

**2011 INFANT MORTALITY RATE
FOR THE
DISTRICT OF COLUMBIA**

Prepared by

**Data Management and Analysis Division
Center for Policy, Planning, and Evaluation
Department of Health**

**Government of the District of Columbia
Vincent C. Gray, Mayor**

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2011 INFANT MORTALITY RATE

Executive Summary

For every 1,000 live births to District of Columbia residents in 2011, approximately seven infants died before reaching their first birthday. In 2011, there were 69 infant deaths in the District, resulting in an infant mortality rate (IMR) of 7.4 per 1,000 live births, a 43.5 percent decline since 2007 and a historic low for the District. There were 47 fewer infant deaths in 2011 compared to 2007; however, there were 419 more live births in 2011 compared to 2007. Table 1 and Figure 1 present a ten-year summary of these statistics.

Table 1: Ten-Year Infant Mortality Trends			
District of Columbia Residents, 2002-2011			
Year	Births	Infant Deaths	Infant Mortality Rate*
2002	7,494	86	11.5
2003	7,616	78	10.2
2004	7,937	94	11.8
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

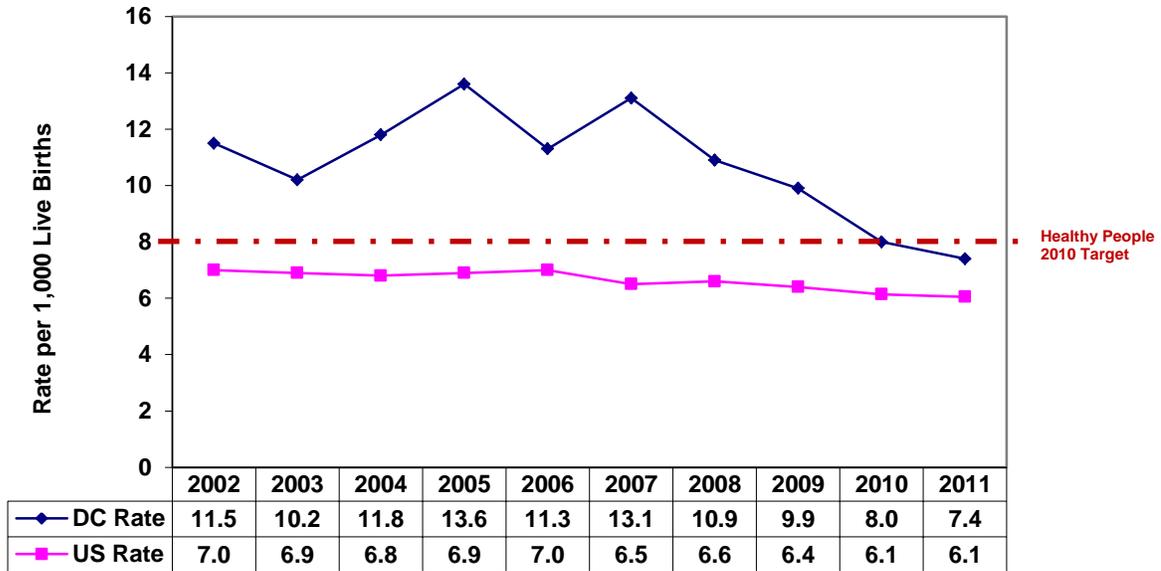
* Per 1,000 live births

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

The declining trend observed in IMR depicts the District's nearly decade long path to achieving its Healthy People 2010 objective of reducing infant mortality to no more than 8 per 1,000 live births (Figures 1 and 2), which was surpassed by the 2011 IMR of 7.4 per 1,000. This overall reduction in IMRs in the District may be explained by large declines in infant deaths to black mothers. Among blacks, the IMR fell from 17.0 in 2007 to 11.6 in 2011, a 31.8 percent decrease over the 5-year period. Interestingly, the IMR among whites fluctuated within the past 5 years, ending with a 64.7 percent reduction from 5.1 in 2007 to 1.8 in 2011. Figure 3 illustrates the racial disparity in IMRs in the District from 2002 to 2011.

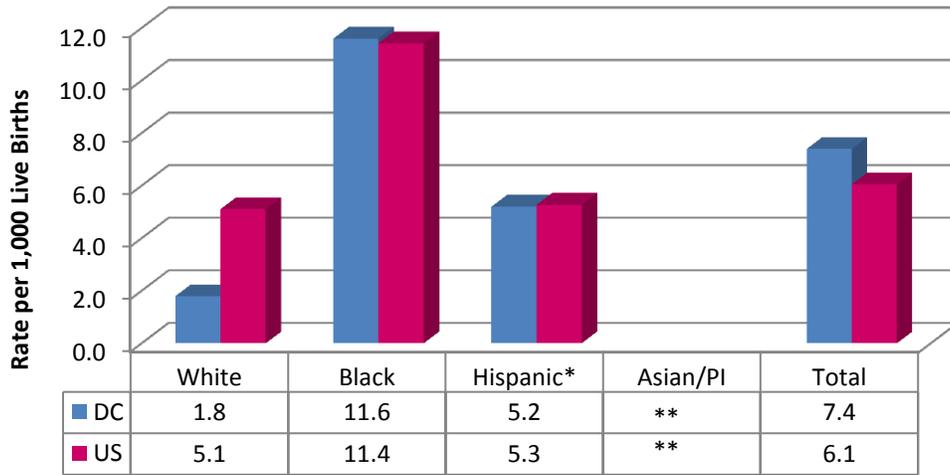
Infant mortality rates in the District fluctuated from 2002 to 2007, however, a stable downward trend was observed from 2007 through 2011. In 2007, the District of Columbia Department of Health (DOH) released the Infant Mortality Action Plan, a comprehensive 5-year road map on the efforts to reduce the infant mortality rate in the District. There are three major foci of effort: (1) to increase the capacity of home visitation for pregnant women; (2) to enhance collaboration within DOH and between other agencies; and (3) to increase coordination between the government and community organizations.

Figure 1. District of Columbia and National Infant Mortality Rate, 2002-2011



Sources: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health. National Center for Health Statistics (NCHS).

Figure 2: Infant Mortality Rates for the District of Columbia, 2011 and the United States, Preliminary 2011



*Hispanics include persons of all Hispanic origin of any race.

**Rates not computed due to small number of infant deaths and, therefore, 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/nvsr61/nvsr61_06.pdf

2010 to 2011 Comparison Highlights

- The number of infant deaths decreased from 73 in 2010 to 69 in 2011, a decrease of 5.5 percent.
- The overall infant mortality rate (IMR) for the District decreased by 7.5 percent from a rate of 8.0 per 1,000 live births in 2010 to 7.4 per 1,000 live births in 2011. The national infant mortality rate slightly decreased from 6.15 in 2010 to 6.05 in 2011.
- From 2010 to 2011, infant mortality rates decreased in Wards 1, 3, 4 and 6 but increased in Wards 2, 5 and 8. Ward 7 infant mortality rate was unchanged (Table 10).
- Death to infants younger than 28 days increased from a rate of 5.6 per 1,000 live births in 2010 to 5.8 per 1,000 live births in 2011, an increase of 3.6 percent. (51 neonatal deaths in 2010 and 54 in 2011.)
- The post-neonatal death rate (deaths occurring from 28 days to under 1 year of age) decreased by 32.4 percent, from 2.4 per 1,000 live births in 2010 to 1.6 in 2011. (22 post-neonatal deaths in 2010 and 15 in 2011.)
- The infant death rate to non-Hispanic black mothers increased from 10.5 per 1,000 live births in 2010 to 11.7 per 1,000 live births in 2011 (Table 2), an increase of 11.4 percent.
- The infant death rate to non-Hispanic white mothers was 5.3 per 1,000 live births in 2010 and 1.5 for 2011, a decrease of 71.7 percent (Table 2).
- The infant death rate to Hispanic mothers increased by 40.5 percent from 3.7 per 1,000 live births in 2010 (Table 2) to 5.2 per 1,000 live births in 2011.
- The number of infant deaths that resulted from multiple births decreased by half from 18 in 2010 to 9 in 2011.
- The number of maternal deaths in 2011 was 4, unchanged from 2010.
- The proportion of births to teen mothers (15-19 years of age) decreased by 8.6 percent from 2010 to 2011. (879 births to teen mothers in 2011).
- In 2011, more than a quarter of all infant deaths (27.6 percent) in the District were to mothers who were obese. The IMR for infants born to obese non-Hispanic black mothers (11.9 per 1,000) was over 1.5-fold higher than the overall IMR for the District (7.4 per 1,000).
- In 2011, infants born to women on Medicaid insurance accounted for 42.6 percent 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 56.5 percent vs. 23.2 percent, respectively.

Statistical Overview

In 2011, there were 9,289 live births and 69 infant deaths to District of Columbia residents (Table 1). This resulted in an IMR of 7.4 deaths for every 1,000 live births. In 2010, there were 9,156 live births and 73 infant deaths. The IMR for 2010 was 8.0 deaths per 1,000 live births. There was a 7.5 percent decrease in the IMR from 2010 to 2011. There were 4 fewer infant deaths in 2011 than in 2010. Ward 5 had the highest IMR at 12.9 deaths per 1,000 live births (Table 10).

Of the 69 infant deaths that occurred in 2011, 54 (or 78.3 percent) occurred during the neonatal period (under 28 days of life). The neonatal death rate decreased by 3.6 percent from 5.6 per 1,000 live births in 2010 to 5.8 per 1,000 live births in 2011. The neonatal period is important relative to efforts to reduce infant mortality. Many of the causes of infant deaths during this period could have been mitigated or prevented with preconception and prenatal care.

**Table 2: Live Births, Infant Deaths and Infant Mortality
by Race/Hispanic Origin of Mother
District of Columbia Residents, 2010 & 2011**

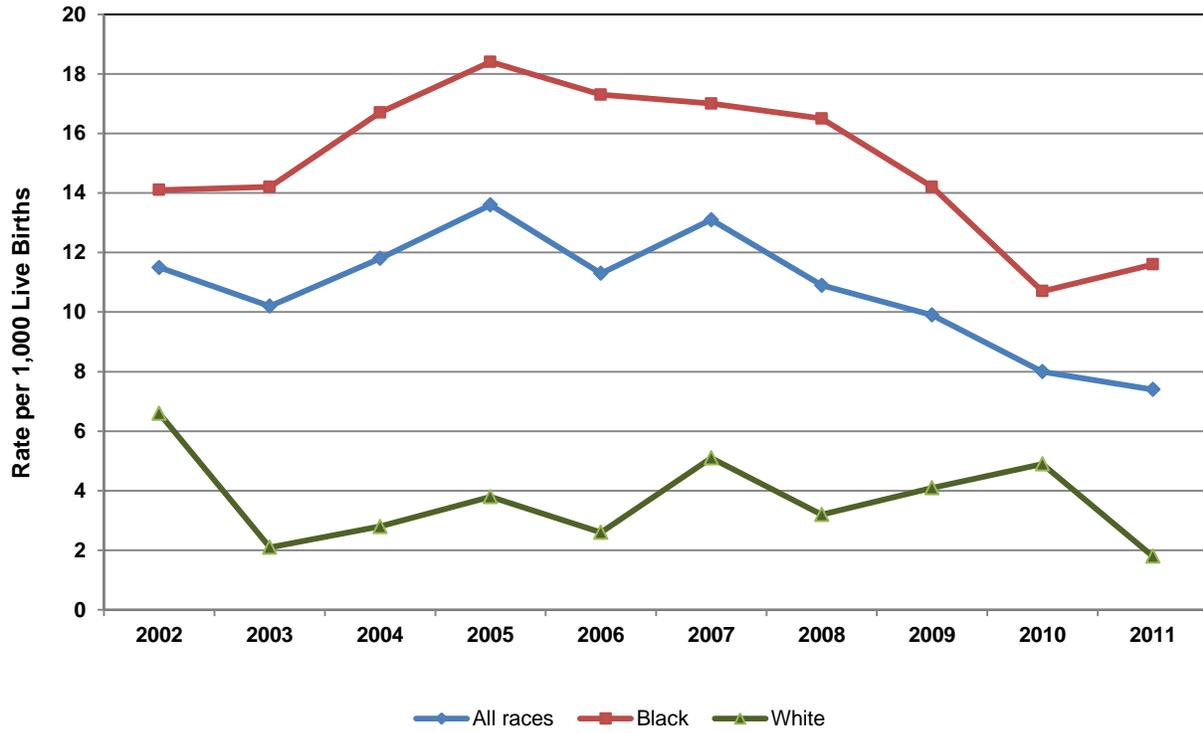
Race/Ethnicity	Live Births		Infant Deaths		Infant Mortality Rate ¹	
	2010	2011	2010	2011	2010	2011
Total	9,156	9,289	73	69	8.0	7.4
Black	4,940	4,903	53	57	10.7	11.6
White	2,632	2,843	13	5	4.9	1.8
Asian/Other	987	1,032	1	2	1.0	1.9
Total	9,156	9,289	73	69	8.0	7.4
Non-Hispanic						
Black	4,854	4,784	51	56	10.5	11.7
White	2,470	2,611	13	4	5.3	1.5
Hispanic ²	1,351	1,358	5	7	3.7	5.2

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.

