Massachusetts Births 2009

Massachusetts Department of Public Health
Bureau of Health Information, Statistics,
Research and Evaluation

August 2011

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Note to Readers

Please review the information below before reading this revision of Massachusetts Births 2009. This revision applies to infant mortality Tables 11-12, 14-15, 21-23, 34-35, 37 and Figures 8, 16-19.

1. **Infant Mortality:** The infant mortality statistics in this report are based upon a revised preliminary 2009 Massachusetts death file (as of August 2, 2011) by the Massachusetts Registry of Vital Records. Infant mortality statistics based upon the final 2009 death file may differ from those in this report.
2. Starting with this year's publication, the following new statistics will be presented:
   - **Early Term Births:** Presented for the state and by maternal race (Table 10) and by maternity facilities (Table 13). Please see the Glossary for definitions of gestational age.
   - **Smoking during Pregnancy by Source of Prenatal Care Payment:** Presented for the state, by maternal race and source of prenatal care payment (Table 30).
3. **Population**: Population estimates from the National Center for Health Statistics for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level, were used to calculate community rates. Data for 2009 were used to calculate statewide rates, e.g., fertility rate, teen birth rate, etc. Please note: If the population in your community increased from 2005 to 2009, the rates listed in this publication may overestimate the actual rate. If the population in your community declined from 2005 to 2009, the rates given in the publication may underestimate the actual rate. When new population data are available for cities and towns, revised rates will be available from MassCHIP (http://masschip.state.ma.us). Please see the Appendix for detailed information about population.
4. **Rate, Proportion, and Number comparisons**: The comparison of rates, proportions, and numbers is based on tests of statistical significance. Comparative words, for example, "higher", "lower", "increase", and "decrease" are used only when the statistics being compared are statistically different (i.e., statistically significant at the $P \leq .05$ level). Please see the Technical Notes for a discussion of how statistical significance is determined. All statistics presented, unless stated otherwise, are based upon the number of births and not on the number of mothers. Proportions are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
5. **Comparisons with National Birth Statistics and Healthy People 2020:** Preliminary US birth statistics for 2009[1] and Preliminary US death statistics for 2009[2] were used for comparison with the 2009 Massachusetts birth figures. Starting with this year's publication, the Maternal, Infant, and Child Health objectives for Healthy People 2020[3] were used to measure the state's progress toward meeting the targets set for 2020 (Table 14).
6. **Resident births:** All data in this publication are resident data unless otherwise stated. Resident data include all events that occur to residents of the Commonwealth, wherever they occur (see Methods in Page 12).
7. **Race and Ethnicity:** In the text, the race categories, White, Black, American Indian, Asian, and Hispanic are mutually exclusive, for example, when we refer to White mothers, this means White non-Hispanic mothers, with the exception of Table 21 (see notes for Table 21).

[1] Hamilton BE, Martin JA, Ventura SJ. Births: Preliminary Data for 2009. National vital statistics reports web release; vol 59 no 3. Hyattsville, MD: National Center for Health Statistics. 2010.
[2] Kochanek KD, Xu JQ, Murphy SL, Miniño AM, Kung HC. Deaths: Preliminary Data for 2009. National Vital Statistics Reports; vol 59 no 4. Hyattsville, MD: National Center for Health Statistics. 2011.
[3] U.S. Department of Health and Human Services. Healthy People 2020. December 2010. http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=26

Highlights

- In 2009 the total number of births to Massachusetts resident women was 74,966, reflecting 2,003 less births than in 2008. This decline in births was essentially driven by 2,001 less births to White women in 2009, compared with 2008. There were significant declines in birth rates among women ages 25-29 years (from 89.7 to 85.3 births per 1,000 women population ages 25-29), and among women ages 30-34 years (from 115.1 to 111.2 births per 1,000 women population ages 30-34).

- The 2009 teen birth rate[4] in Massachusetts (19.5 births per 1,000 women ages 15-19) did not change from 2008 (20.1 births per 1,000) however it continued its downward trend since 1990. Compared with 2007, the teen birth rate declined overall by 11%. During this period this decline was driven by a 32% decline in the rate of Asian teens, a 14% decline in the rate of White teens and an 11% decline in the rate of Hispanic teens.

- The overall preliminary 2009 Massachusetts Infant Mortality Rate (IMR) did not change from 2008 (4.8 infant deaths per 1,000 live births in 2009 vs. 5.0 in 2008). However, for the first time in 2009, the neonatal IMR for Black mothers (5.0 neonatal deaths per 1,000 live births) was not statistically different from the neonatal IMR for White mothers (3.2 neonatal deaths per 1,000). Because of small numbers, neonatal IMRs are less precise and have wide confidence intervals. Neonatal deaths occur within 28 days of birth and accounted for 75% of all infant deaths in 2009 (274 out of 363).
    - In 2009, for the first time in 20 years, the Black to White IMR gap narrowed, from 3.6 in 1990 to 1.9 in 2009, and the Black to White neonatal IMR gap narrowed from 3.6 in 1990 to 1.6 in 2009, to less than a half the gap in 1990.

- For the first time in thirteen consecutive years the primary cesarean delivery rate[5] decreased from the previous year. The rate in 2009 was 23.6%, compared with 24.2% in 2008. The overall cesarean delivery rate in 2009 continued to vary across Massachusetts maternity hospitals, ranging from 15.3% to 45.1%, and by maternal ethnicity, ranging from 22.4% among Cambodian to 44.2% among Brazilian mothers.

- In 2009, the proportion of mothers with their prenatal care (PNC) paid through public sources (including Medicaid/MassHealth, Medicare, free care, other public programs) increased by 2%, from 35.2% in 2008 to 36.4% in 2009. This proportion increased only among Black mothers (by 5%). Three out of four births to mothers with their PNC paid through public sources are paid by Medicaid/MassHealth.

- For the first time since 2001, the percentage of mothers who received adequate prenatal care increased by 3%, from 82.1% in 2008 to 84.3% in 2009. Adequacy of prenatal care utilization (APNCU) began declining in 2001 after it reached a record of 85.2%, the highest since it was introduced as an indicator in 1996. This year's increase was driven by an increase of 2% in the initiation of prenatal care visits, that is, more mothers began their prenatal care in the first trimester, from 81.0% in 2008 to 82.6% in 2009.

[4] State teen birth rates were calculated using 2009 population data; however, please note that 2009 community teen birth rates use 2005 population estimates.

[5] Primary cesarean rate is calculated as the number of primary cesarean delivery births divided by the total number of births to mothers with no prior cesareans and multiplied by 100.

- Breastfeeding initiation remains high at 82%. It increased among all mothers, from 80.8% in 2008 to 82.0% in 2009, and across all racial groups. While initiation figures are high, exclusive breastfeeding for at least four weeks after initiation was only 47%[6].

- Disparities in birth outcomes by race and ethnicity, education, source of prenatal care payments, and by community persist.
    - The Black IMR was 1.9 times higher than the White IMR (7.6 vs. 4.0 infant deaths per 1,000 live births).
    - The birth rate for Hispanic teens was 5.5 times that of Whites (63.1 vs. 11.5 births per 1,000 women ages 15-19 years).
    - Compared with mothers who had a college degree or more, mothers with a high school education or less were less likely to receive adequate prenatal care, more likely to report smoking during their pregnancies, and more likely to deliver low birth weight (LBW) infants (less than 2,500 grams or 5.5 pounds).
    - Mothers with their prenatal care paid through Medicaid/MassHealth were almost 6 times more likely to report smoking during pregnancy than those with their prenatal care paid through private sources (15.3% vs. 2.7%).
    - Among the 30 largest Massachusetts municipalities, Fall River, Lowell, and Weymouth recorded the highest percentages of gestational diabetes mellitus (GDM) (8.6%, 8.1%, and 6.7% respectively).

[6] Massachusetts Preliminary 2009 Pregnancy Risk Assessment Monitoring System (PRAMS) data.

Introduction

This report presents detailed data on the number and characteristics of Massachusetts births in 2009 including maternal behaviors and health characteristics, medical services utilization by pregnant mothers, and infant health characteristics. These data are obtained from the Massachusetts Standard Certificate of Live Birth and the accompanying confidential health and demographic data for each birth record.

Birth certificate data are essential for surveillance, research, programs such as the Universal Newborn Hearing Screening and the Birth Defects Monitoring program, and high-risk infant identification. In addition, birth certificate data are used for the Maternal and Child Health (MCH) five-year needs assessment process to prioritize interventions and services, and for data system development including the Pregnancy to Early Life Longitudinal (PELL) database and the Pregnancy Risk Assessment Monitoring System (PRAMS). The Registry of Vital Records and Statistics and the Massachusetts birthing facilities play a critical role in the collection of birth information for administrative purposes and provide data to programs for decision-making, which guides many public health initiatives. Examples of these are the Gestational Diabetes Summit, in October 2007, and the Massachusetts Perinatal Quality Summit, in May 2011, both as collaborative efforts, with results of their works informing programs, hospitals and health care providers across the state.

Methods

Data on births are based on information from the Massachusetts Standard Certificate of Live Birth (1989 revision) filed with the Registry of Vital Records and Statistics. Medical information, such as birth weight and gestational age, is based on information supplied by hospitals and birthing facilities. Demographic and behavioral data, such as race and ethnicity and smoking during pregnancy, are supplied by the women who gave birth. For example, women chose their race from five categories: White, Black, Asian/Pacific Islander, American Indian, and Other. Mothers identified their ancestry by selecting one of the 38 ancestry/ethnicity groups[7].

Vital statistics birth data may be presented in terms of either maternal residence or place of birth. Resident data include all events that occur to residents of the Commonwealth, regardless of where they happen. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Occurrence data include all events that occur within the state, whether to residents or nonresidents. All data in this publication are for Massachusetts residents unless otherwise stated. There is an agreement among the 50 states, District of Columbia, Puerto Rico, Virgin Islands, Guam, and Canadian provinces that allows for the exchange of statistical copies of birth and death records for events occurring in a state other than the state of residence.

[7] See the “Technical Notes” for a list of ancestries listed in check boxes.

Results

Number and Birth Rate

In 2009, there were 74,966 births to Massachusetts resident mothers compared with 76,969 in 2008. The number of births to Massachusetts residents has declined by 19% since 1990 and by 3% from 2008. The birth rate among women of reproductive age (defined as the number of births per 1,000 females ages 15-44 years) declined by 11% between 1990 and 2009 and by 2% from 2008 (Table 1).

The mean or average maternal age at first birth in 2009 was 27.7 years, which was the same as that of 2008. Asian mothers had the highest mean age at first birth (29.6 years) and Hispanic mothers had the lowest mean age (23.2 years). There were no significant changes in the mean age at first birth for any of the other race and Hispanic categories.

Births to women ages 25-34 years accounted for 55% of all births in 2009 (Table 4). Compared with 2008, the 2009 birth rates decreased among mothers ages 25-29 years (by 5%), and 30-34 years (by 3%). The decline among the 25-29 age group was driven by a 6% decline in the birth rate of Whites and by a 12% decline in the birth rate of Asians. The decline among the 30-34 age group was driven by a 5% decline in the birth rate of Whites (race- and age-specific birth rates not shown).

Births by Race, Hispanic Ethnicity, and Mother's Birthplace

The percentage of births to White mothers decreased from 67.2% in 2008 to 66.4% in 2009. There has been an overall decrease of 15% in the percentage of births to White mothers since 1990, when it was 78.4%. In 2009, the percentage of births to Asian, Hispanic, and Black mothers remained stable compared to the 2008 figures. However, these percentages have increased since 1990 by 120%, 61%, and 20%, respectively (Table 1).

The percentage of births to non-US-born mothers remained stable between 2008 and 2009 (27.7% in 2008 vs. 27.4% in 2009). However, this proportion decreased among White (by 3%), Hispanic (by 3%) and Asian (by 1.5%) mothers in this period (Table 2, 2008 data not shown). The percentage of births to US-born mothers has changed since 2005 by maternal race. Between 2005 and 2009, the proportion of births to US-born mothers decreased among White (by 1%) and Black (by 7%) mothers, while it increased significantly among Hispanic (by 15%) and Asian (by 34%) mothers. In 2009, 37% of Hispanic and 15% of Asian mothers were born in the US, compared with 32% and 11% in 2005, respectively (Table 2, 2005 data not shown).

Emerging Populations

While each of the following populations accounted for less than 3% of all births in 2009, the number of births to mothers with Dominican, Asian Indian, and African ancestry continued to increase from the previous year, by 6%, 6%, and 5% respectively (Table 3, 2008 data not shown).

Births by Age Group

There has been a marked change in the age distribution of Massachusetts women giving birth since 1980. Approximately 25% of women giving birth in 1980 were 30 years and older compared with 53% in 2009 (Figure 1). The 2009 proportion was similar to that of 2008.

Compared with 2008, the largest decreases were among women ages 35-39 years with 649 less births, followed by births to women ages 25-29, with 550 less births in 2009 (Table 4, 2008 data not shown).

Marital Status

The percentage of mothers who were not married at the time of delivery increased by 2% between 2008 and 2009, from 34.0% in 2008 to 34.7% in 2009 (Table 1). In 2009, Hispanics continued to have the highest percentage of unmarried mothers at 67.6% followed by Black mothers at 58.9%. Among the largest ethnic maternal groups, this statistic increased the most among mothers of Portuguese (by 9.7%), European (by 7.6%) and Puerto Rican ancestry (by 2.7%).

In 2009, among the 30 largest cities in the state, Springfield (72.4%), Lawrence (70.7%), and New Bedford (63.5%) had the largest proportion of births to mothers who were not married at time of delivery, while Brookline (5.2%), Newton (7.5%), and Cambridge (15.3%) had the lowest. Between 2008 and 2009, the largest increases in this proportion were seen in Leominster (from 35.0% to 41.3%), Pittsfield (from 52.0% to 58.4%), and Chicopee (from 49.4% to 54.8%) (Table 12, 2008 data not shown). This proportion was highest among mothers with less than a high school education (76.6%), followed by those with a high school education (59.0%) (Table 17).

Breastfeeding

In 2009, the percentage of mothers who breastfed or intended to breastfeed (not exclusively to breast milk) at time of discharge reached a record high of 82% (Table 2), a 2% increase from the 2008 figure. This proportion was highest among Asian mothers (89.3%) and lowest among White mothers (79.9%) and increased by 2% among US-born (50 states and DC) mothers (Table 2, 2008 data not shown). Among the largest maternal ethnic groups, the breastfeeding proportion increased for American (by 2%), Puerto Rican (by 4%), Portuguese (by 5%), and Cambodian (by 10%) mothers (Table 3, 2008 data not shown).

Mothers with a postgraduate education had the highest proportion of breastfeeding infants at 93.1% while those with less than a high school education had the lowest at 70.5%. Between 2008 and 2009, the proportion of breastfed infants increased for all levels of education, except among mothers with a college education. The largest increases were among mothers with a high school education (by 3%) followed by those with less than a high school education (by 2%) (Table 17, 2008 data not shown). This statistic also increased for mothers with prenatal care paid through Medicaid/MassHealth (by 3%) and for those with prenatal care paid through private insurance (by 1%) (Table 30, 2008 data not shown).

Multiple Births

The total percentage of multiple births (twins, triplets or more) has been stable since 2002, after having a 5% increase per year between 1989 and 2002. In 2009, the total proportion of multiple births was 4.7%, compared with 4.5% in 2008. This marginal increase was driven by a 6% increase in the percentage of multiple births among mothers less than 35 years of age, from 3.7% to 3.9%. The proportion of multiple births among mothers ages 35 years and older remained stable from 2008, at 7.5%. This proportion was almost twice that of mothers less than 35 years of age in 2009 (Table 5).

In 2009, 95.3% of births were singletons (71,423 births), 4.5% were twins (3,386 births), and 0.2% were triplets or higher order multiples (157 births) (Table 5). White mothers continue to

have the highest proportion of multiple births at 5.3%, while Hispanic mothers continue to have the lowest at 3.0%.

In 2009, the proportion of multiple births was highest among mothers with post-graduate and college educational attainment (6.6% and 6.4% respectively). Both of these proportions increased from the 2008 figures (Table 17).

Teen Births

In 2009, there were 4,477 births among women ages 15-19 years, which was a decrease of 106 births from 2008 (Table 1). The Massachusetts teen birth rate in 2009 was 19.5 births per 1,000 females ages 15-19 years, compared with 20.1 births per 1,000 females ages 15-19 years in 2008. The Massachusetts teen birth rate in 2009 was 50% below the 2009 US teen birth rate of 39.1 births per 1,000 female ages 15-19 years[8].

Six percent of all births in 2009 were to women under 20 years of age. This proportion was highest among Puerto Rican (22%), Cambodian (15%), and Dominican (13%) women (Table 3), and among women with prenatal care paid through Medicaid (14%) (Table 30).

Twenty-nine percent of teen births were to teenagers 15-17 years (1,318 births), while 71% were to teenagers 18 and 19 years old (3,159) (Table 6). The number of births to the youngest mothers (ages 10-14 years) was 51 in 2009, 40 in 2008, and 49 in 2007. These are small numbers and fluctuate from year to year. Between 2008 and 2009, there was not a significant increase in the birth rate for this age group. In 2009, the youngest mother in Massachusetts was 12 years old, a year younger than that of 2008.

In 2009, teen birth rates decreased for Hispanics (by 5%) and Asians (by 16%). The rate for Hispanic teens was 5.5 times that of Whites (63.1 vs. 11.5 births per 1,000 women ages 15-19 years). When 2009 teen birth rates were compared with those of 1999, all race and ethnicity rates had declined significantly (Figure 2).

Among Massachusetts municipalities with the highest number of teen births, teen birth rates were highest in Holyoke (96.8), Lawrence (79.0), and Chelsea (76.0)[9]. For the calculation of the 2009 city-specific teen birth rates, the latest population estimates available for cities by age, race, and gender are for the year 2005. Note that teen birth rates for 2009 using 2005 population estimates will be overestimated if the female teen population in these cities increased between 2005 and 2009, and teen birth rates will be underestimated if the female teen population in these cities decreased between 2005 and 2009.

Between 2008 and 2009, teen birth rates declined in Chelsea, Fall River, Holyoke, and Worcester, while these rates increased in North Adams (from 28.3 to 51.3 births per 1,000 females ages 15-19 years), Taunton (from 24.5 to 42.9), and Springfield (from 61.4 to 72.1 births per 1,000 females ages 15-19 years) (Table 7, 2008 data not shown).

[8] Hamilton BE, Martin JA, Ventura SJ. Births: Preliminary data for 2009. National vital statistics reports web release; vol 59 no 3. Hyattsville, MD: National Center for Health Statistics. 2010.

[9] Birth rates for cities and towns were calculated using MDPH population estimates for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level. **Please note**: If the population in your community increased from 2005 to 2009, the rates listed may **overestimate** the actual rate. If the population in your community declined from 2005 to 2009, the rates given in the publication may **underestimate** the actual rate.

Low Birth weight

The percentage of low birth weight (LBW) infants (less than 2,500 grams or 5.5 pounds) was 7.8% in 2009, the same as in 2008. This proportion increased by 35% since 1990 when it was 5.8% (Table 1). Since 2004, the proportion of LBW infants in Massachusetts has remained stable. Black infants continue to have the highest percentage of LBW at 10.8% followed by Hispanic infants at 8.6%. Among Asians, this proportion decreased between 2008 and 2009, from 8.4% to 7.6% (Table 2). Infants of African American (12.4%), Haitian (12.4%), Cambodian (11.7%), and Puerto Rican (10.0%) mothers had significantly higher LBW rates than the state overall LBW rate of 7.8% (Table 3).

The percentage of low birth weight among twin births is about 10 times larger than that among singletons. In 2009, 5.5% of singleton births were LBW; whereas, 52.7% of twins and 93.6% of higher order births were LBW (Table 9).

The percentage of very low birth weight (VLBW) infants (less than 1,500 grams or 3.3 pounds), was 1.4% in 2009, similar to that in 2008 at 1.3%. The proportion of VLBW infants born to women ages 35 and older was 1.7%, compared with 1.3% among women less than 35 years of age (Table 9). Black infants continue to have the highest percentage of VLBW at 2.2% followed by Hispanic infants at 1.7% (Table 8).

Preterm and Term Deliveries

The percentage of preterm infants (infants delivered before the 37th week of gestation) was 8.7% in 2009, similar to that of 2008 (Table 1). Black and Hispanic mothers continued to have the highest percentage of preterm infants at 10.5% and 9.3%, respectively, while Asians continued to have the lowest at 7.3% (Table 10). There were no significant changes from the 2008 proportion of preterm infants by race and ethnicity. Among maternal ancestry groups, African American (11.5%), Haitian (11.0%), and Puerto Rican (10.7%) mothers had higher preterm rates than the state overall rate (8.7%).

The percentage of infants delivered very early (before the 28th week of gestation) was 0.7% in 2009. This proportion has remained stable since 1997 when it was 0.6% (close to 500 births each year). Black women had the highest percentage (1.1%) of infants delivered very early, followed by Hispanics (0.9%). Asian and White mothers had the lowest proportion of infants delivered very early (0.5% and 0.6%, respectively) (Table 10).

In 2009, late preterm infants (infants delivered between 34-36 weeks of gestation) comprised 71% of all preterm births in the state. Infants born 34-36 weeks are at heightened risk for adverse health outcomes when compared with infants delivered at higher gestational ages[10]. In 2009, the percentage of late preterm births was 6.2% (Table 1), the same as that of 2008.

This report for the first time differentiates between *early* and *full* term births (Table 10). There is growing evidence of increased neonatal morbidity and mortality among early term infants (infants born between 37-38 weeks of gestation), compared with those born between 39-41 weeks of gestation)[11,12,13] – the latter also known as *full* term infants.

[10] Shapiro-Mendoza CK. Pediatrics 2008; 121:e223-232; Escobar GJ Arch Dis Child 2005; 90:125; Escobar G. Semin Perinatol 2006; 30:28-33; Morse SB Pediatr Res 2006A in Adams-Chapman I Clin Perinatol 2006;33:947; Tomashak KM. J Pediatr 2007; 151:450; Linnet KM. Arch Dis Child 2006; 91:655.

[11] Reddy U et al. Term Pregnancy: A Period of Heterogeneous Risk for Infant Mortality. Obstetrics & Gynecology Volume 117- Issue 6 - pp 1279-1287. doi:10.1097/AOG.0b013e3182179e28. June 2011.

[12] Zhang Xu, Kramer MS. Variation in mortality and morbidity by gestational age among infants born at term. J Pediatr. Mar;154(3):358-62. 2009.

The state proportion of infants born at *early* term has been increasing between 1997 and 2004. Since 2004, this proportion has remained stable and, in 2009, the state proportion of infants born at *early* term was 20.8%, a decrease of 8% from the 2008 proportion. The decline in the proportion of early term infants was driven by declines in this proportion among Asian (by 12%) and White (by 9%) infants.

The proportion of infants born at *early* term was higher than the state's figure for Asian (23.8%) and Black (22.3%) infants and was lower than the state's figure for White infants (20.1%) (Table 10, 2008 data not shown). In 2009, there was a wide variation of this proportion by maternity facilities, from 9.8% in Holyoke Hospital to 29.4% in Milford Regional Medical Center (Table 13).

Smoking

In 2009, 5,116 mothers reported smoking during pregnancy, accounting for 6.8% of all births this year. This proportion remained similar to that of 2008 (6.9%) and has declined by 65% since 1990 (19.3%) (Figure 3). White mothers continued to have the highest reported percentage of smoking during pregnancy at 8.1% followed by Black (5.3%) and Hispanic mothers (5.0%) (Figure 4).

White mothers accounted for 78% of all mothers who reported smoking during pregnancy in 2009. The proportion of mothers who reported smoking during pregnancy did not change from those of 2008 for any of the race and Hispanic ethnicity groups. Native American, Portuguese, African American, American, and Puerto Rican mothers had the highest proportion of mothers who reported smoking during pregnancy in 2009. Each of these proportions was significantly higher than the state overall rate.

While mothers who had prenatal care paid for by Medicaid/MassHealth accounted for only 27% of all births, they encompass 59% of mothers who reported smoking during pregnancy in 2009. This group had 5 times the smoking rate of mothers with prenatal care paid through private insurance (15.3% vs. 2.7% respectively) (Table 30).

In 2009, among the 30 largest cities in the state, the highest reported smoking during pregnancy rates were in Pittsfield (23.2%), Fall River (19.9%), and New Bedford (14.4%) while the lowest were in Newton (1.2%), Cambridge (1.0%) and Brookline (0.2%) (data not shown). The latter three cities are the only among the 30 largest cities that reached the HP2020 target of 1.4% (or less) of women reporting smoking during pregnancy (Table 14).

Mothers with less than a high school education had the highest proportion of smoking during pregnancy (17.7%) and this proportion was much higher than that of mothers with a post-graduate education (0.3%) (Table 17). In 2009, mothers who reported smoking during pregnancy were 1.7 times more likely to have a low birth weight infant than those who reported non-smoking during pregnancy (12.4% vs. 7.4%) (Figure 21).

Prenatal Care

In 2009, for the first time since 2001 the percentage of women receiving adequate prenatal care (PNC) increased to 84.3%, which was a 3% increase from the 2008 figure of 82.1% (Table 1). Adequacy of prenatal care utilization (APNCU) is a measure of the timing and number of prenatal care visits, not an assessment of the quality of PNC. APNCU began declining in 2001 after it reached a record of 85.2%, the highest since it was introduced as an indicator in 1996. This year's increase was driven by a 2% increase in the initiation of prenatal care visits, that is,

[13] Engle WA, Kominiarek MA. Late preterm infants, early term infants and the timing of elective deliveries. Clin Perinatol 35(2):32541. 2008.

more mothers began their prenatal care in the first trimester, 82.6% in 2009, compared with 81.0% in 2008 (Table 2).

The increase from 2008 in the proportion of women receiving adequate PNC was significant across all racial groups except for Black women. In 2009, Hispanic (79.2%) and Black (76.0%) mothers continued to have proportions lower than the state overall proportion of mothers receiving adequate prenatal care. This proportion was highest among White (86.8%) and Asian (84.2%) mothers (Figure 5).

Among the largest maternal ancestry groups, Chinese (88.3%), European (87.8%), Brazilian (87.0%), and American (86.6%) mothers had significantly higher rates of APNCU than the state overall rate of 84.3%. These groups experienced an increase in this proportion from their respective figures in 2008. Lowest proportions of APNCU were among African (75.0%), Cambodian (74.0%), Cape Verdean (72.0%), and Haitian (70.3%) mothers (Table 3).

Mothers with the following maternal characteristics had lower proportion of adequate prenatal care: less than 18 years old, less than a high school education, smoking during pregnancy, unmarried, and non-US-born (Figure 6).

Publicly Financed and Privately Insured Prenatal Care

Maternal characteristics and birth outcomes varied according to whether PNC was paid through public[14] programs or through private[15] insurance. In 2009, Medicaid/MassHealth accounted for 74% of all PNC payments through public programs.

The percentage of mothers who had their prenatal care paid through public programs was 36.1% in 2009, a 2% increase from the 2008 figure of 35.2% (Figure 7). Among teen mothers this proportion was 76.5% in 2009 (Table 20), similar to that in 2008 (77.0%).

In 2009, the rate of mothers with their PNC paid through public sources increased among Black (by 5%) and White (by 2%) mothers, compared with the 2008 rates. Hispanic mothers continued to have the highest rate of PNC paid through public funds at 72.6%, followed by Black mothers at 61.3% (Table 30).

Between 2008 and 2009, among the 30 largest cities in the state, the proportion of mothers with public sources for prenatal care payments increased the most in Chicopee (from 48.0% to 56.9%), Haverhill (from 35.0% to 40.4%), and Pittsfield (from 55.5% to 60.0%) (Table 12).

Overall, in Massachusetts, 26.8% of mothers had prenatal care paid through Medicaid/ MassHealth. However, Medicaid/MassHealth payment for PNC varied widely by race/Hispanic ethnicity. About half of Hispanic and Black mothers had their PNC paid through Medicaid/MassHealth; whereas, 19.7% of Asian and 19.0% of White mothers' PNC was paid through Medicaid/MassHealth (Table 30).

[14] Public programs include: Medicaid/MassHealth, CommonHealth, Healthy Start, and Medicare (may also be HMO or managed care), or free care.

[15] Private insurance include: Commercial indemnity plan, commercial managed care (HMO, PPO, IPP, IPA, and other), or other private insurance.

Cesarean Delivery

The overall cesarean delivery rate in 2009 was 33.6%. Though this was not a statistically significant decline from the 2008 rate of 34.3% (Table 1), this is the first year since 1996 this rate is below (by 2%) the previous year's rate. Since 1997, the overall cesarean delivery rate and the primary cesarean delivery rate[16] had been increasing steadily. However, this steady increase has slowed down in the last five years.

In 2009, the primary cesarean delivery rate for the state declined for the first time in 13 years to 23.6%, compared with 24.2% in 2008 (Table 31, 2008 data not shown). Primary cesarean deliveries accounted for 59% of all cesarean births in 2009 (Table 31). The decline in this rate from the previous year is mainly driven by a 4% decline in the primary cesarean delivery rate among White mothers with PNC paid through private insurance (from 26.6% in 2008 to 25.6% in 2009) (data not shown).

In 2009, Hispanic and Asian mothers continued to have the lowest cesarean delivery rates (29.4% and 31.6%, respectively), while White and Black mothers continued to have the highest rates (34.8% and 33.8%, respectively). Between 2008 and 2009, the largest declines were seen among women born in the US (by 2%) (Table 2) and among women ages 30-34 years (by 4%) (data not shown).

Among the largest ethnic groups, Brazilian mothers had the highest percentage of cesarean deliveries (44.2%), followed by Asian Indian (39.4%), Haitian (38.3%) and Portuguese (38.2%) mothers. Cambodian (22.4%), Honduran (24.0%), and Guatemalan (24.1%) mothers had the lowest percentage of cesarean deliveries in 2009 (Table 3).

Women with prenatal care paid through private sources had higher cesarean delivery rates (35.9%) than those paid through public sources (30.0%) (Table 30). In 2009, Brockton Hospital (45.1%), Metrowest Medical Center-Framingham Campus (42.8%) and South Shore Hospital (42.1%) had the highest overall cesarean delivery rates. Among those with the lowest rates were Heywood Memorial Hospital (15.3%), Holyoke Hospital (18.2%), and Tobey Hospital (22.1%). Between 2008 and 2009, 11 of the 48 maternity hospitals experienced a decline in this rate, while 5 of the 48 experienced increases (Table 13).

Nulliparous women (giving birth for the first time) with term gestation (>= 37 weeks) of a singleton in vertex position (NTSV) was introduced as a quality obstetric measure with a focus on primary cesareans by both the American College of Obstetricians and Gynecologists (ACOG)[17] and the Department of Health and Human Services for Healthy People 2010, Objective 16-9, ''Reduce Cesarean Births in Low Risk Women.''[18] In 2009, 28.3% of NTSV births were delivered by cesarean in the state, compared with 29.6% in 2008. This rate is within 25% of the HP2020 target of 23.9% (Table 14).

In 2009, among NTSV births, the cesarean rates by maternity facilities in Massachusetts ranged from 11.1% to 46.4% (data not shown). The facility with the highest rate was more than four times the rate of the facility with the lowest rate for this low risk population.

[16] The primary cesarean rate is the number of primary cesarean delivery births divided by the total number of births to mothers with no prior cesareans multiplied by 100.

[17] American College of Obstetricians and Gynecologists Task Force on Cesarean Delivery. Evaluation of cesarean delivery. Washington (DC): American College of Obstetricians and Gynecologists; 2000. p. 1-59.

[18] US Department of Health and Human Services. Objectives for Improving Health (Part B: Focus Areas 15-28). Vol 2. In: Healthy People 2010. 2nd ed. Washington (DC): US Government Printing Office; 2000. p. 16-29, 16-31.

Gestational Diabetes Mellitus (GDM)
In 2009, the prevalence of GDM increased by 15% from the 2008 figure, from 4.0% to 4.7% (Table 1). This increase was seen among White (by 16%), Hispanic (by 15%), and Asian (by 11%) mothers. Black mothers also experienced an increase of 11% but this was not statistically significant. Asians continued to have the highest prevalence of GDM (8.6%), while White and Hispanic mothers had the lowest (4.0% and 4.7%, respectively).

The prevalence of gestational diabetes mellitus (GDM) increases with increasing maternal age. In 2009, the prevalence of GDM among women ages 45 years and older was 12.0%, which was almost 5 times that of women ages 20-24 years (2.5%). This rate increased across all age groups from 2008, and the largest increase was among women ages 20-24 years (by 31%).

Among the largest maternal ethnic groups, Asian Indian (10.2%), Chinese (9.4%), Vietnamese (8.8%), Haitian (7.3%), and African (7.2%) mothers had a higher prevalence of GDM than the overall state prevalence. African American (3.5%), European (3.6%) and American (4.3%) mothers had a significantly lower prevalence of GDM than the state's figure (Table 3). Between 2008 and 2009, this rate increased among Native American (by 162%, from 1.9% to 5.0%), African (by 34%, from 5.4% to 7.2%), Dominican (by 33%, from 3.4% to 4.6%), Chinese (by 21%, from 7.8% to 9.4%), Puerto Rican (by 21%, from 4.2% to 5.1%), European (by 20%, from 3.0% to 3.6%) and American (by 18%, from 3.6% to 4.3%) (Table 3, 2008 data not shown).

Between 2008 and 2009, the prevalence of GDM increased in seven of the 30 largest cities of the state: Peabody (by 88%, from 2.6% to 4.9%), Weymouth (by 83%, from 3.6% to 6.6%), Brookline (by 73%, from 2.6% to 4.5%), Framingham (by 59%, from 2.8% to 4.5%), Newton (by 54%, from 3.1% to 4.7%), Worcester (by 51%, from 4.3% to 6.5%), and Waltham (by 49%, from 4.1% to 6.1%). Plymouth was the only city in this group that experienced a significant decline between 2008 and 2009 (by 63%, from 2.7% to 1.0%) and became the city with the lowest prevalence of GDM in its group (Table 12, 2008 data not shown).

Infant Mortality Rate (IMR)
In 2009, there were 363 infant deaths (deaths of infants less than one year of age) compared with 382 in 2008 (Table 11). The IMR was 4.8 deaths per 1,000 live births in 2009, compared with 5.0 deaths per 1,000 live births in 2008. This change was not statistically significant. While the IMR has decreased by 33% since 1990, from 7.0 to 4.8 deaths per 1,000 live births, it has remained stable in the last decade.

The majority of infant deaths occur in the neonatal period (before 28 days of life). The remaining infant deaths occur in the post neonatal period (between 28 and 364 days of life). In 2009, three out of four (75%) infant deaths occurred in the neonatal period and 25% in the post neonatal period (Figure 18). The proportion of neonatal deaths, out of all infant deaths, was highest among Asian (89%) and White (79%) mothers and lowest among Hispanic (69%) and Black (66%) mothers.

The IMR among Black mothers reached a record low in 2009. It declined by 35% from 2008, from 11.7 to 7.6 deaths per 1,000 live births. The decline in IMR among Black mothers between 2008 and 2009 was driven by a 42% decline in the IMR during the neonatal period for this group, from 8.6 in 2008 to 5.0 in 2009, neonatal deaths per 1,000 live births. Though the magnitude of the decline among Black mothers in both, their IMR and neonatal IMR was large, these did not reach significance (Table 11).

However, in 2009, for the first time in 20 years, the ratio of Black to White IMR narrowed, from 3.6 in 1990 to 1.9 in 2009. Also, in 2009, for the first time in 20 years, the neonatal IMR for Black mothers was not statistically different from the neonatal IMR for White mothers (5.0 among Black mothers versus 3.2 among White mothers), and the Black to White neonatal IMR ratio also decreased significantly, from 3.6 in 1990 to 1.6 in 2009 (Table 11, 1990 data not shown).

The post neonatal IMR remained stable between 2008 and 2009 and, in 2009, the post neonatal IMR among Black mothers (2.6 deaths per 1,000 live births) continued to be higher than the state post neonatal IMR (1.2 deaths per 1,000 love births) (Table 11).

Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2009, in the 30 largest municipalities in the Commonwealth, maternal characteristics and outcomes varied (Table 12):

- The proportion of mothers receiving adequate prenatal care ranged from 67.8% in Pittsfield to 91.3% in Framingham.
- The proportion of mothers with prenatal care paid through public sources (government programs including Medicaid/MassHealth, Healthy Start, Medicare, CommonHealth, free care and other) ranged from 5.3% in Brookline to 75.5% in Lawrence.
- The proportion of mothers that were unmarried at time of delivery ranged from 5.2% in Brookline to 72.4% in Springfield.
- Plymouth had the largest proportion of births to White mothers (93%), Brockton had the largest proportion of births to Black mothers (53%), Lawrence had the largest proportion of births to Hispanic mothers (81%), and Quincy had the largest proportion of births to Asian or other race mothers (32%).
- The gestational diabetes mellitus (GDM) prevalence was significantly higher than the statewide prevalence of 4.7% in the following four communities: Fall River (8.6%), Lowell (8.1%), Worcester (6.5%), and Quincy (6.3%).
- Five communities recorded low birth weight percentages that were higher than the statewide average of 7.8%: New Bedford (10.5%), Lowell (10.3%), Waltham (10.1%), Springfield (9.0%), and Boston (8.9%).
- Twelve of the 30 largest communities had higher rates of reported smoking during pregnancy than the state rate of 6.8%. In Pittsfield (23.3%) the rate was over three times higher than the state rate. In Fall River (19.9%), New Bedford (14.4%), and Chicopee (13.9%) these rates were between two and three times the state rate.
- Based on a three-year IMR from 2007-2009, which is a more stable rate than a one-year rate, Worcester (8.8), Springfield (8.3), Fall River (8.2), Brockton (8.0), and Boston (6.7) had higher IMRs than the state overall three-year IMR from 2007-2009 (4.9) (Table 12).
- In seventeen of the thirty largest communities the teen birth rates per 1,000 women ages 15-19 were significantly higher than the statewide rate of 19.6. The highest rates were in Lawrence (79.0), Springfield (72.1), and New Bedford (58.5).

Birth Characteristics by Hospital

Listed below are hospitals that in 2009 had the three highest and three lowest rates of early term, overall cesarean deliveries, low birth weight infants, publicly funded deliveries, and deliveries with adequate prenatal care (Table 13). Non-hospital facilities are not included in this section.

Early Term Births (37-38 weeks) (state: 20.8%)	(%)
Highest percentages in:	
MILFORD REGIONAL MEDICAL CENTER	29.4
EMERSON HOSPITAL	25.9
CARITAS NORWOOD HOSPITAL	25.7
Lowest percentages in:	
HOLYOKE HOSPITAL	9.8
BRIGHAM AND WOMEN'S HOSPITAL	14.2
TOBEY HOSPITAL	14.6
Overall Cesarean Deliveries (state: 33.7%)	
Highest percentages in:	
BROCKTON HOSPITAL	45.1
METROWEST MEDICAL CENTER-FRAMINGHAM UNION	42.8
SOUTH SHORE HOSPITAL	42.1
Lowest percentages in:	
HEYWOOD MEMORIAL HOSPITAL	15.3
HOLYOKE HOSPITAL	18.2
BAYSTATE FRANKLIN MEDICAL CENTER	21.1
Low Birth weight (LBW) (state: 7.7%)	
Highest percentages in:	
TUFTS MEDICAL CENTER	27.7
CARITAS ST. ELIZABETH'S MEDICAL CENTER OF BOSTON	14.9
BAYSTATE MEDICAL CENTER	12.4
Lowest percentages in:	
NANTUCKET COTTAGE HOSPITAL	0.8
FAIRVIEW HOSPITAL	1.2
MARTHA'S VINEYARD HOSPITAL	1.3
Publicly Funded Prenatal Care (state: 35.6%)	
Highest percentages in:	
BOSTON MEDICAL CENTER	77.9
HOLYOKE HOSPITAL	72.9
LAWRENCE GENERAL HOSPITAL	69.0
Lowest percentages in:	
NEWTON WELLESLEY HOSPITAL	4.0
WINCHESTER HOSPITAL	5.8
EMERSON HOSPITAL	8.0
Adequacy of Prenatal Care by Facility (state: 84.4%)	
Highest percentages in:	
NORTH SHORE BIRTH CENTER	96.2
MARTHA'S VINEYARD HOSPITAL	95.3
BRIGHAM AND WOMEN'S HOSPITAL	95.1
Lowest percentages in:	
CARITAS NORWOOD HOSPITAL	58.3
CARITAS ST. ELIZABETH'S MEDICAL CENTER OF BOSTON	62.5
CARITAS GOOD SAMARITAN MEDICAL CENTER	63.7

A Comparison of Massachusetts and US Indicators

According to the US birth statistics for 2009[19], the following Massachusetts perinatal health indicators in 2009 were significantly different than those for the US:

- The fertility rate (births to women ages 15-44 years per 1,000 women ages 15-44 years) in Massachusetts was 55.1, 17% below the US fertility rate at 66.7.
- The teen birth rate in Massachusetts (19.6 births per 1,000 females ages 15-19 years) was 50% lower than the US teen birth rate (39.1 births per 1,000 females ages 15-19 years).
- The percentage of unmarried mothers in Massachusetts (34.7%) was 15% lower than the US percentage of unmarried mothers (41.0%).
- The percentage of low birthweight in Massachusetts (7.8%) was 4% lower than the US low birthweight rate of 8.2%. The state rate reached the new HP2020 target (7.8%) in 2008.
- The Cesarean delivery rate in Massachusetts (33.7%) was 2% higher than the US Cesarean delivery rate (32.9%).
- The IMR in Massachusetts (4.7 deaths per 1,000 live births) was 27% lower than the US IMR in 2009 (6.4 deaths per 1,000 live births)[20].

Healthy People 2020 Objectives

In December of 2010, the US Department of Health and Human Services set new targets for the year 2020 for each measurable Healthy People objective 2020 (HP2020)[21]. Table 14 presents the most recent Massachusetts data and measures the Commonwealth's progress toward meeting the targets set for sixteen of the HP2020 Maternal, Infant, and Child Health (MICH) objectives. The revised targets for the year 2020 have been set to reduce more current national baseline measures using data sources from the National Vital Statistics System (NVSS), CDC, and NCHS. These new targets are more attainable than those set for the year 2010.

For twelve of sixteen HP2020 objectives presented, Massachusetts has met the 2020 targets (Table 14). For four objectives, the 2009 Massachusetts indicators are within 25% of the 2020 target goals: very low birthweight infants born at Level III hospitals, cesareans among low-risk women giving birth for the first time (this group is also known as NTSV births: nulliparous, term, singleton, vertex births), cesareans among low-risk women who had a prior cesarean, and smoking during pregnancy.

