Massachusetts Births 2008

Massachusetts Department of Public Health

Bureau of Health Information, Statistics, Research, and Evaluation
Division of Research and Epidemiology

March 2010

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Note to Readers

Please review the information below before reading the report.

1. **Late Preterm Births:** Starting with this year's publication, detailed statistics on late preterm infants will be presented for the state and by race and ethnicity.

2. **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 2008 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 2008, the rates listed in this publication may **overestimate** the actual rate. If the population in your community declined from 2005 to 2008, 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.

3. **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

4. **Comparisons with National Birth Statistics:** Because US birth statistics for 2008 were not available at the time of publication, we are using the preliminary national statistics from 2007[1]. Although a direct comparison cannot be made between statistics from different years, we are presenting the US statistics for 2007 to give a sense how Massachusetts statistics differ from those of the US.

5. **Infant Mortality:** The infant mortality statistics reported in this report are based upon a preliminary death file. Infant mortality statistics based upon the final death file may differ with those in this report.

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.

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).

Suggested Citation

Massachusetts Births 2008. Boston, MA: Division of Research and Epidemiology, Bureau of Health Information, Statistics, Research, and Evaluation, Massachusetts Department of Public Health. March 2010.

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[1] Hamilton BE, Martin JA, Sutton PD, and Ventura SJ. Births: Preliminary data for 2007. National Vital Statistics Reports; Vol 57 No 12. Hyattsville, MD: National Center for Health Statistics. 2009.

Highlights

- The 2008 teen birth rate[2] in Massachusetts (20.1 births per 1,000 females ages 15-19) was the lowest on record, and it was a significant decrease from the 2007 rate of 22.0. However, disparities persist. In 2008, Hispanic and Black teens have six and three times the rate of white teens, respectively (66.7 for Hispanic teens, 32.3 for Black teens, and 11.7 for White teens).

- The Massachusetts Infant Mortality Rate (IMR) did not change significantly from the prior year. This was true for all racial groups. In 2008, the IMR was 5.0 infant deaths per 1,000 live births compared with 4.9 infant deaths per 1,000 live births in 2007.

- For the second consecutive year the cesarean delivery rate did not increase significantly from the previous year. The rate in 2008 was 34.3%, compared with 33.7% in 2007. This rate continued to vary across Massachusetts hospitals, ranging from 16.2% to 47.4%, and by maternal ethnicity; Brazilian (43.4%) and Haitian (39.8%) mothers had the highest rates while Honduran (19.8%) and Cambodian (19.9%) had the lowest. The 2008 cesarean delivery rate in the state was 8% higher than the 2007 US rate (31.8%).

- The percentage of mothers who received adequate prenatal care declined 0.8% from 82.8% in 2007 to 82.1% in 2008. 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 decrease was driven by a decline in the initiation of prenatal care visits, that is, fewer mothers began their prenatal care in the first trimester, 81.0% in 2008, compared with 82.0% in 2007.

- There were several significant changes in the numbers of births by certain mother's ancestry between 2007 and 2008. American ancestry declined by 948 (3.0%); Asian Indian ancestry increased by 193 (14.2%), and Middle Eastern ancestry increased by 113 (14.9%).

- The proportion of mothers who reported smoking during pregnancy reached a record low of 6.9% in 2008, a decrease of 8% from 2007 (7.5%). This decline was driven by the decline among White mothers, from 8.8% in 2007 to 8.1% in 2008.

- Breastfeeding initiation remains high at close to 81%. It increased among all mothers, from 79.2% in 2007 to 80.8% in 2008, and for all racial groups.

- Disparities in birth outcomes by race and ethnicity, education, and community persist.
    - The Black IMR was 3.2 times higher than the White IMR (11.7 vs. 3.7 infant deaths per 1,000 live births).
    - 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 birthweight (LBW) infants (less than 2,500 grams or 5.5 pounds).
    - Among the 30 largest Massachusetts municipalities, New Bedford, Springfield, and Boston recorded the highest percentages of LBW births (11.1%, 10.7%, and 9.3% respectively).

[2] State teen birth rates were calculated using 2008 population data; however, please note that 2008 community teen birth rates use 2005 population estimates.

Introduction

This report presents detailed data on the number and characteristics of Massachusetts births in 2008 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 data system development including the Pregnancy to Early Life Longitudinal (PELL) and Pregnancy Risk Assessment Monitoring System (PRAMS), and the Maternal and Child Health (MCH) five-year needs assessment prioritization process. The Registry of Vital Records and Statistics plays a critical role in the collection of birth information for administrative purposes and provides MCH data for decision-making, which guides many public health initiatives.

Methods

Data on births are based on information from the Massachusetts Standard Certificate of Live Birth filed with the Registry of Vital Records and Statistics. Medical information, such as birthweight and gestational age, is based on information supplied by hospitals. 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[3].

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 exchange 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.

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

Results

Number and Birth Rate

In 2008, there were 76,969 births to Massachusetts resident mothers compared with 77,934 in 2007. Since 1990, the number of births to Massachusetts residents has declined by 17%. The birth rate among women of reproductive age (defined as the number of births per 1,000 females ages 15-44 years) declined by 9% between 1990 and 2008 (Table 1).

The mean or average maternal age at first birth in 2008 was 27.7 years, which was similar to the mean age (27.6 years) in 2007. Asian mothers had the highest mean age at first birth (29.3 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 race categories.

Compared with 2007, the 2008 birth rates decreased significantly among mothers ages 15-19, 20-24, and 25-29 years, and remained stable among mothers 30 years and older in 2008. The largest decrease in birth rates has been among 1women ages 15-19 years (9%), and the largest increase, though not significant, has been among women ages 40-44 years (7%).

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

The percentage of births to White mothers in 2008was similar to the percentage in 2007 (67.2%) and (67.5%) respectively. There has been an overall decrease of 14% in the percentage of births to White mothers since 1990, when it was 78.4%. In 2008, the percentage of births to Asian, Hispanic, and Black mothers remained stable compared to the 2007 figures. However, these percentages have increased since 1990 by 114%, 56%, and 12%, respectively (Table 1).

The percentage of births to non-US-born mothers in 2008 (27.7%) did not change significantly from the 2007 figure of 27.2%, but there was a 1% decrease among US-born White mothers, and an increase of 6.4% in the non-US-born White mothers. There was also a 4.8% increase in Hispanic US-born mothers and an increase of about 1% in non-US-born Asian mothers (Table 2, 2007 data not shown).

Emerging Populations

While the overall number of Massachusetts births remained stable from 2007 to 2008, the number of mothers with Asian Indian ancestry increased by 193 (14%) from 1,362 to 1,555, and Middle Eastern ancestry increased by 113 (15%) from 758 to 871.

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 2008 (Figure 1).

In 2008, there were fewer births to women ages 10-14, 15-19, 20-24, 25-29, 30-34, and 35-39 years. The largest decrease was among women ages under 20 years. There were 135 more births to women ages 40-44 years, and 7 more births to women ages 50-54, compared with 2007 (Table 4).

Marital Status

The percentage of mothers who were not married at the time of delivery remained stable between 2007 and 2008 (Table 1). This statistic increased by 4% among White mothers, from

24.9% in 2007 to 25.8% in 2008. In 2008, Hispanics continued to have the highest percentage of unmarried mothers at 66.1% followed by Black mothers at 57.5%.

Breastfeeding
In 2008, the percentage of mothers who breastfed or intended to breastfeed reached a record high at almost 81%. This rate increased for Hispanic, White, and Asian mothers. Among racial and ethnic groups, Asians continued to have the highest percentage of breastfeeding intention or initiation (88.1%), followed by Black (84.5%) and Hispanic mothers (83.6%) (Table 2).

Multiple Births
In 2008, 95.5% of births were singletons (73,475 births), 4.4% were twins (3,365 births), and 0.2% were triplets or higher order multiples (129 births) (Table 5). The percentage of births that were multiples has been stable for the last four years. The total percentage of multiple births (twins, triplets or more) was 4.5% in 2008 and 4.4% in 2007. In 2008, the percentage of multiple births among mothers less than 35 years of age remained stable at 3.7%. The percentage of multiple births among mothers ages 35 years and older was 7.4%, double the percentage for mothers under age 35. White mothers continue to have the highest percentage of multiple births at 5.1%, while Hispanic mothers continue to have the lowest at 3.0%.

Teen Births
In 2008, there were 4,583 births among women ages 15-19 years, which was a decrease of 361 births from 2007 (Table 1). The Massachusetts teen birth rate decreased from 22.0 births per 1,000 females ages 15-19 years in 2007 to 20.1 in 2008. The Massachusetts teen birth rate in 2008 was 53% below the 2007 US teen birth rate of 42.5 births per 1,000 females ages 15-19 years[4].

In 2008, 30% of teen births were to women ages 15-17 (1,361 births), while 70% were to women 18 and 19 years old (3,222) (Table 6). The number of births to young teens (ages 10-14 years) was 40 in 2008 as compared with 49 in 2007, but this was not a significant decrease in the rate. In 2008, the youngest mother in Massachusetts was 13 years old, which was the same as the previous year.

In 2008, teen birth rates decreased for Whites, Hispanics, and Asians but not for Blacks. Even though the rates for Whites and Hispanics declined, the gap in the teen birth rate between Hispanics and Whites increased with the Hispanic rate 5.7 times that of Whites (66.7 vs. 11.7 per 1,000 females ages 15-19 years). When 2008 rates were compared with those of 1998, 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 (115.3), Chelsea (97.0), and Lawrence (80.9)[5]. These communities had rates over four times the statewide rate of 20.1. Springfield's teen birth rate declined from 84.3 in 2007 to 61.4 per 1,000 females ages 15-19 in 2008.

[4] Martin JA, Hamilton BE, Sutton PD, Ventura SJ, et al. Births: Final data for 2006. National vital statistics reports; vol 57 no 7. Hyattsville, MD: National Center for Health Statistics. 2009.

[5] 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 2007, the rates listed may **overestimate** the actual rate. If the population in your community declined from 2005 to 2007, the rates given in the publication may **underestimate** the actual rate.

Low Birthweight
The percentage of low birthweight (LBW) infants (less than 2,500 grams or 5.5 pounds) was 7.8% in 2008, similar to the 2007 figure. The percentage of LBW infants has increased by 35% since 1990 when it was 5.8% (Table 8). Since 2004, LBW in Massachusetts has remained stable. The percentage of low birthweight and very low birthweight (VLBW, less than 1,500 grams or 3.3 pounds) among multiple births is much larger than that among singletons. In 2008, 5.5% of singleton births were LBW; whereas, 53.8% of twins and 87.6% of higher order births were LBW Less than 1% of singleton births were VLBW, and 9.7% of twins and 42.6% of higher order births were VLBW (Table 9).

Black infants continue to have the highest percentage of LBW at 11.0%. There were no significant changes from 2007 to 2008 in LBW percentages by race and ethnicity. Among maternal ancestry groups, African American (12.9%), Haitian (11.4%), Cambodian (10.9%), Cape Verdean (10.9%), Asian Indian (10.8%), and Puerto Rican (10.2%) mothers had higher LBW rates than the state overall (7.8%). Korean (5.3%), Mexican (5.5%), Brazilian (5.7%), Guatemalan (5.8%), Portuguese (5.9%), and Chinese (6.1%) mothers had lower LBW rates than the state overall (Table 3).

The percentage of very low birthweight (VLBW) infants (less than 1,500 grams or 3.3 pounds), was 1.3% in 2008, similar to 2007. Black infants continue to have the highest percentage of VLBW at 2.7% (Table 8). There were no significant changes from 2007 to 2008 in the percentage of VLBW infants by race and ethnicity.

Preterm Deliveries
The percentage of preterm infants (infants delivered before the 37th week of gestation) was 8.8% in 2008, similar to 2007 (Table 1). Black and Hispanic mothers continue to have the highest percentage of preterm infants at 10.6% and 9.4%, respectively. There were no significant changes from 2007 to 2008 in the percentage of preterm infants by race and ethnicity. Among maternal ancestry groups, African American (11.3%), Haitian (11.2%), and Puerto Rican (10.6%) mothers had higher preterm rates than the state overall (8.9%).

The percentage of infants delivered very early (before the 28th week of gestation) has remained the same since 1997 at 0.6% (close to 500 births each year). Black women had the highest percentage (1.5%) of infants delivered very early, which was 1.7 times higher than the percentage for Hispanics and more than three times that of Whites (Table 10).

In 2008, late preterm infants (infants delivered between 34-36 weeks of gestation) comprised 70% of all preterm births in the state. Although infants born between 34–36 weeks are at lower risk for adverse health outcomes compared with infants born at earlier gestational ages, they are at heightened risk when compared with infants delivered at higher gestational ages[6]. In 2008, the percentage of late preterm births was 6.2% (Table 10), similar to the 2007 figure.

Smoking
In 2008, the percentage of mothers who reported smoking during pregnancy declined by 8%, from 7.5% in 2007 to 6.9% in 2008 and by 64% 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 (5.1%) and Hispanic mothers (4.8%) (Figure 4).

[6] 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.

White mothers accounted for 80% of all mothers who reported smoking during pregnancy in 2008. The proportion of White mothers who reported smoking during pregnancy declined by 8% between 2007 and 2008. A similar decline was seen in the rate among White mothers enrolled in Medicaid, from 26.7% in 2007 to 23.9% in 2008.

This year, African American mothers had the second highest rate (10.7%) while African and Haitian mothers had some of the lowest smoking rates during pregnancy; both within the Healthy People 2010 target of less than 1% for the rate of smoking during pregnancy.

Puerto Rican mothers continue to have one the highest smoking rates during pregnancy (9.5% in 2008 and 10.4% in 2007). The good news is that since 2000 the smoking rate during pregnancy for Puerto Rican mothers has been declining by 4% per year. Mothers from the other Hispanic ethnic groups have a rate under 2%.

Prenatal Care

In 2008, the percentage of women receiving adequate prenatal care (PNC) was 82.1%, which was a less than 1% decline from the 2007 figure of 82.8% (Table 1). 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 decrease was driven by a decline in the initiation of prenatal care visits, that is, fewer mothers began their prenatal care in the first trimester, 81.0% in 2008, compared with 82.0% in 2007. APNCU is a measure of the timing and number of prenatal care visits, not an assessment of the quality of PNC.

The percentage of women receiving adequate PNC was significantly lower than the state average for Hispanic, Black, and Asian mothers and it was significantly higher for Whites. Seventy-six percent of Hispanic and 76.5% of Black mothers received adequate prenatal care, compared with 84.6% of White mothers. The rate for Asian mothers was 79.3% (Figure 5). The percentage of women receiving adequate PNC decreased in 2008 for Whites (down 1%) and Asians (down 2%) from the 2007 figure. There were no other significant changes from 2007 to 2008 in adequacy of PNC percentages by race and ethnicity. Among maternal ancestry groups, Cambodian (64.8%), Honduran (70.5%), Guatemalan (72.2%), and African (73.5%) mothers had lower rates of adequate PNC than the state overall (82.1%) (Table 3).

Mothers with less than a high school diploma were less likely to receive adequate prenatal care than mothers with a college degree or higher education (71.3% vs. 86.3%) (Figure 6). Younger teens (ages 17 years or younger) were less likely to receive adequate prenatal care than mothers ages 35 years and older, 68.3% vs. 86.1%.

Publicly Financed and Privately Insured Prenatal Care

Maternal characteristics and birth outcomes varied according to whether PNC was paid through public programs or through private insurance. The percentage of mothers who had their prenatal care paid through public programs was 35.2% in 2008, similar to 2007 (Figure 7). In 2008, this rate decreased by 4% among Black mothers and by 2% among Hispanic mothers compared with the 2007 rate. Hispanic mothers continue to have the highest percentage of PNC paid by public funds at 72.2%, followed by Black mothers (58.4%).

Overall, in Massachusetts, 25.9% of mothers had prenatal care paid by Medicaid/ MassHealth. However, Medicaid/MassHealth payment varied widely by race/Hispanic ethnicity. About half of Hispanic and Black mothers had their PNC paid by Medicaid/MassHealth; whereas, 19.7% of Asian and 19.0% of White mothers' PNC was paid by Medicaid/MassHealth (Table 30).

Cesarean Delivery
In 2008, the cesarean delivery rate for the state overall was 34.3%, similar to that in 2007 (33.7%) (Table 1). Since 1998, the cesarean delivery rate had been increasing steadily. However, since 2004, this steadily increase started to slow down.

In 2008, Hispanic and Asian mothers continued to have the lowest cesarean delivery rates (29.3% and 31.6%, respectively) and White and Black mothers continued to have the highest rates (35.5% and 35.4%, respectively). Among the largest ethnic groups, Brazilian mothers had the highest percentage of cesarean deliveries (43.4%), followed by Haitian (39.8%) and Portuguese mothers (39.1%). Guatemalan (21.7%), Cambodian (19.9%), and Honduran (19.8%) mothers had the lowest percentage of cesarean deliveries (Table 3).

In 2008, 12 of the 49 maternal hospitals in the state had higher cesarean delivery rates than the state rate, and 15 had lower rates than the state rate. The hospitals with the highest rates were: Caritas Holy Family Hospital and Medical Center, Methuen (47.4%), Melrose-Wakefield Hospital, Melrose (45.7%), and South Shore Hospital, Weymouth (43.9%). Among those with the lowest rates were: Tobey Hospital, Wareham (19.1%), North Adams Regional, North Adams (18.2%), and Heywood Memorial, Gardner (16.2%).

Gestational Diabetes Mellitus (GDM)
In 2008, the prevalence of gestational diabetes mellitus (GDM) remained stable at 4.0% from the 4.2% figure in 2007 (Table 1). Asian mothers continued to have the highest prevalence of GDM (7.8%), while White and Hispanic mothers had the lowest prevalence (3.5% and 4.1%, respectively). In 2008, only White mothers experienced a decrease in the prevalence of GDM from the previous year, from 3.9% in 2007 to 3.5% in 2008.

Among maternal ancestry groups, Asian Indian (10.1%), Vietnamese (8.8%), Chinese (7.8%), Haitian (7.0%), Salvadoran (5.7%), and African (5.4%) mothers had higher GDM prevalence than the state prevalence. American (3.6%) and European (3.3%) mothers had significantly lower GDM prevalence than the state's figure (Table 3).

Infant Mortality Rate (IMR)
In 2008, there were 382 infant deaths (deaths of infants less than one year of age) compared with 380 in 2007 (Table 11). The IMR was 5.0 deaths per 1,000 live births in 2008, compared with 4.9 deaths per 1,000 live births in 2007. This change was not significant. The IMR has decreased by 29% since 1990, from 7.0 deaths per 1,000 live births to 5.0 deaths per 1,000 live births.

In 2008, Blacks had a significantly higher IMR (11.7) than Whites (3.7) and Asians (2.7), but it was not significantly higher than that of Hispanics (7.9). The IMR for Blacks went from 10.2 in 2007 to 11.7 in 2008, and the IMR for Hispanics went from 7.4 to 7.9, neither of these changes was significant. Similarly, the rates for Whites and Asians did not change significantly from 3.9 and 3.1, respectively. (For confidence intervals, see Table 37).

Birth Characteristics in the 30 Largest Massachusetts Cities and Towns
In 2008, in the 30 largest municipalities in the Commonwealth (Table 12):

- GDM prevalence was significantly higher than the statewide prevalence of 4.2% in the following four communities: Fall River (7.8%), Revere (6.6%), Malden (6.0%), and Lowell (6.0%).
- Three communities recorded low birthweight percentages that were higher than the statewide average of 7.8%: New Bedford (11.1%), Springfield (10.7%), and Boston (9.3%).

- Ten of the 30 largest communities had higher rates of reported smoking during pregnancy than the state rate of 7.1%. In Pittsfield (23.3%) the rate was over three times higher than the state rate, and Fall River (18.7%), New Bedford (15.5%), and Taunton (13.9%) had rates two or more times the state rate.
- Lawrence (76.9%) and Springfield (71.7%) mothers had the highest percentages of prenatal care paid by public funds, while Brookline (5.1%) and Newton (7.3%) mothers had the lowest.
- The IMR in Springfield (11.0 infant deaths per 1,000 live births) and Worcester (10.9 infant deaths per 1,000 live births) were higher than the state IMR of 5.0 infant deaths per 1,000 live births. Based on a three-year IMR from 2006-2008, which is a more stable rate than a one-year rate, Worcester (10.1), Springfield (9.8), Fall River (9.2), Brockton (9.0), New Bedford (8.5), and Boston (6.9) had higher IMRs when compared with the state IMR (4.9 deaths per 1,000 live births).

Birth Characteristics by Hospital

Listed below are hospitals that in 2008 had the three highest and three lowest rates of cesarean deliveries, low birthweight infants, publicly funded deliveries, and deliveries with adequate prenatal care (Table 13). Non-hospital facilities are not included in this section.

Cesarean Deliveries (state rate 34.4%)	
Highest percentages in:	
Caritas Holy Family Hospital and Medical Center	47.4%
Melrose-Wakefield Hospital	45.7%
South Shore Hospital	43.9%
Lowest percentages in:	
Heywood Memorial Hospital	16.2%
North Adams Regional Hospital	18.2%
Tobey Hospital	19.1%
Low Birthweight (LBW) (state rate 7.7%)	
Highest percentages in:	
Tufts Medical Center	26.3%
Caritas St. Elizabeth's Medical Center of Boston	13.1%
Baystate Medical Center	12.3%
Lowest percentages in:	
Martha's Vineyard Hospital	0.6%
Nantucket Cottage Hospital	2.1%
Saints Memorial Medical Ctr.-St. John's Campus	2.1%
Publicly Funded Delivery (state rate 34.7%)	
Highest percentages in:	
Boston Medical Center	79.8%
Cambridge Hospital	71.1%
Brockton Hospital	66.0%
Lowest percentages in:	
Newton Wellesley Hospital	3.3%
Winchester Hospital	5.2%
Emerson Hospital	6.8%
Adequacy of Prenatal Care by Facility (state rate 82.1%)	
Highest percentages in:	
Beverly Hospital	95.6%

Brigham and Women's Hospital	95.2%
Milford Regional Medical Center	93.1%
Lowest percentages in:	
Caritas Norwood Hospital	60.5%
Caritas Good Samaritan Medical Center	64.6%
St. Luke's Hospital	65.4%

Healthy People 2010 Objectives

Healthy People 2010 (HP2010) sets targets for each measurable Healthy People objective[7]. Table 14 presents the most recent Massachusetts data for HP2010 Maternal, Infant, and Child Health objectives and measures the state's progress toward meeting the targets set for 2010.

Out of 16 HP2010 objectives presented, Massachusetts has met the 2010 target for breastfeeding and post-neonatal mortality (Table 14). For eight objectives, the 2008 Massachusetts indicators are within 25% of the 2010 target goals: fetal mortality rate, perinatal mortality rate, infant mortality rate, preterm birth, early and adequate prenatal care, prenatal care beginning in the first trimester, very low birthweight infants born at Level III hospitals, and smoking during pregnancy. For six objectives, Massachusetts is still more than 25% away from achieving the 2010 targets: neonatal mortality rate, maternal mortality, low birthweight, very low birthweight, and cesarean delivery (both low-risk women giving birth for the first time and for low-risk women with prior cesarean delivery).

A Comparison of Massachusetts and US Indicators

According to the US birth statistics for 2007[8], the following Massachusetts perinatal health indicators in 2008 were significantly different than those for the US:

- The teen birth rate in Massachusetts (20.1 births per 1,000 females ages 15-19 years) was 53% lower than the US teen birth rate (42.5 births per 1,000 females ages 15-19 years).
- The percentage of unmarried mothers in Massachusetts (34.0%) was 14% lower than the US percentage of unmarried mothers (39.7%).
- The percentage of low birthweight in Massachusetts (7.8%) was 5% lower than the US low birthweight rate of 8.2%. Both rates are more than 50% above the HP2010 target (5.0%).
- The Cesarean delivery rate in Massachusetts (34.3%) was 8% higher than the US Cesarean delivery rate (31.8%).
- The IMR in Massachusetts (5.0 deaths per 1,000 live births) was 26% lower than the U.S. IMR in 2007[9] (6.8 deaths per 1,000 live births).

[7] U.S. Department of Health and Human Services. Tracking Healthy People 2010. Washington, DC: U.S. Government Printing Office, November 2000

[8] Hamilton BE, Martin JA, Sutton PD, and Ventura SJ. Births: Preliminary data for 2007. National Vital Statistics Reports; Vol 57 No 12. Hyattsville, MD: National Center for Health Statistics. 2009.

[9] Tejada-Vera B, Sutton PD. Births, marriages, divorces, and deaths: Provisional data for 2007. National vital statistics reports; vol 56 no 21. Hyattsville, MD: National Center for Health Statistics. 2008.

