

**2010 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
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2010 INFANT MORTALITY RATE

Executive Summary

For every 1,000 live births to District of Columbia residents in 2010, approximately eight infants died before reaching their first birthday. In 2010, there were 73 infant deaths in the District, resulting in an infant mortality rate of 8.0 per 1,000 live births, a 24.5 percent decline since 2001 and a historic low for the District. There were 8 fewer infant deaths in 2010 compared to 2001; however, there were 1,535 more live births in 2010 compared to 2001. Table 1 and Figure 1 present a ten-year summary of these statistics.

Table 1: Ten-Year Infant Mortality Trends District of Columbia Residents, 2001-2010			
Year	Births	Infant Deaths	Infant Mortality Rate*
2001	7,621	81	10.6
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

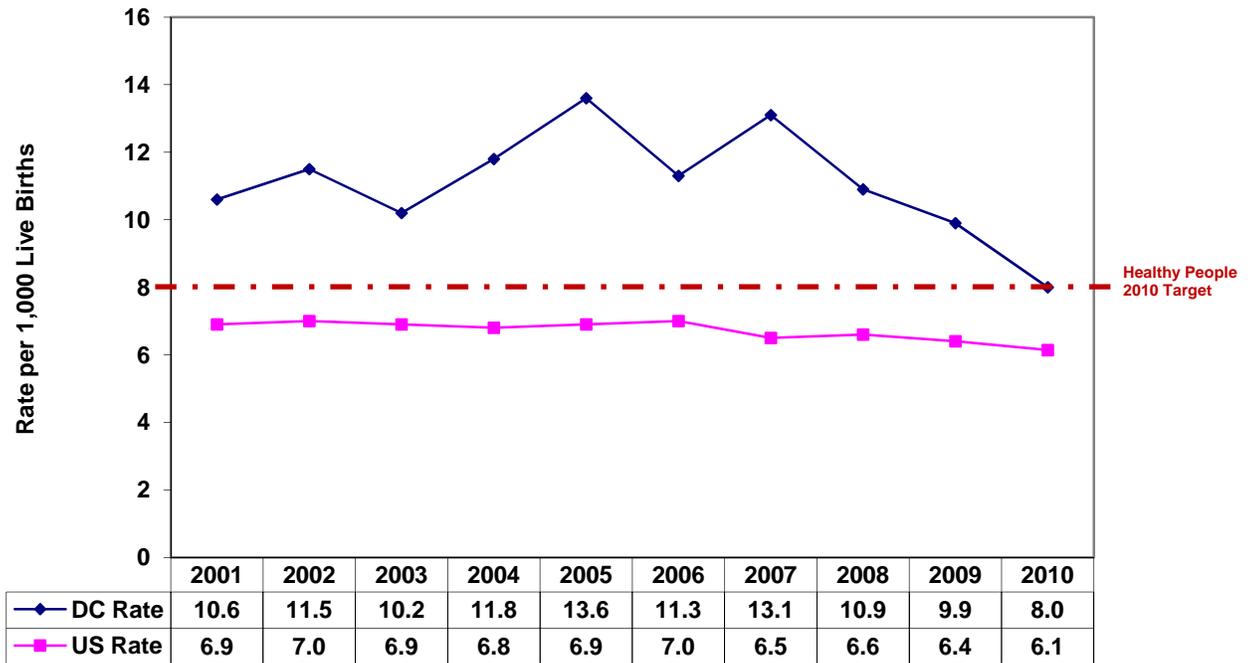
* Per 1,000 live births

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

The declining trend in the infant mortality rate from 2001 to 2010 depicts the District’s 10-year path to achieving its Healthy People 2010 objective of reducing infant mortality to no more than 8 infant deaths per 1,000 live births (Figures 1 and 2). This overall reduction in infant mortality rates in the District may be explained by large declines in infant deaths to black mothers. Among blacks, the infant mortality rate fell from 14.5 in 2001 to 10.7 in 2010, a 26.2 percent decrease over the 10-year period. Conversely, the infant mortality rate among whites rose by 75 percent over the same 10-year period, from 2.8 in 2001 to 4.9 in 2010. Figure 3 illustrates the racial disparity in infant mortality rates in the District from 2001 to 2010.

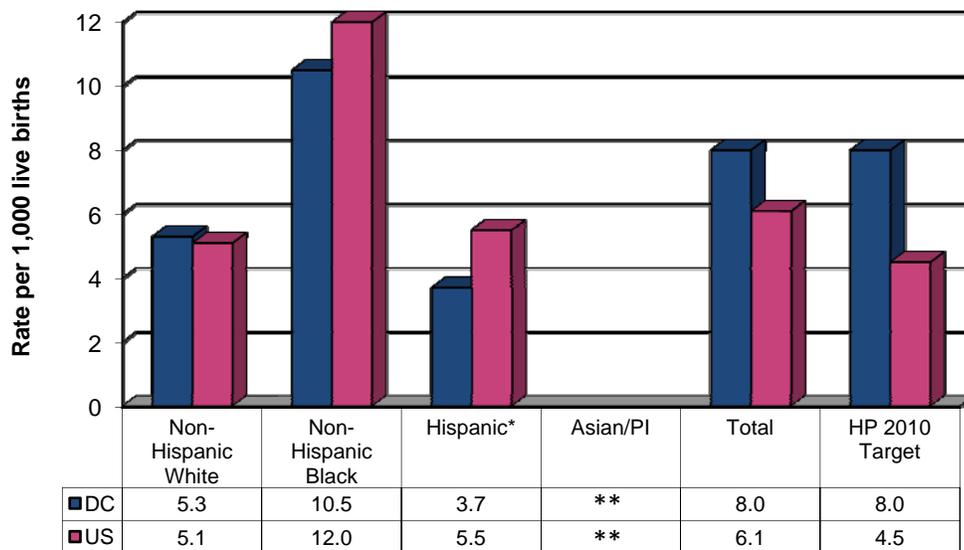
Infant mortality rates in the District fluctuated during the first half of the decade, however, a stable downward trend was observed from 2007 through 2010. In 2007, the District of Columbia Department of Health (DOH) released the Infant Mortality Action Plan, a comprehensive 5-year road map on the efforts 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, 2001-2010



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, 2010 and the United States, Preliminary 2010



*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/nvsr60/nvsr60_04.pdf

2009 to 2010 Comparison Highlights

- The number of infant deaths decreased from 89 in 2009 to 73 in 2010, a decrease of 18.0 percent.
- The overall infant mortality rate for the District decreased by 19.2 percent from a rate of 9.9 per 1,000 live births in 2009 to 8.0 per 1,000 live births in 2010. The national infant mortality rate slightly decreased from 6.4 in 2009 to 6.1 in 2010.
- From 2009 to 2010, infant mortality rates decreased in Wards 1, 2, 5, 7 and 8 but increased in Wards 3, 4 and 6.
- Death to infants younger than 28 days decreased from a rate of 6.3 per 1,000 live births in 2009 to 5.6 per 1,000 live births in 2010, a decrease of 11.1 percent. (57 neonatal deaths in 2009 and 51 in 2010.)
- The post-neonatal death rate (deaths occurring from 28 days to under 1 year of age) decreased by 32.4 percent, from 3.6 per 1,000 live births in 2009 to 2.4 in 2010. (32 post-neonatal deaths in 2009 and 22 in 2010.)
- The infant death rate to non-Hispanic black mothers decreased from 14.6 per 1,000 live births in 2009 to 10.5 per 1,000 live births in 2010 (Table 2), a decrease of 28 percent. For the first time, the DC rate for infant mortality in black mothers was lower than the U.S. rate (51 infant deaths in 2010 to District residents).
- The infant death rate to non-Hispanic white mothers was 2.6 per 1,000 live births in 2009 and 5.3 for 2010, an increase of 103.8 percent (Table 2). (13 infant deaths in 2010 to District residents).
- The infant death rate to Hispanic mothers decreased by 53.8 percent from 8.0 per 1,000 live births in 2009 (Table 2) to 3.7 per 1,000 live births in 2010. (5 infant deaths in 2010 to District residents).
- The number of infant deaths that resulted from multiple births increased from 15 in 2009 to 18 in 2010.
- There were 4 maternal deaths in 2010 compared to 1 in 2009.
- The proportion of births to teen mothers (15-19 years of age) decreased by 9 percent from 2009 to 2010. (951 births to teen mothers in 2010).

Statistical Overview

In 2010, there were 9,156 live births and 73 infant deaths to District of Columbia residents (Table 1). This resulted in an infant mortality rate of 8 deaths for every 1,000 live births. In 2009, there were 9,008 live births and 89 infant deaths. The infant mortality rate for 2009 was 9.9 deaths per 1,000 live births. There was a 19.2 percent decrease in the infant mortality rate from 9.9 per 1,000 live births in 2009 to 8.0 per 1,000 live births in 2010. There were 16 fewer infant deaths in 2010 than in 2009. Ward 4 had the highest infant mortality rate at 11.3 deaths per 1,000 live births (Table 10). The 2010 births (9,156) increased by 1.6 percent over 2009 births (9,008) (Tables 3 and 4).

Of the 73 infant deaths that occurred in 2010, 51 (or 70 percent) occurred during the neonatal period (under 28 days of life). The neonatal death rate decreased by 11.1 percent from 6.3 per 1,000 live births in 2009 to 5.6 per 1,000 live births in 2010. 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.

