Massachusetts Births 2004

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Gerald F. O'Keefe, Acting Director
Center for Health Information, Statistics, Research, and Evaluation
Bruce Cohen, Director
Division of Research and Epidemiology
Stanley E. Nyberg, Registrar
Registry of Vital Records and Statistics

Massachusetts Department of Public Health

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Massachusetts Department of Public Health
Center for Health Information,
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250 Washington Street, 6th floor
Boston, MA 02108
Or
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EXECUTIVE SUMMARY

2004 Highlights

- **The Cesarean section delivery rate in Massachusetts was 31%,** which continues the increasing trend in C sections begun in 1997.

- **In 2004, 78,460 births occurred to Massachusetts residents, 2% fewer than in the previous year.** The number of resident live births in Massachusetts has decreased by 15% since 1990 when it was 92,461 births.

- **In 2004 in Massachusetts, the average age of mothers giving birth for the first time was 28.1 years, which was the oldest in state history**.

- **The Massachusetts teen birth rate in 2004, 22.2 births per 1,000 women ages 15-19, is the lowest in Massachusetts history.** The teen birth rate has declined annually from 35.4 births per 1,000 women ages 15-19 in 1990 to the current historic low.

- **In 2004, the Massachusetts Infant Mortality Rate (IMR) was 4.7 infant deaths per 1,000 live births, compared with 4.8 in 2003.** This is the 2nd lowest IMR in Massachusetts history (lowest was 4.6 in 2000).

- **The percentage of low birthweight (LBW) infants** (less than 2,500 grams or 5.5 pounds), **continues to rise. This year's 7.8% was the highest since 1969 when it was 7.6%.**

- **The percentage of preterm infants** (delivered before the 37th week of gestation) **increased by almost 6% from 8.7% in 2003 to 9.2% in 2004. This increase was statistically significant.**

- Birth certificates allow us to identify emerging population groups. **Births to six ethnicity groups have increased more than 8% since 2003: Salvadoran, Other[1] African, Chinese, Cape Verdean, Brazilians, and Cambodians.** These groups account for 13% of all births in Massachusetts.

- **The percentage of women who smoked during pregnancy continues to decline. It decreased from 7.7% in 2003 to 7.4% in 2004, which was the lowest rate ever recorded.** The percentage of smoking during pregnancy has decreased 62% since 1990, when it was 19.3%.

- **The percentage of breastfeeding among mothers in Massachusetts increased from 78.1% in 2003 to 78.9% in 2004, which was the highest rate in Massachusetts recorded history.** The rate of breastfeeding has increased 51% since 1989.

- **Disparities in birth outcomes by race, ethnicity, education and community persist:**
  - The black non-Hispanic IMR was 3 times that of the white non-Hispanic IMR (11.4 vs. 3.8).

  - The teen birth rate for Hispanics was almost 6 times that for white non-Hispanics (75.7 vs. 13.2 per 1,000 women ages 15-19).

[1] "Other" refers to ancestries for which the parents checked "Other" because their ancestry was not listed explicitly in the standard check boxes on the Parent Worksheet for Birth Certificate. See the "Technical Notes" for a list of ancestries listed in check boxes.

- Cambodian (57.0%), Other[1] Central American (66.6%); and Other[1] African (67.6%) mothers were less likely to receive prenatal care in their first trimester compared with mothers in other ethnicity groups (State average: 83.4%).
- Among Massachusetts cities and towns, teen birth rates were highest in Lawrence (79.4), Holyoke (76.0), and Springfield (70.9). These communities had rates over three times the statewide rate of 22.2 teen births per 1,000 females 15-19.
- Less educated women were more likely to smoke during their pregnancies, more likely to deliver low birthweight infants, and less likely to receive adequate prenatal care.

Executive Summary

Number and Rate of Births

The number of births to Massachusetts residents was 80,167 in 2003 and 78,460 in 2004. Since 1990, the number of births in Massachusetts has declined by 15%, and the birth rate among women of reproductive age has declined by 12% (from 62.2 to 55.0 births per 1,000 females ages 15-44).

The average age of mothers at first birth continues to increase. It was 28.1 years in 2004 compared with 28.0 years in 2003.

Infant Mortality

The infant mortality rate (IMR) in 2004 was 4.7 infant deaths per 1,000 live births, which is a continuation of the long trend of decline. There was a total of 372 infant deaths in 2004, compared with 383 in 2003. The infant mortality rate has decreased 33% since 1990, from 7.0 deaths per 1,000 live births to 4.7 deaths per 1,000 live births.

Although the IMR for black non-Hispanics went from 12.7 to 11.4 from 2003 to 2004, black non-Hispanics continued to have the highest among race and ethnicity groups. The white non-Hispanic IMR went from 4.1 in 2003 to 3.8, and the IMR for Asians remained the same at 2.7 infant deaths per 1,000 live births. The Hispanic IMR went from 5.6 in 2003 to 7.4 in 2004. This change was not statistically significant.

Pregnancy-Associated Mortality and Maternal Mortality Ratios[2]

In 2004, there were 13 pregnancy-associated deaths, including 5 maternal deaths. The 2004 pregnancy-associated mortality ratio (PAMR) was 16.4 deaths per 100,000 live births and the maternal mortality ratio (MMR) was 6.3 per 100,000 live births. Since 1990, the annual PAMR fluctuated from a low of 18.0 in 1990 to a high of 32.8 in 2001. However, due to the small number of deaths, the differences are not statistically significant.

Teen Births

In 2004, 4,559 births occurred to Massachusetts resident women ages 15-19, which was a difference of 80 fewer births than in this age group in 2003. The Massachusetts teen birth rate had decreased yearly from 35.4 births per 1,000 women ages 15-19 in 1990 to the current low of 22.2 in 2004. The Massachusetts teen birth rate in 2004 was 46% below the preliminary U.S. teen birth rate of 41.2 births per 1,000 women ages 15-19.

[2] A "pregnancy-associated death" is the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause. A "maternal death" is the death of a woman while pregnant or within 42 days of termination of pregnancy, the cause of which is related to the pregnancy or its management. These indicators are "ratios" rather than "rates", because the denominators are *live births*, and some of the mothers who died did not deliver a live birth. See the Definition of Rates and Ratios section for further information.

The annual number of births to young teens (ages 10-14) continued to decline in 2004, from a peak of 155 in 1994 to the current low of 42 (a rate of 0.20 births per 1000 females aged 10-14). This represents a 78% decline in births in this age group from 1994. The 2004 U.S. birth rate for younger teens was 0.7 live births per 1000 females aged 10-14 years, which was 71% above the Massachusetts birth rate for young teens.

The percentage of low birthweight among births to teen mothers was 10.2% in 2004, compared with 7.7% among births to mothers ages 20 and older in 2004.

In 2004, among Massachusetts municipalities with the highest number of teen births, teen birth rates were highest in Lawrence (79.4), Holyoke (76.0), and Springfield (70.9). These communities had rates over three times the statewide rate of 22.2 teen births per 1,000 females 15-19. Although the teen births were highest in these cities, their teen birth rates were lower than they were in 2003.

Low Birthweight (LBW)

The percentage of low birthweight infants (less than 2,500 grams or 5.5 pounds) went from 7.6% in 2003 to 7.8% in 2004. The percentage of low birthweight infants has increased by 34% since 1990 when it was 5.8%.

Between 2003 and 2004, LBW for Asians went from 8.1 in 2003 to 6.9 in 2004; whereas, LBW for white non-Hispanics went from 7.0% to 7.3%, LBW for Hispanics went from 8.3% in 2003 to 8.5% in 2004, and remained the same for black non-Hispanics (12.1%).

Between 2003 and 2004, the percentage of low birthweight infants increased about 2% for singletons (5.3% to 5.4%) and about 0.5% for multiple births (55.6% to 55.9%).

Very low birthweight (VLBW; infants weighing less than 3.3 pounds) increased from 1.4% in 2003 to 1.5% in 2004. Black non-Hispanic infants continue to have the highest percentage of VLBW at 3.5%, an increase of 13% from the previous year.

Preterm Deliveries

The percentage of preterm infants (infants delivered before the 37th week of gestation) increased significantly by 6% from 8.7% in 2003 to 9.2% in 2004. The preterm rate for white non-Hispanics increased significantly from 8.6% in 2003 to 9.2% in 2004 and the rate for black non-Hispanics went from 12% in 2003 to 13% in 2004. The preterm rate for Asians, went from 7.1% in 2003 to 6.7% in 2004.

The percentage of infants delivered very early (before the 28th week of gestation) has remained the same since 1997 at 0.6%. Black non-Hispanic women had the highest proportion of infants delivered very early, 1.6%, which was more than double that of any other race group.

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

The percentage of all Massachusetts resident births to white non-Hispanic mothers has decreased by 10% since 1990, from 78.4% to 70.5%, while the percentage of births to black

non-Hispanic mothers has remained the same since 1990, at 7.7%. The percentage of births to Asian mothers increased by 89%, from 3.7% to 7.0%. The percent of births to Hispanic mothers increased by 37%, from 9.1% to 12.5%.

The percentage of births to non-U.S.-born mothers increased significantly between 2003 and 2004 – from 24.1% to 25.2%. In 2004, 1 out of 4 births to Massachusetts residents was to a mother born outside the continental U.S., Puerto Rico, and the U.S. Territories. At the same time, the percentage of US-born mothers decreased significantly from 73.3% in 2003 to 72.1% in 2004.

Smoking

The percentage of women who smoked during pregnancy continues its steady decline from 7.7% in 2003 to 7.4% in 2004. The rate of smoking for white non-Hispanic mothers went from 8.6% in 2003 to 8.4% in 2004, and the rate for Hispanic mothers went from 5.9 in 2003 to 5.7% in 2004. For Asian mothers, smoking during pregnancy was 1.4% in 2003 and 1.5% in 2004, and was 6.5% in 2003 and 6.8% in 2004 for black non-Hispanic mothers.

Prenatal Care

Adequacy of prenatal care was 84.5% in 2003 and 84.2% in 2004. Adequacy of prenatal care is a measure of the timing and number of prenatal care visits, not an assessment of the quality of prenatal care. [Please note: these data are not comparable to data published in reports prior to 2001. Beginning with the 2001 report, the Adequacy of Prenatal Care Utilization (APNCU) Index is used to measure adequacy of prenatal care, replacing the Kessner Index. Please see Chapter 5 for more detail.]

Cesarean Sections

The cesarean section (c-section) rate among births to Massachusetts residents was 31.0% in 2004, which was a significant increase from 29.3% in 2003. There were increases in both primary and repeat c-sections.

Breastfeeding

The percentage of mothers who were breastfeeding increased from 78.1% in 2003 to 78.9% in 2004, continuing the trend of steady increase during the last 14 years. Among race and ethnicity groups, Asians had the highest percent of breastfeeding, 83.4%.

Public Source of Prenatal Care Payment

The percentage of mothers whose source of payment for prenatal care was public, including Medicaid, Healthy Start, and other government sources, increased significantly by 5.5% between 2003 and 2004, from 28.9% to 30.5%, continuing an increasing trend since 1996.

Mothers whose prenatal care source of payment was public were more likely to be very young and to deliver LBW infants, and less likely to receive adequate prenatal care, to breastfeed, and

to deliver by Cesarean section than mothers whose prenatal care was funded by private insurance.

Multiple Births

In 2004, 95.2% of births were singletons (74,677), 4.5% were twins (3,538 births), 0.3% were triplets (229 births), and 16 (4 sets) were quadruplets. The total percentage of multiple births (twins, triplets or more) was 4.8% in 2003, and 4.7% in 2003. The percentage of multiple births among mothers ages 35 and older was 7.6% in 2004, and 6.3% in 2003. The percentage of multiples among births to mothers ages 35 and older (7.6%) was almost double the percentage for mothers under age 35 (4.0%).

A Comparison of Massachusetts and U.S. Indicators

The following Massachusetts perinatal health indicators in 2004 were better than those for the U.S. According to preliminary U.S. birth statistics for 2004:

- The teen birth rate in Massachusetts (22.2 births per 1,000 women ages 15-19) was 46% lower than the U.S. teen birth rate (41.2 births per 1,000 women ages 15-19).
- The low birthweight rate in Massachusetts (7.8%) was 4% lower than the U.S. low birthweight rate (8.1%).
- The preterm rate in Massachusetts (9.2%) was 26% lower than the U.S. preterm rate (12.5%).

The following indicators were the same or worse than those for the U.S.

- The percentage of women receiving prenatal care in the first trimester in Massachusetts (83.5%) was less than one-half percent lower than the U.S. percentage (83.9%).
- The cesarean section delivery rate in Massachusetts (31.0%) was 7% higher than the U.S. c-section rate (29.1%).

CHAPTER 1

BIRTH CHARACTERISTICS

Note:

Unless explicitly stated, the terms "increase" and "decrease" and other terms indicating direction of change or magnitude of difference in birth indicators from one year to the next are merely descriptive, and do not imply statistically or practically significant change.

Birth Numbers and Rates

In 2004, 78,460 births occurred to Massachusetts residents (Table 1), 2% less than in the previous year. The number of resident live births in Massachusetts has decreased by 15% since 1990 when it was 92,461 births.

In 2004, the fertility rate (sometimes known as the "birth rate") was 55.0 births per 1,000 women ages 15-44 years. This rate was slightly lower than last year's rate, and has decreased by 11% since 1990 when it was 62.1 (Table 1).

The Massachusetts fertility rate in 2004 was 17% below the preliminary U.S. rate of 66.3 per 1,000 women ages 15-44[3].

Distribution of Births by Race and Hispanic Ethnicity and Mother's Birthplace

In 2004, of all live births to Massachusetts residents, 70.5% (55,321) were to white non-Hispanic mothers; 12.5% (9,801) were to Hispanic mothers; 7.7% (6,053) were to black non-Hispanic mothers; 7.0% (5,453) were to Asian mothers; and 2.2% (1,729) were American Indian or "Other Race" (Table 2A). Race and Hispanic ethnicity are reported by the mothers themselves.

