

Statistical Note

Perinatal Periods of Risk Analysis, District of Columbia Fetal and Infant Deaths, 2009-2013

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August 31, 2015

Background

The Perinatal Periods Of Risk (PPOR) approach is a sensitive measure of a community's health. It involves a complex interweaving of a social and health problem. PPOR examines four "Periods of Risk" for various population groups:

- Maternal Health/Prematurity
- Maternal Care
- Newborn Care
- Infant Health

This approach identifies groups and periods of risk with the most deaths and highest rates, and uses a comparison (reference) group to estimate "excess" deaths. It provides for rapid assessment of how a city, county or state is doing and allows for comparison of rates across states and localities and with the US.

According to Dr. Brian McCarthy and colleagues at the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), causes of perinatal death are closely related to both age at death and birth weight. PPOR analytic methods were constructed on existing infant mortality study methods, which include acquiring, assessing, and processing of data files. Phase 1 of the PPOR identifies the populations and periods of risk with the largest excess mortality. Phase 2 explains why the excess deaths occurred and directs prevention efforts.

This report aims to inform and enable health officials in the District in quantifying disparities in perinatal health by using nationally recognized methods of PPOR.

The objectives of this study are the following:

- (1) To compare total and race-specific fetal-infant mortality rates (FIMR) in the District of Columbia
- (2) To examine and quantify disparities in FIMR
- (3) To calculate excess fetal-infant deaths using an established reference group

Methodology

The methodology employed in this study was adapted from the CityMatCH Maternal and Child Health Epidemiology Course Training sponsored by the Health Resources and Services Administration (HRSA) and Centers for Disease Control and Prevention (CDC).

1. Data files were obtained as electronic datasets from live birth certificates, fetal death certificates, and linked birth-infant death certificates from the District of Columbia Vital Records Division. The following inclusion/exclusion criteria were used:
 - At least sixty deaths overall or at least ten deaths in each period of risk were required for each population being studied.
 - Five years of data (2009-2013) were aggregated to reach adequate number of deaths, but no more than five years were used due to changes in medical practice and community characteristics.
 - Spontaneous and induced abortions were not included in the analysis.
 - Fetal and infant deaths weighing under 500 grams and/or below 24 weeks of gestational age were not included due to underreporting and variability.

- Numbers and rates for the overall fetal-infant mortality map were calculated. Fetal-infant mortality maps were created for each sub-population.
- Non-Hispanic White mothers were selected as the reference* group as they experienced the best outcome and were used to calculate excess mortality and identify opportunity gaps.

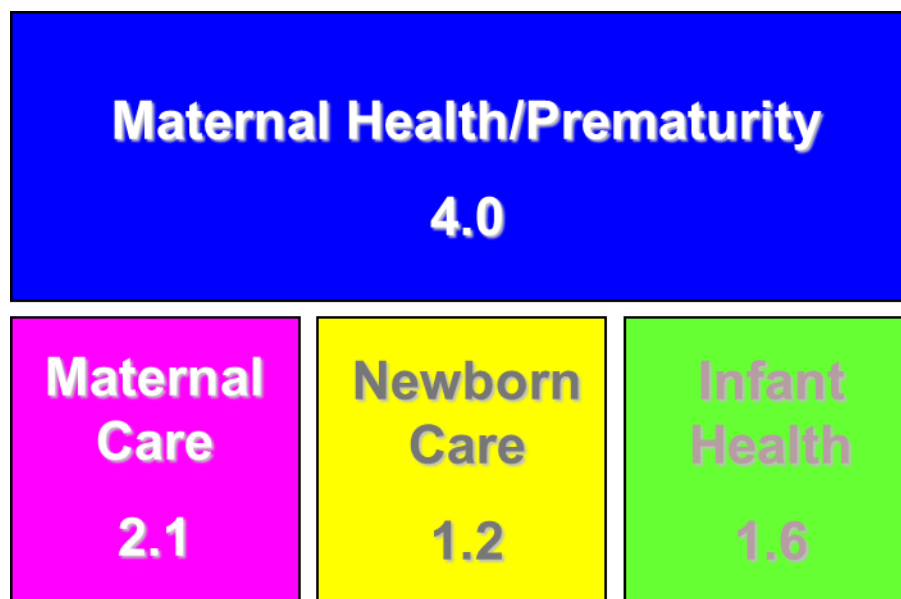
**A reference group is selected based on better or optimal pregnancy outcomes and should represent at least 15% of the population or be composed of at least 60 deaths. Internal reference group selected are non-Hispanic white fetal-infant deaths. External reference group is the national 2000-2002 group of non-Hispanic white women aged 20 years or more and had 13 or more years of education.*

Results and Discussion

Table 1. Data for Births and Fetal-Infant Deaths, District of Columbia, 2009-2013

Birth Weight	Fetal Deaths	Infant Deaths		Total Deaths	Live Births
	24+ weeks	Neonatal	Post-neo		
500-1499g	63	95	24	182	853
1500-2499g	48	24	22	94	3620
2500+g	47	30	51	128	41,414
Total	158	149	97	404	45,887

Figure 1. Perinatal Periods Of Risk (PPOR) Map of Fetal-Infant Deaths, District of Columbia, 2009-2013



Note: Rate is per 1,000 live births plus fetal deaths.