Figure 3. Infant Mortality Rates by Race of Mother, District of Columbia, 2002-2011



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

Factors Contributing to Infant Mortality

Vital statistics over the years have indicated that factors such as low birth weight, 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 2011, the percentage of low birth weight infants (those weighing under 2,500 grams or 5.5 pounds) in the District was 10.5 percent compared to 10.2 percent in 2010 (Tables 3 and 4). This represents approximately a 3 percent increase in low birth weight infants. About 6 per 100 low birth weight infants died before their first birthday (Tables 3 and 5).

Very Low Birth Weight

A slight decrease was seen among very low birth weight (under 1,500 grams) newborns between 2010 and 2011; **very low birth weight** births decreased from 2.3 percent to 2.2 percent, while **moderately low birth weight** (1,500–2,499 grams) births increased from 7.9 percent to 8.3 percent (data not shown). Birth weight is an important predictor of early death and long-term disability^{1,2,3}. The lower the birth weight, the greater the risk of poor birth outcomes. In 2011, about one in four (25.7 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 rate of very low birth weight births slightly decreased for non-Hispanic black infants from 2010 to 2011 (from 3.3 percent to 2.9 percent); very low birth weight births also decreased for non-Hispanic white infants (from 1.2 percent to 0.9 percent); very low birth weight births increased for Hispanic infants from 1.3 percent to 2.1 percent.

Low Birth Weight and Race and Hispanic Origin of Mother

The percentage of low birth weight babies born to all black mothers increased from 13.3 percent in 2010 to 13.7 percent in 2011 (Table 3). Likewise, the percentage of low birth weight babies born to all Asian and Pacific Islander mothers slightly increased from 7.4 percent in 2010 to 7.5 percent in 2011. Conversely, there was a minor decrease in low birth weight babies born to all white mothers, from 6.5 percent in 2010 to 6.3 percent in 2011. Figure 4 shows the distribution of total births by infant birth weight and race and Hispanic origin of mother.

The rate of low birth weight births increased by 21.3 percent among babies born to Hispanic mothers (6.7 percent in 2010 to 8.2 percent in 2011). Non-Hispanic white low birth weight births decreased from 6.4 percent in 2010 to 6.1 percent in 2011. Non-Hispanic black low birth weight births increased slightly from 13.3 percent to 13.6 percent for 2010 to 2011.

Table 3: Percent Distribution of Low Birth Weight¹ Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2010 and 2011			
Race/Hispanic Origin	2010	2011	Percent Change
Total Births for All Races	9,156	9,289	1.5
- Number Low Birth Weight	933	973	
- Percentage LBW among all Births	10.2%	10.5%	2.8
Total Births to Black* Mothers	4,940	4,903	-0.7
- Number Low Birth Weight	657	671	
- Percentage LBW among Births to Black Mothers	13.3%	13.7%	2.9
Total Births to White* Mothers	2,632	2,843	8.0
- Number Low Birth Weight	170	178	
- Percentage LBW among Births to White Mothers	6.5%	6.3%	-3.1
Total Births to Asian and Pacific Islander Mothers	365	402	10.1
- Number Low Birth Weight	27	30	
- Percentage LBW among Births to Asian and Pacific Islander Mothers	7.4%	7.5%	0.9
Total Births to Hispanic/Latina Mothers	1,351	1,358	0.5
- Number of Low Birth Weight	91	111	
- Percentage LBW among Births to Hispanic Mothers	6.7%	8.2%	21.3

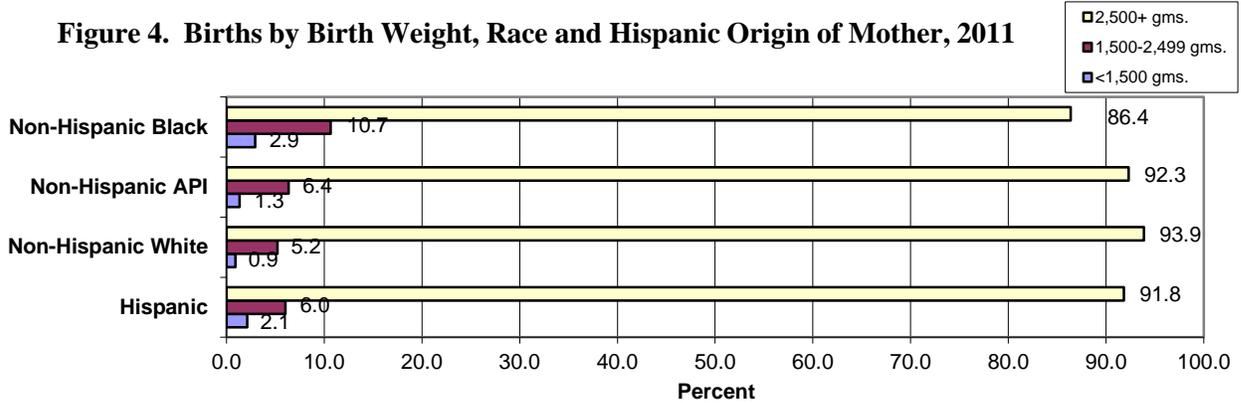
*Includes mothers of Hispanic origin.

Notes: ¹ Low Birth Weight means under 2,500 grams or 5lbs. 8oz.

² Number does not add up due to exclusion of other races and unknown.

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

Figure 4. Births by Birth Weight, Race and Hispanic Origin of Mother, 2011



Note: API refers to Asian and Pacific Islanders.

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 increased from 10.5 percent in 2010 to 12.7 percent in 2011 to (Table 4). The percentage of low birth weight babies born to all mothers 20 years of age and older remained nearly the same.

Table 4: Percent Distribution of Low Birth Weight¹ Babies by Age of Mother District of Columbia Residents, 2010 and 2011			
	2010	2011	Percent Change
Total Births for All Ages	9,156	9,289	1.5
- Number of Low Birth Weight	933	973	
- Percentage of Low Birth Weight	10.2%	10.5%	2.8
Total Births to Mothers Under 20 Years of Age	967	908	-6.1
- Number of Low Birth Weight	102	115	
- Percentage of Low Birth Weight among mothers < 20 years old	10.5%	12.7%	20.1
Total Births to Mothers 20 Years of Age and Older	8,188	8,381	2.4
- Number of Low Birth Weight	831	858	
- Percentage of Low Birth Weight among mothers ≥20 years old	10.1%	10.2%	0.9
Total Births to Mothers Whose Age is Unknown ²	1	0	-100.0
- Number of Low Birth Weight	0	0	
- Percentage of Low Birth Weight	0%		

Notes: ¹ Low Birth Weight means under 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 Infant Deaths by Age of Mother

Of the 973 low birth weight births, 57 infants (5.8 percent) died in 2011. A total of 19 infants (27.5 percent of all 69 infant deaths) died to mothers 30-39 years of age in 2011. Eighteen of these 19 infants (94.7 percent) were low birth weight. Almost 58 percent of all infant deaths (n=40) occurred to mothers aged 20-29 years; 10.1 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 69 infant deaths, 57 (82.6 percent) were low birth weight infants (49 died during the neonatal period and 8 in the post-neonatal period). Four out of five (80 percent) infant deaths to white mothers were born weighing under 2,500 grams. Forty-seven of the 57 (82.5 percent) infant deaths to black mothers were low birth weight babies. Six out of the seven (85.7 percent) infant deaths to mothers of Hispanic origin were also low birth weight (data not shown).

Of the 57 low birth weight infants, 52 (91.2 percent) were very low birth weight and 5 were moderately low birth weight (8.8 percent).

Table 5: Percent Distribution of Low Birth Weight Infant Deaths by Age of Mother and Time of Death District of Columbia Residents, 2011							
Age of Mother	Infant Deaths	Percent Deaths*	LBW Deaths	%LBW Deaths**	Time of Infant Death		
					Total LBW	Neonatal	Post-neonatal
Total	69	100.0	57	82.6	57	49	8
< 20 years	7	10.1	6	85.7	6	5	1
20-24 years	22	31.9	16	72.7	16	13	3
25-29 years	18	26.1	15	83.3	15	14	1
30-34 years	12	17.4	11	91.7	11	9	2
35-39 years	7	10.1	7	100.0	7	6	1
≥ 40 years	3	4.3	2	66.7	2	2	0
Unknown age	0	0	0	0	0	0	0

*Percentage based on all infant deaths (N=69).

**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 2010-2011. Premature births in the District increased from 10.3 percent in 2010 to 11 percent in 2011. Preterm births have increased across all racial groups in 2011 except for Asian/Pacific Islander mothers, which decreased by 9.2 percent. Approximately 13.1 percent of non-Hispanic black mothers delivered preterm babies

compared to 8.1 percent non-Hispanic white mothers and 9.6 percent Hispanic/Latina mothers.

More than 66 percent of all preterm births occurred between 34-36 weeks gestation. Fifty-seven of the 69 (82.6 percent) infants who died in 2011 were preterm. Of these preterm infant deaths, 50 (87.7 percent) were below 32 weeks gestation (very pre-term) and weighed under 1,500 grams (Figure 5). Almost 82 percent of preterm infants died to mothers ages 15-34.

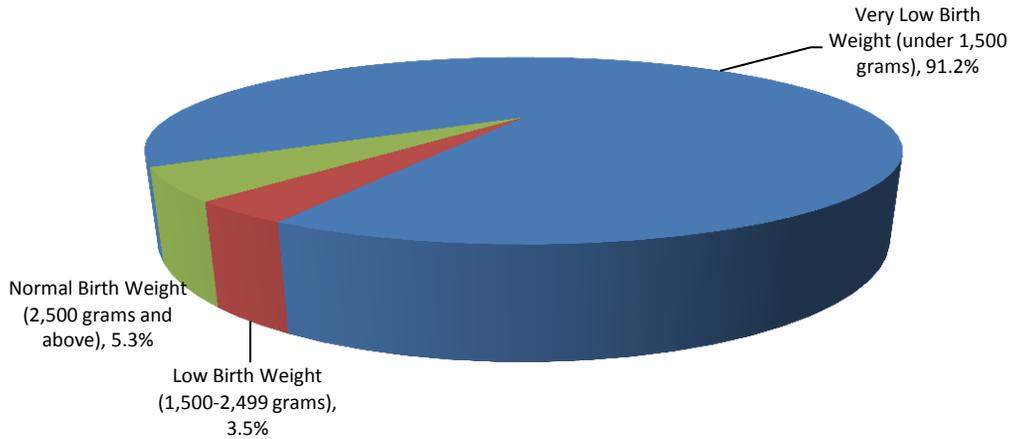
Table 6. Percent Distribution of Premature Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2010 and 2011			
Race/Hispanic Origin	2010	2011	Percent Change
Total Births for All Races	9,156	9,289	
-Number of Premature Babies	945	1,021	
-Percent Premature Babies	10.3%	11.0%	6.5
Total Births to Black* Mothers	4,940	4,903	
-Number of Premature Babies to Black Mothers	619	646	
-Percent Premature Babies to Black Mothers	12.5%	13.2%	5.1
Total Births to White* Mothers	2,632	2,843	
-Number of Premature Babies to White Mothers	204	238	
-Percent Premature Babies to White Mothers	7.8%	8.4%	8.0
Total Births to Asian and Pacific Islander (API) Mothers	365	402	
-Number of Premature Babies to API Mothers	28	28	
-Percent Premature Babies to API Mothers	7.7%	7.0%	-9.2
Total Births to Hispanic Mothers	1,351	1,358	
-Number of Premature Babies to Hispanic Mothers	107	131	
-Percent Premature Babies to Hispanic Mothers	7.9%	9.6%	21.8

* Includes mothers of Hispanic origin.

Note: Premature births mean births under 37 weeks of gestation.

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

**Figure 5. Preterm Infant Deaths by Birth Weight, 2011
(n=57)**



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 mothers⁴. Women who receive late (third trimester of pregnancy⁵) 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 prenatal care began was unknown were subtracted from the total number of births before percentages were computed. Based on this computation, 66.8 percent of District resident mothers who gave birth in 2011 began prenatal care in the first trimester of pregnancy (Table 9). More than 80 percent of white mothers who gave birth in 2011 had timely entry into prenatal care compared to 61.3 percent of Hispanic mothers and 57.5 percent of black mothers (data not shown).

About 6.9 percent of mothers began care late or had no prenatal care at all. About 64 percent of these were black women.

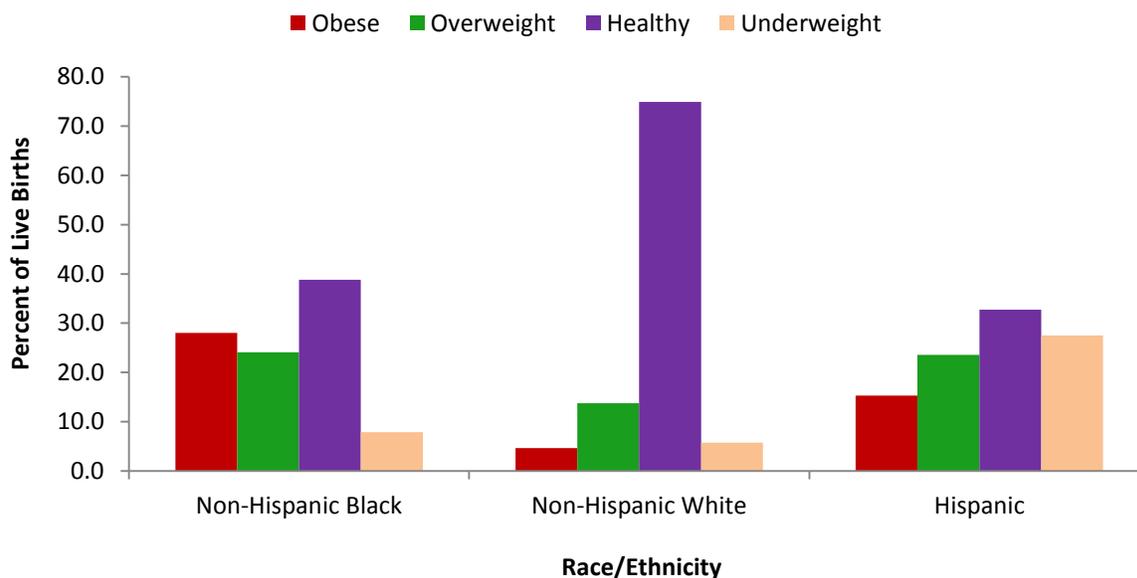
Pre-Pregnancy Weight Status

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 healthy, 25 to 29.9 is considered overweight, and 30 or above indicates obesity⁸. 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.

