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Infant Mortality Report

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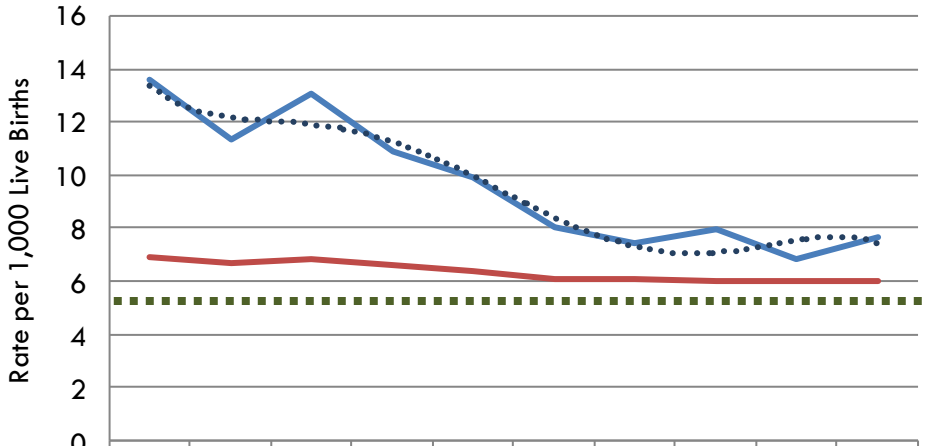
EXECUTIVE SUMMARY

For every 1,000 live births to District of Columbia residents in 2014, approximately eight infants died before reaching their first birthday. In 2014, there were 72 infant deaths in the District, resulting in an infant mortality rate (IMR) of 7.6 per 1,000 live births, a 11.8 percent increase from 2013 but still below 2012 rates. There were 9 more infant deaths in 2014 as compared to 2013; however, there were 146 more live births in 2014 than in 2013. Over the last 10-year period the District has seen a notable decrease in the rate of infant mortality. **Table 1** and **Figure 1** present a ten-year summary of these statistics.

Figure 1. District of Columbia and National Infant Mortality Rate, 2005-2014



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
DC Rate	13.6	11.3	13.1	10.9	9.9	8	7.4	7.9	6.8	7.6
US Rate	6.9	6.7	6.8	6.6	6.4	6.1	6.1	6.0	6.0	6.0

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

The District's IMR, long among the highest in the nation, has increased from a record low of 6.8 in 2013, to 7.6 per 1,000 live births in 2014 after a 5 year-decline. Although this will present a challenge to meet the Healthy People 2020 goal of no more than 6 infant deaths per 1,000 births, the overall decreasing trend is promising. The IMR in the District had dropped in 5 out of 6 years since 2007 (with a slight uptick in 2012) and reflects the important progress the District has made in reducing infant mortality. Although disparities of maternal risk factors and access to care persist in communities of color, the uptick seen in the 2014 figures can largely be explained by increases in infant deaths to white and black mothers(8 and 9 infant death increase, respectively). Mothers of these groups had an increase of infant deaths of 40.7% and 39.3% respectively. For white mothers, the 2014 IMR was 4.0 per 1,000 live births, a 139.2% increase from 2013 rate of 1.8 per 1,000 live births. Still, an IMR of 10.3 (4.3% increase from 9.9, the 2013 IMR) in 2014 for blacks, highlights the disparities that the district is working to dispel. **Figures 2 and 3** illustrate this racial disparity in IMRs in the District and U.S. over time.

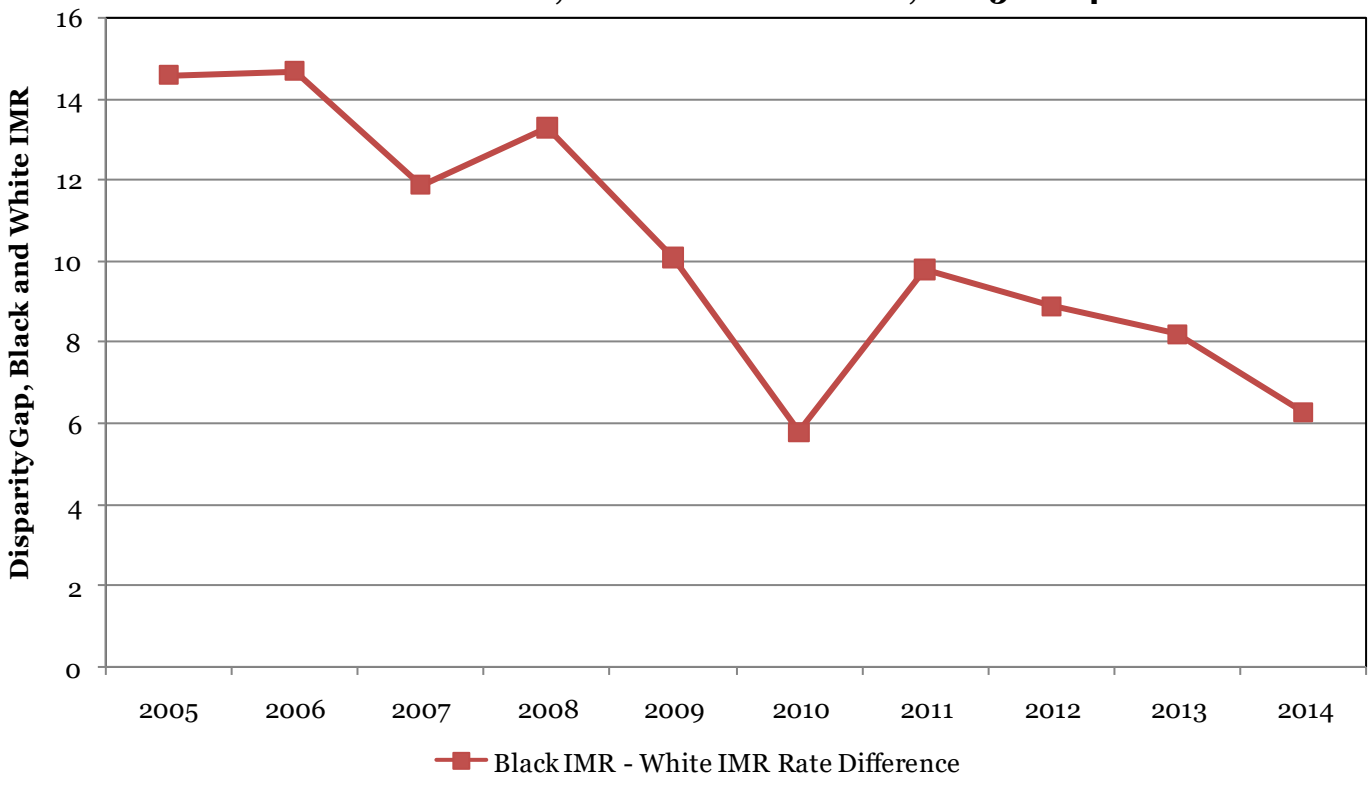
Infant mortality rates in the District fluctuated from 2005 to 2014, however, a stable downward trend has been observed over this time.

Table 1: Ten-Year Infant Mortality Trends
District of Columbia Residents, 2005-2014

Year	Births	Infant Deaths	Infant Mortality Rate*
2005	7,940	108	13.6
2006	8,522	96	11.3
2007	8,870	116	13.1
2008	9,134	100	10.9
2009	9,008	89	9.9
2010	9,156	73	8.0
2011	9,289	69	7.4
2012	9,370	74	7.9
2013	9,264	63	6.8
2014	9,514	72	7.6

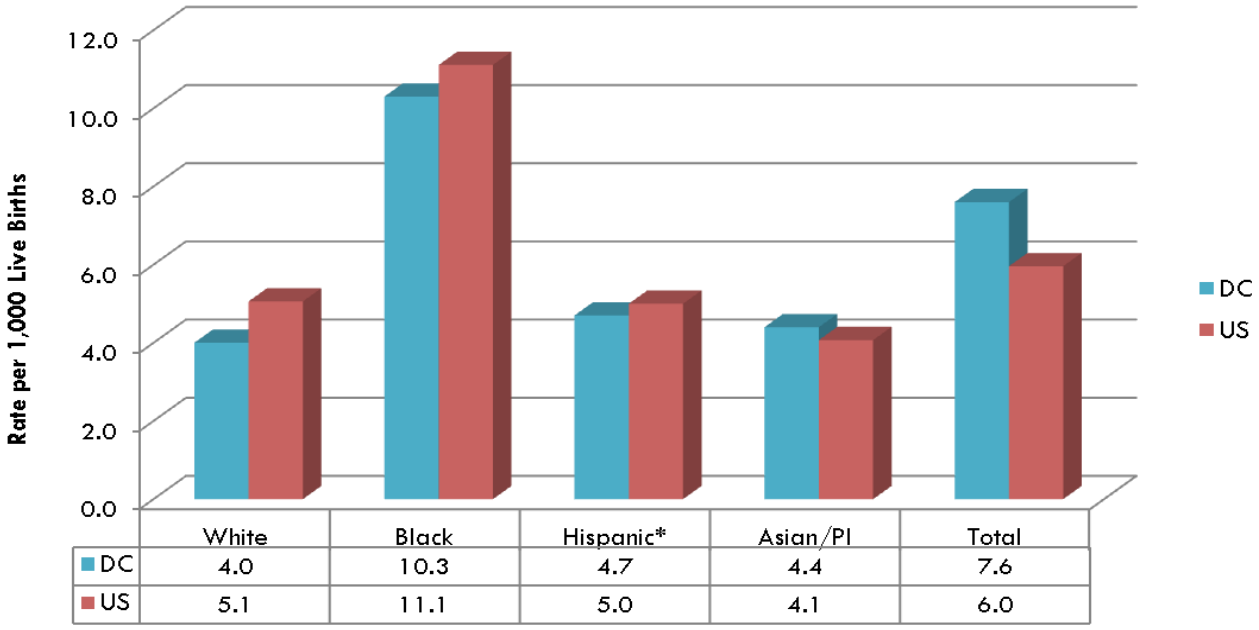
* Per 1,000 live births
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 2: Infant Mortality Rate Disparity Between Black and White Mothers, District of Columbia, 2005-2014



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

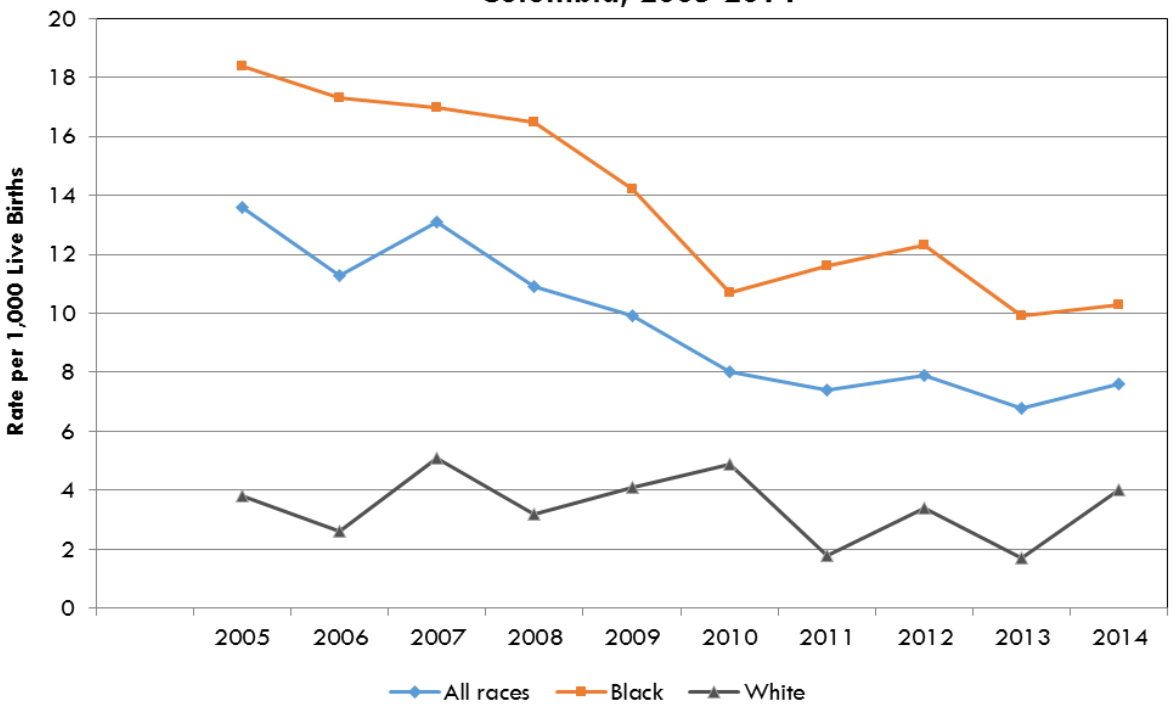
Figure 3: Infant Mortality Rates for the District of Columbia, 2014 and the United States, 2013



	White	Black	Hispanic*	Asian/PI	Total
DC	4.0	10.3	4.7	4.4	7.6
US	5.1	11.1	5.0	4.1	6.0

Note: National Infant Mortality Data by race/ethnicity are for 2013.
*Hispanics include persons of all Hispanic origin of any race.
**Due to small number of infant deaths and, therefore, rates are likely to be unstable.
Sources: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
National Center for Health Statistics: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

Figure 4. Infant Mortality Rates by Race of Mother, District of Columbia, 2005-2014



Sources: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Note: Data for Asian/Pacific Islander were excluded due to rate variability and small numbers.

2013 TO 2014 REPORT HIGHLIGHTS

- The number of infant deaths increased from 63 in 2013 to 72 in 2014, an increase of 14.3 percent.
- The overall infant mortality rate (IMR) for the District increased by 11.8 percent from a rate of 6.8 per 1,000 live births in 2013 to 7.6 per 1,000 live births in 2014.
- From 2013 to 2014, infant mortality rates increased in Wards 1, 2, 3, 6 and 8 but decreased in Wards 4, 5 and 7 (**Table 10**).
- Death to infants younger than 28 days increased from a rate of 4.9 per 1,000 live births in 2013 to 5.0 per 1,000 live births in 2014, an increase of 2.0 percent. (48 neonatal deaths in 2013 and 48 in 2014.)
- The post-neonatal death rate (deaths occurring from 28 days to under 1 year of age) increased by 32.8 percent, from 1.9 per 1,000 live births in 2013 to 2.5 in 2014. (18 post-neonatal deaths in 2013 and 24 in 2014.)
- The infant death rate to non-Hispanic black mothers increased from 9.6 per 1,000 live births in 2013 to 10.5 per 1,000 live births in 2014 (**Table 2**), an increase of 9.0 percent.
- The infant death rate to non-Hispanic white mothers was 1.8 per 1,000 live births in 2013 and 3.7 for 2014, an increase of 105 percent (**Table 2**).
- The infant death rate to Hispanic mothers decreased by 27 percent from 6.4 per 1,000 live births in 2013 (**Table 2**) to 4.7 per 1,000 live births in 2014.
- The number of infant deaths that resulted from multiple births increased by 44.4 percent from 9 in 2013 to 13 in 2014.
- There were 6 maternal deaths in 2014, one greater than what was observed in 2013. (See Technical Notes for Definition.)
- The proportion of births to teen mothers (15-19 years of age) decreased by 11.0 percent from 2013 to 2014. (567 births to teen mothers in 2014).
- In 2014, a little over half of all infant deaths (52.8 percent) in the District were to mothers who were obese or overweight. The IMR for infants born to obese non-Hispanic black mothers (14.0 per 1,000) was almost double the overall IMR for the District (7.7 per 1,000).
- In 2014, infants born to women on Medicaid and private insurance accounted for 37.5 and 46.8 percent, respectively, of all deliveries. Infant deaths disproportionately occurred to mothers who used Medicaid insurance at the time of delivery compared to those with private insurance, at 51.4 percent vs. 19.4 percent, respectively.

STATISTICAL OVERVIEW

The neonatal period is important relative to efforts to reduce infant mortality and many of the causes of infant deaths during this period may be mitigated or prevented with preconception and prenatal care.

In 2014, there were 9,514 live births and 72 infant deaths to District of Columbia residents (**Table 1**). This resulted in an IMR of 7.6 deaths for every 1,000 live births. In 2013, there were 9,264 live births and 63 infant deaths. The IMR for 2013 was 6.8 deaths per 1,000 live births. There was a 11.8 percent increase in the IMR from 2013 to 2014. There were 9 more infant deaths in 2014 than in 2013. Ward 8 had the highest IMR at 12.5 deaths per 1,000 live births (**Table 10**).

Of the 72 infant deaths that occurred in 2014, 48 (or 66.7 percent) occurred during the neonatal period (under 28 days of life). The neonatal death rate increased by 4.1 percent from 4.9 per 1,000 live births in 2013 to 5.1 per 1,000 live births in 2014.

Table 2: Live Births, Infant Deaths and Infant Mortality by Race/Hispanic Origin of Mother District of Columbia Residents, 2013 and 2014

Race/Ethnicity	Live Births		Infant Deaths		Infant Mortality Rate[1]	
	2013	2014	2013	2014	2013	2014
Total	9,264	9,514	63	72	6.8	7.6
Black	4,840	4,836	48	50	9.9	10.3
White	2,997	3,258	5	13	1.7	4.0
Asian/Other	1,347	1,354	7	6	5.2	4.4
Total	9,264	9,514	63	72	6.8	7.6
Non-Hispanic Black	4,767	4,755	46	50	9.6	10.5
Non-Hispanic White	2,742	2,943	5	11	1.8	3.7
Hispanic[2]	1,243	1,283	8	6	6.4	4.7

Notes: [1] Per 1,000 live births

[2] Hispanics include persons of all Hispanic origin of any race.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

FACTORS CONTRIBUTING TO INFANT MORTALITY

Vital statistics over the years have indicated that factors such as low birth weight (Newborn weighing under 2,500 grams or 5 lbs. 8 oz.) , lack of adequate prenatal care, and prematurity are associated with infant mortality. Other factors such as race/ethnicity, maternal age, pre-pregnancy overweight or obesity, and marital status may also be associated with infant mortality.

Low Birth Weight

In 2014, the percentage of low birth weight infants (those weighing under 2,500 grams or 5.5 pounds) in the District increased slightly to 9.9 percent from 2013 to 2014 (**Tables 3 and 4**). About one in seventeen (5.6%) low birth weight infants died before their first birthday (**Tables 3 and 5**).