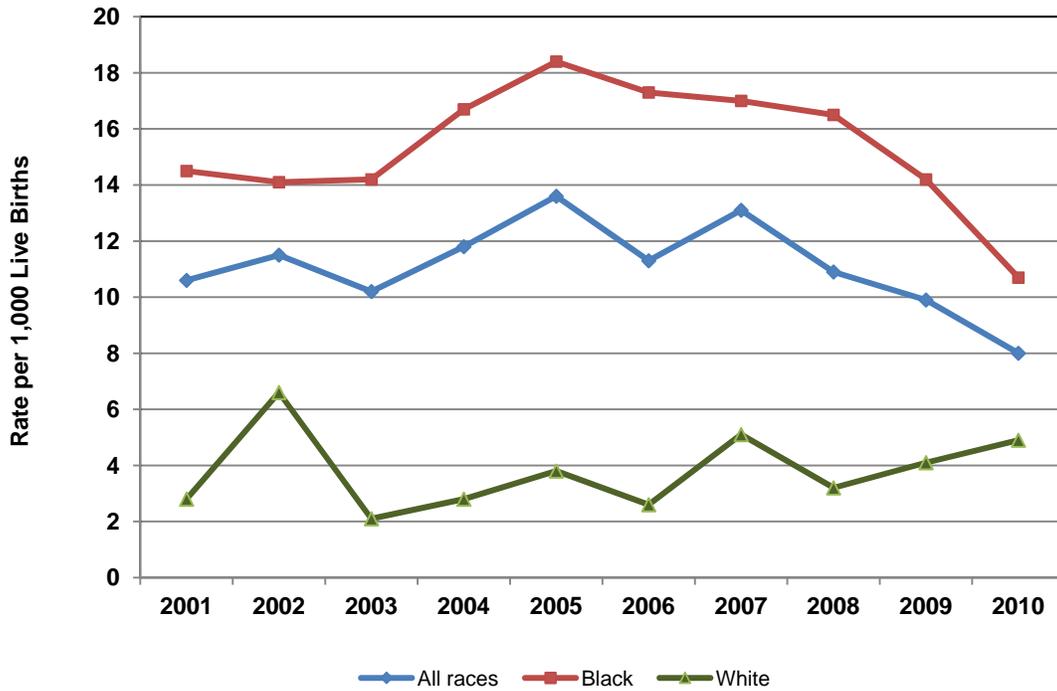
Table 2: Live Births, Infant Deaths and Infant Mortality by Race/Hispanic Origin District of Columbia Residents, 2009 & 2010						
Race/Ethnicity	Live Births		Infant Deaths		Infant Mortality Rate¹	
	2009	2010	2009	2010	2009	2010
Total	9,008	9,156	89	73	9.9	8.0
Black	4,847	4,940	69	53	14.2	10.7
White	2,655	2,632	11	13	4.1	4.9
Asian/Other	1,202	987	7	1	5.8	1.0
Total	9,008	9,156	89	73	9.9	8.0
Non-Hispanic Black	4,670	4,854	68	51	14.6	10.5
Non-Hispanic White	2,325	2,470	6	13	2.6	5.3
Hispanic ²	1,498	1,351	12	5	8.0	3.7

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.

Figure 3. Infant Mortality Rates by Race of Mother, District of Columbia, 2001-2010



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, and marital status may also be associated with infant mortality.

Low Birth Weight

In 2010, the percentage of low birth weight infants (those weighing under 2,500 grams or 5.5 pounds) in the District was 10.2 percent compared to 10.3 percent in 2009 (Tables 3 and 8). This represents a decrease of less than 1 percent. About one in seventeen low birth weight infants died before their first birthday.

Very Low Birth Weight

A slight increase was seen among very low birth weight (under 1,500 grams) newborns between 2009 and 2010; **very low birth weight** births increased from 2.1 percent to 2.3 percent, while **moderately low birth weight** (1,500–2,499 grams) births decreased from 8.2 percent to 7.9 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 2010, about one in five (20 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 increased for non-Hispanic black infants from 2009 to 2010 (from 3.0 percent to 3.3 percent); very low birth weight births also increased for non-Hispanic white infants (from 0.8 percent to 1.2 percent); very low birth weight births decreased for Hispanic infants from 1.7 percent to 1.3 percent.

Low Birth Weight and Race and Hispanic Origin of Mother

The percentage of low birth weight babies that was born to all black mothers increased from 12.9 percent in 2009 to 13.3 percent in 2010 (Table 3). Likewise, the percentage of low birth weight babies born to Asian and Pacific Islander mothers increased from 5.7 percent in 2009 to 7.4 percent in 2010. Conversely, there was a decrease in low birth weight babies born to all white mothers, from 7.4 percent in 2009 to 6.5 percent in 2010. 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 decreased by 11.5 percent among babies born to Hispanic mothers (7.6 percent in 2009 to 6.7 percent in 2010). Non-Hispanic white low birth weight births decreased from 7.0 percent in 2009 to 6.4 percent in 2010. Non-Hispanic black low birth weight births increased slightly from 13.0 percent to 13.3 percent for 2009 to 2010.

Table 3: Percent Distribution of Low Birth Weight¹ Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2009 and 2010			
Race/Hispanic Origin	2009	2010	Percent Change
Total Births for All Races	9,008	9,156	1.6
- Number Low Birth Weight	929	933	
- Percentage LBW among all Births	10.3%	10.2%	-1.1
Total Births to Black* Mothers	4,847	4,940	1.9
- Number Low Birth Weight	627	657	
- Percentage LBW among Births to Black Mothers	12.9%	13.3%	2.8
Total Births to White* Mothers	2,655	2,632	-0.9
- Number Low Birth Weight	196	170	
- Percentage LBW among Births to White Mothers	7.4%	6.5%	-12.5
Total Births to Asian and Pacific Islander Mothers	314	365	16.2
- Number Low Birth Weight	18	27	
- Percentage LBW among Births to Asian and Pacific Islander Mothers	5.7%	7.4%	29.0
Total Births to Hispanic/Latina Mothers	1,498	1,351	-9.8
- Number of Low Birth Weight	114	91	
- Percentage LBW among Births to Hispanic Mothers	7.6%	6.7%	-11.5

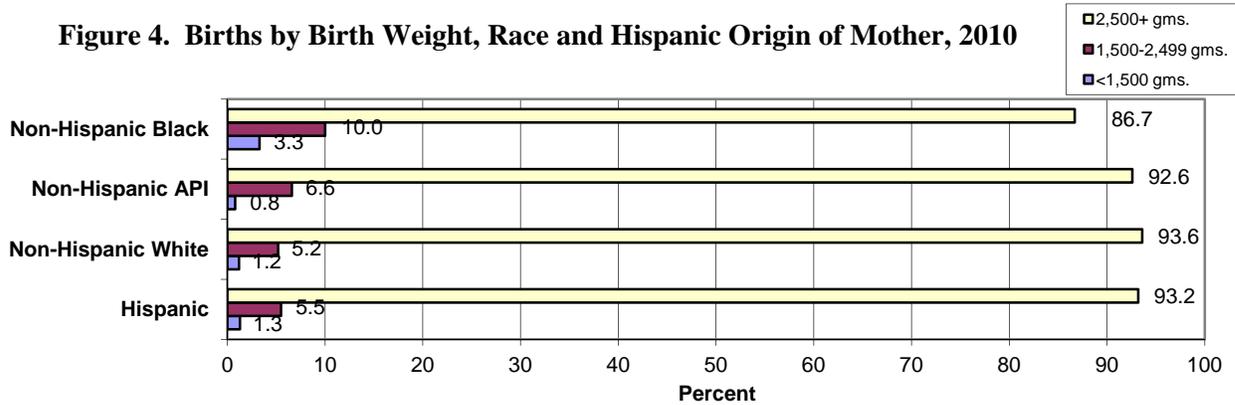
*Includes mothers of Hispanic origin.

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, 2010



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 decreased from 12.0 percent in 2009 to 10.5 percent in 2010 (Table 4). The percentage of low birth weight babies born to all mothers 20 years of age and older remained at 10.1% from 2009 to 2010.

Table 4: Percent Distribution of Low Birth Weight¹ Babies by Age of Mother District of Columbia Residents, 2009 and 2010			
	2009	2010	Percent Change
Total Births for All Ages	9,008	9,156	1.6
- Number of Low Birth Weight	929	933	
- Percentage of Low Birth Weight	10.3%	10.2%	-1.2
Total Births to Mothers Under 20 Years of Age	1,057	967	-8.5
- Number of Low Birth Weight	127	102	
- Percentage of Low Birth Weight among mothers < 20 years old	12.0%	10.5%	-12.2
Total Births to Mothers 20 Years of Age and Older	7,948	8,188	3.0
- Number of Low Birth Weight	802	831	
- Percentage of Low Birth Weight among mothers ≥20 years old	10.1%	10.1%	0.6
Total Births to Mothers Whose Age is Unknown ²	3	1	-66.7
- Number of Low Birth Weight	0	0	
- Percentage of Low Birth Weight	0%	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 933 low birth weight births, 55 infants (5.9 percent) died in 2010. A total of 21 infants (28.8 percent of all 73 infant deaths) died to mothers 30-34 years of age in 2010. Eighteen of these 21 infants (85.7 percent) were low birth weight. Almost 55 percent of all infant deaths (n=40) occurred to mothers aged 30-39 years. Thirty-four percent of all infant deaths occurred to mothers aged 20-29 years and 5.5 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 73 infant deaths, 55 (75.3 percent) were low birth weight infants (45 died during the neonatal period and 10 in the post-neonatal period). Nine of the 13 (69.2 percent) infant deaths to white mothers were born weighing under 2,500 grams. Forty-one of the 53 (77.4 percent) infant deaths to black mothers were low birth weight babies. Five out of the seven (71.4 percent) infant deaths to mothers of race other than black or white were also low birth weight.

Of the 55 low birth weight infants, 45 (81.8 percent) were very low birth weight and 10 were moderately low birth weight (18.2 percent).

Table 5: Percent Distribution of Low Birth Weight Infant Deaths by Age of Mother and Time of Death District of Columbia Residents, 2010							
Age of Mother	Infant Deaths	Percent Deaths*	LBW Deaths	%LBW Deaths**	Time of Infant Death		
					Total LBW	Neonatal	Post-neonatal
Total	73	100.0	55	75.3	55	45	10
< 20 years	4	5.5	3	75.0	3	1	2
20-24 years	12	16.4	7	58.3	7	6	1
25-29 years	13	17.8	10	76.9	10	8	2
30-34 years	21	28.8	18	85.7	18	16	2
35-39 years	19	26.0	14	73.7	14	12	2
≥ 40 years	4	5.5	3	75.0	3	2	1
Unknown age	0	0	0	0	0	0	0

*Percentage based on all infant deaths (N=73).

**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 2009-2010. Premature births in the District decreased from 10.9 percent in 2009 to 10.3 percent in 2010. Preterm births have decreased across all racial groups in 2010 except for Asian/Pacific Islander mothers, which increased by 9.5 percent. Approximately 12.6 percent of non-Hispanic black mothers delivered preterm babies compared to 7.7 percent non-Hispanic white mothers and 7.9 percent Hispanic/Latina mothers.

More than 63 percent of all preterm births occurred between 34-36 weeks gestation. Fifty-seven of the 73 (78.1 percent) infants who died in 2010 were preterm. Of these preterm infant deaths, 45 (78.9 percent) were below 32 weeks gestation (very pre-term) and weighed under 1,500 grams (Figure 5). Almost 72 percent of preterm infants died to mothers ages 15-34.

