

Office of the Chief Medical Examiner

Ten Year Trends in Pregnancy-Associated Death in Virginia

Virginia Pregnancy-Associated Mortality Surveillance System

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Publication Date: January, 2016
<http://www.vdh.virginia.gov/medExam/pamss/index.htm>

2004-2013

Introduction

This brief report provides a ten year overview of the patterns and trends in pregnancy-associated deaths in the state of Virginia from 2004 to 2013. 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

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.

Highlights: See the attached figures and table for data supporting the following conclusions.

- Overall, there were a total of 462 pregnancy-associated deaths among Virginia residents between 2004 and 2013.
- The number of deaths and rate of deaths per 100,000 live births varied from year to year with **no clear pattern suggesting a clear increase or decrease**. The highest number of pregnancy-associated deaths for this 10-year period occurred in 2008 (64 deaths).
- A majority of the pregnancy-associated deaths (54.8%) occurred 43 or more days after the pregnancy ended.
- The pregnancy-associated death rate for African American women (80.7) between 2004 and 2013 was significantly higher than the rate for their White counterparts (35.3).
- The Central Health Planning Region had the highest pregnancy-associated death rate (63.3), followed by the Southwest Health Planning Region (62.4).
- Over 18 percent of pregnancy-associated deaths involved women ages 35 and older. Pregnancies at these ages are considered high risk.
- More than half of the pregnancy-associated deaths between 2004 and 2013, 53%, were due to natural causes. Natural deaths were commonly attributed to cardiac illnesses (23.6%), cancer (12.0%) and deaths due to infection (11.6%).
- Accidents comprised 26% of pregnancy-associated deaths from 2004 to 2013. Of these accidental deaths, 49.2% were from overdose poisonings and 44.3% resulted from motor vehicle collisions.
- The most common mechanism of injury or fatal agent used in both homicides and suicides was a firearm.

¹ See page 7 for other definitions and technical notes related to concepts and statistics presented in this report.

Figure 1: Number and Rate of Pregnancy-Associated Deaths by Year in Virginia, 2004-2013 (N=462)