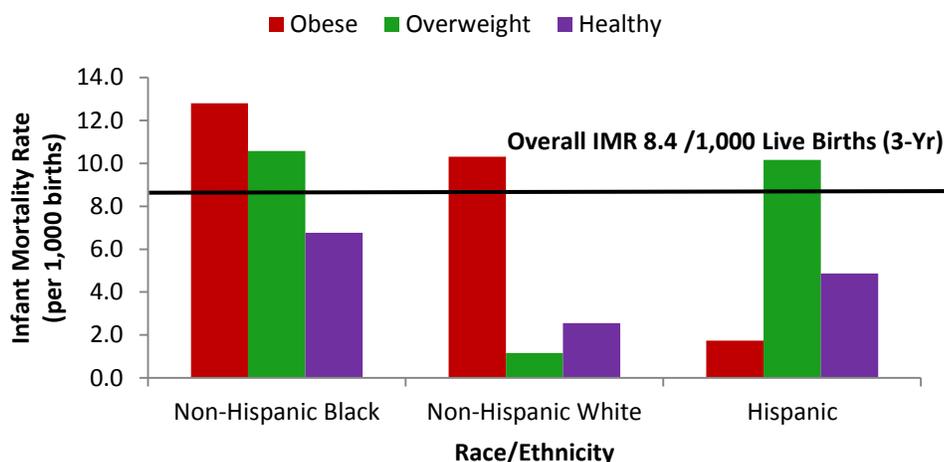
From 2009 to 2011, 49 percent of District of Columbia women who gave birth to a live infant had healthy weight prior to pregnancy, 40 percent were either overweight or obese before their pregnancy, and 11 percent were underweight. Non-Hispanic black and Hispanic mothers in DC were more likely to be overweight or obese (52.7 percent and 39 percent, respectively) than non-Hispanic white mothers (18.6 percent) (Figure 6). 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 6. Disparities in Pre-pregnancy Weight Status by Race/Ethnicity, District of Columbia, 2009-2011



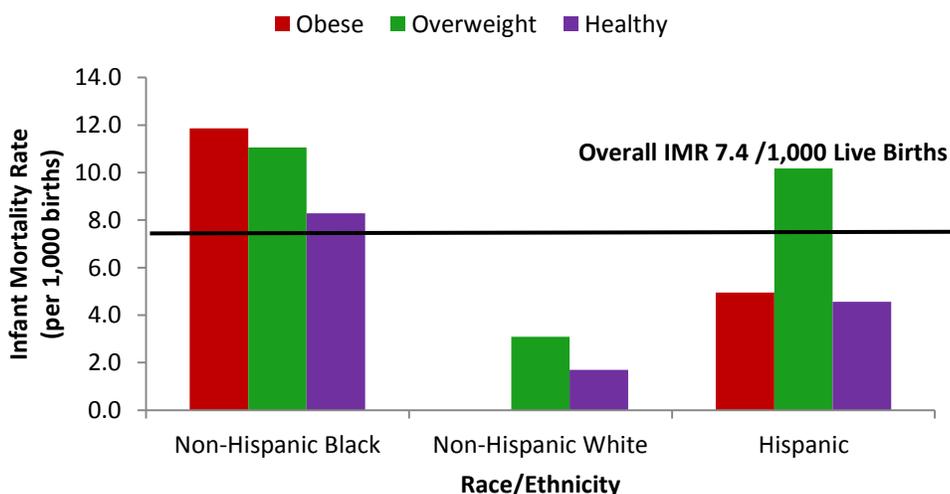
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Figure 7. Infant Mortality by Pre-pregnancy Weight Status and Race/Ethnicity, District of Columbia, 2009-2011



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, 2011



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

Overall, the highest IMR observed for 2009 to 2011 was among obese mothers followed by overweight mothers. However, associations between maternal obesity and IMR differed by maternal race/ethnicity (Figure 7). Among infants born to obese mothers, the highest IMR was among non-Hispanic blacks at 12.8 per 1,000 births followed by non-Hispanic white mothers who had an IMR of 10.3. However, there were only 3 infant deaths to obese, non-Hispanic white mothers, so due to this small number, the rate may be unstable. Mothers who were obese and Hispanic had a much lower IMR of only 1.7. Among infants born to overweight mothers, non-Hispanic blacks and Hispanics had the highest rates, 11.2 and 10.2, respectively.

In 2011, more than a quarter (27.6 percent) of all 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 11.9 per 1,000 live births (Figure 8) —over 1.5-fold higher than the overall infant mortality rate for the District in 2011 (7.4 per 1,000 live births), and slightly higher than the overall IMR for non-Hispanic black mothers (11.7 per 1,000 live births). The overall IMR for Hispanic mothers was very close to the IMR for obese Hispanic mothers, at 5.2 and 5.0 per 1,000 live births, respectively. There were no infant deaths to obese non-Hispanic white mothers in 2011.

Marital Status

The proportion of births to unmarried women decreased in 2011 to 53.4 percent compared with 54.7 percent in 2010, a 2.4 percent decrease. Of the 4,963 (53.4 percent) births to unmarried women in 2011, 18 percent were to teens below 20 years old. Almost 89 percent of births to women aged 20-24 years and 61.6 percent of births to women aged 25-29 years were to unmarried women (data not shown).

In 2011, 69.6 percent of infant deaths were to unmarried women, compared to 68.5 percent in 2010, a slight increase of 1.6 percent. Between 2007 and 2011, the majority 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, 2007-2011**

Year	Total Number of Births	Births to Unmarried Women		Births to Married Women		Total Infant Deaths	Infant Deaths to Unmarried Women		Infant Deaths to Married Women	
		Number of births	Percent	Number of Births	Percent		Number of Infant Deaths	Percent	Number of Infant Deaths	Percent
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
2008	9,134	5,278	57.8	3,846	42.2	100	81	81.0	17	17.0
2007	8,870	5,190	58.5	3,679	41.5	116	87	75.0	25	21.6

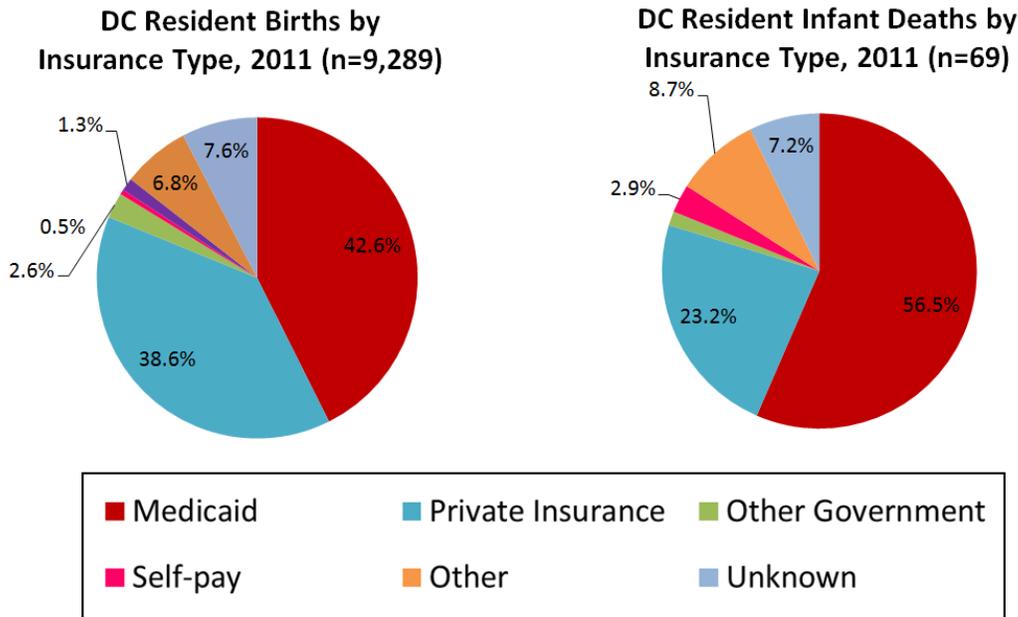
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

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 insurance¹². According to 2004 Pregnancy Risk Assessment Monitoring System (PRAMS) data from 26 states¹³, women on Medicaid had higher rates of smoking during the last 3 months of pregnancy than those with private insurance. Figures 9 and 10 show the breakdown of 2011 births and infant deaths in the District by insurance type and maternal race/ethnicity.

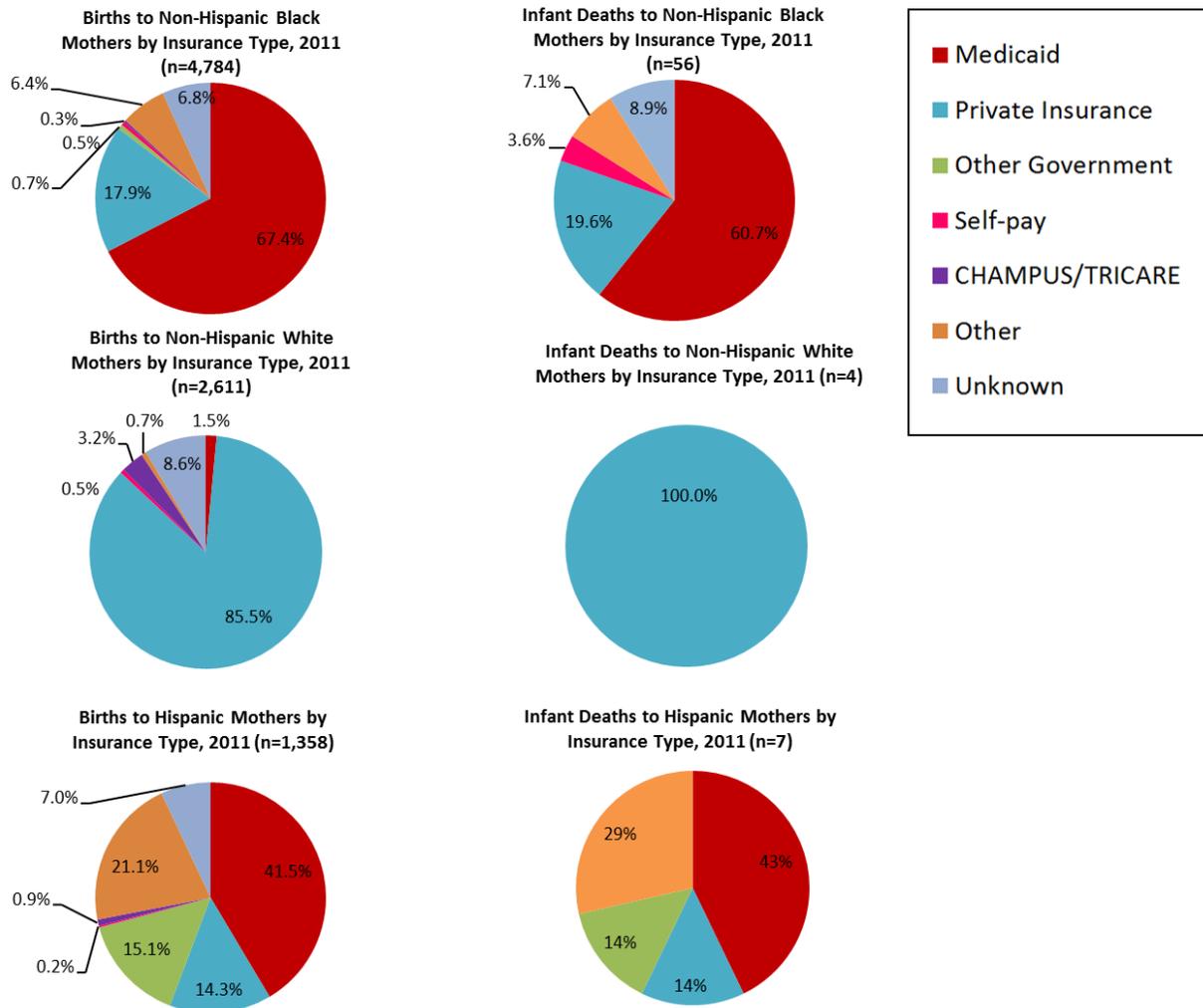
City-wide, 42.6 percent of deliveries were to Medicaid beneficiaries. Infant deaths disproportionately occurred to mothers who used Medicaid at the time of delivery compared to those with private insurance, 56.5 percent vs. 23.2 percent, respectively (Figure 9). Figure 10 shows that non-Hispanic black mothers were the highest Medicaid beneficiaries at 67.4 percent. Almost 61 percent 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, District of Columbia, 2011



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, 2011



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

Geographical Distribution

The District’s IMR is comparable to cities of similar size and population mix. Among the following four cities, the District’s rate has followed a downward trend and consistently ranked lowest in 2009, 2010, and 2011. The District tied with Richmond for lowest rate in 2008; and ranked third lowest in 2007 (Table 8).