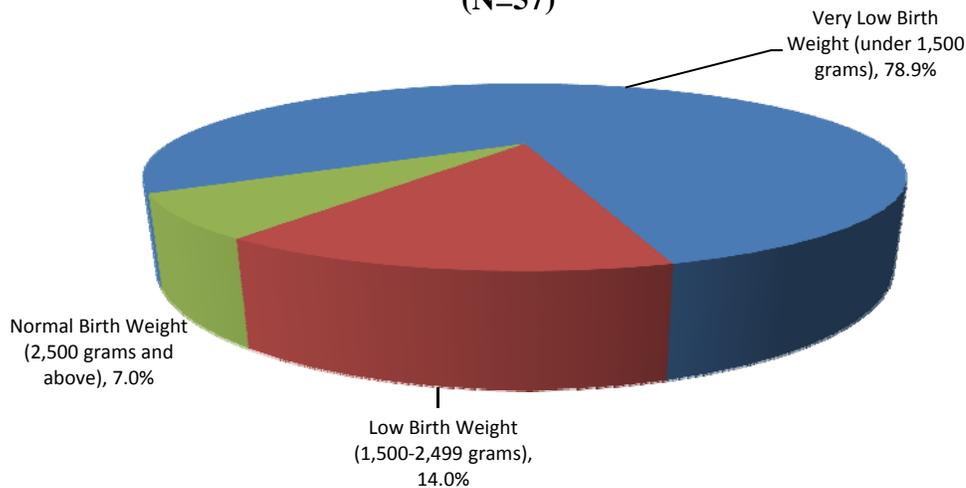
Table 6. Percent Distribution of Premature Babies by Race and Hispanic Origin of Mother District of Columbia Residents, 2009 and 2010			
Race/Hispanic Origin	2009	2010	Percent Change
Total Births for all Races	9,008	9,156	
-Number of Premature Babies	983	945	
-Percent Premature Babies	10.9%	10.3%	-5.4
Total Births to Black* Mothers	4,847	4,940	
-Number of Premature Babies to Black Mothers	635	619	
-Percent Premature Babies to Black Mothers	13.1%	12.5%	-4.4
Total Births to White* Mothers	2,655	2,632	
-Number of Premature Babies to White Mothers	220	204	
-Percent Premature Babies to White Mothers	8.3%	7.8%	-6.5
Total Births to Asian and Pacific Islander (API) Mothers	314	365	
-Number of Premature Babies to API Mothers	22	28	
-Percent Premature Babies to API Mothers	7.0%	7.7%	9.5
Total Births to Hispanic Mothers	1,498	1,351	
-Number of Premature Babies to Hispanic Mothers	134	107	
-Percent Premature Babies to Hispanic Mothers	8.9%	7.9%	-11.5

* 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, 2010
(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 and were subtracted from the total number of births before percentages were computed. Based on this computation, 70 percent of District resident mothers who gave birth in 2010 began prenatal care in the first trimester of pregnancy (Table 9). More than 83 percent of white mothers who gave birth in 2010 had timely entry into prenatal care compared to 63 percent of Hispanic mothers and 61 percent of black mothers (data not shown).

About 6.8 percent of mothers began care late or had no prenatal care at all. About two-thirds of these were black women.

Marital Status

The proportion of births to unmarried women decreased in 2010 to 54.7 percent compared with 55.5 percent in 2009, a 1.4 percent decrease. Of the 5,008 (54.7 percent) births to unmarried women in 2010, 18.5 percent of these births were to teenagers (15-19 years). Almost ninety percent of births to women aged 20-24 years and 61.0 percent of births to women aged 25-29 years were to unmarried women.

In 2010, 68.5 percent of infant deaths were to unmarried women, compared to 91.0 percent in 2009, for a decrease of 24.7 percent. Between 2007 and 2010, the majority of infant deaths were to unmarried women (Table 7).

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
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.

Geographical Distribution

The District's infant mortality rate 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 2006, 2009, and 2010. The District tied with Richmond for lowest rate in 2008; and ranked third lowest in 2007 (Table 8).

City	2006	2007	2008	2009	2010
Baltimore City, Maryland ¹	12.4	11.3	12.1	13.5	11.0
Detroit City, Michigan ²	13.4	14.9	14.9	14.8	13.5*
District of Columbia ³	11.3	13.1	10.9	9.9	8.0
Richmond, Virginia ⁴	13.5	12.4	10.9	12.2	12.8

Sources: ¹Vital Statistics Administration, Department of Health and Mental Hygiene, Maryland.

²Vital Records & Health Data Development Section, Michigan Department of Community Health. (*Provisional data for 2010).

³Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

⁴Virginia Department of Health, VA State Center for Health Statistics.

The presence of geographical subdivisions such as wards and census tracts in the District provides a basis for breaking down District-wide data into small area statistics for comparison and analyses. In the absence of individual-level socioeconomic data, these ward statistics form a useful basis for evaluating health status indicators against demographic and environmental ward characteristics. Table 9 shows selected maternal and child health indicators and infant deaths by geographic areas or wards in the District of Columbia. In 2010, there was a decrease in the number of infants born in four wards (1, 2, 4, and 5) of the city (Table 10). The infant mortality breakdown by ward for 2010 shows a decline in the infant mortality rate for five wards (1, 2, 5, 7, and 8). The infant mortality rate increased in Wards 3, 4, and 6. Among the wards with increased infant mortality rates for 2010, Ward 4 had the highest rate (11.3 per 1,000 live births), but Ward 6 had the largest percentage increase (415.8 percent) from a rate of 1.9 per 1,000 live births in 2009 to 9.8 in 2010. Due to the small number of infant deaths in Ward 6, caution should be exercised when interpreting the percentage increase in the infant mortality rate, which is highly variable and does not meet standards of reliability or precision. Ward 8 had the largest meaningful decrease from 28 infant deaths in 2009 to 17 in 2010. However, caution should be used when interpreting the rate and percentage change because of the very small numbers (Tables 10, 11, and 12). Infant mortality rates by ward from 2006 and 2010 are presented in Table 13. The geographic distribution of 2010 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.

**Table 9. Indicators of Maternal and Child Health, and Infant Mortality by Ward
District of Columbia Residents, 2010**

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	9,156 15.2	1,219 16.0	691 8.6	801 10.4	1,324 17.5	1,067 14.4	1,118 14.6	1,218 17.1	1,635 23.1
Live Births									
Black	4,940	347	118	37	561	756	428	1,150	1,497
White	2,632	401	406	674	267	155	580	21	105
Hispanic ²	1,351	442	103	39	488	127	64	43	31
Births to Unmarried Women (Percent)	5,008 54.7	581 47.7	161 23.3	45 5.6	712 53.8	694 65.0	388 34.7	1,036 85.1	1,337 81.8
% Births to Unmarried Women									
Black	79.7	67.1	65.3	24.3	60.2	77.4	79.2	87.0	87.9
White	5.8	9.5	5.9	3.0	7.1	9.7	4.0	23.8	5.7
Hispanic ²	67.4	71.7	58.3	30.8	71.9	73.2	37.5	72.1	35.5
Births to Mothers age <20 yrs. (Percent)	967 10.6	89 7.3	20 2.9	2 0.2	114 8.6	127 11.9	68 6.1	230 18.9	304 18.6
Births to Mothers 15-19 yrs. (Percent)	951 10.4	89 7.3	20 2.9	2 0.2	112 8.5	125 11.7	68 6.1	223 18.3	299 18.3
Birth Rate/1,000 Women 15-19 yrs. ³	45.4	34.2	5.4	0.8	58.6	43.5	58.3	75.9	90.5
Low Birth Weight Live Births ⁴ (Percent)	933 10.2	113 9.3	40 5.8	46 5.7	116 8.8	121 11.3	114 10.2	157 12.9	219 13.4
% Low Birth Weight Births ⁴									
Black (Percent)	657 (13.3)	55 (15.9)	13 (11)	5 (13.5)	62 (11.1)	104 (13.8)	58 (13.6)	152 (13.2)	204 (13.6)
White (Percent)	170 (6.5)	27 (6.7)	19 (4.7)	34 (5)	24 (9)	6 (3.9)	44 (7.6)	1 (4.8)	12 (11.4)
Hispanic ² (Percent)	91 (6.7)	29 (6.6)	3 (2.9)	2 (5.1)	37 (7.6)	8 (6.3)	7 (10.9)	4 (9.3)	1 (3.2)
Low Birth Weight ⁴ to Mothers <20 yrs. (Percent)	102 10.5	10 11.2	0 0	1 50.0	11 9.6	11 8.7	9 13.2	23 10.0	36 11.8
% Preterm Births (<37 weeks gestation)	10.3	9.3	6.4	7.0	8.8	11.2	11.5	12.0	13.1
% Births With Prenatal Care Beginning First Trimester ^{5,6}	70.0	72.4	74.9	83.4	66.0	63.5	77.4	62.7	61.6
% Births With Late or No Prenatal Care ^{5,6}	6.8	7.6	6.2	3.5	8.4	9.1	5.7	7.0	6.8
Infant Deaths (under 1 yr.) Rate (per 1,000 live births) ⁷	73 8.0	5 4.1	2 2.9	4 5.0	15 11.3	11 10.3	11 9.8	8 6.6	17 10.4

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, 2009 and 2010**

Ward	Births		Infant Deaths		Infant Mortality Rate ¹		
	2009	2010	2009	2010	2009	2010	Percent Change ²
1	1,227	1,219	10	5	8.1	4.1	-49.4
2	693	691	4	2	5.8	2.9	-50.0
3	765	801	2	4	2.6	5.0	92.3
4	1,441	1,324	15	15	10.4	11.3	8.7
5	1,099	1,067	13	11	11.8	10.3	-12.7
6	1,067	1,118	2	11	1.9	9.8	415.8
7	1,162	1,218	15	8	12.9	6.6	-48.8
8	1,521	1,635	28	17	18.4	10.4	-43.5
Unknown	33	83	0	0	0.0	0.0	-
Total	9,008	9,156	89	73	9.9	8.0	-19.2

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	1,227	10	8.1	105	102	7
2	693	4	5.8	63	27	5
3	765	2	2.6	49	3	0
4	1,441	15	10.4	116	118	14
5	1,099	13	11.8	116	159	18
6	1,067	2	1.9	91	73	3
7	1,162	15	12.9	170	267	40
8	1,521	28	18.4	216	302	39
Unknown	33	0	-	3	6	1
Total	9,008	89	9.9	929	1,057	127

*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.

