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Karen Shelton, MD
State Health Commissioner

February 12, 2024

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: 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) 864-7002.

KS/AJ
Enclosure

Pc: The Honorable John Littel, Secretary of Health and Human Resources

VIRGINIA MATERNAL MORTALITY REVIEW TEAM ANNUAL REPORT

REPORT TO THE GOVERNOR AND THE
GENERAL ASSEMBLY

2023



VIRGINIA DEPARTMENT OF HEALTH



PREFACE

The Virginia Maternal Mortality Review Team (MMRT) is proud to present the 2023 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, 2023.

VIRGINIA MATERNAL MORTALITY REVIEW TEAM

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EXECUTIVE SUMMARY

The Virginia Maternal Mortality Review Team (MMRT) is proud to present the 2023 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, 2023. This report provides an overview of the patterns and trends in pregnancy-associated deaths in the state of Virginia in 2021. 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 Additionally, this report presents the MMRT determinations of preventability, pregnancy-relatedness, contributors to mortality, and recommendation themes for 2018² pregnancy-associated death cases. 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 Virginia Department of Health’s Office of Family Health Services and Office of the Chief Medical Examiner. Data highlights are listed below.

DATA HIGHLIGHTS

1. In the Commonwealth of Virginia, the number of pregnancy-associated deaths decreased from 82 in 2020 to 64 in 2021.
2. The pregnancy-associated death rate decreased from 86.6 per 100,000 in 2020 to 66.9 per 100,000 in 2021.
3. Approximately 33% of these deaths occurred between 43 days and 365 days after the end of the pregnancy.
4. Over 30% of pregnancy-associated deaths involved women ages 35 and older.
 - a. Pregnancies in birthing persons over the age of 35 are considered high-risk and account for 22.1% of all live births in 2021.
5. Black women continue to experience higher rates of pregnancy-associated deaths when compared to their White counterparts.
6. Black women were more likely to die from cancer and COVID-19 than other races.

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

² The last completed review cycle of pregnancy-associated death cases that the MMRT has reviewed is 2018. In September of 2022, the Office of the Chief Medical Examiner’s Division of Death prevention received a grant from the Centers for Disease Control and Prevention (CDC) to increase surveillance efforts and create a partnership with the Virginia Neonatal Perinatal Collaborative (VNPC) to further address maternal mortality in Virginia. One of the goals of the grant program is to improve the timeliness of pregnancy-associated death case review. As such, the MMRT moved to begin reviewing cases from 2021. Data from 2019 and 2020 cases will be abstracted and analyzed but will not undergo a full MMRT review.

7. Statistically, black women were significantly more likely to die by homicide than any other race ($p < .01$).
8. The rate of pregnancy-associated deaths by suicide decreased from 7.4 per 100,000 live births in 2020 to 3.1 per 100,000 live births in 2021.
9. Approximately 80% of pregnancy-associated accidental deaths were from accidental overdoses.
10. The rate of accidental overdoses decreased from 22.2 per 100,000 live births in 2020 to 11.5 per 100,000 live births in 2021.
11. The Northwestern Health Services Area had the highest rate of pregnancy-associated deaths at 101.1 per 100,000 live births, followed by the Eastern (85.3 per 100,000 live births) and Southwestern (82.7 per 100,000 live births) Health Services Area.
12. Pregnancy-associated death rates were consistently higher in urban areas versus rural areas.

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INTRODUCTION

MATERNAL MORTALITY REVIEW TEAM MANDATE

In accordance with the Code of Virginia, §32.1-283.8., the Maternal Mortality Review 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.” (Appendix A)

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 Virginia Department of Health (VDH), Office of the Chief Medical Examiner. Data from PAMSS are also used for the review of these deaths by the MMRT.

DATA COLLECTION AND PREPARATION

The data in this report reflect pregnancy-associated deaths that fall under the purview of the Virginia Maternal Mortality Review Team and are tracked using the Pregnancy-Associated Mortality Surveillance System. 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 categories: 1) examining the death certificate check box related to pregnancy status; 2) reviewing death certificate cause of death indicating death was 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, and 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.

STATISTICAL SUMMARY

Data are based upon Virginia residents who died 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. This is a standard classification method in the OCME and other VDH offices.
 - 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 statistical data for all pregnancy-associated deaths in 2021. Next, the report will present the statistical data for specific manners of pregnancy-associated deaths for 2021, namely natural deaths, accidents, homicides, and suicides. MMRT determinations of preventability, pregnancy-relatedness, and contributors to mortality for 2018³ pregnancy-associated death cases will then be presented followed by a discussion of the recommendation themes that emerged from the MMRT review of each 2018 case. The report will conclude with a summarization of the data presented and an outline of the next steps for the MMRT.

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³ The last completed review cycle of pregnancy-associated death cases that the MMRT has reviewed is 2018. In September of 2022, the Office of the Chief Medical Examiner’s Division of Death prevention received a grant from the Centers for Disease Control and Prevention (CDC) to increase surveillance efforts and create a partnership with the Virginia Neonatal Perinatal Collaborative (VNPC) to further address maternal mortality in Virginia. One of the goals of the grant program is to improve the timeliness of pregnancy-associated death case review. As such, the MMRT moved to begin reviewing cases from 2021. Data from 2019 and 2020 cases will be abstracted and analyzed but will not undergo a full MMRT review.

OVERVIEW OF MATERNAL MORTALITY PROJECTS

PREGNANCY-ASSOCIATED MORTALITY SURVEILLANCE SYSTEM

The Pregnancy-Associated Mortality Surveillance System (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 Maternal Mortality Review Team (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 Office of the Chief Medical Examiner (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. 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 Virginia Department of Health, Office of Family Health Services with Title V funds 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 in order 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. As one of the goals of the ERASE MM grant is to be timelier in the review of pregnancy-associated deaths, the Team is currently reviewing cases from 2021.