Since 1990, the percentage of births to white non-Hispanic mothers has decreased, and the percentage of births to black non-Hispanic mothers has stayed the same, while the percentage of births to Asian and Hispanic mothers has increased. The percentage of births to white non-Hispanic mothers decreased by 10%, from 78.4% to 70.5% since 1990, and the percentage of births to black non-Hispanic mothers remained the same at 7.7%. The percentage of births to Asian mothers increased by 89% since 1990, from 3.7% to 7.0%. The percent of births to Hispanic mothers increased by 37%, from 9.1% to 12.5%.

In 2004, 27.8% of births in Massachusetts were to women born outside of the fifty United States, including 2.6% of births to women born in Puerto Rico and other U.S. Territories, and 25.2% of non-US-born mothers. White non-Hispanic mothers had the smallest percentage of births to non-US-born mothers at 11.0%, while the percentages of births to non-US-born of other race and ethnicity groups was as follows: 89.5% for Asian births; 49.6% for black non-Hispanic births, and 49.4% for Hispanic births. Among Hispanic births, 19.0% were to women born in Puerto Rico and other U.S. Territories (Table 2A).

[3] Hamilton BE, Martin JA, Ventura SJ, Sutton PD, Menacker F. Births: Preliminary data for 2004. National vital statistics reports; vol 54 no 8. Hyattsville, Maryland: National Center for Health Statistics. 2005.

Emerging Populations

Despite a 2% decrease in the number of births from 2003, certain groups experienced increases in the numbers of births in 2004. Births to six ethnicity groups have increased more than 8% since 2003: Salvadoran, Other[1] African, Chinese, Cape Verdean, Brazilians, and Cambodians. Births to Salvadoran mothers have increased by 18% since last year. Births to Other[1] African mothers increased by 13% from 2003. Within this category, births to mothers who are Kenyan, Ugandan, Moroccan, and Ghanaian had the largest increases (over 30% from last year). Births to Chinese mothers increased by 12% from 1,356 births in 2003 to 1,520 in 2004. Since 2001, births to Brazilian mothers have increased by 41% and births to Other African mothers by 30%.

Teen Births[4]

In 2004, there were 4,559 births to women ages 15-19 (teen births), 80 fewer births than in 2003 (Table 1). The number of teen births has been decreasing since 1990, with an overall decrease of 37% (7,258 teen births in 1990).

The teen birth rate (births per 1,000 women ages 15-19) was 22.2 in 2004, slightly lower than in the previous year (Table 1). In contrast, the 2004 U.S. teen birth rate was 41.2[3] , which was almost double the Massachusetts teen birth rate.

Statewide in 2004, 1.9% of all births were to women under age 18, and 5.9% were to women under the age of 20 (Table 2A). The highest percentage of births to women under 18 among race and ethnicity groups was for Hispanics (6.0%), followed by black non-Hispanics (3.5%), Asians (1.2%), and white non-Hispanics (1.0%) (Table 2A).

Among maternal ethnicities, Puerto Ricans and African Americans had the highest teen birth percentages in 2004. For Puerto Rican women, 23.6% of births were to women under age 20 and 9.9% to women under age 18 (Table 2B). For African Americans, these percentages were 16.7% and 6.0%, respectively.

Low Birthweight

In 2004, 7.8% of infants born to Massachusetts women were low birthweight (weighed less than 2,500 grams or 5.5 pounds) (Table 1). This percentage increased 3%, from 7.6% in 2003, making the 2004 the highest LBW percent since 1969[5].

In 2004, percent of low birthweight infants in Massachusetts was 4% below the national figure of 8.1%. The percentage of low birthweight births increased nationwide as well from 2003 to 2004, from 7.9% to 8.1%, which was the highest it has been in the U.S. in three decades[3].
The percentage of low birthweight infants varied by mother's race and ethnicity. Black non-Hispanic mothers had the highest proportion of low birthweight infants (12.1%); followed by Hispanic mothers (8.5%), white non-Hispanic mothers (7.3%), and Asian mothers (6.9%) (Table 2A). The low birthweight percentage increased for white non-Hispanic infants by 4% from 2003 to 2004, for Hispanics by 2%, and remained the same for black non-Hispanics

[4] Three age groups are used for "teen births": 10-14, 15-19, and < 20. The group, "10-14" 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. We use "< 20" when comparing young women with "adult" women.
[5] It was 7.6% in 1969 and 7.9% in 1968.

(12.1%). The percentage of low birthweight infants for Asian mothers decreased by 15% from 8.1% in 2003 to 6.9% in 2004.

Among maternal ethnicity groups, the highest percentage of low birthweight infants in 2004 occurred among mothers who identified their ancestries as African American (14.0%), Haitian (11.0%), Cape Verdean (11.0%), Puerto Rican (10.6%), and Cambodian (9.8%). The highest percentages of very low birthweight (VLBW) (less than 1,500 grams or 3.3 pounds), occurred among mothers who identified their ethnicity as Haitian (3.9%), African American (3.6%), and Other African (2.4%) (Table 2B).

Prenatal Care

SPECIAL NOTE ON MEASURING ADEQUACY OF PRENATAL CARE: Beginning with *Massachusetts Births 2001*, adequacy of prenatal care is being measured by the Adequacy of Prenatal Care Utilization (APNCU) Index instead of the Kessner Index, which has been used in past reports. This improves upon the Kessner Index in various ways, the most important of which is the ability to distinguish between inadequate prenatal care due to the timing of initiation and inadequate care due to insufficient number of prenatal care visits.

Table 1 provides a comparison of values based on the two indices between 1996 and 2004. The values for the APNCU Index are consistently higher than those calculated with the Kessner Index. See the Technical Appendix for more information on the change from the Kessner Index to the APNCU Index. Please note: adequacy of prenatal care is a measure of the *timing* and *number* of prenatal care visits, and does not reflect the *quality* of care.

In 2004, 84.2% of infants had mothers who received adequate prenatal care, which was a very slight decrease from 84.5% in 2003. The percentage of women receiving prenatal care during the first trimester of pregnancy also decreased slightly from 83.9% in 2003 to 83.5% (Table 2A).

The percentage of adequate prenatal care varied by mother's race and Hispanic ethnicity, ranging from a low of 76.6% for black non-Hispanic mothers to a high of 86.6% for white non-Hispanic mothers. The rates for Hispanic and Asian mothers were 76.7% and 83.0%, respectively (Table 2A). The percentage of adequate prenatal care increased for Asians, from 81.9% to 83.0% (a 1% increase), and black non-Hispanics, from 76.1% to 76.6% (a less than 1% increase), while it decreased for Hispanics by 2% in 2004.

Adequacy of prenatal care also varied by maternal ancestry. Mothers reporting their ancestries as Chinese, European, and Other Portuguese (not Cape Verdean or Brazilian) were most likely to receive adequate prenatal care – 88.7%, 87.6%, and 86.3%, respectively, while Cambodian and Other Central American (not Mexican or Salvadoran) mothers were least likely to receive adequate prenatal care – 62.8% and 71.6%, respectively (Table 2B).

Cesarean Section Deliveries

In 2004, the Cesarean section delivery rate rose for the sixth straight year to an all time high. In 2004, 31% of all births to Massachusetts residents were delivered by Cesarean section, which is a 6% increase over the 2003 percentage (29.3%), which also was an all time high (Table 2A). The Cesarean section rate in Massachusetts in 2004 was 7% higher than the nationwide rate of 29.1%. The nationwide rate for 2004 was also the highest ever recorded[3].

The percentage of Cesarean sections increased in all race and ethnicity groups in the last year. Black non-Hispanic women had the highest percentage of Cesarean section deliveries (33.0%)[6], and Hispanic women had the lowest percentage (26.9%) (Table 2A). With regard to maternal ancestry groups, the highest percentage of Cesarean section deliveries occurred to Brazilian women (39.8%), and the lowest percentage was among Cambodian women (14.9%) (Table 2B).

Breastfeeding

In 2004, 78.9% of Massachusetts mothers reported that they were breastfeeding or intending to breastfeed their infants (Table 2A). This represents a 39% increase since 1990 (56.6%).

The percentage of mothers breastfeeding differed by maternal race and Hispanic ethnicity, with the highest percentage reported among Asians (83.4%) and the lowest among white non-Hispanics (77.8%) (Table 2A). There was more variation among mothers of different self-identified ancestry groups than there was among race groups. The highest rates of breastfeeding were among Asian Indians (97.2%), Brazilians (94.7%), and Salvadorans (93.6%) (Table 2B). In contrast, only 49.4% of women identifying as Cambodians and 51.9% of Other Portuguese (not Cape Verdean or Brazilian) reported that they were breastfeeding or intending to breastfeed their infants.

The percentage of mothers breastfeeding or intending to breastfeed increased as mother's age increased. For teens ages 15-19, the percentage was 63.2%, while for women ages 30 and above the percentage was greater than 80% (Figure 2).

Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2004, among live births to residents of the 30 largest municipalities (see Table 3A for the list of communities) in the Commonwealth:

- The crude birth rates (number of births per 1,000 residents) were highest in Lawrence (19.7), Brockton (16.9), Lynn (16.0), Lowell (15.7), and Springfield (15.7). The crude birth rates in these cities were 25% or more above the state level (12.4): for example, 59% above in Lawrence, 36% in Brockton, and 29% in Lynn. Crude birth rates were the lowest in Newton (10.1) and Barnstable (9.4), which were below the state level by 19% and 24% respectively. (Table 3A).

- Four communities recorded low birthweight percentages that were at least 25% higher than the statewide average of 7.8% (Table 3A). They were: Peabody (11.1%), Brockton (10.9%), Springfield (10.8%), and Taunton (9.9%). Low birthweight percentages were lowest in Weymouth and Waltham (5.9% and 6.5%, respectively).

- In 2004, low birthweight percentages increased by more than 5% from the previous year in Worcester and Pittsfield.

[6] Note that the category of black non-Hispanic mothers includes mothers who identified with several ancestries including Haitian, African Americans and Other African. Mothers who identified as African American for their ancestry had a Cesarean section rate of 28.4% and Haitian mothers had a Cesarean section rate of 33.9%.

- Over 90% of mothers living in Brookline and Arlington received adequate prenatal care. In contrast, fewer than 70% of mothers living in Pittsfield (69.4%) and Lowell (68.4%) received adequate prenatal care (Table 3A).

- In 2004, adequate prenatal care increased by more than 25% in Haverhill, Barnstable, Newton, and Chicopee from the previous year, while Lynn and Lawrence decreased by more than 5% from 2003.

- The birth rate for teens was highest in Lawrence (79.4 births per 1,000 females ages 15 to 19 years) and in Holyoke (76.0) (Table 3A). Both communities experienced decreases in their teen birth rates in 2004 from the previous year. The Lawrence rate was almost 4 times the state rate of 22.2, and the Holyoke rate was 3.4 times the state rate.

- Two communities had 2004 infant mortality rates (IMR) in excess of 10 deaths per 1,000 live births: Brockton (10.7) and Chicopee (13.1). Infant mortality rates should be interpreted with caution in these communities since they are based on a small number of infant deaths (Brockton: 17 and Chicopee: 8) (Table 3A).

- Based on a three-year infant mortality rate (IMR) from 2002-2004, which is more stable than a one-year rate, the communities with the highest IMRs were: Lowell (9.0), Chicopee (8.1), Brockton (7.4), Arlington (7.2), and Lynn (7.1) (Table 3A).

Birth Characteristics in Community Health Network Areas

In 2004, among resident live births in the 27 Massachusetts Community Health Network Areas (CHNAs):

- One CHNA, the Greater Lawrence Community Health Network (15.1) had a crude birth rate of 14.3 or more births per 1,000 residents (15% greater than the state crude birth rate of 12.4) (Table 3B).

- The LBW rate in two CHNAs was 15% or more above the state LBW rate (7.8): the Community Health Connection (Springfield) (9.1%), and, the Greater Brockton Community Health Network (9.5). (Table 3B).

- Less than 75% of mothers received adequate prenatal care in the Community Health Network of Berkshire County (73.5%), while over 90% of mothers living within the Community Health Network North (Beverly/Gloucester) (92.3%) received adequate prenatal care (Table 3B).

- Teen birth rates for the Community Health Connection (Springfield) (46.9), the Greater Lawrence Community Health Network (43.7), Partners for a Healthier Community (Fall River) (42.1), Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) (37.0), and, the Greater New Bedford Health & Human Services Coalition (36.9) were the highest among the CHNAs, ranging from 1.7 times the statewide teen birth rate in Greater New Bedford Health & Human Services Coalition to more than double the state teen birth rate in the Community Health Connection (Springfield). The teen birth rate was lowest in the West Suburban Health Network (Newton/Waltham) (3.7), and second lowest in the Greater Woburn/ Concord/ Littleton Community Health Network (6.9) (Table 3B).

- The Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) CHNA had the highest infant mortality rate in 2004 among CHNAs: 10.2 deaths per 1,000 live births. Because of the relatively small number of infant deaths, mortality rates in individual CHNAs should be interpreted with caution (Table 3B). The 3-year average IMR was highest for the Community Health Network of Southern Worcester County (7.1) (Table 3B).

Tobacco Use

In 2004, 7.4% of births were to mothers who reported smoking cigarettes during their pregnancies (Figure 3). This represents a 62% decline from 1990 (19.3%), and a decline of 4% from 2003 (7.7%).

Smoking prevalence during pregnancy differed by mother's race and Hispanic ethnicity. White non-Hispanic women had the highest prevalence of smoking during pregnancy (8.4%), followed by black non-Hispanic women (6.8%), Hispanic women (5.7%), and Asian women (1.5%) (Figure 3). There was a decrease in smoking during pregnancy for white non-Hispanic mothers and Hispanic mothers. In 2004, smoking during pregnancy increased by 4% for black non-Hispanic mothers (6.5 to 6.8) from the previous year.

The prevalence of smoking during pregnancy decreased with higher maternal education; close to 19% of mothers with less than a high school education smoked during pregnancy, compared with less than 1% of women with post-college education (Figure 3). This pattern was the same for all race and ethnicity groups.

The majority (86.0%) of women who gave birth in 2004 were non-smokers prior to pregnancy, and 99.9% of them continued to abstain from smoking during pregnancy (Figure 4). One-tenth of a percent (48) women started smoking during pregnancy. Out of the 14% of women who smoked prior to pregnancy, 56.1% were "light" smokers (1-10 cigarettes daily); 38.6% were "moderate" smokers (11-20 cigarettes daily); and 5.3% were "heavy" smokers (21 or more cigarettes daily). Almost half (47.6%) of pre-pregnancy smokers quit smoking during pregnancy.