Very Low Birth Weight

A 22.2 percent decrease was seen among very low birth weight (under 1,500 grams) newborns between 2013 and 2014; **very low birth weight** births decreased from 2.7 percent to 2.1 percent, while **moderately low birth weight** (1,500–2,499 grams) births increased from 7.0 percent to 7.8 percent (data not shown). Birth weight is an important predictor of early death and long-term disability[1,2,3]. Lower birth weight is associated with a greater risk of poor birth outcomes. In 2014, a little more than one in five (21.3 percent) of all very low birth weight infants compared with less than 1 percent of normal weight infants (2,500 and more grams) did not survive their first year of life.

The proportion of very low birth weight births decreased among non-Hispanic black infants from 2013 to 2014 (from 3.6 percent to 3.1 percent); very low birth weight births also decreased for non-Hispanic white infants (from 1.2 percent to 0.8 percent) and Hispanic infants (from 2.2 percent to 1.6 percent).

Low Birth Weight, Race, and Hispanic Origin of Mother

The percentage of low birth weight babies born to all black mothers slightly increased from 12.4 percent in 2013 to 12.8 percent in 2014 (**Table 3**). In addition, a 1.6 percent increase was seen in low birth weight babies born to all white mothers, from 6.1 percent in 2013 to 6.2 percent in 2014. Among Asian and Pacific Islander mothers, the percentage of low birth weight babies increased from 7.1 percent in 2013 to 8.9 percent in 2014. **Figure 5** shows the distribution of total births by infant birth weight and race and Hispanic origin of mother.

The proportion of low birth weight babies born increased by 5.4 percent among Hispanic mothers, (7.6 percent in 2013 to 8.0 percent in 2014). Babies Born to Non-Hispanic White mothers decreased from 6.0 percent in 2013 to 5.8 percent in 2014. Non-Hispanic black low birth weight births increased from 12.5 percent in 2013 to 13.0 percent in 2014.

Table 3: Percent Distribution of Low Birth Weight[1] Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2013 and 2014

Race/Hispanic Origin	2013	2014	Percent Change
Total Births for All Races	9,264	9,514	2.7
- Number Low Birth Weight	895	940	5.0
- Percentage LBW among all Births	9.7%	9.9%	2.3
Total Births to Black* Mothers	4,840	4,836	-0.1
- Number Low Birth Weight	599	620	3.5
- Percentage LBW among Births to Black Mothers	12.4%	12.8%	3.4
Total Births to White* Mothers	2,997	3,258	8.7
- Number Low Birth Weight	183	201	9.8
- Percentage LBW among Births Mothers	6.1%	6.2%	1.1
Total Births to Asian and Pacific Islander Mothers	439	452	3.0
- Number Low Birth Weight	31	33	6.5
Percentage LBW among Births to Asian and Pacific Islander Mothers	7.1%	7.3%	2.8
Total Births to Hispanic/Latina Mothers	1,243	1,283	3.1
- Number of Low Birth Weight	95	103	8.4
- Percentage LBW among Births to Hispanic Mothers	7.6%	8.0%	5.3

*Includes mothers of Hispanic origin.

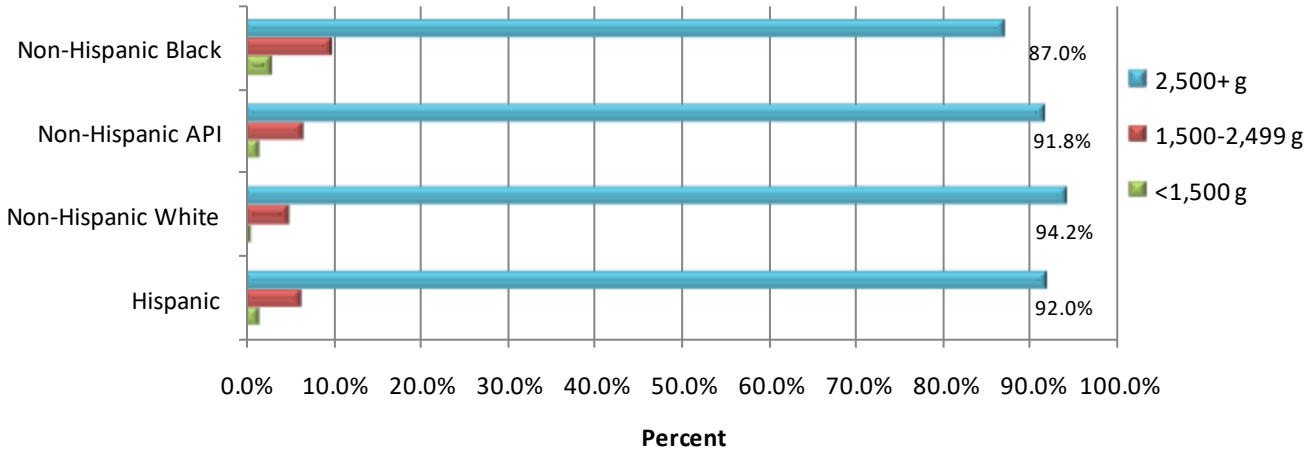
*Numbers may not add up due to exclusion of other races and unknown race/ethnicity.

*Calculations for percent change may differ due to rounding

Notes: [1] Low Birth Weight means less than 2,500 grams or 5lbs. 8oz.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 5. Births by Birth Weight, Race and Hispanic Origin of Mother, 2014



Note: API refers to Asian and Pacific Islanders.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Table 4: Percent Distribution of Low Birth Weight[1] Babies by Age of Mother District of Columbia Residents, 2013 and 2014

	2013	2014	Percent Change
Total Births for All Ages[2]	9,264	9,514	2.7
- Number of Low Birth Weight	895	940	
- Percentage of Low Birth Weight	9.7%	9.9%	2.3
Total Births to Mothers Under 20 Years of Age	657	575	-12.5
- Number of Low Birth Weight	85	61	
Percentage of Low Birth Weight among mothers < 20 years old	12.9%	10.6%	-18.0
Total Births to Mothers 20 Years of Age and Older	8,603	8,937	3.9
- Number of Low Birth Weight	810	878	
Percentage of Low Birth Weight among mothers ≥20 years old	9.4%	9.8%	4.3

Notes: [1] Low Birth Weight means less than 2,500 grams or 5lbs. 8oz.
[2] Mother's age is computed from date of birth to date of delivery. If date of birth is not reported, then mother's age is reported as unknown.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Low Birth Weight and Age of Mother

In the District of Columbia, the percentage of low birth weight infants born to all mothers under 20 years of age decreased from 12.9 percent in 2013 to 10.6 percent in 2014 to (**Table 4**). The percentage of low birth weight babies born to all mothers 20 years of age and older increased from 9.4 percent in 2013 to 9.8 percent in 2014.

Low Birth Weight and Infant Deaths by Age of Mother

Of the 940 low birth weight births, 53 infants (5.7 percent) died in 2014. A total of 19 infants (26.4 percent of all 72 infant deaths) died to mothers 20-29 years of age in 2014. Ten of these 19 infants (52.6 percent) were low birth weight. Twenty-one percent of all infant deaths (n=15) occurred to mothers aged 30-39 years; 1.4 percent of all infant deaths were to mothers aged below 20 years (**Table 5**).

Low Birth Weight and Infant deaths by Race of Mother

Of the 72 infant deaths, 53 (73.6 percent) were low birth weight infants (41 died during the neonatal period and 12 in the post-neonatal period). Eight out of thirteen (61.5 percent) infant deaths to white mothers were born weighing less than 2,500 grams. Thirty-nine of the 50 (78.0 percent) infant deaths to black mothers were low birth weight babies. All three (100 percent) infant deaths to mothers of Hispanic origin were also low birth weight (data not shown). Of the 53 low birth weight infants, 43 (81.1 percent) were very low birth weight and 10 were moderately low birth weight (18.9 percent).

Table 5: Percent Distribution of Low Birth Weight Infant Deaths by Age of Mother and Time of Death District of Columbia Residents, 2014

Age of Mother	Infant Deaths	Percent Deaths*	LBW Deaths	%LBW Deaths**	Time of Infant Death		
					Total LBW	Neonatal	Post-neonatal
Total	72	100.0	53	73.6	53	41	12
< 20 years	1	1.4	1	100.0	1	1	0
20-24 years	17	23.6	12	70.6	12	9	3
25-29 years	19	26.4	10	52.6	10	9	1
30-34 years	16	22.2	12	75.0	12	9	3
35-39 years	15	20.8	14	93.3	14	9	5
≥ 40 years	4	5.6	4	100.0	4	4	0

*Percentage based on all infant deaths (N=72).

**Percentage based on total deaths in each age group.

Note: LBW means low birth weight (under 2,500 grams or 5lbs. 8 oz.).

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Prematurity

Prematurity leads to low birth weight and infant mortality. **Table 6** shows the percentages of all premature births (less than 37 weeks gestation) for 2013-2014. Premature births in the District decreased from 10.6 percent in 2013 to 9.6 percent in 2014. Preterm births have decreased across most racial groups in 2014, with the largest decline of 9.4 percent among White and Black mothers. In contrast, an 11.1 percent increase in preterm births was observed among Asian and Pacific Islander mothers who delivered in 2014.

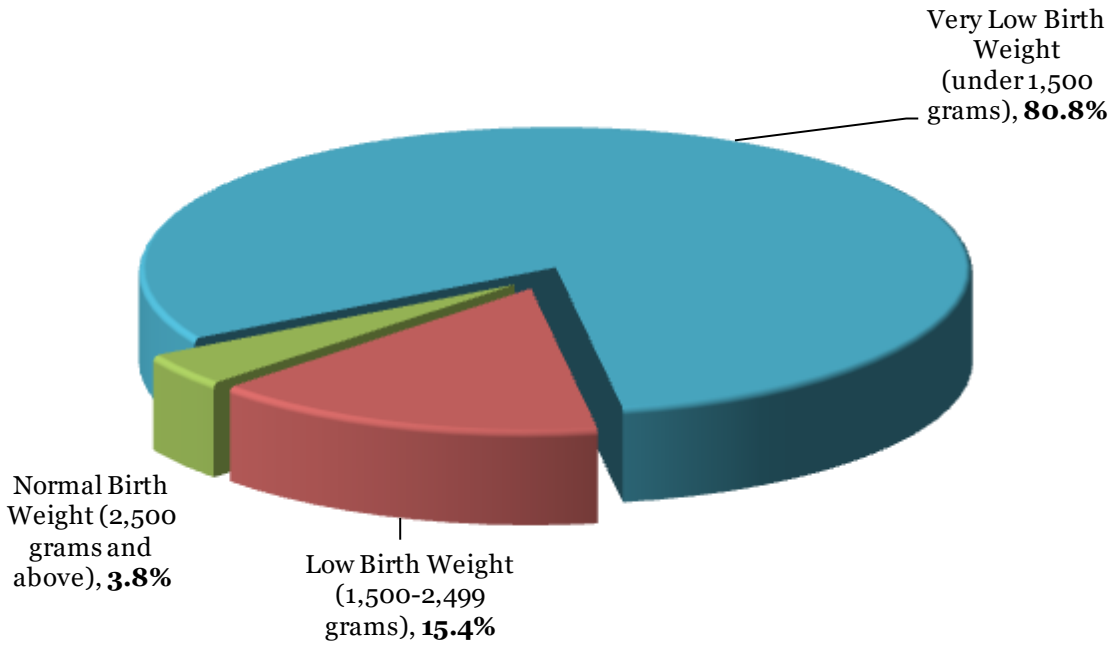
About 65 percent of all preterm births occurred between 34-36 weeks gestation. Fifty-two of the 72 (72.2 %) infants who died in 2014 were preterm. Of these preterm infant deaths, 42 (80.8 %) weighed under 1,500 grams (**Figure 6**). Almost 40 percent of preterm infants died to mothers ages 25-34 in 2014 compared to 60 percent in 2013.

Table 6. Percent Distribution of Premature Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2013 and 2014

Race/Hispanic Origin	2013	2014	Percent Change
Total Births for All Races	9,264	9,514	2.7
-Number of Premature Babies	979	920	-
-Percent Premature Babies	10.6%	9.7%	-8.5
Total Births to Black* Mothers	4,840	4,836	-0.1
-Number of Premature Babies to Black Mothers	619	568	-
-Percent Premature Babies to Black Mothers	12.8%	11.7%	-8.2
Total Births to White* Mothers	2,997	3,258	8.7
-Number of Premature Babies to White Mothers	225	225	-
-Percent Premature Babies to White Mothers	7.5%	6.9%	-8.0
Total Births to Asian and Pacific Islander (API) Mothers	439	452	3.0
-Number of Premature Babies to API Mothers	31	36	-
-Percent Premature Babies to API Mothers	7.1%	8.0%	12.8
Total Births to Hispanic Mothers	1,243	1,283	3.1
-Number of Premature Babies to Hispanic Mothers	111	111	-
-Percent Premature Babies to Hispanic Mothers	8.9%	8.7%	-2.2

* Includes mothers of Hispanic origin.
Note: Premature births mean births under 37 weeks of gestation.

Figure 6. Preterm Infant Deaths by Birth Weight, 2014(n=52)



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Entry into Prenatal Care

Early, high-quality prenatal care (PNC) is one of the cornerstones of a safe motherhood program, which begins before conception, continues with appropriate PNC and protection from pregnancy complications, and maximizes healthy outcomes for infants and mothers[4].Women who receive late (third trimester of pregnancy[5]) or no PNC do not receive timely preventive care or education and are at risk for having undetected complications of pregnancy that can result in severe maternal morbidity and sometimes death[6,7].

It is important to note that births for which the time prenatal care began was unknown were subtracted from the total number of births before percentages were computed. Based on this computation, 58.0 percent of District resident mothers who gave birth in 2014 began prenatal care in the first trimester of pregnancy (**Table 9**). Among white mothers who gave birth in 2014, 83.0 percent had timely entry into prenatal care compared to 67.7 percent of Hispanic mothers and 57.0 percent of black mothers (**Table 9**).

About 21.8 percent of mothers began care late, had no record of prenatal care, or had documented no prenatal care at all. About 70 percent of these were black women (**data not shown**).

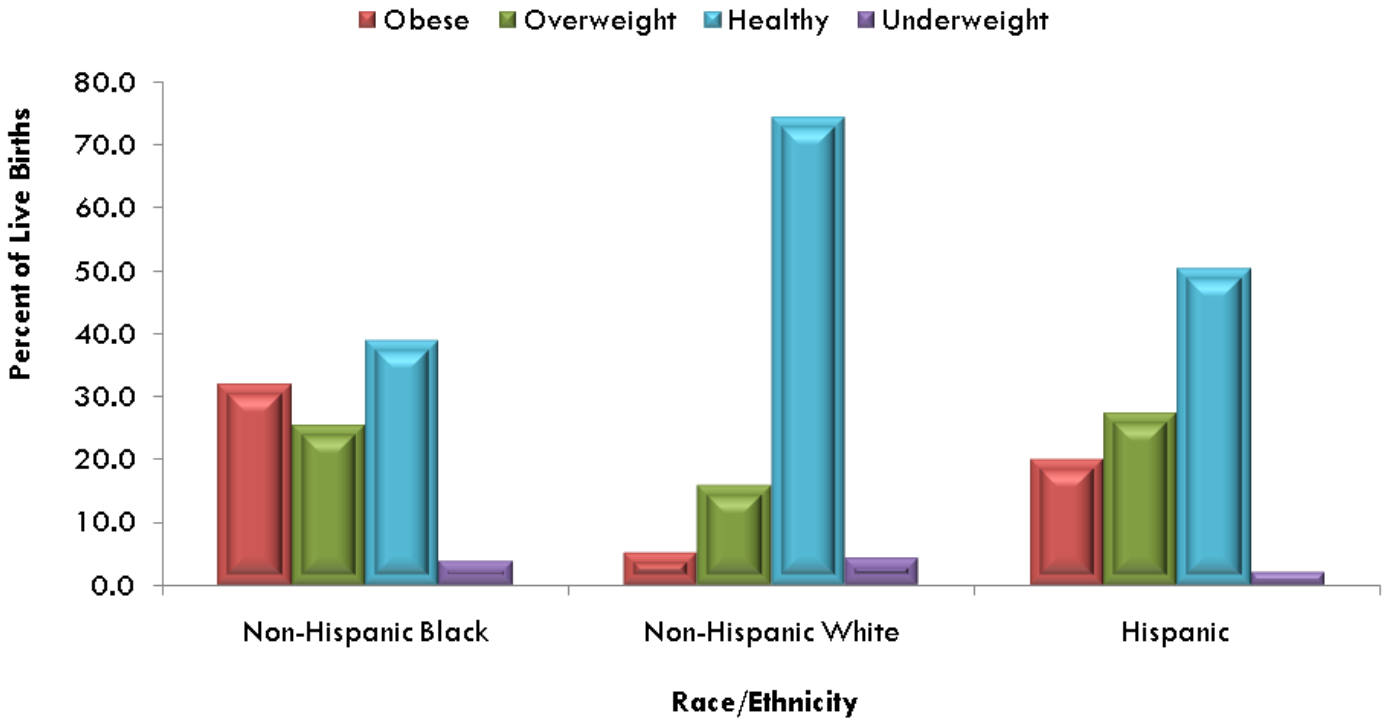
Pre-pregnancy Weight Status

Body Mass Index (BMI) is calculated using height and weight and is a fairly reliable indicator of body fat or weight status. A BMI less than 18.5 is considered underweight, 18.5 to 24.9 is considered healthy, 25 to 29.9 is considered overweight, and 30 or above indicates obesity[8]. Maternal pre-pregnancy overweight and obesity increase risk for adverse pregnancy and birth outcomes, including infant death[9,10,11].

Data on maternal pre-pregnancy weight was collected in the District of Columbia birth certificate beginning in February 2009, allowing for the calculation of maternal BMI for the first time. Pre-pregnancy BMI was calculated using the following formula: pre-pregnancy weight (lb) x 703 / height (sq. in). Records with unknown or invalid values for mothers' height or pre-pregnancy weight were excluded from this analysis.

In 2014 53.3 percent of District of Columbia women who gave birth to a live infant had healthy weight prior to pregnancy, 42.7 percent were either overweight or obese before their pregnancy, and 4.0 percent were underweight. Non-Hispanic black and Hispanic mothers in DC were more likely to be overweight or obese (57.1 percent and 47.4 percent, respectively) than non-Hispanic white mothers (21.4 percent) (**Figure 7**). It should be noted that maternal height and weight reported in birth certificates may be underestimated and subject to biases when self-reported data are used.

