

PERINATAL

DISTRICT OF COLUMBIA DEPARTMENT OF HEALTH

Perinatal Health and Infant Mortality Report

MAY 2018





Acknowledgments

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Definitions of Terms

Birthweight	Weight of the newborn at the time of birth.
Eclampsia	Eclampsia is defined as the presence of new-onset grand mal seizures in a woman with pre-eclampsia. Eclampsia is documented on the birth certificate ^[1] .
Gestational hypertension	Gestational hypertension is a condition characterized by high blood pressure during pregnancy. This type of hypertension is first diagnosed during pregnancy and is documented on the birth certificate (category includes pregnancy induced hypertension and preeclampsia) ^[1] .
Gestational diabetes	Gestational diabetes is a type of diabetes that develops or is first recognized during pregnancy, and is documented on the birth certificate (CDC factsheet).
Initiation into prenatal care	The time at which the mother has her first prenatal care visit. The trimester during which prenatal care was initiated was determined using the obstetric estimate for gestational age, date of birth, and date of first prenatal care visit. Initiation into prenatal care is determined using the date of birth, the date of the first prenatal care visit, and the obstetric estimate of gestational age of the newborn at the time of birth.
Low birthweight birth	Birth of a newborn weighing less than 2,500 grams.
Neonatal period	The period between birth and 27 days of age.
Plurality	The number of live births or by the number of fetuses that remain in utero at 20 weeks gestation and that are subsequently born separately.

Definitions of Terms

Post-neonatal period	The period between 28 days and one year of age.
Maternal pre-pregnancy weight	The pre-pregnancy weight status of the mother is determined using Body Mass Index (BMI), which is calculated using mother's height and pre-pregnancy weight documented on the birth certificate. A BMI less than 18.5 is considered underweight ; between 18.5 and 24.9 is normal weight ; between 25 and 29.9 is overweight ; 30 or above is considered obese .
Pre-pregnancy diabetes	The presence of pre-pregnancy diabetes indicates that the mother was diagnosed with diabetes prior to her pregnancy.
Pre-pregnancy hypertension	The presence of pre-pregnancy hypertension indicates that the mother was diagnosed with chronic hypertension prior to her pregnancy.
Pre-pregnancy smoking status	Mother smoked at least 1 cigarette during the three months prior to pregnancy.
Preterm birth	Birth prior to 37 weeks gestation.
Previous preterm birth	Having had a previous preterm birth prior to current birth.
Smoking status during pregnancy	Smoking during pregnancy is defined as smoking at least 1 cigarette during pregnancy.
Very low birthweight birth	Birth of a newborn weighing less than 1,500 grams.

Preface

The mission of the District of Columbia (DC) Department of Health (DC Health) is to promote health, wellness and equity across the District, and protect the safety of residents, visitors and those doing business in the nation's capital.

Our Agency fulfills three core public health functions for the District of Columbia – assessment, policy development and assurance. Assessment includes monitoring our population's health status in order to identify and solve health challenges. The Vital Statistics System contains information on all births and deaths and provides the most complete and continuous data available. These data inform and drive public health planning and program development and are used to track progress toward health goals.

While we fulfill core responsibilities of a state health agency, we are also guided by five strategic priorities:

- ☑ Promote a Culture of Health and Wellness
- ☑ Address the Social Determinants of Health
- ☑ Strengthen Public-Private Partnerships
- ☑ Close the Chasm between Clinical Medicine and Public Health
- ☑ Implement a data driven outcome oriented approach to program and policy development

These priorities guide the work across our Agency and are reflected in our comprehensive approach to improving perinatal health outcomes.

The objective of this report is to describe births to District residents as well as pre-pregnancy and pregnancy health characteristics and behaviors of mothers who had live births. Trends in birth rates and various birth outcomes are presented, including preterm and low birthweight live births, and infant mortality.

Please note that the analyses presented in this report are descriptive and are useful for understanding basic relationships between maternal health behaviors and characteristics and birth outcomes. However, these analyses are unadjusted for the possible effects of other factors which may impact birth outcomes.



Perinatal Health

Perinatal health is the health and well-being of mothers and babies before, during, and after child birth. As described by Healthy People 2020, “Pregnancy can provide an opportunity to identify existing health risks in women and to prevent future health problems for women and their children.” The well-being of a mother and her infant from conception to one year is the best foundation for lifelong health.

Mother and child well-being “determines the health of the next generation and can help predict future public health challenges for families, communities, and the healthcare system.”^[2] Perinatal health is also profoundly impacted by the health of women prior to conception (preconception or interconception) and can be improved and protected through interventions that strengthen women’s health and promote planned pregnancies.

DC Health Strategy to Improve Perinatal Health Outcomes

OUR APPROACH aligns with nationally-recognized best practices, and reflects the core principles identified to decrease perinatal health disparities and improve maternal and child health (Figure 1). The driving principles include:

- ☑ Using a life course perspective, recognizing that a person's health is determined by factors present prior to conception.
- ☑ Addressing social determinants of health, recognizing that poverty and racism profoundly affect psychosocial well-being and are major contributors to disparities in birth outcomes.
- ☑ Implementing systems level interventions, recognizing that addressing underlying [social] policies have broad impacts on improving health.
- ☑ Building collective impact, recognizing that sectors beyond public health and medicine must have a role in addressing preventable infant deaths to realize long lasting equitable outcomes for all of our families, regardless of race or place.



Figure 1. DC Health Approach to Improve Perinatal Health Outcomes

OUR FRAMEWORK to improve perinatal health outcomes is based on the overarching goal to ensure every community understands its health risks and role in improving perinatal health outcomes. DC Health identified seven core priorities that drive our programmatic efforts.



EVERY TEENAGE GIRL AND WOMAN in DC is in control of her reproductive health.



EVERY NEWBORN receives high-quality neonatal care in the hospital and outpatient setting.



EVERY PREGNANT WOMAN receives patient-centered, high quality prenatal care beginning in the 1st trimester.



EVERY PARENT has the life skills and resources needed to nurture and provide for their family.



EVERY HEALTHCARE PROVIDER has the tools and resources they need to provide quality care and manage complex social needs of women and infants.



EVERY INFANT, MOM, AND DAD has a safe and healthy environment to thrive and receive the support they need to promote early childhood development and learning.



EVERY HEALTHCARE FACILITY providing maternal and infant care has the tools and resources to practice evidence based health care and to document QI/QA activities.



The seven core priorities fall within four overall strategic areas for DC Health’s approach to eliminating preventable infant deaths:

- ☑ Improving Preconception Health
- ☑ Assuring High-Quality Healthcare
- ☑ Assisting District Families with Preparing and Caring for Children
- ☑ Promoting Safe and Healthy Environments

DC Health is actively addressing each of these areas through the support of various programs in the District of Columbia. These programs are highlighted throughout the text and described at the end of the report.



Data on District of Columbia Resident Births

In order to implement the most effective strategies to improve perinatal health and reduce infant mortality, we need to understand our local data. Using vital statistics, we describe 10-year trends in live births, overall and by maternal age, compare the distribution of maternal characteristics before and during pregnancy between two time periods, and provide a current profile of maternal health characteristics, pre-pregnancy and pregnancy characteristics for years 2015-2016.



District of Columbia Vital Statistics

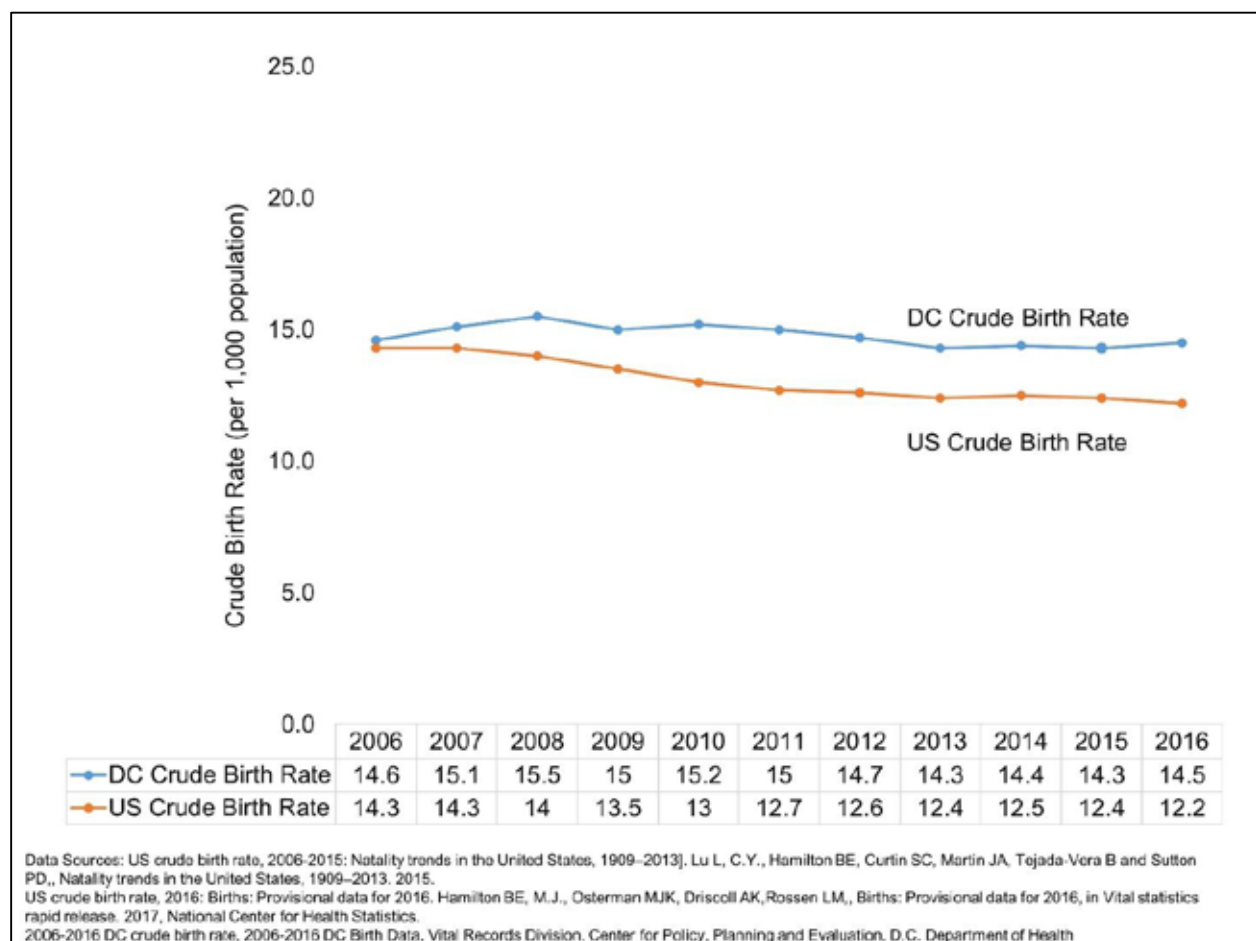
In order to implement the most effective strategies to improve perinatal health and reduce infant mortality, we need to understand our local data. Using vital statistics, we describe 10-year trends in live births, overall and by maternal age, compare the distribution of maternal characteristics before and during pregnancy between two time periods, and provide a current profile of maternal health characteristics, pre-pregnancy and pregnancy characteristics for years 2015-2016.

Live Births to District of Columbia Residents

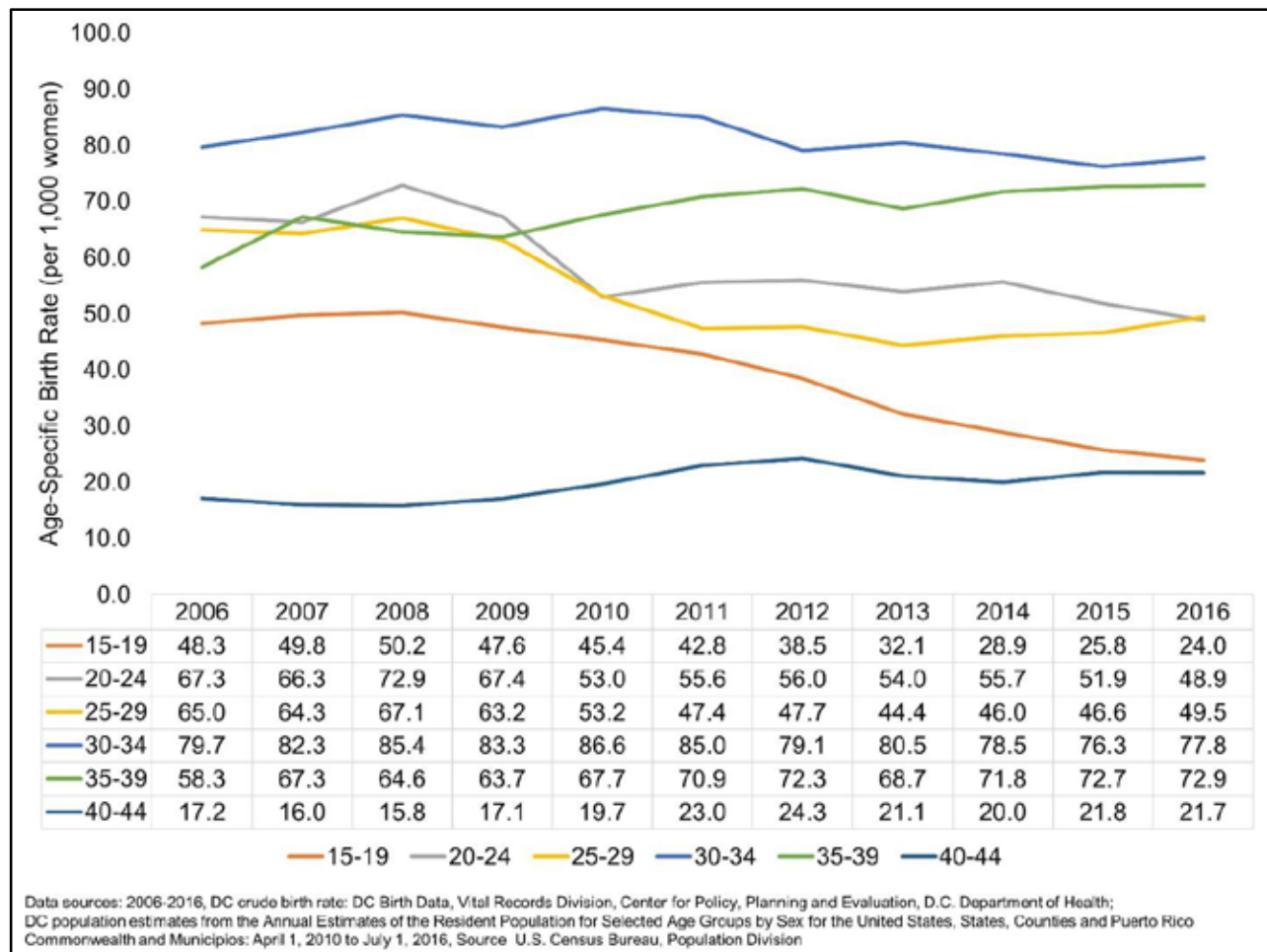
Live Births to District of Columbia Residents, 2006-2016

By examining live births to District of Columbia residents over the past 10 years, we see that birth rates have remained stable, ranging between 14.3 per 1,000 population in 2013 and 2015 to 15.5 per 1,000 population in 2008 (Figure 2).

Figure 2. Crude Birth Rate, US and District of Columbia 2006-2016

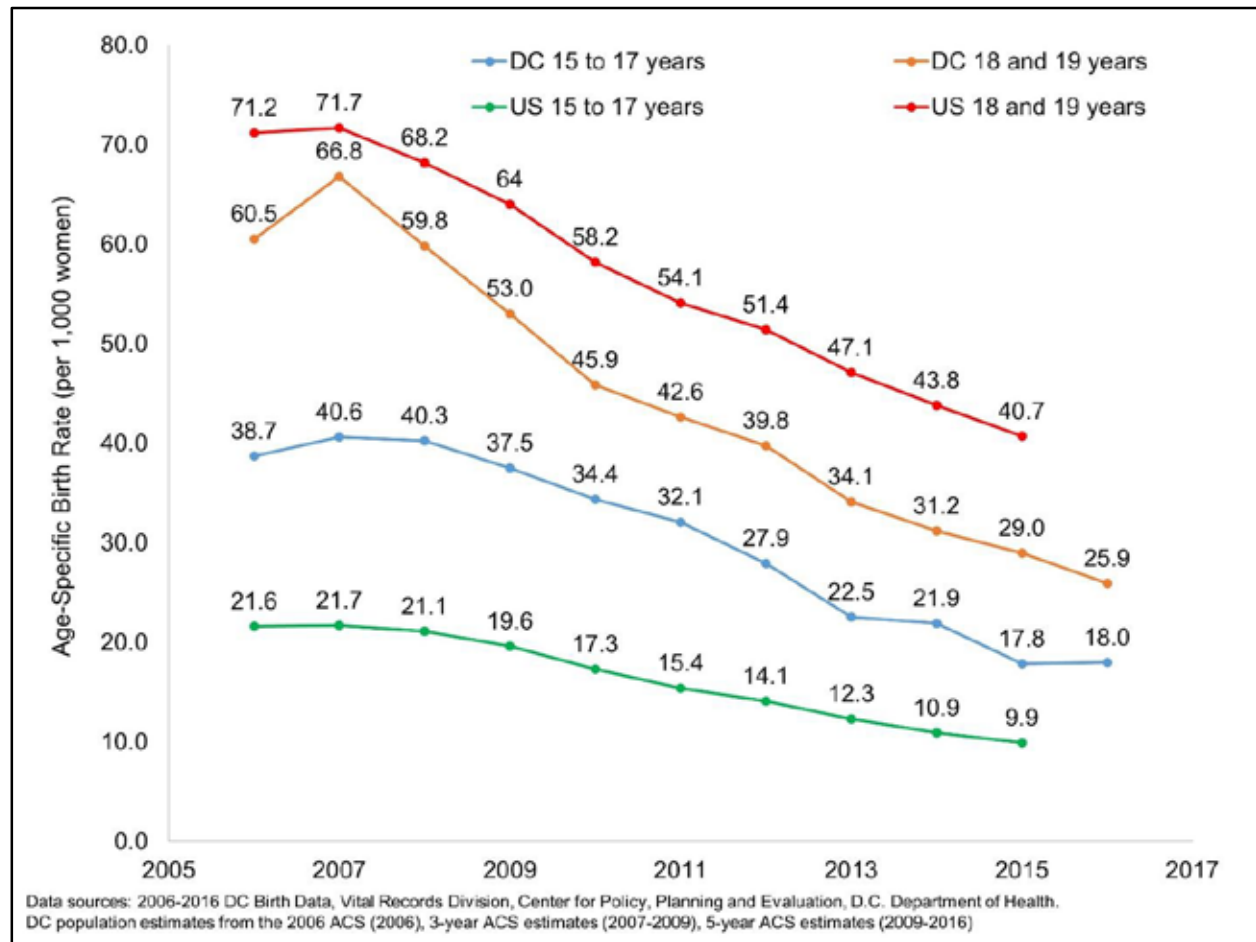


During the same time period, the age-specific birth rates have changed (Figure 3).

Figure 3. Birth Rates by Maternal Age (15-44 years), District of Columbia 2006-2016

For women aged 20-24 years, the rates decreased between 2006 and 2016 from 67.3 to 48.9 per 1,000 women and for women aged 25-29 years, the rates decreased between 2006 and 2016 from 65.0 to 49.5 per 1,000 women. The birth rates for women aged 20-24 and 25-29 were similar in magnitude and plateaued between 2011 and 2016; however, the birth rate for women aged 15-19 continued to decrease during this time and was significantly lower than the birth rates of the two older age groups. Between 2006 and 2016, birth rates increased dramatically for women aged 35-39 (58.3 vs 72.9 per 1,000 women) and 40-44 years (17.2 vs 21.7 per 1,000 women). For each year during this time period, the birth rate for women aged 35-39 years was significantly higher than that of women aged 40-44 years.

Teen birth rates, defined as births to mothers aged 15-19 years, decreased between 2006 and 2016 from 48.3 to 24.0 per 1,000 women (Figure 3). DC Birth rates were higher among mothers aged 18-19 years compared to mothers aged 15-17 years (Figure 4). Between 2006 and 2016, national birth rates were lower than DC birth rates for mothers aged 15-17 years and were higher than DC birth rates for mothers aged 18-19 years.

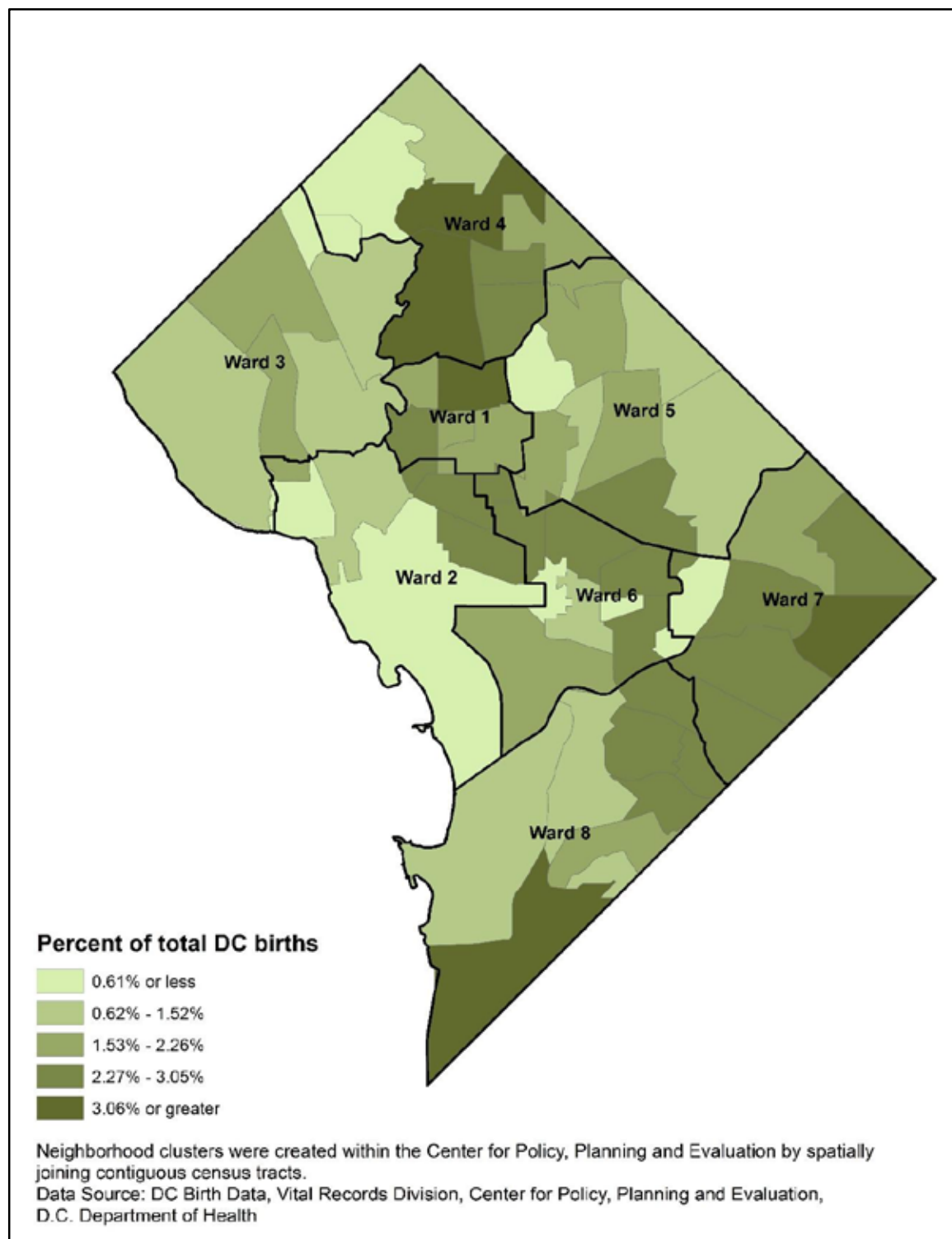
Figure 4. Teen Birth Rates by Maternal Age (15-19 years), District of Columbia 2006-2016**Table 1. Number of Births to Teen Mothers (aged 15-19 years), District of Columbia 2006-2016**

	Birth Year										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
District of Columbia											
15-19 years											
15-17	376	393	388	363	304	280	238	185	176	141	140
18-19	621	658	694	668	647	599	552	452	391	360	320

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

The distribution of live births by neighborhood from 2015-2016 is presented in Figure 5. Neighborhoods with the highest percentage of DC resident births are populated in Wards 4 and 8.

Figure 5. Percent Distribution of Live Births by Neighborhood, District of Columbia 2015-2016



As we examine trends in birth rates over time, we provide descriptive statistics to illustrate how the demographic profile of DC women who had live births has changed during this time period.

Changes in the demographic and socioeconomic profile of mothers who had live births between 2010-2012 and 2013-2016

Demographic characteristics of District of Columbia female residents changed over the last 5 years. We examine differences in maternal demographics and health characteristics and behaviors between two time periods: 2010-2012 and 2013-2016. Data are provided in Appendix Table 1.

The demographic profile of mothers who had live births in 2010-2012 differed from those who had live births during 2013-2016. The majority of births to District of Columbia residents are to non-Hispanic Black mothers, though this percentage decreased from 51.8% to 50.2% between the two time periods. More non-Hispanic white mothers had live births in 2013-2016 than in 2010-2012 (30.7% vs 28.2%).

The percentage of live births to mothers aged less than 20 years decreased during these two time periods (9.6% vs 5.8%). The percentage of live births to women aged 30-39 years was higher in 2013-2016 compared to 2010-2012 (51.0% vs 44.4%).

A higher percentage of births were to married women in 2013-2016 compared to 2010-2012 (50.1% vs. 46.5%).

Maternal educational attainment also differed between the two time periods. The percentage of births to mothers with less than a high school education decreased from 24.0% to 15.8% and the percentage of births to mothers with more than a high school education increased from 53.4% to 61.6%.

The percentage of live births that were financed by Medicaid decreased from 42.8% to 38.8% and the percentage of live births financed by private insurance increased from 38.5% to 45.8% in 2013-2016 compared to 2010-2012. There were no differences in the percentage of live births by mother's residential ward between 2010-2012 and 2013-2016. In both time periods, Ward 8 had the highest percentage of live births (17.5 during the time period 2013-2016).

Sociodemographic characteristics of women who had live births, District of Columbia 2015-2016

The current profile of DC mothers giving birth in the District of Columbia is based on the most recent years of birth data (2015-2016). The overall distribution of maternal sociodemographic characteristics during 2015-2016 is provided in Appendix Table 2 and by ward in Appendix Table 3.

Nearly one-half of births during 2015-2016 were to first-time mothers (46.2%) and the majority of births among first-time mothers were aged 20 years and older (91.2%) (Table 2). Thirty percent of first-time births and one-half of higher order births were financed by Medicaid. The majority of births among mothers aged less than 20 years were insured by Medicaid. However, among mothers aged 20 years and older, the percentage of births financed by Medicaid differed between first-time mothers and mothers of higher-order births; one-quarter of first-time mothers were insured by Medicaid while 50% of mothers of higher order births were insured by Medicaid.

The percentage of first-time births exceeded 50% in four wards, including Ward 1 (53.1%), Ward 2 (64.5%), Ward 3 (52.6%) and Ward 6 (56.0%) (Figure 6). The percentage of first-time births was lowest in Ward 8 (34.5%).

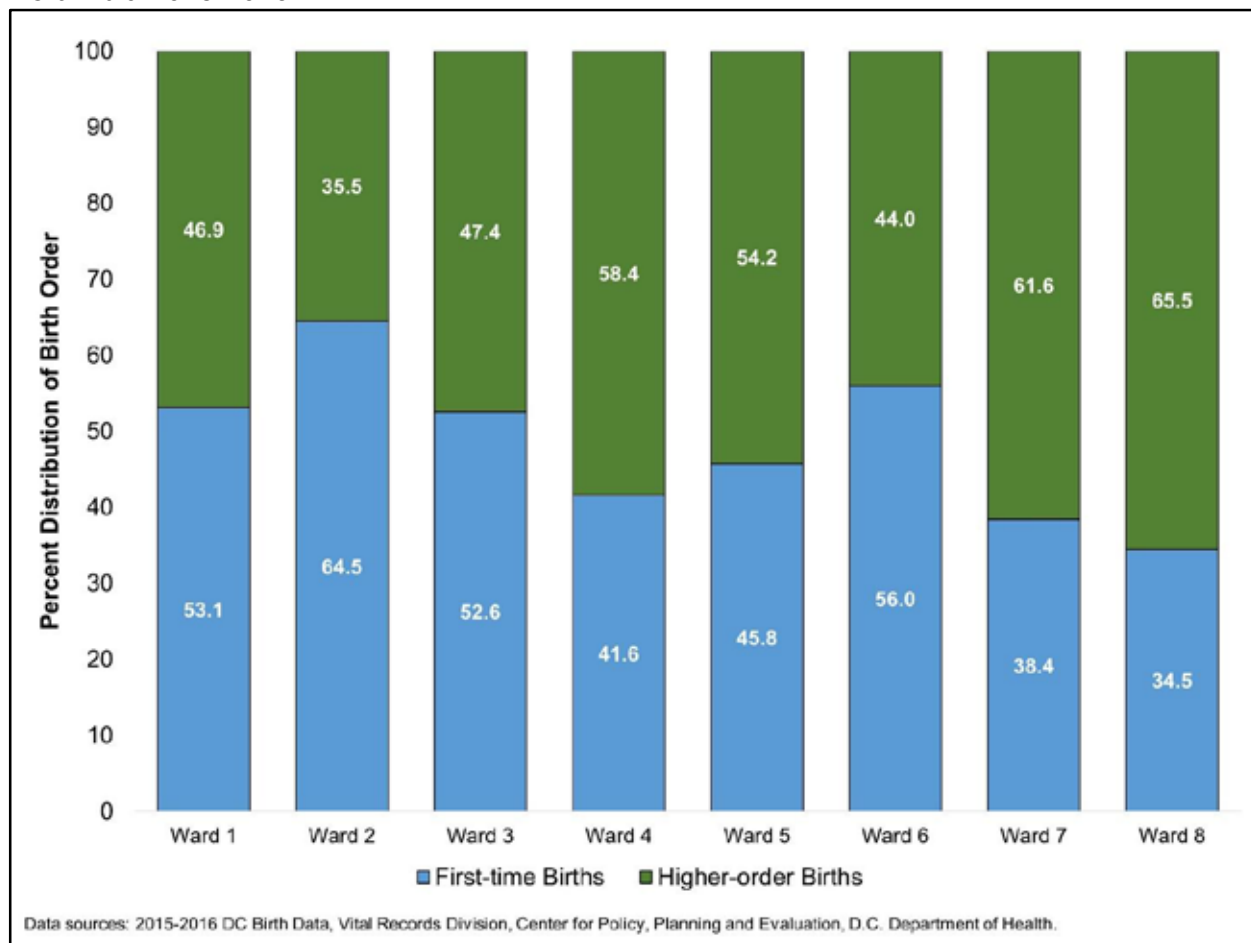
Table 2. Distribution of Payer Type by Birth Order and Maternal Age, District of Columbia 2015-2016

	Total Births		Maternal age			
	N	Percent	Less than 20 years		20 years and older	
	N	Percent	N	Percent	N	Percent
Total births to first-time mothers^a	8,976	46.2	787	80.7	8,187	44.4
Total births to mothers of higher order births^a	10,449	53.8	188	19.3	10,261	55.6
Payer type among mothers by birth order						
First-time mothers						
Payer Type						
Medicaid	2,655	29.58	593	75.35	2,061	25.17
Private Insurance	5,406	60.23	80	10.17	5,325	65.04
Other	874	9.74	107	13.60	767	9.37
Higher order births						
Payer Type						
Medicaid	5,215	49.91	144	76.60	5,071	49.42
Private Insurance	3,773	36.11	9	4.79	3,764	36.68
Other	1,379	13.20	29	15.43	1,350	13.16

^a Percent is based on a denominator including first-time and higher order births.