Patterns in Number and Rate of Births by Age Group

There has been a marked change in the age distribution of Massachusetts resident mothers since 1980. Approximately 25% of women giving birth in 1980 were aged 30 years and older compared with 56% in 2004. Beginning in 1996, the number of births to mothers aged 30 years and older exceeded the number of births to mothers under age 30. This trend has continued through 2004 (Figure 1).

In Massachusetts, the fertility rate (births to women ages 15-44 years per 1,000 women ages 15-44) decreased 12% from 1990 (62.2) to 2004 (55.0) (Table 4). In 2004, the age-specific birth rates were highest for 30-34 year old (103.1 per 1,000) and 25-29 year old mothers (81.2 per 1,000).

Compared with the rates of 1990, birth rates have increased in the age groups over 30 and decreased for age groups under 30. The largest birth rate increases have been for mothers in age groups over 30, while the largest decreases have been among the youngest age groups,

15-19 and 12-14. In 2004, there were 42 births to mothers ages 10-14 years (a decrease of 14 births from 2003) and there were 182 births to women 45 years of age or older (an increase of 14%, 23 more births than in 2003) (Table 4).

Parity

For age-groups of mothers under 30, parity, the number of live births including the current delivery, is a function of age; the older the mother, the greater the parity. This is not the case for mothers in the age groups over 30. For mothers in the age groups 30-34, they are equally likely to have a parity of 1 or 2. Between ages 35 and 44, mothers are most likely to have a parity of 2, and mothers ages 45 and older are more likely have given birth for the first time (parity of 1) (Table 5).

Plurality

Plurality is the number of births in one delivery. In 2004, 95.2% of births (74,677 births) were singletons, 4.5% were twins (3,538 births), 0.3% were triplets (229 births), and 16 (4 sets) were quadruplets. The total percentage of multiple births (twins, triplets or greater) was 4.8% in 2004, compared with 4.7% in 2003 (Table 6).

The percentage of multiple births has increased by 85% since 1990 (from 2.6% to 4.8%) and this increase varies by age. For women under 35 years, the percentage of multiple births increased from 2.5% in 1990 to 4.0% in 2004, an increase of 60%. The percentage of multiple births to women ages 35 years and older increased from 3.5% in 1990 to 7.6% in 2004, which was an increase of 117% (Table 6).

Education

In 2004, 10.3% of women who gave birth had less than a high school education; 24.4% had a high school diploma or GED; 22.1% had some college education; and 43.2% had a college degree or more (Table 7).

Maternal educational attainment varied by race and Hispanic ethnicity; 56.0% of Asian women and 51.1% of white non-Hispanic women had at least a college degree, compared with 18.2% of black non-Hispanic women and 10.3% of Hispanic women (Table 7).

Women with more education were more likely to receive adequate prenatal care; more likely to breastfeed; more likely to have multiple births; more likely to have C-section deliveries; and more likely to be married. These mothers were less likely to smoke during pregnancy, less likely to receive publicly financed prenatal care, and less likely to have low birthweight infants (Table 7).

Interpregnancy Intervals

The interpregnancy interval (IPI) is defined as the time (in months) between the initiation of the current pregnancy and the completion of the previous pregnancy. Research has shown that

infants conceived with a shorter and/or longer than an "optimal range"[7] of interpregnancy intervals (IPI) are more likely to have a higher risk of adverse perinatal outcomes. The extreme" IPIs, i.e., less than five months and 48 months and greater, have the greatest values of LBW and preterm infants.

The Massachusetts IPIs[8] derived from 2004 birth records conform to the research findings mentioned above, that is, both a short[9] IPI (less than 12 months) and an IPI over 35 months were associated with higher proportions of low birthweight and premature deliveries; whereas, an IPI between 12 to 35 months was associated with lower proportions of low birthweight and premature deliveries (Table 8A and Figure 5A).

In Figure 5B, the IPIs are shown for three age groups: less than 20, 20-34, and 35+. About 4 out of 10 teen mothers' subsequent pregnancies were initiated within 12 months after the previous birth, while about 2 out of 10 mothers aged 20 to 34, and about 1 out of 10 mothers aged 35 and older were initiated within 12 months after previous birth (Figure 5B).

In 2004, 41,373 (out of 80,167 total, 52.7%) Massachusetts resident mothers delivered their second or higher order live infant. One percent were teen mothers, 69% were 20 to 34 years old, and 30% were aged 35 and older (Table 8B). Mothers having a subsequent pregnancy[10] while they are still teens represent 13.0% of all teens giving birth in 2004 (592 out of 4,559 teen mothers in 2004).

Among mothers having a subsequent pregnancy (yielding a live birth in 2004), teen pregnancies were 3.3 times as likely to have been initiated within 12 months after the previous birth as compared with mothers 35 years and older (39.4% vs. 12.1%, Table 8B). Among race and Hispanic ethnicity groups, subsequent pregnancies to black non-Hispanic mothers were most likely to have been initiated 36 months or later after the previous live birth (52.2%, compared with 33.0% among white non-Hispanics, Table 8B).

Short Interpregnancy Interval (less than 12 months)

Sixteen percent of all subsequent pregnancies in Massachusetts were initiated within 12 months after delivery of the previous child; that is, within a short interpregnancy interval (IPI). The proportion of mothers with *short IPI* increased slightly with increasing education. This proportion did not vary by the source of payment for their delivery care (public or private). Mothers living in the Metrowest (16.8%) and the Western Executive Office of Health and Human Services (EOHHS) regions[11] (16.9%) had the highest proportion of short IPI. Those living in the communities of Holyoke (21.4%), Attleboro (20.8%), Mansfield (20.3%), and Pittsfield (19.1%) were the most likely to have had a short IPI.

[7] "Optimal range" of interpregnancy interval is the range in which adverse perinatal outcomes are minimized in the population such as the percentages of low birthweight and premature deliveries.
[8] For each mother delivering her 2nd or higher order live infant in 2003, the IPI was derived by calculating the months between the date of last menstrual period of current pregnancy and the date of birth of last live birth. Mothers delivering multiples were included only once.
[9] Short IPI is defined variously in the literature, including values 'less than 6', 'less than 12', and 'less than 18' months. In this report 12 months is used.
[10] The term "subsequent pregnancy" refers to a 2nd or higher pregnancy.
[11] EOHHS Regions are the six regions delineated by the commonwealth's Executive Office of Health and Human Services for statistical, care coordination and administrative purposes.

Interpregnancy Interval: 12 to 35 Months

Forty-six percent of the current subsequent pregnancies were initiated between 12 to 35 months after the previous delivery. This proportion increased more rapidly with increased maternal education (36.4% for mothers with high school education or less, 48.8% for mothers with a college degree or some college education, and 59.6% for those with more than college education, Table 8B). White non-Hispanic mothers were 1.5 times more likely to have begun the subsequent pregnancy between 12 to 35 months after the previous birth, as compared with black non-Hispanic mothers (50.1% vs. 33.1%). Among mothers delivering their subsequent child, those having private funds to pay for delivery care were 1.5 times more likely to have begun their subsequent pregnancy between 12 to 35 months later than mothers with public funding for their delivery care (50.9% vs. 35.0%) (Table 8B).

Mothers living in the Metrowest EOHHS region were 1.4 times more likely to have begun their pregnancy between 12 to 35 months after previous birth as those living in the Boston EOHHS region (52.4% vs. 38.3%). Mothers in the communities of Needham (63.3%), North Andover (62.9%), Newton (61.7%), and Arlington (60.8%) were the most likely to have begun their pregnancy between 12 to 35 months after the previous birth (Table 8B).

Interpregnancy Interval: 36 Months or More

Thirty-eight percent of all subsequent pregnancies in 2004 were initiated 36 months or more after the delivery of the previous child. This proportion decreased with increasing maternal education (48.7% for mothers with high school education or less, 34.7% for mothers with a college degree or some college education, and 23.4% for those with more than college education, Table 8B). In addition, mothers with public funding for delivery care were 1.5 times more likely to have begun their current pregnancy 36 months or later, after previous birth than mothers with private funding (48.9% vs. 33.2%).

Mothers living in the Boston EOHHS region were the most likely to have had their subsequent pregnancy initiated 36 months and after (47.8%); those living in the Metrowest EOHHS region were the least likely (30.9%). Mothers in the communities of Chelsea (59.6%), Randolph (52.2%), Everett (52.0), Lawrence (51.8%), and Revere (50.8%) were the most likely to have begun their subsequent pregnancies 36 months or more after delivering the previous child (Table 8B).

Healthy People 2010 Objectives

Healthy People 2010 (HP2010) sets targets for each measurable Healthy People objective[1112]. Table 9 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.

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

Out of 16 objectives presented, Massachusetts has already met the 2010 target for two indicators: the postneonatal mortality rate and breastfeeding. For six objectives, the 2004 Massachusetts indicators are within 25% of the target goals: 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 eight objectives, Massachusetts is still more than 25% away from achieving the targets: fetal mortality rate, neonatal mortality rate, perinatal mortality rate, maternal mortality ratio, low birthweight, very low birthweight, and Cesarean sections (both low-risk women giving birth for the first time and for low-risk women with prior Cesarean section).

Table 1. Trends in Birth Characteristics, Massachusetts: 1980, 1990, 1992-2004

Characteristic		1980	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Births[1]	**n**[2]	72,591	92,461	87,202	84,627	83,758	81,562	80,164	80,321	81,406	80,866	81,582	81,014	80,624	80,167	78,460
	Rate[3]	53.4	62.1	59.1	57.6	57.0	55.5	54.6	54.7	55.6	55.9	57.2	56.8	56.5	56.2	55.0
Race of Mother																
White[4]	**n**	66,220	80,775	76,052	73,704	72,980	71,083	69,485	69,503	70,452	69,305	69,371	68,728	67,874	67,586	65,362
	%[5]	91.2	87.4	87.2	87.1	87.1	87.2	86.7	86.5	86.5	85.7	85.0	84.8	84.2	84.3	83.3
Black	**n**	4,626	7,729	7,203	6,916	6,713	6,299	5,946	6,182	6,337	6,524	6,445	6,555	6,649	6,561	6,698
	%[5]	6.4	8.3	8.3	8.2	8.0	7.7	7.4	7.7	7.8	8.1	7.9	8.1	8.2	8.2	8.5
Asian/Other[6]	**n**	1,069	3,688	3,582	3,664	3,790	3,817	3,950	4,217	4,248	4,615	5,205	5,279	5,793	5,688	5,906
	%[5]	1.5	4.0	4.1	4.3	4.5	4.7	4.9	5.3	5.2	5.7	6.4	6.5	7.2	7.1	7.5
Unknown	**n**	676	269	365	343	275	363	783	419	369	422	561	452	308	332	494
	%[5]	0.9	0.3	0.4	0.4	0.3	0.4	1.0	0.5	0.5	0.5	0.7	0.6	0.4	0.4	0.6
Teen Births (Ages 15-19)	**n**	7,694	7,258	6,555	6,469	6,412	5,990	5,758	5,801	5,823	5,515	5,305	4,979	4,642	4,639	4,559
	Rate[3]	28.1	35.4	34.5	34.0	33.2	30.3	28.5	28.5	28.1	26.7	25.8	24.3	22.6	22.6	22.2
Births to Unmarried Mothers[7]	**n**	11,356	22,837	22,612	22,345	22,302	20,857	20,253	20,640	21,191	21,448	21,621	21,620	21,604	22,262	22,376
	%	15.6	24.7	25.9	26.4	26.6	25.6	25.3	25.7	26.0	26.5	26.5	26.7	26.8	27.8	28.5
Low Birthweight	**n**	4,413	5,388	5,137	5,202	5,335	5,174	5,105	5,617	5,655	5,708	5,711	5,795	6,060	6,115	6,125
	%	6.1	5.8	5.9	6.2	6.4	6.4	6.4	7.0	7.0	7.1	7.1	7.2	7.5	7.6	7.8
Preterm	**n**	6,732	5,899	6,313	6,201	6,492	6,438	5,705	5,831	6,117	6,136	6,582	6,412	6,795	6,963	7,222
	%	7.4	6.5	7.3	7.4	7.8	7.9	7.2	7.3	7.6	7.6	8.3	8.0	8.5	8.7	9.2
Adequate Prenatal Care																
Kessner Index[8]	**%**	82.0	80.1	82.9	83.8	84.3	84.2	79.9	80.0	79.8	79.4	79.1	80.4	79.9	79.9	79.5
APNCU Index[9]	**%**							83.3	82.9	82.9	82.9	83.3	85.2	84.7	84.5	84.2

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 women age 15-19. 2000-2004 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts. 1999 rates are calculated using the 1999 DPH Massachusetts population estimates (see Technical Notes in Appendix). PLEASE NOTE: DIFFERENCES BETWEEN THESE RATES AND PREVIOUSLY PUBLISHED DATA REFLECT UPDATES IN POPULATION ESTIMATES. 4. On tables and graphs that include data prior to June 1986, the race classifications do not include an ethnicity component; most Hispanics are included in the race category of white. 5. Percentages are calculated based on births, including those to mothers of unknown race. 6. Other races include American Indian and others not specified. 7. Includes those women who were unmarried 300 days before giving birth. 8. 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. 9. 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 2A. Birth Characteristics by Maternal Race and Hispanic Ethnicity and Birthplace, Massachusetts: 2004

