



## DEPARTMENT OF HEALTH

*Larry Hogan, Governor · Boyd K. Rutherford, Lt. Governor · Robert R. Neall, Secretary*

April 6, 2020

The Honorable Larry Hogan  
Governor  
State of Maryland  
Annapolis, MD 21401-1991

The Honorable Bill Ferguson  
President of the Senate  
H-107 State House  
Annapolis, MD 21401-1991

The Honorable Adrienne A. Jones  
Speaker of the House  
H-101 State House  
Annapolis, MD 21401-1991

RE: Health-General Article, §13-1207, Annotated Code of Maryland - 2019 Annual Report –  
Maryland Maternal Mortality Review

Dear Governor Hogan, President Ferguson, and Speaker Jones:

Pursuant to Health-General Article, §13-1207 and §13-1208; Senate Bill 459, Chapter 74 of the Acts of 2000; and House Bill 1518, Chapter 308 of the Acts of 2018, the Maryland Department of Health submits this legislative report. This report includes the findings and program actions of the Maternal Mortality Review Program, as well as the recommendations of two independent bodies, the Maternal Mortality Review Committee, and the Maternal Mortality Review Stakeholder Group.

If you have questions concerning this report, please me or my Chief of Staff, Tom Andrews, at (410) 767-0136 or [Thomas.andrews@maryland.gov](mailto:Thomas.andrews@maryland.gov).

Sincerely,

Robert R. Neall  
Secretary



# **Maryland Maternal Mortality Review**

2019 Annual Report  
Health – General Article § 13-1207—13-1208

**Larry Hogan**  
Governor

**Boyd K. Rutherford**  
Lt. Governor

**Robert R. Neall**  
Secretary of Health

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## **Acknowledgements**

This review of maternal deaths in Maryland would not be possible without the data, expertise, and collaboration of the Maryland Department of Health's Vital Statistics Administration and the Office of the Chief Medical Examiner. The Maternal Mortality Review Program would also like to offer special thanks to the volunteer members of its Maternal Mortality Review Committee (MMR Committee) for the hours spent in discussion and the serious attention given to this important public health project. The Program is grateful for the diligent work of the case abstractors in their careful and thorough abstraction of case materials. The Program also thanks MedChi, the Maryland State Medical Society, for their collaboration in the administrative support of the MMR Committee. Special thanks to all those who participated in this year's MMR Committee meetings and case reviews. A list of Committee members and staff can be found in Appendix A of this document.

## Background

The Maryland Maternal Mortality Review Program (the Program) was established in statute in 2000. Md. Ann. Code Health-General Art., §13-1203—1207, establishes the Program in the Maryland Department of Health (the Department) and describes its scope. The purpose of the Program is to:

- (1) Identify maternal death cases;
- (2) Review medical records and other relevant data;
- (3) Determine preventability of death;
- (4) Develop recommendations for the prevention of maternal deaths; and
- (5) Disseminate findings and recommendations to policymakers, health care providers, health care facilities, and the general public.

The Maternal Mortality Review Committee (the MMR Committee), which was established by the Program and is made up of volunteer health care and public health professionals, conducts maternal mortality case reviews. The Department collaborates with MedChi to provide administrative support in the maternal mortality review process by obtaining medical records, abstracting cases, and hosting meetings of the Department's MMR Committee. The MMR Committee provides an in-depth review of maternal deaths to determine pregnancy-relatedness and preventability. Based upon the MMR Committee's reviews of mortality cases, the MMR Committee then develops recommendations for the prevention of maternal deaths and disseminates their findings and recommendations.

### *Key Definitions*

- A **maternal death** is defined by the World Health Organization's (WHO's) International Classification of Diseases Ninth and Tenth Revisions (ICD-9 and ICD-10) as, "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental causes."
- The **maternal mortality ratio or rate (MMR)** is the number of maternal deaths per 100,000 live births in the same time period.
- A **pregnancy-associated death** is defined by the Centers for Disease Control and Prevention (CDC) as "the death of a woman while pregnant or within one year or 365 days of pregnancy conclusion, irrespective of the duration and site of the pregnancy, regardless of the cause of death."
- The **pregnancy-associated mortality rate** is the number of pregnancy-associated deaths per 100,000 live births in the same time period.
- A **pregnancy-related death** is defined by the CDC as "the death of a woman while pregnant or within one year of conclusion of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by her pregnancy or its management, but not from accidental or incidental causes."
- The **pregnancy-related mortality rate** is the number of pregnancy-related deaths per 100,000 live births in the same time period.

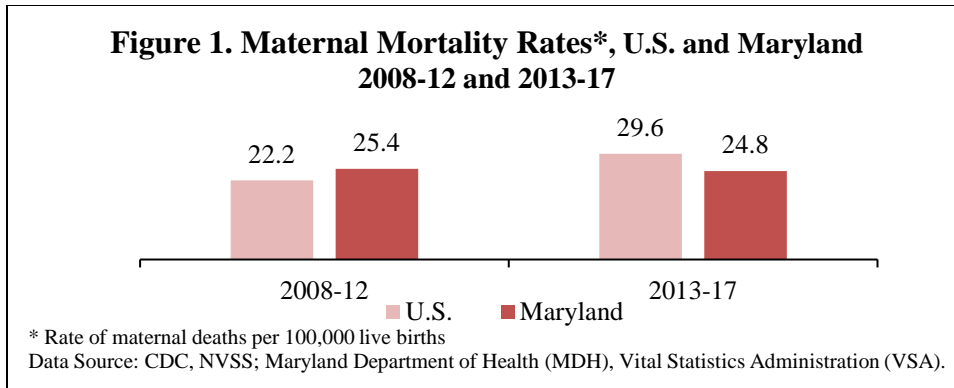
The three terms “maternal death,” “pregnancy-associated death,” and “pregnancy-related death,” create a challenge when comparing data from different sources and reports for different jurisdictional entities. The WHO monitors maternal deaths worldwide as a key indicator of population health, and of social and economic development. Maternal deaths are identified solely from information on the death certificate or similar registration of the occurrence and cause of death. Maternal deaths are limited in both the time period and causes considered.

In more developed countries with improved medical care, many deaths related to pregnancy occur beyond 42 days after the end of pregnancy. In 1986, the CDC and the American College of Obstetricians and Gynecologists (ACOG) collaborated to recommend the use of expanded definitions to more accurately identify deaths among women where pregnancy was a contributing factor. This collaboration led to the definitions for pregnancy-associated and pregnancy-related deaths. Enhanced surveillance methods are necessary to determine pregnancy-associated and pregnancy-related deaths and will be discussed below.

### *Rising Rates of Maternal Deaths*

Nationally, maternal deaths as defined above have declined dramatically since the 1930s when the MMR was 670 maternal deaths per 100,000 live births. The U.S. MMR was at its lowest level in 1987 at 6.6 maternal deaths per 100,000 live births. However, the MMR has risen since that time, and was 31.3 maternal deaths per 100,000 live births in 2017, the latest year for which national data are available. The MMR Committee uses a five-year average of Maryland’s MMR rate to compare it with the national rate. Averaging the Maryland rate stabilizes the number and is necessary because maternal deaths are relatively infrequent events that may vary considerably year to year, particularly in a small state like Maryland.

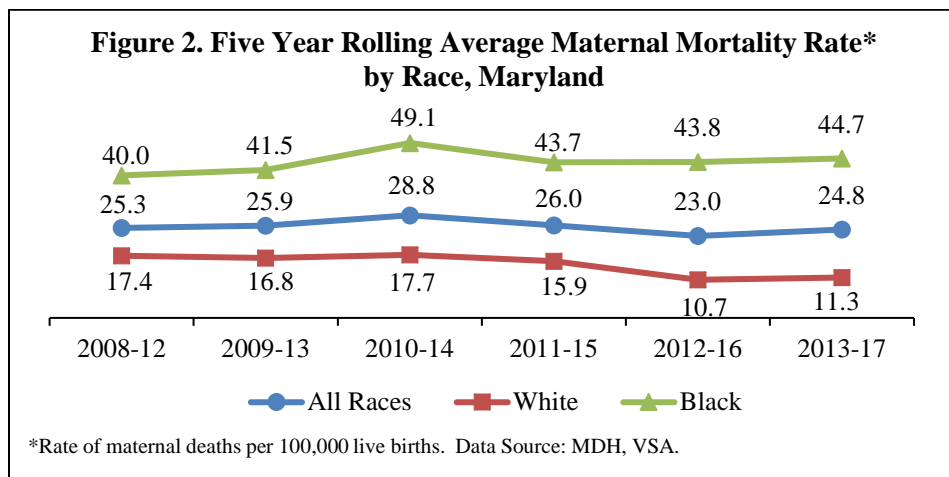
The Maryland MMR has consistently been higher than the national average. For the period from 2008 to 2012, the Maryland MMR was 14 percent higher than the national rate. However, for the period from 2013 to 2017, the Maryland MMR was 16 percent less than the national rate. Between the two five-year periods shown (Figure 1), the U.S. MMR increased by 33.6 percent and the Maryland rate decreased by 2.5 percent. Both the U.S. and Maryland rates remain above the Healthy People 2020 Objective MICH-5 target of 11.4 maternal deaths per 100,000 live births.



The reason for the increase in MMR since the 1980s is unclear. Many studies have shown an increase in chronic health conditions among pregnant women in the United States, including obesity, hypertension, diabetes, and heart disease.<sup>1, 2, 3</sup> These conditions likely put pregnant women at higher risk of adverse outcomes.

### *Racial Disparity*

In the U.S., Black women have an MMR 2.4 times greater than White women, a disparity that has persisted since the 1940s. In Maryland, there is also a large disparity between the rates among Black and White women. Figure 2 shows the MMR by race in Maryland for six overlapping five-year periods over the past decade. Compared to 2008-2012, the 2013-2017 White MMR in Maryland decreased 35.4 percent and the Black MMR increased 11.9 percent, increasing the racial difference. The 2013-2017 Black MMR is 4.0 times the White MMR. Given this racial disparity, it appears that the recent decrease in the Maryland MMR is a result of the decrease in the White MMR.



<sup>1</sup> Azeez O, Kulkarni A, Kuklina EV et al. Hypertension and Diabetes in Non-Pregnant Women of Reproductive Age in the United States. *Prev. Chronic Dis.* 2019;16(E146):1-9.

<sup>2</sup> Catalano PM, Shankar K. Obesity and pregnancy: mechanisms of short term and long term adverse consequences for mother and child. *BMJ.* 2017;356:j1.

<sup>3</sup> Bateman BT, Bansil P, Hernandez-Diaz S et al. Prevalence, trends, and outcomes of chronic hypertension: a nationwide sample of delivery admissions. *Am J Obstet Gynecol.* 2012 Feb;206(2):134.e1-8.