Table 8: Infant Mortality Rate Comparisons for Baltimore, the District of Columbia, Richmond and Detroit Cities, 2007-2011					
[Rates are Infant deaths per 1,000 live births]					
City	2007	2008	2009	2010	2011
Baltimore City, Maryland ¹	11.3	12.1	13.5	11	10.5
Detroit City, Michigan ²	14.9	14.9	14.8	13.5	*
District of Columbia ³	13.1	10.9	9.9	8.0	7.4
Richmond, Virginia ⁴	12.4	10.9	12.2	12.8	8.7

Sources: ¹ Vital Statistics Administration, Department of Health and Mental Hygiene, Maryland.
² Vital Records & Health Data Development Section, Michigan Department of Community Health.
 (*2011 data not available).
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.

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 basis 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 2011, there was a decrease in the number of infants born in Wards 1 and 2 (Table 10). Further, the infant mortality breakdown by ward for 2011 shows a decline in the IMR for four wards (1, 3, 4, and 6). The IMR increased in Wards 2, 5, and 8, while Ward 7 remained at the same rate for both years. Among the wards with increased IMRs in 2011, Ward 5 had the highest rate (12.9 per 1,000 live births), but Ward 2 had the largest percentage increase (131 percent) from a rate of 2.9 per 1,000 live births in 2010 to 6.7 in 2011. There were no infant deaths in Ward 3 in 2011. 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. Ward 6 had the largest meaningful decrease from 11 infant deaths in 2010 to 7 in 2011, a nearly 43 percent decrease in infant mortality rate. However, caution should 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 2007 and 2011 are presented in Table 13. The geographic distribution of 2011 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. An interesting observation is that the IMR in Wards 1, 3, and 6 (3.4, 0.0, and 5.6 per 1,000 live births, respectively) are lower than the US rate (6.1 per 1,000 live births).

**Table 9. Indicators of Maternal and Child Health, and Infant Mortality by Ward
District of Columbia Residents, 2011**

Indicators	DC	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
2010 Census Population ¹	601,723	76,197	79,915	77,152	75,773	74,308	76,598	71,068	70,712
Live Births Rate/1,000 pop ¹	9,289 15.4	1,174 15.4	601 7.5	842 10.9	1,423 18.8	1,089 14.7	1,245 16.3	1,218 17.1	1,667 23.6
Live Births									
Black	4,903	289	58	29	605	778	463	1,136	1,528
White	2,843	439	395	698	330	179	652	32	110
Hispanic ²	1,358	439	93	60	489	126	66	44	36
Births to Unmarried Women (Percent)	4,963 53.4	565 48.1	103 17.1	52 6.2	734 51.6	666 61.2	444 35.7	1,006 82.6	1,374 82.4
% Births to Unmarried Women									
Black	78.7	70.6	48.3	27.6	57.9	71.9	80.8	85.4	88.5
White	7.7	12.1	7.6	2.6	11.2	13.4	5.4	28.1	9.1
Hispanic ²	67.0	71.1	50.5	35.0	74.6	69.8	51.5	68.2	25.0
Births to Mothers age <20 yrs. (Percent)	908 9.8	64 5.5	7 1.2	0 0.0	94 6.6	129 11.8	81 6.5	224 18.4	302 18.1
Births to Mothers 15-19 yrs. (Percent)	879 9.5	62 5.3	7 1.2	0 0.0	89 6.3	125 11.5	81 6.5	215 17.7	293 17.6
Birth Rate/1,000 Women 15-19 yrs. ³	41.9	23.8	1.9	0.0	46.6	43.5	69.4	73.2	88.7
Low Birth Weight Live Births ⁴ (Percent)	973 10.5	106 9.0	49 8.2	62 7.4	109 7.7	119 10.9	124 10.0	179 14.7	223 13.4
% Low Birth Weight Births ⁴									
Black (Percent)	671 (13.7)	37 (12.8)	11 (19.0)	4 (13.8)	62 (10.2)	91 (11.7)	78 (16.8)	168 (14.8)	221 (14.5)
White (Percent)	178 (6.3)	36 (8.2)	27 (6.8)	49 (7.0)	12 (3.6)	13 (7.3)	36 (5.5)	2 (6.3)	2 (1.8)
Hispanic ² (Percent)	111 (8.2)	36 (8.2)	5 (5.4)	8 (13.3)	35 (7.2)	13 (10.2)	6 (9.1)	8 (18.2)	0 (0.0)
Low Birth Weight ⁴ to Mothers <20 yrs. (Percent)	115 12.7	11 17.2	1 14.3	0 -	9 9.6	12 9.3	11 13.6	31 13.8	40 13.2
% Preterm Births (<37 weeks gestation)	11.0	9.5	7.8	8.4	9.4	12.4	10.5	13.5	13.4
% Births With Prenatal Care Beginning First Trimester ^{5,6}	66.8	66.1	72.1	80.8	64.0	66.5	74.6	57.0	59.1
% Births with First Trimester Prenatal Care									
Black	57.5	51.1	56.8	56.5	53.7	62.0	59.0	56.6	58.3
White	80.5	76.4	75.1	83.4	80.8	85.1	84.9	68.0	69.5
Hispanic ²	61.3	60.2	61.6	66.7	61.5	65.5	60.4	58.6	51.6
% Births With Late or No Prenatal Care ^{5,6}	6.9	6.9	7.4	3.6	8.4	8.8	4.5	7.9	7.3
Infant Deaths (under 1 yr.) Rate (per 1,000 live births) ⁷	69 7.4	4 3.4	4 6.7	0 0.0	12 8.4	14 12.9	7 5.6	8 6.6	20 12.0

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, 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, 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.

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, 2010 and 2011**

Ward	Births		Infant Deaths		Infant Mortality Rate ¹		
	2010	2011	2010	2011	2010	2011	Percent Change ²
1	1,219	1,174	5	4	4.1	3.4	-17.1
2	691	601	2	4	2.9	6.7	131.0
3	801	842	4	0	5.0	0.0	-100.0
4	1,324	1,423	15	12	11.3	8.4	-25.7
5	1,067	1,089	11	14	10.3	12.9	25.2
6	1,118	1,245	11	7	9.8	5.6	-42.9
7	1,218	1,218	8	8	6.6	6.6	0.0
8	1,635	1,667	17	20	10.4	12.0	15.4
Unknown	83	30	0	0	0.0	0.0	-
Total	9,156	9,289	73	69	8.0	7.4	-7.5

¹Infant deaths per 1,000 live births.

²Changes in value over time (e.g., rates) [(New - Old) / Old = Decimal x 100 = Percent change].

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 2002 ward boundaries.

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, 2010**

Ward	Births	Infant Deaths	IMR*	LBW	Teen Births	LBW to Teens
1	1,219	5	4.1	113	89	10
2	691	2	2.9	40	20	0
3	801	4	5.0	46	2	1
4	1,324	15	11.3	116	114	11
5	1,067	11	10.3	121	127	11
6	1,118	11	9.8	114	68	9
7	1,218	8	6.6	157	230	23
8	1,635	17	10.4	219	304	36
Unknown	83	0	-	7	13	1
Total	9,156	73	8.0	933	967	102

*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 2002 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.

Ward	Births	Infant Deaths	IMR*	LBW	Teen Births	LBW to Teens
1	1,174	4	3.4	106	64	11
2	601	4	6.7	49	7	1
3	842	0	0.0	62	0	0
4	1,423	12	8.4	109	94	9
5	1,089	14	12.9	119	129	12
6	1,245	7	5.6	124	81	11
7	1,218	8	6.6	179	224	31
8	1,667	20	12.0	223	302	40
Unknown	30	0	-	2	7	0
Total	9,289	69	7.4	973	908	115

*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 2002 ward boundaries.

Teen birth in this table is defined as mother's younger than 20 years of age.

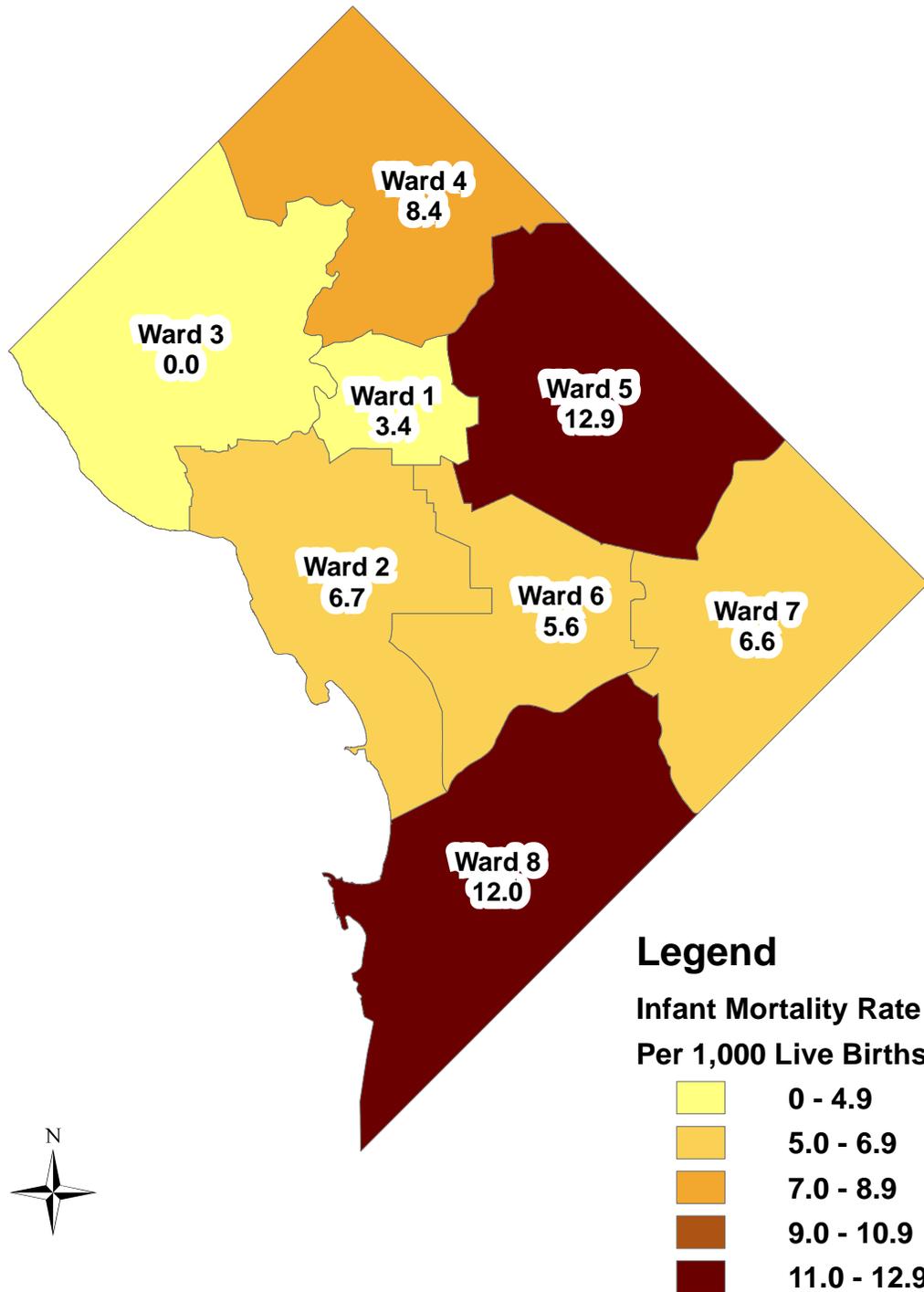
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Ward	2007	2008	2009	2010	2011
1	5.6	6.1	8.1	4.1	3.4
2	12.6	2.9	5.8	2.9	6.7
3	1.3	5.1	2.6	5.0	0
4	17.1	10.2	10.4	11.3	8.4
5	16.3	12.9	11.8	10.3	12.9
6	6.4	8.0	1.9	9.8	5.6
7	19.0	17.2	12.9	6.6	6.6
8	18.8	17.7	18.4	10.4	12
Total	13.1	10.9	9.9	8.0	7.4