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[19] Hamilton BE, Martin JA, Ventura SJ. Births: Preliminary data for 2009. National vital statistics reports web release; vol 59 no 3. Hyattsville, MD: National Center for Health Statistics. 2010.

[20] Kochanek KD, Xu JQ, Murphy SL, Miniño AM, Kung HC. Deaths: Preliminary Data for 2009. National Vital Statistics Reports; vol 59 no 4. Hyattsville, MD: National Center for Health Statistics. 2011..

[21] U.S. Department of Health and Human Services. Healthy People 2020. December 2010. http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=26

Table 1. Trends in Birth Characteristics, Massachusetts: 1990, 1995-2009

Characteristic		1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Births[1]	**n**[2]	92,461	81,562	80,164	80,321	81,406	80,866	81,582	81,014	80,624	80,167	78,460	76,824	77,670	77,934	76,969	74,966
	Rate[3]	62.1	55.5	54.6	54.7	55.6	55.9	57.1	56.6	56.8	56.8	56.2	55.6	56.9	57.2	56.5	55.1
Race of Mother																	
White non-Hispanic	**n**	72,483	63,043	61,829	61,204	61,764	60,402	60,051	59,115	58,136	57,604	55,322	53,469	52,975	52,620	51,760	49,759
	%[4]	78.4	77.3	77.1	76.2	75.9	74.7	73.6	73.0	72.1	71.9	70.5	69.6	68.2	67.5	67.2	66.4
Black non-Hispanic	**n**	7,158	5,858	5,491	5,482	5,549	5,844	5,755	5,862	5,948	5,902	6,053	6,077	6,452	6,462	6,652	6,945
	%[4]	7.7	7.2	6.9	6.8	6.8	7.2	7.1	7.2	7.4	7.4	7.7	7.9	8.3	8.3	8.6	9.3
Asian	**n**	3,349	3,355	3,398	3,719	3,748	4,138	4,667	4,784	5,300	5,224	5,454	5,251	5,469	5,758	5,958	5,939
	%[4]	3.6	4.1	4.2	4.6	4.6	5.2	5.7	5.9	6.6	6.5	7.0	6.8	7.0	7.4	7.7	7.9
Hispanic	**n**	8,406	8,077	7,756	8,211	8,665	8,815	9,247	9,410	9,543	9,764	9,798	10,061	10,696	10,861	10,895	10,986
	%[4]	9.1	9.9	9.7	10.2	10.6	10.9	11.3	11.6	11.8	12.2	12.5	13.1	13.8	13.9	14.2	14.7
Teen Births	**n**	7,258	5,990	5,758	5,801	5,823	5,515	5,305	4,979	4,642	4,639	4,559	4,539	4,722	4,944	4,583	4,477
(Ages 15-19)	**Rate**[3]	35.4	30.3	28.5	28.5	28.1	26.7	25.9	24.9	23.3	23.0	22.2	21.7	21.3	22.0	20.1	19.5
Births to Unmarried	**n**	22,837	20,857	20,253	20,640	21,191	21,448	21,621	21,620	21,604	22,262	22,376	23,170	24,977	26,010	26,146	26,029
	%	24.7	25.6	25.3	25.7	26.0	26.5	26.5	26.7	26.8	27.8	28.5	30.2	32.2	33.4	34.0	34.7
Cesarean Deliveries	**n**	20,615	16,758	15,675	15,742	16,975	18,080	19,086	20,639	22,553	23,392	24,295	24,732	25,901	26,240	26,240	25,067
	%	22.3	20.6	19.6	19.6	20.9	22.4	23.4	25.5	28.0	29.2	31.0	32.3	33.4	33.7	34.3	33.6
Gestational Diabetes[5]	**n**							2,245	2,402	2,633	2,693	2,741	2,666	2,925	3,279	3,086	3,445
	%							2.8	3.0	3.3	3.4	3.5	3.5	3.8	4.2	4.0	4.7
Low Birthweight[6]	**n**	5,388	5,174	5,105	5,617	5,655	5,708	5,711	5,795	6,060	6,115	6,125	6,073	6,150	6,147	5,955	5,804
	%	5.8	6.4	6.4	7.0	7.0	7.1	7.1	7.2	7.5	7.6	7.8	7.9	7.9	7.9	7.8	7.8
Preterm[7]	**n**	5,899	6,438	5,705	5,831	6,117	6,136	6,582	6,412	6,795	6,963	7,222	6,925	6,954	6,980	6,750	6,516
	%	6.5	7.9	7.2	7.3	7.6	7.6	8.3	8.0	8.5	8.7	9.2	9.0	9.0	9.0	8.8	8.7
Late Preterm[8]	**n**	3,977	4,546	3,966	3,949	4,186	4,153	4,509	4,428	4,726	4,800	5,016	4,808	4,918	4,945	4,753	4,602
	%	4.4	5.6	5.0	4.9	5.2	5.2	5.7	5.5	5.9	6.0	6.4	6.3	6.3	6.4	6.2	6.2
Adequate Prenatal Care																	
Kessner Index[9]	**%**	80.1	84.2	79.9	80	79.8	79.4	79.1	80.4	79.9	79.9	79.5	78.9	77.6	77.8	76.9	79.1
APNCU Index[10]	**%**			83.3	82.9	82.9	82.9	83.3	85.2	84.7	84.5	84.2	84.0	83.1	82.8	82.1	84.3

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Births presented in all tables are resident live births unless otherwise specified. 2. Differences in numbers of births from previous publications are the result of updated files. 3. Birth rates represent the total number of births to women ages 15-44 years per 1,000 females ages 15-44; teen birth rates refer to number of births per 1,000 females ages 15-19. Population data for computing 2009 birth rates at the state level were provided by the US Census Bureau. See the "Population Denominators" section of the "Technical Notes" for further information. 4. Percentages are calculated based on births, including those to mothers of unknown race. 5. Gestational diabetes is defined as glucose intolerance found during pregnancy for the first time. It excludes cases with pre-existing diabetes. 6. Low birthweight: less than 2,500 grams or 5.5 pounds. 7. Preterm: <37 weeks gestation. 8. Late preterm: 34-36 weeks of gestation. 9. Adequacy of prenatal care in Massachusetts has historically been measured with the Kessner Index, based on the timing of care and number of visits. This measure is calculated based on only those births with known adequacy of prenatal care. Changes in the calculation of the Kessner Index in 1996, as well as computational adjustments made for 1996-2000 data, make data prior to 1996 non-comparable to data from 1996 onward. 10. Beginning with Births 2001, the APNCU Index has replaced the Kessner Index as the standard measurement of adequacy of prenatal care (see Technical Notes for more information).

Table 2. Birth Characteristics by Maternal Race/Hispanic Ethnicity and Birthplace, Massachusetts: 2009

Race and Hispanic Ethnicity (by mother's birthplace)	Births		Teen Births				Birthweight				Prenatal Care				Cesarean Deliveries		Breastfeeding[5]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate[4]		1st Trimester					
	n	%[1]	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
State Total	**74,966**	**100.0**	**1,369**	**1.8**	**4,528**	**6.0**	**1,014**	**1.4**	**5,804**	**7.8**	**61,669**	**84.3**	**60,758**	**82.6**	**25,067**	**33.6**	**60,261**	82.0
US inc. DC	52,406	69.9	1,096	2.1	3,607	6.9	699	1.3	4,078	7.8	43,811	85.7	43,388	84.4	17,660	33.9	39,854	77.9
US Territories[7]	1,983	2.6	127	6.4	360	18.2	41	2.1	209	10.6	1,507	77.3	1,500	76.6	559	28.3	1,522	77.5
Non-US-born[8]	20,567	27.4	144	0.7	558	2.7	268	1.3	1,508	7.4	16,343	81.5	15,861	78.5	6,846	33.4	18,880	92.7
White Non-Hispanic	**49,759**	**66.4**	**484**	**1.0**	**1,977**	**4.0**	**582**	**1.2**	**3,547**	**7.2**	**42,167**	**86.8**	**41,975**	**85.9**	**17,209**	**34.8**	**38,857**	79.9
US inc. DC	43,497	87.4	461	1.1	1,883	4.3	522	1.2	3,132	7.2	36,944	87.0	36,793	86.2	15,050	34.8	33,088	78.0
US Territories[7]	54	0.1	3	--[6]	9	16.7	1	--[6]	8	14.8	36	67.9	39	73.6	10	18.5	42	79.2
Non-US-born[8]	6,205	12.5	19	0.3	84	1.4	56	0.9	404	6.5	5,184	85.1	5,140	84.1	2,149	34.7	5,727	93.2
Black non-Hispanic	**6,945**	**9.3**	**185**	**2.7**	**602**	**8.7**	**156**	**2.2**	**750**	**10.8**	**5,116**	**76.0**	**4,927**	**72.3**	**2,342**	**33.8**	**5,962**	86.2
US inc. DC	3,293	47.4	163	4.9	511	15.5	73	2.2	411	12.5	2,529	78.9	2,446	75.7	1,041	31.7	2,546	77.7
US Territories[7]	21	0.3	2	--[6]	5	23.8	0	0.0	2	--[6]	21	100.0	19	90.5	7	33.3	18	85.7
Non-US-born[8]	3,630	52.3	20	0.6	86	2.4	83	2.3	336	9.3	2,565	73.2	2,461	69.2	1,294	35.7	3,397	93.9
Hispanic	**10,986**	**14.7**	**604**	**5.5**	**1,697**	**15.4**	**182**	**1.7**	**940**	**8.6**	**8,476**	**79.2**	**8,133**	**75.3**	**3,212**	**29.4**	**9,166**	84.3
US inc. DC	4,011	36.5	385	9.6	1,001	25.0	79	2.0	383	9.6	3,120	79.1	2,985	75.3	1,143	28.6	3,027	76.2
US Territories[7]	1,903	17.3	122	6.4	345	18.1	40	2.1	199	10.5	1,446	77.3	1,439	76.5	540	28.5	1,459	77.4
Non-US-born[8]	5,070	46.1	96	1.9	349	6.9	61	1.2	356	7.1	3,908	80.0	3,707	74.9	1,527	30.3	4,678	93.2
Asian	**5,939**	**7.9**	**57**	**1.0**	**140**	**2.4**	**62**	**1.0**	**451**	**7.6**	**4,945**	**84.2**	**4,771**	**81.0**	**1,872**	**31.6**	**5,273**	89.3
US inc. DC	895	15.1	54	6.0	123	13.7	8	0.9	86	9.6	722	81.2	681	76.4	227	25.4	734	82.6
US Territories[7]	1	--[6]	0	0.0	0	0.0	0	0.0	0	0.0	1	--[6]	0	0.0	1	--[6]	1	--[6]
Non-US-born[8]	5,042	84.9	3	--[6]	17	0.3	53	1.1	364	7.2	4,222	84.7	4,090	81.8	1,644	32.7	4,538	90.6
American Indian[9]	**122**	**0.2**	**5**	**4.1**	**13**	**10.7**	**0**	**0.0**	**6**	**5.0**	**86**	**72.9**	**82**	**69.5**	**35**	**28.9**	**92**	76.0
US inc. DC	114	93.4	5	4.4	13	11.4	0	0.0	6	5.4	78	70.9	74	67.3	34	30.1	84	74.3
US Territories[7]	1	--[6]	0		0		0		0		1	--[6]	1	--[6]	0		1	--[6]
Non-US-born[8]	7	5.7	0	0.0	0	0.0	0	0.0	0	0.0	7	100.0	7	100.0	1	--[6]	7	100.0
Other[10]	**1,036**	**1.4**	**32**	**3.1**	**92**	**8.9**	**26**	**2.5**	**91**	**8.8**	**788**	**79.3**	**775**	**77.0**	**365**	**35.5**	**828**	86.6
US inc. DC	452	43.6	26	5.8	69	15.3	11	2.4	45	10.0	346	80.1	332	75.8	136	30.3	307	75.6
US Territories[7]	3	--[6]	0	0.0	1	--[6]	0	0.0	0	0.0	2	--[6]	2	--[6]	1	--[6]	1	--[6]
Non-US-born[8]	581	56.1	6	1.0	22	3.8	15	2.6	46	7.9	440	78.7	441	77.9	228	39.5	520	95.1
Unknown[11]	**179**	**0.2**	**2**	--[6]	**7**	**3.9**	**6**	**4.8**	**19**	**15.1**	**91**	**82.0**	**95**	**79.8**	**32**	**25.4**	**83**	82.2

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. In the column "Births %," the percentages of the race/Hispanic groups (bolded) are based on the state total (including births of unknown race/ethnicity), and the birthplace percents for the race/ethnicities are based on the total number in race/Hispanic ethnicity category. For all other categories, percentages are based on row totals. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low birthweight: less than 2,500 grams or 5.5 pounds. 4 Based on Adequacy of Prenatal Care Utilization (APNCU) Index. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 6. Calculations based on 1-4 events are excluded. 7. The category "US Territories" includes women born in Puerto Rico, the US Virgin Islands, and Guam. Approximately 95% of the births in this category were to women born in Puerto Rico. 8. The category "Non-US-born" includes women born outside of the 50 US states, District of Columbia, and the US territories. 9. Mothers who selected American Indian as their race. 10. Mothers who indicated "Other" as their race. 11. Mothers who did not indicate a race/ethnicity.

Table 3. Birth Characteristics by Maternal Ancestry, Massachusetts: 2009

Maternal Ancestry	Births[1]		Teen Births				Low Birthwt[2]		Prenatal Care				Late Preterm[4]		Cesarean Section		Breast-feeding[5]		Gestational Diabetes[6]	
			<18 years		<20 Years				Adequate[3]		1st Trimester									
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
State Total	**74,966**	**100.0**	**1,369**	**1.8**	**4,528**	**6.0**	**5,804**	**7.8**	**61,669**	**84.3**	**60,758**	**82.6**	**4,602**	**6.2**	**25,067**	**33.6**	**60,261**	**82.0**	**3,445**	**4.7**
American	29,380	39.2	401	1.4	1,584	5.4	2,223	7.6	25,060	86.6	25,120	86.6	1,833	6.3	10,071	34.4	22,205	76.0	1,245	4.3
European	14,701	19.6	45	0.3	242	1.6	885	6.1	12,531	87.8	12,326	85.9	827	5.7	5,059	34.7	12,509	86.3	518	3.6
Puerto Rican	4,894	6.5	394	8.1	1,089	22.3	489	10.0	3,725	77.3	3,646	75.3	362	7.4	1,365	28.0	3,617	74.5	248	5.1
African-American	2,761	3.7	125	4.5	410	14.8	343	12.4	2,135	79.5	2,096	77.4	211	7.7	855	31.1	2,104	76.5	95	3.5
Brazilian	2,248	3.0	17	0.8	54	2.4	135	6.0	1,917	87.0	1,842	83.3	115	5.2	986	44.2	2,123	95.4	111	5.0
Dominican	2,142	2.9	97	4.5	282	13.2	185	8.7	1,689	80.6	1,630	77.4	126	5.9	752	35.4	1,896	89.6	97	4.6
Asian Indian	1,643	2.2	0	0.0	1	--[7]	142	8.7	1,388	85.2	1,390	85.2	82	5.0	646	39.4	1,586	96.9	167	10.2
African	1,633	2.2	6	0.4	22	1.3	127	7.8	1,198	75.0	1,139	70.7	85	5.2	573	35.2	1,546	94.8	116	7.2
Chinese	1,557	2.1	2	--[7]	4	--[7]	90	5.8	1,367	88.3	1,338	86.3	78	5.0	458	29.5	1,418	91.5	146	9.4
Haitian	1,209	1.6	12	1.0	36	3.0	150	12.4	803	70.3	773	65.6	73	6.0	463	38.3	1,124	93.0	87	7.3
Salvadoran	1,138	1.5	29	2.5	101	8.9	80	7.0	899	83.7	841	76.1	60	5.3	277	24.4	1,082	95.5	56	5.0
Cape Verdean	1,053	1.4	39	3.7	123	11.7	92	8.8	741	72.0	695	67.0	74	7.0	305	29.0	911	87.2	41	3.9
Portuguese	959	1.3	15	1.6	61	6.4	78	8.1	810	86.0	821	86.2	63	6.6	366	38.2	546	60.0	52	5.4
South American	888	1.2	15	1.7	51	5.7	61	6.9	722	83.7	699	80.3	66	7.5	274	31.0	830	94.6	43	4.9
Middle Eastern	861	1.1	2	--[7]	8	0.9	55	6.4	660	78.2	665	78.5	48	5.6	281	32.7	792	92.2	47	5.5
Guatemalan	848	1.1	28	3.3	80	9.4	64	7.6	615	75.6	507	61.8	51	6.1	203	24.1	760	90.8	35	4.2
Vietnamese	721	1.0	2	--[7]	14	1.9	55	7.6	590	83.8	575	80.8	46	6.4	214	29.7	577	80.7	63	8.8
Cambodian	622	0.8	44	7.1	93	15.0	72	11.7	455	74.0	385	62.4	50	8.1	139	22.4	408	66.3	37	6.0
Mexican	490	0.7	25	5.1	46	9.4	20	4.1	372	78.6	375	78.5	25	5.2	165	34.0	443	92.3	20	4.1
Korean	417	0.6	0	0.0	1	--[7]	17	4.1	354	86.3	355	86.4	13	3.1	124	29.7	392	94.9	23	5.5
Honduran	313	0.4	9	2.9	28	8.9	22	7.1	236	79.5	218	71.2	9	2.9	75	24.0	301	96.2	10	3.2
Native American[8]	245	0.3	8	3.3	23	9.4	11	4.5	190	80.2	177	74.4	14	5.7	74	30.3	184	76.0	12	5.0

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. In 2009, certain ancestry groups were combined: Lebanese, Iranian, Israeli, and Other Middle Eastern ancestries were combined into "Middle Eastern"; Colombian and Other South American were combined into "South American"; and Nigerian and Other African were combined into "African." 1. In the column "Births," percentages are based on column total (state total of births, including births for which maternal ethnicity is unknown and other). For all other categories, percentages are based on row totals. 2. Low birthweight: less than 2,500 grams or 5.5 pounds. 3. Based on Adequacy of Prenatal Care Utilization (APNCU) Index. 4. Late preterm: 34-36 weeks gestation. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 6. Gestational diabetes is defined as glucose intolerance found during pregnancy for the first time. It excludes cases with pre-existing diabetes. 7. Calculations based on 1-4 events are excluded. 8. Mothers who selected Native American as their ancestry.

Figure 1. Trends in the Number of Births by Mother's Age Group, Massachusetts: 1980-2009

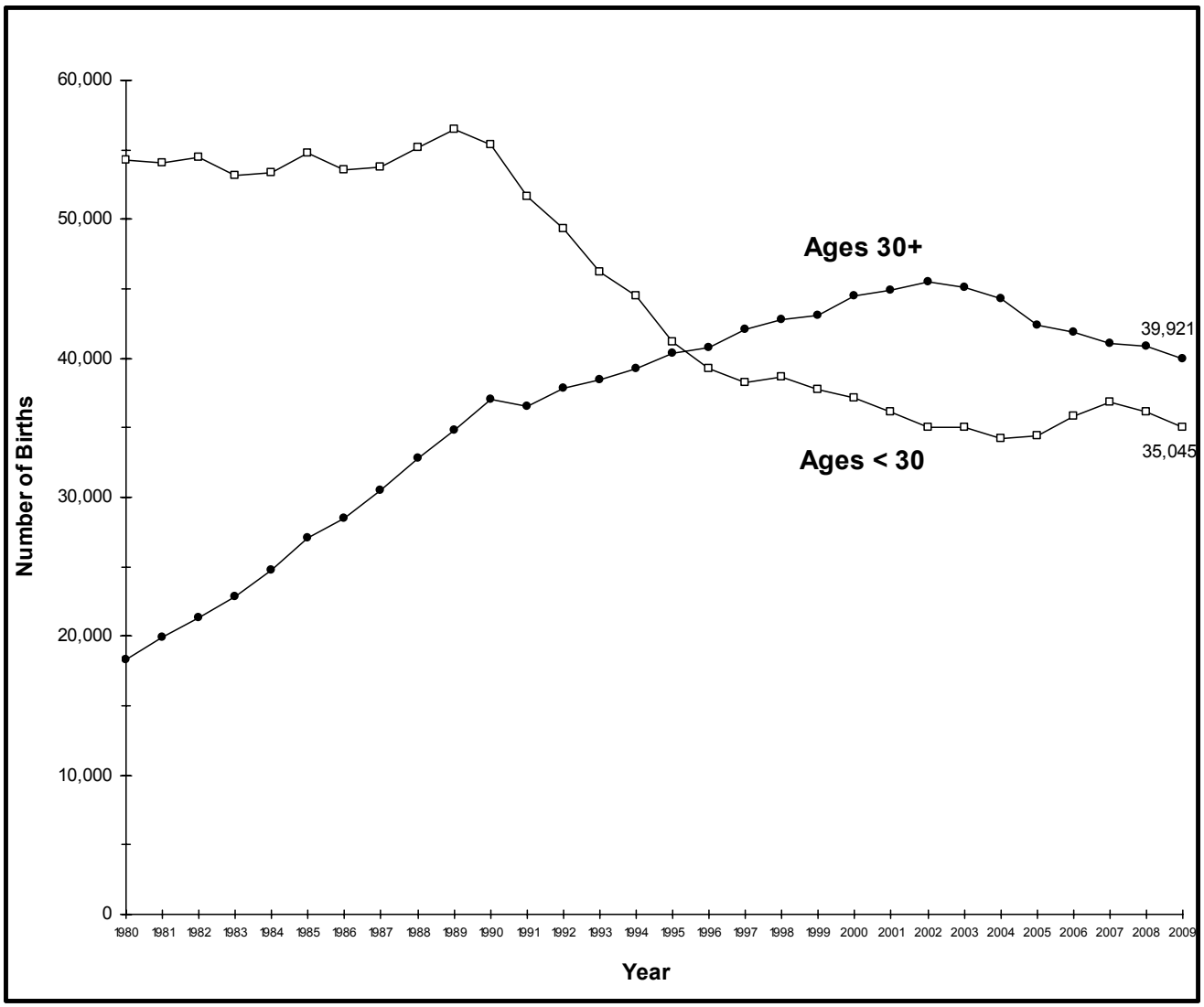


Table 4. Age-Specific and Crude Birth Rates, Massachusetts: 1990 and 2009

	1990		2009		
Mother's Age	**Births[1]**	**Rate**	**Births**	**Rate[2]**	**Percent Change in Rate**
10-14	124	1.3	51	0.3	-76.9%
15-19	7,259	35.1	4,477	19.5	-44.4%
20-24	18,115	69.5	12,048	52.3	-24.7%
25-29	29,913	107.2	18,469	85.3	-20.4%
30-34	25,687	93.9	23,143	111.2	18.4%
35-39	9,795	40.1	13,521	60.4	50.6%
40-44	1,522	6.9	3,040	12.3	78.3%
45+[3]	46	0.3	193	0.7	133.3%
Birth Rate[4] (ages 15-44)	92,290	62.2	74,698	55.1	-11.4%
Crude Birth Rate[5]	92,461	15.4	74,966	11.4	-26.0%

NOTE: All percentages are calculated based on only births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Differences in the number of births from previous publications are the result of updated files. The number of births for all age groups does not always add to the total number of births because mother's age is sometimes not recorded on the birth certificate.
2. Population estimates from the National Center for Health Statistics for 2009 were used to calculate birth rates at the state level.
3. Denominator is the female population ages 45-49.
4. Rate represents the total number of births to women ages 15-44 per 1,000 females in the population ages 15 to 44.
5. Births per 1,000 residents (male and female). Includes births to mothers of all age groups and mothers for whom age is unknown.

Table 5. Trends in Number and Percent Distribution of Births by Plurality and Age Massachusetts: 1995-2009

Age Group / Year	Singletons		Multiples[1]						Total births[2]	
			Twins		Triplets or more		Total Multiples			
	n	%	n	%	n	%	n	%	n	%
All Ages										
1995	78,935	96.8	2,429	3.0	198	0.2	2,627	3.2	81,562	100.0
1996	77,355	96.5	2,621	3.3	194	0.2	2,815	3.5	80,164	100.0
1997	77,203	96.1	2,856	3.6	262	0.3	3,118	3.9	80,321	100.0
1998	78,004	95.8	3,114	3.8	288	0.4	3,402	4.2	81,406	100.0
1999	77,473	95.8	3,147	3.9	246	0.3	3,393	4.2	80,866	100.0
2000	78,075	95.7	3,263	4.0	244	0.3	3,507	4.3	81,582	100.0
2001	77,409	95.6	3,371	4.2	234	0.3	3,605	4.4	81,014	100.0
2002	76,673	95.1	3,708	4.6	243	0.3	3,951	4.9	80,624	100.0
2003	76,367	95.3	3,551	4.4	249	0.3	3,800	4.7	80,167	100.0
2004	74,677	95.2	3,538	4.5	245	0.3	3,783	4.8	78,460	100.0
2005	73,258	95.4	3,375	4.4	190	0.2	3,565	4.6	76,824	100.0
2006	74,146	95.5	3,375	4.3	149	0.2	3,524	4.5	77,670	100.0
2007	74,498	95.6	3,310	4.2	126	0.2	3,436	4.4	77,934	100.0
2008	73,475	95.5	3,365	4.4	129	0.2	3,494	4.5	76,969	100.0
2009	71,423	95.3	3,386	4.5	157	0.2	3,543	4.7	74,966	100.0
Ages <35										
1995	65,669	97.2	1,787	2.6	141	0.2	1,928	2.9	67,597	100.0
1996	63,560	96.9	1,935	2.9	126	0.2	2,061	3.1	65,621	100.0
1997	62,598	96.7	1,949	3.0	170	0.3	2,119	3.3	64,717	100.0
1998	62,719	96.4	2,193	3.4	170	0.3	2,363	3.6	65,082	100.0
1999	61,816	96.4	2,147	3.3	150	0.2	2,297	3.6	64,113	100.0
2000	61,659	96.4	2,205	3.4	130	0.2	2,335	3.6	63,994	100.0
2001	60,704	96.3	2,211	3.5	134	0.2	2,345	3.7	63,049	100.0
2002	59,736	96.0	2,379	3.8	127	0.2	2,506	4.0	62,242	100.0
2003	59,347	95.9	2,389	3.9	118	0.2	2,507	4.1	61,854	100.0
2004	57,618	96.0	2,229	3.7	142	0.2	2,371	4.0	59,989	100.0
2005	56,380	96.3	2,086	3.6	102	0.2	2,188	3.7	58,569	100.0
2006	57,237	96.3	2,116	3.6	89	0.1	2,205	3.7	59,442	100.0
2007	57,977	96.3	2,144	3.6	87	0.1	2,231	3.7	60,208	100.0
2008	57,080	96.3	2,111	3.6	78	0.1	2,189	3.7	59,269	100.0
2009	55,906	96.1	2,202	3.8	80	0.1	2,282	3.9	58,188	100.0
Ages 35+										
1995	13,264	95.0	642	4.6	57	0.4	699	5.0	13,963	100.0
1996	13,793	94.8	686	4.7	68	0.5	754	5.2	14,547	100.0
1997	14,602	93.6	907	5.8	92	0.6	999	6.4	15,601	100.0
1998	15,282	93.6	921	5.6	118	0.7	1,039	6.4	16,321	100.0
1999	15,657	93.5	1,000	6.0	96	0.6	1,096	6.5	16,753	100.0
2000	16,412	93.3	1,058	6.0	114	0.6	1,172	6.7	17,584	100.0
2001	16,703	93.0	1,160	6.5	100	0.6	1,260	7.0	17,963	100.0
2002	16,936	92.1	1,329	7.2	116	0.6	1,445	7.9	18,381	100.0
2003	17,015	92.9	1,162	6.3	131	0.7	1,293	7.1	18,308	100.0
2004	17,055	92.4	1,309	7.1	103	0.6	1,412	7.6	18,467	100.0
2005	16,874	92.5	1,289	7.1	88	0.5	1,377	7.5	18,251	100.0
2006	16,901	92.8	1,257	6.9	60	0.3	1,317	7.2	18,218	100.0
2007	16,519	93.2	1,166	6.6	39	0.2	1,205	6.8	17,724	100.0
2008	16,392	92.6	1,254	7.1	51	0.3	1,305	7.4	17,697	100.0
2009	15,513	92.5	1,184	7.1	77	0.5	1,261	7.5	16,774	100.0

1. Numbers of multiples (n) represent individual infants rather than sets of infants. 2. Differences in the number of births from previous publications are the result of updated files.

Table 6. Summary of Selected Teen Birth Characteristics, Massachusetts: 2009

	Ages 15-17		Ages 18-19		Combined Ages 15-19	
	N	%[1]	N	%[1]	N	%[1]
State total	1,318	29.4%	3,159	70.6%	4,477	100.0%
Maternal Demographics						
Race/Hispanic Ethnicity	N	%[2]	N	%[2]	N	%[2]
White non-Hispanic	473	35.9%	1,493	47.3%	1,966	44.0%
Black non-Hispanic	179	13.6%	417	13.2%	596	13.3%
Asian	56	4.3%	83	2.6%	139	3.1%
Hispanic	572	43.5%	1,093	34.7%	1,665	37.2%
Other	36	2.7%	68	2.2%	104	2.3%
Birthplace						
US States / D.C.	1,056	80.2%	2,511	91.4%	3,567	87.8%
Puerto Rico / US Terr.	123	9.3%	233	8.5%	356	8.8%
Non-US-born	137	10.4%	414	15.1%	551	13.6%
Prenatal care funding						
Public	985	76.4%	2,375	76.6%	3,360	76.5%
Private, other	305	23.6%	725	23.4%	1,030	23.5%
Pregnancy-Related Factors						
Adequacy of Prenatal Care[3]						
Adequate Total[4]	901	68.4%	2,322	73.5%	3,223	72.0%
Adequate Intensive	423	32.1%	1,036	32.8%	1,459	32.6%
Adequate Basic	478	36.3%	1,286	40.7%	1,764	39.4%
Intermediate	112	8.5%	266	8.4%	378	8.4%
Inadequate/None	285	21.6%	496	15.7%	781	17.4%
Unknown	20	1.5%	75	2.4%	95	2.1%
Parity[5]						
1	1,224	93.3%	2,631	83.8%	3,855	86.6%
2	84	6.4%	453	14.4%	537	12.1%
3+	4	--[6]	54	1.7%	58	1.3%
Smoking during Pregnancy						
Yes	126	9.6%	433	13.7%	559	12.5%
No	1,191	90.4%	2,723	86.3%	3,914	87.5%
Birth Outcomes						
Birthweight						
< 500 g	5	0.4%	6	0.2%	11	0.2%
500-1,499 g	28	2.1%	47	1.5%	75	1.7%
1,500-2,499 g	96	7.3%	227	7.2%	323	7.3%
LBW (<2,499 g)	129	9.8%	280	8.9%	409	9.2%
2,500-3,999 g	1,122	85.5%	2,674	85.1%	3,796	85.2%
4000+ g	61	4.6%	187	6.0%	248	5.6%
Gestational age						
< 28 weeks	21	1.6%	25	0.8%	46	1.0%
< 37 weeks	130	9.9%	287	9.1%	417	9.4%
37-42 weeks	1,183	90.1%	2,852	90.9%	4,035	90.6%
43+ weeks	0	0.0%	0	0.0%	0	0.0%
Plurality						
Singleton	1,296	98.3%	3,090	97.8%	4,386	98.0%
Multiple birth	22	1.7%	69	2.2%	91	2.0%

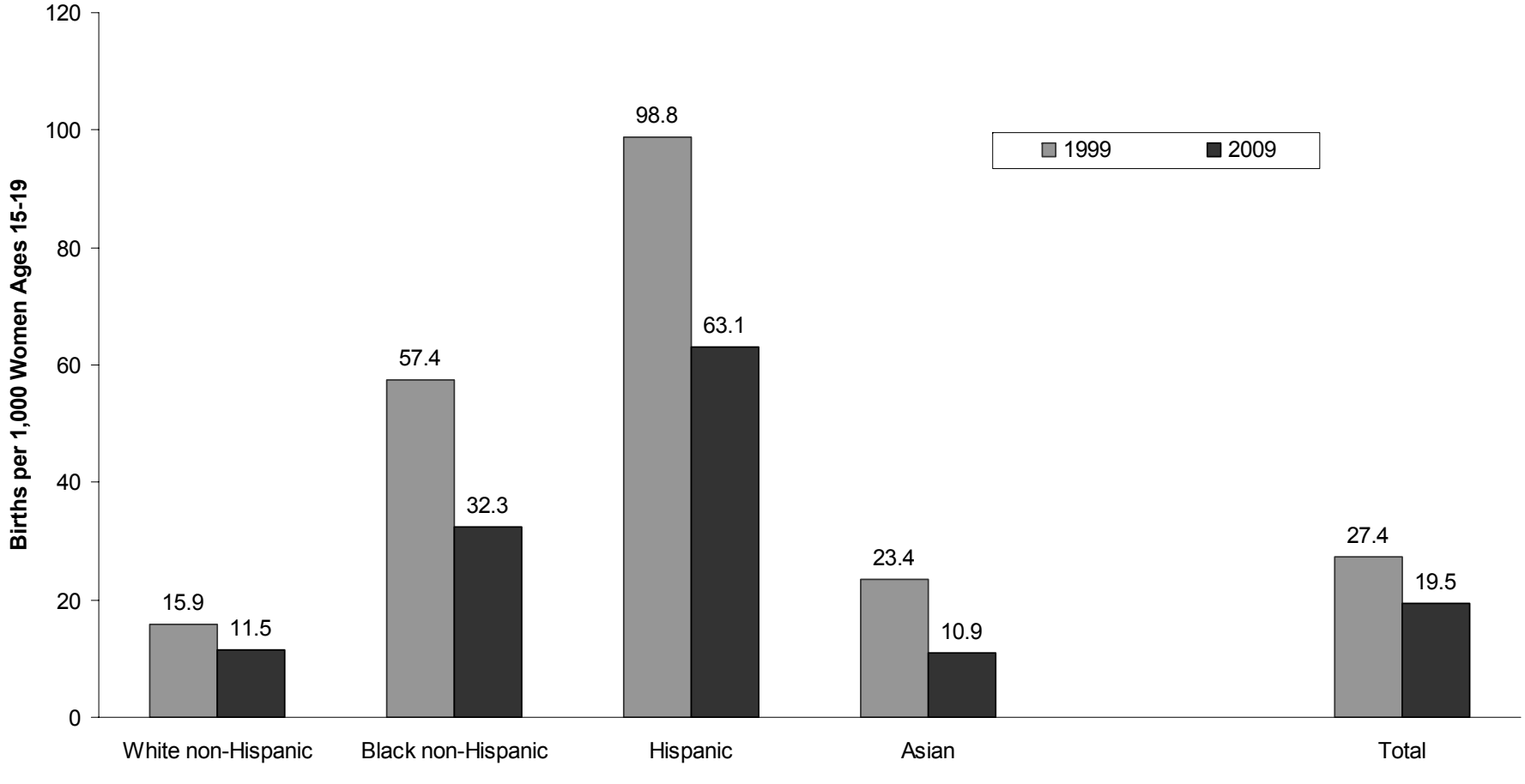
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. For state total row, percentages are based on total births to females ages 15-19. For the rest of the table, percentages are based on births for a given age group and characteristic. 2. Percents are based on state total of the age group. 3. Based on Adequacy of Prenatal Care Utilization (APNCU) Index. 4. Adequate Total = Adequate Basic + Adequate Intensive. 5. Number of live births including the current birth. 6. Calculations based on 1-4 events are excluded.

Table 7. Trends in Teen Birth Rates for Selected Communities, Ranked by 2009 Teen Birth Rate
Massachusetts: 1999, 2008, and 2009

2009 Rank	Municipality[1]	1999[2]		2008		2009	
		Number of Teen Births	Teen Birth Rate[3]	Number of Teen Births	Teen Birth Rate[3]	Number of Teen Births	Teen Birth Rate2[3,4]
	State Total	**5,515**	**26.7**	**4,583**	**20.1**	**4,477**	**19.5**
1	Holyoke	147	98.7	174	115.3	146	96.8
2	Lawrence	277	100.5	245	80.9	239	79.0
3	Chelsea	90	92.7	97	97.0	76	76.0
4	Springfield	485	83.4	373	61.4	438	72.1
5	New Bedford	221	73.3	186	62.9	173	58.5
6	Lynn	174	62.6	164	53.2	172	55.8
7	Southbridge	41	73.7	34	60.9	31	55.6
8	Pittsfield	48	34.1	60	47.2	70	55.1
9	Revere	29	25.0	53	50.3	56	53.2
10	Lowell	235	61.4	193	48.7	210	53.0
11	North Adams	30	41.2	16	28.3	29	51.3
12	Fall River	150	52.1	159	56.2	129	45.6
13	Taunton	83	51.5	40	24.5	70	42.9
14	Chicopee	63	35.6	59	33.9	72	41.4
15	Fitchburg	94	59.8	60	38.4	64	40.9
16	Brockton	169	55.6	155	42.6	137	37.7
17	Haverhill	82	47.5	61	32.0	70	36.7
18	Everett	32	32.1	43	40.6	37	34.9
19	Attleboro	33	28.3	30	26.4	39	34.4
20	Leominster	60	50.5	29	23.1	41	32.7
21	Worcester	304	45.0	256	36.4	219	31.1
22	Methuen	42	33.0	30	22.6	40	30.1
23	Boston	761	37.3	565	28.6	521	26.4
24	Framingham	54	27.9	53	27.1	50	25.6
25	Somerville	64	34.1	33	15.2	40	18.4

1. Selected communities include the 25 Massachusetts cities and towns with the greatest number of teen births. Ranking is by 2009 teen birth rate. 2. Source for 1999 births and rates: Massachusetts Community Health Information Profile (MassCHIP), MDPH, v3.0 r321, October 2009; natality dataset. 3. Rates are per 1,000 females ages 15-19 per city/town. 4. Population estimates from the National Center for Health Statistics for 2009 were used to calculate birth rates at the state level. Birth rates for cities and towns were calculated using MDPH population estimates for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level. Please note: If the population in your community increased from 2005 to 2009, the rates listed may overestimate the actual rate. If the population in your community declined from 2005 to 2009, the rates given in the publication may underestimate the actual rate. As soon as new population data are available for cities and towns, revised rates will be available from MassCHIP http://masschip.state.ma.us.

Figure 2. Birth Rates among Females Ages 15-19 Years by Mother's Race/Hispanic Ethnicity, Massachusetts: 1999 and 2009



Note: Teen birth rate is number of births to females ages 15-19 per 1,000 females ages 15-19.
Denominators for 1999 state rates are based on the 1999 MISER Population Estimates. 2009 birth rates are based on the 2008 population estimates from the National Center for Health Statistics.

Table 8. Births by Birthweight, Race/Hispanic Ethnicity, Massachusetts: 2009

Birthweight (in grams)	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown race/ethnicity
	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n
State Total	**74,966**	**100.0**	**49,759**	**100.0**	**6,945**	**100.0**	**10,986**	**100.0**	**5,939**	**100.0**	**1,158**	**100.0**	**179**
<500	117	0.2	50	0.1	20	0.3	27	0.2	15	0.3	2	--[2]	3
500-999	396	0.5	215	0.4	75	1.1	65	0.6	25	0.4	13	1.1	3
1,000-1,499	501	0.7	317	0.6	61	0.9	90	0.8	22	0.4	11	1.0	0
1,500-1,999	1,147	1.5	737	1.5	136	2.0	173	1.6	77	1.3	22	1.9	2
2,000-2,499	3,643	4.9	2,228	4.5	458	6.6	585	5.3	312	5.3	49	4.3	11
2,500-2,999	12,240	16.4	7,166	14.5	1,494	21.5	2,030	18.6	1,326	22.4	205	17.8	19
3,000-3,499	27,804	37.3	17,842	36.1	2,666	38.4	4,305	39.4	2,508	42.3	443	38.5	40
3,500-3,999	21,679	29.1	15,533	31.5	1,584	22.8	2,862	26.2	1,356	22.9	307	26.6	37
4,000-4,499	6,007	8.1	4,602	9.3	372	5.4	702	6.4	238	4.0	84	7.3	9
4,500-4,999	912	1.2	697	1.4	64	0.9	89	0.8	44	0.7	16	1.4	2
>=5,000	82	0.1	63	0.1	6	0.1	10	0.1	3	--[2]	0	0.0	0
Unknown birthweight	438	0.6	309	0.6	9	0.1	48	0.4	13	0.2	6	0.5	53
VLBW[3] (0-1,499 g)	1,014	1.4	582	1.2	156	2.2	182	1.7	62	1.0	26	2.3	6
LBW[4] (0-2,499 g)	5,804	7.8	3,547	7.2	750	10.8	940	8.6	451	7.6	97	8.4	19

NOTE: Percentages for detailed birthweight rows ("<500" through "Unknown birthweight") are calculated based on births including those with unknown birthweight. Percentages for VLBW and LBW rows are calculated based on births with known birthweight only.

1. Percentages are based on column totals. 2. Calculations based on values of 1-4 are excluded. 3. Very Low Birthweight (VLBW): less than 1,500 grams (3.3 lbs.). 4. Low Birthweight (LBW): less than 2,500 grams (5.5 lbs.).