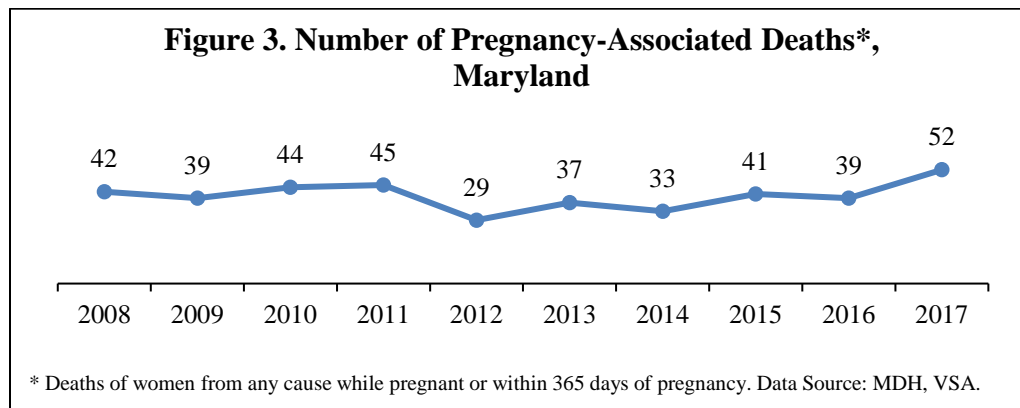
## Methodology

### Case Identification

Cases for review are limited to women who were residents of Maryland at the time of their death. Maryland residents who died in other states are not included in the case reviews. Maternal deaths are determined by cause of death and pregnancy information on the death certificates alone. The Maryland death certificate was revised in January 2001 to include questions about pregnancy status, pregnancy outcome, and date of delivery for the 12 months preceding death. This pregnancy checkbox has significantly increased identification of maternal deaths beyond those recognized by cause of death alone.<sup>4, 5</sup>

Pregnancy-associated deaths are identified in one of three ways in Maryland. Individual death certificates are the first method of identifying pregnancy-associated deaths through the use of checkbox questions, or because the cause of death is clearly related to pregnancy (e.g., ruptured ectopic pregnancy, postpartum hemorrhage). The second method of determining pregnancy-associated deaths comes from linking death certificates for women aged 10-50 years with birth certificates and fetal death certificates from the 365 days preceding death to identify additional cases that were not found through examination of death certificates alone. The third method is the review of cases reported to the Office of the Chief Medical Examiner that are identified to show evidence of pregnancy in deceased women.

The MMR Committee designates and further investigates all deaths occurring during pregnancy or within 365 days of pregnancy conclusion. Using the three methods above, 52 pregnancy-associated deaths were identified in 2017. These cases are reviewed in detail in this report. Figure 3 shows the numbers of pregnancy-associated deaths in Maryland from 2008 to 2017. An average of 40 pregnancy-associated deaths occurred per year during this period.



<sup>4</sup> Horon IL. Underreporting of maternal deaths on death certificates and the magnitude of the problem of maternal mortality. *Am J Public Health*. 2005; 95:478-82.

<sup>5</sup> Horon IL, Cheng D. Effectiveness of pregnancy check boxes on death certificates in identifying pregnancy-associated mortality. *Pub Health Reports*. 2011; 126:195-200.

## *Case Review*

Pregnancy-associated deaths undergo several stages of review. Once cases are identified, medical records are obtained from the hospitals of death and delivery, when applicable. Physician and nurse-midwife abstractors review death certificates, hospital records, Office of the Chief Medical Examiner records, and other available materials for all cases and prepare case summaries that are submitted to the MMR Committee for review. The MMR Committee reviewed all 2017 pregnancy-associated deaths from all causes (medical, injury, substance use, homicide, and suicide) for cause of death, pregnancy-relatedness, and preventability.

Pregnancy-relatedness and potential preventability of the deaths are determined through MMR Committee discussion. The MMR Committee includes obstetric, maternal fetal medicine, nurse-midwifery, nursing, and social work specialists. Public health professionals also participate on the MMR Committee, including representatives from the Department's Maternal and Child Health Bureau. The MMR Committee discussions incorporate the CDC framework for case review.<sup>6</sup> This approach takes into account medical and non-medical factors contributing to maternal death and examines quality and content of medical care. Cases discussed by the MMR Committee are de-identified and all members sign confidentiality agreements.

## **2017 Case Findings**

The MMR Committee identified a total of 52 pregnancy-associated deaths from 2017, resulting in a pregnancy-associated mortality rate of 72.6 deaths per 100,000 live births. For further analysis, the MMR Committee divided these deaths into pregnancy-related and non-pregnancy-related deaths, which represent two non-overlapping groups. Of the 52 pregnancy-associated deaths, 15 were determined to be pregnancy-related, for a pregnancy-related mortality rate of 21 deaths per 100,000 live births. The remaining 37 deaths were determined to be non-pregnancy-related.

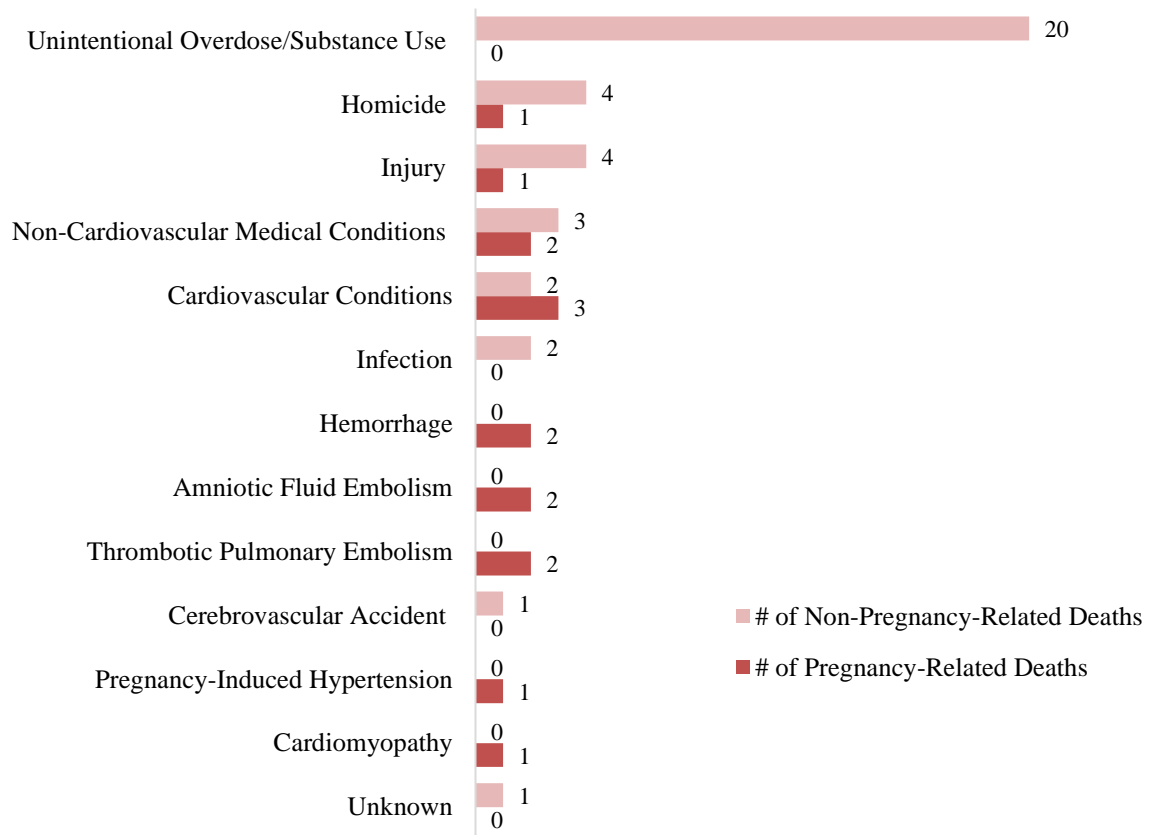
### *Cases by Cause of Death Category*

Figure 4 shows pregnancy-related and non-pregnancy-related deaths by category of cause of death. The leading cause of non-pregnancy-related death was substance use with unintentional overdose, accounting for 20 deaths (54 percent of non-pregnancy-related deaths and 38 percent of all pregnancy-associated deaths in 2017). This is the highest number of overdose deaths reported in one year. Other leading causes of non-pregnancy-related death were homicide, injury, and non-cardiovascular medical conditions.

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<sup>6</sup> Berg C, Danel I, Atrash H, Zane S, Bartlett L (Editors). Strategies to reduce pregnancy-related deaths: from identification and review to action. Atlanta: Centers for Disease Control and Prevention; 2001 <https://stacks.cdc.gov/view/cdc/6537>.

**Figure 4. Number of Pregnancy-Related\* and Non-Pregnancy-Related\*\* Deaths by Category of Cause of Death, Maryland, 2017 (Total Deaths = 52)**



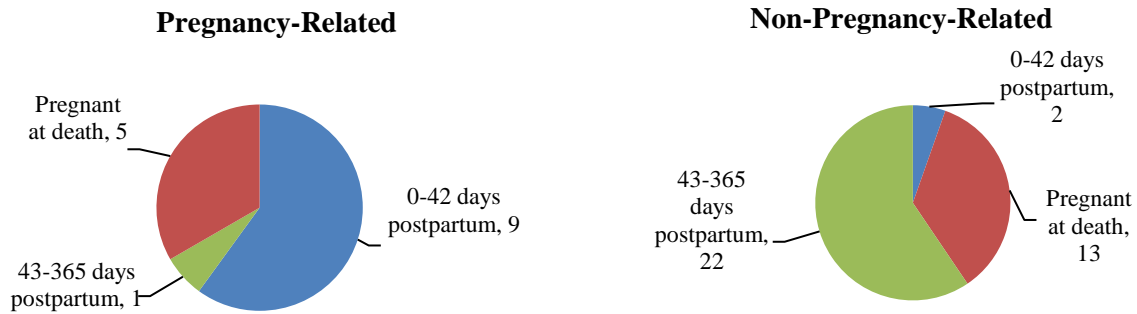
\* Deaths of women while pregnant or within 365 days of pregnancy from a cause related to or aggravated by pregnancy or its management.  
 \*\* Deaths of women while pregnant or within 365 days of pregnancy from any cause not related to or aggravated by pregnancy or its management.  
 Data Source: MDH, VSA, and Maryland Maternal Mortality Review Program.

Among the 15 pregnancy-related deaths in 2017, the leading causes of death were cardiovascular conditions, accounting for three deaths, and non-cardiovascular medical conditions, hemorrhage, thrombotic pulmonary embolism and amniotic fluid embolism, which each accounted for two deaths. The remaining pregnancy-related deaths were single cases of homicide, injury, pregnancy-induced hypertension, and cardiomyopathy.