Table 1. Trends in Birth Characteristics, Massachusetts: 1990, 1995-2008

Characteristic		1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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
	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
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
	%[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
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
	%[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
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
	%[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
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
	%[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
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
(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
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
Mothers	**%**	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
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
	%	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
Gestational	**n**							2,245	2,402	2,633	2,693	2,741	2,666	2,925	3,279	3,086
Diabetes[5]	**%**							2.8	3.0	3.3	3.4	3.5	3.5	3.8	4.2	4.0
Low	**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
Birthweight[6]	**%**	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
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
	%	6.5	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
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
	%	4.4	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
Adequate Prenatal Care																
Kessner Index[9]	**%**	80.1	84.2	79.9	80.0	79.8	79.4	79.1	80.4	79.9	79.9	79.5	78.9	77.6	77.8	76.9
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

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 2008 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 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: 2008

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	**76,969**	**100.0**	**1,401**	**1.8**	**4,623**	**6.0**	**1,006**	**1.3**	**5,955**	**7.8**	**61,774**	**82.1**	**61,292**	**81.0**	**26,240**	**34.3**	**61,033**	**80.8**
US inc. DC	53,683	69.7	1,109	2.1	3,693	6.9	660	1.2	4,172	7.8	43,842	83.5	43,902	83.2	18,536	34.8	40,064	76.3
US Territories[7]	1,981	2.6	125	6.3	340	17.2	52	2.6	212	10.7	1,476	75.7	1,457	74.3	610	30.9	1,500	76.5
Non-US-born[8]	21,299	27.7	167	0.8	590	2.8	293	1.4	1,570	7.4	16,453	79.3	15,930	76.2	7,093	33.5	19,468	92.4
White Non-Hispanic	**51,760**	**67.2**	**540**	**1.0**	**2,035**	**3.9**	**563**	**1.1**	**3,667**	**7.1**	**42,954**	**84.6**	**43,155**	**84.6**	**18,286**	**35.5**	**39,855**	**78.7**
US inc. DC	45,008	87.0	517	1.1	1,932	4.3	489	1.1	3,233	7.2	37,447	84.9	37,694	85.0	15,939	35.6	33,679	76.6
US Territories[7]	92	0.2	4	--[6]	15	16.3	3	--[6]	15	16.3	59	64.8	68	74.7	22	24.2	73	81.1
Non-US-born[8]	6,654	12.9	19	0.3	88	1.3	70	1.1	418	6.3	5,445	82.9	5,390	81.7	2,324	35.0	6,102	92.6
Black non-Hispanic	**6,652**	**8.6**	**179**	**2.7**	**592**	**8.9**	**182**	**2.7**	**731**	**11.0**	**4,879**	**76.5**	**4,697**	**72.5**	**2,344**	**35.4**	**5,576**	**84.5**
US inc. DC	3,222	48.4	152	4.7	507	15.7	85	2.6	405	12.6	2,421	78.1	2,381	75.9	1,040	32.4	2,395	75.0
US Territories[7]	16	0.2	1	--[6]	2	--[6]	1	--[6]	1	--[6]	16	100.0	16	100	6	37.5	15	93.8
Non-US-born[8]	3,414	51.3	26	0.8	83	2.4	96	2.8	325	9.6	2,442	74.8	2,300	69.2	1,298	38.2	3,166	93.4
Hispanic	**10,895**	**14.2**	**591**	**5.4**	**1,696**	**15.6**	**163**	**1.5**	**893**	**8.2**	**8,081**	**76.1**	**7,749**	**72.4**	**3,179**	**29.3**	**9,055**	**83.6**
US inc. DC	3,868	35.5	364	9.4	1,020	26.4	59	1.5	365	9.5	2,833	74.3	2,747	71.7	1,115	28.9	2,837	73.6
US Territories[7]	1,858	17.1	120	6.5	322	17.3	46	2.5	193	10.4	1,392	76.0	1,361	74.0	576	31.1	1,406	76.1
Non-US-born[8]	5,169	47.4	107	2.1	354	6.8	58	1.1	335	6.5	3,856	77.6	3,641	72.3	1,488	29.0	4,812	93.8
Asian	**5,958**	**7.7**	**44**	**0.7**	**152**	**2.6**	**65**	**1.1**	**499**	**8.4**	**4,661**	**79.3**	**4,494**	**76.3**	**1,876**	**31.6**	**5,189**	**88.1**
US inc. DC	819	13.7	40	4.9	130	15.9	11	1.4	88	10.8	613	76.0	565	69.8	221	27.1	644	79.8
US Territories[7]	3	--[6]	0	0.0	0	0.0	0	0.0	0	0.0	3	--[6]	3	--[6]	1	--[6]	3	--[6]
Non-US-born[8]	5,136	86.2	4	--[6]	22	0.4	54	1.1	411	8.0	4,045	79.8	3,926	77.3	1,654	32.3	4,542	89.4
American Indian[9]	**145**	**0.2**	**3**	**--[6]**	**14**	**9.7**	**2**	**--[6]**	**15**	**10.4**	**112**	**78.9**	**114**	**80.3**	**48**	**33.3**	**106**	**73.6**
US inc. DC	136	93.8	3	--[6]	14	10.3	2	--[6]	15	11.1	104	78.2	105	78.9	45	33.3	97	71.9
US Territories[7]	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Non-US-born[8]	9	6.2	0	0.0	0	0.0	0	0.0	0	0.0	8	88.9	9	100	3	--[6]	9	100
Other[10]	**1,417**	**1.8**	**40**	**2.8**	**130**	**9.2**	**29**	**2.1**	**139**	**9.9**	**1,058**	**78.1**	**1,053**	**76.6**	**492**	**34.9**	**1,214**	**88.7**
US inc. DC	520	36.7	30	5.8	87	16.7	12	2.3	56	10.8	399	80.9	385	77.3	163	31.4	380	76.5
US Territories[7]	12	0.8	0	0.0	1	--[6]	2	--[6]	3	--[6]	6	75.0	9	81.8	5	41.7	3	--[6]
Non-US-born[8]	885	62.5	10	1.1	42	4.7	15	1.7	80	9.1	653	76.6	659	76.2	324	36.9	831	95.7
Unknown[11]	**142**	**0.2**	**4**	**--[6]**	**4**	**--[6]**	**2**	**--[6]**	**11**	**19.0**	**29**	**63.0**	**30**	**57.7**	**15**	**25.4**	**38**	82.6

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: 2008

Maternal Ancestry	Births[1]		Teen Births				Low Birthwt[3]		Prenatal Care				Late Preterm		Cesarean Section		Breast-feeding[5]		Gestational Diabetes[6]	
			<18 years		<20 Years				Adequate[4]		1st Trimester									
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
State Total	**76,969**	**100.0**	**1,401**	**1.8**	**4,623**	**6.0**	**5,955**	**7.8**	**61,774**	**82.1**	**61,292**	**81.0**	**4,753**	**6.2**	**26,240**	**34.3**	**61,033**	**80.8**	**3,086**	**4.0**
American	30,928	40.2	469	1.5	1,656	5.4	2,368	7.7	25,927	84.7	26,155	85.4	1,964	6.4	10,684	34.7	22,958	74.5	1,112	3.6
European	14,899	19.4	39	0.3	205	1.4	865	5.8	12,362	84.6	12,345	84.3	878	5.9	5,340	36.1	12,716	86.0	442	3.0
Puerto Rican	4,662	6.1	378	8.1	1,072	23.0	475	10.2	3,398	73.9	3,333	72.1	331	7.1	1,396	30.0	3,338	71.9	196	4.2
African-American	2,843	3.7	118	4.2	429	15.1	366	12.9	2,172	79.5	2,152	77.7	189	6.7	912	32.2	2,127	75.0	101	3.6
Brazilian	2,491	3.2	19	0.8	79	3.2	142	5.7	2,073	83.8	2,032	82.1	118	4.7	1,078	43.4	2,368	95.3	106	4.3
Dominican	2,025	2.6	90	4.4	262	12.9	143	7.1	1,521	76.4	1,489	74.7	126	6.3	686	34.1	1,819	90.6	69	3.4
Chinese	1,605	2.1	0	0.0	3	--[7]	98	6.1	1,319	82.6	1,279	80.0	83	5.2	485	30.3	1,450	90.5	125	7.8
Asian Indian	1,555	2.0	1	--[7]	2	--[7]	167	10.8	1,224	79.6	1,246	80.9	99	6.4	591	38.1	1,493	96.9	156	10.1
African	1,552	2.0	9	0.6	30	1.9	106	6.9	1,107	73.5	1,014	66.6	60	3.9	586	38.0	1,463	94.8	83	5.4
Haitian	1,223	1.6	6	0.5	28	2.3	139	11.4	838	74.0	795	67.8	81	6.6	486	39.8	1,119	91.9	84	7.0
Salvadoran	1,160	1.5	48	4.1	115	9.9	85	7.4	865	80.5	829	74.8	69	6.0	260	22.5	1,109	95.9	65	5.7
Portuguese	1,044	1.4	19	1.8	65	6.2	61	5.9	845	82.2	862	83.1	54	5.2	406	39.1	585	57.4	49	4.7
Cape Verdean	977	1.3	34	3.5	120	12.3	106	10.9	700	73.4	692	72.2	63	6.5	303	31.1	838	86.3	29	3.0
South American	938	1.2	11	1.2	47	5.0	59	6.3	753	83.5	718	78.2	56	6.0	298	31.8	876	93.7	35	3.7
Middle Eastern	871	1.1	0	0.0	6	0.7	54	6.2	683	78.8	661	76.2	42	4.8	290	33.3	793	91.0	42	4.8
Guatemalan	838	1.1	23	2.7	77	9.2	48	5.8	588	72.2	496	60.4	48	5.8	179	21.7	762	92.5	35	4.2
Vietnamese	738	1.0	5	0.7	20	2.7	56	7.6	574	80.2	559	77.6	33	4.5	234	31.8	576	78.5	65	8.8
Cambodian	641	0.8	36	5.6	110	17.2	69	10.9	410	64.8	348	54.8	47	7.4	127	19.9	383	60.3	36	5.6
Mexican	554	0.7	21	3.8	48	8.7	30	5.5	415	76.6	389	71.5	36	6.5	153	27.8	500	91.1	24	4.4
Korean	423	0.5	0	0.0	0	0.0	22	5.3	348	84.5	340	82.3	26	6.2	128	30.7	396	95.2	22	5.3
Honduran	324	0.4	11	3.4	28	8.6	23	7.1	215	70.5	186	59.6	21	6.5	64	19.8	314	97.2	9	2.8
Native American[8]	269	0.3	8	3.0	33	12.3	19	7.2	202	77.1	197	75.2	22	8.3	83	31.4	196	74.2	5	1.9

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. In 2008, 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. Late preterm: 34-36 weeks gestation. 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. 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: 1980-2008

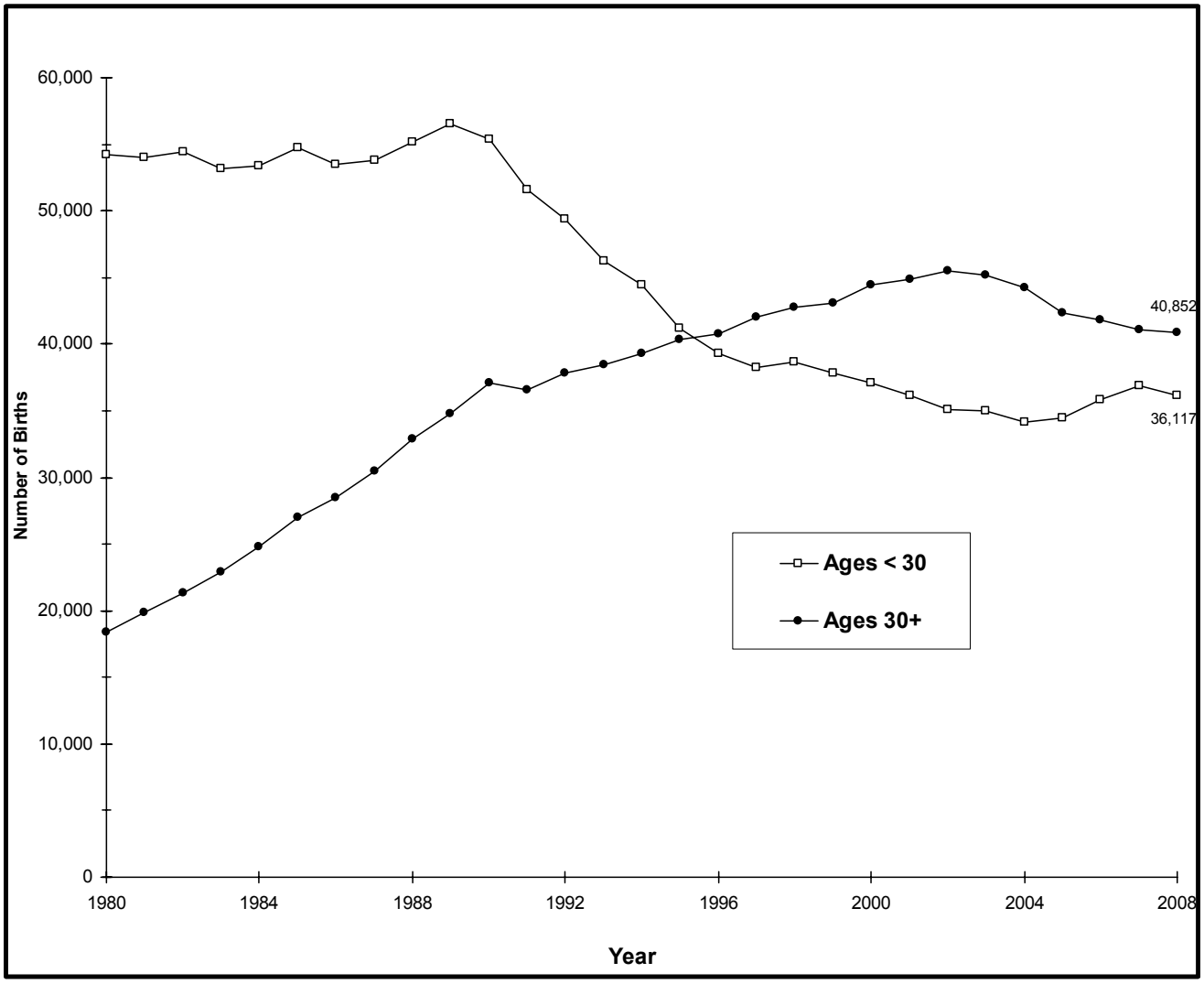


Table 4. Age-Specific and Crude Birth Rates, Massachusetts: 1990 and 2008

	1990		2008		
Mother's Age	**Births[1]**	**Rate**	**Births**	**Rate[2]**	**Percent Change in Rate**
10-14	124	1.3	40	0.2	-84.6%
15-19	7,259	35.1	4,583	20.1	-42.7%
20-24	18,115	69.5	12,475	53.2	-23.5%
25-29	29,913	107.2	19,019	89.7	-16.3%
30-34	25,687	93.9	23,152	115.1	22.6%
35-39	9,795	40.1	14,170	62.0	54.6%
40-44	1,522	6.9	3,286	13.0	88.4%
45+[3]	46	0.3	217	0.8	166.7%
Birth Rate (ages 15-44[4])	92,290	62.2	76,685	56.5	-9.2%
Crude Birth Rate[5]	92,461	15.4	76,969	11.8	-23.4%

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 2008 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: 1995-2008

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
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
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

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: 2008

	Ages 15-17		Ages 18-19		Combined Ages 15-19	
	N	%[1]	N	%[1]	N	%[1]
State total	1,361	29.7%	3,222	70.3%	4,583	100.0%
Maternal Demographics						
Race/Hispanic Ethnicity	N	%[2]	N	%[2]	N	%[2]
White non-Hispanic	534	39.4%	1,495	46.4%	2,029	44.3%
Black non-Hispanic	174	12.8%	413	12.8%	587	12.8%
Asian	43	3.2%	108	3.4%	151	3.3%
Hispanic	565	41.6%	1,105	34.3%	1,670	36.5%
Other	41	3.0%	101	3.1%	142	3.1%
Birthplace						
US States / D.C.	1,086	79.8%	2,584	80.2%	3,670	80.1%
Puerto Rico / US Terr.	120	8.8%	215	6.7%	335	7.3%
Non-US-born	155	11.4%	423	13.1%	578	12.6%
Prenatal care funding						
Public	1,019	76.3%	2,449	77.3%	3,468	77.0%
Private, other	316	23.7%	718	22.7%	1,034	23.0%
Pregnancy-Related Factors						
Adequacy of Prenatal Care[3]						
Adequate Total[4]	918	68.6%	2,276	72.0%	3,194	70.9%
Adequate Intensive	437	32.6%	964	30.5%	1,401	31.1%
Adequate Basic	481	35.9%	1,312	41.5%	1,793	39.8%
Intermediate	100	7.5%	340	10.7%	440	9.8%
Inadequate/None	321	24.0%	547	17.3%	868	19.3%
Unknown	22	1.6%	59	1.8%	81	1.8%
Parity[6]						
1	1,264	93.6%	2,695	83.9%	3,959	86.8%
2	84	6.2%	459	14.3%	543	11.9%
3+	2	--[5]	57	1.8%	59	1.3%
Smoking during Pregnancy						
Yes	133	9.8%	418	13.0%	551	12.0%
No	1,222	90.2%	2,800	87.0%	4,022	88.0%
Birth Outcomes						
Birthweight						
< 500 g	8	0.6%	6	0.2%	14	0.3%
500-1,499 g	23	1.7%	39	1.2%	62	1.4%
1,500-2,499 g	98	7.3%	246	7.7%	344	7.5%
LBW (<2,499 g)	129	9.5%	291	9%	420	9.2%
2,500-3,999 g	1,175	87.0%	2,753	85.8%	3,928	86.1%
4000+ g	47	3.5%	166	5.2%	213	4.7%
Gestational age						
< 28 weeks	19	1.4%	20	0.6%	39	0.9%
< 37 weeks	131	9.7%	241	7.5%	372	8.2%
37-42 weeks	1,221	90.3%	2,971	92.5%	4,192	91.8%
43+ weeks	0	0.0%	0	0.0%	0	0.0%
Plurality						
Singleton	1,343	98.7%	3,180	98.7%	4,523	98.7%
Multiple birth	18	1.3%	42	1.3%	60	1.3%

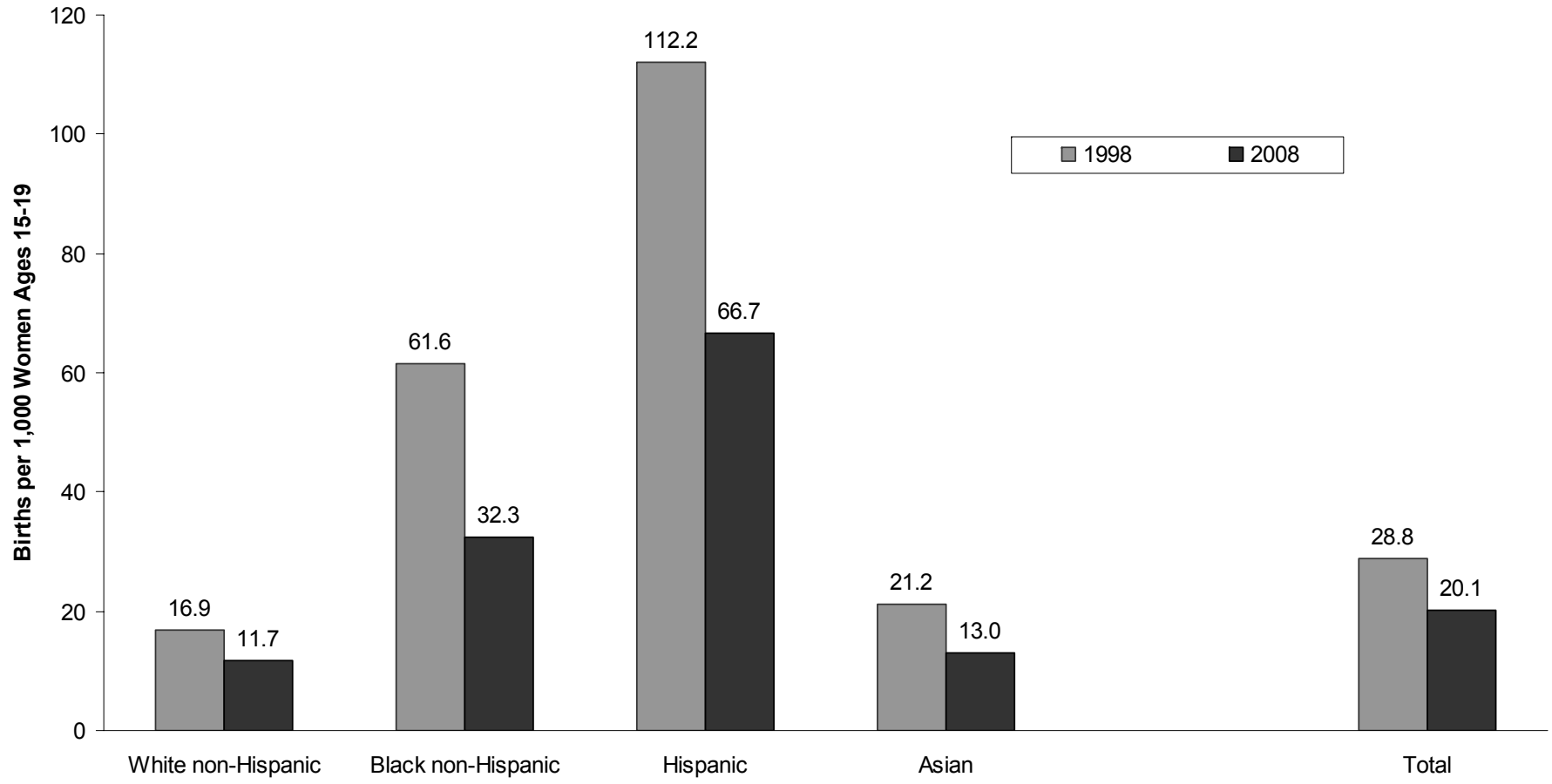
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. For state total row, percentages are based on total births to females ages 15-19. For the rest of the table, percentages are based on births for a given 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. Calculations based on 1-4 events are excluded. 6. Number of live births including the current birth.

Table 7. Trends in Teen Birth Rates for Selected Communities, Ranked by 2008 Teen Birth Rate
Massachusetts: 1998, 2007, and 2008

2008 Rank	Municipality[1]	1998[2]		2007		2008	
		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	**5,823**	**28.1**	**4,944**	**22.0**	**4,583**	**20.1**
1	Holyoke	189	129.3	144	95.4	174	115.3
2	Chelsea	100	119.5	82	82.0	97	97.0
3	Lawrence	298	111.8	230	76.0	245	80.9
4	Gardner	29	48.6	30	50.4	38	63.9
5	New Bedford	220	72.0	197	66.7	186	62.9
6	Springfield	458	81.9	512	84.3	373	61.4
7	Southbridge	45	81.2	43	77.1	34	60.9
8	Fall River	155	54.6	167	59.0	159	56.2
9	Lynn	191	74.5	175	56.7	164	53.2
10	Revere	46	41.9	48	45.6	53	50.3
11	Lowell	239	64.0	215	54.2	193	48.7
12	Pittsfield	68	46.9	67	52.7	60	47.2
13	Brockton	178	64.1	171	47.0	155	42.6
14	Everett	33	34.8	43	40.6	43	40.6
15	Fitchburg	89	54.8	71	45.4	60	38.4
16	Worcester	328	49.8	251	35.7	256	36.4
17	Chicopee	70	40.6	76	43.7	59	33.9
18	Salem	49	39.8	31	23.9	42	32.4
19	Haverhill	80	48.4	67	35.1	61	32.0
20	Boston	823	44.3	588	29.7	565	28.6
21	Framingham	44	22.7	40	20.5	53	27.1
22	Malden	26	22.5	37	25.9	38	26.6
23	Taunton	70	44.7	55	33.7	40	24.5
24	Westfield	36	20.4	35	20.3	38	22.0
25	Waltham	26	12.3	31	13.3	35	15.0

1. Selected communities include the 25 Massachusetts cities and towns with the greatest number of teen births. Ranking is by 2008 teen birth rate. 2. Source for 1998 births and rates: Massachusetts Community Health Information Profile (MassCHIP), MDPH, v3.0 r321, October 2008; 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 2008 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 2008, the rates listed may overestimate the actual rate. If the population in your community declined from 2005 to 2008, 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: 1998 and 2008



Note: Teen birth rate is number of births to females ages 15-19 per 1,000 females ages 15-19.
Denominators for 1997 state rates are based on the 1997 MISER Population Estimates. 2008 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: 2008

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	**76,969**	**100.0**	**51,760**	**100.0**	**6,652**	**100.0**	**10,895**	**100.0**	**5,958**	**100.0**	**1,562**	**100.0**	**142**
<500	143	0.2	66	0.1	36	0.5	32	0.3	7	0.1	2	--[2]	0
500-999	360	0.5	198	0.4	66	1.0	58	0.5	23	0.4	13	0.8	2
1,000-1,499	503	0.7	299	0.6	80	1.2	73	0.7	35	0.6	16	1.0	0
1,500-1,999	1,241	1.6	792	1.5	138	2.1	168	1.5	99	1.7	40	2.6	4
2,000-2,499	3,708	4.8	2,312	4.5	411	6.2	562	5.2	335	5.6	83	5.3	5
2,500-2,999	12,545	16.4	7,522	14.6	1,367	20.6	1,996	18.4	1,359	22.9	290	18.7	11
3,000-3,499	28,697	37.5	18,662	36.3	2,522	38.0	4,402	40.6	2,495	42.1	593	38.2	23
3,500-3,999	22,053	28.8	16,060	31.2	1,546	23.3	2,758	25.4	1,293	21.8	386	24.8	10
4,000-4,499	6,208	8.1	4,769	9.3	389	5.9	685	6.3	256	4.3	106	6.8	3
4,500-4,999	963	1.3	754	1.5	64	1.0	95	0.9	27	0.5	23	1.5	0
>=5,000	96	0.1	70	0.1	10	0.2	12	0.1	2	--[2]	2	--[2]	0
Unknown birthweight	452	0.6	256	0.5	23	0.3	54	0.5	27	0.5	8	0.5	84
VLBW[3] (0-1,499 g)	1,006	1.3	563	1.1	182	2.7	163	1.5	65	1.1	31	2.0	2
LBW[4] (0-2,499 g)	5,955	7.8	3,667	7.1	731	11.0	893	8.2	499	8.4	154	9.9	11

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: 1998-2008

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	**1998**	690	0.9	3,819	4.9	298	9.6	1,570	50.7	82	28.5	266	92.4	380	11.2	1,836	54.2	1,070	1.3	5,655	7.0
	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
Ages < 35	**1998**	540	0.9	3,086	4.9	248	11.4	1,148	52.5	60	35.3	153	90.0	308	13.1	1,301	55.2	848	1.3	4,387	6.8
	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
Ages 35+	**1998**	150	1.0	733	4.8	50	5.5	422	46.2	22	18.6	113	95.8	72	7.0	535	51.8	222	1.4	1,268	7.8
	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

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.).