Table 9. Low Birthweight by Plurality and Maternal Age, Massachusetts: 1999-2009

Age Group (years)	Year	Singleton				Multiples												Total Births			
						Twin				Triplets or more				Total Multiples							
		VLBW[1]		LBW[2]		VLBW[1]		LBW[2]		VLBW[1]		LBW[2]		VLBW[1]		LBW[2]		VLBW[1]		LBW[2]	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All Ages	1999	731	0.9	3,869	5.0	324	10.3	1,617	51.6	65	26.5	222	90.6	389	11.5	1,839	54.5	1,120	1.4	5,708	7.1
	2000	722	0.9	3,886	5.1	284	8.9	1,603	50.0	84	35.0	222	92.5	368	10.7	1,825	53.0	1,090	1.4	5,711	7.1
	2001	730	0.9	3,931	5.1	310	9.2	1,654	49.2	74	32.9	210	93.3	384	10.7	1,864	52.0	1,114	1.4	5,795	7.2
	2002	699	0.9	3,972	5.2	342	9.2	1,855	50.2	68	28.0	233	95.9	410	10.4	2,088	53.0	1,109	1.4	6,060	7.5
	2003	713	0.9	4,006	5.3	331	9.3	1,877	52.9	71	28.5	232	93.2	402	10.6	2,109	55.6	1,115	1.4	6,115	7.6
	2004	740	1.0	4,015	5.4	324	9.2	1,879	53.2	84	34.4	231	94.7	408	10.8	2,110	55.9	1,148	1.5	6,125	7.8
	2005	701	1.0	4,126	5.6	322	9.5	1,765	52.3	75	39.5	181	95.3	397	11.1	1,946	54.6	1,098	1.4	6,072	7.9
	2006	687	0.9	4,264	5.8	308	9.1	1,746	51.8	46	31.1	140	94.6	354	10.1	1,886	53.6	1,041	1.3	6,150	7.9
	2007	693	0.9	4,258	5.7	306	9.2	1,772	53.6	54	42.9	117	92.9	360	10.5	1,889	55.0	1,053	1.4	6,147	7.9
	2008	627	0.9	4,039	5.5	324	9.7	1,803	53.8	55	42.6	113	87.6	379	10.9	1,916	55.1	1,006	1.3	5,955	7.8
	2009	677	1.0	3,886	5.5	276	8.2	1,771	52.7	61	38.9	147	93.6	337	9.6	1,918	54.5	1,014	1.4	5,804	7.8
Ages < 35	1999	569	0.9	3,082	5.0	231	10.8	1,124	52.6	49	32.9	138	92.6	280	12.3	1,262	55.2	849	1.3	4,344	6.8
	2000	555	0.9	3,096	5.1	204	9.4	1,097	50.7	49	38.0	125	96.9	253	11.0	1,222	53.3	808	1.3	4,318	6.9
	2001	576	1.0	3,147	5.2	235	10.7	1,156	52.4	41	31.3	120	91.6	276	11.8	1,276	54.6	852	1.4	4,423	7.0
	2002	537	0.9	3,129	5.2	237	10.0	1,229	51.9	42	33.1	125	98.4	279	11.2	1,354	54.2	816	1.3	4,483	7.2
	2003	539	0.9	3,161	5.3	256	10.7	1,325	55.5	38	32.2	114	96.6	294	11.7	1,439	57.5	833	1.3	4,600	7.5
	2004	565	1.0	3,128	5.4	207	9.3	1,224	55.0	56	39.7	133	94.3	263	11.1	1,357	57.3	828	1.4	4,485	7.5
	2005	552	1.0	3,198	5.7	215	10.3	1,149	55.1	47	46.1	100	98.0	262	12.0	1,249	57.1	814	1.4	4,447	7.6
	2006	534	0.9	3,342	5.8	217	10.3	1,157	54.8	28	31.5	83	93.3	245	11.1	1,240	56.3	779	1.3	4,582	7.7
	2007	533	0.9	3,317	5.7	223	10.4	1,191	55.6	45	51.7	85	97.7	268	12.0	1,276	57.2	801	1.3	4,593	7.6
	2008	492	0.9	3,134	5.5	218	10.4	1,181	56.2	34	43.6	70	89.7	252	11.6	1,251	57.4	744	1.3	4,385	7.4
	2009	525	0.9	3,093	5.6	174	7.9	1,187	54.2	36	45.0	76	95.0	210	9.2	1,263	55.6	735	1.3	4,356	7.5
Ages 35+	1999	162	1.0	787	5.0	93	9.3	493	49.5	16	16.7	84	87.5	109	10.0	577	52.8	271	1.6	1,364	8.2
	2000	167	1.0	790	4.9	80	7.7	506	48.6	35	31.5	97	87.4	115	10.0	603	52.3	282	1.6	1,393	8.1
	2001	154	0.9	784	4.7	75	6.5	498	43.2	33	35.1	90	95.7	108	8.7	588	47.2	262	1.5	1,372	7.7
	2002	161	1.0	842	5.0	105	7.9	626	47.1	26	22.4	108	93.1	131	9.1	734	50.8	292	1.6	1,576	8.6
	2003	174	1.0	844	5.0	75	6.5	552	47.5	33	25.2	118	90.1	108	8.4	670	51.9	282	1.5	1,514	8.3
	2004	174	1.0	886	5.2	117	9.0	655	50.2	28	27.2	98	95.1	145	10.3	753	53.5	319	1.7	1,639	8.9
	2005	149	0.9	927	5.5	107	8.3	616	47.8	28	31.8	81	92.0	135	9.8	697	50.6	284	1.6	1,624	8.9
	2006	151	0.9	919	5.4	89	7.1	587	46.8	18	30.5	57	96.6	107	8.1	644	49.0	258	1.4	1,563	8.6
	2007	160	1.0	941	5.7	83	7.1	581	49.8	9	23.1	32	82.1	92	7.6	613	50.9	252	1.4	1,554	8.8
	2008	135	0.8	905	5.6	106	8.5	622	49.8	21	41.2	43	84.3	127	9.8	665	51.2	262	1.5	1,570	8.9
	2009	152	1.0	792	5.1	102	8.7	584	49.9	25	32.5	71	92.2	127	10.2	655	52.5	279	1.7	1,447	8.7

NOTE: Very Low Birthweight (VLBW) births are a subset of Low Birthweight (LBW) births. All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. 1. Very Low Birthweight (VLBW): less than 1,500 grams (3.3 lbs.). 2. Low Birthweight (LBW): less than 2,500 grams (5.5 lbs.).

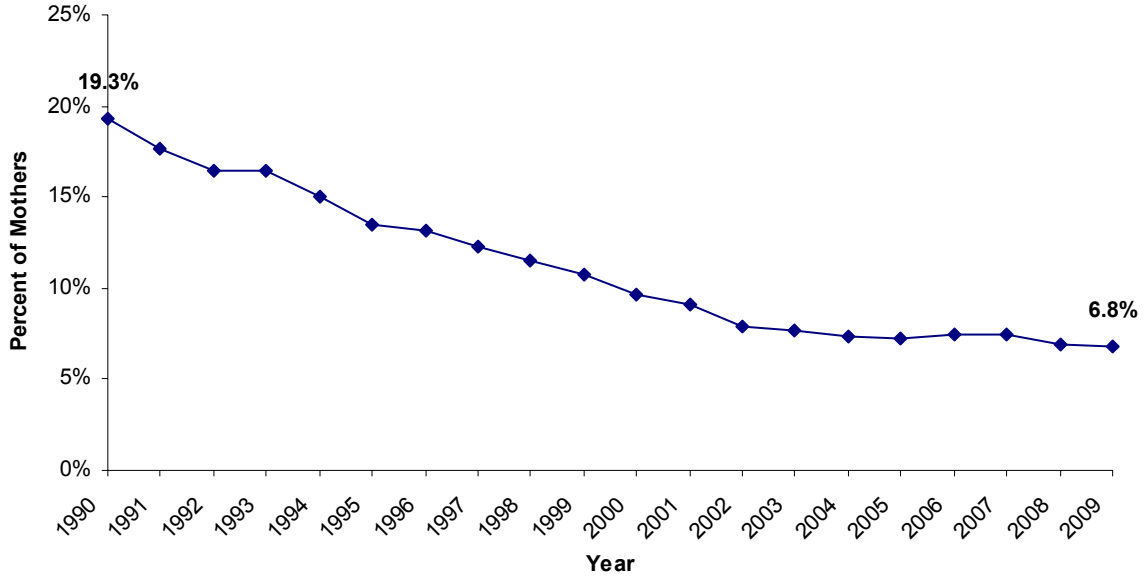
Table 10. Births by Gestational Age, Race/Hispanic Ethnicity, Massachusetts: 2009

Gestational Age[1] (weeks completed)	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[3]		Unknown
	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n
State Total	**74,544**	**100.0**	**49,464**	**100.0**	**6,937**	**100.0**	**10,940**	**100.0**	**5,928**	**100.0**	**1,151**	**100.0**	**124**
<20	13	0.0	8	0.0	2	--[4]	2	--[4]	0	0.0	1	--[4]	0
20-23	144	0.2	61	0.1	23	0.3	37	0.3	14	0.2	3	--[4]	6
24-27	330	0.4	189	0.4	54	0.8	56	0.5	24	0.4	7	0.6	0
28-31	620	0.8	396	0.8	91	1.3	94	0.9	23	0.4	16	1.4	0
32-33	807	1.1	546	1.1	84	1.2	107	1.0	53	0.9	14	1.2	3
34-36	4,602	6.2	3,009	6.1	471	6.8	719	6.6	321	5.4	70	6.1	12
37-38	15,515	20.8	9,960	20.1	1,545	22.3	2,322	21.2	1,408	23.8	255	22.2	25
39	22,380	30.0	15,030	30.4	1,880	27.1	3,218	29.4	1,892	31.9	327	28.4	33
40	22,099	29.6	14,666	29.6	2,112	30.4	3,237	29.6	1,729	29.2	321	27.9	34
41	7,561	10.1	5,272	10.7	624	9.0	1,089	10.0	437	7.4	130	11.3	9
42	459	0.6	317	0.6	48	0.7	59	0.5	26	0.4	7	0.6	2
43	13	0.0	9	0.0	3	--[4]	0	0.0	1	--[4]	0	0.0	0
44+	1	--[4]	1	--[4]	0	0.0	0	0.0	0	0.0	0	0.0	0
Preterm[5] (<37)	**6,516**	**8.7**	**4,209**	**8.5**	**725**	**10.5**	**1,015**	**9.3**	**435**	**7.3**	**111**	**9.6**	**21**
Very Early[6] (<28)	487	0.7	258	0.5	79	1.1	95	0.9	38	0.6	11	1.0	6
(28-33)	1,427	1.9	942	1.9	175	2.5	201	1.8	76	1.3	30	2.6	3
Late (34-36)	4,602	6.2	3,009	6.1	471	6.8	719	6.6	321	5.4	70	6.1	12
Term (>=37)	**68,028**	**91.3**	**45,255**	**91.5**	**6,212**	**89.5**	**9,925**	**90.7**	**5,493**	**92.7**	**1,040**	**90.4**	**103**
Early Term (37-38)	15,515	20.8	9,960	20.1	1,545	22.3	2,322	21.2	1,408	23.8	255	22.2	25
(39-41)	52,040	69.8	34,968	70.7	4,616	66.5	7,544	69.0	4,058	68.5	778	67.6	76
(>=42)	473	0.6	327	0.7	51	0.7	59	0.5	27	0.5	7	0.6	2
Unknown[7]	422		295		8		46		11		7		55

NOTE: Percentages are calculated based on births with known gestational age only.

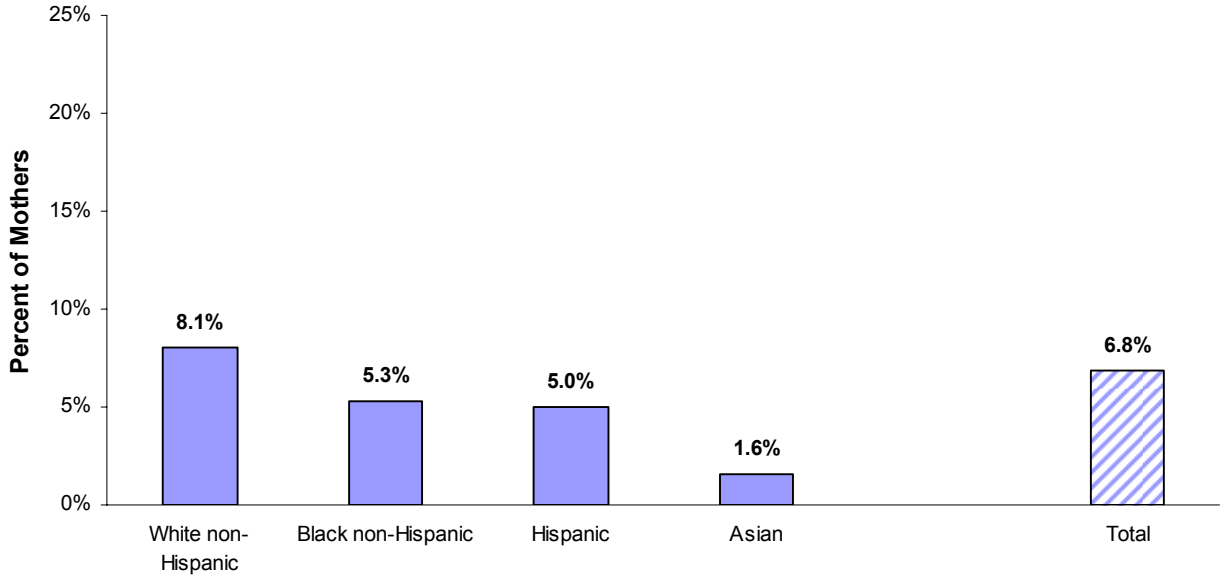
1. A clinical estimate of the number of weeks of pregnancy completed; as estimated by the attendant at birth or the postnatal physician. 2. Percentages are based on column total. 3. Other races include American Indian and others not specified. 4. Calculations based on values of 1-4 are excluded. 5. Also known as early gestational age, premature delivery, or preterm delivery. 6. Also known as extremely premature delivery, or extremely preterm delivery. 7. Estimate of gestational age not provided and excluded from percentage calculations.

Figure 3. Percent of Mothers who Reported Smoking during Pregnancy Massachusetts: 1990-2009



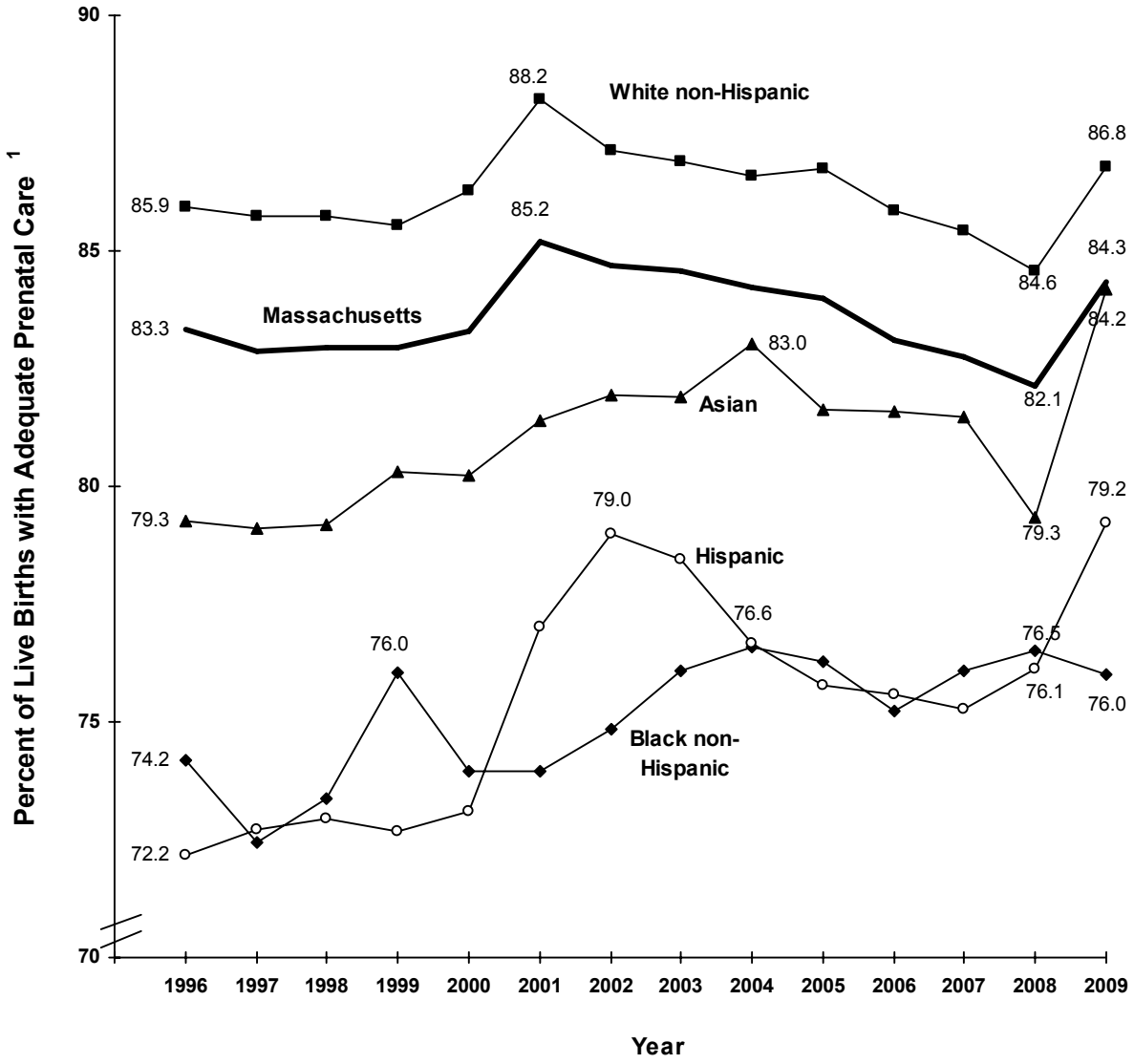
Note: Smoking information provided on the birth certificate as reported by the mother. Due to self-reported nature, data on smoking prevalence should be interpreted cautiously.

Figure 4. Percent of Mothers who Reported Smoking during Pregnancy by Mother's Race/Hispanic Ethnicity, Massachusetts: 2009



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Asian data should be interpreted with caution because of small numbers. Smoking information is provided on the birth certificate as reported by the mother. Due to self-reported nature, data on smoking prevalence should be interpreted cautiously.

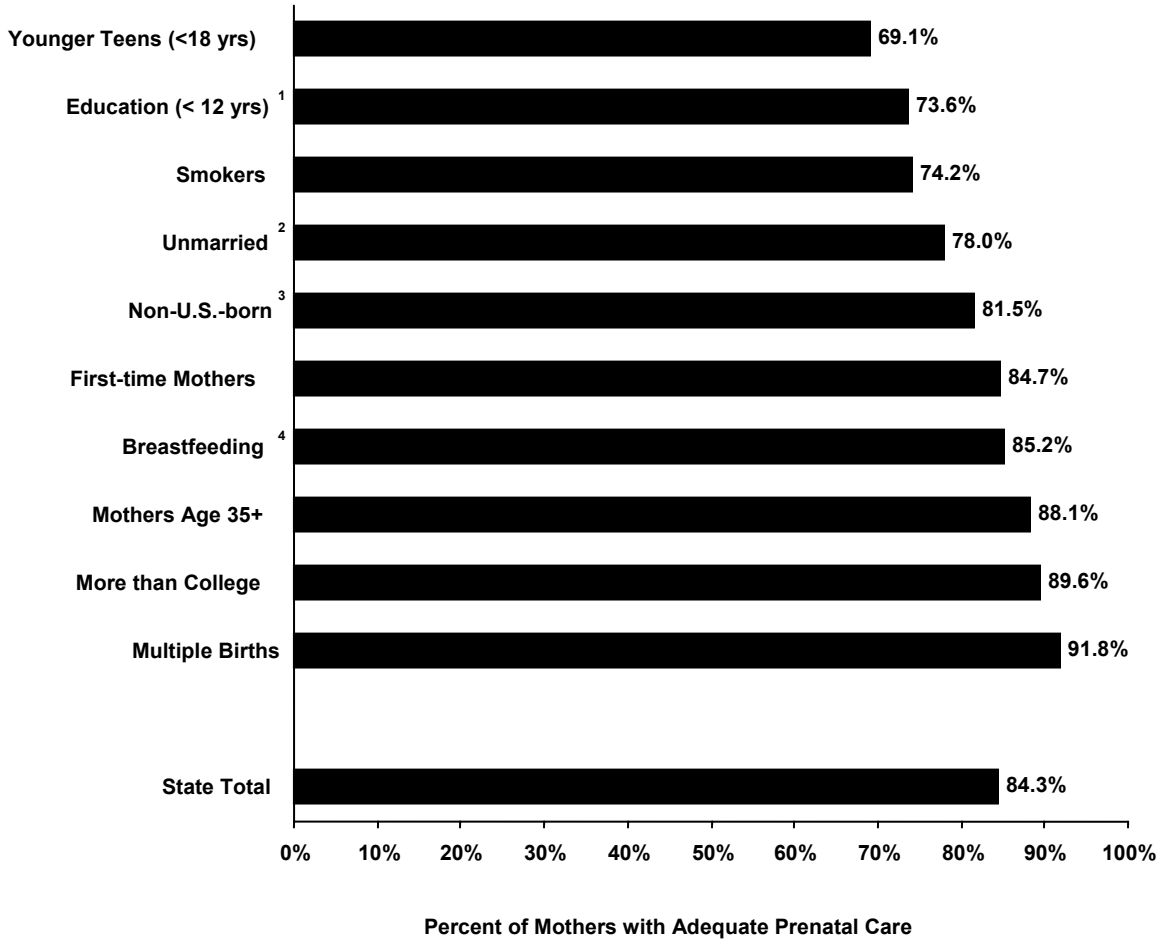
Figure 5. Trends in Adequacy of Prenatal Care by Race and Hispanic Ethnicity, Massachusetts: 1996-2009



PLEASE NOTE THAT FOR PURPOSES OF VISUAL REPRESENTATION THE VERTICAL SCALE OF GRAPH REPRESENTS A SMALL INTERVAL (from 70% to 90%).

1. All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Please note that the Adequacy of Prenatal Care Utilization (APNCU) Index is an assessment of the timing and number of prenatal care visits and not an evaluation of the quality of care delivered.

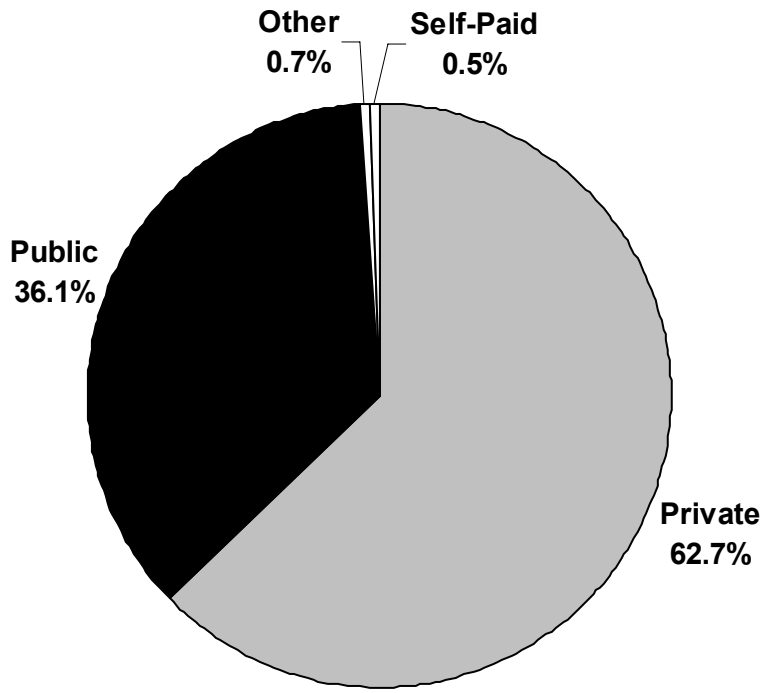
Figure 6. Adequacy of Prenatal Care by Selected Maternal Characteristics, Massachusetts: 2009



NOTE: All percentages are calculated based on the Adequacy of Prenatal Care Utilization (APNCU) Index. Characteristics of interest are not mutually exclusive, except as noted.

1. Women 20 years of age and older. 2. Marital status at time of birth. 3. Non-US-born includes women born outside of the 50 U.S. states, District of Columbia, and U.S. territories (Puerto Rico, U.S. Virgin Islands, Guam). 4. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed.

Figure 7. Distribution of Prenatal Care Payment Source, Massachusetts: 2009



NOTE: Sources of Prenatal Care Payment are private: Commercial indemnity plan, commercial managed care (HMO, PPO, IPP, IPA, and other), or other private insurance; public: Government programs including Commonhealth, Healthy Start, Medicaid/MassHealth, and Medicare (may also be HMO or managed care), or free care; other: Worker's Compensation and other sources.

Table 11. Trends in Infant, Neonatal, and Post Neonatal Mortality by Race/Hispanic Ethnicity, Massachusetts: 1991-2009

INFANT MORTALITY (less than one year of age)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1991	577	6.5	381	5.5	101	15.0	80	9.4	14	4.2	1	--[4]
1992	569	6.5	371	5.5	110	16.4	67	7.9	16	4.9	5	5.1
1993	523	6.2	346	5.3	84	13.1	77	9.3	13	3.9	3	--[4]
1994	499	6.0	343	5.3	79	12.6	64	7.6	8	2.4	5	5.3
1995	419	5.1	275	4.4	65	11.1	58	7.2	19	5.5	2	--[4]
1996	403	5.0	289	4.7	63	11.4	40	5.1	8	2.2	2	--[4]
1997	425	5.3	294	4.8	64	11.7	55	6.7	10	2.6	2	--[4]
1998	414	5.1	287	4.6	59	10.6	58	6.7	10	2.7	0	0.0
1999	418	5.2	285	4.7	72	12.3	49	5.5	8	1.9	4	--[4]
2000	377	4.6	232	3.8	74	12.8	48	5.2	19	4.1	4	--[4]
2001	407	5.0	245	4.1	71	12.1	69	7.3	15	3.1	7	4.1
2002	397	4.9	239	4.1	69	11.6	67	7.0	16	3.0	6	3.8
2003	383	4.8	235	4.1	75	12.7	55	5.6	14	2.7	4	--[4]
2004	376	4.8	210	3.8	70	11.5	75	7.6	15	2.7	6	3.5
2005	391	5.1	230	4.3	57	9.4	78	7.7	18	3.4	8	4.3
2006	369	4.8	221	4.2	72	11.1	62	5.8	10	1.8	3	--[4]
2007	380	4.9	206	3.9	66	10.2	81	7.4	18	3.1	4	--[4]
2008	382	5.0	194	3.7	78	11.7	86	7.9	16	2.7	8	5.1
2009	363	4.8	203	4.1	53	7.6	78	7.1	19	3.2	9	7.8

NEONATAL MORTALITY (birth to 27 days)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1991	401	4.5	266	3.9	72	10.7	53	6.2	10	3.0	0	0.0
1992	415	4.8	274	4.0	76	11.4	51	6.0	10	3.0	4	--[4]
1993	375	4.4	245	3.7	64	10.0	55	6.7	9	2.7	2	--[4]
1994	349	4.2	240	3.7	58	9.3	40	4.7	7	2.1	4	--[4]
1995	298	3.6	198	3.1	50	8.5	39	4.8	10	2.9	1	--[4]
1996	290	3.6	222	3.6	34	6.2	27	3.5	5	1.4	1	--[4]
1997	323	4.0	228	3.7	44	8.0	43	5.2	7	1.8	1	--[4]
1998	315	3.9	218	3.5	47	8.5	43	5.0	7	1.9	0	0.0
1999	332	4.1	226	3.7	58	9.9	39	4.4	5	1.2	4	--[4]
2000	288	3.5	177	2.9	57	9.9	37	4.0	14	3.0	3	--[4]
2001	308	3.8	190	3.2	56	9.5	49	5.2	10	2.1	3	--[4]
2002	299	3.7	185	3.2	49	8.2	50	5.2	13	2.4	2	--[4]
2003	285	3.6	179	3.1	56	9.5	38	3.9	10	1.9	2	--[4]
2004	291	3.7	167	3.0	51	8.4	57	5.8	12	2.2	4	--[4]
2005	282	3.7	168	3.1	40	6.6	57	5.8	11	2.1	5	2.7
2006	279	3.6	173	3.3	53	8.2	42	3.9	7	1.3	3	--[4]
2007	263	3.4	141	2.7	48	7.4	53	4.9	15	2.6	4	--[4]
2008	291	3.8	153	3.0	57	8.6	65	6.0	10	1.7	6	3.8
2009	274	3.7	160	3.2	35	5.0	54	4.9	17	2.9	7	6.0

Table 11 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race/ Hispanic Ethnicity, Massachusetts: 1991-2009

POST NEONATAL MORTALITY (28-364 days)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1991	176	2.0	115	1.7	29	4.3	27	3.2	4	--[4]	1	--[4]
1992	154	1.8	97	1.4	34	5.1	16	1.9	6	1.8	1	--[4]
1993	148	1.7	101	1.5	20	3.1	22	2.7	4	--[4]	1	--[4]
1994	150	1.8	103	1.6	21	3.3	24	2.8	1	--[4]	1	--[4]
1995	121	1.5	77	1.2	15	2.6	19	2.3	9	2.6	1	--[4]
1996	113	1.4	67	1.1	29	5.3	13	1.7	3	--[4]	1	--[4]
1997	102	1.3	66	1.1	20	3.7	12	1.5	3	--[4]	1	--[4]
1998	99	1.2	69	1.1	12	2.2	15	1.7	3	--[4]	0	0.0
1999	86	1.1	59	1.0	14	2.4	10	1.1	3	--[4]	0	0.0
2000	89	1.1	55	0.9	17	2.9	11	1.2	5	1.1	1	--[4]
2001	99	1.2	55	0.9	15	2.6	20	2.1	5	1.0	4	--[4]
2002	98	1.2	54	0.9	20	3.4	17	1.8	3	--[4]	4	--[4]
2003	98	1.2	56	1.0	19	3.2	17	1.7	4	--[4]	2	--[4]
2004	85	1.1	43	0.8	19	3.1	18	1.8	3	--[4]	2	--[4]
2005	109	1.4	62	1.2	17	2.8	20	2.0	7	1.3	3	--[4]
2006	90	1.2	48	0.9	19	2.9	20	1.9	3	--[4]	0	0.0
2007	117	1.5	65	1.2	18	2.8	28	2.6	3	--[4]	3	--[4]
2008	91	1.2	41	0.8	21	3.2	21	1.9	6	1.0	2	--[4]
2009	89	1.2	43	0.9	18	2.6	24	2.2	2	--[4]	2	--[4]

Note that infant deaths are based on a preliminary death file as of the release of this report.
1. Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Other: American Indian and Other races. 3. Rates are expressed per 1,000 live births.
4. Calculations based on values of 1-4 are excluded.

Figure 8. Infant Mortality Rates by Race/Hispanic Ethnicity, Massachusetts: 2009

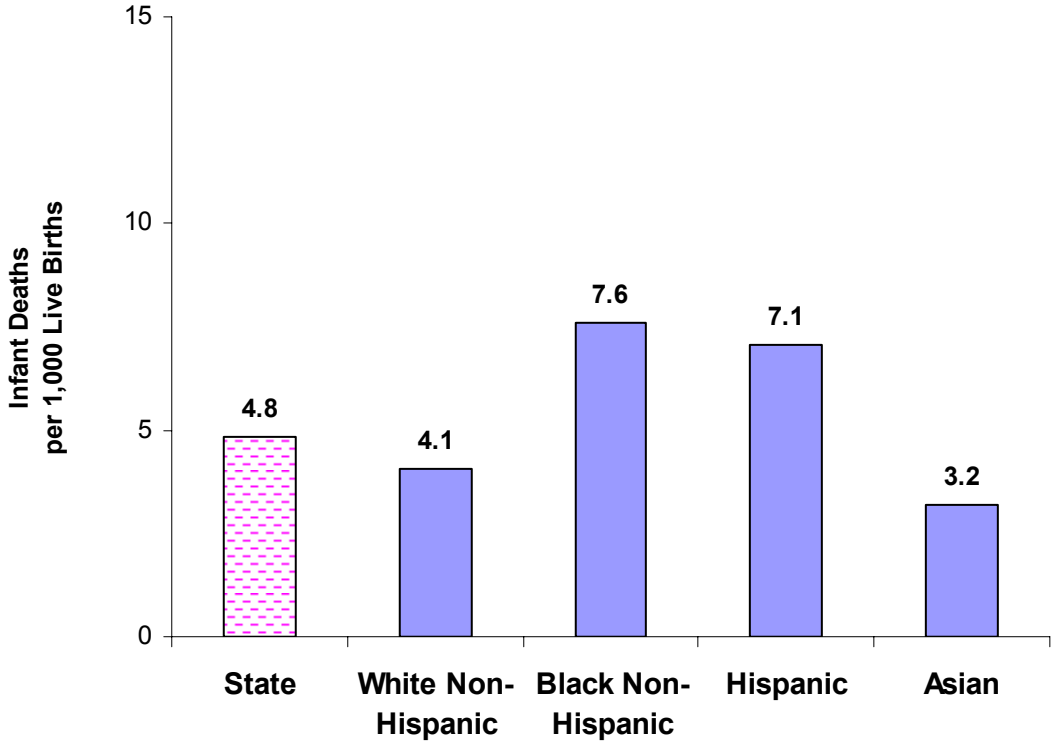


Table 12. Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2009

Municipality[1]	Rank (by pop. size)	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity				Birth weight		Gestational
				White non-Hispanic %[3]	Black non-Hispanic %[3]	Hispanic %[3]	Asian or Other[4] %[3]	Very Low (<1500 g) %	Low (<2500 g) %	Diabetes %
STATE TOTAL		**6,593,587**	**11.4**	**66.4**	**9.3**	**14.7**	**9.5**	**1.4**	**7.8**	**4.7**
Attleboro	29	43364	13.1	78.1	3.2	7.1	11.1	1.8	9.2	3.0
Barnstable	25	47902	8.7	82.0	4.3	7.0	6.7	2.4	7.2	--[5]
Boston	1	558435	14.3	40.5	27.6	22.0	9.9	1.7	8.9	4.0
Brockton	6	100366	14.7	32.8	53.0	9.7	4.3	1.8	8.5	4.6
Brookline	18	56422	12.0	70.0	2.1	4.6	23.1	0.7	8.7	4.5
Cambridge	5	101529	12.5	54.7	14.6	7.0	23.4	1.3	8.1	4.6
Chicopee	21	54599	11.8	68.9	4.2	23.8	3.0	0.9	7.6	4.8
Fall River	9	92117	13.0	77.6	6.0	11.1	5.3	1.7	8.6	8.6
Framingham	14	65651	14.9	64.7	8.0	17.2	10.0	1.5	7.8	4.5
Haverhill	15	60032	14.9	71.7	3.2	20.3	4.2	1.1	5.6	3.0
Lawrence	12	81591	17.5	13.2	2.7	81.3	2.7	1.8	8.4	4.4
Leominster	30	42120	12.5	68.0	5.3	20.1	6.6	0.9	7.4	4.9
Lowell	4	105749	16.4	43.0	7.6	19.8	29.4	1.8	10.3	8.1
Lynn	8	92186	16.3	32.2	14.8	42.7	9.9	1.3	7.2	3.8
Malden	17	56730	17.2	45.8	18.3	8.2	27.6	1.2	8.6	4.8
Medford	22	53801	12.8	69.6	12.7	5.1	12.4	1.0	7.4	3.2
Methuen	27	44532	12.9	63.1	2.3	27.0	7.3	1.4	9.8	4.5
New Bedford	7	94502	14.4	59.2	12.0	25.0	3.7	1.8	10.5	4.2
Newton	11	83346	9.7	73.4	2.9	4.7	18.9	1.1	7.6	4.7
Peabody	24	50954	9.6	81.1	2.9	9.7	6.4	2.0	7.1	4.9
Pittsfield	28	43949	11.8	79.7	6.8	7.1	6.0	1.2	8.5	3.9
Plymouth	20	54781	11.5	92.8	2.1	2.2	2.9	0.8	5.9	1.0
Quincy	10	90458	14.0	55.0	7.2	5.5	32.1	0.9	6.6	6.3
Revere	26	45551	15.6	50.0	5.1	34.0	11.0	--[5]	7.2	5.6
Somerville	13	75372	13.3	58.8	8.8	16.9	15.0	1.2	8.3	4.3
Springfield	3	156358	15.6	23.2	20.2	51.7	4.8	2.3	9.0	5.4
Taunton	19	56348	13.2	79.6	9.0	6.9	4.2	1.3	8.1	4.0
Waltham	16	59564	13.7	51.9	8.3	20.4	19.1	2.7	10.1	6.1
Weymouth	23	53708	11.6	82.5	5.9	2.9	8.7	1.1	6.9	6.6
Worcester	2	179839	14.4	59.0	14.4	18.9	7.7	1.7	8.7	6.5

Table 12 (cont'd). Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2009

Municipality[1]	Births					Deaths			
	Adequate Prenatal Care[6]	Public Payment[7] for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[9]		Neonatal Mortality Rate[9]	
	%	%	%	n	Rate[8]	2009	2007-2009	2009	2007-2009
STATE TOTAL	**84.3**	**36.1**	**34.7**	**4,477**	**19.5**	**4.8**	**4.9**	**3.7**	**3.6**
Attleboro	85.9	19.3	29.6	39	34.4	--[5]	3.0	--[5]	--[5]
Barnstable	84.4	52.4	36.7	21	15.4	--[5]	6.7	--[5]	--[5]
Boston	85.9	42.3	44.2	521	26.4	6.5	6.7	4.9	4.9
Brockton	73.0	65.4	57.4	137	37.7	6.8	8.0	4.1	5.4
Brookline	89.9	5.3	5.2	2	--[5]	0.0	--[5]	0.0	--[5]
Cambridge	86.7	18.2	15.3	16	4.1	6.3	3.5	5.5	2.7
Chicopee	79.4	56.9	54.8	72	41.4	7.8	5.3	--[5]	3.7
Fall River	85.8	69.8	61.4	129	45.6	4.2	8.2	--[5]	6.3
Framingham	91.3	44.5	30.4	50	25.6	5.1	3.3	--[5]	2.6
Haverhill	84.6	40.4	42.3	70	36.7	--[5]	4.4	--[5]	3.7
Lawrence	73.8	75.5	70.7	239	79.0	7.7	6.2	4.2	4.3
Leominster	84.2	40.8	41.3	41	32.7	--[5]	3.2	--[5]	--[5]
Lowell	79.5	58.0	55.0	210	53.0	6.9	6.9	4.6	5.1
Lynn	82.7	67.2	56.9	172	55.8	5.3	5.9	3.3	4.2
Malden	84.2	41.6	26.9	24	16.8	--[5]	3.9	--[5]	3.5
Medford	86.5	26.2	21.3	11	6.2	--[5]	2.4	--[5]	--[5]
Methuen	81.2	36.7	37.1	40	30.1	--[5]	2.9	--[5]	--[5]
New Bedford	76.9	58.0	63.5	173	58.5	5.9	7.7	4.4	5.8
Newton	90.2	8.5	7.5	4	--[5]	--[5]	2.0	--[5]	2.0
Peabody	91.0	34.2	28.3	16	11.2	--[5]	5.3	--[5]	3.3
Pittsfield	67.8	60.0	58.4	70	55.1	--[5]	5.0	--[5]	3.8
Plymouth	89.3	26.1	27.2	20	12.0	--[5]	--[5]	0.0	0.0
Quincy	89.8	33.1	25.1	23	11.1	4.8	4.8	--[5]	2.9
Revere	83.2	55.8	40.0	56	53.2	--[5]	5.3	--[5]	3.5
Somerville	85.5	36.1	29.2	40	18.4	6.0	6.2	6.0	5.1
Springfield	72.1	74.5	72.4	438	72.1	6.1	8.3	4.5	6.2
Taunton	77.0	40.6	47.4	70	42.9	6.8	8.1	--[5]	3.6
Waltham	85.0	29.0	23.6	22	9.4	--[5]	2.1	--[5]	--[5]
Weymouth	90.2	26.2	27.6	10	6.9	--[5]	2.5	--[5]	--[5]
Worcester	73.3	48.1	48.6	219	31.1	7.3	8.8	5.0	6.3

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. The 30 largest municipalities are the cities/ towns in Massachusetts with the largest populations (See Technical Notes). 2. Crude birth rates represent the number of births per 1,000 residents (male and female). 3. For the category of Mother's Race and Ethnicity, percentages are calculated based on the state total of resident births, including births for which mother's race/Hispanic ethnicity is unknown. 4. Mothers who designated themselves as Asian, American Indian, or Other. 5. Calculations based on 1-4 events are excluded. 6. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. Please see Glossary for definition. 7. Public payment sources include CommonHealth, Healthy Start, Medicaid/MassHealth, and Medicare (may be HMO or managed care), or free care. 8. Births per 1,000 female residents ages 15-19; rates for cities and towns were calculated using MDPH population estimates for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level. 9. Deaths per 1,000 live births. See Definitions of Rates section in the Glossary for definitions of infant and neonatal mortality rates.

