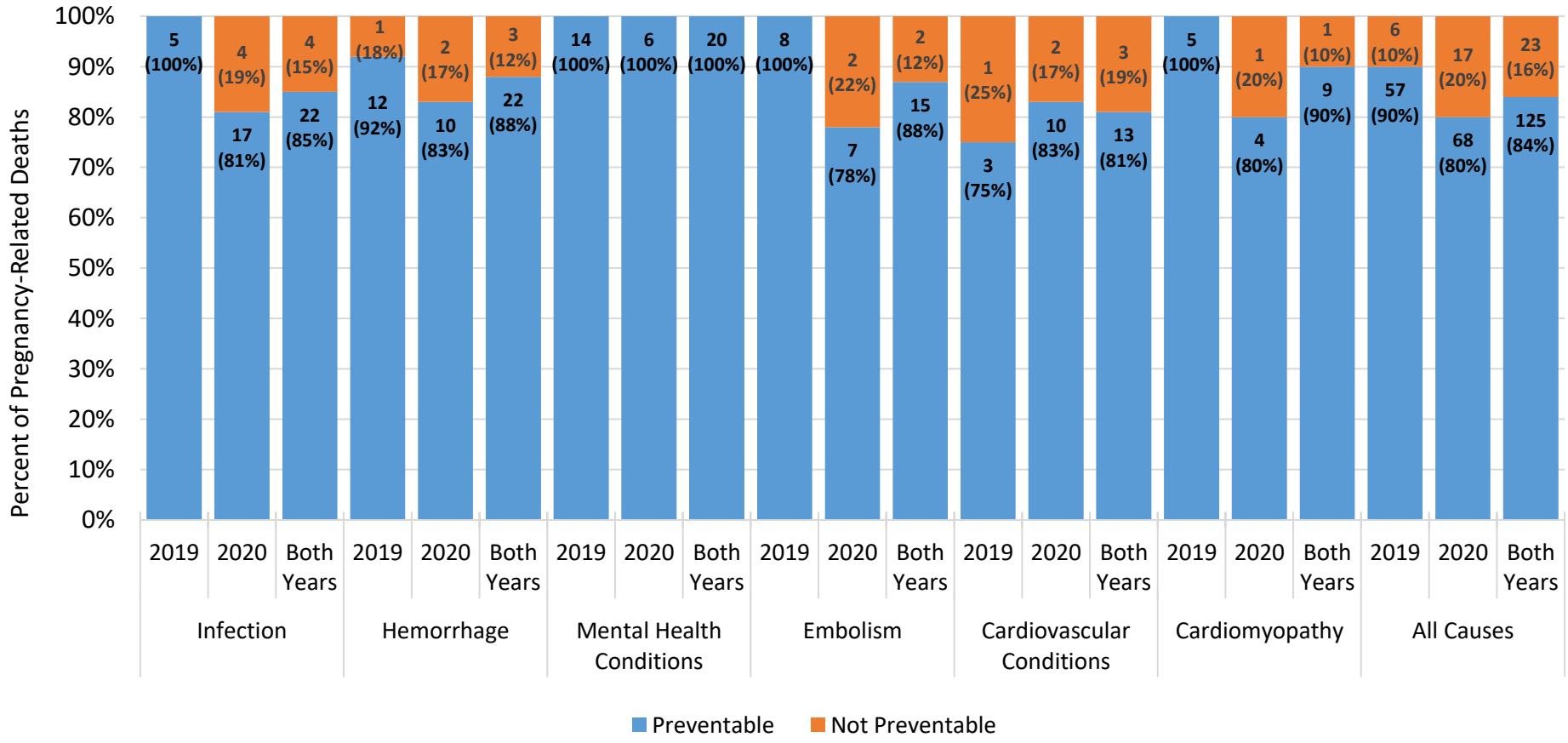
Figure B-3. Pregnancy-Related Mortality Ratios by Education, 2019 and 2020.



PREPARED BY: Maternal and Child Health Epidemiology(MCHE), Community Health Improvement (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Rates marked with * have counts less than 20 and chould be interpreted with caution.
In 2019 N= 63; 2020 with COVID-19 N= 85, 2020 without COVID-19 N= 71. Ratios are expressed as the number of deaths per 100,000 live births.
PRMRs are used to standardize counts and enable comparisons between groups.