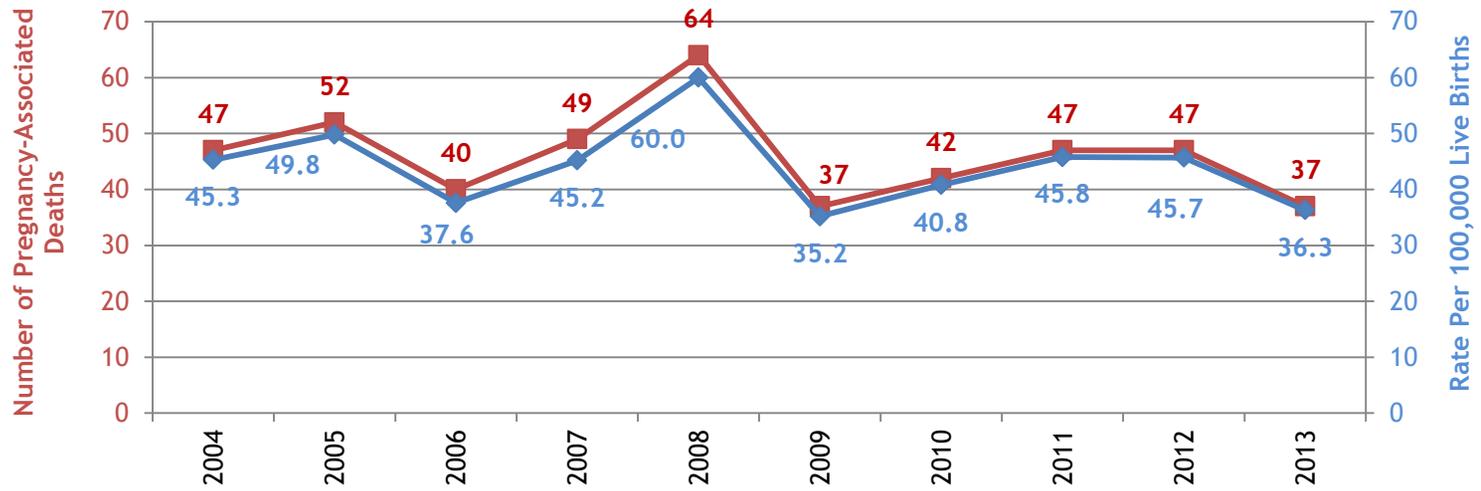


Figure 2: Pregnancy-Associated Deaths by Manner in Virginia, 2004-2013 (N=462)