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Figure 6. Distribution of Birth Order by Maternal Residence (Ward), District of Columbia 2015-2016



Section Highlights

- From 2010-2012 to 2013-2016, DC experienced an increase in births to non-Hispanic white women, women with more than a high school education, women aged 30-39 years, and women who are married. Births to mothers aged less than 20 years continued to decline.
- Births to mothers aged 15-19 years decreased by 50% from 2006-2016. The birth rate to mothers aged 18-19 years is higher than the birth rate to mothers aged 15-17 years in DC. However, compared to national rates, the birth rate for mothers aged 15-17 is higher in DC than in the US while the birth rate for mothers aged 18-19 is lower in DC than in the US.

Health Characteristics of District Women Prior to Pregnancy

Maternal pre-pregnancy health characteristics and behaviors of women who had live births, District of Columbia 2015-2016

During 2015-2016, there were significant differences with respect to pre-pregnancy health characteristics and health behaviors by race and ethnicity. Definitions for the following pre-pregnancy health characteristics are provided at the start of the report in the Terms section: previous preterm birth, pre-pregnancy weight status, pre-pregnancy smoking, pre-pregnancy diabetes, and pre-pregnancy hypertension.

The distribution of pre-pregnancy characteristics and behaviors is presented by race and ethnicity in Table 3.

Table 3. Pre-pregnancy characteristics of women who had live births overall and by maternal race and ethnicity, District of Columbia, 2015-2016

	Maternal Race/Ethnicity ^a									
	DC Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	19,425	100.00	6,050	100.00	9,650	100.00	2,670	100.00	903	100.00
Previous pre-term birth										
No	18,768	96.62	5,981	98.86	9,157	94.89	2,601	97.42	890	98.56
Yes	624	3.21	63	1.04	475	4.92	68	2.55	12	1.33
Maternal Pre-pregnancy weight										
Underweight	841	4.33	252	4.17	420	4.35	77	2.88	84	9.30
Normal Weight	9,921	51.07	4,410	72.89	3,584	37.14	1,199	44.91	649	71.87
Overweight	4,345	22.37	962	15.90	2,547	26.39	704	26.37	108	11.96
Obese	3,737	19.24	327	5.40	2,803	29.05	537	20.11	47	5.20
Smoking prior to pregnancy										
No	18,252	93.96	5,814	96.10	8,825	91.45	2,616	97.98	871	96.46
Yes	776	3.99	57	0.94	680	7.05	27	1.01	10	1.11
Pre-pregnancy diabetes										
Absent	19,212	98.90	6,033	99.72	9,511	98.56	2,632	98.58	892	98.78
Present	187	0.96	15	0.25	122	1.26	38	1.42	11	1.22
Pre-pregnancy hypertension										
Absent	18,940	97.50	5,980	98.84	9,293	96.30	2,631	98.54	894	99.00
Present	459	2.36	68	1.12	340	3.52	39	1.46	9	1.00

^a Other non-Hispanic race-ethnic categories are not presented due to small sample size.

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

The percentage of mothers with previous preterm births was higher among non-Hispanic black mothers (4.9%) compared to non-Hispanic white mothers (1.0%) and Hispanic mothers (2.6%).

The percentage of women with normal pre-pregnancy weight was significantly higher among non-Hispanic white mothers (72.9%) than non-Hispanic black mothers (37.1%) and Hispanic mothers (44.9%). The percentage of overweight or obese mothers was highest among non-Hispanic black mothers (55.4%) compared to non-Hispanic white mothers (21.3%) and Hispanic mothers (46.5%).

The percentage of mothers who smoked prior to pregnancy was significantly higher among non-Hispanic black mothers (7.1%) compared to non-Hispanic white mothers (0.9%) and Hispanic mothers (1.0%). The percentage of mothers with pre-pregnancy diabetes was significantly higher among non-Hispanic black mothers (1.3%) compared to non-Hispanic white mothers (0.3%), but was not significantly different than among Hispanic mothers (1.4%). The percentage of mothers with pre-pregnancy hypertension was significantly higher among non-Hispanic black mothers (3.5%) compared to non-Hispanic white mothers (1.1%) and Hispanic mothers (1.5%).

The distribution of pre-pregnancy characteristics and behaviors is presented by Ward in Appendix Table 4.

Section Highlights

- During 2015-2016, a higher percentage of non-Hispanic black mothers had previous preterm births, smoked prior to pregnancy, were overweight or obese, had a history of diabetes prior to pregnancy, and a history of hypertension prior to pregnancy compared to non-Hispanic white mothers.
- During 2015-2016, a higher percentage of Hispanic mothers had previous preterm births, were overweight or obese, and had a history of diabetes prior to pregnancy compared to non-Hispanic white mothers.

DC Health programs to support the health of women before pregnancy (preconception and interconception health)*

- Healthy Food Access Initiatives
- Chronic Disease Self-Management Programs
- 1-800-QUIT-NOW for smoking cessation
- One Key Question and promotion of reproductive plans
- Well-woman visit promotion
- Healthy Start enhanced medical homes for pregnant and reproductive-age women
- Maternal, Infant and Early Childhood Home Visiting
- Pregnancy Risk Assessment Monitoring System (PRAMS)

**more information in Table 14.*

Health Characteristics of District Women During Pregnancy

Maternal pregnancy health characteristics and behaviors of women who had live births, District of Columbia 2015-2016

Several maternal health characteristics and health behaviors during pregnancy are known to contribute to birth outcomes. Definitions for the following pregnancy health characteristics and behaviors are provided at the start of the report in the Terms section: prenatal care initiation,

plurality, cigarette smoking during pregnancy, gestational diabetes, gestational hypertension and eclampsia.

The distribution of characteristics and behaviors of women during pregnancy is presented by race and ethnicity in Table 4.

Table 4. Pregnancy characteristics of women who had live births, overall and by maternal race and ethnicity, District of Columbia 2015-2016

	Maternal Race/Ethnicity ^a									
	DC Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	19,425	100.00	6,050	100.00	9,650	100.00	2,670	100.00	903	100.00
Trimester prenatal care initiated										
First Trimester	12,759	65.68	5,213	86.17	5,027	52.09	1,718	64.34	705	78.07
Second Trimester	4,343	22.36	619	10.23	2,857	29.61	694	25.99	152	16.83
Third Trimester	1,232	6.34	113	1.87	941	9.75	135	5.06	30	3.32
No Prenatal Care	464	2.39	14	0.23	411	4.26	33	1.24	2	0.22
Plurality of birth										
Singleton	18,586	95.68	5,768	95.34	9,183	95.16	2,611	97.79	875	96.90
Twin	825	4.25	282	4.66	453	4.69	59	2.21	28	3.10
Triplet	9	0.05	0	0	9	0.09	0	0	0	0
Quadruplet	4	0.02	0	0	4	0.04	0	0	0	0
Smoking during pregnancy										
Did not smoke during pregnancy	18,546	95.47	5,844	96.60	9,066	93.95	2,629	98.46	879	97.34
Smoked during pregnancy	487	2.51	26	0.43	444	4.60	15	0.56	2	0.22
Gestational diabetes										
Absent	18,737	96.46	5,910	97.69	9,319	96.57	2,517	94.27	850	94.13
Present	662	3.41	138	2.28	314	3.25	153	5.73	53	5.87
Gestational hypertension										
Absent	18,327	94.35	5,692	94.08	9,060	93.89	2,564	96.03	871	96.46
Present	1,072	5.52	356	5.88	573	5.94	106	3.97	32	3.54
Eclampsia										
Absent	19,306	99.39	6,021	99.52	9,583	99.31	2,657	99.51	900	99.67
Present	81	0.42	19	0.31	48	0.50	12	0.45	2	0.22

^a Other non-Hispanic race-ethnic categories are not presented due to small sample size.

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

The majority of live births were to women who initiated prenatal care during the first trimester of pregnancy (65.7%) while 2.4% of live births were to women who did not initiate prenatal care during pregnancy. The percentage of births that had timely entry into prenatal care differed by maternal race and ethnicity. Nearly 90% of non-Hispanic white mothers and nearly 80% of non-Hispanic Asian/Pacific Islanders initiated prenatal care during their first trimester. Among Hispanic mothers, 64.3% initiated prenatal care during their first trimester; among non-Hispanic black mothers, 52.1% initiated prenatal care during their first trimester.

The majority of mothers did not smoke during pregnancy (95.5%), but this varied by maternal race and ethnicity. Nearly 5% of non-Hispanic black mothers smoked during pregnancy while less than 0.4% of non-Hispanic white and 0.6% of Hispanic mothers smoked during pregnancy.

Most live births were singleton births (95.7%), while 4.3% were twin births and less than 1% were to higher order multiple births. Twin and higher order multiple births occurred at a higher proportion among non-Hispanic white mothers (4.7%) and non-Hispanic black mothers (4.8%) compared to Hispanic mothers (2.2%) and non-Hispanic Asian/Pacific Islander mothers (3.1%).

The distribution of pregnancy characteristics and behaviors is presented by Ward in Appendix Table 5.

Section Highlights

- During 2015-2016, 52% of non-Hispanic black mothers entered prenatal care in the 1st trimester compared to 86% of non-Hispanic white mothers and 64% of Hispanic mothers.
- During 2015-2016, one in twenty non-Hispanic black mothers did not initiate prenatal care which was significantly higher than the percentage of non-Hispanic white and Hispanic mothers.
- During 2015-2016, one in twenty non-Hispanic black mothers smoked during pregnancy which was significantly higher than the percentage of non-Hispanic white and Hispanic mothers.

DC Health programs to support healthy pregnancy*

- Special Supplemental Nutrition Program for Women, Infants and Children
- Healthy Start enhanced medical homes for pregnant and reproductive-age women - Community of Hope, Mary's Center, Children's National Health System Adolescent sites
- Maternal, Infant and Early Childhood Home Visiting
- Collaboration with Department of Health Care Finance to implement provider training and decision support around the use of 17-alpha-hydroxypregesterone caproate (17p) to reduce preterm births
- Healthy Start enhanced medical homes for pregnant and reproductive-age women - Community of Hope, Mary's Center, Children's Adolescent sites
- Focus groups and Pregnancy Risk Assessment Monitoring System (PRAMS) data to inform interventions to drive early entry into prenatal care
- Preventive Health and Chronic Disease Control
- DC Quitline Pregnancy Program

**more information in Table 14.*

Birth Outcomes in the District of Columbia

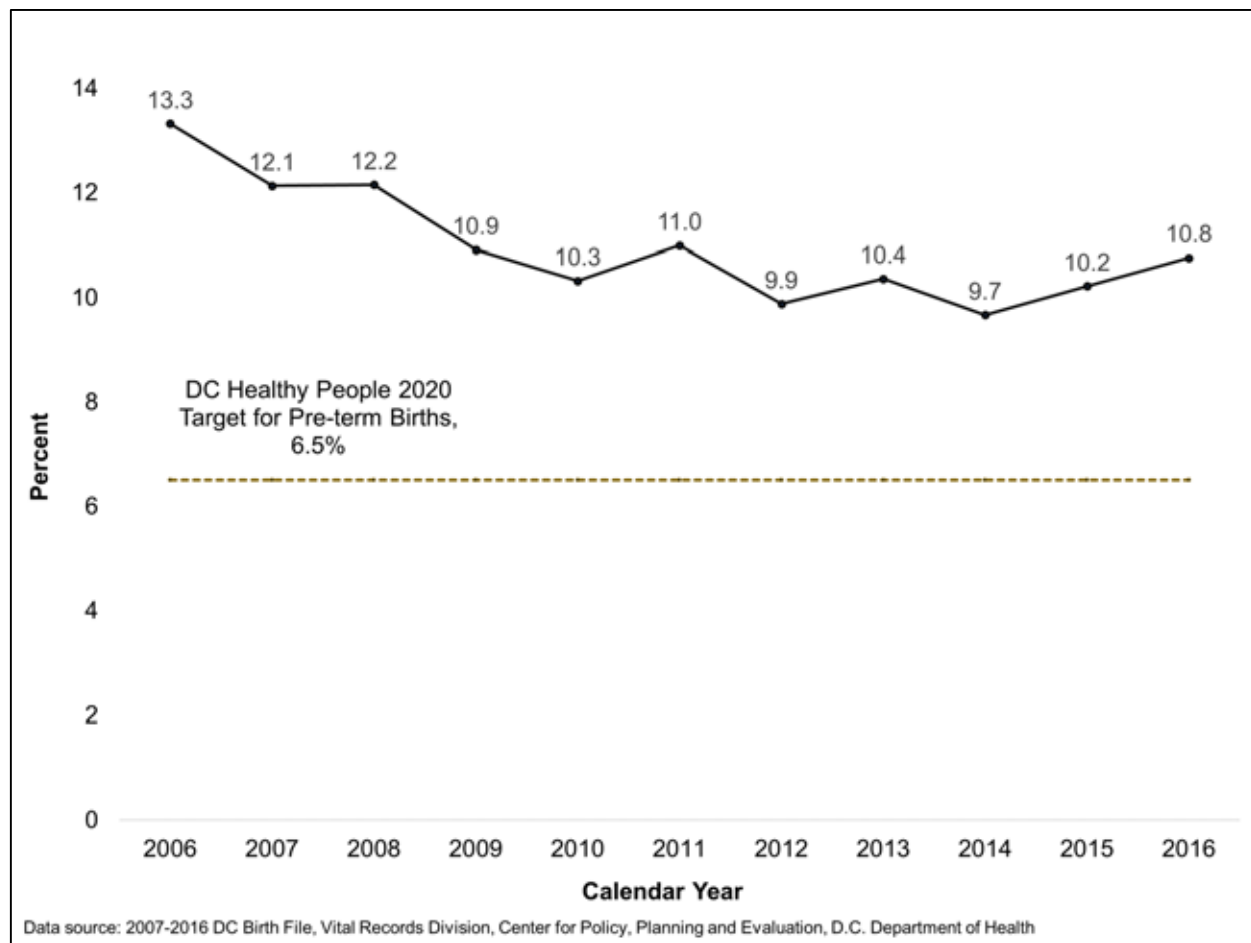
Key outcomes affecting the health of newborns and infants are preterm births, low birthweight, and infant deaths. Ten-year trends of preterm births are provided in this section. The percentage of preterm births and low birthweight births by pre-pregnancy and pregnancy characteristics and behaviors are presented by maternal race and ethnicity for combined years 2015-2016 birth data. The latest two years of data are combined so that the majority of percentages presented are based on 20 events. Rates and percentages based on less than 20 events may yield statistically unreliable estimates. Neighborhood-level maps are presented for the combined years 2012-2016 to similarly improve the reliability of preterm birth and low birthweight estimates.

Infant mortality rates are presented by sociodemographic characteristics, pre-pregnancy and pregnancy characteristics and behaviors for combined years 2012-2016. While annual rates are provided, five years of data are combined to improve the reliability of estimates and detect differences by select characteristics. Ward-level maps are presented for the combined years 2012-2016, due to the number of infant deaths in most DC neighborhoods. The ten leading causes of infant deaths and neonatal deaths are provided for the two latest years of data, 2015-2016.

Uncovering disparate outcomes and investigating root causes can help direct programming most effectively.

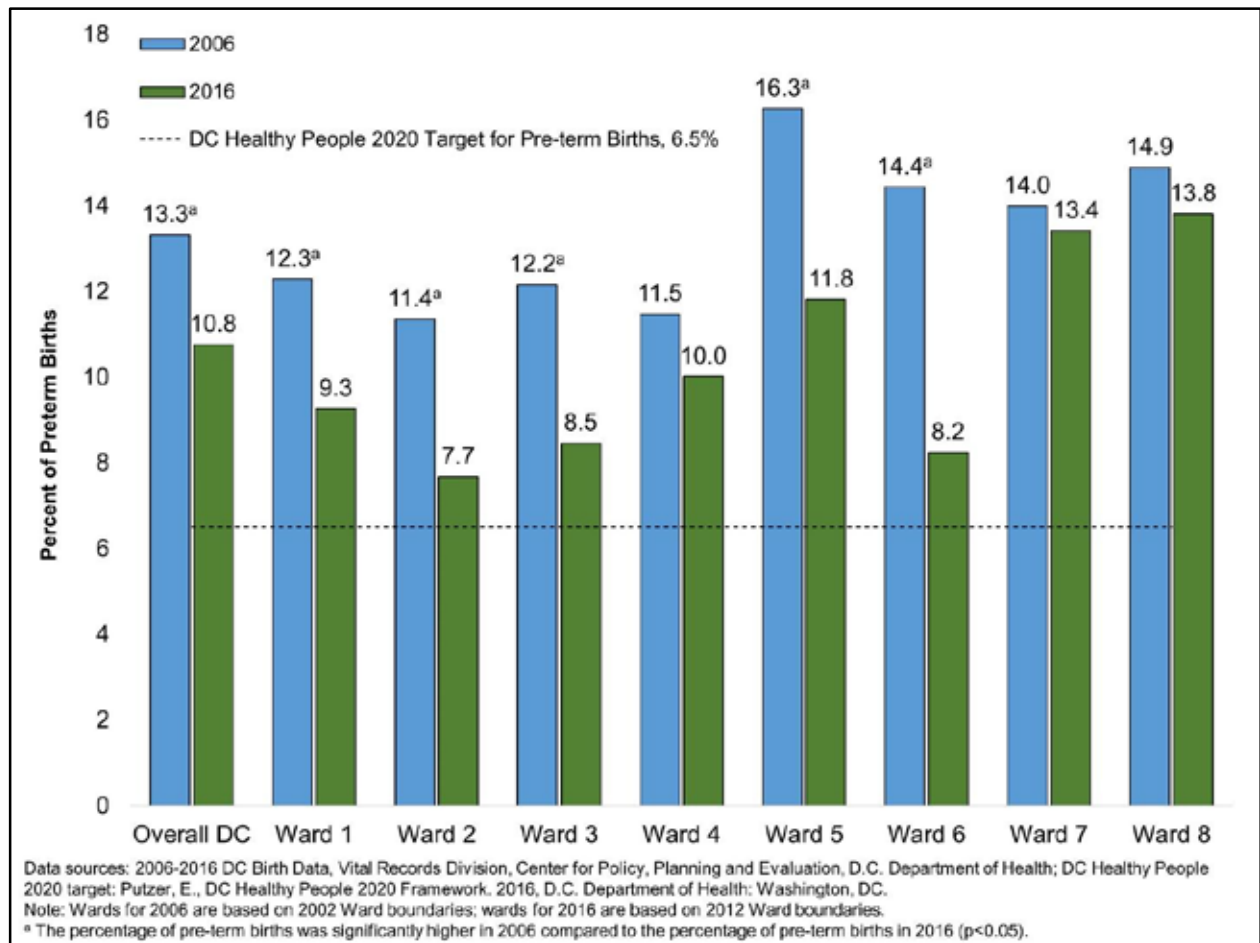
Preterm Live Births, District of Columbia 2015-2016

A preterm birth is defined as a live birth occurring prior to 37 weeks gestation. The percentage of preterm births among all DC resident live births decreased between 2006 and 2016 from 13.3% to 10.8%. During the most recent 5-year period (2012-2016), the percentage of preterm births increased from 9.9% in 2012 to 10.8% in 2016.

Figure 7: Percent of Preterm Live Births, District of Columbia 2006- 2016

The percentage of preterm births decreased between 2006 and 2016 in all wards, with larger absolute reductions in Wards 5 and 6 (Figure 8).

Figure 8. Percent of Preterm Live Births, District of Columbia 2006 and 2016



Preterm live births by sociodemographic characteristics of the mother, District of Columbia 2015-2016

During 2015-2016, there were differences in the percentage of preterm live births by demographic characteristics (Table 5). The percentage of preterm live births among non-Hispanic Black (12.8%) was significantly higher than the percentage of preterm live births among non-Hispanic white (7.8%), Hispanics mothers (9.0%) and non-Hispanic Asian/Pacific Islanders (9.0%).

Table 5. Percentage of preterm births by maternal characteristics among live births in District of Columbia 2015-2016

	Total Births	Gestational Age			
		Preterm birth (Less than 37 weeks gestation)		Full term birth (37 and more weeks of gestation)	
		N	Percent	N	Percent
Total Births	19,425	2,038	10.49	17,383	89.49
Maternal race and ethnicity^a					
non-Hispanic, White	6,050	470	7.77	5,580	92.23
non-Hispanic, Black ^b	9,650	1,235	12.80	8,411	87.16
Hispanic	2,670	240	8.99	2,430	91.01
non-Hispanic, Asian/Pacific Islander	903	81	8.97	822	91.03
Maternal age (years)					
Less than 20 years	975	110	11.28	864	88.62
20-24 years	3,268	337	10.31	2,929	89.63
25-29 years	4,031	433	10.74	3,596	89.21
30-34 years	6,032	551	9.13	5,474	90.75
35-39 years	4,107	449	10.93	3,655	88.99
40 years and older ^c	1,010	158	15.64	851	84.26
Marital Status					
Married	9,905	856	8.64	9,049	91.36
Not Married ^d	9,443	1,175	12.44	8,260	87.47
Maternal Education Level					
Less than High School	2,686	314	11.69	2,371	88.27
High School Graduate or GED ^e	4,246	541	12.74	3,702	87.19
More than High School Education	12,281	1,135	9.24	11,141	90.72
Insurance Type					
Medicaid ^f	7,870	977	12.41	6,885	87.48
Private Insurance	9,179	808	8.80	8,370	91.19
Other Government (Fed, State, Local)	791	70	8.85	721	91.15
Self-pay	221	18	8.14	203	91.86
CHAMPUS/TRICARE	171	23	13.45	148	86.55
Other	1,070	119	11.12	951	88.88
Maternal Residence (Ward)					
Ward 1	2,261	178	7.87	2,083	92.13
Ward 2	1,222	87	7.12	1,135	92.88
Ward 3	1,537	132	8.59	1,403	91.28
Ward 4	3,069	302	9.84	2,764	90.06
Ward 5	2,576	297	11.53	2,275	88.32
Ward 6	2,752	237	8.61	2,514	91.35
Ward 7	2,573	337	13.10	2,233	86.79
Ward 8 ^g	3,386	461	13.61	2,923	86.33

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a Other non-Hispanic race-ethnic categories are not presented due to small sample size.

^b Percentage of preterm births is significantly higher among births of non-Hispanic black mother compared to all other race and ethnic categories ($p < 0.05$).

^c Percentage of preterm births is significantly higher among infants of mothers aged 40 years and older compared to mothers aged less than 20 years ($p < 0.05$), 20-24 years ($p < 0.05$), 25-29 years ($p < 0.05$), 30-34 years ($p < 0.05$), and 35-39 years ($p < 0.05$).

^d Percentage of preterm births is significantly higher among births of unmarried mothers compared to married mothers ($p < 0.05$).

^e Percentage of preterm births is significantly higher among infants of mothers with a high school education compared to those with more than a high school education ($p < 0.05$), but not significantly different than mothers with less than a high school education.

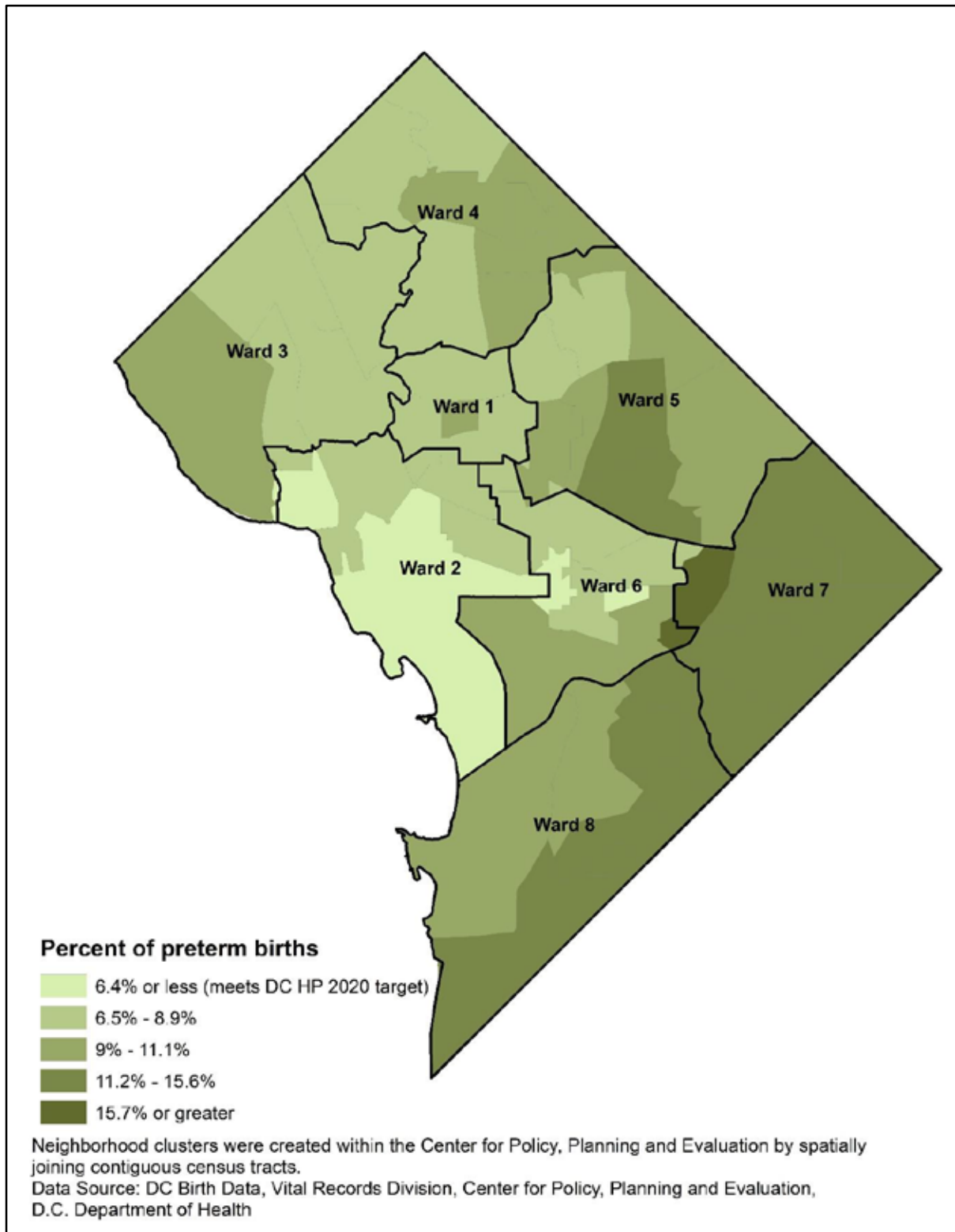
^f Percentage of preterm births is significantly higher among infants of mothers with Medicaid coverage compared to mothers with private insurance ($p < 0.05$), other government coverage ($p < 0.05$) and self-pay ($p < 0.05$), but not significantly different than mothers with CHAMPUS/TRICARE, or other coverage.

^g Percentage of preterm births is significantly higher among infants of mothers residing in Ward 8 compared to all other wards ($p < 0.05$ for six comparisons) except Ward 7.

The percentage of preterm live births among mothers aged 40 years and older (15.6%) was significantly higher than the percentage of preterm live births among all other age groups. Twelve percent of births to unmarried mothers were preterm, which was significantly higher than the percent of preterm births among married mothers (8.7%). The percentage of preterm live births was highest among mothers with a high school diploma (12.7%) and this was significantly higher than the percentage of preterm births among mothers with more than a high school education (9.2%); the percentage of preterm births was not significantly different between mothers with a high school diploma or GED and mothers with no high school diploma. The percentage of preterm births among all Medicaid financed births in the District of Columbia was 12.4%, which was significantly higher than the percentage of preterm births financed by private insurance (8.8%) and Other government (federal, state, local coverage) (8.9%).

The percentage of preterm births differed by ward (Table 5). Across the eight wards, the highest percentage of preterm births was in Ward 8 (13.6%), which was significantly higher than the percentage of preterm births in all other wards except Ward 7 (13.1%). To examine the geographic distribution of preterm births at a local-level, we combine the five most recent years of birth data (2012-2016), and present the percentage of preterm births by neighborhood cluster (Figure 9).