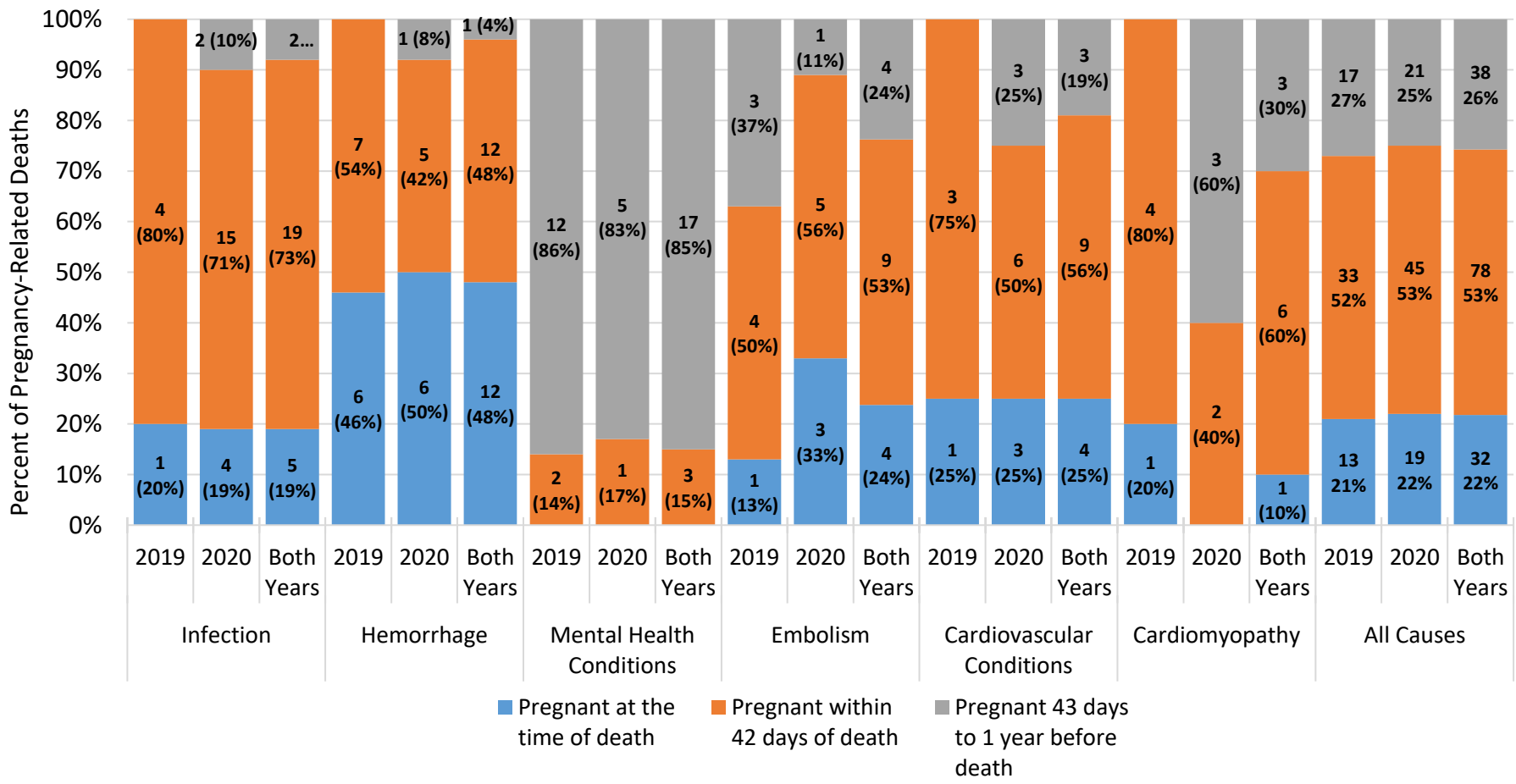
Appendix C. Analysis on Circumstances Surrounding Death for the 2019 and 2020 Case Cohorts

Figure C-1. Pregnancy-Related Death by the Six Leading Causes of Death, 2019 and 2020 (N=148).



