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January 7, 2026

MEMORANDUM

TO: The Honorable Glenn Youngkin
Governor, State of Virginia

The Honorable Don Scott
Speaker of the House, Virginia House of Delegates

The Honorable L. Louise Lucas
President Pro Tempore, Senate of Virginia

FROM: Karen Shelton, MD
State Health Commissioner, Virginia Department of Health

SUBJECT: 2025 Virginia Maternal Mortality Review Team Annual Report

This report is submitted in compliance with the Virginia Acts of the Assembly – §32.1-283.8, which states:

> *G. The Team shall compile annual statistical data, which shall be made available to the Governor and the General Assembly. Any statistical compilations prepared by the Team shall be public record and shall not contain any personal identifying information.*

Should you have any questions or need additional information, please feel free to contact me at (804) 864-7006.

KS/KB
Enclosure

Pc: The Honorable Janet V. Kelly, Secretary of Health and Human Resources

VIRGINIA MATERNAL MORTALITY REVIEW TEAM ANNUAL REPORT

REPORT TO THE GOVERNOR AND THE GENERAL ASSEMBLY

2025

VIRGINIA DEPARTMENT OF HEALTH

PREFACE

The Virginia Maternal Mortality Review Team (MMRT) is proud to present the 2025 Annual Report of statistical data as mandated by Code of Virginia, § 32.1-283.8. This shall be made available to the Governor and the General Assembly by October 1, 2025.

VIRGINIA MATERNAL MORTALITY REVIEW TEAM

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EXECUTIVE SUMMARY

The Virginia Maternal Mortality Review Team (MMRT) is proud to present the 2025 Annual Report of statistical data as mandated by Code of Virginia, § 32.1-283.8. This shall be made available to the Governor and the General Assembly by October 1, 2025. This report provides an overview of the patterns and trends in pregnancy-associated deaths in the state of Virginia in 2023. Pregnancy-associated death is defined as "the death of a woman while pregnant or within one year of pregnancy regardless of the outcome of the pregnancy or the cause of death[1]."

This report also presents the final MMRT determinations of preventability, pregnancy-relatedness, and contributors to mortality for 2021 pregnancy-associated death cases. Additionally, final recommendations from the MMRT for the prevention of future pregnancy-associated deaths based on the final 2021 data are also included. The MMRT is dedicated to understanding the circumstances surrounding each of these deaths so that strategies can be developed to reduce maternal mortality across the Commonwealth. The MMRT is an ongoing collaborative effort led by the VDH's Office of Family Health Services and Office of the Chief Medical Examiner. Data highlights are listed below.

2023 DATA HIGHLIGHTS

1. In the Commonwealth of Virginia, the number of pregnancy-associated deaths decreased from 67 in 2022 to 45 in 2023.

2. The pregnancy-related death rate decreased from 70.1 per 100,000 live births in 2022 to 48.6 per 100,000 live births in 2023.

3. Approximately 42% of these deaths occurred between 43 and 365 days after the end of the pregnancy.

4. Over 45% of pregnancy-related deaths involved women ages 35 and older.

    a. Pregnancies in women over the age of 35 are considered high-risk and account for over 24% of all live births in 2023.

5. Black women continue to experience higher rates of pregnancy-associated deaths when compared to their White counterparts (70.7 vs. 36.2, respectively).

6. Black women were more likely to die from cardiac related causes (16.3 vs. 6.0 per 100,000 live births, respectively).

7. All of the pregnancy-associated accidental deaths resulted from accidental overdoses. Eighty-five percent of these deaths occurred due to the combined use of illicit and prescription drugs.

[1] Association for Maternal and Child Health Programs. (2022, August 8). Definitions. Retrieved from Review to Action: https://reviewtoaction.org/learn/definitions

8. The pregnancy-associated death rate from accidental overdoses was higher among Black and Other race women when compared to White women (21.7 and 25.1 vs. 10.6, respectively).

9. The Southwestern Health Services Area had the highest rate of pregnancy-associated deaths at 99.4 per 100,000 live births, followed by the Central (75.3 per 100,000 live births) and Eastern (61.9 per 100,000 live births) Health Services Areas.

10. Over 43% of pregnancy-associated deaths in 2021 were determined to be pregnancy-related[2] by the Maternal Mortality Review Team.

[2] A pregnancy-related death is defined as a death during pregnancy or within 1 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.

INTRODUCTION

MATERNAL MORTALITY REVIEW TEAM MANDATE

In accordance with the Code of Virginia, § 32.1-283.8., the Maternal Mortality Review Team (MMRT) "shall compile annual statistical data, which shall be made available to the Governor and the General Assembly. Any statistical compilations prepared by the MMRT shall be public record and shall not contain any personal identifying information."

MATERNAL MORTALITY REVIEW TEAM ACTIVITIES

This report presents the pregnancy-associated deaths identified and tracked by the Virginia Pregnancy-Associated Mortality Surveillance System (PAMSS) housed in the VDH, Office of the Chief Medical Examiner (OCME). Data from PAMSS are also used for the review of these deaths by the MMRT.

DATA COLLECTION AND PREPARATION

The data in this report reflects pregnancy-associated deaths that fall under the purview of the MMRT and are tracked using the Pregnancy-Associated Mortality Surveillance System (PAMSS). Several methods are utilized to identify cases of Pregnancy Associated Death (PAD) in Virginia. First, the VDH Office of Vital Records identifies cases of pregnancy-associated death in three ways: 1) examining the death certificate check box related to pregnancy status; 2) reviewing cause of death on the death certificate for causes directly attributable to pregnancy; and 3) matching death certificates of women of reproductive age with birth and fetal death certificates to identify deaths occurring among women who delivered in the year preceding death. Additional cases are identified through the Virginia Violent Death Reporting System (VVDRS). Using information obtained from the death certificates, birth certificates, fetal death certificates, and the VVDRS, the Maternal Mortality Program Manager identifies, requests and abstracts records from the hospital where the birth or pregnancy occurred, birth attendants' records, hospital records where the death occurred, autopsy records, and the Medical Examiner case investigation records. These records are used to confirm that the decedent was pregnant within 365 days of death.

METHODOLOGY

The MMRT collects and reviews retrospective data on all pregnancy-associated deaths in the state. A preliminary list of cases is compiled by the Office of Vital Records after the certification of death certificates from the previous calendar year. The certification process takes approximately 6-9 months after the end of the calendar year. The MMRT support staff then verify that each case is eligible for inclusion in the Pregnancy-Associated Mortality Surveillance System, a process that can take 6-9 months, prior to the MMRT review of the case. Once cases have been verified, the MMRT reviews each case to determine the contributors to mortality, preventability, pregnancy-relatedness and recommendations for interventions, practices, and policy changes that could have prevented the death. At the conclusion of each review cycle, the team develops and disseminates formal recommendations for the prevention of future deaths. The last completed review cycle of pregnancy-associated death cases that the MMRT has reviewed is 2021. The MMRT is currently reviewing 2022 pregnancy-associated death cases.

For 2023, the Office of Vital Records identified 54 deaths that were found to be pregnancy-associated based on the death certificate data for each case. Through the MMRT case eligibility/verification process, it was determined that 9 (16.7%) of the initially identified cases were ineligible for review by the MMRT. Reasons for ineligibility included the decedent not being pregnant within a year of death or the decedent being a resident of another state/territory. This is a significant improvement from previous years. For comparison, over 39% of cases from 2021 and 2022 were found to be ineligible (45% and 39%, respectively).

STATISTICAL SUMMARY

Data are based upon Virginia residents who had a pregnancy-associated death within the state.

- Rates
    - Rates are per 100,000 live births among the specific Virginia population being described. This is the standard method both nationally and internationally. All rates in this report are per 100,000 live births unless otherwise noted.
    - Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.
    - Live birth numbers are used to depict the risk of maternal death relative to the number of live births during the same time-period and essentially captures the risk of death in a single pregnancy or a single live birth event.

- Race/Ethnicity
    - Race is presented as White, Black, and Other.
    - White and Black races represent those who have been identified as of non-Hispanic ethnicity.
    - 'Other' races are persons who are identified as being of Asian or Native American race or Hispanic ethnicity.

REPORT OUTLINE

This report will provide an overview of the Maternal Mortality Projects, the MMRT and its processes followed by a discussion of the preliminary statistical data for all pregnancy-associated deaths in 2023. Next, the report will present the statistical data for specific manners of pregnancy-associated deaths for 2023, namely natural deaths, accidents, homicides, and suicides. MMRT final determinations of preventability, pregnancy-relatedness, and contributors to mortality for 2021 pregnancy-associated death cases will then be presented. The report will conclude with a summarization of the data presented, the discussion of recommendations from the MMRT for the prevention of pregnancy-associated deaths in the state, and an outline of the next steps for the MMRT.

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OVERVIEW OF MATERNAL MORTALITY PROJECTS

PREGNANCY-ASSOCIATED MORTALITY SURVEILLANCE SYSTEM

Virginia's PAMSS collects information on all pregnancy-associated deaths among Virginia residents. This surveillance system allows for the identification and monitoring of patterns and trends related to pregnancy-associated deaths in Virginia, provides a snapshot of maternal mortality, and helps inform policy decisions of public health importance. Data from PAMSS includes not only surveillance data, but also data collected from the Maternal Mortality Review Team process. Current PAMSS data indicates pregnancy-associated deaths in Virginia remain a significant public health problem.