Figure 7. Disparities* in Pre-pregnancy Weight Status by Race/Ethnicity, District of Columbia, 2014 (n=8968)

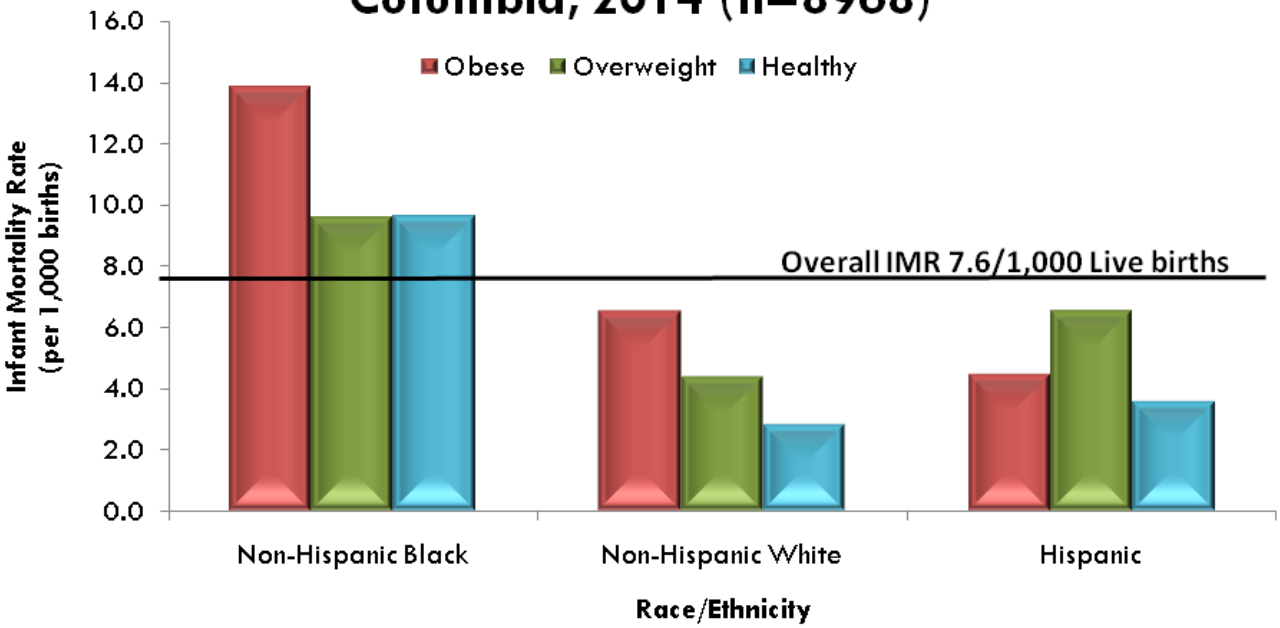


* Differences in calculations are due to missing race/ethnicity data

Note: The analysis does not include mothers with a pre-pregnancy weight <50lbs and >400 lbs.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 8. Infant Mortality by Pre-pregnancy Weight Status and Race/Ethnicity*, District of Columbia, 2014 (n=8968)



*546 records had no data for race/ethnicity

Note: The analysis does not include mothers with a pre-pregnancy weight <50lbs and >400 lbs.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Associations between maternal obesity and IMR differed by maternal race/ethnicity (**Figure 8**). Among infants born to obese mothers, the highest IMR was among non-Hispanic blacks at 14.0 per 1,000 births. Hispanic mothers who were obese had the lowest IMR of 4.4 per 1,000 births, while the IMR infants born to non-Hispanic white mothers was 6.6 in 2014. Among infants born to overweight mothers, non-Hispanic blacks and Hispanic mothers had the highest rates, 9.7 and 6.6, respectively.

In 2014, 33.3 percent of infant deaths in the District were among infants born to mothers who were obese. A correlation between maternal obesity, infant mortality, and maternal race/ethnicity was observed among mothers who were obese and with high rates of infant mortality. The highest IMR was among infants born to obese non-Hispanic black mothers at 14.0 per 1,000 live births (**Figure 8**) —almost double the overall infant mortality rate for the District in 2013 (6.8 per 1,000 live births), and higher than the overall IMR for non-Hispanic black mothers (10.5 per 1,000 live births). There were only 3 infant deaths to obese/overweight Hispanic mothers, and one infant death to an obese non-Hispanic white mother in 2014, so rates may be unstable due to small numbers and should be interpreted carefully.

Marital Status

The proportion of births to unmarried women decreased slightly in 2014 to 50.3 percent compared with 50.6 percent in 2013. Of the 4769 (50.1 percent) births to unmarried women in 2014, 11.8 percent were to teens below 20 years old. Almost 92 percent of births to women aged 20-24 years and 63 percent of births to women aged 25-29 years were to unmarried women (data not shown).

In 2014, 73.6 percent of infant deaths were to unmarried women, compared to 76.2 percent in 2013, an increase of 2.6 percent. Between 2009 and 2014, more than three-quarters of infant deaths were to unmarried women (**Table 7**). **Table 9** shows the distribution of unmarried women by race and Hispanic origin of mother.

Table 7: Number and Percentage of Births and Infant Deaths by Marital Status District of Columbia Residents, 2009-2014

		Births to Unmarried Women		Births to Married Women		Infant Deaths to Unmarried Women			Infant Deaths to Married Women	
Year	Total Number of Births	Number of births	Percent	Number of Births	Percent	Total Infant Deaths	Number of Infant Deaths	Percent	Number of Infant Deaths	Percent
2014	9,514	4,769	50.1	4,725	49.7	72	53	73.6	19	26.4
2013	9,264	4,690	50.6	4,523	48.8	63	48	76.2	12	19.0
2012	9,370	4,788	51.1	4,537	48.4	74	55	74.3	17	23.0
2011	9,289	4,963	53.4	4,290	46.2	69	48	69.6	16	23.2
2010	9,156	5,008	54.7	4,093	44.7	73	50	68.5	23	31.5
2009	9,008	4,995	55.5	3,950	43.8	89	81	91.0	7	7.9

There were 2 records missing marital status information.

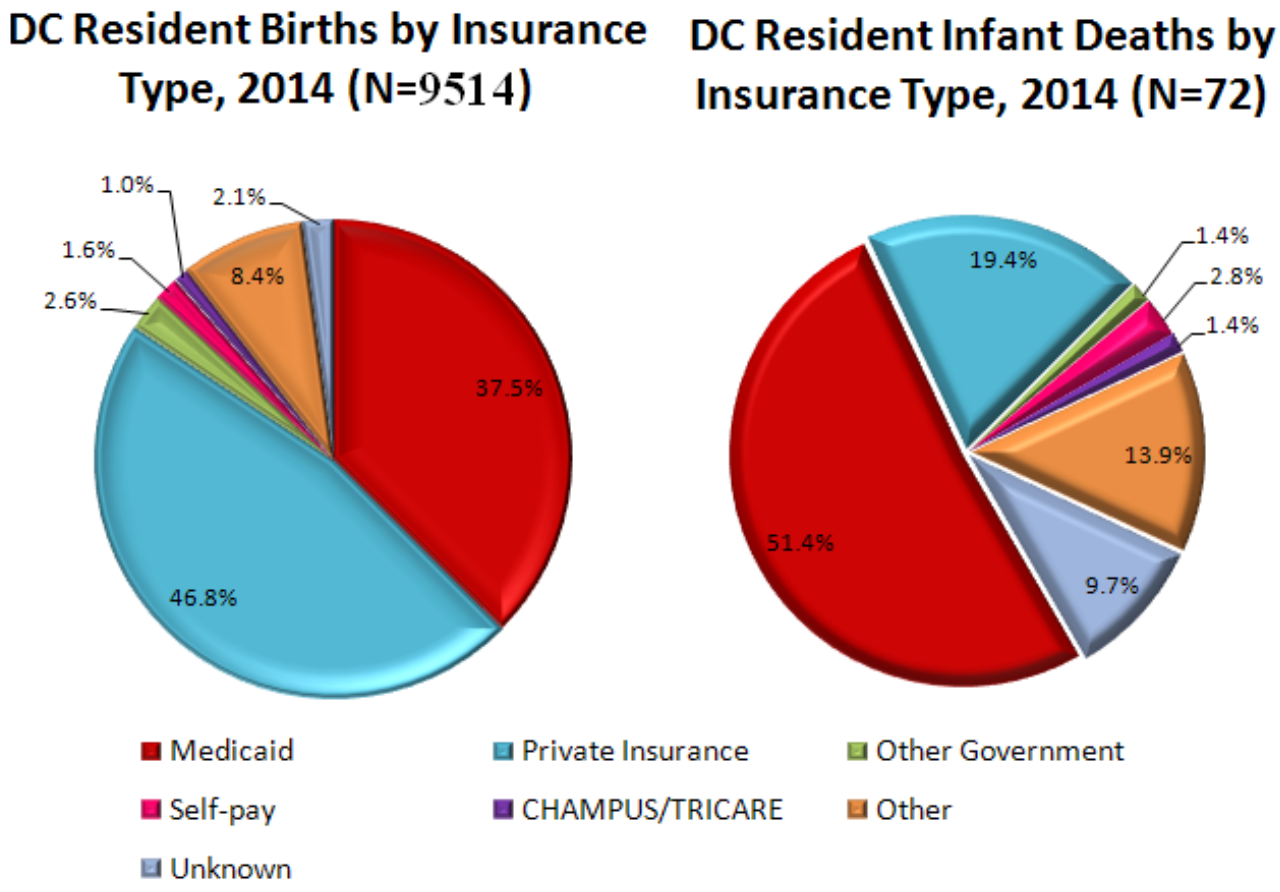
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

HEALTH INSURANCE TYPE

Most women in the District have access to health care and insurance during pregnancy. Studies show that women with Medicaid-paid deliveries were more likely to experience risk factors during pregnancy such as depression, stress, and smoking, compared to women with private insurance[12]. **Figures 8 and 9** display the distribution of 2014 births and infant deaths in the District by maternal race/ethnicity and insurance type.

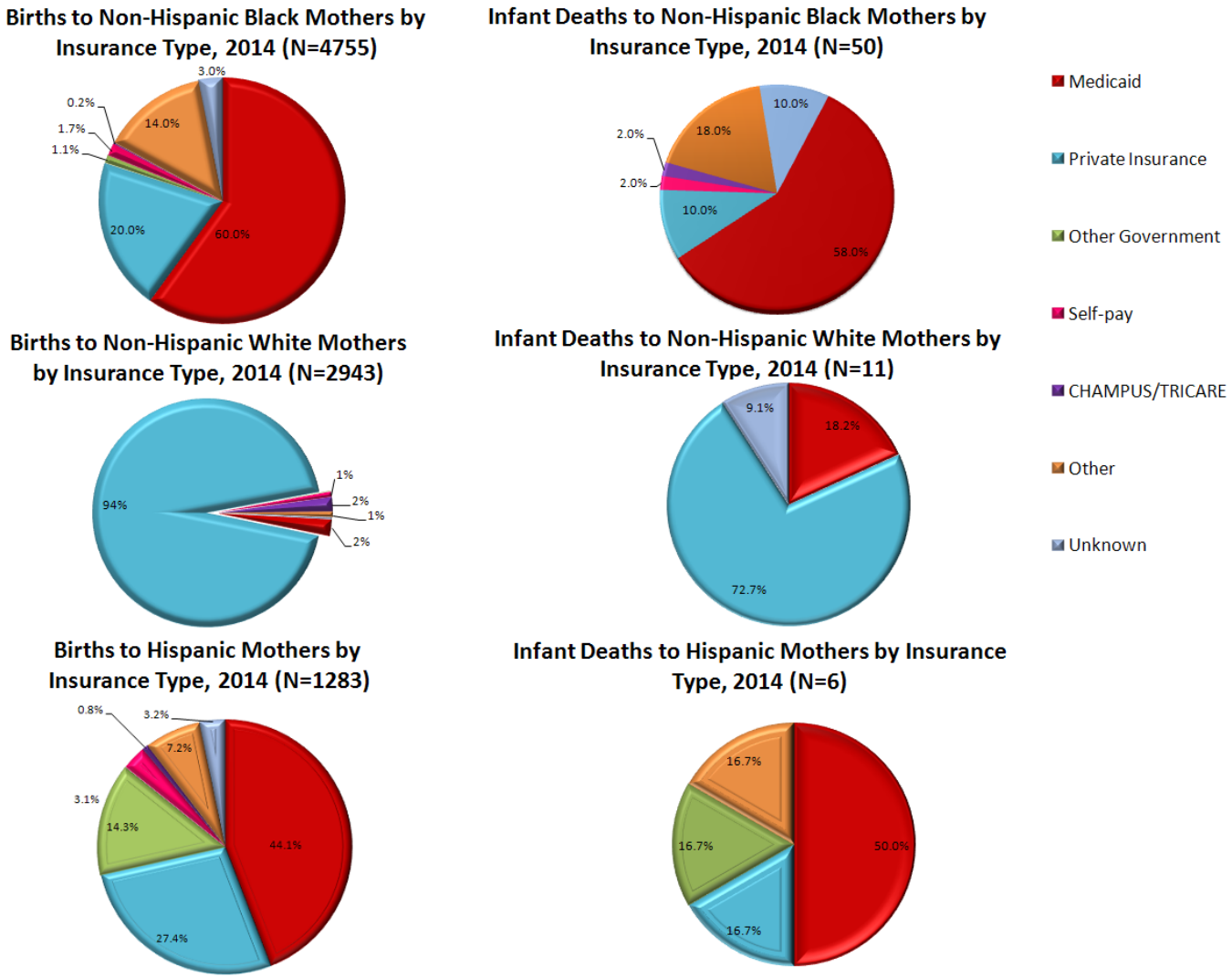
City-wide, 38.5 percent of deliveries were to Medicaid beneficiaries. Infant deaths disproportionately occurred to mothers who used Medicaid at the time of delivery compared to those with private insurance, 51.4 percent vs. 19.4 percent, respectively (**Figure 9**). **Figure 10** shows that non-Hispanic black mothers were the highest Medicaid beneficiaries at 60.0 percent. More than half (58%) of infants who died to non-Hispanic black mothers used Medicaid insurance as the principal source of payment at the time of delivery.

Figure 9. Births and Infant Deaths by Mother's Insurance Type at Time of Delivery,



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 10. Births and Infant Deaths by Mother's Race/Ethnicity and Insurance Type at Time of Delivery, District of Columbia, 2014



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

GEOGRAPHICAL DISTRIBUTION

The District is demographically comparable to cities of similar size and population mix like Baltimore City, Detroit, and Richmond. Among the following four cities, the District's rate has followed a downward trend and continues to consistently be ranked the lowest from 2009 to 2014 (**Table 8**).

Table 8: Infant Mortality Rate Comparisons for Baltimore, the District of Columbia, Richmond and Detroit Cities, 2009-2014

City	2009	2010	2011	2012	2013	2014
Baltimore City, Maryland[1]	13.5	11	10.5	9.7	10.3	10.4
Detroit City, Michigan[2]	14.8	13.3	12.6	15.0	13.3	10.6
District of Columbia[3]	9.9	8.0	7.4	7.9	6.8	7.6
Richmond, Virginia[4]	12.2	12.8	8.7	10.5	10.6	12.3

Sources: [1] Vital Statistics Administration, Department of Health and Mental Hygiene, Maryland.
[2] Vital Records & Health Data Development Section, Michigan Department of Community Health.
[3] Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
[4] Virginia Department of Health, VA State Center for Health Statistics.

Infant Mortality by Ward

There are eight wards in the District which provide a basis for breaking down District-wide data into small geographical subdivisions for comparison and analyses. With very few individual-level socioeconomic data, ward-level statistics form a useful platform for evaluating health status indicators against demographic and environmental characteristics. **Table 9** shows selected maternal and child health indicators and infant deaths by geographic areas or wards in the District of Columbia. In 2014, there was a decrease in the number of infants born in Wards 2 and 3 (**Table 10**). Further, the infant mortality distribution by ward for 2014 shows a decline in the IMR for Wards 4, 5 and 7 and an increase in wards 1, 2, 3, 6 and 8. Among the wards with increased IMRs in 2014, Ward 8 had the highest rate (65% greater than city-wide rate), with a 14.7 percentage increase (from a rate of 10.9 per 1,000 live births in 2013 to 12.5 per 1,000 live births in 2014. Ward 2 had zero infant deaths while Ward 3 had only 1 infant death in 2013, but 4 infant deaths were observed in Ward 2 during 2014 while Ward 3 again had one mortality. Caution should be exercised when interpreting percent changes in the IMR by ward, which are highly variable and do not meet standards of reliability or precision. In addition, caution should also be used when interpreting the rate and percentage change because of the very small numbers in **Tables 10**, **11**, and **12**. IMRs by ward from 2010 and 2014 are presented in **Table 13**. The geographic distribution of 2014 ward-level data for selected measures such as infant mortality, birth rates, low birth weight, preterm births, entry into prenatal care, and teen births in the District of Columbia are depicted in Maps 1, 2, 3, 4, 5, and 6, respectively (**see appendix**).