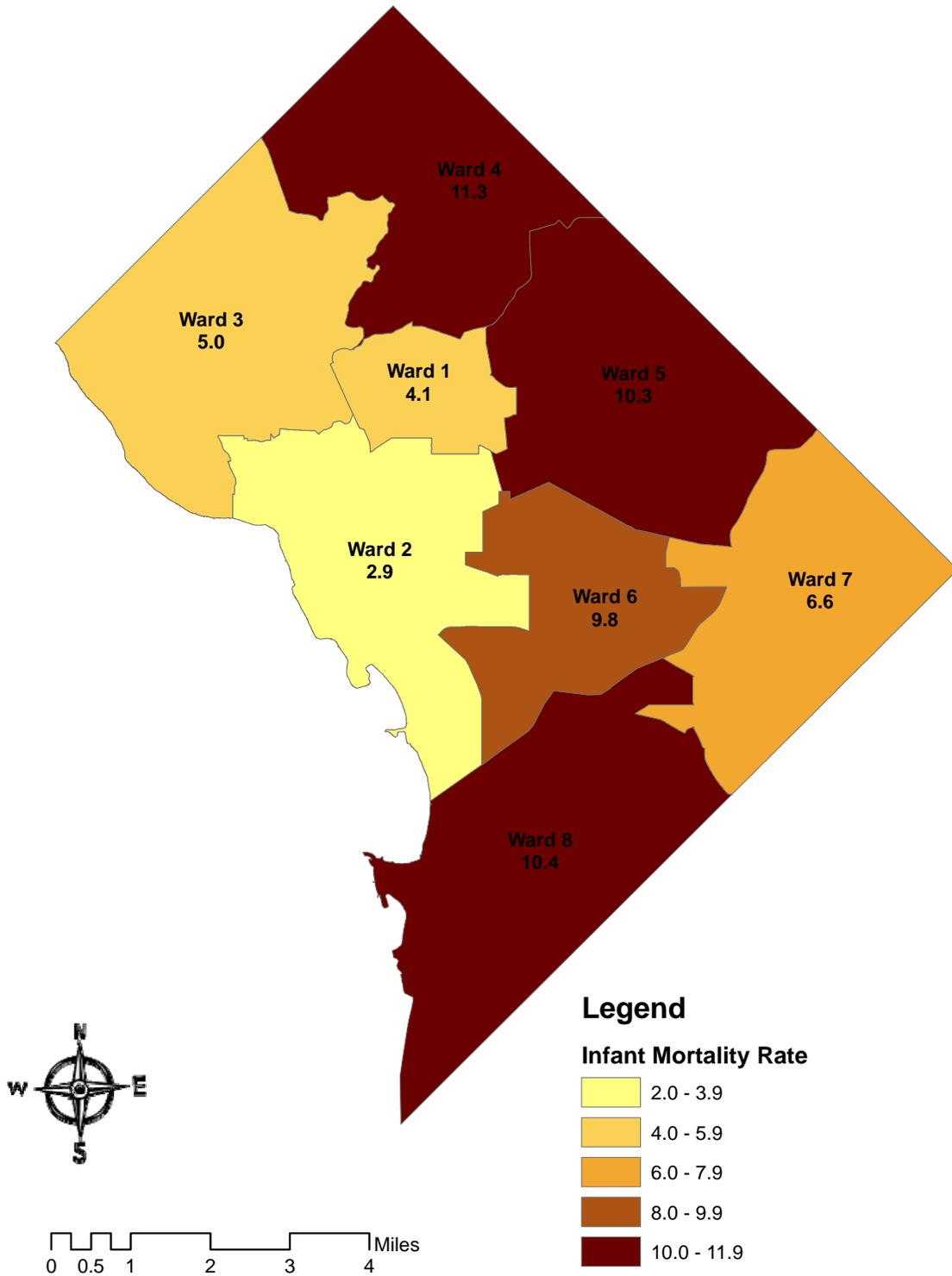
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Ward	2006	2007	2008	2009	2010
1	5.5	5.6	6.1	8.1	4.1
2	13.0	12.6	2.9	5.8	2.9
3	2.2	1.3	5.1	2.6	5.0
4	6.1	17.1	10.2	10.4	11.3
5	20.0	16.3	12.9	11.8	10.3
6	9.1	6.4	8.0	1.9	9.8
7	12.8	19.0	17.2	12.9	6.6
8	21.6	18.8	17.7	18.4	10.4
Total	11.3	13.1	10.9	9.9	8.0

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

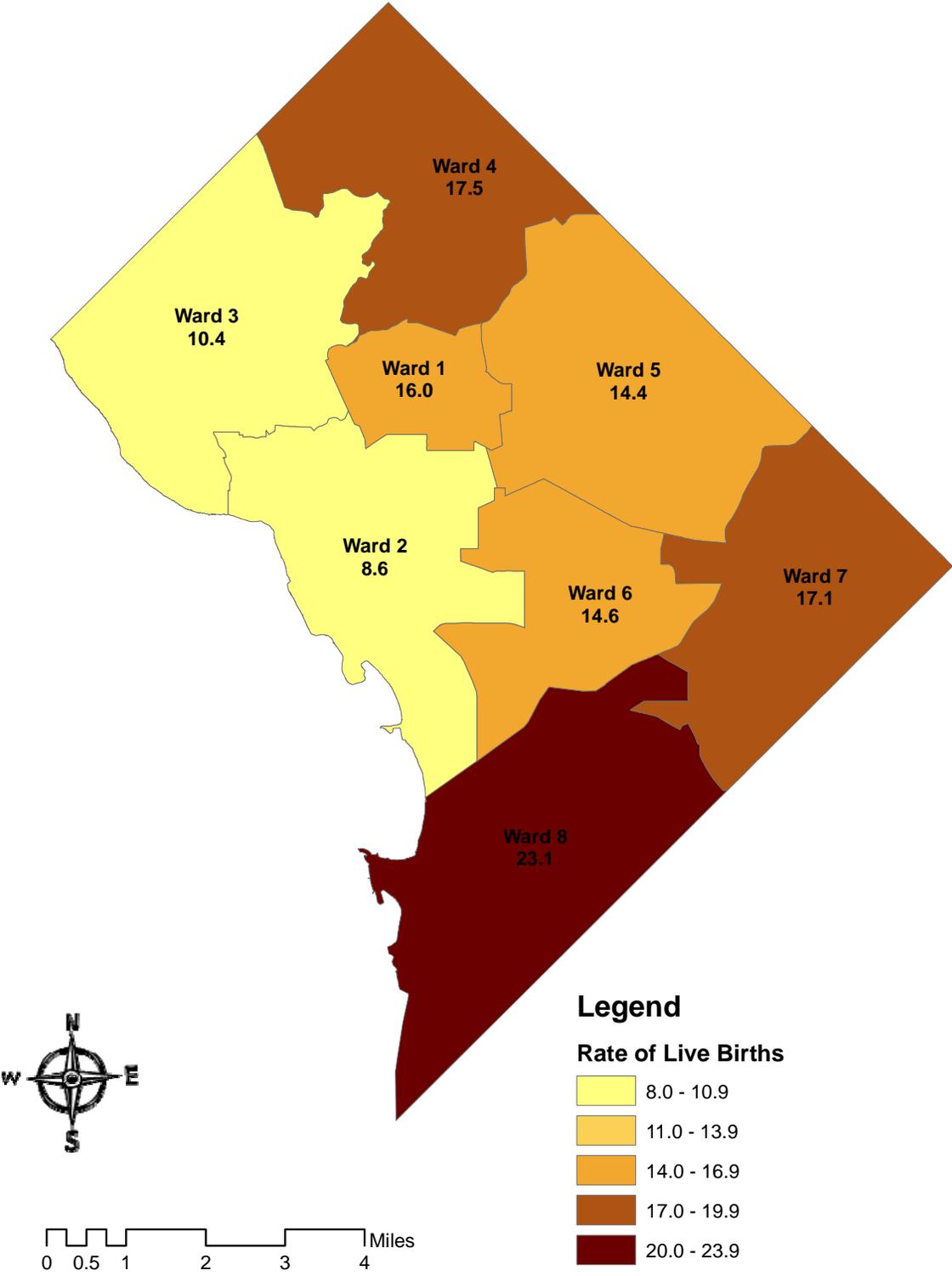
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Map 1. Rates of Infant Mortality by Ward, District of Columbia, 2010



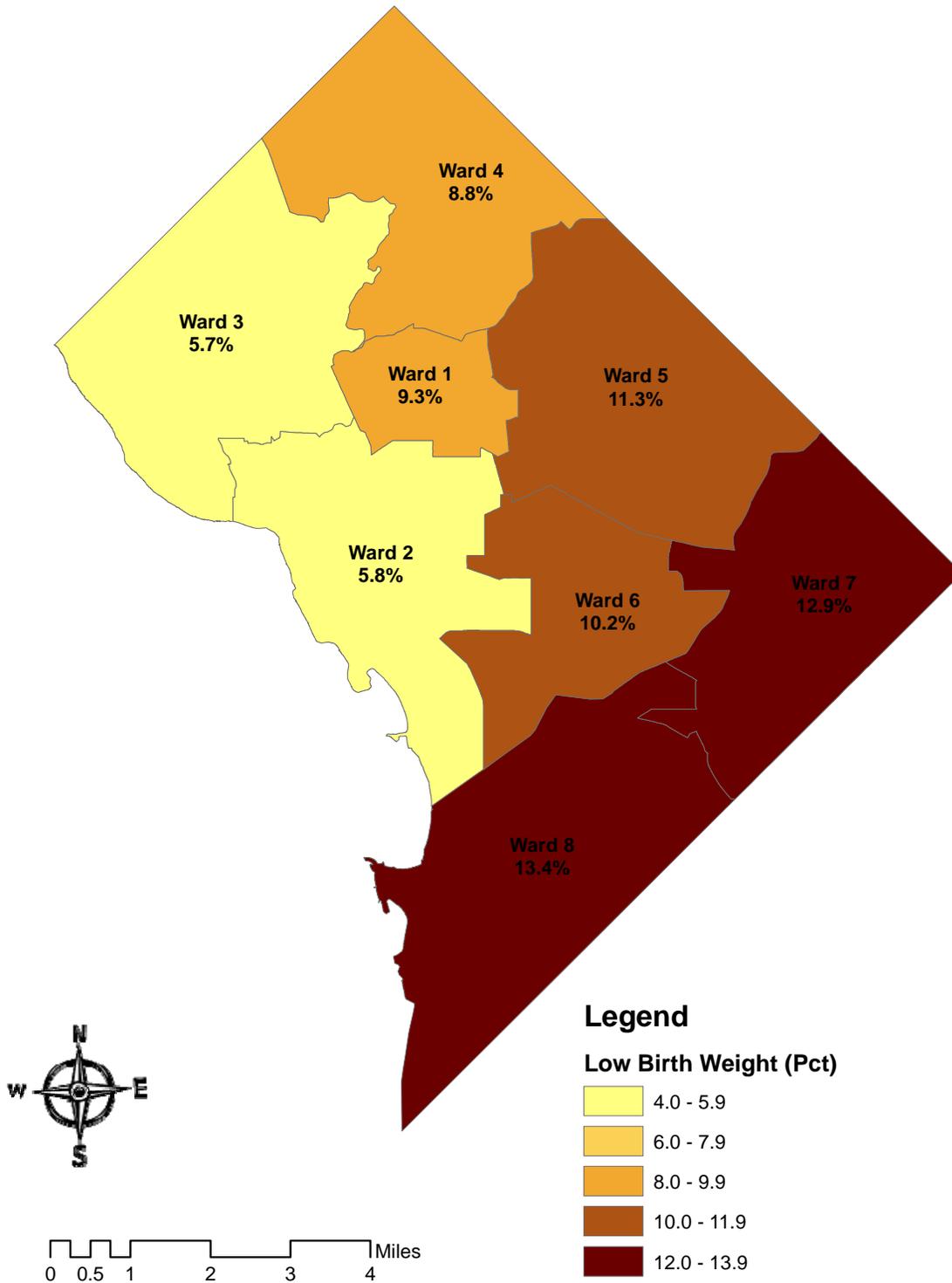
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Infant mortality rate is calculated as the number of infant deaths per 1,000 live births.
Due to the small number of infant deaths, the above infant mortality rates are highly variable and should be interpreted cautiously.
Ward distribution based on 2002 ward boundaries.