Race and Hispanic Ethnicity (by mother's birthplace)	Births		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breastfeeding[5]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate[4]		First Trimester					
	n	%[1]	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
State Total	**78,460**	**100.0**	**1,496**	**1.9**	**4,601**	**5.9**	**1,148**	**1.5**	**6,125**	**7.8**	**65,362**	**84.2**	**64,958**	**83.5**	**24,295**	**31.0**	**60,718**	**78.9**
U.S. States / D.C.	56,599	72.1	1,154	2.0	3,463	6.1	806	1.4	4,474	7.9	48,097	85.8	48,259	85.9	17,809	31.5	41,770	75.5
Puerto Rico/U.S. Terr.[7]	1,949	2.5	153	7.5	382	18.8	59	3.0	237	11.9	1,566	79.7	1,495	75.8	536	27.0	1,418	71.9
Non-U.S.-Born[8]	19,792	25.2	188	0.9	754	3.8	277	1.4	1,403	7.1	15,674	80.1	15,180	77.3	5,941	30.1	17,530	89.2
White non-Hispanic	**55,321**	**70.5**	**566**	**1.0**	**2,137**	**3.9**	**687**	**1.2**	**4,024**	**7.3**	**47,511**	**86.6**	**47,816**	**87.0**	**17,692**	**32.0**	**42,031**	**77.8**
U.S. States / D.C.	49,193	88.9	529	1.1	1,975	4.0	621	1.3	3,647	7.4	42,399	86.9	42,797	87.6	15,789	32.1	36,560	76.2
Puerto Rico/U.S. Terr.[7]	44	0.1	3	--[6]	4	--[6]	0	0.0	2	--[6]	37	84.1	37	84.1	13	29.5	37	90.2
Non-U.S.-Born[8]	6,060	11.0	33	0.5	157	2.6	64	1.1	372	6.1	5,057	84.1	4,964	82.4	1,885	31.1	5,434	90.6
Black non-Hispanic	**6,053**	**7.7**	**214**	**3.5**	**595**	**9.8**	**213**	**3.5**	**733**	**12.1**	**4,522**	**76.6**	**4,288**	**72.0**	**1,987**	**33.0**	**4,806**	**80.0**
U.S. States / D.C.	3,018	49.9	193	6.4	504	16.7	119	3.9	431	14.3	2,297	78.2	2,178	73.5	929	30.9	2,077	69.5
Puerto Rico/U.S. Terr.[7]	26	0.4	1	--[6]	2	--[6]	2	--[6]	5	19.2	16	61.5	19	73.1	12	46.2	20	80.0
Non-U.S.-Born[8]	3,005	49.6	20	0.7	88	2.9	90	3.0	294	9.8	2,207	75.1	2,089	70.6	1,044	34.9	2,709	90.4
Hispanic	**9,801**	**12.5**	**585**	**6.0**	**1,524**	**15.5**	**153**	**1.6**	**834**	**8.5**	**7,432**	**76.7**	**7,196**	**73.9**	**2,627**	**26.9**	**7,918**	**81.0**
U.S. States / D.C.	3,097	31.6	325	10.5	764	24.7	46	1.5	274	8.9	2,352	76.8	2,276	74.0	794	25.7	2,148	69.5
Puerto Rico/U.S. Terr.[7]	1,865	19.0	147	7.9	367	19.7	50	2.7	220	11.8	1,465	79.5	1,392	75.3	494	26.6	1,324	71.3
Non-U.S.-Born[8]	4,839	49.4	113	2.3	393	8.1	57	1.2	340	7.0	3,615	75.5	3,528	73.4	1,339	27.7	4,446	92.0
Asian	**5,453**	**7.0**	**67**	**1.2**	**156**	**2.9**	**57**	**1.0**	**378**	**6.9**	**4,508**	**83.0**	**4,292**	**78.9**	**1,502**	**27.6**	**4,535**	**83.4**
U.S. States / D.C.	563	10.3	54	9.6	93	16.5	9	1.6	57	10.1	462	82.4	433	77.2	129	23.0	454	81.1
Puerto Rico/U.S. Terr.[7]	3	--[6]	0	0.0	1	--[6]	0	0.0	0	0.0	3	--[6]	2	--[6]	0	0.0	3	--[6]
Non-U.S.-Born[8]	4,879	89.5	13	0.3	62	1.3	48	1.0	319	6.5	4,038	83.1	3,853	79.2	1,372	28.1	4,078	83.7
Other[9]	**1,729**	**2.2**	**63**	**3.6**	**184**	**10.6**	**34**	**2.0**	**148**	**8.6**	**1,346**	**79.9**	**1,322**	**78.0**	**469**	**27.3**	**1,393**	**84.0**
U.S. States / D.C.	728	42.1	53	7.3	127	17.4	11	1.5	65	9.0	587	82.6	575	80.5	168	23.2	531	75.6
Puerto Rico/U.S. Terr.[7]	11	0.6	1	--[6]	4	--[6]	4	--[6]	4	--[6]	9	100.0	8	88.9	4	--[6]	5	83.3
Non-U.S.-Born[8]	988	57.1	9	0.9	53	5.4	18	1.8	77	7.8	750	77.8	739	76.1	296	30.1	857	90.1
Unknown[10]	**103**	**0.1**	**1**	**--[6]**	**5**	**4.9**	**4**	--[6]	**8**	**13.3**	**43**	**86.0**	**44**	**86.3**	**18**	**30.5**	**35**	**72.9**

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

1. This 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. Beginning with *Births 2001*, the Adequacy of Prenatal Care Utilization Index has replaced the Kessner Index as the measure of adequate prenatal care. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 6. Calculations based on fewer than five events are excluded. 7. The category "Puerto Rico/U.S. Territories" includes women born in Puerto Rico, the U.S. Virgin Islands, and Guam. Approximately 95% of the births in this category were to women born in Puerto Rico. 8. The category "Non-U.S.-Born" includes women born outside of the 50 U.S. states, District of Columbia, and Puerto Rico/U.S. territories. 9. Other: Mothers who designated themselves as American Indian or Other race. 10. Unknown: Mothers who did not indicate a race/ethnicity.

Table 2B. Birth Characteristics by Maternal Ancestry, Massachusetts: 2004

Maternal Ancestry	Births[1]		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breastfeeding[5]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate[4]		1st Trimester					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
State Total	**78,460**	**100.0**	**1,496**	**1.9**	**4,601**	**5.9**	**1,148**	**1.5**	**6,125**	**7.8**	**65,362**	**84.2**	**64,958**	**83.5**	**24,295**	**31.0**	**60,718**	**78.9**
American	35,239	44.9	467	1.3	1,670	4.7	460	1.3	2,735	7.8	30,362	86.5	30,787	87.7	11,086	31.5	26,477	75.3
European	14,068	17.9	59	0.4	236	1.7	135	1.0	857	6.1	12,265	87.6	12,154	86.7	4,537	32.3	11,758	84.2
Puerto Rican	4,286	5.5	423	9.9	1,013	23.6	88	2.1	455	10.6	3,281	77.5	3,142	73.9	1,122	26.2	2,913	68.2
African American	2,632	3.4	158	6.0	439	16.7	94	3.6	367	14.0	1,995	77.8	1,921	74.3	803	30.7	1,865	71.0
Brazilian	1,801	2.3	23	1.3	99	5.5	15	0.8	106	5.9	1,470	81.8	1,439	80.1	717	39.8	1,706	94.7
Dominican	1,745	2.2	64	3.7	205	11.7	25	1.4	137	7.9	1,342	77.4	1,368	78.8	560	32.1	1,571	90.1
Chinese	1,520	1.9	1	0.1	8	0.5	9	0.6	79	5.2	1,345	88.7	1,245	82.1	410	27.0	1,309	86.2
Other Portuguese	1,350	1.7	26	1.9	97	7.2	13	1.0	95	7.1	1,144	86.3	1,114	84.0	424	31.6	695	51.9
Asian Indian	1,224	1.6	1	0.1	7	0.6	22	1.8	115	9.4	1,025	84.1	1,033	84.7	421	34.4	1,187	97.2
Haitian	1,145	1.5	8	0.7	30	2.6	45	3.9	126	11.0	803	72.5	775	69.0	408	35.8	1,011	88.4
Other Central American[6]	1,055	1.3	25	2.4	99	9.4	16	1.5	71	6.7	748	71.6	698	66.6	265	25.2	935	88.7
Other African[6]	1,015	1.3	6	0.6	21	2.1	24	2.4	78	7.7	735	73.4	679	67.6	378	37.3	937	92.4
Salvadoran	981	1.3	33	3.4	97	9.9	10	1.0	71	7.2	704	72.8	685	70.4	215	21.9	917	93.6
Cape Verdean	863	1.1	36	4.2	107	12.4	19	2.2	94	11.0	615	73.1	586	69.3	214	25.0	672	78.7
Vietnamese	778	1.0	6	0.8	16	2.1	3	0.4	42	5.4	634	82.2	598	77.3	220	28.3	536	69.1
Cambodian	611	0.8	46	7.5	94	15.4	7	1.1	60	9.8	382	62.8	347	57.0	91	14.9	302	49.4
Other South American[6]	565	0.7	13	2.3	28	5.0	4	0.7	33	5.9	448	80.1	432	77.1	153	27.3	509	90.7
Mexican	514	0.7	9	1.8	34	6.6	3	0.6	27	5.3	369	73.1	354	69.5	119	23.2	472	92.0
Other & Missing[7]	7,068	9.0	92	1.3	301	4.3	156	2.2	577	8.2	5,695	84.5	5,601	82.2	2,152	30.7	4,946	85.2

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

1. In the first category, "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. 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. The Adequacy of Prenatal Care Utilization Index has replaced the Kessner Index as the measure of adequate prenatal care. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 6. "Other" refers to groups not specified on the parents' worksheet. See the Glossary entry "ethnicity" for the complete list of ethnicities. 7. This group includes other ethnicities specified that had fewer than 400 births, missing ethnicity, and "Other Ethnicity".

Table 3A. Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2004

Municipality[1]	Rank (by pop. size)	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity				Very Low Birthweight (<1500 g)	Low Birthweight (<2500 g)
				White non-Hispanic	Black non-Hispanic	Hispanic	Asian or Other[4]		
				%[3]	%[3]	%[3]	%[3]	%	%
STATE TOTAL		**6,349,097**	**12.4**	**70.5**	**7.7**	**12.5**	**9.2**	**1.5**	**7.8**
Arlington	29	42,389	13.4	80.3	2.3	3.2	14.2	2.1	6.7
Attleboro	30	42,068	14.6	81.5	4.5	6.3	7.3	1.3	8.1
Barnstable	25	47,821	9.4	84.6	4.2	3.3	7.6	1.3	9.2
Boston	1	589,141	13.1	37.5	27.8	20.7	13.7	1.9	9.0
Brockton	6	94,304	16.9	36.1	38.4	11.0	14.5	2.6	10.9
Brookline	17	57,107	12.2	69.9	2.0	5.0	23.1	1.0	7.9
Cambridge	5	101,355	10.8	57.0	16.0	7.6	19.1	1.4	6.8
Chicopee	21	54,653	11.2	78.3	2.5	15.8	3.4	2.5	8.5
Fall River	8	91,938	12.9	80.7	5.5	7.6	6.2	1.5	8.6
Framingham	14	66,910	14.1	70.0	5.3	15.0	9.8	1.7	8.4
Haverhill	16	58,969	14.8	78.2	3.2	14.6	4.0	1.4	9.3
Lawrence	13	72,043	19.7	17.4	2.5	77.1	3.0	2.1	9.5
Lowell	4	105,167	15.7	45.1	7.5	17.6	29.8	2.0	9.0
Lynn	9	89,050	16.0	37.3	11.8	40.8	10.1	1.4	7.6
Malden	18	56,340	15.2	47.9	16.8	9.2	25.8	0.8	8.2
Medford	20	55,765	11.1	75.0	9.2	4.2	11.3	2.3	7.1
Methuen	28	43,789	14.2	72.0	2.1	19.9	5.9	1.1	7.4
New Bedford	7	93,768	14.7	63.7	6.8	19.7	9.4	1.4	8.0
Newton	11	83,829	10.1	81.3	1.4	2.6	14.6	1.5	9.1
Peabody	24	48,129	10.7	86.4	1.0	8.2	4.5	2.9	11.1
Pittsfield	27	45,793	11.7	78.6	8.7	6.7	5.9	2.0	9.1
Plymouth	23	51,701	13.3	94.0	1.6	1.9	2.0	--[5]	7.1
Quincy	10	88,025	13.3	59.7	5.4	3.3	31.5	1.2	7.1
Revere	26	47,283	14.6	52.0	5.5	27.9	14.5	1.3	8.3
Somerville	12	77,478	11.0	60.7	10.6	16.3	12.5	1.6	6.6
Springfield	3	152,082	15.7	30.4	22.3	43.7	3.5	2.0	10.8
Taunton	19	55,976	13.8	83.0	5.9	6.6	4.4	1.5	9.9
Waltham	15	59,226	11.4	56.2	7.2	21.3	15.2	1.5	6.5
Weymouth	22	53,988	12.9	87.8	3.6	1.0	7.4	1.3	5.9
Worcester	2	172,648	14.9	55.2	12.4	22.6	9.8	1.6	7.6

Table 3A.(cont'd) Resident Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2004

Municipality[1]	Birth					Deaths			
	Adequate Prenatal Care[6]	Public Payment[7] for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[8]		Neonatal Mortality Rate[8]	
	%	%	%	n	Rate[2]	2004	2002-2004	2004	2002-2004
STATE TOTAL	**84.2**	**30.5**	**28.5**	**4,559**	**22.2**	**4.7**	**4.8**	**3.7**	**3.6**
Arlington	93.1	6.9	6.9	7	9.1	8.8	7.2	8.8	6.6
Attleboro	78.1	23.6	24.2	37	32.1	--[5]	2.7	--[5]	2.7
Barnstable	89.0	38.9	26.3	21	16.3	--[5]	6.6	--[5]	4.4
Boston	84.9	46.1	43.5	578	26.0	6.0	6.4	4.7	4.8
Brockton	76.8	58.6	50.7	161	48.7	10.7	7.4	7.5	5.8
Brookline	95.3	5.6	3.2	3	--[5]	--[5]	3.9	--[5]	3.9
Cambridge	89.2	19.4	17.9	25	6.7	--[5]	4.3	--[5]	3.4
Chicopee	82.0	47.3	46.4	64	35.4	13.1	8.1	--[5]	4.9
Fall River	87.2	60.0	50.9	171	58.7	5.0	5.8	4.2	4.9
Framingham	86.9	32.9	22.4	44	22.9	8.5	6.2	6.4	4.5
Haverhill	88.6	29.2	28.9	56	31.2	--[5]	5.3	--[5]	4.2
Lawrence	76.9	70.8	65.6	226	79.4	9.2	6.9	6.4	5.0
Lowell	68.4	53.3	48.0	194	49.6	4.9	9.0	3.6	6.0
Lynn	72.6	61.2	49.3	135	45.2	6.3	7.1	5.6	5.5
Malden	85.2	36.9	27.0	28	20.1	--[5]	3.6	--[5]	3.6
Medford	87.8	21.7	15.2	16	9.1	8.1	4.3	--[5]	3.3
Methuen	84.5	24.2	27.0	38	30.1	--[5]	3.3	--[5]	--[5]
New Bedford	79.2	62.9	57.1	183	61.5	--[5]	6.2	--[5]	3.2
Newton	89.8	5.0	6.8	9	2.6	--[5]	3.7	--[5]	3.7
Peabody	86.2	27.1	21.8	24	18.5	0.0	3.2	0.0	--[5]
Pittsfield	64.9	48.9	50.8	59	43.4	--[5]	5.0	--[5]	--[5]
Plymouth	83.2	18.9	21.2	27	17.1	--[5]	4.2	--[5]	3.7
Quincy	88.5	30.7	22.8	34	17.4	4.3	4.9	--[5]	3.7
Revere	83.8	50.9	37.6	42	34.6	--[5]	2.9	--[5]	2.9
Somerville	85.5	39.8	28.9	36	17.2	5.9	3.0	--[5]	2.6
Springfield	74.6	70.2	67.2	428	70.9	6.3	6.8	3.8	4.3
Taunton	78.8	35.2	38.2	54	32.7	--[5]	5.3	--[5]	4.4
Waltham	82.8	30.4	25.4	18	8.0	--[5]	4.3	--[5]	4.3
Weymouth	89.2	21.0	20.0	27	20.3	--[5]	5.6	--[5]	5.2
Worcester	77.2	44.3	44.2	250	36.1	6.6	6.6	4.7	4.6

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 DPH 2000 population estimates, based on U.S. Census 2000 population counts (see Technical Notes in Appendix). 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. 2004 birth rates are calculated using the DPH 2000 population estimates. 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 fewer than 5 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 Appendix for definitions of infant and neonatal mortality rates.

