New Jersey Maternal Mortality

2019–2021

NJHealth
New Jersey Department of Health
Family Health Services

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Note on Language and Grammar

To align with the Nurture NJ Maternal and Infant Health Strategic Plan and other recent publications, this document uses language and phrases that are meant to be universal and inclusive. We use the phrases and terms "maternal health," "maternal mortality," "woman," "she," and "her" to refer to a person who is pregnant and the health and mortality of pregnant individuals. We recognize that not all people who become pregnant identify as women; these terms are meant to be inclusive of all birthing individuals.

In keeping with APA guidance, all racial and ethnic groups are capitalized as they are considered proper nouns.

Key Definitions

Several key words and phrases used throughout this report are selected from the CDC Maternal Mortality Review Information Application (MMRIA) Committee Decisions Form (Appendix A). This form is a standardized document that all jurisdictions funded by the CDC Enhancing Reviews to Eliminate Maternal Mortality (ERASE-MM) program use to make key decisions on the cases that are reviewed by their committees. Listed below are key definitions and how they are being used throughout this report.

Categories of Maternal Deaths

- **Pregnancy-Associated:** A death during or within one year of pregnancy, regardless of the cause.
- **Pregnancy-Related**: A death during or within one year 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 or within one year of pregnancy, from a cause that is not related to pregnancy.
- **Pregnancy-Associated but Unable to Determine Relatedness:** A death during or within one year of pregnancy, from a cause that the Maternal Mortality Review Committee is unable to determine whether was related to pregnancy or not.

Key Phrases and Terms

- **Circumstances Surrounding Death:** At the time of review, committee members must determine if any of the following factors contributed to a person's death: obesity, discrimination, mental health conditions (not including substance use disorder (SUD)), and substance use disorder. The committee can select 'Yes,' 'Probably,' 'No,' or 'Unknown.' Similar to national reports, this report categorizes 'Yes/Probably' responses together.
    - **Discrimination:** Treating someone less or more favorably based on the group, class, or category they belong to, resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication, and shared decision-making. Discrimination can be based on characteristics such as racial/ethnic background, cultural differences, language barriers, sexual orientation, weight, and disease status.
    - **Mental Health Conditions:** The patient had a documented diagnosis of a psychiatric disorder, inclusive of perinatal mood and anxiety disorders (PMAD) with peripartum onset. If a formal diagnosis was not previously documented, mental health condition status is determined by MMRC subject matter experts (e.g., psychiatrist, psychologist, licensed behavioral health clinician), to determine whether the criteria for a diagnosis of mental health disorder was warranted based on the available information.
    - **Substance Use Disorder:** SUD is a disease characterized by patterns of alcohol or substance use that result in clinically significant functional impairment in physical, social, occupational and legal functioning disability or premature death. The committee may determine that substance use contributed to the death when the use directly compromised the individual's health status (e.g., acute methamphetamine

intoxication exacerbated pregnancy-induced hypertension, increased vulnerability to infections or disease).

- **Contributing Factor Class**: A set of twenty-seven defined factors found on the CDC's Maternal Mortality Review Information Application (MMRIA) Committee Decisions Form that a review committee may determine contributed to a woman's death. Multiple contributing factor class categories may be identified during the review of a pregnancy-associated death. (Class descriptions found in Appendix A).

Contributing Factor Classes – CDC MMRIA Committee Decisions Form		
Access/Financial	Environmental	Referral
Adherence	Equipment/Technology	Social Support/Isolation
Assessment	Interpersonal Racism	Structural Racism
Chronic Disease	Knowledge	Substance Use Disorder
Clinical Skill/Quality of Care	Law Enforcement	Tobacco Use
Communication	Legal	Trauma
Continuity of Care/Care Coordination	Mental Health Conditions	Unstable Housing
Delay	Outreach	Violence
Discrimination	Policies/Procedures	Other

- **Preventability/Preventable Death:** A death is deemed preventable if the committee determines that there was at least some chance of the death being avoided by one or more reasonable changes to patient, family, provider, facility, system and/or community factors. If a death is determined to be preventable, the committee will then decide the degree of preventability based on the following categories: 'Good Chance to Alter the Outcome,' 'Some Chance to Alter the Outcome,' or 'Unable to Determine the Chance to Alter the Outcome.'
- **Recommended Action Level:** A set of five categories ('Patient/Family,' 'Provider,' 'Facility,' 'Community,' 'System') that identify the level at which a specific recommendation should be targeted or implemented. These levels are intended to categorize recommendations for specific groups, who may have an opportunity to intervene or prevent future pregnancy-associated mortalities.

Recommended Action Level	Description
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	A licensed individual with training and clinical expertise who provides medical care, treatment, and/or medical advice. In this report, providers can be understood as individuals who were directly involved in the patient's care (e.g., physicians or advanced practices providers that deliver antepartum, intrapartum, postpartum, midwifery, or primary care).
Facility	A physical location where direct patient care is provided - ranges from ambulator clinics, Federally Qualified Health Centers (FQHC's), and health systems with embedded trauma centers. In this report, "facilities" are referring to "New Jersey hospitals" unless otherwise specified.
System	Interacting entities that provide or support services before, during, and/or after pregnancy - ranges from healthcare systems and payors to public services and programs.
Community	A grouping based on a shared sense of location or identity - ranges from physical neighborhoods to communities created from common interests and shared circumstances. In this report, 'community' focuses on community-based organizations that are able to reach individuals through various points of contact (e.g., programs, events, initiatives, etc.).

- **Underlying Cause of Death:** The cause of death as determined by the New Jersey Maternal Mortality Review Committee. These deaths are defined by specific categories listed on the CDC Committee Decisions Form (Appendix A).

Note on Interpretation

This report focuses on the deaths of women who were recently pregnant within the year leading up to their deaths. Upon review by the New Jersey Maternal Mortality Review Committee (NJMMRC), these deaths are classified into three primary categories: 'pregnancy-related,' 'pregnancy-associated, but not related,' and 'pregnancy-associated, but unable to determine relatedness' (defined above). As readers engage in this report, it is important to note that these are **distinct** categories of maternal deaths that should not be compared to one another. 'Pregnancy-related' mortality and 'pregnancy-associated, but not related' mortality each refer to independent causes leading to mortality and should be interpreted as such.

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The New Jersey Department of Health would like to acknowledge the 171 pregnant and postpartum women who died between 2019 and 2021 and their loved ones.

Appointed Members of the New Jersey Maternal Mortality Review Committee, P.L. 2019, c75

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About the New Jersey Maternal Mortality Review Committee (NJMMRC)

For nearly 100 years, New Jersey (NJ) has been a national leader in maternal mortality reviews. NJ was the second state in the nation to institute a maternal mortality review team in 1932. Since then, NJ has continued to prioritize cross-sector and interdisciplinary collaboration to improve the health of pregnant people. The current work of the New Jersey Maternal Mortality Review Committee is part of a longstanding commitment among healthcare professionals, community program leaders, State agencies, and NJ residents to reduce the number of preventable deaths occurring during pregnancy or within one year of the end of pregnancy.

The New Jersey Department of Health (NJDOH), in collaboration with its partners for case abstraction, Central Jersey Family Health Consortium (CJFHC), has reviewed over 1,100 cases of maternal deaths since 1999. This review has aided in the implementation of numerous quality improvement initiatives that have improved the safety of pregnant women throughout the state.

The detailed history (including historical timeline), partnerships, and case review process of the NJMMRC can be found in the prior 2016-2018 NJ Maternal Mortality Report (Nantwi et al., 2022).

Partners

CJFHC has been the NJDOH's contracted agency to perform abstractions since 1999. CJFHC employs several staff members who are devoted to the work of the NJMMRC. Established in 1992, CJFHC is a leading private non–profit 501(C)3 organization licensed by the NJDOH and part of a regionalized maternal and child health system. CJFHC's mission is to promote an equitable and healthy future for families through service, advocacy, education, and collaboration. This mission is accomplished by implementing various programs based on the community's needs.

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Executive Summary

- One hundred seventy-one (171) pregnancy-associated deaths occurred in New Jersey from 2019-2021, of which 100 (58.5%) were pregnancy-associated, but not related; 61 (35.7%) were pregnancy-related; and 10 (5.8%) were pregnancy-associated but unable to determine relatedness.
- Nearly 33% of pregnancy-related deaths occurred during pregnancy up to 6 days within the end of pregnancy (n=20). Among pregnancy-associated, but not related deaths, sixty percent occurred in the late postpartum period (n=60).
- COVID-19 accounted for 29.5% (n=18) of all pregnancy-related deaths from 2019-2021, while substance use disorder accounted for 55% (n=55) of pregnancy-associated, but not related deaths.
- The NJMMRC identified that more than 80% of both pregnancy-related (n=49) and pregnancy-associated, but not related (n=83) deaths may have been preventable.
- Disparities continue to persist in pregnancy-related mortality, where Black, non-Hispanic (NH) women experienced mortality at 7.2 times the rate of their White, NH counterparts (65.1 per 100,000 compared to 9.0 per 100,000), much of which has been driven by deaths resulting from COVID-19.
- When assessing geographic disparities, from 2019-2021, the NJMMRC identified that pregnancy-related mortality was highest in the Northern region (24.4 per 100,000) compared to the Central (15.6 per 100,000) and Southern (18.9 per 100,000) regions.
- When examining circumstances that led to pregnancy-related mortality, the committee found that among the 61 pregnancy-related deaths, obesity[1] contributed to 42.6% (n=26) of deaths and discrimination[1,2] contributed to 18.0% (n=11) of deaths.
- A total of 759 recommendations were analyzed, including 279 recommendations for pregnancy-related deaths and 480 recommendations for pregnancy-associated, but not related deaths. The recommended action level for most pregnancy-associated, but not related deaths was geared toward the 'provider' level.
- Four key mechanisms or processes that may inform change for both pregnancy-related and pregnancy-associated deaths in New Jersey were: 1) Implement a comprehensive approach to care, 2) Ensure high-quality care, 3) Address barriers to care, and 4) Build health consumer knowledge.
- Recommendations to address pregnancy-related deaths:
    - Committee-developed recommendations for pregnancy-related deaths most frequently addressed contributing factor classes knowledge (20%), continuity of care/care coordination (17%), and policies/procedures (11%).
    - The most common recommended actions under each theme include:
        - **Ensure high-quality care:** Facilities ensure that escalation of patient care and patient transfer occurs after assessment of patient status indicates the need (Contributing Factor Class Addressed - Continuity of Care/Care Coordination).
        - **Implement a comprehensive approach to care:** Providers incorporate weight management counseling/referrals into patient care when obesity/history of obesity is present (Contributing Factor Class Addressed - Chronic Disease).
        - **Build health consumer knowledge:** Providers educate patients about the warning signs and symptoms of pregnancy and postpartum complications and when to seek care (Contributing Factor Class Addressed - Knowledge).
        - **Address barriers to care:** Facilities connect patients with a medical home or source of consistent primary care whenever need is indicated (Contributing Factor Class Addressed - Continuity of Care/Care Coordination).
- Recommendations to address pregnancy-associated, but not related deaths:
    - Committee-developed recommendations for pregnancy-associated, but not related deaths most frequently addressed contributing factor classes substance use disorder (23%), continuity of care/care coordination

[1] Comprised of 'yes' and 'probably' responses

[2] **Discrimination:** Treating someone less or more favorably based on the group, class, or category they belong to, resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication, and shared decision-making. Discrimination can be based on characteristics such as racial/ethnic background, cultural differences, language barriers, sexual orientation, weight, and disease status.

(13%), and knowledge (12%).

- The most common recommended actions under each theme include:
  - **Implement a comprehensive approach to care:** Facilities (i.e., harm reduction centers and hospitals) prescribe patients naloxone and provide other harm reduction tools such as other opioid antidotes, fentanyl and xylazine test strips, and clean syringes and educate on their use when substance use disorder (SUD) is identified (Contributing Factor Class Addressed – Substance Use Disorder).
  - **Ensure high-quality care:** Throughout patient care, provider teams should collaborate on care plans to ensure optimal patient outcomes (Contributing Factor Class Addressed - Continuity of Care/Care Coordination).
  - **Build health consumer knowledge:** Institutions or entities across systems (i.e., state agencies or community-based organizations) disseminate public health education on a continual basis about substance use disorder, harm reduction centers and evidence-based interventions to build public awareness and reduce stigma (Contributing Factor Class Addressed – Knowledge & Substance Use Disorder).
  - **Address barriers to care:** Providers connect patients with community-based services and supports (e.g., home visiting, perinatal addiction and maternal wrap-around programs, bereavement, inter-partner violence, or mental health resources) that are aligned with individual patient needs where appropriate or clinically indicated (Contributing Factor Class Addressed – Continuity of Care/Care Coordination & Referral).