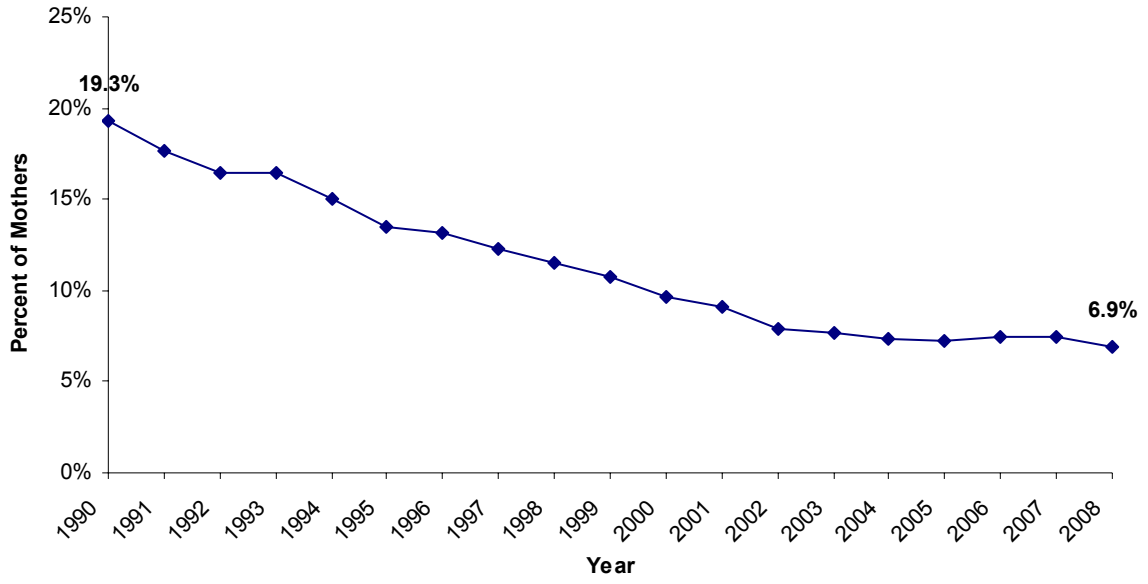
Table 10. Births by Gestational Age, Race/Hispanic Ethnicity, Massachusetts: 2008

Gestational Age[1]	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[3]		Unknown
(weeks completed)	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n
State Total	**76,969**	**100.0**	**51,760**	**100.0**	**6,652**	**100.0**	**10,895**	**100.0**	**5,958**	**100.0**	**1,562**	**100.0**	**142**
<20	36	0.0	19	0.0	6	0.1	8	0.1	3	--[7]	0	0.0	0
20-23	148	0.2	66	0.1	40	0.6	32	0.3	4	--[7]	5	0.3	1
24-27	284	0.4	149	0.3	55	0.8	55	0.5	17	0.3	7	0.5	1
28-31	684	0.9	419	0.8	91	1.4	100	0.9	50	0.8	22	1.4	2
32-35	3,098	4.0	2,086	4.0	307	4.6	414	3.8	210	3.5	77	5.0	4
36	2,500	3.3	1,652	3.2	203	3.1	409	3.8	188	3.2	44	2.8	4
37-39	39,236	51.3	26,285	51.0	3,293	49.7	5,546	51.1	3,335	56.2	752	48.4	25
40	22,620	29.6	15,339	29.8	1,962	29.6	3,204	29.5	1,619	27.3	483	31.1	13
41	7,474	9.8	5,179	10.1	622	9.4	1,014	9.3	495	8.3	160	10.3	4
42	449	0.6	304	0.6	52	0.8	69	0.6	18	0.3	5	0.3	1
43	8	0.0	8	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
44+	3	--[7]	2	--[7]	0	0.0	1	--[7]	0	0.0	0	0.0	0
Unknown[4]	429	0.6	252	0.5	21	0.3	43	0.4	19	0.3	7	0.4	87
Very early gestation, <28 weeks[5]	468	0.6	234	0.5	101	1.5	95	0.9	24	0.4	12	0.8	2
Late Preterm 34-36 weeks	4,753	6.2	3,179	6.2	414	6.2	714	6.6	340	5.7	98	6.3	8
Preterm, <37 weeks[6]	6,750	8.8	4,391	8.5	702	10.6	1,018	9.4	472	7.9	155	10.0	12

NOTE: Percentages for detailed gestational age category rows ("<20" through "Unknown") are calculated based on births including those with unknown gestational age. Percentages for "Very early gestation" and "Preterm" rows are calculated based on births with known gestational age only.

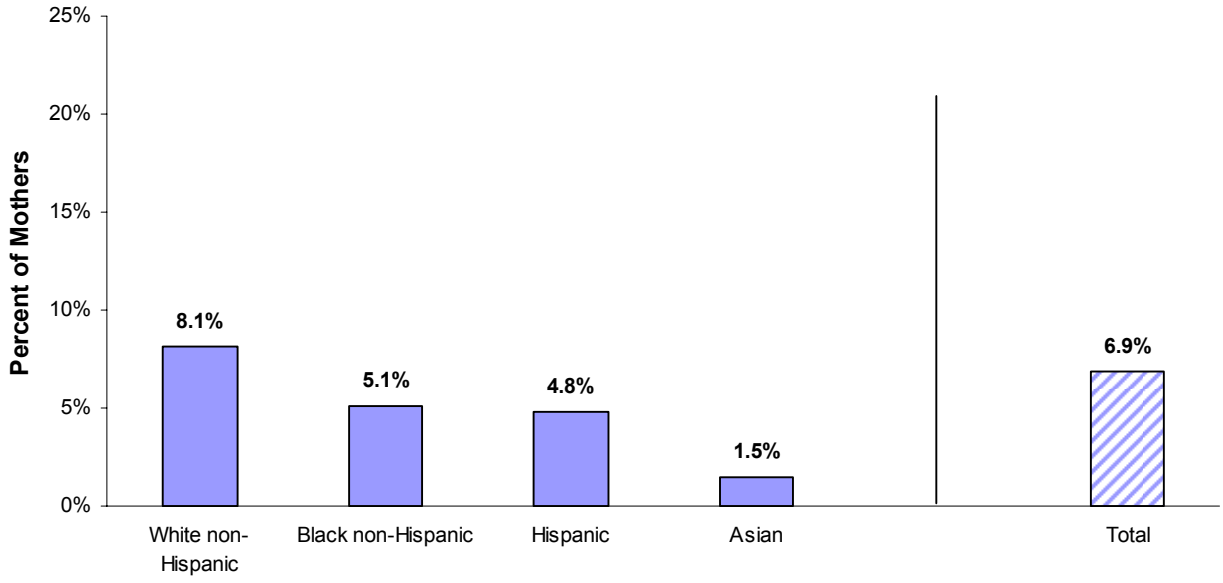
1. A clinical estimate of the number of weeks of pregnancy completed; as estimated by the attendant at birth or the postnatal physician. 2. Percentages are based on column total. 3. Other races include American Indian and others not specified. 4. Estimate of gestational age not provided. 5. Also known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

Figure 3. Percent of Mothers who Reported Smoking During Pregnancy Massachusetts: 1990-2008



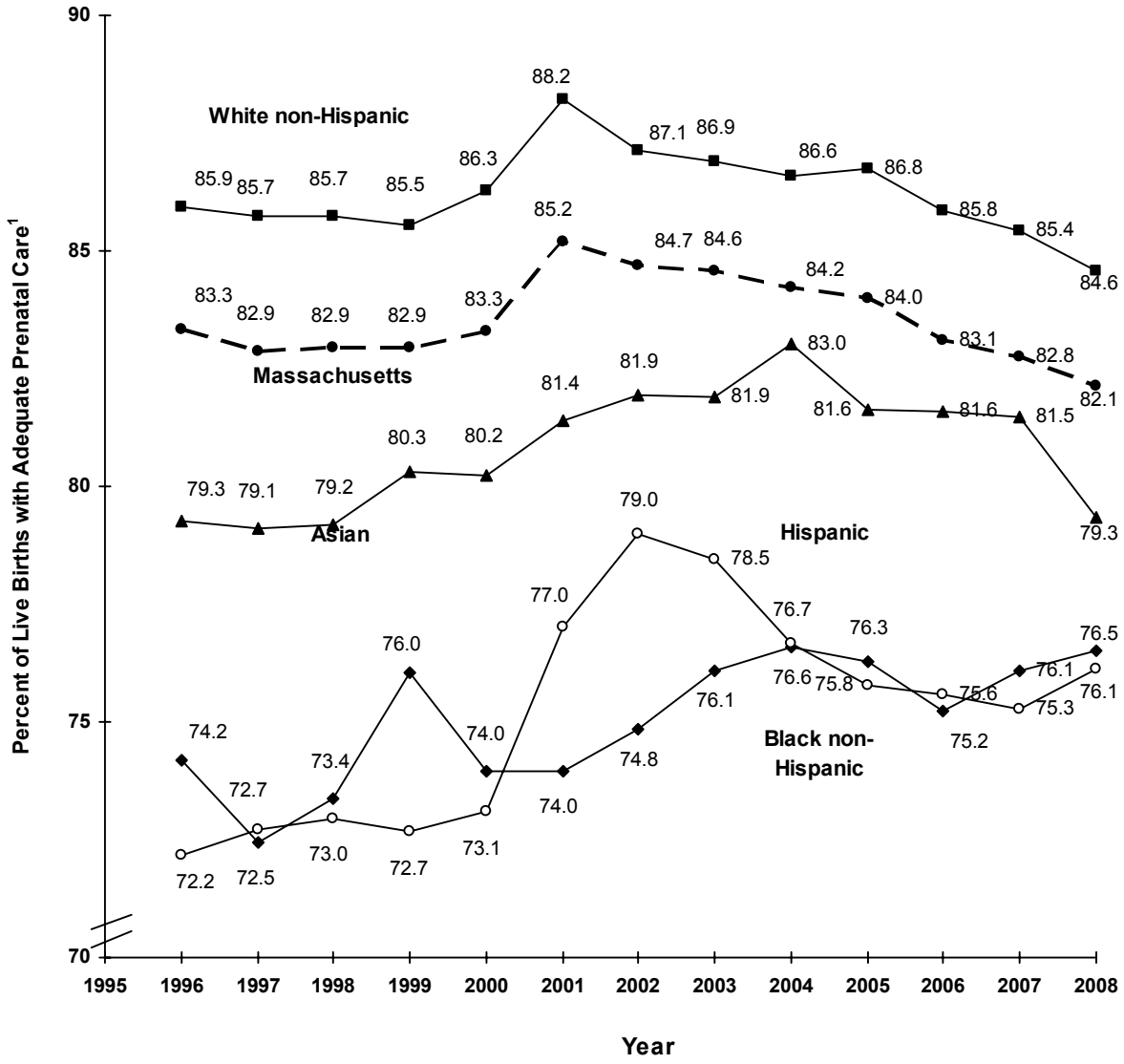
Note: Smoking information provided on the birth certificate as reported by the mother. Due to self-reported nature, data on smoking prevalence should be interpreted cautiously.

Figure 4. Percent of Mothers who Reported Smoking During Pregnancy by Mother's Race/Hispanic Ethnicity, Massachusetts: 2008



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.

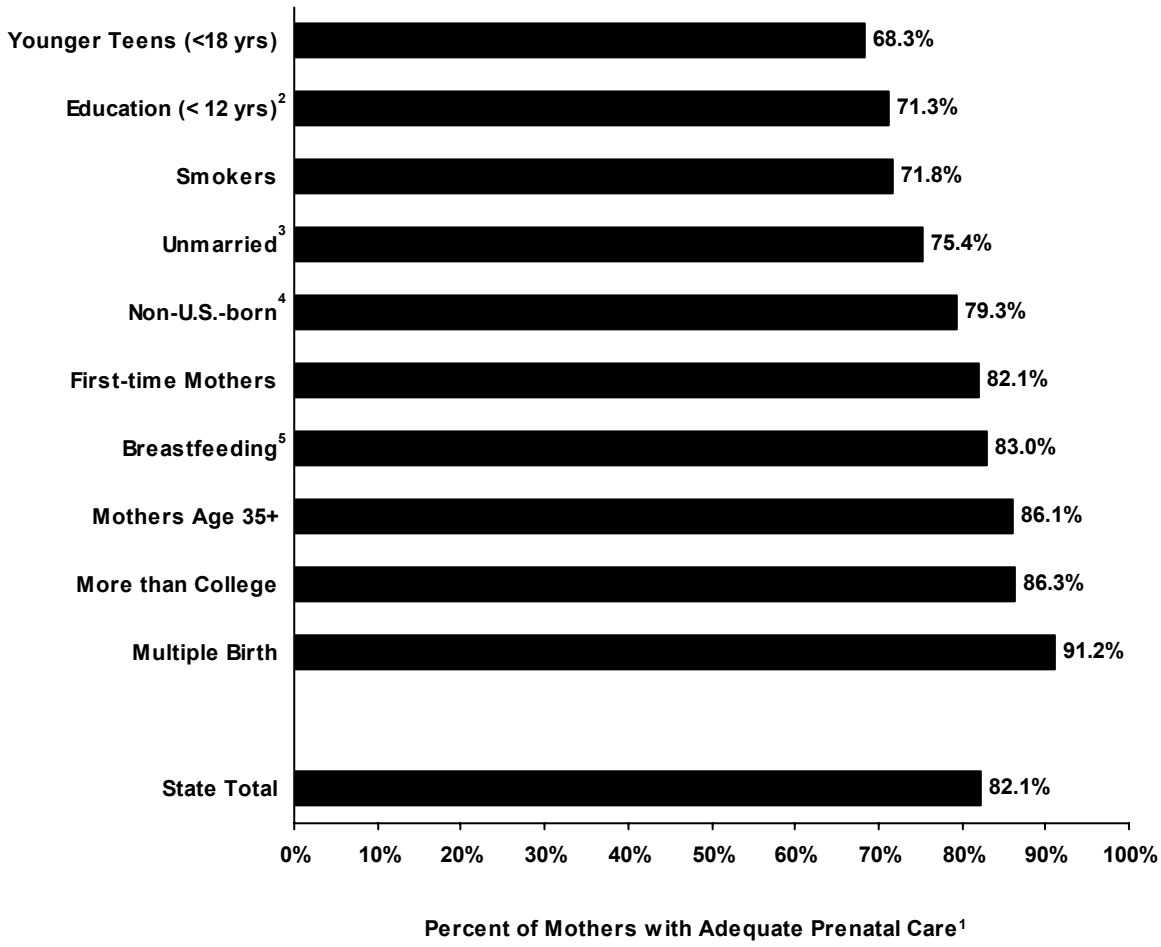
Figure 5. Trends in Adequacy of Prenatal Care by Race and Hispanic Ethnicity, Massachusetts: 1996-2008



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

NOTE: 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.

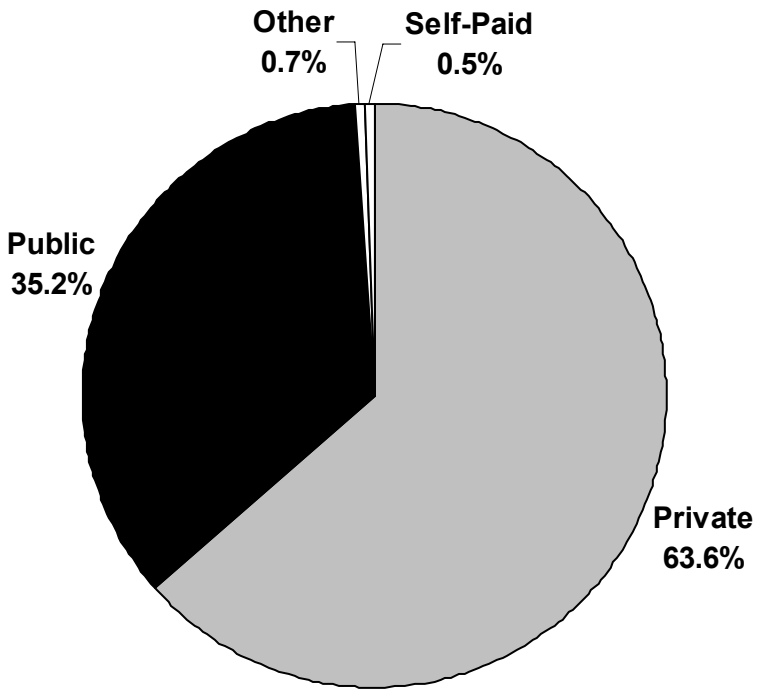
Figure 6. Adequacy of Prenatal Care by Selected Maternal Characteristics, Massachusetts: 2008



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

1. Characteristics of interest are not mutually exclusive, except as noted. 2. Women 20 years of age and older. 3. Marital status at time of birth. 4. 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). 5. 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: 2008



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: 1991-2008

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

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

Table 11 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race/ Hispanic Ethnicity, Massachusetts: 1991-2008

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]

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: 2008

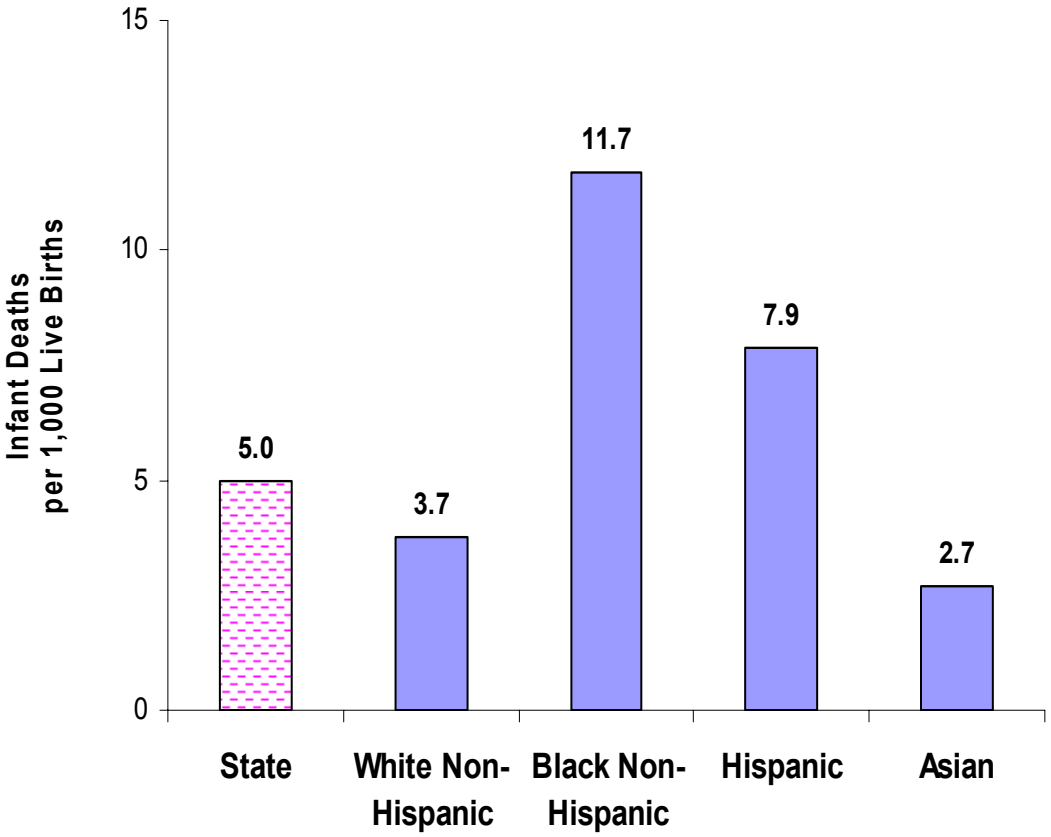


Table 12. Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2008

Municipality[1]	Rank (by pop. size)	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity				Birth weight		Gestational Diabetes
				White non-Hispanic %[3]	Black non-Hispanic %[3]	Hispanic %[3]	Asian or Other[4] %[3]	Very Low (<1500 g) %	Low (<2500 g) %	%
STATE TOTAL		**6,497,967**	**11.8**	**67.2**	**8.6**	**14.2**	**9.8**	**1.3**	**7.8**	**4.0**
Attleboro	29	43,364	12.3	81.8	4.7	6.0	7.1	0.8	6.6	2.4
Barnstable	25	47,902	9.3	83.0	3.8	5.1	8.1	0.7	4.3	1.6
Boston	1	558,435	14.4	39.8	26.5	21.6	11.9	1.7	9.3	3.8
Brockton	6	100,366	15.5	31.1	48.6	11.6	8.7	1.5	9.0	3.9
Brookline	18	56,422	11.8	74.3	1.2	2.4	22.1	1.8	8.7	2.6
Cambridge	5	101,529	11.8	56.3	14.1	8.0	21.5	0.5	8.0	3.5
Chicopee	21	54,599	11.6	69.7	4.6	22.2	3.5	1.3	7.4	5.8
Fall River	9	92,117	13.6	79.1	6.5	10.0	4.5	2.1	9.4	7.8
Framingham	14	65,651	16.1	68.0	6.2	16.2	9.5	1.0	7.4	2.8
Haverhill	15	60,032	14.7	74.5	3.7	18.5	3.3	1.1	6.9	3.3
Lawrence	12	81,591	16.9	13.9	2.6	80.6	2.9	1.7	8.1	3.8
Leominster	30	42,120	11.9	71.0	7.2	15.4	6.4	1.6	6.4	5.2
Lowell	4	105,749	16.8	44.2	7.5	19.3	28.8	1.3	8.7	6.0
Lynn	8	92,186	16.3	30.7	12.9	44.7	10.7	1.5	8.6	3.2
Malden	17	56,730	17.1	43.0	18.1	9.2	29.5	1.9	9.4	6.0
Medford	22	53,801	12.5	67.6	11.4	4.9	15.9	1.3	6.9	3.0
Methuen	27	44,532	12.7	63.4	3.0	25.8	7.6	1.1	7.6	3.2
New Bedford	7	94,502	14.7	61.9	6.6	22.2	9.1	2.7	11.1	4.0
Newton	11	83,346	10.9	74.0	2.5	4.7	18.7	0.9	8.6	3.1
Peabody	24	50,954	10.3	79.1	3.2	9.1	7.8	1.2	7.1	2.6
Pittsfield	28	43,949	11.8	76.0	8.8	10.8	4.4	1.5	8.8	4.8
Plymouth	20	54,781	11.6	90.5	2.1	3.0	4.3	0.3	4.6	2.7
Quincy	10	90,458	14.3	53.1	7.3	3.6	36.1	1.7	7.5	5.2
Revere	26	45,551	16.7	48.2	6.0	32.7	12.6	0.7	7.5	6.6
Somerville	13	75,372	12.7	59.1	8.5	14.3	17.5	0.9	8.1	3.7
Springfield	3	156,358	15.7	25.5	20.9	49.2	4.4	2.1	10.7	4.9
Taunton	19	56,348	12.9	85.6	5.2	5.6	3.2	1.8	7.8	4.1
Waltham	16	59,564	14.1	52.1	9.8	22.1	16.0	1.1	6.7	4.1
Weymouth	23	53,708	12.5	81.9	8.3	3.1	6.4	0.9	8.5	3.6
Worcester	2	179,839	14.8	64.0	12.8	15.6	7.5	2.0	8.2	4.3

Table 12 (cont'd). Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2008

Municipality[1]	Birth					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]	2008	2006-2008	2008	2006-2008
STATE TOTAL	**82.1**	**35.2**	**34.0**	**4,583**	**20.1**	**5.0**	**4.9**	**3.8**	**3.6**
Attleboro	87.5	21.4	31.1	30	26.4	0.0	--[5]	0.0	--[5]
Barnstable	83.9	49.2	36.7	31	22.8	--[5]	4.9	0.0	--[5]
Boston	85.3	42.6	44.5	565	28.6	7.1	6.9	5.1	5.0
Brockton	75.1	62.0	55.6	155	42.6	9.7	9.0	8.4	6.8
Brookline	86.3	5.1	5.4	3	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	83.3	17.2	15.2	22	5.6	--[5]	2.0	0.0	--[5]
Chicopee	80.4	48.0	49.4	59	33.9	--[5]	3.2	--[5]	--[5]
Fall River	87.5	67.4	61.2	159	56.2	7.2	9.2	4.8	7.1
Framingham	85.5	42.7	27.7	53	27.1	--[5]	3.0	--[5]	3.0
Haverhill	83.2	35.0	39.9	61	32.0	7.9	6.6	6.8	5.5
Lawrence	69.1	76.9	72.5	245	80.9	5.1	5.2	4.4	4.2
Leominster	80.3	36.7	35.0	29	23.1	--[5]	3.9	--[5]	--[5]
Lowell	68.0	55.4	53.9	193	48.7	8.5	7.4	6.2	5.5
Lynn	77.4	65.8	56.0	164	53.2	4.7	5.7	3.3	4.2
Malden	81.8	44.3	27.9	38	26.6	5.2	5.1	5.2	4.8
Medford	82.8	28.8	20.2	9	5.1	--[5]	3.0	--[5]	--[5]
Methuen	82.0	36.0	37.7	30	22.6	--[5]	4.0	--[5]	2.9
New Bedford	69.1	59.2	62.7	186	62.9	8.6	8.5	7.2	6.6
Newton	85.6	7.3	8.4	5	1.4	--[5]	2.4	--[5]	2.4
Peabody	85.3	30.5	30.7	23	16.1	--[5]	3.3	0.0	--[5]
Pittsfield	68.9	55.5	52.0	60	47.2	--[5]	5.7	--[5]	3.2
Plymouth	90.1	30.0	27.4	30	17.9	--[5]	--[5]	0.0	0.0
Quincy	87.9	31.6	24.9	22	10.6	6.2	5.5	5.4	3.8
Revere	81.0	59.1	37.5	53	50.3	--[5]	5.8	--[5]	4.0
Somerville	84.0	34.5	26.8	33	15.2	--[5]	5.7	--[5]	3.9
Springfield	68.8	71.7	68.6	373	61.4	11.0	9.8	9.4	7.7
Taunton	76.7	43.6	46.1	40	24.5	12.3	9.7	--[5]	3.1
Waltham	79.4	31.1	25.9	35	15.0	--[5]	--[5]	--[5]	--[5]
Weymouth	90.3	30.8	29.7	27	18.6	--[5]	--[5]	--[5]	--[5]
Worcester	72.9	49.0	51.3	256	36.4	10.9	10.1	8.2	7.4

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; teen birth rates refer to the number of births per 1,000 females ages 15-19. Birth rates for cities/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. 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. 8. 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. 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: 2008

Facility[1]	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)	Cesarean Deliveies[6] (%)
State Total		**77,542**	**7.7**	**34.7**	**82.1**	**34.4**
Anna Jaques Hospital	Newburyport	726	5.6	25.4	87.9	34.7
Baystate Franklin Medical Center	Greenfield	470	3.4	43.6	79.8	24.5
Baystate Mary Lane Hospital	Ware	180	4.5	61.6	81.1	31.1
Baystate Medical Center	Springfield	4,239	12.3	50.0	75.5	32.1
Berkshire Medical Center	Pittsfield	717	5.9	47.3	70.4	30.0
Beth Israel Deaconess Medical Center	Boston	5,086	10.9	19.4	79.2	40.8
Beverly Hospital	Beverly	2,092	5.2	32.5	95.6	34.8
Boston Medical Center	Boston	2,417	9.7	79.8	71.9	30.1
Brigham & Women's Hospital	Boston	8,115	11.5	19.8	95.2	35.2
Brockton Hospital	Brockton	1,232	6.7	66.0	79.9	41.1
Cambridge Birth Center	Cambridge	127	0.0	21.3	64.6	0.0
Cambridge Hospital	Cambridge	1,337	2.6	71.1	78.3	28.3
Cape Cod Hospital	Barnstable	904	3.5	48.7	82.0	32.3
Caritas Good Samaritan Medical Center	Brockton	952	6.3	57.4	65.4	37.8
Caritas Holy Family Hospital & Medical Center	Methuen	1,198	3.7	36.2	76.8	47.4
Caritas Norwood Hospital	Norwood	562	2.7	28.0	60.5	37.2
Caritas St. Elizabeth's Medical Center Of Boston	Boston	1,136	13.1	27.4	85.4	35.6
Charlton Memorial Hospital	Fall River	1,686	6.5	53.7	88.7	36.5
Cooley Dickinson Hospital	Northampton	846	3.1	25.4	92.6	29.3
Emerson Hospital	Concord	1,143	5.4	6.8	73.6	38.1
Fairview Hospital	Great Barrington	179	2.8	46.4	85.5	31.8
Falmouth Hospital	Falmouth	616	4.3	41.4	86.5	37.6
Harrington Memorial Hospital	Southbridge	345	3.8	52.8	83.2	38.0
Heywood Memorial Hospital	Gardner	551	4.0	45.5	80.3	16.2
Holyoke Hospital	Holyoke	663	5.9	64.9	68.2	21.6
Jordan Hospital	Plymouth	711	4.5	33.1	87.5	34.9
Lawrence General Hospital	Lawrence	1,711	5.6	63.7	73.3	32.2
Leominster Hospital	Leominster	1,096	4.0	48.0	84.0	22.2
Lowell General Hospital	Lowell	2,318	6.3	44.5	71.4	35.8
Martha's Vineyard Hospital	Oak Bluffs	165	0.6	47.9	92.1	28.5
Massachusetts General Hospital	Boston	3,624	10.2	29.1	87.1	31.5
Melrose-Wakefield Hospital	Melrose	1,226	5.2	30.2	89.9	45.7
Mercy Medical Center	Springfield	1,339	4.0	57.5	77.7	25.5

Table 13 (cont'd). Birth Characteristics by Licensed Maternity Facility, Massachusetts: 2008

Facility[1]	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)	Cesarean Deliveies[6] (%)
Metrowest Medical Center-Framingham Union Campus	Framingham	1,714	5.7	43.5	88.3	41.8
Milford Regional Medical Center	Milford	995	5.1	28.1	93.1	34.6
Morton Hospital	Taunton	521	3.6	50.6	68.4	34.4
Mount Auburn Hospital	Cambridge	2,057	3.5	17.6	87.3	27.4
Nantucket Cottage Hospital	Nantucket	147	2.1	45.6	86.6	36.1
Newton Wellesley Hospital	Newton	3,750	4.6	3.3	79.3	37.1
North Adams Regional Hospital	North Adams	269	3.7	54.6	90.0	18.2
North Shore Birth Center	Beverly	102	0.0	16.8	92.0	0.0
North Shore Medical Center - Salem Hospital	Salem	1,677	5.7	50.4	72.6	32.2
Saint Vincent Hospital	Worcester	2,025	4.0	21.5	86.2	32.2
Saints Memorial Medical Ctr.-St. John's Campus[7]	Lowell	164	2.1	45.3	81.1	36.5
South Shore Hospital	Weymouth	3,649	6.5	17.5	92.0	43.9
St. Luke's Hospital	New Bedford	1,520	7.7	53.4	67.7	37.9
Sturdy Memorial Hospital	Attleboro	968	2.7	15.8	83.7	38.6
Tobey Hospital	Wareham	435	2.8	39.6	91.3	19.1
Tufts Medical Center	Boston	1,319	26.3	42.3	90.0	39.4
UMASS Memorial Medical Center - West Campus	Worcester	4,217	10.9	38.3	70.8	28.7
Winchester Hospital	Winchester	1,914	7.0	5.2	84.5	36.3
Other Hospitals		13	16.7	28.6	50.0	18.2
Home, En route & Dr. Off.		377	6.0	24.0	55.4	0.0

NOTES: 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 definition of occurrence births. 3. Less than 2,500 grams (5.5 lbs.) 4. Public payment for delivery includes Medicaid/MassHealth, Commonhealth, Medicare, Healthy Start, other government programs, and free care. 5. Based on the APNCU Index. 6. The percentages provided in this row are based on occurrence births and may differ from data presented elsewhere in this book that are based on resident births. 7. Facility was closed to births on 4/1/2008.