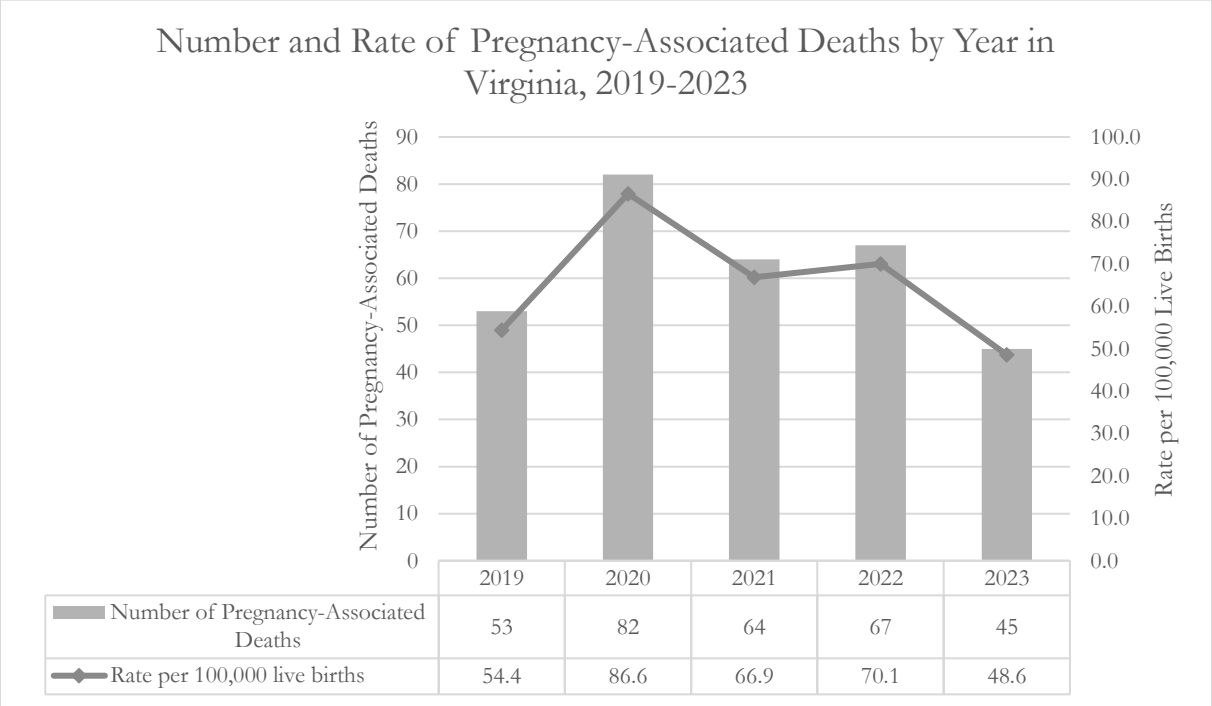
MATERNAL MORTALITY REVIEW TEAM

Virginia's MMRT is one of the longest continuously functioning, multidisciplinary review teams in the United States. The MMRT was established in March 2002 as a partnership between the Office of Family Health Services (OFHS) and the OCME. The team was codified, § 32.1-283.8, by the 2019 General Assembly, with the OCME continuing to provide coordination for the team. The MMRT is multidisciplinary and includes representatives from the Medical Society of Virginia; Virginia Section of the American College of Obstetricians and Gynecologists; Virginia College of Emergency Physicians; Virginia Chapter of the American College of Nurse Midwives; Association of Women's Health, Obstetrics and Neonatal Nurses; Virginia Chapter of the National Association of Social Workers; Virginia Hospital and Healthcare Association; Virginia Sexual and Domestic Violence Action Alliance; Virginia Dietetic Association; local health departments; and state planning agencies. The maternal mortality review is supported by the Center for Disease Control with funds from the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program and the OFHS with the Title V Maternal and Child Health Block Grant from the U.S. Department of Health and Human Services, Maternal and Child Health Bureau.

Virginia's MMRT is dedicated to the identification of all pregnancy-associated deaths in the Commonwealth and the development of recommendations for interventions to reduce preventable deaths. The team collects records from the hospital where the birth or pregnancy-related issue, concern, or termination occurred; the birth attendant's records; hospital records where the death occurred; the autopsy records; and the Medical Examiner case investigation records. The team also collects records from other health care providers and specialists, social service agencies, and mental health facilities to ensure that each review is comprehensive and thoroughly assesses the woman's life, health, and healthcare utilization in the five years prior to her death. The team reviews each case to determine the community-related, patient-related, healthcare facility-related, and/or healthcare provider-related factors that contributed to the woman's death. Consensus decision-making is used to determine whether the death was preventable and/or related to the pregnancy. The team also recommends needed changes in the care received that may have led to better outcomes in that specific case. The MMRT is currently reviewing 2022 pregnancy-associated death cases.

SECTION 1: TOTAL PREGNANCY-ASSOCIATED DEATHS (PAD)

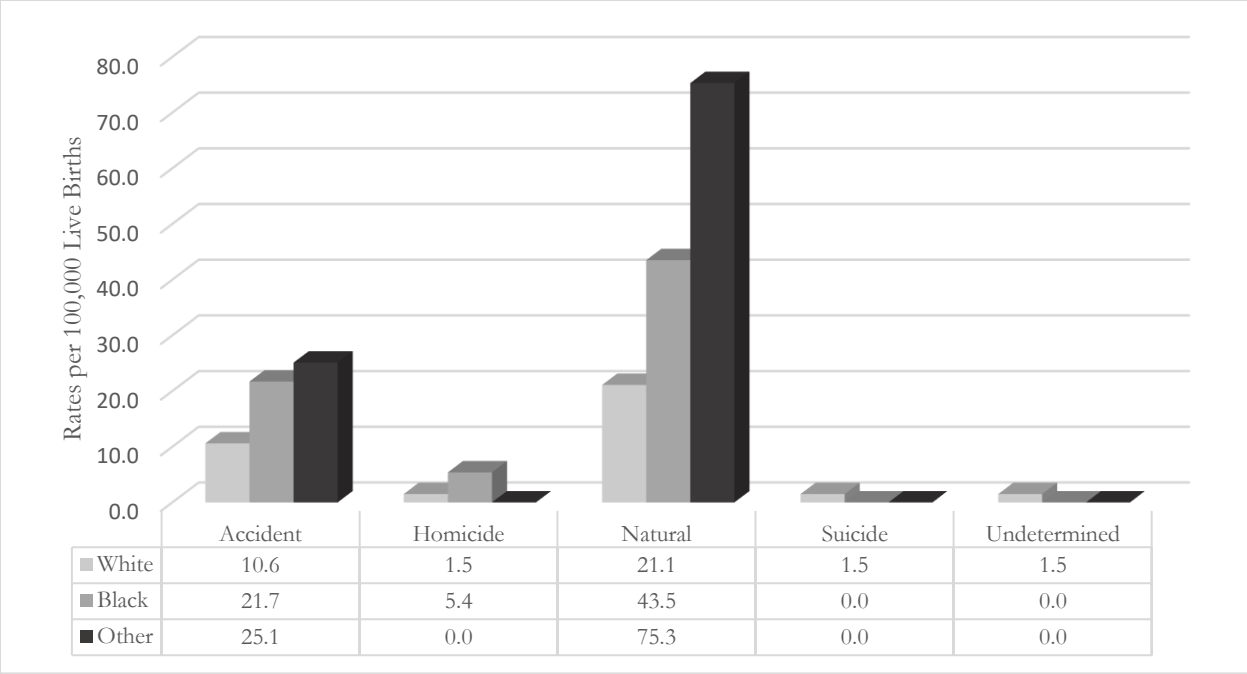
In 2023, the total number of pregnancy-associated deaths decreased from 67 in 2022 to 45 in the state of Virginia (see Figure 1). The overall pregnancy-associated death rate[3] also decreased from 70.1 in 2022 to 48.6 deaths per 100,000 live births in 2023. Black women continue to have higher rates of pregnancy-associated deaths compared to their White counterparts. In 2023, the rate for Black women was nearly twice as high as the rate for White women at 70.7 vs. 36.2, respectively. Black women experienced higher rates of death from all manners of death when compared to White women. Additionally, women from 'Other' races, had higher rates of pregnancy-associated deaths from accidental and natural causes of death when compared to White women (25.1 vs. 10.1 and 75.3 vs. 21.1, respectively) (see Figure 2). Natural deaths, or deaths caused by a disease alone, accounted for 62.2% of all pregnancy-associated deaths (a decrease from 73.1% in 2022). The proportion of accidental deaths increased from 17.9% in 2022 to 28.9% in 2023. The proportion of deaths from homicides and suicides decreased in 2023 from 6.0% to 4.4% and 3.0% to 2.2% respectively. There was 1 (2.2%) death from an undetermined cause in 2023. The Central and Eastern Health Services Area had the highest proportion of deaths (26.7% each) followed by the Southwest Health Services Area (22.2%). The Southwest and Central Health Services Areas had the highest rates of pregnancy-associated death at 99.4 and 75.3, respectively (see Table 1, Figure 3).



	2019	2020	2021	2022	2023
Number of Pregnancy-Associated Deaths	53	82	64	67	45
Rate per 100,000 live births	54.4	86.6	66.9	70.1	48.6

Figure 1: Number and Rate of Pregnancy-Associated Deaths by Year in Virginia, 2019-2023

[3] Rate provided is the Maternal Mortality Rate (MMR), which is calculated by dividing the number of deaths in a category by the number of live births and then multiplying that number by 100,000. The rate provides the number of deaths for every 100,000 live births to women who were residents of the state at the time of their deaths. Rates for race, age, and Health Services Area are category specific. The MMR is the standard measure for evaluating maternal morbidity and mortality.



	Accident	Homicide	Natural	Suicide	Undetermined
White	10.6	1.5	21.1	1.5	1.5
Black	21.7	5.4	43.5	0.0	0.0
Other	25.1	0.0	75.3	0.0	0.0

Figure 2: Rates of Manner of Pregnancy-Associated Deaths by Race, 2023

Table 1: Pregnancy-Associated Deaths in Virginia, 2023: Selected Characteristics

	2023 (n=45)		
Pregnancy-Associated rate*	**48.6**		
	No.	**%**	**Rate***
Manner			
Natural	28	62.2	30.2
Accidental	13	28.9	14.0
Homicide	2	4.4	2.2
Suicide	1	2.2	1.1
Undetermined	1	2.2	1.1
Race			
White	24	53.3	36.2
Black	13	28.9	70.7
Other	8	17.8	100.4
Age			
19 and under	0	0.0	0.0
20-24	4	8.9	30.2
25-29	8	17.8	34.2
30-34	15	33.3	52.1
35-39	11	24.2	66.3
40 and over	7	15.6	166.2
Education			
Less than High School	7	15.6	7.6

	2023 (n=45)		
Pregnancy-Associated rate*	**48.6**		
	No.	**%**	**Rate***
High School Diploma	16	35.6	17.3
More than High School	21	46.7	22.7
Unknown	1	2.2	1.1
Interval Between End of Pregnancy and Death			
Pregnant at the time of death	16	35.6	17.3
0-42 days	10	22.2	10.8
43 days – 365 days	19	42.2	20.5
Health Planning Region			
Central	12	26.7	75.3
Eastern	12	26.7	61.9
Northern	9	20.0	30.4
Northwest	2	4.4	14.3
Southwest	10	22.2	99.4
Rural vs. Urban			
Rural	12	26.7	185.5
Urban	33	73.3	40.5