Table 13. Birth Characteristics by Licensed Maternity Facility, Massachusetts: 2009

Facility[1]	Location	(2) Occurrence Births (n)	(3) Low Birth weight (%)	(4) Public Pay for PNC (%)	(5) Adequate Prenatal Care (%)	(6) Early Term (%)	Cesarean Deliveries (%)
State Total		**75,443**	**7.7**	**35.6**	**84.4**	**20.8**	**33.7**
Anna Jaques Hospital	Newburyport	735	3.5	32.8	85.3	15.2	34.4
Baystate Franklin Medical Center	Greenfield	487	2.7	50.3	80.7	17.5	21.1
Baystate Mary Lane Hospital	Ware	154	6.5	55.6	85.6	20.8	29.9
Baystate Medical Center	Springfield	4,314	12.4	52.9	78.1	24.1	32.5
Berkshire Medical Center	Pittsfield	648	4.8	54.7	66.0	19.3	29.6
Beth Israel Deaconess Medical Center	Boston	4,792	11.5	19.1	86.1	23.4	38.7
Beverly Hospital	Beverly	2,173	5.3	34.3	92.4	24.6	34.8
Boston Medical Center	Boston	2,411	10.0	77.9	69.6	25.5	29.8
Brigham And Women's Hospital	Boston	8,144	11.0	20.7	95.1	14.2	34.8
Brockton Hospital	Brockton	1,192	6.8	68.8	79.4	22.8	45.1
Cambridge Birth Center	Cambridge	117	0.0	12.8	76.1	17.1	0.0
Cambridge Hospital	Cambridge	1,317	2.6	68.5	78.9	22.0	25.9
Cape Cod Hospital	Barnstable	899	5.3	51.2	85.0	16.1	33.9
Caritas Good Samaritan Medical Center	Brockton	891	5.7	62.1	63.7	22.4	39.1
Caritas Holy Family Hospital And Medical Center	Methuen	1,015	5.6	39.4	78.4	22.0	40.9
Caritas Norwood Hospital	Norwood	509	4.1	25.6	58.3	25.7	38.9
Caritas St. Elizabeth's Medical Center Of Boston	Boston	957	14.9	23.1	62.5	23.8	39.9
Charlton Memorial Hospital	Fall River	1,591	5.9	56.3	88.1	17.8	37.4
Cooley Dickinson Hospital	Northampton	773	3.2	28.2	93.3	15.9	30.4
Emerson Hospital	Concord	1,133	4.7	8.0	84.1	25.9	35.6
Fairview Hospital	Great Barrington	166	1.2	49.4	87.9	19.9	28.3
Falmouth Hospital	Falmouth	546	4.2	41.8	89.5	22.7	40.0
Harrington Memorial Hospital	Southbridge	339	3.2	55.9	90.0	17.4	30.1
Heywood Memorial Hospital	Gardner	503	3.4	46.5	80.6	16.9	15.3
Holyoke Hospital	Holyoke	529	4.5	72.9	74.2	9.8	18.2
Jordan Hospital	Plymouth	676	4.9	34.2	86.1	19.0	33.7
Lawrence General Hospital	Lawrence	1,602	5.9	69.0	76.8	21.7	32.6

Table 13 (cont'd). Birth Characteristics by Maternity Facility, Massachusetts: 2009

Facility[1]	Location	(2) Occurrence Births (n)	(3) Low Birth weight (%)	(4) Public Pay for PNC (%)	(5) Adequate Prenatal Care (%)	(6) Early Term (%)	Cesarean Deliveries (%)
Leominster Hospital	Leominster	1,099	3.7	50.3	85.0	16.3	25.7
Lowell General Hospital	Lowell	2,391	6.5	48.7	82.2	25.2	34.1
Martha's Vineyard Hospital	Oak Bluffs	149	1.3	51.7	95.3	20.8	32.2
Massachusetts General Hospital	Boston	3,601	10.2	28.6	89.2	20.4	31.2
Melrose-Wakefield Hospital	Melrose	1,212	5.1	29.0	90.1	18.5	40.5
Mercy Medical Center	Springfield	1,258	3.6	60.9	79.8	24.1	25.1
Metrowest Medical Center-Framingham Union Campus	Framingham	1,522	5.0	43.3	94.2	19.5	42.8
Milford Regional Medical Center	Milford	982	3.4	30.5	91.9	29.4	38.0
Morton Hospital	Taunton	576	4.2	40.6	71.1	25.0	29.9
Mount Auburn Hospital	Cambridge	2,084	4.1	18.5	88.7	16.6	23.5
Nantucket Cottage Hospital	Nantucket	123	0.8	50.8	71.9	18.7	29.3
Newton Wellesley Hospital	Newton	3,512	4.2	4.0	89.3	21.1	37.8
North Adams Regional Hospital	North Adams	273	4.4	54.2	90.8	21.2	26.7
North Shore Birth Center	Beverly	106	0.0	22.6	96.2	16.0	0.0
North Shore Medical Center - Salem Hospital	Salem	1,594	4.4	51.9	84.6	23.0	34.4
Saint Vincent Hospital	Worcester	1,967	4.2	24.6	86.9	22.3	26.2
South Shore Hospital	Weymouth	3,558	5.5	19.5	93.8	21.1	42.1
St. Luke's Hospital	New Bedford	1,501	7.6	50.9	74.9	25.7	37.6
Sturdy Memorial Hospital	Attleboro	880	3.5	14.1	84.2	19.1	34.2
Tobey Hospital	Wareham	493	3.0	40.7	85.9	14.6	22.1
Tufts Medical Center	Boston	1,228	27.7	43.5	89.0	23.3	39.4
UMass Memorial Medical Center - West Campus	Worcester	4,242	11.8	35.5	71.7	19.2	29.3
Winchester Hospital	Winchester	2,116	6.3	5.8	86.7	23.9	35.5
Other Hospitals		4	--[7]	--[7]	--[7]	--[7]	--[7]
Home, Enroute & Dr. Off.		359	9.4	21.3	65.1	14.2	0.3

NOTES: All percentages are calculated based on only those occurrence births with known values for the characteristic(s) of interest.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definition of occurrence births. 3. Less than 2,500 grams (5.5 lbs.) 4. Public payment for prenatal care (PNC) includes Medicaid/MassHealth, CommonHealth, Medicare, Healthy Start, other government programs, and free care. 5. Based on the APNCU Index. 6. Birth at 37 or 38 week of gestation. 7. Calculations based on 1-4 events are excluded.

Table 14. Comparison of Massachusetts Perinatal Health Indicators with Healthy People 2020 Objectives, Massachusetts: 2006-2009

Healthy People 2020 Objectives[1] (Focus Area: Maternal, Infant and Child Health MICH[2])	HP2020 Target	Massachusetts 2006	2007	2008	2009	Has Massachusetts achieved HP2020 target? ✓ = YES O = NO, but within 25% of target ● = NO, > 25% from target
Fetal, Infant, and Maternal Deaths						
MICH-1.1. Fetal Mortality Rate[3]	5.6	5.0	5.1	5.0	5.0	√
MICH-1.2. Perinatal Mortality Rate[4]	5.9	5.7	5.2	5.6	5.5	√
MICH-1.3. Infant Mortality Rate[5]	6.0	4.8	4.9	5.0	4.8	√
MICH-1.4. Neonatal Mortality Rate[6]	4.1	3.6	3.4	3.8	3.7	√
MICH-1.5. Postneonatal Mortality Rate[7]	2.0	1.2	1.5	1.2	1.2	√
MICH-5. Maternal Mortality Ratio[8]	11.4	8.9	8.9	10.3	4.0	√
Risk Factors						
MICH-8.1. Low Birthweight[9] (%)	7.8	7.9	7.9	7.8	7.8	√
MICH-8.2. Very Low Birthweight[10] (%)	1.4	1.3	1.4	1.3	1.4	√
MICH-9.1. Preterm[11] (%)	11.4	9.0	9.0	8.8	8.7	√
Prenatal Care						
MICH-10.1. Care beginning in first trimester (%)	77.9	82.1	82.0	81.0	82.6	√
MICH-10.2. Early and adequate care[12] (%)	77.6	83.1	82.8	82.1	84.3	√
Obstetrical Care						
MICH-33. Very Low Birthweight[10] Infants born at Level III Hospitals[13] (%)	82.5	76.8	81.1	76.2	81.1	**O**
MICH-7.1. Cesarean Sections: Low-Risk[14] Women Giving Birth for the First Time (%)	23.9	28.5	29.3	29.6	28.3	**O**
MICH-7.2. Cesarean Sections: Low-Risk[14] Women with Prior Cesarean Section (%)	81.7	91.3	91.1	91.1	90.4	**O**
Breastfeeding						
MICH-21.1. Breastfeeding[15] (%)	81.9	79.9	79.2	80.8	82.0	√
Prenatal Substance Exposure						
MICH-11.3. Abstinence from Smoking[15] (%)	98.6	92.6	92.5	93.1	93.2	**O**

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. National health promotion and disease prevention agenda established by the US Dept. of Health and Human Services. 2. Goal: to improve the health and well-being of women, infants, children, and families. 3. Number of fetal deaths per 1,000 fetal deaths plus live births. 4. Number of fetal and infant deaths in perinatal period (from 28 weeks gestation (inclusive) to 6 days (inclusive) after birth per 1,000 fetal deaths plus live births. 5. Number of infant deaths (under one year of age) per 1,000 live births. 6. Number of deaths to infants less than 28 days of age per 1,000 live births. 7. Number of deaths to infants 28-364 days of age per 1,000 live births. 8. See Definition of Rates section in Technical Notes. 9. Less than 2,500 grams, or 5.5 pounds. 10. Less than 1,500 grams, or 3.3 pounds. 11. Born before completion of 37th week of gestation. 12. Based on Adequacy of Prenatal Care Utilization Index (see Glossary). 13. Facilities for high-risk deliveries and neonates that can provide care to very small infants, including mechanical ventilation and neonatal surgery and special care for transferred patients and for which a full-time neonatologist serves as the director. 14. "Low-risk"= full term birth, singleton, vertex presentation. 15. HP2020 specifies objective as mother 'ever' breastfeeding. Massachusetts data is based on mother's self-report of current breastfeeding or intention to breastfeed, and of smoking during pregnancy.

Appendix:

Additional Tables & Figures

Technical Notes

Glossary

Table 15. Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2009

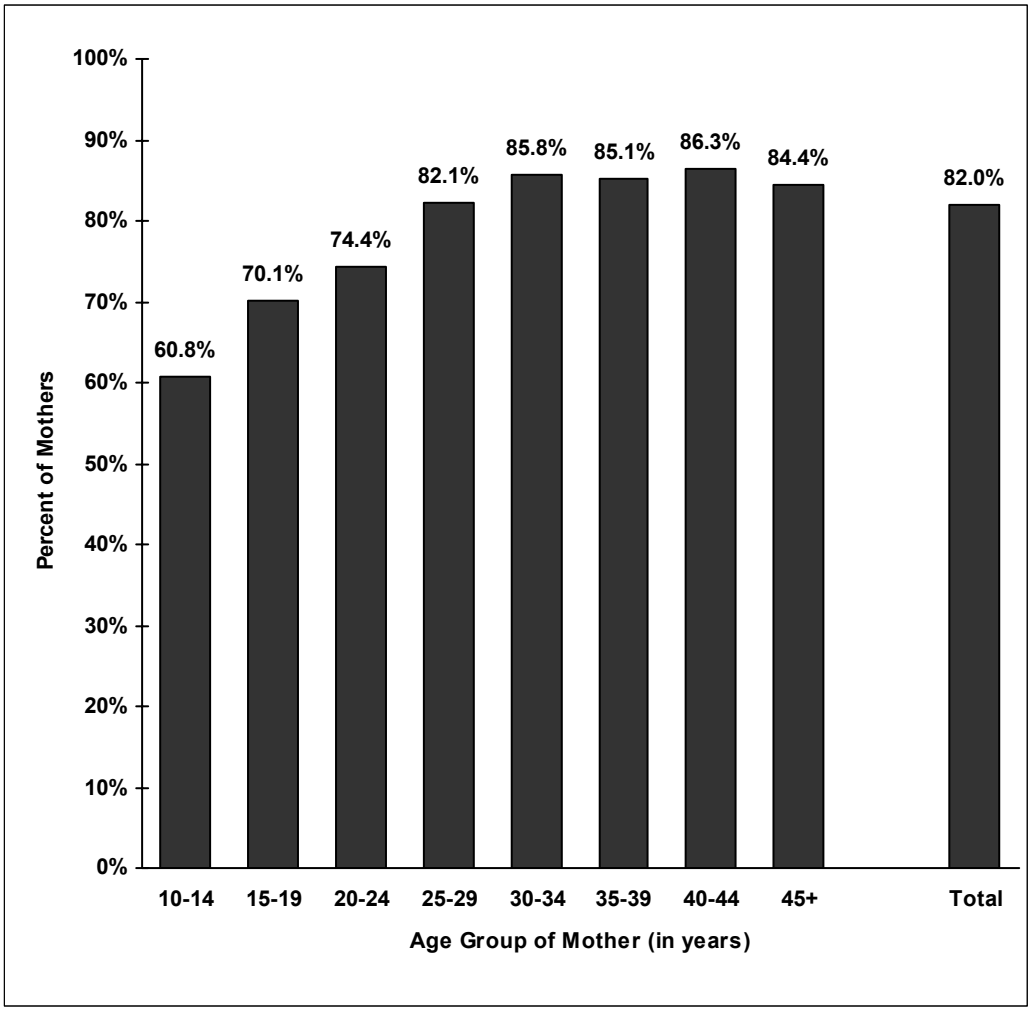
CHNA[1]	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity: White non-Hispanic % [4]	Black non-Hispanic % [4]	Hispanic % [4]	Asian and Other[3] % [4]	Very Low BWT (<1500 g) %	Low BWT (<2500) %	GDM %
STATE TOTAL	**6,593,587**	**11.4**	**66.4**	**9.3**	**14.7**	**9.5**	**1.4**	**7.8**	**4.7**
Community Health Network of Berkshire County	131,965	8.6	84.9	4.0	5.6	5.0	1.0	7.2	3.5
Upper Valley Health Web (Franklin County)	88,506	9.2	90.3	1.3	3.7	2.4	2.1	7.7	3.6
Partnership for Health in Hampshire County (Northampton)	151,801	7.1	81.2	2.4	6.6	9.6	0.9	7.3	3.8
The Community Health Connection (Springfield)	299,490	12.3	44.0	14.3	36.6	5.1	2.0	8.5	5.6
Community Health Network of Southern Worcester County	119,141	11.2	87.4	1.5	8.8	2.2	1.3	7.9	6.8
Community Partners for Health (Milford)	160,521	11.4	91.0	1.1	3.8	3.9	1.3	6.8	4.2
Community Health Network of Greater Metro West (Framingham)	379,658	11.4	77.4	3.1	8.0	11.4	1.3	7.0	4.4
Community Wellness Coalition (Worcester)	303,669	12.7	66.1	10.2	13.3	10.2	1.5	8.3	6.0
Fitchburg/Gardner Community Health Network	261,369	10.7	79.4	3.0	12.8	4.3	1.2	6.7	5.0
Greater Lowell Community Health Network	272,893	12.5	61.8	4.9	12.0	20.9	1.4	8.3	6.9
Greater Lawrence Community Health Network	195,176	13.5	41.0	2.2	50.8	5.9	1.5	8.4	4.3
Greater Haverhill Community Health Network	148,557	11.6	81.6	1.9	11.5	4.2	1.3	5.8	3.7
Community Health Network North (Beverly/Gloucester)	119,378	9.3	87.7	1.6	3.9	5.4	--[5]	5.3	6.1
North Shore Community Health Network	287,352	11.8	59.1	8.3	25.0	7.3	1.5	7.3	3.7
Greater Woburn/Concord/Littleton Community Health Network	209,597	10.2	73.3	3.5	4.4	18.6	1.0	7.3	5.2
North Suburban Health Alliance (Medford/Malden/Melrose)	257,235	13.7	65.7	11.7	8.3	14.3	1.1	7.7	4.2
Greater Cambridge/Somerville Community Health Network	273,883	13.2	64.3	8.7	8.6	18.0	1.1	7.7	4.2
West Suburban Health Network (Newton/Waltham)	253,138	10.4	71.0	4.4	9.3	15.2	1.5	7.8	4.8
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	711,603	14.4	42.2	22.7	24.7	10.3	1.5	8.9	4.2
Blue Hills Community Health Alliance (Greater Quincy)	372,309	11.5	69.0	9.9	4.2	16.8	1.1	7.5	5.3
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	161,454	12.0	61.1	3.6	32.5	2.7	1.4	8.8	4.8
Greater Brockton Community Health Network	242,404	11.7	58.0	31.1	6.3	4.3	1.1	8.1	4.9
South Shore Community Partners in Prevention (Plymouth)	188,787	10.2	93.7	1.7	1.9	2.4	1.0	5.6	2.7
Greater Attleboro-Taunton Health & Education Response	252,919	11.1	84.9	4.4	4.3	6.1	1.6	7.8	3.3
Partners for a Healthier Community (Fall River)	141,977	11.1	82.0	4.7	8.7	4.5	1.5	8.2	7.7
Greater New Bedford Health & Human Services Coalition	199,955	11.0	71.6	8.9	16.1	3.2	1.6	9.0	4.9
Cape and Islands Community Health Network	252,204	8.4	84.8	4.1	5.8	5.1	1.6	7.2	1.5

Table 15 (cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2009

CHNA[1]	Births					Deaths			
	Adequate Prenatal Care[6] %	Public Payment[7] for Prenatal Care %	Unmarried %	Teen Mothers 15 to 19 years n	Teen Mothers 15 to 19 years Rate[8]	Infant Mortality Rate[9] 2009	Infant Mortality Rate[9] 2007-2009	Neonatal Mortality Rate[9] 2009	Neonatal Mortality Rate[9] 2007-2009
STATE TOTAL	**84.3**	**36.1**	**34.7**	**4,477**	**19.5**	**4.8**	**4.9**	**3.7**	**3.6**
Community Health Network of Berkshire County	75.4	54.4	49.8	122	27.2	--[5]	3.9	--[5]	2.5
Upper Valley Health Web (Franklin County)	83.6	44.3	39.4	62	21.9	9.8	6.5	7.3	4.4
Partnership for Health in Hampshire County (Northampton)	88.1	30.3	28.3	54	6.4	--[5]	4.5	--[5]	3.4
The Community Health Connection (Springfield)	76.3	61.0	58.1	505	48.3	5.2	6.5	3.8	4.8
Community Health Network of Southern Worcester County	80.7	32.9	39.9	93	23.9	3.7	5.6	3.7	4.2
Community Partners for Health (Milford)	88.4	22.0	21.3	67	13.2	6.0	2.8	4.4	1.7
Community Health Network of Greater Metro West (Framingham)	88.7	21.7	18.1	120	11.4	6.9	4.7	5.6	4.2
Community Wellness Coalition (Worcester)	75.8	36.4	37.9	243	22.6	5.2	6.4	3.6	4.7
Fitchburg/Gardner Community Health Network	84.2	34.7	36.2	190	21.7	4.6	5.2	4.3	4.0
Greater Lowell Community Health Network	83.9	37.0	38.2	263	29.4	5.0	4.6	3.5	3.2
Greater Lawrence Community Health Network	78.3	51.2	49.7	290	43.7	4.9	4.9	3.0	3.6
Greater Haverhill Community Health Network	87.0	30.3	32.5	103	22.6	--[5]	4.0	--[5]	3.1
Community Health Network North (Beverly/Gloucester)	90.9	22.6	22.5	32	8.2	--[5]	2.4	0.0	--[5]
North Shore Community Health Network	87.1	45.2	39.7	225	25.7	5.6	5.3	4.1	3.8
Greater Woburn/Concord/Littleton Community Health Network	86.6	10.9	13.9	38	6.8	3.7	2.9	3.7	2.6
North Suburban Health Alliance (Medford/Malden/Melrose)	86.1	31.2	23.5	90	12.6	4.5	3.7	4.0	3.1
Greater Cambridge/Somerville Community Health Network	87.2	20.3	17.0	67	8.2	4.4	3.8	3.9	3.1
West Suburban Health Network (Newton/Waltham)	87.8	14.1	12.7	37	3.6	1.9	1.8	--[5]	1.5
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	85.9	42.6	42.2	662	28.0	5.4	6.0	4.0	4.4
Blue Hills Community Health Alliance (Greater Quincy)	88.4	24.1	21.9	80	7.7	4.9	5.0	4.2	3.6
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	79.4	58.3	54.1	242	42.4	6.2	5.5	4.1	3.8
Greater Brockton Community Health Network	79.9	46.0	42.2	183	20.8	5.0	5.7	2.8	4.0
South Shore Community Partners in Prevention (Plymouth)	90.8	22.7	24.0	56	9.5	5.7	3.6	3.6	2.0
Greater Attleboro-Taunton Health & Education Response	83.3	25.9	31.7	172	22.2	3.6	3.5	2.1	2.1
Partners for a Healthier Community (Fall River)	86.6	62.9	54.6	143	33.0	3.8	7.2	--[5]	5.4
Greater New Bedford Health & Human Services Coalition	79.0	47.3	54.8	228	35.0	5.9	7.1	5.0	5.5
Cape and Islands Community Health Network	86.4	44.6	36.0	110	16.8	4.2	4.3	2.3	2.7

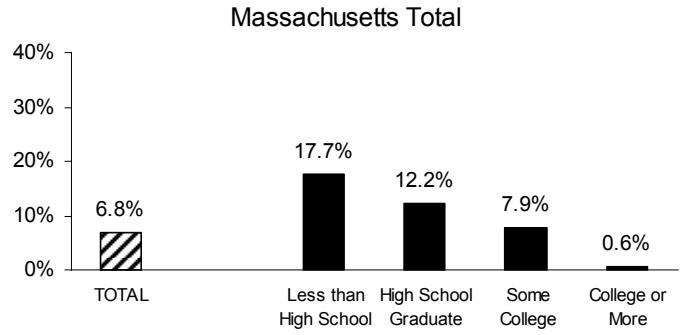
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Please see TableA1 for cities/ towns by CHNA. 2. Crude birth rates represent the number of births per 1,000 residents (male and female). 3. For the category of Mother's Race and Ethnicity, percentages are calculated based on the state total of resident births, including births for which mother's race/Hispanic ethnicity is unknown. 4. Mothers who designated themselves as Asian, American Indian, or Other. 5. Calculations based on 1-4 events are excluded. 6. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. Please see Glossary for definition. 7. Public payment sources include CommonHealth, Healthy Start, Medicaid/MassHealth, and Medicare (may be HMO or managed care), or free care. 8. Births per 1,000 female residents ages 15-19; rates for cities and towns were calculated using MDPH population estimates for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level. 9. Deaths per 1,000 live births. See Definitions of Rates section in the Glossary for definitions of infant and neonatal mortality rates.

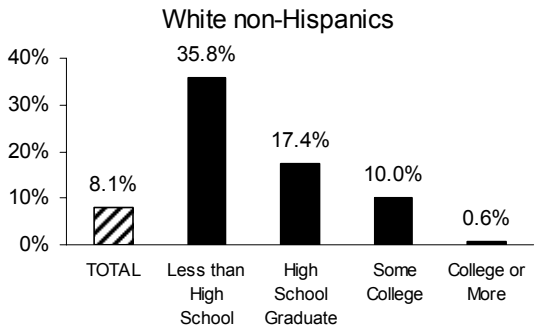
Figure 9. Percent of Mothers Breastfeeding or Intending to Breastfeed by Age Group, Massachusetts: 2009

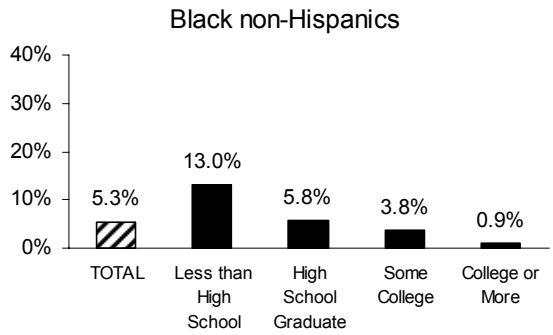


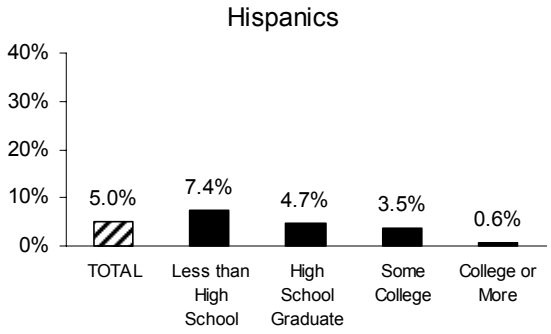
NOTE: Information about breastfeeding is reported by the mother at the time of the birth. For race-specific breastfeeding rates see Table 2.

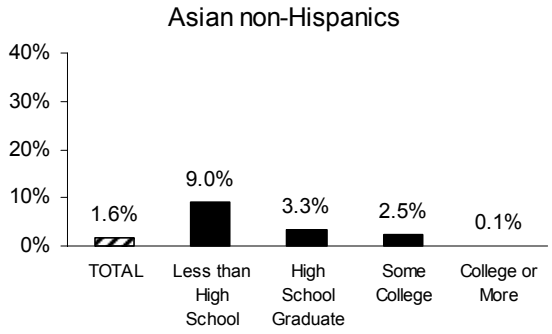
Figure 10. Percent of Mothers who Reported Smoking during Pregnancy by Mother's Race/Hispanic Ethnicity and Educational Attainment, Massachusetts: 2009





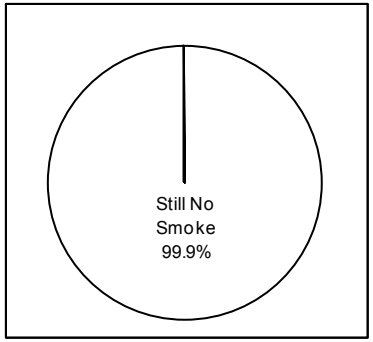
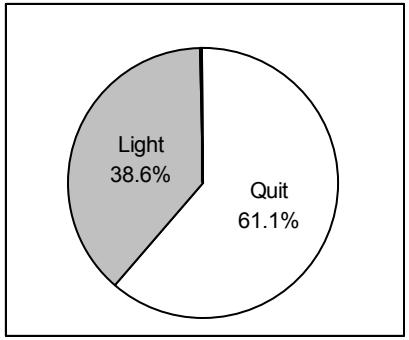
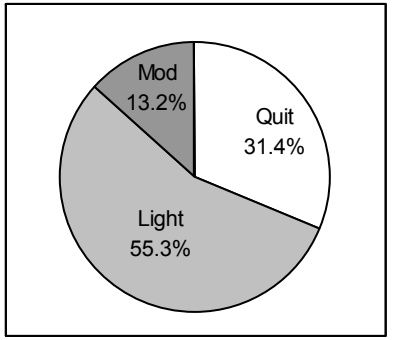
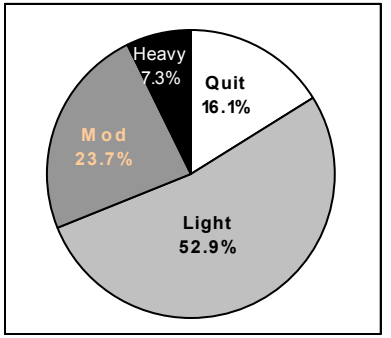






NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Smoking information provided on the birth certificate as reported by the mother. Because smoking is self-reported, data on smoking prevalence should be interpreted cautiously. Asian data should be interpreted with caution because of small numbers.

Figure 11. Distribution of Reported Smoking Status during Pregnancy by Smoking Status Prior to Pregnancy, Massachusetts: 2009

Reported **Smoking Status[1] Prior to Pregnancy:**	**Non-Smokers 86.4% (64,717)**	**Light Smokers 8.4% (6,380)**	**Moderate Smokers 4.7% (3,287)**	**Heavy Smokers 0.5% (410)**
Reported **Smoking Status[1] During Pregnancy**:				
	99.9% of Non-Smokers continued not smoking (0.1% started smoking)	**61% of Light Smokers quit Smoking**	**87% of Moderate Smokers decreased the number of cigarettes smoked daily or quit**	**93% of Heavy Smokers decreased the number of cigarettes smoked daily or quit**

1. Light Smokers=1-10 cigarettes daily; Moderate Smokers=11-20 cigarettes daily; Heavy Smokers=21 cigarettes or more daily.

Table 16. Parity by Age of Mother, Massachusetts: 2009

Age of Mother (years)		Total Births	Parity[1]				
			1st	2nd	3rd	4th	5th+
State Total	**N[2]**	**74,966**	**34,004**	**25,481**	**9,943**	**3,167**	**1,628**
	%[3]	100.0	45.8	34.3	13.4	4.3	2.2
10-14	**N[2]**	51	50	1	0	0	0
	%[3]	100.0	98.0	--[4]	0.0	0.0	0.0
15-19	**N[2]**	4,477	3,855	537	55	3	0
	%[3]	100.0	86.6	12.1	1.2	--[4]	0.0
20-24	**N[2]**	12,048	7,101	3,513	1,030	247	60
	%[3]	100.0	59.4	29.4	8.6	2.1	0.5
25-29	**N[2]**	18,469	9,039	5,970	2,259	713	322
	%[3]	100.0	49.4	32.6	12.3	3.9	1.8
30-34	**N[2]**	23,143	9,236	8,898	3,261	1,013	500
	%[3]	100.0	40.3	38.8	14.2	4.4	2.2
35-39	**N[2]**	13,521	3,792	5,378	2,724	937	516
	%[3]	100.0	28.4	40.3	20.4	7.0	3.9
40-44	**N[2]**	3,040	860	1,115	587	232	204
	%[3]	100.0	28.7	37.2	19.6	7.7	6.8
45+	**N[2]**	213	67	69	27	22	26
	%[3]	100.0	31.8	32.7	12.8	10.4	12.3

1. The number of live births including this birth. 2. State totals include births of unknown parity and unknown mother's age. 3. Percents may not sum to 100.0 due to rounding. 4. Calculations based on values of 1-4 are excluded.

Table 17. Selected Birth Characteristics by Maternal Education, Massachusetts: 2009

	Less than High School		High School Graduate		Some College		College Graduate		More than College	
	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]
State Total	**7,811**	**10.4**	**18,809**	**25.2**	**15,823**	**21.2**	**19,545**	**26.1**	**12,772**	**17.1**
Race										
White non-Hispanic	2,577	5.2	10,813	21.8	10,517	21.2	15,552	31.3	10,232	20.6
Black non-Hispanic	976	14.1	2,498	36.0	2,115	30.5	1,043	15.0	304	4.4
Hispanic	3,628	33.1	4,091	37.3	2,147	19.6	797	7.3	308	2.8
Asian	457	7.7	1,000	16.9	758	12.8	1,947	32.8	1,772	29.9
Age (years)										
20-29	3,856	12.7	10,929	35.9	8,226	27.0	5,355	17.6	2,068	6.8
30-39	1,535	4.2	5,560	15.2	6,662	18.2	13,028	35.6	9,782	26.8
40+	137	4.2	497	15.4	538	16.6	1,146	35.4	918	28.4
Non-US-born[2]	3,132	40.1	5,926	31.5	3,652	23.1	4,628	23.7	3,182	24.9
Unmarried	5,980	76.6	11,089	59.0	6,565	41.5	1,812	9.3	506	4.0
Publicly-financed prenatal care	6,579	85.6	11,832	64.0	5,850	38.6	1,771	9.2	375	3.0
Very low birthweight[3]	109	1.4	323	1.7	211	1.3	242	1.2	108	0.9
Low birthweight[4]	685	8.8	1,658	8.9	1,185	7.5	1,391	7.1	842	6.6
Adequate prenatal care[5]	5,462	72.4	14,819	80.4	13,065	85.0	17,033	88.9	11,202	89.6
Cesarean delivery	2,069	26.6	5,965	31.9	5,483	34.9	7,003	36.0	4,496	35.4
Breastfeeding[6]	5,444	70.5	13,694	73.8	12,080	79.4	17,238	89.2	11,756	93.1
Multiple births	151	1.9	673	3.6	630	4.0	1,219	6.2	849	6.6
Smoking during pregnancy	1,384	17.7	2,295	12.2	1,245	7.9	152	0.8	37	0.3

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

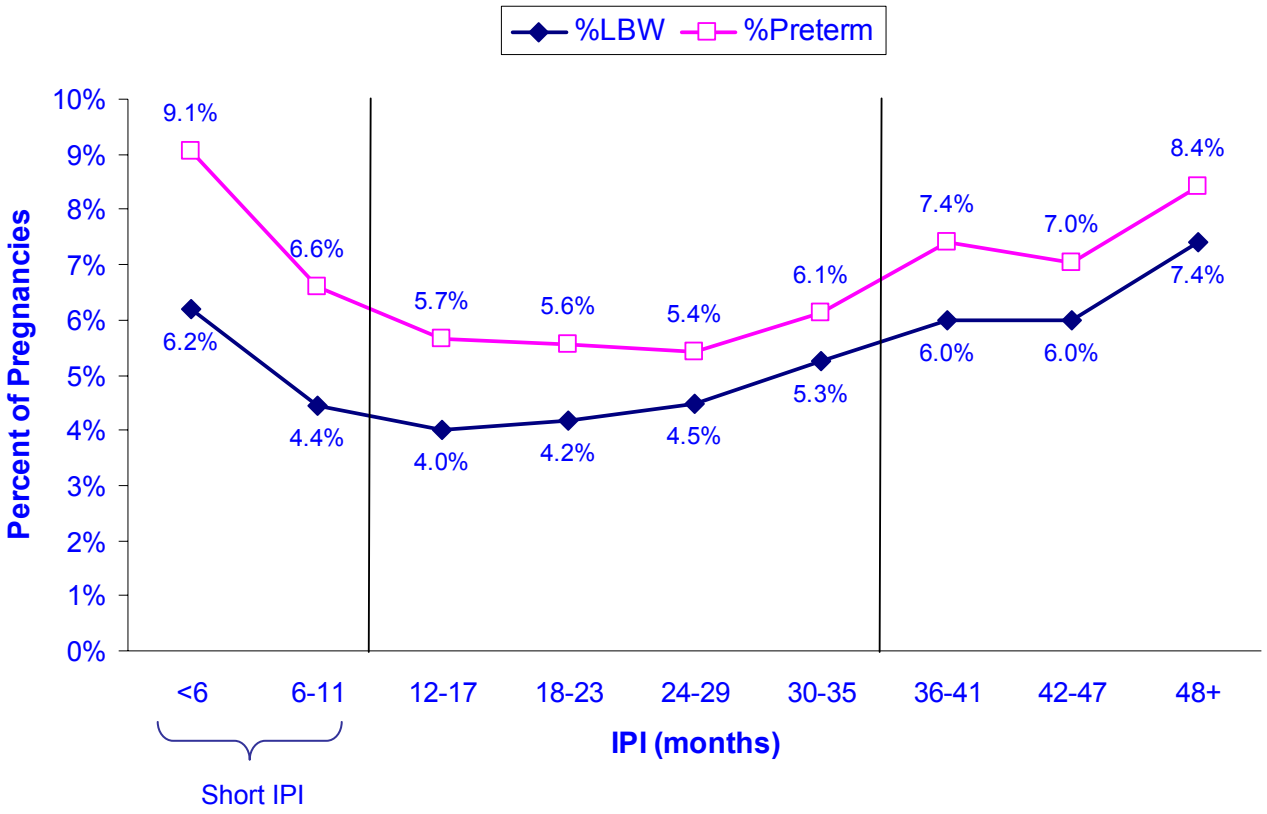
1. For state total, race and age categories, percentages are based on row totals. For all other categories, percentages are based on state column totals. 2. Includes women born outside of the 50 US States, Washington D.C., and Puerto Rico/US territories (the US Virgin Islands, and Guam). 3. Very low birthweight: less than 1,500 grams or 3.3 pounds. 4. Low birthweight: less than 2,500 grams or 5.5 pounds. 5. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. Please see Glossary for definition. 6. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed.

Table 18. Inter-pregnancy Interval (IPI) and Birth Outcomes -- Pregnancies to Multiparous Mothers, Massachusetts: 2009

	IPI[1] (months)	Pregnancies to Multiparous[2] Mothers	Birth Weight (BW)				Gestational Age (GA)			
			Low (<2,500 g)		Very Low (<1,500 g)		Preterm[3] (<37 wk)		Very Early[4] (<28 wk)	
			n	%LBW	n	%VLBW	n	%Preterm	n	%VEGA
	State Total	38,262	2,096	**5.5%**	334	**0.9%**	2,620	**6.8%**	169	**0.4%**
	<6	1,745	108	**6.2%**	19	**1.1%**	158	**9.1%**	9	**0.5%**
	6-11	4,273	190	**4.4%**	36	**0.8%**	282	**6.6%**	23	**0.5%**
	12-17	5,538	221	**4.0%**	36	**0.7%**	313	**5.7%**	20	**0.4%**
	18-23	5,024	210	**4.2%**	29	**0.6%**	279	**5.6%**	13	**0.3%**
	24-29	3,944	176	**4.5%**	21	**0.5%**	214	**5.4%**	8	**0.2%**
	30-35	3,026	159	**5.3%**	21	**0.7%**	185	**6.1%**	11	**0.4%**
	36-41	2,272	136	**6.0%**	20	**0.9%**	168	**7.4%**	9	**0.4%**
	42-47	1,823	109	**6.0%**	14	**0.8%**	128	**7.0%**	7	**0.4%**
	48+	10,617	787	**7.4%**	138	**1.3%**	893	**8.4%**	69	**0.6%**
Short	**0-11**	6,018	298	**5.0%**	55	**0.7%**	440	**25.2%**	32	**1.8%**
	12-35	17,532	766	**4.4%**	107	**0.6%**	991	**56.8%**	52	**3.0%**
	36+	14,712	1,032	**7.0%**	172	**1.2%**	1,189	**68.1%**	85	**4.9%**

1. Interpregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth. 2. Multiparous is defined as having given birth two or more times. 3. Also known as premature delivery. 4. Very early gestational age (VEGA) refers to birth before 28 weeks of gestational age and is also known as *extremely preterm* delivery.

Figure 12. Inter-pregnancy Interval (IPI) by Selected Birth Outcomes: LBW and Preterm -- Pregnancies to Multiparous Mothers, Massachusetts: 2009



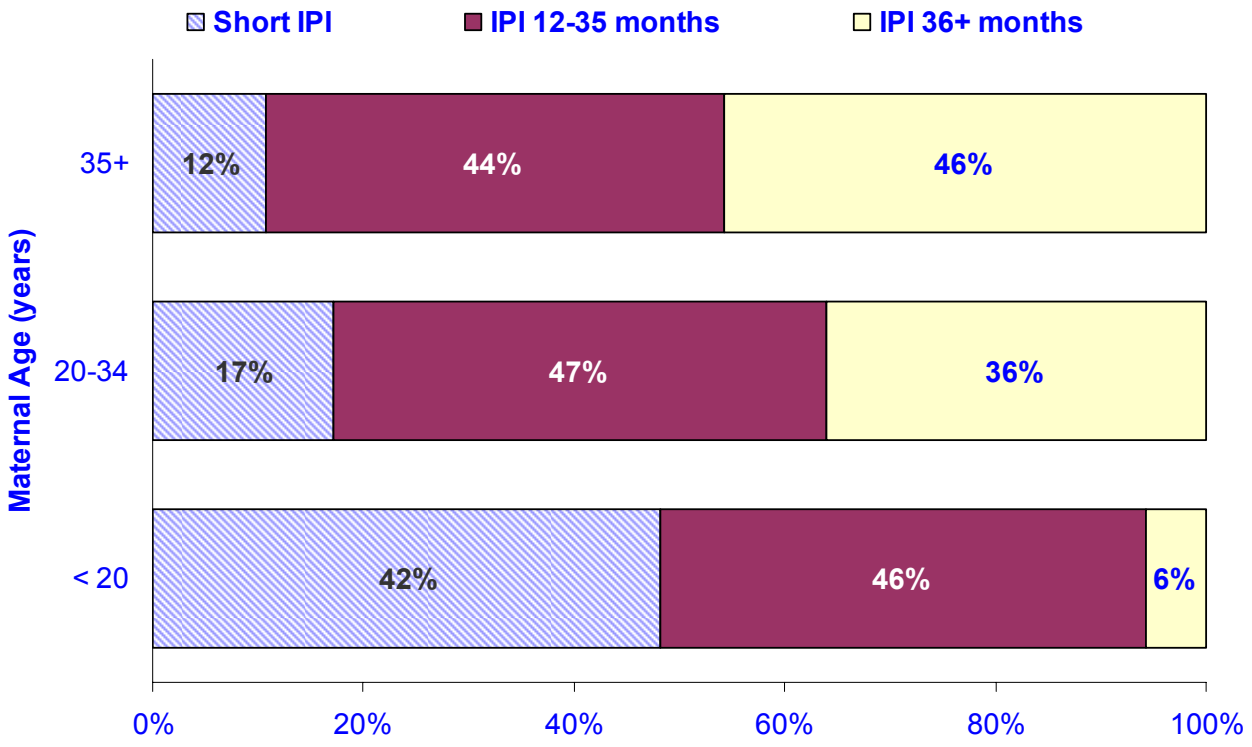
NOTE: Inter-pregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth. Short IPIs (less than 12 months) and IPIs over 35 months were associated with higher proportions of low birthweight (less than 2,500 grams or 5.5 pounds) and premature deliveries (gestational age less than 37 weeks).

Table 19. Inter-pregnancy Interval (IPI) by Maternal Characteristics -- Pregnancies to Multiparous Mothers, Massachusetts: 2009

	Total Pregnancies Parity >1		IPI[1] Short < 12 months		12-35 months		36+ months	
	n	%	n	%	n	%	n	%
State Total[2]	38,262	100%	6,018	15.7%	17,532	45.8%	14,712	38.5%
Age								
< 20	543	1.4%	262	48.3%	250	46.0%	31	5.7%
20-34	26,534	69.3%	4,553	17.2%	12,408	46.8%	9,573	36.1%
35+	11,185	29.2%	1,203	10.8%	4,874	43.6%	5,108	45.7%
Race Ethnicity								
White non-Hispanic	24,830	64.9%	4,089	16.5%	12,537	50.5%	8,204	33.0%
Black non-Hispanic	3,828	10.0%	592	15.5%	1,273	33.3%	1,963	51.3%
Hispanic	6,182	16.2%	916	14.8%	2,199	35.6%	3,067	49.6%
Asian non-Hispanic	2,815	7.4%	338	12.0%	1,248	44.3%	1,229	43.7%
Education								
High School or less	14,350	37.5%	2,316	16.1%	5,262	36.7%	6,772	47.2%
BA or Assoc	17,917	46.8%	2,784	15.5%	8,656	48.3%	6,477	36.2%
More than college	5,934	15.5%	908	15.3%	3,592	60.5%	1,434	24.2%
Delivery Payment Source								
Public	14,687	38.4%	2,432	16.6%	5,328	36.3%	6,927	47.2%
Private	22,612	59.1%	3,429	15.2%	11,714	51.8%	7,469	33.0%
Region[3] of Residence								
Western MA	4,641	12.1%	798	17.2%	2035	43.8%	1808	39.0%
Central MA	5,364	14.0%	919	17.1%	2429	45.3%	2016	37.6%
Northeast MA	7,835	20.5%	1221	15.6%	3621	46.2%	2993	38.2%
Metrowest MA	8,490	22.2%	1264	14.9%	4439	52.3%	2787	32.8%
Southeast MA	7,209	18.8%	1128	15.6%	3162	43.9%	2919	40.5%
Boston Region	4,723	12.3%	688	14.6%	1846	39.1%	2189	46.3%
Town of Residence[4]			**Top 10**		**Top 10**		**Top 10**	
			Fitchburg (22.9%)		Arlington (62.4%)		Chelsea (58.3%)	
			Haverhill (20.8%)		Brookline (60.5%)		Revere (53.0%)	
			Springfield (20.4%)		Newton (57.3%)		Brockton (50.8%)	
			Westfield (19.7%)		Attleboro (54.8%)		Malden (50.0%)	
			Fall River (18.8%)		Natick (54.0%)		Randolph (49.5%)	
			Natick (18.5%)		Medford (54.0%)		Everett (49.0%)	
			Chicopee (18.0%)		Billerica (51.9%)		Lawrence (47.5%)	
			Holyoke (17.7%)		Braintree (50.9%)		Lynn (46.4%)	
			Woburn (17.3%)		Salem (50.6%)		Fall River (46.0%)	
			Lowell (17.0%)		Cambridge (50.3%)		Boston (45.6%)	

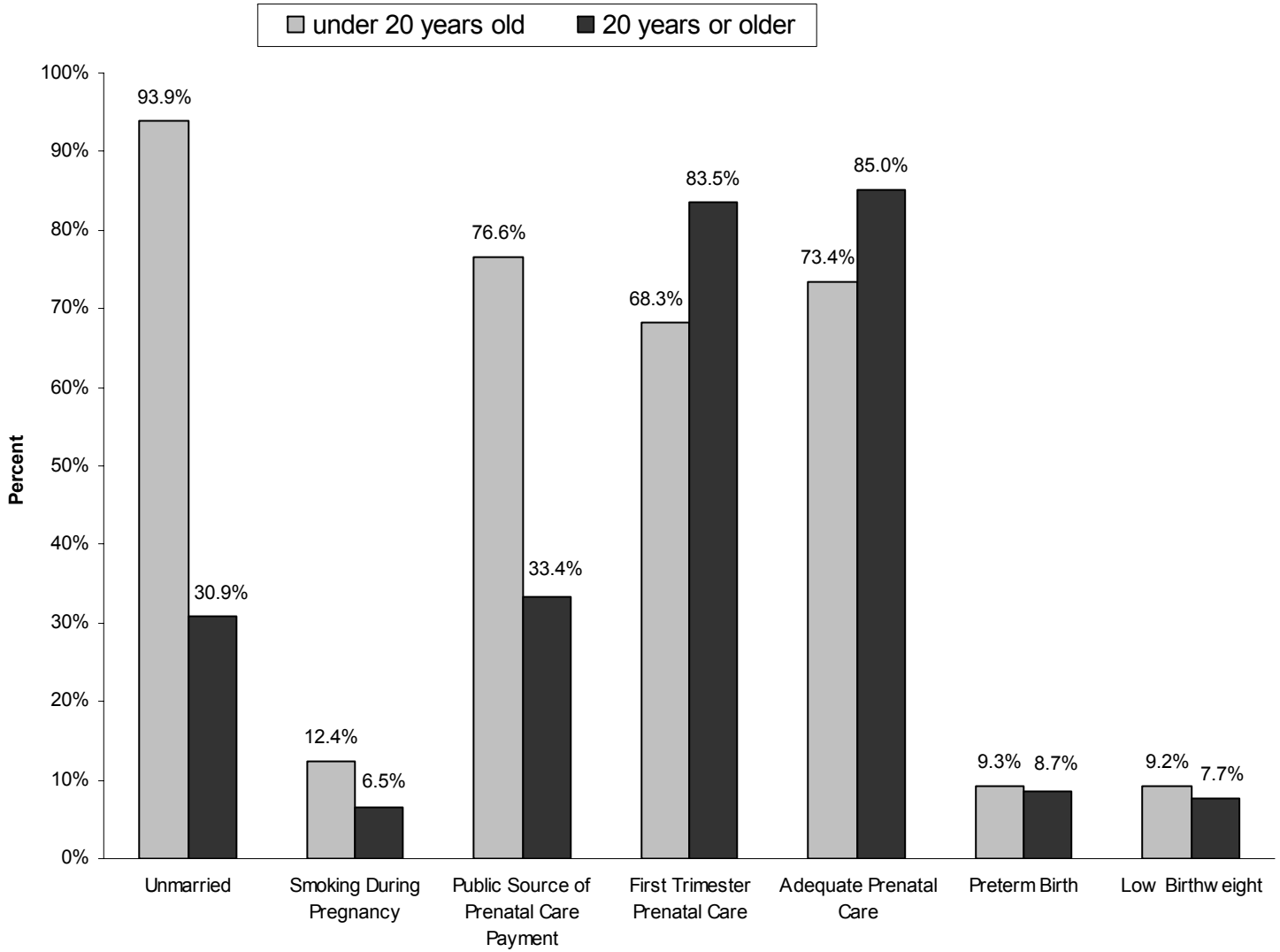
1. Inter-pregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth among multiparous mothers, i.e. among those giving birth to their 2nd or later child. 2. State total includes pregnancies with known IPI. 3. Regions of the state defined by the Executive Office of Health and Human Services 4. Among towns with at least 200 mothers giving birth to their 2nd or later child.