Table 14. Comparison of Massachusetts Perinatal Health Indicators with Healthy People 2010 Objectives, Massachusetts: 2005-2008

Healthy People 2010 Objectives[1] (Focus Area 16: Maternal, Infant and Child Health[2])	HP2010 Target	Massachusetts 2005	2006	2007	2008	Has Massachusetts achieved HP2010 target? ✓ = YES ○ = NO, but within 25% of target ● = NO, > 25% from target
Fetal, Infant, and Maternal Deaths						
16-1a. Fetal Mortality Rate[3]	4.1	5.5	5.0	5.1	5.0	○
16-1b. Perinatal Mortality Rate[4]	4.5	5.4	5.7	5.2	5.6	○
16-1c. Infant Mortality Rate[5]	4.5	5.1	4.8	4.9	5.0	○
16-1d. Neonatal Mortality Rate[6]	2.9	3.7	3.6	3.4	3.8	●
16-1e. Postneonatal Mortality Rate[7]	1.2	1.4	1.2	1.5	1.2	✓
16-4. Maternal Mortality Ratio[8]	3.3	10.3	8.9	8.9	10.3	●
Risk Factors						
16-10a. Low Birthweight[9] (%)	5.0	7.9	7.9	7.9	7.7	●
16-10b. Very Low Birthweight[10] (%)	0.9	1.4	1.3	1.4	1.3	●
16-11a. Preterm[11] (%)	7.6	9.0	9.0	9.0	8.8	○
Prenatal Care						
16-6a. Care beginning in first trimester (%)	90.0	83.2	82.1	82.0	81.0	○
16-6b. Early and adequate care[12] (%)	90.0	84.0	83.1	82.8	82.1	○
Obstetrical Care						
16-8. Very Low Birthweight[10] Infants born at Level III Hospitals[13] (%)	90.0	78.5	76.8	81.1	76.2	○
16-9a. Cesarean Sections: Low-Risk[14] Women Giving Birth for the First Time (%)	15.0	27.8	28.5	29.3	29.6	●
16-9b. Cesarean Sections: Low-Risk[14] Women with Prior Cesarean Section (%)	63.0	89.8	91.3	91.1	91.1	●
Breastfeeding						
16-19a. Breastfeeding[15] (%)	75.0	79.3	79.9	79.2	80.8	✓
Prenatal Substance Exposure						
16-17c. Abstinence from Smoking (%)	99.0	92.8	92.6	92.5	93.1	○

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. HP2010 specifies objective as mother breastfeeding in "early postpartum period." Massachusetts data is based on mother's self-report of current breastfeeding or intention to breastfeed.

Appendix:

Additional Tables & Figures

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Table 15. Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2008

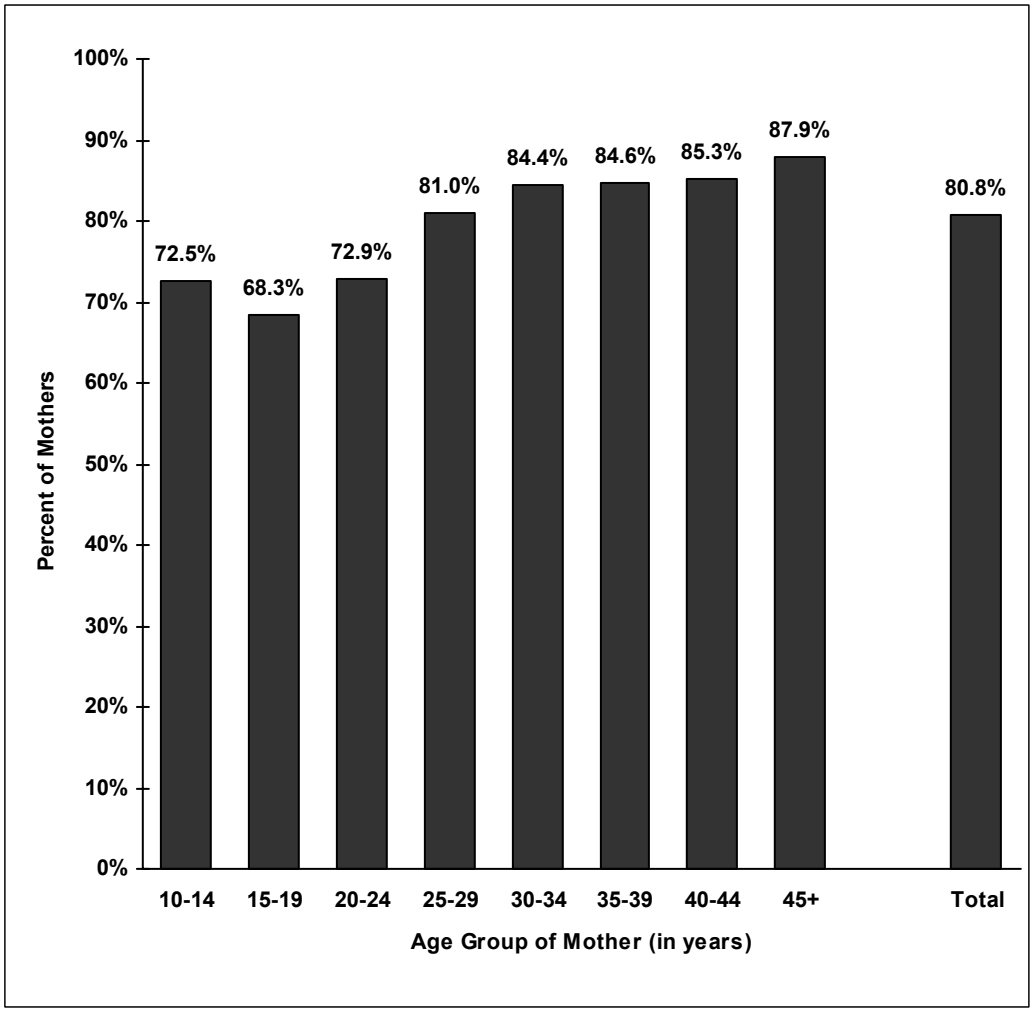
CHNA	Population	Crude Birth Rate[1]	Mother's Race and Ethnicity: White non-Hispanic % [3]	Black non-Hispanic % [3]	Hispanic % [3]	Asian and Other[2] % [3]	Very Low BWT (<1500 g) %	Low BWT (<2500) %	GDM %
STATE TOTAL	**6,497,967**	**11.8**	**67.2**	**8.6**	**14.2**	**9.8**	**1.3**	**7.8**	**4.0**
Community Health Network of Berkshire County	131,965	9.2	84.7	4.4	6.7	3.8	1.7	8.1	3.9
Upper Valley Health Web (Franklin County)	88,506	8.8	89.0	1.5	5.2	3.1	1.7	8.2	3.7
Partnership for Health in Hampshire County (Northampton)	151,801	8.0	80.7	2.6	8.3	8.3	0.7	5.6	4.6
The Community Health Connection (Springfield)	299,490	12.5	46.9	14.2	34.2	4.6	1.7	9.0	5.6
Community Health Network of Southern Worcester County	119,141	11.1	89.7	0.9	7.4	1.7	1.2	6.3	5.5
Community Partners for Health (Milford)	160,521	11.5	90.0	1.8	3.8	4.2	1.0	7.9	2.6
Community Health Network of Greater Metro West (Framingham)	379,658	12.2	79.6	2.7	7.0	10.5	1.1	6.9	3.2
Community Wellness Coalition (Worcester)	303,669	13.2	70.8	9.1	11.0	9.0	1.7	7.6	4.0
Fitchburg/Gardner Community Health Network	261,369	11.2	80.5	3.4	11.0	5.0	1.3	6.5	3.9
Greater Lowell Community Health Network	272,893	12.9	62.9	5.2	11.1	20.7	0.9	7.9	5.3
Greater Lawrence Community Health Network	195,176	13.2	41.1	2.7	50.3	5.9	1.4	8.3	3.3
Greater Haverhill Community Health Network	148,557	11.7	83.9	2.3	10.8	2.8	0.9	7.2	3.0
Community Health Network North (Beverly/Gloucester)	119,378	9.2	88.7	1.5	4.0	4.7	1.2	7.0	1.8
North Shore Community Health Network	287,352	12.1	58.8	7.2	25.3	7.9	1.2	7.8	2.7
Greater Woburn/Concord/Littleton Community Health Network	209,597	10.3	73.6	3.4	4.3	18.5	1.2	7.5	4.2
North Suburban Health Alliance (Medford/Malden/Melrose)	257,235	13.8	64.2	10.4	9.4	15.9	1.4	7.5	4.8
Greater Cambridge/Somerville Community Health Network	273,883	12.8	65.5	8.0	8.3	17.9	0.9	7.7	3.6
West Suburban Health Network (Newton/Waltham)	253,138	11.1	71.8	4.4	10.0	13.7	1.1	6.7	3.5
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	711,603	14.6	41.4	21.7	24.9	11.9	1.6	9.1	4.1
Blue Hills Community Health Alliance (Greater Quincy)	372,309	12.0	69.0	9.2	3.3	18.4	1.3	7.1	4.4
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	161,454	12.4	60.7	3.4	33.6	2.2	1.0	8.1	5.8
Greater Brockton Community Health Network	242,404	12.7	57.7	27.7	7.4	7.1	1.4	8.6	4.6
South Shore Community Partners in Prevention (Plymouth)	188,787	10.7	93.1	1.6	2.3	2.8	1.0	6.9	2.9
Greater Attleboro-Taunton Health & Education Response	252,919	11.0	87.9	3.4	3.7	4.7	1.2	7.2	4.1
Partners for a Healthier Community (Fall River)	141,977	11.5	83.2	5.1	7.8	3.9	1.7	8.8	7.5
Greater New Bedford Health & Human Services Coalition	199,955	11.5	73.9	4.7	14.1	7.2	2.1	9.3	3.7
Cape and Islands Community Health Network	252,204	8.8	85.3	4.0	5.0	5.5	1.2	6.1	1.9

Table 15 (cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2008

CHNA	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[4]	Infant Mortality Rate[8] 2008	Infant Mortality Rate[8] 2006-2008	Neonatal Mortality Rate[8] 2008	Neonatal Mortality Rate[8] 2006-2008
STATE TOTAL	**82.1**	**35.2**	**34.0**	**4,583**	**20.1**	**5.0**	**4.9**	**3.8**	**3.6**
Community Health Network of Berkshire County	76.5	49.1	46.5	117	26.1	5.7	4.6	--[5]	2.2
Upper Valley Health Web (Franklin County)	83.0	39.0	40.7	55	19.4	7.7	5.5	6.4	4.0
Partnership for Health in Hampshire County (Northampton)	86.0	28.8	28.0	55	6.5	5.0	5.2	4.1	3.8
The Community Health Connection (Springfield)	73.7	57.8	54.0	428	41.0	8.5	7.5	6.9	5.8
Community Health Network of Southern Worcester County	80.9	31.2	39.1	90	23.1	5.3	6.1	3.8	4.2
Community Partners for Health (Milford)	86.9	21.6	22.9	77	15.2	--[5]	1.2	--[5]	0.7
Community Health Network of Greater Metro West (Framingham)	83.2	21.7	17.7	123	11.6	3.9	3.7	3.7	3.5
Community Wellness Coalition (Worcester)	74.9	37.2	40.1	288	26.8	8.3	7.4	6.5	5.6
Fitchburg/Gardner Community Health Network	80.2	32.5	33.1	185	21.1	3.8	4.8	2.7	3.4
Greater Lowell Community Health Network	74.9	34.4	36.3	230	25.7	4.6	4.4	3.1	3.1
Greater Lawrence Community Health Network	76.0	52.6	50.2	280	42.2	4.3	4.6	3.5	3.8
Greater Haverhill Community Health Network	86.6	25.9	29.4	83	18.2	5.2	5.1	4.6	3.9
Community Health Network North (Beverly/Gloucester)	93.9	24.5	22.1	34	8.7	--[5]	3.0	--[5]	1.5
North Shore Community Health Network	82.1	42.7	38.5	244	27.9	3.2	4.5	1.7	3.0
Greater Woburn/Concord/Littleton Community Health Network	83.1	10.5	12.3	23	4.1	2.8	2.6	2.8	2.3
North Suburban Health Alliance (Medford/Malden/Melrose)	85.6	33.6	24.3	104	14.6	3.4	3.4	2.8	2.8
Greater Cambridge/Somerville Community Health Network	85.1	19.3	16.1	70	8.5	2.9	3.3	1.7	2.4
West Suburban Health Network (Newton/Waltham)	83.4	14.3	13.5	55	5.4	1.8	1.8	--[5]	1.5
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	84.8	43.2	42.7	722	30.5	6.6	6.4	4.7	4.7
Blue Hills Community Health Alliance (Greater Quincy)	86.5	24.1	22.0	107	10.3	5.4	5.2	4.5	3.8
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	77.4	54.9	53.0	278	48.7	3.5	4.6	2.5	3.3
Greater Brockton Community Health Network	81.1	42.0	39.8	202	22.9	6.5	6.2	5.8	4.9
South Shore Community Partners in Prevention (Plymouth)	90.2	23.3	23.7	78	13.2	2.5	2.6	--[5]	1.3
Greater Attleboro-Taunton Health & Education Response	82.5	27.0	31.3	135	17.4	4.7	3.7	2.1	2.0
Partners for a Healthier Community (Fall River)	88.6	59.6	53.0	182	42.0	5.5	7.7	3.7	5.9
Greater New Bedford Health & Human Services Coalition	74.7	48.6	52.3	231	35.5	8.7	7.9	7.4	6.2
Cape and Islands Community Health Network	85.2	41.8	33.9	107	16.3	4.5	4.4	3.6	3.1

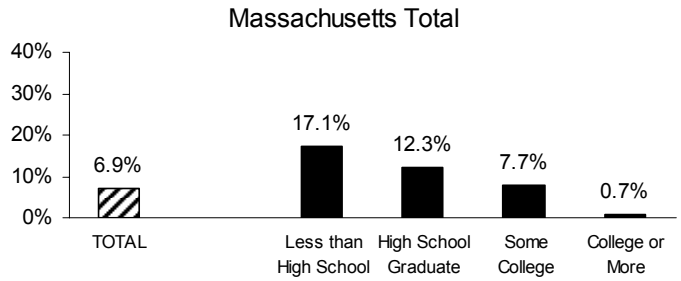
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Births per 1,000 residents (male and female). 2008 rates are calculated using Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2005 (MMARS05), released October 2006 (see Technical Notes in Appendix). 2. Mothers who designated themselves as Asian, American Indian or Other. 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. Births per 1,000 female residents 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. 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. Deaths per 1,000 live births. See Definitions of Rates section in Technical Notes for definitions of infant and neonatal mortality rates.

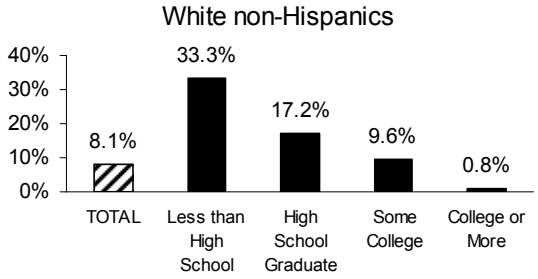
Figure 9. Percent of Mothers Breastfeeding or Intending to Breastfeed by Age Group, Massachusetts: 2008

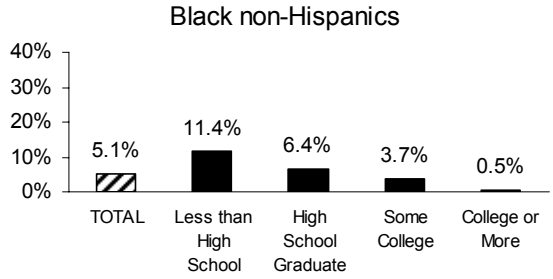


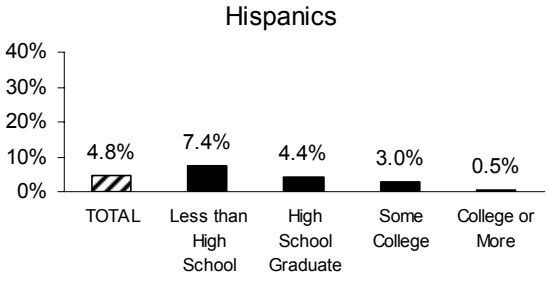
NOTE: Information about breastfeeding is reported by the mother at the time of the birth. For race-specific breastfeeding rates see Table 2.

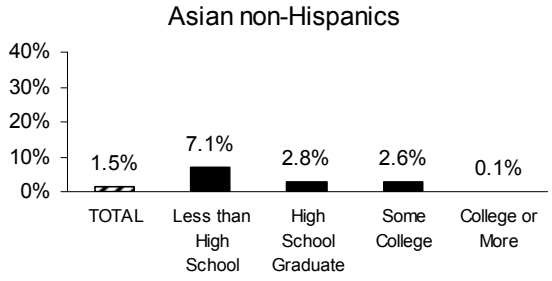
Figure 10. Percent of Mothers who Reported Smoking During Pregnancy by Mother's Race/Hispanic Ethnicity and Educational Attainment, Massachusetts: 2008





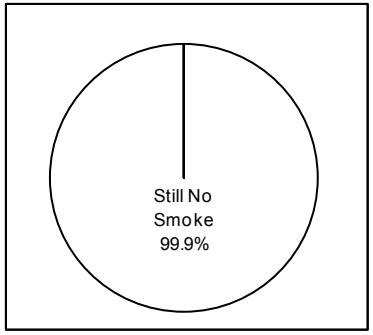
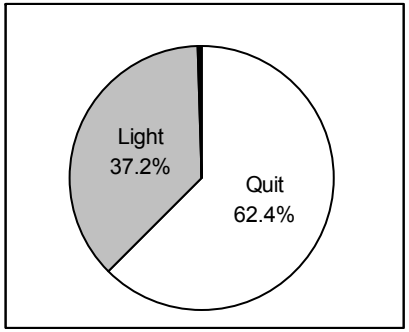
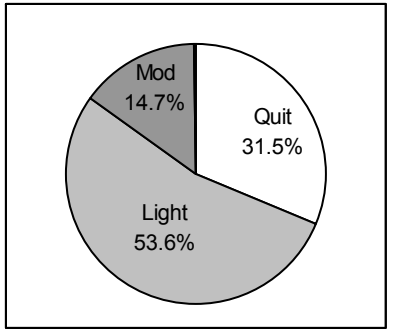
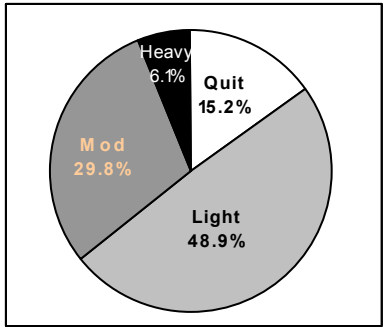






NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Smoking information provided on the birth certificate as reported by the mother. Because smoking is self-reported, data on smoking prevalence should be interpreted 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: 2008

Reported **Smoking Status[1] Prior to Pregnancy:**	**Non-Smokers 86.4% (66,673)**	**Light Smokers 8.4% (6,461)**	**Moderate Smokers 4.7% (3,635)**	**Heavy Smokers 0.5% (376)**
Reported **Smoking Status[1] During Pregnancy**:				
	99.9% of Non-Smokers continued not smoking (0.1% started smoking)	**62% of Light Smokers quit Smoking (0.03% increased)**	**85% of Moderate Smokers decreased the number of cigarettes smoked daily or quit**	**94% 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: 2008

Age of Mother (years)		Total Births	Parity[1]				
			1st	2nd	3rd	4th	5th+
State Total	**N[2]**	**76,969**	**34,723**	**26,488**	**10,254**	**3,296**	**1,673**
	%[3]	100.0	45.4	34.7	13.4	4.3	2.2
10-14	**N[2]**	40	39	1	0	0	0
	%[3]	100.0	97.5	--[4]	0.0	0.0	0.0
15-19	**N[2]**	4,583	3,959	543	55	4	0
	%[3]	100.0	86.8	11.9	1.2	--[4]	0.0
20-24	**N[2]**	12,475	7,292	3,740	1,068	231	68
	%[3]	100.0	58.8	30.2	8.6	1.9	0.5
25-29	**N[2]**	19,019	9,311	6,140	2,324	791	328
	%[3]	100.0	49.3	32.5	12.3	4.2	1.7
30-34	**N[2]**	23,152	9,174	9,083	3,259	984	492
	%[3]	100.0	39.9	39.5	14.2	4.3	2.1
35-39	**N[2]**	14,170	3,963	5,692	2,877	1,000	516
	%[3]	100.0	28.2	40.5	20.5	7.1	3.7
40-44	**N[2]**	3,286	900	1,220	640	267	233
	%[3]	100.0	27.6	37.4	19.6	8.2	7.1
45+	**N[2]**	241	84	68	31	19	36
	%[3]	100.0	35.3	28.6	13.0	8.0	15.1

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: 2008

	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	**8,155**	**10.6**	**19,577**	**25.5**	**16,469**	**21.5**	**20,358**	**26.5**	**12,170**	**15.9**
Race										
White non-Hispanic	2,836	5.5	11,537	22.3	11,193	21.7	16,319	31.6	9,797	19.0
Black non-Hispanic	849	12.8	2,454	36.9	2,083	31.4	972	14.6	286	4.3
Hispanic	3,722	34.2	3,974	36.5	2,043	18.8	790	7.3	358	3.3
Asian	481	8.1	1,049	17.6	771	13.0	2,044	34.4	1,604	27.0
Age (years)										
20-29	4,175	13.3	11,277	35.9	8,397	26.7	5,574	17.8	1,977	6.3
30-39	1,545	4.2	5,770	15.5	7,089	19.1	13,550	36.4	9,257	24.9
40+	176	5.0	553	15.8	620	17.7	1,224	34.9	935	26.7
Non-US-born[2]	3,450	42.3	6,159	31.5	3,727	22.6	4,790	23.5	3,118	25.6
Unmarried	6,116	75.0	11,328	57.9	6,453	39.2	1,682	8.3	482	4.0
Publicly-financed prenatal care	6,855	85.4	11,950	62.1	5,667	35.8	1,652	8.2	359	3.0
Very low birthweight[3]	137	1.7	321	1.6	201	1.2	235	1.2	96	0.8
Low birthweight[4]	707	8.7	1,720	8.8	1,271	7.8	1,443	7.1	775	6.4
Adequate prenatal care[5]	5,534	70.2	14,936	78.1	13,372	83.3	17,508	87.4	10,350	86.3
Cesarean delivery	2,190	27.0	6,168	31.6	5,912	36.2	7,443	36.8	4,470	36.9
Breastfeeding[6]	5,574	69.1	13,872	71.7	12,476	78.6	17,897	89.0	11,153	92.6
Multiple births	170	2.1	642	3.3	737	4.5	1,194	5.9	732	6.0
Smoking during pregnancy	1,392	17.1	2,400	12.3	1,262	7.7	183	0.9	42	0.3