Table 3B: Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2004

CHNA	Population	Crude Birth Rate[1]	Mother's Race and Ethnicity: White non-Hispanic %[3]	Black non-Hispanic %[3]	Hispanic %[3]	Asian or Other[2] %[3]	Very Low Birthweight (<1500 g) %	Low Birthweight (<2500 g) %
STATE TOTAL	**6,349,097**	**12.4**	**70.5**	**7.7**	**12.5**	**9.2**	**1.5**	**7.8**
Community Health Network of Berkshire County	134,953	9.6	86.7	4.5	4.7	4.1	1.7	7.2
Upper Valley Health Web (Franklin County)	86,889	9.7	91.3	1.5	3.7	2.6	1.9	7.8
Partnership for Health in Hampshire County (Northampton)	150,077	8.6	85.9	2.0	6.0	6.1	0.6	6.8
The Community Health Connection (Springfield)	291,665	13.1	53.0	14.4	28.9	3.6	1.7	9.1
Community Health Network of Southern Worcester County	113,702	12.0	85.9	1.9	9.2	2.9	1.0	7.8
Community Partners for Health (Milford)	152,117	14.2	91.9	0.6	3.2	4.1	0.6	5.6
Community Health Network of Greater Metro West (Framingham)	374,478	13.0	82.6	2.0	6.3	9.0	1.1	6.8
Community Wellness Coalition (Worcester)	289,834	14.1	66.7	8.4	15.1	9.8	1.7	7.8
Fitchburg/Gardner Community Health Network	250,362	11.8	80.2	3.3	11.8	4.7	1.2	7.0
Greater Lowell Community Health Network	270,083	13.4	67.0	4.3	9.3	19.4	1.5	8.1
Greater Lawrence Community Health Network	182,025	15.1	47.1	2.2	45.0	5.7	1.6	8.3
Greater Haverhill Community Health Network	144,275	12.7	87.4	1.9	7.6	3.2	1.3	8.4
Community Health Network North (Beverly/Gloucester)	118,280	10.1	92.5	0.8	2.1	4.6	1.5	7.3
North Shore Community Health Network	278,839	12.5	65.6	5.9	21.6	6.8	1.7	8.5
Greater Woburn/Concord/Littleton Community Health Network	208,406	11.7	80.0	2.2	2.5	15.2	1.1	6.8
North Suburban Health Alliance (Medford/Malden/Melrose)	261,844	12.5	71.1	8.5	7.7	12.5	1.4	7.0
Greater Cambridge/Somerville Community Health Network	278,402	11.3	67.1	9.3	8.5	14.9	1.3	6.8
West Suburban Health Network (Newton/Waltham)	253,187	10.8	77.9	2.9	7.5	11.6	1.3	7.4
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	746,914	13.3	40.0	22.6	23.5	13.8	1.8	8.8
Blue Hills Community Health Alliance (Greater Quincy)	365,457	12.5	74.7	7.0	2.6	15.5	1.4	7.3
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	159,254	11.7	66.9	2.4	28.1	2.6	2.1	8.6
Greater Brockton Community Health Network	232,260	14.0	63.6	20.6	6.3	9.4	2.1	9.5
South Shore Community Partners in Prevention (Plymouth)	180,609	12.5	95.3	1.2	0.9	2.3	0.7	7.2
Greater Attleboro-Taunton Health & Education Response	242,659	13.3	89.0	2.8	3.5	4.4	1.3	8.0
Partners for a Healthier Community (Fall River)	140,256	11.2	84.8	4.1	5.8	5.1	1.7	7.9
Greater New Bedford Health & Human Services Coalition	195,533	12.1	75.2	4.7	12.2	7.6	1.6	7.8
Cape and Islands Community Health Network	246,737	9.0	87.2	3.6	3.7	5.3	1.7	7.9

Table 3B.(cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2004

CHNA Number and CHNA	Births					Deaths			
	Adequate Prenatal Care[6]	Public Payment[7] for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[8]		Neonatal Mortality Rate[8]	
	%	%	%	n	Rate[4]	2004	2002-2004	2004	2002-2004
STATE TOTAL	**84.2**	**30.5**	**28.5**	**4,559**	**22.2**	**4.7**	**4.8**	**3.7**	**3.6**
1. Community Health Network of Berkshire County	73.5	43.1	41.0	122	25.8	6.2	5.8	3.9	3.7
2. Upper Valley Health Web (Franklin County)	83.5	34.1	37.9	69	24.1	8.3	3.6	8.3	3.2
3. Partnership for Health in Hampshire County (Northampton)	87.2	24.4	26.4	72	8.0	--[6]	3.4	--[6]	2.3
4. The Community Health Connection (Springfield)	78.0	54.2	50.0	493	46.9	6.0	6.9	3.7	4.5
5. Community Health Network of Southern Worcester County	81.5	26.1	30.6	92	25.1	8.1	7.1	6.6	5.2
6. Community Partners for Health (Milford)	87.5	13.8	15.3	70	15.5	3.7	4.0	2.8	3.1
7. Community Health Network of Greater Metro West (Framingham)	87.8	15.0	12.5	102	10.3	4.5	4.0	4.1	3.4
8. Community Wellness Coalition (Worcester)	78.6	31.5	32.3	278	26.8	5.6	5.8	4.1	4.4
9. Fitchburg/Gardner Community Health Network	83.8	26.1	27.8	186	22.7	4.1	4.4	3.0	3.0
10. Greater Lowell Community Health Network	77.3	29.9	28.5	247	28.8	3.3	5.2	2.2	3.3
11. Greater Lawrence Community Health Network	82.2	43.8	42.2	273	43.7	5.8	4.8	3.6	3.3
12. Greater Haverhill Community Health Network	90.0	19.9	21.2	86	20.4	3.3	4.7	--[6]	3.9
13. Community Health Network North (Beverly/Gloucester)	92.3	19.7	17.1	30	8.1	4.2	3.7	--[6]	3.2
14. North Shore Community Health Network	80.5	37.9	31.9	201	24.2	4.6	5.1	3.7	3.8
15. Greater Woburn/Concord/Littleton Community Health Network	88.0	7.4	8.1	37	6.9	2.1	2.2	2.1	1.7
16. North Suburban Health Alliance (Medford/Malden/Melrose)	87.6	24.8	19.3	92	13.3	3.4	3.4	3.1	2.7
17. Greater Cambridge/Somerville Community Health Network	89.2	20.9	17.1	74	9.4	4.8	4.1	3.8	3.2
18. West Suburban Health Network (Newton/Waltham)	88.7	11.3	10.5	36	3.7	2.6	3.1	2.2	2.7
19. Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	85.2	44.6	40.9	703	26.6	5.8	5.9	4.6	4.5
20. Blue Hills Community Health Alliance (Greater Quincy)	88.4	19.0	16.9	109	11.3	4.6	4.9	4.2	4.4
21. Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	80.3	51.3	47.2	218	37.0	10.2	6.1	7.0	4.6
22. Greater Brockton Community Health Network	82.1	37.5	34.3	214	25.9	8.0	5.7	6.2	4.5
23. South Shore Community Partners in Prevention (Plymouth)	87.5	13.4	16.4	73	13.0	3.1	3.4	--[6]	2.4
24.Greater Attleboro-Taunton Health & Education Response	80.3	22.1	22.8	143	18.8	2.8	3.3	2.5	3.0
25. Partners for a Healthier Community (Fall River)	88.9	51.8	43.2	187	42.1	5.7	5.6	3.8	4.6
26. Greater New Bedford Health & Human Services Coalition	79.5	46.8	43.8	241	36.9	2.1	5.1	--[6]	3.0
27. Cape and Islands Community Health Network	86.8	32.3	25.5	111	18.0	4.0	5.1	3.1	3.7

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). 2004 birth rates are calculated using DPH 2000 population estimates; based on U.S. Census 2000 population counts (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. 5. Calculations based on fewer than 5 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 Appendix for definitions of infant and neonatal mortality rates.

Table 4. Age-Specific and Crude Birth Rates, Massachusetts: 1990 and 2004

Mother's Age	1990 Births[1]	1990 Rate	2004 Births	2004 Rate[2]	Percent Change in Rate
10-14	124	1.3	42	0.3	-76.9
15-19	7,258	35.1	4,559	22.2	-36.8
20-24	18,115	69.5	11,670	56.8	-18.3
25-29	29,913	107.2	17,914	81.2	-24.3
30-34	25,687	93.9	25,804	103.1	9.8
35-39	9,795	40.1	14,977	54.6	36.2
40-44	1,522	6.9	3,308	12.4	79.7
45+[3]	46	0.3	182	0.7	133.3
Birth rate, ages 15-44[4]	92,290	62.2	78,232	55.0	-11.6
Crude Birth Rate[5]	92,461	15.4	78,460	12.4	-19.5

NOTE: All percentages are calculated based on only those 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 updating of the birth files. The number of births for all age groups does not always add to the total number of births as mother's age is sometimes not recorded on the birth certificate.
2. 2004 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts (see Technical Notes in Appendix). 3. Denominator is female population ages 45-49. 4. Rate represents the total number of births to women age 15-44 per 1,000 women age 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.

Figure 1. Trends in the Number of Births by Mother's Age Group, Massachusetts: 1980-2004

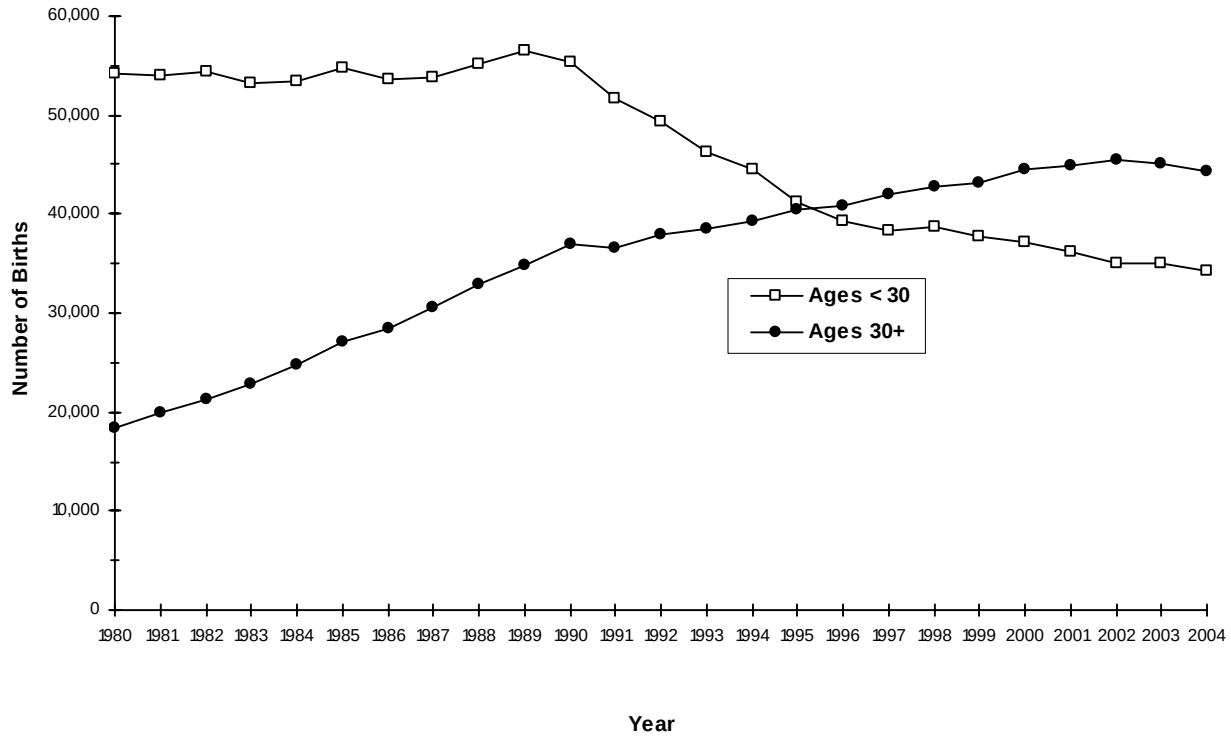
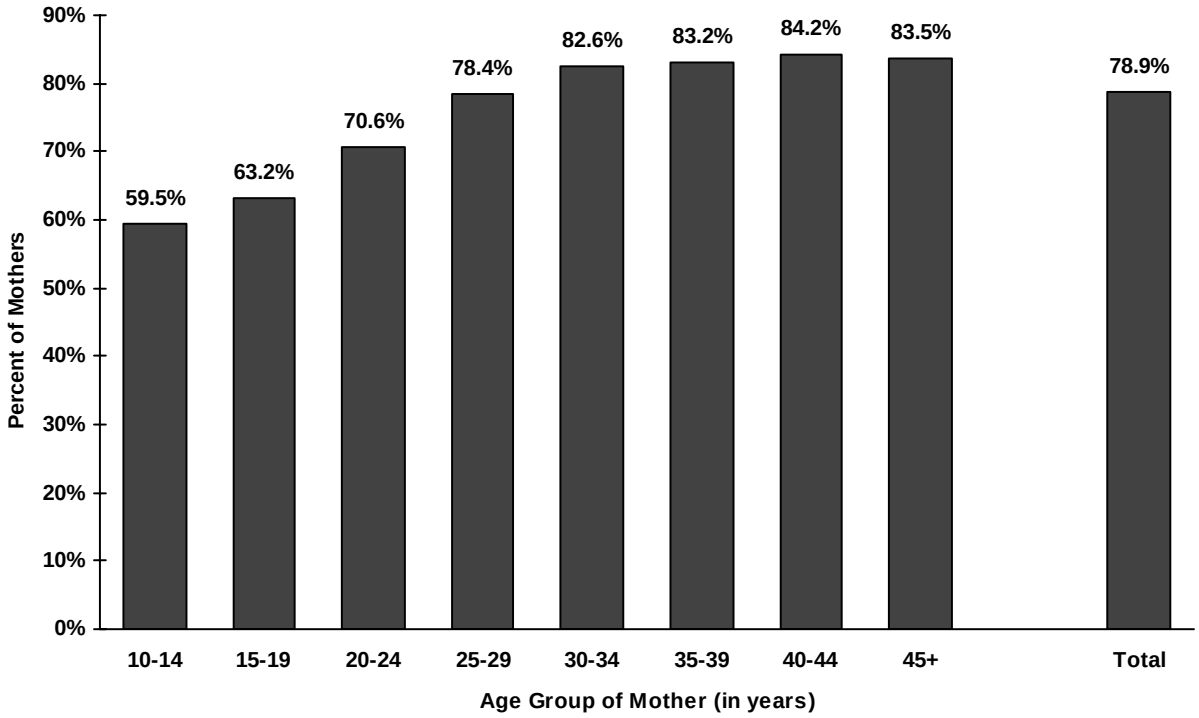