Table 1: Pregnancy-Associated Deaths in Virginia, 2023: Selected Characteristics

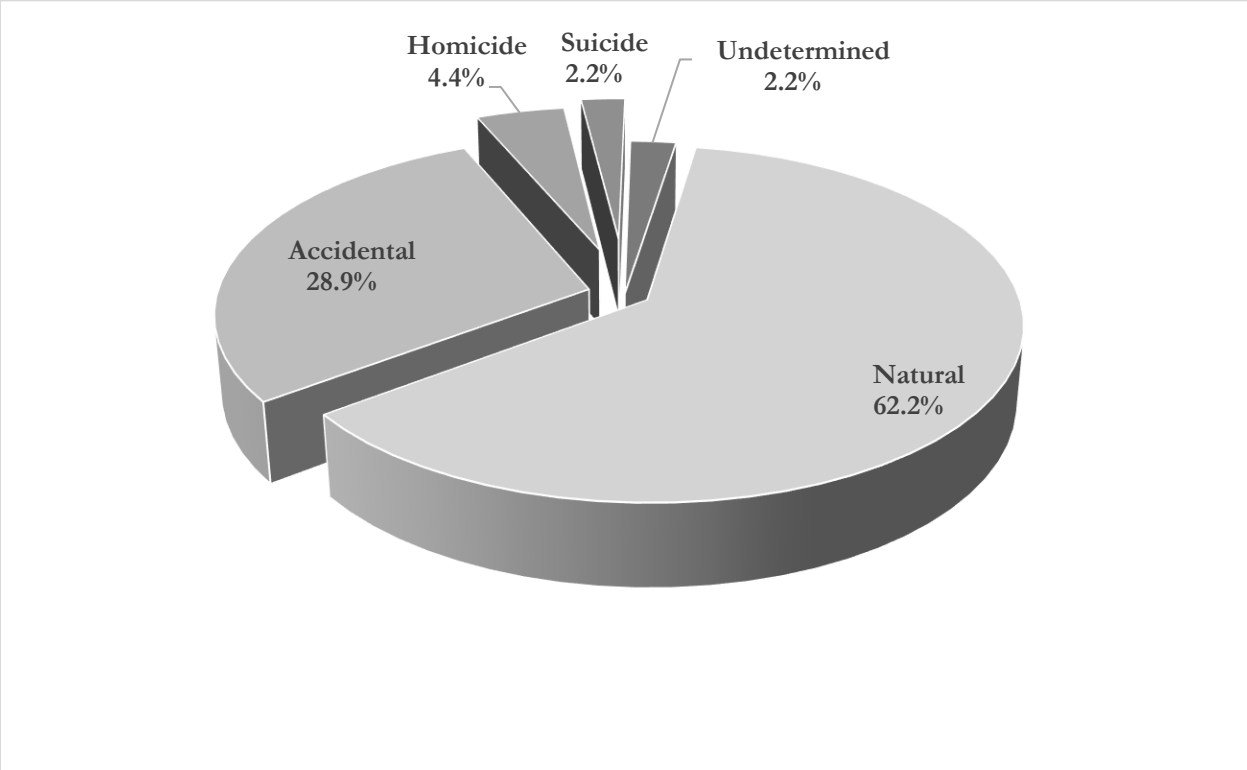


Figure 3: Percent of Pregnancy-Associated Deaths by Manner of Death, 2023

SECTION 2: MANNERS OF DEATH

NATURAL DEATHS

The pregnancy-associated death rates for all natural deaths decreased from 51.3 in 2022 to 30.2 in 2023. Black women continue to have significantly higher rates of natural pregnancy-associated deaths when compared to their White counterparts (43.5 vs. 21.2, respectively, $p<.05$). Cardiac related causes of death accounted for the largest proportion of natural deaths at 42.9% followed by deaths from cancer (14.3%). Among Black women, over 37% of natural deaths were from cardiac-related causes while over 83% of natural deaths among Other Race women were from cardiac-related causes. Cardiac-related causes of death include all deaths from a cardiac-related cause except for cardiomyopathy, including coronary artery disease, pulmonary hypertension, valvular heart disease, and hypertensive cardiovascular disease, among others. Black women continue to have a significantly higher rate of death from cardiac-related causes when compared to their White counterparts (26.6 vs. 5.8, respectively). Other race women also had a higher rate of death from cardiac-related causes at 62.7. (see Table 2, Figure 4).

Table 2: Natural Pregnancy-Associated Deaths, 2023: Selected Characteristics

	White (n=14)			Black (n=8)			Other (n=6)			Total (n=28)		
Pregnancy-Associated rate*	**21.2**			**43.5**			**75.3**			**30.2**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Cause of Death												
Amniotic Fluid Embolism	1	7.1%	1.5	1	12.5%	5.4	0	0.0%	0.0	2	7.1%	2.2
Cancer	2	14.3%	3.0	1	12.5%	5.4	1	16.7%	12.5	4	14.3%	4.3
Cardiac	4	28.8%	6.0	3	37.5%	16.3	5	83.3%	62.7	12	42.9%	13.0
COVID-19	0	0.0%	0.0	1	12.5%	5.4	0	0.0%	0.0	1	3.6%	1.1
Disorders of the Central Nervous System	0	0.0%	0.0	1	12.5%	5.4	0	0.0%	0.0	1	3.6%	1.1
Exacerbation of Chronic Disease	1	7.1%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	3.6%	1.1
Hemorrhage	2	14.3%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	7.1%	2.2
Infection	2	14.3%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	7.1%	2.2
Pulmonary Embolism	2	14.3%	3.0	1	12.5%	5.4	0	0.0%	0.0	3	10.7%	3.2
Age												
19 and under	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0

	White (n=14)			Black (n=8)			Other (n=6)			Total (n=28)		
Pregnancy-Associated rate*	**21.2**			**43.5**			**75.3**			**30.2**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
20-24	1	7.1%	10.6	2	25.0%	58.0	0	0.0%	0.0	3	10.7%	22.6
25-29	0	0.0%	0.0	1	12.5%	21.6	1	16.7%	65.4	2	7.1%	8.6
30-34	7	50.0%	33.8	1	12.5%	19.9	1	16.7%	33.0	9	32.1%	31.3
35-39	5	35.7%	43.2	2	25.0%	69.3	1	16.7%	47.0	8	28.6%	48.2
40 and over	1	7.1%	34.8	2	25.0%	241.8	3	50.0%	589.4	6	21.4%	142.4
Education												
Less than High School	1	7.1%	1.5	0	0.0%	0.0	3	50.0%	37.6	4	14.3%	4.3
High School Diploma	5	35.7%	7.5	2	25.0%	10.9	0	0.0%	0.0	7	25.0%	7.6
More than High School	8	57.1%	12.1	5	62.5%	27.2	3	50.0%	37.6	16	57.1%	17.3
Unknown	0	0.0%	0.0	1	12.5%	5.4	0	0.0%	0.0	1	3.6%	1.1
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	3	21.4%	4.5	2	25.0%	10.9	2	33.3%	25.1	7	25.0%	7.6
0-42 days	4	28.6%	6.0	2	25.0%	10.9	3	50.0%	37.6	9	32.1%	9.7
43 days – 365 days	7	50.0%	10.6	4	50.0%	21.7	1	16.7%	12.5	12	42.9%	13.0
Health Services Area												
Central	5	35.7%	46.5	2	25.0%	44.4	1	16.7%	146.4	8	28.6%	50.2
Eastern	3	21.4%	23.2	3	37.5%	47.6	0	0.0%	0.0	6	21.4%	30.9
Northern	1	7.1%	4.9	2	25.0%	50.6	5	83.3%	96.5	8	28.6%	27.0
Northwest	2	14.3%	16.9	0	0.0%	0.0	0	0.0%	0.0	2	7.1%	14.3
Southwest	3	21.4%	35.8	1	12.5%	70.0	0	0.0%	0.0	4	14.6%	39.8
Rural vs. Urban												
Rural	5	35.7%	90.6	1	12.5%	118.1	0	0.0%	0.0	6	21.4%	92.8
Urban	9	64.3%	15.5	7	87.5%	41.6	6	100.0%	79.4	22	78.6%	27.0

Table 2: Natural Pregnancy-Associated Deaths, 2023: Selected Characteristics

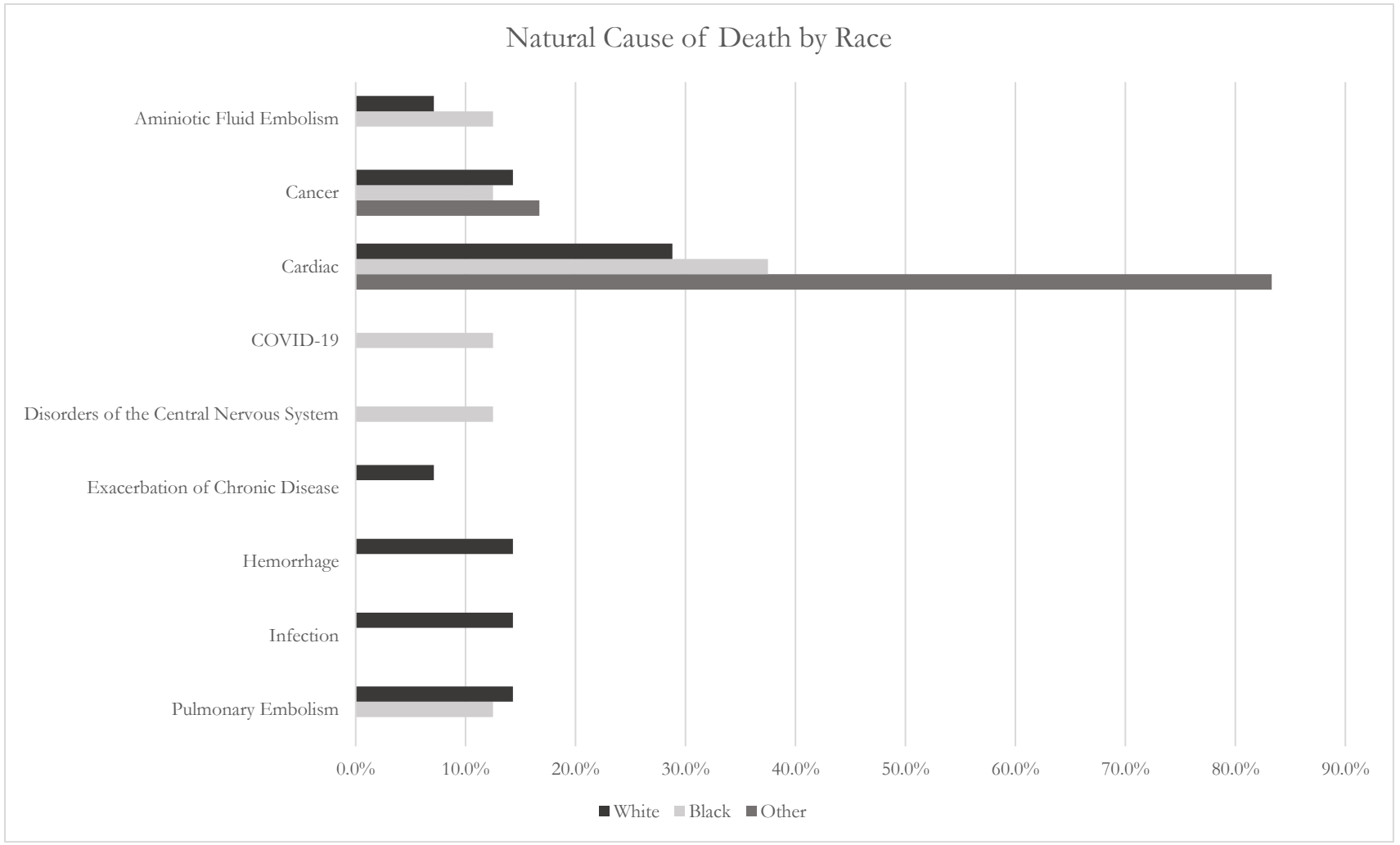


Figure 4: Natural Causes of Death by Race

ACCIDENTAL DEATHS

The pregnancy-associated death rate for accidental causes increased from 12.6 in 2022 to 14.0 in 2023. All of these deaths were from accidental overdoses. In 2023, there were 13 total pregnancy-associated deaths caused by accidental overdoses. Eighty-five percent of these deaths occurred due to the combined use of illicit and prescription drugs. Fentanyl was the most used substance and was present in 10 out of the 13 cases. The pregnancy-associated death rate from accidental overdoses was higher among Black and Other Race women when compared to White women (21.7 and 25.1 vs. 10.6, respectively). The Central, Eastern and Southwestern Health Services Area had the highest proportion of accidental deaths at 30.8% each. The highest rates of accidental death occurred in the Southwestern and Central Health Services Areas at 39.8 and 25.1, respectively (see Table 3).