***Cases by Timing of Death in Relation to Pregnancy***

Among the 15 pregnancy-related deaths in 2017, nine (60 percent) occurred within 42 days postpartum, one (seven percent) occurred between 43-365 days postpartum, and in five cases (33 percent) the woman was pregnant at the time of death (Figure 5). Of the 37 non-pregnancy-related deaths, two (five percent) occurred within 42 days postpartum, 22 (59 percent) occurred between 43-365 days postpartum, and 13 deaths (35 percent) occurred during pregnancy. Deaths in the early postpartum period, before the traditional six-week postpartum visit, were much more frequent among pregnancy-related deaths compared to non-pregnancy-related deaths.

**Figure 5. Number of Pregnancy-Related\* and Non-Pregnancy-Related\*\* Deaths by Timing of Death, Maryland, 2017**

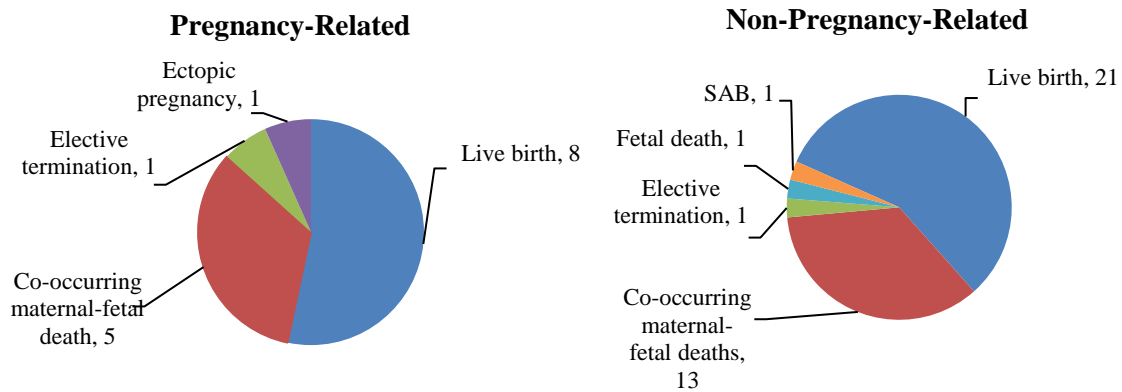


\* Deaths of women while pregnant or within 365 days of pregnancy from a cause related to or aggravated by pregnancy or its management.  
 \*\* Deaths of women while pregnant or within 365 days of pregnancy from any cause not related to or aggravated by pregnancy or its management. Data Source: Maryland Maternal Mortality Review Program.

**Cases by Outcome of Pregnancy**

Among the 15 pregnancy-related deaths in 2017, eight cases (53 percent) had a live birth, five (33 percent) involved co-occurring maternal and fetal deaths, one had an elective termination, and one involved an ectopic pregnancy (Figure 6). Among the 37 non-pregnancy-related deaths, 21 cases (57 percent) had a live birth, 13 (35 percent) involved co-occurring maternal and fetal deaths, one had an elective termination, one involved a fetal death, and one involved a spontaneous abortion.

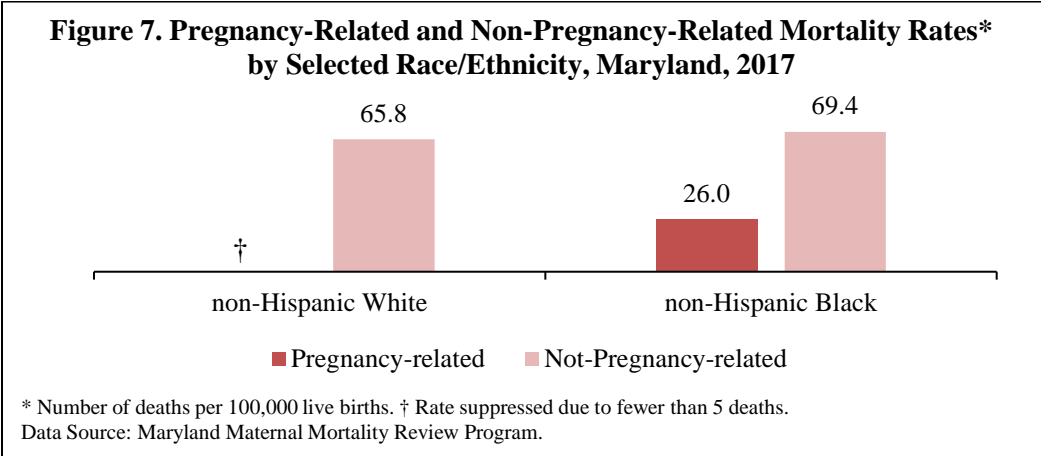
**Figure 6. Number of Pregnancy-Related\* and Non-Pregnancy-Related\*\* Deaths by Pregnancy Outcome, Maryland, 2017**



\* Deaths of women while pregnant or within 365 days of pregnancy from a cause related to or aggravated by pregnancy or its management.  
 \*\* Deaths of women while pregnant or within 365 days of pregnancy from any cause not related to or aggravated by pregnancy or its management. SAB: spontaneous abortion. Data Source: Maryland Maternal Mortality Review Program.

**Cases by Maternal Race and Ethnicity**

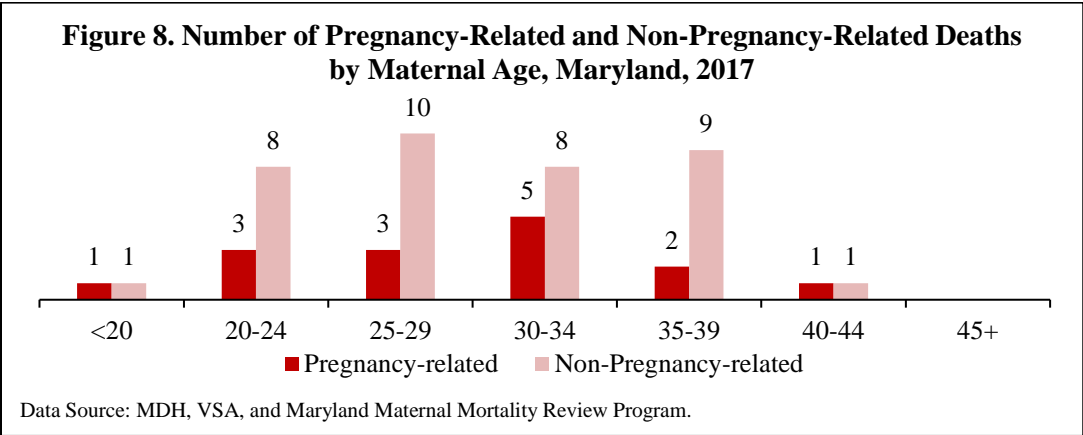
Of the 15 pregnancy-related deaths occurring in 2017, four cases (27 percent) involved non-Hispanic White women, another four (27 percent) involved Hispanic women, six (40 percent) were among non-Hispanic Black women, and one was a non-Hispanic woman of Black and White races. Among non-pregnancy-related deaths, 20 (54 percent) occurred among non-Hispanic White women, 16 (43 percent) among non-Hispanic Black women, and one case involved a Hispanic woman. Pregnancy-related and non-pregnancy-related mortality rates among non-Hispanic Black and non-Hispanic White women in 2017 are shown in Figure 7. A rate is not displayed if there are fewer than five deaths within a group.



The rate of non-pregnancy-related deaths is similar between non-Hispanic White and non-Hispanic Black women. Although a rate cannot be calculated for pregnancy-related deaths among non-Hispanic White women since there were only four cases, it is clear that the preponderance of pregnancy-related deaths is occurring among non-Hispanic Black women.

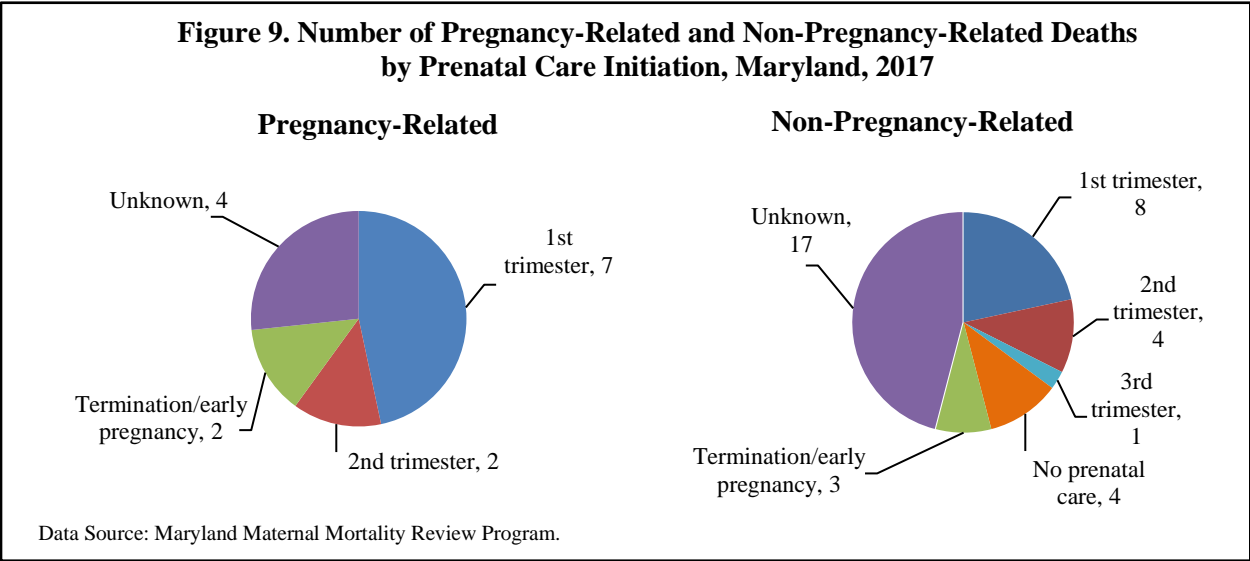
**Cases by Maternal Age**

The distribution of pregnancy-related and non-pregnancy-related deaths by maternal age group is shown in Figure 8. Rates of death by age group are not calculated because the numbers of deaths in most groups are very small. Rates involving fewer than five events cannot be reported.



**Cases by Timing of Prenatal Care Initiation**

Pregnancy-related and non-pregnancy-related deaths by the trimester when prenatal care was initiated are shown in Figure 9. Of the 15 pregnancy-related deaths, nine (60 percent) were among women who initiated care in the first or second trimester of pregnancy. Among the 37 non-pregnancy-related deaths, 12 (32 percent) of the women began prenatal care in the first or second trimester. In four pregnancy-related and 17 non-pregnancy-related cases, timing of prenatal care initiation was unknown.