Figure 13. Inter-pregnancy Interval (IPI) Distribution by Maternal Age -- Pregnancies to Multiparous Mothers, Massachusetts: 2009



NOTE: Inter-pregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth among multiparous mothers, i.e. among those giving birth to their 2nd or later child.

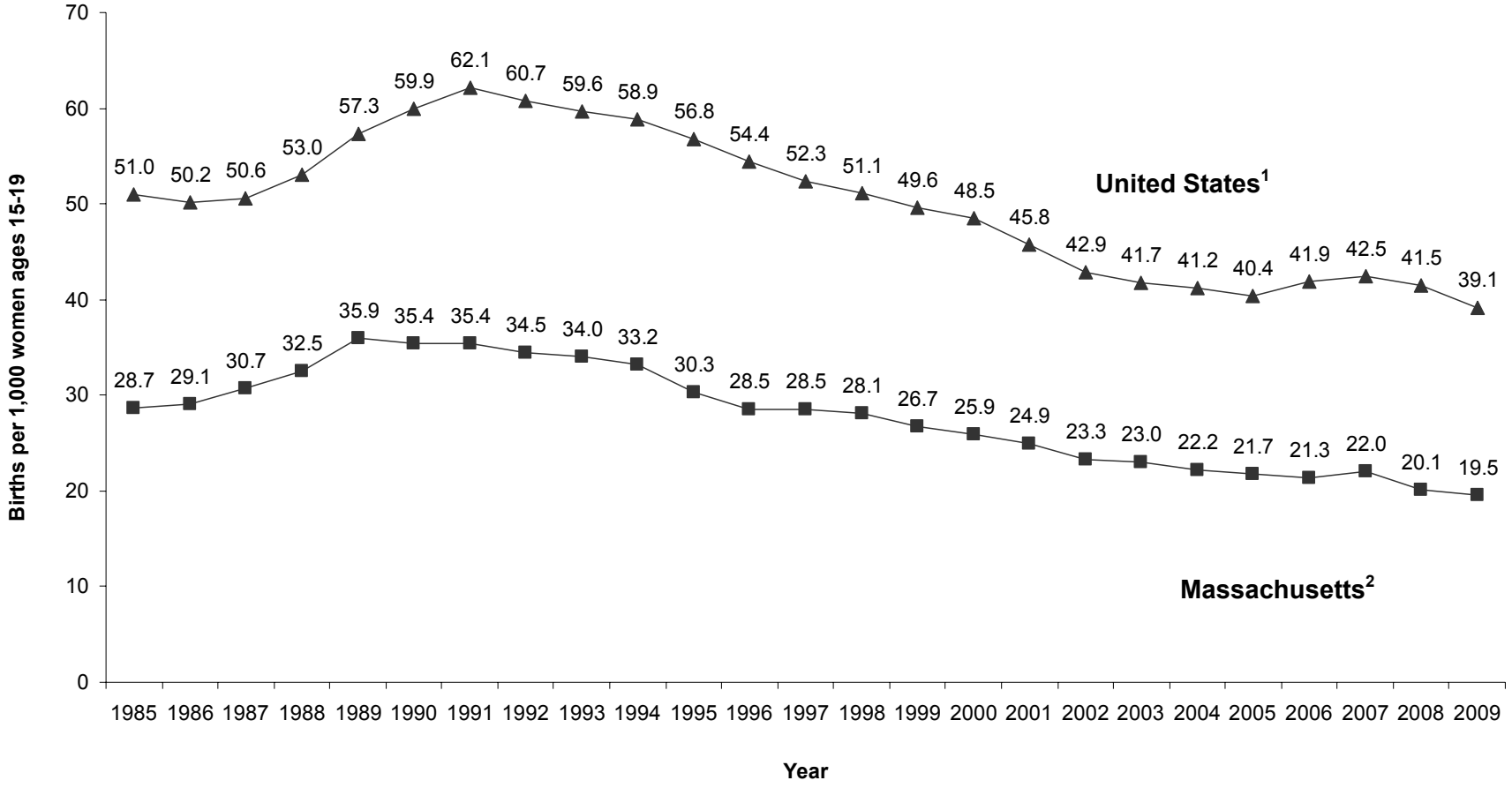
Figure 14. Comparison of Teen vs. Adult Births, Selected Characteristics, Massachusetts: 2009



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Three age groups are used for "teen births": 10-14, 15-19, and <20. The "10-14" group refers to young teens, and the "15-19" group is the age group referred to as teens by the Centers for Disease Control and Prevention. For this publication, "<20" is used when comparing young women with "adult" women.

Definitions: Adequate Prenatal Care = based on Adequacy of Prenatal Care Utilization (APNCU) Index. See Appendix (Glossary and Technical Notes) for more details on the APNCU Index. Preterm Birth = gestational age less than 37 weeks, based on clinical estimate of gestational age. Low Birthweight = less than 2,500 grams (5.5 lbs.).

Figure 15. Trend in Birth Rates among Females ages 15-19, Massachusetts and the United States: 1985-2009



Teen birth rate is the number of births to females ages 15-19 per 1,000 females ages 15-19

Data sources: 1) U.S. annual natality data (NCHS) and 1990 U.S. Census data (population data used in denominators); 2) Massachusetts: annual birth data files, decennial Census counts (1990) and intercensal population estimates based on MISER (Massachusetts Institute for Social and Economic Research) population estimates for 1991 through 1998. 1999 rates are calculated using the 1999 DPH Massachusetts population estimates and Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2000-2005, released October 2006 (see Technical Notes in Appendix). 2009 birth rates are based on the 2009 population estimates from the National Center for Health Statistics. PLEASE NOTE: DIFFERENCES BETWEEN THESE RATES AND PREVIOUSLY PUBLISHED DATA REFLECT UPDATES IN POPULATION ESTIMATES.

Table 20. Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2009

Municipality[1]	Total Population Rank	Female Population, ages 15-19	Number of Teen Births	Teen Birth Rate[2]	Mother's Race and Hispanic Ethnicity (% of teen births)			
					White non-Hispanic	Black non-Hispanic	Hispanic	Asian or other[3]
State Total		**228,275**	**4,477**	**19.5**	**44.0**	**13.3**	**37.2**	**5.4**
Attleboro	29	1,134	39	34.4	74.4	0.0	23.1	2.6
Barnstable	25	1,360	21	15.4	61.9	19.0	14.3	4.8
Boston	1	19,770	520	26.3	8.7	43.5	41.7	6.2
Brockton	6	3,638	137	37.7	24.8	50.4	21.2	3.6
Brookline	18	1,451	2	--[4]	--[4]	--[4]	--[4]	--[4]
Cambridge	5	3,923	15	3.8	33.3	40.0	26.7	0.0
Chicopee	21	1,738	72	41.4	50.0	4.2	43.1	2.8
Fall River	9	2,829	129	45.6	70.5	5.4	18.6	5.4
Framingham	14	1,955	50	25.6	36.0	14.0	50.0	0.0
Haverhill	15	1,908	70	36.7	57.1	5.7	34.3	2.9
Lawrence	12	3,027	239	79.0	7.5	2.1	87.9	2.5
Leominster	30	1,254	41	32.7	56.1	0.0	43.9	0.0
Lowell	4	3,966	210	53.0	32.4	2.4	32.4	32.9
Lynn	8	3,084	171	55.4	24.0	10.5	50.3	15.2
Malden	17	1,430	24	16.8	25.0	33.3	25.0	16.7
Medford	22	1,776	11	6.2	54.5	18.2	27.3	0.0
Methuen	27	1,327	40	30.1	57.5	0.0	42.5	0.0
New Bedford	7	2,955	173	58.5	46.8	15.0	34.1	4.0
Newton	11	3,500	4	--[4]	--[4]	--[4]	--[4]	--[4]
Peabody	24	1,432	16	11.2	56.3	6.3	31.3	6.3
Pittsfield	28	1,270	70	55.1	77.1	11.4	8.6	2.9
Plymouth	20	1,672	20	12.0	95.0	5.0	0.0	0.0
Quincy	10	2,078	23	11.1	56.5	26.1	17.4	0.0
Revere	26	1,053	56	53.2	26.8	1.8	55.4	16.1
Somerville	13	2,170	40	18.4	22.5	20.0	47.5	10.0
Springfield	3	6,074	437	71.9	9.2	20.4	67.7	2.7
Taunton	19	1,631	70	42.9	71.4	10.0	12.9	5.7
Waltham	16	2,340	22	9.4	18.2	9.1	63.6	9.1
Weymouth	23	1,452	10	6.9	100.0	0.0	0.0	0.0
Worcester	2	7,036	219	31.1	63.9	5.0	28.8	2.3

Table 20 (cont'd). Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2009

Municipality	Public Payment for Prenatal Care[5] (%)	Unmarried (%)	Low Birthweight[6] (%)	Preterm[7] (%)	Adequacy of Prenatal Care[8]			
					Adequate Intensive	Adequate Basic	Intermediate	Inadequate[9]
State Total	**76.5**	**93.8**	**9.2**	**9.4**	**33.3**	**40.3**	**8.6**	**17.8**
Attleboro	36.4	89.7	--[4]	--[4]	42.1	34.2	--[4]	21.1
Barnstable	71.4	90.5	28.6	--[4]	33.3	28.6	--[4]	33.3
Boston	73.6	96.2	10.6	11.3	25.9	54.2	7.6	12.3
Brockton	87.5	92.7	8.0	10.9	27.2	41.2	10.3	21.3
Brookline	--[4]	--[4]	0.0	0.0	--[4]	0.0	0.0	--[4]
Cambridge	50.0	100.0	--[4]	--[4]	53.3	--[4]	--[4]	--[4]
Chicopee	84.7	90.3	9.7	8.3	32.9	41.4	8.6	17.1
Fall River	92.6	93.0	9.3	7.8	63.8	16.5	0.0	19.7
Framingham	88.0	88.0	20.0	20.0	62.0	26.0	.	.
Haverhill	71.4	92.9	.	.	31.4	44.3	8.6	15.7
Lawrence	86.9	96.7	9.6	8.8	28.5	39.7	15.1	16.7
Leominster	80.5	95.1	.	.	46.3	41.5	.	.
Lowell	83.7	96.2	10.0	10.5	31.4	37.1	7.1	24.3
Lynn	85.0	89.0	9.2	9.2	33.1	36.3	8.1	22.5
Malden	82.6	87.5	--[4]	--[4]	33.3	45.8	0.0	20.8
Medford	81.8	100.0	--[4]	0.0	54.5	--[4]	--[4]	--[4]
Methuen	64.1	97.5	--[4]	15.0	22.5	45.0	--[4]	22.5
New Bedford	64.1	97.1	11.6	11.0	30.8	38.4	12.2	18.6
Newton	--[4]	--[4]	0.0	0.0	--[4]	--[4]	0.0	--[4]
Peabody	75.0	100.0	0.0	0.0	35.7	57.1	--[4]	0.0
Pittsfield	82.9	98.6	--[4]	--[4]	15.7	41.4	27.1	15.7
Plymouth	73.7	100.0	--[4]	--[4]	25.0	50.0	0.0	25.0
Quincy	91.3	91.3	0.0	0.0	--[4]	65.2	--[4]	--[4]
Revere	76.4	91.1	--[4]	--[4]	55.6	24.1	--[4]	16.7
Somerville	76.9	92.5	--[4]	12.5	25.6	35.9	--[4]	33.3
Springfield	89.1	94.3	8.7	10.0	27.5	36.5	9.6	26.4
Taunton	62.5	90.0	15.7	14.3	23.2	52.2	14.5	10.1
Waltham	86.4	90.9	27.3	31.8	59.1	31.8	--[4]	--[4]
Weymouth	80.0	90.0	--[4]	--[4]	--[4]	70.0	0.0	--[4]
Worcester	74.9	93.6	10.0	7.3	25.1	42.5	14.6	17.8

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. The 30 largest municipalities are the cities and towns in Massachusetts with the largest populations according to the Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2005 (MMARS05), released October 2006 (see Technical Notes in Appendix). 2. Birth rates represent the number of births per 1,000 females ages 15-19. Birth rates for cities and towns were calculated using MDPH population estimates for 2005, which are the most up-to-date information available on the number of persons by age, race, and sex at the sub-state level. 3. Mothers who designated themselves as Asian, American Indian, or Other. 4. Calculations based on values of 1-4 are excluded. 5. See Glossary under "Prenatal Care Payment Source." 6. Less than 2,500 grams or 5.5 pounds. 7. Less than 37 weeks of gestational age. 8. Based on Adequacy of Prenatal Care Utilization (APNCU) Index. Please see Glossary and Technical Notes in the Appendix for definitions of index and adequacy categories. 9. Inadequate includes those mothers with no prenatal care.

Table 21. Trends in Infant, Neonatal, and Post Neonatal Mortality by Race, Massachusetts: 1981-2009

INFANT MORTALITY (less than one year of age) **BY RACE**[1]

	State Total[2]		White		Black		Asian/Other[3]	
Year	n	Rate[4]	n	Rate[4]	n	Rate[4]	n	Rate[4]
1981	710	9.6	616	9.1	85	18.2	8	6.1
1982	764	10.1	656	9.4	102	21.3	5	3.3
1983	682	9.0	579	8.3	89	19.0	12	7.4
1984	699	8.9	601	8.4	82	16.4	13	7.5
1985	745	9.1	608	8.1	126	23.8	11	6.1
1986	695	8.4	560	7.5	123	22.0	11	4.6
1987	608	7.2	486	6.4	110	17.5	12	4.5
1988	693	7.9	546	7.0	133	19.5	13	3.8
1989	697	7.6	549	6.8	131	17.7	17	4.8
1990	649	7.0	519	6.4	106	13.7	24	6.5
1991	577	6.5	461	6.0	102	13.8	14	3.9
1992	569	6.5	438	5.7	114	15.8	17	4.7
1993	523	6.2	423	5.7	87	12.5	13	3.5
1994	499	6.0	407	5.6	81	12.0	11	2.9
1995	419	5.1	333	4.7	65	10.3	21	5.5
1996	403	5.0	329	4.7	65	10.8	8	2.0
1997	425	5.3	349	5.0	66	10.6	10	2.4
1998	414	5.1	345	4.9	59	9.3	10	2.3
1999	418	5.2	334	4.8	75	11.4	9	1.9
2000	377	4.6	280	4.0	76	11.7	19	3.6
2001	407	5.0	314	4.5	77	11.7	16	3.0
2002	397	4.9	306	4.5	74	11.1	17	2.9
2003	383	4.8	290	4.3	78	11.8	15	2.6
2004	376	4.8	285	4.3	75	11.1	15	2.5
2005	391	5.1	308	4.8	63	9.3	20	3.5
2006	369	4.8	283	4.4	75	10.5	10	1.7
2007	380	4.9	286	4.4	73	10.0	18	2.8
2008	382	5.0	280	4.4	83	11.5	19	2.9
2009	363	4.8	252	4.1	55	7.5	18	2.8

Table 21 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race[1], Massachusetts: 1981-2009

NEONATAL MORTALITY (birth to 27 days old)

	State Total[2]		White		Black		Asian/Other[3]	
Year	n	Rate[4]	n	Rate[4]	n	Rate[4]	n	Rate[4]
1981	510	6.9	442	6.5	59	12.4	5	3.8
1982	573	7.6	494	7.1	75	15.7	3	--[5]
1983	482	6.3	411	5.9	63	13.4	7	4.3
1984	472	6.0	411	5.8	49	9.8	8	4.6
1985	538	6.6	447	6.0	85	16.0	5	2.8
1986	478	5.8	383	5.2	89	15.9	5	2.1
1987	432	5.1	343	4.6	80	12.7	9	3.4
1988	477	5.4	383	4.9	87	12.8	6	1.8
1989	479	5.2	376	4.7	95	12.8	8	2.3
1990	446	4.8	347	4.3	80	10.3	9	5.1
1991	401	4.5	319	4.1	72	9.8	10	2.8
1992	415	4.8	325	4.3	79	10.9	11	3.1
1993	375	4.4	300	4.1	66	9.5	9	2.4
1994	349	4.2	280	3.8	60	8.9	9	2.4
1995	298	3.6	237	3.3	50	7.9	11	2.9
1996	290	3.6	249	3.5	35	5.8	5	1.2
1997	323	4.0	271	3.9	45	7.2	7	1.7
1998	315	3.9	261	3.7	47	7.4	7	1.6
1999	332	4.1	265	3.8	61	9.3	6	1.3
2000	288	3.5	214	3.1	58	8.9	14	2.7
2001	308	3.8	239	3.5	59	9.0	10	1.9
2002	299	3.7	235	3.4	51	7.6	13	2.2
2003	285	3.6	217	3.2	58	8.8	10	1.8
2004	291	3.7	224	3.4	54	8.0	13	2.2
2005	282	3.7	226	3.5	45	6.6	11	1.9
2006	279	3.6	215	3.3	56	7.8	7	1.2
2007	263	3.4	194	3.0	52	7.2	15	2.4
2008	291	3.8	218	3.4	62	8.6	11	1.7
2009	274	3.7	192	3.1	37	5.1	16	2.5

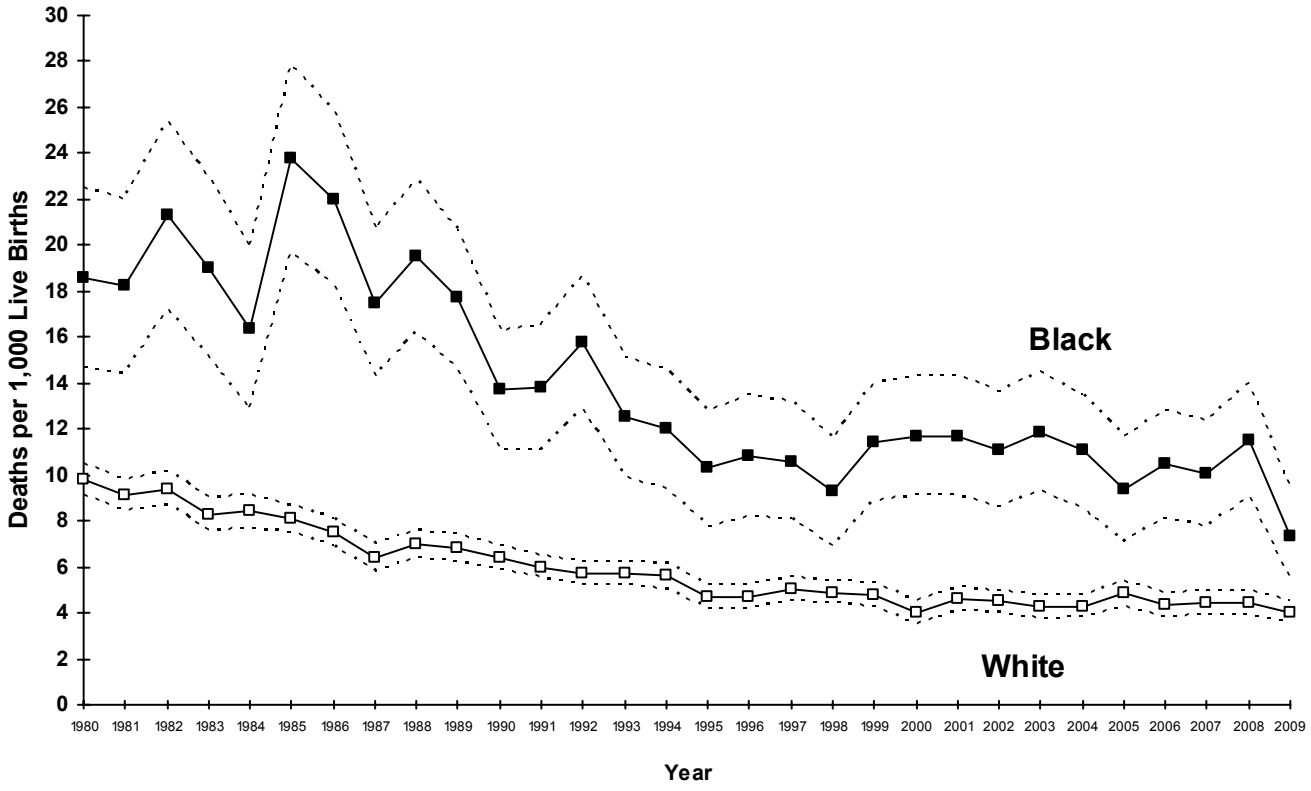
Table 21 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race[1], Massachusetts: 1981-2009

POST NEONATAL MORTALITY (28-364 days old)

	State Total[2]		White		Black		Asian/Other[3]	
Year	n	Rate[4]	n	Rate[4]	n	Rate[4]	n	Rate[4]
1981	200	2.7	174	2.6	26	5.8	3	--[5]
1982	191	2.5	162	2.3	27	5.6	2	--[5]
1983	200	2.7	168	2.4	26	5.6	5	3.1
1984	227	2.9	190	2.6	33	6.6	5	2.9
1985	207	2.5	161	2.1	41	7.8	6	3.3
1986	217	2.6	177	2.3	34	6.1	6	2.5
1987	176	2.1	143	1.8	30	4.8	3	--[5]
1988	216	2.5	163	2.1	46	6.7	7	2.0
1989	218	2.4	173	2.1	36	4.9	9	2.5
1990	203	2.2	172	2.1	26	3.4	5	1.4
1991	176	2.0	142	1.8	30	4.1	4	--[5]
1992	154	1.8	113	1.5	35	4.8	6	1.7
1993	148	1.7	123	1.7	21	3.0	4	--[5]
1994	150	1.8	127	1.7	21	3.1	2	--[5]
1995	121	1.5	96	1.3	15	2.4	10	2.6
1996	113	1.4	80	1.1	30	5.0	3	--[5]
1997	102	1.3	78	1.1	21	3.4	3	--[5]
1998	99	1.2	84	1.2	12	1.9	3	--[5]
1999	86	1.1	69	1.0	14	2.1	3	--[5]
2000	89	1.1	66	0.9	18	2.8	5	1.0
2001	99	1.2	75	1.1	18	2.7	6	1.1
2002	98	1.2	71	1.0	23	3.4	4	--[5]
2003	98	1.2	73	1.1	20	3.0	5	0.9
2004	85	1.1	61	0.9	21	3.1	3	--[5]
2005	109	1.4	82	1.3	18	2.7	7	1.6
2006	90	1.2	68	1.1	19	2.6	3	--[5]
2007	117	1.5	92	1.4	21	2.9	3	--[5]
2008	91	1.2	62	1.0	21	2.9	8	1.2
2009	89	1.2	60	1.0	18	2.5	2	0.3

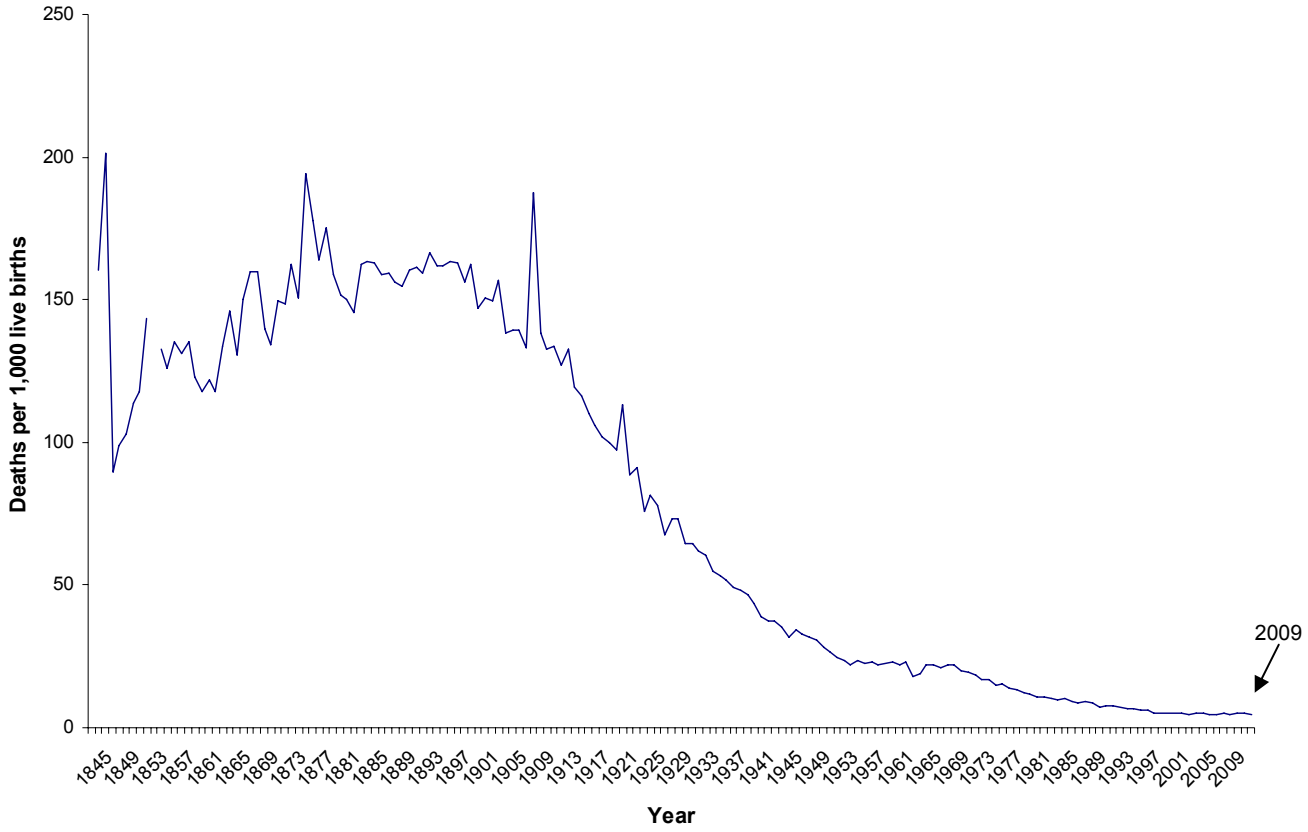
Note: Infant deaths are based on a preliminary death file as of the release of this report.
1. Hispanic origin could not be identified from the Massachusetts death certificate before 1989; thus, Hispanic trend data are not available. Most Hispanics are included in the race category of White. Hispanic infant mortality data for the years 1990 through 2005 are presented in Table 11. 2. Deaths of infants of unknown race are included in the total calculation. For rate computations, infants of unknown race are allocated into the race categories according to the distribution of births of known race. 3. Other: American Indian and Other races. 4. Rates are expressed per 1,000 live births. 5. Calculations based on values of 1-4 are excluded.

Figure 16. Infant Mortality Rates and 95% Confidence Intervals by Race Massachusetts: 1980-2009[1,2,3]



1. See Technical Notes for explanation. 2. For rate computations, infant births of unknown race are allocated into race categories according to the distribution of the births of known race. 3. On tables and graphs which include data prior to June 1986, the race classifications do not include ethnicity; most Hispanics are included in the race category of whites.

Figure 17. Infant Mortality Rates, Massachusetts: 1842-2009



NOTE: Data not available for 1850.

Figure 18. Trends in the Timing of Infant Deaths, Massachusetts: 1990-2009

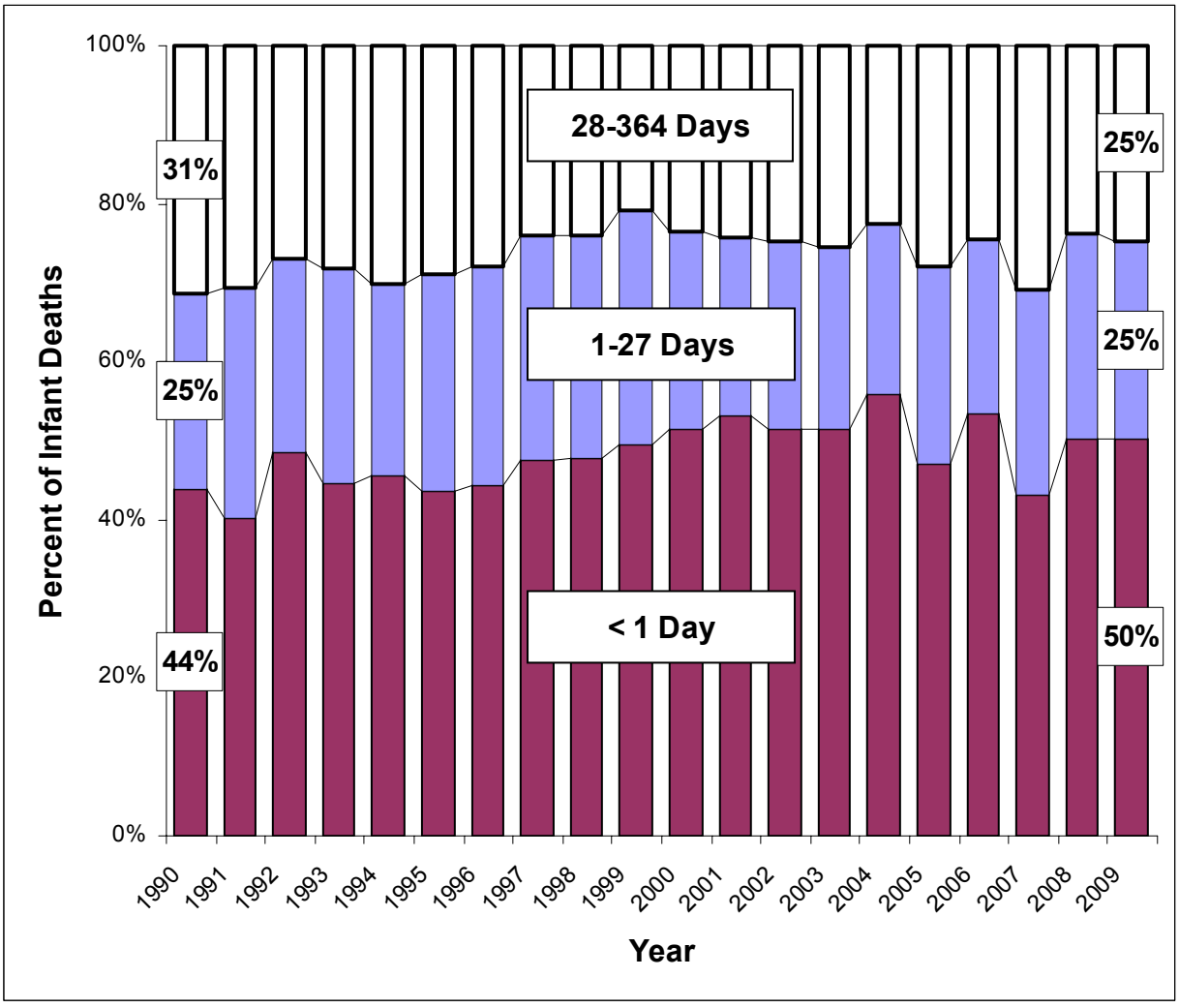


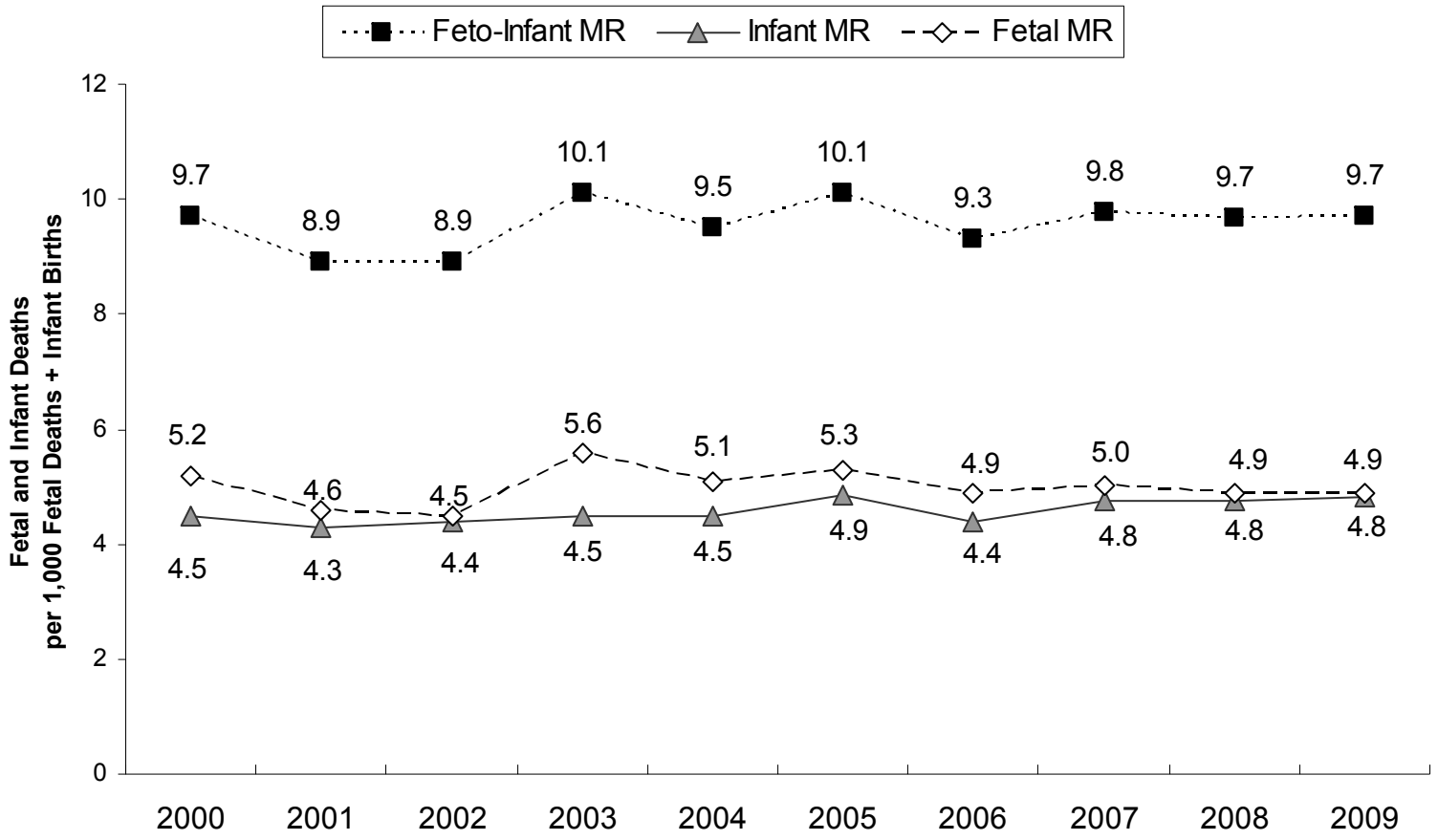
Table 22. Feto-Infant Mortality Rate[1] by Birthweight, Massachusetts: 2000-2009

Birthweight	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<500	940.2	938.3	943.5	923.1	912.0	910.9	943.2	934.1	944.9	926.4
500-749	500.0	487.0	525.5	523.4	561.8	564.7	544.1	487.3	588.0	482.5
750-999	182.2	146.9	188.6	220.7	157.7	187.8	247.2	282.2	238.1	243.2
1,000-1,249	125.4	83.0	131.4	142.9	124.1	100.7	112.4	87.3	80.4	133.0
1,250-1,499	84.6	84.6	95.8	67.7	74.4	73.6	65.8	63.3	72.1	87.5
1,500-1,999	41.8	40.3	38.3	31.3	38.0	37.2	35.2	39.1	32.5	41.7
2,000-2,499	15.3	12.2	11.9	16.4	14.8	12.8	15.2	14.6	16.0	16.9
2,500-4,000	2.2	2.6	2.5	2.3	2.5	2.4	2.4	2.7	2.4	2.5
4001+	1.5	1.5	1.7	2.5	1.3	2.5	2.3	2.3	1.4	1.9
Unknown Birthweight	*(37)*	*(23)*	*(17)*	*(30)*	*(19)*	*(11)*	*(34)*	*(10)*	*(16)*	*(14)*
Feto-Infant Mortality Rate[2]	**9.9**	**9.7**	**9.1**	**10.3**	**9.5**	**10.1**	**9.3**	**9.8**	**9.7**	**9.7**

1. Fetal and infant deaths per 1,000 live births plus fetal deaths. 2. The feto-infant mortality rate is calculated here *excluding* fetal deaths, infant deaths, and births of *unknown birthweight*.

Source: Starting with *Massachusetts Births 2003*, linked death-cohort files of MA resident infant deaths for the years 2000-2009 have been used for the calculation of infant mortality.

Figure 19. Feto-Infant Mortality Rate, Massachusetts: 2000-2009



NOTES: In this graph, Infant, Fetal, and Feto-Infant Mortality Rates include all deaths (including those with unknown birthweight). The Infant Mortality Rate in this graph includes fetal deaths in the denominator unlike the conventional IMR. The Infant Mortality Rate and Fetal Mortality Rate may not add up to the Feto-Infant Mortality Rate due to rounding.

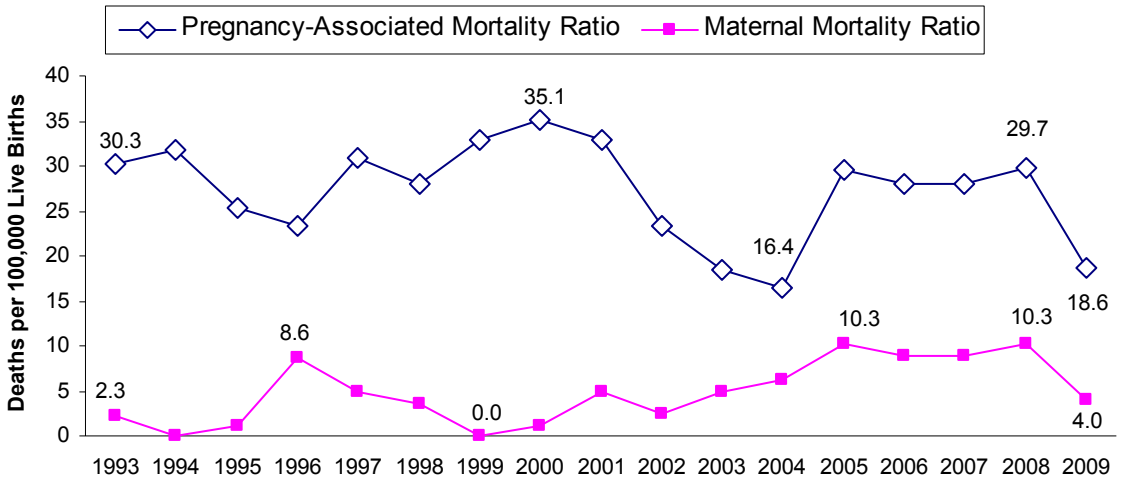
Source: Starting with *Massachusetts Births 2003*, linked death-cohort files of MA resident infant deaths for the years 2000-2009 have been used for the calculation of infant mortality.