SECTION 1: TOTAL PREGNANCY-ASSOCIATED DEATHS (PAD)

In 2021, the total number of pregnancy-associated deaths decreased from 82 in 2020 to 64 in the state of Virginia. The overall pregnancy-associated death rate⁴ also decreased from 86.6 in 2020 to 66.9 deaths per 100,000 live births in 2021. Black women continue to have higher rates of pregnancy-associated deaths compared to their White counterparts. In 2021, the rate for Black women was just over two times the rate for White women at 113.8 vs. 54.8, respectively. Natural deaths accounted for 64.1% of all pregnancy-associated deaths (an increase from 51.2% in 2020). The proportion of accidental deaths declined from 28.0% in 2020 to 21.9% in 2021. The proportion of deaths from homicides and suicides also decreased in 2021 from 9.8% to 7.8% and 8.5% to 4.7% respectively. The Eastern Health Services Area had the highest proportion of deaths (29.7%) followed by the Northwest Health Services Area (23.4%). These two areas also had the highest rates of pregnancy-associated deaths at 85.3 and 101.1, respectively (see Table 1, Figure 2).

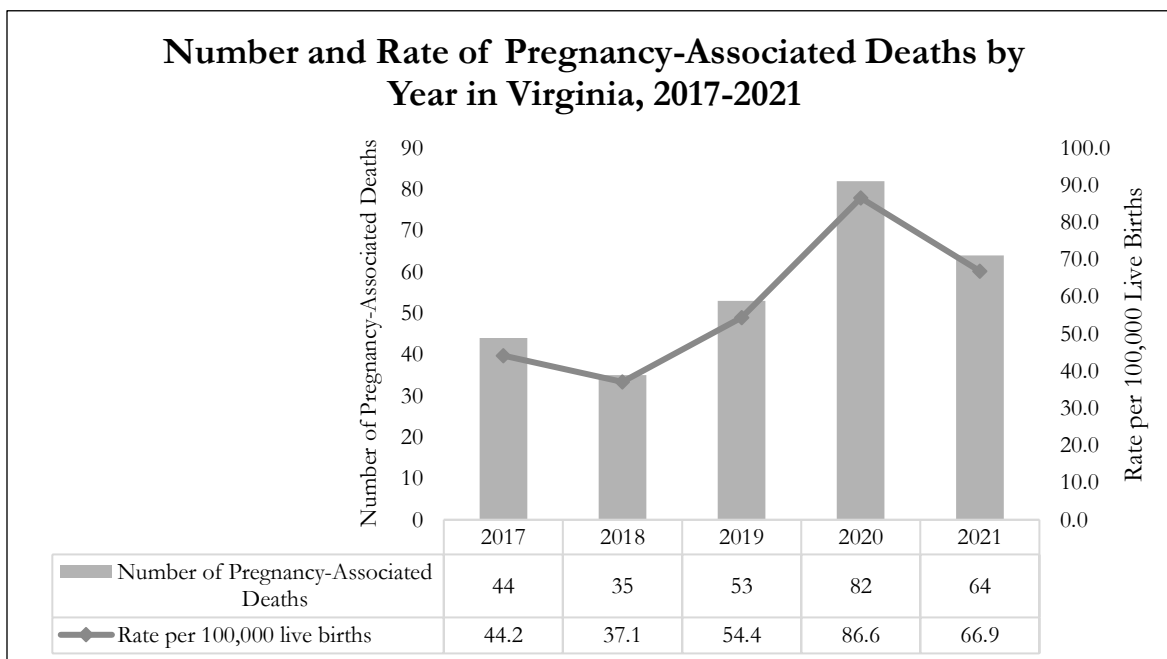


Figure 1: Number and Rate of Pregnancy-Associated Deaths by Year in Virginia, 2017-2021

⁴ 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.

	2021 (n=64)		
	No.	%	Rate ⁵
Manner			
Natural	41	64.1	42.9
Accidental	14	21.9	14.6
Homicide	5	7.8	5.2
Suicide	3	4.7	3.1
Undetermined	1	1.6	1.0
Race			
White	37	57.8	54.8
Black	23	35.9	113.8
Other	4	6.3	51.1
Age			
19 and under	0	0.0	0.0
20-24	10	15.6	67.1
25-29	18	28.1	70.4
30-34	16	25.0	52.0
35-39	11	17.2	64.1
40 and over	9	14.1	226.0
Education			
Less than High School	9	14.1	8.4
High School Diploma	35	54.7	36.6
More than High School	20	31.3	20.9
Interval Between End of Pregnancy and Death			
Pregnant at the time of death	20	31.3	20.9
0-42 days	23	35.9	24.1
43 days – 365 days	21	32.8	22.0
Health Services Area			
Central	11	17.2	63.4
Eastern	19	29.7	85.3
Northern	9	14.1	30.2
Northwest	15	23.4	101.1
Southwest	10	15.6	82.7
Rural vs. Urban			
Rural	18	28.1	18.8
Urban	46	71.9	48.1