Table 3: Accidental Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

	White (n=7)			Black (n=4)			Other (n=2)			Total (n=13)		
Pregnancy-Associated rate*	**10.6**			**21.7**			**25.1**			**14.0**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Cause of Death												
Poison (Accidental Overdose)	7	100.0%	10.6	4	100.0%	21.7	2	100.0%	25.1	13	100.0%	14.0
Age												
19 and under	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
20-24	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
25-29	2	28.6%	11.6	0	0.0%	0.0	1	50.0%	65.4	3	23.1%	12.9
30-34	4	57.1%	19.3	2	50.0%	39.7	0	0.0%	0.0	6	46.2%	20.9
35-39	0	0.0%	0.0	2	50.0%	69.3	1	50.0%	47.0	3	23.1%	18.1
40 and over	1	14.3%	34.8	0	0.0%	0.0	0	0.0%	0.0	1	7.7%	23.7
Education												
Less than High School	1	14.3%	1.5	1	25.0%	5.4	1	50.0%	12.5	3	23.1%	3.3
High School Diploma	5	71.4%	7.5	2	50.0%	10.9	0	0.0%	0.0	7	53.8%	7.6
More than High School	1	14.3%	1.5	1	25.0%	5.4	1	50.0%	12.5	3	23.1%	3.3
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	5	71.4%	7.5	2	50.0%	10.9	0	0.0%	0.0	7	53.8%	7.6
0-42 days	1	14.3%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	7.7%	1.1
43 days – 365 days	1	14.3%	1.5	2	50.0%	10.9	2	100.0%	25.1	5	38.5%	5.4

	White (n=7)			Black (n=4)			Other (n=2)			Total (n=13)		
Pregnancy-Associated rate*	**10.6**			**21.7**			**25.1**			**14.0**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Health Services Area												
Central	3	42.9%	27.9	1	25.0%	22.2	0	0.0%	0.0	4	30.8%	25.1
Eastern	1	14.3%	7.7	2	50.0%	31.7	1	50.0%	109.4	4	30.8%	20.6
Northern	0	0.0%	0.0	0	0.0%	0.0	1	50.0%	19.3	1	7.7%	3.4
Northwestern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Southwestern	3	42.9%	35.8	1	25.0%	70.0	0	0.0%	0.0	4	30.8%	39.8
Rural vs. Urban												
Rural	4	57.1%	72.5	1	25.0%	118.1	0	0.0%	0.0	5	38.5%	77.3
Urban	3	42.9%	5.2	3	75.0%	17.8	2	100.0%	26.5	8	61.5%	9.8

Table 3: Accidental Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

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HOMICIDES

The rate of pregnancy-associated deaths caused by homicides decreased from 4.2 in 2022 to 2.2 in 2023. The rate of homicide deaths among Black women continues to be higher than the rate among White women (5.4 vs. 1.5, respectively). The fatal agent used in each case was a firearm. Homicides occurred in the Eastern and Southwestern Health Services Area. The Southwestern Area had the highest rate of homicides at 9.9 (see Table 4).

Table 4: Homicide Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

	White (n=1)			Black (n=1)			Other (n=0)			Total (n=2)		
Pregnancy-Associated rate*	**1.5**			**5.4**			**0.0**			**2.2**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Fatal Agent												
Firearm	1	100.0%	1.5	1	100.0%	5.4	0	0.0%	0.0	2	100.0%	2.2
Age												
19 and under	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
20-24	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
25-29	1	100.0%	5.8	1	100.0%	21.6	0	0.0%	0.0	2	100.0%	0.0
30-34	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
35-39	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
40 and over	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Education												
Less than High School	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
High School Diploma	0	0.0%	0.0	1	100.0%	5.4	0	0.0%	0.0	1	50.0%	1.1
More than High School	1	100.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	50.0%	1.1
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	0	0.0%	0.0	1	100.0%	5.4	0	0.0%	0.0	1	50.0%	1.1
0-42 days	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
43 days – 365 days	1	100.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	50.0%	1.1
Health Services Area												
Central	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0

	White (n=1)			Black (n=1)			Other (n=0)			Total (n=2)		
Pregnancy-Associated rate*	**1.5**			**5.4**			**0.0**			**2.2**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Eastern	0	0.0%	0.0	1	100.0%	15.9	0	0.0%	0.0	1	50.0%	5.2
Northern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Northwestern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Southwestern	1	100.0%	11.9	0	0.0%	0.0	0	0.0%	0.0	1	50.0%	9.9
Rural vs. Urban												
Rural	1	100.0%	18.1	0	0.0%	0.0	0	0.0%	0.0	1	50.0%	15.5
Urban	0	0.0%	0.0	1	100.0%	5.9	0	0.0%	0.0	1	50.0%	1.2

Table 4: Homicide Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

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SUICIDES

In 2023, the pregnancy-associated death rate from suicides decreased from 2.1 in 2022 to 1.1 in 2023. The one suicide in 2023 occurred while the decedent was pregnant. The fatal agent used was intentional poisoning. This death occurred in the Eastern Health Services Areas (See Table 5).

Table 5: Suicide Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

	White (n=1)			Black (n=0)			Other (n=0)			Total (n=1)		
Pregnancy-Associated rate*	**1.5**			**0.0**			**0.0**			**1.1**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Cause of Death												
Poisoning (Intentional Overdose)	1	100.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	1.1
Age												
19 and under	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
20-24	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
25-29	1	100.0%	5.8	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	4.3
30-34	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
35-39	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
40 and over	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Education												
Less than High School	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
High School Diploma	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
More than High School	1	100.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	1.1
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	1	100.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	1.1
0-42 days	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
43 days – 365 days	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Health Services Area												
Central	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Eastern	1	100.0%	7.7	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	5.2

	White (n=1)			Black (n=0)			Other (n=0)			Total (n=1)		
Pregnancy-Associated rate*	**1.5**			**0.0**			**0.0**			**1.1**		
	No.	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***	**No.**	**%**	**rate***
Northern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Northwestern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Southwestern	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Rural vs. Urban												
Rural	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
Urban	1	100.0%	1.7	0	0.0%	0.0	0	0.0%	0.0	1	100.0%	1.2

Table 5: Suicide Pregnancy-Associated Mortality in Virginia, 2023: Selected Characteristics

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SECTION 3: PREVENTABILITY, PREGNANCY-RELATEDNESS AND CONTRIBUTORS TO MORTALITY FROM 2021 PREGNANCY-ASSOCIATED DEATH CASE REVIEW

The MMRT has completed the review of 2021 pregnancy-associated death cases. During case review, the MMRT comprehensively and thoroughly assesses the woman's life, health, and healthcare utilization in the five years prior to her death. The MMRT reviews each case to determine the community-related, patient-related, healthcare facility-related and/or healthcare provider-related factors that contributed to the woman's death. The MMRT also assesses and/or recommends needed changes in the care received that may have led to better outcomes. The MMRT then uses consensus decision making to determine whether the death was preventable and/or related to the pregnancy. This section will outline the final contributors to mortality, preventability, pregnancy-relatedness, and recommendation themes determined from the review of 2021 cases.

FINAL FINDINGS ON CONTRIBUTORS TO MORTALITY

The review of 2021 cases uncovered that 56.8% of all pregnancy-associated deaths had at least one facility/systems-related factor contribute to the death (see Figure 5). Facility-related factors refer to the individual healthcare facility's or system's infrastructure, policies, and the availability of personnel, equipment, and technology. The most prevalent facility-related factors from 2021 cases include "lack of continuity of care" (32.0%) and "inadequate or unavailable personnel or services" (24.0%) (see 0 for the full list of contributors assessed in each case).

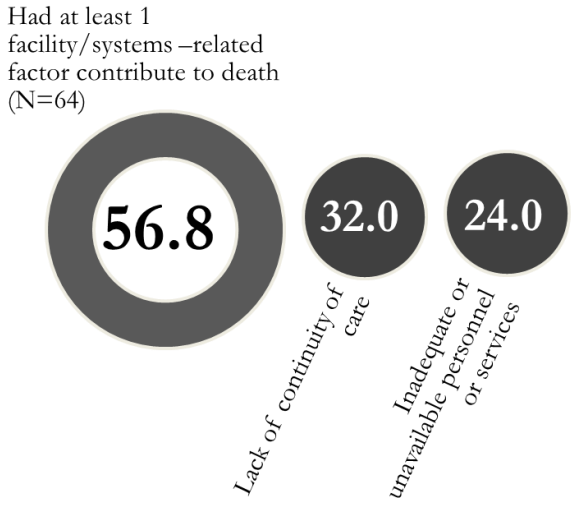


Figure 5: Percent of Women with a Facility-Related Factor Contributing to Their Death, 2021

Community-related factors involve the availability and accessibility of services in the community, law enforcement response, community outreach and availability of subsidized care. Nearly 30% of all pregnancy-associated deaths had a community-related factor contribute to the death in 2021 (See Figure 6). The most common community-related factors included "services inaccessible or unavailable" (30.4%) and "inadequate community outreach" (26.1%).

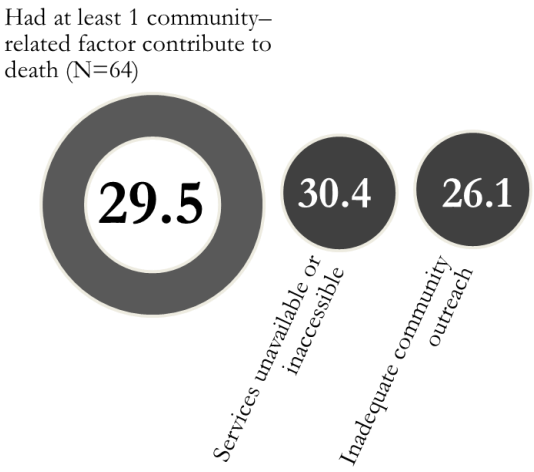


Figure 6: Percent of Women with a Community-Related Factor Contributing to Their Death, 2021

Nearly 73% of cases were found to have at least one provider-related contributor to mortality (See Figure 7). Provider-related factors are factors associated with the care and/or treatment provided by a healthcare provider to individuals. The predominant provider-related contributors to mortality included "delay in or lack of diagnosis, treatment, or follow-up" (46.9%), "inadequate assessment of risk" (34.4%), and "failure to follow evidence-based standards of care" (21.9%).