Table 23. Fetal and Infant Deaths by Birthweight and Gestational Age, Massachusetts: 1998-2009

Year	Fetals <24 wks or <500 grams	Fetals ≥ 24 wks and ≥ 500 grams	Infants <24 wks or <500 grams	Infants ≥ 24 wks and ≥ 500 grams	Total
1998	216 (25.5%)	219 (25.8%)	183 (21.6%)	230 (27.1%)	848 (100.0%)
1999	214 (25.4%)	215 (25.6%)	196 (23.3%)	216 (25.7%)	841 (100.0%)
2000	203 (25.1%)	234 (28.9%)	168 (20.7%)	205 (25.3%)	810 (100.0%)
2001	174 (22.0%)	214 (27.1%)	197 (24.9%)	206 (26.0%)	791 (100.0%)
2002	165 (22.3%)	210 (28.3%)	185 (25.0%)	181 (24.4%)	741 (100.0%)
2003	218 (26.3%)	246 (29.6%)	189 (22.8%)	177 (21.3%)	830 (100.0%)
2004	177 (22.7%)	240 (30.8%)	182 (23.3%)	181 (23.2%)	780 (100.0%)
2005	210 (26.3%)	213 (26.7%)	174 (21.8%)	201 (25.2%)	798 (100.0%)
2006	178 (24.1%)	210 (28.5%)	173 (23.4%)	177 (24.0%)	738 (100.0%)
2007	184 (23.7%)	215 (27.7%)	149 (19.2%)	227 (29.3%)	775 (100.0%)
2008	178 (23.5%)	209 (27.5%)	194 (25.6%)	178 (23.5%)	759 (100.0%)
2009	158 (21.6%)	221 (30.2%)	162 (21.8%)	201 (27.1%)	742 (100.0%)

Source: Starting with *Massachusetts Births 2003*, linked death-cohort files of MA resident infant deaths for the years 1998-2009 have been used for the calculation of infant mortality.

Figure 20. Trends in Pregnancy-Associated and Maternal Mortality, Massachusetts: 1993-2009



NOTE: Ratios shown in graph are per 100,000 live births. Ratios are based on occurrence births, not resident births.

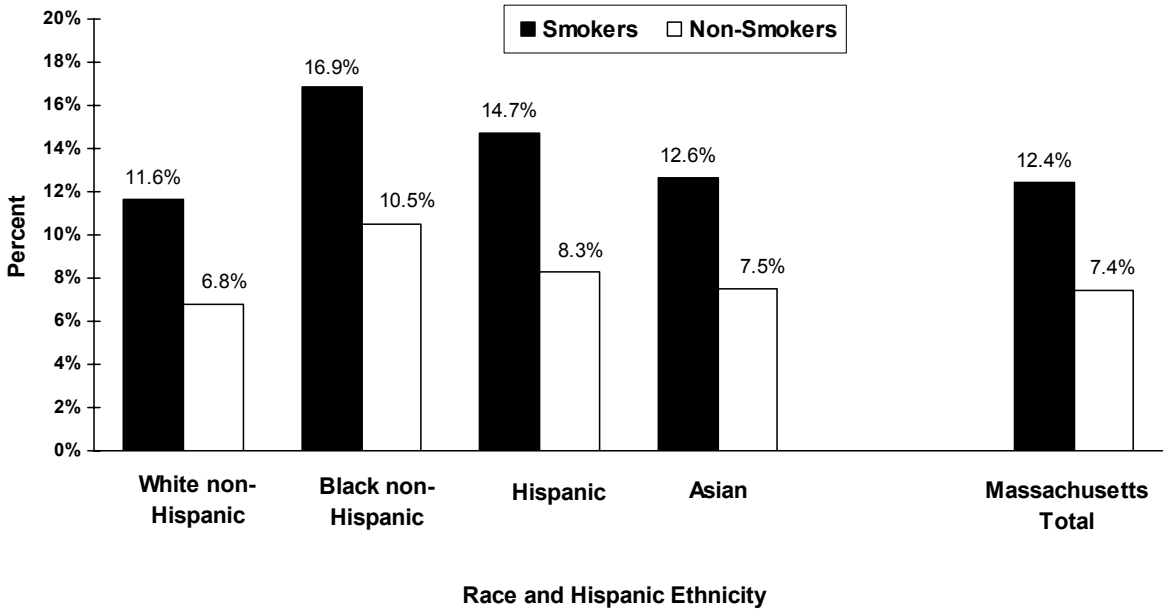
Pregnancy-associated death is defined as the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause. The pregnancy-associated mortality ratio is the number of pregnancy-associated deaths per 100,000 live occurrence births (see Definition of Rates and Technical Notes in Appendix for further information). Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes. Maternal mortality ratio is the number of maternal deaths per 100,000 live occurrence births (see Definition of Rates and Technical Notes in Appendix for more information.)

Table 24. Number of Pregnancy-Associated and Maternal Deaths, Massachusetts: 1998-2009

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Pregnancy Associated Deaths[1]	23	27	29	27	19	15	13	23	22	22	23	14
Maternal Deaths[2]	3	0	1	4	2	4	5	8	7	7	8	3

1. Pregnancy-associated death is defined as the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause. 2. Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes.

Figure 21. Low Birthweight among Smoking and Non-Smoking Mothers by Race and Hispanic Ethnicity, Massachusetts: 2009



NOTE: Maternal smoking is self-reported on the Parent Worksheet of the Birth Certificate; these data should be interpreted cautiously. Low birthweight: less than 2,500 grams or 5.5 pounds.

Table 25. Low Birthweight (LBW) by Maternal Age, Race/Hispanic Ethnicity, Massachusetts: 2009

Mother's Age	Total LBW[1] Infants		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[4]		Unknown[5]
(in years)	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n
State Total[2]	**5,804**	**7.8**	**3,547**	**7.1**	**750**	**10.8**	**940**	**8.6**	**451**	**7.6**	**97**	**8.4**	**19**
<18	133	9.8	37	7.6	19	10.3	59	9.8	15	26.3	3	--[6]	0
18-19	280	8.9	116	7.8	52	12.5	94	8.6	13	15.7	5	7.4	0
20-24	917	7.7	435	6.7	170	11.0	257	7.8	39	7.4	15	7.4	1
25-29	1,364	7.4	810	6.8	179	9.9	239	8.4	108	7.1	25	7.0	3
30-34	1,662	7.2	1,107	6.6	185	10.9	180	9.0	150	6.7	28	9.1	12
35-39	1,097	8.2	785	7.7	115	11.4	81	8.7	103	8.2	13	8.7	0
40+	350	10.8	257	10.6	30	10.3	30	13.0	23	9.3	8	20.5	2

NOTE: 1. Low Birthweight (LBW): less than 2,500 grams or 5.5 pounds. 2. State totals include women of unknown age. 3. Percentages are based upon the number of low birthweight infants divided by the total births in each age and race/ethnicity category. 4. Other races include American Indian and others not specified. 5. Race and/or mother's age unknown. 6. Calculations based on values of 1-4 are excluded.

Table 26. Adequacy of Prenatal Care Utilization: Summary and Component Indices, Massachusetts: 2009

	Adequate Total[1]		Adequate Intensive[2]		Adequate Basic[2]		Intermediate[2]		Inadequate[2]		Unknown[2]
	n	%	n	%	n	%	n	%	n	%	n
Summary Index[3]											
Adequacy of Prenatal Care Utilization	61,669	84.3	28,171	38.5	33,498	45.8	4,758	6.5	6,698	9.2	1,841
Component Indices[3]											
Adequacy of Initiation	66,881	91.5	30,228	41.3	36,653	50.1	3,711	5.1	2,533	3.5	1,841
Adequacy of Received Services (Visits)	67,173	91.9	32,584	44.6	34,589	47.3	5,192	7.1	760	1.0	1,841

NOTE: All percentages are calculated based on the Adequacy of Prenatal Care Utilization (APNCU) Index.

1. Adequate Total is the sum of Adequate Intensive and Adequate Basic categories. 2. For definitions of these categories, please see the Technical Notes in the Appendix. 3. For an explanation of the APNCU Index (summary index) and its component indices, please see Technical Notes in the Appendix (page 102).

Table 27. Adequacy of Prenatal Care Summary by Selected Characteristics, Massachusetts: 2009

Summary Index	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**61,669**	**84.3%**	**28,171**	**38.5%**	**33,498**	**45.8%**	**4,758**	**6.5%**	**6,698**	**9.2%**	**1,841**
Maternal Demographics											
Age											
<18	931	69.1%	439	32.6%	492	36.5%	118	8.8%	299	22.2%	21
18-19	2,322	75.3%	1,036	33.6%	1,286	41.7%	266	8.6%	496	16.1%	75
20-24	9,159	77.8%	4,125	35.0%	5,034	42.8%	994	8.4%	1,618	13.7%	277
25-29	15,037	83.7%	6,783	37.7%	8,254	45.9%	1,287	7.2%	1,646	9.2%	499
30-34	19,834	87.6%	8,810	38.9%	11,024	48.7%	1,278	5.6%	1,519	6.7%	512
35-39	11,600	88.1%	5,517	41.9%	6,083	46.2%	688	5.2%	873	6.6%	360
40+	2,786	88.2%	1,461	46.2%	1,325	41.9%	127	4.0%	247	7.8%	93
Educational Attainment											
< High school	5,462	72.4%	2,575	34.1%	2,887	38.3%	686	9.1%	1,397	18.5%	266
High school	14,819	80.4%	6,824	37.0%	7,995	43.4%	1,502	8.1%	2,115	11.5%	373
Some college	13,065	85.0%	6,263	40.7%	6,802	44.3%	934	6.1%	1,371	8.9%	453
College	17,033	88.9%	7,477	39.0%	9,556	49.9%	1,019	5.3%	1,103	5.8%	390
> College	11,202	89.6%	4,979	39.8%	6,223	49.7%	613	4.9%	694	5.5%	263
Race/Ethnicity											
Hispanic	8,476	79.2%	3,771	35.2%	4,705	44.0%	941	8.8%	1,283	12.0%	286
White non-Hispanic	42,167	86.8%	19,445	40.0%	22,722	46.8%	2,943	6.1%	3,486	7.2%	1,163
Black non-Hispanic	5,116	76.0%	2,236	33.2%	2,880	42.8%	450	6.7%	1,165	17.3%	214
Asian	4,945	84.2%	2,219	37.8%	2,726	46.4%	336	5.7%	594	10.1%	64
Other	874	78.6%	446	40.1%	428	38.5%	82	7.4%	156	14.0%	46
Birthplace											
US/D.C.	43,811	85.7%	20,176	39.5%	23,635	46.2%	3,209	6.3%	4,101	8.0%	1,285
Puerto Rico/US Terr.	1,507	77.3%	651	33.4%	856	43.9%	208	10.7%	235	12.1%	33
Non-US-born	16,343	81.5%	7,337	36.6%	9,006	44.9%	1,341	6.7%	2,361	11.8%	522
Pregnancy-Related Factors											
Parity[2]											
1	28,327	84.7%	12,658	37.9%	15,669	46.9%	2,106	6.3%	2,995	9.0%	576
2-3	29,598	85.0%	13,689	39.3%	15,909	45.7%	2,284	6.6%	2,942	8.4%	600
4+	3,584	76.6%	1,732	37.0%	1,852	39.6%	356	7.6%	741	15.8%	114
Smoking[3]											
Yes	3,712	74.2%	1,875	37.5%	1,837	36.7%	436	8.7%	858	17.1%	110
No	57,876	85.1%	26,257	38.6%	31,619	46.5%	4,319	6.3%	5,823	8.6%	1,667
Birth Outcomes											
Plurality											
Singleton	58,540	84.0%	25,460	36.5%	33,080	47.5%	4,706	6.8%	6,469	9.3%	1,708
Multiple birth	3,129	91.8%	2,711	79.5%	418	12.3%	52	1.5%	229	6.7%	133
Birthweight											
<500 g	97	91.5%	91	85.8%	6	5.7%	0	0.0%	9	8.5%	11
500-1,499 g	758	89.8%	679	80.5%	79	9.4%	13	1.5%	73	8.6%	53
1,500-2,499 g	3,988	85.7%	3,147	67.6%	841	18.1%	174	3.7%	491	10.6%	137
2,500-3,999 g	50,883	84.0%	22,100	36.5%	28,783	47.5%	4,072	6.7%	5,621	9.3%	1,147
4,000+ g	5,888	85.6%	2,119	30.8%	3,769	54.8%	496	7.2%	496	7.2%	121
Gestational Age											
<28 weeks	420	91.7%	389	84.9%	31	6.8%	6	1.3%	32	7.0%	29
<37 weeks	5,506	87.7%	4,818	76.7%	688	11.0%	183	2.9%	592	9.4%	235
37-42 weeks	56,142	84.0%	23,339	34.9%	32,803	49.1%	4,571	6.8%	6,086	9.1%	1,215

NOTE: All percentages are calculated based on the Adequacy of Prenatal Care Utilization (APNCU) Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories.

1. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 2. Parity is the number of live births including this birth. 3. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution.

Table 28. Adequacy of Prenatal Care Initiation by Selected Characteristics, Massachusetts: 2009

Based on month of PNC Initiation	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**66,881**	**91.5%**	**30,228**	**41.3%**	**36,653**	**50.1%**	**3,711**	**5.1%**	**2,533**	**3.5%**	**1,841**
Maternal Demographics											
Age											
<18	1,059	78.6%	365	27.1%	694	51.5%	193	14.3%	96	7.1%	21
18-19	2,617	84.9%	1,055	34.2%	1,562	50.6%	288	9.3%	179	5.8%	75
20-24	10,262	87.2%	4,115	35.0%	6,147	52.2%	957	8.1%	552	4.7%	277
25-29	16,445	91.5%	7,248	40.3%	9,197	51.2%	900	5.0%	625	3.5%	499
30-34	21,222	93.8%	10,192	45.0%	11,030	48.7%	787	3.5%	622	2.7%	512
35-39	12,344	93.8%	5,879	44.7%	6,465	49.1%	458	3.5%	359	2.7%	360
40+	2,932	92.8%	1,374	43.5%	1,558	49.3%	128	4.1%	100	3.2%	93
Educational Attainment											
< High school	6,210	82.3%	2,189	29.0%	4,021	53.3%	852	11.3%	483	6.4%	266
High school	16,500	89.5%	6,795	36.9%	9,705	52.6%	1,200	6.5%	736	4.0%	373
Some college	14,071	91.5%	6,111	39.8%	7,960	51.8%	786	5.1%	513	3.3%	453
College	18,149	94.7%	9,287	48.5%	8,862	46.3%	521	2.7%	485	2.5%	390
> College	11,857	94.8%	5,815	46.5%	6,042	48.3%	345	2.8%	307	2.5%	263
Race/Ethnicity											
Hispanic	9,482	88.6%	3,926	36.7%	5,556	51.9%	791	7.4%	427	4.0%	286
White non-Hispanic	45,403	93.4%	20,844	42.9%	24,559	50.5%	1,926	4.0%	1,267	2.6%	1,163
Black non-Hispanic	5,632	83.7%	2,716	40.4%	2,916	43.3%	567	8.4%	532	7.9%	214
Asian	5,303	90.3%	2,274	38.7%	3,029	51.6%	343	5.8%	229	3.9%	64
Other	962	86.5%	426	38.3%	536	48.2%	79	7.1%	71	6.4%	46
Birthplace											
US/D.C.	47,330	92.6%	21,643	42.3%	25,687	50.2%	2,365	4.6%	1,426	2.8%	1,285
Puerto Rico/US Terr.	1,732	88.8%	669	34.3%	1,063	54.5%	139	7.1%	79	4.1%	33
Non-US-born	17,811	88.9%	7,909	39.5%	9,902	49.4%	1,207	6.0%	1,027	5.1%	522
Pregnancy-Related Factors											
Parity[2]											
1	30,619	91.6%	14,331	42.9%	16,288	48.7%	1,633	4.9%	1,176	3.5%	576
2-3	32,097	92.2%	14,273	41.0%	17,824	51.2%	1,639	4.7%	1,088	3.1%	600
4+	3,993	85.3%	1,509	32.2%	2,484	53.1%	429	9.2%	259	5.5%	114
Smoking[3]											
Yes	4,202	83.9%	1,503	30.0%	2,699	53.9%	482	9.6%	322	6.4%	110
No	62,592	92.0%	28,684	42.2%	33,908	49.9%	3,221	4.7%	2,205	3.2%	1,667
Birth Outcomes											
Plurality											
Singleton	63,694	91.4%	28,602	41.0%	35,092	50.3%	3,572	5.1%	2,449	3.5%	1,708
Multiple birth	3,187	93.5%	1,626	47.7%	1,561	45.8%	139	4.1%	84	2.5%	133
Birthweight											
<500 g	97	91.5%	32	30.2%	65	61.3%	4	--[4]	5	4.7%	11
500-1,499 g	772	91.5%	404	47.9%	368	43.6%	47	5.6%	25	3.0%	53
1,500-2,499 g	4,186	90.0%	2,027	43.6%	2,159	46.4%	261	5.6%	206	4.4%	137
2,500-3,999 g	55,340	91.4%	24,761	40.9%	30,579	50.5%	3,126	5.2%	2,110	3.5%	1,147
4,000+ g	6,427	93.4%	2,970	43.2%	3,457	50.2%	269	3.9%	184	2.7%	121
Gestational Age											
<28 weeks	427	93.2%	200	43.7%	227	49.6%	21	4.6%	10	2.2%	29
<37 weeks	5,717	91.0%	2,816	44.8%	2,901	46.2%	313	5.0%	251	4.0%	235
37-42 weeks	61,138	91.5%	27,403	41.0%	33,735	50.5%	3,395	5.1%	2,266	3.4%	1,215

NOTE: All percentages are calculated based on the Adequacy of Prenatal Care Utilization (APNCU) Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories.

1. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 2. Parity is the number of live births including this birth. 3. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution. 4. Calculations based on values of 1-4 are excluded.

Table 29 Adequacy of Prenatal Care Visits by Selected Characteristics, Massachusetts: 2009

Based on number of PNC Visits	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**67,173**	**91.9%**	**32,584**	**44.6%**	**34,589**	**47.3%**	**5,192**	**7.1%**	**760**	**1.0%**	**1,841**
Maternal Demographics											
Age											
<18	1,176	87.2%	636	47.2%	540	40.1%	142	10.5%	30	2.2%	21
18-19	2,733	88.6%	1,342	43.5%	1,391	45.1%	304	9.9%	47	1.5%	75
20-24	10,441	88.7%	5,111	43.4%	5,330	45.3%	1,133	9.6%	197	1.7%	277
25-29	16,385	91.2%	7,869	43.8%	8,516	47.4%	1,387	7.7%	198	1.1%	499
30-34	21,124	93.3%	9,857	43.6%	11,267	49.8%	1,343	5.9%	164	0.7%	512
35-39	12,334	93.7%	6,138	46.6%	6,196	47.1%	734	5.6%	93	0.7%	360
40+	2,980	94.3%	1,631	51.6%	1,349	42.7%	149	4.7%	31	1.0%	93
Educational Attainment											
< High school	6,601	87.5%	3,445	45.7%	3,156	41.8%	805	10.7%	139	1.8%	266
High school	16,477	89.4%	8,121	44.0%	8,356	45.3%	1,665	9.0%	294	1.6%	373
Some college	14,214	92.5%	7,179	46.7%	7,035	45.8%	1,012	6.6%	144	0.9%	453
College	17,969	93.8%	8,269	43.2%	9,700	50.6%	1,064	5.6%	122	0.6%	390
> College	11,815	94.5%	5,510	44.0%	6,305	50.4%	641	5.1%	53	0.4%	263
Race/Ethnicity											
Hispanic	9,555	89.3%	4,605	43.0%	4,950	46.3%	1,036	9.7%	109	1.0%	286
White non-Hispanic	44,973	92.5%	21,730	44.7%	23,243	47.8%	3,155	6.5%	468	1.0%	1,163
Black non-Hispanic	6,070	90.2%	2,977	44.2%	3,093	46.0%	541	8.0%	120	1.8%	214
Asian	5,477	93.2%	2,670	45.4%	2,807	47.8%	360	6.1%	38	0.6%	64
Other	1,000	89.9%	545	49.0%	455	40.9%	93	8.4%	19	1.7%	46
Birthplace											
US/D.C.	47,089	92.1%	22,794	44.6%	24,295	47.5%	3,499	6.8%	533	1.0%	1,285
Puerto Rico/US Terr.	1,697	87.0%	794	40.7%	903	46.3%	227	11.6%	26	1.3%	33
Non-US-born	18,379	91.7%	8,989	44.8%	9,390	46.8%	1,466	7.3%	200	1.0%	522
Pregnancy-Related Factors											
Parity[2]											
1	30,862	92.3%	14,716	44.0%	16,146	48.3%	2,257	6.8%	309	0.9%	576
2-3	31,996	91.9%	15,613	44.8%	16,383	47.0%	2,486	7.1%	342	1.0%	600
4+	4,140	88.4%	2,152	46.0%	1,988	42.5%	437	9.3%	104	2.2%	114
Smoking[3]											
Yes	4,326	86.4%	2,343	46.8%	1,983	39.6%	524	10.5%	156	3.1%	110
No	62,757	92.3%	30,196	44.4%	32,561	47.9%	4,663	6.9%	598	0.9%	1,667
Birth Outcomes											
Plurality											
Singleton	63,839	91.6%	29,687	42.6%	34,152	49.0%	5,132	7.4%	744	1.1%	1,708
Multiple birth	3,334	97.8%	2,897	85.0%	437	12.8%	60	1.8%	16	0.5%	133
Birthweight											
<500 g	101	95.3%	95	89.6%	6	5.7%	0	0.0%	5	4.7%	11
500-1,499 g	822	97.4%	737	87.3%	85	10.1%	13	1.5%	9	1.1%	53
1,500-2,499 g	4,378	94.1%	3,483	74.9%	895	19.2%	200	4.3%	75	1.6%	137
2,500-3,999 g	55,514	91.6%	25,793	42.6%	29,721	49.1%	4,448	7.3%	614	1.0%	1,147
4,000+ g	6,297	91.5%	2,435	35.4%	3,862	56.1%	528	7.7%	55	0.8%	121
Gestational Age											
<28 weeks	441	96.3%	408	89.1%	33	7.2%	6	1.3%	11	2.4%	29
<37 weeks	5,975	95.1%	5,232	83.3%	743	11.8%	200	3.2%	106	1.7%	235
37-42 weeks	61,174	91.6%	27,337	40.9%	33,837	50.7%	4,986	7.5%	639	1.0%	1,215

NOTE: All percentages are calculated based on the Adequacy of Prenatal Care Utilization (APNCU) Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories.

1. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 2. Parity is the number of live births including this birth. 3. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution.

Table 30. Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment, Massachusetts: 2009

Race/Ethnicity and Payment Source	Births[1]		Teen Births				Birthweight			
			<18 Years		<20 Years		Very Low[2]		Low[3]	
	n	%	n	%	n	%	n	%	n	%
STATE TOTAL[4]	**74,966**	**100.0**	**1,369**	**1.8**	**4,528**	**6.0**	**1,014**	**1.4**	**5,804**	**7.8**
Public	26,443	36.1	1,027	3.9	3,402	12.9	377	1.4	2,198	8.3
Medicaid[5]	19,666	26.8	794	4.0	2,663	13.5	257	1.3	1,624	8.3
Other Public[6]	6,777	9.2	233	3.4	739	10.9	120	1.8	574	8.5
Private[7]	46,002	62.7	297	0.6	990	2.2	536	1.2	3,297	7.2
White non-Hispanic	**49,759**	**100.0**	**484**	**1.0**	**1,977**	**4.0**	**582**	**1.2**	**3,547**	**7.1**
Public	12,279	25.3	311	2.5	1,314	10.7	149	1.2	928	7.6
Medicaid[5]	9,643	19.9	255	2.6	1,099	11.4	106	1.1	721	7.5
Other Public[6]	2,636	5.4	56	2.1	215	8.2	43	1.6	207	7.9
Private[7]	35,615	73.4	154	0.4	592	1.7	372	1.0	2,413	6.8
Black non-Hispanic	**6,945**	**100.0**	**185**	**2.7**	**602**	**8.7**	**156**	**2.2**	**750**	**10.8**
Public	4,219	61.3	145	3.4	468	11.1	79	1.9	435	10.3
Medicaid[5]	3,155	45.9	118	3.7	385	12.2	54	1.7	322	10.2
Other Public[6]	1,064	15.5	27	2.5	83	7.8	25	2.3	113	10.6
Private[7]	2,591	37.7	31	1.2	118	4.6	73	2.8	293	11.3
Hispanic	**10,986**	**100.0**	**604**	**5.5**	**1,697**	**15.4**	**182**	**1.7**	**940**	**8.6**
Public	7,887	72.6	502	6.4	1,427	18.1	126	1.6	667	8.5
Medicaid[5]	5,242	48.2	359	6.8	1,007	19.2	79	1.5	446	8.5
Other Public[6]	2,645	24.3	143	5.4	420	15.9	47	1.8	221	8.4
Private[7]	2,895	26.6	88	3.0	233	8.0	43	1.5	235	8.1
Asian	**5,939**	**100.0**	**57**	**1.0**	**140**	**2.4**	**62**	**1.0**	**451**	**7.6**
Public	1,490	25.3	45	3.0	113	7.6	16	1.1	131	8.8
Medicaid[5]	1,187	20.1	43	3.6	106	8.9	12	1.0	107	9.0
Other Public[6]	303	5.1	2	--[8]	7	2.3	4	--[8]	24	7.9
Private[7]	4,382	74.3	12	0.3	25	0.6	43	1.0	314	7.2
Other[9]	**1,158**	**100.0**	**37**	**3.2**	**105**	**9.1**	**26**	**2.2**	**97**	**8.4**
Public	543	51.0	24	4.4	77	14.2	7	1.3	34	6.3
Medicaid[5]	415	39.0	19	4.6	63	15.2	6	1.4	25	6.0
Other Public[6]	128	12.0	5	3.9	14	10.9	1	--[8]	9	7.0
Private[7]	498	46.8	11	2.2	21	4.2	5	1.0	39	7.8

Table 30 (cont'd). Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment, Massachusetts: 2009

Race/Ethnicity by PNC Payment Source	Prenatal Care: Adequate[10] n	Adequate %	Began 1st Trimester n	Began 1st Trimester %	Cesarean Delivery n	Cesarean Delivery %	Breastfeeding[11] n	Breastfeeding %	Smoking[12] n	Smoking %
STATE TOTAL[4]	**61,669**	**84.3**	**60,758**	**82.6**	**25,067**	**33.6**	**60,261**	**82.0**	**5,116**	**6.8**
Public	19,967	77.1	19,103	73.2	7,941	30.0	19,834	75.2	3,683	13.9
Medicaid[5]	15,106	78.0	14,483	74.5	5,928	30.2	14,394	73.3	3,013	15.3
Other Public[6]	4,861	74.2	4,620	69.4	2,013	29.7	5,440	80.5	670	9.9
Private[7]	40,433	89.0	40,345	88.6	16,481	35.9	39,521	86.0	1,248	2.7
White non-Hispanic	**42,167**	**86.8**	**41,975**	**85.9**	**17,209**	**34.8**	**38,857**	**79.9**	**4,015**	**8.1**
Public	9,615	79.4	9,276	76.3	3,870	31.5	8,229	67.2	2,753	22.4
Medicaid[5]	7,592	79.8	7,316	76.6	3,000	31.1	6,211	64.6	2,349	24.4
Other Public[6]	2,023	78.1	1,960	75.2	870	33.0	2,018	76.8	404	15.3
Private[7]	31,556	89.8	31,656	89.9	12,856	36.1	30,001	84.4	1,115	3.1
Black non-Hispanic	**5,116**	**76.0**	**4,927**	**72.3**	**2,342**	**33.8**	**5,962**	**86.2**	**365**	**5.3**
Public	2,900	71.2	2,781	67.4	1,381	32.8	3,532	83.8	311	7.4
Medicaid[5]	2,282	74.4	2,187	70.6	1,011	32.1	2,635	83.6	234	7.4
Other Public[6]	618	61.7	594	57.6	370	34.8	897	84.4	77	7.2
Private[7]	2,173	85.3	2,105	82.0	928	35.9	2,344	90.5	43	1.7
Hispanic	**8,476**	**79.2**	**8,133**	**75.3**	**3,212**	**29.4**	**9,166**	**84.3**	**547**	**5.0**
Public	5,920	76.9	5,635	72.4	2,158	27.4	6,481	82.3	478	6.1
Medicaid[5]	4,003	77.5	3,850	74.2	1,503	28.7	4,315	82.4	301	5.7
Other Public[6]	1,917	75.6	1,785	68.9	655	24.8	2,166	82.1	177	6.7
Private[7]	2,469	86.4	2,411	84.1	1,005	34.7	2,600	89.9	55	1.9
Asian	**4,945**	**84.2**	**4,771**	**81.0**	**1,872**	**31.6**	**5,273**	**89.3**	**96**	**1.6**
Public	1,112	75.6	1,002	67.8	351	23.6	1,134	76.3	73	4.9
Medicaid[5]	899	76.4	808	68.5	278	23.4	890	75.1	69	5.8
Other Public[6]	213	72.4	194	65.3	73	24.1	244	80.8	4	--[8]
Private[7]	3,805	87.3	3,743	85.8	1,502	34.3	4,111	93.9	19	0.4
Other[9]	**874**	**78.6**	**857**	**76.2**	**400**	**34.8**	**920**	**85.4**	**89**	**7.7**
Public	402	74.9	389	72.3	175	32.2	442	81.4	66	12.2
Medicaid[5]	313	76.2	303	73.7	130	31.3	328	79.0	58	14.0
Other Public[6]	89	70.6	86	67.7	45	35.2	114	89.1	8	6.3
Private[7]	412	83.7	413	83.8	184	37.0	447	89.8	16	3.2

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. In the "Births" column, percentages are based on race/ethnicity category totals (in column). For all other characteristics, percentages are based on the total number of births for the race/ethnicity by payment source for the row. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low Birthweight: less than 2,500 grams or 5.5 pounds. 4. Total births do not equal Public + Private because Workers' Compensation, self-paid, and other are in the state total but not shown in the table. 5. Medicaid/MassHealth. 6. Other Public: CommonHealth, Healthy Start, Medicare, other government programs, and free care. 7. Private: commercial indemnity plans or commercial managed care organizations (HMO, PPO, IPP, or IPA). It does not include Self-Paid/Other. 8. Calculations based on values of 1-4 are excluded. 9. Other: Mothers who designated their race as American Indian or "Other." 10. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. 11. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 12. Mother reported smoking during pregnancy.

Table 31. Cesarean Deliveries and Vaginal Births after Cesarean (VBACs) by Licensed Maternity Facility, All Births, Massachusetts: 2009

Facility[1]	Occurrence Births[2]	Total Cesareans		Primary Cesareans[2]		Repeat Cesareans		VBACs[2]	
		N	%[3,4]	N	%[3,5]	N	%[3,6]	N	%[7]
State Total	**75,443**	**25,292**	**33.7**	**15,033**	**23.6**	**10,259**	**91.3**	**975**	**8.7**
Anna Jaques Hospital	735	253	34.4	136	22.7	117	86.7	18	13.3
Baystate Franklin Medical Center	487	103	21.1	66	14.9	37	86.0	6	14.0
Baystate Mary Lane Hospital	154	46	29.9	23	17.6	23	100.0	0	0.0
Baystate Medical Center	4,314	1,401	32.5	860	23.3	541	87.8	75	12.2
Berkshire Medical Center	648	192	29.6	99	18.3	93	86.1	15	13.9
Beth Israel Deaconess Medical Center	4,792	1,853	38.7	1,149	28.7	704	89.8	80	10.2
Beverly Hospital	2,173	639	34.8	388	24.8	251	92.3	21	7.7
Boston Medical Center	2,411	719	29.8	414	19.7	305	99.0	3	--[8]
Brigham And Women's Hospital	8,144	2,827	34.8	1,841	26.5	986	84.9	175	15.1
Brockton Hospital	1,192	538	45.1	313	32.8	225	94.9	12	5.1
Cambridge Hospital	1,317	341	25.9	195	17.1	146	83.4	29	16.6
Cape Cod Hospital	899	305	33.9	186	23.9	119	99.2	1	--[8]
Caritas Good Samaritan Medical Center	891	348	39.1	192	26.2	156	98.7	2	--[8]
Caritas Holy Family Hospital And Medical Center	1,015	415	40.9	233	28.1	182	98.4	3	--[8]
Caritas Norwood Hospital	509	198	38.9	114	27.6	84	87.5	12	12.5
Caritas St. Elizabeth's Medical Center Of Boston	957	380	39.9	249	31.2	131	85.1	23	14.9
Charlton Memorial Hospital	1,591	595	37.4	387	28.0	208	100.0	0	0.0
Cooley Dickinson Hospital	773	235	30.4	147	22.0	88	83.0	18	17.0
Emerson Hospital	1,133	403	35.6	201	22.0	202	91.8	18	8.2
Fairview Hospital	166	47	28.3	35	22.7	12	100.0	0	0.0
Falmouth Hospital	546	217	40.0	130	28.5	87	100.0	0	0.0
Harrington Memorial Hospital	339	102	30.1	66	21.9	36	97.3	1	--[8]
Heywood Memorial Hospital	503	77	15.3	36	7.9	41	89.1	5	10.9
Holyoke Hospital	529	96	18.2	56	11.8	40	75.5	13	24.5
Jordan Hospital	676	228	33.7	135	23.4	93	93.9	6	6.1
Lawrence General Hospital	1,602	522	32.6	244	18.5	278	97.9	6	2.1
Leominster Hospital	1,099	282	25.7	167	17.0	115	97.5	3	--[8]
Lowell General Hospital	2,391	815	34.1	497	24.1	318	95.5	15	4.5
Martha's Vineyard Hospital	149	48	32.2	29	22.3	19	100.0	0	0.0
Massachusetts General Hospital	3,601	1,125	31.2	661	21.4	464	90.1	51	9.9
Melrose-Wakefield Hospital	1,212	491	40.5	304	29.7	187	100.0	0	0.0
Mercy Medical Center	1,258	316	25.1	184	16.4	132	96.4	5	3.6

Table 31 (cont'd). Cesarean Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility, All Births, Massachusetts: 2009

Facility[1]	Occurrence Births[2]	Total Cesareans		Primary Cesareans[2]		Repeat Cesareans		VBACs[2]	
		N	%[3,4]	N	%[3,5]	N	%[3,6]	N	%[7]
Metrowest Medical Center-Framingham Union Campus	1,522	652	42.8	363	29.4	289	100.0	0	0.0
Milford Regional Medical Center	982	373	38.0	229	27.5	144	96.0	6	4.0
Morton Hospital	576	172	29.9	98	19.6	74	97.4	2	--[8]
Mount Auburn Hospital	2,084	490	23.5	332	17.8	158	70.5	66	29.5
Nantucket Cottage Hospital	123	36	29.3	18	17.1	18	100.0	0	0.0
Newton Wellesley Hospital	3,512	1,326	37.8	764	26.3	562	92.0	49	8.0
North Adams Regional Hospital	273	73	26.7	40	16.7	33	100.0	0	0.0
North Shore Medical Center - Salem Hospital	1,594	548	34.4	325	23.9	223	95.7	10	4.3
Saint Vincent Hospital	1,967	515	26.2	311	18.3	204	77.3	60	22.7
South Shore Hospital	3,558	1,499	42.1	911	31.3	588	91.3	56	8.7
St. Luke's Hospital	1,501	563	37.6	357	27.6	206	100.0	0	0.0
Sturdy Memorial Hospital	880	301	34.2	167	22.8	134	91.8	12	8.2
Tobey Hospital	493	109	22.1	68	15.3	41	85.4	7	14.6
Tufts Medical Center	1,228	484	39.4	294	28.5	190	96.0	8	4.0
UMASS Memorial Medical Center - West Campus	4,242	1,242	29.3	613	17.2	629	91.4	59	8.6
Winchester Hospital	2,116	751	35.5	406	23.1	345	97.2	10	2.8

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definitions of occurrence births, primary and repeat Cesarean sections, and VBACs. The percentages provided in this table are based on occurrence births, and may differ from data that are based on resident births presented elsewhere in this book. 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. Percentage of total Cesarean = (total Cesarean births/all births) x 100. 5. Percentage primary Cesarean = (primary Cesarean /all births-repeat Cesarean -VBACs) x 100. 6. Percentage repeat Cesarean = (repeat Cesarean / (repeat Cesarean + VBACs)) x100. 7. Percentage VBACs= (VBAC deliveries/ (repeat Cesarean + VBAC)) x 100. 8. Calculations based on values of 1-4 are excluded.

Table 32. Cesarean Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2009

Facility[1]	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section n	C-section %[3]	Births[2]	C-section n	C-section %[3]	Births[2]	C-section n	C-section %[3]
State Total	**33,071**	**10,374**	**31.4**	**27,472**	**2,543**	**9.3**	**10,459**	**9,509**	**90.9**
Anna Jaques Hospital	323	109	33.7	255	20	7.8	123	105	85.4
Baystate Franklin Medical Center	217	48	22.1	215	14	6.5	41	35	85.4
Baystate Mary Lane Hospital	58	15	25.9	73	8	11.0	19	19	100.0
Baystate Medical Center	1,810	557	30.8	1,683	163	9.7	551	479	86.9
Berkshire Medical Center	279	78	28.0	252	17	6.7	98	83	84.7
Beth Israel Deaconess Medical Center	2,174	755	34.7	1,527	154	10.1	740	661	89.3
Beverly Hospital	703	209	29.7	588	65	11.1	225	205	91.1
Boston Medical Center	992	268	27.0	1,057	109	10.3	297	294	99.0
Brigham And Women's Hospital	3,755	1,134	30.2	2,584	263	10.2	951	793	83.4
Brockton Hospital	486	230	47.3	445	61	13.7	223	211	94.6
Cambridge Hospital	655	155	23.7	473	30	6.3	173	144	83.2
Cape Cod Hospital	383	121	31.6	360	39	10.8	116	115	99.1
Caritas Good Samaritan Medical Center	343	133	38.8	375	47	12.5	151	149	98.7
Caritas Holy Family Hospital And Medical Center	435	176	40.5	379	47	12.4	175	172	98.3
Caritas Norwood Hospital	230	90	39.1	177	18	10.2	94	82	87.2
Caritas St. Elizabeth's Medical Center Of Boston	420	156	37.1	310	41	13.2	143	122	85.3
Charlton Memorial Hospital	724	277	38.3	624	84	13.5	199	199	100.0
Cooley Dickinson Hospital	351	112	31.9	295	25	8.5	104	86	82.7
Emerson Hospital	498	152	30.5	385	31	8.1	205	187	91.2
Fairview Hospital	85	28	32.9	67	5	7.5	11	11	100.0
Falmouth Hospital	235	95	40.4	213	29	13.6	87	87	100.0
Harrington Memorial Hospital	150	47	31.3	144	11	7.6	35	34	97.1
Heywood Memorial Hospital	202	24	11.9	246	12	4.9	46	41	89.1
Holyoke Hospital	249	36	14.5	220	20	9.1	53	40	75.5
Jordan Hospital	301	94	31.2	250	23	9.2	98	92	93.9
Lawrence General Hospital	656	167	25.5	621	49	7.9	271	265	97.8
Leominster Hospital	445	110	24.7	518	45	8.7	117	114	97.4
Lowell General Hospital	1,058	340	32.1	941	112	11.9	314	299	95.2
Martha's Vineyard Hospital	72	25	34.7	58	4	--[4]	19	19	100.0
Massachusetts General Hospital	1,633	431	26.4	1,201	84	7.0	483	432	89.4
Melrose-Wakefield Hospital	623	237	38.0	361	40	11.1	181	181	100.0

Table 32 (cont'd). Cesarean Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2009

Facility[1]	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section n	C-section %[3]	Births[2]	C-section n	C-section %[3]	Births[2]	C-section n	C-section %[3]
Mercy Medical Center	511	136	26.6	588	41	7.0	133	128	96.2
Metrowest Medical Center-Framingham Union Campus	697	298	42.8	498	40	8.0	287	287	100.0
Milford Regional Medical Center	424	157	37.0	380	51	13.4	146	140	95.9
Morton Hospital	267	73	27.3	229	23	10.0	72	70	97.2
Mount Auburn Hospital	1,105	267	24.2	700	39	5.6	212	146	68.9
Nantucket Cottage Hospital	58	15	25.9	47	3	--[4]	18	18	100.0
Newton Wellesley Hospital	1,669	569	34.1	1,080	75	6.9	590	541	91.7
North Adams Regional Hospital	135	30	22.2	101	6	5.9	30	30	100.0
North Shore Medical Center - Salem Hospital	675	225	33.3	647	76	11.7	221	211	95.5
Saint Vincent Hospital	839	218	26.0	813	60	7.4	255	195	76.5
South Shore Hospital	1,545	655	42.4	1,211	139	11.5	614	558	90.9
St. Luke's Hospital	636	253	39.8	618	82	13.3	204	204	100.0
Sturdy Memorial Hospital	389	124	31.9	333	31	9.3	142	130	91.5
Tobey Hospital	214	39	18.2	216	20	9.3	45	38	84.4
Tufts Medical Center	517	160	30.9	371	51	13.7	174	166	95.4
UMass Memorial Medical Center - West Campus	1,782	460	25.8	1,611	68	4.2	611	553	90.5
Winchester Hospital	888	286	32.2	789	68	8.6	347	337	97.1

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definitions of occurrence births. 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. Calculations based on 1-4 events are excluded.