Table 9. Indicators of Maternal and Child Health, and Infant Mortality by Ward
District of Columbia Residents, 2014

Indicators	DC	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
2014 Estimated Population[1]	633,736	81,637	75,780	82,795	82,375	80,307	82,092	70,064	76,686
Live Births	9,514	1,123	630	774	1,451	1,214	1,390	1,245	1,676
Rate/1,000 pop[1]	15.0	13.8	8.3	9.3	17.6	15.1	16.9	17.8	21.9
Black Live Births	4,836	298	48	40	577	737	429	1,175	1,526
White Live Births	3,258	487	437	628	413	299	845	33	113
Hispanic[2] Live Births	1,283	316	83	65	479	176	76	36	52
Births to Unmarried Women	4,769	464	87	41	668	673	403	1,046	1,383
(Percent)	50.1	41.3	13.8	5.3	46.0	55.4	29.0	84.0	82.5
% Births to Unmarried Black Women	79.3	43.8	21.8	17.1	46.6	79.6	82.9	96.9	98.1
% Births to Unmarried White Women	5.6	9.5	37.9	65.9	8.7	4.6	12.9	0.6	1.2
% Births to Unmarried Hispanic[2]Women	16.1	46.8	44.8	12.2	48.5	16.0	6.2	2.5	1.9
Births to Mothers Aged <20 yrs.	575	50	6	0	73	77	41	147	181
(Percent)	6.0	4.5	1.0	0.0	5.0	6.3	3.0	11.8	10.8
Births to Mothers 15-19 yrs.	567	50	6	0	73	77	40	146	175
(Percent)	6.0	4.5	1.0	0.0	5.0	6.3	2.9	11.7	10.4
Birth Rate/1,000[8]	27.6	19.7	1.6	0.0	36.3	30.8	32.3	58.5	53.2

Notes:
[1] Rates and ward estimates were derived from the District of Columbia Census 2000 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 and the 2014 single-year DC Population Estimates prepared by the DC Office of Planning State Data Center, Retrieved 11/25/2015 from https://factfinder.census.gov
[2] Hispanics include persons of all Hispanic origin of any race.
[3] Rates by ward for women aged 15-19 years were calculated using sex- and age-specific ward-level data from the District of Columbia Census 2010 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 and the 2014 DC Population Estimates prepared by the DC Office of Planning State Data Center.
[4] Low birth weight (under 2,500 grams or 5 lbs. 8 oz.).
[5] Prenatal care beginning in the first trimester of pregnancy is defined as the date of the first prenatal care visit occurring during the first three months of pregnancy (or during the first 13 weeks after the first day of the last menstrual period). Late prenatal care is defined as the date of the first prenatal care visit occurring during the third trimester (or the last three months of pregnancy).
[6] Births for which unknown "prenatal care began" were subtracted from the total number of births before percentages were computed.
[7] Due to the small number of infant deaths, infant mortality rates are highly variable and should be interpreted cautiously.
[8] Birth Rates by ward were calculated using 2014 5-year estimates from the Census Bureau

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health

Table 9. Indicators of Maternal and Child Health, and Infant Mortality by Ward District of Columbia Residents, 2014 (Continued)

Indicators	DC	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
Women 15-19 yrs.[3] Low Birth Weight Live Births[4]	940	79	48	36	114	134	126	169	231
(Percent)	9.9	7.0	7.6	4.7	7.9	11.0	9.1	13.6	13.8
Low Birth Weight Births[4] Black (Percent)	620 (12.8)	23 (7.7)	4 (8.3)	2 (5)	50 (8.7)	94 (12.8)	60 (14)	163 (13.9)	222 (14.5)
Low Birth Weight Births[4] White (Percent)	201 (6.2)	31 (6.4)	32 (7.3)	24 (3.8)	27 (6.5)	23 (7.7)	53 (6.3)	5 (15.2)	6 (5.3)
Low Birth Weight Births[4] Hispanic[2] (Percent)	103 (8)	24 (7.6)	7 (8.4)	4 (6.2)	40 (8.4)	17 (9.7)	10 (13.2)	1 (2.8)	0 (0)
Low Birth Weight[4]to Mothers <20 yrs.	61	3	0	0	9	8	6	14	21
(Percent)	10.6	6.0	0.0	0.0	12.3	10.4	14.6	9.5	11.6
% Preterm Births (<37 weeks gestation)	9.7	6.9	7.0	6.2	9.1	10.1	8.3	14.1	12.1
% Births With Prenatal Care Beginning First Trimester[5,6]	58.0	61.7	73.5	81.8	57.3	52.8	68.8	43.7	44.9
% Black Births with First Trimester Prenatal Care	57.0	58.3	53.7	66.7	55.8	57.0	60.0	55.5	57.5
% White Births with First Trimester Prenatal Care	83.0	81.3	81.2	86.0	81.0	82.3	85.4	70.0	71.6
% Hispanic[2] Births with First Trimester Prenatal Care	67.7	66.9	66.7	87.1	68.0	55.3	79.2	65.5	67.6
% Births With Late or No Prenatal Care[5,6]	21.8	20.4	10.5	7.0	23.7	23.4	15.6	30.4	29.8
Infant Deaths (under 1 yr.)	72	8	4	1	6	13	7	12	21
Rate (per 1,000 live births)[7]	7.6	7.1	6.3	1.3	4.1	10.7	5.0	9.6	12.5

Notes: [1] Rates and ward estimates were derived from the District of Columbia Census 2010 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 and the 2013 DC Population Estimates prepared by the DC Office of Planning State Data Center.
[2] Hispanics include persons of all Hispanic origin of any race.
[3] Rates by ward for women aged 15-19 years were calculated using sex- and age-specific ward-level data from the District of Columbia Census 2010 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 and the 2013 DC Population Estimates prepared by the DC Office of Planning State Data Center.
[4] Low birth weight (under 2,500 grams or 5 lbs. 8 oz.).
[5] Prenatal care beginning in the first trimester of pregnancy is defined as the date of the first prenatal care visit occurring during the first three months of pregnancy (or during the first 13 weeks after the first day of the last menstrual period). Late prenatal care is defined as the date of the first prenatal care visit occurring during the third trimester (or the last three months of pregnancy).
[6]Births for which unknown "prenatal care began" were subtracted from the total number of births before percentages were computed.
[7] Due to the small number of infant deaths, infant mortality rates are highly variable and should be interpreted cautiously.
3 Low weight births excluded due to missing ward data
11 Pre-natal Care births excluded due to missing ward data
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health

Table 10: Births, Infant Deaths and Infant Mortality Rates by Ward
District of Columbia Residents, 2013 and 2014

	Births		Infant Deaths		Infant Mortality Rate[1]		
Ward	2013	2014	2013	2014	2013	2014	Percent Change[2]
1	1,061	1,123	6	8	5.7	7.1	26.0
2	667	630	0	4	0.0	6.4	640.0
3	824	774	1	1	1.2	1.3	6.5
4	1,372	1,451	7	6	5.1	4.1	-19.0
5	1,178	1,214	14	13	11.9	10.7	-9.9
6	1,259	1,390	5	7	4.0	5.0	26.8
7	1,235	1,245	12	12	9.7	9.6	-0.8
8	1,646	1,676	18	21	10.9	12.5	14.6
Unknown	22	11	0	0	0.0	0.0	-
Total	9,264	9,514	63	72	6.8	6.8	0.0

Notes: Due to the small number of infant deaths, the above infant mortality rates are highly variable and should be interpreted cautiously.
Ward distribution based on 2012 ward boundaries.
[1]Infant deaths per 1,000 live births.
[2]Changes in value over time (e.g., rates) [(New - Old) / Old = Decimal x 100 = Percent change].
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Table 11: Statistical Overview by Ward, District of Columbia Residents, 2013

Ward	Births	Infant Deaths	IMR*	LBW	Teen Births	LBW to Teens
1	1,061	6	5.7	82	53	7
2	667	0	0.0	56	9	1
3	824	1	1.2	42	3	0
4	1,372	7	5.1	123	74	9
5	1,178	14	11.9	119	84	9
6	1,259	5	4.0	104	48	5
7	1,235	12	9.7	173	153	24
8	1,646	18	10.9	195	230	30
Unknown	22	0	0.0	1	3	0
Total	9,264	63	6.8	895	657	85

*Infant deaths per 1,000 live births.
Notes: Due to the small number of infant deaths, the above infant mortality rates are highly variable and should be interpreted cautiously.
Ward distribution based on 2012 ward boundaries.
Teen birth in this table is defined as mother's younger than 20 years of age.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Table 12: Statistical Overview by Ward
District of Columbia Residents, 2014

Ward	Births	Infant Deaths	IMR*	LBW	Teen Births	LBW to Teens
1	1,123	8	7.1	74	50	3
2	630	4	6.3	46	6	0
3	774	1	1.3	34	0	0
4	1,451	6	4.1	113	73	9
5	1,214	13	10.7	134	76	8
6	1,390	7	5.0	122	40	6
7	1,245	12	9.6	168	143	14
8	1,676	21	12.5	226	173	21
Unknown	11	0	0.0	5	0	0
Total	9,514	72	7.6	922	561	61

*Infant deaths per 1,000 live births.

Notes: Due to the small number of infant deaths, the above infant mortality rates are highly variable and should be interpreted cautiously.
Ward distribution based on 2012 ward boundaries.
Teen birth in this table is defined as mother's younger than 20 years of age.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Table 13: Five-Year Infant Mortality Trend by Ward, District of Columbia Residents, 2010-2014
[Rates are Infant deaths per 1,000 live births]

Ward	2010	2011	2012	2013	2014
1	4.1	3.4	5.9	5.7	7.1
2	2.9	6.7	1.6	0.0	6.3
3	5.0	0	1.2	1.2	1.3
4	11.3	8.4	3.4	5.1	4.1
5	10.3	12.9	11.7	11.9	10.7
6	9.8	5.6	8.6	4.0	5.0
7	6.6	6.6	9.5	9.7	9.6
8	10.4	12	14.9	10.9	12.5
Total	8.0	7.4	7.9	6.8	7.6

Note: Due to the small number of infant deaths, the above infant mortality rates are highly variable and should be interpreted cautiously.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Causes of Death

The leading cause of infant mortality, **Congenital malformations, deformations and chromosomal abnormalities** accounted for 22.2 percent of all infant deaths in 2014 (**Table 14**). This is the first time since 2009 and 2010 congenital malformations, deformations, and chromosomal abnormalities have surpassed all other causes of infant death. **Newborn affected by maternal complications of pregnancy** slid from the first to the second leading cause of death in 2014, accounting for 15.3 percent of all infant deaths. There was a 25% decrease in the number of infant deaths due to **Disorders related to short gestation and low birth weight, not elsewhere classified** and it slid from the second leading cause of death in 2013 to the third leading cause of death in 2014 and accounted for 12.5 percent of all infant mortality. **Newborn affected by complications of placenta, cord, and membranes** dropped from third to fourth leading cause of death, and accounted for 11.1 percent of infant deaths in 2014. **Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified** also came in tied for fourth contributing 11.1 percent of infant deaths in 2014. These five leading causes of infant death in 2014 accounted for 72.2 percent of all infant deaths in the District of Columbia.

Table 14: Leading Causes of Infant Death District of Columbia Residents, 2014 (N=72)		Number	Percent*	Rate**
Rank[1]	All Causes	72	100.0	765.1
1	**Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)**	16	22.2	170.0
…	Congenital malformations of genitourinary system (Q50-Q64)	3	4.2	31.9
…	Congenital malformations of digestive system (Q35-Q45)	2	2.8	21.3
…	Congenital malformations of heart (Q20-Q24)	2	2.8	21.3
…	Edward's syndrome(Q91.0-Q91.3)	2	2.8	21.3
…	Other congenital malformations and deformations (Q10-Q18,Q86-Q89)	2	2.8	21.3
…	Other congenital malformations of nervous system (Q01-Q02,Q04,Q06-Q07)	2	2.8	21.3
…	Congenital malformations and deformations of musculoskeletal system, limbs and integument (Q65-Q85)	1	1.4	10.6
…	Congenital malformations of respiratory system (Q30-Q34)	1	1.4	10.6
…	Other congenital malformations of circulatory system (Q25-Q28)	1	1.4	10.6
2	**Newborn affected by maternal complications of pregnancy (P01)**	11	15.3	116.9
…	Newborn affected by incompetent cervix (P01.0)	5	6.9	53.1
…	Newborn affected by premature rupture of membranes (P01.1)	6	8.3	63.8
3	**Disorders related to short gestation and low birth weight, not elsewhere classified (P07)**	9	12.5	95.6
…	Extremely low birth weight or extreme immaturity (P07.0,P07.2)	7	9.7	74.4
…	Other low birth weight or preterm (P07.1,P07.3)	2	2.8	21.3
4	**Newborn affected by complications of placenta, cord, and membranes (P02)**	8	11.1	85.0
…	Newborn affected by complications involving placenta (P02.0-P02.3)	6	8.3	63.8
…	Newborn affected by chorioamnionitis (P02.7)	2	2.8	21.3
4	**Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R99)†**	**8**	**11.1**	**85.0**

*Percent based on total number of infant deaths
**Rate per 100,000 live births.
…Category not applicable.
[1] Rank based on number of infant deaths.
†See Technical notes for details on R99 and related designations related to this measure (A15).
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

In 2014, the leading cause of infant death nationally was C**ongenital malformations, deformations and chromosomal abnormalities. Disorders related to short gestation and low birth weight, not elsewhere classified** (low birth weight) was the second leading cause for the U.S. (**Table 15),** followed by **Newborn affected by maternal complications of pregnancy.** These rankings were unchanged from 2013.

Table 15. Infant Deaths and Infant Mortality Rates for the 10 Leading Causes of Infant Death: United States, 2014

Rank[1]	Cause of death (based on the *International Classification of Diseases, Tenth Revision, 2008 Edition*, 2009)	Number	Rate[2]
…	All causes	23,215	582.1
1	Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	4,746	119
2	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	4,173	104.6
3	Newborn affected by maternal complications of pregnancy (P01)	1,574	39.5
4	Sudden infant death syndrome (R95)	1,545	38.7
5	Accidents (unintentional injuries) (V01–X59)	1,161	29.1
6	Newborn affected by complications of placenta, cord and membranes (P02)	965	24.2
7	Bacterial sepsis of newborn (P36)	544	13.6
8	Respiratory distress of newborn (P22)	460	11.5
9	Diseases of the circulatory system (I00-I99)	444	11.1
10	Neonatal hemorrhage ((P50-P52,P54)	441	11.1
…	All other causes (residual)	7,162	…

Notes: 1. Data are based on a continuous file of records received from the states. Figures are based on weighted data rounded to the nearest individual, so categories may not add to totals or subtotals.
For certain causes of death such as unintentional injuries, sudden infant death syndrome, and congenital malformations, deformations and chromosomal abnormalities, preliminary and final data may differ significantly because of the truncated nature of the preliminary file. Data are subject to sampling and/or random variation.
…Category not applicable.
[1] Rank based on number of infant deaths.
[2] Rates are per 100,000 live births.

Source: CDC/NCHS, National Vital Statistics System, Mortality 2014. Available from:
http://www.cdc.gov/nchs/data/databriefs/db229_table.pdf#2

Neonatal Mortality

The leading causes of neonatal deaths in 2014 were **Newborns affected by maternal complications of pregnancy and Congenital malformations, deformations and chromosomal abnormalities.** Both causes each accounted for 22.9 percent of all neonatal deaths (45.8% total of all causes of neonatal deaths). **Disorders related to short gestation and low birth weight, not elsewhere classified** was the third leading cause in this category contributing to 18.8% of all neonatal deaths in 2014 (**Table 16**).

Table 16: Leading Causes of Neonatal Infant Death (N=48)
District of Columbia Residents, 2014

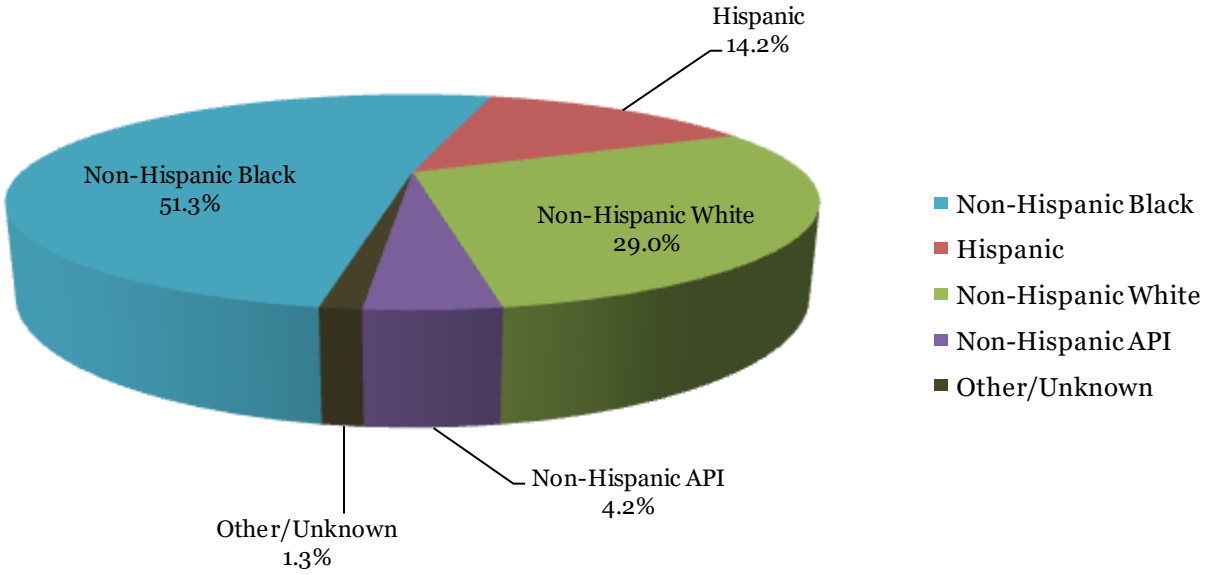
Rank[1]	Cause of Death (Based on Tenth Revision, International Classification of Diseases, 2008 Edition, 2009)	Number	Percent*	Rate**
…	All causes	48	100	510.1
1	Newborn affected by maternal complications of pregnancy (P01)	11	22.9	116.9
1	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	11	22.9	116.9
3	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	9	18.8	95.6
…	All other causes or total	17	35.5	107.9

*Percent based on total number of neonatal deaths.
**Rate per 100,000 live births.
…Category not applicable.
[1] Rank based on number of infant deaths.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Five-Year Birth and Infant Death Trend

Figure 11 shows the total number of births, 46,489 for the five-year period of 2010 to 2014. About 51.3 percent were to non-Hispanic black mothers, 29 percent were to non-Hispanic white mothers and 14.2 percent were to Hispanic mothers.