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

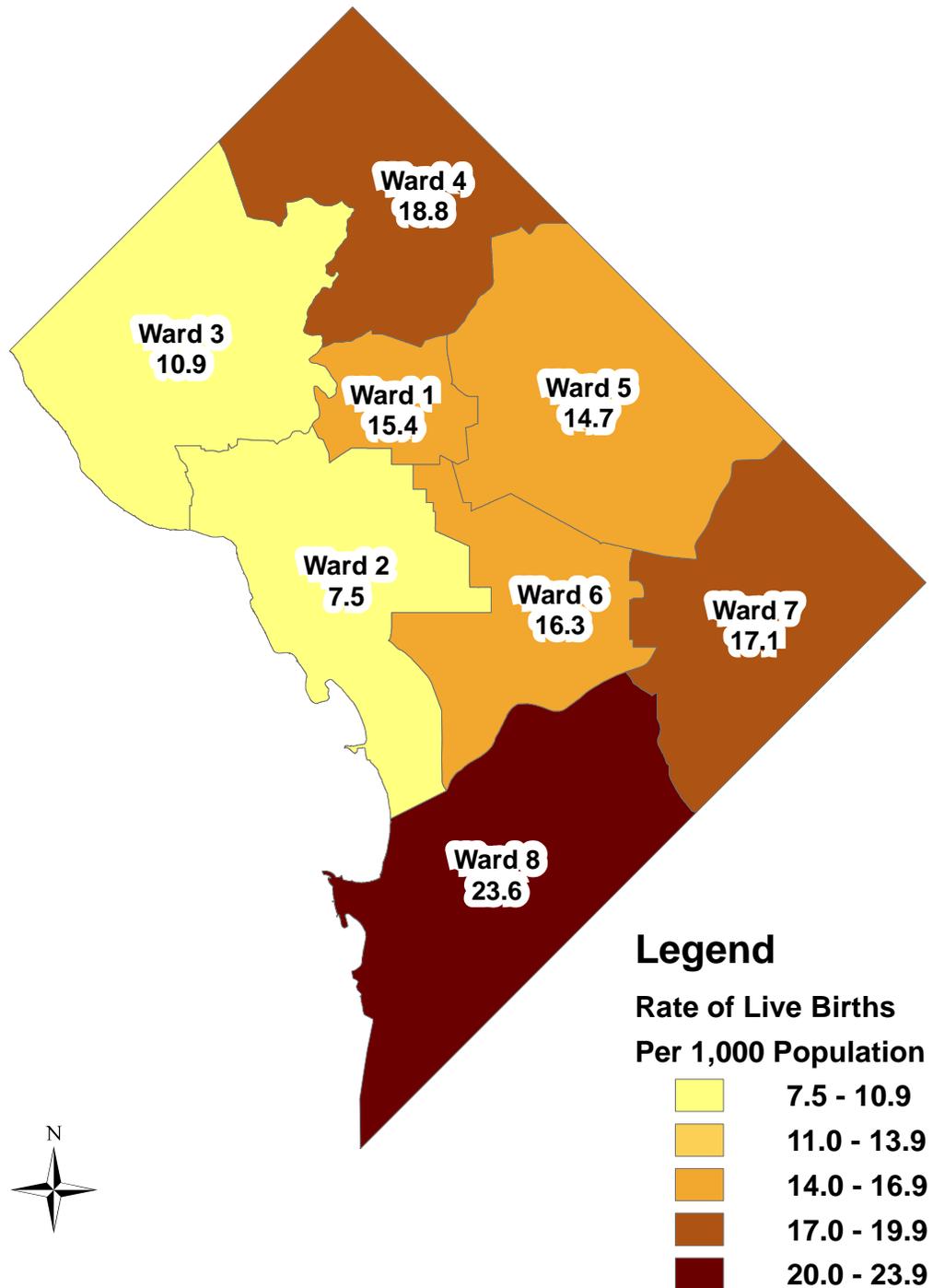
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Map 1. Rates of Infant Mortality by Ward, District of Columbia, 2011



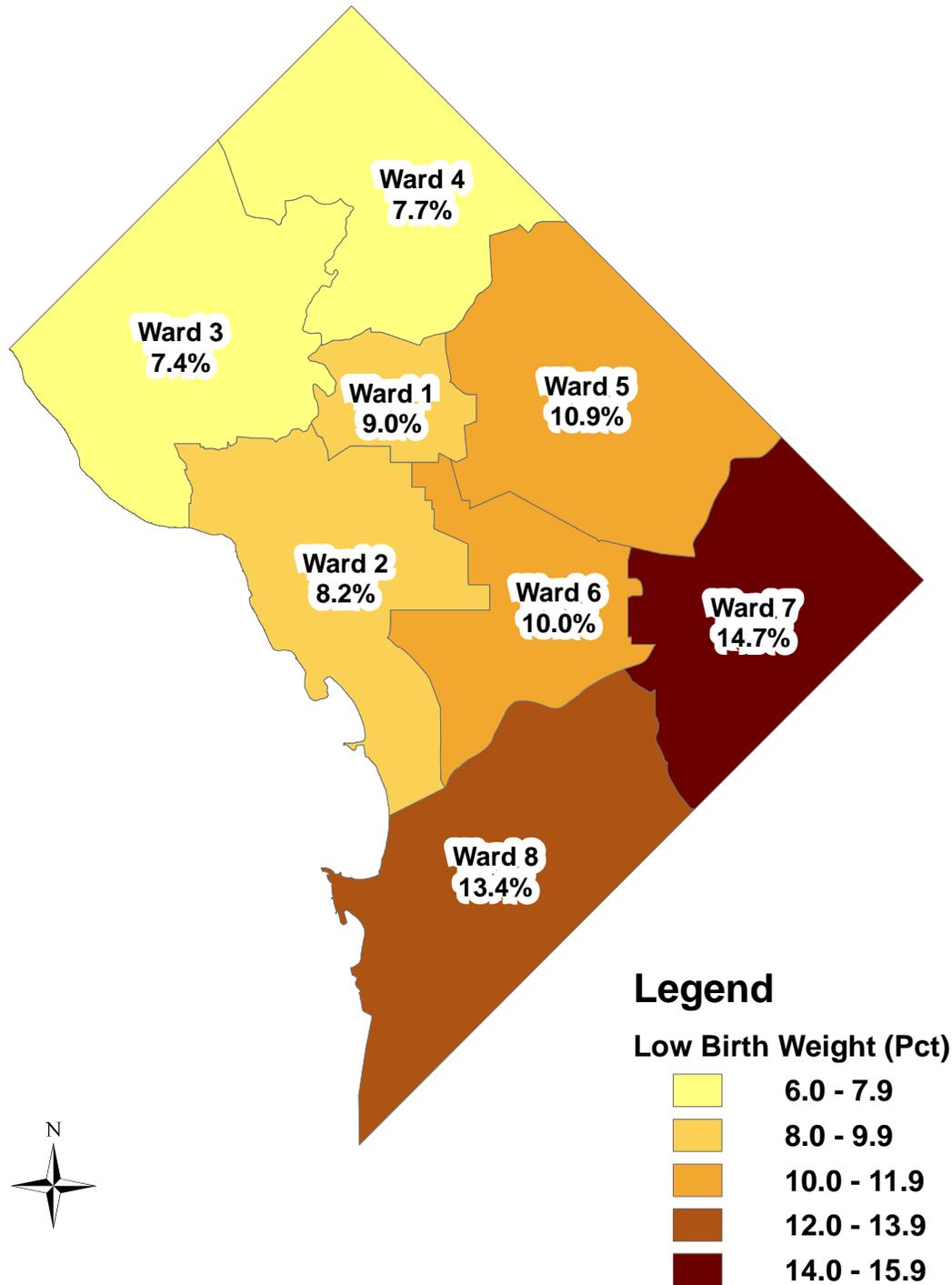
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Map 2. Rates of Live Birth to DC Residents by Ward, District of Columbia, 2011



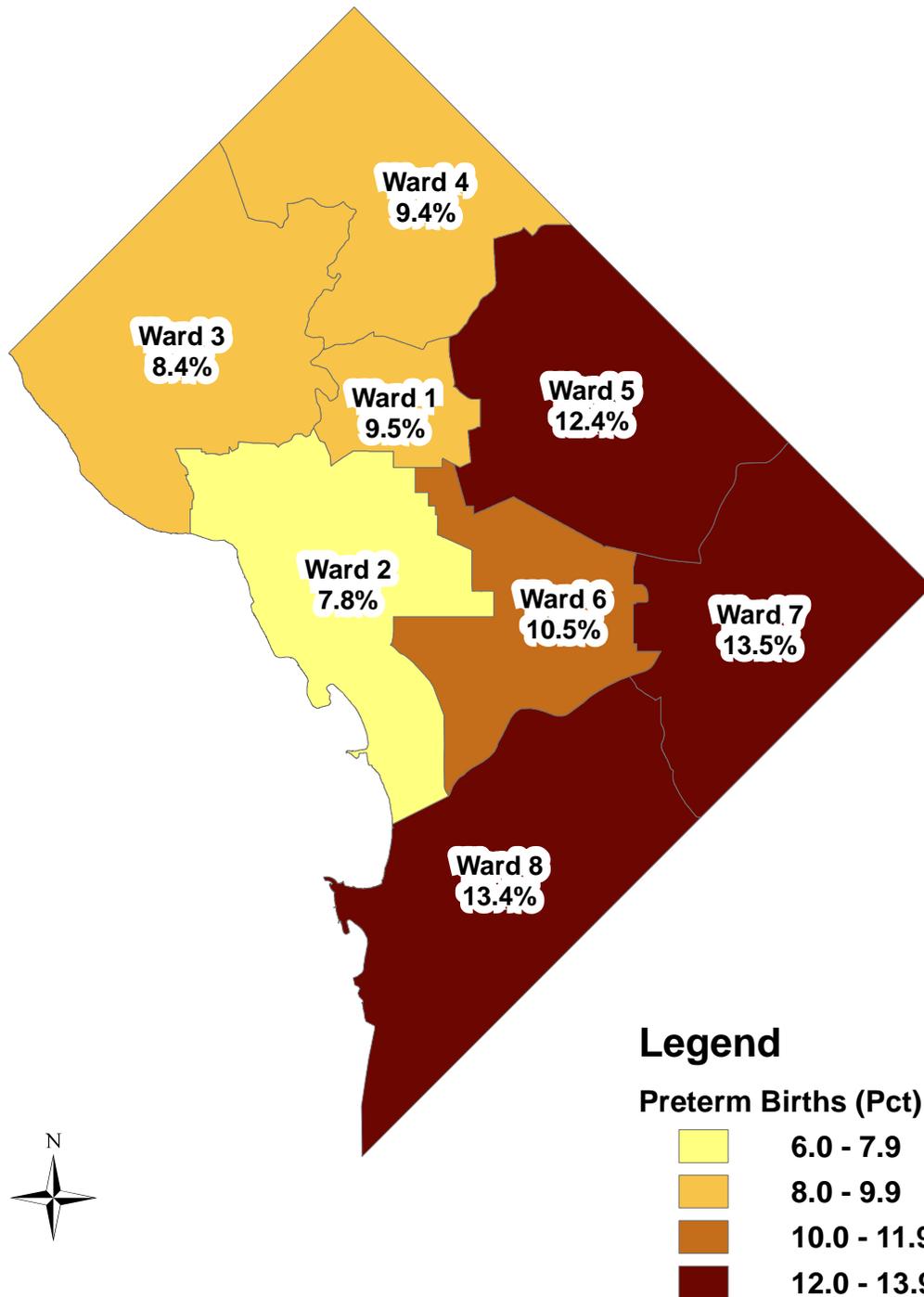
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Map 3. Percentage of Low Birth Weight Live Births by Ward, District of Columbia, 2011



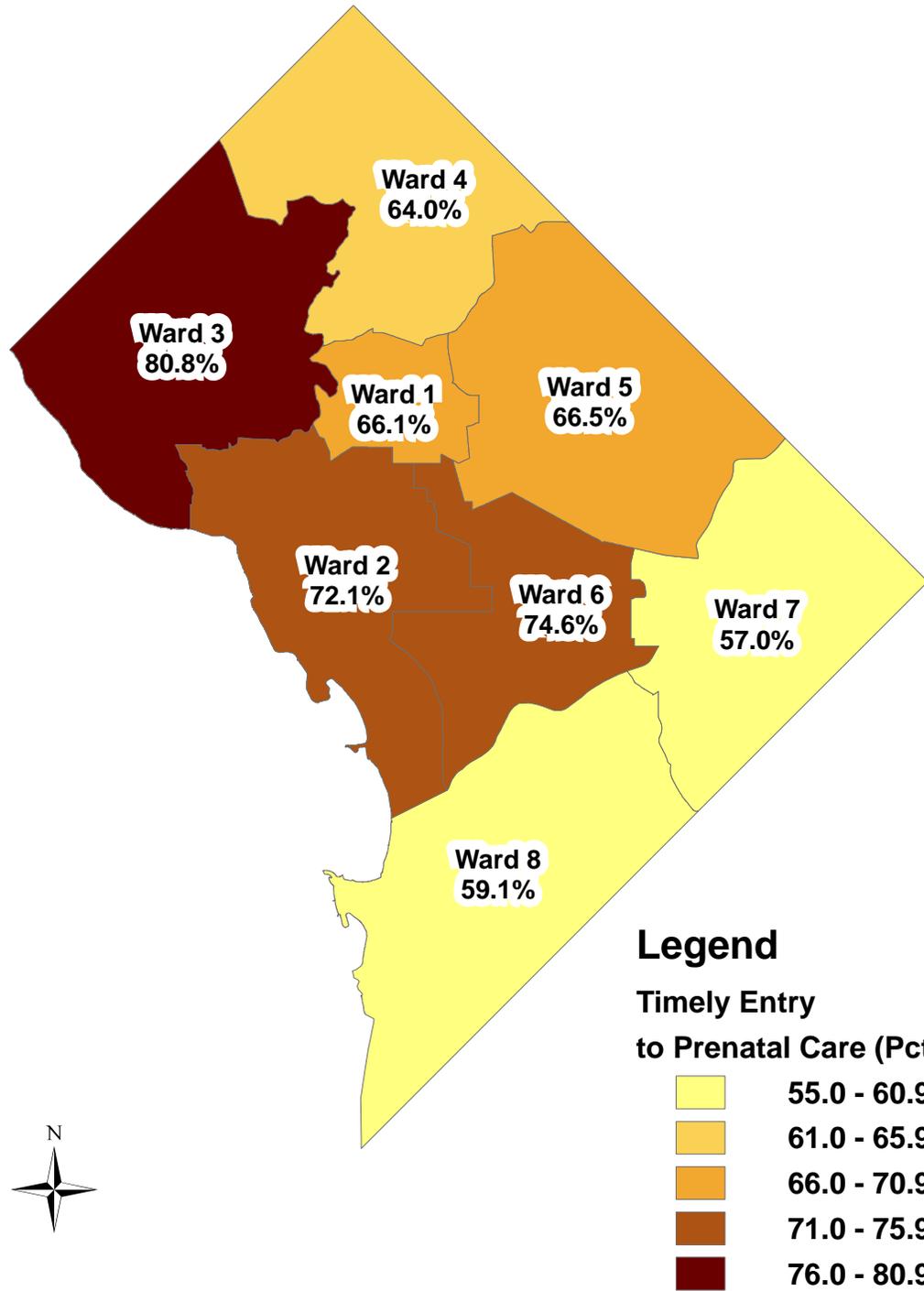
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Map 4. Percentage of Preterm Births by Ward, District of Columbia, 2011