Table 33. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2009

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
STATE TOTAL	**75,443**	**74,966**	**5,804**	**4,477**	**363**	**274**	**378**
ABINGTON	1	201	16	--[7]	1	1	--[7]
ACTON	1	179	15	--[7]	3	3	0
ACUSHNET	0	90	5	7	0	0	0
ADAMS	1	63	6	5	0	0	--[7]
AGAWAM	1	197	17	11	1	1	0
ALFORD	0	0	0	0	0	0	0
AMESBURY	0	210	16	7	1	1	--[7]
AMHERST	7	156	7	5	1	1	--[7]
ANDOVER	3	273	11	--[7]	0	0	--[7]
ARLINGTON	6	621	50	--[7]	2	1	--[7]
ASHBURNHAM	0	46	--[7]	--[7]	0	0	0
ASHBY	0	27	--[7]	0	0	0	0
ASHFIELD	1	10	0	0	0	0	0
ASHLAND	0	225	9	--[7]	2	2	0
ATHOL	1	134	7	10	2	1	--[7]
ATTLEBORO	882	567	52	39	3	2	--[7]
AUBURN	1	150	5	--[7]	0	0	--[7]
AVON	1	49	--[7]	--[7]	0	0	0
AYER	0	110	--[7]	8	0	0	0
BARNSTABLE	901	417	30	21	3	1	--[7]
BARRE	1	58	5	--[7]	0	0	0
BECKET	0	14	--[7]	--[7]	0	0	0
BEDFORD	2	149	12	--[7]	1	1	--[7]
BELCHERTOWN	1	123	13	--[7]	0	0	0
BELLINGHAM	2	202	17	10	0	0	--[7]
BELMONT	2	282	11	--[7]	0	0	--[7]
BERKLEY	0	60	--[7]	--[7]	0	0	0
BERLIN	0	19	0	0	0	0	0
BERNARDSTON	0	11	0	0	0	0	0
BEVERLY	2,282	476	16	13	1	0	--[7]
BILLERICA	1	457	34	13	2	2	--[7]
BLACKSTONE	0	96	8	--[7]	2	1	0
BLANDFORD	0	7	0	--[7]	0	0	0
BOLTON	0	42	--[7]	0	0	0	0
BOSTON	21,177	7,976	711	521	52	39	43
BOURNE	0	192	12	12	0	0	0
BOXBOROUGH	0	39	--[7]	--[7]	0	0	0
BOXFORD	0	42	--[7]	0	1	1	0
BOYLSTON	0	38	6	0	0	0	0
BRAINTREE	2	424	28	14	0	0	0
BREWSTER	0	66	--[7]	6	0	0	--[7]
BRIDGEWATER	0	171	9	--[7]	0	0	--[7]

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
BRIMFIELD	0	26	--[7]	--[7]	0	0	0
BROCKTON	2,085	1,474	125	137	10	6	16
BROOKFIELD	0	33	--[7]	--[7]	0	0	0
BROOKLINE	3	676	59	--[7]	0	0	--[7]
BUCKLAND	0	12	0	0	0	0	0
BURLINGTON	2	319	18	7	0	0	0
CAMBRIDGE	3,535	1,266	102	16	8	7	8
CANTON	0	234	15	--[7]	1	1	0
CARLISLE	0	22	0	0	0	0	0
CARVER	0	120	6	6	1	1	0
CHARLEMONT	1	12	0	0	0	0	0
CHARLTON	0	135	7	5	0	0	--[7]
CHATHAM	0	29	7	0	0	0	0
CHELMSFORD	0	328	20	6	1	1	--[7]
CHELSEA	1	702	72	76	1	1	--[7]
CHESHIRE	0	23	0	--[7]	0	0	0
CHESTER	2	14	--[7]	0	0	0	0
CHESTERFIELD	0	8	0	--[7]	0	0	0
CHICOPEE	2	643	49	72	5	4	0
CHILMARK	0	6	0	0	0	0	0
CLARKSBURG	0	9	0	--[7]	0	0	0
CLINTON	0	167	13	13	1	1	--[7]
COHASSET	0	57	--[7]	--[7]	0	0	0
COLRAIN	0	11	--[7]	0	0	0	0
CONCORD	1,135	126	7	0	0	0	0
CONWAY	0	8	--[7]	--[7]	0	0	0
CUMMINGTON	2	10	0	--[7]	0	0	0
DALTON	0	40	--[7]	--[7]	0	0	0
DANVERS	1	251	14	--[7]	2	1	0
DARTMOUTH	0	212	11	18	2	2	--[7]
DEDHAM	0	266	15	6	0	0	0
DEERFIELD	0	47	--[7]	--[7]	0	0	0
DENNIS	1	136	17	10	0	0	--[7]
DIGHTON	1	58	7	--[7]	0	0	--[7]
DOUGLAS	2	101	--[7]	--[7]	0	0	0
DOVER	0	31	--[7]	0	0	0	0
DRACUT	0	325	18	13	1	0	--[7]
DUDLEY	0	94	9	5	0	0	0
DUNSTABLE	0	26	0	--[7]	0	0	--[7]
DUXBURY	0	91	6	--[7]	2	1	0
EAST BRIDGEWATER	0	136	8	--[7]	1	1	0
EAST BROOKFIELD	0	23	--[7]	--[7]	0	0	0
EAST LONGMEADOW	0	135	--[7]	--[7]	0	0	--[7]
EASTHAM	0	33	--[7]	--[7]	0	0	0
EASTHAMPTON	2	156	16	6	0	0	--[7]
EASTON	0	212	17	7	0	0	--[7]
EDGARTOWN	0	37	--[7]	--[7]	0	0	--[7]

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
EGREMONT	1	9	--[7]	0	0	0	0
ERVING	0	17	--[7]	--	1	1	0
ESSEX	0	32	--[7]	--[7]	0	0	--[7]
EVERETT	2	626	51	37	7	6	--[7]
FAIRHAVEN	0	137	8	7	0	0	0
FALL RIVER	1,592	1,202	103	129	5	3	7
FALMOUTH	547	257	19	17	2	2	--[7]
FITCHBURG	2	586	53	64	1	1	--[7]
FLORIDA	0	4	0	--[7]	0	0	0
FOXBOROUGH	2	139	6	5	0	0	--[7]
FRAMINGHAM	1,527	976	76	50	5	3	--[7]
FRANKLIN	1	302	26	--[7]	1	1	0
FREETOWN	1	75	6	5	1	1	0
GARDNER	505	240	20	24	5	5	0
GAY HEAD	0	3	0	0	0	0	0
GEORGETOWN	0	87	--[7]	0	0	0	0
GILL	1	9	--[7]	--[7]	0	0	0
GLOUCESTER	1	266	15	9	1	0	0
GOSHEN	0	9	0	0	0	0	0
GOSNOLD	0	0	0	0	0	0	0
GRAFTON	0	217	18	5	0	0	--[7]
GRANBY	0	29	--[7]	--[7]	0	0	0
GRANVILLE	0	11	--[7]	0	0	0	0
GREAT BARRINGTON	167	46	--[7]	--[7]	0	0	0
GREENFIELD	490	200	15	15	3	2	--[7]
GROTON	5	87	--[7]	0	0	0	--[7]
GROVELAND	1	55	6	0	0	0	--[7]
HADLEY	2	29	--[7]	0	0	0	--[7]
HALIFAX	0	64	--[7]	0	0	0	0
HAMILTON	0	91	--[7]	--[7]	0	0	0
HAMPDEN	0	35	--[7]	--[7]	0	0	--[7]
HANCOCK	0	5	0	0	0	0	0
HANOVER	0	133	5	--[7]	0	0	--[7]
HANSON	0	102	8	9	2	2	--[7]
HARDWICK	0	22	--[7]	--[7]	0	0	0
HARVARD	0	28	--[7]	0	0	0	0
HARWICH	0	90	--[7]	6	0	0	0
HATFIELD	1	15	0	0	0	0	0
HAVERHILL	1	895	50	70	1	1	--[7]
HAWLEY	0	3	0	0	0	0	0
HEATH	0	7	--[7]	0	0	0	0
HINGHAM	0	238	19	--[7]	3	3	--[7]
HINSDALE	0	9	0	0	0	0	0
HOLBROOK	0	110	9	6	1	0	0
HOLDEN	1	167	17	0	1	1	0
HOLLAND	0	20	--[7]	--[7]	0	0	0
HOLLISTON	0	116	9	--[7]	3	1	--[7]

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
HOLYOKE	533	653	68	146	5	3	8
HOPEDALE	0	52	--[7]	--[7]	0	0	0
HOPKINTON	0	133	8	0	0	0	--[7]
HUBBARDSTON	0	40	0	0	0	0	0
HUDSON	1	223	20	14	1	1	--[7]
HULL	1	80	10	5	0	0	0
HUNTINGTON	0	28	--[7]	--[7]	0	0	0
IPSWICH	1	97	8	5	0	0	--[7]
KINGSTON	0	119	12	--[7]	1	0	0
LAKEVILLE	0	86	--[7]	--[7]	0	0	0
LANCASTER	1	67	5	--[7]	0	0	0
LANESBOROUGH	0	21	--[7]	--[7]	0	0	0
LAWRENCE	1,605	1,426	120	239	11	6	11
LEE	0	55	5	--[7]	0	0	0
LEICESTER	0	90	7	6	0	0	0
LENOX	0	25	0	0	0	0	0
LEOMINSTER	1,102	528	39	41	1	1	--[7]
LEVERETT	0	8	0	0	0	0	0
LEXINGTON	1	206	24	--[7]	0	0	--[7]
LEYDEN	0	8	--[7]	--[7]	0	0	0
LINCOLN	1	59	--[7]	--[7]	0	0	0
LITTLETON	0	81	8	--[7]	0	0	0
LONGMEADOW	0	102	6	--[7]	0	0	--[7]
LOWELL	2,398	1,736	178	210	12	8	8
LUDLOW	1	157	14	5	1	0	0
LUNENBURG	0	90	--[7]	--[7]	1	1	--[7]
LYNN	6	1,502	104	172	8	5	8
LYNNFIELD	0	88	6	--[7]	0	0	0
MALDEN	2	973	84	24	2	2	6
MANCHESTER	0	27	0	0	0	0	0
MANSFIELD	0	243	23	9	0	0	0
MARBLEHEAD	0	156	16	5	4	4	--[7]
MARION	0	29	--[7]	0	0	0	0
MARLBOROUGH	3	528	34	22	7	5	--[7]
MARSHFIELD	1	239	11	5	1	1	--[7]
MASHPEE	0	124	6	10	0	0	--[7]
MATTAPOISETT	0	39	0	0	0	0	0
MAYNARD	2	138	--[7]	--[7]	0	0	--[7]
MEDFIELD	0	72	5	0	0	0	0
MEDFORD	3	691	51	11	1	1	--[7]
MEDWAY	1	113	9	--[7]	2	2	0
MELROSE	1,213	295	19	--[7]	2	2	--[7]
MENDON	1	49	--[7]	0	0	0	0
MERRIMAC	0	36	--[7]	5	0	0	0
METHUEN	1,017	574	56	40	1	1	5
MIDDLEBOROUGH	0	234	9	22	1	1	0
MIDDLEFIELD	0	4	--[7]	0	0	0	0

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
MIDDLETON	0	61	--[7]	0	0	0	0
MILFORD	983	365	21	11	4	3	--[7]
MILLBURY	1	145	11	5	0	0	--[7]
MILLIS	0	85	8	--[7]	1	1	--[7]
MILLVILLE	0	40	--[7]	--[7]	0	0	--[7]
MILTON	0	264	21	--[7]	2	2	--[7]
MONROE	0	0	0	0	0	0	0
MONSON	0	70	--[7]	5	2	2	--[7]
MONTAGUE	2	97	5	14	0	0	0
MONTEREY	0	6	0	--[7]	0	0	0
MONTGOMERY	0	9	--[7]	0	0	0	0
MOUNT WASHINGTON	0	1	0	0	0	0	0
NAHANT	0	22	--[7]	0	0	0	0
NANTUCKET	125	152	7	--[7]	0	0	--[7]
NATICK	3	432	38	6	2	2	0
NEEDHAM	2	298	15	0	0	0	0
NEW ASHFORD	0	0	0	0	0	0	0
NEW BEDFORD	1,504	1,363	143	173	8	6	9
NEW BRAINTREE	0	4	0	0	0	0	0
NEW MARLBOROUGH	1	15	--[7]	0	1	1	0
NEW SALEM	0	6	0	0	0	0	0
NEWBURY	0	41	--[7]	0	0	0	0
NEWBURYPORT	736	180	7	10	0	0	0
NEWTON	3,515	806	61	--[7]	1	1	--[7]
NORFOLK	0	82	9	--[7]	0	0	--[7]
NORTH ADAMS	274	157	11	29	0	0	--[7]
NORTH ANDOVER	0	308	32	10	1	1	0
NORTH ATTLEBORO	1	302	16	7	1	0	--[7]
NORTH BROOKFIELD	0	46	--[7]	--[7]	0	0	0
NORTH READING	0	149	15	--[7]	0	0	0
NORTHAMPTON	786	205	16	13	1	1	0
NORTHBOROUGH	1	122	8	--[7]	1	1	0
NORTHBRIDGE	1	207	13	17	2	1	0
NORTHFIELD	0	21	5	--[7]	0	0	0
NORTON	0	175	20	10	0	0	0
NORWELL	0	90	8	0	0	0	0
NORWOOD	512	365	34	6	1	1	--[7]
OAK BLUFFS	149	64	6	--[7]	0	0	0
OAKHAM	0	8	--[7]	0	0	0	0
ORANGE	0	83	8	6	0	0	--[7]
ORLEANS	0	16	0	--[7]	0	0	--[7]
OTIS	0	10	0	0	0	0	--[7]
OXFORD	1	155	6	7	1	1	0
PALMER	0	121	6	9	0	0	--[7]
PAXTON	2	29	--[7]	--[7]	0	0	0
PEABODY	0	487	32	16	4	3	--[7]
PELHAM	0	10	--[7]	--[7]	0	0	0

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
PEMBROKE	0	182	10	5	2	2	0
PEPPERELL	0	100	7	5	0	0	--[7]
PERU	0	2	0	0	0	0	0
PETERSHAM	0	12	--[7]	0	0	0	0
PHILLIPSTON	0	13	--[7]	--[7]	1	1	0
PITTSFIELD	649	518	44	70	3	3	--[7]
PLAINFIELD	0	4	0	0	0	0	0
PLAINVILLE	0	88	7	--[7]	0	0	0
PLYMOUTH	679	629	37	20	1	0	--[7]
PLYMPTON	0	19	0	--[7]	0	0	0
PRINCETON	1	25	--[7]	0	0	0	0
PROVINCETOWN	0	16	0	0	1	0	0
QUINCY	3	1,263	83	23	6	4	7
RANDOLPH	2	384	39	9	6	5	--[7]
RAYNHAM	0	150	15	8	0	0	0
READING	1	268	22	--[7]	1	1	0
REHOBOTH	0	94	7	0	0	0	0
REVERE	0	712	51	56	2	1	--[7]
RICHMOND	0	5	0	0	0	0	0
ROCHESTER	0	41	--[7]	--[7]	0	0	0
ROCKLAND	0	221	8	5	1	0	--[7]
ROCKPORT	0	49	--[7]	--[7]	0	0	0
ROWE	0	4	0	--[7]	0	0	0
ROWLEY	0	60	--[7]	--[7]	0	0	0
ROYALSTON	0	7	0	--[7]	0	0	0
RUSSELL	1	21	--[7]	--[7]	0	0	0
RUTLAND	1	76	--[7]	--[7]	1	0	0
SALEM	1,595	527	42	20	1	1	--[7]
SALISBURY	2	72	5	8	0	0	--[7]
SANDISFIELD	0	5	0	0	0	0	0
SANDWICH	0	163	11	--[7]	2	1	0
SAUGUS	0	233	17	5	0	0	--[7]
SAVOY	0	1	0	0	0	0	0
SCITUATE	0	154	12	--[7]	0	0	0
SEEKONK	0	88	--[7]	0	0	0	0
SHARON	1	102	--[7]	--[7]	0	0	0
SHEFFIELD	0	26	--[7]	--[7]	0	0	--[7]
SHELBURNE	1	18	--[7]	--[7]	1	1	--[7]
SHERBORN	0	17	--[7]	0	0	0	0
SHIRLEY	1	58	5	--[7]	2	2	0
SHREWSBURY	1	371	23	--[7]	0	0	--[7]
SHUTESBURY	3	12	0	--[7]	0	0	0
SOMERSET	0	127	9	5	0	0	0
SOMERVILLE	8	1,001	83	40	6	6	--[7]
SOUTH HADLEY	1	134	13	8	1	1	0
SOUTHAMPTON	0	41	--[7]	0	0	0	0
SOUTHBOROUGH	0	77	5	0	1	1	0

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
SOUTHBRIDGE	340	235	20	31	0	0	--[7]
SOUTHWICK	0	78	10	5	0	0	0
SPENCER	0	126	15	9	1	1	--[7]
SPRINGFIELD	5,590	2,445	221	438	15	11	27
STERLING	0	56	--[7]	--[7]	0	0	0
STOCKBRIDGE	1	10	0	0	0	0	0
STONEHAM	0	250	15	5	2	1	--[7]
STOUGHTON	0	265	23	9	0	0	--[7]
STOW	0	81	6	--[7]	1	1	0
STURBRIDGE	1	97	--[7]	--[7]	0	0	0
SUDBURY	2	138	8	0	0	0	--[7]
SUNDERLAND	0	24	--[7]	0	0	0	0
SUTTON	0	80	5	5	0	0	0
SWAMPSCOTT	0	126	--[7]	--[7]	0	0	--[7]
SWANSEA	0	134	12	5	1	0	0
TAUNTON	577	741	60	70	5	3	--[7]
TEMPLETON	3	95	7	6	0	0	0
TEWKSBURY	1	281	21	12	1	1	0
TISBURY	1	54	9	--[7]	0	0	0
TOLLAND	0	6	0	0	0	0	0
TOPSFIELD	0	44	--[7]	0	0	0	0
TOWNSEND	1	75	6	--[7]	0	0	0
TRURO	0	11	--[7]	--[7]	0	0	0
TYNGSBOROUGH	0	97	6	5	0	0	--[7]
TYRINGHAM	0	2	0	--[7]	0	0	0
UPTON	3	64	7	--[7]	0	0	0
UXBRIDGE	0	153	8	8	0	0	--[7]
WAKEFIELD	1	275	14	7	1	1	0
WALES	0	20	--[7]	0	0	0	0
WALPOLE	0	199	6	--[7]	0	0	5
WALTHAM	2	815	82	22	3	3	--[7]
WARE	155	110	5	12	0	0	--[7]
WAREHAM	493	216	20	17	2	2	0
WARREN	1	59	8	--[7]	0	0	0
WARWICK	0	6	--[7]	--[7]	0	0	0
WASHINGTON	0	3	0	0	0	0	0
WATERTOWN	1	445	30	5	0	0	--[7]
WAYLAND	2	105	12	--[7]	2	2	--[7]
WEBSTER	0	234	20	26	2	2	0
WELLESLEY	2	215	15	--[7]	1	0	0
WELLFLEET	0	20	--[7]	--[7]	0	0	0
WENDELL	0	9	0	--[7]	0	0	--[7]
WENHAM	0	28	--[7]	0	0	0	--[7]
WEST BOYLSTON	0	58	--[7]	--[7]	0	0	0
WEST BRIDGEWATER	1	49	9	--[7]	0	0	0
WEST BROOKFIELD	0	35	5	0	1	1	0
WEST NEWBURY	1	38	--[7]	0	0	0	0

Table 33 (cont'd).

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births 15-19 yr	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
WEST SPRINGFIELD	3	372	31	27	1	0	--[7]
WEST STOCKBRIDGE	0	4	0	0	0	0	0
WEST TISBURY	1	24	0	--[7]	0	0	0
WESTBOROUGH	0	243	16	--[7]	0	0	0
WESTFIELD	6	440	37	17	1	1	--[7]
WESTFORD	1	171	8	--[7]	0	0	--[7]
WESTHAMPTON	0	13	--[7]	0	0	0	0
WESTMINSTER	0	48	--[7]	--[7]	0	0	0
WESTON	0	80	7	0	0	0	0
WESTPORT	0	119	6	--[7]	0	0	--[7]
WESTWOOD	0	114	8	--[7]	0	0	0
WEYMOUTH	3,561	623	43	10	2	2	--[7]
WHATELY	0	9	--[7]	0	0	0	0
WHITMAN	0	160	8	7	1	0	0
WILBRAHAM	0	80	5	--[7]	0	0	0
WILLIAMSBURG	1	17	0	0	0	0	--[7]
WILLIAMSTOWN	0	46	8	0	0	0	0
WILMINGTON	4	238	16	--[7]	0	0	--[7]
WINCHENDON	1	107	6	12	1	1	--[7]
WINCHESTER	2,119	222	10	0	0	0	--[7]
WINDSOR	0	2	0	0	0	0	0
WINTHROP	0	165	20	7	0	0	0
WOBURN	2	504	40	17	4	4	--[7]
WORCESTER	6,220	2,592	226	219	19	13	14
WORTHINGTON	0	4	0	0	0	0	0
WRENTHAM	0	105	7	0	4	4	0
YARMOUTH	0	220	18	11	1	1	0

Note that infant deaths are based on a preliminary death file as of the release of this report.
1. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details. 2. Births to mothers who report their usual place of residence as a particular geographical place (state, or city/town). See Glossary for more details. 3. Less than 2,500 grams (5.5 lbs.). 4. Death of a child whose age is less than one year. 5. Death of a child whose age is less than 28 days. 6. A stillbirth delivered, extracted or expulsed at 20 weeks gestation or more or weighs 350 grams or more. 7. Due to small numbers (n=1-4), exact count not provided.

Table 34. Birth Characteristics: Occurrence and Resident Births and Infant Deaths by County, Massachusetts: 2009

County	Occurrence Births[1]	Resident Births[2]			Deaths		
		Number	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
STATE TOTAL	**75,443**	**74,966**	**5,804**	**4,477**	**363**	**274**	**378**
Barnstable	1,449	1,790	130	102	9	5	9
Berkshire	1,094	1,136	82	122	4	4	10
Bristol	4,558	6,149	525	507	26	17	29
Dukes	151	188	16	6	0	0	--[7]
Essex	7,252	8,860	604	650	37	25	46
Franklin	499	652	53	50	5	4	5
Hampden	6,139	5,662	487	747	31	22	45
Hampshire	958	1,105	79	56	3	3	6
Middlesex	15,506	17,977	1,387	606	86	71	74
Nantucket	125	152	7	--[7]	0	0	--[7]
Norfolk	4,095	7,127	519	130	28	23	28
Plymouth	3,261	5,317	368	267	30	21	29
Suffolk	21,178	9,555	854	660	55	41	48
Worcester	9,178	9,296	693	572	49	38	44

Note that infant deaths are based on a preliminary death file as of the release of this report.
1. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details. 2. Births to mothers who report their usual place of residence as a particular geographical place (state, or city/town). See Glossary for more details. 3. Less than 2,500 grams (5.5 lbs.). 4. Death of a child whose age is less than one year. 5. Death of a child whose age is less than 28 days. 6. A stillbirth delivered, extracted or expulsed at 20 weeks gestation or more or weighs 350 grams or more. 7. Due to small numbers (n=1-4), exact count not provided.

Table 35. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs), Massachusetts: 2009

Community Health Network Area	Occurrence Births[1]	Resident Births[2]			Deaths		
		Number	LBW[3]	Teen Births (15-19 years)	Infant[4]	Neonatal[5]	Fetal[6]
STATE TOTAL	**75,443**	**74,966**	**5,804**	**4,477**	**363**	**274**	**378**
Community Health Network of Berkshire County	1,094	1,136	82	122	4	4	10
Upper Valley Health Web (Franklin County)	500	818	63	62	8	6	6
Partnership for Health in Hampshire County (Northampton)	958	1,077	78	54	3	3	6
The Community Health Connection (Springfield)	5,595	3,689	312	505	19	14	34
Community Health Network of Southern Worcester County	343	1,338	105	93	5	5	6
Community Partners for Health (Milford)	994	1,824	124	67	11	8	6
Community Health Network of Greater Metro West (Framingham)	1,543	4,324	303	120	30	24	26
Community Wellness Coalition (Worcester)	6,226	3,857	318	243	20	14	21
Fitchburg/Gardner Community Health Network	1,624	2,809	187	190	13	12	13
Greater Lowell Community Health Network	2,401	3,421	285	263	17	12	18
Greater Lawrence Community Health Network	2,625	2,642	222	290	13	8	17
Greater Haverhill Community Health Network	741	1,716	97	103	3	3	7
Community Health Network North (Beverly/Gloucester)	2,284	1,110	50	32	2	0	--[7]
North Shore Community Health Network	1,602	3,392	235	225	19	14	18
Greater Woburn/Concord/Littleton Community Health Network	3,267	2,144	157	38	8	8	6
North Suburban Health Alliance (Medford/Malden/Melrose)	1,222	3,527	271	90	16	14	15
Greater Cambridge/Somerville Community Health Network	3,552	3,615	276	67	16	14	12
West Suburban Health Network (Newton/Waltham)	3,521	2,625	204	37	5	4	--[7]
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	21,181	10,231	913	662	55	41	49
Blue Hills Community Health Alliance (Greater Quincy)	4,082	4,278	319	80	21	18	17
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	544	1,935	170	242	12	8	11
Greater Brockton Community Health Network	2,088	2,827	228	183	14	8	23
South Shore Community Partners in Prevention (Plymouth)	680	1,919	107	56	11	7	7
Greater Attleboro-Taunton Health & Education Response	1,461	2,798	218	172	10	6	10
Partners for a Healthier Community (Fall River)	1,592	1,582	130	143	6	3	8
Greater New Bedford Health & Human Services Coalition	1,998	2,202	197	228	13	11	10
Cape and Islands Community Health Network	1,725	2,130	153	110	9	5	12

Note that infant deaths are based on a preliminary death file as of the release of this report.

1. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details. 2. Births to mothers who report their usual place of residence as a particular geographical place (state, city/town). See Glossary for more details. 3. Less than 2,500 grams (5.5 lbs.). 4. Death of a child whose age is less than one year. 5. Death of a child whose age is less than 28 days. 6. A stillbirth delivered, extracted or expulsed at 20 weeks gestation or more or weighs 350 grams or more. 7. Due to small numbers (n=1-4), exact count not provided.

Technical Notes

Data Cautions

Limitations of small numbers:
Cells in some tables in this publication, and particularly those tables specific to individual cities and towns, contain small numbers. Rates and proportions based on fewer than five observations are suppressed, and trends based upon small numbers should be interpreted cautiously.

Differences with previously published data
Numbers and rates in this publication may differ from those in previous reports because of updated birth and death files, or release of the most up-to-date population estimates for a given year (see Population Denominators for details on population files).

Self-reported data
Many statistics reported in this publication, such as maternal smoking, education, and race/ethnicity are *self-reported*, and are subject to the usual limitations of this type of information.

Changes in the Collection of Race/Ethnicity Information

Assignment of an Infant's Race/Ethnicity
Prior to 1989, the race/ethnicity of an infant was assigned by combining information on the race/ethnicity of the mother and the race/ethnicity of the father. Since 1989, Massachusetts has followed the recommendation of the National Center for Health Statistics of classifying births according to the self-reported race/ethnicity of the mother. Therefore, beginning in 1989, the race/ethnicity of an infant is identical to the self-reported race/ethnicity of the infant's mother.

Addition of Information on Hispanic Ethnicity
Beginning in 1986, an identifier for Hispanic ethnicity was added to the birth certificate; in 1989, an identifier for Hispanic ethnicity was added to the death certificate. Prior to these changes, most infants and mothers of Hispanic ethnicity were included with Whites and it was not possible to accurately calculate Hispanic-specific rates of natality and mortality.

Changes in Mother's Ancestry Reporting

The following table is from the Parent Worksheet for the birth certificate, which is the self-reported information we use to report on mother's ancestry.

MOTHER's ANCESTRY Please mark the *one* category that *best describes* the mother's ancestry of ethnic heritage:

HISPANIC/LATINA

1 ☐ Puerto Rican
2 ☐ Dominican
3 ☐ Mexican
4 ☐ Cuban
5 ☐ Colombian
6 ☐ Salvadoran
7 ☐ Other Central American (specify) _____
8 ☐ Other South American (specify) _____
9 ☐ Other Hispanic/Latina (specify):

ASIAN/PACIFIC ISLANDER

10 ☐ Chinese
11 ☐ Vietnamese
12 ☐ Cambodian
13 ☐ Asian Indian
14 ☐ Korean
15 ☐ Filipino
16 ☐ Japanese
17 ☐ Laotian
18 ☐ Pakistani
19 ☐ Thai
20 ☐ Hawaiian
21 ☐ Other Asian/Pacific Islander(specify) _____

PORTUGUESE SPEAKING

22 ☐ Cape Verdean
23 ☐ Brazilian
24 ☐ Other Portuguese (specify): _____

WEST INDIAN/CARIBBEAN ISLANDER

25 ☐ Haitian
26 ☐ Jamaican
27 ☐ Barbadian
28 ☐ OtherWest Indian/Caribbean Islander (specify):_____

AFRICAN/AFRICAN AMERICAN

29 ☐ African-American/ Afro-American
30 ☐ Nigerian
31 ☐ Other African specify):_____

MIDDLE EASTERN

32 ☐ Lebanese
33 ☐ Iranian
34 ☐ Israeli
35 ☐ Other Middle Eastern (specify):_____

AMERICAN ANCESTRY

36 ☐ Native American/ American Indian (specify tribe/affiliation):_____
37 ☐ American

EUROPEAN and OTHER ancestries

38 ☐ European (specify): _____
39 ☐ Other (specify): _____

Beginning in 2006, we eliminated the "Other" categories from the mother's ancestries and used the literal ancestry text to create new categories such as "Honduran" and "Guatemalan," which a large number of mothers wrote in for "Other Hispanic/Latina." In 2006, we reported on groups that had greater than 400 births.

Since 2007, certain ancestry groups were combined to form meta-groups: Lebanese, Iranian, Israeli, and Other Middle Eastern ancestries were combined into "Middle Eastern"; Colombian and Other South American were combined into "South American"; and Nigerian and Other African were combined into "African."

Population Denominators

In the *Massachusetts Births 2009*, there are two sources for the population denominators used to calculate population-based rates. For state level birth rates e.g., birth rate, teen birth rate, teen birth rates by race and Hispanic ethnicity, age-specific birth rates, and the crude birth rate, we used the latest available population for 2009, the MARS (Modified Age, Race/Ethnicity, and Sex) file, which is produced by the National Center for Health Statistics (NCHS) and the Census Bureau Population Estimates Program. This file has data by single year or age, sex, race and Hispanic ethnicity in the five mutually exclusive categories used by the Department: White Non-Hispanic, Black Non-Hispanic, Asian Non-Hispanic, American Indian/Alaska Native Non-

Hispanic, and Hispanic. These estimates are not available for geographic levels below the county. See the "Note to Readers" at the beginning of this report.
For city and town rates, we have used population estimates for 2005, which are the most up-to-date population estimates available by age, race, and sex at the sub-county level. If the population in your community increased from 2005 to 2009, the rates listed may **overestimate** the actual rate. If the population in your community declined from 2005 to 2009, the rates given in the publication may **underestimate** the actual rate. As soon as new population data are available, revised rates will be posted on MassCHIP, the Department's online database (http://masschip.state.ma.us).

Note on Population Estimate Changes Due to Readjustment for Boston and Medford:

In 2006, the cities of Boston and Medford challenged the Census Bureau's population estimates for their cities. Boston disagreed with the estimates that showed Boston had lost 30,000 in population since 2000. The Census Bureau accepted much of that challenge and increased the city's estimated population for 2005 from 559,034 to 596,638, an increase of 37,604 or 6.7%. The Census Bureau accepted Medford's challenge and increased its estimate for 2005 from 53,523 to 55,798, an increase of 2,275 or 4.3%. The combined population increase for the two cities was 39,879. One impact of these adjustments was an increase in the state's female teen population of 12,111. Since the Census Bureau's 2006 population estimates are based upon their (final) 2005 estimates, this means that the 2006 teen population is 13,540 larger than the original 2005 estimate. Refer to Table 36 for the statewide age, race, and sex population distribution.

Source for 2009 Population Estimates

National Center for Health Statistics. Postcensal estimates of the resident population of the United States for July 1, 2000-July 1, 2009, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2009). Prepared under a collaborative arrangement with the US Census Bureau; released July 23, 2010. Available from:
http://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm as of March 28, 2011.

Source for 2005 Population Estimates (used for city/town rates)

Massachusetts Department of Public Health, Bureau of Health Information, Statistics, Research, and Evaluation, Division of Research and Epidemiology. Massachusetts Department of Public Health Modified Age, Race/Ethnicity, and Sex (MMARS00-05) which is based upon 2005 estimates produced by the National Center for Health Statistics in collaboration with the Census Bureau's Population Estimation Program. October 2006. Available on the Internet from: http://masschip.state.ma.us.

For additional information about population and MDPH estimation methods, refer to the Technical Notes in the report, *Massachusetts Births 2005,* which can be downloaded from the following website:
http://www.mass.gov/dph/pubstats.htm

Table 36. 2009 Massachusetts Population Estimates by Age Group, Gender, Race and Hispanic Ethnicity (mutually exclusive)

Age Group	Total[1]	White Non-Hispanic	Black Non-Hispanic	Native American Non-Hispanic	Asian Non-Hispanic	Hispanic[2]
Female						
0 to 4	189,011	128,120	16,986	526	13,643	29,736
5 to 9	191,868	136,030	15,993	544	12,679	26,622
10 to 14	195,001	144,689	15,294	475	10,830	23,713
15 to 19	229,058	170,817	18,451	694	12,715	26,381
20 to 24	230,539	172,995	17,830	640	14,473	24,601
25 to 29	216,562	159,809	15,786	655	16,280	24,032
30 to 34	208,118	150,384	15,279	540	17,692	24,223
35 to 39	223,718	168,118	15,374	523	17,230	22,473
40 to 44	247,981	197,243	15,489	545	14,139	20,565
45 to 49	268,646	222,225	15,559	658	12,052	18,152
50+	1,188,102	1,050,764	51,337	2,337	35,924	47,740
All Females	3,388,604	2,701,194	213,378	8,137	177,657	288,238
Male						
0 to 4	196,840	134,452	17,333	533	13,774	30,748
5 to 9	199,699	142,040	16,928	540	12,552	27,639
10 to 14	204,087	151,953	15,980	502	10,372	25,280
15 to 19	234,200	175,253	18,720	639	11,590	27,998
20 to 24	230,811	171,920	17,971	652	12,936	27,332
25 to 29	222,663	160,654	17,455	632	14,981	28,941
30 to 34	208,249	148,342	15,545	548	16,709	27,105
35 to 39	218,204	163,343	14,243	526	17,113	22,979
40 to 44	241,855	192,251	14,626	586	13,676	20,716
45 to 49	262,104	217,408	15,080	644	11,866	17,106
50+	986,271	872,329	40,764	2,116	32,263	38,799
All Males	3,204,983	2,529,945	204,645	7,918	167,832	294,643
Total						
0 to 4	385,851	262,572	34,319	1,059	27,417	60,484
5 to 9	391,567	278,070	32,921	1,084	25,231	54,261
10 to 14	399,088	296,642	31,274	977	21,202	48,993
15 to 19	463,258	346,070	37,171	1,333	24,305	54,379
20 to 24	461,350	344,915	35,801	1,292	27,409	51,933
25 to 29	439,225	320,463	33,241	1,287	31,261	52,973
30 to 34	416,367	298,726	30,824	1,088	34,401	51,328
35 to 39	441,922	331,461	29,617	1,049	34,343	45,452
40 to 44	489,836	389,494	30,115	1,131	27,815	41,281
45 to 49	530,750	439,633	30,639	1,302	23,918	35,258
50+	2,174,373	1,923,093	92,101	4,453	68,187	86,539
State Total	6,593,587	5,231,139	418,023	16,055	345,489	582,881

1. National Center for Health Statistics. Postcensal estimates of the resident population of the US for July 1, 2000-July 1, 2009, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2009). Prepared under a collaborative arrangement with the US Census Bureau; released July 23, 2010. Available from: http://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm as of March 28, 2011

2. Persons of Hispanic ethnicity are NOT included in the race categories. These estimates are used to calculate ***statewide population based rates*** published in this report.

Change in Measurement of Adequacy of Prenatal Care

Change in Adequacy of Prenatal Care Indicator since *Massachusetts Births 2001*:
(This discussion is based on excerpts from "An Overview of the APNCU Index" by Milton Kotelchuck, Sept. 1994, available online at

http://www.mchlibrary.info/databases/HSNRCPDFs/Overview_APCUIndex.pdf. Accessed December 2003).

Beginning with *Massachusetts Births 2001*, adequacy of prenatal care is being measured using a new method. The Adequacy of Prenatal Care Utilization (APNCU) Index, developed by Dr. Milton Kotelchuck, has replaced the Kessner Index, which had been used in the *Advanced Data Births* and *Massachusetts Births* series. The APNCU Index is the standard used in Healthy People 2010 and by the majority of states. It improves upon the Kessner Index in various ways, the most important being the ability to distinguish between inadequate prenatal care due to the timing of initiation and inadequate care due to insufficient prenatal care visits. The APNCU Index also improves upon the Kessner Index by correcting some of its principal faults. First, the APNCU Index more accurately assesses adequacy of visits for term pregnancies; the Kessner Index characterizes 9 or more visits as adequate, due to an early computer database limitation, which only allowed for a single-digit number to record prenatal care visits. Other faults of the Kessner Index include its bias towards measurement of adequacy of initiation of care, and its various computational algorithms due to inadequate initial documentation.

Table 1 of this report provides a comparison of data on adequacy of prenatal care from 1996-2009 as measured by these two separate indices. Below are the definitions for the APNCU Index categories and its two component indices (initiation and received services), and the definition of the Kessner Index categories. Also below is a short summary of the major differences in classification of adequacy of prenatal care using the Kessner Index and the APNCU Index.

The APNCU Index characterizes prenatal care (PNC) utilization by measuring two distinct components of prenatal care -- adequacy of initiation and adequacy of received services (visits). Each of these components is measured as an independent index, and the APNCU Index is a summary of these 2 component indices. As with the Kessner Index, the APNCU Index does not assess quality of the prenatal care that is delivered, only its utilization.

Adequacy of Prenatal Care Utilization (APNCU) Index: Definition of Categories

Category	Month Prenatal Care Began	% of Expected[1] Prenatal Care Visits
Adequate Intensive	1, 2, 3, or 4	110% or more
Adequate Basic	1, 2, 3, or 4	80 – 109%
Intermediate	1, 2, 3, or 4	50 – 79%
Inadequate	Month 5 or later	Less than 50%
Unknown	Prenatal care information not recorded	

[1] The number of "expected" visits is determined based on standards set by the American College of Obstetricians and Gynecologists (ACOG).

Component Indices of the APNCU Index: Definitions of Categories

Component Indices and Summary Index:

The first component index is "Adequacy of Initiation," which describes the adequacy of when prenatal care began during pregnancy. The assumption underlying this scale is that the earlier PNC begins the better. The month or trimester prenatal care begins is widely used as a measure to assess the adequacy of timing of initiation of PNC, since it accurately and succinctly describes when PNC begins. The APNCU Index uses this measure to determine the “adequacy of initiation.”

The second component index, "Adequacy of Received Services” (visits), characterizes the adequacy of received PNC visits during the time period after prenatal care is begun until the delivery. This component attempts to characterize if the woman received the appropriate number of prenatal care visits for the time period in which she received PNC services. [The appropriate number of visits is based on recommendations of the American College of Obstetricians and Gynecologists for an uncomplicated pregnancy. For example, a woman beginning prenatal care during the first month of pregnancy who delivers during the 40th week of gestation (and has no complications with her pregnancy) should receive 14 visits].

The two component indices are measured independently from one another, and can be used as separate indices, since the policy and practice issues underlying whether women are beginning care early and whether they are receiving the recommended amount of visits may be quite distinct. However, because of the popularity and utility of using one overall adequacy of PNC index, the two component indices are combined into a single summary index – the “Adequacy of Prenatal Care Utilization (APNCU) Index.”

Index Categories

Both component indices and the summary index (APNCU Index) characterize PNC as one of five categories: “adequate intensive,” “adequate basic,” “intermediate,” “inadequate,” or “unknown.” The category "adequate basic" refers to the minimum recommended level of care (for a pregnancy with no complications), while "adequate intensive" refers to a level of care exceeding recommended standards. The sum of the "adequate basic" and "adequate intensive" categories is the total adequacy score. In addition, the “inadequate” category can be subdivided to isolate those women who received no PNC. [For definitions of categories, please see the Technical Notes in the Appendix.]

[For more detail on the methodology of the APNCU Index, please call the Bureau of Health Information, Statistics, Research & Evaluation at 617-624-5600].

Adequacy of Initiation Index

Category	Month Prenatal Care Began
Adequate Intensive	1 or 2
Adequate Basic	3 or 4
Intermediate	5 or 6
Inadequate	Month 7 or later, or no PNC
Unknown	Prenatal care initiation information not recorded

Adequacy of Received Services (Visits) Index

Category	% of Expected Prenatal Care Visits
Adequate Intensive	110% or more
Adequate Basic	80 – 109%
Intermediate	50 – 79%
Inadequate	Less than 50%
Unknown	Information on prenatal care visits not recorded

Kessner Index of Adequacy of Prenatal Care: Definition of Categories

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
Inadequate	1	1-4
	2	1-4
	3	1 or more
No prenatal care	--	0
Unknown	Unknown	Unknown

Summary of Major Differences in Categorization of Adequacy of Prenatal Care between the Kessner Index and the APNCU Index

The two different methods used in the Kessner Index and APNCU Index to calculate adequacy of prenatal care can result in differences in how each one classifies adequacy of prenatal care. These differences only occur under certain conditions, not in all cases (see "Explanation" column).

The Kessner Index classifies prenatal care as…	… but the APNCU Index classifies prenatal care as …	Explanation
Intermediate	Adequate Basic	This is primarily due to the fact that the APNCU Index allows for prenatal care in the 4th month of pregnancy to be considered adequate if the mother received 80-109% of expected visits, whereas the Kessner Index only allows for care begun in the first trimester (months 1-3) to be considered adequate.
Intermediate	Inadequate	This is primarily due to the fact that the APNCU requires that the mother must make at least 50% of the "expected visits for a normal pregnancy", i.e., 7 visits, which is 50% of the recommended 14 visits for a normal pregnancy, to be "intermediate", while the Kessner Index allows 5 or 6 visits to meet "intermediate" status if the initiation of PNC is in the second trimester.
Adequate	Intermediate	This is primarily due to the consideration of "expected" visits (based on when the mother initiated care and the length of gestation) using the APNCU Index, which bases expected visits on the ACOG recommendations, which can be as high as 14 visits if a gestational period is 40 weeks, whereas the Kessner Index considers 9 visits sufficient in all cases.
Adequate	Adequate Intensive	The APNCU Index added an "Adequate Intensive" category, which is not used in the Kessner Index. This allows analysis of situations in which more than normal care is received (e.g. women with high-risk conditions, pregnancy complications).

Tests of Statistical Significance

Since the 2005 report, statistics presented in the text section have been tested to determine whether they differ significantly from a target statistic. For example, the number of births in 2009 was compared with the number of births in 2008, to determine whether their difference could have occurred by chance. When a difference is unlikely to have occurred by chance, it is referred to as "significant."

Note that with respect to statistical difference, the language in the reports beginning with 2005 differs from that of past reports, and caution must be used when comparing the text of previous reports with this year's report.

In testing for statistical significance, we have used the testing methods from the National Center for Health Statistics (NCHS). These methods are presented in the following document:

> National Vital Statistics Reports, Volume 52, Number 10
> Births: Final Data for 2002
> by Joyce A. Martin, M.P.H.; Brady E. Hamilton, Ph.D.; Paul D. Sutton, Ph.D.; Stephanie J. Ventura, M.A.; Fay Menacker, Dr. P.H.; and Martha L. Munson, M.S.;
> From the Division of Vital Statistics, NCHS.
> Technical Notes, "Significance testing" section beginning on page 110.

This document is available from the following website:
http://www.cdc.gov/nchs/products/pubs/pubd/nvsr/52/52-23.htm

For comparisons of more than 100 events, whether they are rates, proportions, or numbers, the binomial distribution is assumed, and confidence intervals are examined to see whether they overlap (Refer to the "Confidence Intervals and Infant Mortality Rates" section in this Appendix for an explanation of using confidence intervals to determine statistical significance.) When the number of events is less than 100, a Poisson distribution is assumed, and confidence intervals are constructed based upon the Poisson distribution. For more details and exact formulas for calculating confidence intervals or other tests of statistical significance, refer to the publication listed above.