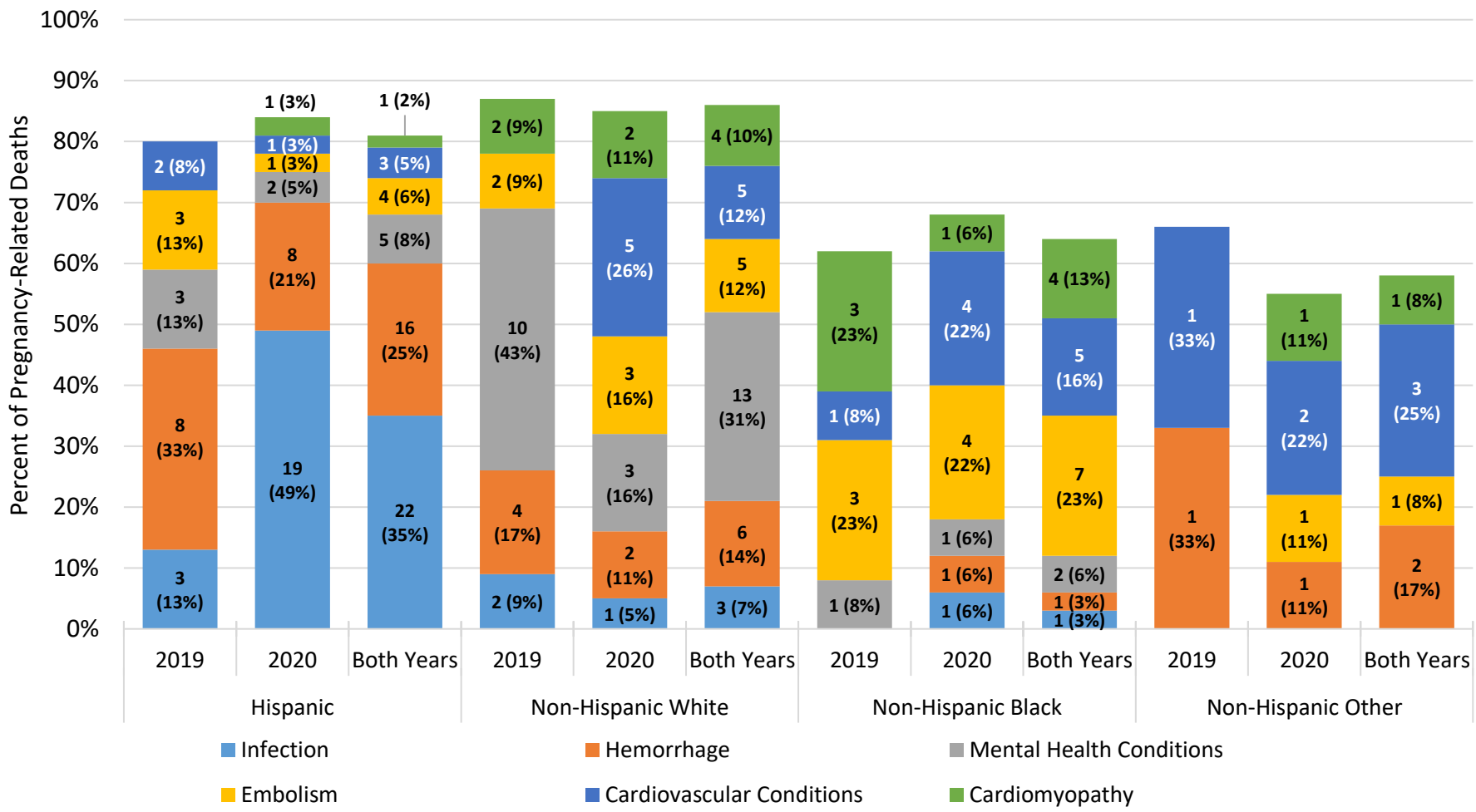
PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division, DSHS.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure C-2. Timing of Pregnancy-Related Death in Relation to Pregnancy by the Six Leading Causes of Death, 2019 and 2020 (N=148).