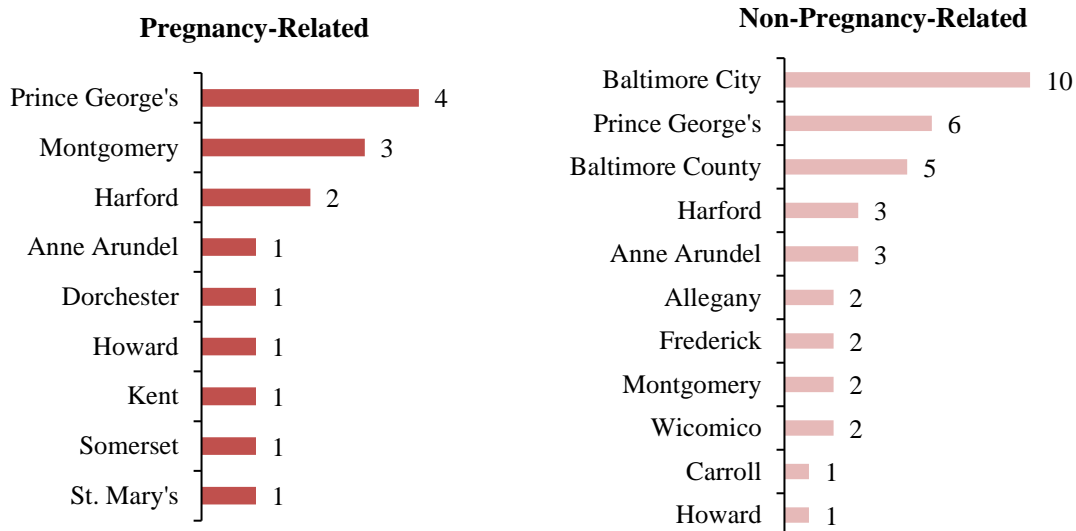


**Cases by Jurisdiction of Residence and Occurrence**

Figure 10 shows pregnancy-related and non-pregnancy-related deaths by jurisdiction of residence. Nine (60 percent) of the 15 pregnancy-related deaths were among residents of Prince George’s, Montgomery, and Harford Counties. There were single death cases among residents of Anne Arundel, Dorchester, Howard, Kent, Somerset, and St. Mary’s Counties. Of the 37 non-pregnancy-related deaths, 10 (27 percent) occurred among residents of Baltimore City and an additional 17 cases (46 percent) among residents of Prince George’s, Baltimore, Harford, and Anne Arundel Counties. Residents of six other counties accounted for the remaining deaths.

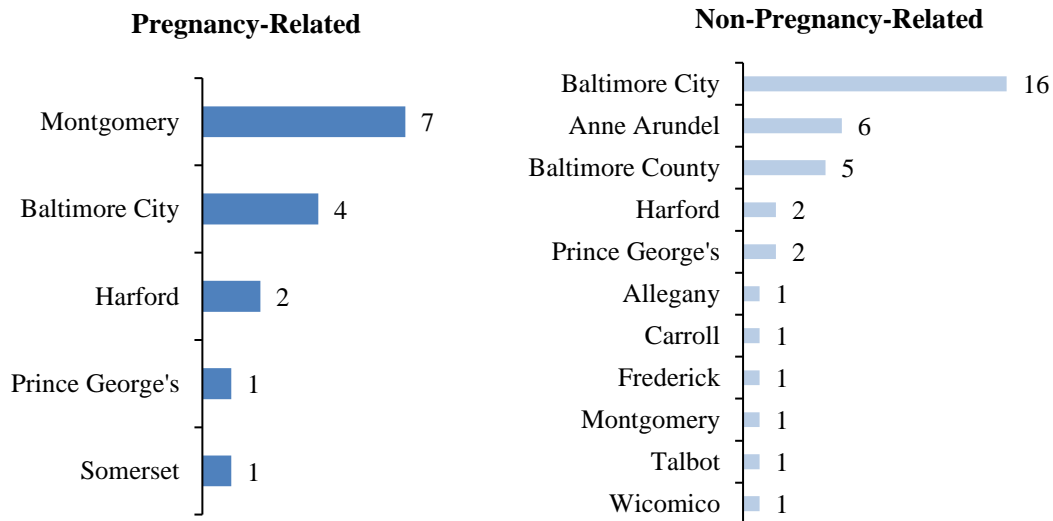
Figure 11 shows pregnancy-related and non-pregnancy-related deaths by jurisdiction in which the death occurred. Seven (47 percent) of the 15 pregnancy-related deaths occurred in Montgomery County, four (27 percent) in Baltimore City, and two (13 percent) in Harford County. Single deaths occurred in Prince George’s and Somerset Counties. Sixteen (43 percent) of the non-pregnancy-related deaths occurred in Baltimore City, six (16 percent) in Anne Arundel County, and five (14 percent) in Baltimore County. The remaining deaths occurred in eight other counties.

**Figure 10. Number of Pregnancy-Related and Non-Pregnancy-Related Deaths by Jurisdiction of Residence, Maryland, 2017**



Data Source: MDH, VSA, and Maryland Maternal Mortality Review Program.

**Figure 11. Number of Pregnancy-Related and Non-Pregnancy-Related Deaths by Jurisdiction of Occurrence, Maryland, 2017**



Data Source: MDH, VSA, and Maryland Maternal Mortality Review Program.

### *Preventability of Deaths*

A death was considered preventable if the death “may have been averted by one or more changes in the health care system related to clinical care, facility infrastructure, public health infrastructure and/or patient factors.”<sup>7</sup> Whether the death was clearly preventable or only potentially preventable by some intervention is a decision made by the MMR Committee. Of the 15 pregnancy-related deaths, 12 (80 percent) were judged to be preventable or potentially preventable. Two cases were considered unpreventable deaths, and for one case preventability was unknown. Among the 37 non-pregnancy-related deaths, 31 (84 percent) were judged to be preventable or potentially preventable. In one case, preventability could not be determined, and five deaths were considered unpreventable. All 20 of the unintentional overdose deaths were considered preventable or potentially preventable, as were the five homicide deaths. Four of the five injury deaths were also considered preventable. The seven deaths considered unpreventable involved medical causes of death (including cardiovascular conditions and infection) and one motor vehicle accident death.

### *Trends in Pregnancy-Associated and Pregnancy-Related Deaths*

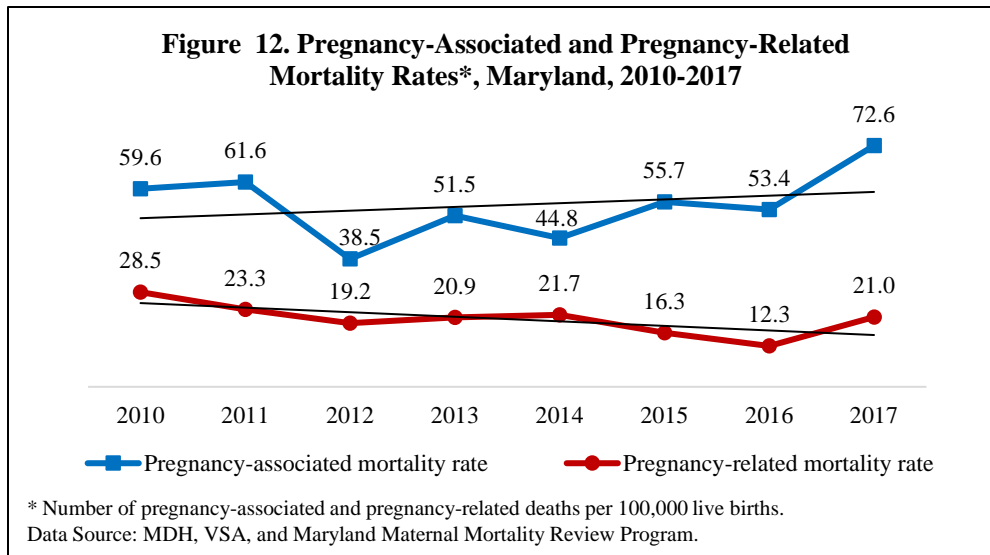
As noted above in Figure 1, the Maryland MMR has dropped over the past ten years and is now below the national average. The MMR, however, is limited in both causes of death considered and the timeframe in relation to pregnancy. The MMR includes only deaths from pregnancy-related causes that can be identified by the death certificate alone and that occurred during pregnancy or within 42 days of pregnancy conclusion. The decrease in the Maryland MMR suggests that fewer early pregnancy-related deaths are occurring, and this decrease has occurred primarily among White maternal deaths.

The cases reviewed by the MMR Committee are more comprehensive and include all pregnancy-associated deaths, which include deaths from any cause that occur during pregnancy or up to 365 days after the conclusion of pregnancy. All pregnancy-associated deaths are reviewed for pregnancy-relatedness, creating a subgroup of pregnancy-related deaths. The trends in pregnancy-associated and pregnancy-related mortality rates from 2010 to 2017 are shown in Figure 12. The pregnancy-associated mortality rate shows considerable variability over the eight-year period and the 2017 rate is the highest observed over this time. The increasing number of overdose deaths in the last several years has contributed to the upward trend in pregnancy-associated mortality rate. The pregnancy-related mortality rate, although up in 2017, remains similar to previous years and shows a decrease of 26 percent since 2010. Therefore, similar to the MMR, the pregnancy-related mortality rate is decreasing. An analysis of racial disparities in pregnancy-related deaths is below on beginning of page 18.

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<sup>7</sup> Berg CJ, Harper MA, Atkinson SM, et al. Preventability of Pregnancy-Related Deaths - Results of a State-Wide Review. *Obstet and Gynecol.* 2005; 106:1228-1234.





Causes of pregnancy-related deaths are largely medical conditions directly related to pregnancy (such as postpartum hemorrhage, amniotic fluid embolus, or pre-eclampsia) or those exacerbated by pregnancy (such as pre-existing cardiovascular disease). There are some cases of homicide and suicide that are also determined to be pregnancy-related. The number of cases in Maryland from any individual cause is so small that determining trends for specific causes of pregnancy-related death is not possible.

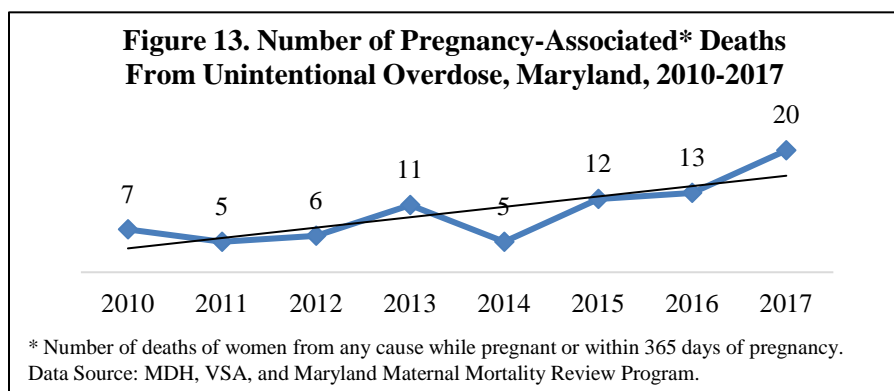
### *Substance Use Disorder and Overdose Deaths*

In 2017, for the fifth consecutive year, unintentional drug overdose was the leading cause of pregnancy-associated death in Maryland. Twenty of the 52 total deaths (38 percent) resulted from substance use and unintentional overdose. All of the overdose deaths were considered to be non-pregnancy-related. The 20 overdose deaths accounted for 54 percent of the 37 non-pregnancy-related deaths. All of these deaths involved opioids. In 17 of the 20 cases (85 percent), two or more drugs were found by postmortem toxicology testing. Sixteen of the 17 multi-drug cases (94 percent) involved two or more different opioids; up to six different opioids were detected in individual cases. Of the overdose deaths 90 percent involved the potent opioid fentanyl or one of its analogs. The three cases in which a single opioid was detected all involved fentanyl. Cocaine was found in eight cases. Alcohol or marijuana was not detected in any of the cases.