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

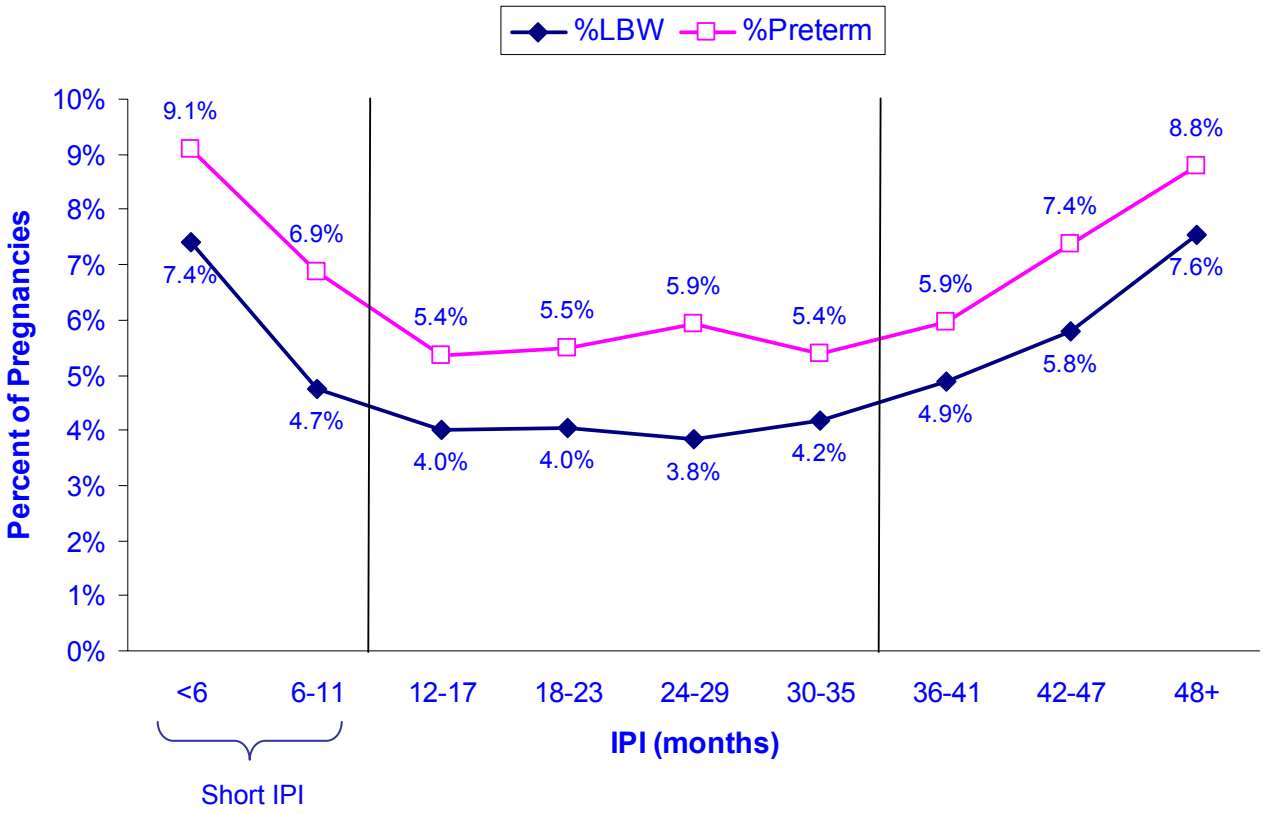
1. For state total, race and age categories, percentages are based on row totals. For all other categories, percentages are based on state column totals. 2. Includes women born outside of the 50 US States, Washington D.C., and Puerto Rico/US territories (the US Virgin Islands, and Guam). 3. Very low 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: 2008

	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	39,637	2,128	**5.4%**	340	**0.9%**	2,717	**6.9%**	163	**0.4%**
	<6	1,839	136	**7.4%**	18	**1.0%**	167	**9.1%**	11	**0.6%**
	6-11	4,523	214	**4.7%**	41	**0.9%**	310	**6.9%**	19	**0.4%**
	12-17	5,795	233	**4.0%**	36	**0.6%**	311	**5.4%**	19	**0.3%**
	18-23	5,005	202	**4.0%**	24	**0.5%**	274	**5.5%**	8	**0.2%**
	24-29	4,044	155	**3.8%**	18	**0.4%**	239	**5.9%**	11	**0.3%**
	30-35	3,108	130	**4.2%**	24	**0.8%**	167	**5.4%**	14	**0.5%**
	36-41	2,423	118	**4.9%**	20	**0.8%**	144	**5.9%**	10	**0.4%**
	42-47	1,885	109	**5.8%**	10	**0.5%**	139	**7.4%**	4	--[5]
	48+	11,015	831	**7.6%**	149	**1.4%**	966	**8.8%**	67	**0.6%**
Short	**0-11**	6,362	350	**5.5%**	59	**0.7%**	477	**26.0%**	30	**1.6%**
	12-35	17,952	720	**4.0%**	102	**0.6%**	991	**53.9%**	52	**2.8%**
	36+	15,323	1,058	**6.9%**	179	**1.2%**	1,249	**68.0%**	81	**4.4%**

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. 5. Calculations based on values of 1-4 are excluded.

Figure 12. Inter-pregnancy Interval (IPI) by Selected Birth Outcomes: LBW and Preterm -- Pregnancies to Multiparous Mothers, Massachusetts: 2008



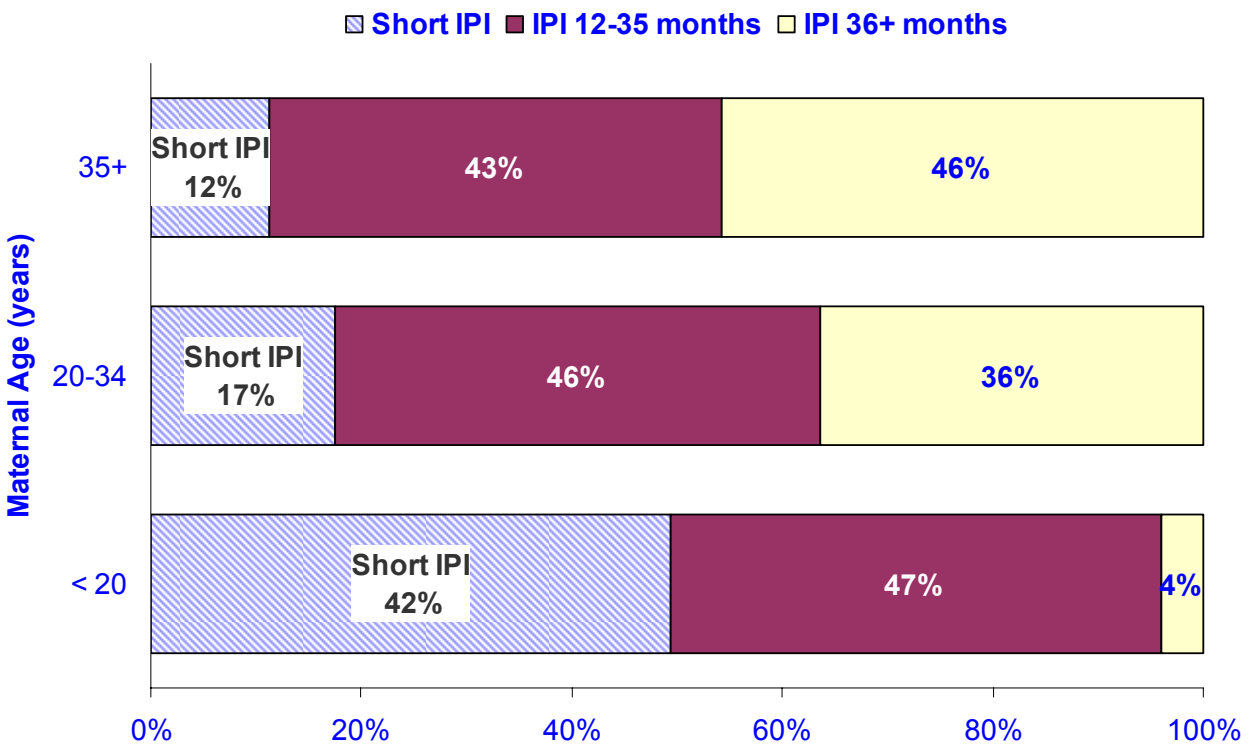
NOTE: Inter-pregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth. Short IPIs (less than 12 months) and IPIs over 35 months were associated with higher proportions of low birthweight (less than 2,500 grams or 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: 2008

	Total Pregnancies Parity >1		IPI[1]					
			Short < 12 months		12-35 months		36+ months	
	n	%	n	%	n	%	n	%
State Total[2]	**39,637**	**100%**	**6,362**	**16.1%**	**17,952**	**45.3%**	**15,323**	**38.7%**
Age								
< 20	567	1.4%	280	49.4%	264	46.6%	23	4.1%
20-34	27,211	68.7%	4,741	17.4%	12,590	46.3%	9,880	36.3%
35+	11,859	29.9%	1,341	11.3%	5,098	43.0%	5,420	45.7%
Race Ethnicity								
White non-Hispanic	26,175	66.0%	4,342	16.6%	13,070	49.9%	8,763	33.5%
Black non-Hispanic	3,635	9.2%	574	15.8%	1,208	33.2%	1,853	51.0%
Hispanic	6,236	15.7%	963	15.4%	2,189	35.1%	3,084	49.5%
Asian non-Hispanic	2,821	7.1%	368	13.0%	1,227	43.5%	1,226	43.5%
Education								
High School or less	14,838	37.4%	2,485	16.7%	5,295	35.7%	7,058	47.6%
BA or Assoc	19,001	47.9%	2,954	15.5%	9,158	48.2%	6,889	36.3%
More than college	5,748	14.5%	915	15.9%	3,477	60.5%	1,356	23.6%
Delivery Payment Source								
Public	14,668	37.0%	2,571	17.5%	5,220	35.6%	6,877	46.9%
Private	24,004	60.6%	3,630	15.1%	12,252	51.0%	8,122	33.8%
Region of Residence								
Western MA	4,964	12.5%	859	17.3%	2,105	42.4%	2,000	40.3%
Central MA	5,295	13.4%	876	16.5%	2,415	45.6%	2,004	37.8%
Northeast MA	8,068	20.4%	1,271	15.8%	3,599	44.6%	3,198	39.6%
Metrowest MA	8,748	22.1%	1,344	15.4%	4,566	52.2%	2,838	32.4%
Southeast MA	7,667	19.3%	1,282	16.7%	3,331	43.4%	3,054	39.8%
Boston Region	4,895	12.3%	730	14.9%	1,936	39.6%	2,229	45.5%
Town of Residence[3]			**Top 10**		**Top 10**		**Top 10**	
			Weymouth	(20.5%)	Arlington	(66.3%)	Everett	(53.6%)
			Fall River	(20.2%)	Natick	(61.8%)	Chelsea	(53.5%)
			Barnstable	(20.2%)	Needham	(59.7%)	Revere	(51.7%)
			Springfield	(19.5%)	Brookline	(58.0%)	Brockton	(50.3%)
			Haverhill	(19.3%)	Cambridge	(55.8%)	Lawrence	(49.7%)
			Holyoke	(19.2%)	Newton	(55.1%)	Fall River	(47.9%)
			New Bedford	(19.0%)	Braintree	(52.2%)	Malden	(47.7%)
			Plymouth	(18.9%)	Norwood	(50.2%)	Boston	(45.8%)
			Lawrence	(18.0%)	Woburn	(50.0%)	Lynn	(45.2%)
			Lowell	(17.7%)	Attleboro	(49.5%)	Springfield	(45.1%)

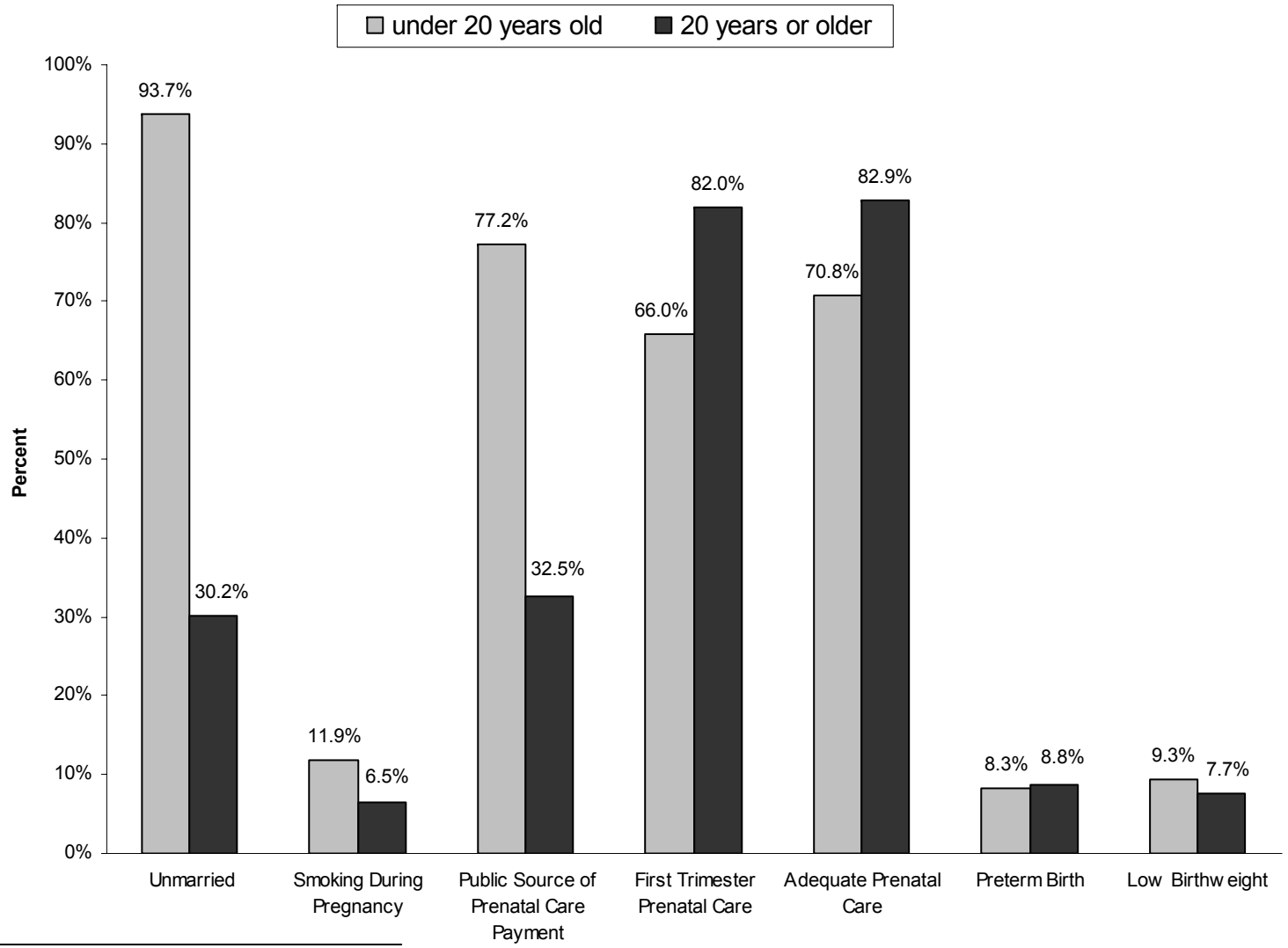
1. Inter-pregnancy Interval (IPI) is the time in months between the date of last menstrual period of current pregnancy and the date of previous live birth among multiparous mothers, i.e. among those giving birth to their 2nd or later child. 2. State total includes pregnancies with known IPI. 3. Among 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: 2008



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.

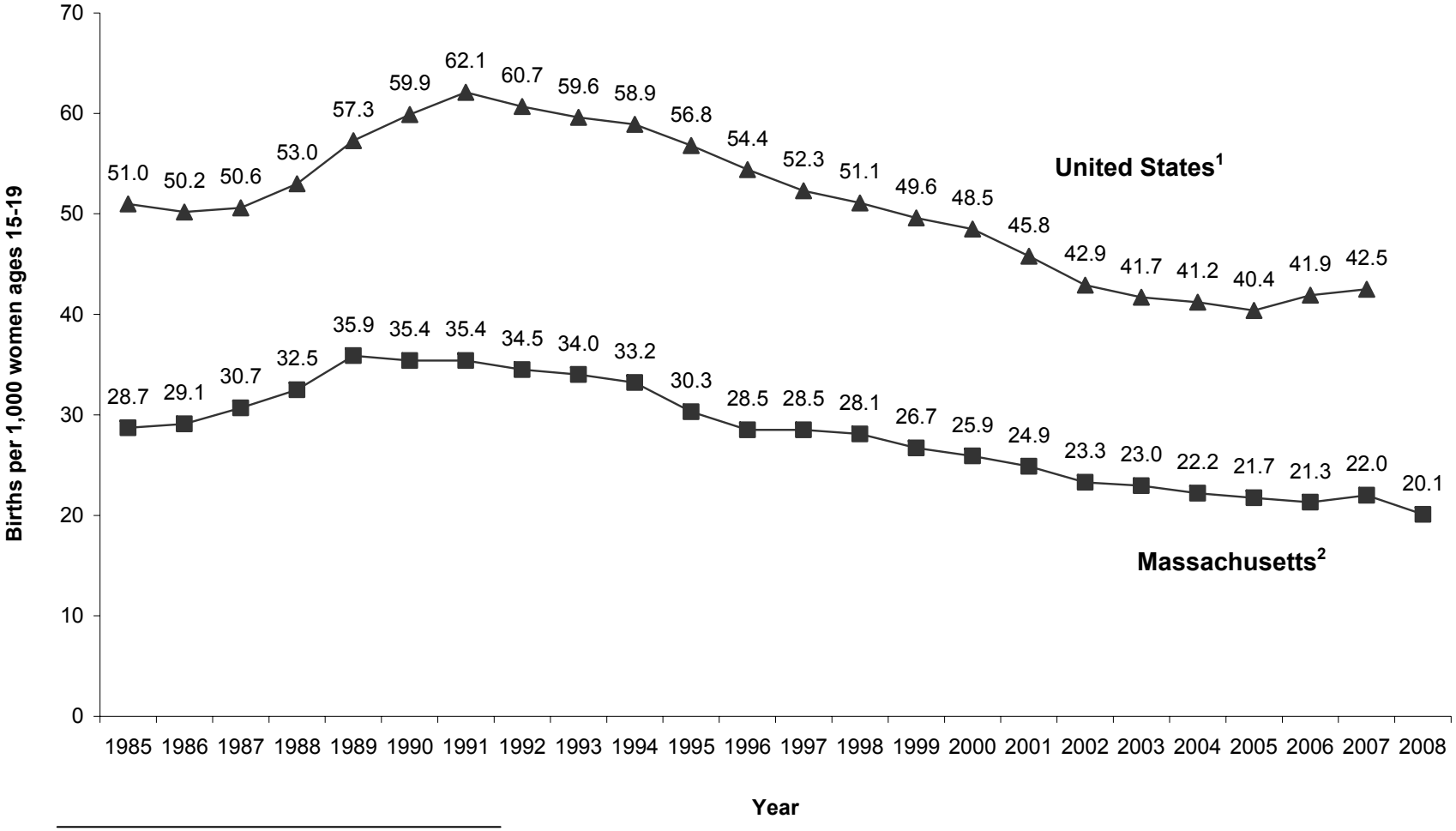
Figure 14. Comparison of Teen vs. Adult Births, Selected Characteristics, Massachusetts: 2008



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: 1985-2008



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). 2008 birth rates are based on the 2008 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: 2008

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**	**4,583**	**20.1**	**44.3**	**12.8**	**36.5**	**6.4**
Attleboro	29	1,134	30	26.4	73.3	6.7	16.7	3.3
Barnstable	25	1,360	31	22.8	64.5	9.7	12.9	12.9
Boston	1	19,770	565	28.6	14.3	40.0	38.4	7.3
Brockton	6	3,638	155	42.6	24.5	47.1	19.4	9.0
Brookline	18	1,451	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	5	3,923	22	5.6	22.7	54.5	22.7	0.0
Chicopee	21	1,738	59	33.9	52.5	5.1	42.4	0.0
Fall River	9	2,829	159	56.2	66.0	8.2	17.0	8.8
Framingham	14	1,955	53	27.1	45.3	3.8	49.1	1.9
Haverhill	15	1,908	61	32.0	52.5	4.9	39.3	3.3
Lawrence	12	3,027	245	80.9	6.1	0.8	91.8	1.2
Leominster	30	1,254	29	23.1	65.5	6.9	24.1	3.4
Lowell	4	3,966	193	48.7	30.6	4.7	31.1	33.7
Lynn	8	3,084	164	53.2	15.9	10.4	53.7	19.5
Malden	17	1,430	38	26.6	55.3	15.8	21.1	7.9
Medford	22	1,776	9	5.1	55.6	33.3	0.0	11.1
Methuen	27	1,327	30	22.6	60.0	0.0	40.0	0.0
New Bedford	7	2,955	186	62.9	48.9	7.5	32.8	10.8
Newton	11	3,500	5	1.4	40.0	20.0	20.0	20.0
Peabody	24	1,432	23	16.1	69.6	0.0	26.1	4.3
Pittsfield	28	1,270	60	47.2	63.3	13.3	18.3	5.0
Plymouth	20	1,672	30	17.9	96.7	0.0	0.0	3.3
Quincy	10	2,078	22	10.6	63.6	18.2	9.1	9.1
Revere	26	1,053	53	50.3	30.2	3.8	54.7	11.3
Somerville	13	2,170	33	15.2	24.2	24.2	42.4	9.1
Springfield	3	6,074	373	61.4	9.7	22.3	66.0	2.1
Taunton	19	1,631	40	24.5	75.0	0.0	17.5	7.5
Waltham	16	2,340	35	15.0	31.4	17.1	48.6	2.9
Weymouth	23	1,452	27	18.6	85.2	7.4	7.4	0.0
Worcester	2	7,036	256	36.4	69.1	2.3	26.2	2.3

Table 20 (cont'd). Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2008

Municipality	Public Payment for Prenatal Care[4] (%)	Unmarried (%)	Low Birthweight[6] (%)	Preterm[7] (%)	Adequacy of Prenatal Care[8]			
					Adequate Intensive	Adequate Basic	Intermediate	Inadequate
State Total	**77.0**	**93.6**	**9.2**	**8.2**	**31.1**	**39.8**	**9.8**	**19.3**
Attleboro	55.2	90.0	3.3	6.7	53.3	23.3	6.7	16.7
Barnstable	80.6	96.8	9.7	6.5	25.8	45.2	9.7	19.4
Boston	75.2	95.0	9.8	8.3	23.9	55.3	9.1	11.7
Brockton	82.8	95.5	8.4	6.5	25.5	41.2	9.8	23.5
Brookline	100.0	66.7	0.0	0.0	33.3	0.0	66.7	0.0
Cambridge	59.1	95.5	18.2	13.6	45.5	27.3	0.0	27.3
Chicopee	76.3	91.5	13.6	5.1	39.0	37.3	10.2	13.6
Fall River	89.7	96.2	8.8	6.3	64.3	18.5	1.9	15.3
Framingham	88.7	90.6	11.3	13.2	47.2	30.2	9.4	13.2
Haverhill	60.7	93.4	6.6	8.2	32.8	36.1	6.6	24.6
Lawrence	89.4	95.1	11.0	9.0	19.2	40.8	13.9	26.1
Leominster	86.2	93.1	3.4	6.9	25.0	46.4	7.1	21.4
Lowell	82.6	95.9	8.4	7.8	22.4	31.3	12.5	33.9
Lynn	84.4	89.6	8.3	6.9	40.0	33.1	8.1	18.8
Malden	65.8	78.9	7.9	15.8	42.1	26.3	7.9	23.7
Medford	88.9	77.8	0.0	0.0	44.4	44.4	0.0	11.1
Methuen	60.7	96.7	16.7	16.7	24.1	51.7	3.4	20.7
New Bedford	70.7	95.7	13.4	12.4	25.0	37.0	20.7	17.4
Newton	60.0	60.0	0.0	0.0	0.0	80.0	20.0	0.0
Peabody	66.7	95.7	9.1	13.6	36.4	31.8	0.0	31.8
Pittsfield	85.0	95.0	11.7	5.0	10.0	53.3	16.7	20.0
Plymouth	63.3	100	3.3	10.0	46.7	40.0	0.0	13.3
Quincy	76.2	95.5	13.6	18.2	23.8	38.1	9.5	28.6
Revere	80.4	84.9	18.9	15.1	36.5	44.2	3.8	15.4
Somerville	84.8	90.9	15.2	15.2	21.2	54.5	18.2	6.1
Springfield	87.2	96.2	10.2	9.4	25.3	37.0	8.2	29.6
Taunton	82.5	95.0	2.5	5.0	17.5	52.5	10.0	20.0
Waltham	80.0	88.6	11.4	11.4	34.3	37.1	11.4	17.1
Weymouth	76.9	96.3	7.4	7.4	44.4	37.0	0.0	18.5
Worcester	77.3	95.3	8.6	9.8	21.2	46.7	15.7	16.5

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. See Glossary under "Prenatal Care Payment Source." 5. Calculations based on values of 1-4 are excluded. 6. Less than 2,500 grams or 5.5 pounds. 7. Less than 37 weeks 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.