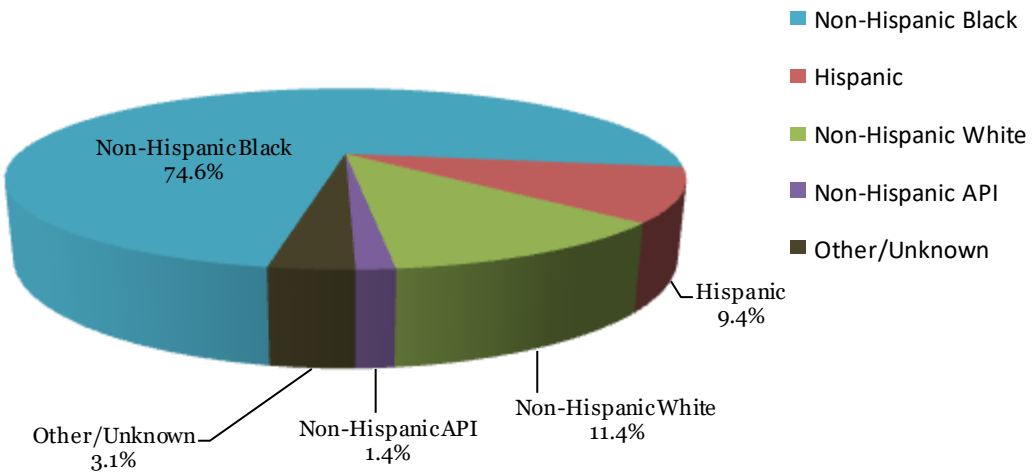
Figure 11. Births by Race and Hispanic Origin of Mother, 2010- 2014 (N=46,489)



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

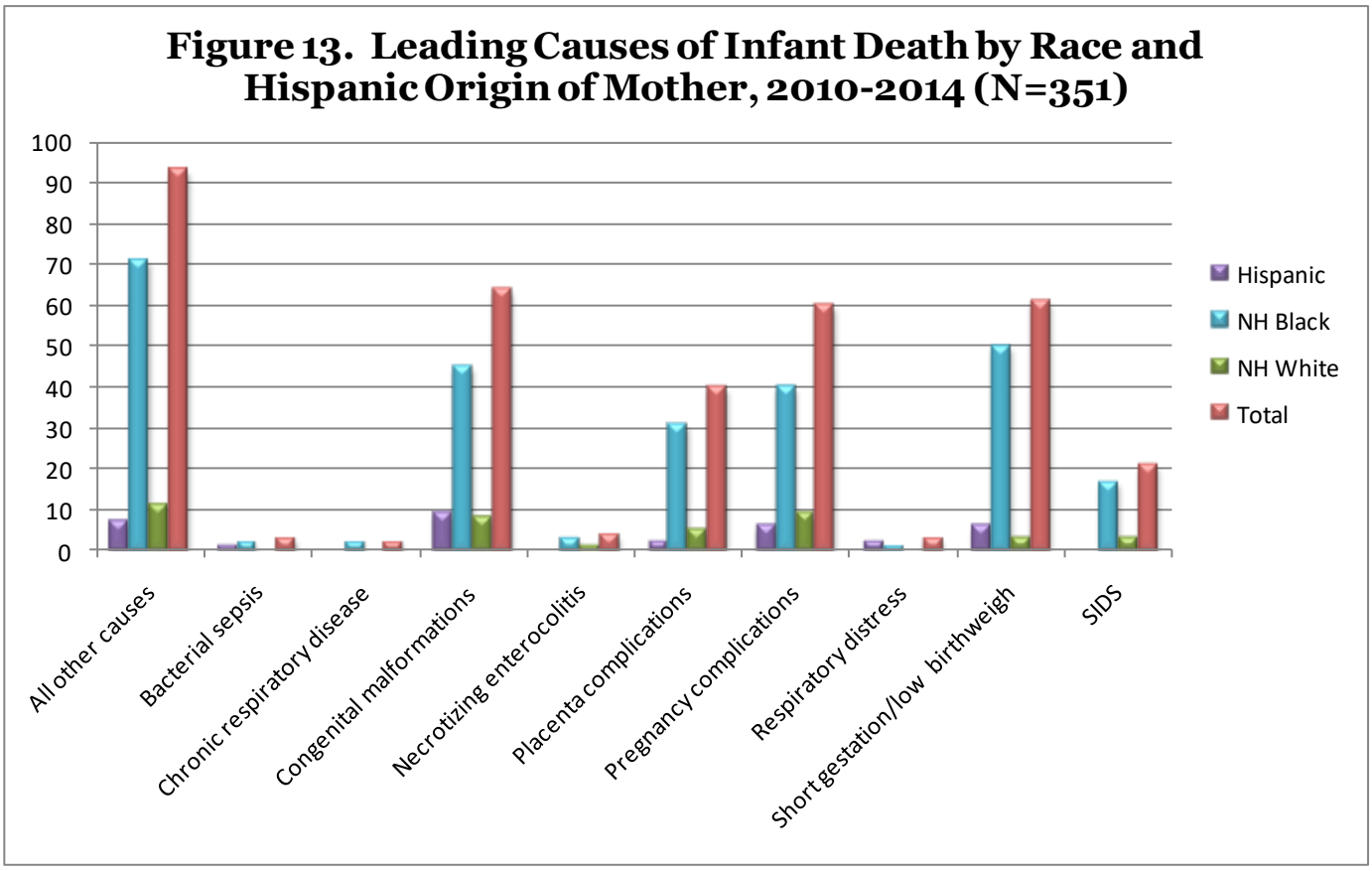
Of the total number of births (N=46,489), 351 infants died from 2010 to 2014. **Figure 12** shows the percentage of infant deaths by race/ethnicity from 2010 to 2014. Between 2010 to 2014, infants to non-Hispanic black mothers disproportionately died (74.6 percent) compared to their total number of births (51.3 percent).

Figure 12. Infant Deaths by Race and Hispanic Origin of Mother, 2010-2014 (N=351)



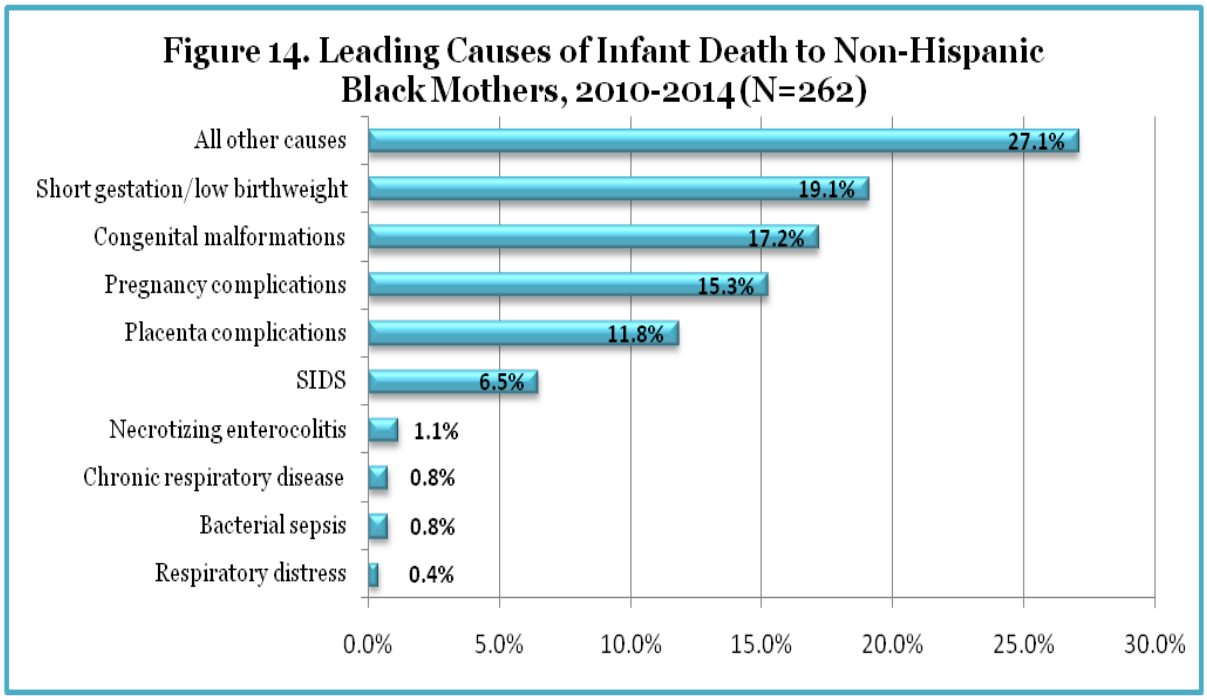
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 13 shows the leading causes of infant death over this five-year period (2010-2014). The leading cause of infant mortality was **Congenital malformations, deformations and chromosomal abnormalities,** which accounted for 18.2 percent, followed by **Short gestation and low birth weight** (17.4 percent). The third leading cause was **Newborn affected by maternal complications of pregnancy** (17.1 percent).



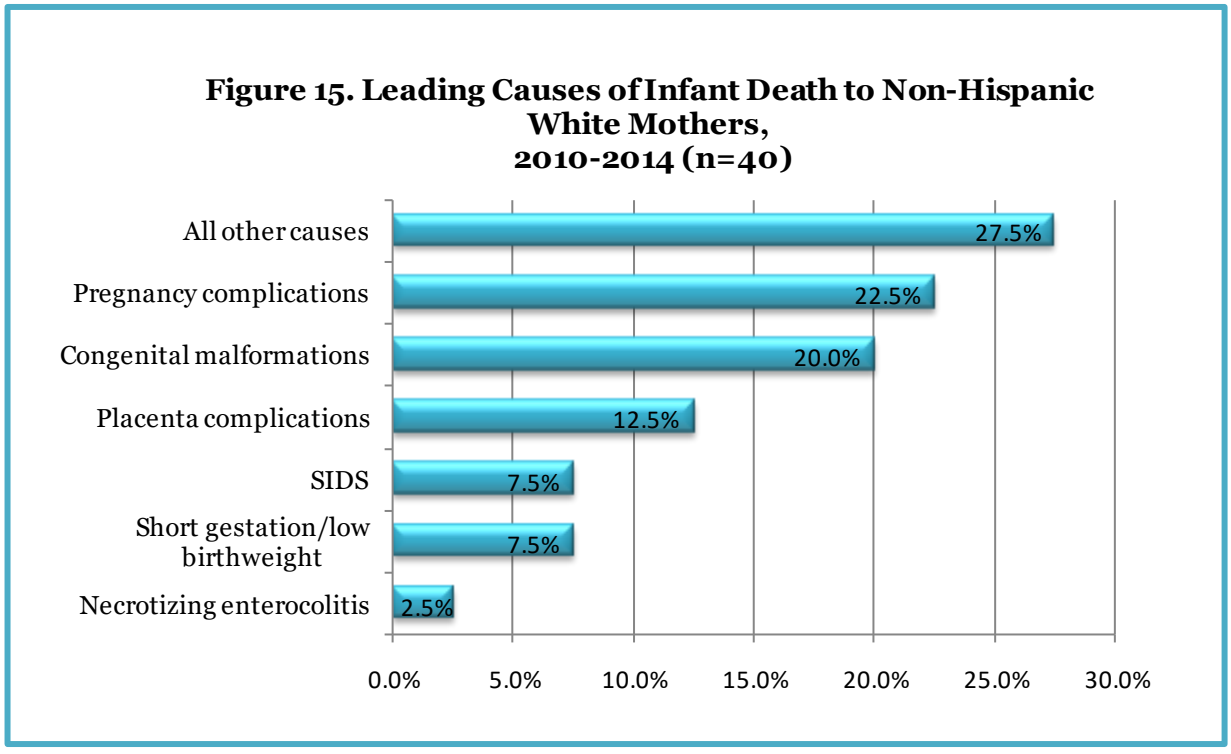
Note: Data by Asian/Pacific Islander were excluded due to small numbers.
NH Black = Non-Hispanic Black
NH White = Non-Hispanic White
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Among non-Hispanic black mothers, **Disorders related to short gestation and low birth weight, not elsewhere classified** was the leading cause of death (19.1 percent), followed by **Congenital malformations, deformations and chromosomal abnormalities** (17.2 percent). **Newborn affected by maternal complications of pregnancy** was the third leading cause of infant death (15.3 percent), from 2010-2014 **(Figure 14)**.



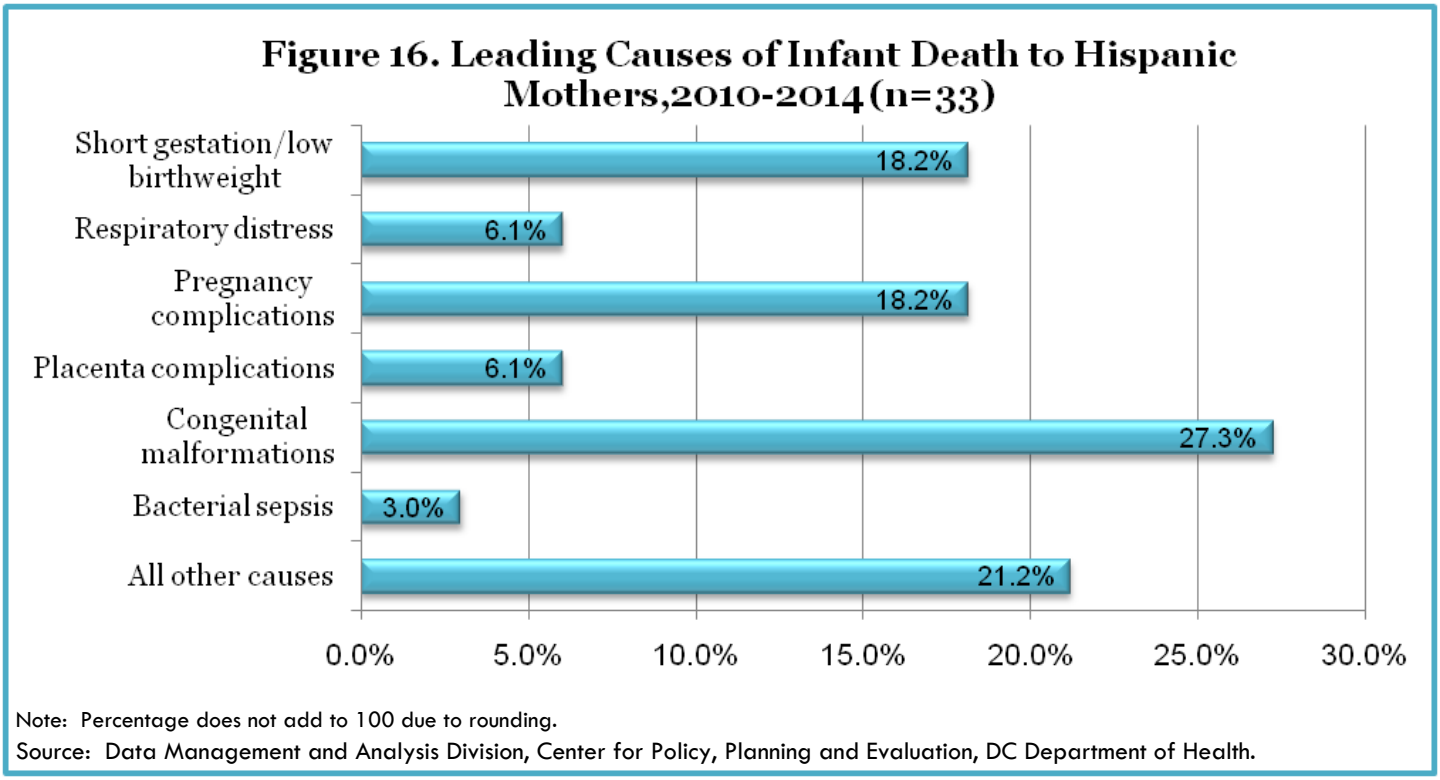
Note: Percentage does not add to 100 due to rounding.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

For infant deaths to non-Hispanic white mothers between 2010 to 2014, **Newborn affected by maternal complications of pregnancy** was the leading cause of infant death (22.5 percent) and **Congenital malformations, deformations and chromosomal abnormalities** was the second leading cause (20 percent). **Newborn affected by complications of placenta, cord, and membranes** was the third leading cause of infant death (12.5 percent) (**Figure 15**).



Note: Percentage does not add to 100 due to rounding.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 16 shows that the leading cause of infant death to Hispanic mothers from 2010 to 2014 was **Congenital malformations, deformations and chromosomal abnormalities** (27.3 percent). **Disorders related to short gestation and low birth weight, not elsewhere classified** (18.2 percent) was the second leading cause, along with **Newborn affected by maternal complications of pregnancy** (18.2 percent).

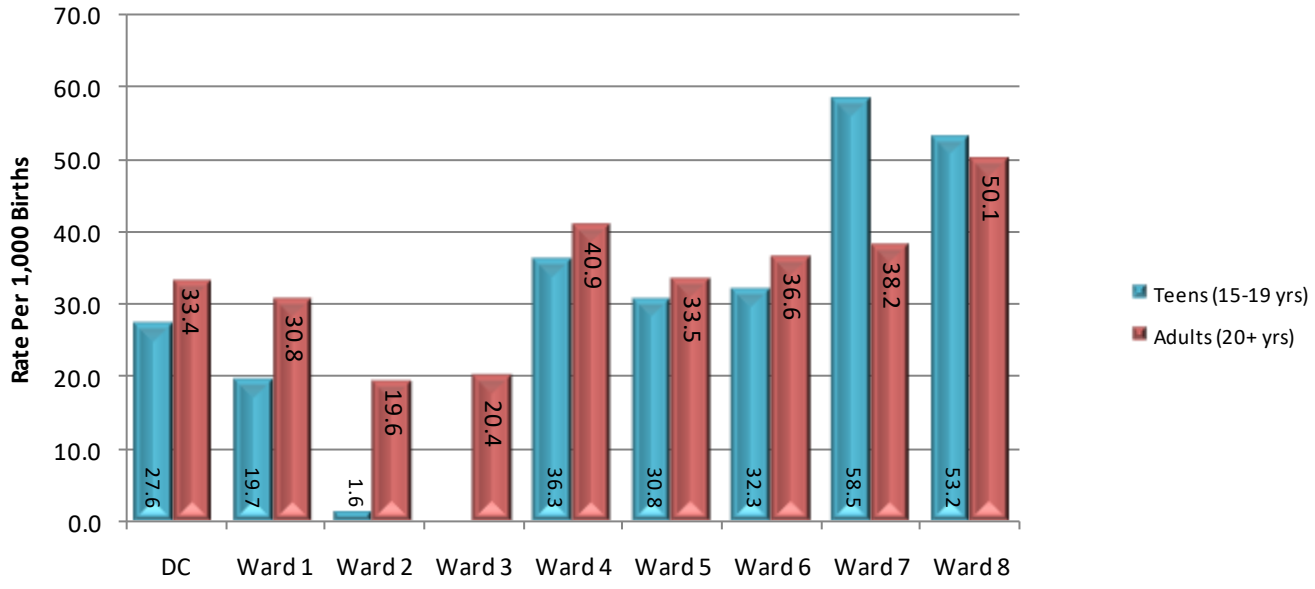


Note: Percentage does not add to 100 due to rounding.
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

TEEN BIRTHS

Figure 17 depicts birth rates among teens and adults in DC and the eight wards that make up the District. In 2013, there were 631 births to girls aged 15-19, resulting in a teen birth rate of 32.1 births per 1,000 girls. In 2014, decrease was observed with DC recording 567 births to girls aged 15-19, a teen birth rate of 27.6. As noted below, there are notable differences when looking at the teen birth rate by ward. These trends can also be seen in the map located in the appendix (**A12**). For comparison, birth rates for adults over 19 have been included.