The average age at death was 29.9 years (range 21-39 years). Sixteen overdose deaths (80 percent) were among non-Hispanic White women and four (20 percent) were among non-Hispanic Black women. Thirteen of the 20 women (65 percent) had delivered live born infants and the average timing of death was 203 days postpartum. Seven women (35 percent) were pregnant at the time of death, resulting in co-occurring maternal and fetal deaths. None of the overdose deaths occurred in the traditional postpartum period up to 42 days after the conclusion of pregnancy. Nineteen of the 20 overdose victims had a known history of substance use and 12 (60 percent) had received at least some treatment. In 17 (85 percent) of the 20 cases, there was a history of one or more mental health diagnoses, with anxiety documented in 14, depression in 13, and bipolar disorder in seven.

## Multiyear Review of Overdose Deaths

To better understand factors involved in overdose deaths, a review of all pregnancy-associated deaths in Maryland from 2010 to 2017 was undertaken. Over this eight-year period, substance use and unintentional overdose was the leading cause of death, accounting for 79 (25 percent) of 319 pregnancy-associated deaths. Figure 13 shows the number of unintentional overdose deaths by year, with the highest number of cases occurring in 2017.



Of the 79 overdose deaths, 77 (98 percent) involved opioids, one case involved alcohol, and one case involved alcohol plus the amphetamine methylone. Table 1 shows the specific opioid(s) identified by toxicology testing at the time of death in these cases.

**Table 1. Opioid Identified Postmortem, Pregnancy-Associated Unintentional Overdose Deaths, Maryland, 2010-2016**

Opioid	Number of cases (n=77)
Fentanyl/fentanyl analogs	32
Morphine (heroin)	30
Methadone	22
Oxycodone	14
Tramadol	7
Unspecified opioid	6
Codeine	5
Hydrocodone	2
Oxymorphone	2
Buprenorphine	1
Hydromorphone	1
Meperidine	1

Data Source: Maryland Maternal Mortality Review Program. NOTE: Values in the table do not add up to the sample size of 77 because multiple drugs can be detected in a single case.

With the addition of the 2017 cases, the most frequently detected opioid was fentanyl (including fentanyl analogs). Fentanyl was not detected in any overdose death prior to 2014 but has contributed increasingly to these deaths each year since. In 71 (90 percent) of the 79 overdose deaths, two or more drugs were detected by postmortem testing. In 36 (51 percent) of the

multiple drug cases, two to six different opioids were identified. Benzodiazepines were detected in 18 (23 percent) and alcohol in 14 (18 percent) of the 79 overdose death cases. The risk of fatal overdose is substantially increased when opioids are combined with other central nervous system depressants such as benzodiazepines or alcohol.

Among the 79 unintentional overdose deaths occurring from 2010 to 2017, the average age at death was 29 years. Sixty (76 percent) of these deaths were among non-Hispanic White women and 16 (20 percent) among non-Hispanic Black women, with two cases (3 percent) among non-Hispanic women of other races and one case (1 percent) in a Hispanic woman.

Fifty-six (71 percent) of the 79 women who died of overdose had delivered live born infants. Sixteen women (20 percent) were pregnant at the time of death and six (8 percent) had had an elective termination, spontaneous abortion, or fetal demise prior to death. In one case, pregnancy outcome was unknown. Only four deaths (5 percent) occurred at 42 days or less postpartum; 59 (75 percent) occurred between 43 and 365 days postpartum. The average timing of death was 196 days postpartum.

In 65 cases (82 percent), at least one mental health diagnosis was documented. Depression was diagnosed in 50 cases (63 percent), anxiety in 48 cases (61 percent), and bipolar disorder in 27 (34 percent). Seventy-five (95 percent) of the women who died of overdose had a known history of substance use and 37 of these (50 percent) had documentation of some substance use treatment.

In Table 2, the 79 overdose deaths are compared with the 240 non-overdose deaths that occurred between 2010 and 2017. Average age at death was comparable in both groups. However, the racial distribution is strikingly different, with a preponderance of non-Hispanic White women among the overdose deaths and overrepresentation of non-Hispanic Black women among the non-overdose deaths. A similar percentage of women were pregnant at the time of death in both groups, but deaths after the conclusion of pregnancy occurred on average much later among the overdose group. Pregnancy outcome was similar in both groups, with 71 percent of pregnancies among the overdose group and 65 percent among the non-overdose group resulting in a live birth. Timing of prenatal care initiation was similar, with just over half of women in both groups starting prenatal care in the first or second trimester.

There were large differences, however, between the two groups related to several behavioral health factors. Women who died of overdose were more than four times as likely as women who died of other causes to have a known history of substance use (94 percent vs. 20 percent); although a similar proportion of each group with a history of substance use had received any substance use treatment. Women who died of overdose were more than three times as likely to smoke (84 percent vs. 25 percent) and almost four times as likely to have one or more mental health diagnosis (82 percent vs. 22 percent). Also, 77 of 79 overdose deaths (97 percent) were considered preventable or potentially preventable, compared with 58 percent of the non-overdose deaths.

<b>Table 2: Incident Characteristics of Pregnancy-Associated Deaths, Maryland, 2010-2017</b>		
Data presented as mean ± standard deviation, or number (%)		
<b>Characteristic</b>	<b>Overdose Deaths (n=79)</b>	<b>Non-overdose Deaths (n=240)</b>
<b>Demographics</b>		
Average age at death (years)	29 ±5	31 ±7
White non-Hispanic	60 (76)	83 (35)
Black non-Hispanic	16 (20)	120 (50)
Other non-Hispanic	2 (3)	15 (6)
Hispanic	1 (1)	22 (9)
<b>Timing of death</b>		
Pregnant at death	16 (20)	52 (22)
0-42 days postpartum	4 (5)	93 (39)
43-365 days postpartum	59 (75)	93 (39)
Unknown	0 (0)	2 (1)
Average days postpartum	196 ±91	103 ±116
<b>Pregnancy outcome</b>		
Live born infant	56 (71)	157 (65)
Co-occurring maternal-fetal deaths	16 (20)	52 (22)
Spontaneous abortion / fetal death	5 (6)	18 (8)
<b>Prenatal care initiation</b>		
1 <sup>st</sup> trimester	24 (30)	96 (40)
2 <sup>nd</sup> trimester	17 (22)	26 (11)
3 <sup>rd</sup> trimester	6 (8)	7 (3)
No prenatal care	7 (9)	21 (9)
Termination or death in early pregnancy	6 (8)	10 (4)
Unknown	19 (24)	80 (33)
<b>Behavioral health / social factors</b>		
Known history of substance use	74 (94)	47 (20)
Any history of substance use treatment (among those with known history of substance use)	37 (50)	18 (8)
Smoking	66 (84)	60 (25)
Mental health diagnosis(es)	65 (82)	52 (22)
Intimate partner violence	10 (13)	20 (8)
<b>Preventability</b>		
Death preventable / potentially preventable	77 (97)	140 (58)

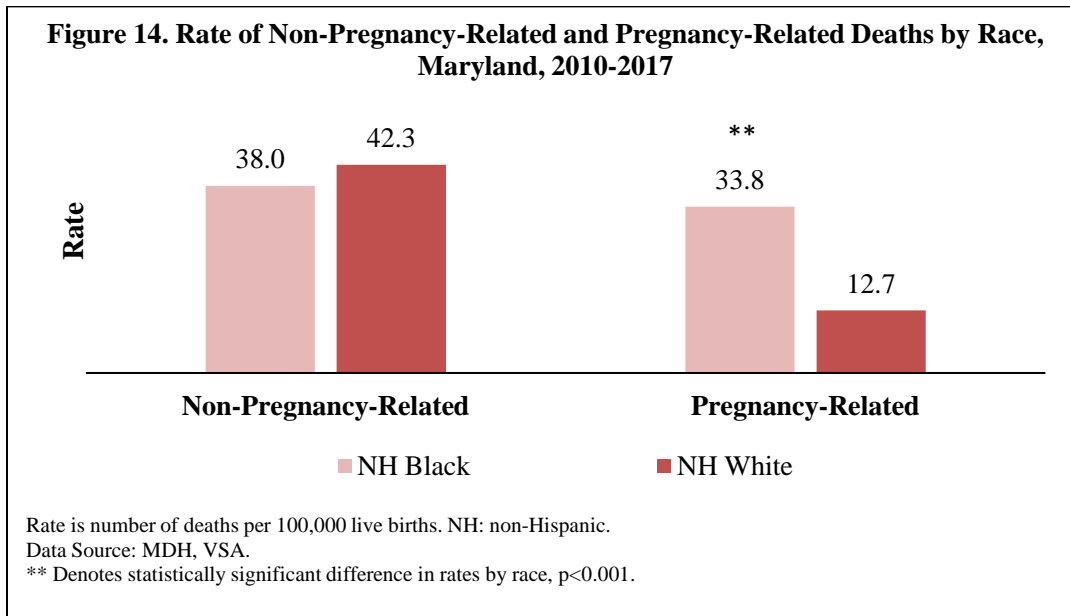
Data Source: Maryland Maternal Mortality Review.

### *Racial Disparities in Pregnancy-Related Mortality*

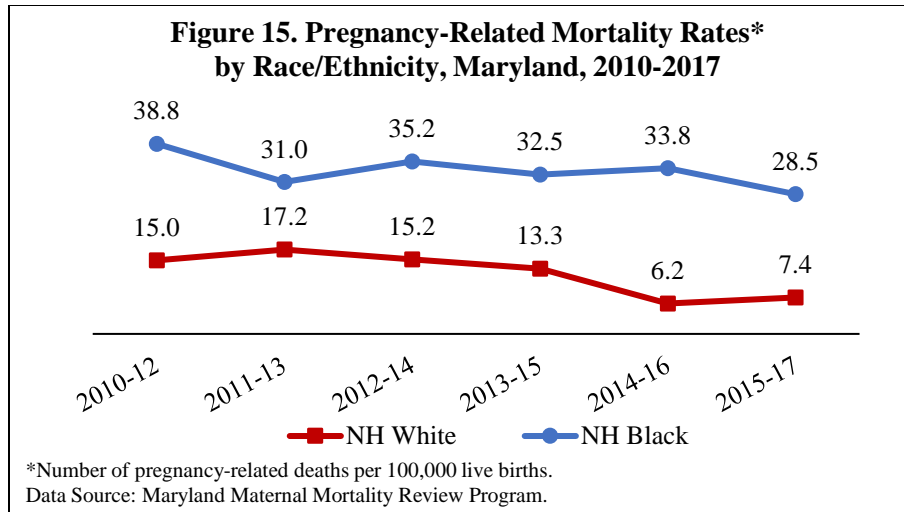
Figure 2 above shows the trend and racial disparity in the Maryland MMR. As noted, the MMR has dropped over the past ten years and is now below the national average, but the racial disparity has widened. The MMR, however, includes only deaths from pregnancy-related causes that can be identified by the death certificate and that occurred during pregnancy or within 42 days of pregnancy conclusion. The decrease in the Maryland MMR suggests that fewer early pregnancy-related deaths are occurring and this decrease has occurred primarily among White women.