Figure 9. Percentage of Preterm Live Births by Neighborhood Cluster, District of Columbia 2012-2016

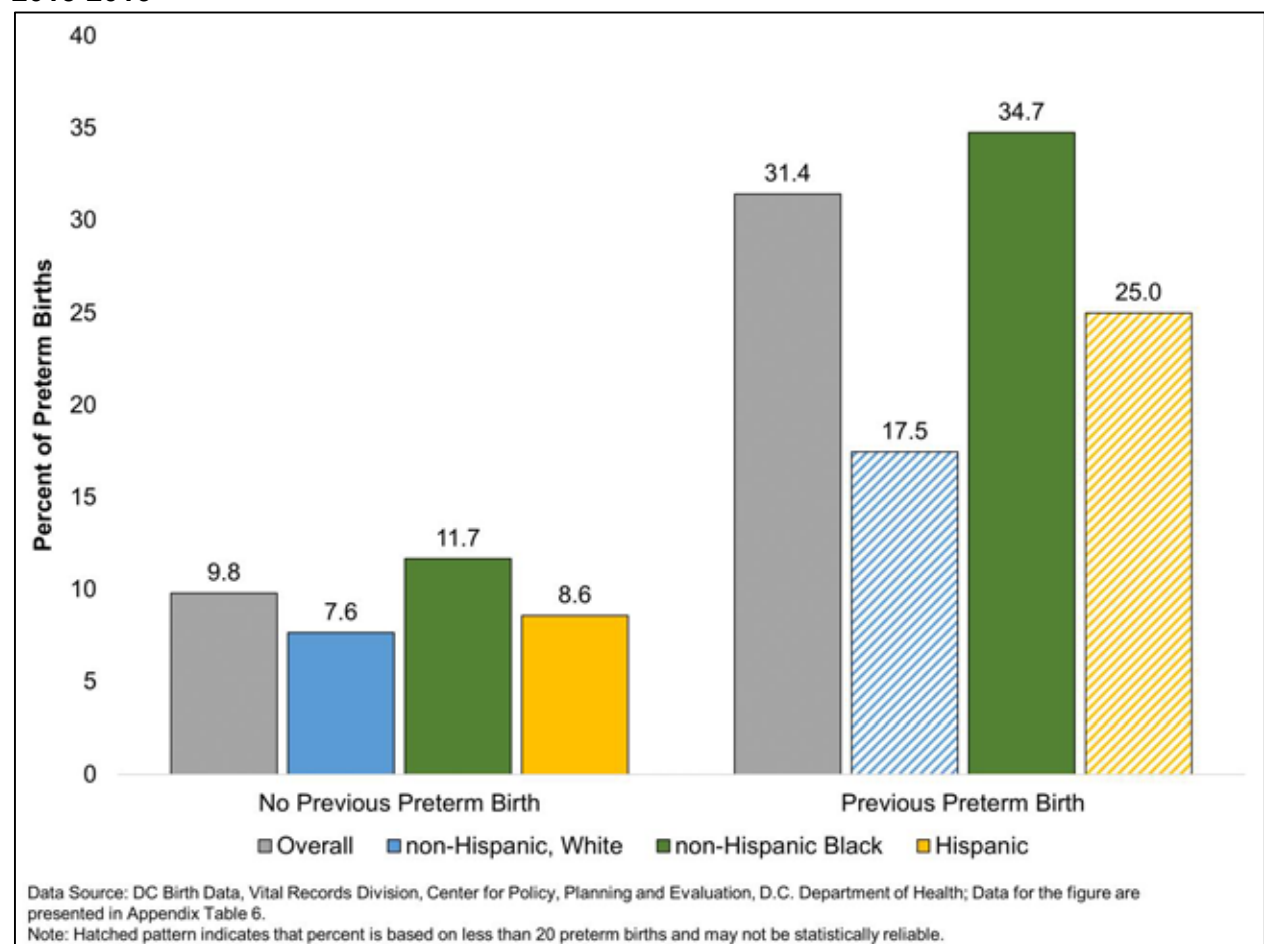


Preterm live births by pre-pregnancy health characteristics and behaviors of the mother, District of Columbia 2015-2016

The percentage of preterm live births also differed by health characteristics and behaviors prior to pregnancy, such as: previous preterm birth, pre-pregnancy weight, pre-pregnancy smoking, pre-pregnancy diabetes, and pre-pregnancy hypertension. The percentage of preterm births by pre-pregnancy characteristics is presented by maternal race and ethnicity (Appendix Table 6) and by ward (Appendix Table 7).

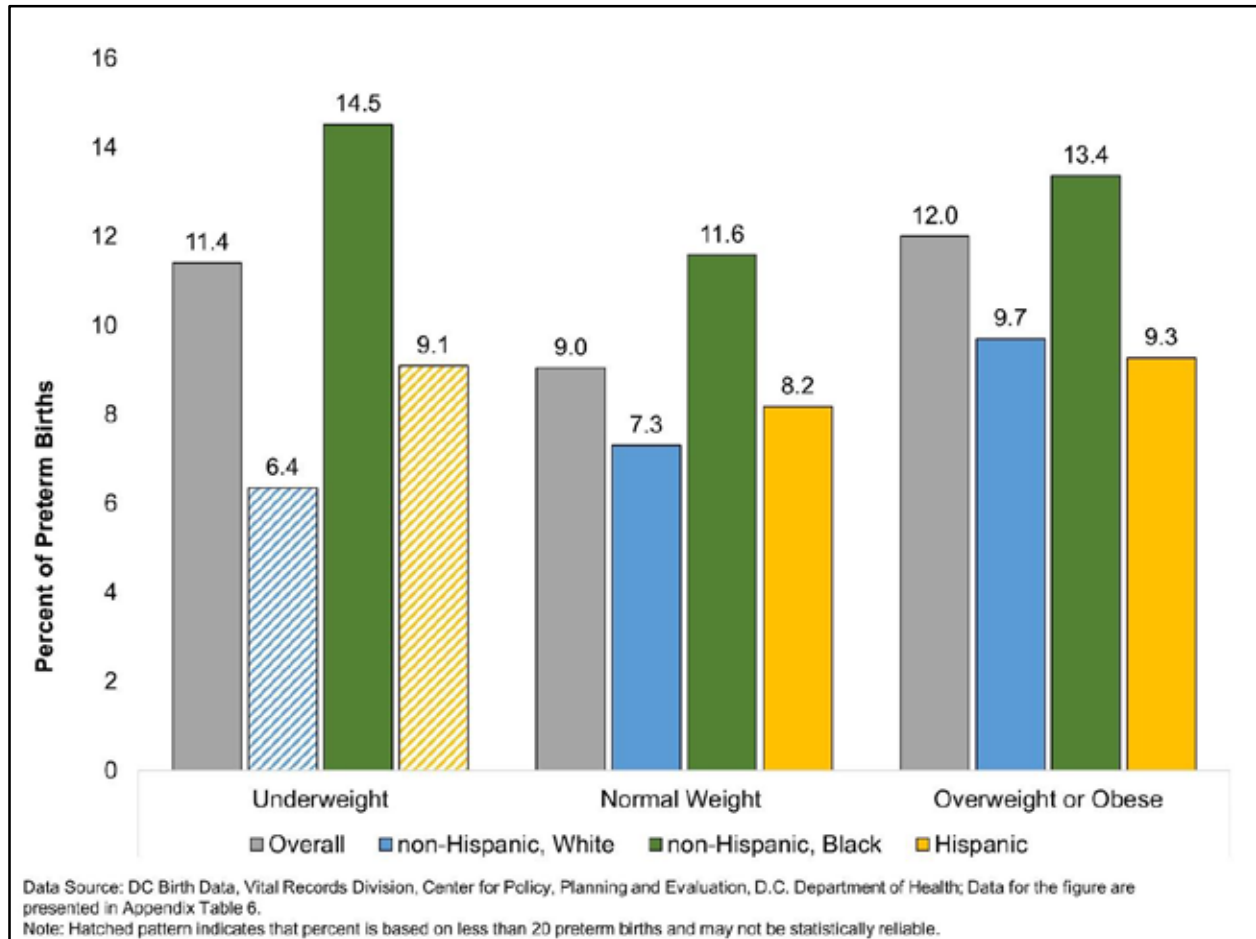
The percentage of mothers who had preterm births was higher (31.4%) among mothers who had a previous preterm birth compared to mothers who did not have a previous preterm birth (9.8%) (Figure 10).

Figure 10. Percent of Preterm Live Births by Previous Preterm Birth, District of Columbia 2015-2016



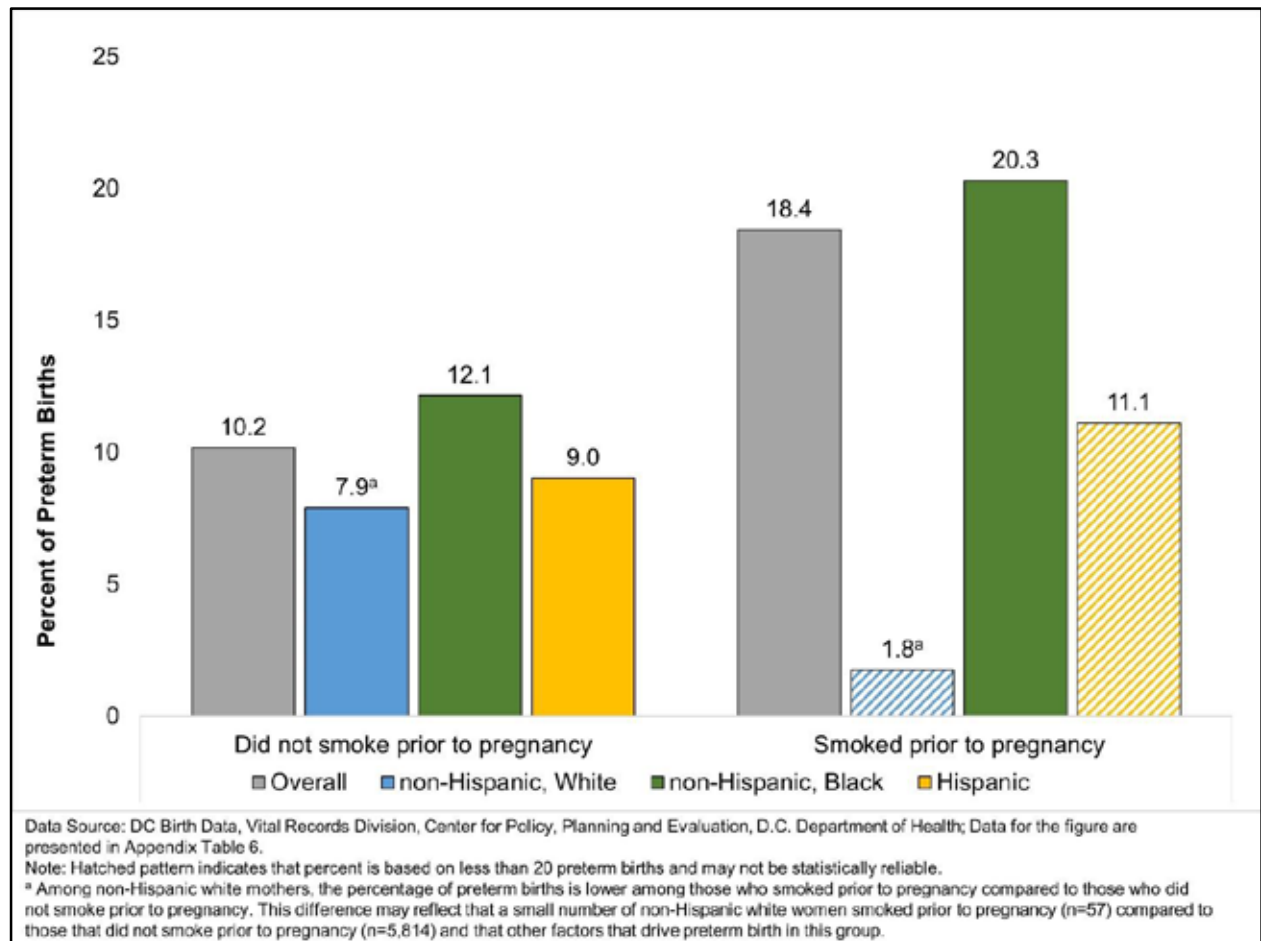
Overall, the percentage of mothers who had preterm births was highest (12.0%) among overweight or obese mothers. Mothers with normal pre-pregnancy weight had a lower percentage of preterm births (9.0%) compared to mothers who were underweight (11.4%), overweight or obese (12.0%). The percentage of preterm births among non-Hispanic black mothers who had normal pre-pregnancy weight (11.6%) was significantly higher than non-Hispanic white mothers (7.3%) and Hispanic mothers (8.2%) (Figure 11).

Figure 11. Percent of Preterm Live Births by Pre-Pregnancy Weight, District of Columbia 2015-2016



Nearly one in five mothers (18.4%) who smoked prior to pregnancy had preterm births, which was significantly higher than the percentage of mothers who did not smoke (10.2%). The percentage of preterm births among non-Hispanic Black mothers who smoked prior to pregnancy (20.3%) was significantly higher among non-Hispanic Black mothers who did not smoke (12.1%) prior to pregnancy (Figure 12).

Figure 12. Percent of Preterm Live Births by Pre-Pregnancy Smoking Status and Maternal Race and Ethnicity, District of Columbia 2015-2016



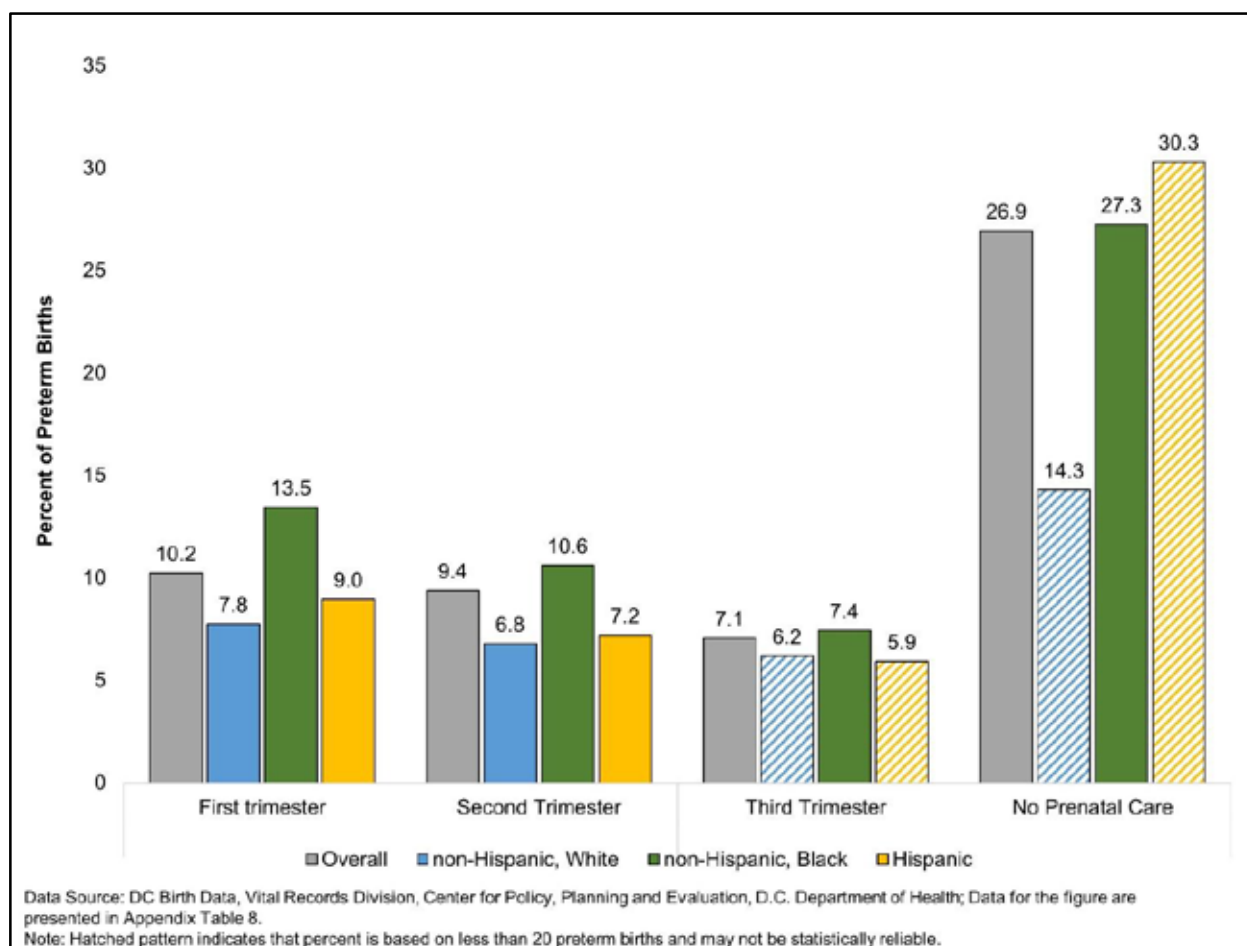
The percentage of mothers who had preterm births was significantly higher among mothers with pre-pregnancy diabetes, (26.9%) compared to mothers without pre-pregnancy diabetes (10.3%) (Appendix Table 6). The percentage of mothers who had preterm births was significantly higher among mothers with pre-pregnancy hypertension (25.5%) compared to mothers without pre-pregnancy hypertension (10.1%) (Appendix Table 6).

Preterm live births by health characteristics and behaviors of the mother during pregnancy, District of Columbia 2015-2016

The percentage of preterm live births also differed by health characteristics and behaviors during pregnancy, such as: initiation of prenatal care, smoking during pregnancy, diagnosis of gestational diabetes, diagnosis of gestational hypertension, and diagnosis of eclampsia. The percentage of preterm births by health characteristics and behaviors during pregnancy is presented by maternal race and ethnicity (Appendix Table 8) and by ward (Appendix Table 9).

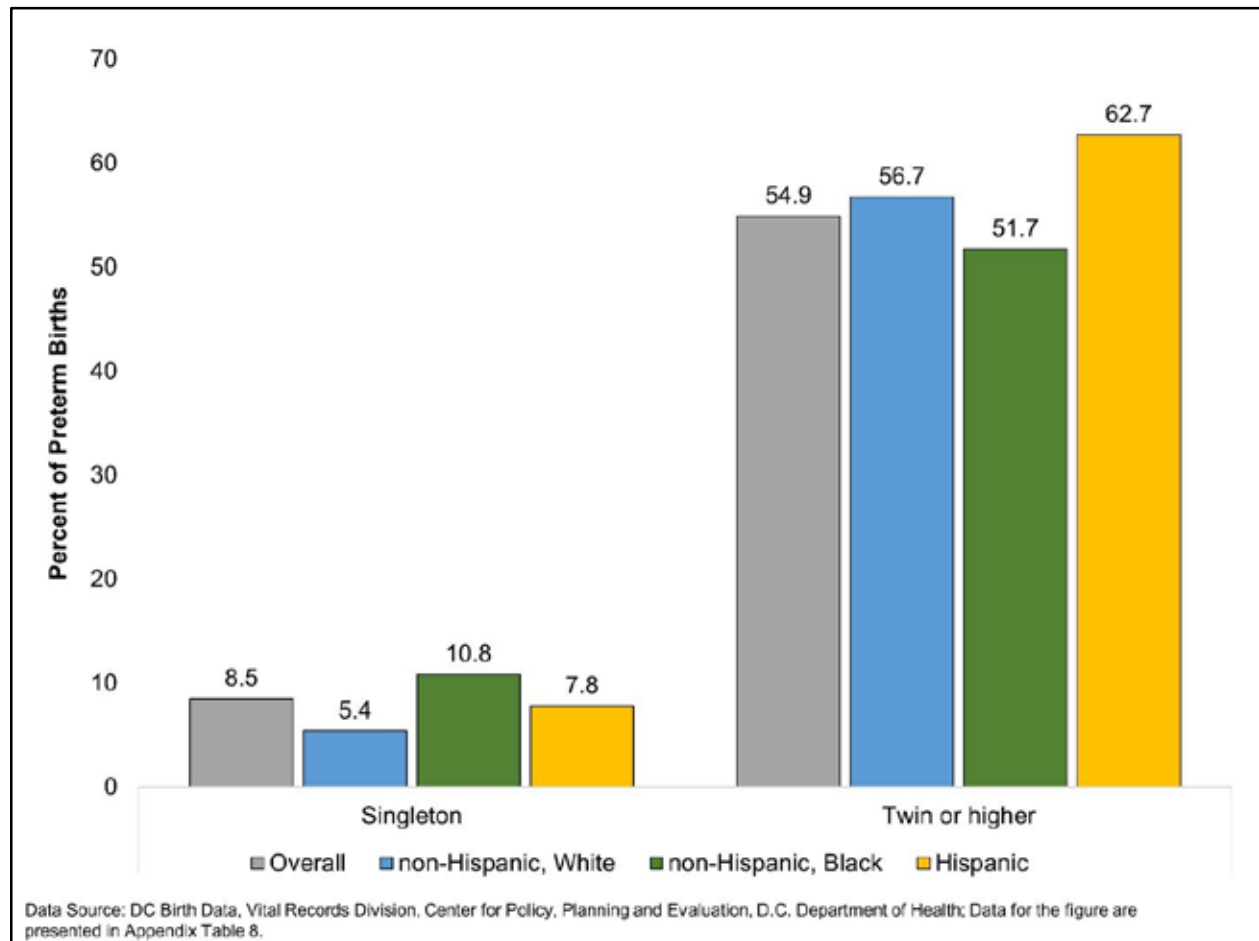
The percentage of preterm births was significantly higher (26.9%) among births to mothers who did not initiate prenatal care compared to mothers who initiated prenatal care during their first trimester (10.2%) (Figure 13). This was observed for births across all maternal race and ethnic categories, however, the absolute percent difference was larger for non-Hispanic black mothers and Hispanic mothers.

Figure 13. Percent of Preterm Live Births by Prenatal Care Initiation, District of Columbia 2015-2016



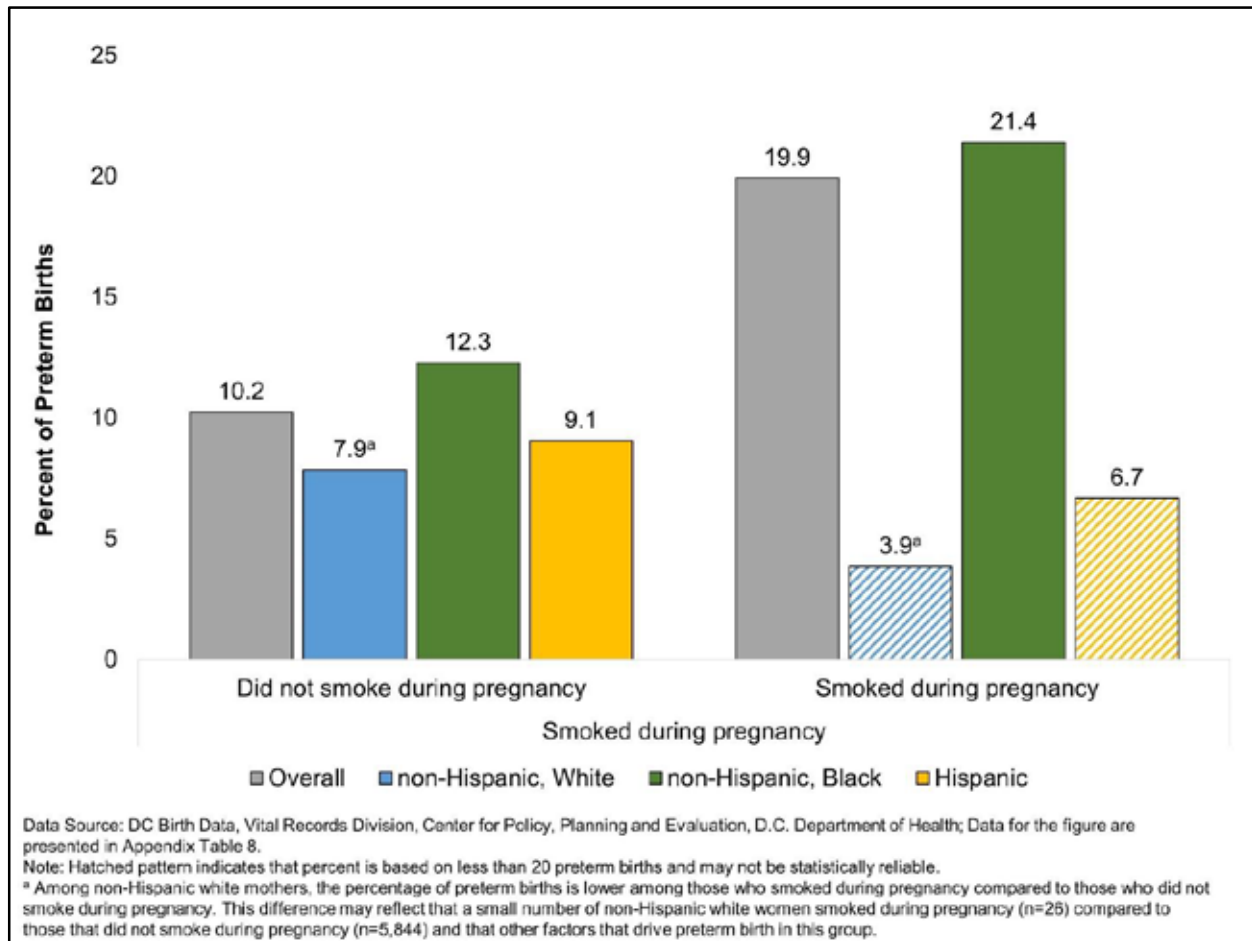
The percentage of preterm births among twin and higher order multiple births was significantly higher (54.9%) compared to singleton births (8.5%) (Figure 14). The percentage of preterm births among non-Hispanic black mothers who gave birth to twins or higher order multiple births (51.7%) is not significantly different than the percentage of preterm births among non-Hispanic white mothers who gave birth to twins or higher order multiple births (56.7%). However, among mothers who had singleton births, the percentage of preterm births is significantly higher among non-Hispanic black mothers (10.8%) compared to non-Hispanic white mothers (5.4%).

Figure 14. Percent of Preterm Live Births by Plurality, District of Columbia 2015-2016



The percentage of preterm births was higher among mothers who smoked during pregnancy (19.9%) compared to mothers who did not smoke during pregnancy (10.2%) (Figure 15). Among non-smokers, the percentage of preterm births was significantly higher among non-Hispanic black mothers (12.3%) compared to non-Hispanic white mothers (7.9%), and Hispanic mothers (9.1%).

Figure 15. Percent of Preterm Live Births by Smoking Status during Pregnancy, District of Columbia 2015-2016



The percentage of preterm births was higher among mothers with gestational diabetes (13.4%) compared to mothers without gestational diabetes (10.4%) (Appendix Table 8). Among mothers without gestational diabetes, non-Hispanic black mothers (12.7%) had significantly higher rates of preterm births than non-Hispanic white (7.7%) and Hispanic mothers (8.9%). While the percentage of gestational diabetes was similar across the wards, ranging in 2.5% in Ward 7 to 4.8% in Ward 4 (Appendix Table 5), the percentage of preterm births among mothers with gestational diabetes ranged between 5.6% in Ward 6 to 23.9% in Ward 8 (Appendix Table 9).

The percentage of preterm births was higher among mothers with gestational hypertension (22.4%) compared to mothers without gestational hypertension (9.8%) (Appendix Table 8). The percentage of preterm births was highest among Hispanic mothers with gestational hypertension (26.4%) compared to non-Hispanic white mothers (22.5%) and non-Hispanic black mothers (21.6%) (Appendix Table 8) even though the percentage of Hispanic mothers with gestational hypertension (4.0%) was the lowest compared to non-Hispanic white mothers (5.9%) and non-Hispanic black mothers (5.9%) (Table 3).

The percentage of preterm births was higher among mothers with eclampsia (35.8%) compared to mothers without eclampsia (10.3%).

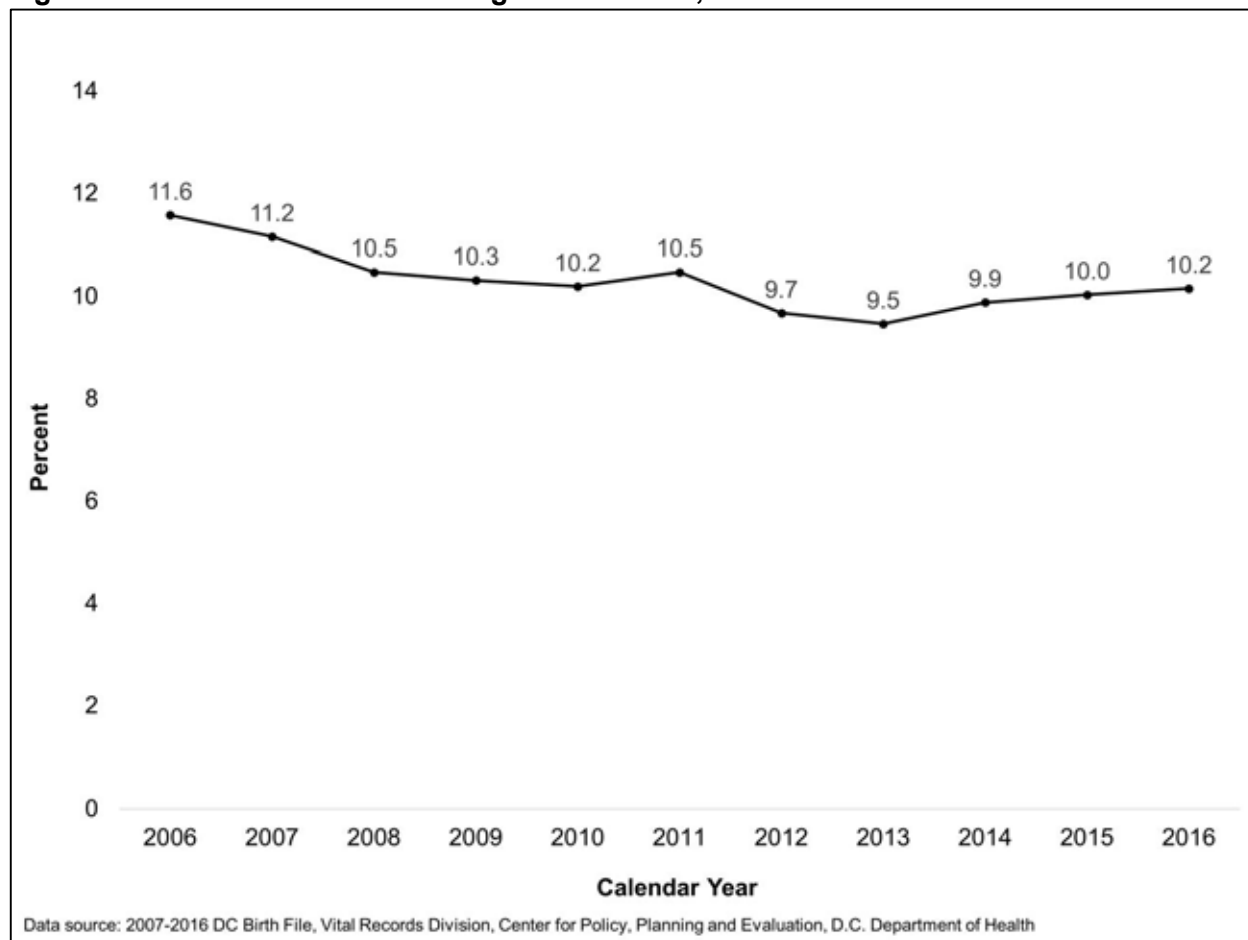
Section Highlights

- The percentage of preterm births in the District has not changed significantly from 2006-2016.
- The percentage of preterm births for non-Hispanic Black mothers was double the percentage for White mothers.
- The percentage of preterm births was nearly three times higher for women with diabetes prior to pregnancy compared to women without diabetes prior to pregnancy.
- The percentage of preterm births was nearly three times higher for women who did not receive prenatal care compared to women who entered prenatal care in their 1st trimester.
- The percentage of preterm births was 45% higher for women who smoked compared to women who did not smoke.
- The percentage of preterm births was 33% higher for women who were overweight or obese before pregnancy compared to women who were not.