Figure 17. Comparison of Birth Rate[1] by Age Group and Geographic Location, District of Columbia, 2014 (N=567)



[1]Rates were calculated using Bureau of the Census 5yr estimated population for 2014 by ward.

Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

DOH Maternal and Child Health Program Activities

In 2014, the District of Columbia Department of Health (DOH) Community Health Administration (CHA) continued its efforts to improve maternal, child and family health outcomes through a variety of programmatic activities. Major DOH initiatives that aim to improve birth outcomes and infant health include the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Perinatal HIV Program, Maternal, Infant and Early Childhood Home Visiting (MIECHV) program, and DC Healthy Start (DCHS).

DOH administers several food and nutrition programs that aim to improve the health and wellness of city residents by increasing access to healthy, locally sourced foods and nutrition intervention provided by registered dietitians and trained paraprofessionals. The largest of these programs is WIC, which serves low-income pregnant and postpartum women, infants and children at or below 185% of the poverty level. WIC provides prescribed food packages, tailored to meet specific nutrition and health needs of participants. Prenatal WIC participation has been shown to lower the risk of infant mortality by connecting expectant mothers to essential prenatal health care, promoting healthy eating through nutrition assessments and counseling, and providing healthy foods tailored to the specific needs of pregnant women and their babies[14]. Additionally, prenatal WIC participation is associated with significant improvements in African American infant mortality rate and reducing the IMR disparity gap between African Americans and Whites[15]. In 2014, the WIC program served more than 28,000 mothers and children.

In addition to food packages, pregnant and post-partum women participating in WIC, and their families receive breastfeeding promotion and peer counselor support. Breastfeeding has been shown to positively impact perinatal and infant health outcomes. The DC WIC Program has seen a steady increase in breastfeeding rates over the past three years. Breastfeeding rates increased from 49.92% to 51.53% between 2013 and 2014. Plans are in place to increase the number and reach of breastfeeding peer counselors with a particular focus on African American communities with lower rates of breastfeeding initiation and duration.

DOH provides services specifically for HIV-infected pregnant women. In addition to linking women to care and services and following up on the health-status of the infants, home visits can be made to locate women who are out of care (either HIV care or obstetrical care). In August of 2013, a regulation change was created to make pregnancy in HIV-infected women a reportable condition. This change was made so that DOH can ensure the health of the pregnant woman and offer medical and/or social services if needed. In calendar year 2014, no known HIV perinatal transmission occurred in the District. Sixty-eight pregnancies were reported to DOH. Of these, 12 did not require any further follow up (6 were not pregnant, 6 did not complete the pregnancy). Of the 56 remaining reports, all 56 pregnancies resulted in live births. Fifty-three infants have at least 1 documented negative HIV result. The remaining 3 infants require further follow-up to document their HIV status and linkage to care. Ten field visits were conducted during calendar year 2014.

The DC Maternal, Infant and Early Childhood Home Visit (MIECHV) Program began implementation in 2013. Using evidenced based home visiting models, MIECHV programs are designed to improve the health, educational and socio-economic outcomes for high-risk District families and children, focusing efforts in Wards 5, 7 and 8. MIECHV measures program progress in the following areas: improved maternal and newborn health; prevention of child injuries, child abuse, neglect, or maltreatment, and reduction of emergency department visits; improvement in school readiness and achievement; reduction in crime or domestic violence; improvements in family economic self-sufficiency; and, improvements in the coordination and referrals for other community resources and supports. During 2014, the MIECHV program served 249 families/children.

Beginning in 2014, DC Healthy Start began to transition from the historical DOH direct service structure to community-based approaches to service delivery, leveraging patient centered medical homes in areas of higher risk and need. Using a medical home model, participating organizations provide comprehensive case management services for DCHS program participants, while DOH provides overall program oversight, technical assistance and capacity-building within community based organizations. DCHS aims to aims to address the District's significant perinatal health disparities by improving the health and well-being of preconception, pregnant and postpartum women, their infants and fathers. Emphasis is placed on Wards 5, 6, 7 and 8 due to the widespread health and socioeconomic disparities in these communities. DOH seeks to improve perinatal and infant health outcomes by: 1) improving women's health, 2) promoting quality services, 3) strengthening family resilience, 4) achieving collective impact, and 5) increasing accountability through quality improvement, performance monitoring and evaluation.

DOH Strategy to Improve Perinatal and Infant Health

In late 2014, responding to emerging national best practices in addressing perinatal and infant mortality disparities, DOH began restructuring our strategies to align with nationally recognized strategies. DOH's citywide strategy reflects the core principles identified to decrease perinatal health disparities and improve maternal and child health. These principles include: using a life course perspective, recognizing that a person's health is determined by factors present prior to conception; addressing social determinants of health, recognizing that poverty and racism profoundly affect psychosocial well-being and are major contributors to disparities in birth outcomes; implementing systems level interventions, recognizing that addressing underlying social policies have profound impacts on improving health; and building collective impact, recognizing that sectors beyond public health and medicine must have a role in addressing preventable infant deaths to realize long lasting equitable outcomes for all of our families, regardless of race or place[16].

Our established framework to improve perinatal health outcomes is based on the overarching goal to ensure every community understands its health risks and role in improving perinatal health outcomes. To achieve this goal, DOH has identified seven core priorities that drive our programmatic efforts (Table 17).

TABLE 17: DOH Perinatal Strategic Framework

Priority Area	DOH Initiative
Every teenage girl and woman in DC is in control of her reproductive health.	Promotion of One Key Question® and reproductive life planning. Increasing adolescent engagement in preventive health through promotion of adolescent friendly health services and clinical-community linkages. Increasing availability and usage of long-acting reversible contraceptives (LARCs). Collaborating with education agency partners to ensure implementation of evidenced based comprehensive sexual health education in school settings.
Every pregnant woman receives patient-centered, high quality prenatal care beginning in the 1st trimester.	Developing learning collaborative and quality improvement projects to enhance early entry into prenatal care. Implementation and evaluation of media strategies to increase well-woman care. Federally-funded perinatal disparities programs, MIECHV, Healthy Start and WIC supplement medical care through provision of case management, education, nutrition counseling, and linkages to social services.

In addition to newer strategies described in **Table 17**, DOH will continue other programming (See Appendix) that addresses infant mortality from a life course perspective including Safe Sleep Program, Health Sexuality and Education, Title V funded programs, teen pregnancy prevention and chronic disease self-management.

TABLE 17: DOH Perinatal Strategic Framework

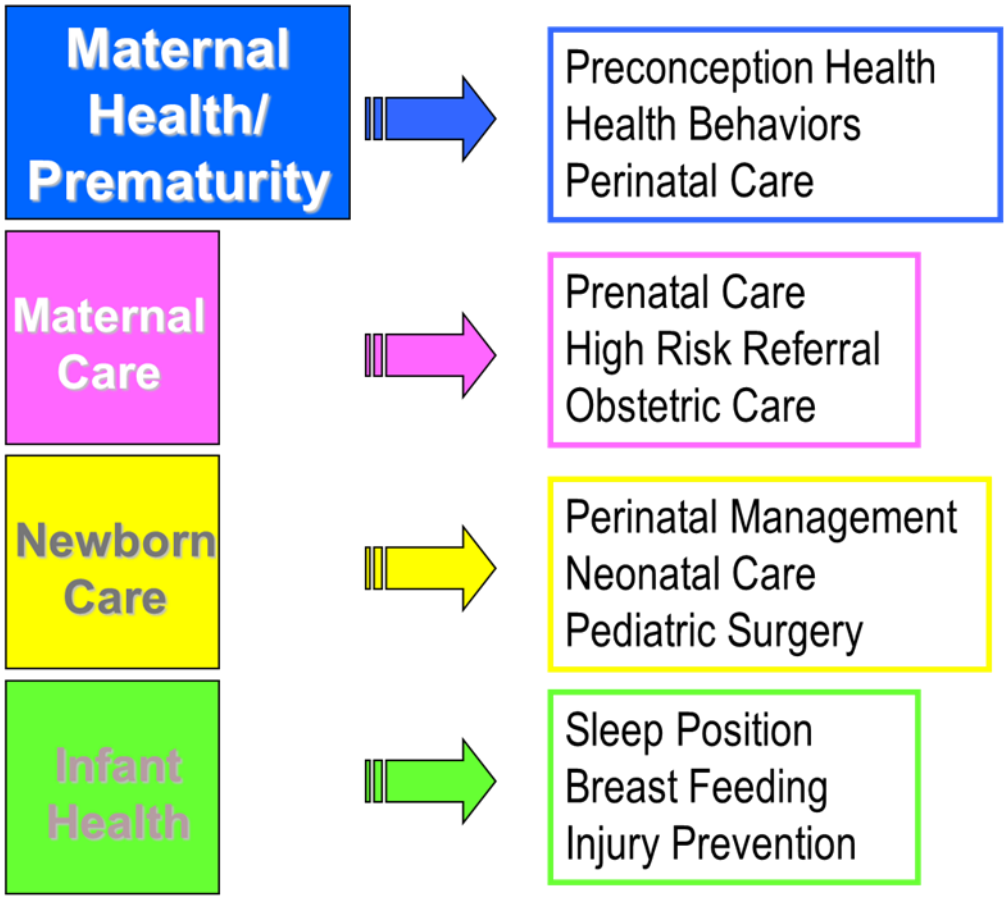
Priority Area	DOH Initiative
Every healthcare provider has the tools and resources they need to provide quality care and manage complex social needs of women and infants.	Implementing *Help Me Grow*, as centralized information and referral line to assist providers and families in linking children at risk for developmental and behavioral problems to needed services. Partnering with provider organizations to ensure dissemination of clinical best practices (ex. trauma informed care). Partnering with Department of Health Care Finance to establish provider quality indicators to drive improvement processes. Demonstrating outcomes of enhanced case management programs to drive insurance based funding of effective interventions.
Every healthcare facility providing maternal and infant care has the tools and resources to practice evidence based health care and to document QI/QA activities.	Partnering with Department of Health Care Finance and subject matter experts to develop clinical quality indicators that may be used to measure quality improvement projects (ex. decreasing early elective deliveries). Partnering with Office of Chief Medical Examiner to implement Maternal Mortality Review Committee. Partnering with OCME to add maternal interview to Infant Mortality Review Committee process, allowing for more comprehensive evaluation of infant deaths to drive systemic improvements. Participating in the Collaborative Improvement and Innovation Network to reduce Infant Mortality (federally-funded national initiative to link all 59 states and territories in a virtual learning community to improve birth outcomes with a focus on reducing disparities and quality improvement).
Every newborn receives high-quality neonatal care in the hospital and outpatient setting.	Perinatal HIV and Hepatitis B coordination programs work to decrease maternal-infant transmission of infectious diseases. Newborn Hearing and Newborn Metabolic screening programs work with birthing facilities and clinical providers to ensure all newborns in the District receive appropriate screening and follow up care. Partnering with DC Breastfeeding Coalition and birthing facilities to implement Baby Friendly Hospital Initiative.
Every parent has the life skills needed to nurture and provide for their family.	Working with District agencies and community partners to implement evidenced based or informed programs to enhance parenting skills for District residents. Working with District agencies and community partners to strengthen father engagement in prenatal care and parenting. Working with the State Early Childhood Development Coordinating Council to implement policies and programs leading to high quality early learning and care for children birth to five and their families.
Every infant, mom, and dad has a safe and healthy environment to thrive and receive the support they need to promote early childhood development and learning.	Working with community based organizations to implement and strengthen place based approaches to improve perinatal health. Establishing multi-sector partnerships to address perinatal health disparities using collective impact model. Providing preconception and perinatal health education for District families (ex. Safe Sleep, Perinatal Oral Health, Immunization, etc.).

Statistical Note

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

Background

The Perinatal Periods of Risk (PPOR) approach is designed to help communities use data to reduce infant mortality. The process involves examining the complex interweaving of social and health problems.[17] PPOR examines four "Periods of Risk" for fetal and infant deaths: Maternal Health/Prematurity, Maternal Care, Newborn Care and Infant Health.



If causes of death are found to predominant within specific periods, a community can better identify where to focus efforts to eliminate preventable infant deaths. Through calculating a mortality rate for each period of risk, stakeholders can compare populations to examine time trends and compare populations to a reference group or other jurisdictions. The comparison (reference) group is a population of mothers with near optimal birth outcomes. Using reference group data, PPOR estimates "excess" deaths.

According to Dr. Brian McCarthy, developer of the PPOR model, and colleagues at the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), causes of perinatal deaths are intimately related to both age at death and birth weight. PPOR analytic methods use existing infant mortality epidemiologic methods, including acquiring, assessing, and processing of vital records (birth and death) files.

Phase 1 of the PPOR divides fetal and infant deaths into the four periods of risk based on birth weight and gestational age and calculates a mortality rate for each period. After determining the reference group rate, excess mortality rates (or gaps) are calculated for each risk period. Phase 2 of the analysis involves three steps: 1) community uses vital records and other local population data to determine causes of infant mortality that most likely contribute to gaps; 2) after determining the most important causes of excess death, data are used to determine which known risk factors for the causes most likely contribute to gaps; and 3) potential impact of addressing the contributing risk factors is estimated to help the community prioritize its prevention efforts.

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.
2. Numbers and rates for the overall fetal-infant mortality map were calculated. Fetal-infant mortality maps were created for each sub-population.
3. 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

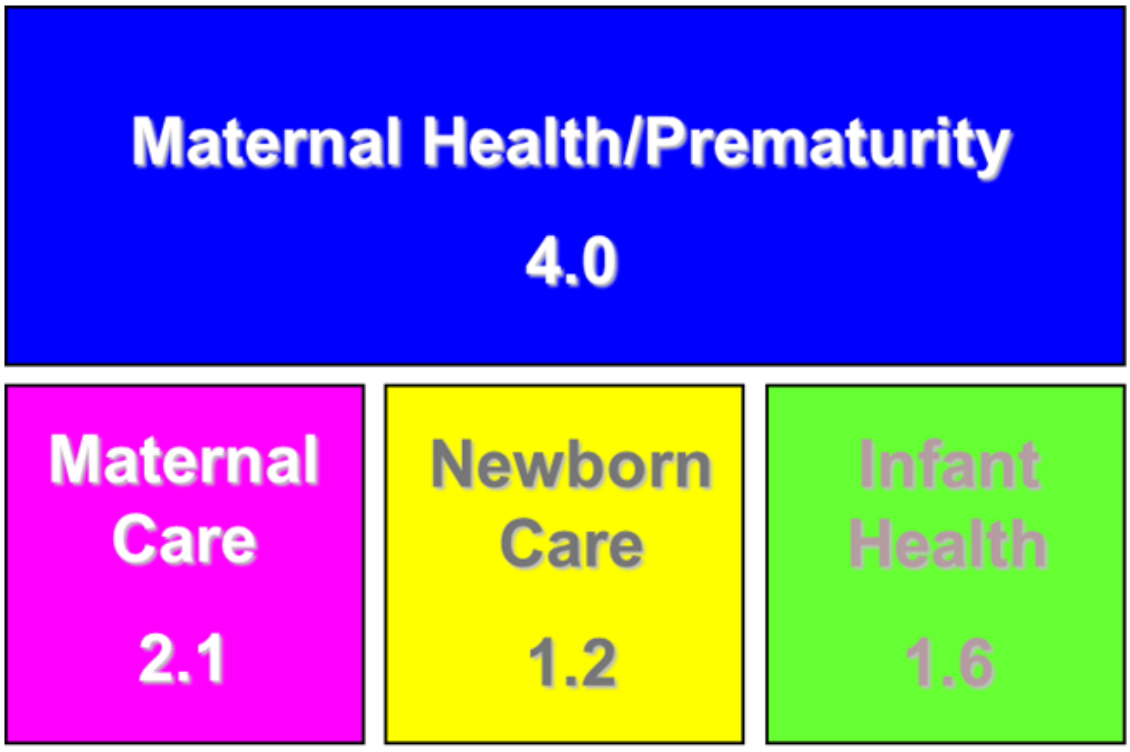
Table 1 stratifies fetal-infant deaths in the District of Columbia by birth weight and age at death for the years 2009-2013. The overall number of fetal and infant deaths during this period was 128 or a mortality rate of 8.8 deaths per 1000 live births plus fetal deaths. The table also allows fetal and infant deaths to be classified into a perinatal risk period. The Maternal Health and Prematurity subgroup is comprised of fetal deaths that occurred at 24 weeks gestation or greater weighing 500-1499 grams along with neonatal and post-neonatal deaths that weigh 500-1499 grams at delivery. Fetal deaths with gestational age 24 weeks or greater and delivery weight more than 1500 grams comprise the Maternal Care subgroup. The neonatal deaths for live births over 1500 grams make up the Newborn Care group, while the Infant Health group is composed of those post-neonatal deaths weighing more than 1500 grams at birth. Figure 1 depicts the mortality rates within each risk period for 2009-2013. The highest rate of deaths during this time occurred in the Maternal Health/Prematurity period (4.0 deaths per 1000 live births plus fetal deaths).

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-neonatal**		
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

*-Neonatal deaths are infant deaths occurring at less than 28 days of age.

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.

Table 2 further separates fetal and infant death rates by risk period and race. For the purpose of this analysis, Non-Hispanic White mothers were selected as the reference group due to the low mortality rates among this population. In each period of risk the reference population's rate was subtracted from the study population (population/subgroup) rate to determine the excess rates (**Table 3**). The excess rates represent likely preventable deaths that occurred in the study population.

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 Rate/Number Using Non-Hispanic White as Reference Group, District of Columbia, 2009-201 3

Population/Sub-group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
DC Overall	3.7 (n=170)	1.9 (n=87)	1.0 (n=46)	1.4 (n=64)	7.9 (n=364)
Non-Hispanic Black	2.5 (n=59)	1.0 (n=24)	0.6 (n=14)	1.0 (n=24)	5.1 (n=121)
Hispanic	0.2 (n=1)	0.1 (n=1)	0.0 (n=0)	-0.1 (n=-1)	0.2 (n=1)

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

The largest number of excess deaths in the District of Columbia occurred in the Maternal Health/Prematurity (MH/P) and Maternal Care (MC) risk periods, with overall rates of 3.7 and 1.9, respectively . Excess deaths in the MH/P period comprised nearly half (46%) of all excess deaths in DC from 2009-2013 (Figure 2). Among the sub-groups, Non-Hispanic Blacks experienced approximately five excess death per 1000 live births and fetal deaths. Using the numerical value, during the five year period 121 Non-Hispanic black infant and fetal deaths were potentially preventable. Figure 3 shows 49% of excess deaths among Black mother were attributable to the Maternal Health/Prematurity period. These findings suggest where intervention efforts should be concentrated.

