

A Glimpse at Pregnancy-Related Death in Virginia Using the World Health Organization Definitions and Categorization of Deaths in Pregnancy, Childbirth and the Puerperium

Maternal mortality is recognized as a serious and growing problem globally. Worldwide, efforts are underway to reduce the number of women who die as a result of complications of pregnancy and childbirth. At the same time, the magnitude of the problem is becoming more clearly understood through efforts to standardize the registration and recording of maternal deaths throughout the world.

The World Health Organization (WHO) defines pregnancy-related death as “the death of a woman while pregnant or within 42 days of termination of pregnancy; irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management including those from accidental or incidental causes.” This definition allows identification of maternal deaths based on the causes of death using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, 1992 (ICD-10). Deaths are further classified as *direct* maternal deaths, those that result from complications of the pregnancy itself, either prenatally, during delivery or in the postpartum period. *Indirect* maternal deaths are those that occur within 42 days of delivery but are due to existing disease or diseases that develop during pregnancy and which are not due to direct obstetric causes but are aggravated by physiological effects of the pregnancy. All other deaths that occur within the postpartum period are considered to be “accidental” or “coincidental” to the pregnancy.

In the US, other methods of identifying potential maternal deaths are utilized besides examination of causes of death. Many states, including Virginia, have a check box on the death certificate specifically for identifying whether or not the decedent had a recent pregnancy. This allows for identification of deaths occurring within the postpartum period (up to 42 days after delivery) but which are due to causes unrelated to pregnancy, i.e. indirect maternal deaths and deaths due to coincidental causes such as accidents and homicides.

Using the WHO definitions, direct maternal deaths are grouped according to categories defined by ICD-10 cause of death codes and include deaths due to pregnancies with abortive outcome, hypertensive disorders of pregnancy and the puerperium, obstetric hemorrhage, pregnancy-related infections, other obstetric complications and unanticipated complications of management. Indirect deaths account for the deaths occurring within 42 days of pregnancy but which are due to non-obstetric complications. Examination by roughly grouping deaths of women in Virginia who were pregnant or had been pregnant within 42 days of death reveals that one-fourth were direct maternal deaths. Nearly 43% of deaths were indirect maternal deaths. Just under 1/3 of the deaths were considered coincidental – due to external causes such as accidents or injuries.

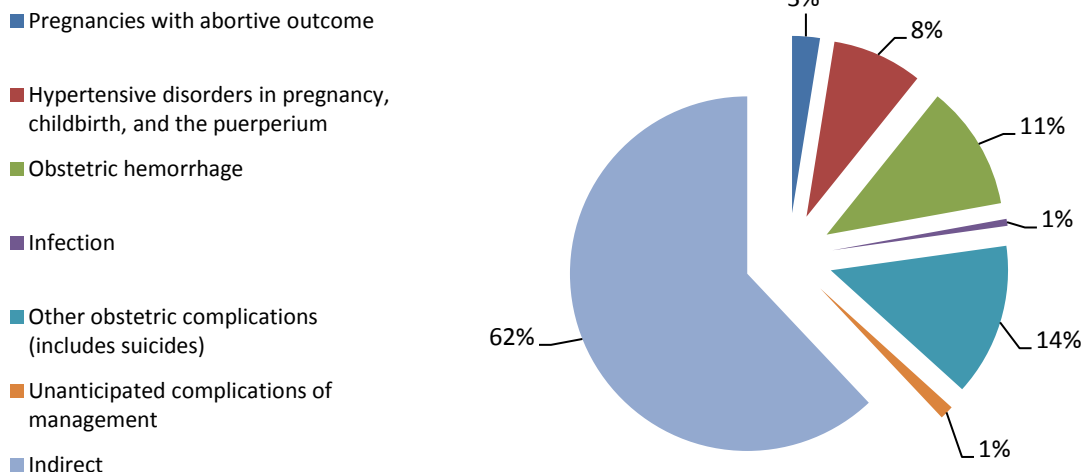
Table 1 shows the causes of maternal death in Virginia using WHO classifications. Among the causes of direct maternal deaths, other obstetric complications (which includes suicides) accounts for the largest percentage of deaths followed by obstetric hemorrhage and hypertensive disorders of pregnancy. Among indirect maternal deaths, cardiac disorders accounted for the most deaths followed by disorders of the central nervous system.