Table 1: Pregnancy-Associated Deaths in Virginia, 2021: Selected Characteristics

⁵ Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

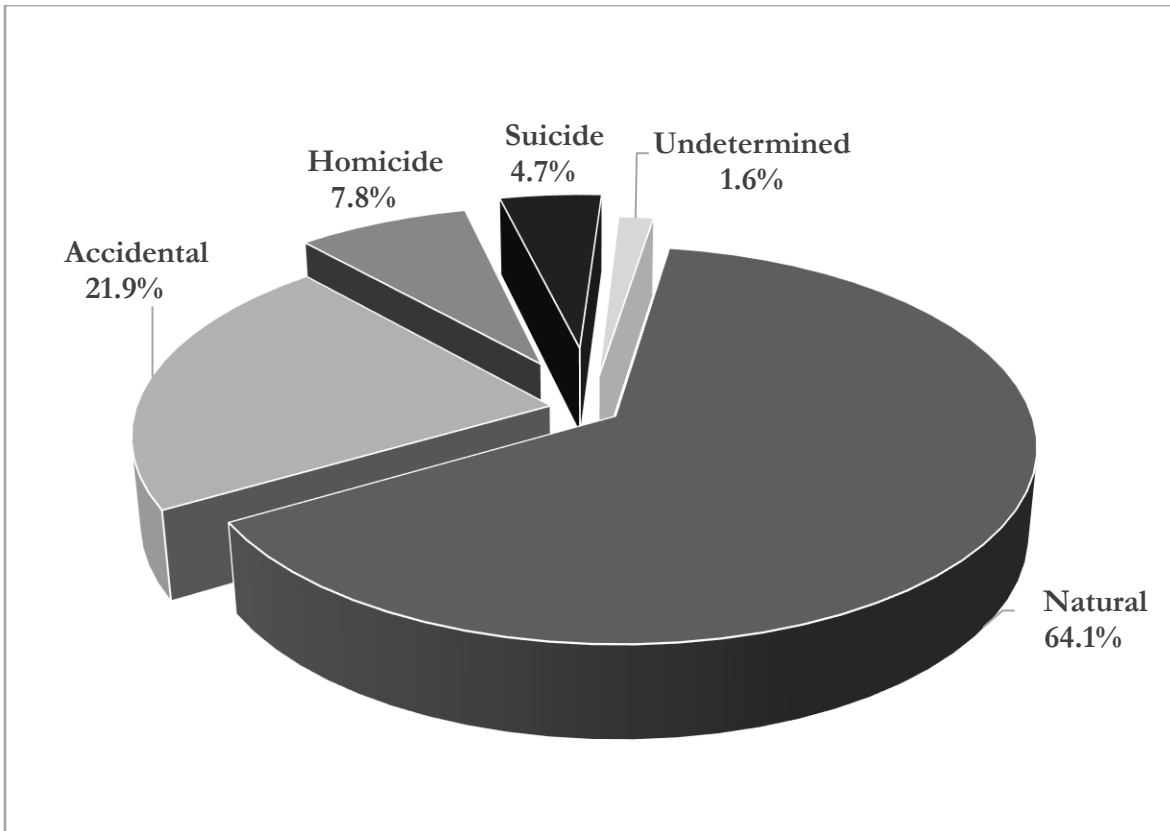


Figure 2: Percent of Pregnancy-Associated Deaths by Manner of Death, 2021

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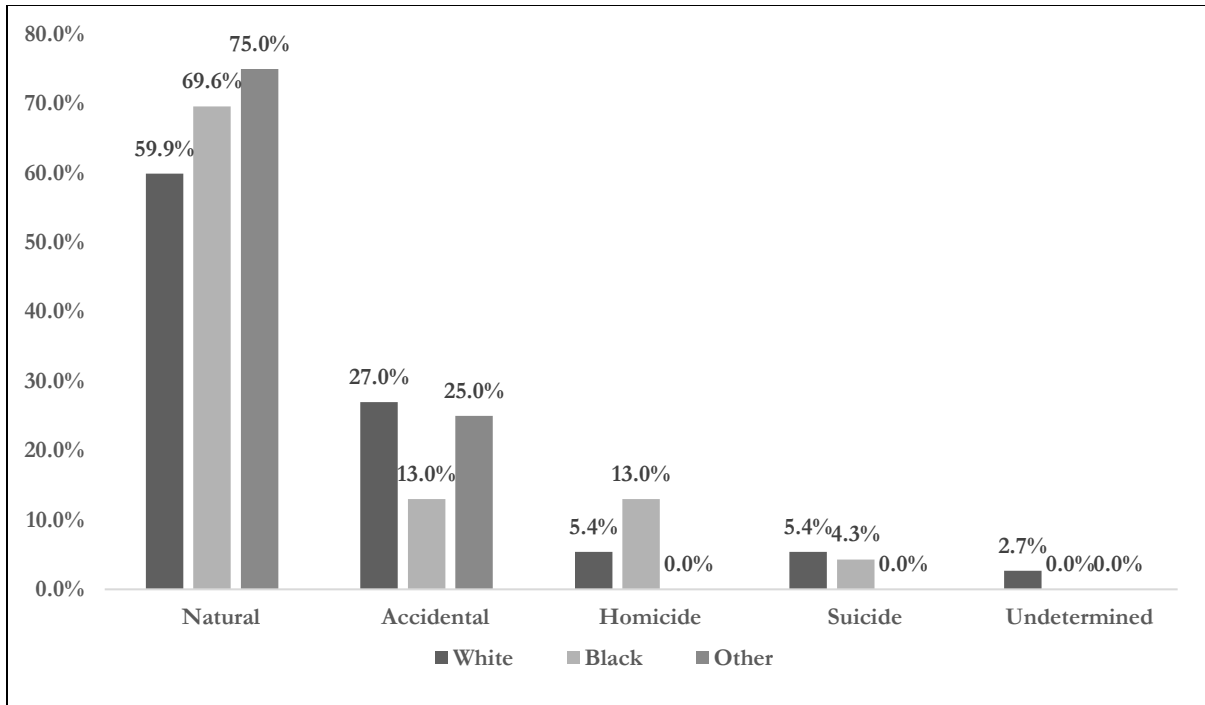


Figure 3: Manner of Pregnancy-Associated Deaths by Race, 2021

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SECTION 2: MANNERS OF DEATH

NATURAL DEATHS

The pregnancy-associated death rates for all natural deaths decreased slightly from 44.4 in 2020 to 42.9 in 2021. Cardiac related causes of death accounted for the largest proportion of natural deaths at 31.7% followed by deaths from other causes (17.1%). These other causes included diagnoses such as placental abruption, uterine perforation, and respiratory failure. Black women continue to have significantly higher rates of natural pregnancy-associated deaths when compared to their White counterparts (79.1 vs. 32.6, respectively, $p < .05$). Unlike previous years, there were no deaths caused by the exacerbation of chronic disease or hemorrhage among Black women. COVID-19 was listed as a cause of death for 12.2% of natural pregnancy-associated deaths. Black women had significantly higher rates of death from COVID-19 when compared to White women at 19.8 vs. 4.5, respectively ($p < .05$) (see Table 2).