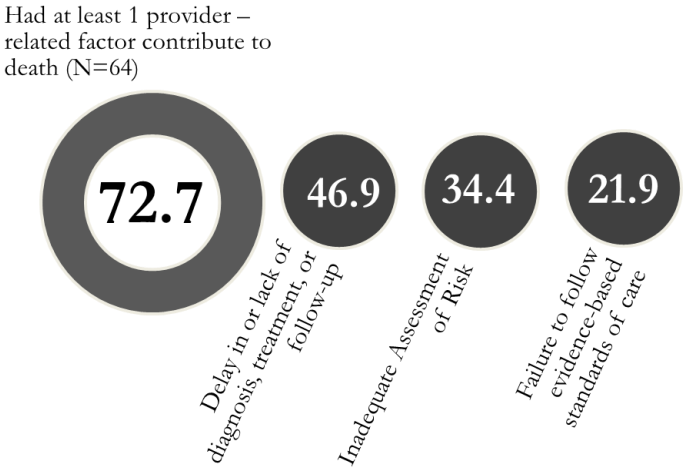


Figure 7: Percent of Women with Provider-Related Factor Contributing to Their Death, 2021

Over 93% of cases from 2021 had at least one patient-related contributor to mortality (See Figure 8). Patient-related factors are factors associated with the individual's health behaviors, personal history, social support, and healthcare utilization. The most common patient-related factors were "lack of knowledge" (48.7%), "delay or failure to seek care – medical services" (46.3%), "substance use" (41.5%), and "mental illness" (34.1%).

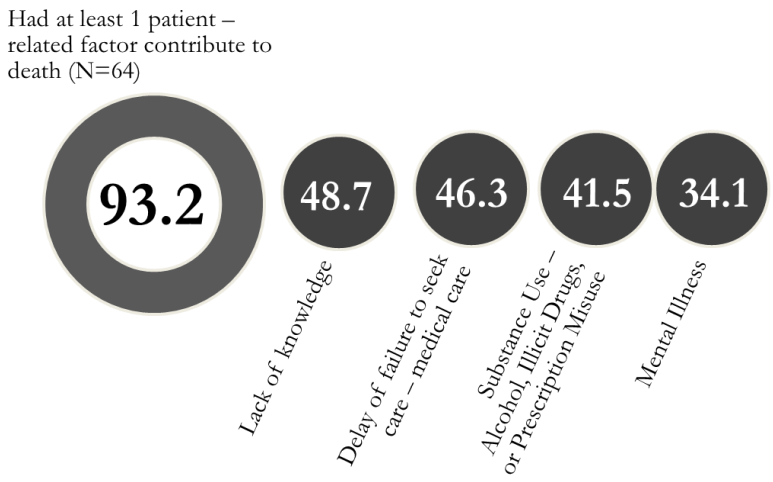


Figure 8: Percent of Women with a Patient-Related Factor Contributing to Their Death, 2021

FINAL FINDINGS ON PREVENTABILITY AMONG 2021 CASES

A preventable death is a death that may have been averted by one or more reasonable changes in clinical care, facility infrastructure, community and/or patient factors. The review of the 2021 pregnancy-associated death cases (n=64) revealed 87% of these deaths were preventable. Among these, over 86% of cases involving White women were found to be preventable, while 100% of cases among Black women and women of other races were deemed preventable.

FINAL FINDINGS ON PREGNANCY-RELATED DEATH IN 2021

The MMRT determined that 43.5% of the pregnancy-associated deaths occurring in 2021 were pregnancy-related. The MMRT was unable to determine pregnancy-relatedness for 8.7% of the reviewed 2021 cases. Approximately 60% of pregnancy-related deaths occurred among White women, 35% occurred among Black women and 5% occurred among women of other races. The pregnancy-related death rate for 2021 was 29.3. The estimated rate for Black women (49.5) was 1.7 times the rate for White women (28.5). Most pregnancy-related deaths occurred while the decedent was pregnant or within 0 to 42 days of the end of the pregnancy (35.7% and 50.0%, respectively). The Northwest Health Services Area had the highest rate of pregnancy-related deaths at 67.4 followed by the Eastern Health Services Area at 35.9 (see Table 6).

Most pregnancy-related deaths in 2021 (82.1%) were from natural causes (see Table 6 and Figure 9). These causes included hemorrhage, pulmonary embolism, infection, cardiac-related conditions and other natural causes of death. Pulmonary embolism and infections were the leading causes of natural pregnancy-related deaths at 18.8% each. The next leading natural cause of death was cardiac-related conditions (12.5%). Suicides accounted for 10.7% of pregnancy-related deaths while accidental overdoses accounted for 7.1% of pregnancy-related cases.

Table 6: Pregnancy-Related Deaths in Virginia, 2021: Selected Characteristics

	2021 (n=28)		
Pregnancy-Related Death Rate*	**20.9**		
	No.	**%**	**rate***
Manner			
Natural	23	82.1	24.1
Accidental	2	7.1	2.1
Suicide	3	10.7	3.1
Race			
White	17	60.7	28.5
Black	10	35.7	49.5
Other	1	3.6	6.4
Age			
19 and under	0	0.0	0.0
20-24	6	21.4	38.5
25-29	8	28.6	31.3
30-34	11	39.3	35.8
35-39	3	10.7	17.5
40 and over	0	0.0	0.0
Education			
Less than High School	4	14.3	4.2
High School Diploma	18	64.3	18.8
More than High School	6	21.4	6.3
Interval Between End of Pregnancy and Death			
Pregnant at the time of death	10	35.7	10.5
0-42 days	14	50.0	14.6
43 days – 365 days	4	14.3	4.2
Health Planning Region			
Central	4	15.0	23.1
Eastern	8	30.0	35.9
Northern	3	10.0	10.1
Northwest	10	35.0	67.4
Southwest	3	10.0	24.6
Rural vs. Urban			
Rural	6	20.0	86.4
Urban	22	80.0	24.8

Table 6: Pregnancy-Related Deaths in Virginia, 2021: Selected Characteristics

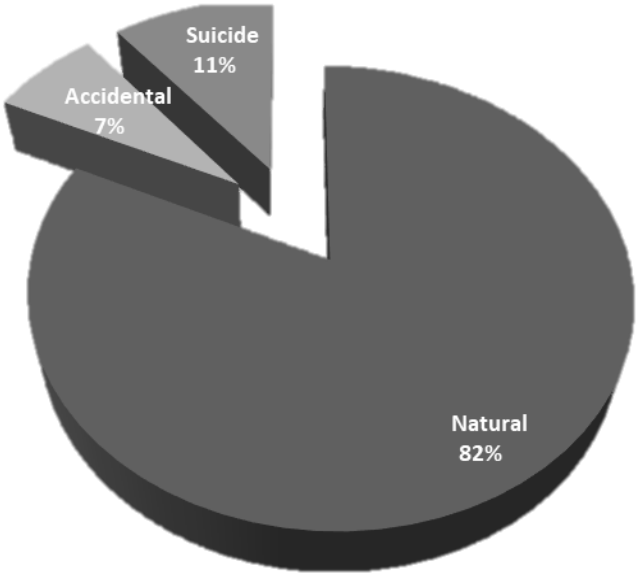


Figure 9: Percentage of Pregnancy-Related Deaths by Manner of Death, 2021

The MMRT review of 2021 deaths found that just over 80% of pregnancy-related cases were preventable. Pregnancy-related cases were also found to have contributors to mortality that were similarly aligned with all other pregnancy-associated deaths. Over 90% of pregnancy-related cases had at least one patient-related factor contribute to their death with the most prevalent factors being delays in seeking medical care, a lack of knowledge and substance misuse. Just over 70% of these cases had at least one provider-related factor contribute to their death. The most prevalent provider-related factors included delay in or lack of diagnosis, treatment or follow up and inadequate assessment of risk. Nearly 65% of pregnancy-related cases had at least one facility-related factor contribute to their death, including lack of continuity of care and inadequate or unavailable personnel or services. Additionally, just over 35% of cases had at least one community related factor contribute to their death. These community-related contributors include inaccessible services and lack of community outreach.

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FINAL RECOMMENDATIONS BASED ON THE REVIEW OF 2021 CASES[4]

Given the portrait of pregnancy-associated and pregnancy-related mortality in the state of Virginia, pre-conception care, routine health care and support for the social determinants of health needs for every woman of childbearing age are critical. Data from the MMRT review of pregnancy-associated and pregnancy-related deaths reveal that many women of child-bearing age do not enter pregnancy in optimal health and often experience multiple risk factors such as mental illness, substance misuse and a lack of access to care. The data also reveal that there is a lack of coordination of care, with many women not receiving the appropriate screenings, referrals and/or being left to navigate the complicated health care system on their own. There is a need for a system of affordable, accessible and coordinated care that is institutionalized in the U.S. as a cultural value, a medical standard of care and a human right. Women's health is part of a system of care that includes women and their families, their communities, standard practices and institutions. Improving the health outcomes of pregnant and postpartum women involves change at the community, provider, facility and system level.

The following recommendations were developed by the Virginia MMRT in fulfillment of its mission and in honor of the women who died and from whom the MMRT are privileged to have learned these lessons. The MMRT hopes the information published in this report along with its recommendations will be used in the continued effort to prevent maternal deaths among women in Virginia. Recommendations are organized by topic area and grouped by the agencies or associations that would be best equipped to implement the recommendation(s) presented.

EVIDENCE BASED STANDARDS OF CARE

Improving the quality of health services for pregnant and postpartum women is essential to enhancing maternal health outcomes and reducing preventable deaths. Delays in timely, appropriate care often result from inadequate quality of care and inaccurate identification of illnesses during pregnancy and postpartum periods. The MMRT emphasizes that advancing quality care requires the implementation of clinical best practices and the development of updated protocols and procedures across all levels of healthcare — from individual providers to hospital systems. Of particular concern is the ongoing insufficient care for mental health conditions and substance use disorders among pregnant and postpartum women, including low rates of screening, treatment access, medication management, and follow-up.

In response, Virginia MMRT recommendations emphasize quality improvement initiatives that focus on increasing screening, provider training, and adoption of evidence-based protocols to address these critical care gaps. The following recommendations aim to promote the use and dissemination of evidence-based standards of care to ensure consistent, high-quality maternal health services throughout Virginia.

[4] As a part of each case review, the Team assesses and/or recommends needed changes in the care received that may have led to better outcomes. The analysis of recommendation themes that emerge from the individual case review is the first step in the MMRT process for developing formal recommendations that are targeted towards specific agencies and/or organizations. Formal recommendations are then vetted by the target audience prior to a public release of recommendations.