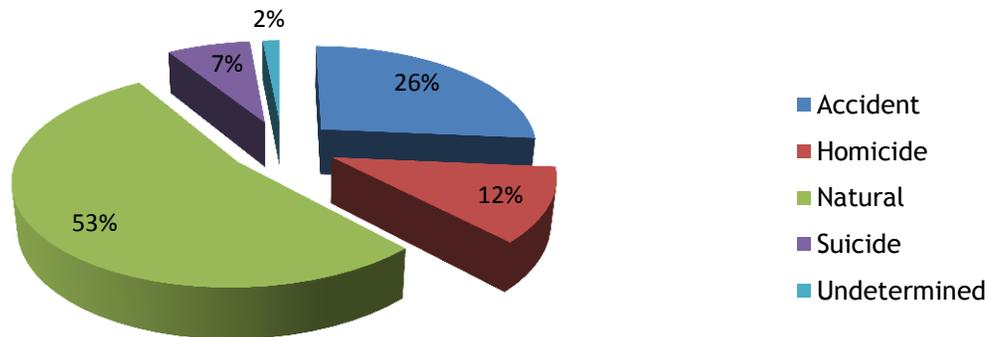


Table 1: Pregnancy-Associated Mortality in Virginia, 2004 - 2008: Selected Characteristics															
	2004 (n=47)			2005 (n=52)			2006 (n=40)			2007 (n=49)			2008 (n=64)		
Pregnancy-Associated Ratio*	46.2			52.6			37.6			47.0			60.0		
	No.	%	Ratio*												
Race															
Black	18	37.5	80.9	19	35.1	86.0	18	45.0	77.7	14	28.0	59.1	24	37.5	103.0
White	28	60.4	38.6	30	59.3	41.5	20	50.0	27.5	30	62.0	41.1	33	51.6	45.2
Other	1	2.1	11.2	3	5.6	29.5	2	5.0	19.1	5	10.0	42.7	7	11.0	68.4
Age															
19 and under	4	8.5	44.9	5	9.6	56.1	6	15.0	65.2	2	4.1	21.5	8	12.5	89.9
20-24	18	38.3	73.4	16	30.8	64.7	13	32.5	51.2	13	26.5	50.6	11	17.2	44.3
25-29	11	23.4	40.7	13	25.0	47.1	8	20.0	27.7	18	37.7	60.0	20	31.3	67.7
30-34	7	14.9	26.6	9	17.3	35	9	22.5	35.3	6	12.2	23.1	12	18.8	46.2
35-39	5	10.6	36.1	8	15.4	56.4	3	7.5	21.0	7	14.3	49.1	10	15.6	71.7
40 and over	2	4.3	62.1	1	1.9	29.7	1	2.5	31.5	3	6.1	95.8	3	4.7	88.3
Outcome of Pregnancy															
Ectopic Pregnancy	1	2.1	1.0	1	1.9	1.0	2	5.0	1.9	0	0.0	0.0	0	0.0	0.0
Fetal death	3	6.4	2.9	5	9.6	4.8	4	10.0	3.8	5	10.2	4.6	4	6.3	3.8
Live birth	34	72.3	32.7	40	76.9	38.3	26	65.0	24.4	37	75.5	34.1	46	71.9	43.2
Pregnant at the time of death	9	19.1	8.7	6	11.5	5.7	8	20.0	7.5	7	14.3	6.5	14	21.9	13.1
Interval Between End of Pregnancy and Death															
0-42 days	16	34.0	15.4	20	38.5	19.1	18	45.0	16.9	25	51.0	23.1	26	40.6	24.4
43 days - 365 days	31	66.0	29.9	32	61.5	30.6	22	55.0	20.7	24	49.0	22.1	38	59.4	35.7
Health Planning Region															
Central	10	21.3	60.6	12	23.1	72.6	6	15.0	35.0	14	28.5	80.8	15	23.4	88.0
Eastern	19	40.4	73.5	14	26.9	54.9	18	45.0	69.3	11	22.4	42.0	20	31.2	78.6
Northern	5	10.6	15.2	11	21.2	33.0	6	15.0	18.0	7	14.3	20.6	13	20.3	38.4
Northwest	8	17	55	6	11.5	40.3	5	12.5	32.5	7	14.3	43.9	6	9.4	39.1
Southwest	5	10.6	35.7	9	17.3	63.4	5	12.5	34.1	10	20.4	66.7	10	15.6	67.1
Causes of Pregnancy-Associated Natural Deaths															
AIDS	0	0.0	0.0	0	0.0	0.0	1	5.0	0.9	0	0.0	0.0	0	0.0	0.0
Amniotic Fluid Embolism	0	0.0	0.0	0	0.0	0.0	2	10.0	1.9	0	0.0	0.0	1	2.9	0.9
Cancer	1	4.3	1.0	5	18.5	4.8	4	20.0	3.8	3	11.5	2.8	2	5.9	1.9
Cardiac	7	30.4	6.7	6	22.2	5.7	4	20.0	3.8	6	23.1	5.5	13	38.2	12.2
Cardiomyopathy	1	4.3	1.0	1	3.7	1.0	2	10.0	1.9	0	0.0	0.0	3	8.8	2.8
Disorders of Central Nervous System	2	8.7	1.9	3	11.1	2.9	2	10.0	1.9	4	15.4	3.7	0	0.0	0.0
Ectopic Pregnancy	0	0.0	0.0	0	0.0	0.0	1	5.0	0.9	0	0.0	0.0	0	0.0	0.0
Exacerbation of Chronic Disease	3	13.0	2.9	5	18.5	4.8	0	0.0	0.0	0	0.0	0.0	1	2.9	0.9
Hemorrhage	1	4.3	1.0	2	7.4	1.9	1	5.0	0.9	3	11.5	2.8	3	8.8	2.8
Infection	3	13.0	2.9	0	0.0	0.0	1	5.0	0.9	6	23.1	5.5	4	11.8	3.8
Pregnancy Induced Hypertension	2	8.7	1.9	2	7.4	1.9	1	5.0	0.9	1	3.8	0.9	0	0.0	0.0
Pulmonary Embolism	2	8.7	1.9	3	11.1	2.9	1	5.0	0.9	2	7.7	1.8	3	8.8	2.8
Other	1	4.3	1.0	0	0.0	0.0	0	0.0	0.0	1	3.8	0.9	4	11.8	3.8

*Deaths per 100,000 live births to Virginia residents.

Table 1: Pregnancy-Associated Mortality in Virginia, 2004 - 2008: Selected Characteristics