Natural Pregnancy-Associated Deaths, 2021: Selected Characteristics

	White (n=22)			Black (n=16)			Other (n=3)			Total (n=41)		
Pregnancy-Associated Rate	32.6			79.1			38.3			42.9		
	No.	%	Rate ⁶	No.	%	Rate	No.	%	Rate	No.	%	Rate
Cause of Death												
Cancer	0	0.0%	0.0	2	12.5%	9.9	1	33.3%	12.8	3	7.3%	3.1
Cardiac	9	40.9%	13.3	3	18.8%	14.8	1	33.3%	12.8	13	31.7%	13.6
COVID-19	1	4.5%	1.5	4	25.0%	19.8	0	0.0%	0.0	5	12.2%	5.2
Exacerbation of Chronic Disease	4	18.2%	5.9	0	0.0%	0.0	0	0.0%	0.0	4	9.8%	4.2
Hemorrhage	2	9.1%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	4.9%	2.1
Infection	2	9.1%	3.0	2	12.5%	9.9	0	0.0%	0.0	4	9.8%	4.2
Pulmonary Embolism	2	9.1%	3.0	1	6.3%	4.9	0	0.0%	0.0	3	7.3%	3.1
Other cause of death	2	9.1%	3.0	4	25.0%	19.8	1	33.3%	12.8	7	17.1%	7.3
Age												
19 and under	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0

⁶ Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

	White (n=22)			Black (n=16)			Other (n=3)			Total (n=41)		
Pregnancy-Associated Rate	32.6			79.1			38.3			42.9		
	No.	%	Rate ⁶	No.	%	Rate	No.	%	Rate	No.	%	Rate
20-24	2	9.1%	19.9	3	18.8%	68.0	0	0.0%	0.0	5	12.2%	33.6
25-29	7	31.8%	38.7	3	18.8%	52.1	1	33.3%	57.7	11	26.8%	43.0
30-34	6	27.3%	26.9	3	18.8%	56.3	1	33.3%	31.7	10	24.4%	32.5
35-39	2	9.1%	16.3	4	25.0%	138.4	1	33.3%	49.9	7	17.1%	40.8
40 and over	5	22.7%	183.2	3	18.8%	388.6	0	0.0%	0.0	8	19.5%	200.9
Education												
Less than High School	0	0.0%	0.0	5	31.3%	24.7	1	33.3%	12.8	6	14.6%	6.3
High School Diploma	14	63.6%	20.7	7	43.8%	34.6	1	33.3%	12.8	22	53.7%	23.0
More than High School	8	36.4%	11.8	4	25.0%	19.8	1	33.3%	12.8	13	31.7%	13.6
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	10	45.5%	14.8	5	31.3%	24.7	0	0.0%	0.0	15	36.6%	15.7
0-42 days	8	36.4%	11.8	9	56.3%	44.5	1	33.3%	12.8	18	43.9%	18.8
43 days – 365 days	4	18.2%	5.9	2	12.5%	9.9	2	67.7%	25.5	8	19.5%	8.4
Health Services Area												
Central	1	4.5%	10.3	5	31.3%	95.0	0	0.0%	0.0	6	14.6%	36.1
Eastern	4	18.2%	32.6	8	50.0%	102.9	1	33.3%	44.6	13	31.7%	58.4
Northern	5	22.7%	30.9	0	0.0%	0.0	1	33.3%	10.0	6	14.6%	20.1
Northwest	8	36.4%	69.3	2	12.5%	106.3	1	33.3%	70.7	11	26.8%	74.1
Southwest	4	18.2%	40.0	1	6.3%	60.0	0	0.0%	0.0	5	12.2%	41.4
Rural vs. Urban												
Rural	6	27.3%	8.9	3	18.8%	14.8	1	33.3%	12.8	10	24.4%	10.5
Urban	16	72.7%	23.7	13	81.2%	64.3	2	67.7%	25.5	31	75.6%	32.4