Table 21. Trends in Infant, Neonatal, and Post Neonatal Mortality by Race, Massachusetts: 1981-2008

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

Table 21 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race[1], Massachusetts: 1981-2008

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

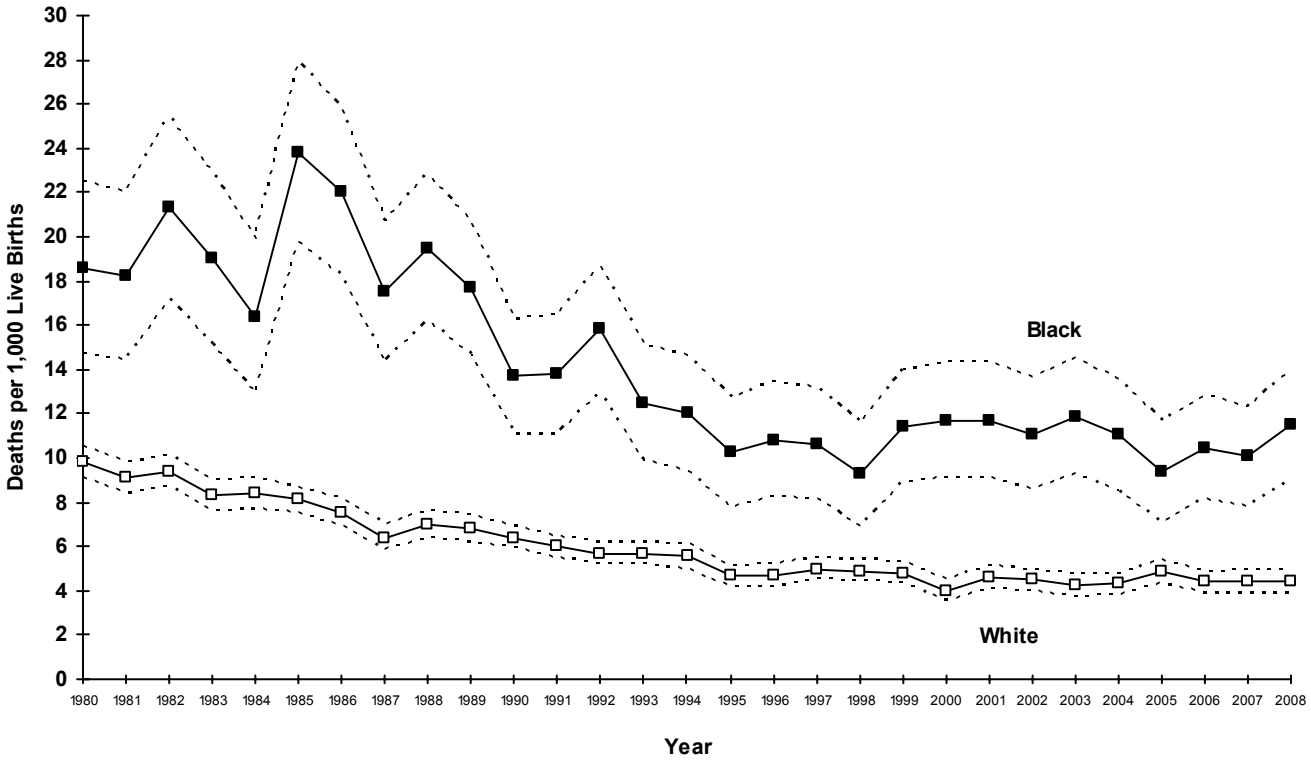
Table 21 (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality by Race[1], Massachusetts: 1981-2008

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

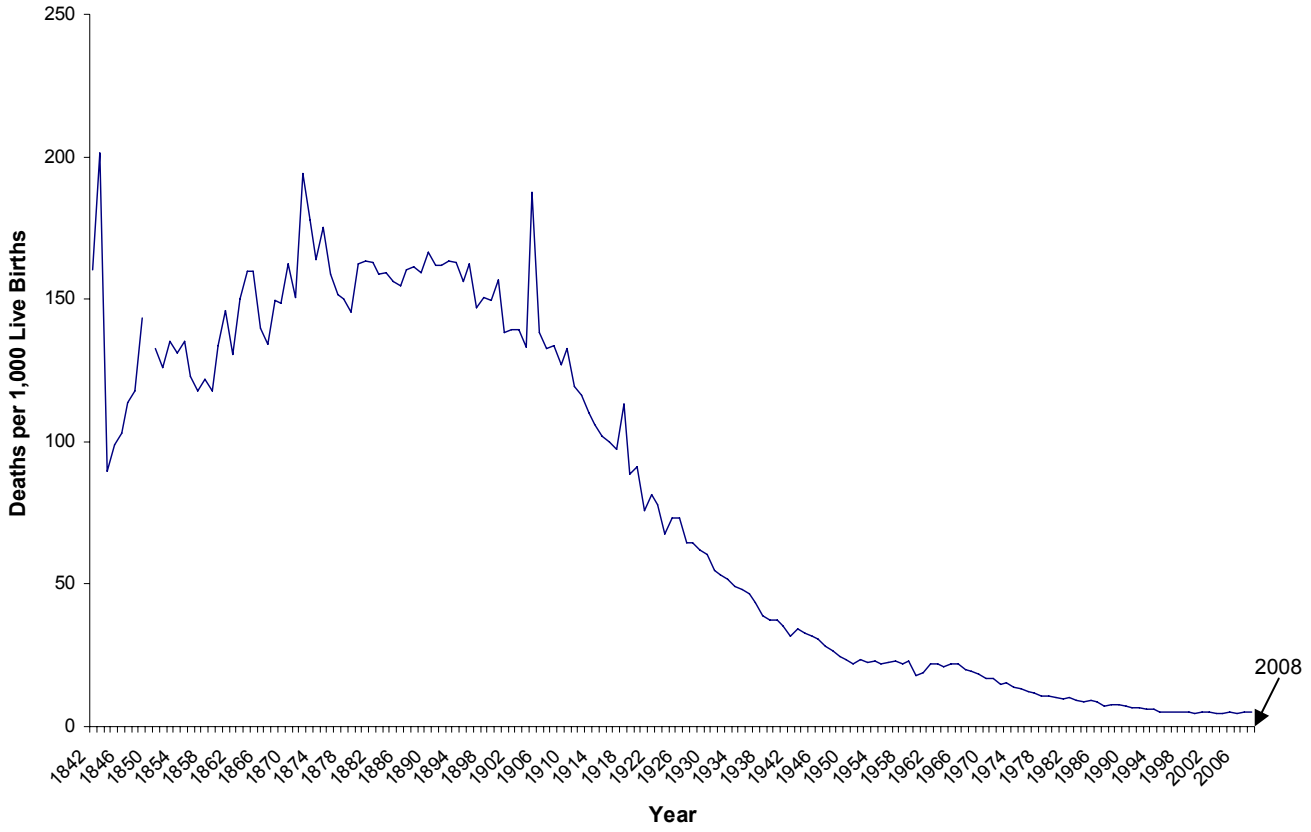
Note : Infant deaths are based on a preliminary death file as of the release of this report.
1. Hispanic origin could not be identified from the Massachusetts death certificate before 1989; thus, Hispanic trend data are not available. Most Hispanics are included in the race category of White. Hispanic 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: 1980-2008[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: 1842-2008



NOTE: Data not available for 1850.

Figure 18. Trends in the Timing of Infant Deaths, Massachusetts: 1990-2008

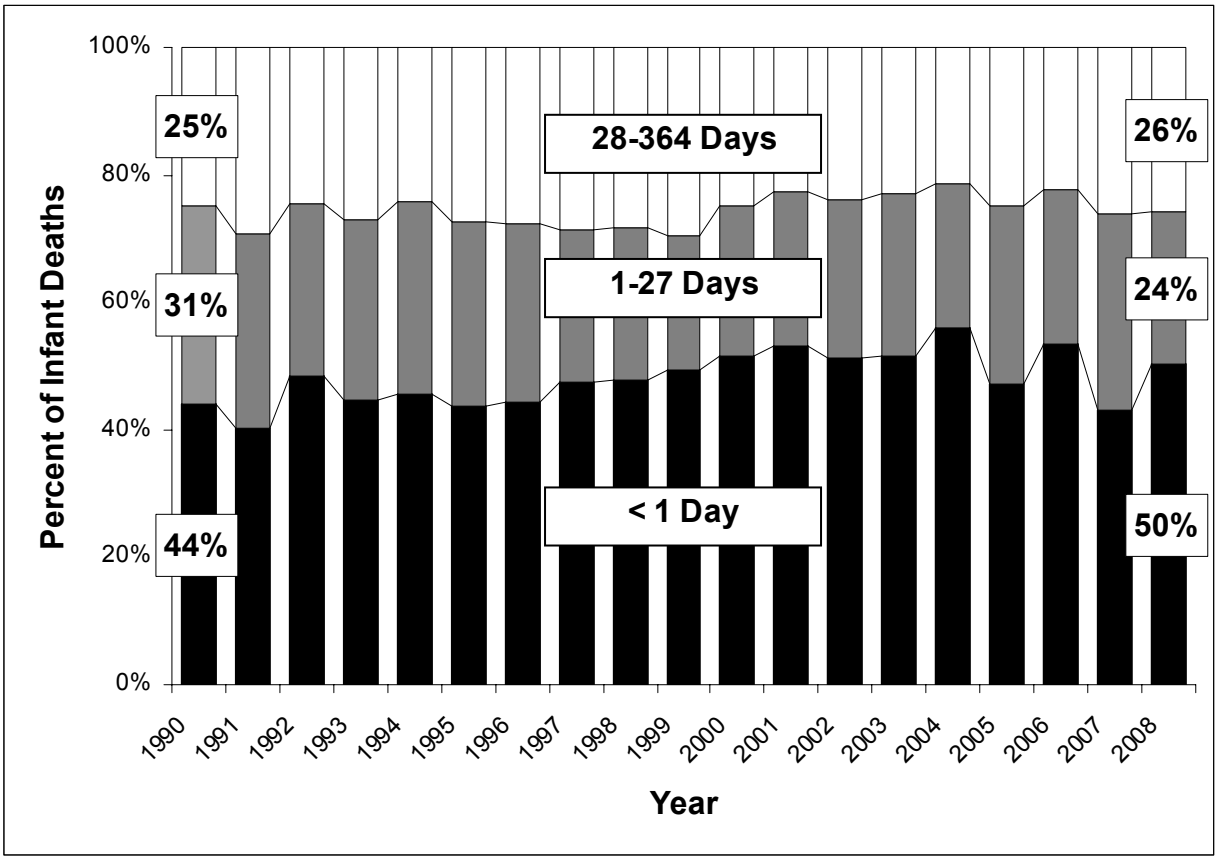
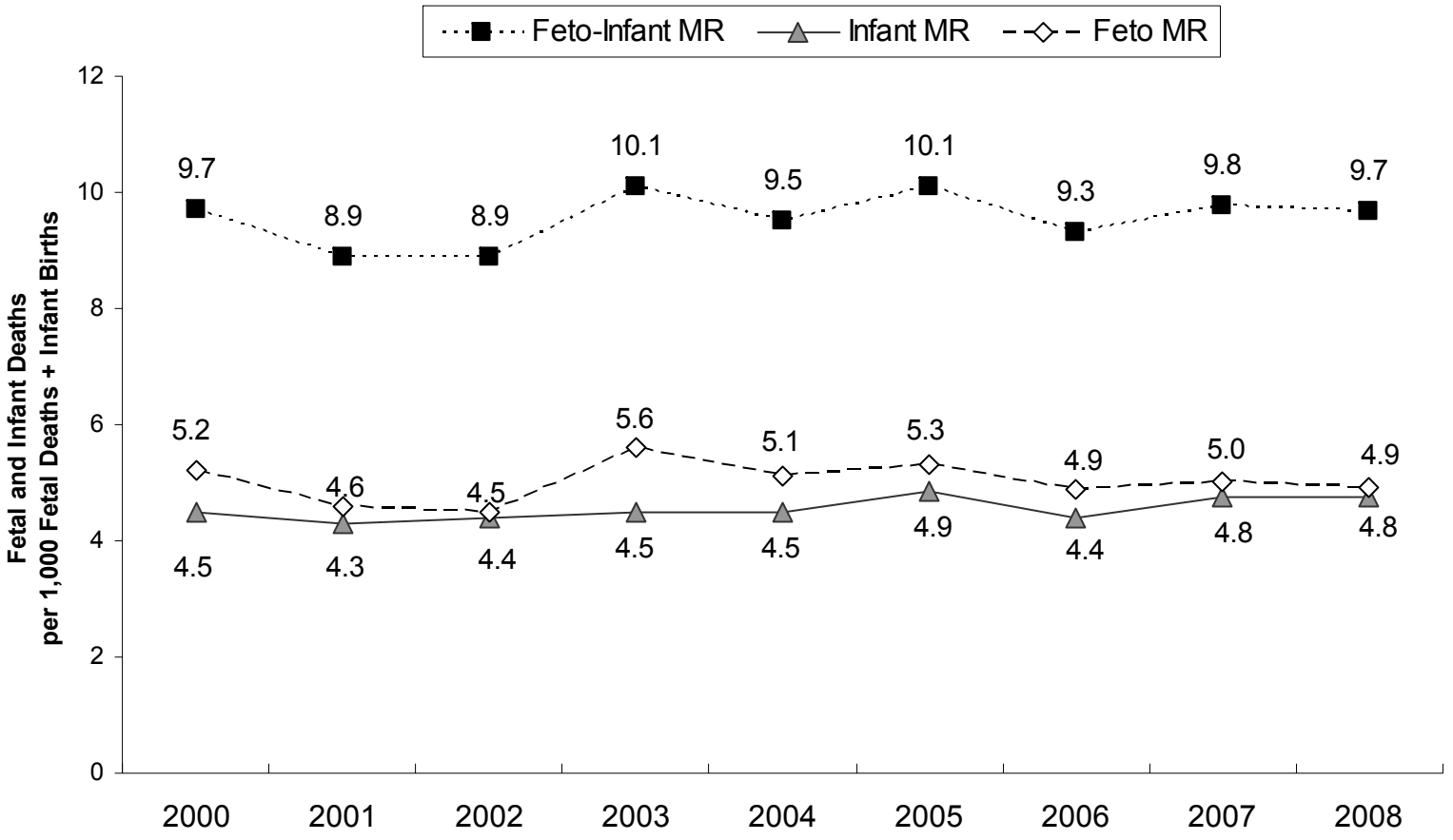


Table 22. Feto-Infant Mortality Rate[1] by Birthweight, Massachusetts: 2000-2008

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

Figure 19. Feto-Infant Mortality Rate, Massachusetts: 2000-2008

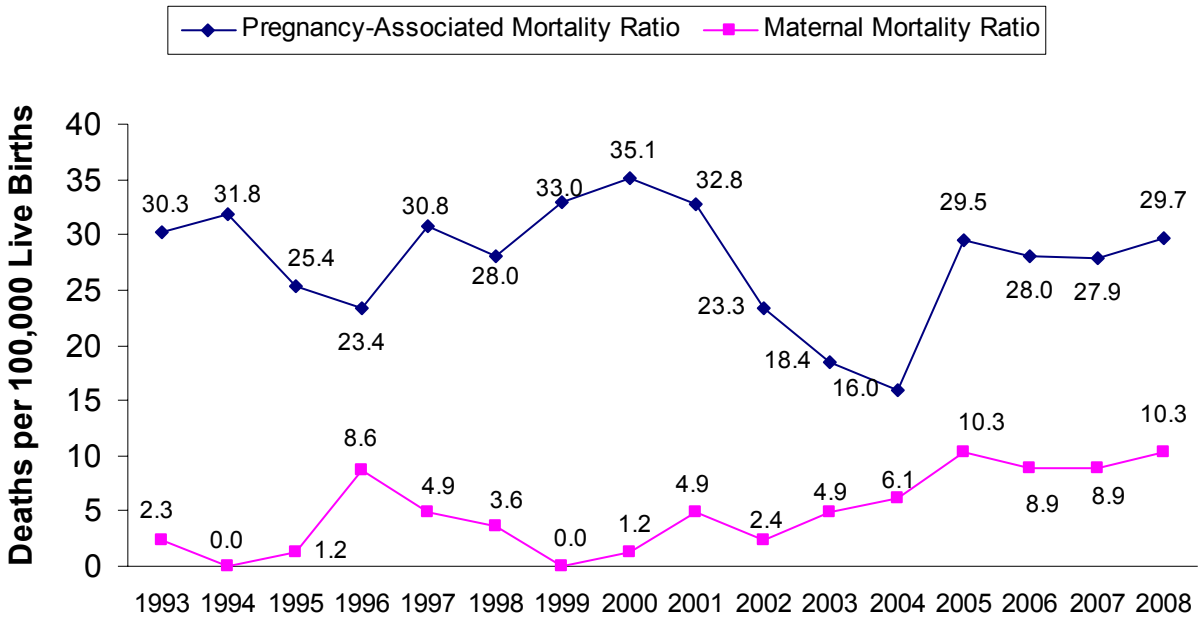


1. The Infant Mortality Rate in this graph includes fetal deaths in the denominator unlike the conventional IMR. 2. In this graph, Total Fetal, Infant, and Feto-Infant Mortality Rates include all deaths (including those with unknown birthweight). The Fetal Mortality Rate and Infant Mortality Rate may not add up to the Feto-Infant Mortality Rate due to rounding.

Table 23. Fetal and Infant Deaths by Birthweight and Gestational Age, Massachusetts: 1998-2008

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%)

Figure 20. Trends in Pregnancy-Associated and Maternal Mortality, Massachusetts: 1993-2008



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

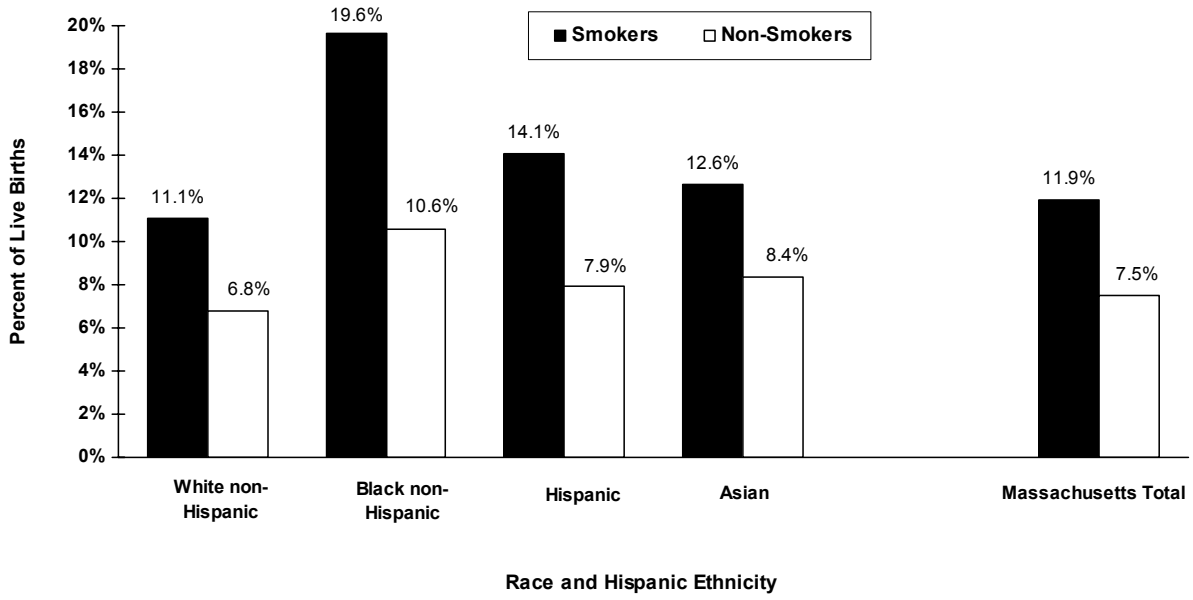
Pregnancy-associated death is defined as the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause. The pregnancy-associated mortality ratio is the number of pregnancy-associated deaths per 100,000 live occurrence births (see Definition of Rates and Technical 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: 1997-2008

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Pregnancy-Associated Deaths[1]	25	23	27	29	27	19	15	13	23	22	22	23
Maternal Deaths[2]	4	3	0	1	4	2	4	5	8	7	7	8

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: 2008



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: 2008

Mother's Age	Total LBW[1] Infants		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[4]		Unknown[5,6]
(in years)	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n
State Total[2]	**5,955**	**7.8**	**3,667**	**7.1**	**731**	**11.0**	**893**	**8.2**	**499**	**8.4**	**154**	**9.9**	**11**
<18	138	9.9	52	9.6	21	11.7	52	8.8	5	11.4	8	18.6	0
18-19	291	9.1	99	6.6	54	13.1	116	10.5	15	13.9	7	6.9	0
20-24	971	7.8	462	6.7	170	11.5	247	7.8	55	9.9	36	10.3	1
25-29	1,346	7.1	795	6.5	162	9.5	208	7.3	146	8.6	35	8.0	0
30-34	1,639	7.1	1,127	6.6	171	10.8	151	7.7	148	6.9	38	10.9	4
35-39	1,181	8.4	856	8.0	109	10.9	89	9.2	102	8.6	22	9.8	3
40+	389	11.1	276	10.3	44	14.7	30	12.8	28	11.2	8	14.3	3

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, thus, unknown percentages are not shown.

Table 26. Adequacy of Prenatal Care Utilization: Summary and Component Indices, Massachusetts: 2008

	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	61,774	82.1	28,026	37.3	33,748	44.9	5,844	7.8	7,589	10.1	1,762
Component Indices[3]											
Adequacy of Initiation	68,128	90.6	29,203	38.8	38,925	51.8	4,267	5.7	2,812	3.7	1,762
Adequacy of Received Services (Visits)	67,948	90.3	32,989	43.9	34,959	46.5	6,424	8.5	835	1.1	1,762

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.

Table 27. Adequacy of Prenatal Care by Selected Characteristics, Massachusetts: 2008

	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**61,774**	**82.1%**	**28,026**	**37.3%**	**33,748**	**44.9%**	**5,844**	**7.8%**	**7,589**	**10.1%**	**1,762**
Maternal Demographics											
Age											
<18	940	68.3%	448	32.5%	492	35.7%	103	7.5%	334	24.3%	24
18-19	2,276	72.0%	964	30.5%	1,312	41.5%	340	10.7%	547	17.3%	59
20-24	9,124	75.1%	4,129	34.0%	4,995	41.1%	1,180	9.7%	1,839	15.1%	332
25-29	15,201	81.8%	6,751	36.3%	8,450	45.5%	1,512	8.1%	1,861	10.0%	445
30-34	19,350	85.3%	8,523	37.6%	10,827	47.8%	1,633	7.2%	1,691	7.5%	478
35-39	11,919	86.1%	5,687	41.1%	6,232	45.0%	892	6.4%	1,036	7.5%	323
40+	2,964	86.4%	1,524	44.4%	1,440	42.0%	184	5.4%	281	8.2%	98
Educational Attainment											
< High school	5,534	70.2%	2,654	33.7%	2,880	36.5%	782	9.9%	1,571	19.9%	268
High school	14,936	78.1%	6,751	35.3%	8,185	42.8%	1,818	9.5%	2,381	12.4%	442
Some college	13,372	83.3%	6,500	40.5%	6,872	42.8%	1,159	7.2%	1,519	9.5%	419
College	17,508	87.4%	7,515	37.5%	9,993	49.9%	1,310	6.5%	1,223	6.1%	317
> College	10,350	86.3%	4,566	38.1%	5,784	48.3%	768	6.4%	869	7.2%	183
Race/Ethnicity											
Hispanic	8,081	76.1%	3,660	34.5%	4,421	41.6%	993	9.4%	1,541	14.5%	280
White non-Hispanic	42,954	84.6%	19,594	38.6%	23,360	46.0%	3,788	7.5%	4,055	8.0%	963
Black non-Hispanic	4,879	76.5%	2,170	34.0%	2,709	42.5%	495	7.8%	1,003	15.7%	275
Asian	4,661	79.3%	2,059	35.0%	2,602	44.3%	432	7.4%	783	13.3%	82
Other	1,170	78.2%	526	35.2%	644	43.0%	131	8.8%	195	13.0%	66
Birthplace											
US/D.C.	43,842	83.5%	20,071	38.2%	23,771	45.3%	4,008	7.6%	4,665	8.9%	1,168
Puerto Rico/US Terr.	1,476	75.7%	664	34.1%	812	41.7%	211	10.8%	262	13.4%	32
Non-US-born	16,453	79.3%	7,290	35.1%	9,163	44.2%	1,625	7.8%	2,662	12.8%	559
Pregnancy-Related Factors											
Parity[2]											
1	28,055	82.1%	12,397	36.3%	15,658	45.8%	2,639	7.7%	3,490	10.2%	539
2-3	30,036	83.2%	13,815	38.2%	16,221	44.9%	2,774	7.7%	3,309	9.2%	623
4+	3,614	75.0%	1,789	37.1%	1,825	37.9%	427	8.9%	780	16.2%	148
Smoking[3]											
Yes	3,700	71.8%	1,847	35.9%	1,853	36.0%	452	8.8%	1,000	19.4%	132
No	58,003	82.9%	26,146	37.4%	31,857	45.5%	5,384	7.7%	6,566	9.4%	1,518
Birth Outcomes											
Plurality											
Singleton	58,709	81.7%	25,382	35.3%	33,327	46.4%	5,769	8.0%	7,368	10.3%	1,629
Multiple birth	3,065	91.2%	2,644	78.7%	421	12.5%	75	2.2%	221	6.6%	133
Birthweight											
<500 g	116	89.9%	110	85.3%	6	4.7%	3	--[4]	10	7.8%	14
500-1,499 g	704	86.0%	633	77.3%	71	8.7%	24	2.9%	91	11.1%	44
1,500-2,499 g	4,081	85.3%	3,236	67.6%	845	17.7%	190	4.0%	516	10.8%	162
2,500-3,999 g	50,865	81.7%	21,785	35.0%	29,080	46.7%	5,028	8.1%	6,345	10.2%	1,057
4,000+ g	5,954	83.1%	2,229	31.1%	3,725	52.0%	596	8.3%	613	8.6%	104
Gestational Age											
<28 weeks	369	85.6%	337	78.2%	32	7.4%	14	3.2%	48	11.1%	37
<37 weeks	5,624	86.5%	4,900	75.3%	724	11.1%	218	3.4%	662	10.2%	246
37-42 weeks	56,123	81.7%	23,109	33.7%	33,014	48.1%	5,619	8.2%	6,910	10.1%	1,127

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 28. Adequacy of Prenatal Care Initiation by Selected Characteristics, Massachusetts: 2008