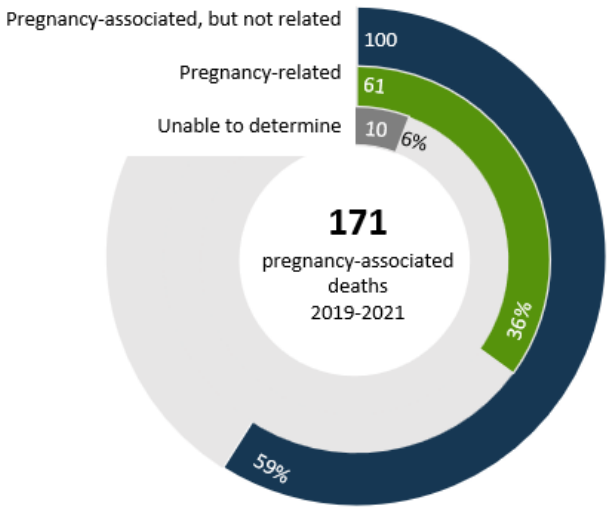
NJ Birthing Population, 2019-2021

From 2019 to 2021, there were 297,781 live births in NJ (Table 1). Among these live births, approximately 45.0% of women identified as White, non-Hispanic (NH), 13.0% identified as Black, NH, and 28.0% identified as Hispanic (Table 1). Additionally, between 2019 and 2021, 35.5% of women who gave birth were between the ages of 30 and 34 at the time they gave birth, while 27.1% were aged 35 years or above. Eighty-nine percent (89%) of women who gave birth during this time had at least a high school-level education. For primary source of payment, 29.0% of women utilized Medicaid, and 69.0% utilized private insurance (Table 1).

Pregnancy-Associated Mortality

Among the 171 pregnancy-associated deaths occurring between 2019 and 2021, 61 (35.7%) were determined to be pregnancy-related, while 100 (58.5%) were determined to be pregnancy-associated, but not related (Figure 1). Additionally, 10 cases (5.8%) were pregnancy-associated but unable to determine relatedness. These 10 cases are included in the total count for all-pregnancy-associated cases, but given the small sample size are not included in any further analyses in the remainder of the report.

Figure 1. Pregnancy-Associated Deaths, New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

Demographics

Among all 171 pregnancy-associated deaths reviewed by the NJMMRC, 35.1% of women were Black, NH, 39.7% were above 35 years of age, 46.8% had completed a high school degree or GED equivalent, and 43.3% had Medicaid as their payor source. Most deaths determined to be pregnancy-related were comprised of Black, NH, and Hispanic origin (73.8%), over the age of 35 (50.8%), had completed a high school degree or GED equivalent (47.5%) or some college and above (44.3%), and had Medicaid as their payor source (39.3%). The composition of deaths determined to be pregnancy-associated, but not related were primarily of White, non-Hispanic origin (46.0%), between the ages of 30-34 (31.0%) and 35+ years (34.0%), had completed a high school degree or GED equivalent (46.0%), and had Medicaid as their payor source (48.0%) (Table 1).

Table 1. Demographics of NJMMRC Pregnancy-Associated Deaths, 2019-2021 (n=171)

	All Live Births 2019-2021	All Pregnancy-Associated	Pregnancy-Related	Pregnancy-Associated, but Not Related
		Count (%)	Count (%)	Count (%)
All	297,781 (100.0)	171 (100.0)[1]	61 (35.7)	100 (58.5)
Race/Ethnicity				
Black, non-Hispanic	38,390 (12.9)	60 (35.1)	25 (41.0)	30 (30.0)
White, non-Hispanic	134,044 (45.0)	58 (33.9)	12 (19.7)	46 (46.0)
Hispanic	82,540 (27.7)	43 (25.2)	20 (32.8)	20 (20.0)
Other Race, non-Hispanic	42,807 (14.4)	10 (5.8)	*	*
Age, years				
24 and below	42,898 (14.4)	21 (12.3)	*	11 (11.0)
25-29	69,801 (23.4)	33 (19.3)	8 (13.1)	24 (24.0)
30-34	105,796 (35.5)	49 (28.7)	16 (26.2)	31 (31.0)
35 and above	79,273 (26.6)	68 (39.7)	31 (50.8)	34 (34.0)
Unknown	13 (<0.1)	*	*	*

Education				
Less than High School	27,893 (9.4)	18 (10.5)	*	12 (12.0)
High School Graduate/GED	69,358 (23.3)	80 (46.8)	29 (47.5)	46 (46.0)
Some College or Above	197,814 (66.4)	73 (42.7)	27 (44.3)	42 (42.0)
Unknown	2,716 (0.9)	*	*	*
Payor Source				
Medicaid/State Insurance	86,926 (29.2)	74 (43.3)	24 (39.3)	48 (48.0)
Private	205,364 (69.0)	47 (27.5)	16 (26.2)	29 (29.0)
Self-Pay/Other	5,210 (1.7)	15 (8.8)	*	*
Unknown	281 (0.1)	35 (20.4)	14 (23.0)	17 (17.0)

Note: Other Race, non-Hispanic denotes individuals whose race/ethnicity was recorded as: Asian (non-Hispanic), Other Single Race, or Two or More Races. *Counts where n<7 were suppressed due to the small sample size. [1]Additionally, 10 deaths were pregnancy-associated, but unable to determine relatedness. **Source:** Live birth counts - New Jersey Birth Certificate Database, Office of Vital Statistics and Registry, New Jersey Department of Health: Committee determinations and race/ethnicity counts – Electronic Birth Record/Death Certificate captured in CDC Maternal Mortality Review Information Application

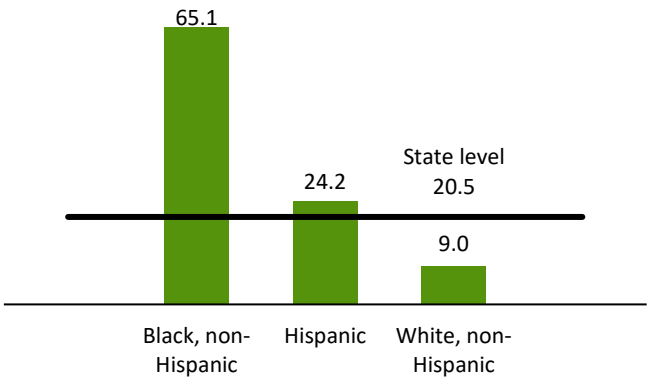
Pregnancy-Related Mortality

Pregnancy-related mortality refers to "a death during or within one year 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." From 2019-2021, 61 deaths were determined to be pregnancy-related. This section will focus on factors related to these deaths that can inform prevention strategies, target populations, and recommendations for actionable next steps.

Pregnancy-Related Mortality Ratio (PRMR)

The pregnancy-related mortality ratio (PRMR) is defined as the "number of pregnancy-related deaths in a given time period per 100,000 live births". It serves as a surveillance measure to assess changes in mortality over time. From 2019-2021, the NJ statewide PRMR was 20.5 deaths per 100,000 live births. This ratio represents an increase in pregnancy-related mortality compared to 14.4 deaths per 100,000 live births from 2016-2018. This increase in mortality is driven primarily by the number of pregnancy-related deaths resulting from COVID-19 infection, where research has shown that COVID-19 can exacerbate pregnancy complications (Van Dyke et al., 2021). Deaths due to COVID-19 in 2020 occurred during a period when vaccines were not widely available for pregnant individuals, which may have further exacerbated poor maternal health outcomes.

Figure 2. Pregnancy-Related Mortality Ratio (PRMRs) by Race/Ethnicity, New Jersey, 2019-2021



Source: Live birth counts - New Jersey Birth Certificate Database, Office of Vital Statistics and Registry, New Jersey Department of Health; New Jersey Maternal Mortality Review Committee

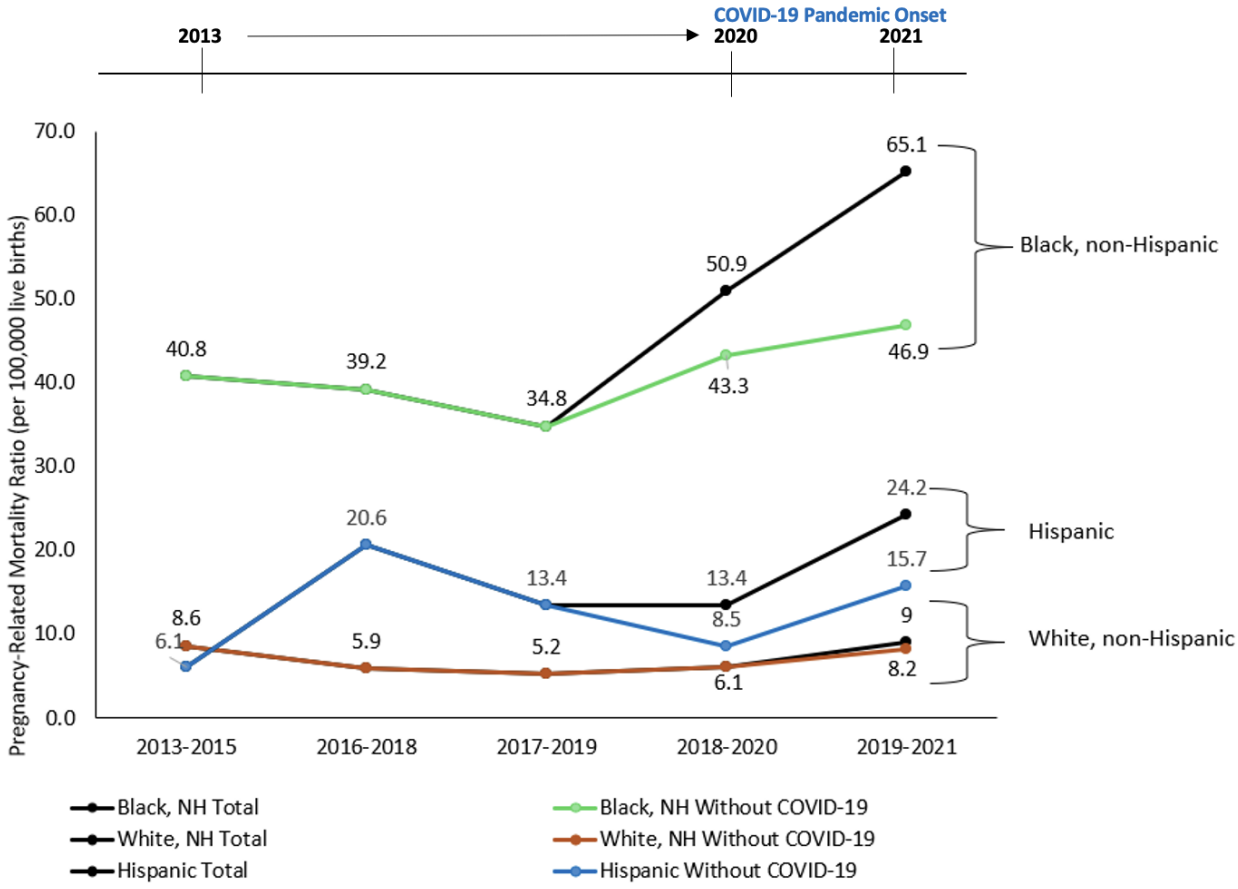
Race/Ethnicity

National data shows that racial and ethnic disparities have persisted in maternal mortality for decades. Data from the Pregnancy Monitoring Surveillance System (PMSS) identified that non-Hispanic (NH) American Indian/Alaska Native women and Black, NH women experience pregnancy-related mortality at a rate that is, respectively, 3.5 and 3.0 times higher than White, NH women. In NJ, racial/ethnic disparities in pregnancy-related mortality continue to persist. For pregnancy-related deaths from 2019-2021, the Pregnancy-Related Mortality Ratio (PRMR, number of deaths for every 100,000 live births) was 20.5 deaths per 100,000 live births; however, among Black, NH women, the PRMR was 65.1 per 100,000 (Figure 2).

This disparity in racial/ethnic outcomes has persisted since 2013-2015 (Nantwi et al., 2022); however, the increase in 2019-2021 is more pronounced due to the COVID-19 pandemic. This outcome aligns with several national studies which identified that Black, NH, and Hispanic individuals died from COVID-19 at a disproportional rate when compared to

White, NH individuals (Van Dyke et al., 2021, Hill and Artiga, 2022). The current overall PRMR ratio for Black, NH women is 7.2 times greater than the PRMR for White, NH women (9.0 per 100,000) and has increased compared to the PRMR from 2016-2018 (39.2 per 100,000). Among Hispanic women who died due to pregnancy-related mortality, the PRMR was 24.2 per 100,000, which was 2.6 times the rate of White, NH women (Figure 3). Figure 3 notes the difference in PRMRs overall compared to the PRMR excluding deaths among women who died as a result of COVID-19 infection.

Figure 3. Pregnancy-Related Mortality Ratios With and Without COVID-19, New Jersey, 2013-2021



Source: New Jersey Maternal Mortality Review Committee
Black graph lines indicate ratios including COVID-19 deaths (all); Color graph lines indicate ratio without COVID-19 deaths
* Hispanic Ratio without COVID-19 from 2018-2020 is an unstable ratio due to sample size

Geographic Region

To assess the geographic distribution of pregnancy-related mortality cases throughout NJ, the counties of the catchment areas of the three Maternal and Child Health Consortia within NJ were classified into North, Central, and South. The county-level catchment areas for each consortium are as follows:

- North (Partnership for Maternal and Child Health of Northern New Jersey): Bergen, Essex, Hudson, Morris, Passaic, Sussex, Union, and Warren
- Central (Central Jersey Family Health Consortium): Hunterdon, Mercer, Middlesex, Monmouth, Ocean, and Somerset
- South (The Cooperative): Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Salem

Table 2. Pregnancy-Related Mortality, by Region, New Jersey, 2019-2021

	Count (%)	PRMR
All	61 (100)	20.5
North	35 (57.4)	24.4
Central	15 (24.6)	15.6
South	11 (18.0)	18.9

Source: New Jersey Maternal Mortality Review Committee

When assessing pregnancy-related mortality, the PRMR in the Northern region (24.4 per 100,000) was higher than the state-level PRMR (20.5 per 100,00). PRMRs in the Central (15.6 per 100,000) and Southern (18.9 per 100,000) regions were below the state level (Table 2).