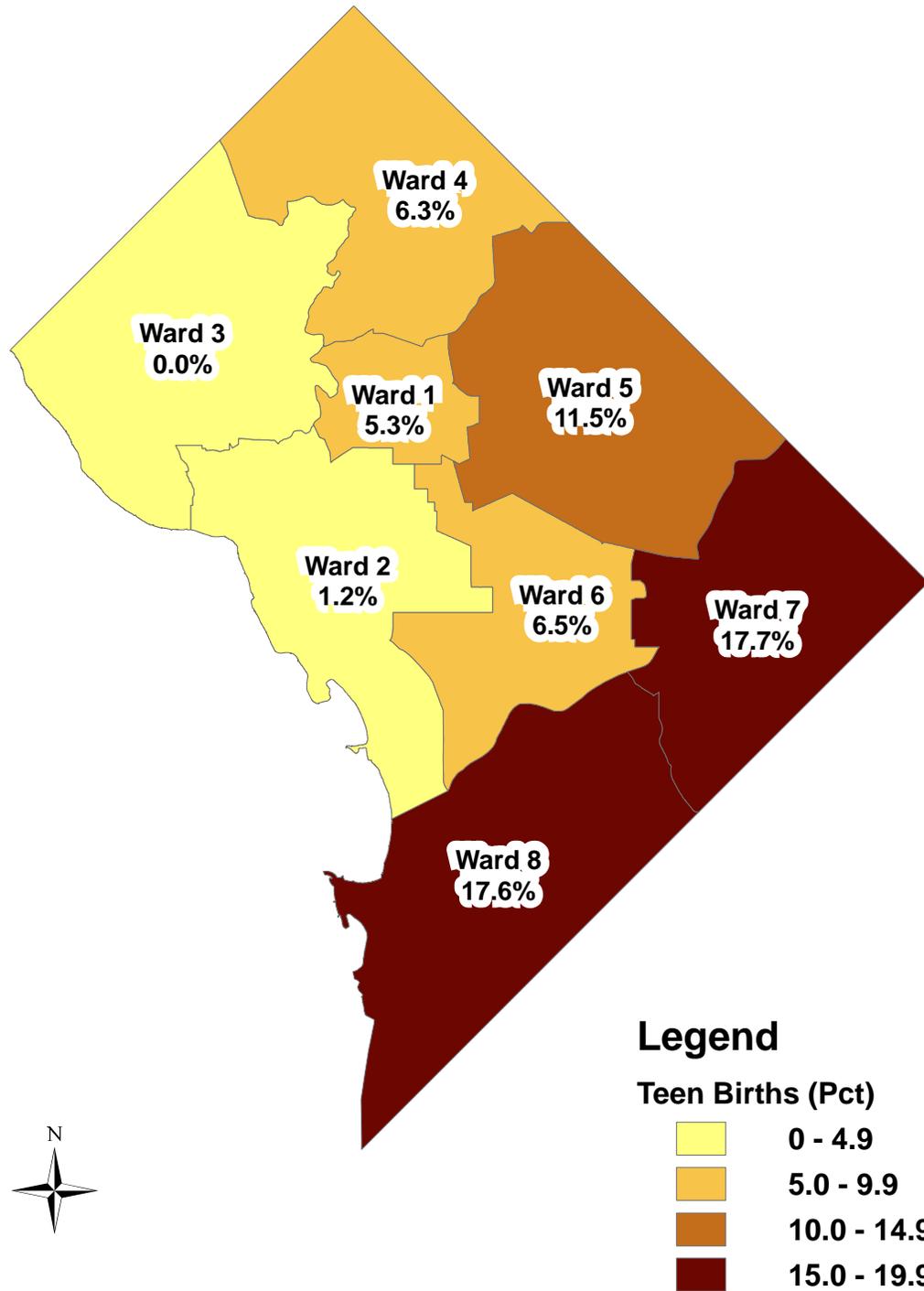
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Map 5. Percentage of Births with Prenatal Care Beginning First Trimester by Ward, District of Columbia, 2011



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Map 6. Teen Births by Ward, District of Columbia, 2011



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Ward distribution based on 2002 ward boundaries.

Causes of Death

The number one cause of infant mortality in 2011 was tied between **Disorders related to short gestation and low birth weight, not elsewhere classified** and **Newborn affected by maternal complications of pregnancy**, which accounted for a combined 40.6 percent of all infant deaths in 2011 (Table 14). **Newborn affected by complications of placenta, cord, and membranes** was the third leading cause of death, which accounted for 15.9 percent of all infant mortality. **Congenital malformations, deformations and chromosomal abnormalities** were the fourth leading cause of death, which accounted for 14.5 percent of all infant deaths. **Sudden infant death syndrome (SIDS)** was the fifth leading cause of death, which accounted for 2.9 percent of all infant mortality. **These five leading causes of infant death in 2011 accounted for 75.3 percent of all infant deaths in the District of Columbia.** These five leading causes of death in 2011 were the same as those in 2010; however, infant deaths due to congenital malformations dropped from 16 to 10 while SIDS decreased from 6 to 2. Infant deaths related to short gestation and low birth weight rose from 10 to 14, maternal complications of pregnancy from 11 to 14, and complications of placenta, cord, and membranes rose from 5 to 11 between 2010 and 2011.

**Table 14: Leading Causes of Infant Death
District of Columbia Residents, 2011**

Rank ¹	Cause of Death (Based on Tenth Revision, International Classification of Diseases, 2008 Edition, 2009)	Number	Percent*	Rate**
...	All causes	69	100.0	742.8
1	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	14	20.3	150.7
	... Extremely low birth or extreme immaturity (P07.0, P07.2)	13	18.8	140.0
	... Other low birth weight or preterm (P07.1, P07.3)	1	1.4	10.8
1	Newborn affected by maternal complications of pregnancy (P01)	14	20.3	150.7
	... Newborn affected by incompetent cervix (P01.0)	2	2.9	21.5
	... Newborn affected by premature rupture of membranes (P01.1)	11	15.9	118.4
	... Newborn affected by other maternal complications of pregnancy (P01.2–P01.4, P01.6–P01.9)	1	1.4	10.8
3	Newborn affected by complications of placenta, cord, and membranes (P02)	11	15.9	118.4
	... Newborn affected by complications involving cord (P02.4–P02.6)	1	1.4	10.8
	... Newborn affected by chorioamnionitis (P02.7)	10	14.5	107.7
4	Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	10	14.5	107.7
	... Other congenital malformations of nervous system (Q01–Q02, Q04, Q06–Q07)	1	1.4	10.8
	... Spina bifida (Q05)	1	1.4	10.8
	... Congenital malformations of heart (Q20–Q24)	4	5.8	43.1
	... Congenital malformations of genitourinary system (Q50–Q64)	3	4.3	32.3
	... Congenital malformations and deformations of musculoskeletal system, limbs and integument (Q65–Q85)	1	1.4	10.8
5	Sudden infant death syndrome (SIDS) (R95)	2	2.9	21.5
...	All other causes	18	26.1	193.8

*Percent based on total number of infant deaths.

**Rate per 100,000 live births.

... Category not applicable.

¹Rank based on number of infant deaths.

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

In 2011, the leading cause of infant death nationally was **Congenital malformations, deformations and chromosomal abnormalities**, which was fourth in the District of Columbia. **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), but ranked first for the District of Columbia.

Rank ¹	Cause of death (based on the <i>International Classification of Diseases, Tenth Revision, 2008 Edition, 2009</i>)	Number	Rate ²
...	All causes	23,907	604.7
1	Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	4,984	126.1
2	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	4,116	104.1
3	Sudden infant death syndrome (R95)	1,711	43.3
4	Newborn affected by maternal complications of pregnancy (P01)	1,578	39.9
5	Accidents (unintentional injuries) (V01–X59)	1,089	27.5
6	Newborn affected by complications of placenta, cord and membranes (P02)	992	25.1
7	Bacterial sepsis of newborn (P36)	526	13.3
8	Respiratory distress of newborn (P22)	514	13.0
9	Diseases of the circulatory system (I00–I99)	496	12.5
10	Neonatal hemorrhage ((P50–P52,P54)	444	11.2
...	All other causes (residual)	7,457	188.6

... Category not applicable.

¹ Rank based on number of infant deaths.

² Rates are per 100,000 live births.

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.

2. 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.

Source: National Vital Statistics Reports, Vol. 61, No. 6, October 10, 2012. Deaths: Preliminary data for 2011. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_06.pdf

Neonatal Mortality

The leading cause of neonatal death in 2011 was tied between **Disorders related to short gestation and low birth weight, not elsewhere classified** and **Newborn affected by maternal complications of pregnancy**, which accounted for a combined 51.8 percent of all neonatal deaths. **Newborn affected by complications of placenta, cord, and membranes** (16.7 percent) was the third leading cause of neonatal death (Table 16). **Congenital malformations, deformations and chromosomal abnormalities** was the leading cause of neonatal death in 2010 but has dropped to the fourth position in 2011.

Rank ¹	Cause of Death (Based on Tenth Revision, International Classification of Diseases, 2008 Edition, 2009)	Number	Percent*	Rate**
...	All causes	54	100.0	581.3
1	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	14	25.9	150.7
1	Newborn affected by maternal complications of pregnancy (P01)	14	25.9	150.7
3	Newborn affected by complications of placenta, cord, and membranes (P02)	9	16.7	96.9
4	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	7	13.0	75.4
...	All other causes or total	10	18.5	107.7

*Percent based on total number of neonatal deaths.

**Rate per 100,000 live births.

... Category not applicable.

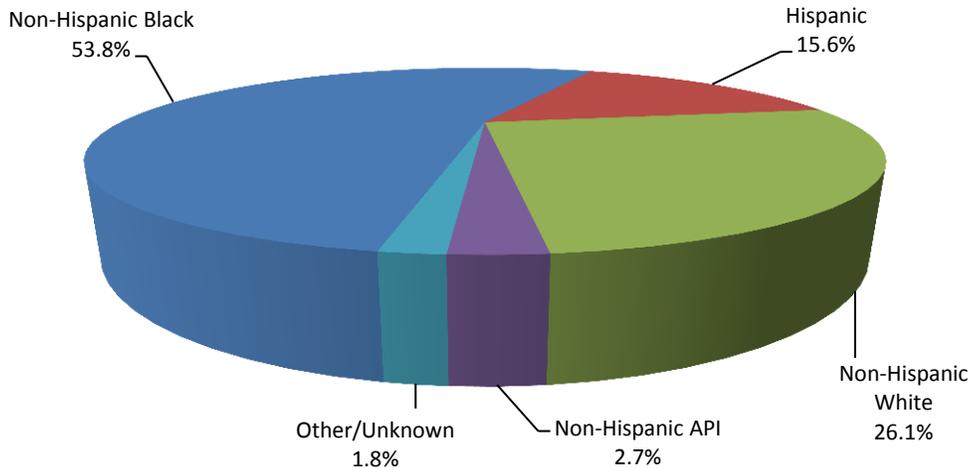
¹ Rank based on number of infant deaths.

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, 53,397 for the five-year period of 2007 to 2011. About 53.8 percent were to non-Hispanic black mothers, 26.1 percent were to non-Hispanic white mothers and 15.6 percent were to Hispanic mothers.