1. Virginia Neonatal Perinatal Collaborative

    a. We recommend that the Virginia Neonatal Perinatal Collaborative maintain an updated list of evidence-based maternal care protocols and links on their website that can easily be accessed by providers and hospital systems.

2. Virginia Hospital and Healthcare Association

    a. In support of Acts of Assembly Chapter 423[5], which passed in the March 2025, we recommend that the appropriate state agencies, including the Virginia Department of Health Professions, collaborate closely with the Virginia Neonatal and Perinatal Collaborative (VNPC) as well as the Medical Society of Virginia, Virginia Chapter of the American College of Obstetricians and Gynecologists, Virginia Hospital and Healthcare Association, Virginia Nurses Association and other professional organizations to reinforce the need for hospital systems and clinicians to utilize evidence-based protocols from the Alliance for Innovation on Maternal Health (AIM) Patient Safety Bundles. These include protocols for postpartum hemorrhage, massive transfusion, perinatal mental health and others as needed to address the clinical trends identified in the Maternal Mortality Review Team case reviews.

        i. These entities should encourage hospitals and health systems to participate in and regularly attend VNPC meetings and events, etc. in the VNPC-led initiative and quality improvement projects that would support the Center for Medicare and Medicaid Services Maternal Morbidity Structural Measure in the Hospital Inpatient Quality Reporting (IQR) Program.

        ii. The previously mentioned entities should also recommend and encourage non-birthing hospitals to adopt the Association of Women's Health, Obstetric and Neonatal Nursing Post-Birth Warning Signs Education Program.

MATERNAL LEVELS OF CARE

Maternal levels of care serve as a critical framework for ensuring that pregnant and postpartum women receive the appropriate resources and expertise based on their individual risk profiles and clinical needs. By categorizing facilities and providers according to their capabilities, maternal levels of care help optimize patient safety, improve health outcomes, and reduce disparities. Appropriate designation and adherence to maternal levels of care facilitate timely risk assessment, enable effective referral systems, and promote coordinated care across healthcare settings. This system ensures that high-risk patients receive specialized services at facilities equipped with the necessary technology, personnel, and protocols to manage complex cases.

[5] Acts of Assembly Chapter 423 mandates that all hospitals, licensed birthing centers, and freestanding emergency departments in the state of Virginia implement standardized protocols to identify and manage obstetric emergencies. These protocols are based on evidence-based guidelines, which the Virginia Neonatal Perinatal Collaborative (VNPC) supports hospitals and outpatient providers in implementing statewide.

Improving maternal health outcomes depends heavily on standardizing and implementing these levels of care statewide. Doing so supports healthcare providers and systems in delivering consistent, evidence-based care tailored to the needs of all pregnant and postpartum women, ultimately reducing preventable maternal morbidity and mortality. The following recommendations aim to strengthen the understanding of maternal levels of care across Virginia, ensuring that women are directed to the most appropriate facilities for their individual needs—thereby improving access to timely, specialized care and ultimately enhancing maternal health outcomes.

3. Virginia General Assembly

    a. We recommend that the Virginia General Assembly require all hospitals to participate in the Virginia Neonatal Perinatal Collaborative's survey of Levels of Maternal Care using the Center for Disease Control's (CDC) Levels of Care Assessment Tool (LOCATe) and that the information be publicly available.

4. Virginia Department of Health, Virginia Hospital and Healthcare Association and Virginia Neonatal Perinatal Collaborative

    a. We recommend that the Virginia Department of Health (VDH), Virginia Hospital and Healthcare Association (VHHA), and Virginia Neonatal Perinatal Collaborative (VNPC) collaborate with the payer systems, hospitals and professional societies in the Commonwealth with the goal for all hospitals to identify their CDC Level of Maternal Care using the CDC's Levels of Care Assessment Tool (LOCATe) and develop strategies to foster communication between obstetric caregivers and hospitals to assure that pregnant women have the opportunity to deliver in the location where their medical, obstetric, and social needs are best met. By prioritizing this, women with high-risk pregnancies are able to be provided with the specialized care required at appropriate facilities, effectively reducing the risk of severe complications and maternal mortality.

CARE COORDINATION

Effective care coordination is essential to ensuring that pregnant and postpartum women receive seamless, comprehensive care tailored to their unique medical and social needs. Maternal health often involves multiple providers and services, including obstetricians, primary care, mental health specialists, and social support systems. Without strong coordination, gaps in communication and follow-up can lead to delays in diagnosis, fragmented care, and poorer health outcomes.

Improving care coordination facilitates timely referrals, continuous monitoring, and collaborative decision-making, which are especially critical for women with high-risk pregnancies, chronic conditions, or behavioral health challenges. The following recommendations focus on enhancing care coordination efforts to bridge these gaps, promote integrated service delivery, and ensure that all women receive the right care, at the right time, from the right provider—ultimately improving maternal health outcomes across Virginia.

5. Virginia Hospital and Healthcare Association

    a. We recommend that the Virginia Hospital and Healthcare Association (VHHA), in partnership with the Virginia Association of Health Plans (VAHP) and the Department of Medical Assistance Services (DMAS), encourage healthcare systems and hospitals to provide care coordination for pregnant and post-partum patients following discharge from the hospital to ensure that the appropriate referrals are completed, and treatment plans are followed. Systems and processes should be in place to assist patients in making appointments for referrals. Additionally, providers should communicate the patient status/urgency, medical history and needs to the referred provider to ensure timely care. Funding and reimbursement should also be provided.

        i. Healthcare systems and hospitals should ensure the scheduling of follow-up or postpartum appointments for the patient either in person or via telemedicine.

        ii. The Virginia Hospital and Healthcare Association should evaluate the current postpartum care policies and protocols across hospitals and healthcare systems in the state. This evaluation should aim to identify best practices for conducting and documenting postpartum risk assessments and ensuring appropriate referrals prior to discharge. These referrals should include home visiting services and other community-based organizations that support birthing and postpartum individuals.

    b. We recommend that hospital systems and providers who see patients with multiple risk factors, including chronic conditions with a history of poor disease management, multiple stressors, history of trauma, mental illness or substance abuse, and/or socio-economic needs should provide referrals for services during the admission for delivery. These services should include but are not limited to home visiting, social work, postpartum doula, and care coordination/patient navigation services.

        i. Maternity support providers, such as community health workers, doulas, home visiting teams and payer care coordinators, should be encouraged to participate as key members of the hospital team with access to the facility and the postpartum patient (as well as their family/support system) prior to discharge from the hospital.

        ii. The Virginia Hospital and Healthcare Association and the Virginia Department of Health should collaboratively examine and address the workforce development needs for care coordinators among providers and within hospital systems across the state. This review should include identifying opportunities for funding and reimbursement to expand the care coordination workforce, including roles such as doulas, community health workers, and other qualified personnel, to enhance maternal care and improve health outcomes.

6. Virginia Association of Health Plans and Department of Medical Assistance Services

    a. We recommend that all public and private payer systems in the Commonwealth provide postpartum care coordination support for all high-risk postpartum discharges from hospitals, including education patients, providers and hospital systems on the availability of these services.

    b. We recommend that all payer systems encourage and incentivize the utilization of the Smartchart Network Program by all provider types for notifications of Emergency Room visits and deliveries by their patients.

    c. We recommend that all public and private payer systems provide behavioral health coordinators to assist individuals with mental health and substance use disorder diagnoses with family-based residential or outpatient treatment, as appropriate, and provide education on the treatment options available.

MENTAL HEALTH AND SUBSTANCE USE DISORDER SERVICES

Addressing mental health conditions and substance use disorders is crucial to preventing pregnancy-associated deaths and promoting the well-being of mothers and their families. Effective treatment systems must not only support the individual woman but also incorporate family-centered approaches that engage partners and children to foster a supportive recovery environment. Ensuring access to evidence-based residential and outpatient programs across all regions of the state is vital for comprehensive care. Additionally, improved monitoring and coordination of medication-assisted treatment are necessary to enhance patient adherence and outcomes. Robust prescription tracking can help providers identify and intervene when treatments are not followed as prescribed, reducing risks related to opioid use and other substance disorders.

The following recommendations focus on expanding and strengthening mental health and substance use disorder services through family-inclusive treatment programs, enhanced prescription monitoring, and integrated postpartum care to reduce maternal mortality related to these conditions.

7. Virginia General Assembly

    a. There is a need for mental health and substance misuse treatment systems that encourage seeking residential and outpatient treatment and include the entire family (including partners and spouses). The MMRT recommends that the General Assembly fund the development of at least one evidence-based residential program for families including partners and children within every health district in the state. These programs should be developed in partnership with relevant community stakeholders, including, but not limited to, the Department of Behavioral Health and Developmental Services (DBHDS), Community Service Boards (CSBs), community-based organizations (CBOs), and other relevant local or regional organizations.

    b. We recommend that the Virginia General Assembly require anyone who dispenses medication for an Opioid Treatment Program be required to report to the

Prescription Monitoring Program. There should also be a system in place through the Prescription Monitoring Program that will allow providers to see and follow up on prescriptions that are not being filled as prescribed. This is particularly important for medications used in medication-assisted addiction treatment.

8. The Virginia Association of Health Plans

    a. We recommend that the Virginia Association of Health Plans promote and incentivize integrating regular postnatal patient appointments into the existing pediatric appointments during the 365-day postpartum period. These appointments, conducted by either the pediatrician or an appropriate care extender such as a nurse or social worker, should include screenings for depression, substance use, suicidal ideation, and other high-risk behaviors, along with brief interventions and referrals to services as needed.

COMMUNITY OUTREACH, PUBLIC EDUCATION AND AWARENESS

Raising public awareness and fostering community engagement are essential strategies for preventing pregnancy-associated complications and deaths. Educating individuals about the safety and accessibility of life-saving interventions, such as opioid antagonists like Narcan, is particularly critical during pregnancy and the postpartum period when opioid-related risks are heightened. Expanding the availability of these medications in diverse community settings ensures timely access and can save lives. Beyond addressing opioid misuse, broad public health campaigns focused on maternal health risks and the importance of prenatal care empower families and communities to recognize urgent warning signs and seek care promptly.

The following recommendations aim to increase awareness of opioid antagonist safety and accessibility during pregnancy and postpartum, broaden their distribution in community settings, and strengthen public health messaging on maternal health. Together, these efforts will enhance access to life-saving treatments, promote early identification of maternal warning signs, and support greater engagement with prenatal and postpartum care services throughout Virginia.