Table 2: Natural Pregnancy-Associated Deaths, 2021: Selected Characteristics

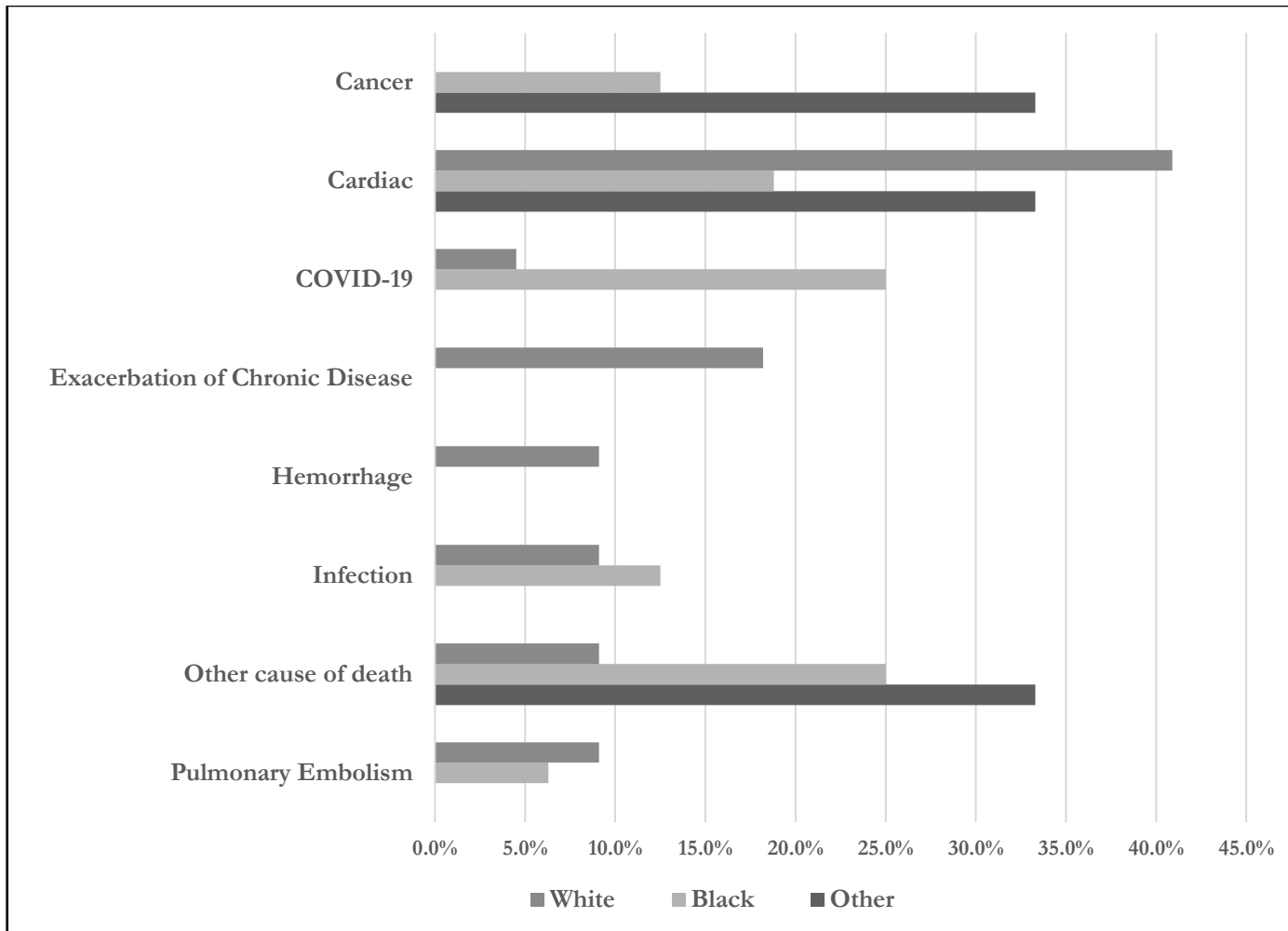


Figure 4: Natural Causes of Death by Race

ACCIDENTAL DEATHS

The pregnancy-associated death rate for accidental causes decreased from 24.3 in 2020 to 14.6 in 2021. Nearly 79% of these deaths were from accidental overdoses. In 2021, there were 11 total pregnancy-associated deaths caused by accidental overdoses. The

pregnancy-associated death rate from accidental overdoses was slightly higher among White women when compared to Black women (11.8 vs. 9.9, respectively). The Southwestern Health Services Area had the highest proportion of accidental deaths at 28.6% followed by the Eastern and Northwestern Health Services Areas at 21.4%. The highest rates of accidental death occurred in the Southwestern and Northwestern Health Services Areas at 33.1 and 20.2, respectively (see Table 3).

Accidental Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

	White (n=10)			Black (n=3)			Other (n=1)			Total (n=14)		
Pregnancy-Associated Rate	14.8			14.8			12.8			14.6		
	No.	%	Rate ⁷	No.	%	Rate	No.	%	Ratio*	No.	%	Rate
Fatal Agent												
Fire	1	10.0%	1.5	1	33.3%	4.9	0	0.0%	0.0	2	14.3%	2.1
Other Vehicle (Driver/Passenger) Accident	1	10.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	7.1%	1.0
Poison	8	80.0%	11.8	2	66.7%	9.9	1	100.0%	12.8	11	78.6%	11.5
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	3	30.0%	29.8	1	33.3%	22.7	0	0.0%	0.0	4	28.6%	26.8
25-29	2	20.0%	11.1	1	33.3%	17.4	0	0.0%	0.0	3	21.4%	11.7
30-34	1	10.0%	4.5	1	33.3%	18.8	0	0.0%	0.0	2	14.3%	6.5
35-39	3	30.0%	24.5	0	0.0%	0.0	1	100.0%	49.9	4	28.6%	23.3
40 and over	1	10.0%	36.6	0	0.0%	0.0	0	0.0%	0.0	1	7.1%	25.1
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	6	60.0%	8.9	3	100.0%	14.8	1	100.0%	12.8	10	71.4%	10.5
More than High School	4	40.0%	5.9	0	0.0%	0.0	0	0.0%	0.0	4	28.6%	4.2
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	4	40.0%	5.9	0	0.0%	0.0	0	0.0%	0.0	4	28.6%	4.2
0-42 days	2	20.0%	3.0	1	33.3%	4.9	1	100.0%	12.8	4	28.6%	4.2

⁷ Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

	White (n=10)			Black (n=3)			Other (n=1)			Total (n=14)		
Pregnancy-Associated Rate	14.8			14.8			12.8			14.6		
	No.	%	Rate ⁷	No.	%	Rate	No.	%	Ratio*	No.	%	Rate
43 days – 365 days	4	40.0%	5.9	2	66.7%	9.9	0	0.0%	0.0	6	42.9%	6.3
Health Services Area												
Central	1	10.0%	10.3	1	33.3%	19.0	0	0.0%	0.0	2	14.3%	12.0
Eastern	3	30.0%	24.5	0	0.0%	0.0	0	0.0%	0.0	3	21.4%	13.5
Northern	1	10.0%	6.2	0	0.0%	0.0	1	100.0%	10.0	2	14.3%	6.7
Northwestern	2	20.0%	8.7	1	33.3%	53.1	0	0.0%	0.0	3	21.4%	20.2
Southwestern	3	30.0%	30.0	1	33.3%	60.0	0	0.0%	0.0	4	28.6%	33.1
Rural vs. Urban												
Rural	5	50.0%	7.4	1	33.3%	4.9	0	0.0%	0.0	6	42.9%	6.3
Urban	5	50.0%	7.4	2	66.7%	9.9	1	100.0%	12.8	8	57.1%	8.4

Table 3: Accidental Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

HOMICIDES

The rate of pregnancy-associated deaths caused by homicides decreased from 8.5 in 2020 to 5.2 in 2021. The rate of homicide deaths among Black women continues to be significantly higher than the rate among White women (14.8 vs. 3.9, respectively, $p < .05$). Homicide deaths were most prevalent among those aged 25 to 34. The fatal agent most often used was firearms (60.0%). Homicides occurred in all Health Services Areas with the exception of the Southwestern Health Services Area. The Central Area had the highest rate of homicides at 12.0 (see Table 4).