	2004 (n=47)			2005 (n=52)			2006 (n=40)			2007 (n=49)			2008 (n=64)		
Pregnancy-Associated Ratio*	46.2			52.6			37.6			47.0			60.0		
	No.	%	Ratio*	No.	%	Ratio*	No.	%	Ratio*	No.	%	Ratio*	No.	%	Ratio*
Manner of Death and Fatal Agency															
Accident															
Blunt Instrument	0	0.0	0.0	0	0.0	0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Drowning	0	0.0	0.0	0	0.0	0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Firearm	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fire/Burn	1	6.7	1.0	1	11.1	1.0	0	0.0	0.0	1	5.9	0.9	0	0.0	0.0
Hanging/Strangulation/Suffocation	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Motor Vehicle-Driver or Passenger	9	60.0	8.7	5	55.6	4.8	8	61.5	7.5	6	35.3	5.5	4	26.7	3.8
Motor Vehicle Collision-Pedestrian	0	0.0	0.0	1	11.1	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	5	33.3	4.8	2	22.2	1.9	5	38.5	4.7	10	58.8	9.2	11	73.3	10.3
Sharp Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Homicide															
Blunt Instrument	0	0.0	0.0	1	11.1	1.0	0	0.0	0.0	0	0.0	0.0	1	11.1	0.9
Drowning	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fire/Burn	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Firearm	4	57.1	3.9	5	55.6	4.8	2	100.0	1.9	1	33.3	0.9	4	44.4	3.8
Hanging/Strangulation/Suffocation	1	14.3	1.0	1	11.1	1.0	0	0.0	0.0	1	33.3	0.9	0	0.0	0.0
Motor Vehicle-Driver or Passenger	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Motor Vehicle Collision-Pedestrian	1	14.3	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	33.3	0.9	1	11.1	0.9
Poison	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Sharp Instrument	1	14.3	1.0	2	22.2	1.9	0	0.0	0.0	0	0.0	0.0	3	33.3	2.8
Suicide															
Blunt Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	14.3	0.9
Drowning	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	14.3	0.9
Fire/Burn	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Firearm	0	0.0	0.0	1	20.0	1.0	2	40.0	1.9	1	50.0	0.9	2	28.6	1.9
Hanging/Strangulation/Suffocation	2	100.0	1.9	1	20.0	1.0	1	20.0	0.9	0	0.0	0.0	1	14.3	0.9
Motor Vehicle-Driver or Passenger	0	0.0	0.0	1	20.0	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Motor Vehicle Collision-Pedestrian	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	0	0.0	0.0	2	40.0	1.9	2	40.0	1.9	1	50.0	0.9	1	14.3	0.9
Sharp Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	14.3	0.9
Undetermined															
Firearm	0	0.0	0.0	1	50.0	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Undetermined	0	0.0	0.0	1	50.0	1.0	0	0.0	0.0	1	100.0	0.9	0	0.0	0.0

*Deaths per 100,000 live births to Virginia residents.

