

# Pregnancy-Associated Death Due to Cancer in Virginia, 1999-2007

A Public Health Brief from  
The Virginia Maternal Mortality Review Team

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This report was supported in part by a Grant Number B04MC25377 from the Maternal and Child Health Bureau (Title V, Social Security Act), Health Resources and Services Administration, U.S. Department of Health and Human Services.

**Introduction.** Between 1999 and 2007, a total of 64,053 women of all ages died of cancer in Virginia. Among women of reproductive ages (10-49), 5,050 died of cancer, reflecting 7.8 percent of all cancer deaths in the state.<sup>1</sup> Of these 5,050 cancer deaths, 35 women died while pregnant or within one year of pregnancy in Virginia (3.8/100,000 live births), reflecting less than one percent (0.7) of all cancer deaths among women of reproductive age. Cancer accounted for 16.8% of all pregnancy-associated deaths<sup>2</sup> from natural causes during that time period and was the second leading cause of natural death after cardiovascular diseases.

This report provides an overview of the women who died from cancer during or soon after their pregnancies and provides key insights about these deaths after review by Virginia's Maternal Mortality Review Team. And while pregnancy-associated deaths are rare events, understanding the circumstances of such deaths, many of them premature, can shed light on important areas for intervention.

**Background.** Cancer is a rare occurrence among pregnant or recently pregnant women. Estimates show that approximately 1 out of 1,000 women are diagnosed with cancer during pregnancy. However, recent research suggests pregnancy-associated cancer may be on the rise.<sup>3</sup> Increases in cancer rates may be due to women postponing childbearing until later age, to improved likelihood of diagnosis due to increased interaction with healthcare providers during pregnancy, and/or to the pregnancy itself influencing tumor growth.<sup>4</sup> A study of cancer related maternal mortality found differences in mortality among women who were or had been pregnant compared to the non-pregnant population. Mortality for leukemia and brain malignancies was higher for recently pregnant women compared to non-pregnant women, while malignancies of the female genital tract were

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<sup>1</sup> Virginia Department of Health, Division of Health Statistics.

<sup>2</sup> A pregnancy associated death is any death to a woman while pregnant or within one year of the end of her pregnancy, regardless of cause of death or pregnancy outcome.

<sup>3</sup> Wiley. "Rate of women with pregnancy-associated cancer on the rise, study suggests." ScienceDaily. ScienceDaily. 4 September 2012.

[www.sciencedaily.com/releases/2012/09/120904193742.htm](http://www.sciencedaily.com/releases/2012/09/120904193742.htm). Accessed 6/11/2014.

<sup>4</sup> Ibid.

lower for the recently pregnant group.<sup>5</sup> The most common cancers diagnosed during pregnancy are breast, cervical, Hodgkin’s disease, malignant melanoma and leukemias.<sup>6</sup>

**Populations At Risk in Virginia.** Compared with all other women who died a pregnancy-associated death during this time frame, women dying from cancers were older, more frequently married, paid for care with private insurance, and delivered by cesarean section. See Table 1. Nearly three times as many white women as black women died from pregnancy-associated cancer between 1999 and 2007, even though the ratio of death to live births was similar – 3.5/100,000 for white women and 3.9/100,000 for black women. The largest group of women (n=15, 42.9%), nearly half, was from the Eastern Health Planning Region of the State. Women between the ages of 30 and 34 accounted for the highest percentage of deaths (n=13, 37.1%) followed by women 25-29 years old (n=9, 25.7%). Half of the women had private insurance to pay for care and half were covered by Medicaid. While 14.3% of the women died while pregnant or in the six week postpartum period, the vast majority (n=30, 85.7%) died more than six weeks after delivery. Most women delivered a live infant (88.6%).

**Table 1: Selected Characteristics of Women Dying Pregnancy-Associated Deaths Due to Cancer and All Other Pregnancy-Associated Deaths in Virginia, 1999-2007**

	Pregnancy-Associated Deaths Due to Cancer, n=35		All Other Pregnancy-Associated Deaths, n=362	
	Number	Percent	Number	Percent
<b>Age</b>				
19 and under	2	5.7	35	9.7
20-24	4	11.4	107	29.6
25-29	9	25.7	89	24.6
30-34	13	37.1	66	18.2
35-39	6	17.1	50	13.8
40 and above	1	2.9	15	4.2
<b>Age Range</b>	18– 40 years old		14– 46 years old	

<sup>5</sup> SA Harvey, J Burlingame, J Davis, KY Terada. Cancer-related maternal mortality. Journal of Clinical Oncology, 2010 ASCO Annual Meeting Abstracts. Vol28,15\_suppl.2010.