Low Birthweight Births, District of Columbia 2015-2016

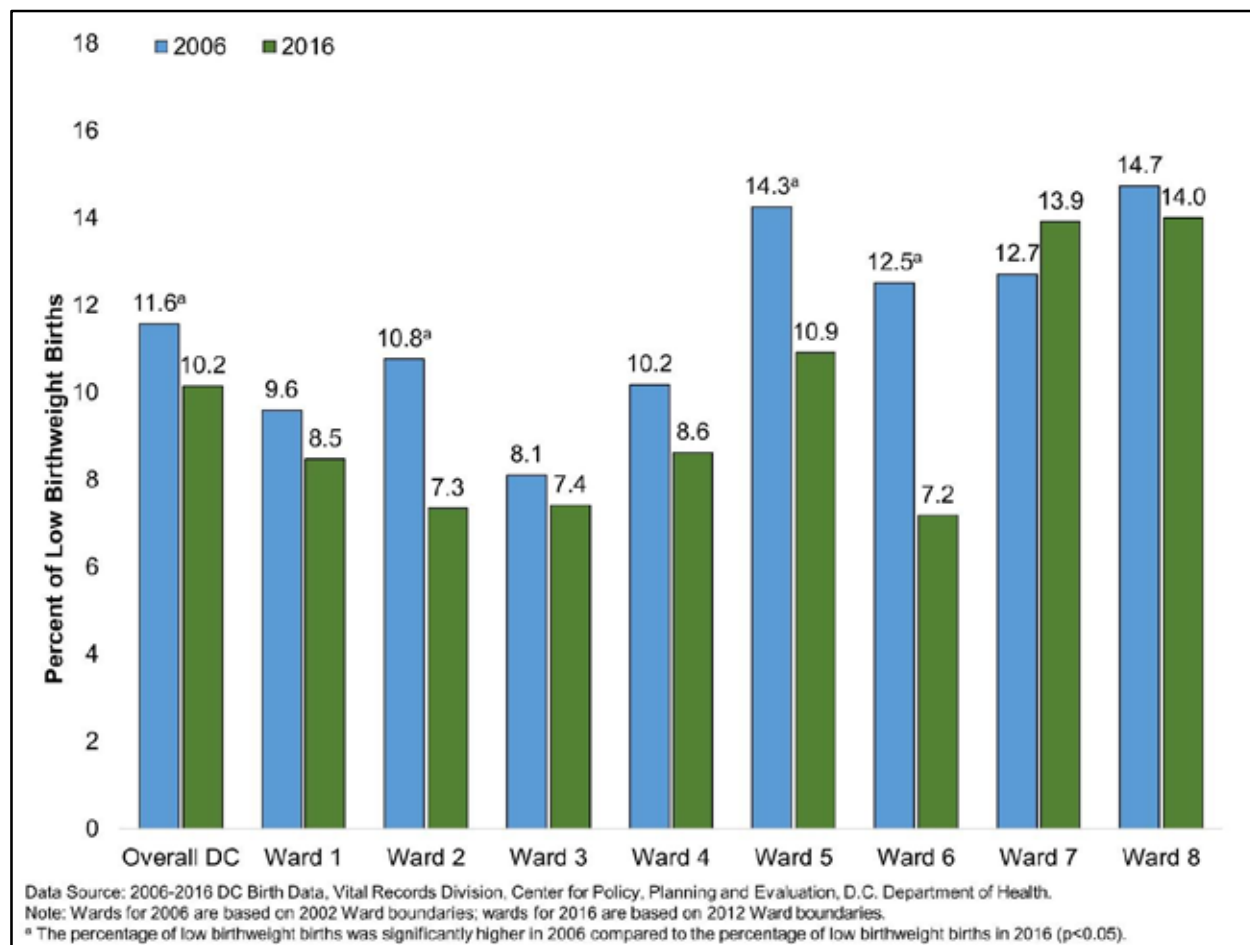
Low birthweight infants are at high risk for health problems. A low birthweight birth is the birth of a newborn with weight below 2,500 grams. The percentage of low birthweight births among all DC resident live births decreased between 2006 and 2016 from 11.6% to 10.2% (Figure 16). In the most recent 5-year period (2012-2016), however, the percentage of low birthweight births has increased slightly from 9.7% to 10.2

Figure 16: Percent of Low Birthweight Live Births, District of Columbia 2006-2016



As mentioned previously, the percentage of low birthweight births was lower in 2016 than in 2006, however, these differences varied by mother's residence, with the largest absolute reduction in Ward 6 (Figure 17).

Figure 17. Percent of Low Birthweight Live Births, District of Columbia 2006 and 2016



Low birthweight live births by sociodemographic characteristics of the mother, District of Columbia 2015-2016

During 2015-2016, the percentage of low birthweight live births differed by demographic characteristics (Table 6).

The percentage of low birthweight live births among non-Hispanic black (13.3%) was higher than the percentage of low birthweight live births among non-Hispanic white (6.5%) and Hispanics mothers (7.5%). The percentage of low birthweight live births was highest among mothers aged 40 years and older (13.4%) and lowest among mothers aged 30-34 years (8.1%) compared to mothers in other age groups. A higher percentage of live births to unmarried mothers (12.8%) were low birthweight, compared to married mothers (7.5%). The percentage of low birthweight live births was highest among mothers with a high school diploma (13.0%) or less than a high school education (11.9%) compared to mothers with more than a high school education (8.5%). The percentage of low birthweight births among all Medicaid financed births in the District of Columbia was 13.0%, which was significantly higher than the percentage of low birthweight births financed by private insurance (7.6%) and Other government (federal, state, local coverage) (7.2%).

Table 6. Percentage of low birthweight live births by maternal characteristics among live births in District of Columbia 2015-2016

	Low Birthweight (Less than 2500 grams)						Normal birthweight	
	Overall		Less than 1500 grams		1500-2499 grams			
	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	1,960	10.09	397	2.04	1,563	8.05	17,458	89.87
Maternal race and ethnicity^a								
non-Hispanic, White	391	6.46	44	0.73	347	5.74	5,659	93.54
non-Hispanic, Black ^b	1,287	13.34	314	3.25	973	10.08	8,363	86.66
Hispanic	199	7.45	34	1.27	165	6.18	2,471	92.55
non-Hispanic, Asian/Pacific Islander	72	7.97	4	0.44	68	7.53	831	92.03
Maternal Age (years)								
Less than 20 years	126	12.92	21	2.15	105	10.77	849	87.08
20-24 years	372	11.38	85	2.60	287	8.78	2,896	88.62
25-29 years	445	11.04	93	2.31	352	8.73	3,585	88.94
30-34 years	490	8.12	101	1.67	389	6.45	5,538	91.81
35-39 years	391	9.52	82	2.00	309	7.52	3,714	90.43
40 years and older ^c	135	13.37	15	1.49	120	11.88	875	86.63
Marital Status								
Married ^d	743	7.50	120	1.21	623	6.29	9,162	92.50
Not Married	1,210	12.81	274	2.90	936	9.91	8,233	87.19
Maternal Education Level								
Less than High School	319	11.88	67	2.49	252	9.38	2,367	88.12
High School Graduate ^e	551	12.98	118	2.78	433	10.20	3,695	87.02
More than High School Education	1,043	8.49	190	1.55	853	6.95	11,238	91.51
Insurance Type								
Medicaid ^f	1,025	13.02	227	2.88	798	10.14	6,845	86.98
Private Insurance	698	7.60	113	1.23	585	6.37	8,481	92.40
Other Government (Fed, State, Local)	57	7.21	14	1.77	43	5.44	734	92.79
Self-pay	19	8.60	3	1.36	16	7.24	202	91.40
CHAMPUS/TRICARE	20	11.70	4	2.34	16	9.36	151	88.30
Other	124	11.59	30	2.80	94	8.79	946	88.41
Maternal Residence (Ward)								
Ward 1	165	7.30	30	1.33	135	5.97	2,096	92.70
Ward 2	85	6.96	6	0.49	79	6.46	1,137	93.04
Ward 3	118	7.68	9	0.59	109	7.09	1,417	92.19
Ward 4	248	8.08	49	1.60	199	6.48	2,820	91.89
Ward 5	274	10.64	58	2.25	216	8.39	2,300	89.29
Ward 6	226	8.21	35	1.27	191	6.94	2,525	91.75
Ward 7	351	13.64	95	3.69	256	9.95	2,222	86.36
Ward 8 ^g	488	14.41	112	3.31	376	11.10	2,898	85.59

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Note: A low birthweight live birth is defined as a birth of an infant weighing less than 2,500 grams.

Missing values for the characteristics are included in the denominator but are not presented in the table.

^a Other non-Hispanic race-ethnic categories are not presented due to small sample size.

^b Percentage of low birthweight births is significantly higher among non-Hispanic black mothers compared to non-Hispanic white mothers ($p < 0.05$), Hispanic mothers ($p < 0.05$), and non-Hispanic mothers, Asian/Pacific Islander mothers ($p < 0.05$).

^c Percentage of low birthweight births is significantly higher among infants of mothers aged 40 years and older compared to mothers aged 20-24 years ($p < 0.05$), 25-29 years ($p < 0.05$), 30-34 years ($p < 0.05$), and 35-39 years ($p < 0.05$).

^d Percentage of low birthweight births is significantly higher among unmarried mothers compared to married mothers ($p < 0.05$).

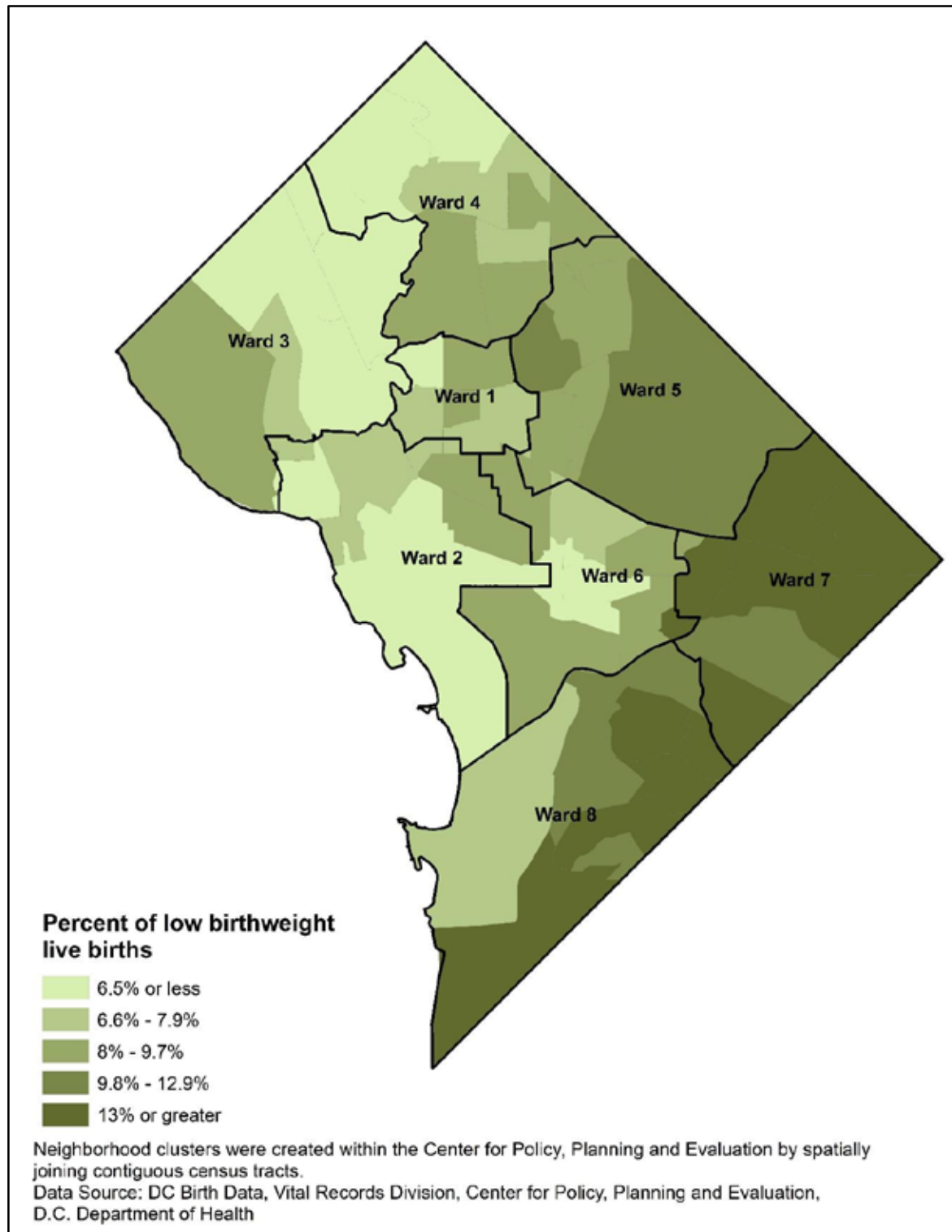
^e Percentage of low birthweight births is significantly higher among mothers with a high school diploma compared to mothers with more than a high school education ($p < 0.05$).

^f Percentage of low birthweight births is significantly higher among mothers with Medicaid coverage compared to mothers with private insurance ($p < 0.05$), other government coverage ($p < 0.05$) and self-pay ($p < 0.05$), but not significantly different than mothers with CHAMPUS/TRICARE, or other coverage.

^g Percentage of low birthweight births is significantly higher among mothers residing in Ward 8 compared to all other wards ($p < 0.05$ for six comparisons) except Ward 7.

The percentage of low birthweight births combining the five most recent years of birth data (2012-2016) is presented at the neighborhood-level (Figure 18).

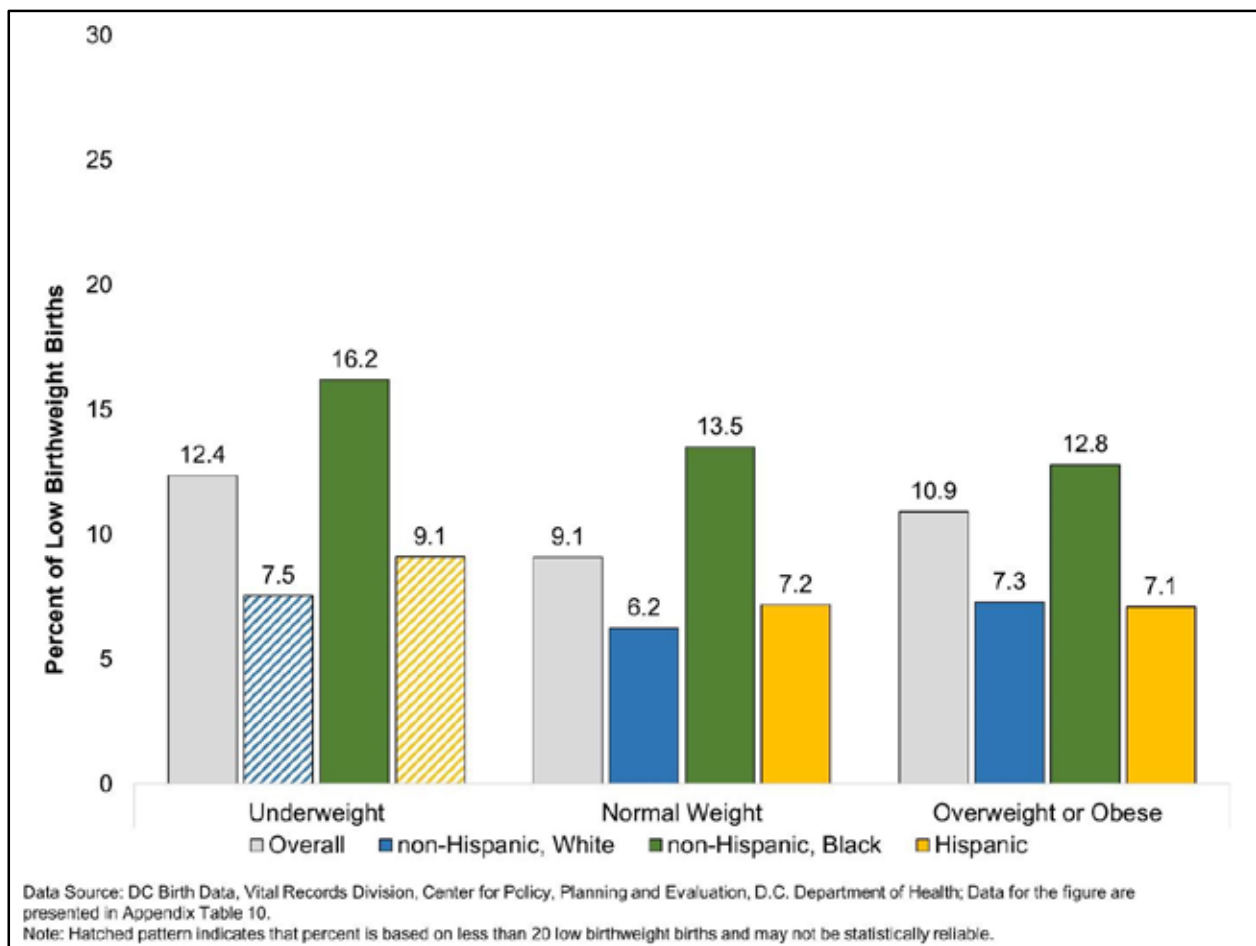
Figure 18. Percentage of Low Birthweight Live Births by Neighborhood Cluster, District of Columbia 2012-2016



Preterm live births by pre-pregnancy health characteristics and behaviors of the mother, District of Columbia 2015-2016

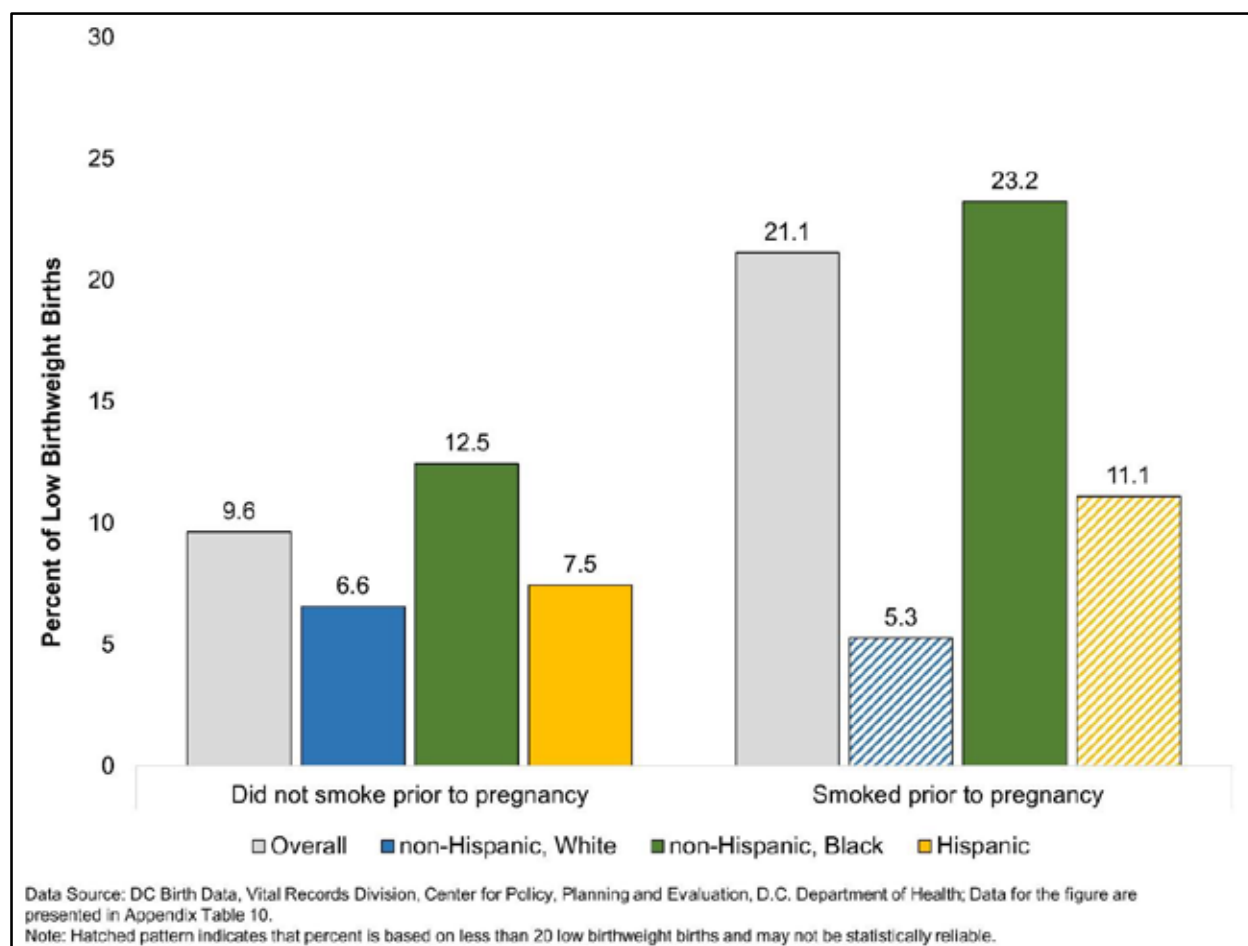
The percentage of low birthweight live births was highest among mothers that were underweight (12.4%) and overweight or obese (10.9%) prior to pregnancy, and lowest among mothers who were normal weight prior to pregnancy (9.1%). For non-Hispanic black mothers, the percentage of low birthweight live births was significantly higher among underweight mothers (16.2%) compared to overweight mothers (12.8%). For each weight category, the percentage of low birthweight births was highest among non-Hispanic black mothers compared to non-Hispanic white mothers and Hispanic mothers (Figure 19).

Figure 19. Percent of Low Birthweight Live Births by Pre-Pregnancy Weight, Overall and by Maternal Race and Ethnicity, District of Columbia 2015-2016



The percentage of low birthweight live births among mothers who smoked prior to pregnancy was significantly higher (21.1%) than the percentage of low birthweight live births among mothers who did not smoke prior to pregnancy (9.6%). For non-Hispanic black mothers, the percentage of low birthweight births was significantly higher among mothers who smoked prior to pregnancy (23.2%) compared to mothers who did not smoke (12.5%) (Figure 20).

Figure 20. Percent of Low Birthweight Live Births by Smoking Status prior to Pregnancy, Overall and by Maternal Race and Ethnicity, District of Columbia 2015-2016



The percentage of low birthweight live births among mothers who had a history of pre-pregnancy diabetes (18.2%) was significantly higher than the percentage of low birthweight live births among mothers who did not have a history of pre-pregnancy diabetes (10.0%) (Appendix Table 10). For non-Hispanic black mothers, the percentage of low birthweight births was significantly higher among mothers who had a diagnosis of diabetes prior to pregnancy (22.1%) compared to mothers who did not have a history of diabetes (13.2%).

Nearly one-quarter of live births to mothers with a history of pre-pregnancy hypertension were low birthweight (23.8%), which was significantly higher than the percentage of low birthweight births born to mothers with no history of pre-pregnancy hypertension (9.8%) (Appendix Table 10). For non-Hispanic black mothers, the percentage of low birthweight births was significantly higher among mothers who had a diagnosis of hypertension prior to pregnancy (24.7%) compared to mothers who did not have a history of hypertension prior to pregnancy (12.9%).

The percentage of low birthweight live births by pre-pregnancy characteristics and behaviors is presented by Ward in Appendix Table 11.

Section Highlights

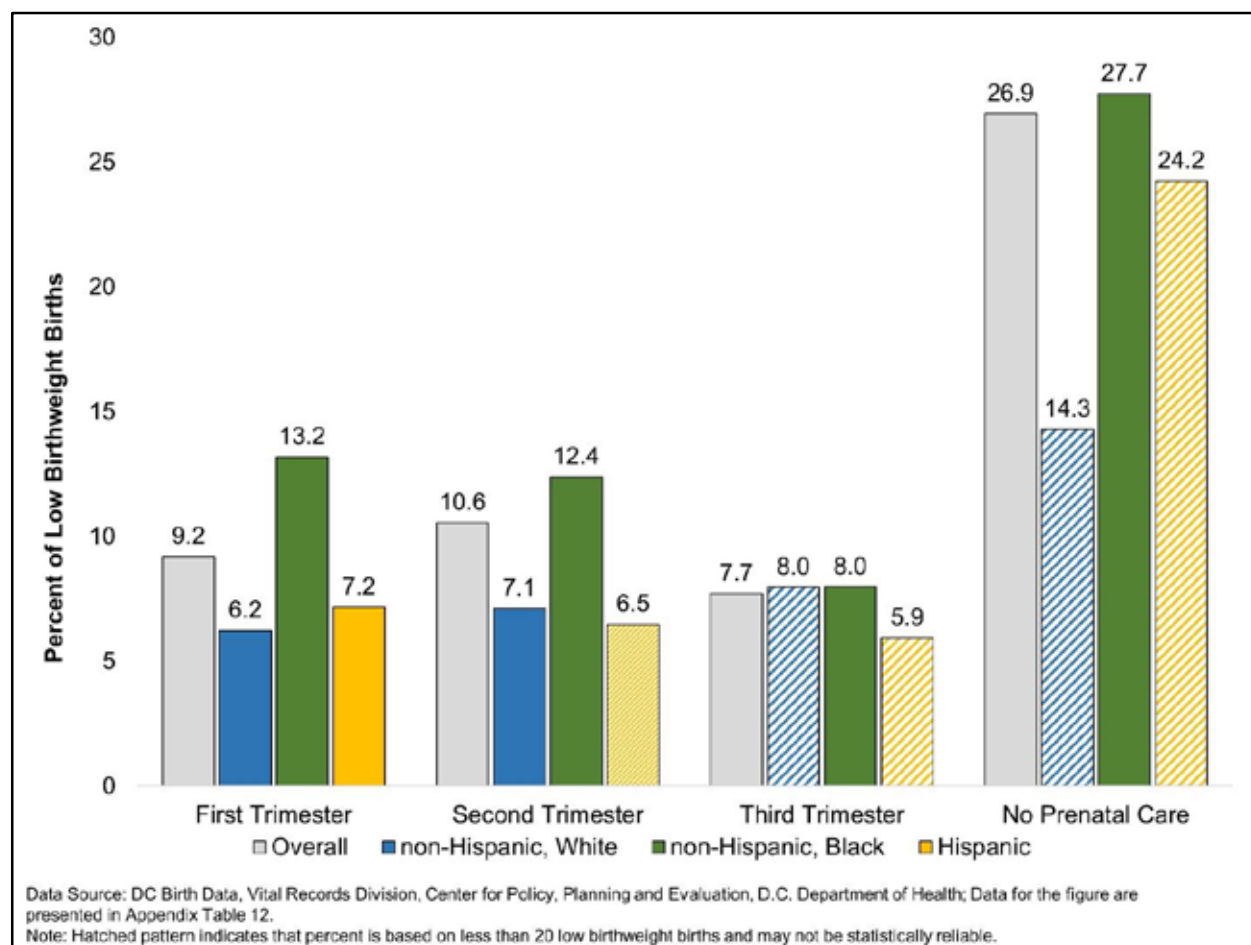
- Non-Hispanic black or African American mothers are two times more likely than white and Hispanic mothers to have a low birthweight baby.
- Mothers aged 40 years and older were more likely than any other age groups to have a baby that is low birthweight.
- Mothers whose births were Medicaid financed were almost two times more likely than mothers with other types of insurance to have a low birthweight baby.
- Mothers who smoked prior to pregnancy were more than two times likely than mothers who did not smoke prior to pregnancy to have a baby that is low birthweight.
- Mothers who had a history of pre-pregnancy diabetes were almost two times more likely to have a low birthweight baby.
- 25% of live births to mothers with a history of pre-pregnancy hypertension were low birthweight.

Low birthweight live births by pregnancy health characteristics and behaviors of the mother, District of Columbia 2015-2016

The percentage of low birthweight live births by health characteristics and behaviors of the mother during pregnancy is presented by maternal race and ethnicity in Appendix Table 12 and by mother's residential Ward in Appendix Table 13.

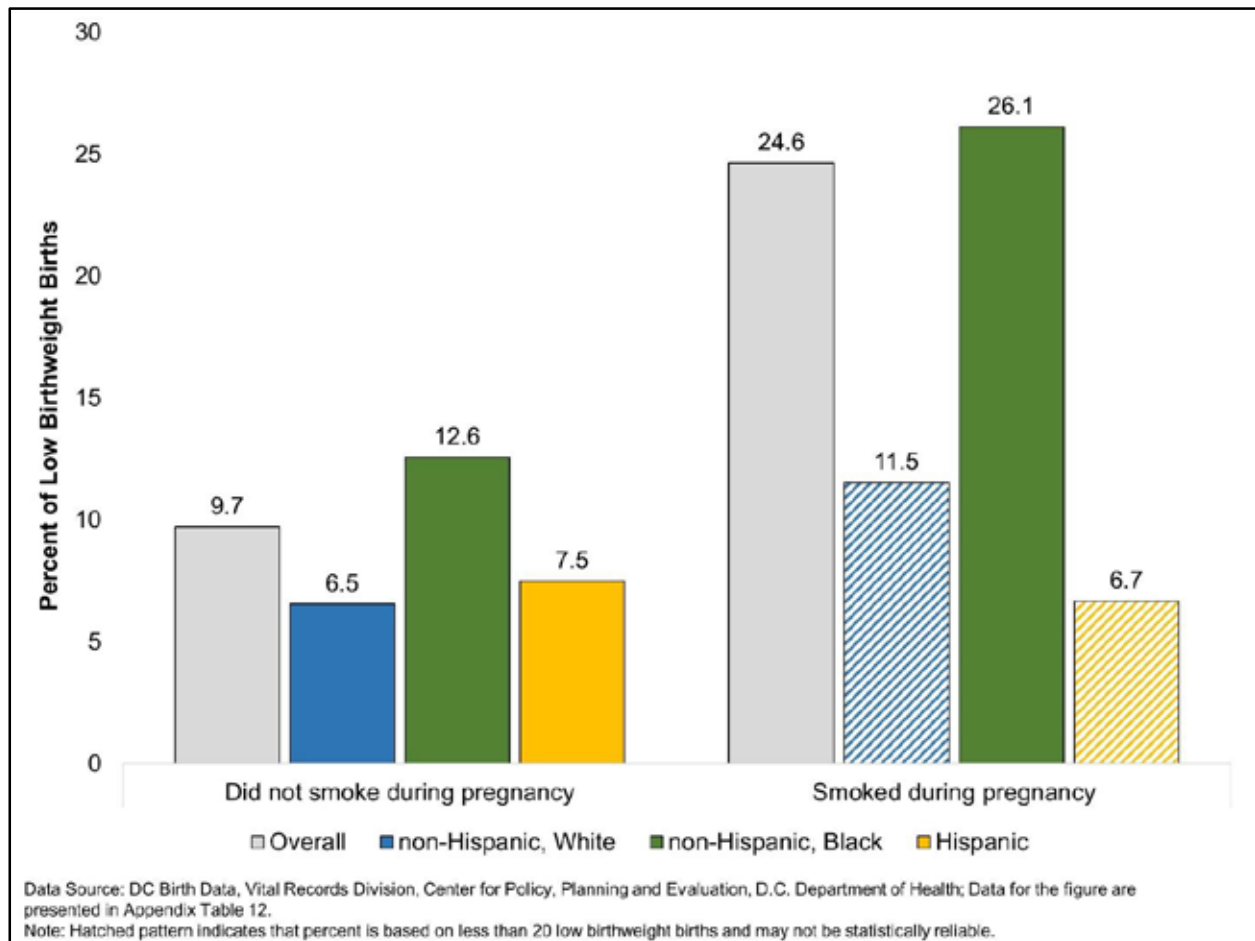
As shown in Figure 21, a higher percentage of low birthweight births were observed among newborns of mothers that did not initiate prenatal care (26.9%) compared to newborns born to mothers who initiated prenatal care during the first trimester (9.2%).