Homicide Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

	White (n=2)			Black (n=3)			Other (n=0)			Total (n=5)		
Pregnancy-Associated Rate	3.9			14.8			0.0			5.2		
	No.	%	Rate ⁸	No.	%	Rate	No.	%	Rate	No.	%	Rate
Cause of Death												
Firearm	0	0.0%	0.0	3	100.0%	14.8	0	0.0%	0.0	3	60.0%	3.1

⁸ Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

	White (n=2)			Black (n=3)			Other (n=0)			Total (n=5)		
Pregnancy-Associated Rate	3.9			14.8			0.0			5.2		
	No.	%	Rate ⁸	No.	%	Rate	No.	%	Rate	No.	%	Rate
Sharp Instrument	2	100.0%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	40.0%	2.1
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	50.0%	5.5	2	66.7%	34.7	0	0.0%	0.0	3	60.0%	11.7
30-34	1	50.0%	4.5	1	33.3%	18.8	0	0.0%	0.0	2	40.0%	6.5
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	2	66.7%	9.9	0	0.0%	0.0	2	40.0%	2.1
High School Diploma	0	0.0%	1.0	1	33.3%	4.9	0	0.0%	0.0	1	20.0%	1.0
More than High School	2	100.0%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	40.0%	2.1
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	1	50.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	20.0%	1.0
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	50.0%	1.5	3	100.0%	14.8	0	0.0%	0.0	4	80.0%	4.2
Health Services Area												
Central	0	0.0%	0.0	2	66.7%	38.0	0	0.0%	0.0	2	40.0%	12.0
Eastern	0	0.0%	0.0	1	33.3%	12.9	0	0.0%	0.0	1	20.0%	4.5
Northern	1	50.0%	6.2	0	0.0%	0.0	0	0.0%	0.0	1	20.0%	3.4
Northwestern	1	50.0%	8.7	0	0.0%	0.0	0	0.0%	0.0	1	20.0%	6.7
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	1	50.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	20.0%	1.0
Urban	1	50.0%	1.5	3	100.0%	14.8	0	0.0%	0.0	4	80.0%	4.2

Table 4: Homicide Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

SUICIDES

In 2021, the pregnancy-associated death rate from suicides decreased from 7.4 in 2020 to 3.1 in 2021. This increase was most pronounced amongst White decedents. Suicides were more likely to occur 43 to 365 days past the end of pregnancy among women ages 20-34. The fatal agent used in each of these cases was a firearm. The Eastern and Central Health Services Area had the highest rates of death by suicide at 9.0 and 6.0, respectively (See Table 5).

Suicide Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

	White (n=2)			Black (n=1)			Other (n=0)			Total (n=3)		
Pregnancy-Associated Rate	3.0			4.9			0.0			3.1		
	No.	%	Rate ⁹	No.	%	Rate	No.	%	Rate	No.	%	Rate
Cause of Death												
Firearm	2	100.0%	3.0	1	100.0%	4.9	0	0.0%	0.0	3	100.0%	3.1
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	1	50.0%	9.9	0	0.0%	0.0	0	0.0%	0.0	1	33.3%	6.7
25-29	0	0.0%	0.0	1	100.0%	17.4	0	0.0%	0.0	1	33.3%	3.9
30-34	1	50.0%	4.5	0	0.0%	0.0	0	0.0%	0.0	1	33.3%	3.2
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	1	50.0%	1.5	1	100.0%	4.9	0	0.0%	0.0	2	66.7%	2.1
More than High School	1	50.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	33.3%	1.0
Interval Between End of Pregnancy and Death												
Pregnant at the time of death	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
0-42 days	1	50.0%	1.5	0	0.0%	0.0	0	0.0%	0.0	1	33.3%	1.0
43 days – 365 days	1	50.0%	1.5	1	100.0%	4.9	0	0.0%	0.0	2	66.7%	2.1

⁹ Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

	White (n=2)			Black (n=1)			Other (n=0)			Total (n=3)		
Pregnancy-Associated Rate	3.0			4.9			0.0			3.1		
	No.	%	Rate ⁹	No.	%	Rate	No.	%	Rate	No.	%	Rate
Health Services Area												
Central	1	50.0%	10.3	0	0.0%	0.0	0	0.0%	0.0	1	33.3%	6.0
Eastern	1	50.0%	8.2	1	100.0%	12.9	0	0.0%	0.0	2	66.7%	9.0
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	1	100.0%	4.9	0	0.0%	0.0	1	33.3%	1.0
Urban	2	100.0%	3.0	0	0.0%	0.0	0	0.0%	0.0	2	66.7%	2.1

Table 5: Suicide Pregnancy-Associated Mortality in Virginia, 2021: Selected Characteristics

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SECTION 3: PREVENTABILITY, PREGNANCY-RELATEDNESS AND CONTRIBUTORS TO MORTALITY FROM 2018 PAD CASE REVIEW

All pregnancy-associated deaths from 2018 have been reviewed by the Team. 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 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. The Team also assesses and/or recommends needed changes in the care received that may have led to better outcomes. The Team then uses consensus decision making to determine whether the death was preventable and/or related to the pregnancy. This section will outline the contributors to mortality, preventability, pregnancy-relatedness and recommendation themes determined from the review of 2018 cases, the last year of finalized cases reviewed by the MMRT.

CONTRIBUTORS TO MORTALITY

The review of 2018 cases uncovered that 28.6% of all pregnancy-associated deaths had at least one facility-related factor contribute to the death (see Figure 5). Facility-related factors refer to the individual facility’s infrastructure, policies, and the availability of personnel, equipment, and technology. The most prevalent type of facility-related factors from 2018 cases were present include “inadequately trained personnel” (15.4%) and “unavailable services” (15.4%) (see Appendix C for the full list of contributors assessed in each case).

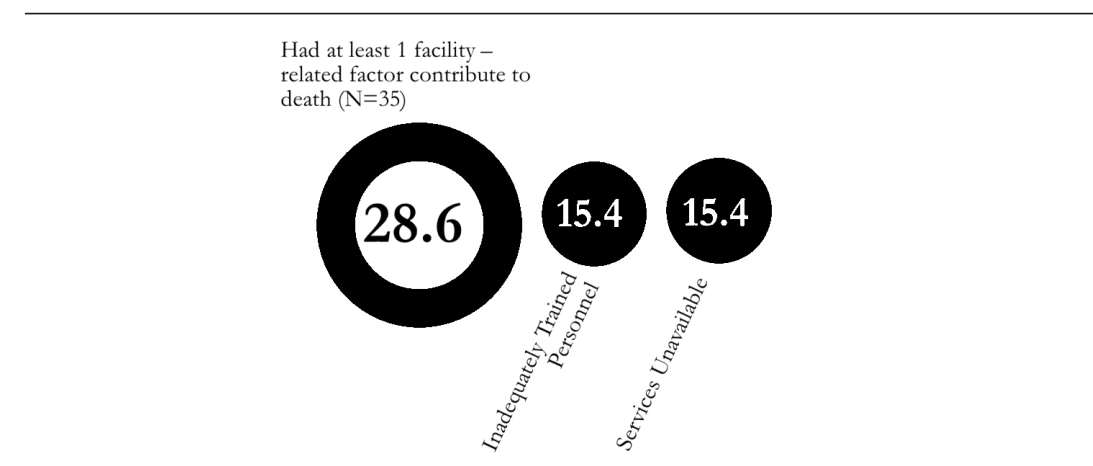


Figure 5: Percent of Women with a Facility-Related Factor Contributing to Their Death, 2018

Community-related factors involve the availability and accessibility of services in the community, law enforcement response, community outreach and availability of subsidized care. Nearly 23% of all PADs had a community-related factor contribute to the death in 2018 (See Figure 6). Among those with a community-related factor, the most prevalent factors included “neighborhood or community environment” (60.0%) and “services unavailable” (20.0%).