9. Virginia Department of Health (VDH) and Community Services Boards (CSBs)

    a. We recommend that the Virginia Department of Health and Community Services Boards collaborate to increase public awareness of the safety of using of opioid antagonists, such as Narcan, in pregnancy and postpartum periods.

    b. Although opioid antagonists are available over the counter, it is still costly for most individuals. We recommend that the Virginia Department of Health work to increase the supply as well as accessibility and affordability of opioid antagonists throughout the Commonwealth. This can be done through providing opioid antagonists at Women, Infants, and Children program (WIC) clinics, pediatricians' offices, family planning clinics, Alcoholics Anonymous, Narcotics Anonymous and other self-help meetings, and other public and community settings such as post offices, libraries, fire and rescue departments and schools.

c. We recommend that the Virginia Department of Health should collaborate with community-based organizations to conduct public health campaigns to bring greater awareness to pregnancy and postpartum risks and health promoting practices with the goal of increasing community awareness and engagement. This should include public education and community discussions on the value of prenatal care and education on urgent maternal warning signs. The Virginia Department of Health should incorporate the community-targeted messaging highlighted in the Center for Disease Control's Hear Her Campaign into these efforts.

PROVIDER EDUCATION

Effective communication and engagement strategies are essential in addressing perinatal substance use, particularly for patients who decline referral to treatment services. Providing healthcare and community providers with comprehensive training in Motivational Interviewing and the Harm Reduction Model enhances their ability to support and motivate patients, facilitating improved outcomes. The following recommendation calls for a collaborative effort to provide this foundational training across relevant disciplines in Virginia.

10. Virginia Department of Health (VDH)

a. We recommend that the Virginia Department of Health collaborate with the Virginia Section of the American College of Obstetricians and Gynecologists, the Department of Behavioral Health and Developmental Services and Early Impact Virginia to provide medical providers, nurses, therapists, social workers, case managers, care coordinators and community health workers with foundational training in Motivational Interviewing and the Harm Reduction Model for perinatal substance use and addiction for the patient who declines referral to treatment services.

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CONCLUSION

In 2023, Virginia saw a notable decrease in the number of pregnancy-associated deaths from 67 in 2022 to 45. The number and rate of pregnancy-associated deaths for all manners of death decreased except for accidental causes of death. The rate of accidental deaths increased slightly from 12.6 (n=12) in 2022 to 14.0 (n=13) in 2023. The overall decrease in the number of pregnancy-associated deaths aligns with the decrease seen nationally for all causes of death, including a significant decrease in the number of deaths from COVID-19. Provisional data from the Centers for Disease Control and Prevention (CDC) indicate that, nationally, there were approximately 3.09 million deaths overall in 2023, down from 3.28 million in 2022. This represents a 6.1% decrease in the age-adjusted death rate[6].

Despite the reduction in the number and rate of pregnancy-associated deaths overall, significant disparities and concerning trends remain. The pregnancy-associated death rate decreased overall but continues to disproportionately affect certain populations—particularly Black and Other race women—who experience consistently higher rates of mortality across all manners of death.

Natural causes remained the leading manner of pregnancy-associated death, though they decreased from the previous year. Cardiac-related conditions were the most prevalent among these, especially among Black and Other race women, highlighting the ongoing need for early identification and management of cardiovascular risks in pregnant and postpartum individuals. Accidental deaths, driven entirely by drug overdoses—primarily involving fentanyl—have increased, with particularly high rates among Other race and Black women, indicating a persistent substance use crisis that requires culturally responsive intervention and support.

The data also underscores continued geographic disparities. The Southwest and Central Health Services Areas experienced the highest rates of pregnancy-associated death, with rural residents facing significantly higher mortality rates than their urban counterparts. These patterns suggest the ongoing influence of healthcare access and infrastructure, socioeconomic challenges, and systemic barriers in determining maternal outcomes.

The review of 2021 cases by the Maternal Mortality Review Team (MMRT) found that most deaths involved multiple contributing factors, particularly related to patient behaviors, healthcare provider actions, and systemic facility-level issues. Over 93% of reviewed deaths had patient-related contributors, and more than half had provider- or facility-related factors, pointing to missed opportunities for intervention at multiple levels of care.

A majority of 2021 cases were determined to be preventable (87%) while 43.5% were found to be pregnancy-related. Recommendations that emerged from the review of these cases centered around the development of a system of affordable, accessible and coordinated care that meets the care coordination, mental health and substance use and social determinants of health needs of women and their families and improves the health outcomes of pregnant and postpartum

[6] Murphy SL, Kochanek KD, Xu JQ, Arias E. Mortality in the United States, 2023. NCHS Data Brief, no 521. Hyattsville, MD: National Center for Health Statistics. 2024. DOI: https://dx.doi.org/10.15620/cdc/170564

women in the Commonwealth. Addressing pregnancy-associated deaths in Virginia requires a multifaceted approach focused on eliminating disparities, improving access to care—especially in rural regions—and enhancing provider adherence to evidence-based guidelines. Continued investment in data-driven, community-informed interventions will be essential to further reducing maternal mortality and improving the health and well-being of birthing people across the Commonwealth.

NEXT STEPS

In accordance with the Code of Virginia, § 32.1-283.8, the MMRT has begun the thorough review of 2022 pregnancy-associated deaths to determine the contributors to mortality, whether the death was preventable and the pregnancy-relatedness of the death. Additionally, the MMRT will continue to develop and disseminate recommendations for the prevention of future deaths with additional recommendations forthcoming in 2026.

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APPENDIX A – CODE OF VIRGINIA § 32.1-283.8

§ 32.1-283.8. Maternal Mortality Review Team; duties; membership; confidentiality; penalties; report; etc.

A. As used in this section, "maternal death" means the death of a woman who was pregnant at the time of death or within one year prior to the time of death, regardless of the outcome of the pregnancy, including any death determined to be a natural death, unnatural death, or violent death or for which no cause of death was determined.

B. There is hereby created the Maternal Mortality Review Team (the Team), which shall develop and implement procedures to ensure that certain maternal deaths occurring in the Commonwealth are analyzed in a systematic way. The Team shall review every maternal death in the Commonwealth. The Team shall not initiate a maternal death review until the conclusion of any law-enforcement investigation or criminal prosecution. The Team shall (i) develop and revise as necessary operating procedures for maternal death reviews, including identification of cases to be reviewed and procedures for coordinating among the agencies and professionals involved; (ii) improve the identification of and data collection and record keeping related to causes of maternal deaths; (iii) recommend components of programs to increase awareness and prevention of and education about maternal deaths; and (iv) recommend training to improve the review of maternal deaths. Such operating procedures shall be exempt from the Administrative Process Act (§ 2.2-4000 et seq.) pursuant to subdivision B 17 of § 2.2-4002.

C. The Team shall consist of the following persons or their designees: the Chief Medical Examiner, the Director of the Office of Family Health of the Department of Health, the State Registrar of Vital Records, and the Commissioner of Behavioral Health and Developmental Services. In addition, the Governor shall appoint one representative of each of the following entities: local law enforcement, local fire departments, local emergency medical services providers, local departments of social services, community services boards, attorneys for the Commonwealth, the Medical Society of Virginia, the Virginia Hospital and Healthcare Association, the Virginia College of Emergency Physicians, the Virginia Section of the American College of Obstetricians and Gynecologists, the Virginia Affiliate of the American College of Nurse-Midwives, the Virginia Chapter of the Association of Women's Health, Obstetric and Neonatal Nurses, the Virginia Neonatal Perinatal Collaborative, the Virginia Midwives Alliance, and the Virginia Academy of Nutrition and Dietetics. The Chief Medical Examiner and the Director of the Office of Family Health of the Department of Health shall serve as co-chairs of the Team and may appoint additional members of the Team as may be needed to complete maternal death reviews pursuant to this section.

After the initial staggering of terms, members other than the Chief Medical Examiner, the Director of the Office of Family Health of the Department of Health, the State Registrar of Vital Records, the Commissioner of Behavioral Health and Developmental Services, and the Director of the Department of Criminal Justice Services shall be appointed for a term of three years. Appointments to fill vacancies, other than by expiration of a term, shall be for the unexpired terms. Vacancies shall be filled in the same manner as the original appointments. All members may be reappointed. The Chief Medical Examiner, the Director of the Office of Family Health of the Department of

Health, the State Registrar of Vital Records, the Commissioner of Behavioral Health and Developmental Services, and the Director of the Department of Criminal Justice Services shall serve terms coincident with their terms of office.

D. Upon the request of the Chief Medical Examiner in his capacity as a co-chair of the Team, made after the conclusion of any law-enforcement investigation or prosecution, the Chief Medical Examiner or his designee may inspect and copy information and records regarding a maternal death, including (i) any report of the circumstances of the maternal death maintained by any state or local law-enforcement agency or medical examiner, and (ii) information or records about the woman maintained by any social services agency or court. Information, records, or reports maintained by any attorney for the Commonwealth shall be made available for inspection and copying by the Chief Medical Examiner or his designee pursuant to procedures that shall be developed by the Chief Medical Examiner and the Commonwealth's Attorneys' Services Council established by § 2.2-2617. Any presentence report prepared pursuant to § 19.2-299 for any person convicted of a crime that led to the death of the woman shall be made available for inspection and copying by the Chief Medical Examiner or his designee. In addition, the Chief Medical Examiner or his designee may inspect and copy from any health care provider in the Commonwealth, on behalf of the Team, (a) without obtaining consent, subject to any limitations on disclosure under applicable federal and state law, the health and mental health records of the woman and those prenatal medical records relating to any child born to the woman and (b) upon obtaining consent, from each adult regarding his records.

E. All information and records obtained or created by the Team or on behalf of the Team regarding a review shall be confidential and excluded from the Virginia Freedom of Information Act (§ 2.2-3700 et seq.) pursuant to subdivision 7 of § 2.2-3705.5. All such information and records shall be used by the Team only in the exercise of its proper purpose and function and shall not be disclosed. In preparing information and records for review by the Team, the Department shall remove any individually identifiable information or information identifying a health care provider, as those terms are defined in 45 C.F.R. § 160.103. Such information shall not be subject to subpoena, subpoena duces tecum, or discovery, be admissible in any civil or criminal proceeding, or be used as evidence in any disciplinary proceeding or regulatory or licensure action of the Department of Health Professions or any health regulatory board. If available from other sources, however, such information and records shall not be immune from subpoena, discovery, or introduction into evidence when obtained through such other sources solely because the information and records were presented to the Team during a maternal death review. The findings of the Team may be disclosed or published in statistical or other form, but shall not identify any individual. Upon conclusion of the maternal death review, all information and records concerning the woman and the woman's family shall be shredded or otherwise destroyed by the Office of the Chief Medical Examiner in order to ensure confidentiality.

The portions of meetings in which individual maternal deaths are discussed by the Team shall be closed pursuant to subdivision A 21 of § 2.2-3711. In addition to the requirements of § 2.2-3712, all Team members and other persons attending closed Team meetings, including any persons presenting information or records on specific maternal deaths to the Team during closed meetings, shall execute a sworn statement to (i) honor the confidentiality of the information, records, discussions, and opinions disclosed during meetings at which the Team reviews a specific maternal

death and (ii) not use any such information, records, discussions, or opinions disclosed during meetings at which the Team reviews a specific maternal death for any purpose other than the exercise of the proper purpose and function of the Team. Violations of this subsection are punishable as a Class 3 misdemeanor.