Figure 21. Percent of Low Birthweight Live Births by Initiation of Prenatal Care, Overall and by Maternal Race and Ethnicity, District of Columbia 2015-2016



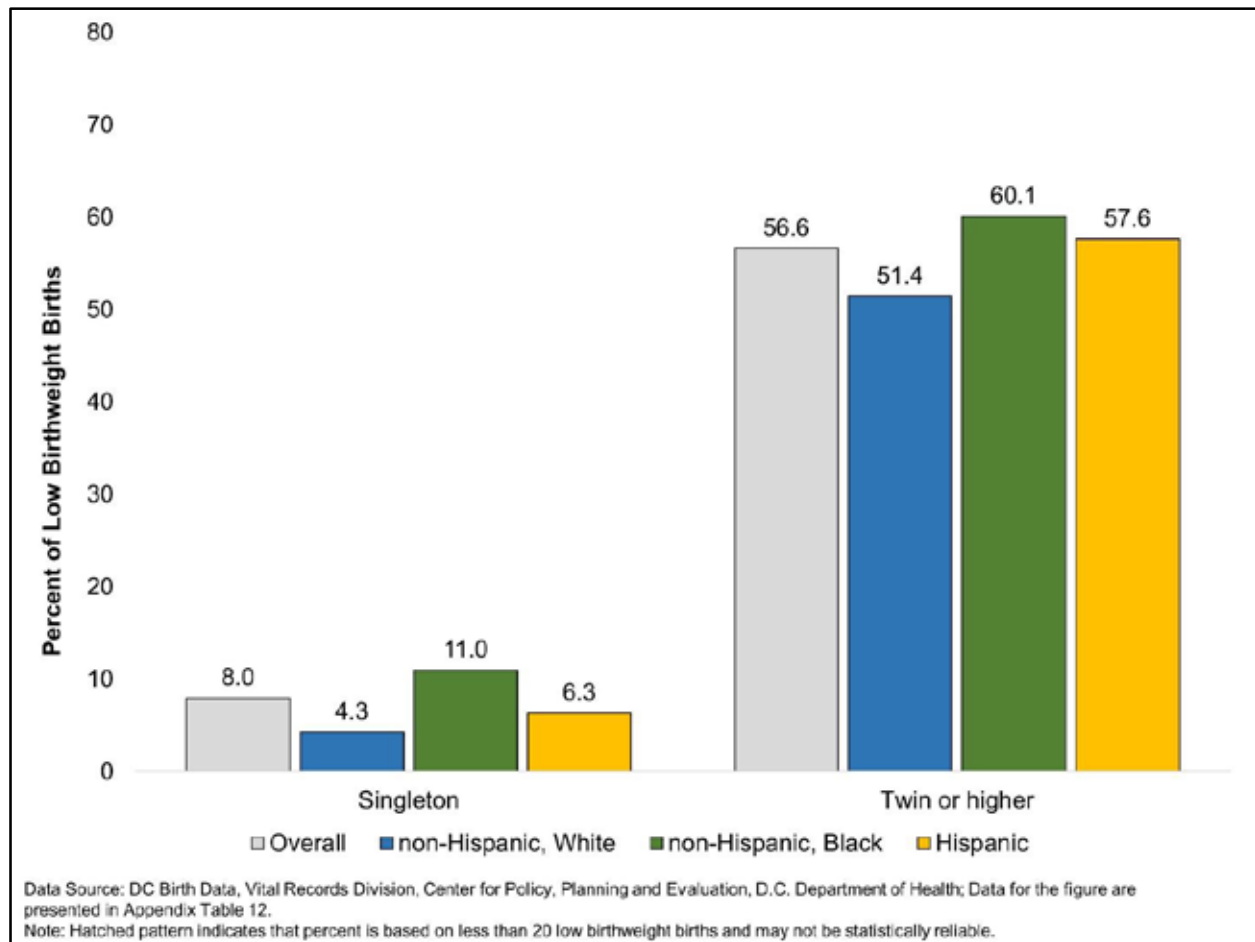
A higher percentage of infants born to mothers who smoked during pregnancy were low birthweight (24.6%) compared to infants born to mothers who did not smoke during pregnancy (9.7%) (Figure 22). For mothers who did not smoke during pregnancy, the percentage of low birthweight live births was significantly higher among non-Hispanic black mothers (12.6%) compared non-Hispanic white mothers (6.5%) and Hispanic mothers (7.5%).

Figure 22. Percent of Low Birthweight Live Births by Smoking Status During Pregnancy, Overall and by Maternal Race and Ethnicity, District of Columbia 2015-2016



The percentage of low birthweight births is higher among twin or higher order multiple births (56.6%) compared to singleton births (8.0%) (Figure 23). Among singleton live births, the percentage of low birthweight live births is higher among non-Hispanic black mothers (11.0%) compared to non-Hispanic white mothers (4.3%) and Hispanic mothers (6.3%).

Figure 23. Percent of Low Birthweight Live Births by Plurality, Overall and by Maternal Race and Ethnicity, District of Columbia 2015-2016



The percentage of low birthweight live births was not significantly different among mothers with gestational diabetes (9.2%) compared to mothers with no history of gestational diabetes (10.1%) (Appendix Table 12). The percentage of low birthweight live births was significantly higher among mothers with gestational hypertension (21.7%) compared to those with no history of gestational hypertension (9.4%) and for mothers with eclampsia (35.8%) compared to those with no history of eclampsia (10.0%) (Appendix Table 12).

Section Highlights

- Mothers who had no prenatal care were three times more likely than mothers who initiated prenatal at any time during pregnancy to have a low birthweight baby.
- Mothers who smoked during pregnancy were almost three times likely than mothers who did not smoke during pregnancy to have a baby that is low birthweight.
- Mothers who had multiple births were seven times likely than mothers who had a single birth to have a low birthweight baby.

DC Health programs to support healthy newborns and infants *

- Newborn Screening and Surveillance Programs - Birth Defects Registry
- Pilot quality improvement efforts around newborn discharge protocols
- Baby-Friendly Hospital Initiative
- Collaboration with Department of Employment Services to implement healthy relationships and parenting skills curricula with men
- Help Me Grow, a centralized referral program that links prenatal women and children 0-5 and their families to services to support healthy development
- Pilot place-based approaches to improve perinatal health: Early Childhood Innovation Network (ECIN), Smart from the Start Woodland Terrace Child & Family Development Program

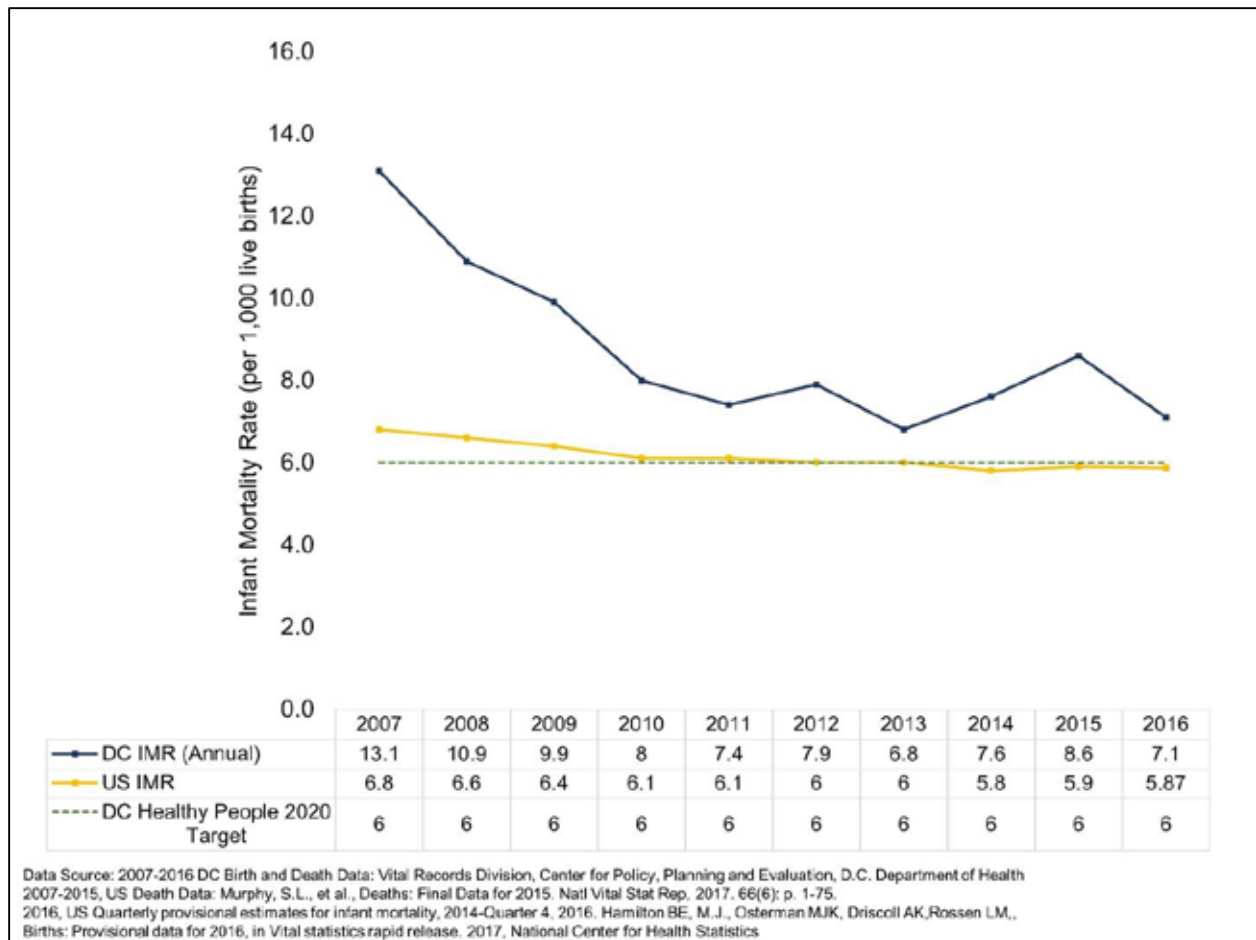
**more information in Table 14.*

Infant mortality, District of Columbia 2012-2016

Infant mortality is often viewed as a marker of the health of women and girls in a society. Infant mortality is defined as an infant who died before one year of age. The DC infant mortality rate decreased from 13.1 per 1,000 live births in 2007 to 7.1 per 1,000 live births in 2016 (Figure 24), yet continue to exceed the DC Health People 2020 Target of 6.0 per 1,000 live births.

Per guidance from the National Center for Health Statistics, when the number of infant deaths is small (less than 100), great care should be taken in the interpretation of the data. As a result, for most analyses of infant mortality, we present estimates based on combined years of data. Infant mortality rates by maternal demographic characteristics, pre-pregnancy and pregnancy characteristics and behaviors are presented for the latest five years (2012-2016) to improve the reliability of the estimates.

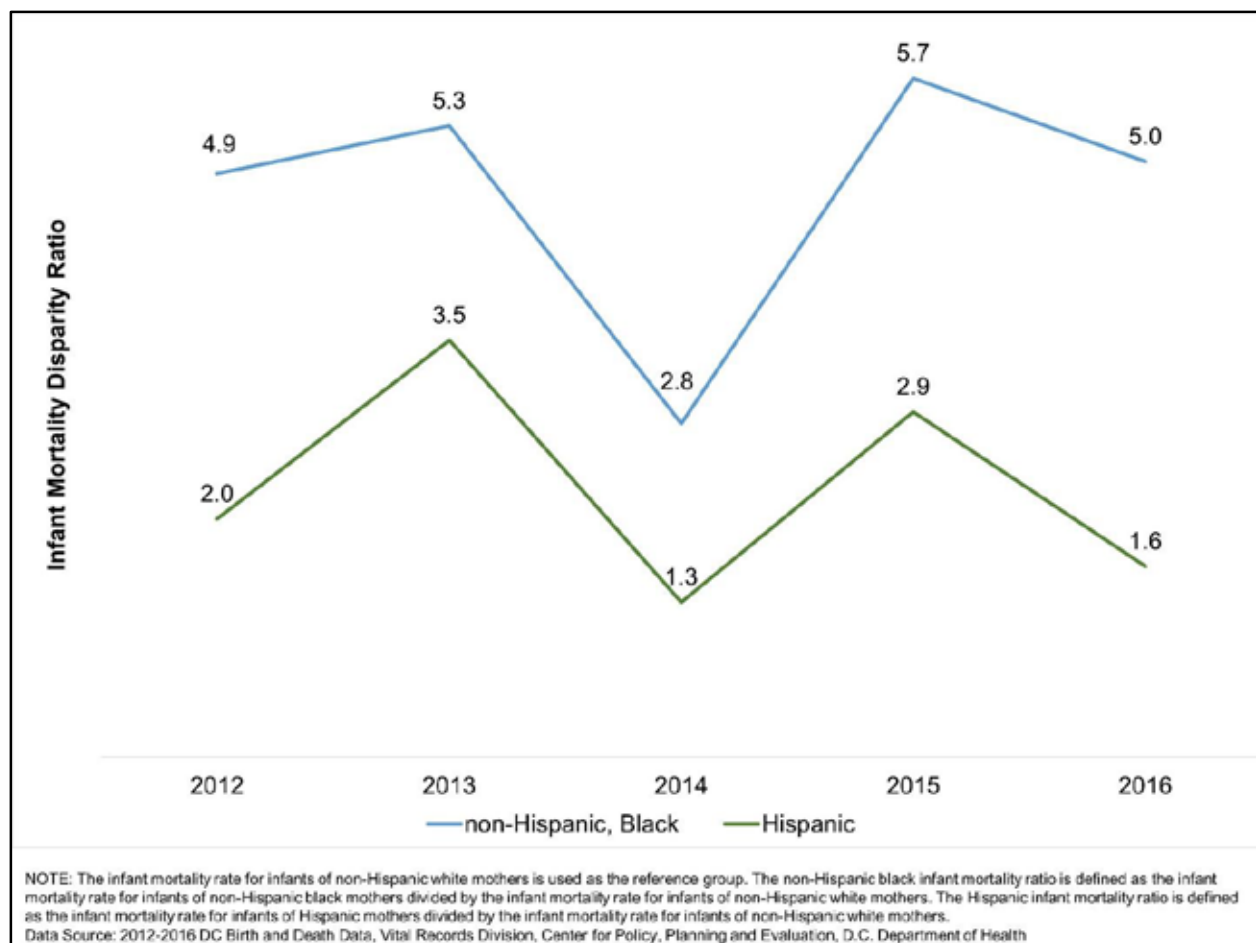
Figure 24. Infant Mortality Rate, US and District of Columbia 2007-2016



The overall infant mortality rate during 2012-2016 was 7.59 per 1,000 live births, on average, (based on n=361 infant deaths), which was similar to the average infant mortality rate for 2015-2016 of 7.8 per 1,000 live births.

The annual infant mortality disparity ratios for the last five years is presented in Figure 25. The ratio comparing the infant mortality rate among infants of non-Hispanic black and non-Hispanic white mothers was highest in 2015 (disparity ratio: 5.7) and lowest in 2014 (disparity ratio 2.0). The 2016 non-Hispanic black:non-Hispanic white disparity ratio of 5.0 indicates that the infant mortality among infants of non-Hispanic black mothers is 5 times higher than that of non-Hispanic white mothers. The annual Hispanic:non-Hispanic white infant mortality disparity ratio has ranged between 1.3 and 3.5 during the 2012-2016, and was 1.6 for 2016. The annual infant mortality rates for the calendar years 2010-2016 by maternal race and ethnicity is reported in Appendix Table 14.

Figure 25. Infant Mortality Disparity Ratio, District of Columbia 2012-2016



Infant mortality by sociodemographic characteristics of the mother, District of Columbia 2012-2016

The infant mortality rate by sociodemographic characteristics of the mother is presented in Table 7.

The infant mortality rate was significantly higher for infants of non-Hispanic black mothers (11.49 per 1,000 live births) compared to infants of Hispanic mothers (5.33 per 1,000 live births) and infants of non-Hispanic white mothers (2.55 per 1,000 live births). The infant mortality rate among infants of Hispanic mothers was significantly higher than that of infants of non-Hispanic white mothers.

The infant mortality rates were significantly higher among infants of mothers aged 20-29 years (9.92 per 1,000 live births) compared to those of mothers aged 30-34 years (5.53 per 1,000 live births) and 35-39 years (6.15 per 1,000 live births).

The infant mortality rates were highest among mothers who had a high school diploma (10.5 per 1,000 live births) and mothers who had less than a high school education (8.0 per 1,000 live births). The infant mortality rates in these two groups were significantly higher than the infant mortality rate among mothers who had more than a high school education (4.9 per 1,000 live births).

Table 7. Infant mortality rate by maternal characteristics, 2012-2016

Characteristic	Births	Deaths	Rate (per 1,000 live births)
DC Overall	47,573	361	7.59
Maternal Race and Ethnicity^a			
non-Hispanic, White	14,490	37	2.55
non-Hispanic, Black ^b	23,929	275	11.49
Hispanic	6,566	35	5.33
Maternal Age (years)			
Less than 20 years	3,003	18	5.99
20-24 years ^b	8,546	92	10.77
25-29 years	9,805	90	9.18
30-34 years	14,460	80	5.53
35-39 years	9,273	57	6.15
40 years and older	2,478	20	8.07
Marital Status			
Married	23,690	81	3.42
Not Married ^c	23,690	272	11.48
Maternal Education Level			
Less than High School	8,220	66	8.03
High School Graduate ^d	10,087	106	10.51
More than High School Education	28,715	142	4.95
Insurance Type			
Medicaid	18,876	192	10.17
Private Insurance	21,264	73	3.43
Other Government (Fed, State, Local)	1,575	8	5.08
Self-pay	530	6	11.32
CHAMPUS/TRICARE	438	7	15.98
Other	3,517	44	12.51
Maternal Residence (Ward)			
Ward 1	5,661	32	5.65
Ward 2	3,159	7	2.22
Ward 3	3,960	9	2.27
Ward 4	7,382	38	5.15
Ward 5	6,095	56	9.19
Ward 6	6,653	38	5.71
Ward 7	6,213	58	9.34
Ward 8 ^e	8,371	122	14.57

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a non-Hispanic, Asian/Pacific Islander and Other non-Hispanic race-ethnic categories are not presented due to small sample size.

^b Infant mortality rate is significantly higher among non-Hispanic black mothers compared to non-Hispanic white mothers ($p<0.05$), and Hispanic mothers ($p<0.05$).

^c Infant mortality rate is significantly higher among infants of mothers aged 20-24 years compared to mothers aged 30-34 years ($p<0.05$) and 35-39 years ($p<0.05$).

^d Infant mortality rate is significantly higher among unmarried mothers compared to married mothers ($p<0.05$).

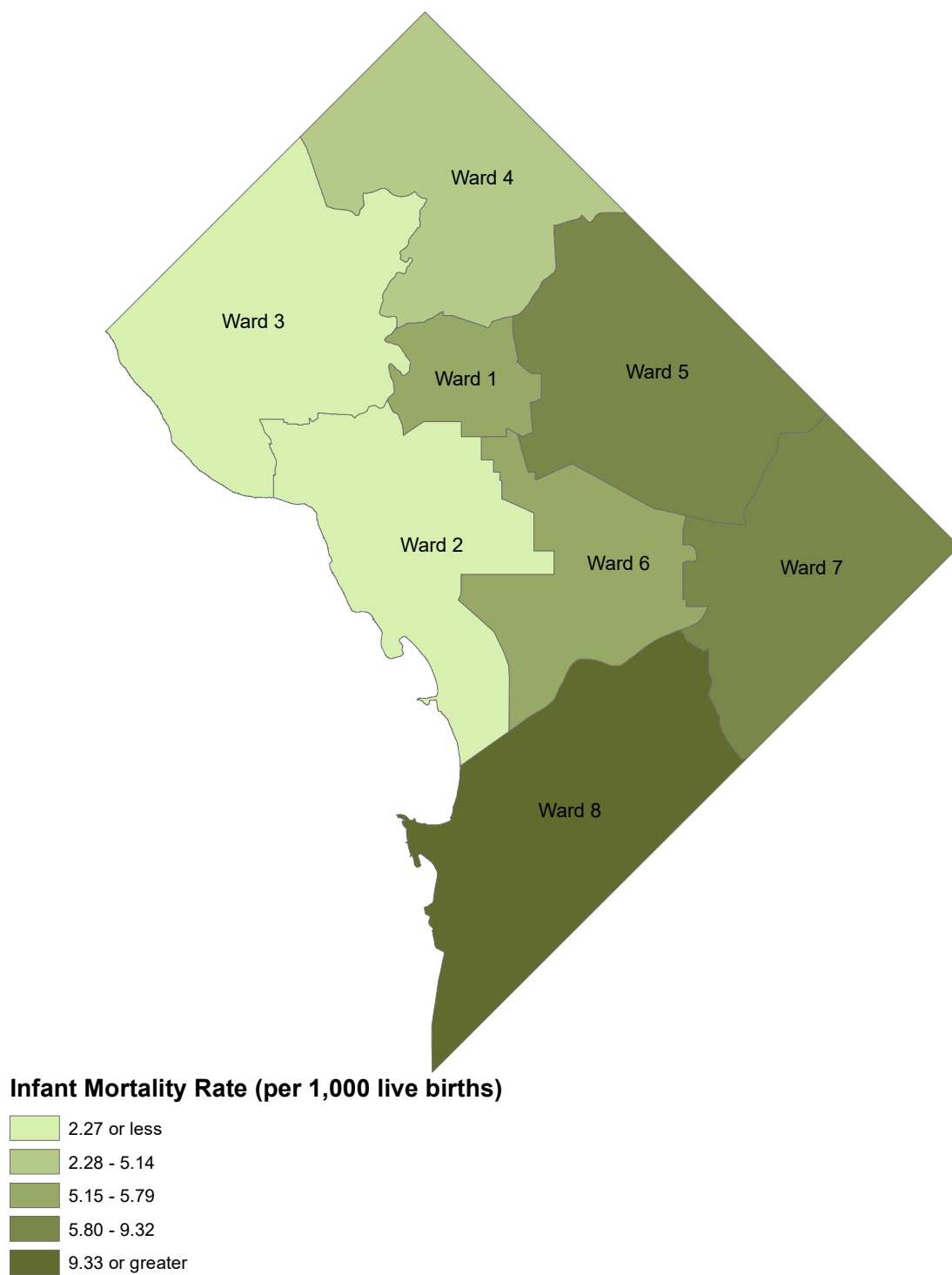
^e Infant mortality rate is significantly higher among mothers with a high school diploma compared to mothers with more than a high school education ($p<0.05$).

^f Infant mortality rate is significantly higher among mothers with Medicaid coverage compared to mothers with private insurance ($p<0.05$).

^g Percentage of low birthweight births is significantly higher among mothers residing in Ward 8 compared to all other wards ($p<0.05$ for seven comparisons).

The infant mortality rate was highest among infants whose births were financed by Medicaid (10.2 per 1,000 live births) compared to infants whose births were financed by private insurance (3.4 per 1,000 live births). The infant mortality rate among infants whose mothers were unmarried was significantly higher than the rate among infants whose mothers were married (10.2 vs. 2.7 per 1,000 live births).

During the five year time period 2012-2016, Wards 5, 7, and 8 had the highest infant mortality rates of 9.2, 9.32 and 14.6 per 1,000 live births respectively. During 2015-2016, these three Wards accounted for 44% of all live births yet 64% of all infant deaths. Infant mortality rates for 2012-2016 are presented by ward in Figure 26.

Figure 26. Infant Mortality Rate by Ward, District of Columbia 2012-2016

Infant mortality by pre-pregnancy health characteristics and behaviors of the mother, District of Columbia 2012-2016

The infant mortality rates pre-pregnancy health characteristics and behaviors of the mother is presented in Table 8. The rate of infant mortality was higher among women with a previous preterm birth compared to those without a previous preterm birth (28.0 vs. 6.7 per 1,000 live births). The infant mortality rate was highest among mothers who were obese prior to pregnancy (13.04 per 1,000 live births) compared to underweight (3.6 per 1,000), normal weight (4.7 per 1,000), and overweight (7.5 per 1,000) mothers. The infant mortality rate among infants of mothers with pre-pregnancy diabetes was higher than that of mothers without pre-pregnancy diabetes (25.5 vs 7.3 per 1,000 live births); the infant mortality rate among infants of mothers with pre-pregnancy hypertension was higher than that of mothers without pre-pregnancy hypertension (19.6 vs 7.2 per 1,000 live births).

Table 8: Infant mortality rate by pre-pregnancy characteristics, District of Columbia 2012-2016

	Births	Deaths	Rate (per 1,000 live births)
Total Births	47,573	361	7.59
Previous preterm birth			
No	44,750	298	6.66
Yes ^a	1,609	45	27.97
Pre-pregnancy weight			
Underweight	1,943	7	3.60
Normal Weight	23,425	109	4.65
Overweight	10,139	76	7.50
Obese ^b	8,970	117	13.04
Smoking prior to pregnancy			
No	43,432	290	6.68
Yes ^c	2,162	33	15.26
Pre-pregnancy diabetes			
Absent	45,934	334	7.27
Present ^d	432	11	25.46
Pre-pregnancy hypertension			
Absent	45,295	324	7.15
Present ^e	1,071	21	19.61

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a Infant mortality rate is significantly higher among mothers with a previous preterm birth compared to mothers without a previous preterm (p<0.05).

^b Infant mortality rate is significantly higher among mothers who were obese prior to pregnancy compared to mothers who were underweight (p<0.05), normal weight (p<0.05), and overweight (p<0.05).

^c Infant mortality rate is significantly higher among mothers who smoked prior to pregnancy compared to mothers who did not smoke prior to pregnancy (p<0.05).

^d Infant mortality rate is significantly higher among mothers who had pre-pregnancy diabetes compared to mothers who did not have pre-pregnancy diabetes (p<0.05).

^e Infant mortality rate is significantly higher among mothers who had pre-pregnancy hypertension compared to mothers who did not have pre-pregnancy hypertension (p<0.05).

Infant mortality pregnancy health characteristics and behaviors of the mother, 2012-2016

The infant mortality rates pregnancy health characteristics and behaviors of the mother is presented in Table 9. The infant mortality rate among mothers who did not initiate prenatal care was higher (42.9 per 1,000) than those who initiated prenatal care in the first trimester (5.2 per 1,000), second trimester (8.2 per 1,000), and third trimester (3.7 per 1,000). The infant mortality for singleton births (6.5 per 1,000) was lower than multiple births (twin or higher: 32.9 per 1,000 live births). The infant mortality rate among mothers who smoked during pregnancy (16.7 per 1,000) was higher than the rate among mothers who did not smoke during pregnancy (6.8 per 1,000).

The infant mortality rates among mothers who had gestational diabetes did not differ from those without gestational diabetes (5.2 vs 7.5 per 1,000); similarly, the infant mortality rate among mothers with gestational hypertension were not significantly different from those without gestation hypertension (5.0 vs 7.6 per 1,000). The infant mortality rate among mothers with eclampsia (19.1 per 1,000) was not significantly higher than that of mothers without eclampsia (7.1 per 1,000).

Table 9: Infant mortality rate by pregnancy characteristics, District of Columbia 2012-2016

	Births	Deaths	Rate (per 1,000 live births)
Total Births	47,573	361	7.59
Trimester prenatal care initiated			
First Trimester	29,232	153	5.23
Second Trimester	9,998	82	8.20
Third Trimester	2,966	11	3.71
No Prenatal Care ^a	1,073	46	42.87
Plurality of birth			
Singleton	45,689	295	6.46
Twin ^b	1,814	56	30.87
Triplet	36	3	83.33
Quadruplet	4	2	500.00
Smoking during pregnancy			
No	44,287	301	6.80
Yes ^c	1,318	22	16.69
Gestational diabetes			
Absent	44,818	337	7.52
Present ^d	1,548	8	5.17
Eclampsia			
Absent	45,985	324	7.05
Present ^d	367	7	19.07
Gestational hypertension			
Absent	44,176	334	7.56
Present ^d	2,190	11	5.02

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a Infant mortality rate is significantly higher among mothers with who did not initiate prenatal care compared to mothers who initiated care during the first trimester ($p < 0.05$), second trimester ($p < 0.05$), or third trimester ($p < 0.05$).

^b Infant mortality rate is significantly higher among twin births compared to singleton births ($p < 0.05$).

^c Infant mortality rate is significantly higher among mothers who smoked during pregnancy compared to mothers who did not smoke during pregnancy ($p < 0.05$).

^d Infant mortality rate is not significantly different between mothers without this characteristic compared to mothers with this characteristic ($p < 0.05$).