<sup>6</sup> NA Pavlidis. Coexistence of pregnancy and malignancy. The Oncologist 2002;7:279-287.

<b>Race</b>				
White	22	62.9	197	54.4
Black	8	22.9	149	41.2
Other	5	14.4	16	4.4
<b>Marital Status</b>				
Never Married	6	17.1	159	43.9
Married	26	74.3	173	47.8
Divorced/Widowed	3	8.6	30	8.3
<b>Health Planning Region of Residence</b>				
Northwest	3	8.6	44	12.2
Northern	4	11.4	59	16.3
Southwest	6	17.1	67	18.5
Central	7	20.0	83	22.9
Eastern	15	42.9	109	30.1
<b>Payment for Care</b>				
No Medical Care	0	0.0	12	3.3
Self Pay	0	0.0	33	9.1
Private Insurance	17	48.6	131	36.2
Public	17	48.6	145	40.1
Unknown	1	2.9	41	11.3
<b>Method of Delivery</b>				
Vaginal Delivery (includes miscarriage/stillbirth)	12	34.3	167	46.1
Cesarean Section	19	54.3	110	30.3
Other	2	5.7	23	6.3
Pregnant at the Time of Death	2	5.7	62	17.1
<b>Interval Between End of Pregnancy and Death</b>				
Pregnant at the Time of Death or Died the Day of Delivery	2	5.7	98	27.1
1-42 Days	3	8.6	74	20.4
More than 42 Days After Delivery	30	85.7	189	52.2

Overall, women with a recent pregnancy were less likely to die from cancer than women of reproductive age without a pregnancy in the prior year (OR 0.14, 95% CI: 0.1060 to 0.2061,  $p < .001$ ). Table 2 shows the five most prevalent cancers among the pregnant/recently pregnant women reviewed by the Team and for women of reproductive age without a recent pregnancy. Among women not identified with a pregnancy associated death, cancers of the breast; of the trachea, bronchus, and lung; and of the colon, rectum, or anus were most common, followed by ovarian and cervical cancers. Among pregnancy-associated deaths, women also died most frequently from breast cancers, but other cancers associated with the immune system - specifically melanoma, lymphomas, and leukemia -

ranked as the second and third most common types of cancer. This suggests that changes to the immune system during or immediately after pregnancy may foster tumor growth, which is the subject of a current national research project.<sup>7</sup>

Type of Cancer	Women of Reproductive Ages (10-49) Without a Pregnancy in the Past Year		Women With a Pregnancy in the Past Year	
	Rank	Number of Deaths	Rank	Number of Deaths
<b>Trachea, Bronchus, and Lung</b>	2	738	5	2
<b>Breast</b>	1	1,490	1	7
<b>Colon, Rectum, or Anal</b>	3	383	--	--
<b>Ovary</b>	4	276	--	--
<b>Cervical</b>	5	245	5	2
<b>Melanoma</b>	--	--	2	5
<b>Lymphoma</b>	--	--	3	3
<b>Leukemia</b>	--	--	3	3

**Team Review and Response.** As each case was reviewed, the Maternal Mortality Review Team agreed that few opportunities existed to change the outcome of these deaths. At the same time, Team members were able to identify systems changes that would have improved quality of care. Among those factors, case management and care coordination were mentioned most often. Critical appointments were missed and patients were lost to follow-up. Coordination and management services were needed to avoid delays and/or missed treatments which were essential. Improved systems of care could help identify and

<sup>7</sup> M Jacobs. Investigating cancer and the immune system at Lankenau Hospital: Is there a link between the immune system's response to cancer and pregnancy? MainLine Healthcare Guide. Spring-Summer 2013. <http://www.mainlinetoday.com/Main-Line-Today/April-2013/Lankenau-Institute-for-Medical-Researchs-George-Prendergast-Investigates-Immunotherapy-Pregnancy-and-Cancer/> Accessed 8/14/2014.

eliminate barriers to obtaining appropriate follow-up care, aid in discharge planning, and improve overall communication between providers and families.

The Team also expressed the need for recognition and management of the psychological impact of the diagnosis of cancer on the individual and her family. Mental health care was often lacking as patients and families struggled with the gravity of the diagnosis of cancer. Family members were sometimes at odds among themselves with decisions on treatment objectives and the appropriate course of care to follow. The Team identified the need to encourage and empower patients to seek second opinions and to become educated about treatment options.

Finally, bereavement services were needed as these women and their families worked toward understanding the futility of further treatment. Earlier recognition of the terminal nature of the disease may have improved opportunities for end of life planning. This includes developing advance directives to allow the wishes of the patient to be made known and to participate in decisions regarding palliative and hospice care.