Legend:

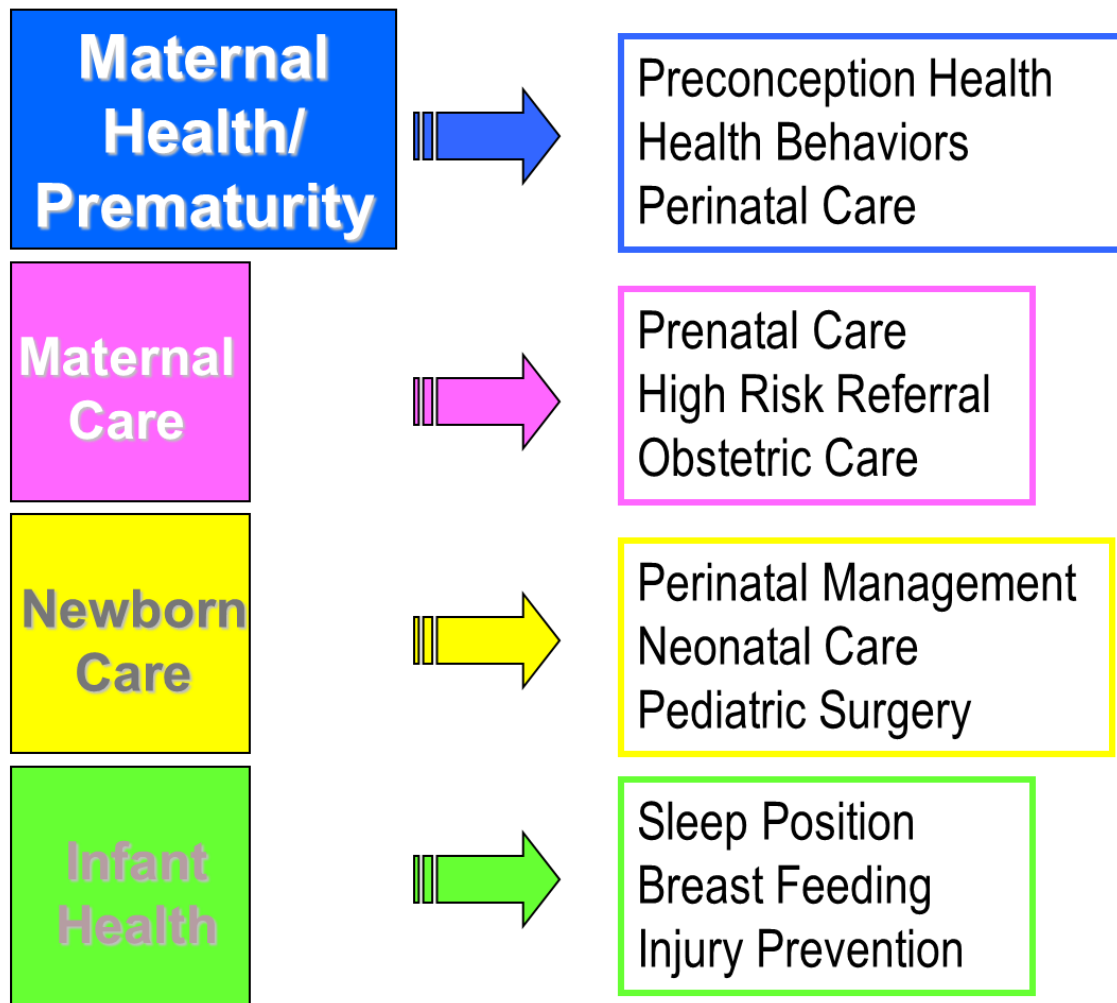


Table 2. Perinatal Periods Of Risk (PPOR) Data for Fetal-Infant Deaths by Race/Ethnicity, District of Columbia, 2009-2013

Population/Sub-group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
DC Overall	4.0	2.1	1.2	1.6	8.8
Non-Hispanic White*	0.3	0.2	0.2	0.2	0.9
Non-Hispanic Black	2.8	1.2	0.8	1.2	6.0
Hispanic	0.5	0.3	0.2	0.1	1.1

Note: Rate is per 1,000 live births plus fetal deaths.