Table 1. Causes of Maternal Death in Virginia by WHO Classification of Deaths in Pregnancy, Childbirth and the Puerperium, 1999-2010 (N=232)			
Type of Maternal Death	Classification Group Number and Title	No.	Percent
Maternal Death: direct	1. Pregnancies with abortive outcome	4	1.7
Maternal Death: direct	2. Hypertensive disorders in pregnancy, childbirth, and the puerperium	13	5.6
Maternal Death: direct	3. Obstetric hemorrhage	18	7.7
Maternal Death: direct	4. Pregnancy-related infection	0	0.0
Maternal Death: direct	5. Other obstetric complications (includes suicide)	22	9.5
Maternal Death: direct	6. Unanticipated complications of management	2	0.8
Maternal Death: indirect	7. Nonobstetric complications:		
	Cardiac disease	33	14.2
	Pulmonary	18	7.7
	Central nervous system complications	16	6.9
	Infections not a direct result of pregnancy	16	6.9
	Neoplasms	9	3.9
	Other	6	2.6
Maternal Death: unspecified	8. Unknown/undetermined	3	1.3
Death during pregnancy, childbirth and the puerperium	9. Coincidental causes (Accidents – 39 Homicides – 33)	72	31.0

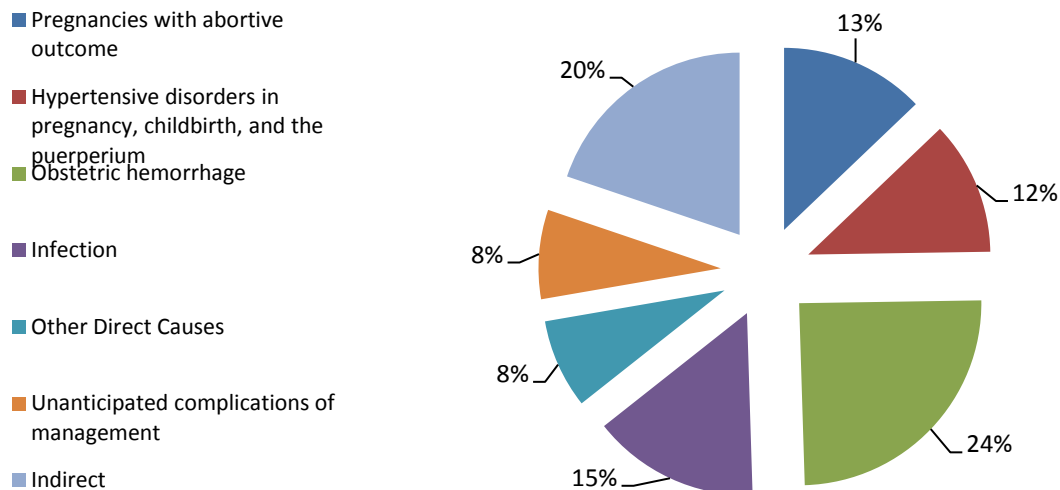
Figure 1 below demonstrates the proportion of deaths of Virginia residents within the WHO categories of direct and indirect maternal deaths. Figure 2 shows the proportion of deaths within each category that are reported worldwide. As can be seen, women in Virginia who die within 42 days of being pregnant are more likely to die from causes indirectly related to the pregnancy than is shown for women around the world. Well over half of the deaths in Virginia occurring within the postpartum period were classified as indirect maternal deaths. Worldwide, indirect causes are thought to account for only 20% of deaths with the majority of deaths being due to the pregnancy itself (direct maternal deaths). Heart disease stands out as a major contributor to the numbers of indirect deaths in Virginia, accounting for twice as many indirect deaths as any other cause.

Caution in interpretation is advised as the overall numbers of deaths are quite small, differences in ascertaining cases may dramatically impact the numbers, and causes of death listed on death certificates are often inconsistent. The significance however, lies in our ability to focus our attention on the root causes of these deaths and thus toward targeted interventions to reduce them. This data suggests efforts to reduce the numbers of women dying during and soon after childbirth in Virginia should extend to healthcare providers from all specialties and remains a public health issue of importance.

Maternal Deaths in Virginia by WHO Classification, 1999-2010 (n=157)



Maternal Deaths Worldwide by WHO Classification¹



¹Matthews, Z. (2005). *World health report 2005: make every mother and child count*. World Health (Vol. 33, pp. 409-11). World Health Organization. Retrieved from <http://www.who.int/whr/2005/en/> on March 7, 2013.

For information on Fatality Review and Surveillance Projects in Virginia please visit:

<http://www.vdh.state.va.us/medExam/FatalityReviewSurveillance.htm>.

Prepared by: Victoria M. Kavanaugh, PhD
 Coordinator, Maternal Mortality Review
 Virginia Department of Health
 Office of the Chief Medical Examiner
 400 East Jackson Street
 Richmond, VA 23219
 E-Mail: Victoria.kavanaugh@vdh.virginia.gov