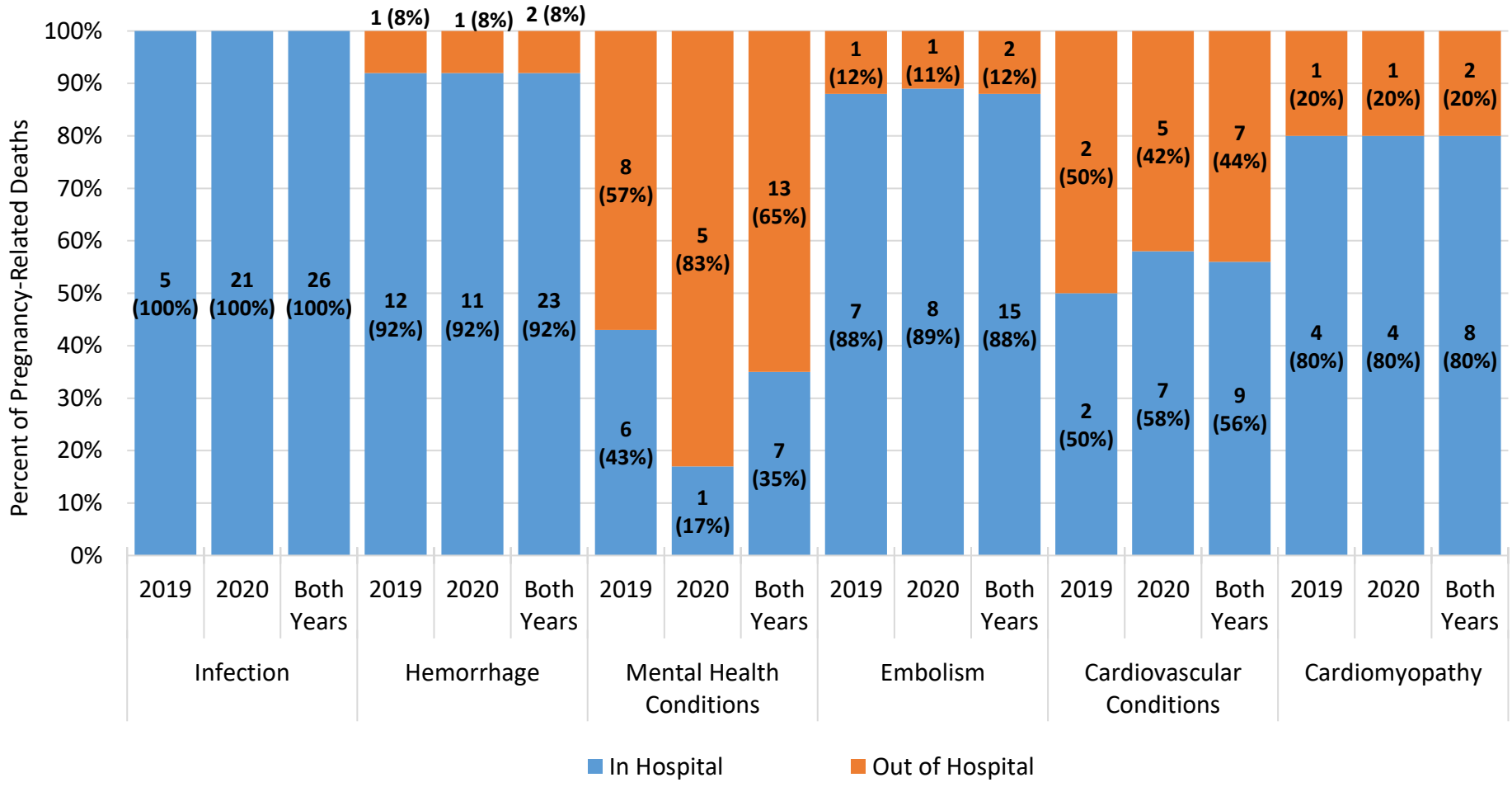
PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division, DSHS.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure C-3. Six Leading Causes of Pregnancy-Related Death by Race and Ethnicity, 2019 and 2020 (N=148).