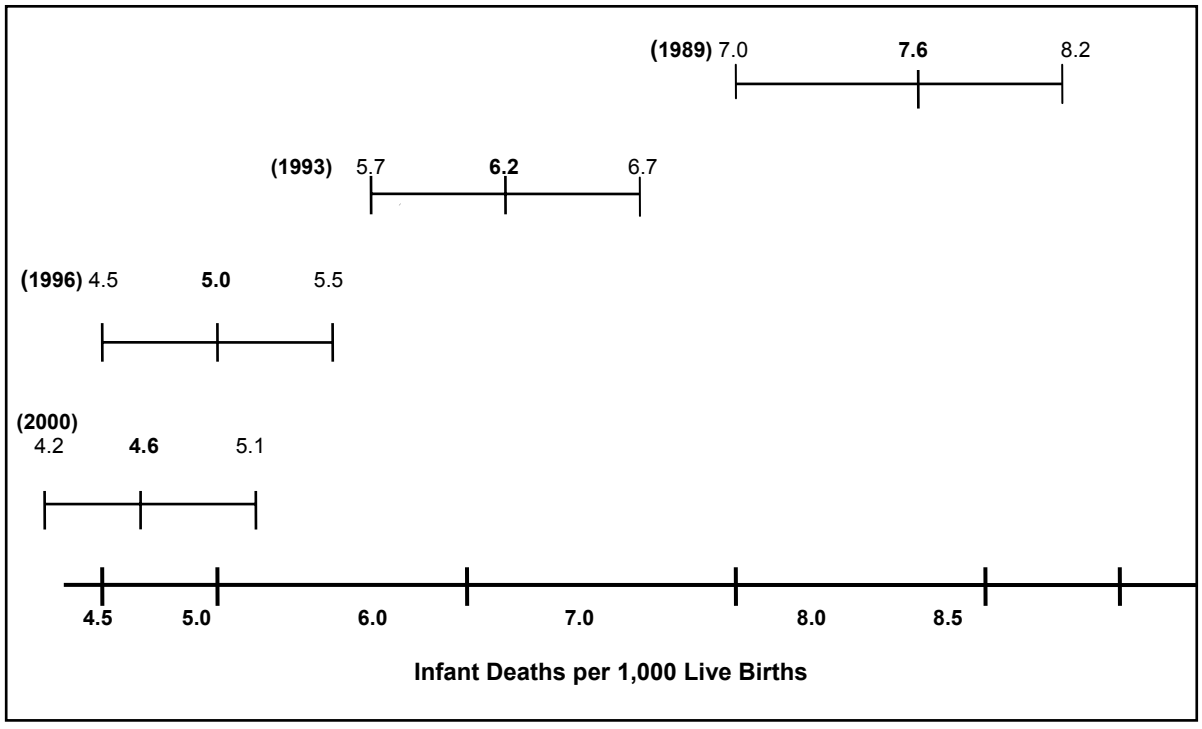
When two statistics are determined to differ significantly, they then are referred to in the text with language expressing differences, such as "higher" and "lower," or "increased" and "decreased". Otherwise, differences that are not significant are reported as having "no change" or "no statistical difference."

Confidence Intervals and Infant Mortality Rates

Beginning with the 1992 Advance Data: Births publication, 95% confidence intervals were added to the calculation of infant mortality rates (IMRs). The confidence interval (CI) provides a measure of stability of the IMR and a basis for comparing rates to determine if they are statistically different. Rates can be compared for the same group in different years or for different groups in the same year. The width of the CI reflects the stability of the IMR. For example, a narrow CI reflects high stability, and a wide interval reflects low stability. If the CIs around two IMRs being compared do not overlap, the difference between the two rates is statistically significant. The following table and chart illustrate the concept of statistically significant differences using actual data from 1989, 1993, 1996, and 2000.

Comparison of Infant Mortality Rates and Confidence Intervals for Selected Years

Year	IMR (per 1,000 births)	95% Confidence Interval
1989	7.6	(7.0-8.2)
1993	6.2	(5.7-6.7)
1996	5.0	(4.5-5.5)
2000	4.6	(4.2-5.1)



The difference between the 1993 IMR and 1996 IMR is statistically significant – the confidence intervals do not overlap. The same is true for the differences between the 1989 IMR and each annual IMR for 1993, 1996, and 2000. However, the difference between the 1996 and 2000 IMRs is not statistically significant, since their confidence intervals overlap.

Table 37. 95% Confidence Intervals for Infant Mortality Rates by Race and Hispanic Ethnicity, Massachusetts: 1990-2009

	Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian	
Year	n	Rate[2] (95% CI)	n	Rate[2] (95% CI)	n	Rate[2] (95% CI)	n	Rate[2] (95% CI)	n	Rate[2] (95% CI)
1990	649	7.0 (6.5, 7.5)	442	6.1 (5.5, 6.7)	98	13.7 (11.0, 16.4)	77	9.1 (7.1, 11.1)	24	7.0 (4.2, 10.0)
1991	577	6.5 (6.0, 7.0)	381	5.5 (4.9, 6.1)	101	15.0 (12.1, 17.9)	80	9.4 (7.3, 11.5)	14	4.2 (2.0, 6.4)
1992	569	6.5 (6.0, 7.0)	371	5.5 (4.9, 6.1)	110	16.4 (13.4, 19.4)	67	7.9 (6.0, 9.8)	16	4.9 (2.5, 7.3)
1993	523	6.2 (5.7, 6.7)	346	5.3 (4.7, 5.9)	84	13.1 (10.3, 15.9)	77	9.3 (7.2, 11.4)	13	3.9 (1.8, 6.0)
1994	499	6.0 (5.4, 6.5)	343	5.3 (4.7, 5.9)	79	12.6 (9.8, 15.4)	64	7.6 (5.7, 9.4)	8	2.4 (0.7, 4.0)
1995	419	5.1 (4.6, 5.6)	275	4.4 (3.8, 4.9)	65	11.1 (8.4, 13.8)	58	7.2 (5.3, 9.0)	19	5.5 (3.0, 8.0)
1996	403	5.0 (4.5, 5.5)	289	4.7 (4.1, 5.2)	63	11.4 (8.6, 14.2)	40	5.1 (3.5, 6.7)	8	2.2 (0.7, 3.7)
1997	425	5.3 (4.8, 5.8)	294	4.8 (4.2, 5.3)	64	11.7 (8.8, 14.5)	55	6.7 (4.9, 8.4)	10	2.6 (1.0, 4.2)
1998	414	5.1 (4.6, 5.6)	294	4.6 (4.1, 5.2)	64	10.6 (7.9, 13.3)	55	6.7 (5.0, 8.4)	10	2.7 (1.0, 4.3)
1999	418	5.2 (4.7, 5.7)	285	4.7 (4.2, 5.3)	72	12.3 (9.5, 15.1)	49	5.5 (4.0, 7.1)	8	1.9 (0.6, 3.3)
2000	377	4.6 (4.2, 5.1)	232	3.8 (3.4, 4.3)	74	12.8 (9.9, 15.7)	48	5.2 (3.7, 6.6)	19	4.1 (2.2, 5.9)
2001	407	5.0 (4.5, 5.5)	245	4.1 (3.6, 4.7)	71	12.1 (9.3, 14.9)	69	7.3 (5.6, 9.1)	15	3.1 (1.6, 4.7)
2002	397	4.9 (4.4, 5.4)	239	4.1 (3.6, 4.6)	69	11.6 (8.9, 14.3)	67	7.0 (5.3, 8.7)	16	3.0 (1.5, 4.5)
2003	383	4.8 (4.3, 5.3)	235	4.1 (3.6, 4.6)	75	12.7 (9.8, 15.5)	55	5.6 (4.1, 7.1)	14	2.7 (1.3, 4.1)
2004	376	4.7 (4.3, 5.3)	210	3.8 (3.3, 4.3)	70	11.5 (8.9, 14.2)	75	7.6 (5.9, 9.4)	15	2.7 (1.4, 4.1)
2005	391	5.1 (4.6, 5.6)	230	4.3 (3.7, 4.9)	57	9.4 (7.0, 11.8)	78	7.8 (6.0, 9.5)	18	3.4 (1.8, 5.0)
2006	369	4.8 (4.3, 5.2)	221	4.2 (3.6, 4.7)	72	11.1 (8.6, 13.7)	62	5.8 (4.4, 7.2)	10	1.8 (0.7, 3.0)
2007	380	4.9 (4.4, 5.4)	206	3.9 (3.4, 4.4)	66	10.2 (7.8, 12.6)	81	7.4 (5.8, 9.1)	18	3.1 (1.7, 4.6)
2008	382	5.0 (4.5, 5.5)	194	3.7 (3.2, 4.3)	78	11.7 (9.1, 14.3)	86	7.9 (6.2, 9.5)	16	2.7 (1.4, 4.0)
2009	363	4.8 (4.3, 5.3)	203	4.1 (3.5, 4.6)	53	7.6 (5.6, 9.7)	78	7.1 (5.5, 8.7)	19	3.2 (1.8, 4.6)

1. Deaths of infants of unknown race are excluded except for the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Rates are expressed per 1,000 live births.

In 2009, the Black infant mortality rate was 7.6 deaths per 1,000 live births (95% CI: 5.6, 9.7), which was about two times greater than the White infant mortality rate of 4.1 (95% CI: 3.5, 4.6). The difference in these two rates was statistically significant. The rate of infant mortality for Blacks was also significantly elevated compared with Asians (3.2, 95% CI: 1.8, 4.6) in 2009.

Definition of Rates and Ratios

Age-Specific Birth Rate

The number of children born to women in a specific age group divided by the population of women in that specific age group, multiplied by 1,000.

$$\text{Age-Specific Birth Rate} = \frac{\text{Number of births to females ages X to Y years}}{\text{Number of females ages X to Y years in the population}} \times 1{,}000$$

Birth Rate

(See Age-Specific Birth Rate, Crude Birth Rate, Fertility Rate, and Teen Birth Rate)

Cesarean Section Rates

$$\text{Total Cesarean Delivery Rate} = \frac{\text{Number of Cesarean births}}{\text{Number of occurrence births}} \times 100$$

$$\text{Primary Cesarean Delivery Rate} = \frac{\text{Number of primary Cesarean births}}{\text{[Number of occurrence births-(number of repeat Cesarean births +VBACs)]}} \times 100$$

$$\text{Repeat Cesarean Delivery Rate} = \frac{\text{Number of repeat Cesarean births}}{\text{(Number of repeat Cesarean births+number of VBACs)}} \times 100$$

$$\text{VBAC Rate} = \frac{\text{Number of VBACs}}{\text{(Number of repeat Cesarean births+number of VBACs)}} \times 100$$

Crude Birth Rate

$$\text{Crude Birth Rate} = \frac{\text{Number of resident live births}}{\text{Total resident population}} \times 1{,}000$$

Fertility Rate (sometimes referred to as "Birth Rate")

$$\text{Fertility Rate} = \frac{\text{Number of births to females ages 15-44 years}}{\text{Number of females ages 15-44 years in the population}} \times 1{,}000$$

Fetal Mortality Rate

$$\text{Fetal Mortality Rate} = \frac{\text{Number of fetal deaths}}{\text{Number of fetal deaths plus live births in the same year}} \times 1{,}000$$

Feto-Infant Mortality Rate

$$\text{ii) Feto-Infant Mortality Rate} = \frac{\text{Number of fetal deaths + Number of infant deaths}}{\text{Number of fetal deaths + live births in the same year}} \times 1{,}000$$

(Refer to the definitions of Fetal Mortality Rate and Infant Mortality Rate for more details.)

Infant Mortality Rate (IMR)
The death rate among infants less than one year old per 1,000 live births.

$$\text{Infant Mortality Rate} = \frac{\text{Number of resident deaths of infants less than one year old in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Inter-pregnancy Interval (IPI)
Inter-pregnancy interval is the time, in months, between the date of last menstrual period of current pregnancy and the date of previous live birth. IPI is calculated for each mother currently giving birth to their second or later child.

$$\text{\%Short IPI} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI <12 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

$$\text{\% IPI 12 to 35 months} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI between 12 and 35 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

$$\text{\% IPI 36+ months} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI >=36 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

Maternal Mortality Ratio (MMR)
The number of maternal deaths per 100,000 live occurrence births. The term "ratio" is used instead of "rate" in this report because the numerator (number of deaths) is not a subset of the denominator (live births). The ideal measure would incorporate the total number of pregnancies not just live births in the denominator. However, pregnancies that result in late fetal death or end in induced terminations are difficult to record, and data are often incomplete. As a result, the population at risk of maternal death is generally taken as the number of live births, which is assumed to be a good proxy for the number of pregnancies.

$$\text{Maternal Mortality Ratio (MMR)} = \frac{\text{Number of maternal deaths}}{\text{Number of occurrence live births in the same year}} \times 100{,}000$$

Neonatal Mortality Rate (NMR)
The death rate among infants less than 28 days of age per 1,000 live births.

$$\text{Neonatal Mortality Rate} = \frac{\text{Number of resident deaths of infants less than 28 days of age in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Perinatal Mortality Rate

$$\text{Perinatal Mortality Rate} = \frac{\text{Number of fetal deaths from 28 weeks gestation plus infant deaths (less than 7 days old)}}{\text{Number of fetal deaths plus live births in the same year}} \times 1{,}000$$

Post Neonatal Mortality Rate
The death rate among infants 28 days of age to less than one year old per 1,000 live births.

$$\text{Post Neonatal Mortality Rate} = \frac{\text{Number of resident deaths of infants 28 days of age to less than one year of age in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Pregnancy-Associated Mortality Ratio (PAMR)
The number of pregnancy-associated deaths per 100,000 live occurrence births. The term "ratio" is used instead of rate in this report because the numerator includes some maternal deaths that were not related to live-born infants and thus were not included in the denominator.

$$\text{Pregnancy-Associated Mortality Ratio (PAMR)} = \frac{\text{Number of pregnancy-associated deaths}}{\text{Number of occurrence live births in the same year}} \times 100{,}000$$

Teen Birth Rate

$$\text{Teen birth rate} = \frac{\text{Number of births to females ages 15-19 years old}}{\text{Number of females ages 15-19 years old in the population}} \times 1{,}000$$

Total Rate of Change
Total rate of change between two numbers or rates is expressed as a percentage in this report (e.g. The Massachusetts birth rate decreased by 12% from 1990 to 1996.):

$$\frac{Pn-Po}{Po} \times 100$$

where, Pn = rate during later time period
Po = rate during earlier time period

Table A1. Population Estimates for Massachusetts Communities: 2005

TOWN NAME	COUNTY	CHNA	POPULATION[1]
Abington	Plymouth	22	16,305
Acton	Middlesex	15	20,539
Acushnet	Bristol	26	10,535
Adams	Berkshire	1	8,456
Agawam	Hampden	4	28,547
Alford	Berkshire	1	400
Amesbury	Essex	12	16,617
Amherst	Hampshire	3	34,721
Andover	Essex	11	32,838
Aquinnah (Gay Head)	Dukes	27	362
Arlington	Middlesex	17	41,273
Ashburnham	Worcester	9	5,970
Ashby	Middlesex	9	2,926
Ashfield	Franklin	2	1,824
Ashland	Middlesex	7	15,431
Athol	Worcester	2	11,690
Attleboro	Bristol	24	43,364
Auburn	Worcester	8	16,393
Avon	Norfolk	22	4,345
Ayer	Middlesex	9	7,212
Barnstable	Barnstable	27	47,902
Barre	Worcester	9	5,375
Becket	Berkshire	1	1,783
Bedford	Middlesex	15	12,486
Belchertown	Hampshire	3	13,897
Bellingham	Norfolk	6	15,735
Belmont	Middlesex	17	23,453
Berkley	Bristol	24	6,352
Berlin	Worcester	9	2,683
Bernardston	Franklin	2	2,237
Beverly	Essex	13	39,833
Billerica	Middlesex	10	39,812
Blackstone	Worcester	6	9,051
Blandford	Hampden	4	1,266
Bolton	Worcester	9	4,428
Boston	Suffolk	19	558,435
Bourne	Barnstable	27	19,355
Boxborough	Middlesex	15	5,032
Boxford	Essex	12	8,162
Boylston	Worcester	8	4,253
Braintree	Norfolk	20	33,658
Brewster	Barnstable	27	10,242
Bridgewater	Plymouth	22	25,769
Brimfield	Hampden	5	3,627
Brockton	Plymouth	22	100,366
Brookfield	Worcester	5	3,096
Brookline	Norfolk	19	56,422
Buckland	Franklin	2	1,995
Burlington	Middlesex	15	23,265
Cambridge	Middlesex	17	101,529
Canton	Norfolk	20	21,481
Carlisle	Middlesex	15	4,823
Carver	Plymouth	23	11,552
Charlemont	Franklin	2	1,387
Charlton	Worcester	5	12,447
Chatham	Barnstable	27	6,833
Chelmsford	Middlesex	10	33,728
Chelsea	Suffolk	19	34,128
Cheshire	Berkshire	1	3,356
Chester	Hampden	21	1,320
Chesterfield	Hampshire	3	1,271
Chicopee	Hampden	21	54,599
Chilmark	Dukes	27	944
Clarksburg	Berkshire	1	1,663
Clinton	Worcester	9	13,997
Cohasset	Norfolk	20	7,219
Colrain	Franklin	2	1,858
Concord	Middlesex	15	16,858
Conway	Franklin	2	1,902
Cummington	Hampshire	3	986
Dalton	Berkshire	1	6,697
Danvers	Essex	14	25,999
Dartmouth	Bristol	26	31,371
Dedham	Norfolk	18	23,681
Deerfield	Franklin	2	4,786
Dennis	Barnstable	27	15,914
Dighton	Bristol	24	6,648
Douglas	Worcester	6	7,861
Dover	Norfolk	18	5,634
Dracut	Middlesex	10	28,805
Dudley	Worcester	5	10,787
Dunstable	Middlesex	10	3,142
Duxbury	Plymouth	23	14,655
East Bridgewater	Plymouth	22	13,832
East Brookfield	Worcester	5	2,111
East Longmeadow	Hampden	4	14,845
Eastham	Barnstable	27	5,550
Easthampton	Hampshire	3	15,994
Easton	Bristol	22	22,995
Edgartown	Dukes	27	3,934
Egremont	Berkshire	1	1,355
Erving	Franklin	2	1,542
Essex	Essex	13	3,342
Everett	Middlesex	16	37,100
Fairhaven	Bristol	26	16,223
Fall River	Bristol	25	92,117
Falmouth	Barnstable	27	33,620
Fitchburg	Worcester	9	40,514
Florida	Berkshire	1	666
Foxborough	Norfolk	7	16,288
Framingham	Middlesex	7	65,651
Franklin	Norfolk	6	30,748
Freetown	Bristol	26	8,963
Gardner	Worcester	9	20,955
Georgetown	Essex	12	8,023
Gill	Franklin	2	1,392
Gloucester	Essex	13	30,671
Goshen	Hampshire	3	956
Gosnold	Dukes	27	86
Grafton	Worcester	8	16,783
Granby	Hampshire	3	6,332
Granville	Hampden	4	1,644
Great Barrington	Berkshire	1	7,440
Greenfield	Franklin	2	17,888
Groton	Middlesex	9	10,396
Groveland	Essex	12	6,591
Hadley	Hampshire	3	4,820
Halifax	Plymouth	23	7,805
Hamilton	Essex	13	8,334
Hampden	Hampden	4	5,312
Hancock	Berkshire	1	1,018
Hanover	Plymouth	23	14,077
Hanson	Plymouth	23	9,915
Hardwick	Worcester	9	2,655
Harvard	Worcester	9	6,116
Harwich	Barnstable	27	12,673
Hatfield	Hampshire	3	3,280
Haverhill	Essex	12	60,032
Hawley	Franklin	2	345
Heath	Franklin	2	805
Hingham	Plymouth	20	21,470
Hinsdale	Berkshire	1	1,811
Holbrook	Norfolk	22	10,765
Holden	Worcester	8	16,571

Table A1 (cont'd). Population Estimates for Massachusetts Communities: 2005

TOWN NAME	COUNTY	CHNA	POPULATION[1]
Holland	Hampden	5	2,529
Holliston	Middlesex	7	13,830
Holyoke	Hampden	21	41,089
Hopedale	Worcester	6	6,234
Hopkinton	Middlesex	7	14,048
Hubbardston	Worcester	9	4,340
Hudson	Middlesex	7	18,847
Hull	Plymouth	20	11,279
Huntington	Hampshire	21	2,180
Ipswich	Essex	13	13,285
Kingston	Plymouth	23	12,435
Lakeville	Plymouth	24	10,618
Lancaster	Worcester	9	7,069
Lanesborough	Berkshire	1	2,951
Lawrence	Essex	11	81,591
Lee	Berkshire	1	5,882
Leicester	Worcester	8	10,953
Lenox	Berkshire	1	5,149
Leominster	Worcester	9	42,120
Leverett	Franklin	2	1,769
Lexington	Middlesex	15	30,452
Leyden	Franklin	2	815
Lincoln	Middlesex	15	7,935
Littleton	Middlesex	15	8,561
Longmeadow	Hampden	4	15,556
Lowell	Middlesex	10	105,749
Ludlow	Hampden	21	21,835
Lunenburg	Worcester	9	10,008
Lynn	Essex	14	92,186
Lynnfield	Essex	14	11,540
Malden	Middlesex	16	56,730
Manchester	Essex	13	5,332
Mansfield	Bristol	24	22,933
Marblehead	Essex	14	20,285
Marion	Plymouth	26	5,316
Marlborough	Middlesex	7	37,163
Marshfield	Plymouth	23	24,879
Mashpee	Barnstable	27	14,159
Mattapoisett	Plymouth	26	6,477
Maynard	Middlesex	7	10,221
Medfield	Norfolk	7	12,328
Medford	Middlesex	16	53,801
Medway	Norfolk	6	12,780
Melrose	Middlesex	16	26,366
Mendon	Worcester	6	5,743
Merrimac	Essex	12	6,350
Methuen	Essex	11	44,532
Middleborough	Plymouth	24	21,153
Middlefield	Hampshire	3	549
Middleton	Essex	11	9,077
Milford	Worcester	6	27,523
Millbury	Worcester	8	13,443
Millis	Norfolk	7	7,949
Millville	Worcester	6	2,938
Milton	Norfolk	20	26,243
Monroe	Franklin	2	100
Monson	Hampden	4	8,744
Montague	Franklin	2	8,416
Monterey	Berkshire	1	959
Montgomery	Hampden	4	743
Mt. Washington	Berkshire	1	135
Nahant	Essex	14	3,591
Nantucket	Nantucket	27	10,095
Natick	Middlesex	7	31,895
Needham	Norfolk	18	28,445
New Ashford	Berkshire	1	247
New Bedford	Bristol	26	94,502
New Braintree	Worcester	9	1,090
New Marlborough	Berkshire	1	1,522
New Salem	Franklin	2	986
Newbury	Essex	12	6,990
Newburyport	Essex	12	17,395
Newton	Middlesex	18	83,346
Norfolk	Norfolk	7	10,506
North Adams	Berkshire	1	14,031
North Andover	Essex	11	27,137
North Attleboro	Bristol	24	28,078
North Brookfield	Worcester	5	4,812
North Reading	Middlesex	16	13,930
Northampton	Hampshire	3	28,803
Northborough	Worcester	7	14,652
Northbridge	Worcester	6	14,184
Northfield	Franklin	2	3,226
Norton	Bristol	24	19,106
Norwell	Plymouth	20	10,382
Norwood	Norfolk	20	28,472
Oak Bluffs	Dukes	27	3,794
Oakham	Worcester	9	1,892
Orange	Franklin	2	7,659
Orleans	Barnstable	27	6,459
Otis	Berkshire	1	1,391
Oxford	Worcester	5	13,710
Palmer	Hampden	4	12,895
Paxton	Worcester	8	4,556
Peabody	Essex	14	50,954
Pelham	Hampshire	3	1,415
Pembroke	Plymouth	23	18,069
Pepperell	Middlesex	9	11,386
Peru	Berkshire	1	836
Petersham	Worcester	2	1,282
Phillipston	Worcester	2	1,753
Pittsfield	Berkshire	1	43,949
Plainfield	Hampshire	3	600
Plainville	Norfolk	7	7,994
Plymouth	Plymouth	23	54,781
Plympton	Plymouth	23	2,777
Princeton	Worcester	9	3,520
Provincetown	Barnstable	27	3,444
Quincy	Norfolk	20	90,458
Randolph	Norfolk	20	32,552
Raynham	Bristol	24	13,428
Reading	Middlesex	16	23,161
Rehoboth	Bristol	24	11,229
Revere	Suffolk	19	45,551
Richmond	Berkshire	1	1,618
Rochester	Plymouth	26	5,295
Rockland	Plymouth	23	17,842
Rockport	Essex	13	7,761
Rowe	Franklin	2	350
Rowley	Essex	12	5,832
Royalston	Worcester	2	1,366
Russell	Hampden	4	1,723
Rutland	Worcester	9	7,406
Salem	Essex	14	41,647
Salisbury	Essex	12	8,264
Sandisfield	Berkshire	1	830
Sandwich	Barnstable	27	20,707
Saugus	Essex	14	26,867
Savoy	Berkshire	1	724
Scituate	Plymouth	20	18,119
Seekonk	Bristol	24	13,660
Sharon	Norfolk	20	17,269
Sheffield	Berkshire	1	3,360
Shelburne	Franklin	2	2,054
Sherborn	Middlesex	7	4,220
Shirley	Middlesex	9	7,361

Table A1 (cont'd). Population Estimates for Massachusetts Communities: 2005

TOWN NAME	COUNTY	CHNA	POPULATION[1]
Shrewsbury	Worcester	8	33,171
Shutesbury	Franklin	2	1,843
Somerset	Bristol	25	18,564
Somerville	Middlesex	17	75,372
South Hadley	Hampshire	3	17,071
Southampton	Hampshire	3	5,828
Southborough	Worcester	7	9,511
Southbridge	Worcester	5	17,503
Southwick	Hampden	4	9,512
Spencer	Worcester	5	12,087
Springfield	Hampden	4	156,358
Sterling	Worcester	9	7,761
Stockbridge	Berkshire	1	2,256
Stoneham	Middlesex	16	21,594
Stoughton	Norfolk	22	26,782
Stow	Middlesex	7	6,159
Sturbridge	Worcester	5	8,825
Sudbury	Middlesex	7	17,035
Sunderland	Franklin	2	3,853
Sutton	Worcester	6	8,974
Swampscott	Essex	14	14,283
Swansea	Bristol	25	16,243
Taunton	Bristol	24	56,348
Templeton	Worcester	9	7,474
Tewksbury	Middlesex	10	28,990
Tisbury	Dukes	27	3,819
Tolland	Hampden	4	446
Topsfield	Essex	13	6,178
Townsend	Middlesex	9	9,273
Truro	Barnstable	27	2,162
Tyngsborough	Middlesex	10	11,297
Tyringham	Berkshire	1	352
Upton	Worcester	6	6,374
Uxbridge	Worcester	6	12,377
Wakefield	Middlesex	16	24,553
Wales	Hampden	5	1,818
Walpole	Norfolk	7	23,067
Waltham	Middlesex	18	59,564
Ware	Hampshire	3	9,988
Wareham	Plymouth	26	21,274
Warren	Worcester	5	5,040
Warwick	Franklin	2	763
Washington	Berkshire	1	546
Watertown	Middlesex	17	32,255
Wayland	Middlesex	7	13,015
Webster	Worcester	5	16,853
Wellesley	Norfolk	18	26,975
Wellfleet	Barnstable	27	2,821
Wendell	Franklin	2	1,035
Wenham	Essex	13	4,643
West Boylston	Worcester	8	7,708
West Bridgewater	Plymouth	22	6,819
West Brookfield	Worcester	5	3,896
West Newbury	Essex	12	4,301
West Springfield	Hampden	4	27,938
West Stockbridge	Berkshire	1	1,450
West Tisbury	Dukes	27	2,666
Westborough	Worcester	7	18,781
Westfield	Hampden	21	40,432
Westford	Middlesex	10	21,369
Westhampton	Hampshire	3	1,566
Westminster	Worcester	9	7,358
Weston	Middlesex	18	11,591
Westport	Bristol	25	15,053
Westwood	Norfolk	18	13,902
Weymouth	Norfolk	20	53,708
Whately	Franklin	2	1,584
Whitman	Plymouth	22	14,424
Wilbraham	Hampden	4	13,960
Williamsburg	Hampshire	3	2,433
Williamstown	Berkshire	1	8,276
Wilmington	Middlesex	15	21,431
Winchendon	Worcester	9	10,085
Winchester	Middlesex	15	21,139
Windsor	Berkshire	1	858
Winthrop	Suffolk	19	17,067
Woburn	Middlesex	15	37,074
Worcester	Worcester	8	179,839
Worthington	Hampshire	3	1,291
Wrentham	Norfolk	7	11,066
Yarmouth	Barnstable	27	24,663

1. Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2005 (MMARS05), released October 2006.

Table A2. Population Estimates for Massachusetts Community Health Network Areas (CHNAs) and Counties: 2005

CHNA	POPULATION[1]	COUNTY	POPULATION[1]
1. Community Health Network of Berkshire County	131,965	Barnstable	226,505
2. Upper Valley Health Web (Franklin County)	88,506	Berkshire	131,965
3. Partnership for Health in Hampshire County (Northampton)	151,801	Bristol	547,711
4. The Community Health Connection (Springfield)	299,490	Dukes	15,605
5. Community Health Network of Southern Worcester County	119,141	Essex	750,463
6. Community Partners for Health (Milford)	160,521	Franklin	72,415
7. Community Health Network of Greater Metro West (Framingham)	379,658	Hampden	466,739
8 .Community Wellness Coalition (Worcester)	303,669	Hampshire	153,981
9. Fitchburg/Gardner Community Health Network	261,369	Middlesex	1,464,179
10. Greater Lowell Community Health Network	272,893	Nantucket	10,095
11. Greater Lawrence Community Health Network	195,176	Norfolk	656,472
12. Greater Haverhill Community Health Network	148,557	Plymouth	497,687
13. Community Health Network North (Beverly/Gloucester)	119,378	Suffolk	655,181
14. North Shore Community Health Network	287,352	Worcester	787,943
15. Greater Woburn/Concord/Littleton Community Health Network	209,597		
16. North Suburban Health Alliance (Medford/Malden/Melrose)	257,235	**STATE**	**6,436,940**
17. Greater Cambridge/Somerville Community Health Network	273,883		
18. West Suburban Health Network (Newton/Waltham)	253,138		
19. Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	711,603		
20. Blue Hills Community Health Alliance (Greater Quincy)	372,309		
21. Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	161,454		
22. Greater Brockton Community Health Network	242,404		
23. South Shore Community Partners in Prevention (Plymouth)	188,787		
24. Greater Attleboro-Taunton Health & Education Response	252,919		
25. Partners for a Healthier Community (Fall River)	141,977		
26. Greater New Bedford Health & Human Services Coalition	199,955		
27. Cape and Islands Community Health Network	252,204		

1. Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2005 (MMARS05), released October 2006.

Glossary

Adequacy of Prenatal Care Utilization (APNCU) Index
The Adequacy of Prenatal Care Utilization Index, developed by Dr. Milton Kotelchuck, is the measure used in this publication to classify the adequacy of prenatal care received by Massachusetts resident mothers. (*Please note:* Prior to the *Births 2001 publication, the Kessner Index was used to measure adequacy of prenatal care; please see definition for Kessner Index below*.) The APNCU Index has five categories (adequate intensive, adequate basic, intermediate, inadequate, and unknown), based on the month of pregnancy in which prenatal care begins and the percent of expected prenatal care visits for the time period during which a woman receives prenatal care services. Please see Technical Notes for more details.

Birthweight
The weight of an infant recorded at the time of delivery. It may be recorded in either pounds/ounces or grams. If recorded in pounds/ounces, it is converted to grams for use in this report.

1 pound = 453.6 grams
1,000 grams = 2 pounds and 3 ounces

Birthweight Categories

Normal birthweight (NBW):	An infant's weight of 2,500 grams (approximately 5.5 pounds) or more recorded at birth.
Low birthweight (LBW):	An infant's weight of less than 2,500 grams (5.5 pounds) recorded at birth.
Very low birthweight (VLBW):	An infant's weight of less than 1,500 grams (3.3 pounds) recorded at birth.

Cesarean Delivery or Cesarean Section (C-Section)
Primary: A mother's first cesarean delivery.
Repeat: A cesarean delivery that has been preceded by at least one Cesarean delivery.

Community Health Network Areas (CHNAs)
The Department of Public Health, in collaboration with health service providers, coalition members, and interested citizens, has designated 27 areas for community health planning. It is the Department's intention to foster in each of these areas the development of Community Health Networks – consortia of health care providers, human service agencies, schools, churches, youth, parents, elders, advocacy groups, and individual consumers – to address the health needs of the community. These community coalitions will participate in monitoring outcomes and progress of strategies and responses to those health needs.

It is hoped the Networks will mobilize around key health issues affecting the community, promote prevention efforts, enhance access to care, provide opportunities for more collaboration among agencies, and create a client-centered, outcome-oriented health service delivery system. Community Health Networks will also promote efficiency in service delivery by working to reduce duplication and overlap, and by identifying gaps in service.

A Community Health Network Area (CHNA) is defined as an aggregation of cities and towns. In the current publication, we have presented some data by CHNA. To determine which cities and towns make up a particular CHNA, Table A1 provides the appropriate CHNA code for each city and town. The data published in this volume reflect the definitions of CHNAs instituted in January 1997 and the corresponding CHNA names.

Confidence Intervals

The confidence interval (CI) for the infant mortality rate (IMR) is a range of values that has a 95% chance of including the underlying risk of an infant death. Observed rates are subject to statistical variation; even if the underlying risk of infant death is identical in two subpopulations, the observed IMRs for the subpopulations may differ because of random variation. The confidence interval describes the precision of observed IMR as an estimate of the underlying risk of infant death, with a wider interval indicating less certainty about this estimate. The width of the interval reflects the size of the subpopulation and the number of infant deaths; smaller subpopulations with fewer infant deaths lead to wider confidence intervals.

Death Cohort Linked File or Linked Birth and Infant Death File – Death Cohort

All infant deaths occurring in a specific year have been linked to their corresponding birth certificates, whether the birth occurred during the same year or in the previous one. This is in contrast to a birth cohort linked file, in which infant deaths may have occurred in the same year or in the year following the year of birth.

Delivery

A delivery may consist of one or more live born or stillborn fetuses. The number of deliveries in a given period will be equal to or less than the number of births because multiple births (twins, triplets or higher–order births) are counted as single deliveries.

EOHHS Regions

The six regions delineated by the commonwealth's Executive Office of Health and Human Services and used by the Department of Public Health for statistical, care coordination and administrative purposes. The regions - Western, Central, Northeast, Metro West, Boston and Southeast - are based on geographical groupings of cities and towns.

Ethnicity

Also known as mother's ancestry. See the section in the Technical Notes of the Appendix entitled: "Changes in the Collection of Race and Ethnicity Information."

Fetal Death

A stillbirth delivered, extracted or expulsed at 20 weeks gestation or more or weighs 350 grams or more.

Feto-Infant Mortality Rate

The combined number of fetal deaths and infant deaths per 1,000 live births and fetal deaths.

Gestational Age (GA)

The developmental period of a fetus from time of conception to time of birth, measured in weeks. Some groups of GA used in this report are:

Preterm:	infant born with less than 37 weeks of gestation
Late Preterm:	infant born between 34th and 36th week of gestation
Term:	infant born at 37th week of gestation or later
Early Term:	infant born between 37th and 38th week of gestation

Healthy Start
A Massachusetts-funded program providing services and financing for prenatal care to low-income pregnant women who lack health insurance, but do not qualify for Medicaid.

Infant
A child whose age is less than one year (365 days).

Infant Death
Death of a child whose age is less than one year.

Kessner Index (Adequacy of Prenatal Care)
A measure of adequacy of prenatal care, used in *Advance Data: Births* and *Massachusetts Births* publications prior to 2001. The Kessner Index classifies prenatal care as one of 5 categories (adequate, intermediate, inadequate, no prenatal care, and unknown), based on the trimester in which prenatal care began and the number of prenatal visits. The classification adjusts for gestational age to allow for proper classification of premature births, and is as follows:

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
Inadequate	1	1-4
	2	1-4
	3	1 or more
No prenatal care	--	0
Unknown	Unknown	Unknown

Live Birth
A live birth is any infant who breathes or shows any other evidence of life (such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles) after separation from the mother's uterus, regardless of the duration of gestation.

Low Birthweight (LBW)
See Birthweight Categories.

Maternal Death
The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes.

Mother's Birthplace
In this publication, birth characteristics are presented according to mother's birthplace: those who were born in the 50 states and District of Columbia, or "US States / D.C."; those who were born in Puerto Rico, the US Virgin Islands, and Guam, or "Puerto Rico/US Territories"; and those who were born outside of the US and Puerto Rico/US territories, or "Non-US-born".

Neonatal
Infants under 28 days of age.

Neonatal Death
Death of a child whose age is less than 28 days.

Non-US-born Women
See Mother's Birthplace.

Occurrence Birth
A birth occurring in the Commonwealth of Massachusetts, regardless of the residency of the mother. For individual cities/towns, an occurrence birth represents any birth occurring in that city/town, regardless of the residence of the mother. See Resident Birth.

Parity
The total number of live infants ever born to a woman, including the current birth.

Perinatal
Referring to the time period immediately before and after birth (28 weeks of gestation to 7 days after birth).

Perinatal Death
Death to a fetus of 28 weeks gestation or older or a live-born infant less than 7 days old.

Plurality
The number of births to a woman produced in the same gestational period. A singleton is the birth of one infant; twins represent the births of two infants, etc.

Post Neonatal
A child whose age is at least 28 days, but less than one year.

Post Neonatal Death
Death of a child whose age is at least 28 days, but less than one year.

Prenatal Care Source of Payment
Categories used in this publication include:

Public = Government programs including CommonHealth, Healthy Start, Medicaid/MassHealth, and Medicare (may be HMO or managed care), or free care;
Private = Commercial indemnity plan, commercial managed care (HMO, PPO, IPP, IPA, and other), or other private insurance;
Other = Worker's Compensation and other sources;
Self-paid.

Pregnancy-Associated Death
The death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause.

Race
See the section in the Technical Notes in the Appendix entitled: "Changes in the Collection of Race and Ethnicity Information."

Resident Birth
The birth of an infant whose mother reports that her usual place of residence is in Massachusetts. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Vital statistics data may be presented in terms either of residence or occurrence. All data in this publication are resident data unless otherwise stated. Resident data include all events that occur to residents of the Commonwealth, wherever they occur.

Occurrence data include all events that occur within the state, whether to residents or nonresidents. There is an exchange agreement among the 50 states, District of Columbia, Puerto Rico, Virgin Islands, Guam, and Canadian provinces that provides for exchange of copies of birth and death records. These records are used for statistical purposes only, and allow each state or province to track the births and deaths of its residents.

Vaginal Birth After Cesarean (VBAC)
A vaginal delivery of an infant to a mother who has had at least one prior cesarean delivery.

Very Low Birthweight (VLBW)
An infant's weight of less than 1,500 grams (3.3 pounds) recorded at birth.

Massachusetts Birth Certificate: 2009

USE ONLY STATE APPROVED RIBBONS AND MASS. STANDARD INK
AS REQUIRED BY GEN. LAWS, CHAP. 66, SECT. 4

1. RECORD NUMBER

768283

1A. CERTIFICATE NUMBER (DPH USE ONLY)

2. FACILITY NUMBER

22A. SOCIAL SECURITY CARD

INITIALS

22B. RESIDENT COPY

INITIALS

1. OCCURRENCE

R-101 • 100M • 10-98

CHILD

3. PLACE OF BIRTH — 3C. CITY/TOWN — 3B. COUNTY

3A. FACILITY NAME-IF NOT IN FACILITY, NUMBER AND STREET

NAME — 4A. FIRST — 4B. MIDDLE — 4C. LAST

5. SEX — 6A. PLURALITY — 6B. BIRTH ORDER — 7. TIME — 8. DATE OF BIRTH (Month, Day, Year)

SAMPLE

The Commonwealth of Massachusetts
DEPARTMENT OF PUBLIC HEALTH
REGISTRY OF VITAL RECORDS AND STATISTICS
STANDARD CERTIFICATE OF LIVE BIRTH

STATE USE ONLY

3D. REGISTERED NUMBER

CERTIFIER

9A. NAME — 9B. TITLE

9C. CERTIFIER TYPE — 9D. LICENSE NUMBER

9E. NUMBER AND STREET — 9F. CITY/TOWN — 9G. STATE — 9H. ZIP CODE

MOTHER

NAME — 10A. FIRST — 10B. MIDDLE — 10C. LAST — 10D. MAIDEN SURNAME

BIRTHPLACE — 11A. CITY/TOWN — 11B. STATE/COUNTRY — 12. DATE OF BIRTH (Month, Day, Year)

RESIDENCE (Do not use mailing address) — 13A. NUMBER AND STREET — 13B. CITY/TOWN — 13C. COUNTY — 13D. STATE — 13E. ZIP CODE

FATHER

NAME — 14A. FIRST — 14B. MIDDLE — 14C. LAST

BIRTHPLACE — 15A. CITY/TOWN — 15B. STATE/COUNTRY — 16. DATE OF BIRTH (Month, Day, Year)

INFORMANT

17A. I (WE) CERTIFY THAT THE PERSONAL INFORMATION APPEARING ABOVE IS TRUE AND CORRECT. — 17B. RELATIONSHIP TO CHILD

17C. DATE SIGNED (Month, Day, Year) — 17D. MAILING ADDRESS (If different from item # 13 above) — NUMBER AND STREET — CITY — STATE — ZIP CODE

CLERK

18. DATE OF RECORD (Month, Day, Year) — 19. SUPPLEMENT FILED (Month, Day, Year) — 20. CLERK/REGISTRAR

21. DPH USE ONLY

Massachusetts Births 2009 Evaluation Form

TO OUR READERS:
In an attempt to better serve our users, we are enclosing this evaluation form. Please take the time to complete this questionnaire and return it to the address at the bottom of the page. Thank you.

What tables and charts do you find most useful?
What tables and charts do you find least useful?
Are there other tables and charts that you would like added to this publication? If yes, please describe them in detail.
Do you have other comments or suggestions?
Name (optional): **Address:** **(For those who received the publication by mail)** Is the mailing label address correct? If not, please correct the address. Thank you.

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Bureau of Health Information, Statistics, Research and Evaluation
Massachusetts Department of Public Health
250 Washington Street, 6th floor, Boston, MA 02108

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Isabel A. Cáceres
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