The Maryland MMR Committee provides a more comprehensive review of all pregnancy-associated deaths, which include deaths from any cause that occur during pregnancy or up to 365

days after the conclusion of pregnancy. Each of these deaths is categorized as non-pregnancy-related or pregnancy-related. The rates of non-pregnancy-related and pregnancy-related death by race during the period from 2010 to 2017 are shown in Figure 16. While non-Hispanic Black women had a slightly lower rate of non-pregnancy-related mortality than non-Hispanic White women, the pregnancy-related mortality rate was significantly higher among non-Hispanic Black women compared to non-Hispanic White women.



The trend over time in pregnancy-related mortality rate by race is shown in Figure 15. Rates are shown as rolling three-year averages because of the small number of cases in each category. Since 2010, the non-Hispanic Black pregnancy-related mortality rate was consistently higher than the non-Hispanic White rate although the rates decreased in both racial groups. Comparing rates from 2010-2012 and 2015-2017, there was a 26 percent decrease in the non-Hispanic Black rate. The non-Hispanic White rate decreased by 51 percent during this time period. In the most recent three-year average, the non-Hispanic Black rate is 3.9 times higher than the non-Hispanic White rate.



In Table 3, the racial and ethnic distribution of births in Maryland from 2010 to 2017 is compared with the distribution of non-pregnancy-related and pregnancy-related deaths. Again, the over-representation of non-Hispanic Black women among pregnancy-related deaths compared to live births is evident.

**Table 3. Live Births, Non-Pregnancy-Related Deaths, Pregnancy-Related Deaths  
by Race and Ethnicity, Maryland 2010-2017**  
Data presented as number (%)

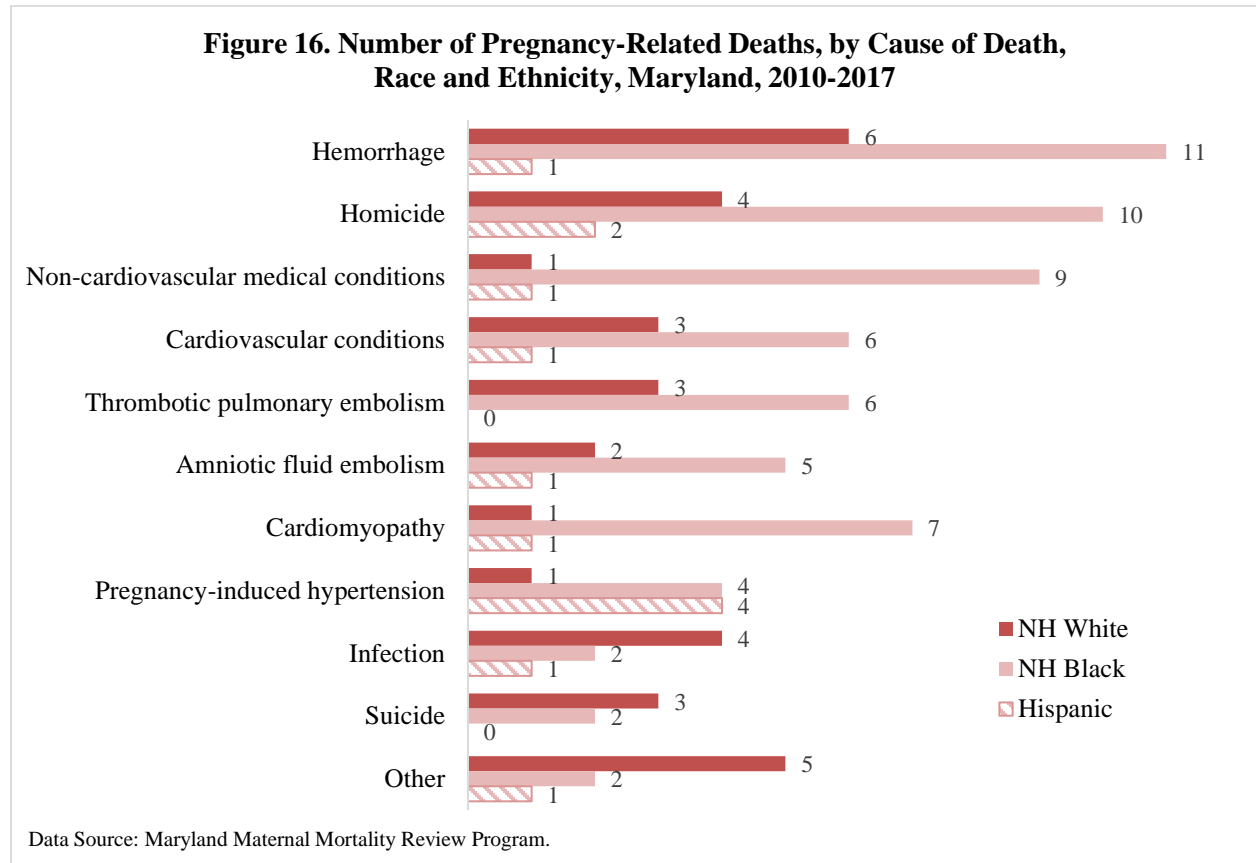
	Total (Maryland)	NH White	NH Black	Hispanic
<b>Live births</b>	583,186 (100)	260,220 (45)	189,471 (32)	88,046 (15)
<b>Non-pregnancy-related deaths</b>	200 (100)	110 (55)	72 (36)	10 (5)
<b>Pregnancy-related deaths</b>	119 (100)	33 (28)	64 (54)	13 (11)

Data Source: MDH VSA and Maryland Maternal Mortality Review Program.

Review of the causes of death by race and ethnicity revealed that among pregnancy-related deaths, hemorrhage was the leading cause of death for both non-Hispanic White and non-Hispanic Black women (Figure 16). The number of hemorrhage deaths was nearly twice as high among Black women compared to White women. Although total numbers were small, the leading cause of pregnancy-related death among Hispanic women was pregnancy-induced hypertension.

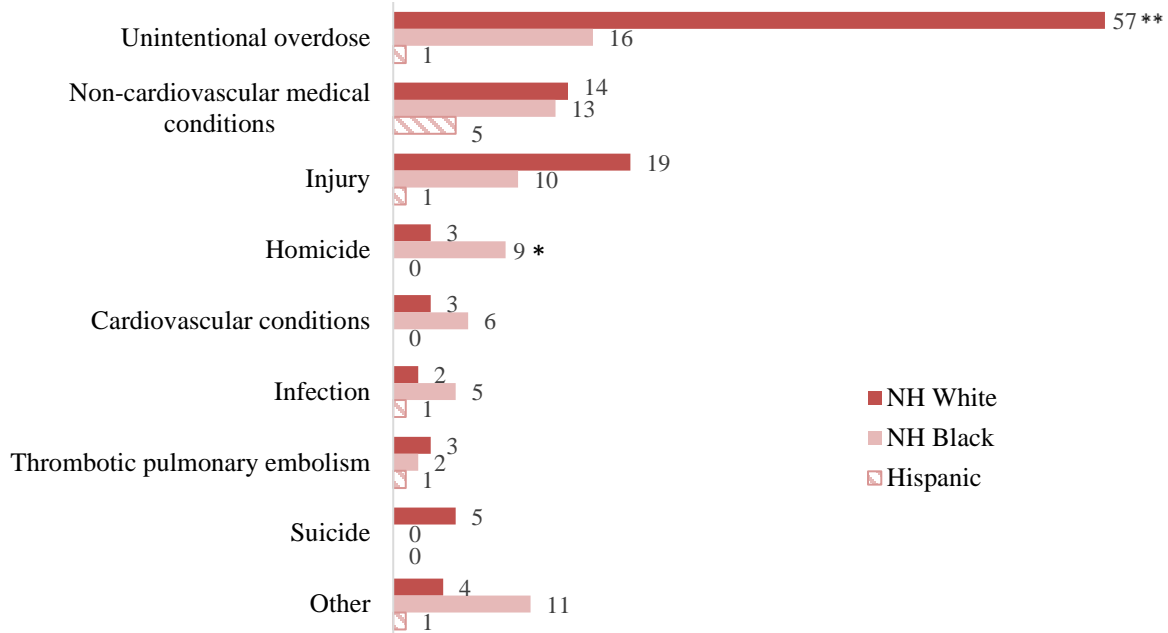
Homicide was the second leading cause of pregnancy-related deaths overall. The number of homicide deaths among non-Hispanic Black women was 2.5 times the number among non-Hispanic White women. Non-cardiovascular medical conditions were the third leading cause of

pregnancy-related death overall, with the vast majority occurring among non-Hispanic Black women. This category includes medical conditions such as seizure disorders, asthma, cancer, and collagen vascular disease such as lupus. Cases listed as “other” cause include individual cases from causes not otherwise listed and cases in which the cause of death was unknown.



For non-pregnancy-related deaths (Figure 17), the leading cause was unintentional overdose, representing 38 percent of these deaths overall. Overdose was significantly more common among non-Hispanic White women, the number of overdose deaths being 3.6 times higher than among non-Hispanic Black women. The second leading cause of non-pregnancy-related death was non-cardiovascular medical conditions, the most frequent being cancer. Injury, predominantly motor vehicle accidents, was the third leading cause.

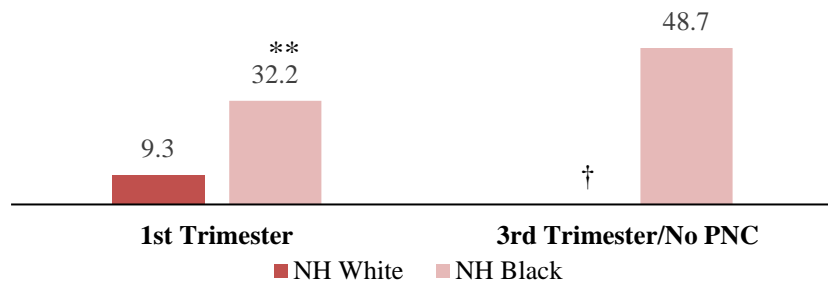
**Figure 17. Number of Non-Pregnancy-Related Deaths, by Cause of Death, Race, and Ethnicity, Maryland, 2010-2017**



\* Denotes statistically significant difference between non-Hispanic Black and non-Hispanic White,  $p < 0.05$ .  
 \*\* Denotes statistically significant difference between non-Hispanic Black and non-Hispanic White,  $p < 0.001$ .  
 Data Source: Maryland Maternal Mortality Review Program.