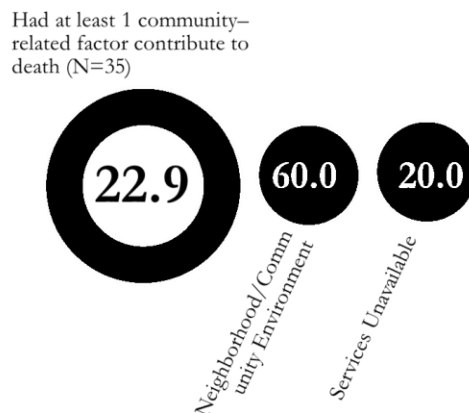


Figure 6: Percent of Women with a Community-Related Factor Contributing to Their Death, 2018

Over 54% 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 individual birthing persons. Among those with at least one provider related contributor to mortality, the most prevalent included “failure to screen for risk” (15.9%), “inadequate assessment of risk” (12.7%), and “delay in or lack of diagnosis, treatment or follow-up” (11.1%).

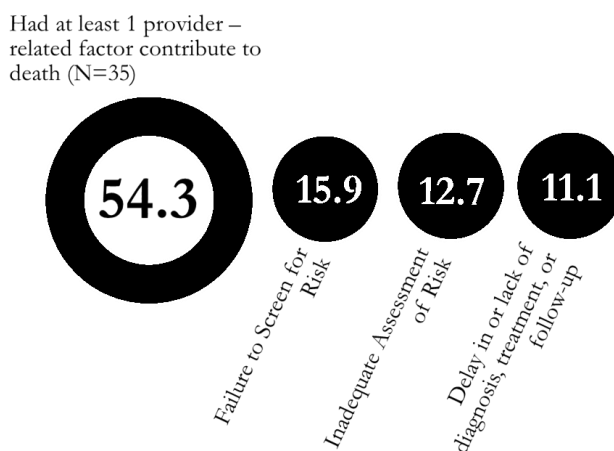


Figure 7: Percent of Women with Provider-Related Factor Contributing to Their Death, 2018

All cases from 2018 had at least 1 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. When present, the most prevalent patient-related

factors were “delay or failure to seek care – medical services” (12.2%), “chronic medical conditions” (7.8%), “noncompliance” (7.2%), and “mental illness” (6.7%).

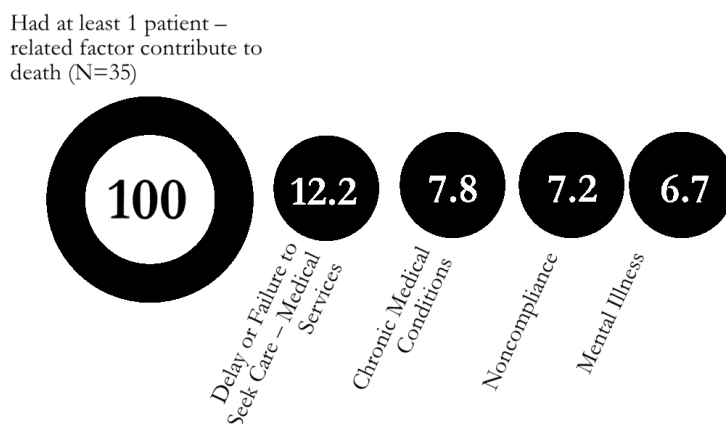


Figure 8: Percent of Women with a Patient-Related Factor Contributing to Their Death, 2018

PREVENTABILITY AND PREGNANCY-RELATEDNESS

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 MMRT determined that nearly 83% of all pregnancy-associated deaths in 2018 (n=35) were found to be preventable. Ninety percent of cases among White women were found to be preventable as compared to 70% of cases among Black women and 80% among women of other races. Only 6 cases (17.1%) from 2018 were determined to pregnancy-related. Half of the pregnancy-related deaths occurred among White women and the other half among Black women. The overall pregnancy-related death rate for 2018 was 6.0. The rates for Black women (14.3) were nearly 3 times the rate for White women (4.9). The MMRT was unable to determine pregnancy-relatedness for 37.1% of all 2018 cases¹⁰. A majority of pregnancy-related deaths (66.7%) occurred from 0 to 42 days after delivery or the end of the pregnancy.

RECOMMENDATION THEMES

As a part of each case review, the Team also assesses and/or recommends needed changes in the care received that may have led to better outcomes. Recommendation themes that emerged from the review of 2018 (n=35) and 2021 (the Team is still reviewing 2021 cases, n=64)¹¹ cases include, the need for public outreach, awareness and/or educational campaigns related to substance abuse, the need for regular screenings and risk assessments through the pregnancy and post-partum period, and the need for providers to make the appropriate referrals for birthing persons with a

¹⁰Based on the information and records available for review, the death that could not be conclusively classified as either related or not related to the pregnancy.

¹¹ The MMRT is currently reviewing 2021 cases. Themes from cases that have already been reviewed will be included in this report. A full analysis of contributors, recommendation themes and the development of formal recommendations will occur at the completion of the 2021 case reviews.

history of chronic conditions, mental illness, and chronic substance abuse. Additionally, the team made recommendations on the need for improved coordination of care within and between health systems and violence reduction strategies. See Figure 7 for example recommendations made in individual cases. The analysis of recommendation themes is the first step in the MMRT process for developing formal recommendations that are targeted towards specific agencies and/or organizations. Once the Team crafts the formal recommendations, they are then vetted by the intended audience for the recommendation. The MMRT is working to finalize and vet the formal recommendations for 2018 and 2021. A report with these recommendations will be forthcoming, estimated to be published by the Fall of 2024.