Underlying Causes of Pregnancy-Related Deaths

Table 3. Leading Underlying Causes of **Pregnancy-Related Deaths**, New Jersey, 2019-2021

	Count
Total	61
COVID-19	18
Infection (excluding COVID-19)	8
Cardiovascular Conditions	6
Cardiomyopathy	5
Hemorrhage	5
Embolism (excluding Amniotic Fluid)	5
Amniotic Fluid Embolism	4
Gastrointestinal Disorders	3
Other Causes of Death Where n<2	7

***Note:** Other pregnancy-related underlying causes of death include cancer (whereby pregnancy contributed to death), hematologic conditions, hypertensive pregnancy disorders, and unknown/undetermined etiology.
Source: New Jersey Maternal Mortality Review Committee

Among the 61 cases of pregnancy-related deaths, the leading underlying causes of death were attributed to COVID-19 (n=18), infection [excluding COVID-19, e.g., sepsis, chorioamnionitis (n=8)], and cardiovascular conditions (n=6) (Table 3). Additional causes of pregnancy-related deaths include cancer (whereby pregnancy complicated the disease progression), cardiomyopathy, hemorrhage, amniotic fluid embolism (AFE), other embolisms excluding AFE, gastrointestinal disorders, hematological conditions, hypertensive pregnancy disorders, and unknown etiology. When compared to 2016 to 2018, cardiovascular conditions and hemorrhage continue to remain a leading cause of pregnancy-related mortality (Nantwi et al., 2022). As depicted in Table 3, deaths attributed to COVID-19 also represent a majority of pregnancy-related deaths from 2019 to 2021, which aligns with trends observed in national pregnancy-related mortality data (Trost et al., 2024).

For the underlying causes of pregnancy-related mortality by race/ethnicity, there are noted differences among racial/ethnic groups. Understanding the leading causes of death within each racial/ethnic group is essential for identifying strategies that reduce and eliminate disparities in pregnancy-related mortality. To examine a greater number of women and assess data by cause of death within each racial/ethnic group, we looked at MMRC data from **2016 to 2021** (Table 4). For pregnancy-related deaths, most Black, NH women died from cardiomyopathy (n=7), cardiovascular conditions (excluding cardiomyopathy, n=7), and COVID-19 (n=7). Hispanic women primarily died due to COVID-19 (n=10) and cardiovascular conditions (n=8), while White, NH women died primarily due to hemorrhage (n=6).

Table 4. Leading Underlying Causes of **Pregnancy-Related** Deaths, by Race/Ethnicity, New Jersey, 2016-2021					
Black, NH	**Count**	**Hispanic**	**Count**	**White, NH**	**Count**
Total	**41**	**Total**	**37**	**Total**	**20**
Cardiomyopathy	7	COVID-19	10	Hemorrhage	6
Cardiovascular Conditions	7	Cardiovascular Conditions	8	Other causes where n<5	14
COVID-19	7	Other causes where n<5	19		
Embolism (excluding AFE)	6				
Other causes where n<5	14				

Source: New Jersey Maternal Mortality Review Committee

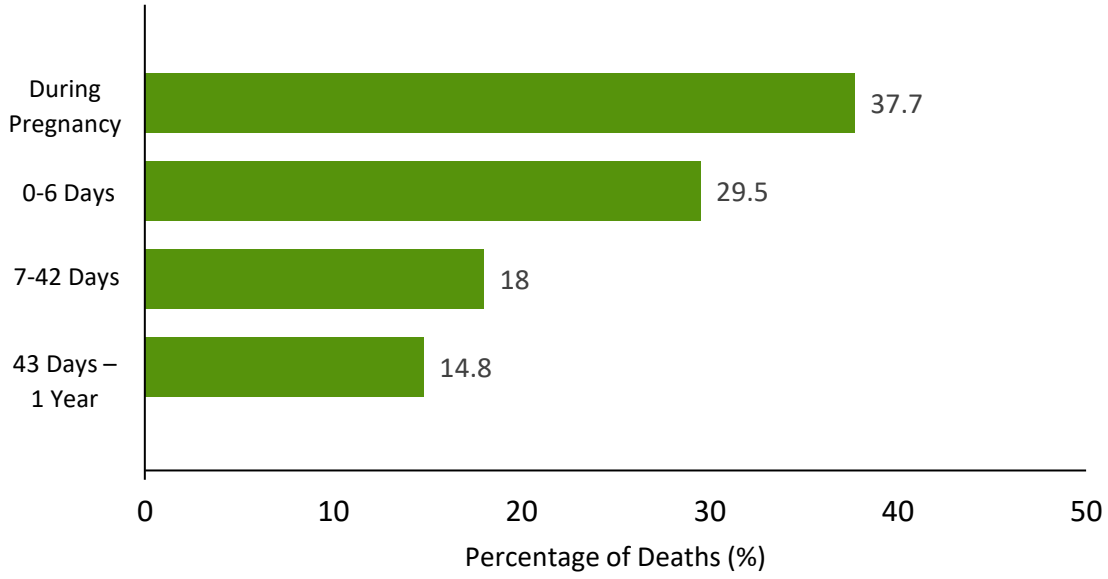
Timing of Pregnancy-Related Deaths

The timing of death is categorized into four periods:

1. Deaths that occurred during pregnancy,
2. 0 (delivery) up to 6 days within the end of pregnancy,
3. 7 - 42 days within the end of pregnancy, and
4. 43 days up to one year of the end of pregnancy

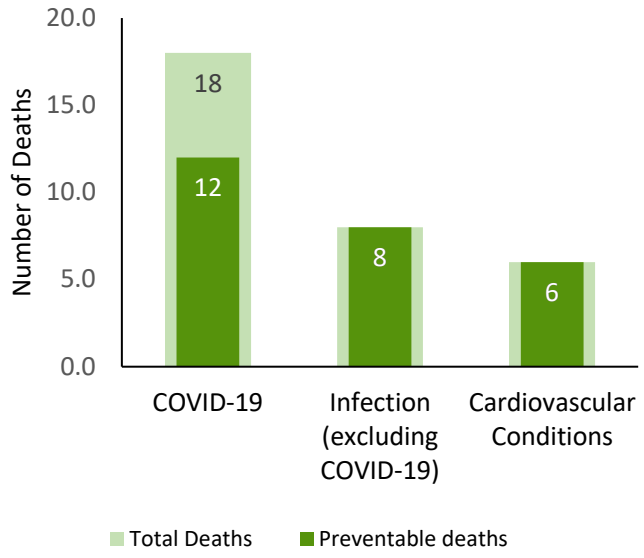
Nearly forty-eight percent (48%) of pregnancy-related deaths occurred between delivery and 42 days after the end of pregnancy (n=34). This marks an increase from 2016 to 2018, where only 29.6% (n=13/44) of pregnancy-related deaths occurred during this period (Nantwi et al., 2022).

Figure 4. Timing of Pregnancy-Related Deaths, New Jersey, 2019-2021



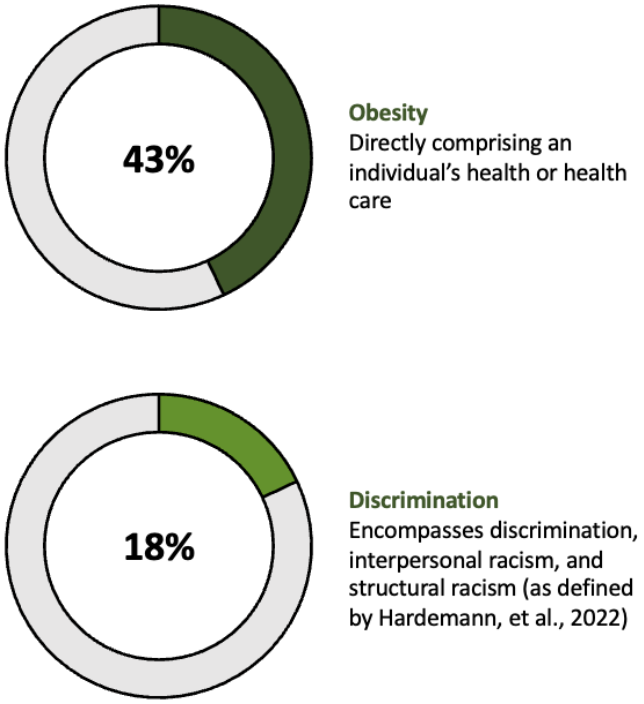
Source: New Jersey Maternal Mortality Review Committee

Figure 5. Preventability by Underlying Cause of Pregnancy-Related Deaths, New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

Figure 6. Pregnancy-Related Committee Determinations, New Jersey, 2019-2021



Percentage comprised of "Yes/Probably" Responses
Source: New Jersey Maternal Mortality Review Committee

Preventability

A preventable death is defined on the Committee Decisions Form as a death having, "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." Deaths that are deemed to be preventable are then assessed to determine the probability of altering the outcome (some chance, good chance, or unable to determine). Deaths that are deemed not preventable, are identified as having no chance to alter the outcome. Among the 61 pregnancy-related deaths from 2019-2021, the NJMMRC determined that 49 (80.3%) of the 61 deaths were preventable, where all preventable, pregnancy-related deaths had at least some chance to alter the outcome. Among deaths due to COVID-19, 66.7% were preventable; all deaths (100%) due to infection, excluding COVID-19, all deaths (100%) due to cardiovascular conditions, and all deaths (100%) due to cardiomyopathy were preventable (Figure 5).

Committee Determinations and Recommendations

When assessing pregnancy-related deaths, the NJMMRC determines whether the following circumstances contributed to the woman's death: obesity, discrimination (defined on pg. 3), mental health, or substance use disorder. The determinations of these factors are categorized as "yes," "probably," "no," or "unknown." Data from 2019-2021 indicated that among the 61 pregnancy-related deaths, obesity probably contributed to 42.6% of deaths and discrimination probably contributed to 18.0% of fatalities, (Figure 6).

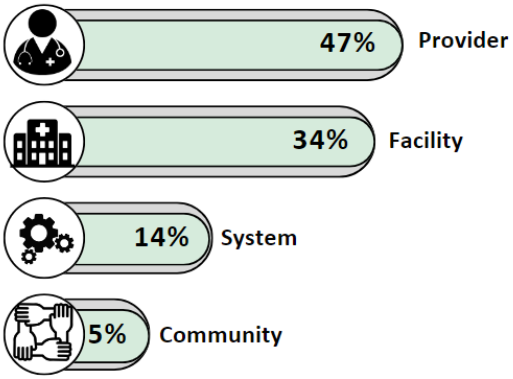
Recommendations to Address Pregnancy-Related Deaths

This section summarizes the analysis of recommendations developed during the NJMMRC case review for pregnancy-related deaths. The three components of the analysis include (1) the recommendations or recommended action posed by the committee, (2) the recommendation level or level at which the committee thinks the change should occur, and (3) the contributing factor class that the recommendation intends to address. Recommendation data is grouped by contributing factor class to ensure that findings illustrate the connection between recommended actions and the contributing factor classes they address. Analyses of recommendations identified commonalities across recommended actions and across the level at which the recommended change should happen, as per the committee.

Findings comprise the recommended actions or codes and their associated level of action (i.e., patient/family, provider, facility, community, system) that emerged most frequently in the recommendation data.

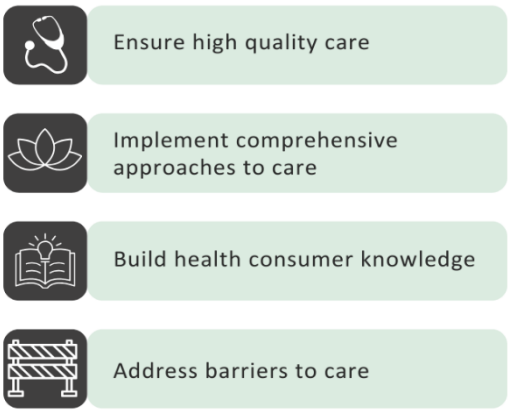
The final set of recommendation codes from the analyses of recommendations for pregnancy-related deaths provided the initial set of findings for this report. The recommendation codes underwent further internal review to ensure recommendation codes were complete, worded correctly, actionable, and in line with current best practice guidelines and state policy, where applicable. Feedback informed the revision of the recommendation codes, resulting in the final set of findings presented below.

Figure 10. Summation of Recommendation Levels for Pregnancy-Related Deaths in New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

Figure 11. Key Themes to Address Pregnancy-Related Deaths in New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

A total of 279 recommendations posed to address preventable, pregnancy-related deaths across 49 cases were included in the analyses of recommendations. Thirty-four recommendations were tied to 2019 pregnancy-related deaths, 97 recommendations were tied to 2020 pregnancy-related deaths, and 148 recommendations were tied to 2021 pregnancy-related deaths. The 279 recommendations were categorized into one of four levels, with nearly half (47%) targeting provider-level changes (Figure 10). Facility-level recommendations were the next most frequent recommendation (34%), followed by system-level recommendations (14%), and community-level recommendations (5%). No recommendations were made at the patient/family level.