Map 2. Rates of Live Births to DC Residents by Ward, District of Columbia, 2010



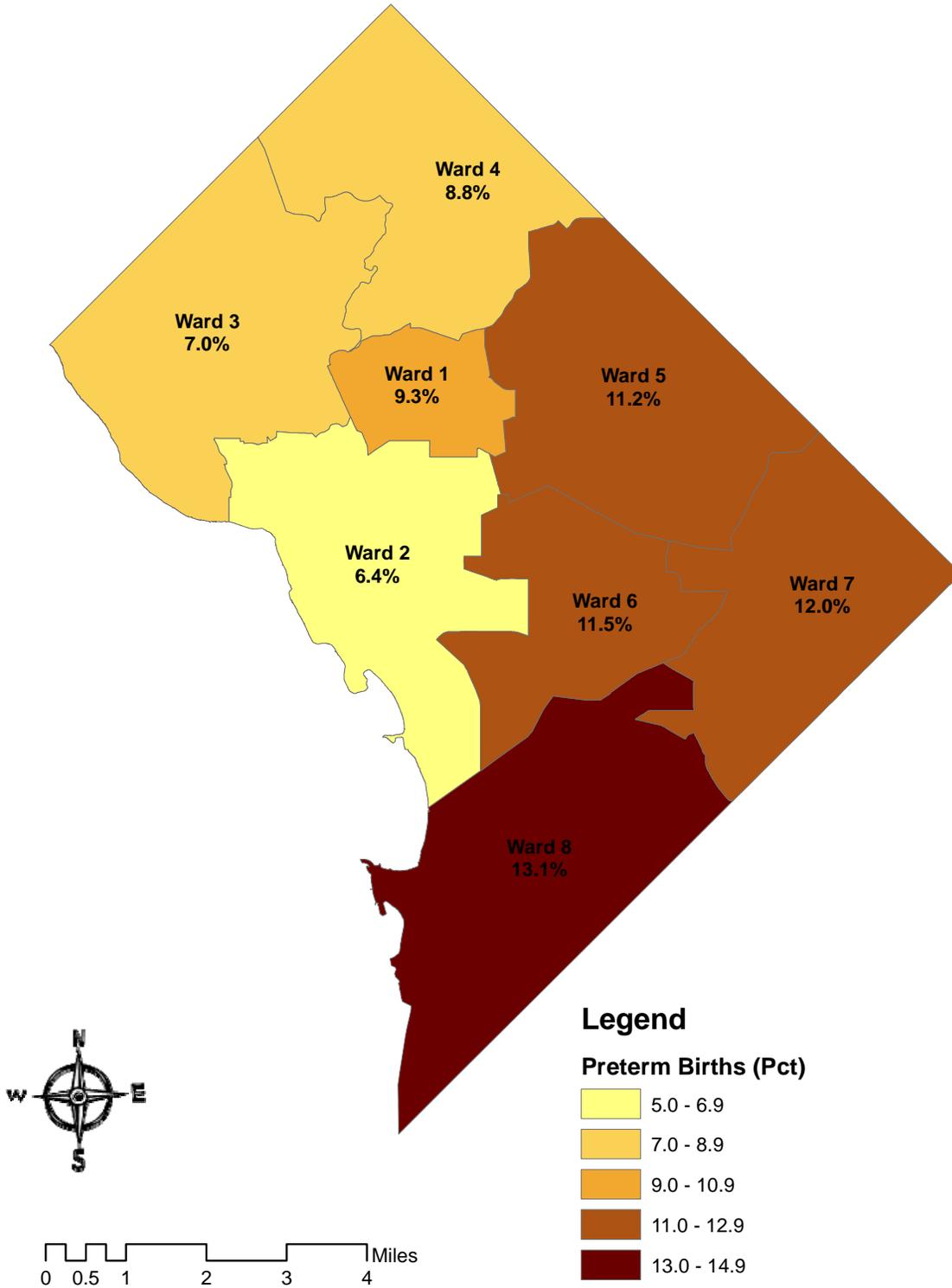
Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
 Notes: Birth rate is calculated as the number of births per 100,000 population.
 Ward distribution based on 2002 ward boundaries.

Map 3. Percentage of Low Birth Weight Live Births by Ward, District of Columbia, 2010



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
Notes: Low birth weight is defined by infants weighing under 2,500 grams or 5.5 pounds.
Ward distribution based on 2002 ward boundaries.

Map 4. Percentage of Preterm Births by Ward, District of Columbia, 2010

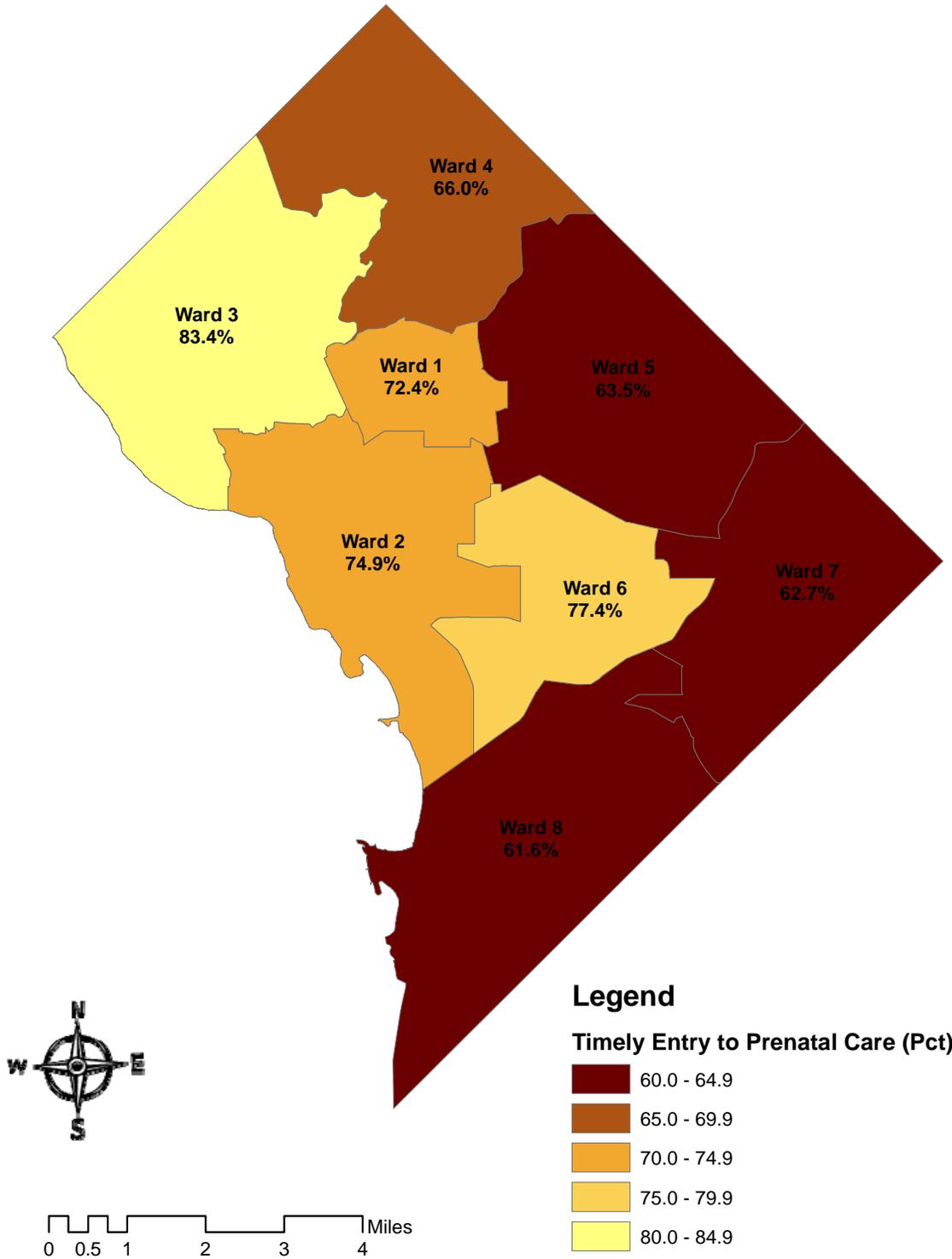


Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.

Notes: Preterm birth is defined by infants with less than 37 weeks of gestation.