Calculation of the pregnancy-related mortality rates by race and selected maternal characteristics revealed notable differences. Figure 18 shows pregnancy-related mortality rates among non-Hispanic White and non-Hispanic Black women by timing of prenatal care initiation. Among women initiating prenatal care during the first trimester, the pregnancy-related mortality rate was over three times higher in non-Hispanic Black women compared to non-Hispanic White women. Early initiation of prenatal care did not eliminate the racial disparity in pregnancy-related deaths. For non-Hispanic Black women, the pregnancy-related mortality rate increased by 51 percent with late or no prenatal care. A rate cannot be calculated for non-Hispanic White women in this group because of the small number of cases.

**Figure 18. Pregnancy-Related Mortality Rates by Prenatal Care Initiation and Race, Maryland, 2010-2017**

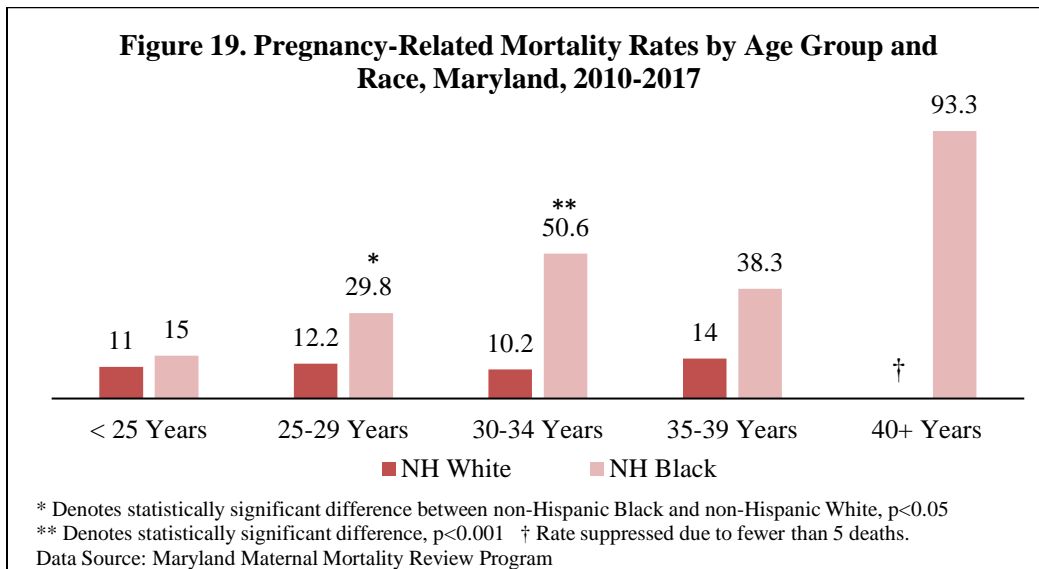


\*\* Denotes statistically significant difference between non-Hispanic Black and non-Hispanic White,  $p < 0.001$ . † Rate suppressed due to fewer than 5 deaths. Data Source: Maryland Maternal Mortality Review Program.



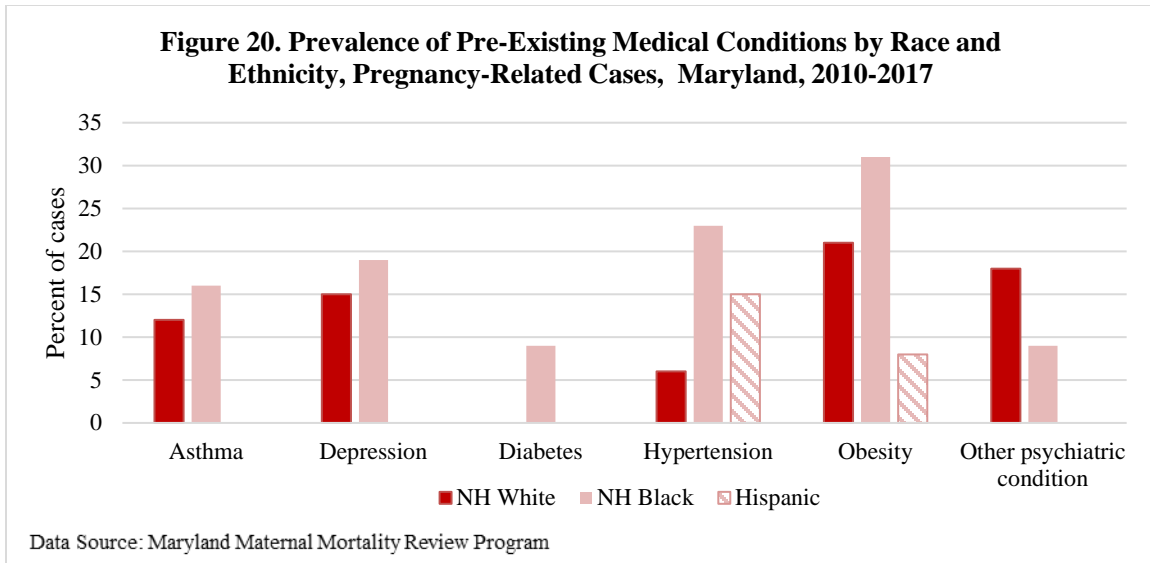
As shown in Figure 19, racial differences also appeared when examining pregnancy-related mortality rates by maternal age. The non-Hispanic Black mortality rate was higher than that in non-Hispanic White women at all ages, reaching statistical significance in the 25-29 year and 30-34-year age groups. In the 25-29-year age group, the mortality rate was more than twice as high in non-Hispanic Black women compared to non-Hispanic White women. The mortality rate among non-Hispanic Black women between 30 and 34 years of age was almost five times higher than that among non-Hispanic White women in the same age range.

The pregnancy-related mortality rate among non-Hispanic White women shows little change with increasing age, although a rate cannot be calculated for this racial group over age 40 due to the small number of cases. Among non-Hispanic Black women, the rate shows a clear trend up with age, reaching a rate of 93.3 deaths per 100,000 live births above age 40. These data suggest that increasing maternal age has a greater impact on pregnancy-related mortality among non-Hispanic Black women. The impact of maternal age may be related to the “weathering” hypothesis, which proposes that Black women experience earlier deterioration of health because of the cumulative impact of exposure to psychosocial, economic, and environmental stressors.<sup>8</sup>



The prevalence of pre-existing medical conditions was also determined by race among pregnancy-related death cases (Figure 20). Every condition evaluated, except non-depression psychiatric conditions, was more prevalent among non-Hispanic Black women than among non-Hispanic White and Hispanic women. The greatest differences were seen in hypertension and obesity, although no differences reached statistical significance. The higher prevalence of pre-existing medical conditions among non-Hispanic Black women is likely to be a contributing factor in the higher pregnancy-related mortality rate in this racial group.

<sup>8</sup> Geronimus AT, Hicken M, Keene D, Bound J. “Weathering” and age patterns of allostatic load scores among blacks and whites in the United States. *Am J Public Health* 2006;96:826–33.



Although pregnancy-related mortality rates have decreased in Maryland in recent years, racial disparities have persisted. In addition to medical and health care factors, there is increasing recognition of the importance of social determinants of health in shaping health outcomes. Social determinants of health are the conditions in which people are born, grow, live, work, and age that impact health.<sup>9</sup> Social determinants include factors such as socioeconomic status, education, neighborhood, physical environment, employment, and social support networks, as well as access to health care. There has been increasing recognition that improving health, preventing morbidity and mortality, and achieving health equity require broad approaches that address not only health care, but also social, economic, and environmental factors that influence health.<sup>10,11,12,13</sup>

<sup>9</sup> “About Social Determinants of Health,” World Health Organization, accessed October 3, 2019, [https://www.who.int/social\\_determinants/sdh\\_definition/en/](https://www.who.int/social_determinants/sdh_definition/en/).

<sup>10</sup> Artiga S, Hinton E. Beyond health care: the role of social determinants in promoting health and health equity. Issue Brief. Henry J. Kaiser Family Foundation; 2018. <https://www.kff.org/disparities-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/>.

<sup>11</sup> Importance of social determinants of health and cultural awareness in the delivery of reproductive health care. ACOG Committee Opinion No. 729. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2018;131:e43–8.

<sup>12</sup> “Healthy People 2020: Social Determinants of Health,” Office of Disease Prevention and Health Promotion, accessed October 3, 2019, <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>.

<sup>13</sup> Petersen EE, Davis NL, Goodman D, et al. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016. *MMWR Morb Mortal Wkly Rep* 2019;68:762–765. <http://dx.doi.org/10.15585/mmwr.mm6835a3>.

## **Summary**

Maryland's MMR in the most recent five-year average data is 16 percent below the national rate. While the U.S. MMR continued to increase, the Maryland rate has decreased slightly; however, both rates remain above the Healthy People 2020 goal of 11.4 deaths per 100,000 live births, and significant racial disparities in maternal death persist.

Fifty-two pregnancy-associated deaths were identified in 2017. Thirty-seven deaths (71 percent) were determined to be non-pregnancy-related. The leading cause of non-pregnancy-related death for the fifth consecutive year was substance use and unintentional overdose. Fifteen deaths (29 percent) were determined to be pregnancy-related, with the cause of death related to or aggravated by the pregnancy or its management. Cardiovascular conditions were the leading causes of pregnancy-related death. The pregnancy-related mortality rate has decreased by 26 percent since 2010. A majority of deaths (84 percent of non-pregnancy-related deaths and 80 percent of pregnancy-related deaths) were considered preventable or potentially preventable.

Recommendations from the MMR Committee and the MMR Stakeholder Group are included as appendices to this report. The recommendations address postpartum care, behavioral health screening, and racial disparities in maternal mortality. The MMR Committee will continue to disseminate the findings of this review process and promote collaboration among all providers caring for pregnant and postpartum women in an effort to reduce pregnancy-associated deaths in Maryland.

## **Appendix A: Maternal Mortality Review Committee**

## **MATERNAL MORTALITY REVIEW COMMITTEE**

[DATE]

The Honorable Larry Hogan  
Governor  
State of Maryland  
Annapolis, MD 21401-1991

The Honorable Thomas V. Mike Miller, Jr.  
President of the Senate  
H-107 State House  
Annapolis, MD 21401-1991

The Honorable Adrienne A. Jones  
Speaker of the House  
H-101 State House  
Annapolis, MD 21401-1991

RE: Health-General Article, §13-1207, Annotated Code of Maryland - 2019 Annual Report –  
Maryland Maternal Mortality Review

Dear Governor Hogan, President Miller, and Speaker Jones:

Pursuant to Health-General Article, §13-1207 and §13-1208; Senate Bill 459, Chapter 74 of the Acts of 2000; and House Bill 1518, Chapter 308 of the Acts of 2018, and based on the report of the Maternal Mortality Review Program, the Maternal Mortality Review Committee submits these recommendations related to maternal mortality in Maryland. The Committee thanks the Governor and the General Assembly of Maryland for their leadership and interest in maternal mortality in Maryland, and looks forward to working with you for continued improved outcomes in this important public health issue.