	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**68,128**	**90.6%**	**29,203**	**38.8%**	**38,925**	**51.8%**	**4,267**	**5.7%**	**2,812**	**3.7%**	**1,762**
Maternal Demographics											
Age											
<18	1,062	77.1%	323	23.5%	739	53.7%	208	15.1%	107	7.8%	24
18-19	2,657	84.0%	985	31.1%	1,672	52.9%	333	10.5%	173	5.5%	59
20-24	10,422	85.8%	3,830	31.5%	6,592	54.3%	1,101	9.1%	620	5.1%	332
25-29	16,821	90.6%	7,136	38.4%	9,685	52.1%	1,080	5.8%	673	3.6%	445
30-34	21,116	93.1%	9,656	42.6%	11,460	50.5%	876	3.9%	682	3.0%	478
35-39	12,881	93.0%	5,845	42.2%	7,036	50.8%	521	3.8%	445	3.2%	323
40+	3,169	92.4%	1,428	41.6%	1,741	50.8%	148	4.3%	112	3.3%	98
Educational Attainment											
< High school	6,412	81.3%	2,124	26.9%	4,288	54.4%	962	12.2%	513	6.5%	268
High school	16,941	88.5%	6,612	34.6%	10,329	54.0%	1,401	7.3%	793	4.1%	442
Some college	14,607	91.0%	5,869	36.6%	8,738	54.4%	894	5.6%	549	3.4%	419
College	18,917	94.4%	9,398	46.9%	9,519	47.5%	599	3.0%	525	2.6%	317
> College	11,169	93.2%	5,172	43.1%	5,997	50.0%	401	3.3%	417	3.5%	183
Race/Ethnicity											
Hispanic	9,156	86.3%	3,603	33.9%	5,553	52.3%	954	9.0%	505	4.8%	280
White non-Hispanic	47,075	92.7%	20,479	40.3%	26,596	52.4%	2,260	4.4%	1,462	2.9%	963
Black non-Hispanic	5,435	85.2%	2,456	38.5%	2,979	46.7%	518	8.1%	424	6.6%	275
Asian	5,119	87.1%	2,062	35.1%	3,057	52.0%	429	7.3%	328	5.6%	82
Other	1,309	87.5%	590	39.4%	719	48.1%	101	6.8%	86	5.7%	66
Birthplace											
US/D.C.	48,205	91.8%	20,968	39.9%	27,237	51.9%	2,689	5.1%	1,621	3.1%	1,168
Puerto Rico/US Terr.	1,712	87.8%	664	34.1%	1,048	53.8%	161	8.3%	76	3.9%	32
Non-US-born	18,208	87.8%	7,571	36.5%	10,637	51.3%	1,417	6.8%	1,115	5.4%	559
Pregnancy-Related Factors											
Parity[2]											
1	30,899	90.4%	13,475	39.4%	17,424	51.0%	1,930	5.6%	1,355	4.0%	539
2-3	33,073	91.6%	14,113	39.1%	18,960	52.5%	1,863	5.2%	1,183	3.3%	623
4+	4,082	84.7%	1,569	32.5%	2,513	52.1%	469	9.7%	270	5.6%	148
Smoking[3]											
Yes	4,206	81.6%	1,412	27.4%	2,794	54.2%	599	11.6%	347	6.7%	132
No	63,843	91.3%	27,757	39.7%	36,086	51.6%	3,660	5.2%	2,450	3.5%	1,518
Birth Outcomes											
Plurality											
Singleton	64,984	90.4%	27,745	38.6%	37,239	51.8%	4,112	5.7%	2,750	3.8%	1,629
Multiple birth	3,144	93.5%	1,458	43.4%	1,686	50.2%	155	4.6%	62	1.8%	133
Birthweight											
<500 g	119	92.2%	55	42.6%	64	49.6%	1	--[4]	9	7.0%	14
500-1,499 g	734	89.6%	350	42.7%	384	46.9%	59	7.2%	26	3.2%	44
1,500-2,499 g	4,289	89.6%	1,998	41.7%	2,291	47.9%	311	6.5%	187	3.9%	162
2,500-3,999 g	56,328	90.5%	23,923	38.4%	32,405	52.1%	3,560	5.7%	2,350	3.8%	1,057
4,000+ g	6,600	92.1%	2,856	39.9%	3,744	52.3%	328	4.6%	235	3.3%	104
Gestational Age											
<28 weeks	383	88.9%	179	41.5%	204	47.3%	25	5.8%	23	5.3%	37
<37 weeks	5,864	90.2%	2,828	43.5%	3,036	46.7%	410	6.3%	230	3.5%	246
37-42 weeks	62,230	90.6%	26,363	38.4%	35,867	52.2%	3,855	5.6%	2,567	3.7%	1,127

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: 2008

	Adequate Total[1]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**67,948**	**90.3%**	**32,989**	**43.9%**	**34,959**	**46.5%**	**6,424**	**8.5%**	**835**	**1.1%**	**1,762**
Maternal Demographics											
Age											
<18	1,205	87.5%	653	47.4%	552	40.1%	142	10.3%	30	2.2%	24
18-19	2,702	85.4%	1,283	40.6%	1,419	44.9%	391	12.4%	70	2.2%	59
20-24	10,570	87.0%	5,214	42.9%	5,356	44.1%	1,340	11.0%	233	1.9%	332
25-29	16,725	90.0%	7,972	42.9%	8,753	47.1%	1,666	9.0%	183	1.0%	445
30-34	20,759	91.6%	9,716	42.9%	11,043	48.7%	1,730	7.6%	185	0.8%	478
35-39	12,790	92.4%	6,419	46.4%	6,371	46.0%	955	6.9%	102	0.7%	323
40+	3,197	93.2%	1,732	50.5%	1,465	42.7%	200	5.8%	32	0.9%	98
Educational Attainment											
< High school	6,774	85.9%	3,593	45.6%	3,181	40.3%	941	11.9%	172	2.2%	268
High school	16,782	87.7%	8,162	42.7%	8,620	45.0%	2,035	10.6%	318	1.7%	442
Some college	14,629	91.1%	7,516	46.8%	7,113	44.3%	1,268	7.9%	153	1.0%	419
College	18,551	92.6%	8,409	42.0%	10,142	50.6%	1,367	6.8%	123	0.6%	317
> College	11,125	92.8%	5,259	43.9%	5,866	48.9%	804	6.7%	58	0.5%	183
Race/Ethnicity											
Hispanic	9,360	88.2%	4,646	43.8%	4,714	44.4%	1,120	10.6%	135	1.3%	280
White non-Hispanic	46,212	91.0%	22,245	43.8%	23,967	47.2%	4,071	8.0%	514	1.0%	963
Black non-Hispanic	5,675	89.0%	2,805	44.0%	2,870	45.0%	588	9.2%	114	1.8%	275
Asian	5,342	90.9%	2,627	44.7%	2,715	46.2%	483	8.2%	51	0.9%	82
Other	1,322	88.4%	641	42.8%	681	45.5%	157	10.5%	17	1.1%	66
Birthplace											
US/D.C.	47,542	90.5%	23,030	43.9%	24,512	46.7%	4,372	8.3%	601	1.1%	1,168
Puerto Rico/US Terr.	1,677	86.0%	815	41.8%	862	44.2%	238	12.2%	34	1.7%	32
Non-US-born	18,726	90.3%	9,143	44.1%	9,583	46.2%	1,814	8.7%	200	1.0%	559
Pregnancy-Related Factors											
Parity[2]											
1	30,967	90.6%	14,783	43.2%	16,184	47.3%	2,877	8.4%	340	1.0%	539
2-3	32,689	90.5%	15,939	44.1%	16,750	46.4%	3,030	8.4%	400	1.1%	623
4+	4,217	87.5%	2,236	46.4%	1,981	41.1%	513	10.6%	91	1.9%	148
Smoking[3]											
Yes	4,437	86.1%	2,381	46.2%	2,056	39.9%	568	11.0%	147	2.9%	132
No	63,428	90.7%	30,564	43.7%	32,864	47.0%	5,846	8.4%	679	1.0%	1,518
Birth Outcomes											
Plurality											
Singleton	64,687	90.0%	30,176	42.0%	34,511	48.0%	6,337	8.8%	822	1.1%	1,629
Multiple birth	3,261	97.0%	2,813	83.7%	448	13.3%	87	2.6%	13	0.4%	133
Birthweight											
<500 g	117	90.7%	110	85.3%	7	5.4%	3	--[4]	9	7.0%	14
500-1,499 g	772	94.3%	688	84.0%	84	10.3%	25	3.1%	22	2.7%	44
1,500-2,499 g	4,509	94.2%	3,606	75.3%	903	18.9%	219	4.6%	59	1.2%	162
2,500-3,999 g	56,032	90.0%	25,908	41.6%	30,124	48.4%	5,533	8.9%	673	1.1%	1,057
4,000+ g	6,455	90.1%	2,637	36.8%	3,818	53.3%	640	8.9%	68	0.9%	104
Gestational Age											
<28 weeks	396	91.9%	359	83.3%	37	8.6%	14	3.2%	21	4.9%	37
<37 weeks	6,163	94.8%	5,366	82.5%	797	12.3%	243	3.7%	98	1.5%	246
37-42 weeks	61,756	90.0%	27,605	40.2%	34,151	49.7%	6,174	9.0%	722	1.1%	1,127

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 30. Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment, Massachusetts: 2008

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]	**76,969**	**100.0**	**1,401**	**1.8**	**4,623**	**6.0**	**1,006**	**1.3**	**5,955**	**7.8**
Public	26,514	35.2	1,056	4.0	3,505	13.2	360	1.4	2,180	8.2
Medicaid[5]	19,469	25.9	827	4.2	2,758	14.2	256	1.3	1,605	8.2
Other Public[6]	7,045	9.4	229	3.3	747	10.6	104	1.5	575	8.2
Private[7]	47,857	63.6	306	0.6	998	2.1	542	1.1	3,456	7.2
White non-Hispanic	**51,760**	**100.0**	**540**	**1.0**	**2,035**	**3.9**	**563**	**1.1**	**3,667**	**7.1**
Public	12,441	24.6	353	2.8	1,383	11.1	128	1.0	926	7.4
Medicaid[5]	9,612	19.0	294	3.1	1,165	12.1	97	1.0	713	7.4
Other Public[6]	2,829	5.6	59	2.1	218	7.7	31	1.1	213	7.5
Private[7]	37,323	73.9	173	0.5	590	1.6	366	1.0	2,508	6.7
Black non-Hispanic	**6,652**	**100.0**	**179**	**2.7**	**592**	**8.9**	**182**	**2.7**	**731**	**11.0**
Public	3,838	58.4	133	3.5	461	12.0	87	2.3	409	10.7
Medicaid[5]	2,962	45.0	104	3.5	382	12.9	68	2.3	317	10.7
Other Public[6]	876	13.3	29	3.3	79	9.0	19	2.2	92	10.5
Private[7]	2,678	40.7	44	1.6	121	4.5	83	3.1	299	11.2
Hispanic	**10,895**	**100.0**	**591**	**5.4**	**1,696**	**15.6**	**163**	**1.5**	**893**	**8.2**
Public	7,801	72.2	505	6.5	1,439	18.4	118	1.5	641	8.2
Medicaid[5]	5,082	47.0	369	7.3	1,015	20.0	76	1.5	436	8.6
Other Public[6]	2,719	25.2	136	5.0	424	15.6	42	1.5	205	7.5
Private[7]	2,936	27.2	72	2.5	227	7.7	38	1.3	234	8.0
Asian	**5,958**	**100.0**	**44**	**0.7**	**152**	**2.6**	**65**	**1.1**	**499**	**8.4**
Public	1,528	26.0	38	2.5	127	8.3	15	1.0	124	8.1
Medicaid[5]	1,158	19.7	36	3.1	119	10.3	10	0.9	91	7.9
Other Public[6]	370	6.3	2	--[8]	8	2.2	5	1.4	33	8.9
Private[7]	4,299	73.1	4	--[8]	19	0.4	45	1.0	355	8.3
Other[9]	**1,562**	**100.0**	**43**	**2.8**	**144**	**9.2**	**31**	**2.0**	**154**	**9.9**
Public	892	59.2	27	3.0	95	10.7	12	1.3	80	9.0
Medicaid[5]	641	42.6	24	3.7	77	12.0	5	0.8	48	7.5
Other Public[6]	251	16.7	3	--[8]	18	7.2	7	2.8	32	12.7
Private[7]	595	39.5	13	2.2	41	6.9	9	1.5	53	8.9

Table 30 (cont'd). Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment, Massachusetts: 2008

Race/Ethnicity and Payment Source	Prenatal Care: Adequate[10] n	Adequate[10] %	Began 1st Trimester n	Began 1st Trimester %	Cesarean Delivery n	Cesarean Delivery %	Breastfeeding[11] n	Breastfeeding[11] %
STATE TOTAL[4]	**61,774**	**82.1**	**61,292**	**81.0**	**26,240**	**34.3**	**61,033**	**80.8**
Public	19,288	74.4	18,460	70.6	8,042	30.4	19,467	73.5
Medicaid[5]	14,387	75.2	13,861	72.1	5,997	30.8	13,839	71.1
Other Public[6]	4,901	72.2	4,599	66.6	2,045	29.0	5,628	80.0
Private[7]	41,242	86.9	41,529	87.3	17,504	36.6	40,658	85.0
White non-Hispanic	**42,954**	**84.6**	**43,155**	**84.6**	**18,286**	**35.5**	**39,855**	**78.7**
Public	9,430	76.6	9,098	73.7	3,914	31.5	8,081	65.0
Medicaid[5]	7,334	77.1	7,065	74.1	3,009	31.3	5,940	61.8
Other Public[6]	2,096	74.9	2,033	72.1	905	32.0	2,141	75.7
Private[7]	32,470	87.6	32,948	88.8	13,801	37.0	31,082	83.3
Black non-Hispanic	**4,879**	**76.5**	**4,697**	**72.5**	**2,344**	**35.4**	**5,576**	**84.5**
Public	2,580	70.9	2,463	66.4	1,281	33.4	3,116	81.3
Medicaid[5]	2,080	73.2	2,025	70.4	972	32.9	2,398	81.0
Other Public[6]	500	62.5	438	52.4	309	35.4	718	82.1
Private[7]	2,254	85.5	2,186	82.3	1,021	38.2	2,396	89.5
Hispanic	**8,081**	**76.1**	**7,749**	**72.4**	**3,179**	**29.3**	**9,055**	**83.6**
Public	5,575	73.3	5,307	69.1	2,141	27.5	6,362	81.6
Medicaid[5]	3,661	73.1	3,545	70.4	1,485	29.3	4,120	81.2
Other Public[6]	1,914	73.7	1,762	66.6	656	24.2	2,242	82.6
Private[7]	2,453	84.4	2,390	81.9	1,010	34.4	2,619	89.2
Asian	**4,661**	**79.3**	**4,494**	**76.3**	**1,876**	**31.6**	**5,189**	**88.1**
Public	1,057	70.2	956	63.2	385	25.2	1,133	74.2
Medicaid[5]	835	72.9	756	65.9	308	26.6	833	72.1
Other Public[6]	222	61.7	200	54.9	77	20.8	300	81.1
Private[7]	3,546	82.9	3,482	81.4	1,459	34.0	4,003	93.1
Other[9]	1,170	78.2	1,167	77.0	540	34.8	1,320	87.2
Public	639	74.2	630	72.3	315	35.3	765	85.9
Medicaid[5]	470	75.2	464	73.9	217	33.9	538	84.1
Other Public[6]	169	71.6	166	68.3	98	39.0	227	90.4
Private[7]	501	85.2	504	85.7	206	34.7	535	89.9

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). 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.

Table 31. Cesarean Deliveries and Vaginal Births after Cesarean (VBACs) by Licensed Maternity Facility, All Births, Massachusetts: 2008

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	**77,542**	**26,505**	**34.4**	**15,897**	**24.2**	**10,608**	**91.9**	**934**	**8.1**
Anna Jaques Hospital	726	252	34.7	165	26.4	87	86.1	14	13.9
Baystate Franklin Medical Center	470	115	24.5	77	18.3	38	77.6	11	22.4
Baystate Mary Lane Hospital	180	56	31.1	29	19.0	27	100.0	0	0.0
Baystate Medical Center	4,239	1,359	32.1	803	22.3	556	86.9	84	13.1
Berkshire Medical Center	717	215	30.0	124	20.2	91	89.2	11	10.8
Beth Israel Deaconess Medical Center	5,086	2,076	40.8	1,235	29.6	841	92.3	70	7.7
Beverly Hospital	2,092	619	34.8	356	23.7	263	96.0	11	4.0
Boston Medical Center	2,417	725	30.1	423	20.1	302	98.4	5	1.6
Brigham And Women's Hospital	8,115	2,853	35.2	1,823	26.4	1,030	86.8	157	13.2
Brockton Hospital	1,232	506	41.1	293	29.1	213	94.7	12	5.3
Cambridge Hospital	1,337	377	28.3	222	19.2	155	89.1	19	10.9
Cape Cod Hospital	904	292	32.3	174	22.3	118	95.2	6	4.8
Caritas Good Samaritan Medical Center	952	360	37.8	203	25.8	157	95.2	8	4.8
Caritas Holy Family Hospital And Medical Center	1,198	568	47.4	339	35.1	229	98.7	3	--[8]
Caritas Norwood Hospital	562	209	37.2	130	27.3	79	92.9	6	7.1
Caritas St. Elizabeth's Medical Center Of Boston	1,136	404	35.6	214	23.1	190	91.3	18	8.7
Charlton Memorial Hospital	1,686	615	36.5	377	26.1	238	100.0	0	0.0
Cooley Dickinson Hospital	846	248	29.3	150	20.5	98	85.2	17	14.8
Emerson Hospital	1,143	436	38.1	262	27.4	174	93.0	13	7.0
Fairview Hospital	179	57	31.8	33	21.3	24	100.0	0	0.0
Falmouth Hospital	616	229	37.6	132	25.8	97	100.0	0	0.0
Harrington Memorial Hospital	345	131	38.0	88	29.4	43	93.5	3	--[8]
Heywood Memorial Hospital	551	89	16.2	37	7.6	52	83.9	10	16.1
Holyoke Hospital	663	143	21.6	83	13.9	60	90.9	6	9.1
Jordan Hospital	711	248	34.9	145	24.1	103	94.5	6	5.5
Lawrence General Hospital	1,711	551	32.2	282	19.7	269	97.1	8	2.9
Leominster Hospital	1,096	243	22.2	129	13.2	114	93.4	8	6.6
Lowell General Hospital	2,318	830	35.8	493	25.1	337	95.5	16	4.5
Martha's Vineyard Hospital	165	47	28.5	25	17.5	22	100.0	0	0.0
Massachusetts General Hospital	3,624	1,142	31.5	722	22.9	420	89.2	51	10.8
Melrose-Wakefield Hospital	1,226	560	45.7	362	35.3	198	99.0	2	--[8]
Mercy Medical Center	1,339	342	25.5	203	17.0	139	95.2	7	4.8

Table 31 (cont'd). Cesarean Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility, All Births, Massachusetts: 2008

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	1,714	717	41.8	405	28.9	312	100.0	0	0.0
Milford Regional Medical Center	995	344	34.6	208	24.4	136	94.4	8	5.6
Morton Hospital	521	179	34.4	88	20.5	91	98.9	1	--[8]
Mount Auburn Hospital	2,057	564	27.4	393	21.4	171	77.7	49	22.3
Nantucket Cottage Hospital	147	53	36.1	39	29.3	14	100.0	0	0.0
Newton Wellesley Hospital	3,750	1,391	37.1	847	26.7	544	93.3	39	6.7
North Adams Regional Hospital	269	49	18.2	29	11.8	20	83.3	4	--[8]
North Shore Medical Center - Salem Hospital	1,677	540	32.2	324	22.6	216	89.3	26	10.7
Saint Vincent Hospital	2,025	652	32.2	398	23.0	254	86.1	41	13.9
Saints Memorial Medical Ctr.-St. John's Campus[9]	164	58	36.5	34	25.2	24	100.0	0	0.0
South Shore Hospital	3,649	1,601	43.9	973	32.9	628	91.1	61	8.9
St. Luke's Hospital	1,520	575	37.9	338	26.4	237	99.6	1	--[8]
Sturdy Memorial Hospital	968	374	38.6	223	27.6	151	95.0	8	5.0
Tobey Hospital	435	83	19.1	50	12.5	33	97.1	1	--[8]
Tufts Medical Center	1,319	520	39.4	330	29.6	190	92.2	16	7.8
UMASS Memorial Medical Center - West Campus	4,217	1,212	28.7	686	18.9	526	88.7	67	11.3
Winchester Hospital	1,914	694	36.3	398	24.8	296	96.4	11	3.6

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. 9. Closed to births on 4/1/2008.

Table 32. Cesarean Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2008

Facility[1]	First Birth			Second or Later Birth without prior Cesarean			Second or Later Birth with prior Cesarean		
	Births[2]	Cesareans		Births[2]	Cesareans		Births[2]	Cesareans	
		n	%[3]		n	%[3]		n	%[3]
State Total	**33,899**	**11,074**	**32.7**	**28,670**	**2,714**	**9.5**	**10,821**	**9,914**	**91.6**
Anna Jaques Hospital	332	124	37.3	266	22	8.3	97	83	85.6
Baystate Franklin Medical Center	214	54	25.2	185	9	4.9	47	36	76.6
Baystate Mary Lane Hospital	77	24	31.2	72	3	--[4]	25	25	100.0
Baystate Medical Center	1,667	493	29.6	1,734	178	10.3	600	519	86.5
Berkshire Medical Center	304	96	31.6	296	17	5.7	99	89	89.9
Beth Israel Deaconess Medical Center	2,273	825	36.3	1,595	144	9.0	849	780	91.9
Beverly Hospital	741	254	34.3	652	49	7.5	244	234	95.9
Boston Medical Center	1,073	312	29.1	991	89	9.0	294	289	98.3
Brigham And Women's Hospital	3,681	1,143	31.1	2,677	263	9.8	979	837	85.5
Brockton Hospital	528	215	40.7	460	66	14.3	218	206	94.5
Cambridge Hospital	703	175	24.9	445	38	8.5	172	153	89.0
Cape Cod Hospital	399	122	30.6	365	41	11.2	122	116	95.1
Caritas Good Samaritan Medical Center	380	138	36.3	377	43	11.4	158	150	94.9
Caritas Holy Family Hospital And Medical Center	499	238	47.7	443	79	17.8	223	220	98.7
Caritas Norwood Hospital	283	110	38.9	184	10	5.4	82	76	92.7
Caritas St. Elizabeth's Medical Center Of Boston	473	151	31.9	406	33	8.1	190	172	90.5
Charlton Memorial Hospital	760	259	34.1	647	93	14.4	222	222	100.0
Cooley Dickinson Hospital	372	109	29.3	323	23	7.1	111	94	84.7
Emerson Hospital	519	185	35.6	403	43	10.7	176	163	92.6
Fairview Hospital	78	21	26.9	73	8	11.0	24	24	100.0
Falmouth Hospital	256	98	38.3	240	25	10.4	95	95	100.0
Harrington Memorial Hospital	159	62	39.0	130	18	13.8	46	43	93.5
Heywood Memorial Hospital	211	31	14.7	271	6	2.2	57	48	84.2
Holyoke Hospital	318	55	17.3	261	22	8.4	65	59	90.8
Jordan Hospital	316	111	35.1	259	18	6.9	109	103	94.5
Lawrence General Hospital	672	196	29.2	734	64	8.7	277	269	97.1
Leominster Hospital	450	91	20.2	505	32	6.3	116	108	93.1
Lowell General Hospital	966	340	35.2	943	109	11.6	330	314	95.2
Martha's Vineyard Hospital	81	20	24.7	58	3	--[4]	22	22	100.0
Massachusetts General Hospital	1,592	481	30.2	1,351	97	7.2	432	385	89.1
Melrose-Wakefield Hospital	616	280	45.5	377	59	15.6	189	187	98.9
Mercy Medical Center	508	150	29.5	671	45	6.7	136	129	94.9
Metrowest Medical Center-Framingham Union Campus	759	313	41.2	609	68	11.2	302	302	100.0
Milford Regional Medical Center	451	158	35.0	382	39	10.2	136	128	94.1
Morton Hospital	227	75	33.0	198	9	4.5	88	87	98.9
Mount Auburn Hospital	1,059	311	29.4	723	41	5.7	216	167	77.3

Table 32 (cont'd). Cesarean Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2008

Facility[1]	First Birth			Second or Later Birth without prior Cesarean			Second or Later Birth with prior Cesarean		
	Births[2]	Cesareans		Births[2]	Cesareans		Births[2]	Cesareans	
		n	%[3]		n	%[3]		n	%[3]
Nantucket Cottage Hospital	73	30	41.1	60	9	15.0	14	14	100.0
Newton Wellesley Hospital	1,761	666	37.8	1,263	91	7.2	550	511	92.9
North Adams Regional Hospital	123	27	22.0	120	2	--[4]	24	20	83.3
North Shore Medical Center - Salem Hospital	732	221	30.2	666	73	11.0	235	209	88.9
Saint Vincent Hospital	869	270	31.1	801	85	10.6	287	246	85.7
Saints Memorial Medical Ctr.-St. John's Campus[5]	74	26	35.1	55	6	10.9	24	24	100.0
South Shore Hospital	1,517	672	44.3	1,294	179	13.8	665	604	90.8
St. Luke's Hospital	590	210	35.6	657	104	15.8	232	231	99.6
Sturdy Memorial Hospital	415	161	38.8	366	46	12.6	157	149	94.9
Tobey Hospital	196	37	18.9	201	9	4.5	34	33	97.1
Tufts Medical Center	575	210	36.5	420	49	11.7	190	174	91.6
UMASS Memorial Medical Center - West Campus	1,958	462	23.6	1,441	94	6.5	551	485	88.0
Winchester Hospital	831	261	31.4	682	61	8.9	290	279	96.2

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. 5. Closed to births on 4/1/2008.