Table 2: Pregnancy-Associated Mortality in Virginia, 2009 - 2013: Selected Characteristics																
	2009 (n=37)			2010 (n=42)			2011 (n=47)			2012 (n=47)			2013 (n=37)			
Pregnancy-Associated Ratio*	35.2			40.8			48.8			49.6			38.2			
	No.	%	Ratio*													
Race																
Black	16	43.2	73.3	18	42.9	80.2	19	42.8	86.3	23	44.0	105.3	13	35.1	60.1	
White	19	51.4	27.3	21	50.0	30.2	24	49.0	34.5	22	50.0	32.9	22	59.5	33.8	
Other	2	5.4	18.2	3	7.2	27.4	4	8.2	36.3	2	6.0	14.2	2	5.4	13.0	
Age																
19 and under	2	5.4	24.1	3	7.1	40.3	8	17.0	121.7	3	6.4	48.9	2	5.4	37.6	
20-24	10	27.0	41.7	15	35.7	65.7	14	29.8	63.5	17	36.2	78.1	5	13.5	23.9	
25-29	12	32.4	41.3	10	23.8	34.6	11	23.4	37.9	11	23.4	38.0	9	24.3	31.2	
30-34	6	16.2	22.8	10	23.8	37.2	5	10.6	18.1	8	17.0	27.9	7	18.9	23.9	
35-39	5	13.5	36.5	3	7.1	22.3	6	12.8	43.7	6	12.8	43.5	14	37.8	100.0	
40 and over	2	5.4	60.5	1	2.4	29.3	3	6.4	85.3	2	4.3	57.9	0	0.0	0.0	
Outcome of Pregnancy																
Ectopic Pregnancy	0	0.0	0.0	1	2.4	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
Fetal death	7	18.9	6.7	9	21.4	8.7	11	23.4	10.7	8	17.0	7.8	4	10.8	3.9	
Live birth	22	59.5	21.0	32	76.2	31.1	33	70.2	32.2	32	68.1	31.1	28	75.7	27.5	
Pregnant at the time of death	8	21.6	7.6	0	0.0	0.0	3	6.4	2.9	7	14.9	6.8	5	13.5	4.9	
Interval Between End of Pregnancy and Death																
0-42 days	20	54.1	19.1	23	54.8	22.3	22	46.8	21.5	20	42.6	19.5	19	51.4	18.6	
43 days - 365 days	17	45.9	16.2	19	45.2	18.5	25	53.2	24.4	27	57.4	26.3	18	48.6	17.7	
Health Planning Region																
Central	8	21.6	47.2	10	23.8	61.8	9	19.1	56.1	8	17.0	49.7	13	35.1	81.1	
Eastern	10	27.0	40.0	11	26.1	45.2	11	23.4	45.4	18	38.3	74.7	4	10.8	16.9	
Northern	7	18.9	20.6	7	16.7	20.7	6	12.8	17.7	4	8.5	11.7	7	18.9	20.6	
Northwest	2	5.4	13.6	6	14.3	41.1	5	10.6	34.5	9	19.1	62.3	5	13.5	34.6	
Southwest	10	27.0	69.4	8	19.0	57.4	16	34.0	115.8	8	17.0	57.5	8	21.6	58.3	
Causes of Pregnancy-Associated Natural Deaths																
AIDS	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	4.5	1.0	0	0.0	0.0	
Amniotic Fluid Embolism	0	0.0	0.0	1	4.3	0.9	2	7.7	2.0	0	0.0	0.0	3	13.0	2.9	
Cancer	2	9.1	1.9	5	21.7	4.8	5	19.2	4.9	0	0.0	0.0	3	13.0	2.9	
Cardiac	3	13.6	2.9	8	34.8	7.8	4	15.4	3.9	4	18.2	3.9	4	17.4	3.9	
Cardiomyopathy	1	4.5	1.0	1	4.3	0.9	1	3.8	1.0	1	4.5	1.0	0	0.0	0.0	
Disorders of Central Nervous System	2	9.1	1.9	1	4.3	0.9	1	3.8	1.0	1	4.5	1.0	1	4.3	1.0	
Ectopic Pregnancy	0	0.0	0.0	0	0.0	0.0	1	3.8	1.0	0	0.0	0.0	0	0.0	0.0	
Exacerbation of Chronic Disease	2	9.1	1.9	0	0.0	0.0	2	7.7	2.0	3	13.6	2.9	3	13.0	2.9	
Hemorrhage	1	4.5	1.0	0	0.0	0.0	3	11.5	2.9	0	0.0	0.0	3	13.0	2.9	
Infection	7	31.8	6.7	1	4.3	0.9	3	11.5	2.9	2	9.1	1.9	2	8.7	2.0	
Pregnancy Induced Hypertension	2	9.1	1.9	3	13.0	2.9	0	0.0	0.0	2	9.1	1.9	1	4.3	1.0	
Pulmonary Embolism	1	4.5	1.0	2	8.7	1.9	2	7.7	2.0	3	13.6	2.9	2	8.7	2.0	
Other	1	4.5	1.0	1	4.3	0.9	2	7.7	2.0	5	22.7	4.9	1	4.3	1.0	

*Deaths per 100,000 live births to Virginia residents.