The three most cited contributing factor classes across recommendations included: knowledge (20%), continuity of care/care coordination (17%), and policies/procedures (11%). Thematic analysis organized by contributing factor class was conducted across the 279 recommendations. Through iterative review, recommendations were assigned text codes that captured the salient features or meaning of recommendations. A minimum of at least three separate cases are required to have a similar code for it to be included in the analysis findings. Recommendation codes emerged across themes and across a variety of contributing factor classes. The final set of codes or recommended actions is presented next and grouped by key themes and common contributing factor classes. The analyses of recommendations for the preventable, pregnancy-related deaths are summarized into the following four, key themes: (1) Ensure high-quality care, (2) Implement a comprehensive approach to care, (3) Build health consumer knowledge, and (4) Address barriers to care (Figure 11).

The first theme— e**nsure high-quality care**—comprised recommended actions or codes that reflected one or more of the six domains of health care quality: Safe, Effective, Patient-centered, Timely, Efficient, and Equitable care (Agency for Healthcare Research and Quality, 2018). Ensure high-quality care emerged as the most salient theme with the largest number of recommended actions to avoid preventable, pregnancy-related deaths. Nine recommended actions or codes emerged from the recommendation analysis in support of this theme.

- Recommended Actions under Theme **Ensure High Quality** that address Contributing Factor Classes **Continuity of Care/Care Coordination, *Policies/Procedures, Discrimination, Knowledge, and Equipment*:**
    - Facilities ensuring escalation of patient care and patient transfer [Most common recommended action under theme 1]

- Facilities sharing patient records/information about care provided for common patients
- Provider teams collaborating on patient care plan
- Providers ensuring timely follow-up appointment scheduled
- Facilities having massive blood transfusion protocol in place
- Facilities incorporating AIM patient safety bundles into standard care
- Facilities educating staff on identifying and averting biased language in documentation
- Providers utilizing a shared decision-making approach in patient interactions
  Facilities' (e.g., hospitals and clinics) electronic medical records (EMRs) noting patient responses around vaccination and care plan

The second most salient theme— i**mplement comprehensive approach to care**— comprised four recommended actions or codes that emphasized whole patient care or addressed physical and mental health comorbidities as part of overall patient care.

- Recommended Actions under Theme **implement comprehensive approach to care** that address Contributing Factor Classes Chronic Disease, Knowledge, and Continuity of Care/Care Coordination:
  - Providers incorporating weight management/referral throughout patient care [Most common recommended action under theme 2 and overall, across all four themes]
  - Providers ensuring continuous counseling and management of ongoing health conditions
  - Providers incorporating family planning into patient care
  - Providers referring and ensuring connection to specialist care

The third most salient theme— b**uild health consumer knowledge**— comprised three recommended actions or codes that emphasized imparting knowledge to patients or more broadly consumers of health care to enable them to manage their health and care plan.

- Recommended Actions under Theme **build health consumer knowledge** that address Contributing Factor Class Knowledge:
  - Providers educating patients about the warning signs and symptoms of pregnancy and postpartum complications and when to seek care [Most common recommended action under theme 3]
  - Providers educating patients about the importance of vaccinations and addressing vaccine hesitancy
  - Facilities educating patients and providing educational materials on COVID-19 signs, symptoms, and prevention

The fourth most salient theme— a**ddress barriers to care**— comprised two recommended actions or codes that emphasized enabling patients to access care as needed, including addressing social determinants of health.

- Recommended Actions under Theme **address barriers to care** that address Contributing Factor Classes Continuity of Care/Care Coordination and Access/Financial:
  - Facilities connecting patients with a medical home or source of consistent primary care[3] [Most common recommended action under theme 4]
  - Stakeholders across the system (e.g., payors, government agencies, providers) proactively connecting uninsured patients with health insurance.

[1] "Medical home" is being defined as "an approach to providing comprehensive and high-quality primary care" in alignment with the American Academy of Pediatrics. It is meant to highlight a need for patients to have a comprehensive and consistent source of primary care.

Final key themes, related complete codes, and associated contributing factor classes are displayed in Table 8. In the table, the order of themes and the order of recommended actions or codes within each theme reflect their frequency in the recommendation data. The columns 'Contributing Factor Class Addressed', and 'Recommendation Action Level' are categorical factors defined by the MMRIA Committee Decisions form (Appendix A) and assigned to each recommendation during case review.

Table 8. Results of Thematic Analysis of Recommendations to Address Preventable, Pregnancy-Related Deaths, New Jersey, 2019-2021

Key Theme #1 - Ensure High-Quality Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Facilities ensure that escalation of patient care and patient transfer occurs after assessment of patient status indicates the need.	Continuity of Care/Care Coordination	Facility
Providers utilize a shared decision-making approach during interactions with patients.	Knowledge	Provider
Facilities have a massive blood transfusion protocol (i.e., administering 10+ units of whole or packed red blood cells within 24 hours) in place at all times.	Policies/Procedures	Facility
Whenever there is a common patient, **facilities** share information about patient care and patient records.	Continuity of Care/Care Coordination	Facility
Throughout patient care, **provider** teams need to collaborate on care plans to ensure optimal patient outcomes.	Continuity of Care/Care Coordination	Provider
Facilities ensure all providers and staff are educated about biased language in documentation, its impact on patient care, and how to document without bias.	Discrimination	Facility
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Electronic Medical Records (EMRs) in **facilities (e.g., hospitals and clinics)** enable noting patient's reasons for refusing vaccination and whether any counseling or education was offered to inform decision-making.	Equipment	System, Facility
Facilities incorporate AIM patient safety bundles (i.e., hemorrhage & sepsis) into their standard care.	Policies/Procedures	Facility
Providers ensure follow-up appointment scheduled prior to discharge/post birth event.	Continuity of Care/Care Coordination	Provider
Key Theme #2 - Implement Comprehensive Approach to Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Providers incorporate weight management counseling/referrals into patient care when obesity/history of obesity is present.	Chronic Disease	Provider
Providers incorporate family planning into patient care, particularly for patients at	Knowledge	Provider

higher-than-average risk for complications during pregnancy.		
Providers refer and ensure connection to specialist care when need identified.	Continuity of Care/Care Coordination	Provider
Providers ensure continuous counseling and management of any ongoing conditions with patients at higher-than-average risk for complications.	Chronic Disease	Provider
Key Theme #3 - Build Health Consumer Knowledge		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Providers educate patients about the warning signs and symptoms of pregnancy and postpartum complications and when to seek care.	Knowledge	Provider
Providers educate patients about the importance of vaccinations and address vaccine hesitancy.	Knowledge	Provider
Prior to discharge, **facilities** educate patients/provide educational materials on COVID-19 signs and symptoms and prevention.	Knowledge	Facility
Key Theme #4 - Address Barriers to Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Facilities connect patients with a medical home or source of consistent primary care whenever need is indicated.	Continuity of Care/Care Coordination	Facility
Stakeholders **across the system (e.g., payors, government agencies, providers)** proactively connect uninsured patients with health insurance.	Access/Financial	System

Pregnancy-Associated, but Not Related Mortality

Pregnancy-associated, but not related mortality refers to "a death during or within one year of pregnancy, from a cause that is **not related** to pregnancy." From 2019-2021, one-hundred deaths were determined to be pregnancy-associated, but not related. This section will focus on factors and outcomes related to these deaths.

Pregnancy-Associated, but Not Related Mortality Ratio (PANR)

From 2019-2021, the NJ statewide pregnancy-associated, but not related mortality ratio (PANR) was 33.5 deaths per 100,000 live births, an increase from 24.3 per 100,000 from 2016-2018 (Nantwi et al., 2022). Many deaths determined to be pregnancy-associated, but not related were deaths due to substance use disorder (SUD, defined on pg. 3). The committee may determine that SUD contributed to the death when the disorder directly compromised their health status (e.g., acute methamphetamine intoxication exacerbated pregnancy-induced hypertension, or they were more vulnerable to infections or medical conditions). Regionally, the PANR ratio was highest in the state's Southern region (48.2 per 100,000). In contrast, the PANR in the Northern region was relatively comparable to the state-level PANR (33.4 vs. 33.6 per 10,000, respectively) (Table 5).

Table 5. Pregnancy-Associated, but Not Related Mortality, by Region, New Jersey, 2019-2021

	Count (%)	PRMR
All	100 (100)	33.6
North	48 (48.0)	33.4
Central	24 (24.0)	25.0
South	28 (28.0)	48.2

Source: New Jersey Maternal Mortality Review Committee

Underlying Causes of Pregnancy-Associated, but Not Related Deaths

Table 6. Leading Underlying Causes of **Pregnancy-Associated, But Not Related Deaths**, New Jersey, 2019-2021

	Count
Total	100
Substance Use Disorder (SUD)	55
Injury	15
Unintentional Injury	6
Suicide or Unknown Intent	5
Homicide	4
Cancer	11
Cardiovascular Conditions	3
Neurologic/Neurovascular Conditions	3
Other Causes of Death Where n<2	13

***Note:** Other pregnancy-associated, but not related underlying causes of death include COVID-19, cardiomyopathy, cerebrovascular accidents not secondary to pregnancy, vascular/autoimmune disease, gastrointestinal disorders, infection (excluding COVID-19), renal disease, and unknown/undetermined etiology.

From 2019-2021, 55 of the 100 pregnancy-associated, but not related deaths were attributed to substance use disorder, which is characterized by the recurrent use of alcohol and/or drugs causing significant impairment (Table 3). Injuries (including unintentional injuries, suicide, homicide, and unknown intent) and cancer were also leading underlying causes of pregnancy-associated, but not related mortality. Additional causes of pregnancy-associated, but not related deaths include cancer, COVID-19 infection, cardiovascular conditions, cardiomyopathy, neurologic/neurovascular disorders, cerebrovascular accidents not secondary to pregnancy, vascular/autoimmune disease, gastrointestinal disorders, infection (excluding COVID-19), renal disease, and unknown/undetermined etiology (Table 6). When compared to NJMMRC data from 2016-2018, SUD remains a leading cause of pregnancy-associated, but not related mortality. NJMMRC data from **2016 to 2021** was assessed to determine the leading underlying causes of pregnancy-associated, but not related deaths among racial/ethnic groups. Among pregnancy-associated, but not related deaths, the leading underlying cause of death among Black, NH (n=13), Hispanic (n=17), and White, NH women (n=65) was substance use disorder (Table 7).

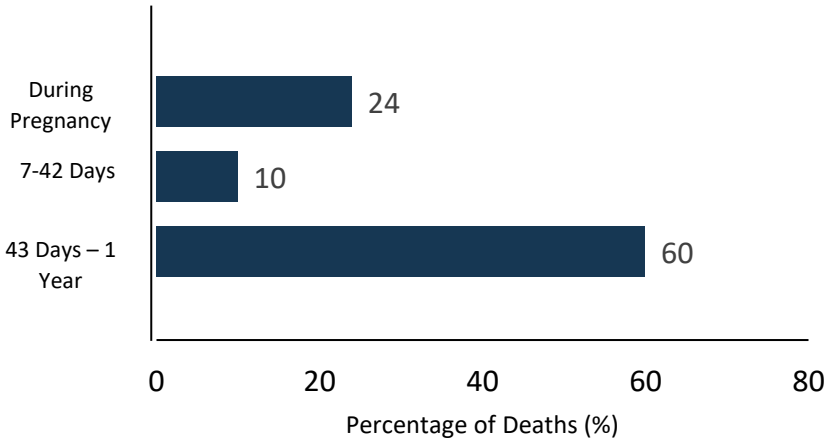
Table 7. Leading Underlying Causes of **Pregnancy-Associated, But Not Related Deaths**, by Race/Ethnicity, New Jersey, 2016-2021

Black, NH	Count	Hispanic	Count	White, NH	Count
Total	**37**	**Total**	**38**	**Total**	**89**
Substance Use Disorder	13	Substance Use Disorder	17	Substance Use Disorder	65
Cancer	5	Cancer	5	Injury (Excluding Homicide)	8
Other causes where n<5	19	Other causes where n<6	16	Cancer	6
				Other causes where n<6	10

Source: New Jersey Maternal Mortality Review Committee

Timing of Pregnancy-Associated, but Not Related Deaths

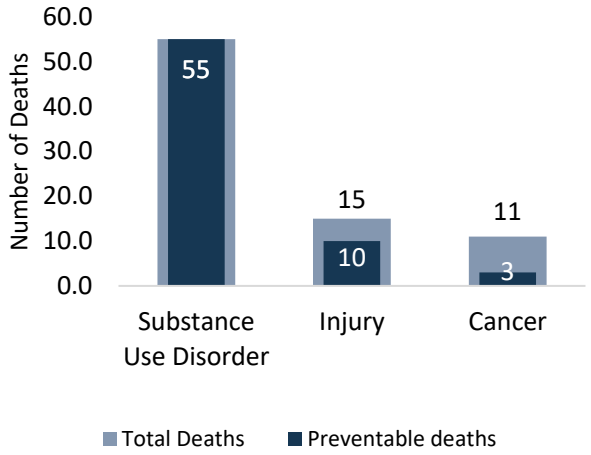
Figure 7. Timing of Pregnancy-Related Deaths, New Jersey, 2012-2021



Source: New Jersey Maternal Mortality Review Committee

For pregnancy-associated, but not related deaths, the majority occurred 43 days up to one year within the end of pregnancy (n=60, 60.0%, Figure 7), which is a decline from 2016-2018 where 79.7% of pregnancy-associated, but not related deaths occurred in the late postpartum period (Nantwi et al., 2022).