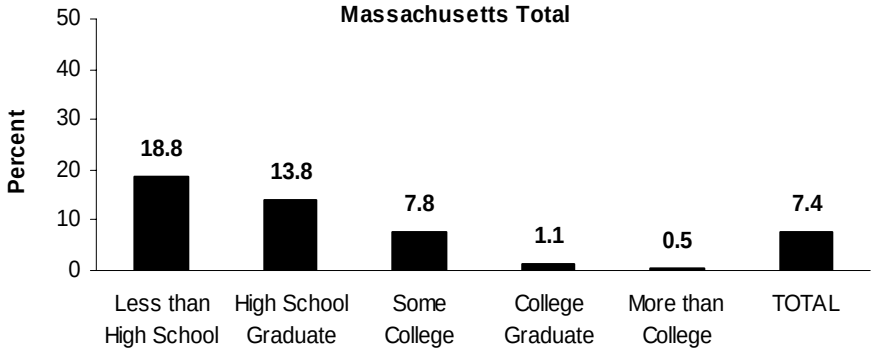
Figure 2. Percent of Mothers Breastfeeding or Intending to Breastfeed[1] by Age Group, Massachusetts [2]: 2004

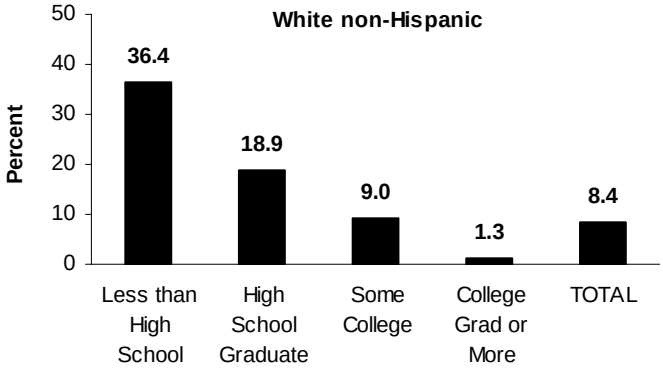


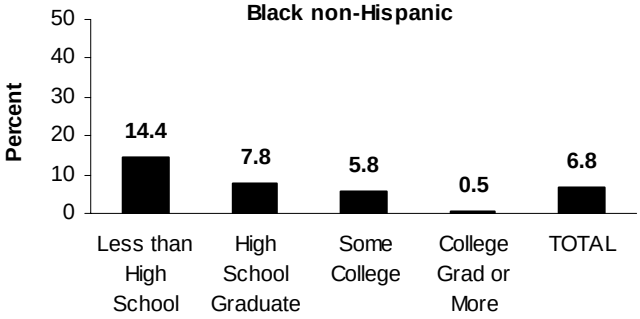
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

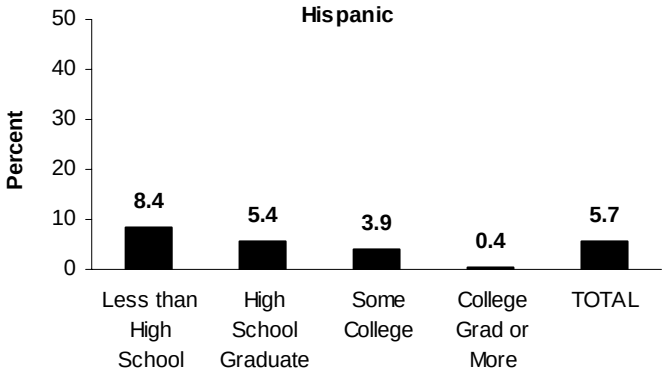
1. Information about breastfeeding is reported by the mother at the time of the birth.
2. For race-specific breastfeeding rates see Table 2A.

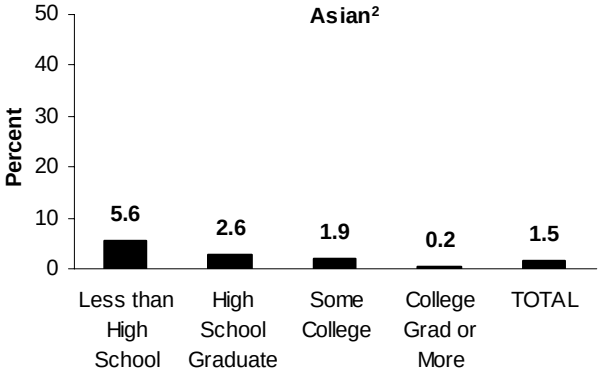
Figure 3. Percent of Mothers who Smoked During Pregnancy[1], by Mother's Race/Hispanic Ethnicity and Educational Attainment, Massachusetts: 2004







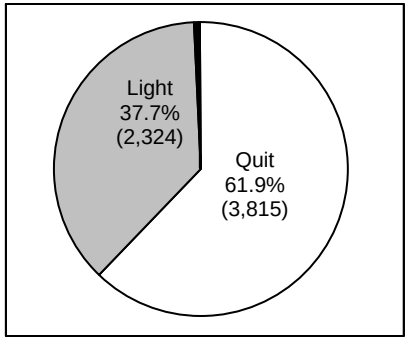
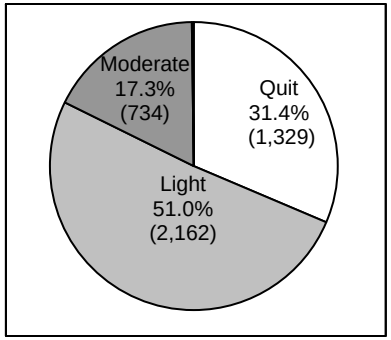
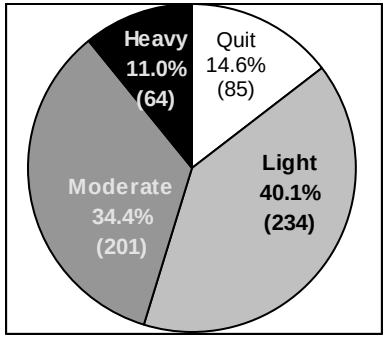




NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Based on information provided on parent worksheet. Because smoking is self-reported, data on smoking prevalence should be interpreted cautiously. Mothers with multiples are counted for each birth. 2. Caution should be used with Asian data because of small numbers.

Figure 4. Distribution of Smoking Status[1] during Pregnancy by Smoking Status Prior to Pregnancy, Massachusetts: 2004

Smoking Status[1] Prior to Pregnancy:	Non-Smokers 86.0% (67,335)	Light Smokers 7.9% (6,166)	Moderate Smokers 5.4% (4,239)	Heavy Smokers 0.7% (584)
Smoking Status[1] During Pregnancy:				
	99.9% of Non-Smokers continued not smoking (0.1% started smoking)	**61.9 % of Light Smokers quit smoking (0.5% increased)**	**82.4% of Moderate Smokers decreased the number of cigarettes smoked daily or quit (0.3% increased)**	**89.0% of Heavy Smokers decreased the number of cigarettes smoked daily or quit**

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

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

Table 5. Parity[1] by Age of Mother, Massachusetts: 2004

Age of Mother (years)		Total Births	1st	2nd	3rd	4th	5th+
STATE TOTAL	**n[2]**	78,460	34,702	27,053	11,139	3,538	1,838
	%[3]	100.0	44.3	34.6	14.2	4.5	2.3
10-14	**n**	42	41	1	0	0	0
	%	100.0	97.6	2.4	0.0	0.0	0.0
15-19	**n**	4,559	3,909	561	69	5	0
	%	100.0	86.0	12.3	1.5	0.1	0.0
20-24	**n**	11,670	6,561	3,627	1,132	240	76
	%	100.0	56.4	31.2	9.7	2.1	0.7
25-29	**n**	17,914	8,766	5,802	2,262	720	317
	%	100.0	49.1	32.5	12.7	4.0	1.8
30-34	**n**	25,804	10,093	10,060	3,823	1,158	619
	%	100.0	39.2	39.1	14.8	4.5	2.4
35-39	**n**	14,977	4,314	5,813	3,179	1,084	557
	%	100.0	28.9	38.9	21.3	7.3	3.7
40-44	**n**	3,308	935	1,135	656	317	254
	%	100.0	28.4	34.4	19.9	9.6	7.7
45+	**n**	182	80	54	18	14	14
	%	100.0	44.4	30.0	10.0	7.8	7.8

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

1. The 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.

Table 6. Trends in Number and Percent Distribution of Births[1] by Plurality and Age, Massachusetts: 1991-2004

Age Group	Year	Singletons n	Singletons %	Multiples[2] Twins n	Twins %	Triplets or more n	Triplets or more %	Total Multiples n	Total Multiples %	Total births n	Total births %
All Ages											
	1991	85,802	97.3	2,285	2.6	89	0.1	2,374	2.7	88,176	100.0
	1992	84,722	97.2	2,347	2.7	133	0.2	2,480	2.8	87,202	100.0
	1993	82,055	97.0	2,367	2.8	205	0.2	2,572	3.0	84,627	100.0
	1994	81,187	96.9	2,357	2.8	214	0.3	2,571	3.1	83,758	100.0
	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
Ages <35											
	1991	74,810	97.5	1,863	2.4	76	0.1	1,939	2.5	76,749	100.0
	1992	73,043	97.3	1,914	2.6	103	0.1	2,017	2.7	75,060	100.0
	1993	70,042	97.2	1,849	2.6	158	0.2	2,007	2.8	72,049	100.0
	1994	68,644	97.2	1,844	2.6	164	0.2	2,008	2.8	70,652	100.0
	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
Ages 35+											
	1991	10,987	96.2	422	3.7	13	0.1	435	3.8	11,422	100.0
	1992	11,675	96.2	433	3.6	30	0.3	463	3.8	12,138	100.0
	1993	12,007	95.5	518	4.1	47	0.4	565	4.5	12,572	100.0
	1994	12,543	95.7	513	3.9	50	0.4	563	4.3	13,106	100.0
	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

NOTE: All percentages are calculated based on only those 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 updating of files. 2. Numbers of multiples (n) represent individual infants rather than sets of infants.