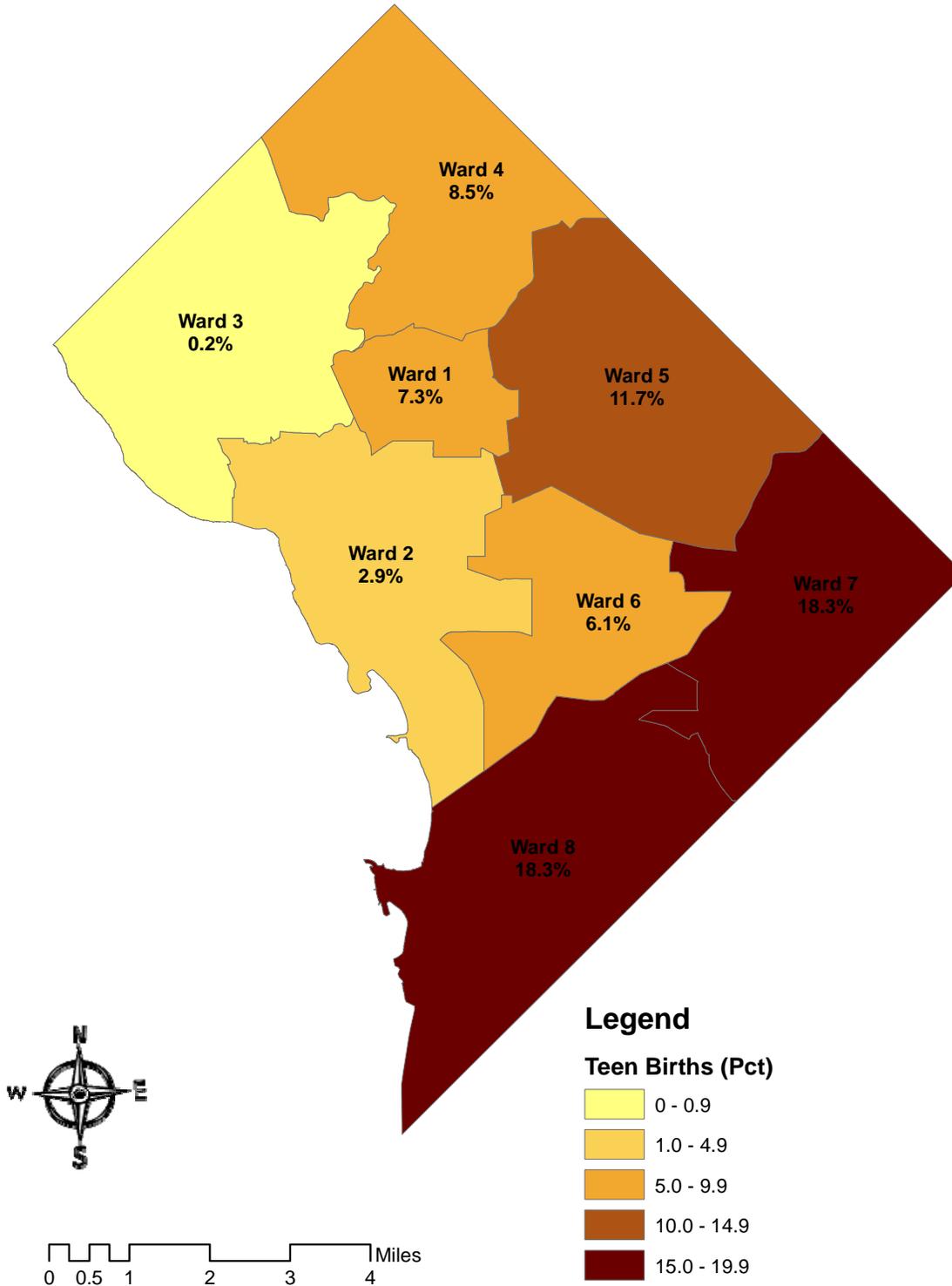
Ward distribution based on 2002 ward boundaries.

Map 5. Percentage of Births with Prenatal Care Beginning First Trimester by Ward, District of Columbia, 2010



Source: Data Management and Analysis Division, Center for Policy, Planning and Evaluation, DC Department of Health.
 Notes: Timely entry to prenatal care is defined by prenatal care beginning in the first trimester of pregnancy.
 Ward distribution based on 2002 ward boundaries.

Map 6. Percentage of Teen Births (15-19 years) by Ward, District of Columbia, 2010



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 leading cause of infant mortality, **Congenital malformations, deformations and chromosomal abnormalities classified** accounted for 21.9 percent of all infant deaths in 2010 (Table 14). **Newborn affected by maternal complications of pregnancy** was the second ranked leading cause of infant death, which accounted for 15.1 percent of all infant deaths in 2010. **Disorders related to short gestation and low birth weight, not elsewhere classified (low birth weight)** was the third leading cause of death, which accounted for 13.7 percent of all infant mortality. **Sudden infant death syndrome (SIDS)** was the fourth leading cause of death, which accounted for 8.2 percent of all infant deaths. **Newborn affected by complications of placenta, cord, and membranes** was the fifth leading cause of death, which accounted for 6.8 percent of all infant mortality. **These five leading causes of infant death in 2010 accounted for two-thirds of all infant deaths in the District of Columbia.** These five leading causes of death in 2010 were the same as those in 2009; however, the second and third ranks switched positions from the previous year. Also, **Sudden infant death syndrome (SIDS)** became the fourth leading cause in 2010, one position higher from 2009.

**Table 14: Leading Causes of Infant Death
District of Columbia Residents, 2010**

Rank ¹	Cause of Death (Based on Tenth Revision, International Classification of Diseases, Second Edition, 2004)	Number	Percent*	Rate**
...	All causes	73	100.0	797.3
1	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	16	21.9	174.7
	... Anencephaly and similar malformations (Q00)	1	1.4	10.9
	... Other congenital malformations of nervous system(Q01–Q02,Q04,Q06–Q07)	2	2.7	21.8
	... Congenital malformations of heart (Q20–Q24)	5	6.8	54.6
	... Congenital malformations of respiratory system (Q30-Q34)	1	1.4	10.9
	... Congenital malformations of genitourinary system (Q50–Q64)	3	4.1	32.8
	... Other congenital malformations and deformations (Q10–Q18,Q86–Q89)	1	1.4	10.9
	... Edward’s syndrome (Q91.0–Q91.3)	2	2.7	21.8
	... Other chromosomal abnormalities, not elsewhere classified (Q92–Q99)	1	1.4	10.9
2	Newborn affected by maternal complications of pregnancy (P01)	11	15.1	120.1
	... Newborn affected by incompetent cervix (P01.0)	2	2.7	21.8
	... Newborn affected by premature rupture of membranes (P01.1)	8	11.0	87.4
	... Newborn affected by other maternal complications of pregnancy (P01.2–P01.4,P01.6–P01.9)	1	1.4	10.9
3	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	10	13.7	109.2
	... Extremely low birth or extreme immaturity (P07.0, P07.2)	8	11.0	87.4
	... Other low birth weight or preterm (P07.1, P07.3)	2	2.7	21.8
4	Sudden infant death syndrome (SIDS) (R95)	6	8.2	65.5

Rank ¹	Cause of Death (Based on Tenth Revision, International Classification of Diseases, Second Edition, 2004)	Number	Percent*	Rate**
5	Newborn affected by complications of placenta, cord, and membranes (P02)	5	6.8	54.6
	... Newborn complications involving placenta (P02.0-P02.3)	1	1.4	10.9
	... Newborn affected by complications involving cord (P02.4-P02.6)	1	1.4	10.9
	... Newborn affected by chorioamnionitis (P02.7)	3	4.1	32.8
...	All other causes	25	34.2	273.0

*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 2010, the leading cause of infant death nationally was **Congenital malformations, deformations and chromosomal abnormalities**, which was the same as 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 third for the District of Columbia.

Rank ¹	Cause of death (based on the <i>International Classification of Diseases, Tenth Revision, Second Edition, 2004</i>)	Number	Rate ²
...	All causes	24,548	613.7
1	Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	5,077	126.9
2	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	4,130	103.2
3	Sudden infant death syndrome (R95)	1,890	47.2
4	Newborn affected by maternal complications of pregnancy (P01)	1,555	38.9
5	Accidents (unintentional injuries) (V01–X59)	1,043	26.1
6	Newborn affected by complications of placenta, cord and membranes (P02)	1,030	25.7
7	Bacterial sepsis of newborn (P36)	569	14.2
8	Diseases of the circulatory system (I00-I99)	499	12.5
9	Respiratory distress of newborn (P22)	496	12.4
10	Necrotizing enterocolitis of newborn (P77)	470	11.7
...	All other causes (residual)	7,789	194.7

...Category not applicable.

¹Rank based on number of infant deaths.

²Rates 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. 60, No. 4, January 11, 2012. Deaths: Preliminary data for 2010. Available from:

http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_04.pdf

Neonatal Mortality

The leading cause of neonatal death in 2010 was **Congenital malformations, deformations and chromosomal abnormalities**, which accounted for 21.6 percent of all neonatal deaths. **Newborn affected by maternal complications of pregnancy** was the second leading cause (19.6 percent), and **Disorders related to short gestation and low birth weight, not elsewhere classified (low birth weight)** (17.6 percent) was the third leading cause of neonatal death (Table 16).

Rank ¹	Cause of Death (Based on Tenth Revision, International Classification of Diseases, Second Edition, 2004)	Number	Percent*	Rate**
...	All causes	51	100.0	557.0
1	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	11	21.6	120.1
2	Newborn affected by maternal complications of pregnancy (P01)	10	19.6	109.2
3	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	9	17.6	98.3
4	Newborn affected by complications of placenta, cord, and membranes (P02)	5	9.8	54.6
5	Other respiratory conditions originating in the perinatal period (P23-P28)	3	5.9	32.8
...	All other causes or total	13	25.5	142.0

*Percent based on total number of neonatal deaths.

**Rate per 100,000 live births.

...Category not applicable.

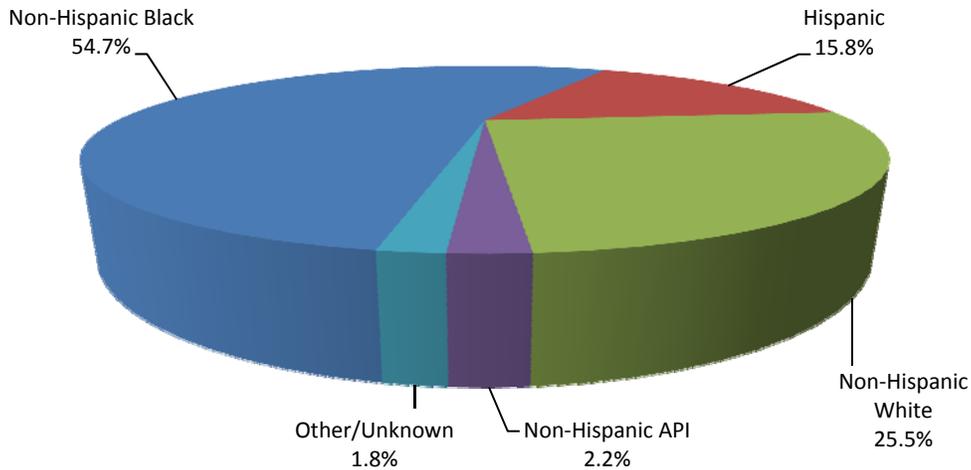
¹Rank based on number of infant deaths.

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

Five-Year Birth and Infant Death Trend

Figure 6 shows the total number of births, 52,630 for the five-year period of 2006 to 2010. About 55 percent were to non-Hispanic black mothers, 25.5 percent were to non-Hispanic white mothers and 15.8 percent were to Hispanic mothers.