F. Upon notification of a maternal death, any state or local government agency maintaining records on the woman or the woman's family that are periodically purged shall retain such records for the longer of 12 months or until such time as the Team has completed its review of the case.

G. The Team shall compile annual statistical data, which shall be made available to the Governor and the General Assembly. Any statistical compilations prepared by the Team shall be public record and shall not contain any personal identifying information.

H. Members of the Team, as well as their agents and employees, shall be immune from civil liability for any act or omission made in connection with participation in a review by the Team, unless such act or omission was the result of gross negligence or willful misconduct. Any organization, institution, or person furnishing information, data, testimony, reports, or records to the Team as part of such review shall be immune from civil liability for any act or omission in furnishing such information, unless such act or omission was the result of gross negligence or willful misconduct.

APPENDIX B – GLOSSARY, ACRONYMS AND ABBREVIATIONS

This is a listing of the terms, acronyms and abbreviations appearing throughout the report and its appendices.

Accident – The manner of death used when there is no evidence of intent; and unintentional, sudden, and unexpected death.

AIM – Alliance for Innovation on Maternal Health

Cause of Death – The disease, injury, or poison that results in a physiological derangement or biochemical disturbance that is incompatible with life. The result of post-mortem examination, including autopsy and toxicological findings, combined with information about the medical history of the decedent, serves to establish the cause of death.

CDC – Centers for Disease Control

CSB – Community Services Boards

Fatal Agent – The means, fatal agency or item causing death, present at the time of injury or death. This is specific to homicides, suicides, and accidental deaths.

Homicide – The manner of death in which death results from the intentional harm of one person by another.

IQR – Hospital Inpatient Reporting Program

LOCATe – Levels of Care Assessment Tool

Manner of Death – The general category of the circumstances of the event which causes the death. The categories are accident, homicide, natural, suicide, and undetermined.

MMRT – Maternal Mortality Review Team

Natural – The manner of death used when a disease alone causes death. If death is hastened by an injury, the manner of death is not considered natural.

OCME – Office of the Chief Medical Examiner

OFHS – Office of Family Health Services

Other Vehicle (Driver/Passenger) Accidental Death – A death involving a vehicle other than a motor vehicle. This includes ATVs and other off-road vehicles. The decedent is usually a driver of, a passenger in, or a pedestrian who is struck by the other vehicle.

Pregnancy-Associated Death (PAD) – The death of a woman while pregnant or within one year of pregnancy regardless of the outcome of the pregnancy or the cause of death.

Pregnancy-Associated Death Rate – Calculated by dividing the number of pregnancy-associated deaths by the number of live births for the same time period and multiplying by 100,000. The rate provides the number of deaths for every 100,000 live births to women who were residents of the state at the time of their deaths. Rates for race, age, and Health Planning Region (HPR) are category specific. Rates for manner and cause of death are overall rates/100,000 live births.

Pregnancy-Related Death – The death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Preventable Death - A death that may have been averted by one or more reasonable changes in clinical care, facility infrastructure, community and/or patient factors. These determinations were made with the benefit of retrospective review and current clinical practice guidelines.

Suicide – The manner of death in which death results from the purposeful attempt to end one's life.

Undetermined – The manner of death for deaths in which there is insufficient information to assign another manner. An undetermined death may have an undetermined cause of death and an unknown manner, an undetermined cause of death and a known manner, or a determined cause of death and an unknown manner.

VDH – Virginia Department of Health

Virginia's Pregnancy-Associated Mortality Surveillance System (PAMSS) – This surveillance system allows for the identification and monitoring of patterns and trends related to pregnancy-associated deaths in Virginia, provides a snapshot of how, when and to whom these deaths occur, and helps inform policy decisions of public health importance.

VNPC – Virginia Neonatal Perinatal Collaborative

VVDRS – Virginia Violent Death Reporting System

WIC – Women, Infants, and Children Program

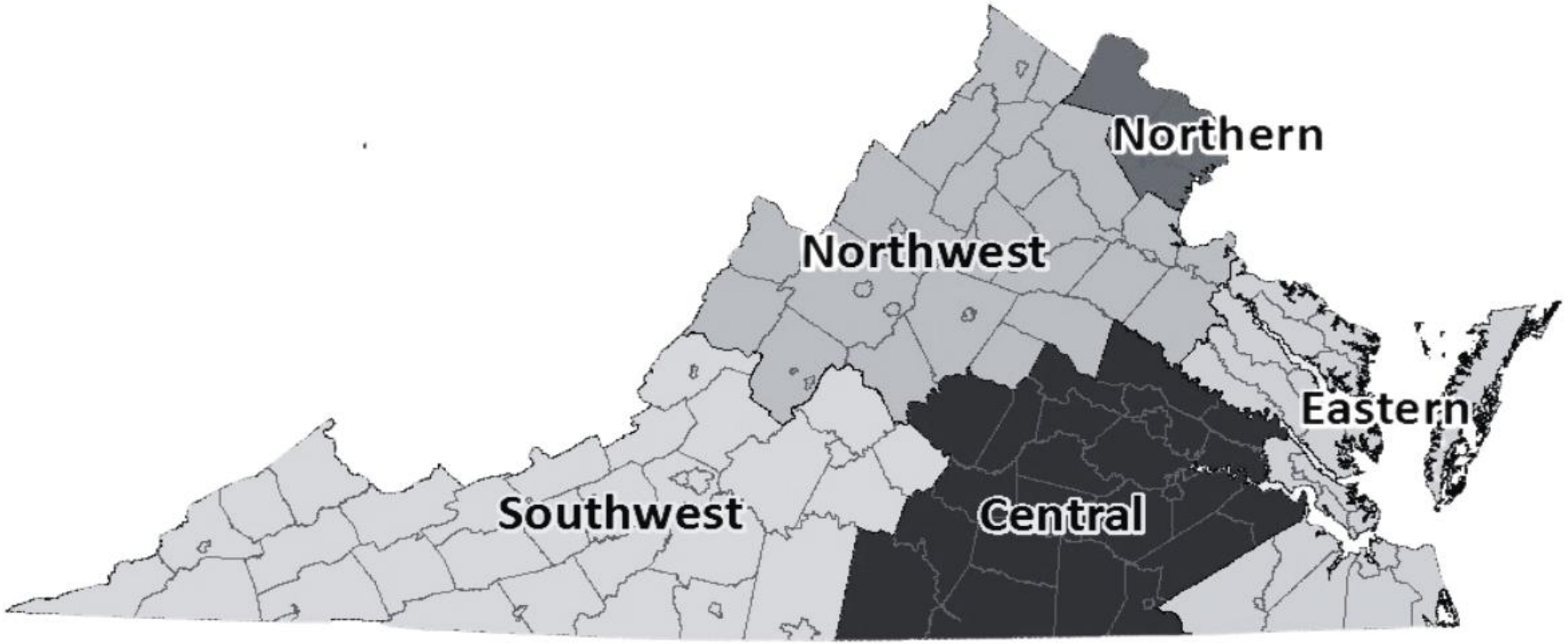
APPENDIX C – Contributors To Mortality Form

VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF THE CHIEF MEDICAL EXAMINER
MATERNAL MORTALITY REVIEW TEAM
CONTRIBUTORS TO MORTALITY

1. COMMUNITY STRUCTURE & SYSTEMS FACTORS	**Check if Yes**
a. Services unavailable (specify needed services such as case management, care coordination, transportation):	
b. Services inaccessible (due to. . .)	
c. Inadequate law enforcement response	
d. Inadequate legal protection	
e. Inadequate community outreach	
f. Neighborhood demographics/community environment	
g. Temporary Shelter – inaccessible or unavailable	
h. Accessible/Available/Affordable permanent housing	
i. Other (specify)	
2. PATIENT FACTORS	**Check if Yes**
a. (i) Delay or failure to seek care/services – medical care	
(ii) Delay or failure to seek care/services – legal protection/assistance	
(iii) Delay or failure to seek care/services – social services	
(iv) COVID related delay to seeking care	
b. Noncompliance	
c. Lack of knowledge regarding importance of event	
d. Lack of knowledge of treatment or follow-up	
e. Lack of access to birth control	
f. (i)Environmental Hazards – Work	
(ii) Environmental Hazards – Home	
(iii) Environmental Hazards – Other (ex. Interpersonal Relationships)	
g. Intimate partner violence	
h. (i) Incarceration - History of Incarceration	
(ii) Incarceration - Incarcerated at time of death	
i. Mental illness	
j. (i) Substance use – Alcohol, illicit drugs, prescription abuse	
(ii) Substance use – Tobacco, Vaping	
k. Intellectually delayed/Cognitive impairment	
l. History of brain injury	
m. (i) Chronic medical condition - Congenital	
(ii) Chronic medical condition - Acquired	
n. Obesity	
o. History of sexual abuse (specify time-period)	
p. History of trauma (specify time-period)	

q. Other history of violence	
o. Uninsured	
p. Lack of financial resources	
r. Unstable housing	
s. Isolation: Lack of family/friend support system	
t. Cultural/ Religious barriers (specify)	
u. Multiple stressors (specify)	
v. Multiple risk factors (specify)	
w. Active Military/Veteran (specify)	
x. Personal Association with Individuals with criminal/substance abuse history (describe relationship)	
y. Social isolation d/t COVID: societal & interpersonal level	
z. COVID diagnosis (timing)	
aa. COVID Vaccine declined	
ab. Other (specify)	
3. HEALTHCARE SYSTEMS/ORGANIZATIONAL FACTORS	**Check if Yes**
a. Inadequately trained personnel	
b. Inadequate or unavailable equipment/technology	
c. Policies contributed to delay or inadequate treatment	
d. Unavailable facilities	
e. Poor communications	
f. Unavailable or inadequate response by EMS	
g. Lack of continuity of care (ex. transferring from inpatient mental health care to outpatient care)	
h. Inadequate or unavailable personnel or services, including translation services (specify)	
i. COVID policies: limited support available	
j. Other (specify)	
4. HEALTHCARE PROFESSIONAL FACTORS	**Check if Yes**
a. Delay in or lack of diagnosis, treatment, or follow-up	
b. Use of ineffective treatment	
c. Misdiagnosis	
d. Failure to refer or seek consultation	
e. Lack of continuity of care	
f. Inadequate patient education	
g. Lack of communication between providers	
h. Inadequate preconception counseling	
i. Failure to screen for risk	
j. Inadequate assessment of risk	
k. Poor provider-patient communication	
l. Failure to utilize translation services with non-English speakers	
m. Failure to follow Evidence-Based Standards of Care	
n. Other (specify)	

APPENDIX D – VIRGINIA HEALTH SERVICES AREAS MAP



APPENDIX E – MATERNAL MORTALITY PROGRAMS CONTACT INFORMATION

For more information related to the Virginia Maternal Mortality Programs and Maternal Mortality Review Team, please contact:

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