Infants with a low birthweight and born preterm had higher rates of infant mortality (Table 10). The infant mortality rates are highest among very low birthweight births (228.1 per 1,000 live births), compared to normal birthweight live births (1.8 per 1,000 live births) and births of newborns weighing between 1500 and 2499 grams (14.1 per 1,000 live births). The infant mortality rate was 26 times higher among infants who were born preterm compared to infants born full term.

Table 10. Infant mortality rate by birthweight and preterm status, District of Columbia 2012-2016

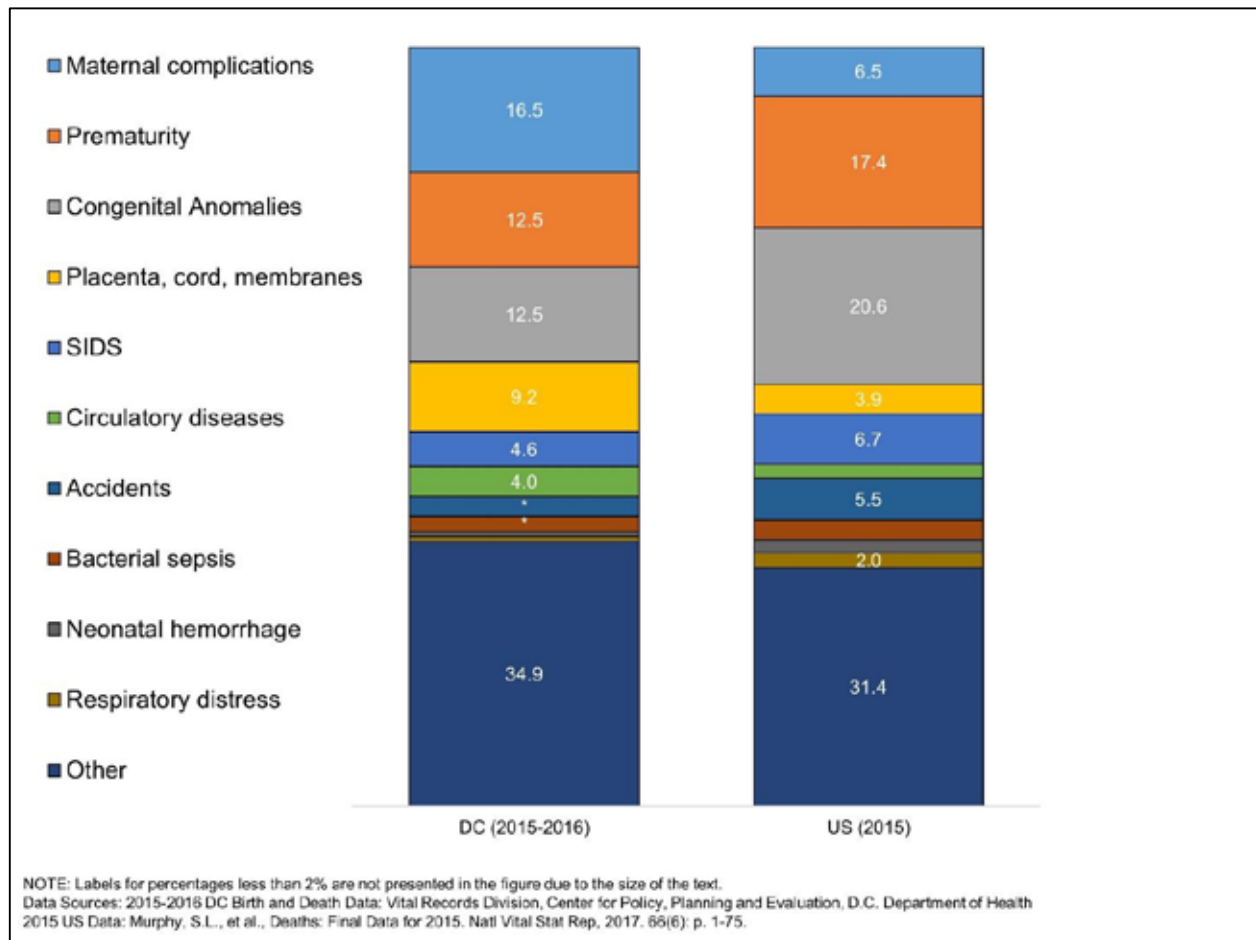
Characteristic	Births	Deaths	Infant Mortality Rate (per 1,000 live births)
Total Births	47,573	361	7.59
Birthweight			
Less than 1,500 grams	991	226	228.05
1,500 – 2,499 grams	3,691	52	14.09
2,500 grams and greater	42,857	79	1.84
Gestational Age			
Preterm	4,844	267	55.12
Not preterm	42,624	89	2.09

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Leading causes of infant death, District of Columbia 2015-2016

The ten leading causes of death are presented for the most recent two years, 2015-2016, since these data are not further stratified beyond the leading causes of death. The 10 leading causes of infant death in 2015-2016 accounted for 65% of all infant deaths in DC (Figure 27).

Figure 27. Percentage of total infant deaths for the 10 leading causes of infant death, District of Columbia 2015-2016 and US 2015



The first ranked leading cause of infant death during this time period was maternal complications of pregnancy, which accounted for 16% of infant deaths in DC (Table 11). For every 10,000 live births to DC residents, nearly 13 infants died due to maternal complications of pregnancy. In 2015, maternal complications of pregnancy was the fourth ranked leading cause of infant death in the US and accounted for 6.5% of infant deaths; the rate of infant mortality from maternal complications in the US was approximately 4 per 10,000 live births [3].

Prematurity and congenital anomalies each accounted for 12.5% of infant deaths with a tie rank of second leading cause of death. For every 10,000 live births to DC residents, nearly 10 infants died due to prematurity. In 2015, disorders related to prematurity was the second ranked leading cause of infant death in the US and accounted for 17.4% of infant deaths. The rate of infant mortality from disorders related to prematurity in the US was approximately 10 per 10,000 live births [3].

As previously mentioned, congenital anomalies also accounted for 12.5% of infant deaths with a tie rank of second leading cause of death. For every 10,000 live births to DC residents, nearly 10 infants died due to congenital anomalies. In 2015, congenital anomalies was the first ranked leading cause of infant death and accounted for 20.6% of infant deaths in the US; the rate of infant mortality from congenital anomalies in the US was approximately 12 per 10,000 live births [3].

Table 11. Ten leading causes of infant deaths, District of Columbia 2015-2016

Leading Cause of Death	ICD-10 codes	Total Infant Deaths	Percent	Infant Mortality Rate (per 10,000 live births)
Total infant deaths		152	100.00	78.25
Maternal complications	P01	25	16.45	12.87
Prematurity	P07	19	12.50	9.78
Congenital Anomalies	Q00-Q99	19	12.50	9.78
Placenta, cord, membranes	P02	14	9.21	7.21
SIDS	R95	7	4.61	3.60
Circulatory diseases	I00-I99	6	3.95	3.09
Accidents	V01-X59	4	2.63	2.06
Bacterial sepsis	P36	*	*	*
Neonatal hemorrhage	P50-P52,P54	*	*	*
Respiratory distress	P22	*	*	*
Other		53	34.87	27.28

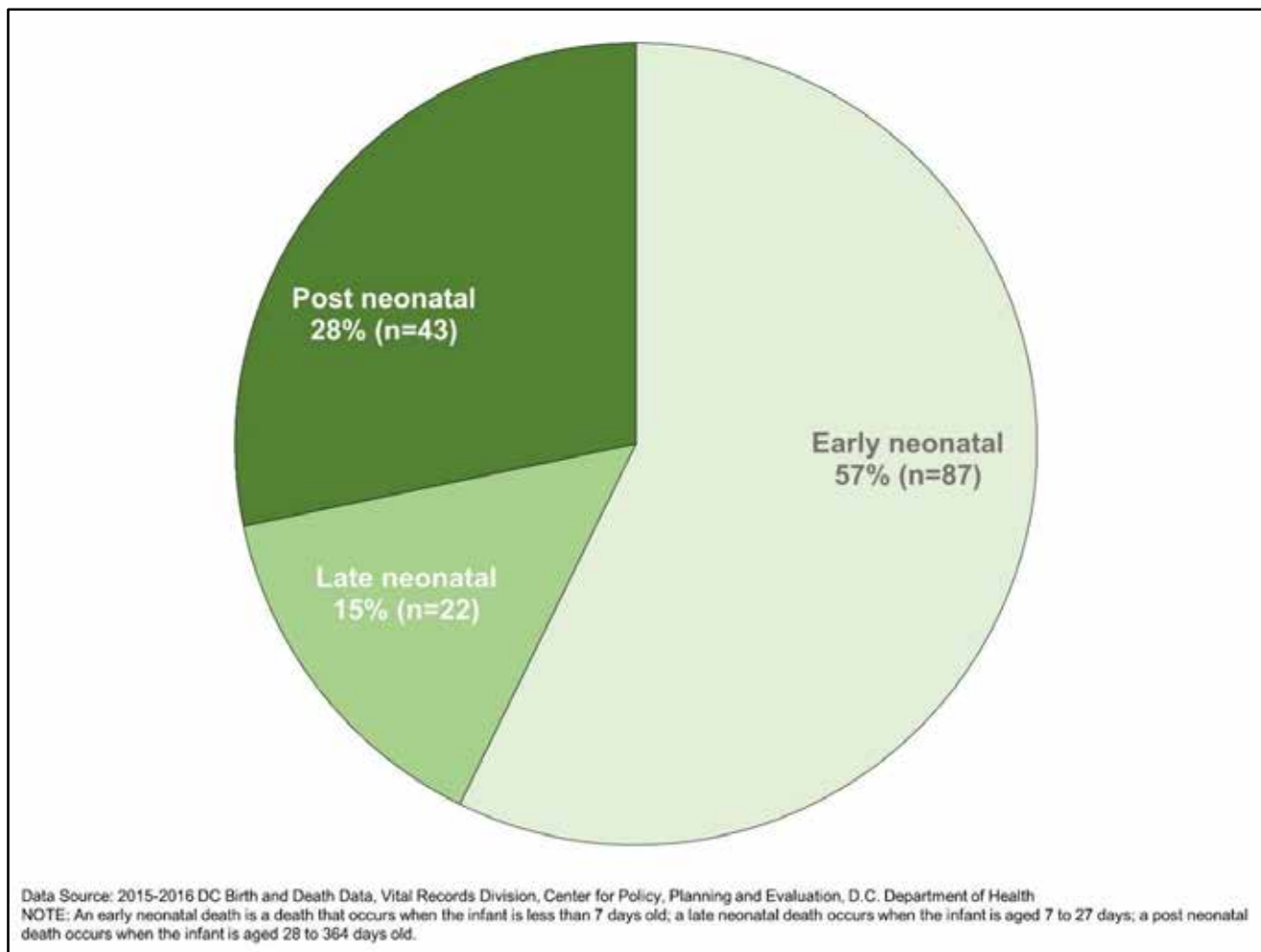
Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

*Data suppressed for less than 4 infant deaths.

Neonatal Mortality, District of Columbia 2012-2016

Among all 152 infant deaths that occurred in 2015-2016, the majority (72%, n=109) of deaths occurred among neonates (newborns aged less than 28 days), and resulted in a neonatal mortality rate of 5.6 per 1,000 live births (Figure 28). Nearly 60% of infant deaths occurred during the first six days following birth, known the early neonatal period (57%, n=87). Fifteen percent (n=22) of infant deaths occurred between 7-27 days after birth, known as the late neonatal period.

Figure 28. Infant Age at Time of Death, District of Columbia 2015-2016



Neonatal mortality by sociodemographic characteristics of the mother, 2012-2016

To examine characteristics of neonatal mortality by maternal characteristics, we examine neonatal rates over the 5-year period, 2012-2016. During this time, the neonatal mortality rate was 5.53 per 1,000 live births (Table 12).

Table 12. Neonatal mortality rate by infant age and maternal characteristics, 2012-2016

Characteristic	All Infants			Neonatal		Post Neonatal	
	Births	Total deaths	Rate (per 1,000 live births)	Total deaths	Rate (per 1,000 live births)	Total deaths	Rate (per 1,000 live births)
All	47,573	361	7.59	263	5.53	98	2.06
Maternal Race and Ethnicity							
non-Hispanic, White	14,490	37	2.55	23	1.59	14	0.97
non-Hispanic, Black	23,929	275	11.49	198	8.27	77	3.22
Hispanic	6,566	35	5.33	29	4.42	6	0.91
Maternal Age (years)							
Less than 20 years	3,003	18	5.99	15	5.00	3	1.00
20-24 years	8,546	92	10.77	62	7.25	30	3.51
25-29 years	9,805	90	9.18	63	6.43	27	2.75
30-34 years	14,460	80	5.53	58	4.01	22	1.52
35-39 years	9,273	57	6.15	44	4.74	13	1.40
40 years and older	2,478	20	8.07	17	6.86	3	1.21
Marital Status							
Married	23,690	81	3.42	66	2.79	15	0.63
Not Married	23,690	272	11.48	190	8.02	82	3.46
Maternal Education Level							
Less than High School	8,220	66	8.03	46	5.60	20	2.43
High School Graduate	10,087	106	10.51	70	6.94	36	3.57
More than High School Education	28,715	142	4.95	101	3.52	41	1.43
Insurance Type							
Medicaid	18,876	192	10.17	130	6.89	62	3.28
Private Insurance	21,264	73	3.43	59	2.77	14	0.66
Other Government (Fed, State, Local)	1,575	8	5.08	7	4.44	1	0.63
Self-pay	530	6	11.32	3	5.66	3	5.66
CHAMPUS/TRICARE	438	7	15.98	6	13.70	1	2.28
Other	3,517	44	12.51	31	8.81	13	3.70
Unknown	1,372	31	22.59	27	19.68	4	2.92
Maternal Residence (Ward)							
Ward 1	5,661	32	5.65	21	3.71	11	1.94
Ward 2	3,159	7	2.22	6	1.90	1	0.32
Ward 3	3,960	9	2.27	8	2.02	1	0.25
Ward 4	7,382	38	5.15	25	3.39	13	1.76
Ward 5	6,095	56	9.19	46	7.55	10	1.64
Ward 6	6,653	38	5.71	30	4.51	8	1.20
Ward 7	6,213	58	9.34	40	6.44	18	2.90
Ward 8	8,371	122	14.57	87	10.39	35	4.18

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

The neonatal mortality was highest among non-Hispanic black infants (8.27 per 1,000 live births) compared to Hispanic infants (4.42 per 1,000 live births) and non-Hispanic white infants (1.59 per 1,000 live births). The neonatal infant mortality rate among infants of Hispanic mothers was significantly higher than that of infants of non-Hispanic white mothers.

The neonatal mortality rate was significantly higher among infants of mothers aged 20-24 years (7.25 per 1,000 live births) compared to infants of mothers aged 30-34 years (4.01 per 1,000 live births).

The neonatal mortality rates were significantly higher among infants of mothers who had a high school diploma (6.94 per 1,000 live births) compared to infants of mothers who had more than a high school education (3.52 per 1,000 live births). While the neonatal mortality rate among infants of mothers who had a high school diploma was higher than the rate among those with less than a high school education (5.60 per 1,000 live births), the difference was not statistically significant.

The neonatal mortality rate was highest among infants whose births were financed by Medicaid (6.89 per 1,000 live births) compared to infants whose births were financed by private insurance (2.77 per 1,000 live births).

The neonatal mortality rate among infants whose mothers were unmarried was significantly higher than the rate among infants whose mothers were married (8.02 vs. 2.79 per 1,000 live births).

During the five year time period 2012-2016, Wards 5, 7, and 8 had the highest neonatal mortality rates of 7.56, 6.42 and 10.49 per 1,000 live births respectively. The neonatal mortality rate was significantly higher in Ward 8 than in all other wards.

Leading causes of neonatal death, District of Columbia 2015-2016

The 10 leading causes of neonatal deaths in 2015-2016 accounted for 72% of all neonatal deaths in DC (Table 13). The first ranked leading cause of infant death during this time period was maternal complications of pregnancy, which accounted for 22% (n=24) of infant deaths in DC. For every 10,000 live births to DC residents, nearly 12 infants died within the first 28 days due to maternal complications of pregnancy.

Prematurity accounted for 17.4% (n=19) of neonatal deaths and was the second leading cause of neonatal death. For every 10,000 live births to DC residents, nearly 10 infants died due to prematurity.

Complications due to placenta, cord, and membranes accounted for 12.8% (n=14) of neonatal deaths and was the third leading cause of death. For every 10,000 live births to DC residents, nearly 14 infants died due to congenital anomalies.

Table 13. Ten leading causes of neonatal deaths, District of Columbia 2015-2016

Cause of Death Category	ICD-10 codes	Total Neonatal Deaths	Percent	Neonatal Mortality Rate (per 10,000 live births)
Total neonatal deaths		109	100	56.11
Maternal complications	P01	24	22.02	12.36
Prematurity	P07	19	17.43	9.78
Placenta, cord, membranes	P02	14	12.84	7.21
Congenital Anomalies	Q00-Q99	13	11.93	6.69
Circulatory diseases	I00-I99	4	3.67	2.06
Bacterial sepsis	P36	*	*	*
Neonatal hemorrhage	P50-P52,P54	*	*	*
Respiratory distress	P22	*	*	*
Other		30	27.52	15.44

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

*Data suppressed for less than 4 infant deaths.

Section Highlights

- The infant mortality rate was nearly three times higher among infants of mothers who were obese prior to pregnancy compared to mothers with normal weight prior to pregnancy.
- Maternal complications is the leading cause of infant death in the District of Columbia, accounting for nearly 17% of all infant deaths, and 22% of all neonatal deaths.
- The majority (57%) of infant deaths occur during the early neonatal period, the first 7 days of the infant's life.

DC HEALTH'S

APPROACH TO IMPROVE PERINATAL HEALTH

Improving Preconception Health

THE WELL-BEING OF A WOMAN BEFORE PREGNANCY
IS THE BEST FOUNDATION FOR LIFELONG HEALTH

The DC Department of Health is committed to improving the health of women prior to pregnancy and ensuring women have the opportunity to plan their pregnancy. Several strategies and programs support this goal. At the foundation, DC Health works with local health centers to promote annual well visits for every teenager and woman in this District. Well visits provide opportunities for women of all ages to establish a relationship with a primary care provider; be screened for health conditions; receive healthy lifestyle counseling; as well as discuss reproductive life planning. In 2016, DC Health began working with health providers to implement One Key Question® (OKQ). OKQ encourages all health providers who support women to routinely ask: “Would you like to become pregnant in the next year?” From there, providers can help women prepare for pregnancy or plan to prevent pregnancy. Helping women achieve their optimal health prior to pregnancy and actively choose when they want to be pregnant helps reduce poor pregnancy outcomes and infant mortality.

DC Health also aims to help District residents lead healthy lifestyles and prevent the onset of chronic disease. The SNAP-Ed (Supplemental Nutrition Assistance Program Education) Program aims to prevent obesity and related chronic diseases by promoting increased consumption of healthful foods and daily physical activity for low-income residents. SNAP-Ed educators emphasize work with early childhood development centers and schools to help our youngest residents achieve healthy eating habits early in life. In addition to education, access to healthy foods is also an important strategy, especially given the persistence of food deserts in DC. Joyful Markets, run in elementary schools in Wards 7 and 8, are monthly commu-

nity events, where families and children can select up to 23 pounds of fresh, seasonal produce and healthy pantry staples per student, while participating in food demonstrations and nutrition education. By the end of 2018, Joyful Markets are expected to be in all 49 public and public charter elementary schools in Wards 7 and 8. Other healthful food access programs include Healthy Corner Stores (promotes fresh produce at corner stores in Wards 5, 7, and 8); Home Delivered Meals (provides healthy meals and nutrition services for chronically ill residents in their homes); Produce Plus (gives low-income District residents incentive checks to use at local farmer’s markets); and Produce Prescription Program (health providers prescribe checks for fresh produce to patients with chronic illnesses). Knowledge of healthy eating and exercise, as well as access to healthful food can help District women achieve good health prior to and during pregnancy, decreasing the risks of poor birth outcomes.



OKQ encourages all health providers who support women to routinely ask: “Would you like to become pregnant in the next year?” From there, providers can help women prepare for pregnancy or plan to prevent pregnancy.

Tobacco use continues to be a leading cause of preventable death in the District and increases the risk of poor outcomes such as prematurity and low birth weight. DC Health oversees a comprehensive tobacco control program which aims to prevent residents from starting to use tobacco and to help those residents who do use tobacco to quit. DC Health supports the toll-free cessation quitline, 1-800-QUIT-NOW, as well as programs targeted to women before and during pregnancy and to households with children.

For those residents with chronic illness, DC Health aims to work with health systems and communities to help residents achieve optimal management. Conditions like high blood pressure and diabetes increase the risk for pregnancy complications, so it is imperative that women with chronic conditions have good control prior to and during pregnancy. The Million Hearts Programs engages healthcare stakeholders, including physicians, pharmacists, quality improvement organizations and insurers, to implement evidence-based clinical quality improvement strategies to improve blood pressure control for residents. Programs like the Chronic Disease Self-Management and Diabetes Prevention Programs are evidence-based prevention and health promotion programs that addresses common issues faced by people with chronic conditions. Group classes are implemented in community settings, focusing on those communities with higher disease burdens, and help participants build confidence in their ability to manage their health and maintain active and fulfilling lives.

Other initiatives to improve pre-pregnancy health and planning include promoting adolescent-friendly health centers (so adolescents feel comfortable and empowered to seek health care); increasing availability and usage of long-acting reversible contraceptives (LARCs); and, collaborating with education agency partners to ensure implementation of evidenced-based comprehensive sexual health education in school settings.

Lastly, in 2016, the District of Columbia was selected to participate in the Pregnancy Risk Assessment Monitoring System (PRAMS). With 46 additional states including the District of Columbia, PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during and shortly after pregnancy. Data are collected through a mixed-mode methodology using a self-administered questionnaire in mailing packets and an interviewer-administered questionnaire conducted over the phone. The core questionnaire includes questions about barriers to and content of prenatal care, obstetric history, maternal use of alcohol and cigarettes, physical abuse, contraception, economic status, maternal stress, and early infant development and health status.

We anticipate that PRAMS will enable the DC Department of Health to learn more about the health profile of mothers in order to improve health outcomes among mothers and children in the District of Columbia.



DC Health supports the toll-free cessation quitline, 1-800-QUIT-NOW, as well as programs targeted to women before and during pregnancy and to households with children.

Assuring High Quality Health Services and Care

ACCESSING AND RECEIVING QUALITY HEALTH SERVICES ARE INSTRUMENTAL IN ELIMINATING PREVENTABLE INFANT DEATHS, AS WELL AS MATERNAL AND CHILD MORBIDITIES RELATED TO INADEQUATE OR LOW QUALITY HEALTHCARE

Prematurity is the second leading cause of death for District infants and is more common among women who have late or no prenatal care. Accessing and receiving quality health services are instrumental in eliminating preventable infant deaths, as well as maternal and child morbidities related to inadequate or low quality healthcare. DC Health endeavors to work with the healthcare community to ensure high quality health services are available for all residents, and that community and clinical systems of care are in place to achieve the best health outcomes for mothers and children. This system covers a continuum of healthcare from well-woman visits and prenatal care to labor and delivery services to care for both postpartum mothers and for newborns and infants.

DC Health works closely with other government agencies to improve systems of care for women and children. DC Health's Perinatal Quality Improvement Collaborative works with managed care organizations (MCOs) and other stakeholders, including health providers, social service providers and government agencies, to reduce the rate of adverse perinatal events that occur for pregnancies. The Collaborative works with MCOs to conduct ongoing quality improvement initiatives based on performance results. DC Health is also an integral member of the Office of the Chief Medical Examiner's Infant Mortality Review Committee (IMRC). The IMRC is a cross-sector stakeholder group that meets monthly to review infant deaths, assess root causes, and provide recommendations to the District to improve the systems that impact infant

health and eliminate preventable deaths. DC Health is spearheading quality improvement projects to improve early entry into prenatal care and increase administration of 17 alpha-hydroxyprogesterone caproate (17P), a medication that can decrease recurrence of preterm births by 33%. DC Health additionally has oversight of newborn care programs, including newborn metabolic screening, newborn hearing screening, perinatal hepatitis B prevention and perinatal HIV prevention. DC Health works with hospitals and clinical care providers to ensure every newborn has received appropriate screenings, as well as follow up if screening tests are abnormal; ensure every eligible newborn receives vaccination against hepatitis B, a potentially fatal liver infection; and, newborns born to mothers with hepatitis B or HIV receive necessary preventive to treatment so they are not affected by those diseases. Other initiatives to improve access to high quality health services include support of the Baby Friendly Hospital Initiative in conjunction with DC Breastfeeding Coalition and support of lactation counselors in hospitals and community health centers.

More broadly, DC Health works with the acute care facilities, ambulatory care centers, and long-term care facilities to monitor demands on the healthcare system, which includes the maternal and infant healthcare system, in the District of Columbia. This is done in myriad ways. The Center for Policy, Planning and Evaluation's (CPPE) State Health Planning and Development Agency (SHPDA) issues Certificates



of Need (CONS) to healthcare facilities to provide services in the District of Columbia based on six criteria: need, accessibility, quality, acceptability, continuity and coordination of care, and financial viability. In addition, DC Health's Health Regulation and Licensing Administration (HRLA) and the Health Emergency Preparedness and Response Administration (HEPRA) actively monitor the demands on the District's healthcare system and the systems response to patients, both District residents and non-District residents. HRLA licenses hospital beds at every facility upon receipt of a CON and HEPRA routinely monitors bed availability at every facility. For example, birthing facilities regularly report to HRLA when they reach nurse staffing or Newborn Intensive Care Unit (NICU) capacity so system-wide decisions regarding hospital diversion can be made and all our residents can be safely cared for. This data is shared with critical partners such as DC Fire and Emergency Medical Services (DC FEMS) to ensure a holistic view of the inpatient system of care in the District.

**We can decrease recurrence
of preterm births by**

33%



Strengthening Families

ENGAGING AND EMPOWERING FAMILIES IS ESSENTIAL TO IMPROVING THE HEALTH AND VITALITY OF INFANTS AND GETTING THEM READY FOR SCHOOL

DC Health recognizes that engaging and empowering families is essential to improving the health and vitality of infants. Efforts to ensure parents and caregivers have access to information and resources to aid in their infant's care and development is a key component of our strategy to improve outcomes for District babies. DC Health administers several perinatal support programs through federal and local funds. The largest of these programs is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Program, which serves low-income pregnant and postpartum women, infants and children. There are currently 15 WIC centers in the District serving women and children in Wards 1, 4, 5, 7 and 8. WIC has been shown to reduce infant mortality by promoting healthy eating through nutrition assessments and counseling, and providing healthy foods tailored to the specific needs of pregnant women and their babies. In 2016, the DC WIC program served more than 25,000 mothers and children.

The DC Maternal, Infant and Early Childhood Home Visit (MIECHV) and DC Healthy Start (DCHS) programs provide District families with prenatal, newborn and infant care education; connections with preventive health and prenatal services, including

lactation support; support for child development; and parenting education. MIECHV uses evidenced-based home visiting models to give high-risk pregnant women and families, necessary resources and skills to raise children who are physically, socially, and emotionally healthy and ready to learn. Since implementation in 2013, MIECHV has focused efforts in areas of the District where poor health and birth outcomes are disproportionately high (Wards 5, 7, and 8), and has served more than 900 families.

Two evidence-based MIECHV programs are currently implemented in the District, Healthy Families America and Parents as Teachers. These programs are best suited for the needs of our higher-risk communities, with eligibility criteria that include non-first-time-mothers as well as younger target ages of children who are not yet eligible for the District's universal pre-kindergarten education program. DC Healthy Start (DCHS) employs community-based approaches to service delivery, leveraging patient-centered medical homes in areas of higher risk. DCHS aims to address the District's perinatal health disparities by improving the health and well-being of preconception, pregnant, interconception, and postpartum women, their infants and fathers. Using a medical home model, participating organizations

provide prenatal care along with education and comprehensive case management services for DCHS program participants.

As fathers have an important role to play in childbearing and influence child and family health outcomes and well-being, DC Health implements programs to strengthen paternal involvement in pregnancy and parenting. In 2015, in conjunction with the Department of Employment Services (DOES), DC Health developed the Greater Access Program (GAP). GAP was designed to build upon the success of DOES' Project Empowerment (PE) program, a work readiness program for District residents facing multiple barriers to employment. GAP provides participants with health and psychosocial screenings, linking participants with beneficial wraparound services. GAP additionally focuses on providing parenting supports for program participants. Enhanced case management includes connections with stable housing, financial assistance and food access programs.



WIC has been shown to reduce infant mortality by promoting healthy eating through nutrition assessments and counseling, and providing healthy foods tailored to the specific needs of pregnant women and their babies.



As fathers have an important role to play in childbearing and influence child and family health outcomes and well-being, DC Health implements programs to strengthen paternal involvement in pregnancy and parenting



Promoting Healthy Environments

TO ACHIEVE OPTIMAL HEALTH FOR THE DISTRICT'S INFANTS AND FAMILIES, EFFORTS MUST BE MADE TO IMPROVE THE CONDITIONS UNDER WHICH PEOPLE LIVE, WORK AND PLAY



While access to high quality health services and health behaviors have significant impacts on an individual's health, socio-economic factors such as income, community safety, and education as well as the built environment (i.e. healthy food access, walkability, building conditions) have equal influence on health status. Programming that addresses improved health services and health education are important; however, those interventions alone will not significantly improve the health of all District residents. To achieve optimal health for the District's infants and families, efforts must be made to improve the conditions under which people live, work and play. In 2015, DC Health established the Office of Health Equity (OHE) with the goal of establishing a sustained, multi-sector, health in all policies approach to governance. OHE collaborates with other government agencies, community partners, and all DC Health Administrations to ensure a multi-pronged cohesive strategy is developed to identify and address the social determinants of health, which are the key drivers of inequities in health outcomes.



In recent years, DC Health has developed specific initiatives aimed at establishing safe and healthy environments that will allow District babies to thrive. The Community Action Network (CAN) uses a collective impact model to achieve equitable birth outcomes in DC. Collective impact is based on the principle that addressing complex social issues, like infant mortality, comes from maximizing cross-sector coordination, not from isolated efforts of individual organizations. The DC CAN is bringing together a variety of stakeholders, including health providers, government agencies, community-based organizations, and individuals with lived experience to align their organization's work

Through place-based initiatives, DC Health strives to help create neighborhoods that are places where children and families can succeed and thrive.

with a common goal of reducing infant mortality. CAN uses shared measurement systems (establishing how success will be measured and reported); mutually reinforcing activities (ensuring each participant is doing activities within their expertise and that are coordinated with other participants' activities); continuous communication (helping to develop trust among organizations that are not used to working with each other and keeping partners engaged); and DC Health as the backbone organization (allowing DC Health to provide the infrastructure for coordination and administration of the initiative). Aligning and organizing the work of the many District stakeholders committed to improving health outcomes for mothers and babies, as well as engaging those sectors not traditionally thought of as impacting health (ex. housing, transportation, business) will achieve the most significant and lasting impacts for equitable perinatal health outcomes.