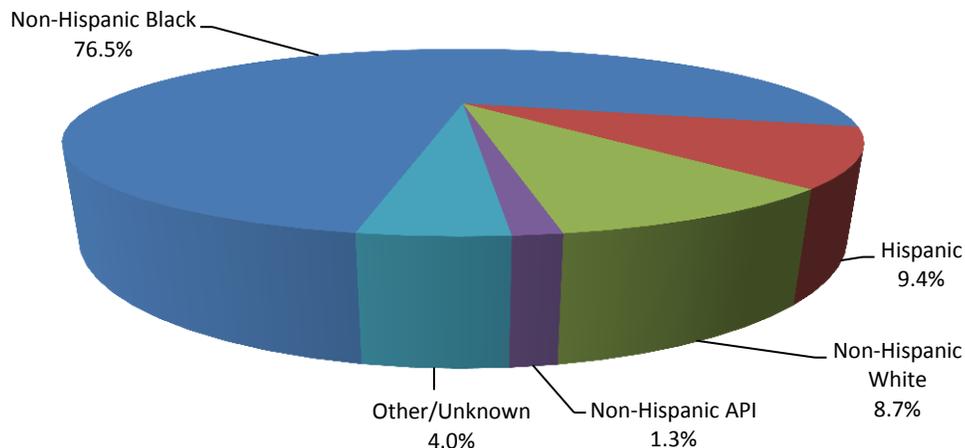
Figure 11. Births by Race and Hispanic Origin of Mother, 2007-2011 (n=53,397)



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

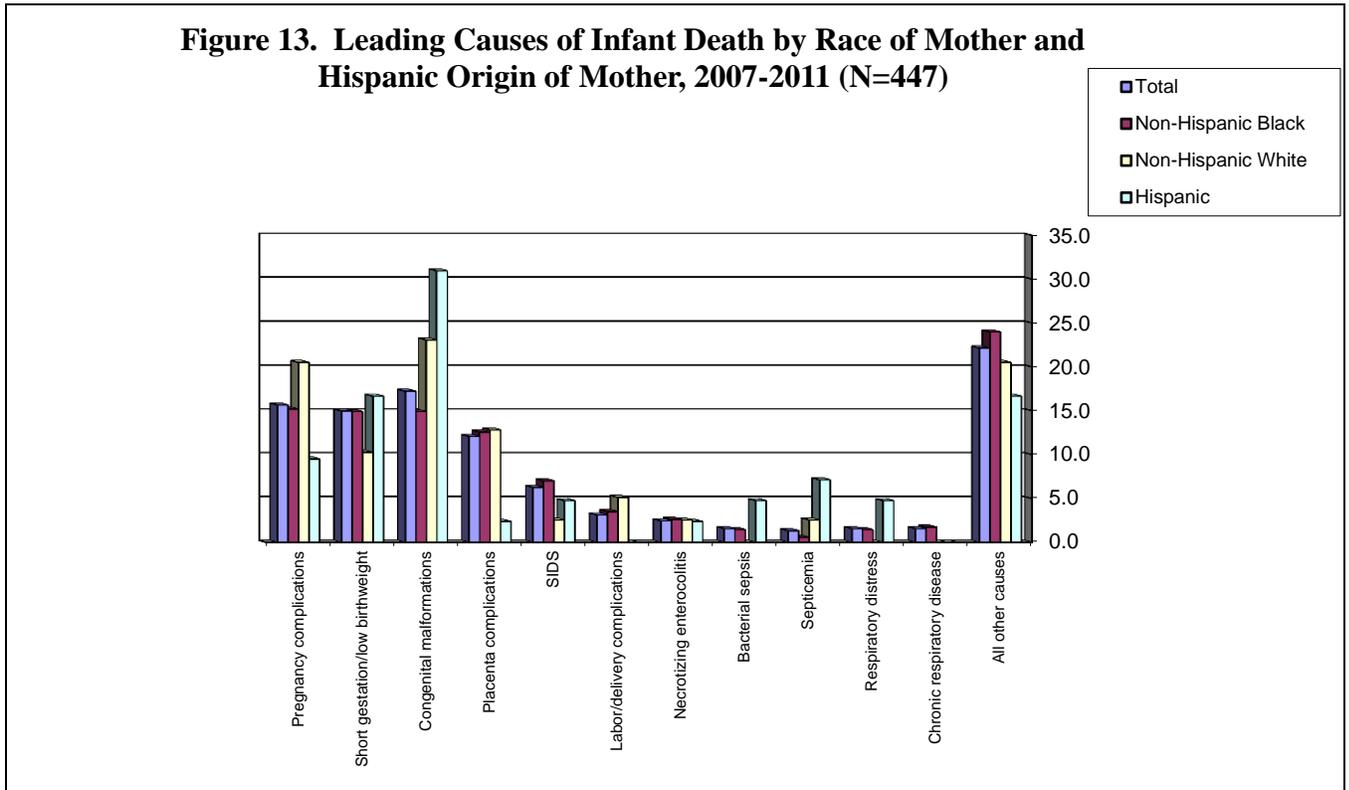
Of the total number of births (N=53,397), 447 infants died from 2007 to 2011. Figure 12 shows the average percentage of infant deaths by race/ethnicity from 2007 to 2011. On average between 2007 to 2011, infants to non-Hispanic black mothers disproportionately died (76.5 percent) compared to their total number of births (53.8 percent).

Figure 12. Infant Deaths by Race and Hispanic Origin of Mother, 2007-2011 (n=447)



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 (2007-2011). The leading cause of infant mortality was **Congenital malformations, deformations and chromosomal abnormalities**, which accounted for 17.2 percent, followed by **Newborn affected by maternal complications of pregnancy**, (15.7 percent). The third leading cause was **Short gestation and low birth weight** (15.0 percent).

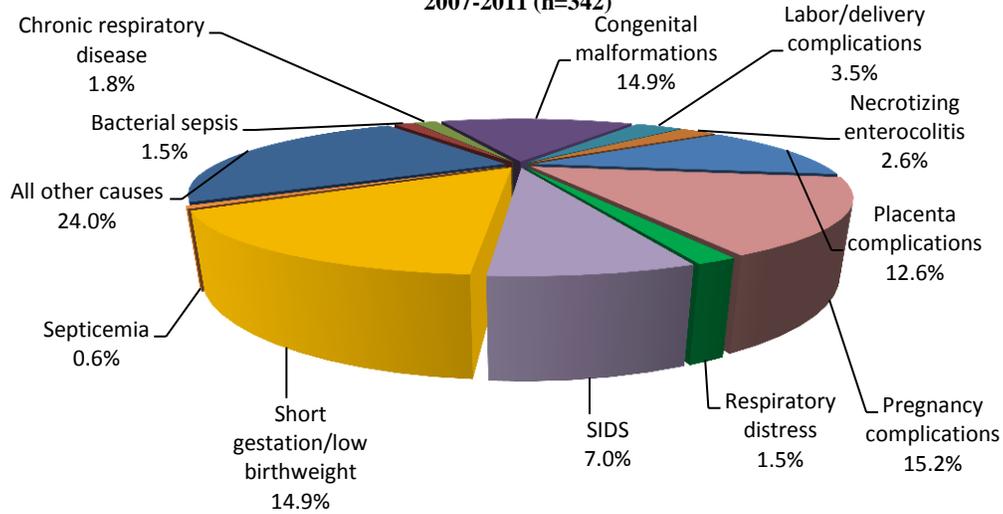


Note: Data by Asian/Pacific Islander were excluded due to small numbers.

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

Among non-Hispanic black mothers, **Newborn affected by maternal complications of pregnancy** was the leading cause of death (15.2 percent), followed by **Disorders related to short gestation and low birth weight, not elsewhere classified** tied with **Congenital malformations, deformations and chromosomal abnormalities**, each at 14.9 percent on the average, from 2007 to 2011. **Newborn affected by complications of placenta, cord and membranes** was the third leading cause of infant death (12.6 percent) (Figure 14).

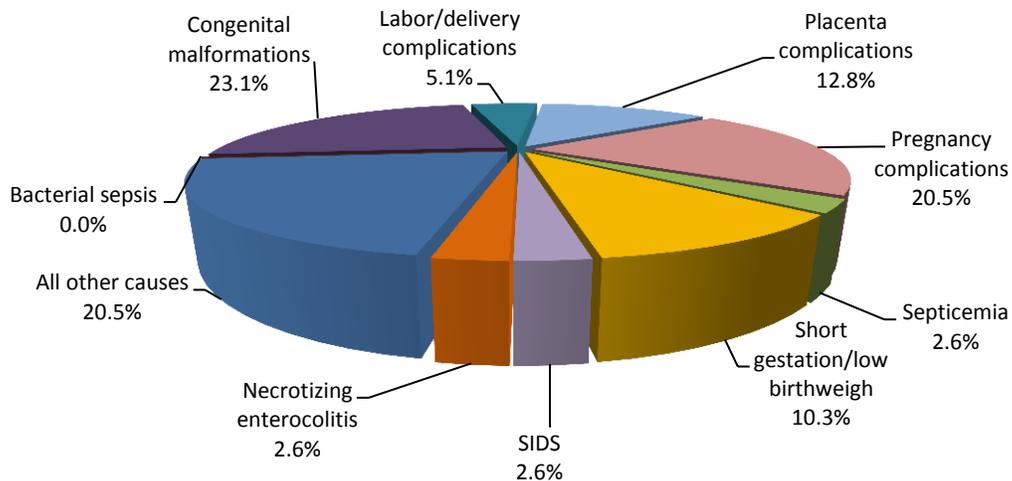
Figure 14. Leading Causes of Infant Death to Non-Hispanic Black Mothers, 2007-2011 (n=342)



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 2007 to 2011, **Congenital malformations, deformations and chromosomal abnormalities** was the leading cause of infant death (23.1 percent) and **Newborn affected by maternal complications of pregnancy** was the second leading cause (20.5 percent). **Newborn affected by complications of placenta, cord and membranes** was the third leading cause of infant death (12.8 percent) (Figure 15).

Figure 15. Leading Causes of Infant Death to Non-Hispanic White Mothers, 2007-2011 (n=39)

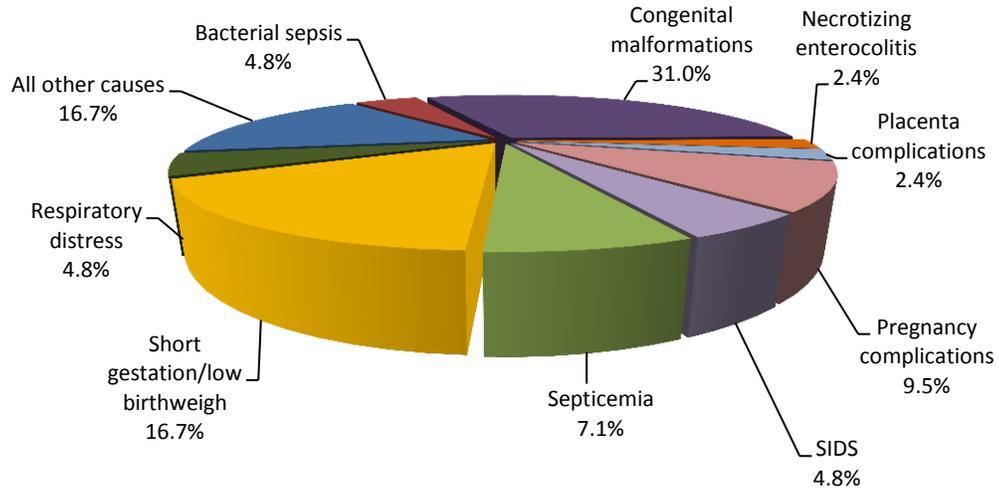


Note: Percentage does not add to 100 due to rounding.

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 2007 to 2011 was **Congenital malformations, deformations and chromosomal abnormalities (31.0 percent)**. **Disorders related to short gestation and low birth weight, not elsewhere classified (16.7 percent)** was the second leading cause, followed by **Newborn affected by maternal complications of pregnancy (9.5 percent)**.

Figure 16. Leading Causes of Infant Death to Hispanic Mothers, 2007-2011
(n=42)



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

DOH Maternal and Child Health Program Activities

Since the implementation of all applicable initiatives in the District of Columbia Department of Health 2007 Infant Mortality Action Plan, the Community Health Administration (CHA) has continued its efforts to reduce the District's infant mortality rate. Through the DC Healthy Start Project, CHA continued to utilize outreach and client recruitment, case management, health education, interconception services and health screenings in Wards 5, 6, 7, and 8 to improve high rates of perinatal disparities. The District's Safe Crib Program provided pack-n-plays and education on a safe sleep environment to over 1,000 eligible residents (an increase of 173 from 2010). On a weekly basis, the program provided a two hour Sudden Infant Death Syndrome (SIDS)/Safe Sleep workshops for residents which is a requirement for all parents and/or caregivers receiving a pack-n-play. Other programs and services targeting the District's perinatal disparities include home visitation services and public awareness campaigns.

In 2011, the DC Women, Infant, and Children (WIC) Program conducted a five-day Certified Lactation specialist training course for the WIC local and state agencies staff, technicians, peer counselors, and nutritionists. The course served to enhance breastfeeding education skills, prepare staff to counsel and promote breastfeeding, and teach mothers how to breastfeed. The course also enhanced staff's lactation management abilities to support and advise mothers on how to prevail over a variety of lactation challenges. Researchers have linked SIDS prevention as another benefit of breastfeeding and in 2011 DC WIC saw a slight increase in the percentage of women who initiated breastfeeding from 46.60 percent in 2010 to 47.12 percent in 2011.

Current Reproductive Health Outcomes Oriented Programs

CHA's Perinatal and Infant Health Bureau (PIHB) continues its work to decrease perinatal disparities such as prematurity, low birth weight, very low birth weight, and infant mortality by increasing awareness of how to improve birth outcomes. The Bureau continues to promote the "I am a Healthy DC MOM", and "I am a Healthy DC Baby" and the newly released "I am a Healthy DC Dad" public information campaigns. Materials related to all these campaigns emphasize what parents can do to have a healthy baby and where to call to obtain more information and support. In FY12, the Bureau expanded its public information campaign to develop targeted preconceptional messages to teens through the release of "I Care About Me". The sub-messages were: "I care about eating right and keeping fit"; "I care about my annual health checkup/protect myself"; "I care about asking for help"; and "I care about my education and future." All the public information campaign activities will continue in FY13.

To enhance the impact of these campaign activities, social marketing research has been identified as a potentially valuable component in the development and tailoring of health messages and programs that resonate with special populations at-risk. New tools and strategies employing market research data will be discussed in the next section of this report.