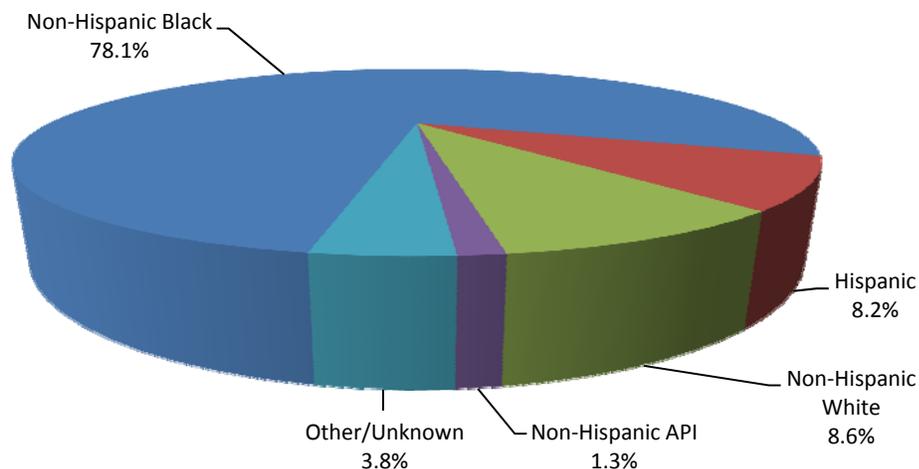
Figure 6. Births by Race and Hispanic Origin of Mother, 2006-2010 (N=52,630)



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

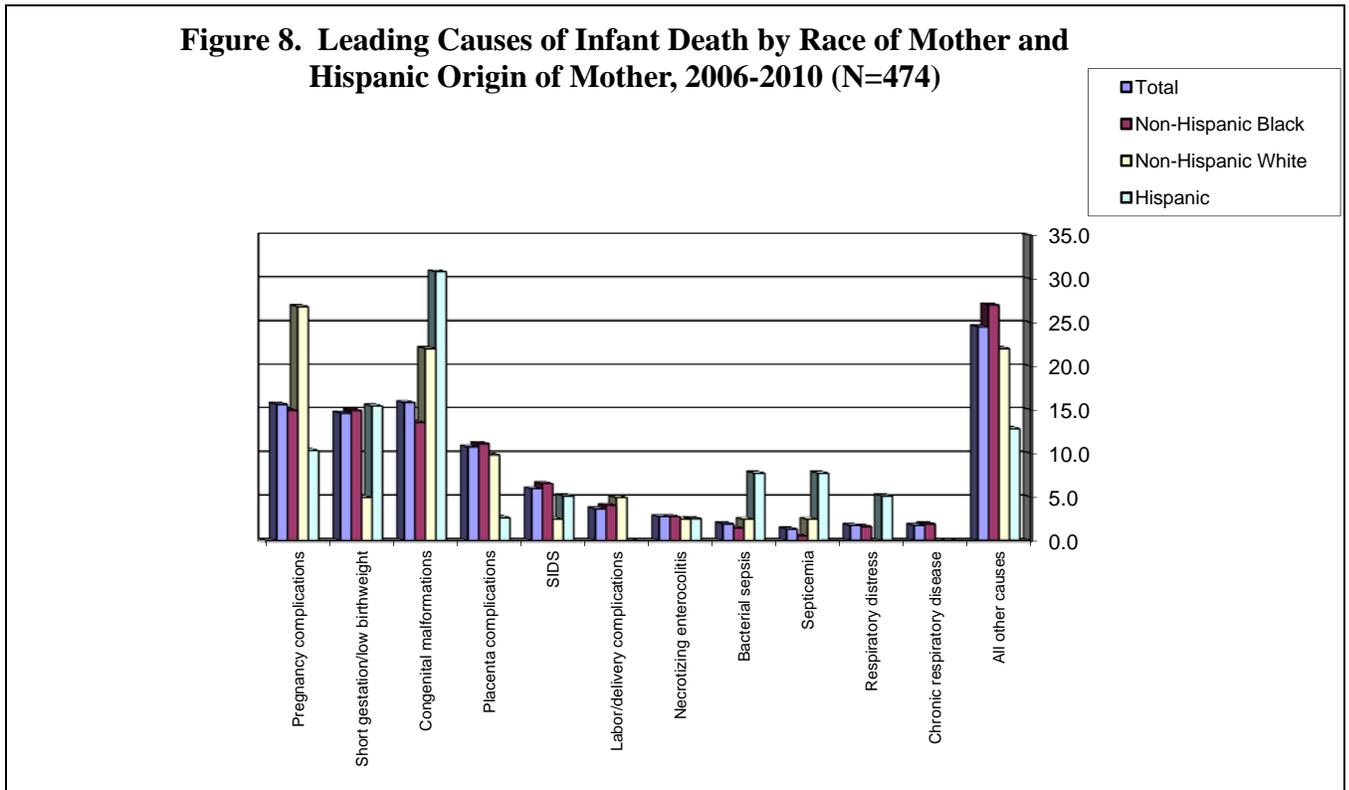
Of the total number of births (N=52,630), 474 infants died from 2006 to 2010. Figure 7 shows the average percentage of infant deaths by race/ethnicity from 2006 to 2010. On average between 2006 to 2010, infants to non-Hispanic black mothers disproportionately died (78.1 percent) compared to their total number of births (54.7 percent).

Figure 7. Infant Deaths by Race and Hispanic Origin of Mother, 2006-2010 (N=474)



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

Figure 8 shows the leading causes of infant death over this five-year period (2006-2010). The leading cause of infant mortality was **Congenital malformations, deformations and chromosomal abnormalities**, which accounted for 15.8 percent, followed by **Newborn affected by maternal complications of pregnancy**, (15.6 percent). The third leading cause was **Short gestation and low birth weight** (14.6 percent).

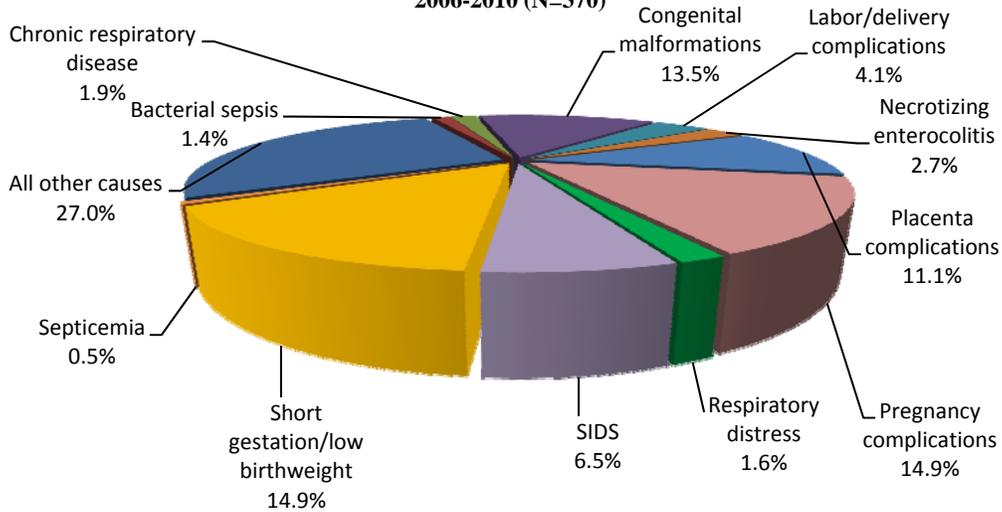


Note: Data by Asian/Pacific Islander were excluded due to small numbers.

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** tied with **Disorders related to short gestation and low birth weight, not elsewhere classified** for the leading cause of infant death. Each of these two causes of death accounted for 14.9 percent, on the average, from 2006-2010. **Congenital malformations, deformations and chromosomal abnormalities**(13.5 percent) was the third leading cause (Figure 9).

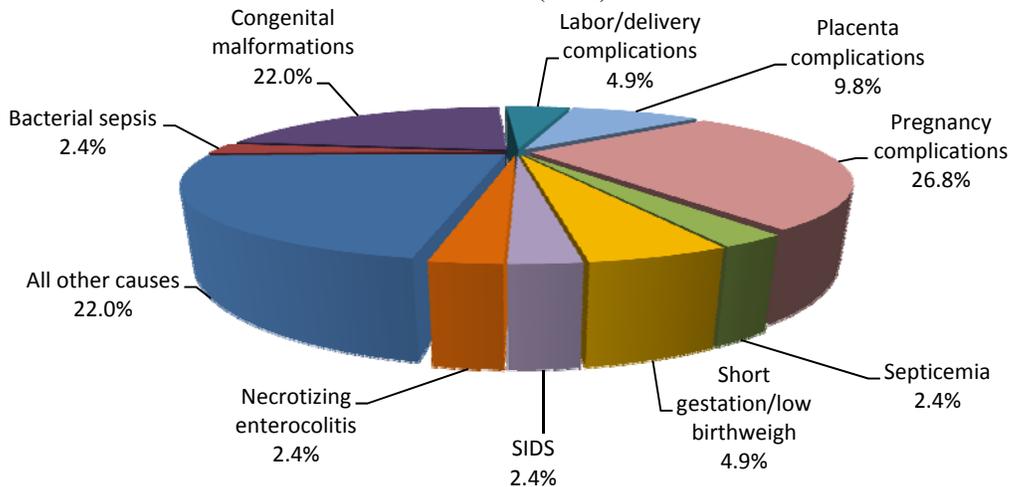
Figure 9. Leading Causes of Infant Death to Non-Hispanic Black Mothers, 2006-2010 (N=370)



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

For infant deaths to non-Hispanic white mothers, **Newborn affected by maternal complications of pregnancy** was the leading cause of infant death (26.8 percent) and **Congenital malformations, deformations and chromosomal abnormalities** was the second leading cause (22.0 percent). **Newborn affected by complications of placenta, cord and membranes** was the third leading cause of infant death (9.8 percent) (Figure 10).