If you have questions concerning this report, please contact Dr. Linda Alexander, Reproductive Health Medical Director, at (410) 767-6723.

Sincerely,



Clark Johnson, MD, MPH  
Maternal Mortality Review Committee Chair

Enclosure

Cc: Robert R. Neall, Secretary, Maryland Department of Health  
Frances B. Phillips, RN, MHA, Deputy Secretary, Public Health Services, Maryland Department of Health  
Donna Gugel, MHS, Director, Prevention and Health Promotion Administration  
Courtney McFadden, MPH, Interim Director, Maternal and Child Health Bureau  
Sarah Albert, MSAR #2181

## **Maternal Mortality Review Committee**

<b>University of Maryland St. Joseph Medical Center</b> <i>Cristina Aquia, RN</i>	<b>University of Maryland Baltimore Washington Medical Center</b> <i>Pablo Argeles, MD</i>
<b>Sinai Hospital</b> <i>Pedro Arrabal, MD</i>	<b>Mercy Medical Center</b> <i>Robert Atlas, MD</i>
<b>University of Maryland St. Joseph Medical Center</b> <i>Carol Ator, RN</i>	<b>University of Maryland Medical System</b> <i>Shobana Bharadwaj, MD</i>
<b>Holy Cross Hospital</b> <i>Ann Burke, MD</i>	<b>Maternal Mortality Review Abstractor</b> <i>Diana Cheng, MD</i>
<b>Johns Hopkins Bloomberg School of Public Health</b> <i>Andreea Creanga, MD, PhD</i>	<b>Johns Hopkins Hospital</b> <i>Deborah Doerfer, CNM</i>
<b>Johns Hopkins Bayview Medical Center, Maternal Mortality Review Abstractor</b> <i>Jill Edwardson, MD</i>	<b>University of Maryland Medical System</b> <i>Jen Fahey, CNM</i>
<b>University of Maryland Medical System</b> <i>Stacy Fisher, MD</i>	<b>University of Maryland Medical System</b> <i>Katherine Goetzinger, MD</i>
<b>Maternal Mortality Review Abstractor</b> <i>Lorraine Goldstein, CNM</i>	<b>Anne Arundel Medical Center</b> <i>Elizabeth Greely, MD</i>
<b>Medstar Southern Maryland Hospital</b> <i>Asrar Green, RN</i>	<b>Johns Hopkins Hospital, Maternal Mortality Review Committee Chair</b> <i>Clark Johnson, MD, MPH</i>
<b>Maternal Mortality Review Abstractor</b> <i>Jan Kriebs, CNM</i>	<b>Johns Hopkins Bayview Medical Center, Center for Addiction and Pregnancy, Maternal Mortality Review Abstractor</b> <i>Lorraine Milio, MD</i>
<b>University of Maryland St. Joseph Medical Center</b> <i>Judith Rossiter, MD</i>	<b>Maryland Department of Health, Maternal Mortality Review Program Director</b> <i>S. Lee Woods, MD, PhD*</i>
<b>Staff to the Committee</b> <i>Shayna Banfield</i>	<b>Staff to the Committee</b> <i>Clara Richards</i>

\* Retired effective October 2019.

## ***Maternal Mortality Review Committee Recommendations, 2019***

Substance use with unintentional overdose remains the leading cause of pregnancy-associated death for the fifth consecutive year in Maryland. The number and proportion of overdose deaths among deaths during pregnancy and the first year postpartum continue to increase, with overdose accounting for 38 percent of all pregnancy-associated deaths in 2017. The MMR Committee continues to support the detailed recommendations related to substance use disorder that were put forward in the Maryland Maternal Mortality Review [2018 Annual Report](#). The MMR Committee also makes the following recommendations based on the findings in this report.

### **Improve access and coordination of care to one year postpartum.**

- Extend Medicaid and other insurance coverage to provide postpartum care to one year, including coverage for primary care, specialty care, medications, mental health and substance use treatment services.
- Prior to discharge after delivery, create mechanisms to coordinate warm hand-off for patients needing primary care and specialty follow-up as well as those needing behavioral health treatment, including appointments and referrals, and addressing needs such as transportation and childcare.
- Develop mechanisms for improved coordination between obstetric, mental health, and substance use treatment providers.
- Establish guidelines for improved communication concerning pregnant and postpartum patients between hospital units, specifically emergency departments and labor and delivery units.

### **Reinforce screening and support services for social predictors of maternal death.**

- Provide training for providers and staff on trauma-informed care. Provide trauma counseling for patients with behavioral health disorders and intimate partner violence.
- Promote universal screening every trimester for substance use, mental health, and intimate partner violence.
- Improve access to intimate partner violence counseling and services.
- Provide up-to-date resource lists to providers from local government agencies identifying services for substance use, mental health, and intimate partner violence referrals.

### **Increase training and awareness regarding disparities in maternal health.**

- Provide implicit bias training for obstetric providers and hospital staff.
- Require all hospitals with delivery services to review and analyze internal maternal health outcomes data for racial disparities.

## **Appendix B: Maternal Mortality Review Stakeholder Group**



## ***Maternal Mortality Review Stakeholder Group Background***

House Bill 1518, enacted by the 2018 Maryland General Assembly, established a Maternal Mortality Review Stakeholder Group in Md. Ann. Code Health – General Art. §13-1208. The statute requires the Stakeholder Group to meet at least twice a year to review the findings and recommendations in the annual Maternal Mortality Review Report. This group includes representatives of the Maryland Office of Minority Health and Health Disparities, the Maryland Patient Safety Center, the Maryland Healthy Start Program, women’s health advocacy organizations, community organizations engaged in maternal health and family support issues, families that have experienced a maternal death, local health departments, and health care providers that provide maternal health services (full membership listing included in this appendix). The Stakeholder Group was convened for the first time on March 25, 2019 and decided to meet quarterly with meetings open to the public. Information and upcoming meeting dates can be found on the [Stakeholder Group website](#).

The Stakeholder Group is charged with reviewing and adding to the recommendations of the previous Maternal Mortality Review report, examining issues resulting in disparities in maternal deaths and identifying new recommendations with a focus on initiatives to address disparities in maternal deaths. Recommendations from the Stakeholder Group follow those put forward by the MMR Committee.

## **Maternal Mortality Review Stakeholder Group**

<b>Maryland Commission for Women</b> <i>Amanda L. Costley, Esq.</i>	<b>Maryland Patient Safety Center</b> <i>Bonnie DiPietro, MS, RN, NEA-BC, FACHE</i>
<b>Black Mamas Matter Alliance</b> <i>Elizabeth Dawes Gay, MPH</i>	<b>Healthy New Moms/Mental Health Association of Maryland</b> <i>Kari J. Gorkos, MS</i>
<b>Office of Minority Health and Health Disparities</b> <i>David Mann, MD, PhD</i>	<b>House of Ruth Maryland</b> <i>Janice Miller, LCSW-C</i>
<b>Maryland Association of County Health Officers</b> <i>Russell Moy, MD, MPH</i>	<b>Women’s Healthcare Provider</b> <i>Meghana Rao, MD</i>
<b>Baltimore Healthy Start</b> <i>Maxine Reed Vance, PhD, RN</i>	<b>Maryland Department of Health</b> <i>Linda Alexander, MD, MPP, FACOG</i> <i>S. Lee Woods, MD, PhD*</i>
<b>Family Representative</b> <i>Rosemarie DiMauro Satyshur, PhD, RN</i>	

\* Retired effective October 2019.

## ***Maternal Mortality Review Stakeholder Group Recommendations, 2019***

### **Additions to the recommendations in the Maternal Mortality Review 2018 Annual Report:**

- Screen for behavioral health risks (substance use disorder, mental health, and intimate partner violence) at least every trimester during pregnancy and postpartum, or ideally at every visit. Screening, especially for intimate partner violence, should be done in private.
- Increase provider awareness of the interrelatedness of these behavioral health risks. If a pregnant woman screens positive for any one risk, the provider should carefully screen her for other risks.
- Include screening for social determinants of health in every clinical appointment during and after pregnancy, including access to safe housing, food, transportation, and utility services, among other determinants as outlined in the Maryland Medicaid Pregnancy Risk Assessment (PRA) form and [ICD 10 codes Z55 – Z65](#).
- Enhance provider awareness of social risk factors (aligning with the PRA and ICD 10 codes) and establish systems for referral to public health and community-based resources to help mitigate those risk factors.
- Expand the Maryland Behavioral Health Integration in Pediatric Primary Care program to include screening and referral for perinatal mental health disorders. This could be accomplished either by providing maternal screening at pediatric visits, or by developing a parallel program of mental health consultation and support for obstetricians caring for pregnant and postpartum women.
- Include intimate partner violence screening in pediatric visits.

Dedicate a portion of the federal funding received by Maryland for opioid use disorder and its related behavioral health issues specifically to the treatment of pregnant and postpartum women.

### **Recommendations to improve maternal care and reduce maternal morbidity and mortality:**

- Increase health care provider awareness and adoption of the ACOG recommendations for optimizing postpartum care as outlined in the [May 2018 ACOG Committee Opinion](#) statement.
- Enforce completion of the Maryland Medicaid PRA form and standardize PRA use across the state.
- Make the PRA form electronic statewide for ease of completion and to allow data analysis. Ensure statewide results are compiled and used to improve pregnancy-related care.
- Improve access to patient-centered comprehensive postpartum and interconception care and continuity of care through care models that integrate mother and baby care at the time of pediatric visits.
- Conduct internal reviews of cases of severe maternal morbidity at each delivery hospital to evaluate quality of care, adherence to established clinical practice guidelines by service providers, and opportunities to shift practices to prevent maternal death.
- Review preventability of the leading causes of maternal death to understand what factors were most commonly identified that could have prevented the death to better direct

disease prevention efforts, improve care coordination, and enhance the quality of care provided.

**Recommendations to address disparities in maternal mortality:**

- Assure that the team conducting maternal mortality reviews is diverse (race, ethnicity, gender, professional field, geographic representation, etc.) and includes representation of community-based organizations that directly serve the communities most affected by poor maternal health outcomes, including Black and Latina women and low-income women and their families.
- Include community groups addressing intimate partner violence prevention and support in the review process. Include data on maternal insurance coverage (Medicaid vs. private insurance) for maternal death cases.
- Investigate risk factors, such as pre-existing medical conditions and social determinants of health, by race among maternal death cases.
- Evaluate data on hemorrhage deaths, including geographic information on site of care.
- Evaluate birth outcomes, severe maternal morbidity, adherence to clinical practice guidelines, quality metrics, and patient satisfaction data by patient and provider race at each delivery hospital.
- Fund additional opportunities to gather qualitative data on the quality of maternity care by race.
- Require local health departments to complete an inventory of services and resources available to address social determinants of health in their locale.