Figure 8. Preventability by Underlying Cause of Pregnancy-Associated, but Not Related Deaths, New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

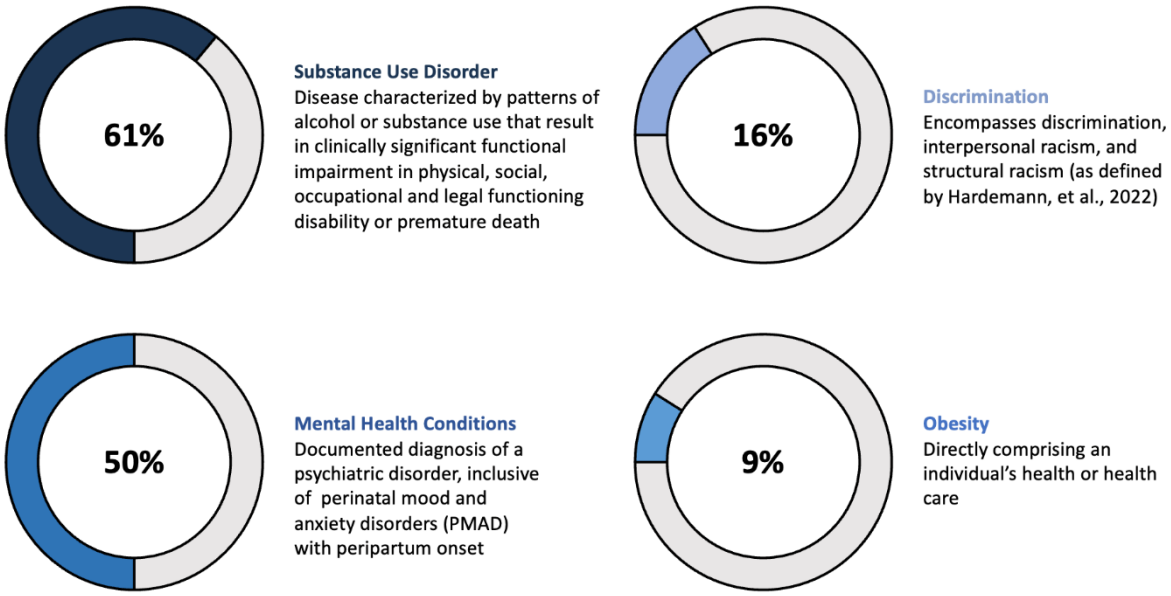
Preventability

For pregnancy-associated, but not related deaths, the NJMMRC found that 83 (83.0%) of the 100 deaths were preventable, of which all preventable deaths had some chance to have had the outcome altered. Among pregnancy-associated, but not related causes of death, all deaths due to substance use disorder (100%), 66.7% of deaths due to injury of any form, and 27.3% of cancer deaths were deemed to be preventable (Figure 8).

Committee Determinations and Recommendations

Among the 100 pregnancy-associated, but not related deaths, substance use disorder contributed to 61.0% of deaths, mental health conditions contributed to 50.0% of deaths, discrimination contributed to 16.0% of deaths, and obesity contributed to 9.0% of deaths (Figure 9).

Figure 9. Pregnancy-Associated, but Not Related Committee Determinations, New Jersey, 2019-2021



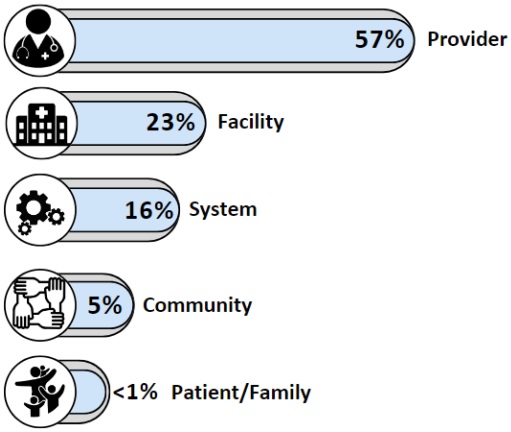
Percentage comprised of "Yes/Probably" Responses
Source: New Jersey Maternal Mortality Review Committee

Recommendations to Address *Pregnancy-Associated but not Related Deaths*

This section summarizes the analysis of recommendations developed during NJMMRC case review for pregnancy-associated but related deaths, as explained above in the Recommendations to Address Pregnancy-Related Deaths section.

A total of 480 recommendations posed to address preventable, pregnancy-associated, but not related deaths across 84 cases were included in the analyses of recommendations. There were 198 recommendations for 2019 maternal deaths, 166 recommendations for 2020 maternal deaths, and 116 recommendations for 2021 maternal deaths.

Figure 12. Summation of Recommendation Levels for Pregnancy-Associated but Not Deaths, New Jersey, 2019-2021



Source: New Jersey Maternal Mortality Review Committee

The 480 recommendations were categorized into one of five levels, with over half (57%) targeting provider-level changes (Figure 12). Secondarily prevalent were Facility-level recommendations (23%), followed by System-level recommendations (16%), Community-level recommendations (5%), and Patient/Family (<1%).

The three most cited contributing factor classes across recommendations included: substance use disorder (23%), continuity of care/care coordination (13%), and knowledge (12%).

Thematic analysis organized by contributing factor class was conducted across the 480 recommendations. Through iterative review, recommendations were assigned text codes that captured the salient features or components of recommendations. A code needed a minimum of at least five separate cases to be included in the analysis findings. Recommendation codes emerged across themes and across a variety of contributing factor classes. The final set of codes or recommended actions are presented next and grouped by key themes and common contributing factor classes.

The following four themes also emerged from the analysis of recommendations for preventable, pregnancy-associated but not related deaths: (1) implement a comprehensive approach to care, (2) ensure high-quality care, (3) build health consumer knowledge, and 4) address barriers to care (Figure 13). The order of themes changed in this second analysis to reflect the salience of themes and recommended actions or codes in the pregnancy-associated, but not related deaths recommendation data. The first theme— **implement comprehensive approach to care**—was the most common theme with the most recommendation codes across all four themes. Seven recommended actions or codes supported this theme.

Figure 13. Key Themes to Address Pregnancy-Associated, but Not Related Deaths in New Jersey, 2019-2021

Source: New Jersey Maternal Mortality Review Committee

- Recommended Actions under Theme **implement comprehensive approach to care** that address Contributing Factor Classes Substance Use Disorder, Mental Health Conditions, Assessment, and Continuity of Care/Care Coordination:
    - Facilities (i.e., harm reduction centers and hospitals) prescribing patients with SUD naloxone, providing other harm reduction tools, educating on their use [Most common recommended action under theme 1 and overall across all four themes]
    - Providers implementing universal, evidence-based substance use disorder screening and starting treatment
    - Providers starting patients with SUD on FDA-approved medication-assisted treatment (MAT)
    - Providers screening for mental health conditions (i.e., depression and anxiety) using validated tools and referring for evidence-based treatment and supports
    - Facilities ensuring evidence-based mental health screenings are completed at key intervals and timeframes during the perinatal period
    - Facilities ensuring universal and evidence-based verbal screening for SUD
    - Providers across disciplines ensuring patients are started on appropriate mental health medications that are safe for use in pregnancy and facilitating access to mental health treatment

The second most salient theme— **ensure high-quality care**—comprised four recommended actions or codes.

- Recommended Actions under Theme **ensure high-quality care** that address Contributing Factor Classes Continuity of Care/Care Coordination, Discrimination, and Substance Use Disorder:
    - Provider teams collaborating on patient care plan throughout care [Most common recommended action under theme 2]
    - Facilities mandating ongoing implicit/explicit bias training for all providers/staff
    - Facilities educating staff on identifying and averting biased language in documentation
    - Providers ensuring that patients with a history of SUD who are discharged with pain management medications have a safety/pain management plan

The third most salient theme— **build health consumer knowledge**— comprised three recommended actions or codes.

- Recommended Actions under Theme **build health consumer knowledge** that address Contributing Factor Classes Substance Use Disorder and Knowledge:
    - Institutions or entities across the system (i.e., state agencies or community-based organizations) disseminating public health education campaigns about SUD and harm reduction centers and tools [Most common recommended action under theme 3]
    - Providers assessing for cravings or current use, starting patients on FDA-approved medication-assisted treatment (MAT), and educating about risks for relapse and overdose in pregnant patients with identified substance use disorder (SUD) history, educating patient support persons about harm reduction centers and tools as part of patient care plans

The fourth theme— **address barriers to care**— comprised three recommended actions or codes.

- Recommended Actions under Theme **address barriers to care** that address Contributing Factor Classes Continuity of Care/Care Coordination and Referral:
    - Providers connecting patients with community-based services and supports that are aligned with their individual needs [Most common recommended action under theme 4]
    - Facilities leveraging available resources to ensure patient is connected with needed services and supports and has assistance with managing care plan
    - Entities across the system (i.e., facilities, payers, providers) connecting patients with a medical home or source of consistent primary care

Final key themes, related complete codes, and associated contributing factor classes are displayed in Table 9. In the table, the order of themes and the order of recommended actions or codes within each theme reflect their frequency in the recommendation data. The columns 'Contributing Factor Class Addressed' and 'Recommendation Action Level' are categorical factors defined by the MMRIA Committee Decisions form (Appendix A) and assigned to each recommendation during case review.

Table 9. Results of Thematic Analysis of Recommendations to Address Preventable, Pregnancy-Associated but Not Related Deaths, New Jersey, 2019-2021

Key Theme #1 - Implement Comprehensive Approach to Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Facilities (i.e., harm reduction centers and hospitals) prescribe patients naloxone and provide other harm reduction tools such as other opioid antidotes, fentanyl and xylazine test strips, and clean syringes and educate on their use when substance use disorder (SUD) is identified.	Substance Use Disorder	Facility
Providers screen for mental health conditions, in particular depression and anxiety, using validated tools and refer for treatment and supports (or ensure this occurs) throughout care whenever need is identified.	Mental Health Conditions	Provider
Providers across disciplines ensure patients are started on appropriate mental health medications that are safe for use in pregnancy and facilitate access to mental health treatment whenever need is identified.	Continuity of Care/Care Coordination	Provider
Facilities ensure evidence-based mental health screenings are completed at key intervals and timeframes during the perinatal period (e.g., first prenatal care encounter, first postpartum visit after delivery).	Assessment	Facility
Facilities ensure universal and evidence-based verbal screening for substance use disorder.	Assessment Substance Use Disorder	Facility
Providers implement universal, evidence-based substance use disorder (SUD) screening and provide patient with treatment when they screen positive for SUD.	Substance Use Disorder	Provider

Providers start pregnant patients with substance use disorder (SUD) on Food and Drug Administration (FDA)-approved medication-assisted treatment (MAT) as soon as possible.	Substance Use Disorder	Provider
Key Theme #2 - Ensure High-Quality Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Throughout patient care, **provider** teams should collaborate on care plans to ensure optimal patient outcomes.	Continuity of Care/Care Coordination	Provider
In line with New Jersey law, P.L.2021, c.79, **facilities** mandate ongoing implicit/explicit bias training for all providers/staff to ensure respectful care for all patients.	Discrimination	Facility
Facilities ensure all providers and staff are educated about biased language in documentation, its impact on patient care, and how to document without bias.	Discrimination	Facility
Providers ensure that patients with a history of substance use disorder (SUD) who are discharged with pain management medications have a safety/pain management plan in place to prevent risk for relapse.	Substance Use Disorder	Provider
Key Theme #3 - Build Health Consumer Knowledge		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Institutions or entities across systems (i.e., state agencies or community-based organizations) disseminate public health education on a continual basis about substance use disorder, harm reduction centers and evidence-based interventions to build public awareness and reduce stigma.	Knowledge Substance Use Disorder	Community, System
For pregnant patients with identified substance use disorder (SUD) history, **providers** assess for cravings or current use, start patients on Food and Drug Administration (FDA)-approved medication-assisted treatment (MAT) as soon as possible, and educate them about risks for relapse and overdose from misuse.	Substance Use Disorder	Provider
Providers educate patient support persons about harm reduction centers and tools, including using naloxone, as part of patient care plans.	Substance Use Disorder	Provider
Key Theme #4 - Address Barriers to Care		
Recommendation Codes	**Contributing Factor Class Addressed**	**Recommendation Action Level**
Providers connect patients with community-based services and supports (e.g., home visiting, perinatal addiction and maternal wrap-	Continuity of Care/Care Coordination Referral	Provider

around programs, bereavement, inter-partner violence, or mental health resources) that are aligned with individual patient needs where appropriate or clinically indicated.		
Entities **across the system** (i.e., facilities, payers, providers) connect patients with a medical home or source of consistent primary care whenever need is indicated.	Continuity of Care/Care Coordination	System
Facilities leverage available resources (e.g., case management, navigators, and Connecting NJ) to ensure patient is connected with needed services and supports and has assistance with managing care plan.	Continuity of Care/Care Coordination	Facility

Where Do We Go From Here? Next Steps

This report provided a robust set of findings about pregnancy-associated deaths and how to prevent them in New Jersey. Additional considerations can also include:

- There is an opportunity to identify and act on community- and system-level recommendations. Additional data sources such as the CDC ERASE MM Community Vital Signs dashboard enable further understanding of community-level factors to address.
- We recommend that a body such as the NJMCQC or other stakeholders review the recommendations to understand their feasibility for actionable change and identify what gaps need to be addressed before these recommendations can be moved to action.
- Stakeholders should consider the disparities highlighted in the report (e.g., across NJ region and across race/ethnicity groups) to ensure next actions prioritize higher-risk communities.
- Stakeholders (e.g., state agencies, community-based organizations) should share report findings with communities in New Jersey and engage community members around how to move recommendations to action and how they can be directly involved in these efforts.
- Three recommended actions apply to **all** pregnancy-associated maternal deaths in New Jersey, since they emerged for both pregnancy-related and pregnancy-associated, but not related recommendation analyses. These recommended actions warrant collective consideration and action.
    - Facilities should educate providers/staff about biased language in documentation, its impact on patient care, and how to document without bias [Ensure high-quality care].
    - Multiple stakeholders across the system should connect patients with a medical home or source of consistent primary care whenever need is indicated [Address barriers to care].
    - Throughout patient care, provider teams need to collaborate on care plan to ensure optimal patient outcomes [Ensure high-quality care].
- Given that over 50% of pregnancy-associated maternal deaths were in the postpartum period, stakeholders should consider the full spectrum of needs during the postpartum period and map out programs, policies, and resources that align with those needs.
- Non-Hispanic Black women are more likely to die from pregnancy-related causes than other women in New Jersey. Efforts to address this disparity should prioritize capturing the voice of Black birthing people to inform programs and policies that ensure equitable care and dismantle structural and systemic biases in the New Jersey health care system.
- The report elevated the need to address cardiac conditions, cardiomyopathy, and related chronic diseases, such as obesity, to reduce maternal mortality. Stakeholders should seek to understand current practices for weight management as part of perinatal care and identify gaps that can be addressed as part of a broader plan to incorporate obesity prevention/management throughout care.
- Eight recommended actions addressing substance use disorder as a contributing factor for pregnancy-associated, but not related mortality emerged from analysis, underscoring the need for a multi-pronged approach (i.e., multiple actions at multiple levels) to prevent maternal deaths in New Jersey.

Programmatic and Statewide Efforts to Improve Maternal Health

Nurture New Jersey

Governor Phil Murphy and First Lady Tammy Snyder Murphy of New Jersey have championed policies and programs aimed to reduce rates of maternal mortality, severe maternal morbidity, and racial and ethnic disparities. They are committed to making New Jersey the safest, most equitable place to give birth in the country. To achieve this vision, First Lady Murphy established the Nurture NJ campaign in 2019 and released the Nurture New Jersey (NJ) Maternal and Infant Health Strategic Plan in 2021 to develop and coordinate statewide actions to reduce maternal morbidity and mortality and racial disparities in birth outcomes for mothers and children. In New Jersey, there is a need to coordinate and expand the multiple fractionalized maternal mortality and morbidity reduction efforts being conducted by caring and committed individuals and organizations across the state. The New Jersey Department of Health, the State-designated agency responsible for public health protection and services, uniquely leverages its position to impact critical changes in the delivery of care and the implementation of statewide strategies to reduce maternal mortality and morbidity and to eliminate the racial and ethnic disparities in maternal outcomes (Hogan, et al., 2021).

Since its inception, Nurture NJ has made tremendous strides to advance maternal and infant health with a focus on tackling disparate populations. Some of the major milestones of the Nurture NJ Initiative to date include:

- Passing more than 70 articles of maternal and child health legislation,
- Launching the nation's most robust universal nurse home visitation program, Family Connects NJ, and
- Establishing the first of its kind Maternal and Infant Health Innovation Authority (MIHIA), the only government agency dedicated to the health and well-being of mothers and babies.

Maternal and Infant Health Innovation Authority (MIHIA)

In July 2023, Governor Murphy enacted legislation S3864, the "New Jersey Maternal and Infant Health Innovation Act" which established the Maternal and Infant Health Innovation Authority (MIHIA). MIHIA is the statewide coordinating entity responsible for ensuring all mothers in New Jersey have the support they need for a healthy pregnancy and birth.

MIHIA oversees the advancement of the Trenton, NJ-based Maternal and Infant Health Innovation Center (MIHIC) as well as the New Jersey Maternal Care Quality Collaborative (NJMCQC), the state's maternal health task force. MIHIC will serve as a staple for maternal and infant health and social support services in the city of Trenton and serve as a national model as the first of its kind, all-encompassing facility. MIHIA will ensure that the NJMCQC—a legislated team of 39 multidisciplinary members—will disseminate statewide action-based initiatives and recommendations aimed at reducing disparities in maternal health and improving health across the reproductive health period.

Midwifery Training Centers of Excellence

To advance Nurture NJ's goal of expanding and diversifying the midwifery workforce, the Rutgers University School of Nursing—the sole midwifery education program in NJ—developed Midwifery Training Centers of Excellence in 2022 to increase the quality and number of midwifery preceptors, establish a midwifery simulation center to ensure hands-on clinical midwifery experiences, and increase available student training opportunities. The initiative has provided funding to 25 midwifery students attending the Rutgers School of Nursing and provided scholarships totaling $250,000 in aid between Spring 2023 and Summer 2024 to enhance affordability in midwifery education. These newly established Centers will create a midwifery training network statewide, develop ongoing professional development for current midwives, and expand the state's only midwifery program to grow and diversify the workforce.

Division of Family Health Services

The Division of Family Health Services (FHS) at the NJDOH has aligned several of its programming and initiatives alongside the Nurture NJ mission to advance maternal and infant health equity. Many of the programs highlighted below are housed within Family Health Services and are essential in improving outcomes for all birthing people:

New Jersey Maternal Mortality Review Committee (NJMMRC) Program

The New Jersey Maternal Mortality Review Committee (NJMMRC) has made extensive strides programmatically to increase the comprehensiveness and timeliness of its reviews to not only move toward action-based initiatives based on the latest data, but also ensure its mission and vision continue to center community engagement and health equity.

Since 2022, the NJMMRC reviewed 227 cases of pregnancy-associated deaths occurring from 2019-2023. It increased its timeliness to review more than 50% of pregnancy-associated deaths within two years of the occurrence of the death, while also accounting for an increased number of pregnancy-associated deaths because of the COVID-19 pandemic. This accomplishment is in alignment with national initiatives toward improving maternal health data capacity and dissemination.

In addition, the NJMMRC has focused on building community engagement and connecting with community-centered providers to both disseminate current maternal mortality data and engage in amplifying the importance of community inclusion. The Black Mamas Matter Alliance (BMMA) noted in their report, "Sharing Power with Communities," the need for MMRCs to increase accountability, frequency and transparency of communications with community members and ensure that communities are properly integrated into the creation of recommendations. As part of its commitment to achieving this, the NJMMRC is working with national and state-based entities to center on community-focused programming and data dissemination.

Reproductive Justice for Equitable Maternal Health – Statewide Implicit and Explicit Bias Training

The Reproductive Justice for Equitable Maternal Health training is a legislated, statewide training developed by the New Jersey Department of Health to provide implicit- and explicit-bias training statewide for all clinical and non-clinical staff in NJ birthing facilities. The course has focused on the history and current implications of racial and ethnic bias and discrimination on maternal health outcomes, while also providing evidence-based tools and resources to mitigate these biases and promote equitable and respectful maternity care.

Healthy Women, Healthy Families (HWHF)

Healthy Women, Healthy Families (HWHF) is a community-driven, coordinated approach to implement community-based activities to increase postpartum care, particularly through deployment of the community health worker (CHW) workforce. Through HWHF, CHWs have been providing long-term case management to underserved populations statewide and are trained through the Colette Lamothe-Galette Community Health Worker Institute, a training program aimed at improving the CHW workforce through a specialized curriculum and hands-on experience. In addition, HWHF also implements municipality-based activities aimed at reducing health disparities, especially among the Black, NH and Hispanic perinatal populations throughout NJ by focusing on increasing care during the postpartum period. These activities consist of postpartum doula services, expanding breastfeeding education sessions, and support to non-traditional groups. The postpartum doula care program focuses on providing access to postpartum doulas to women for 12 months after birth, focusing on the "4th Trimester" and transitions occurring after childbirth. Targeted evidence-based breastfeeding education and support to nontraditional groups such as fathers, grandparents, partners, siblings, and teens will also increase breastfeeding knowledge and provide families with the support they need to breastfeed their babies.

Doula Learning Collaborative (DLC)

Community doulas are trained persons who provide physical, emotional, and information support before, during, and after childbirth using culturally competent methods to amplify the voices of birthing persons. The NJ Doula Learning Collaborative (NJDLC) develops and supports the doula workforce to address maternal and child health disparities by conducting training, workforce development, mentoring, and technical assistance. The NJDLC provides community outreach and collaboration, doula credentialing, billing support, mentorship, workforce development, and NJFamilyCare (Medicaid) fee-for-service enrollment.

New Jersey Postpartum Resources and Support Program (NJPRSN)

The New Jersey Postpartum Resources and Support Program (NJPRSN) is aimed at improving postpartum health outcomes for birthing persons and their families, particularly disproportionately affected populations. Using evidence-based practices and a region-based and community-focused approach, NJPRSN is focused on improving access to both postpartum resources and service delivery networks by increasing provider knowledge on postpartum supports, such as screening and services, and enhancing support for those at risk of postpartum depression. Currently, the NJDOH is aiming to implement the NJPRSN in early 2025 across several agencies.

Connecting NJ

Connecting NJ (formerly known as Central Intake) is a partner and agency network that uses a county-based and centralized system to streamline referrals for obstetrical and prenatal care providers, community agencies, and families. The network provides mothers, fathers, caregivers, and guardians with referrals to community resources, programs and services that support families during pregnancy, in the acute postpartum period, and during the phase of early childhood to age 5. Referrals include community doulas who offer wide-spectrum, culturally competent support to pregnant persons pre-pregnancy, throughout the pregnancy and post-pregnancy; home visiting programs such as the Nurse-Family Partnership and universal home visiting; Healthy Women, Healthy Families; NJ FamilyCare (NJ's publicly funded health insurance program) that provides a wide variety of health insurance coverage, and more. The number of referrals processed by Connecting NJ has significantly increased since 2018, driven primarily by increase in referrals from prenatal health providers.

New Jersey Maternal Health Hospital Report Card

Pursuant to P.L. 2018, c82, the New Jersey Maternal Health Hospital Report Card is an annual report/dashboard published by the New Jersey Department of Health's Maternal Data Center that publicly shares maternal health outcomes of labor and delivery at all acute general care hospitals that are licensed birthing hospitals. The report card is the first of its kind nationwide and provides information on the demographics of all NJ birthing people who delivered at a NJ hospital, newborn characteristics, cesarean birth rates, and delivery outcomes and complications, such as hemorrhage, infection, and severe maternal morbidity (SMM, with transfusion). The first iteration of the report card was released in 2019. Since then, several improvements have been made to the report, including a consumer-focused design that deploys a user-friendly format and the ability to make side-by-side comparisons of facilities to assist birthing persons in making informed decisions about their care.

Family Connects NJ

Family Connects New Jersey (NJ) is an evidence-based universal home visiting program led by the Department of Children and Families (NJDCF) aimed at providing support for all birth, adoptive, and resource parents with a newborn, as well as parents experiencing a stillbirth or loss of their newborn. The program, which is offered at no cost to all families regardless of income, insurance, or immigration status, consists of specially trained registered nurses that evaluate health and screen for newborn complications and address

any unexpected changes families may experience. Community-based resources are also made available to families to ensure their connection to needed supports and services. Family Connects NJ has been implemented in eleven counties (Bergen, Cumberland, Essex, Gloucester, Hudson, Mercer, Middlesex, Ocean, Passaic, Somerset, Sussex) to date and aims to be implemented across all 21 NJ counties by January 2027.

Shared Decision-Making

TEAMBIRTH

Since 2022, New Jersey Healthcare Quality Institute (NJHCQI) and Ariadne Labs in partnership with NJDOH and funded through the State Maternal Health Innovation Program from Health Resources & Services Administration (HRSA) have implemented the TeamBirth model of shared decision-making in New Jersey birthing facilities. TeamBirth, which was developed by Ariadne Labs, is an evidence-based patient-centered care model that involves team huddles and other tools used during labor and delivery. Using these tools for every birth helps to improve communication and ensure respectful care that aligns with patient preferences. TeamBirth represents a critical approach for elevating the patient voice, fostering collaboration and trust between patient and provider, improving patients' care and birth experiences and in turn mitigating racial disparities in pregnancy outcomes, particularly for Black, Asian, and Hispanic birthing patients. Continued funding from HRSA will support scale-up of TeamBirth throughout New Jersey by 2029.

Methodology

Data Sources

Pregnant and postpartum women whose deaths occurred from years 2019-2021 are included in this report and were entered into the Maternal Mortality Review Information Application (MMRIA). For each death reviewed by the MMRC, abstraction forms are available in the MMRIA database to retrieve elements from the death certificate, birth/fetal death certificate, autopsy reports, case narratives, and multiple forms for emergency room and hospital encounters. Upon completion of committee review, decisions are also entered into its respective MMRIA form. The data included in this report include information pulled from the maternal death certificate, birth or fetal death certificate, and Committee Decisions Form in the MMRIA database.

Data Cleaning

Data retrieved from MMRIA for this report were assessed for duplicates, errors, and quality issues prior to analysis. Since 10 cases from the data sample were determined by the NJ MMRC as "unable to determine relatedness," information for these cases will not be included in tables and figures to protect confidentiality and use of potential identifiers.