Table 33. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
STATE TOTAL	**77,542**	**76,969**	**5,955**	**4,583**	**382**	**291**	**387**
ABINGTON	1	221	19	--	0	0	0
ACTON	1	180	14	--	0	0	0
ACUSHNET	0	85	6	7	0	0	0
ADAMS	0	68	5	9	0	0	--
AGAWAM	2	295	16	14	0	0	--
ALFORD	1	2	0	0	0	0	0
AMESBURY	0	187	17	7	1	1	0
AMHERST	6	184	9	5	0	0	0
ANDOVER	0	262	21	--	0	0	0
ARLINGTON	4	567	30	5	2	2	--
ASHBURNHAM	0	59	--	--	0	0	0
ASHBY	0	25	--	0	0	0	0
ASHFIELD	1	9	0	0	0	0	0
ASHLAND	1	265	20	--	1	1	0
ATHOL	0	121	8	9	0	0	--
ATTLEBORO	971	533	35	30	0	0	--
AUBURN	1	147	7	7	0	0	0
AVON	0	57	--	0	1	1	--
AYER	0	102	8	--	1	1	0
BARNSTABLE	906	447	19	31	1	0	7
BARRE	0	58	6	--	1	1	0
BECKET	1	23	0	--	0	0	0
BEDFORD	2	136	11	--	2	2	0
BELCHERTOWN	3	154	12	6	0	0	0
BELLINGHAM	1	229	18	8	0	0	--
BELMONT	1	309	29	--	1	1	--
BERKLEY	0	64	6	--	0	0	0
BERLIN	1	17	0	0	0	0	0
BERNARDSTON	0	6	0	0	0	0	0
BEVERLY	2,197	448	25	10	2	2	--
BILLERICA	2	445	31	12	1	0	0
BLACKSTONE	0	104	7	10	0	0	0
BLANDFORD	0	9	--	0	1	0	0
BOLTON	0	36	--	0	0	0	0
BOSTON	21,756	8,019	745	565	57	41	42
BOURNE	1	184	9	8	0	0	0
BOXBOROUGH	1	38	--	0	0	0	0
BOXFORD	0	46	--	--	0	0	0
BOYLSTON	1	28	--	0	0	0	--
BRAINTREE	2	385	27	12	2	2	--
BREWSTER	1	66	--	--	1	1	0
BRIDGEWATER	0	229	15	8	1	1	--
BRIMFIELD	1	31	--	--	0	0	0
BROCKTON	2,187	1,552	139	155	15	13	13
BROOKFIELD	0	39	--	--	1	0	0
BROOKLINE	2	666	58	--	1	1	--
BUCKLAND	0	17	--	--	0	0	0

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
BURLINGTON	1	286	24	--	0	0	--
CAMBRIDGE	3,529	1,199	96	22	2	0	7
CANTON	1	237	13	--	1	1	0
CARLISLE	0	33	--	0	0	0	0
CARVER	0	119	7	13	1	1	--
CHARLEMONT	1	10	--	--	0	0	0
CHARLTON	0	131	8	--	0	0	0
CHATHAM	0	42	--	0	0	0	0
CHELMSFORD	0	329	22	8	0	0	--
CHELSEA	7	745	68	97	6	4	6
CHESHIRE	0	29	--	--	0	0	0
CHESTER	0	9	0	0	0	0	0
CHESTERFIELD	0	8	0	0	0	0	0
CHICOPEE	2	636	47	59	1	1	--
CHILMARK	1	7	0	0	0	0	0
CLARKSBURG	1	19	--	--	0	0	0
CLINTON	3	203	13	9	0	0	0
COHASSET	0	69	--	--	0	0	0
COLRAIN	1	15	--	--	0	0	0
CONCORD	1,145	103	6	--	0	0	0
CONWAY	0	13	0	0	0	0	0
CUMMINGTON	0	2	0	0	0	0	0
DALTON	0	57	7	5	0	0	0
DANVERS	0	245	13	--	0	0	--
DARTMOUTH	0	221	18	9	4	4	--
DEDHAM	2	280	14	11	0	0	--
DEERFIELD	1	39	--	--	1	1	0
DENNIS	0	123	13	9	2	1	--
DIGHTON	0	55	--	--	0	0	--
DOUGLAS	0	85	--	--	0	0	0
DOVER	0	29	--	0	0	0	0
DRACUT	2	370	27	9	0	0	0
DUDLEY	0	97	6	--	0	0	--
DUNSTABLE	0	13	--	0	0	0	0
DUXBURY	1	119	6	--	0	0	0
E. BRIDGEWATER	1	139	--	--	1	1	0
E. BROOKFIELD	0	27	--	--	0	0	0
E. LONGMEADOW	0	104	5	--	0	0	0
EASTHAM	0	20	--	--	0	0	0
EASTHAMPTON	1	168	6	8	2	2	0
EASTON	1	186	10	--	0	0	--
EDGARTOWN	0	48	0	--	0	0	0
EGREMONT	0	10	--	--	0	0	0
ERVING	0	12	0	0	0	0	0
ESSEX	0	36	--	--	0	0	--
EVERETT	4	655	50	43	2	2	6
FAIRHAVEN	0	139	7	7	0	0	0
FALL RIVER	1,689	1,251	118	159	9	6	--

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
FALMOUTH	617	281	25	13	1	1	--
FITCHBURG	1	615	47	60	3	2	--
FLORIDA	0	11	0	0	0	0	0
FOXBOROUGH	0	159	16	--	1	1	--
FRAMINGHAM	1,718	1,059	78	53	4	4	--
FRANKLIN	0	344	17	6	0	0	0
FREETOWN	0	85	5	--	0	0	0
GARDNER	552	267	18	38	2	2	--
AQUINNAH	0	3	0	0	0	0	0
GEORGETOWN	0	91	5	0	0	0	0
GILL	0	14	--	0	0	0	0
GLOUCESTER	1	282	17	15	0	0	--
GOSHEN	1	10	--	0	0	0	0
GOSNOLD	0	0	0	0	0	0	0
GRAFTON	1	240	13	--	0	0	--
GRANBY	0	41	--	--	0	0	--
GRANVILLE	1	10	--	0	0	0	0
GREAT BARRINGTON	183	50	--	--	0	0	0
GREENFIELD	471	177	14	14	0	0	--
GROTON	2	90	--	0	2	1	--
GROVELAND	0	59	7	0	1	1	--
HADLEY	1	38	--	0	0	0	0
HALIFAX	0	77	11	--	0	0	0
HAMILTON	0	93	6	0	0	0	--
HAMPDEN	0	28	--	0	0	0	0
HANCOCK	1	5	0	0	0	0	0
HANOVER	0	118	6	--	1	0	--
HANSON	0	101	7	7	0	0	0
HARDWICK	0	34	--	--	0	0	0
HARVARD	0	29	0	--	0	0	0
HARWICH	1	85	--	--	0	0	0
HATFIELD	0	24	0	--	0	0	0
HAVERHILL	2	882	60	61	7	6	5
HAWLEY	0	1	0	0	0	0	0
HEATH	0	8	0	--	0	0	0
HINGHAM	0	230	9	0	0	0	--
HINSDALE	0	17	--	--	0	0	0
HOLBROOK	0	132	14	5	0	0	0
HOLDEN	1	188	14	--	0	0	--
HOLLAND	0	13	--	--	1	1	0
HOLLISTON	3	132	14	--	0	0	0
HOLYOKE	666	701	69	174	4	2	7
HOPEDALE	0	59	7	--	1	1	0
HOPKINTON	1	138	5	--	0	0	0
HUBBARDSTON	1	47	--	--	0	0	0
HUDSON	0	241	17	9	1	1	--
HULL	0	99	5	--	2	2	--
HUNTINGTON	1	30	--	--	0	0	0
IPSWICH	0	105	12	--	0	0	0
KINGSTON	1	127	13	--	1	1	0

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
LAKEVILLE	1	88	15	7	0	0	--
LANCASTER	2	61	--	--	0	0	0
LANESBOROUGH	0	21	0	--	0	0	0
LAWRENCE	1,714	1,379	112	245	7	6	--
LEE	0	49	--	--	0	0	0
LEICESTER	0	123	7	5	0	0	0
LENOX	2	31	--	--	0	0	--
LEOMINSTER	1,097	500	32	29	2	1	--
LEVERETT	0	13	0	0	0	0	0
LEXINGTON	0	220	14	--	0	0	0
LEYDEN	0	5	0	0	0	0	0
LINCOLN	1	95	--	0	1	1	0
LITTLETON	0	86	6	0	0	0	--
LONGMEADOW	0	129	--	0	0	0	0
LOWELL	2,489	1,775	153	193	15	11	12
LUDLOW	1	175	17	6	0	0	0
LUNENBURG	0	96	--	--	0	0	0
LYNN	6	1,501	124	164	7	5	9
LYNNFIELD	0	77	9	--	1	0	0
MALDEN	1	969	91	38	5	5	--
MANCHESTER	0	32	--	0	0	0	0
MANSFIELD	0	222	10	6	0	0	--
MARBLEHEAD	0	175	16	--	1	1	--
MARION	0	40	--	--	0	0	0
MARLBOROUGH	0	566	35	27	6	5	6
MARSHFIELD	0	261	20	5	1	1	0
MASHPEE	1	133	11	6	0	0	0
MATTAPOISETT	0	33	--	--	1	1	0
MAYNARD	1	154	9	7	0	0	0
MEDFIELD	1	96	6	--	0	0	0
MEDFORD	6	673	46	9	2	1	--
MEDWAY	1	120	10	--	0	0	0
MELROSE	1,227	351	23	--	0	0	--
MENDON	1	47	5	0	0	0	0
MERRIMAC	0	44	--	0	0	0	0
METHUEN	1,199	565	43	30	3	2	--
MIDDLEBOROUGH	0	263	13	24	0	0	--
MIDDLEFIELD	0	4	0	--	0	0	0
MIDDLETON	0	56	--	0	0	0	--
MILFORD	997	369	45	21	0	0	--
MILLBURY	0	137	12	7	0	0	0
MILLIS	0	80	6	0	0	0	0
MILLVILLE	0	26	--	--	0	0	0
MILTON	0	272	32	--	3	3	0
MONROE	0	0	0	0	0	0	0
MONSON	0	74	--	--	0	0	0
MONTAGUE	3	99	9	11	3	2	--
MONTEREY	0	6	0	--	0	0	0
MONTGOMERY	0	4	0	0	0	0	0
MOUNT WASHINGTON	0	1	0	--	0	0	0

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
NAHANT	0	28	--	--	0	0	0
NANTUCKET	156	181	6	--	1	1	--
NATICK	4	454	30	--	3	3	--
NEEDHAM	0	333	23	--	1	1	0
NEW ASHFORD	0	0	0	0	0	0	0
NEW BEDFORD	1,521	1,389	154	186	12	10	10
NEW BRAINTREE	0	9	--	--	0	0	0
NEW MARLBOROUGH	0	7	0	0	0	0	0
NEW SALEM	1	7	0	0	0	0	0
NEWBURY	0	49	5	--	0	0	0
NEWBURYPORT	726	205	12	6	0	0	0
NEWTON	3,760	907	78	5	2	2	--
NORFOLK	2	95	--	0	0	0	0
NORTH ADAMS	270	150	17	16	2	1	--
NORTH ANDOVER	0	315	33	--	1	1	0
NORTH ATTLEBORO	0	340	21	7	1	1	--
NORTH BROOKFIELD	1	49	--	--	0	0	0
NORTH READING	0	136	8	--	0	0	--
NORTHAMPTON	859	222	6	11	0	0	--
NORTHBOROUGH	1	120	--	--	0	0	--
NORTHBRIDGE	2	184	17	14	1	1	--
NORTHFIELD	0	19	--	--	2	2	0
NORTON	1	187	17	--	0	0	0
NORWELL	0	91	--	0	2	2	--
NORWOOD	563	407	27	9	3	1	0
OAK BLUFFS	165	60	--	0	0	0	--
OAKHAM	0	15	--	--	0	0	0
ORANGE	1	71	9	8	0	0	0
ORLEANS	0	42	0	--	0	0	0
OTIS	0	13	--	--	0	0	0
OXFORD	1	147	9	7	1	1	--
PALMER	1	107	8	8	1	1	--
PAXTON	0	28	--	--	0	0	0
PEABODY	1	527	36	23	1	0	5
PELHAM	0	12	0	--	0	0	0
PEMBROKE	0	205	17	--	0	0	0
PEPPERELL	2	107	8	--	0	0	0
PERU	0	5	0	0	0	0	0
PETERSHAM	0	14	0	0	0	0	0
PHILLIPSTON	0	17	--	--	0	0	0
PITTSFIELD	720	520	46	60	4	2	6
PLAINFIELD	0	5	--	0	0	0	0
PLAINVILLE	0	94	--	0	0	0	--
PLYMOUTH	717	634	29	30	1	0	--
PLYMPTON	0	18	--	--	0	0	0
PRINCETON	0	25	--	0	0	0	0
PROVINCETOWN	0	18	--	0	0	0	0
QUINCY	5	1,292	97	22	8	7	6
RANDOLPH	2	393	25	17	2	1	--

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
RAYNHAM	0	139	12	7	0	0	--
READING	0	265	11	--	0	0	0
REHOBOTH	1	88	9	5	3	3	0
REVERE	1	761	57	53	3	2	7
RICHMOND	0	4	0	0	0	0	0
ROCHESTER	1	35	--	--	1	1	0
ROCKLAND	0	236	20	10	0	0	--
ROCKPORT	0	53	0	--	1	0	0
ROWE	0	1	0	0	0	0	0
ROWLEY	0	65	--	--	0	0	0
ROYALSTON	0	9	0	--	0	0	0
RUSSELL	0	22	--	--	0	0	0
RUTLAND	1	71	--	--	0	0	0
SALEM	1,678	503	28	42	0	0	--
SALISBURY	0	82	7	6	0	0	--
SANDISFIELD	1	7	0	0	0	0	0
SANDWICH	1	166	13	7	0	0	--
SAUGUS	0	254	27	6	1	0	--
SAVOY	0	7	--	0	0	0	0
SCITUATE	2	154	12	6	0	0	--
SEEKONK	1	86	--	--	0	0	0
SHARON	1	149	7	--	0	0	--
SHEFFIELD	0	37	--	--	0	0	0
SHELBURNE	0	18	--	0	0	0	0
SHERBORN	0	30	--	0	0	0	0
SHIRLEY	0	79	--	7	0	0	0
SHREWSBURY	3	379	29	--	3	3	--
SHUTESBURY	1	19	--	--	0	0	0
SOMERSET	0	147	--	10	0	0	--
SOMERVILLE	6	958	77	33	4	2	5
SOUTH HADLEY	1	124	15	6	4	3	--
SOUTHAMPTON	0	41	--	0	0	0	0
SOUTHBOROUGH	1	84	6	--	0	0	0
SOUTHBRIDGE	345	237	18	34	1	1	0
SOUTHWICK	0	67	6	--	0	0	0
SPENCER	0	108	7	--	1	1	--
SPRINGFIELD	5,587	2,458	263	373	27	23	23
STERLING	0	69	5	--	0	0	0
STOCKBRIDGE	0	8	--	--	0	0	0
STONEHAM	0	226	17	--	0	0	--
STOUGHTON	2	308	41	7	2	2	--
STOW	0	68	6	0	1	1	0
STURBRIDGE	1	109	8	--	0	0	0
SUDBURY	1	147	13	--	0	0	0
SUNDERLAND	0	28	7	0	0	0	0
SUTTON	0	68	--	--	0	0	--
SWAMPSCOTT	0	163	5	--	0	0	0
SWANSEA	0	127	16	8	0	0	0
TAUNTON	525	729	57	40	9	2	--
TEMPLETON	0	87	--	--	0	0	0

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
TEWKSBURY	0	284	22	--	0	0	--
TISBURY	0	51	--	--	2	2	0
TOLLAND	0	9	0	--	0	0	0
TOPSFIELD	0	30	--	0	0	0	0
TOWNSEND	0	72	5	--	0	0	0
TRURO	0	10	0	0	0	0	0
TYNGSBOROUGH	2	116	5	5	0	0	--
TYRINGHAM	0	1	0	0	0	0	0
UPTON	0	59	--	--	0	0	0
UXBRIDGE	1	145	7	5	0	0	--
WAKEFIELD	0	286	19	--	3	2	0
WALES	0	24	0	--	0	0	0
WALPOLE	0	253	18	0	0	0	0
WALTHAM	6	837	56	35	2	1	--
WARE	181	140	8	14	0	0	--
WAREHAM	437	264	17	16	2	1	--
WARREN	0	65	--	6	1	0	--
WARWICK	0	5	0	0	0	0	0
WASHINGTON	0	4	0	0	0	0	0
WATERTOWN	0	465	38	7	1	1	0
WAYLAND	0	94	8	--	0	0	0
WEBSTER	1	216	14	18	0	0	0
WELLESLEY	2	252	13	--	0	0	0
WELLFLEET	1	11	--	--	0	0	0
WENDELL	0	4	0	0	0	0	0
WENHAM	0	21	--	0	1	0	0
WEST BOYLSTON	0	58	--	--	1	1	0
WEST BRIDGEWATER	2	72	--	6	0	0	0
WEST BROOKFIELD	0	33	--	--	1	1	0
WEST NEWBURY	1	34	--	0	0	0	0
WEST SPRINGFIELD	0	336	22	19	0	0	0
WEST STOCKBRIDGE	0	7	0	0	0	0	0
WEST TISBURY	1	23	--	0	0	0	0
WESTBOROUGH	1	230	21	7	1	1	0
WESTFIELD	2	446	27	38	2	2	--
WESTFORD	1	182	16	0	0	0	--
WESTHAMPTON	0	9	0	0	0	0	0
WESTMINSTER	0	41	--	--	0	0	0
WESTON	0	61	--	0	0	0	0
WESTPORT	1	110	8	5	0	0	--
WESTWOOD	1	120	--	0	0	0	--
WEYMOUTH	3,651	674	57	27	1	1	--
WHATELY	0	11	0	0	0	0	0
WHITMAN	0	185	15	10	0	0	0
WILBRAHAM	0	95	6	--	3	2	--

Table 33 (cont'd). Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2008

Community	Occurrence Births[1]	Resident Births[2]	Low Birthweight[3]	Teen Births (15-19 years)	Infant Deaths[4]	Neonatal Deaths[5]	Fetal Deaths[6]
WILLIAMSBURG	1	15	0	--	0	0	0
WILLIAMSTOWN	0	41	--	--	1	0	--
WILMINGTON	1	248	21	--	1	1	0
WINCHENDON	1	114	11	7	0	0	0
WINCHESTER	1,917	214	14	--	0	0	0
WINDSOR	0	8	--	--	0	0	0
WINTHROP	0	171	14	--	1	1	--
WOBURN	0	514	44	10	2	2	5
WORCESTER	6,256	2,670	217	256	29	22	17
WORTHINGTON	0	7	--	0	0	0	0
WRENTHAM	1	91	--	0	0	0	0
YARMOUTH	3	206	16	18	2	2	--

"--" Due to small numbers (n=1-4), exact count not provided.

Note: 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.

Table 34. Birth Characteristics: Occurrence and Resident Births and Infant Deaths by County, Massachusetts: 2008

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	**77,542**	**76,969**	**5,955**	**4,583**	**382**	**291**	**387**
Barnstable	1,532	1,834	121	102	7	5	15
Berkshire	1,180	1,218	98	117	7	3	12
Bristol	4,711	6,183	516	500	38	26	27
Dukes	167	192	8	--	2	2	--
Essex	7,525	8,894	663	641	35	25	42
Franklin	481	621	53	41	6	5	--
Hampden	6,263	5,782	500	708	40	32	42
Hampshire	1,055	1,238	69	56	6	5	5
Middlesex	15,842	18,354	1,376	591	67	53	76
Nantucket	156	181	6	--	1	1	--
Norfolk	4,240	7,616	557	146	26	22	28
Plymouth	3,351	5,710	415	326	30	25	29
Suffolk	21,764	9,696	884	719	67	48	57
Worcester	9,275	9,450	689	631	50	39	45

"--" Due to small numbers (n=1-4), exact count not provided.

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.

Table 35. Birth Characteristics, Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs), Massachusetts: 2008

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	**77,542**	**76,969**	**5,955**	**4,583**	**382**	**291**	**387**
Community Health Network of Berkshire County	1,180	1,218	98	117	7	3	12
Upper Valley Health Web (Franklin County)	481	782	64	55	6	5	5
Partnership for Health in Hampshire County (Northampton)	1,054	1,208	67	55	6	5	5
The Community Health Connection (Springfield)	5,591	3,747	337	428	32	26	29
Community Health Network of Southern Worcester County	350	1,326	84	90	7	5	6
Community Partners for Health (Milford)	1,003	1,839	146	77	2	2	7
Community Health Network of Greater Metro West (Framingham)	1,736	4,650	322	123	18	17	15
Community Wellness Coalition (Worcester)	6,263	3,998	305	288	33	26	26
Fitchburg/Gardner Community Health Network	1,663	2,928	190	185	11	8	7
Greater Lowell Community Health Network	2,496	3,514	277	230	16	11	20
Greater Lawrence Community Health Network	2,913	2,577	212	280	11	9	6
Greater Haverhill Community Health Network	729	1,744	123	83	9	8	8
Community Health Network North (Beverly/Gloucester)	2,198	1,100	68	34	4	2	6
North Shore Community Health Network	1,685	3,473	260	244	11	6	22
Greater Woburn/Concord/Littleton Community Health Network	3,069	2,153	161	23	6	6	7
North Suburban Health Alliance (Medford/Malden/Melrose)	1,238	3,561	265	104	12	10	16
Greater Cambridge/Somerville Community Health Network	3,540	3,498	270	70	10	6	14
West Suburban Health Network (Newton/Waltham)	3,771	2,819	190	55	5	4	8
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	21,766	10,362	942	722	68	49	61
Blue Hills Community Health Alliance (Greater Quincy)	4,227	4,452	317	107	24	20	23
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	672	1,997	162	278	7	5	13
Greater Brockton Community Health Network	2,194	3,081	264	202	20	18	17
South Shore Community Partners in Prevention (Plymouth)	719	2,015	139	78	5	3	5
Greater Attleboro-Taunton Health & Education Response	1,500	2,794	200	135	13	6	11
Partners for a Healthier Community (Fall River)	1,690	1,635	144	182	9	6	5
Greater New Bedford Health & Human Services Coalition	1,959	2,291	213	231	20	17	13
Cape and Islands Community Health Network	1,855	2,207	135	107	10	8	18

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. When the number of fetal deaths is between 1-4, it is suppressed.

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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 2008*, 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 2008, 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 2008, the rates listed may **overestimate** the actual rate. If the population in your community declined from 2005 to 2008, 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 2008 Population Estimates

National Center for Health Statistics. Postcensal estimates of the resident population of the United States for July 1, 2000-July 1, 2008, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2008). Prepared under a collaborative arrangement with the US Census Bureau; released May 14, 2009. Available from:
http://www.cdc.gov/nchs/nvss/bridged_race.htm as of September 2, 2009.

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. 2008 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	187,835	129,770	16,399	526	12,349	28,791
5 to 9	188,411	136,216	15,148	526	11,316	25,205
10 to 14	195,139	146,435	15,050	478	10,324	22,852
15 to 19	228,275	172,816	18,146	658	11,619	25,036
20 to 24	234,290	177,114	18,008	726	14,417	24,025
25 to 29	212,131	155,572	15,963	627	15,870	24,099
30 to 34	201,193	145,558	14,416	439	17,371	23,409
35 to 39	228,610	174,156	15,067	566	16,452	22,369
40 to 44	253,365	203,014	15,646	546	13,691	20,468
45 to 49	265,327	220,940	15,023	663	11,312	17,389
50+	1,150,215	1,021,702	48,427	2,232	33,715	44,139
All Females	**3,344,791**	**2,683,293**	**207,293**	**7,987**	**168,436**	**277,782**
Male						
0 to 4	195,733	135,600	17,001	537	12,680	29,915
5 to 9	196,033	142,342	15,658	528	11,230	26,275
10 to 14	204,379	154,231	15,656	488	9,960	24,044
15 to 19	232,123	175,861	18,395	667	11,107	26,093
20 to 24	230,694	173,608	18,290	672	12,878	25,246
25 to 29	215,870	155,068	17,061	613	15,253	27,875
30 to 34	202,595	144,611	14,220	557	17,350	25,857
35 to 39	223,293	168,843	14,108	535	17,361	22,446
40 to 44	245,392	196,426	14,685	556	13,820	19,905
45 to 49	257,112	214,992	14,084	688	11,322	16,026
50+	949,952	844,014	38,152	2,030	30,323	35,433
All Males	**3,153,176**	**2,505,596**	**197,310**	**7,871**	**163,284**	**279,115**
Total						
0 to 4	383,568	265,370	33,400	1,063	25,029	58,706
5 to 9	384,444	278,558	30,806	1,054	22,546	51,480
10 to 14	399,518	300,666	30,706	966	20,284	46,896
15 to 19	460,398	348,677	36,541	1,325	22,726	51,129
20 to 24	464,984	350,722	36,298	1,398	27,295	49,271
25 to 29	428,001	310,640	33,024	1,240	31,123	51,974
30 to 34	403,788	290,169	28,636	996	34,721	49,266
35 to 39	451,903	342,999	29,175	1,101	33,813	44,815
40 to 44	498,757	399,440	30,331	1,102	27,511	40,373
45 to 49	522,439	435,932	29,107	1,351	22,634	33,415
50+	2,100,167	1,865,716	86,579	4,262	64,038	79,572
State Total	**6,497,967**	**5,188,889**	**404,603**	**15,858**	**331,720**	**556,897**

1. National Center for Health Statistics. Postcensal estimates of the resident population of the US for July 1, 2000-July 1, 2008, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2008). Prepared under a collaborative arrangement with the US Census Bureau; released May 14, 2009. Available from: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm as of September 2, 2009

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 1996-2008 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 2008 was compared with the number of births in 2007, 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.

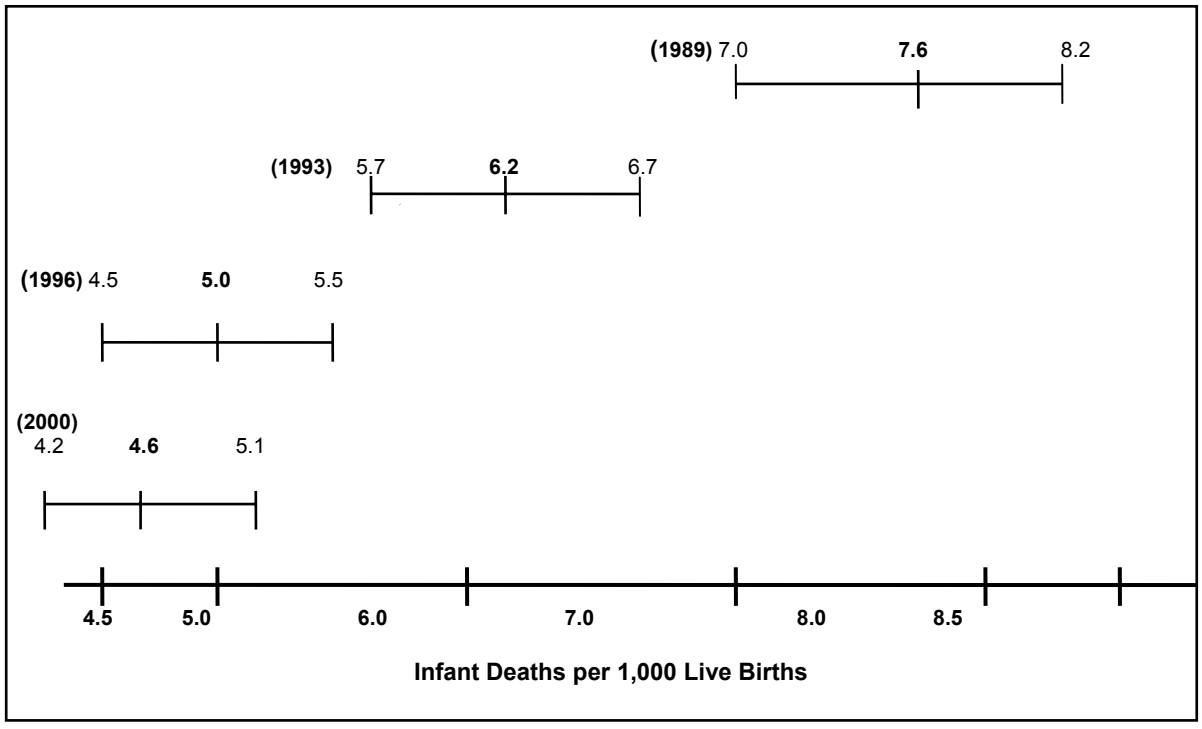
When two statistics are determined to differ significantly, they then are referred to in the text with language expressing differences, such as "higher" and "lower," or "increased" and "decreased". Otherwise, differences that are not significant are reported as having "no change" or "no statistical difference."

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: 1990-2008

	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)

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 2008, the Black infant mortality rate was 11.7 deaths per 1,000 live births (95% CI: 9.1, 14.3), which was more than three times greater than the White infant mortality rate of 3.7 (95% CI: 3.2, 4.3). The difference in these two rates was statistically significant. The rate of infant mortality for Blacks was also significantly elevated compared with Asians (95% CI: 1.4, 4.0) in 2008.

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

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

(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.

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: 2008

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

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

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

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 2008 Evaluation Form

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