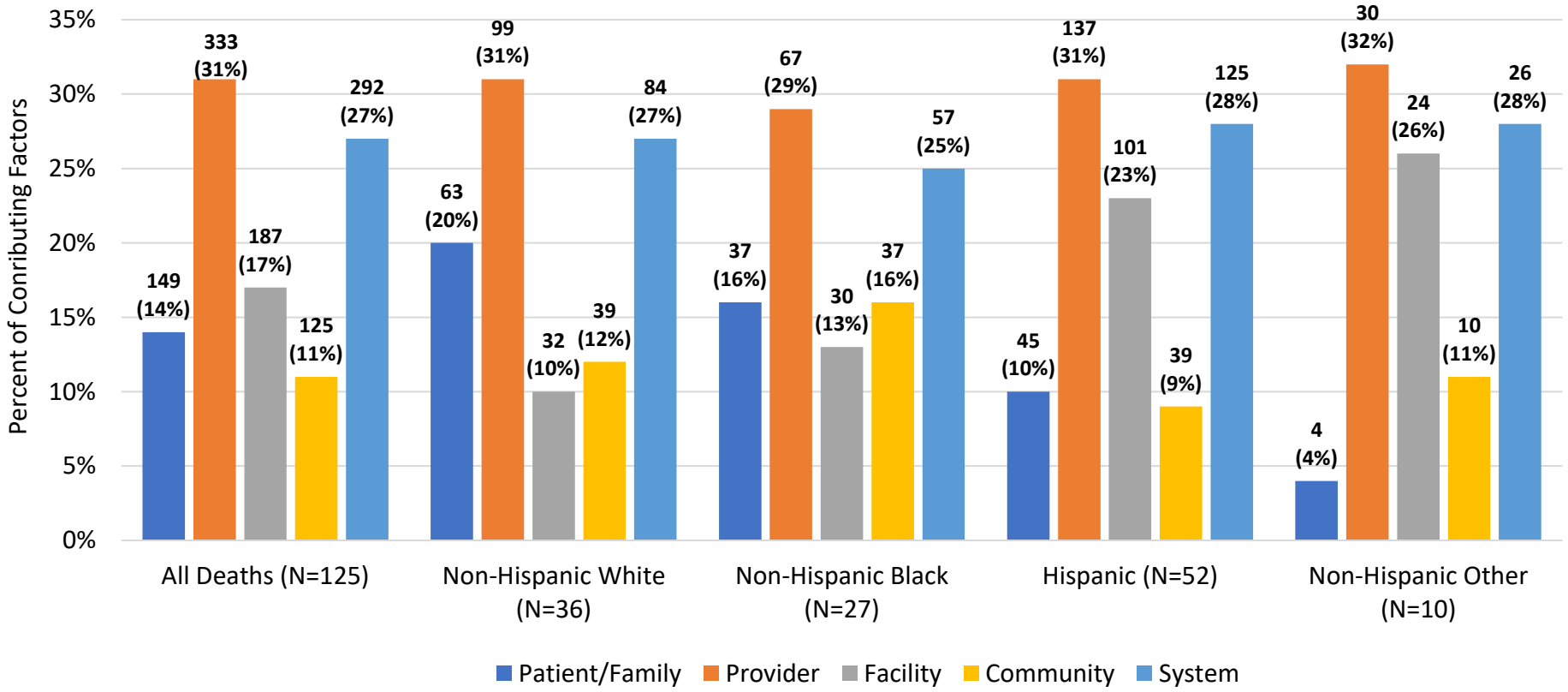
PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division, DSHS.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Less common causes of death not shown, percentages do not sum to 100%.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure C-4. Location of Pregnancy-Related Death by the Six Leading Causes of Death (N=148).



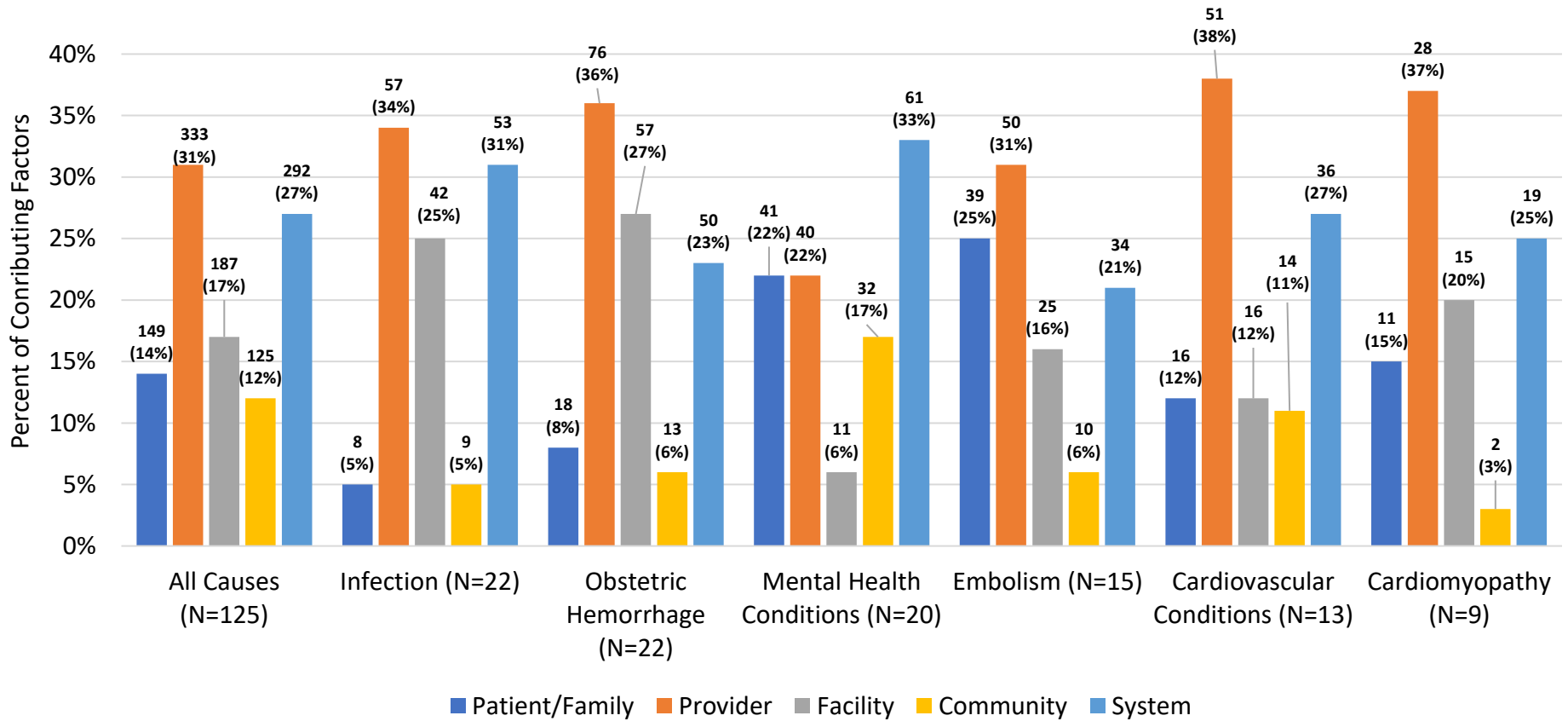
PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division, DSHS.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure C-5. Percent and Number of Contributing Factors to Pregnancy-Related Death by Action Level by Race and Ethnicity, 2019 and 2020 (N=125).



PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Percentages may not sum to 100% due to rounding.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure C-6. Percent and Number of Contributing Factors by Action level for Six Leading Causes of Pregnancy Related Death, 2019 and 2020 (N=125)



PREPARED BY: Maternal and Child Health Epidemiologists (MCHE), Community Health Improvement (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Percentages may not sum to 100% due to rounding.
Pregnancy-related death is the death of a woman during pregnancy or within one year of the end pregnancy from a pregnancy complication, a chain of events initiative by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Appendix D. Best Practices and Programs from Other States

The Texas MMMRC identified best practices and programs from other states:

- Georgia Department of Public Health (DPH) implemented an evidence-based group prenatal care telehealth intervention also known as Centering to provide prenatal care for women in rural and underserved areas. In 2011, DPH with the Southwest Georgia Public Health implemented Centering among pregnant African American and Hispanic women in high-risk obstetric clinics. Among the program's 500 deliveries, preterm labor reduced from 18.8 percent at baseline to 8 percent at the end of the 18-month intervention.[18] In fiscal year 2019, the state appropriated $500,000 to improve sustainability of Centering program, allowing for the implementation of an enhanced Medicaid reimbursement to provide more group prenatal care.
- Ohio Pregnancy Associated Mortality Review identified training needs for obstetric emergencies, and subsequently collaborated with the Ohio State University's Clinical Skills and Education Assessment Center to conduct patient simulation training for postpartum hemorrhage, cardiomyopathy, and pre-eclampsia/hypertensive urgency. Program objectives included 1) prepare maternity department to participate in patient safety programs; 2) educate obstetric providers on common clinical issues; and 3) improve access to training programs for low-resource birthing centers. Program evaluation findings revealed simulated training impacted valuable knowledge, risk assessment skills, and awareness to detect early signs and symptoms.
- Michigan Department of Health and Human Services launched the Michigan Perinatal Quality Collaborative (MI PQC) in 2015 to expand and improve access to respectful quality care throughout pregnancy and postpartum period. MI PQC expands and promotes Centering Pregnancy prenatal care model; increase referrals and enrolment to evidence-based home visiting programs; bolsters virtual birthing and breastfeeding education and support; and builds diverse doula workforce through training, mentorship, and continued education opportunities.

[18] Ahn, R., Gonzalez, G. P., Anderson, B., Vladutiu, C. J., Fowler, E. R., & Manning, L. (2020). Initiatives to reduce maternal mortality and severe maternal morbidity in the United States: A narrative review. Annals of Internal Medicine, 173(11_Supplement), S3-S10.