Recommendations and associated data in the Committee Decisions Form were reviewed and checked for accuracy in the MMRIA system, prior to data export. The data were exported from the MMRIA system via SAS programming into an Excel workbook. Numerical case identification numbers were created for all cases and excel formulas executed to connect all data across spreadsheets. The NJDOH team reviewed all recommendations, recommendation levels (i.e., patient/family, community, provider, system, facility, community), and contributing factors to determine which data were complete and could be included in our analyses. A case needed to have been deemed preventable, pregnancy-related, or pregnancy-associated, but not related and have at least one complete recommendation to be included.

The analytic Excel file was reorganized to enable summary of data for all cases together, as well as separate analyses for pregnancy-related cases and pregnancy-associated, but not related cases. Descriptive summaries of the available recommendations and associated data were summarized through calculation of counts and frequencies. Thematic analyses were conducted on the subset of cases with complete recommendations to understand common actions suggested by the NJMMRC to address factors that contributed to these maternal deaths. All recommendations for preventable, pregnancy-related deaths and pregnancy-associated, but not related deaths were sorted by common contributing factors before completing thematic analyses.

Thematic analyses were conducted separately for any preventable, pregnancy-related deaths and pregnancy-associated, but not related deaths with at least one recommendation. The grounded theory approach to qualitative analysis (Glaser

& Strauss, 2017) was used to assign codes to the data and identify themes and supporting quoted text. This qualitative analysis approach is iterative, as the process of reviewing data and assigning codes is repeated until a final set of themes are identified to summarize all available data. Key themes that summarize the set of recommended actions that emerged from analysis of recommendations are reported for pregnancy-related and pregnancy-associated, but not related cases.

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Appendix A: CDC Committee Decisions Form

MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v24 1

REVIEW DATE

Month/Day/Year

RECORD ID #

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

ESTIMATE THE DEGREE OF RELEVANT INFORMATION (RECORDS) AVAILABLE FOR THIS CASE:
These fields are for internal jurisdiction use in order to evaluate opportunities to gain better access to information for reviews.

☐ 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)

DOES THE COMMITTEE AGREE WITH THE UNDERLYING[1] CAUSE OF DEATH LISTED ON DEATH CERTIFICATE?
The underlying cause of death determination as documented by a multidisciplinary MMRC may be different from the underlying cause of death used by pathologists in the course of death certification documented in the Vital Statistics system.

☐ YES ☐ NO

COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING[1] CAUSE OF DEATH
Refer to Appendix A for PMSS-MM cause of death list.

If a death is pregnancy-associated, not related then an underlying cause of death entry is not necessary. Use optional box below.

TYPE	OPTIONAL: CAUSE (DESCRIPTIVE)
UNDERLYING[1,2]	
CONTRIBUTING[2,3]	
IMMEDIATE[2]	
OTHER SIGNIFICANT[2]	

COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH[4]

DID **OBESITY** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **DISCRIMINATION**[5] 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

MANNER OF DEATH

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

IF ACCIDENTAL DEATH, HOMICIDE, OR SUICIDE, LIST THE **MEANS OF FATAL INJURY**	☐ FIREARM ☐ SHARP INSTRUMENT ☐ BLUNT INSTRUMENT ☐ POISONING/OVERDOSE ☐ HANGING/ STRANGULATION/ SUFFOCATION	☐ FALL ☐ PUNCHING/ KICKING/BEATING ☐ EXPLOSIVE ☐ DROWNING ☐ FIRE OR BURNS ☐ MOTOR VEHICLE	☐ INTENTIONAL NEGLECT ☐ OTHER, SPECIFY: ☐ UNKNOWN ☐ NOT APPLICABLE
IF HOMICIDE, WHAT WAS THE **RELATIONSHIP OF THE PERPETRATOR TO THE DECEDENT?**	☐ NO RELATIONSHIP ☐ PARTNER ☐ EX-PARTNER ☐ OTHER RELATIVE	☐ OTHER ☐ ACQUAINTANCE ☐ OTHER, SPECIFY:	☐ UNKNOWN ☐ NOT APPLICABLE

[1] 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.
[2] OPTIONAL field, CDC does not use this data.
[3] Add descriptions of contributors in the pathway between the immediate and underlying cause of death, as provided by the committee. Note that this is different from the contributing factors worksheet on page 2.
[4] If "Yes" or "Probably" is selected for preventable deaths, then an aligned contributing factor class and description would be expected in the grid on page 2.
[5] Encompasses Discrimination, Interpersonal Racism, and Structural Racism as described in Appendix B.

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[6]	☐ GOOD CHANCE ☐ NO CHANCE	☐ SOME CHANCE ☐ UNABLE TO DETERMINE

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Entries may continue to grid on page 3)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

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? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	CONTRIBUTING FACTOR (enter one per row; repeat as needed if a contributor has more than one recommendation)	LEVEL	COMMITTEE RECOMMENDATION [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	LEVEL	PREVENTION TYPE (choose below)	EXPECTED IMPACT (choose below)

CONTRIBUTING FACTOR KEY (DESCRIPTIONS IN APPENDIX B)

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

DEFINITION OF LEVELS

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

PREVENTION TYPE

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

EXPECTED IMPACT

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

[6] If "Good Chance" or "Some Chance" are selected, then CDC considers this is a "Yes" in their analytic use of the preventability determination.

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Continued from page 2)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

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? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	**CONTRIBUTING FACTOR** (enter one per row; repeat as needed if a contributor has more than one recommendation)	**LEVEL**	**COMMITTEE RECOMMENDATIONS** [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	**LEVEL**	**PREVENTION TYPE** (choose below)	**EXPECTED IMPACT** (choose below)

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Continued from page 3)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

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? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	**CONTRIBUTING FACTOR** (enter one per row; repeat as needed if a contributor has more than one recommendation)	**LEVEL**	**COMMITTEE RECOMMENDATIONS** [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	**LEVEL**	**PREVENTION TYPE** (choose below)	**EXPECTED IMPACT** (choose below)

APPENDIX A. PMSS-MM CODES: IF PREGNANCY-RELATED,[7] COMMITTEE DETERMINATION OF UNDERLYING[1] CAUSE OF DEATH

Hemorrhage (Excludes Aneurysms or CVA)
10.1 - Hemorrhage – Uterine Rupture
10.2 - Placental Abruption
10.3 - Placenta Previa
10.4 - Ruptured Ectopic Pregnancy
10.5 - Hemorrhage – Uterine Atony/Postpartum Hemorrhage
10.6 - Placenta Accreta/Increta/Percreta
10.7 - Hemorrhage due to Retained Placenta
10.10 - Hemorrhage – Laceration/Intra-Abdominal Bleeding
10.9 - Other Hemorrhage/NOS

Infection
20.1 - Postpartum Genital Tract (e.g., of the Uterus/ Pelvis/Perineum/Necrotizing Fasciitis)
20.2 - Sepsis/Septic Shock
20.4 - Chorioamnionitis/Antepartum Infection
20.6 - Urinary Tract Infection
20.7 - Influenza
20.8 - COVID-19
20.10 - Pneumonia
20.11 - Other Non-Pelvic Infection (e.g., TB, Meningitis, HIV)
20.9 - Other Infection/NOS

Embolism (Excludes Cerebrovascular)
30.1 - Embolism – Thrombotic
30.9 - Other Embolism (Excludes Amniotic Fluid Embolism)/NOS

Amniotic Fluid Embolism
31.1 - Amniotic Fluid Embolism

Hypertensive Disorders of Pregnancy (HDP)
40.1 - Preeclampsia
50.1 - Eclampsia
60.1 - Chronic Hypertension with Superimposed Preeclampsia

Anesthesia Complications
70.1 - Anesthesia Complications

Cardiomyopathy
80.1 - Postpartum/Peripartum Cardiomyopathy
80.2 - Hypertrophic Cardiomyopathy
80.9 - Other Cardiomyopathy/NOS

Hematologic
82.1 - Sickle Cell Anemia
82.9 - Other Hematologic Conditions including Thrombophilias/TTP/HUS/NOS

Collagen Vascular/Autoimmune Diseases
83.1 - Systemic Lupus Erythematosus (SLE)
83.9 - Other Collagen Vascular Diseases/NOS

Conditions Unique to Pregnancy
85.1 - Conditions Unique to Pregnancy (e.g., Gestational Diabetes, Hyperemesis, Liver Disease of Pregnancy)

Injury
88.1 - Intentional (Homicide)
88.2 - Unintentional
88.9 - Unknown Intent/NOS

Cancer
89.1 - Gestational Trophoblastic Disease (GTD)
89.3 - Malignant Melanoma
89.9 - Other Malignancies/NOS

Other Cardiovascular Conditions (excluding cardiomyopathy, HDP, and CVA)
90.1 - Coronary Artery Disease/Myocardial Infarction (MI)/Atherosclerotic Cardiovascular Disease
90.2 - Pulmonary Hypertension
90.3 - Valvular Heart Disease Congenital and Acquired
90.4 - Vascular Aneurysm/Dissection (Non-Cerebral)
90.5 - Hypertensive Cardiovascular Disease
90.6 - Marfan Syndrome
90.7 - Conduction Defects/Arrhythmias
90.8 - Vascular Malformations Outside Head and Coronary Arteries
90.9 - Other Cardiovascular/NOS, including CHF, Cardiomegaly, Cardiac Hypertrophy, Cardiac Fibrosis, Non-Acute Myocarditis

Pulmonary Conditions (Excludes ARDS-Adult Respiratory Distress Syndrome)
91.1 - Chronic Lung Disease
91.2 - Cystic Fibrosis
91.3 - Asthma
91.9 - Other Pulmonary Disease/NOS

Neurologic/Neurovascular Conditions (Excluding CVA)
92.1 - Epilepsy/Seizure Disorder
92.9 - Other Neurologic Diseases/NOS

Renal Disease
93.1 - Chronic Renal Failure/End-Stage Renal Disease (ESRD)
93.9 - Other Renal Disease/NOS

Cerebrovascular Accident (CVA) not Secondary to HDP
95.1 - Cerebrovascular Accident (Hemorrhage/ Thrombosis/Aneurysm/Malformation) not Secondary to Hypertensive Disorders of Pregnancy

Metabolic/Endocrine
96.2 - Diabetes Mellitus
96.9 - Other Metabolic/Endocrine Disorders/NOS

Gastrointestinal Disorders
97.1 - Crohn's Disease/Ulcerative Colitis
97.2 - Liver Disease/Failure/Transplant
97.9 - Other Gastrointestinal Diseases/NOS

Mental Health Conditions
100.1 - Depressive Disorder
100.2 - Anxiety Disorder (including Post-Traumatic Stress Disorder)
100.3 - Bipolar Disorder
100.4 - Psychotic Disorder
100.5 - Substance Use Disorder
100.9 - Other Psychiatric Conditions/NOS

Unknown COD
999.1 - Unknown COD

[1] 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.
[7] Pregnancy-related death: death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

APPENDIX B. CONTRIBUTING FACTOR DESCRIPTIONS

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

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

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

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

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

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

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

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

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

DISCRIMINATION
Treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Hardeman, 2022)[8]

ENVIRONMENTAL FACTORS
Factors related to weather or social environment.

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

INTERPERSONAL RACISM
Discriminatory interactions between individuals based on differential assumptions about the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization. (Hardeman, 2022)[8]

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

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

LEGAL
Legal considerations that impacted outcome.

MENTAL HEALTH CONDITIONS
The patient had a documented diagnosis of a psychiatric disorder. This includes postpartum depression. If a formal diagnosis is not available, refer to your review committee subject matter experts (e.g., psychiatrist, psychologist, licensed counselor) to determine whether the criteria for a diagnosis of substance use disorder or another mental health condition are met based on the available information.

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

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

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

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

STRUCTURAL RACISM
The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage white people through inequities in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc. (Hardeman, 2022)[8]

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

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

TRAUMA
The individual experienced trauma: i.e., loss of child (death or loss of custody), rape, molestation, or one or more of the following: sexual exploitation during childhood plus persuasion, inducement, or coercion of a child to engage in sexually explicit conduct; or other physical or emotional abuse other than that related to sexual abuse during childhood.

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

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

OTHER
Contributing factor not otherwise mentioned. Please provide description.

[8] Hardeman RR, et al. *Developing Tools to Report Racism in Maternal Health for the CDC Maternal Mortality Review Information Application (MMRIA): Findings from the MMRIA Racism & Discrimination Working Group.* Matern Child Health J. 2022.