Table 7. Selected Birth Characteristics by Maternal Education, Massachusetts: 2004

	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	8,103	10.3	19,072	24.4	17,298	22.1	21,417	27.4	12,409	15.8
Race										
White non-Hispanic	2,855	5.2	11,518	20.8	12,611	22.8	17,918	32.4	10,358	18.7
Black non-Hispanic	842	13.9	2,234	36.9	1,870	30.9	842	13.9	263	4.3
Hispanic	3,482	35.6	3,651	37.3	1,652	16.9	720	7.4	285	2.9
Asian	610	11.2	989	18.2	797	14.6	1,685	30.9	1,367	25.1
Age										
20-29	4,010	13.6	10,260	34.8	7,822	26.5	5,568	18.9	1,858	6.3
30-39	1,534	3.8	6,404	15.7	8,472	20.8	14,638	36.0	9,658	23.7
40+	148	4.3	557	16.0	702	20.2	1,180	33.9	891	25.6
Non-U.S.-born[2]	3,359	41.5	5,849	30.7	3,715	21.5	4,096	19.1	2,738	22.1
Unmarried	5,936	73.3	9,558	50.1	5,009	29.0	1,406	6.6	428	3.5
Publicly-financed prenatal care	6,546	82.4	10,354	55.4	4,798	28.5	1,412	6.7	286	2.4
Very low birthweight[3]	142	1.8	307	1.6	237	1.4	312	1.5	140	1.1
Low birthweight[4]	774	9.6	1,640	8.6	1,303	7.5	1,555	7.3	834	6.7
Adequate prenatal care[5]	5,593	70.2	15,185	80.6	14,449	84.7	18,932	88.8	11,130	90.2
Cesarean section delivery	1,908	23.6	5,618	29.5	5,639	32.7	7,091	33.2	4,009	32.3
Breastfeeding[6]	5,094	63.6	13,029	69.3	12,882	76.4	18,524	88.0	11,135	91.6
Multiple births	189	2.3	670	3.5	788	4.6	1,320	6.2	801	6.5
Smoking during pregnancy	1,521	18.8	2,635	13.8	1,347	7.8	239	1.1	64	0.5

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

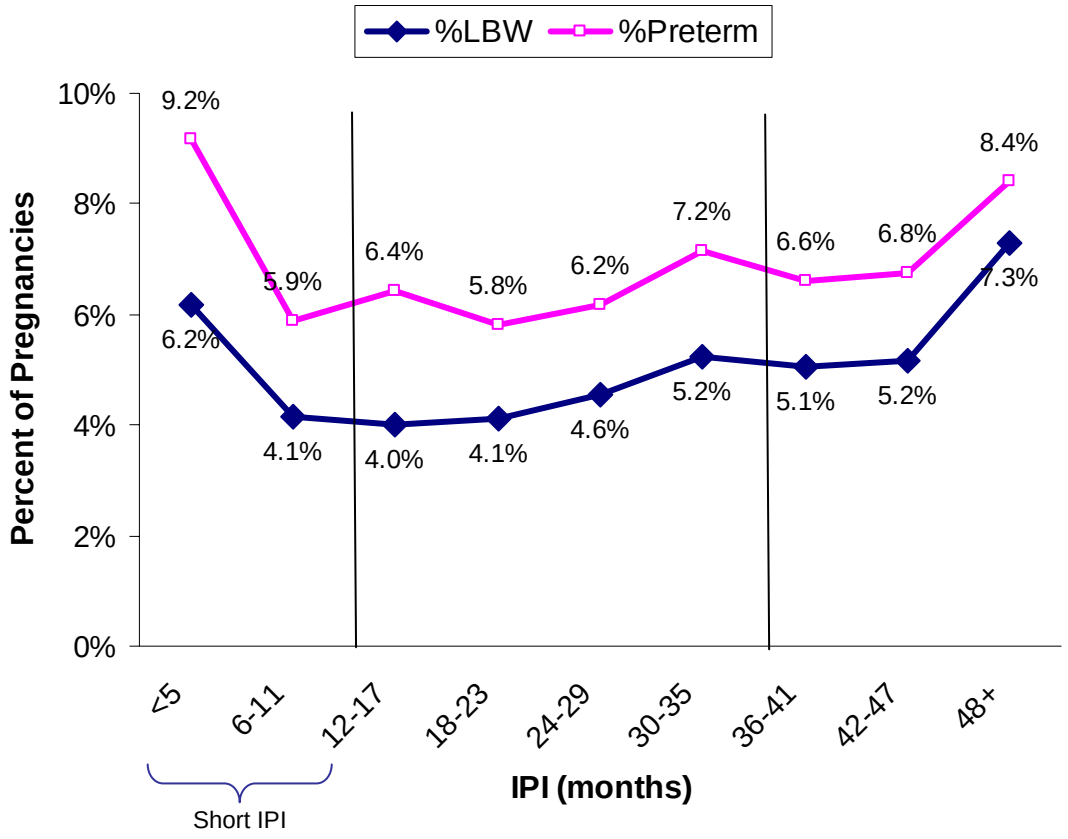
1. For state total, race and age categories, percentages are based on row totals. For all other categories, percentages are based on state column totals. 2. Includes women born outside of the 50 U.S. States, Washington D.C., and Puerto Rico/U.S. territories (the U.S. Virgin Islands, and Guam). 3. Very low birthweight: less than 1,500 grams or 3.3 pounds. 4. Low birthweight: less than 2,500 grams or 5.5 pounds. 5. Beginning with the 2001 publication, the Adequacy of Prenatal Care Utilization Index has replaced the Kessner Index as the measure of adequate prenatal care. 6. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed.

Table 8A. Interpregnancy Intervals[1] (IPI) and Birth Outcomes. Pregnancies to Multiparous[2] Mothers, Massachusetts: 2004

	IPI (months)	Pregnancies[3]	Birth Weight (BW)				Gestational Age (GA)			
			Low Birthweight (<2,500 g)		Very Low Birthweight (<1,500 g)		Preterm[4] (<37 wk)		Very Early[5] (<28 wk)	
			n	% LBW[6]	n	% VLBW	n	% Preterm	n	% VEGA
	State Total	**41,373**	**2,189**	**5.3%**	**358**	**0.9%**	**2,889**	**7.0%**	**160**	**0.4%**
	<5	1,786	110	6.2	13	0.7	163	9.2	5	0.3
	6-11	4,849	201	4.1	36	0.7	284	5.9	21	0.4
	12-17	6,079	244	4.0	39	0.6	391	6.4	20	0.3
	18-23	5,348	220	4.1	31	0.6	310	5.8	14	0.3
	24-29	4,338	198	4.6	30	0.7	268	6.2	13	0.3
	30-35	3,216	168	5.2	23	0.7	230	7.2	10	0.3
	36-41	2,525	128	5.1	18	0.7	167	6.6	3	--[2]
	42-47	2,092	108	5.2	19	0.9	141	6.8	6	0.3
	48+	11,140	812	7.3	149	1.3	935	8.4	68	0.6
Short	< 12	6,635	311	4.7	49	0.7	447	6.8	26	0.4
	12-35	18,981	830	4.4	123	0.6	1,199	6.3	57	0.3
	36+	15,757	1,048	6.7	186	1.2	1,243	7.9	77	0.5

Note: 1. Interpregnancy Interval (IPI) is calculated in months between the date of last menstrual period of the current pregnancy and the date of previous live birth, among pregnancies to multiparous mothers (parity >1). 2. Multiparous is defined as having given birth 2 or more times. 3. IPIs are calculated based upon pregnancies rather than births, i.e., multiple births are counted as *1* pregnancy. 4. Also known as premature delivery. 5. Very early gestational age (VEGA) refers to birth delivery before 28 weeks of gestation age and is also known as extremely preterm delivery. 6. These are the row percentages, that is, the relevant column N/the row totals.

Figure 5A. Interpregnancy Interval (IPI)[1] vs. LBW[2] and Preterm[3] Pregnancies to Multiparous Mothers[4], Massachusetts: 2004



NOTE: Percentages are calculated based on pregnancies to mothers who gave birth to their 2nd or later child in 2004 and with known values for the characteristic(s) of interest, unless otherwise stated.

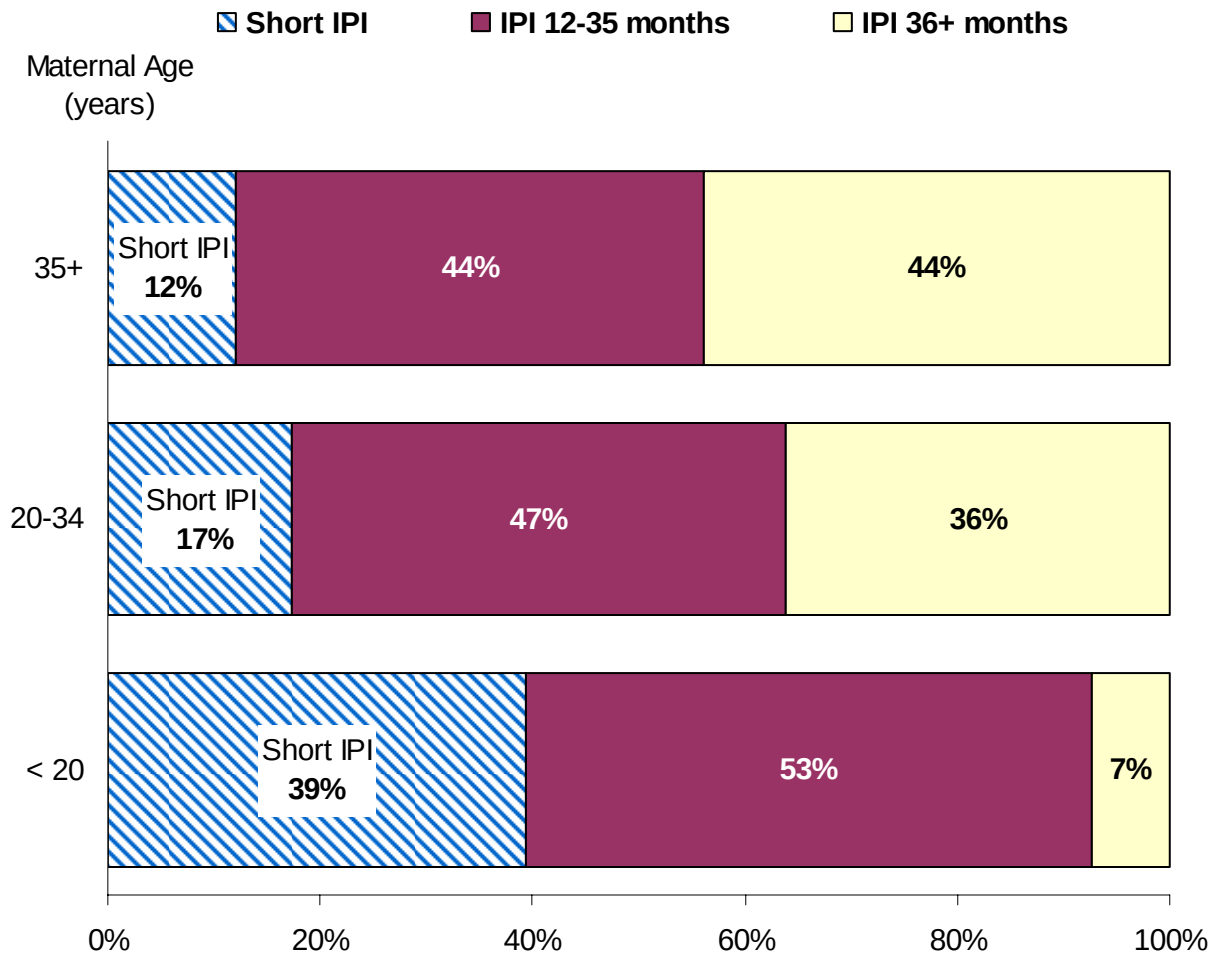
1. See Table 8A.
2. Low birthweight: less than 2,500 grams or 5.5 pounds.
3. Preterm delivery is defined as gestational age less than 37 weeks. It is also known as premature delivery.
4. Multiparous is defined as having given birth 2 or more times.

Table 8B. Interpregnancy Interval[1] (IPI) by Maternal Characteristics Pregnancies to Multiparous Mothers[2], Massachusetts: 2004

	Total Pregnancies Parity >1		IPI					
			Short (< 12 months)		(12-35 months)		(36+ months)	
	N	%	N	%	N	%	N	%
State Total[3]	**41,373**	100%	**6,635**	**16.0%**	**18,981**	**45.9%**	**15,757**	**38.1%**
Age								
< 20	592	1.4	233	39.4	315	53.2	44	7.4
20-34	28,472	68.8	4,908	17.2	13,256	46.6	10,308	36.2
35+	12,309	29.8	1,494	12.1	5,410	44.0	5,405	43.9
Race Ethnicity								
White non-Hispanic	29,000	70.1	4,899	16.9	14,533	50.1	9,568	33.0
Black non-Hispanic	3,354	8.1	495	14.8	1,109	33.1	1,750	52.2
Hispanic	5,574	13.5	771	13.8	1,951	35.0	2,852	51.2
Asian non-Hispanic	2,583	6.2	355	13.7	1,091	42.2	1,137	44.0
Education								
High school or less	14,904	36.0	2,230	15.0	5,422	36.4	7,252	48.7
College or some college	20,437	49.4	3,376	16.5	9,970	48.8	7,091	34.7
More than college	5,976	14.4	1,016	17.0	3,564	59.6	1,396	23.4
Delivery Payment Source								
Public	12,877	31.1	2,063	16.0	4,512	35.0	6,302	48.9
Private	27,342	66.1	4,366	16.0	13,905	50.9	9,071	33.2
EOHHS Region of Residency								
Western	5,031	12.2	851	16.9	2,213	44.0	1,967	39.1
Central	5,889	14.2	948	16.1	2,625	44.6	2,316	39.3
Northeast	8,597	20.8	1,307	15.2	4,012	46.7	3,278	38.1
Metrowest	9,159	22.1	1,536	16.8	4,795	52.4	2,828	30.9
Southeast	8,050	19.5	1,345	16.7	3,556	44.2	3,149	39.1
Boston	4,647	11.2	648	13.9	1,780	38.3	2,219	47.8
Town of Residency[4]			**10 Largest by %**		**10 Largest by %**		**10 Largest by %**	
			Holyoke (21.4%)		Needham (63.3%)		Chelsea (59.6%)	
			Attleboro (20.8%)		North Andover (62.9%)		Randolph (52.2%)	
			Mansfield (20.3%)		Newton (61.7%)		Everett (52.0%)	
			Pittsfield (19.1%)		Arlington (60.8%)		Lawrence (51.8%)	
			Quincy (18.9%)		Marshfield (56.7%)		Revere (50.8%)	
			Westfield (18.8%)		Natick (56.5%)		Lynn (49.6%)	
			Waltham (18.2%)		Peabody (56.0%)		Brockton (49.2%)	
			Springfield (18.2%)		Chelmsford (54.5%)		New Bedford (48.5%)	
			Natick (18.2%)		Brookline (54.2%)		Boston (47.2%)	
			Framingham (18.1%)		Franklin (53.9%)		Malden (46.9%)	

1. See Table 8A. 2. Multiparous is defined as having given birth 2 or more times. 3. State total includes pregnancies with known IPI.
4. Among towns with at least 200 mothers giving birth to their 2nd or later child.

Figure 5B. Interpregnacy Interval (IPI)[1] Distribution by Maternal Age Pregnancies to Multiparous Mothers[2], Massachusetts: 2004



NOTE: Short IPI refers to interpregnancy intervals less than 12 months.