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

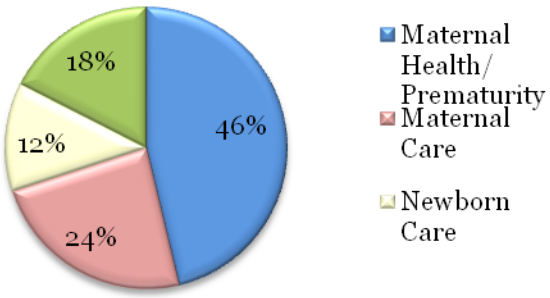
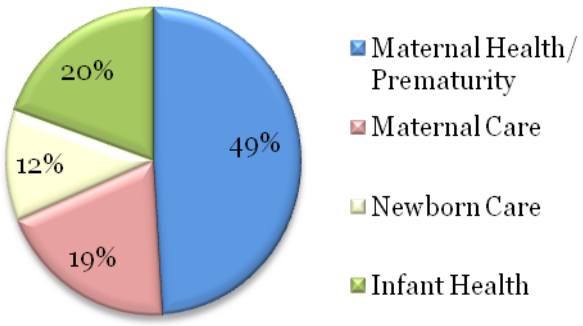


Figure 3. Excess Fetal-Infant Mortality among Non-Hispanic Black (Non-Hispanic White as Reference Group), District of Columbia, 2009-2013



Discussion

This PPOR summary report aims to inform and enable the District to quantify and better determine root causes of disparities in perinatal health through use of nationally recognized analytical methods. If all District reproductive aged women, mothers and infants had equitable opportunities to achieve their optimal health and wellness, more than 360 deaths could have been prevented during the five year period (**Table 3**). Given the large number of excess deaths in the Maternal Health/ Prematurity period, prevention strategies in the community should focus on improving preconception and maternal health and ensuring timely, continuous and high quality perinatal health care.

From Data to Action

Perinatal Periods of Risk (PPOR) provides a data driven foundation for community partners to build consensus and partnerships to reduce infant mortality. The analyses point to major opportunities in improving maternal health to address the disparity gaps that exist for infants born in DC. In response to this noted trend, DOH has placed emphasis on strategies aimed to improve the health of women before, during and immediately following pregnancy.

Beginning in 2015, DOH implemented programs to increase use of well woman visits. Aligning with this effort, DOH is leveraging touch points with reproductive aged women in clinical and community settings, to promote the use of One Key Question® (OKQ). The OKQ initiative encourages all primary care health teams to routinely ask women of reproductive age "Would you like to become pregnant in the next year?" and then link to or offer essential preventive reproductive health services based on her needs. Additionally, DOH has also expanded efforts to decrease the damaging effects of tobacco before and after a baby is born. The DC Tobacco Control Program offers cessation services and promotes awareness of the harmful effects of smoking during pregnancy and secondhand smoke exposure. The Quitline provides free tobacco cessation services for all District residents. In 2013, the Quitline added the Pregnancy Program, which offers pregnant smoker's more intense behavioral support, to help pregnant woman attain and maintain smoke free status. A full listing of DOH perinatal programs is available in Appendix ,A2.

To achieve equitable health outcomes for all women, children and families in the District, the entire community must be engaged in prevention efforts. DOH will use PPOR findings in our collective impact strategy, the Community Action Network (CAN). The CAN will bring together a robust partnership of stakeholders representing the "social determinant" sectors, with shared values and commitment to improving the health of women, families and communities. The CAN membership will include traditional Maternal and Child Health (MCH) partners, government agencies, non-profits and local businesses. The CAN cross-sector membership will focus on sustainable systems-level policy and environmental initiatives and will have support from DOH's Center for Planning Policy and Evaluation, Community Health Administration and Office of Health Equity.

Collective impact model provides a framework to address complicated social issues, like infant mortality. It requires a systematic approach to social impact, focusing on relationships between organizations and the progress toward shared objectives. Research shows successful collective impact initiatives have five conditions: a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication and a backbone support organization. During the initial phase, CAN members will review PPOR analyses and related District infant mortality and women's health data to drive the dialogue to better identify root causes for preventable infant deaths and poor birth outcomes in the District. With this understanding, the CAN will establish a common agenda, shared outcomes and strategies to drive collective efforts to improve perinatal health in the District.

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APPENDIX

DOH Maternal and Child Health Programs		
Program	**Description**	**Perinatal Period**
Baby Friendly Hospital Initiative	Initiative to implement evidenced-based maternity care in District hospitals and birthing centers to achieve optimal infant feeding outcomes and mother/baby bonding.	Newborn Care
Chronic Disease Self-Management Program	Evidence based program to teach District residents skills (such as learning healthier eating habits; communicating with doctors and making informed treatment decisions) to improve chronic disease (diabetes, hypertension) outcomes.	Maternal Health
DC Healthy Start	Comprehensive assessments and linkages, health promotion and education for prenatal and postpartum women and their families.	Maternal Health/ Maternal Care/ Infant Health
DC Hears	Ensures all infants born in the District of Columbia receive a newborn hearing screening and all abnormal screens receive appropriate follow up care.	Newborn Care
DC Linkage and Tracking System (DCLTS)	Designed to identify, refer, and linkage of infants with Medicaid, at risk for developmental delays or disabilities into comprehensive services.	Infant Health
DC Quitline Pregnancy Program	Offers education, nicotine replacement therapy and individual counseling for all District residents. The Pregnancy Program offers enhanced behavioral support through additional counseling sessions and postpartum follow up to prevent relapse.	Maternal Health/ Maternal Care
Fetal Alcohol Spectrum Disorder (FASD)	Educates pregnant women and women of childbearing age on the dangers of drinking alcohol while pregnant. Provides FASD awareness trainings to maternal and child health partners and community-based organizations	Maternal Health
Healthful Food Access Programs	Programs include farmers' market incentive programs and free pop up markets at elementary schools.	Maternal Health/ Infant Health
Help Me Grow	Systematically connects children at-risk for developmental delays and disabilities with needed services through comprehensive physician and community outreach and centralized information and referral centers.	Infant Health
Immunization Program	Works with families, providers and community partners to ensure children and adults in the District are protected against vaccine-preventable disease.	Infant Health
Maternal, Infant Early Childhood Home Visitation	Evidence based home visiting services for at-risk pregnant women and parents with young children up to kindergarten entry	Maternal Health/ Maternal Care/ Infant Health
Newborn Metabolic Screening Program	Ensures all newborns born in the District of Columbia have screening for metabolic and genetic disorder, and ensures all abnormal screens receive appropriate follow up care.	Newborn Care
Perinatal Hepatitis B Prevention Program	Works with clinical providers and birthing facilities to identify Hepatitis B infected mothers and ensure protocols to decrease transmission to their infants.	Newborn Care
Perinatal HIV Program	Links HIV positive pregnant women to care and services and following up on the health-status of the infants	Newborn Care
Perinatal Oral Health Program	Education and training to increase awareness of early childhood and prenatal oral health prevention and care for maternal and child health providers and community based organizations.	Maternal Health/ Maternal Care
Safe Sleep Program	Safe sleep education and free Pack-'N-Plays for DC residents to reduce sleep related infant deaths.	Infant Health

DOH Maternal and Child Health Programs		
Program	**Description**	**Perinatal Period**
School Based Health Centers	Comprehensive primary care clinics located within schools to reduce barriers to adolescents accessing primary health care services, including medical, oral and behavioral health. Centers also care for children of enrolled students.	Maternal Health/ Infant Health
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	Program services include health assessments, nutrition intervention, education and counseling, breastfeeding promotion and peer counselor support along with a monthly, nutritionally prescribed tailored food package that includes healthful food options.	Maternal Health/ Infant Health
Supplemental Nutrition Assistance Program: Nutrition Education and Obesity Prevention (SNAP-Eed)	Behavior-based health and wellness educational activities to prevent obesity by promoting increased consumption of healthful foods and daily physical activity for SNAP-eligible residents.	Maternal Health
Teen Pregnancy Prevention Programs	Teen pregnancy prevention to programs implemented by Crittenton Services of Greater Washington. SNEAKERS is a primary prevention program to promote healthy decisions for vulnerable teen girls as they navigate the challenges of high school. PEARLS program enables pregnant and parenting teens to develop positive life and parenting skills, and avoid subsequent teen births.	Maternal Health
Tobacco Control Program	Provides awareness and education on the harmful effects of secondhand smoke exposure. Efforts include targeted public health campaigns for pregnant women and mothers on the impact of smoking during pregnancy and secondhand smoke exposure; and, training and technical assistance on the health effects of smoking and tobacco use to programs that directly serve mothers and children.	Maternal Health/ Infant Health
Newborn Metabolic Screening Program	Ensures all newborns born in the District of Columbia have screening for metabolic and genetic disorder, and ensures all abnormal screens receive appropriate follow up care.	Newborn Care

Data Sources and Method

Data shown in this report for 2013 are based on data from the District of Columbia (DC) resident linked birth/ infant death data set, which are part of the DC Vital Registration System and DC resident infant deaths and births that occurred in other states through the inter-state exchange agreement. Data for DC were collected and reported using the 2003 revision of the U.S. standard birth certificate and the 2003 revision of the U.S. standard death certificate.

The report also uses data from the National Center for Health Statistics (NCHS) 2013 mortality report for the United States, National Vital Statistics Reports, Vol. 64, No. 2. Deaths: Final data for 2013. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

The linked birth/infant death data set is the primary data source for analyzing infant mortality trends and patterns in DC. In the linked birth/infant death data set, information from resident birth certificate is linked to information from resident death certificate for each infant less than 1 year of age. The purpose of the linkage is to use the many additional variables available from the birth certificate to conduct more detailed analyses of infant mortality patterns. The linked birth/infant death data set is particularly useful for computing accurate infant mortality rates by race and ethnicity because the race and ethnicity of the mother from the birth certificate is used in both the numerator and denominator of the infant mortality rate. The race and ethnicity from the birth certificate is generally provided by the mother at the time of delivery, and is considered to be more accurate than race and ethnicity from the death certificate that is provided by an infor-mant, or in the absence of an informant, by observation. Linked birth/infant death data sets are available from the Data Management and Analysis Division (DMAD), Center for Policy, Planning, and Evaluation (CPPE), DC Department of Health.

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the International Classification of Diseases (ICD). The ICD provides the basic guidelines used in virtually all countries to code and classify causes of death. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of this classification (ICD-10).

In this report, tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as "the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident of violence which produced the fatal injury." The underlying cause is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection rules and modifications. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics.

Tabulation lists and cause-of-death ranking

For this report, the tabulation List of 130 Selected Causes of Death is used for deaths for all infant less than 1 year of age. This list is also used to rank leading causes of death.

Race and Hispanic origin

The 2003 revision of the U.S. Standard Certificate of Birth allows the reporting of more than one race (multiple races) and Hispanic origin of mother separately on the birth certificates. This change was implemented to reflect the increasing diversity of the population of the United States and to be consistent with the decennial census. The race and ethnicity items on the revised certificate are compliant with the 1997 "Revision of the Race and Ethnic Standards for Federal Statistics and Administrative Reporting." These were issued by the Office of Management and Budget (OMB) and have replaced the previous standards that were issued in 1997.

Population bases for computing rates

Populations used for computing 2014 birth and death rates shown in this report represent the population residing in DC, estimated as 633,736 as of July 1, 2014. Birth and death rates shown in this report for 2014 by ward were derived from the District of Columbia Census 2010 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 and the 2014 DC Population Estimates prepared by the DC Office of Planning State Data Center.

Computing rates

Rates in this report are on an annual basis per 1,000 live births and per 100,000 population residing in the District of Columbia. The infant mortality rate (IMR) is calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as a rate per 1,000 live births. The number of infant deaths and live births reported for an area represent complete counts of such events. However, numbers of births, deaths, and infant mortality rates are subject to random variation. This means that when the number of events is small (less than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the data. When comparing infant mortality rates that are based on less than 100 deaths, statistical testing[1] is conducted to determine the precision, variability, and significance of findings. Similarly, when interpreting percent changes in infant mortality by ward, caution should be exercised because ward-level IMR are highly variable and do not meet standards of reliability or precision.

Availability of mortality data

Infant Mortality data are available in publications, unpublished tables, and electronic products as described on the Department of Health, Center for Policy, Planning, and Evaluation website at the following address: http://doh.dc.gov/node/164152. Detailed analyses not provided in this report are available upon request.

Source:Matthews TJ, MacDorman MF. Infant mortality statistics from the 2009 period linked birth/infant death data set. National Vital Statistics Report; Vol 6 No 5. Hyattsville, MD: National Center for Health Statistics. 2013.

[1] Statistical testing was performed by constructing 95-percent confidence intervals and applying the non-overlap method.

Definition of terms

Birth weight	The weight of the fetus or infant at the time of delivery.
Body Mass Index	Calculated using height and weight, is a fairly reliable indicator of body fat or weight status. A BMI between less than 18.5 is considered underweight, 18.5 to 24.9 is healthy, 25 to 29.9 is considered overweight, and 30 or above indicates obesity.
Entry into prenatal care	Prenatal care is more likely to be effective if women begin receiving care early in pregnancy - in the first trimester. The American College of Obstetrics and Gynecology recommends that all pregnant women receive at least 13 prenatal visits during a full-term pregnancy.
Gestational period	Number of weeks elapsed between the first day of the last menstrual period and date of delivery or date of pregnancy termination. The term gestational period is interchangeable with weeks of gestation, gestational age, and duration of pregnancy. This report uses the physician's estimate of gestational age.
Infant death	Death of an infant before his or her first birthday.

Live birth Every product of conception that gives a sign of life after birth, regardless of the length of the pregnancy, is considered a live birth. This concept is included in the definition set forth by the World Health Organization in 1950 and revised in 1988 by a working group formed by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists. A live birth is the complete expulsion or extraction from its mother of a result of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.

Low birth weight (lbw) Newborn weighing under 2,500 grams or 5 lbs. 8 oz.

Maternal death/ pregnancy-related Death of a woman from direct or indirect obstetric cause during or within one year of pregnancy, and all deaths from any cause (including injury or trauma) among women who were pregnant or within one year of pregnancy and were identified using a pregnancy "check-box" on the death certificate or by linking the death certificate to a live birth or fetal death.

Moderately lbw Newborn weighing between 1,500 and 2,499 grams.

Neonatal death Death of a child younger than 28 days of age.

Occurrence data Vital statistics compiled on the basis of where the vital event actually occurred.

Plurality The number of siblings born as the result of a single pregnancy (e.g., twins, triplets).

Post-neonatal death Death of a child 28 days of age or older but younger than one year of age.

Premature birth A live birth weighing 2,500 grams (5-1/2 pounds) or less. If birth weight is not stated, length of gestation (under 37 weeks) is used.

Preterm birth Birth before 37 completed weeks of gestation.

Residence data Vital statistics compiled on the basis of the usual place of residence of the mother regardless of where the birth occurred.

Very low birth weight Newborn weighing under 1,500 grams or 3lbs. 5oz.

Rates and Ratios The impact of chance variation must be considered in evaluating categories with small frequencies. For example, a small change in the number of births by racial/ethnic groups in a county or ward—as is the case in the District—can disproportionately affect the fertility rate for that county. Rates for cities and counties, therefore, require special consideration. Regional and state rates, with larger frequencies, provide more stable rates.

Birth Rate (Crude) = (Number of live births / Population) X 1,000

Fertility Rate = (Number of live births to women aged 15-44/ Number of women aged 15-44) X 1,000

Infant mortality rate = (Number of infant deaths/Number of live births) X 1,000

Neonatal mortality rate = (Number of neonatal deaths/Number of live births) X 1,000

Post-neonatal mortality rate = (Number of post-neonatal deaths/Number of live births) X 1,000

Leading Cause of Infant Mortality Designations

Cause of death (based on ICD-10)

R95	Sudden infant death syndrome
R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; Ill-defined and unknown cause of mortality

†Of the 8 reported R99 cases: 2 were Undetermined/Bed-Sharing; 2 other cases were related to Asphyxia due to Overlay†

About SIDS and SUID

About 3,500 US infants die suddenly and unexpectedly each year. We often refer to these deaths as sudden unexpected infant deaths (SUID). Although the causes of death in many of these children can't be explained, most occur while the infant is sleeping in an unsafe sleeping environment. SUID has a number of different sub-categories including SIDS

Types of SUID

Sudden Infant Death Syndrome (SIDS)

SIDS is defined as the sudden death of an infant less than 1 year of age that cannot be explained after a thorough investigation is conducted, including a complete autopsy, examination of the death scene, and a review of the clinical history. About 1,500 infants died of SIDS in 2013. SIDS is the leading cause of death in infants 1 to 12 months old.

Unknown Cause

The sudden death of an infant less than 1 year of age that cannot be explained because a thorough investigation was not conducted and cause of death could not be determined.

Accidental Suffocation and Strangulation in Bed

Mechanisms that lead to accidental suffocation include:

Suffocation by soft bedding—for example, when a pillow or waterbed mattress covers an infant's nose and mouth.

Overlay—for example, when another person rolls on top of or against the infant while sleeping.