Table 2: Pregnancy-Associated Mortality in Virginia, 2009 - 2013: Selected Characteristics

	2009 (n=37)			2010 (n=42)			2011 (n=47)			2012 (n=47)			2013 (n=37)		
Pregnancy-Associated Ratio*	35.2			40.8			48.8			49.6			38.2		
	No.	%	Ratio*												
Manner of Death and Fatal Agency															
Accident															
Blunt Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Drowning	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	6.7	1.0	0	0.0	0.0
Firearm	1	12.5	1.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fire/burn	0	0.0	0.0	1	8.3	1.0	0	0.0	0.0	0	0.0	0	1	14.3	1.0
Hanging/Strangulation/Suffocation	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	6.7	1.0	0	0.0	0.0
Motor Vehicle-Driver or Passenger	2	25.0	1.9	6	50.0	5.8	4	36.4	3.9	6	40.0	5.8	1	14.3	1.0
Motor Vehicle Collision-Pedestrian	0	0.0	0.0	0	0.0	0.0	1	9.1	1.0	0	0.0	0.0	1	14.3	1.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	5	62.5	4.8	5	41.7	4.9	6	54.5	5.9	7	46.7	6.8	4	57.1	3.9
Sharp Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0	0	0.0	0.0
Homicide															
Blunt Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Drowning	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fire/Burn	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Firearm	3	100.0	2.9	6	100.0	5.8	5	83.3	4.9	2	50.0	1.9	2	50.0	2.0
Hanging/Strangulation/Suffocation	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	1.0
Motor Vehicle-Driver or Passenger	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Motor Vehicle Collision-Pedestrian	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	25.0	1.0	0	0.0	0.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Sharp Instrument	0	0.0	0.0	0	0.0	0.0	1	16.7	1.0	1	25.0	1.0	1	25.0	1.0
Suicide															
Blunt Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Drowning	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fall	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Fire/Burn	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Firearm	2	50.0	1.9	0	0.0	0.0	1	33.3	1.0	1	20.0	1.0	1	50.0	1.0
Hanging/Strangulation/Suffocation	0	0.0	0.0	0	0.0	0.0	1	33.3	1.0	4	80.0	3.9	0	0.0	0.0
Motor Vehicle-Driver or Passenger	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Motor Vehicle Collision-Pedestrian	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Personal Weapon	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	2	50.0	1.9	0	0.0	0.0	1	33.3	1.0	0	0.0	0.0	1	50.0	1.0
Sharp Instrument	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Undetermined															
Firearm	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Poison	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	100.0	1.0
Undetermined	0	0.0	0.0	1	100.0	1.0	1	100.0	1.0	1	100.0	1.0	0	0.0	0.0

*Deaths per 100,000 live births to Virginia residents.

Technical Notes and Definitions

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.

Pregnancy-Associated Death: 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 Ratio: 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 ratio 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. Ratios for Race, Age, and Health Planning Region (HPR)² are category specific. Ratios for Manner and Cause of Death are overall ratios/100,000 live births.

Case Identification: Beginning with deaths that occurred in 1999, cases have been identified by the Virginia Department of Health’s Division of Health Statistics using three methods:

1. Through the *International Classification of Diseases, (ICD)* causes of death codes in the “pregnancy, childbirth and the puerperium” categories.
2. By matching birth or fetal death certificate with maternal death certificate information.
3. By selecting cases where a Commonwealth of Virginia death certificate indicates the decedent was recently pregnant by checking a box on the death certificate indicating if pregnant in past year.

Data Sources: Each year maternal death certificates, along with matched infant birth or fetal death certificates, are provided to PAMSS by the Division of Health Statistics. Data from these documents are abstracted into the PAMSS database. The database includes variables such as demographic information, interval between the termination of pregnancy and the mother’s date of death, cause of death, manner of death, and the fatal agent involved in the death.

This report was supported in part by MCH Title V Grant Numbers: B04MC25377, B04MC26702, and B04MC28133 (Project Period: 10/1/2014 through 09/30/2016). Title of Project: Maternal and Child Health Services.

² Appendix A. Rate of Pregnancy-Associated Deaths by Health Planning Region, 2004-2013

Appendix A: Rate of Pregnancy-Associated Deaths by Health Planning Region in Virginia, 2004-2013