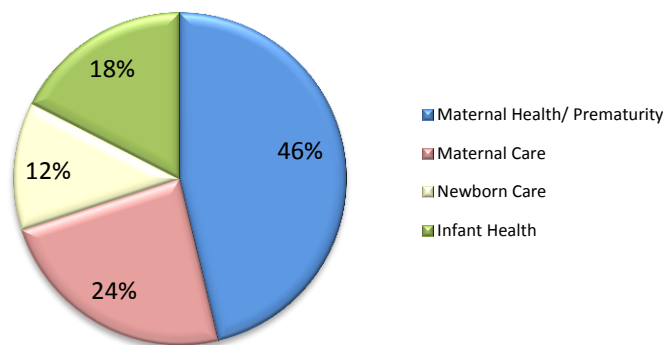
*Reference group.

Table 3. Excess Fetal-Infant Mortality Rates Using Non-Hispanic White as Reference Group, District of Columbia, 2009-2013

Population/Sub-group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
DC Overall	3.7	1.9	1.0	1.4	7.9
Non-Hispanic Black	2.5	1.0	0.6	1.0	5.1
Hispanic	0.2	0.1	0.0	-0.1	0.2

Note: Rate is per 1,000 live births plus fetal deaths.

Figure 2. Excess Fetal-Infant Mortality (Non-Hispanic White as Reference Group), District of Columbia, 2009-2013



The DC overall rate is about 8 fetal-infant deaths per 1,000 births higher than among Non-Hispanic White mothers (Table 3). Maternal Health/Prematurity (MH/P) and Maternal Care (MC) were the two risk periods with the highest difference in rates, 3.7 and 1.9, respectively. Seventy percent of excess fetal-infant deaths (258 deaths) in the District could potentially be prevented if the overall population experienced the same opportunities and benefits in maternal health and maternal care as the reference population (Figure 2).

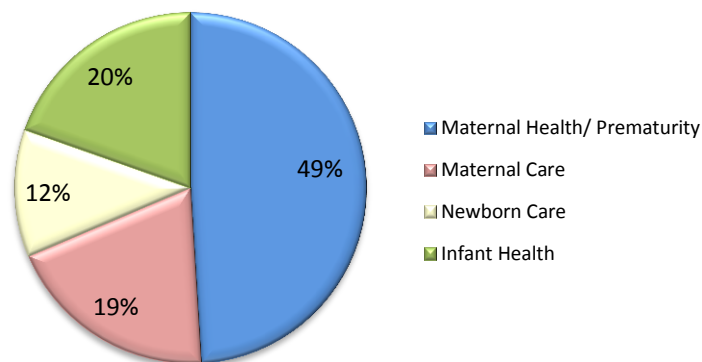
Table 4. Excess Number of Fetal-Infant Deaths Using Non-Hispanic White as Reference Group, District of Columbia, 2009-2013

Population/Sub-group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
DC Overall	170	87	46	64	364
Non-Hispanic Black	59	24	14	24	121
Hispanic	1	1	0	-1	1

The Non-Hispanic Black rate is about 5 fetal-infant deaths per 1,000 births higher than among Non-Hispanic White mothers (Table 3). Maternal Health/Prematurity (MH/P) was the risk period with the highest difference in rate at 2.5 per 1,000 births. Forty-nine percent of excess fetal-infant deaths among Non-Hispanic Blacks in the District (59 deaths) could potentially be prevented if this group experienced the same opportunities and benefits in maternal health as the reference population (Table 4 and Figure

3). Prevention strategies in the community may need to focus on improving maternal health and prematurity rates to reduce racial disparities in overall fetal-infant mortality rates.

Figure 3. Excess Fetal-Infant Mortality among Non-Hispanic Black (Non-Hispanic White as Reference Group), District of Columbia, 2009-2013



From Data to Potential Action

PPOR analytic methods are based on the principle that the infant mortality rate in every population group should be as low as the rate in the “best case” reference group. Higher rates are termed “excess mortality”, which is a measure of how many of the deaths were preventable. The first phase of PPOR analysis uses local vital records data files to identify the periods of risk that contribute most to the community’s preventable deaths and narrows the focus to the periods with the most potential for impact. The second phase uses vital records and other data sources to find the most important underlying causes or biological

mechanisms for excess mortality, and which of the known risk and protective factors are most important in this particular community. This information assists community stakeholders in prioritizing action based on the best available information.

PPOR studies bring community partners together to build consensus, support, and partnership. PPOR aims to focus on understanding the overall fetal-infant death rate in order to look for opportunity gaps between different groups and mobilize for sustainable systems change.

References

CityMatCH. 2013 Training Course In Maternal and Child Health Epidemiology available at <http://www.citymatch.org/training-course-mch-epi/archive-2013-training-course>

Mittal, Manjoo. Perinatal Periods of Risk (PPOR): A Useful Tool for Analyzing Fetal and Infant Mortality. Statistical Brief No. 28. Raleigh, North Carolina: North Carolina Department of Health and Human Services, Division of Public Health. 2005.