Use of Market Research Data for Community Health Assessment: A Novel Approach in the District of Columbia

About the data

Market research data is generally defined as information collected on consumer preferences and characteristics commonly utilized by business groups, retailers, media providers, and advertisers to enhance marketing strategies. Sources of market research data include a combination of self-reported survey data, sales data, automobile registration, product warranty cards, financial services, and other public records¹⁴. Because market research data is fundamentally intended to capture the tendencies of a particular population, it may also contain a geospatial component such as point location data, zip code and census information. This data not only provides a comprehensive understanding of the marketplace but is also an invaluable resource in determining geographic areas predominated by the target population.

Our rationale

Under a cooperative agreement with the Directors for Health Promotion and Education (DHPE), the District of Columbia Department of Health (DC DOH) has been granted access to ***Nielsen PrimeLocation and ConsumerPoint***, a Nielsen-Claritas market research database and software application useful in developing new approaches to achieving health equity in the District. DC DOH is conducting multidisciplinary studies based on the unique collaboration between market research and public health. This new approach will leverage an extensive compilation of consumer behavioral research in designing public health interventions to maximize program impact. For example, geographically summarized demographic data, lifestyle preferences, spending habits, and healthcare utilization data gleaned from market research will enable DC DOH to make data-driven decisions targeting areas with high infant mortality rates in the District. This knowledge will enable DC DOH to develop the appropriate health messages to targeted populations.

Presented in this report are preliminary findings of studies linking market research data and infant mortality rates for 2011 in the District.

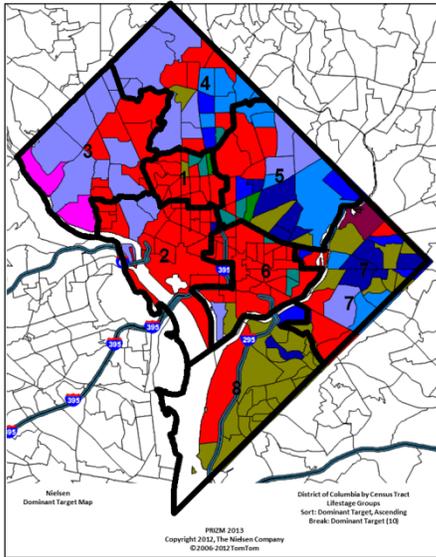
Market Research Data Correlations with Infant Mortality

Market research data can be used to show the interplay of social, economic, and environmental dynamics that drive health indicators of a community, in this case, infant mortality in the District of Columbia. Preliminary findings show that high infant mortality is co-located with households composed of working class families, mostly with children, have low income, and are ethnically mixed. Households that share certain sociological traits, behavioral patterns, geographic location, and other common characteristics (such as age, income, race, household structure, and education) are classified into Lifestage Groups defined by Nielsen. For detailed descriptions of the Lifestage Groups depicted in Map 7, please refer to Appendix 1.

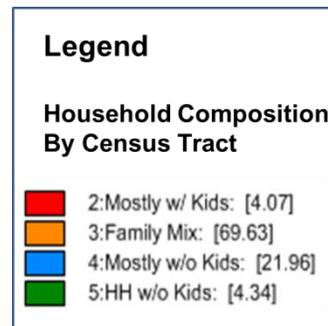
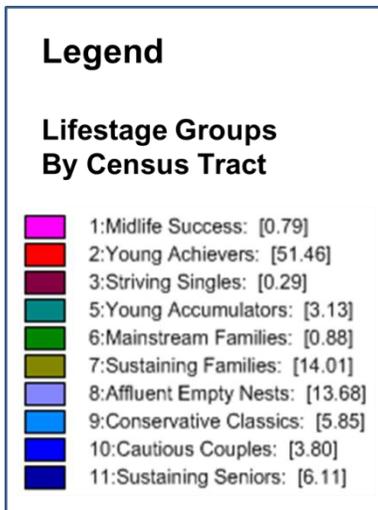
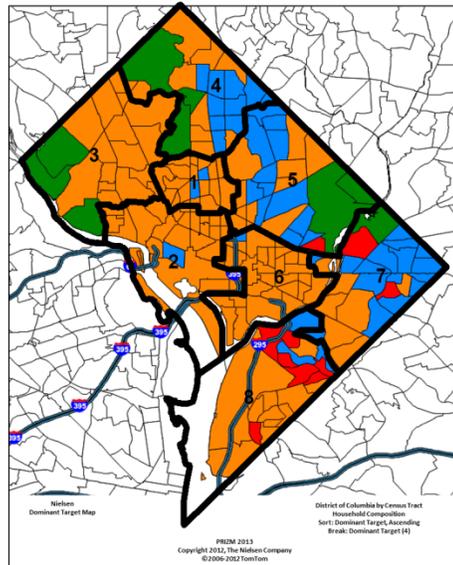
The Lifestage Group - Sustaining Families, dominates high infant mortality census tracts (green polygons in Map 7) and coincides with areas characterized by lower income and families with children. Sustaining Families is the least affluent of the Family Lifestage Groups (annual income below \$30,000), and have a high percentage of African American, Asian, and Hispanic families. Most adults hold blue-collar and service jobs, earning wages that relegate their families to small, older apartments and modest lifestyles. These households shop at discount chains and convenience stores, and tune into BET channel and read Ebony magazine. This information on consumption and lifestyle patterns typically used in the advertising industry can be incorporated in the planning and development of DC DOH intervention campaigns and health messages to educate the public. In addition, programs targeting teen pregnancy, perinatal disparities, and infant mortality should factor in the distribution of social lifestyle groups in the District. Other findings include:

- Sustaining Families were predominant in Ward 8 which had the highest number of infant deaths in 2011. This Lifestage Group was also found in census tracts in Wards 1, 4, 5, 6, and 7 (green polygons Map 7).
- The number of infant deaths in Ward 5 was only 6 fewer than in Ward 8, but the number of births in Ward 5 was 35 percent lower than in Ward 8, resulting in a higher computed infant mortality rate.
- Household composition in Ward 5 depicted a combination of households with no kids, households mostly without kids, and family mix (green, blue, and orange census tracts in Map 8).
- Lifestage groups in Ward 5 were a combination of Young Achievers, Mainstream Families, Sustaining Families, Affluent Empty Nests, Conservative Classics, Cautious Couples, and Sustaining Seniors (Map 7).
- Ward 3, on the other hand, did not have infant deaths in 2011. The household composition in Ward included family mix and households with no kids (orange and green polygons in Map 8).
- Lifestage groups in Ward 3 were a combination of Midlife Success, Affluent Empty Nests, and Young Achievers (pink, light blue and red polygons in Map 7). Predominance of these groups may explain low infant mortality rates in wards with high income, high educational attainment, and households with no children.

Map 7. Lifestage Groups by Census Tract, District of Columbia, 2011



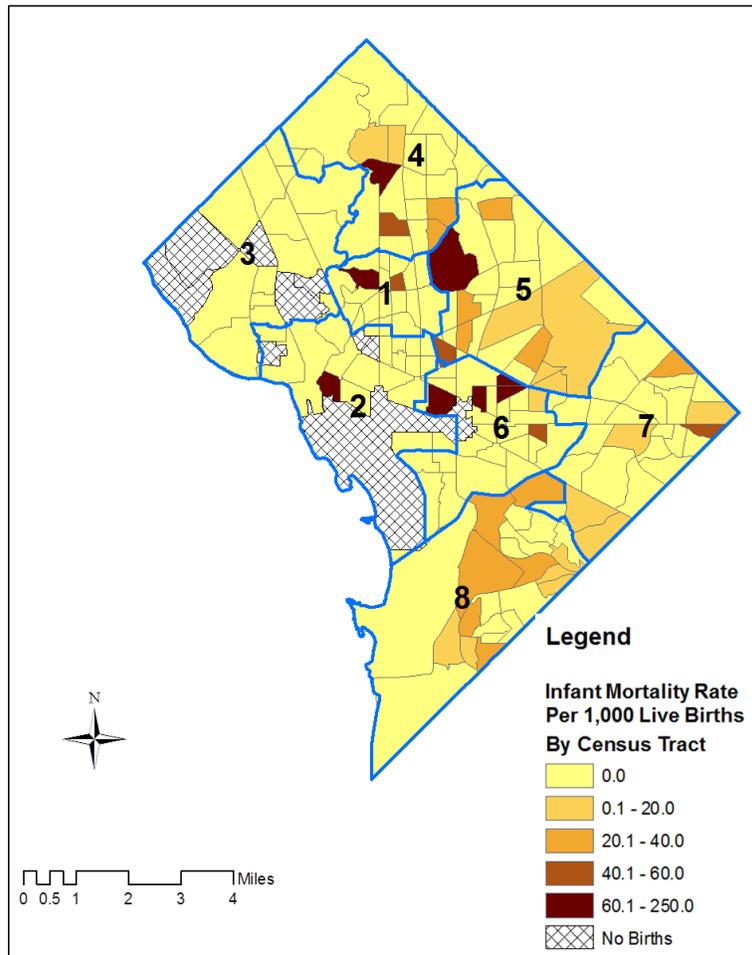
Map 8. Household Composition by Census Tract, District of Columbia, 2011



Note:

Lifestage Groups are based on a Nielsen classification of households that share certain sociological traits, behavioral patterns, and other common characteristics (such as age, income, race, household structure, education).

Map 9. Infant Mortality Rate among Black Mothers by Census Tract, District of Columbia, 2011



Limitations of the Study

- Infant mortality rates by census tract may be considered unstable due to very low number of infant deaths and/or births. Infant mortality rates by census tract should not be compared with rates by ward.
- Because infant mortality in the District is largely driven by infant deaths to black mothers (82.6 percent), Map 9 focuses on depicting black infant mortality rates by census tract.
- Census tract data presented in Maps 7-9 were not weighted or tested for statistical significance. Results are considered preliminary until more in-depth analyses are performed.
- In order to get a full understanding of increasing and/or decreasing infant mortality trends, other co-factors for infant mortality should be included in further analyses.
- Availability of market research data prior to 2011 would aid in determining how social and Lifestage Group behavior influence trends in infant mortality.

Appendix: Description of Lifestage Groups (Adapted from Nielsen 2011 PRIZM, DHPE)

Lifestage Group	Selected Description	Ethnicity	Ward
Young Achievers	Median HH Income: \$91,104, Family Mix - Order from expedia.com - Go water skiing - Read The Economist - Watch Independent Film Channel - Audi A3	White, Asian, Hispanic, Mix	1, 2, 3, 4, 5, 6, 7, 8
Sustaining Families	Median HH Income: \$25,761, Mostly w/ Kids - In-home cosmetics purchase - Domestic travel by bus - Read Ebony - Watch BET - Nissan Pathfinder	White, Black, Hispanic, Mix	1, 6, 7, 8,
Affluent Families	Median HH Income: \$121,186, HH w/o Kids - Shop at Saks Fifth Ave. - Belong to a country club - Read Conde Nast Traveler - Watch Golf Channel - Mercedes SL Class	White, Asian, Mix	1, 2, 3, 4, 5, 6, 7
Conservative Classics	Median HH Income: \$59,750, Mostly w/o Kids - Shop at Costco - Buy classical music - Read Harper's Bazaar - Watch BBC America - Lexus LX	White, Black, Asian, Hispanic	2, 3, 4, 5, 7
Cautious Couples	Median HH Income: \$43,049, Mostly w/o Kids - Shop at Macy's - Domestic travel by railroad - Read The New Yorker - Watch The View - Chrysler PT Cruiser	White, Black, Asian, Hispanic	3, 5, 6, 7
Sustaining Seniors	Median HH Income: \$26,113, Mostly Retired - Order from drugstore.com - Gamble in Reno, NV - Read Town & Country - Watch NAACP Image Awards - Chrysler 300	White, Black, Asian, Hispanic	5
Midlife Success	Median HH Income: \$109,351, HHO w/out Kids, Mostly Owners - Order from J Crew - Attend NHL games - Watch Saturday Night Live - Land Rover Range Rover	White, Asian, Mix	3
Striving Singles (subgroup)	Median HH Income: \$34,647, Twenty-something singles - Live in apartment complexes, dormitories, or mobile homes - Favor outdoor sports, movies and music, fast food - Inexpensive cars	-	5, 6, 7
Young Accumulators (subgroup)	Median HH Income: \$74,570, Ethnically diverse and college educated - Live in mid-sized homes in suburban or exurban areas - Favor outdoor sports, campers, powerboats, motorcycles	-	1, 4, 5, 6, 7
Mainstream Families (subgroup)	Median HH Income: \$48,719, Large families with at least one child under 18 still at home - Live in modestly priced homes - Own three or more cars - Favor sports, electronic toys, groceries in bulk, televised media	-	1, 6

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Technical Notes

Data Sources and Method

Data shown in this report for 2011 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 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 informant, 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.

The report also uses data from the National Center for Health Statistics (NCHS) 2011 preliminary mortality report for the United States, National Vital Statistics Reports, Vol. 61, No. 6, October 10, 2012. Deaths: Preliminary data for 2011. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_06.pdf

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 2011 birth and death rates shown in this report represent the population residing in DC, enumerated as 601,723 for Census Year 2010 (Release Date: May 5, 2011). Birth and death rates shown in this report for 2010 by ward were calculated using the District of Columbia Census 2010 Demographic and Housing Profiles by Ward, U.S. Census Bureau, Census 2010 Data, 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 testing¹ 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	Newborn weighing under 2,500 grams or 5 lbs. 8 oz.
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