DC Health has recently provided funding and partnership for place-based initiatives in five District communities. Place-based initiatives intend to achieve improved health, education and economic outcomes through effective and sustainable neighborhood transformation.



Current Projects:

Smart From The Start (Smart) is a family support and community engagement organization promoting the healthy development of children located in the Woodland Terrace community (Ward 8). Smart engages, educates, and empowers parents to step confidently into their role as their child's first teacher and to achieve goals to increase their self-sufficiency. Smart's multi-disciplinary team works with families to create home and community environments conducive to healthy child development while addressing the social determinants of health that impact the overall wellness of families and communities. Woodland Terrace families participate in individual and group programming that addresses trauma and stress, financial literacy classes, job training programs, and mental health counseling while also learning to address their children's health and development.

The Early Childhood Innovation Network Place-Based (ECIN) project provides a holistic health strategy in Historic Anacostia, Berry Farm, Sheridan, and the Buena Vista communities (Ward 8) through the development and implementation of a Community Mavens (CM) model. ECIN partners with Far Southeast Family Strengthening Collaborative, Parent Watch, Total Family Care Coalition and Health Alliance Network to recruit and train a Community Maven from each neighborhood to reach families where they live. CMs from each community serve as social capital builders, making important contact and connecting with families with children ages zero through five. The CMs will utilize the ECIN mobile app to connect families to physical and mental health supports that reduce the duration and severity of maternal depression, food insecurity, and other family stressors that perpetuate poor health outcomes.

NEXT STEPS

The District's birth data presented here point to women's health both before and during pregnancy as a large influencer of infant deaths and other poor birth outcomes.



As DC Health implements its comprehensive approach to improving and protecting perinatal health, the following strategies will be rolled out in 2018 to directly address some of the report's key findings



Improving Women's Health Before Pregnancy

District women who smoked, who were overweight or obese, or who had diabetes prior to pregnancy were far more likely to experience poorer birth outcomes such as prematurity, low birth weight and infant mortality. Helping women prevent and manage chronic conditions before becoming pregnant can improve birth outcomes in the District.

One Key Question® (OKQ) encourages all health providers who support women to routinely ask: "Would you like to become pregnant in the next year?" From there, providers can support women who choose to become pregnant to achieve their optimal health through smoking cessation support, weight management and control of chronic disease. DC Health is enhancing its implementation of OKQ by incorporating it into the electronic health record system of community health centers, beginning with Unity Health Care. This type of electronic prompt has been shown to increase the use of evidence-based clinical interventions and will support the routine use of OKQ in practice.

Addressing Barriers to Prenatal Care

Differences in timely entry into prenatal care persist with 52% of non-Hispanic black mothers and 64% of Hispanic mothers entering prenatal care in the 1st trimester compared to 86% of non-Hispanic white mothers. Delayed prenatal care is associated with poorer health outcomes for both mothers and infants, including preterm birth, low birthweight birth and infant mortality.

DC Health will continue to work with residents, community partners and local researchers to identify and support enabling services to facilitate timely early entry into prenatal care.



Preventing Preterm Births

The percentage of preterm births has not changed in the past decade, and almost 1 in 3 preterm births in the District were to women with a previous preterm birth. These preterm births may be preventable through the use of a medication called 17 alpha-hydroxyprogesterone caproate (17P).

Nationally, 17P is underutilized, and states are implementing innovative programs to increase its use. DC Health plans to work with birthing facilities to develop programs to facilitate the administration of 17P to reduce and prevent prematurity in the District.

Table 14 provides a summary of DC Health perinatal health programs.

Table 14: DC Health Perinatal Health Programs

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

Table 14: DC Health Perinatal Health Programs (cont.)

Greater Access Program	Provides community navigators for residents facing barriers to employment enrolled in a work readiness program at the Department of Employment Services. Navigators assist with providing supports for parenting, behavioral health and other social needs (ex. housing, healthcare, food access).	Women's Health
Safe Sleep and Fetal Alcohol Spectrum Disorder (FASD) Program	Safe sleep and FASD education for all District residents in community-based settings. Program participants receive free portable cribs to provide safe sleep environments for infants. DC Health provides trainings to maternal and child health partners and community-based organizations.	Infant Health
School-Based Health Centers	Comprehensive primary care clinics located within schools to reduce barriers to adolescents accessing primary healthcare services, including medical, oral and behavioral health. Centers also care for children of enrolled students.	Women's Health/ Infant Health
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	Program services include health assessments, nutrition intervention, education and counseling, breastfeeding promotion and peer counselor support along with a monthly, nutritionally prescribed tailored food package that includes healthful food options.	Women's Health/ Infant Health
Supplemental Nutrition Assistance Program: Nutrition Education and Obesity Prevention (SNAP-Ed)	Behavior-based health and wellness educational activities to prevent obesity by promoting increased consumption of healthful foods and daily physical activity for SNAP-eligible residents.	Women's Health
Teen Pregnancy Prevention Programs	Seven evidence-based or evidence-informed programs are being implemented in clinical, school or community-based settings to promote youth social-emotional development and to increase access to adolescent-friendly health services. Programs includes Children's National Medical Center Generations Program, Sasha Bruce Teen Outreach Program, Florence Crittenton Services of Greater Washington SNEAKERS and PEARLS programs, the Urban Institute PASS program, Healthy Babies Inc., Big Brothers Big Sisters, and Young Women's Project.	Women's Health
Tobacco Control Program	Provides awareness and education on the harmful effects of secondhand smoke exposure. Efforts include targeted public health campaigns for pregnant women and mothers on the impact of smoking during pregnancy and secondhand smoke exposure; and, training and technical assistance on the health effects of smoking and tobacco use to programs that directly serve mothers and children.	Women's Health/ Infant Health
Place-Based Initiatives	Innovative programs located in neighborhoods or housing communities to improve health outcomes for children ages zero to five and their families. These programs meet a critical need to provide multi-generational supports for all the District families who do not want a home visit.	Women's Health/ Infant Health

Appendix A. Technical notes

All live births described in the report were to District of Columbia residents at the time of birth. An infant who was a District of Columbia resident at birth (based on the infant's birth certificate) and died less than 1 year of age is included in all analyses of infant mortality. This includes infants who were not District of Columbia residents at birth, but were District of Columbia residents at the time of death (as recorded on the infant's death certificate).

Data Sources

Birth Data

The birth record is based on data collected from the 2003 revision of the U.S. Standard Certificate of live birth, which is described in: <https://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf> . All sociodemographic data from the mother is collected on the birth certificate.

Death Data

The death record is based on data collected from the 2003 revision of the U.S. Standard Certificate of live death, which is described in: <https://www.cdc.gov/nchs/data/dvs/DEATH11-03final-ACC.pdf> .

Birth record linked to death records

The District of Columbia vital statistics linked birth/death dataset is the major source of information for this report. 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 aged one year and younger. The linked birth/death dataset contains data available from the birth certificate, such as estimated gestational age, race/ethnicity of the mother, type of insurance coverage. In addition, the linked birth/death dataset contains information collected within the death certificate, such as the age of the infant at the time of death, the cause of death, race/ethnicity of the infant. The linked birth/infant death data set is particularly useful for computing infant mortality and neonatal mortality rates by race and ethnicity because the maternal race and ethnicity of the mother from the birth certificate is used to classify infant births and deaths by maternal race and ethnicity. 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 infant 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), D.C. Department of Health.

Population Estimates

Population estimates are used as the denominator to calculate the crude birth rate and age-specific birth rates. The annual estimates of the resident population are released July of each year [4].

Ward Boundaries

Wards presented in tables, figures and maps for years 2006-2011 are based on 2002 Ward boundaries. Wards presented in tables, figures and maps for years 2012-2016 are based on 2012 Ward boundaries.

Thematic Maps

Infant mortality estimates for each ward are presented in choropleth or thematic maps. These maps are based on the Ward boundaries from the 2012 election, which can be downloaded from the DC Office of Planning [5].

Estimates for the percentage of preterm and low birthweight live births are presented in neighborhood-level choropleth or thematic maps. The neighborhood groupings were created within CPPE by spatially joining contiguous census tracts.

For both the ward-level and neighborhood-level thematic maps, the percentages and rates were categorized into groups using the ArcGIS “natural breaks” algorithm, which partitions the data into classes based on natural groups in the data distribution.

Statistical Methods

Computing percentages

Percentages were computed using all events for which the characteristic is reported. The “missing” category is included in the denominator when calculating the percentage.

Comparing percentages and rates

Differences in maternal characteristics between live births in 2010-2012 and 2013-2016 and differences in the percentage of preterm births and low birthweight births were assessed using two-sided difference in proportions for two independent samples at a 0.05 significance level. No adjustments were made for multiple comparisons. To assess differences between infant mortality rates that are based on fewer than 100 deaths, we compute the 95% confidence intervals for each of the infant mortality rates based on the Poisson distribution and assess for overlap between the two confidence intervals. If the two 95% confidence intervals overlap the difference is not statistically significant at the 95% level. If they do not overlap, the difference is statistically significant. The phrases terms such as “significantly higher” or “significantly lower” indicate that the difference was statistically significant using a significance level of 0.05 [6].

Random variation in infant mortality rates

While the number of infant deaths and live births represent complete counts of these events and are not subject to sampling error, they are subject to nonsampling error in the registration process. As described by Mathews et al., when rates are used for analytic purposes, the number of births, deaths, and infant mortality rates are subject to random variation when the rates are being used for analytic purposes [6]. The probability range of values can be estimated from the observed events according to statistical assumptions. The distribution of vital events is assumed to follow the normal distribution when the number of events is large and the relative standard error is small. However, when the number of events is small (i.e., fewer than 100), caution must be taken in interpreting results. Infrequent vital events are then assumed to follow a Poisson probability distribution.

Rate and Ratio Definitions

Birth rate

The *birth rate* presented in this report is the crude birth rate, defined as the number of resident live births in the District of Columbia during a specified calendar year divided by the total population for that area. The rate is multiplied by 1,000 to provide an estimate per 1,000 DC residents.

$$\text{Birth rate} = \frac{\text{DC resident live births in year X}}{\text{Total DC population in year X}} \times 1,000$$

The population estimates from the US Census Bureau are used as denominators in birth rate calculations [4].

This report also presents age-specific birth rates for the 5-year age groups: 15-19, 20-24, 25-29, 30-34, 35-39, and 40-44. The age-specific birth rate is calculated:

$$\text{Age-specific birth rate} = \frac{\text{DC resident live births to mothers age Y in year X}}{\text{Total DC population of females age Y in year X}} \times 1,000$$

Infant mortality rate

The *infant mortality rate* presented in this report is the crude infant mortality rate, defined as the number of DC resident infants who died aged less than one year divided by total live births in the District of Columbia for the specified time period. The rate is multiplied by 1,000 to provide an estimate per 1,000 live births. This is often referred to as the period cohort and includes deaths of infants from the calendar year, some of whom were born in the prior calendar year. The infant mortality rate is calculated:

$$\text{Infant Mortality Rate} = \frac{\text{DC resident infant deaths less than one-year old in year X}}{\text{DC resident births in year X}} \times 1,000$$

Infant Mortality Disparity Ratio

The *infant mortality disparity ratio* is the ratio of two infant mortality rates and is used to compare the infant mortality rate in one category group to the rate of another group. In this report, the infant mortality ratio is used to compare the infant mortality rates between non-Hispanic black and Hispanic mothers to that of non-Hispanic white mothers.

Neonatal mortality rate

The *neonatal mortality rate* is the number of infants less than 28-days old that died in the District of Columbia divided by total live births in the District of Columbia for the specified time period. The rate is multiplied by 1,000 to provide an estimate per 1,000 live births.

$$\text{Neonatal Mortality Rate} = \frac{\text{DC resident infant deaths less than 28-days old in year X}}{\text{DC resident births in year X}} \times 1,000$$

References

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Appendix Tables

Appendix Table 1. Maternal characteristics of live births, District of Columbia 2010-2012 and 2013-2016

	Year of Birth			
	2010-2012		2013-2016	
	N	Percent	N	Percent
All	27,815	100.00	38,203	100.00
Race and ethnicity				
non-Hispanic, White ^a	7,836	28.17	11,735	30.72
non-Hispanic, Black ^a	14,395	51.75	19,172	50.18
Hispanic ^a	4,079	14.66	5,196	13.60
non-Hispanic, Asian/Pacific Islander	1,104	3.97	1,745	4.57
non-Hispanic, All other race-ethnic categories	108	0.39	144	0.38
Age of Mother (years)				
Less than 20 years ^a	2,671	9.60	2,207	5.78
20-24 years ^a	5,587	20.09	6,719	17.59
25-29 years	5,844	21.01	7,838	20.52
30-34 years ^a	7,702	27.69	11,842	31.00
35-39 years ^a	4,645	16.70	7,629	19.97
40 years and older	1,365	4.91	1,960	5.13
Marital Status				
Married ^a	12,920	46.45	19,153	50.13
Not Married ^a	14,759	53.06	18,902	49.48
Maternal Education Level				
Less than High School ^a	6,685	24.03	6,035	15.80
High School Graduate	5,895	21.19	8,178	21.41
More than High School Education ^a	14,840	53.35	23,543	61.63
Insurance Type				
Medicaid ^a	11,910	42.82	14,828	38.81
Private Insurance ^a	10,707	38.49	17,489	45.78
Other Government (Fed, State, Local) ^a	779	2.80	1,336	3.50
Self-pay ^a	174	0.63	464	1.21
CHAMPUS/TRICARE ^a	330	1.19	346	0.91
Other ^a	1,845	6.63	2,888	7.56
Maternal Residence (Ward)^b				
Ward 1 ^a	3,593	12.92	4,454	11.66
Ward 2	1,865	6.71	2,519	6.59
Ward 3 ^a	2,465	8.86	3,143	8.23
Ward 4	4,239	15.24	5,900	15.44
Ward 5 ^a	3,267	11.75	4,980	13.04
Ward 6 ^a	3,685	13.25	5,385	14.10
Ward 7	3,568	12.83	5,060	13.25
Ward 8	5,021	18.05	6,694	17.52

Totals and percentages may not sum to 100 due to missing values.

^a Percentage of characteristic is significantly different between 2010-2012 and 2013-2016 time period ($p < 0.05$).

^b Wards for 2010-2011 are based on 2002 Ward boundaries; wards for 2012-2016 are based on 2012 Ward boundaries.

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 2. Maternal characteristics of live births, District of Columbia 2015-2016

	DC Overall	
	N	Percent
All	19,425	100.00
Race and ethnicity		
non-Hispanic, White	6,050	31.15
non-Hispanic, Black	9,650	49.68
Hispanic	2,670	13.75
non-Hispanic, Asian/Pacific Islander	903	4.65
non-Hispanic, All other race-ethnic categories	82	0.42
Age of Mother (years)		
Less than 20 years	975	5.02
20-24 years	3,268	16.82
25-29 years	4,031	20.75
30-34 years	6,032	31.05
35-39 years	4,107	21.14
40 years and older	1,010	5.20
Marital Status		
Married	9,905	50.99
Not Married	9,443	48.61
Maternal Education Level		
Less than High School	2,686	13.83
High School Graduate	4,246	21.86
More than High School Education	12,281	63.22
Insurance Type		
Medicaid	7,870	40.51
Private Insurance		
Other Government (Fed, State, Local)	9,179	47.25
Self-pay	791	4.07
CHAMPUS/TRICARE	221	1.14
Other	171	0.88
Maternal Residence (Ward)		
Ward 1	2,261	11.64
Ward 2	1,222	6.29
Ward 3	1,537	7.91
Ward 4	3,069	15.80
Ward 5	2,577	13.27
Ward 6	2,752	14.17
Ward 7	2,575	13.26
Ward 8	3,387	17.44

Totals and percentages may not sum to 100 due to missing values.

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 3. Maternal demographics of live births in the District of Columbia by Ward, 2015-2016

	Maternal Residence (Ward)															
	Ward 1		Ward 2		Ward 3		Ward 4		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	2,261	100.00	1,222	100.00	1,537	100.00	3,069	100.00	2,577	100.00	2,752	100.00	2,575	100.00	3,387	100.00
Race and ethnicity																
non-Hispanic, White	863	38.17	792	64.81	1,134	73.78	767	24.99	629	24.41	1,561	56.72	81	3.15	211	6.23
non-Hispanic, Black	587	25.96	113	9.25	80	5.20	1,182	38.51	1,468	56.97	817	29.69	2,354	91.42	3,032	89.52
Hispanic	656	29.01	153	12.52	138	8.98	996	32.45	365	14.16	153	5.56	115	4.47	90	2.66
non-Hispanic, Asian/Pacific Islander	145	6.41	150	12.27	164	10.67	102	3.32	94	3.65	196	7.12	9	0.35	36	1.06
Age of Mother (years)																
Less than 20 years	73	3.23	8	0.65	3	0.20	134	4.37	127	4.93	77	2.80	232	9.01	317	9.36
20-24 years	244	10.79	39	3.19	27	1.76	421	13.72	437	16.96	237	8.61	775	30.10	1,084	32.00
25-29 years	395	17.47	180	14.73	163	10.61	600	19.55	551	21.38	441	16.02	694	26.95	999	29.50
30-34 years	825	36.49	524	42.88	614	39.95	992	32.32	790	30.66	1,097	39.86	553	21.48	621	18.33
35-39 years	580	25.65	384	31.42	570	37.09	722	23.53	543	21.07	736	26.74	253	9.83	309	9.12
40 years and older	144	6.37	87	7.12	160	10.41	200	6.52	129	5.01	163	5.92	67	2.60	57	1.68
Marital Status																
Married	1,373	60.73	1,059	86.66	1,419	92.32	1,703	55.49	1,253	48.62	1,966	71.44	490	19.03	616	18.19
Not Married	873	38.61	161	13.18	114	7.42	1,353	44.09	1,310	50.83	779	28.31	2,077	80.66	2,758	81.43
Maternal Education Level																
Less than High School	390	17.25	52	4.26	14	0.91	648	21.11	352	13.66	155	5.63	443	17.20	629	18.57
High School Graduate	353	15.61	64	5.24	29	1.89	594	19.35	554	21.50	319	11.59	969	37.63	1,357	40.06
More than High School Education	1,491	65.94	1,099	89.93	1,482	96.42	1,793	58.42	1,649	63.99	2,256	81.98	1,124	43.65	1,353	39.95
Insurance Type																
Medicaid	704	31.14	113	9.25	67	4.36	1,247	40.63	1,116	43.31	594	21.58	1,669	64.82	2,352	69.44
Private Insurance	1,193	52.76	1,016	83.14	1,401	91.15	1,255	40.89	1,143	44.35	1,953	70.97	558	21.67	631	18.63
Other Government (Fed, State, Local)	207	9.16	27	2.21	13	0.85	319	10.39	114	4.42	36	1.31	43	1.67	31	0.92
Self-pay	16	0.71	28	2.29	27	1.76	25	0.81	44	1.71	23	0.84	34	1.32	22	0.65
CHAMPUS/TRICARE	9	0.40	13	1.06	13	0.85	13	0.42	9	0.35	47	1.71	2	0.08	65	1.92
Other	119	5.26	20	1.64	11	0.72	185	6.03	128	4.97	87	3.16	250	9.71	268	7.91

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 4. Pre-pregnancy characteristics of women who had live births overall and by ward, District of Columbia 2015-2016

	Total Births		Maternal Residence (Ward)															
			Ward 1		Ward 2		Ward 3		Ward 4		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	19,425	100.00	2,282	100.00	1,237	100.00	1,552	100.00	3,082	100.00	2,573	100.00	2,735	100.00	2,563	100.00	3,356	100.00
Previous pre-term birth																		
No	18,768	96.62	2,209	97.70	1,204	98.53	1,513	98.44	2,997	97.65	2,485	96.43	2,691	97.78	2,423	94.10	3,202	94.54
Yes	624	3.21	51	2.26	14	1.15	21	1.37	70	2.28	85	3.30	59	2.14	146	5.67	178	5.26
Pre-pregnancy weight																		
Underweight	841	4.33	91	4.02	84	6.87	94	6.12	101	3.29	98	3.80	121	4.40	114	4.43	136	4.02
Normal Weight	9,921	51.07	1,353	59.84	885	72.42	1,109	72.15	1,519	49.49	1,244	48.27	1,665	60.50	933	36.23	1,196	35.31
Overweight	4,345	22.37	430	19.02	163	13.34	241	15.68	818	26.65	598	23.21	577	20.97	673	26.14	834	24.62
Obese	3,737	19.24	315	13.93	72	5.89	69	4.49	532	17.33	566	21.96	327	11.88	768	29.83	1,080	31.89
Smoking prior to pregnancy																		
No	18,252	93.96	2,196	97.13	1,184	96.89	1,509	98.18	2,985	97.26	2,428	94.22	2,616	95.06	2,345	91.07	2,958	87.33
Yes	776	3.99	43	1.90	14	1.15	15	0.98	60	1.96	107	4.15	52	1.89	181	7.03	304	8.98
Pre-pregnancy diabetes																		
Absent	18,737	96.46	2,243	99.20	1,216	99.51	1,526	99.28	3,037	98.96	2,536	98.41	2,740	99.56	2,539	98.60	3,332	98.38
Present	662	3.41	17	0.75	6	0.49	9	0.59	31	1.01	34	1.32	11	0.40	30	1.17	48	1.42
Pre-pregnancy hypertension																		
Absent	18,940	97.50	2,228	98.54	1,208	98.85	1,521	98.96	3,015	98.24	2,504	97.17	2,697	98.00	2,472	96.00	3,251	95.98
Present	459	2.36	32	1.42	14	1.15	14	0.91	53	1.73	66	2.56	54	1.96	97	3.77	129	3.81

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 5. Pregnancy characteristics of all mothers who had live births by Ward, District of Columbia 2015-2016

	Total Births		Maternal Residence (Ward)															
			Ward 1		Ward 2		Ward 3		Ward 4		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	19,425	100.00	2,261	100.00	1,222	100.00	1,537	100.00	3,069	100.00	2,577	100.00	2,752	100.00	2,575	100.00	3,387	100.00
Trimester prenatal care initiated																		
First Trimester	12,759	65.68	1,587	70.19	956	78.23	1,319	85.82	2,012	65.56	1,681	65.23	2,046	74.35	1,423	55.26	1,719	50.75
Second Trimester	4,343	22.36	437	19.33	184	15.06	164	10.67	679	22.12	601	23.32	508	18.46	739	28.70	1,018	30.06
Third Trimester	1,232	6.34	147	6.50	59	4.83	32	2.08	231	7.53	169	6.56	104	3.78	206	8.00	281	8.30
No Prenatal Care	464	2.39	32	1.42	9	0.74	5	0.33	51	1.66	46	1.79	30	1.09	100	3.88	189	5.58
Plurality of birth																		
Singleton	18,586	95.68	2,178	96.33	1,176	96.24	1,465	95.32	2,922	95.21	2,462	95.54	2,646	96.15	2,474	96.08	3,218	95.01
Twin	825	4.25	83	3.67	46	3.76	72	4.68	142	4.63	112	4.35	106	3.85	98	3.81	166	4.90
Triplet	9	0.05	0	0	0	0	0	0	0	0	3	0.12	0	0	3	0.12	3	0.09
Quadruplet	4	0.02	0	0	0	0	0	0	4	0.13	0	0	0	0	0	0	0	0
Smoking during pregnancy																		
No	18,546	95.47	2,217	98.05	1,190	97.38	1,518	98.76	3,015	98.24	2,465	95.65	2,629	95.53	2,411	93.63	3,070	90.64
Yes	487	2.51	21	0.93	7	0.57	6	0.39	30	0.98	71	2.76	40	1.45	115	4.47	197	5.82
Gestational diabetes																		
Absent	18,737	96.46	2,172	96.06	1,181	96.64	1,479	96.23	2,920	95.14	2,469	95.81	2,679	97.35	2,506	97.32	3,288	97.08
Present	662	3.41	88	3.89	41	3.36	56	3.64	148	4.82	101	3.92	72	2.62	63	2.45	92	2.72
Gestational hypertension																		
Absent	18,327	94.35	2,149	95.05	1,160	94.93	1,456	94.73	2,906	94.69	2,402	93.21	2,606	94.69	2,413	93.71	3,192	94.24
Present	1,072	5.52	111	4.91	62	5.07	79	5.14	162	5.28	168	6.52	145	5.27	156	6.06	188	5.55
Eclampsia																		
Absent	19,306	99.39	2,253	99.65	1,212	99.18	1,532	99.67	3,052	99.45	2,554	99.11	2,742	99.64	2,559	99.38	3,360	99.20
Present	81	0.42	7	0.31	5	0.41	2	0.13	13	0.42	16	0.62	8	0.29	10	0.39	20	0.59

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 6. Percentage of preterm and full term births by pre-pregnancy characteristics of mothers who had live births and maternal race and ethnicity, District of Columbia 2015-2016

	Preterm Births										Full Term Births									
	Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander		Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	2,038	10.49	470	7.77	1,235	12.80	240	8.99	81	8.97	17,371	89.43	5,580	92.23	8,406	87.11	2,430	91.01	822	91.03
Previous preterm birth																				
No	1,837	9.79	457	7.64 ^a	1,067	11.65 ^a	223	8.57 ^a	80	8.99	16,923	90.17	5,524	92.36	8,082	88.26	2,378	91.43	810	91.01
Yes	196	31.41	11	17.46	165	34.74	17	25.00	1	8.33	427	68.43	52	82.54	309	65.05	51	75.00	11	91.67
Pre-pregnancy Weight																				
Underweight	96	11.41	16	6.35	61	14.52 ^c	7	9.09	11	13.10	745	88.59	236	93.65	359	85.48	70	90.91	73	86.90
Normal Weight	897	9.04	322	7.30	415	11.58	98	8.17	57	8.78	9,021	90.93	4,088	92.70	3,166	88.34	1,101	91.83	592	91.22
Overweight	466	10.73	83	8.63	323	12.69	57	8.10	2	1.85 ^d	3,874	89.20	879	91.37	2,219	87.19	647	91.90	106	98.15
Obese	504	13.48	42	12.84 ^b	392	13.98	58	10.80	8	17.02 ^b	3,233	86.47	285	87.16	2,411	85.95	479	89.20	39	82.98
Smoking prior to pregnancy																				
No	1,854	10.16	459	7.89 ^a	1,071	12.14 ^a	236	9.02	79	9.07	16,391	89.80	5,355	92.11	7,747	87.78	2,380	90.98	792	90.93
Yes	143	18.43	1	1.75	138	20.29	3	11.11	0	0	632	81.44	56	98.25	541	79.56	24	88.89	10	100.00
Pre-pregnancy diabetes																				
Absent	1,985	10.33	468	7.76	1,191	12.52	234	8.89	81	9.08	17,218	89.62	5,565	92.24	8,311	87.38	2,398	91.11	811	90.92
Present	50	26.74	2	13.33	41	33.61 ^f	6	15.79	0	0	137	73.26	13	86.67	81	66.39	32	84.21	11	100.00
Pre-pregnancy hypertension																				
Absent	1,918	10.13	458	7.66	1,140	12.27	227	8.63	81	9.06	17,014	89.83	5,522	92.34	8,145	87.65	2,404	91.37	813	90.94
Present	117	25.49	12	17.65 ^g	92	27.06 ^g	13	33.33 ^g	0	0	341	74.29	56	82.35	247	72.65	26	66.67	9	100.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a Percentage of preterm births is significantly higher among mothers who had previous preterm births compared to mothers who did not have previous preterm births (p<0.05).^b Percentage of preterm births is significantly higher among obese mothers compared to underweight mothers (p<0.05), normal weight mothers (p<0.05), and overweight mothers (p<0.05).^c Percentage of preterm births is significantly higher among underweight mothers compared to normal weight mothers (p<0.05).^d Percentage of preterm births is significantly higher among underweight mothers and normal weight mothers compared to overweight mothers (p<0.05 for all comparisons).^e Percentage of preterm births is significantly higher among mothers who smoked prior to pregnancy compared to mothers who did not smoke prior to pregnancy (p<0.05).^f Percentage of preterm births is significantly higher among mothers with pre-pregnancy diabetes compared to mothers who did not have pre-pregnancy diabetes (p<0.05).^g Percentage of preterm births is significantly higher among mothers with pre-pregnancy hypertension compared to mothers who did not have pre-pregnancy hypertension (p<0.05).