Recommendation Themes and Example Recommendations for the Prevention of Pregnancy-Associated Deaths

Recommendation Theme:

Public outreach/awareness/education campaigns related to substance abuse

Examples:

1. Education and outreach to reduce the stigma related to substance abuse and pregnancy must be done to encourage birthing persons to seek treatment and care during and after pregnancy.
2. Education should be provided on the importance of annual physicals, having a medical model home and insurance coverage, as it increases the opportunity for substance use screening and health education.

Regular Screenings and Risk Assessment

1. For birthing persons with a history of trauma and high-risk profile, providers should conduct regular screenings for depression throughout care.
2. For pregnant and post-partum birthing persons that have a known history of substance abuse, drug screenings should be performed on admission to the hospital.
3. Providers should conduct risk assessments and social determinants of health assessments at the initiation of treatment and then refer to the appropriate services, including home visiting and doula services.

Recommendation Themes and Example Recommendations for the Prevention of Pregnancy-Associated Deaths	
Recommendation Theme:	Examples:
<i>Making the Appropriate Referrals</i>	<ol style="list-style-type: none"> 1. Providers should consult with social work, as appropriate, for pregnancy and post-partum birthing persons that exhibit multiple stressors and have a history of trauma and chronic substance abuse. 2. Appropriate referrals should be provided for birthing persons with chronic conditions and history of poor disease management,
<i>Coordination of Care</i>	<ol style="list-style-type: none"> 1. Health care systems should provide care coordination for pregnant and post-partum birthing persons following discharge from the hospital to ensure that the appropriate referrals are completed and treatment plans followed. 2. Care coordination that address the barriers created by multiple stressors for the birthing person is essential in helping them to seek the appropriate care and treatment. Education on the care coordination services available and contact information should be included in the medical record or readily available with the birthing persons insurance information.
<i>Violence Reduction</i>	<ol style="list-style-type: none"> 1. Consistent advocacy across the state is needed so that all women are protected. More of a connection to an actual person for resources is necessary. Efforts could include assigning a case-worker to follow-up for each protective order granted.

Table 6: Recommendation Themes and Example Recommendations for the Prevention of Pregnancy-Associated Deaths

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CONCLUSION

Analysis of the Virginia Pregnancy Associated Mortality Surveillance System data for 2021 reveals that the pregnancy-associated death rate in Virginia has decreased, from 86.6 in 2020 to 66.9 in 2021. Just over 64% of these deaths were natural deaths representing an increase from 51.2% in 2020. Accidental deaths accounted for nearly 22% of deaths in 2021, a decrease from 28% in 2020. The proportion of deaths from suicide and homicide also decreased in 2021. Overall, the pregnancy-associated death rates for all manners of pregnancy-associated deaths declined in 2021.

Significant racial disparities continue to be identified among pregnancy-associated deaths in the Commonwealth of Virginia. Overall, in 2021, Black women had higher rates of pregnancy-associated deaths when compared to their White counterparts (113.8 vs. 54.8, respectively). This disparity is most pronounced when looking specifically at cases with homicide and natural causes of deaths. For natural causes of death, Black women had rates of death 2.4 times higher than their White counterparts (32.6 vs. 79.1, respectively). For homicides, Black women had rates of death over three times higher than their White counterparts (14.8 vs. 3.0, respectively). A different pattern is seen, however, when focusing on accidental and suicide causes of deaths. For accidental causes of death, White and Black women were found to have similar rates of death at 14.8. It is important to note that nearly 80% of all accidental pregnancy-associated deaths were caused by fatal drug overdoses. Among suicides, Black women had a slightly higher rate of death compared to their White counterparts, 4.9 vs. 3.0¹².

Analysis of the various causes of natural deaths reveal additional differences by race. Approximately 64% of the pregnancy-associated deaths in 2021 were from natural causes. Over half of the natural deaths were caused by cardiac conditions, COVID-19, pulmonary embolism, or cancer. Black women had a slightly higher rate of death caused by cardiac conditions compared to their White counterparts. While White women had a higher rate of death caused by hemorrhage and the exacerbation of a chronic disease when compared to their Black counterparts, other race women were found to have the highest rate of deaths from cancer when compared to White and Black women.

The MMRT review of 2018 cases revealed several community-, patient-, provider-, and facility/system-related contributors to mortality in these cases. All cases had at least one patient-related factor. Over 54% of cases were found to have at least one provider related factor. While community-related and facility-related contributors were identified in 22.9% and 28.6% of cases, respectively. A vast majority of 2018 cases were determined to be preventable (83%) while only 17.1% were found to be pregnancy-related. Recommendation themes that emerged from the review of these cases centered around the need for public outreach, awareness and/or educational campaigns related to substance abuse, the need for regular screenings and risk assessments, and the need for providers to make the appropriate referrals for birthing persons with a history of chronic conditions, mental illness, and chronic substance abuse. Additional recommendation

¹² Rates calculated from small case amounts (< 5) are considered unreliable and should be interpreted with caution.

themes included the need for improved coordination of care within and between health systems and violence reduction strategies.

NEXT STEPS

In accordance with the Code of Virginia, § 32.1-283.8., the Virginia Maternal Mortality Review Team will continue to conduct thorough reviews of 2021 pregnancy-associated deaths to determine the contributors to mortality, whether the death was preventable and the pregnancy-relatedness of the death. Additionally, the Team will develop and disseminate recommendations for the prevention of future deaths. Formal recommendations based on the review of 2018 and 2021 cases will be forthcoming, estimated to be in Fall of 2024.

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.

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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.

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

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.

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

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.

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.

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.

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.

VDH – Virginia Department of Health

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APPENDIX C – CONTRIBUTORS TO MORTALITY FORM

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

<u>1. COMMUNITY STRUCTURE & SYSTEMS FACTORS</u>	<u>Check if Yes</u>
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)	
<u>2. PATIENT FACTORS</u>	<u>Check if Yes</u>
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	<u>Check if Yes</u>
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	<u>Check if Yes</u>
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)	