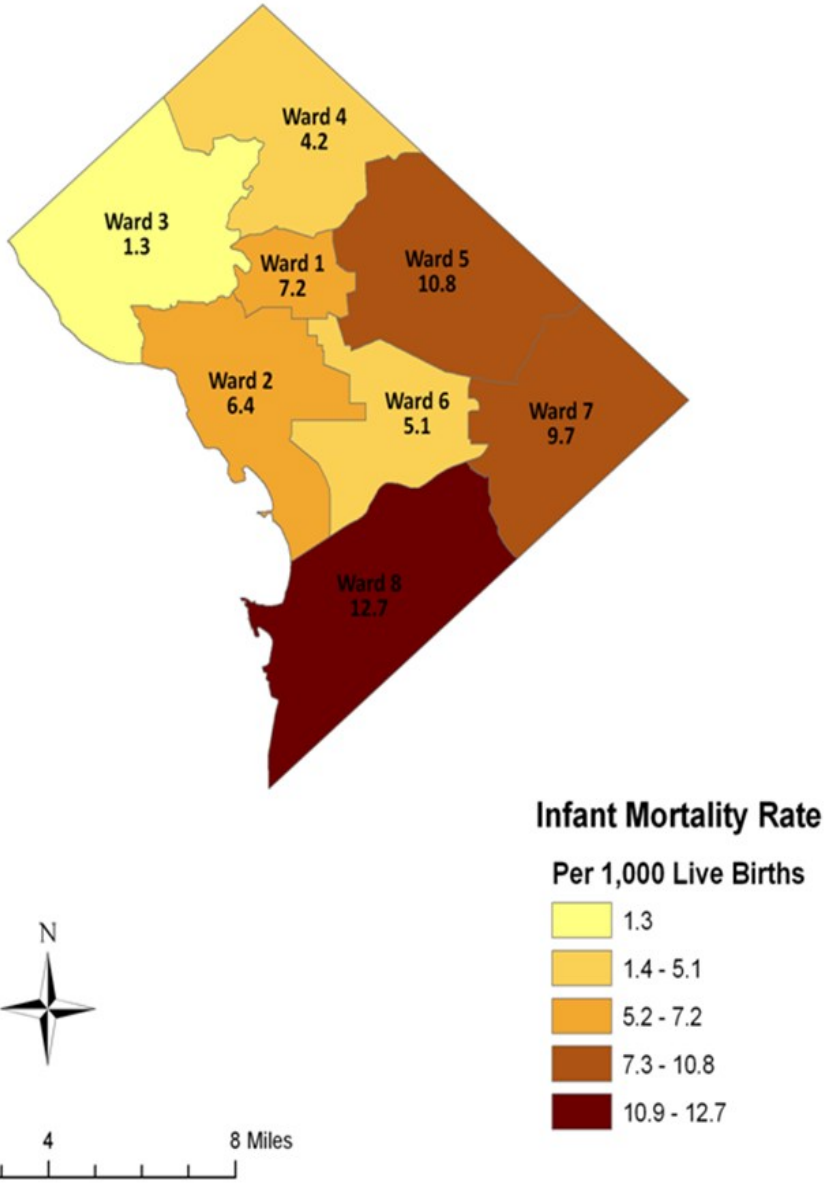
Wedging or entrapment—for example, when an infant is wedged between two objects such as a mattress and wall, bed frame, or furniture.

Strangulation—for example, when an infant's head and neck become caught between crib railings.

Even after a thorough investigation, it is hard to tell SIDS apart from other sleep-related infant deaths such as overlay or suffocation in soft bedding. While an observed overlay may be considered an explained infant death, no autopsy tests can tell for certain that suffocation was the cause of death.

Available from: http://www.cdc.gov/sids/aboutsuidandsids.htm

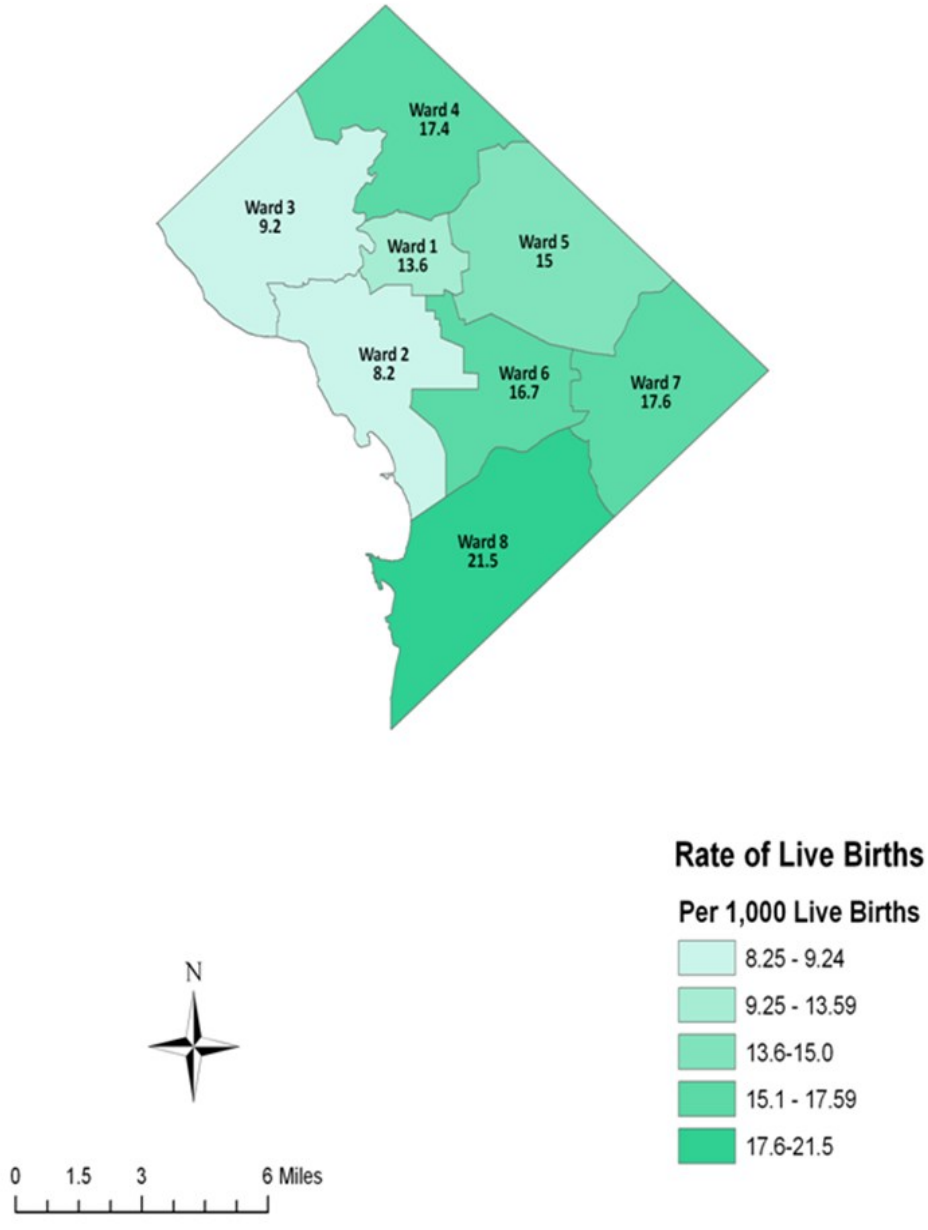
Map 1. Rates of Infant Mortality by Ward, District of Columbia, 2014



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.

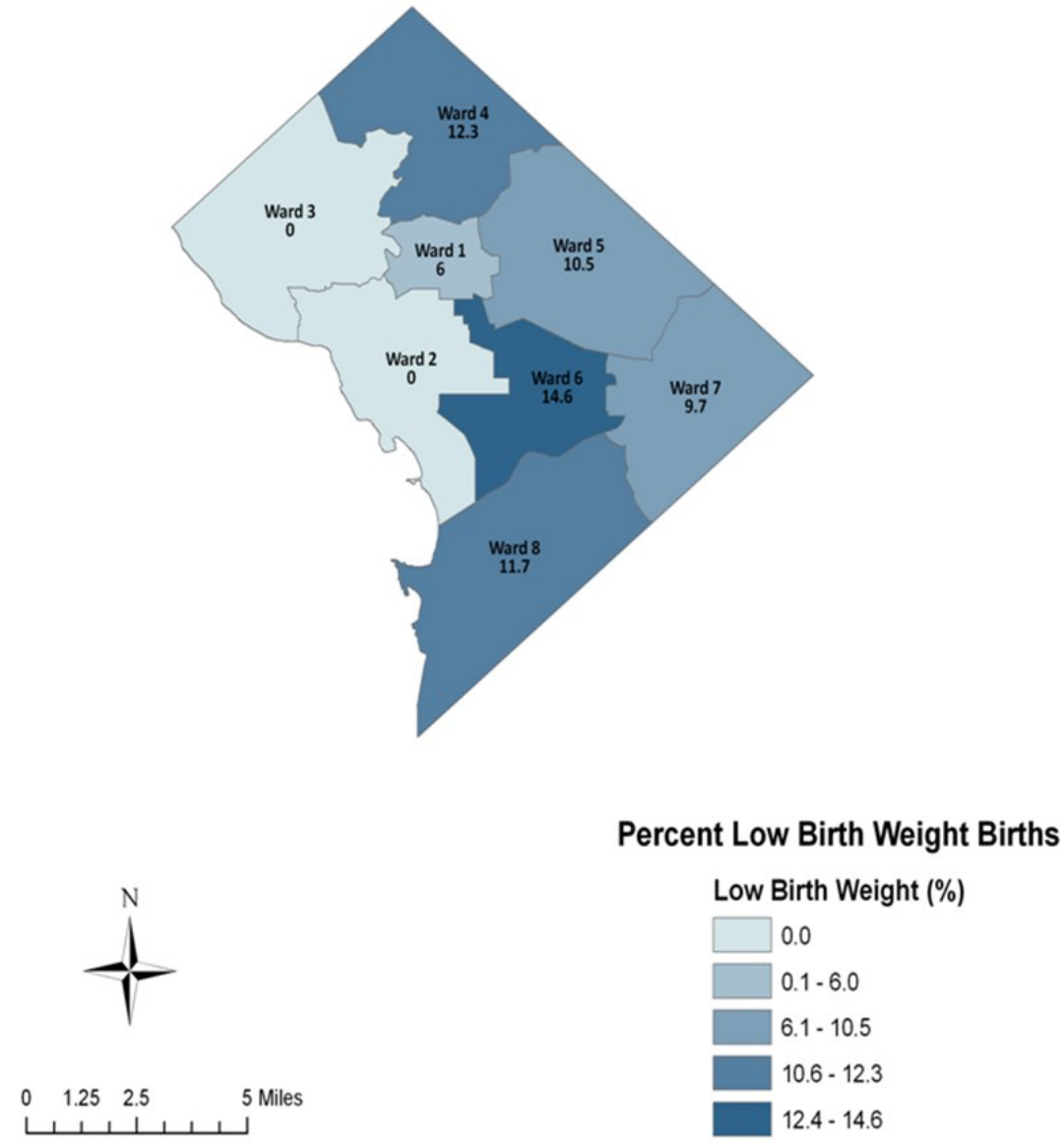
Map 2. Rates of Live Births to DC Residents by Ward, District of Columbia, 2014



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.

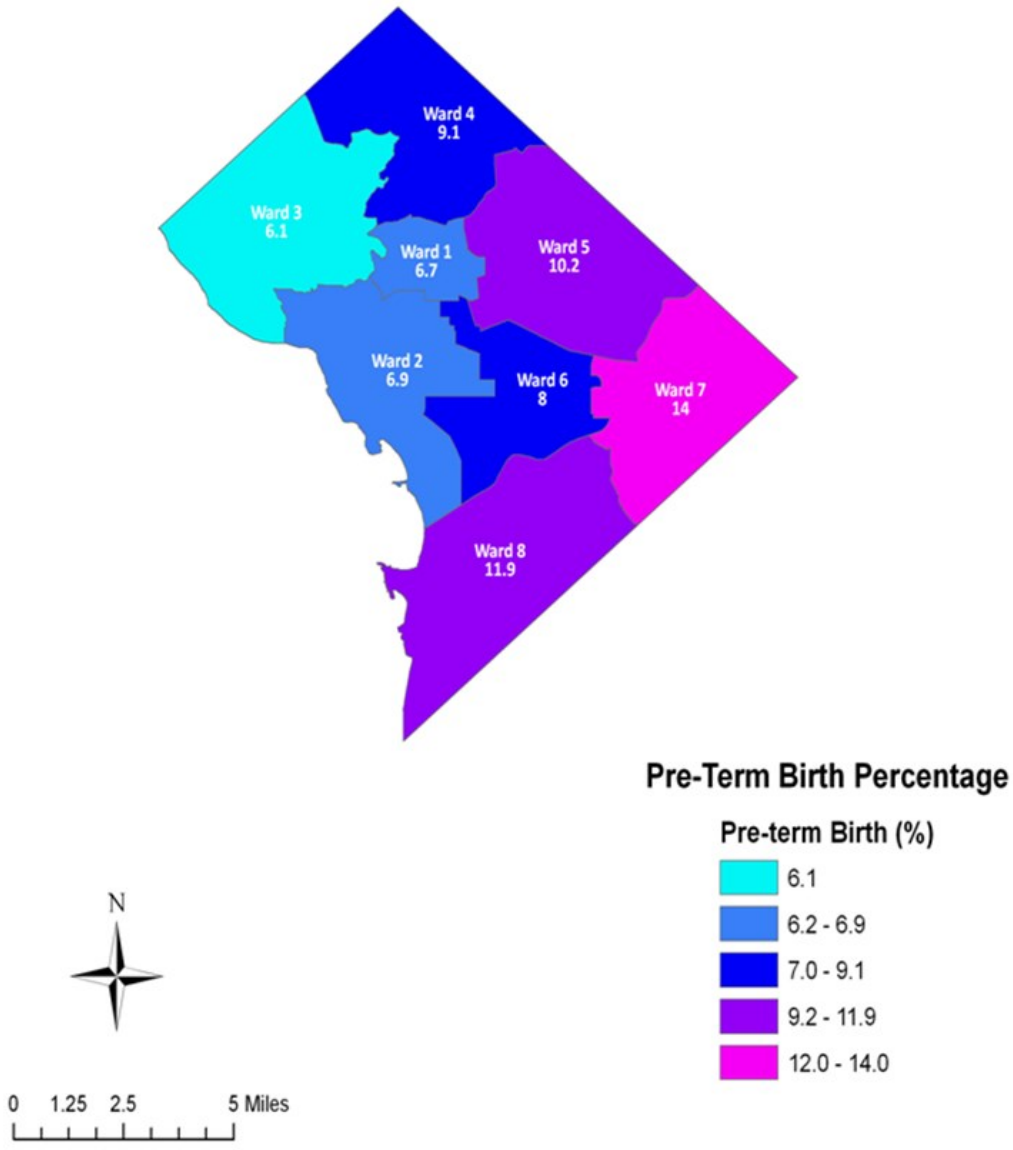
Map 3. Percentage of Low Birth Weight Live Births by Ward, District of Columbia, 2014



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.

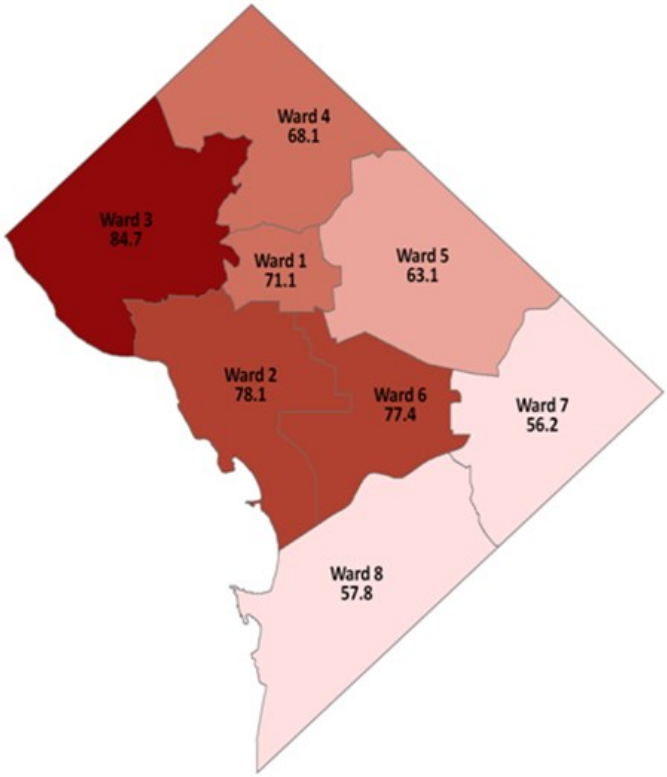
Map 4. Percentage of Preterm Births by Ward, District of Columbia, 2014

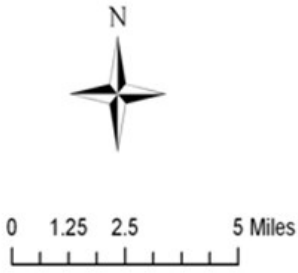


Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.

Map 5. Percentage of Births with Prenatal Care Beginning First Trimester by Ward, District of Columbia, 2014

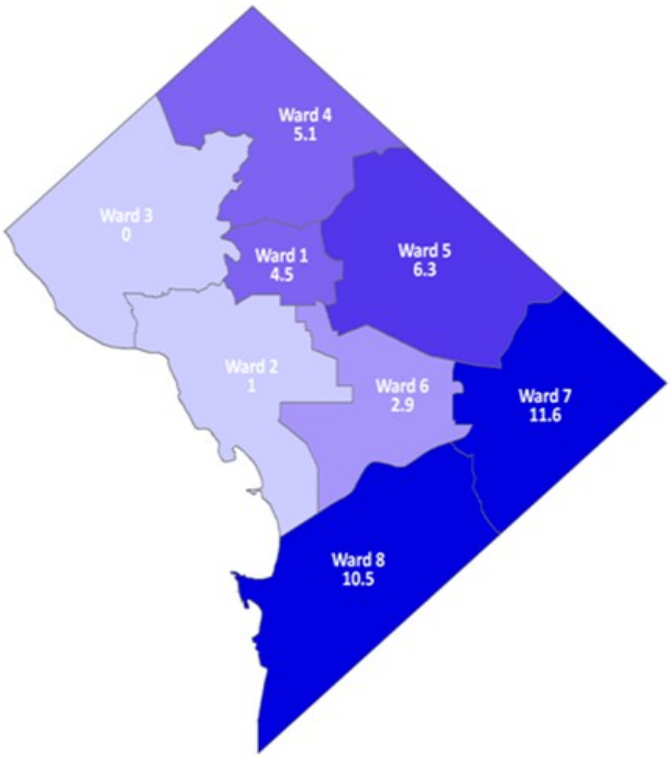


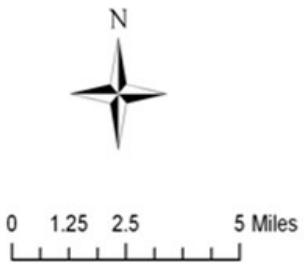


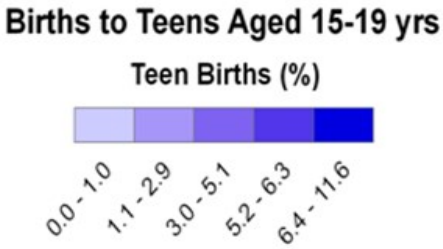
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.

Map 6. Teen Births by Ward, District of Columbia, 2014







Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Ward distribution based on 2012 ward boundaries.