Appendix Table 7. Percentage of preterm and full term births by pre-pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Preterm Births								Full Term Births							
	Ward 1		Ward 2		Ward 3		Ward 4		Ward 1		Ward 2		Ward 3		Ward 4	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	178	7.87	87	7.12	132	8.59	302	9.84	2,083	92.13	1,135	92.88	1,403	91.28	2,764	90.06
Previous preterm birth																
No	161	7.29	82	6.81	130	8.59	288	9.61	2,048	92.71	1,122	93.19	1,383	91.41	2,707	90.32
Yes	17	33.33	3	21.43	2	9.52	14	20.00	34	66.67	11	78.57	19	90.48	56	80.00
Pre-pregnancy Weight																
Underweight	5	5.49	0	0	15	15.96	16	15.84	86	94.51	84	100.00	79	84.04	85	84.16
Normal Weight	93	6.87	63	7.12	84	7.57	139	9.15	1,260	93.13	822	92.88	1,025	92.43	1,379	90.78
Overweight	36	8.37	14	8.59	20	8.30	78	9.54	394	91.63	149	91.41	221	91.70	740	90.46
Obese	36	11.43	8	11.11	10	14.49	55	10.34	279	88.57	64	88.89	59	85.51	476	89.47
Smoking prior to pregnancy																
No	173	7.88	84	7.09	128	8.48	284	9.51	2,023	92.12	1,100	92.91	1,381	91.52	2,699	90.42
Yes	5	11.63	1	7.14	2	13.33	12	20.00	38	88.37	13	92.86	13	86.67	48	80.00
Pre-pregnancy diabetes																
Absent	173	7.71	87	7.15	132	8.65	291	9.58	2,070	92.29	1,129	92.85	1,394	91.35	2,744	90.35
Present	5	29.41	0	0	0	0	11	35.48	12	70.59	6	100.00	9	100.00	20	64.52
Pre-pregnancy hypertension																
Absent	172	7.72	85	7.04	132	8.68	290	9.62	2,056	92.28	1,123	92.96	1,389	91.32	2,723	90.32
Present	6	18.75	2	14.29	0	0	12	22.64	26	81.25	12	85.71	14	100.00	41	77.36

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 7 (continued). Percentage of preterm and full term births by pre-pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Preterm Births								Full Term Births							
	Ward 5		Ward 6		Ward 7		Ward 8		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Pre-term Births	297	11.53	237	8.61	337	13.10	461	13.61	2,275	88.32	2,514	91.35	2,233	86.79	2,923	86.33
Previous preterm birth																
No	269	10.82	218	8.10	279	11.52	405	12.65	2,215	89.13	2,473	91.90	2,140	88.36	2,794	87.29
Yes	27	32.14	19	32.20	56	38.62	56	31.46	56	66.67	40	67.80	89	61.38	122	68.54
Pre-pregnancy Weight																
Underweight	8	8.16	10	8.26	17	14.91	24	17.65	90	91.84	111	91.74	97	85.09	112	82.35
Normal Weight	141	11.33	116	6.97	117	12.54	143	11.96	1,103	88.67	1,549	93.03	815	87.35	1,052	87.96
Overweight	60	10.05	53	9.19	90	13.39	115	13.79	536	89.78	524	90.81	580	86.31	719	86.21
Obese	82	14.49	47	14.37	101	13.17	160	14.83	483	85.34	280	85.63	666	86.83	919	85.17
Smoking prior to pregnancy																
No	274	11.29	220	8.41	291	12.42	394	13.32	2,152	88.63	2,396	91.59	2,051	87.54	2,561	86.61
Yes	17	16.04	9	17.31	37	20.44	59	19.41	89	83.96	43	82.69	143	79.01	245	80.59
Pre-pregnancy diabetes																
Absent	292	11.52	234	8.54	325	12.81	445	13.36	2,241	88.40	2,506	91.46	2,209	87.07	2,884	86.58
Present	4	11.76	3	27.27	10	33.33	16	33.33	30	88.24	8	72.73	20	66.67	32	66.67
Pre-pregnancy hypertension																
Absent	285	11.39	224	8.31	303	12.27	420	12.92	2,217	88.57	2,473	91.69	2,164	87.61	2,828	87.02
Present	11	16.67	13	24.07	32	32.99	41	31.78	54	81.82	41	75.93	65	67.01	88	68.22

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 8. Percentage of preterm births by pregnancy characteristics of mothers who had live births and maternal race and ethnicity, District of Columbia 2015-2016

	Preterm Births										Full Term Births									
	Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander		Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	2,038	10.49	470	7.77	1,235	12.80	240	8.99	81	8.97	17,371	89.43	5,580	92.23	8,406	87.11	2,430	91.01	822	91.03
Initiation of Prenatal Care																				
First Trimester	1,307	10.24	404	7.75	676	13.45	154	8.96	68	9.65	11,451	89.76	4,809	92.25	4,350	86.55	1,564	91.04	637	90.35
Second Trimester	408	9.39	42	6.79	303	10.61	50	7.20	12	7.89	3,935	90.61	577	93.21	2,554	89.39	644	92.80	140	92.11
Third Trimester	87	7.06	7	6.19	70	7.44	8	5.93	0	0	1,145	92.94	106	93.81	871	92.56	127	94.07	30	100.00
No Prenatal Care	125	26.94	2	14.29	112	27.25 ^{a,b,c}	10	30.30 ^a	1	50.00 ^d	331	71.34	12	85.71	291	70.80	23	69.70	1	50.00
Plurality																				
Singleton	1,578	8.49	310	5.37	994	10.82	203	7.77	61	6.97	16,992	91.42	5,458	94.63	8,180	89.08	2,408	92.23	814	93.03
Twin	447	54.18	160	56.74 ^a	228	50.33 ^a	37	62.71 ^a	20	71.43 ^a	378	45.82	122	43.26	225	49.67	22	37.29	8	28.57
Triplet	9	100.00	0	0	9	100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quadruplet	4	100.00	0	0	4	100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smoked during pregnancy																				
No	1,899	10.24	459	7.85	1,113	12.28	238	9.05	79	8.99	16,640	89.72	5,385	92.15	7,946	87.65	2,391	90.95	800	91.01
Yes	97	19.92	1	3.85	95	21.40 ^f	1	6.67	0	0	389	79.88	25	96.15	348	78.38	14	93.33	2	100.00
Gestational diabetes																				
Absent	1,946	10.39	455	7.70	1,179	12.65	225	8.94	75	8.82	16,783	89.57	5,302	93.15	7,944	87.68	2,352	91.73	795	91.27
Present	89	13.44	15	10.87	53	16.88 ^g	15	9.80	6	11.32	572	86.40	276	77.53	448	78.18	78	73.58	27	84.38
Gestational hypertension																				
Absent	1,795	9.79	390	6.85	1,108	12.23	212	8.27	76	8.73	16,524	90.16	5,302	93.15	7,944	87.68	2,352	91.73	795	91.27
Present	240	22.39	80	22.47 ^h	124	21.64 ^h	28	26.42 ^h	5	15.63	831	77.52	276	77.53	448	78.18	78	73.58	27	84.38
Eclampsia																				
Absent	2,000	10.36	455	7.56	1,219	12.72	234	8.81	80	8.89	17,297	89.59	5,566	92.44	8,355	87.19	2,423	91.19	820	91.11
Present	29	35.80	10	52.63 ⁱ	12	25.00 ⁱ	6	50.00 ⁱ	1	50.00 ⁱ	52	64.20	9	47.37	36	75.00	6	50.00	1	50.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

^a Percentage of preterm births is significantly higher among mothers who had no prenatal care compared to mothers who initiated prenatal care in the first (p<0.05), second (p<0.05), and third trimester (p<0.05).

^b Percentage of preterm births is significantly higher among mothers who initiated prenatal care during the first trimester compared to mothers who initiated prenatal care in the second (p<0.05) and third trimester (p<0.05).

^c Percentage of preterm births is significantly higher among mothers who had initiated prenatal care during the second trimester compared to mothers who initiated prenatal care in the third trimester (p<0.05).

^d Percentage of preterm births is significantly higher among twin births compared to singleton births (p<0.05).

^e Percentage of preterm births is significantly higher among mothers who smoked during pregnancy compared to mothers who did not smoke during pregnancy (p<0.05).

^f Percentage of preterm births is significantly higher among mothers who had gestational diabetes compared to mothers who did not have gestational diabetes (p<0.05).

^g Percentage of preterm births is significantly higher among mothers who had gestational hypertension compared to mothers who did not have gestational hypertension (p<0.05).

^h Percentage of preterm births is significantly higher among mothers who had eclampsia compared to mothers who did not have eclampsia (p<0.05).

Appendix Table 9. Percentage of preterm births by pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Preterm Births								Full Term Births							
	Ward 1		Ward 2		Ward 3		Ward 4		Ward 1		Ward 2		Ward 3		Ward 4	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	178	7.87	87	7.12	132	8.59	302	9.84	2,083	92.13	1,135	92.88	1,403	91.28	2,764	90.06
Initiation of Prenatal Care																
First Trimester	119	7.50	70	7.32	110	8.34	191	9.49	1,468	92.50	886	92.68	1,209	91.66	1,821	90.51
Second Trimester	37	8.47	10	5.43	16	9.76	56	8.25	400	91.53	174	94.57	148	90.24	623	91.75
Third Trimester	7	4.76	1	1.69	0	0	13	5.63	140	95.24	58	98.31	32	100.00	218	94.37
No Prenatal Care	9	28.13	2	22.22	2	40.00	19	37.25	23	71.88	7	77.78	3	60.00	30	58.82
Plurality																
Singleton	139	6.38	65	5.53	95	6.48	225	7.70	2,039	93.62	1,111	94.47	1,368	93.38	2,694	92.20
Twin	39	46.99	22	47.83	37	51.39	73	51.41	44	53.01	24	52.17	35	48.61	69	48.59
Triplet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quadruplet	0	0	0	0	0	0	4	100.00	0	0	0	0	0	0	0	0
Smoked during pregnancy																
No	176	7.94	84	7.06	129	8.50	290	9.62	2,041	92.06	1,106	92.94	1,389	91.50	2,723	90.32
Yes	2	9.52	1	14.29	1	16.67	6	20.00	19	90.48	6	85.71	5	83.33	24	80.00
Gestational diabetes																
Absent	161	7.41	83	7.03	123	8.32	288	9.86	2,011	92.59	1,098	92.97	1,356	91.68	2,631	90.10
Present	17	19.32	4	9.76	9	16.07	14	9.46	71	80.68	37	90.24	47	83.93	133	89.86
Gestational hypertension																
Absent	148	6.89	75	6.47	115	7.90	267	9.19	2,001	93.11	1,085	93.53	1,341	92.10	2,638	90.78
Present	30	27.03	12	19.35	17	21.52	35	21.60	81	72.97	50	80.65	62	78.48	126	77.78
Eclampsia																
Absent	175	7.77	82	6.77	130	8.49	295	9.67	2,078	92.23	1,130	93.23	1,402	91.51	2,755	90.27
Present	3	42.86	2	40.00	2	100.00	5	38.46	4	57.14	3	60.00	0	0	8	61.54

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 9 (cont). Percentage of preterm births by pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Preterm Births								Full Term Births							
	Ward 5		Ward 6		Ward 7		Ward 8		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	297	11.53	237	8.61	337	13.10	461	13.61	2,275	88.32	2,514	91.35	2,233	86.79	2,923	86.33
Initiation of Prenatal Care																
First Trimester	193	11.48	182	8.90	201	14.14	241	14.02	1,488	88.52	1,864	91.10	1,221	85.86	1,478	85.98
Second Trimester	65	10.82	32	6.30	77	10.42	115	11.30	536	89.18	476	93.70	662	89.58	903	88.70
Third Trimester	17	10.06	5	4.81	16	7.80	28	9.96	152	89.94	99	95.19	189	92.20	253	90.04
No Prenatal Care	11	23.91	8	26.67	27	27.00	46	24.34	33	71.74	22	73.33	70	70.00	142	75.13
Plurality																
Singleton	226	9.18	177	6.69	276	11.17	368	11.44	2,231	90.65	2,468	93.27	2,193	88.71	2,847	88.50
Twin	68	60.71	60	56.60	58	59.18	90	54.22	44	39.29	46	43.40	40	40.82	76	45.78
Triplet	3	100.00	0	0	3	100.00	3	100.00	0	0	0	0	0	0	0	0
Quadruplet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smoked during pregnancy																
No	281	11.40	220	8.37	304	12.62	409	13.33	2,182	88.52	2,409	91.63	2,104	87.34	2,658	86.61
Yes	10	14.29	9	22.50	23	20.00	44	22.34	60	85.71	31	77.50	91	79.13	153	77.66
Gestational diabetes																
Absent	285	11.55	233	8.70	327	13.06	439	13.36	2,181	88.37	2,446	91.30	2,174	86.82	2,846	86.58
Present	11	10.89	4	5.56	8	12.70	22	23.91	90	89.11	68	94.44	55	87.30	70	76.09
Gestational hypertension																
Absent	261	10.87	206	7.90	301	12.48	416	13.04	2,138	89.05	2,400	92.10	2,107	87.39	2,773	86.90
Present	35	20.83	31	21.38	34	21.79	45	23.94	133	79.17	114	78.62	122	78.21	143	76.06
Eclampsia																
Absent	292	11.44	235	8.57	332	12.98	453	13.49	2,259	88.48	2,507	91.43	2,222	86.90	2,904	86.45
Present	4	25.00	2	25.00	3	30.00	8	40.00	12	75.00	6	75.00	7	70.00	12	60.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Appendix Table 10. Percentage of low birthweight births by pre-pregnancy characteristics of mothers who had live births and maternal race and ethnicity, District of Columbia 2015-2016

	Low Birthweight Births										Normal Weight Births									
	Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander		Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	1,960	10.09	391	6.46	1,287	13.34	199	7.45	72	7.97	17,458	89.87	5,659	93.54	8,363	86.66	2,471	92.55	831	92.03
Previous preterm birth																				
No	1,776	9.46	380	6.35 ^a	1,129	12.33 ^a	186	7.15 ^a	72	8.09	16,992	90.54	5,601	93.65	8,028	87.67	2,415	92.85	818	91.91
Yes	178	28.53	9	14.29	154	32.42	13	19.12	0	0	446	71.47	54	85.71	321	67.58	55	80.88	12	100.00
Pre-pregnancy Weight																				
Underweight	104	12.37	19	7.54	68	16.19 ^b	7	9.09	10	11.90	737	87.63	233	92.46	352	83.81	70	90.91	74	88.10
Normal Weight	901	9.08	275	6.24	484	13.50	86	7.17	50	7.70	9,020	90.92	4,135	93.76	3,100	86.50	1,113	92.83	599	92.30
Overweight	437	10.06	70	7.28	315	12.38	47	6.68	4	3.70 ^c	3,906	89.94	892	92.72	2,230	87.62	657	93.32	104	96.30
Obese	445	11.90	24	7.34	370	13.19	41	7.64	6	12.77	3,294	88.10	303	92.66	2,435	86.81	496	92.36	41	87.23
Smoking prior to pregnancy																				
No	1,757	9.63	382	6.57	1,099	12.45	195	7.45	71	8.15	16,495	90.37	5,432	93.43	7,726	87.55	2,421	92.55	800	91.85
Yes	164	21.13	3	5.26	158	23.24	3	11.11	0	0	612	78.87	54	94.74	522	76.76	24	88.89	10	100.00
Pre-pregnancy diabetes																				
Absent	1,922	10.00	390	6.46	1,256	13.21	195	7.41	71	7.96	17,290	90.00	5,643	93.54	8,255	86.79	2,437	92.59	821	92.04
Present	34	18.18	1	6.67	27	22.13 ^d	4	10.53	1	9.09	153	81.82	14	93.33	95	77.87	34	89.47	10	90.91
Pre-pregnancy hypertension																				
Absent	1,847	9.75	375	6.27	1,199	12.90	190	7.22	72	8.05	17,093	90.25	5,605	93.73	8,094	87.10	2,441	92.78	822	91.95
Present	109	23.75	16	23.53 ^e	84	24.71 ^e	9	23.08 ^e	0	0	350	76.25	52	76.47	256	75.29	30	76.92	9	100.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams. Underweight is defined as a BMI < 18.5; Normal weight is defined as a BMI between 18.5 and 24.9; overweight is defined as a BMI between 25 and 29.9; obese is defined as BMI of 30 and greater.

^a The percentage of low birthweight live births was greater among mothers with previous preterm births compared to mothers with no preterm births ($p < 0.05$).^b The percentage of low birthweight live births was greater among underweight mothers compared to overweight mothers ($p < 0.05$) and obese mothers ($p < 0.05$).^c The percentage of low birthweight live births was greater among underweight mothers and obese mothers compared to overweight mothers ($p < 0.05$ for both comparisons).^d The percentage of low birthweight live births was greater among mothers with pre-pregnancy diabetes than those without pre-pregnancy diabetes ($p < 0.05$).^e The percentage of low birthweight live births was greater among mothers with pre-pregnancy hypertension than those without pre-pregnancy hypertension ($p < 0.05$).

Appendix Table 11. Percentage of low birthweight births by pre-pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Low Birthweight Births								Normal Weight Births							
	Ward 1		Ward 2		Ward 3		Ward 4		Ward 1		Ward 2		Ward 3		Ward 4	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	165	7.30	85	6.96	118	7.68	248	8.08	2,096	92.70	1,137	93.04	1,417	92.19	2,820	91.89
Previous preterm birth																
No	154	6.97	79	6.56	117	7.73	237	7.91	2,055	93.03	1,125	93.44	1,396	92.27	2,760	92.09
Yes	11	21.57	4	28.57	1	4.76	11	15.71	40	78.43	10	71.43	20	95.24	59	84.29
Pre-pregnancy Weight																
Underweight	6	6.59	6	7.14	14	14.89	11	10.89	85	93.41	78	92.86	80	85.11	90	89.11
Normal Weight	87	6.43	61	6.89	80	7.21	122	8.03	1,266	93.57	824	93.11	1,029	92.79	1,397	91.97
Overweight	27	6.28	12	7.36	18	7.47	62	7.58	403	93.72	151	92.64	223	92.53	756	92.42
Obese	35	11.11	5	6.94	4	5.80	41	7.71	280	88.89	67	93.06	65	94.20	491	92.29
Smoking prior to pregnancy																
No	157	7.15	84	7.09	115	7.62	234	7.84	2,039	92.85	1,100	92.91	1,394	92.38	2,751	92.16
Yes	7	16.28	1	7.14	1	6.67	8	13.33	36	83.72	13	92.86	14	93.33	52	86.67
Pre-pregnancy diabetes																
Absent	164	7.31	85	6.99	117	7.67	242	7.97	2,079	92.69	1,131	93.01	1,409	92.33	2,795	92.03
Present	1	5.88	0	0	1	11.11	6	19.35	16	94.12	6	100.00	8	88.89	25	80.65
Pre-pregnancy hypertension																
Absent	160	7.18	82	6.79	117	7.69	235	7.79	2,068	92.82	1,126	93.21	1,404	92.31	2,780	92.21
Present	5	15.63	3	21.43	1	7.14	13	24.53	27	84.38	11	78.57	13	92.86	40	75.47

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams. Underweight is defined as a BMI<18.5; Normal weight is defined as a BMI between 18.5 and 24.9; overweight is defined as a BMI between 25 and 29.9; obese is defined as BMI of 30 and greater. Ward is based on the mother's residential ward recorded on the birth certificate.

Appendix Table 11 (cont). Percentage of low birthweight births by pre-pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Low Birthweight Births								Normal Weight Births							
	Ward 5		Ward 6		Ward 7		Ward 8		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	274	10.64	226	8.21	351	13.64	488	14.41	2,300	89.29	2,525	91.75	2,222	86.36	2,898	85.59
Previous preterm birth																
No	250	10.06	206	7.66	301	12.43	428	13.37	2,235	89.94	2,485	92.34	2,121	87.57	2,773	86.63
Yes	23	27.38	20	33.90	47	32.41	60	33.71	61	72.62	39	66.10	98	67.59	118	66.29
Pre-pregnancy Weight																
Underweight	11	11.22	15	12.40	17	14.91	23	16.91	87	88.78	106	87.60	97	85.09	113	83.09
Normal Weight	137	11.01	113	6.79	128	13.72	172	14.38	1,107	88.99	1,552	93.21	805	86.28	1,024	85.62
Overweight	58	9.72	46	7.97	90	13.39	124	14.87	539	90.28	531	92.03	582	86.61	710	85.13
Obese	62	10.95	42	12.84	102	13.30	151	13.99	504	89.05	285	87.16	665	86.70	928	86.01
Smoking prior to pregnancy																
No	252	10.38	210	8.03	297	12.68	404	13.66	2,176	89.62	2,406	91.97	2,046	87.32	2,553	86.34
Yes	17	16.04	8	15.38	44	24.31	77	25.33	89	83.96	44	84.62	137	75.69	227	74.67
Pre-pregnancy diabetes																
Absent	268	10.57	225	8.21	343	13.52	474	14.23	2,267	89.43	2,515	91.79	2,194	86.48	2,857	85.77
Present	5	14.71	1	9.09	5	16.67	14	29.17	29	85.29	10	90.91	25	83.33	34	70.83
Pre-pregnancy hypertension																
Absent	262	10.47	211	7.82	320	12.96	455	14.00	2,241	89.53	2,486	92.18	2,150	87.04	2,795	86.00
Present	11	16.67	15	27.78	28	28.87	33	25.58	55	83.33	39	72.22	69	71.13	96	74.42

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams. Underweight is defined as a BMI<18.5; Normal weight is defined as a BMI between 18.5 and 24.9; overweight is defined as a BMI between 25 and 29.9; obese is defined as BMI of 30 and greater. Ward is based on the mother's residential ward recorded on the birth certificate.

Appendix Table 12. Percentage of low birthweight births by pregnancy characteristics of mothers who had live births and maternal race and ethnicity, District of Columbia 2015-2016

	Low Birthweight Births										Normal Weight Births									
	Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander		Overall		non-Hispanic, White		non-Hispanic, Black		Hispanic		non-Hispanic, Asian/Pacific Islander	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	1,960	10.09	391	6.46	1,287	13.34	199	7.45	72	7.97	17,458	89.87	5,659	93.54	8,363	86.66	2,471	92.55	831	92.03
Initiation of Prenatal Care																				
First Trimester	1,172	9.19	325	6.23	663	13.19	123	7.16	56	7.94	11,586	90.81	4,888	93.77	4,363	86.81	1,595	92.84	649	92.06
Second Trimester	458	10.55	44	7.11	354	12.39	45	6.48	14	9.21	3,885	89.45	575	92.89	2,503	87.61	649	93.52	138	90.79
Third Trimester	95	7.71	9	7.96	75	7.97	8	5.93	0	0	1,137	92.29	104	92.04	866	92.03	127	94.07	30	100.00
No Prenatal Care	125	26.94	2	14.29	114	27.74 ^a	8	24.24 ^a	1	50.00 ^b	339	73.06	12	85.71	297	72.26	25	75.76	1	50.00
Plurality																				
Singleton	1,480	7.96	246	4.26	1,007	10.97	165	6.32	53	6.06	17,099	92.00	5,522	95.74	8,176	89.03	2,446	93.68	822	93.94
Twin	467	56.61	145	51.42 ^c	267	58.94 ^c	34	57.63 ^c	19	67.86 ^c	358	43.39	137	48.58	186	41.06	25	42.37	9	32.14
Triplet	9	100.00	0	0	9	100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quadruplet	4	100.00	0	0	4	100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smoked during pregnancy																				
No	1,800	9.71	382	6.54	1,140	12.57	197	7.49	71	8.08	16,746	90.29	5,462	93.46	7,926	87.43	2,432	92.51	808	91.92
Yes	120	24.64	3	11.54	116	26.13 ^d	1	6.67	0	0	367	75.36	23	88.46	328	73.87	14	93.33	2	100.00
Gestational diabetes																				
Absent	1,895	10.11	381	6.45	1,249	13.40	188	7.47	66	7.76	16,842	89.89	5,529	93.55	8,070	86.60	2,329	92.53	784	92.24
Present	61	9.21	10	7.25	34	10.83	11	7.19	6	11.32	601	90.79	128	92.75	280	89.17	142	92.81	47	88.68
Gestational hypertension																				
Absent	1,723	9.40	311	5.46	1,162	12.83	177	6.90	64	7.35	16,604	90.60	5,381	94.54	7,898	87.17	2,387	93.10	807	92.65
Present	233	21.74	80	22.47 ^e	121	21.12 ^e	22	20.75 ^e	8	25.00 ^e	839	78.26	276	77.53	452	78.88	84	79.25	24	75.00
Eclampsia																				
Absent	1,921	9.95	375	6.23	1,267	13.22	196	7.38	72	8.00	17,385	90.05	5,646	93.77	8,316	86.78	2,461	92.62	828	92.00
Present	29	35.80	11	57.89 ^f	15	31.25 ^f	3	25.00 ^f	0	0	52	64.20	8	42.11	33	68.75	9	75.00	2	100.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams.

^a The percentage of low birthweight live births was greater among mothers with no prenatal care compared to mothers who initiated prenatal care during the first trimester ($p < 0.05$), second trimester ($p < 0.05$), and third trimester ($p < 0.05$).

^b The percentage of low birthweight live births was greater among mothers with no prenatal care compared to mothers who initiated prenatal care during the first trimester ($p < 0.05$) and second trimester ($p < 0.05$).

^c The percentage of low birthweight live births was greater among twin births compared to singleton births ($p < 0.05$).

^d The percentage of low birthweight live births was greater among mothers who smoked during pregnancy compared to mothers who did not smoke during ($p < 0.05$).

^e The percentage of low birthweight live births was greater among mothers with gestational hypertension compared to those without gestational hypertension ($p < 0.05$).

^f The percentage of low birthweight live births was greater among mothers with eclampsia compared to those without eclampsia ($p < 0.05$).

Appendix Table 13. Percentage of low birthweight births by pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Low Birthweight Births								Normal Weight Births							
	Ward 1		Ward 2		Ward 3		Ward 4		Ward 1		Ward 2		Ward 3		Ward 4	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	165	7.30	85	6.96	118	7.68	248	8.08	2,096	92.70	1,137	93.04	1,417	92.19	2,820	91.89
Initiation of Prenatal Care																
First Trimester	98	6.18	65	6.80	98	7.43	146	7.26	1,489	93.82	891	93.20	1,221	92.57	1,866	92.74
Second Trimester	41	9.38	9	4.89	15	9.15	58	8.54	396	90.62	175	95.11	149	90.85	621	91.46
Third Trimester	7	4.76	3	5.08	2	6.25	13	5.63	140	95.24	56	94.92	30	93.75	218	94.37
No Prenatal Care	8	25.00	4	44.44	1	20.00	9	17.65	24	75.00	5	55.56	4	80.00	42	82.35
Plurality																
Singleton	122	5.60	62	5.27	75	5.12	177	6.06	2,056	94.40	1,114	94.73	1,388	94.74	2,744	93.91
Twin	43	51.81	23	50.00	43	59.72	67	47.18	40	48.19	23	50.00	29	40.28	75	52.82
Triplet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quadruplet	0	0	0	0	0	0	4	100.00	0	0	0	0	0	0	0	0
Smoked during pregnancy																
No	162	7.31	84	7.06	115	7.58	235	7.79	2,055	92.69	1,106	92.94	1,403	92.42	2,780	92.21
Yes	2	9.52	1	14.29	1	16.67	7	23.33	19	90.48	6	85.71	5	83.33	23	76.67
Gestational diabetes																
Absent	150	6.91	82	6.94	112	7.57	238	8.15	2,022	93.09	1,099	93.06	1,367	92.43	2,682	91.85
Present	15	17.05	3	7.32	6	10.71	10	6.76	73	82.95	38	92.68	50	89.29	138	93.24
Gestational hypertension																
Absent	140	6.51	74	6.38	92	6.32	218	7.50	2,009	93.49	1,086	93.62	1,364	93.68	2,688	92.50
Present	25	22.52	11	17.74	26	32.91	30	18.52	86	77.48	51	82.26	53	67.09	132	81.48
Eclampsia																
Absent	164	7.28	80	6.60	117	7.64	241	7.90	2,089	92.72	1,132	93.40	1,415	92.36	2,811	92.10
Present	1	14.29	2	40.00	1	50.00	5	38.46	6	85.71	3	60.00	1	50.00	8	61.54

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health
 Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams.

Appendix Table 13 (cont). Percentage of low birthweight births by pregnancy characteristics of mothers who had live births and ward, District of Columbia 2015-2016

	Low Birthweight Births								Normal Weight Births							
	Ward 5		Ward 6		Ward 7		Ward 8		Ward 5		Ward 6		Ward 7		Ward 8	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Total Births	274	10.64	226	8.21	351	13.64	488	14.41	2,300	89.29	2,525	91.75	2,222	86.36	2,898	85.59
Initiation of Prenatal Care																
First Trimester	182	10.83	154	7.53	191	13.43	238	13.85	1,499	89.17	1,892	92.47	1,231	86.57	1,481	86.15
Second Trimester	60	9.98	48	9.45	91	12.31	136	13.36	541	90.02	460	90.55	648	87.69	882	86.64
Third Trimester	13	7.69	5	4.81	21	10.24	31	11.03	156	92.31	99	95.19	184	89.76	250	88.97
No Prenatal Care	10	21.74	9	30.00	27	27.00	56	29.63	36	78.26	21	70.00	73	73.00	133	70.37
Plurality																
Singleton	203	8.25	173	6.54	285	11.53	378	11.75	2,256	91.67	2,472	93.42	2,187	88.47	2,839	88.25
Twin	68	60.71	53	50.00	63	64.29	107	64.46	44	39.29	53	50.00	35	35.71	59	35.54
Triplet	3	100.00	0	0	3	100.00	3	100.00	0	0	0	0	0	0	0	0
Quadruplet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smoked during pregnancy																
No	259	10.51	209	7.95	308	12.79	424	13.82	2,206	89.49	2,420	92.05	2,101	87.21	2,645	86.18
Yes	10	14.29	9	22.50	32	27.83	57	28.93	60	85.71	31	77.50	83	72.17	140	71.07
Gestational diabetes																
Absent	265	10.74	223	8.32	345	13.78	475	14.45	2,203	89.26	2,456	91.68	2,159	86.22	2,812	85.55
Present	8	7.92	3	4.17	3	4.76	13	14.13	93	92.08	69	95.83	60	95.24	79	85.87
Gestational hypertension																
Absent	241	10.04	197	7.56	308	12.77	449	14.07	2,160	89.96	2,409	92.44	2,103	87.23	2,742	85.93
Present	32	19.05	29	20.00	40	25.64	39	20.74	136	80.95	116	80.00	116	74.36	149	79.26
Eclampsia																
Absent	266	10.42	223	8.13	344	13.45	482	14.35	2,287	89.58	2,519	91.87	2,213	86.55	2,877	85.65
Present	7	43.75	3	37.50	4	40.00	6	30.00	9	56.25	5	62.50	6	60.00	14	70.00

Data Source: DC Birth Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health
 Note: A low birthweight live birth is defined as a birth of an infant less than 2500 grams.

Appendix Table 14. Annual infant mortality rates by maternal race and ethnicity, District of Columbia 2010-2016

Year	Overall			non-Hispanic, White			non-Hispanic, Black			Hispanic		
	Number of Births	Number of Deaths	Infant Mortality Rate (per 1,000 live births)	Number of Births	Number of Deaths	Infant Mortality Rate (per 1,000 live births)	Number of Births	Number of Deaths	Infant Mortality Rate (per 1,000 live births)	Number of Births	Number of Deaths	Infant Mortality Rate (per 1,000 live births)
2010	9,156	73	8.0	2,470	13	5.3	4,854	51	10.5	1,351	5	3.7
2011	9,289	69	7.4	2,611	4	1.5	4,784	56	11.7	1,358	7	5.2
2012	9,370	74	7.9	2,755	7	2.5	4,757	59	12.4	1,370	7	5.1
2013	9,264	63	6.8	2,742	5	1.8	4,767	46	9.6	1,243	8	6.4
2014	9,514	72	7.6	2,943	11	3.7	4,755	50	10.5	1,283	6	4.7
2015	9,571	82	8.6	2,957	7	2.4	4,781	65	13.6	1,324	9	6.8
2016	9,854	70	7.1	3,093	7	2.3	4,869	55	11.3	1,346	5	3.7

Data Source: DC Birth and Death Data, Vital Records Division, Center for Policy, Planning and Evaluation, D.C. Department of Health