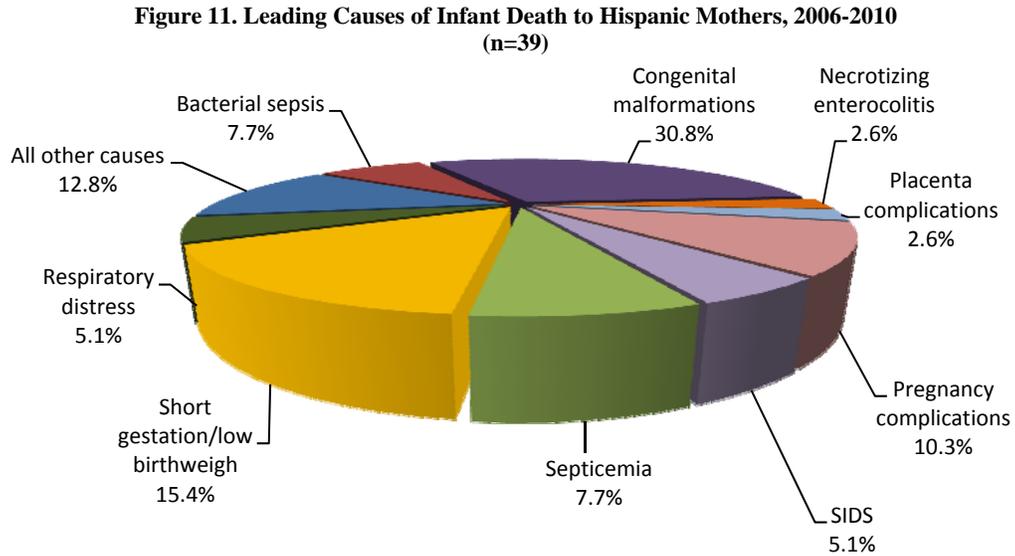
Figure 10. Leading Causes of Infant Death to Non-Hispanic White Mothers, 2006-2010 (N=41)



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 11 shows that the leading cause of infant death to Hispanic mothers was **Congenital malformations, deformations and chromosomal abnormalities (30.8 percent)**. **Disorders related to short gestation and low birth weight, not elsewhere classified (15.4 percent)** was the second leading cause, followed by **Newborn affected by maternal complications of pregnancy (10.3 percent)**.



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

DOH Maternal and Child Health Program Activities

In 2007, the District of Columbia Department of Health (DOH) released the Infant Mortality Action Plan, which is a comprehensive 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. Since that time, the Community Health Administration (CHA) has successfully implemented all applicable initiatives. One initiative provided the District's Safe Crib program with additional pack-n-plays. In 2010, the program provided 901 pack-n-plays (an increase from 56 in 2009) to eligible District residents. Also in that year, CHA's Maternal-Child Health Title V grant provided the following grants to eligible community stakeholders to decrease maternal child disparities:

1. Healthy Babies received two grants – a) Case manage and provide home visits to 150 enrolled clients; and b) Case manage 100 pregnant teens.
2. Washington Hospital received two grants – a) Provide services to 154 teens in its Healthy Foundation program in Wards 1, 2, and 4; and b) Provide services to 100 teens in the Teen Alliance for Prepared Parenting (TAPP) program.
3. Georgetown University Hospital received funding for their Girl Talk 2 program to case manage 50 teen mothers.
4. Children's Hospital received funding for its Healthy Generation program to provide comprehensive services to 250 teen parents and their children.

These programs were instrumental in providing education on the importance of a safe sleep environment, teen prevention, and supportive services to improve teen self-esteem.

Current Reproductive Health Outcomes Oriented Programs

CHA's Perinatal and Infant Health Bureau (PIHB) continues to promote the "*I am a Healthy DC MOM*", "*I am a Healthy DC Baby*" and "*I am a Healthy DC Dad*" public information campaigns. In 2011, PIHB looks to release a new campaign geared toward increasing teen awareness of preconception planning and discovering their natural skills and talents to build a career.

The DOH's Safe Cribs program will continue to provide education and approved pack-n-plays to increase the likelihood of infants being placed in a safe sleeping environment. DOH will also continue its efforts to offer Fetal Alcohol Syndrome Disorder (FASD) education to medical providers and District residents.

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 records⁸. 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, to be used in developing new approaches to achieving health equity in the District. DC DOH will conduct 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 the first study linking market research data and infant mortality rates in the District.

Preliminary Findings

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. This analysis shows that high infant mortality is co-located with households of low education, high poverty, mostly with children, and renters. 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 11 Lifestage Groups depicted in Map 8, please refer to Appendix 1.

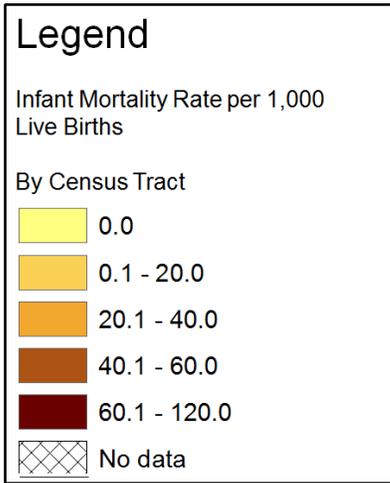
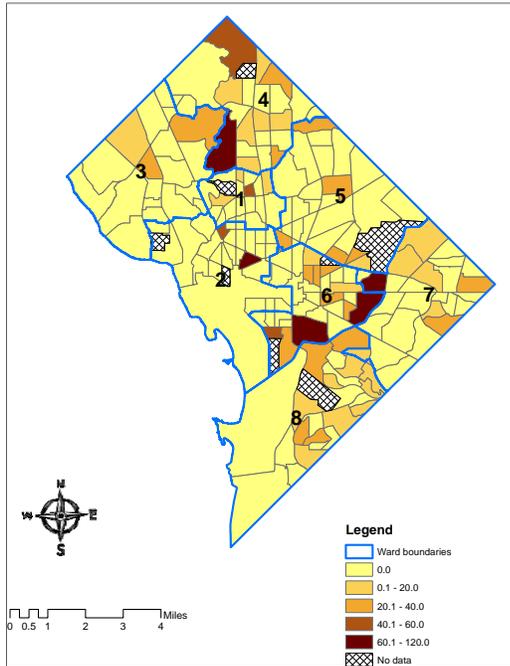
The Lifestage Group, Sustaining Families, dominates high infant mortality census tracts and coincides with areas characterized by lower income and families with children. Sustaining Families were also found to have higher cigarette consumption compared to other groups. Since cigarette smoking or tobacco use may be a risk factor for infant mortality, knowledge of behavioral risk factors prevalent in certain geographic clusters is critical in the planning and development of DC DOH intervention campaigns and messages to educate the public. In addition, programs targeting teen pregnancy and infant mortality should factor in the diverse distribution of social lifestyle groups in the District. Other findings include:

- While Sustaining Families were predominant in Wards 7 and 8, they were also found in census tracts in Wards 1, 4, 5 and 6.
- The decrease in infant mortality in several Ward 5 census tracts could be attributed to a combination of households with Striving Singles, Conservative Classics, and Cautious Couples (who are mostly without children).
- Ethnicity does not seem to be a significant risk factor for infant mortality in this study.

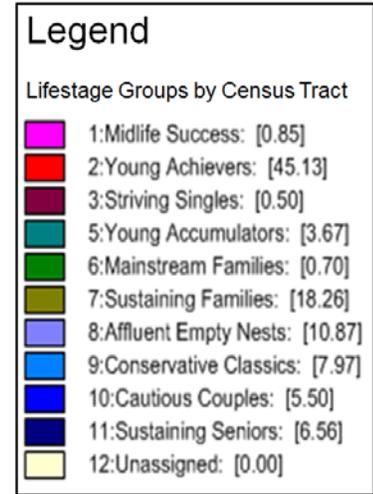
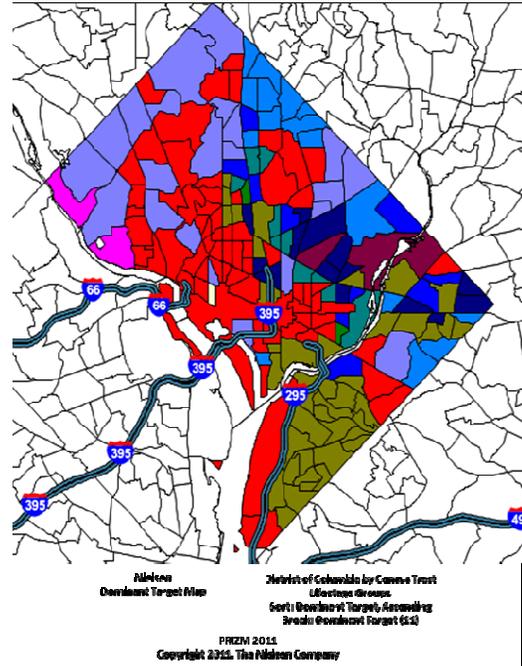
Limitations of the Study

- 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.
- Census tract data presented in Maps 7 and 8 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 2010 would aid in determining how social and Lifestage Group behavior influence trends in infant mortality.
- Future studies should utilize BRFSS data on alcohol use to augment the Nielsen cigarette and tobacco data.

Map 7. Infant Mortality Rate by Census Tract, District of Columbia, 2010



Map 8. Lifestage Group by Census Tract, District of Columbia, 2010



Notes:

1. Census tract rates for infant mortality are 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.
2. 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).

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

References

1. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2004 period linked birth/infant death data set. National Vital Statistics Reports; vol 55 no 15. Hyattsville, MD: National Center for Health Statistics. 2008.
2. Hack M, Klein NK, Taylor HG. Long-term developmental outcomes of low birth weight infants. In: The future of children: Low birth weight. 5(1):19–34. Los Altos, California: Center for the Future of Children. The David and Lucile Packard Foundation. 1995.
3. Wilson-Costello D, Friedman H, Minich N, et al. Improved survival rates with increased neurodevelopmental disability for extremely low birth weight infants in the 1990s. *Pediatrics* 115(4):997–1003. 2005.
4. Centers for Disease Control and Prevention. Entry Into Prenatal Care – United States, 1989-1997. *MMWR* 49(18):393–8. 2000.
5. Osterman MJK, Martin JA, Mathews TJ, et al. Expanded data from the new birth certificate, 2008. National Vital Statistics Reports; vol 59 no 7. Hyattsville, MD: National Center for Health Statistics. 2011.
6. Institute of Medicine. Preventing low birth weight. Washington, DC: Institute of Medicine, National Academy Press, 1985.
7. Office of Technology Assessment, US Congress. Healthy children: investing in the future. Washington, DC: US Congress, Office of Technology Assessment, 1988.
8. Customer Acquisition with Nielsen ConsumerPoint: CPT 101 Training Guide. © 2010 The Nielsen Company.

Technical Notes

Data Sources and Method

Data shown in this report for 2010 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) 2010 preliminary mortality report for the United States, National Vital Statistics Reports, Vol. 60, No. 4, January 11, 2012. Deaths: Preliminary data for 2010. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_04.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 2010 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.

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/doh/cwp/view,a,1374,q,602031.asp>. Detailed analyses not provided in this report are available upon request.

Definition of terms

Birth weight	The weight of the fetus or infant at the time of delivery.
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