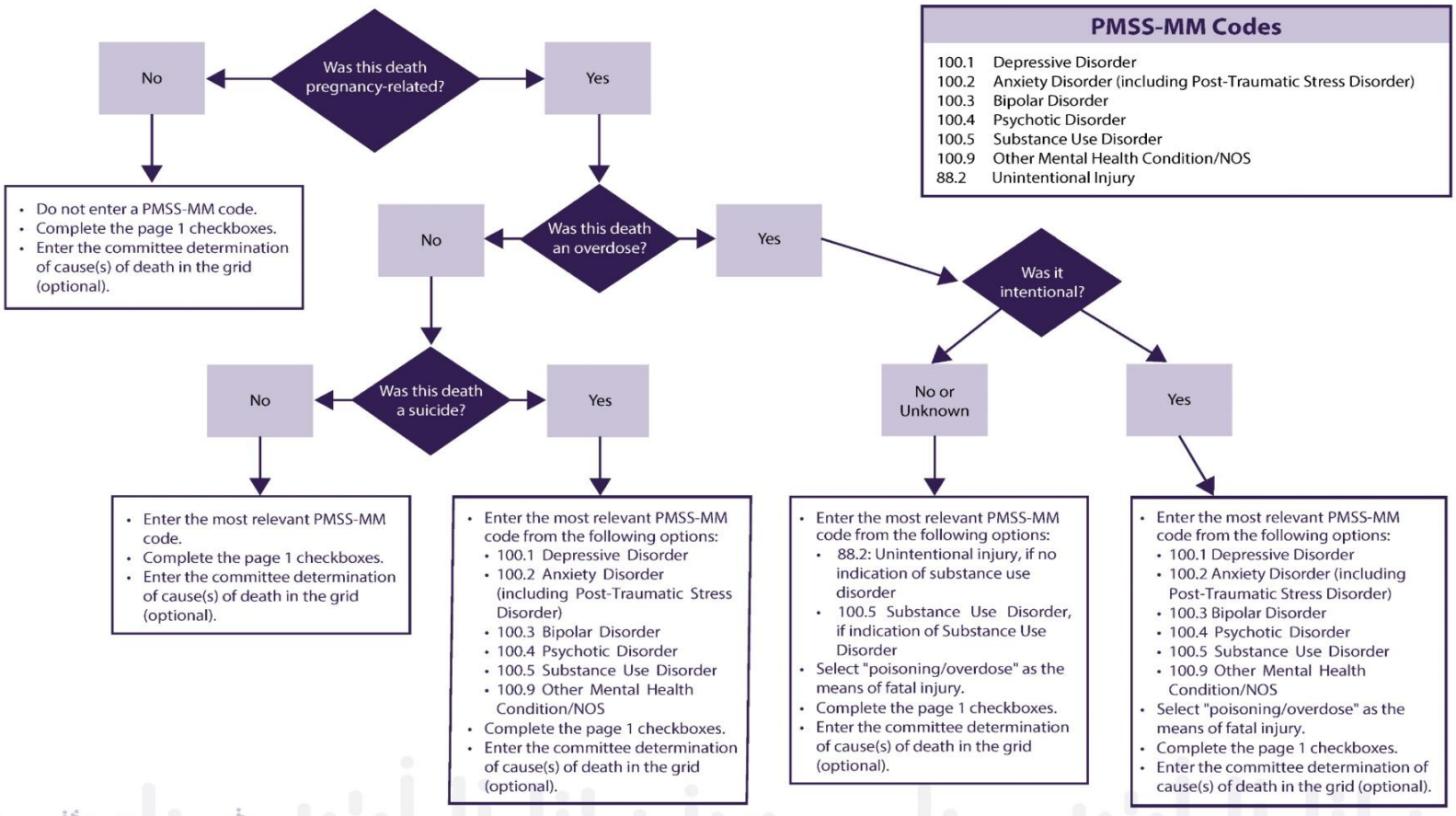
APPENDIX C. CONSENSUS PREGNANCY-RELATED CRITERIA FOR SUICIDE AND UNINTENTIONAL OVERDOSES[9, 10]

Present Y/N	Consensus pregnancy-related criteria for suicide and unintentional overdoses	Examples
	Pregnancy Complication	
	Increased pain directly attributable to pregnancy or postpartum events leading to self-harm or drug use that are implicated in suicide or unintentional drug-related death. *[consensus during pregnancy]*	Back pain, pelvic pain, kidney stones, cesarean incision, or perineal tear pain
	Traumatic event in pregnancy or postpartum (diagnosis of fetal anomaly, stillbirth, preterm delivery, neonatal or infant death, traumatic delivery experience, removal of children from custody) with a temporal relationship between the event leading to self-harm or increased drug use and subsequent death. *[consensus in all time periods]*	Stillbirth, preterm delivery, diagnosis of fetal anomaly, traumatic delivery experience, relationship destabilization due to pregnancy, removal of child(ren) from custody
	Pregnancy-related complication likely exacerbated by drug use leading to subsequent death. *[consensus in pregnancy – only time period considered]*	Placental abruption or preeclampsia in setting of drug use
	Chain of Events Initiated by Pregnancy	
	Cessation or attempted taper of medications for pregnancy-related concerns (neonatal/fetal exposure risk, fear of child protective service involvement) leading to maternal destabilization or drug use and subsequent death. Neonatal or fetal risk - *[consensus in all time periods]*. Child Protective Service involvement - *[consensus during pregnancy]*	Substance use pharmacotherapy (methadone or buprenorphine), psychiatric medications, pain medications
	Inability to access inpatient or outpatient addiction or mental health treatment due to pregnancy. *[consensus during and within 6 months of pregnancy]*	Health care professionals uncomfortable with treating pregnant women, facilities not available that accept pregnant women
	Perinatal psychiatric conditions resulting in maternal destabilization or drug use and subsequent death. *[consensus during and within 6 months of pregnancy]*	Depression diagnosed in pregnancy or postpartum resulting in suicide
	Recovery/stabilization of substance use disorder achieved during pregnancy or postpartum with clear statement in records that pregnancy was motivating factor with subsequent relapse and subsequent death. *[no consensus at any time period]*	Relapse leading to overdose due to decreased tolerance or polysubstance use
	Aggravation of Underlying Condition by Pregnancy	
	Worsening of underlying depression, anxiety or other psychiatric condition in pregnancy or postpartum period with documentation that mental illness led to drug use or self-harm and subsequent death. *[consensus during and within 6 months of pregnancy]*	Pre-existing depression exacerbated in the postpartum period leading to suicide
	Exacerbation, under-treatment or delayed treatment of pre-existing condition in pregnancy or postpartum leading to use of prescribed or illicit drugs resulting in death, or suicide. *[consensus during and within 6 months of pregnancy]*	Undertreatment of chronic pain leading to misuse of medications or use of illicit drugs, resulting in death
	Medical conditions secondary to drug use in setting of pregnancy or postpartum that may be attributable to pregnancy-related physiology and increased risk of complications leading to death. *[no consensus at any time period]*	Stroke or cardiovascular arrest due to stimulant use

[9] Smid MC et al, 2023. *Consensus pregnancy-related criteria for suicide and unintentional overdoses using a Delphi process.* Arch Womens Ment Health.

[10] The italicized text in brackets specify where the Delphi exercise with representatives from 48 MMRCs and eight experts in maternal mortality, substance use disorder, and maternal mental health reached consensus on the criterion. Lack of Delphi consensus as shown in brackets should not override committee consensus on a specific case. If "Yes" is chosen by the committee for at least one of the boxes under any of the three categories then that would constitute a pregnancy-related death.

APPENDIX D. CODING UNDERLYING CAUSE OF DEATH FOR SUICIDES AND OVERDOSES



ERASE MM
Enhancing Reviews and Surveillance to Eliminate Maternal Mortality

MMRIA
MATERNAL MORTALITY REVIEW INFORMATION APP

CDC

APPENDIX E. FAQ: COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH

These frequently asked questions refer to the following checkboxes on the committee decisions form:

Did obesity contribute to the death?
Did discrimination[11] contribute to the death?
Did mental health conditions other than substance use disorder contribute to the death?
Did substance use disorder[12] contribute to the death?
Was this death a suicide?
Was this death a homicide?
If accidental death, homicide, or suicide, list the means of fatal injury.
If homicide, what was the relationship of the perpetrator to the decedent?

1. **Should the checkboxes be completed for all pregnancy-associated deaths or just those determined to be pregnancy-related?**

   The checkboxes should be completed for all deaths reviewed by your committee, regardless of relatedness. If your committee does not review a pregnant or postpartum person's death because it is considered out of your scope, there is no need to complete the checkboxes.

2. **Should the checkboxes be completed in reference to the pregnant or postpartum person, or the broader context surrounding the death?**

   The checkboxes refer to the decedent's own experience. For example, if a pregnant or postpartum person had a substance use disorder which contributed to the death, the checkbox should be marked 'yes'. In contrast, if the death was a homicide where the perpetrator had a substance use disorder that contributed to causing a death, and the victim did not have a substance use disorder, or the victim had a substance use disorder that did not contribute to the death, the checkbox should be marked 'no'.

3. **Does discrimination encompass racism and other forms of bias?**

   Yes, and more specificity may be added using the contributing factors worksheet on page 2 of the committee decisions form. Interpersonal racism or structural racism may also be documented there.

4. **If substance use was involved in the death, should we choose 'yes' for the substance use disorder checkbox?**

   This checkbox refers to 'substance use disorder', not just substance use. The committee should only choose 'yes' or 'probably' if there is indication of a substance use disorder diagnosis or an expert on the committee (e.g., psychiatrist, psychologist, licensed counselor) who feels that the criteria for a diagnosis of substance use disorder are met based on the available information. Additionally, the checkbox should only be marked 'yes' if the committee decides that the substance use disorder was a contributing factor in the death. If the pregnant or postpartum person had a substance use disorder but this did not contribute to the death, the checkbox should be marked 'no'.

   If the committee determines the death was an intentional or accidental overdose, this should be recorded as poisoning/overdose under means of fatal injury.

5. **For the substance use disorder and mental health conditions checkboxes, is a formal diagnosis required?**

   A diagnosis should ideally be indicated in the pregnant or postpartum person's medical records. However, this may underestimate the number of pregnant or postpartum people with substance use disorder or mental health conditions if persons are unable to access care or treatment. Refer to your review committee subject matter experts (e.g. psychiatrist, psychologist, licensed counselor) to determine whether the criteria for a diagnosis of substance use disorder or another mental health condition are met based on the available information.

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[11] Defined as treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping [including racism]. It can manifest as differences in care, clinical communication and shared decision-making. (Hardeman RR, et al. *Developing Tools to Report Racism in Maternal Health for the CDC Maternal Mortality Review Information Application (MMRIA): Findings from the MMRIA Racism & Discrimination Working Group*. Matern Child Health J. 2022.)

[12] Characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised a pregnant or postpartum person's health status (e.g., acute methamphetamine intoxication exacerbated pregnancy-induced hypertension, or the pregnant or postpartum person was more vulnerable to infections or medical conditions).

6. **If substance use disorder contributed to the death, but another mental health condition did not, should we also choose 'yes' for the mental health conditions checkbox?**

   No, substance use disorder should be captured separately from other mental health conditions.

7. **Does substance use disorder include tobacco use?**

   No, substance use disorder as defined here does not include tobacco use. You would NOT mark the substance use disorder checkbox as 'yes' or 'probably' based solely on tobacco use. If the committee determines that tobacco use was a contributor to the death, ensure that Tobacco Use is noted in the contributing factor worksheet with an actionable recommendation that addresses it.

8. **When do we need to choose a means of fatal injury on the committee decisions form?**

   If the committee determines that a death was an accidental death, homicide, or suicide, they should also determine the means of fatal injury to be recorded on the committee decisions form. Unintentional and intentional overdoses should be recorded as poisoning/overdose.

9. **If the committee selects 'yes' or 'probably' for any of the checkboxes (obesity, discrimination, mental health conditions, and/or substance use disorder), should they always document the corresponding contributing factor class and an actionable recommendation?**

   Typically, we expect the circumstances surrounding a death to align with a specified contributing factor class and recommendation. However, recommendations are focused on actions that would have prevented the death. If your committee determines that a circumstance such as obesity contributed to a death that is not preventable, they do not need to document a contributing factor class and recommendation.

10. **When do we need to choose a relationship of the perpetrator to the decedent?**

    If the committee determines that a death was a homicide, they should also record the relationship of the perpetrator to the decedent on the committee decisions forms. The means of fatal injury checkbox should also be filled out for all homicides.

11. **If certain deaths are not reviewed by our committee (for example, suicides and homicides), should we still complete the checkboxes?**

    No, these checkboxes are intended to capture the committee decisions. If a death is not reviewed by the committee, the Circumstances Surrounding Death checkboxes should not be completed.

12. **What if our determination for manner of death does not match the manner indicated on the death record?**

    The checkboxes are intended to capture the decisions of the review committee, and it is expected that sometimes these decisions may differ from the death record. For example, an overdose may have an unknown manner of death on the death certificate, but relevant subject matter experts (e.g. medical examiner), could review additional information and determine that the overdose was intentional. The committee would then check 'yes' for the suicide checkbox. There is also a place on the committee decisions form for indicating whether the committee agrees with the cause of death listed on the death certificate.

13. **Are there opportunities for quality improvement with the checkbox data?**

    Yes, there are lots of opportunities using checkbox data. For example, all unintentional overdoses and overdoses of unknown intent with indication of substance use disorder should have an underlying cause of death PMSS-MM code of 100.5 (Substance Use Disorder) or 100.9 (Other Mental Health Conditions/NOS). If the substance use disorder checkbox is marked 'yes', but the PMSS-MM code is 88.2 (Unintentional Injury), there may be discrepancies in how the MMRC is selecting PMSS-MM codes.

    Another opportunity for quality improvement is to compare the obesity checkbox with the decedent's actual BMI calculated using the height and weight provided in the records. Are there instances where your committee is selecting 'yes' when the BMI suggests the person was at a healthy weight? Of note—this checkbox is intended to capture whether obesity contributed to the death, not whether the pregnant or postpartum person was obese / obesity was present.

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