1. See Table 8A.
2. Multiparous is defined as having given birth 2 or more times.

Table 9. Comparison of Massachusetts Perinatal Health Indicators with Healthy People 2010 Objectives[1]

Healthy People 2010 Objectives (Focus Area 16: Maternal, Infant and Child Health[2])	HP2010 Target	Massachusetts				Has Massachusetts achieved HP2010 target? ✓ = YES ○ = NO, but within 25% of target ● = NO, > 25% from target
		2001	2002	2003	2004	
Fetal, Infant, and Maternal Deaths						
16-1a. Fetal Mortality Rate[3]	4.1	4.7	4.6	5.7	5.3	●
16-1b. Perinatal Mortality Rate[4]	4.5	5.6	4.7	5.8	5.8	●
16-1c. Infant Mortality Rate[5]	4.5	5.0	4.9	4.8	4.7	○
16-1d. Neonatal Mortality Rate[6]	2.9	3.8	3.7	3.6	3.7	●
16-1e. Postneonatal Mortality Rate[7]	1.2	1.2	1.2	1.2	1.1	✓
16-4. Maternal Mortality Ratio[8]	3.3	4.9	2.4	4.9	6.3	●
Risk Factors						
16-10a. Low Birthweight[9] (%)	5.0	7.2	7.5	7.6	7.8	●
16-10b. Very Low Birthweight[10] (%)	0.9	1.4	1.4	1.4	1.5	●
16-11a. Preterm[11] (%)	7.6	8.0	8.5	8.7	9.2	○
Prenatal Care						
16-6a. Care beginning in first trimester (%)	90.0	84.3	84.2	83.9	83.5	○
16-6b. Early and adequate care[12] (%)	90.0	85.2	85.0	84.5	84.2	○
Obstetrical Care						
16-8. Very Low Birthweight[10] Infants born at Level III Hospitals[13] (%)	90.0	79.1	81.2	79.1	80.1	○
16-9a. Cesarean Sections: Low-Risk[14] Women Giving Birth for the First Time (%)	15.0	22.0	24.0	25.0	26.7	●
16-9b. Cesarean Sections: Low-Risk[14] Women with Prior Cesarean Section (%)	63.0	79.2	84.2	86.7	87.9	●
Breastfeeding						
16-19a. Breastfeeding[15] (%)	75.0	75.3	76.1	78.1	78.9	✓
Prenatal Substance Exposure						
16-17c. Abstinence from Smoking (%)	99.0	90.9	92.1	92.3	92.6	○

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 U.S. 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 Appendix. 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.

CHAPTER 2

TEEN BIRTH CHARACTERISTICS

Birth Numbers and Rates

In 2004, there were 4,559 births to women ages 15-19 (teen births), 80 fewer births than in 2003 (Table 1). The number of resident live teen births in Massachusetts has decreased by 37% since 1990 (7,258 births). In 2004, about one-third of the teen births were to women ages 15-17 (1,454 births), and two-thirds were to women ages 18-19 (3,105) (Table 10).

The annual number of births to young teens (ages 10-14) continued to decline in 2004, from a peak of 155 in 1994 to the current low of 42 births. This represents a 25% decline in births in this age group from last year (Table 4). In Massachusetts, in 2004, the youngest mothers were 13 and 14: 31 births were to mothers age 14, and 11 were to mothers age 13.

The Massachusetts teen birth rate decreased by 37% from 35.4 births per 1,000 women ages 15-19 in 1990 to 22.2 in 2004**, the lowest in Massachusetts' history** (Table 1). The Massachusetts teen birth rate in 2004 was 46% below the preliminary U.S. teen birth rate of 41.2 births per 1,000 women ages 15-19 (National Vital Statistics Reports, web released on November 15, 2005) (Figure 7).

Overall, teen mothers were more likely than adult women to have specific characteristics that may be associated with adverse birth outcomes. Teen mothers were less likely to breastfeed, less likely to be married, less likely to receive adequate prenatal care, and more likely to smoke during pregnancy than adult women. Teen mothers also had more adverse birth outcomes (i.e. higher rates of low birthweight and preterm infants) than adult women, reflecting an increased risk associated with adolescent maternity.

Although Massachusetts continues to have a low teen birth rate relative to most other states and the nation as a whole, some Massachusetts communities have teen birth rates that are much higher than the state rate (Table 3A). There are disparities in low birthweight infants and adequacy of prenatal care among the race/Hispanic ethnicity groups in Massachusetts as well among teens.

Distribution of Births by Race and Hispanic Ethnicity and Mother's Birthplace

In 2004, 59.5% of births to young teens (ages 10-14) were to Hispanic mothers (25 births); 21.4% were to white non-Hispanic mothers (9 births); and 9.5% were to black non-Hispanic and Asian mothers (4 births each).

In 2004, 46.7% of births to Massachusetts residents ages 15-19 were to white non-Hispanic mothers; 32.9% were to Hispanic mothers; 13.0% were to black non-Hispanic mothers; 3.3% were to Asian mothers; and 4.0% were to mothers of other races (Table 10).

In 2004, birth rates among resident teen women had the same rank order from highest to lowest by race and Hispanic ethnicity as they had in 1994 (Hispanic and black non-Hispanic women had the highest teen birth rates, while Asian and white non-Hispanic women had the lowest), and they have decreased for all groups compared with 1994 rates. However, black non-Hispanics have had the greatest decrease, 50% from 1994 (87.6) to 2004 (43.6); the Asian teen birth rate has decreased by 47% (from 27.3 to

14.5); and the Hispanic teen birth rate has decreased by 45% (from 138.8 to 75.7). The white non-Hispanic teen birth rate declined by the least, 34% (from 20.1 to 13.2) (Figure 8).

In 2004, there were decreases in teen birth rates for all race and ethnicity groups except for black non-Hispanics compared with the previous year. In 2004, the teen birth rate for black non-Hispanics increased 8% from the 2003 rate (43.6 vs. 40.3). The Asian teen birth rate declined the most, from 16.5 to 14.5 (12%). The white non-Hispanic teen birth rate decreased (3.6%) from 13.7 to 13.2 and the Hispanic teen birth rate declined the least (3.3%) from 78.3 to 75.7 births per 1,000 females ages 15-19.

Seventy-five percent of teen births were to mothers who were born in the 50 U.S. states and the District of Columbia. Eight percent of teen births were to mothers born in Puerto Rico or other U.S. Territories. The percentage of births to non-U.S.-born teen mothers was 16% (Table 10).

Low Birthweight

In 2004, 10.2% of the infants born to women under age 20 were low birthweight (less than 2,500 grams or 5.5 pounds) as compared with 7.7% of infants born to Massachusetts women ages 20 and older (Figure 6).

The percentage of low birthweight infants was 16% greater for teen mothers ages 15-17 (11.6%) than for teens ages 18-19 (10.0%) (Table 10).

Preterm

In 2004, 10.1% of infants born to women under age 20 were preterm (born before the mother had completed the 37th week of pregnancy) as compared with 9.2% of infants born to Massachusetts women ages 20 and older (Figure 6).

The percentage of preterm infants was 17% greater for teen mothers ages 15-17 (11.2%) than for teens ages 18-19 (9.6%) (Table 10).

Prenatal Care

In 2004, of the births to women under age 20, 71.0% of the mothers received adequate prenatal care, compared with 85.0% of births to women ages 20 and over, which is 20% greater (Figure 6). (Adequacy of prenatal care is a measure of the timing and number of prenatal care visits.)

The percentage of women ages 15-17 that received inadequate prenatal care (22.3%) was 23% greater than for women ages 18-19 (18.1%) (Table 10). Seventy-six percent of women less than 20 years of age had their prenatal care funded by public sources, compared with 27.7% of women ages 20 and over (Figure 6).

Teen Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2004, among live births to women ages 15-19 who were residents of the 30 largest cities and towns in the Commonwealth (Table 11):

- Teen birth rates (number of births per 1,000 females 15-19) were highest in Lawrence (79.4), Springfield (70.9), New Bedford (61.5), and Fall River (58.7). These rates range from over two times to almost four times the statewide teen birth rate of 22.2.

- In 2004, teen birth rates were lowest in Newton (2.6), Cambridge (6.7), and Waltham (8.0). Brookline had fewer than 5 teen births.

- Among births to teen mothers, seven communities (Peabody, Waltham, Brockton, Taunton, Barnstable, Methuen, and Springfield) recorded low birthweight percentages that were at least 25% higher than the statewide average of 10.2% for teen mothers.

- Over 85% of mothers ages 15-19 living in New Bedford, Brockton, Peabody, Springfield, and Lynn had their prenatal care paid for by a public source. Only 33% of mothers ages 15-19 living in Brookline and Newton had their prenatal care paid for by a public source.

Communities with Highest Teen Births

Among the communities with the greatest *number* of teen births (as opposed to the *largest cities* discussed in the previous section), teen birth rates were highest in Lawrence (79.4), Holyoke (76.0), Springfield (70.9), Southbridge (68.3), and Chelsea (66.2). In 2004, all but Chelsea and Southbridge experienced decreases in teen birth rates from the previous year. These communities had rates of almost three to greater than 4 times the statewide rate of 22.2 teen births per 1,000 females 15-19 (Table 12).

Tobacco Use

In 2004, 14.3% of teen births were to mothers who reported smoking cigarettes during their pregnancies (Table 10). In comparison, only 7.0% of mothers ages 20 and over reported smoking during pregnancy (Figure 6).

For teen mothers ages 18-19, 15.6% smoked cigarettes during their pregnancies compared with 11.3% of mothers ages 15-17 (Table 10).

Parity

In 2004, 86.0% of all live births to teen mothers were the mother's first live-born infant. The percentage of births that were the teen mother's second live-born infant was 12.3%, and only 1.6% were the mother's third or higher live-born infants (Table 10).

As expected, mothers ages 18-19 had the greatest percentage of previous live births; almost three times higher than teens ages 15-17 (17.2% v. 6.9%, Table 10).

Plurality

Plurality is the number of births to a woman in one delivery. A delivery may consist of one or more live born infants 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.

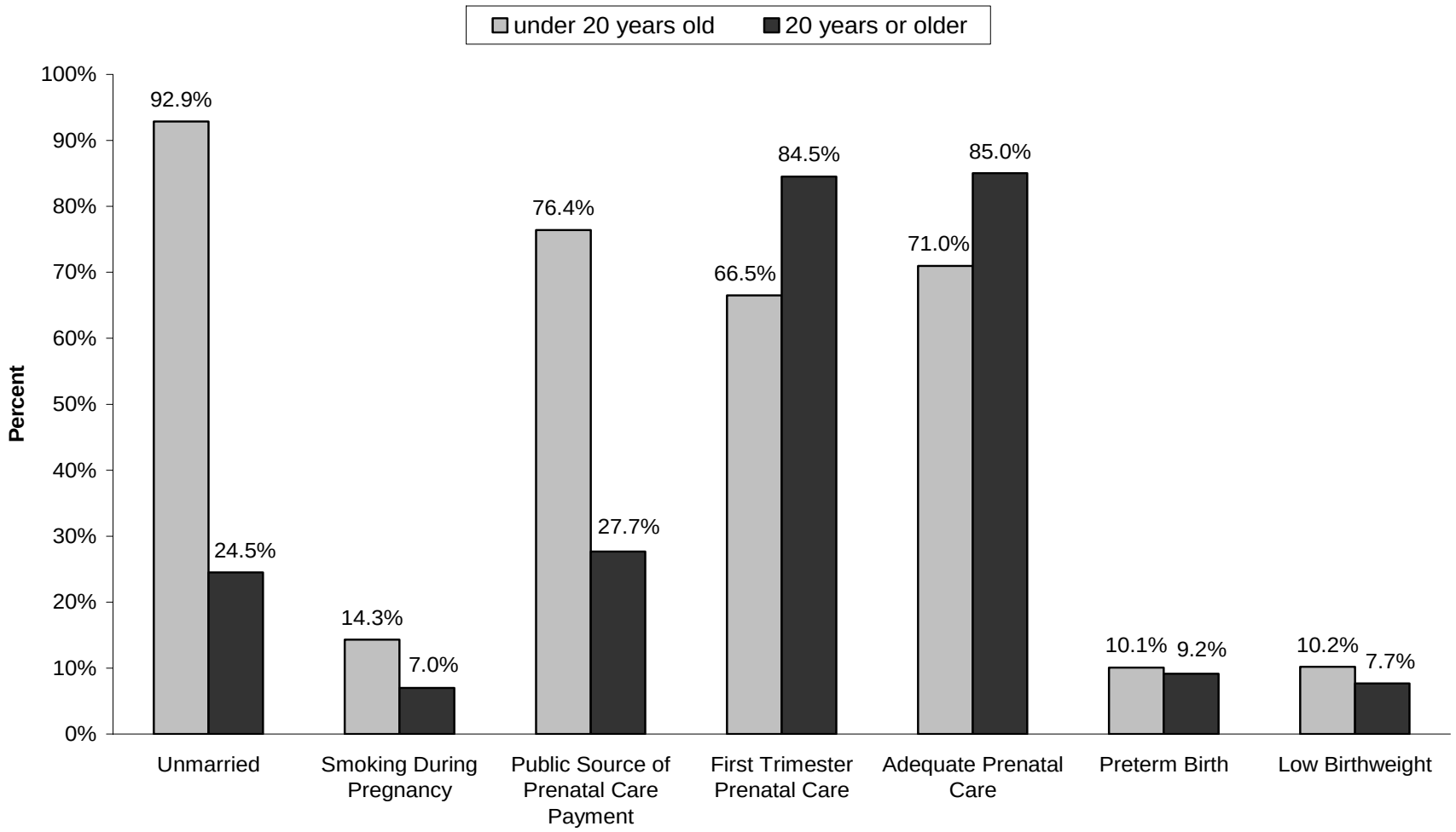
In 2004, 98.3% of births to mothers ages 15-19 were singletons, and 1.7% were twins or higher order multiple births (Table 10).

Table 10. Summary of Selected Teen Birth Characteristics, Massachusetts: 2004

	Age 15-17		Age 18-19		Combined Ages 15-19	
	N	%[1]	N	%[1]	N	%[1]
State total	**1,454**	**31.9**	**3,105**	**68.1**	**4,559**	**100.0**
Maternal Demographics						
Race/Hispanic Ethnicity	**N**	**%[2]**	**N**	**%[2]**	**N**	**%[2]**
White non-Hispanic	557	38.3	1,571	50.7	2,128	46.7
Black non-Hispanic	210	14.5	381	12.3	591	13.0
Asian	63	4.3	89	2.9	152	3.3
Hispanic	560	38.5	939	30.3	1,499	32.9
Other	63	4.3	121	3.9	184	4.0
Birthplace						
U.S. States / D.C.	1,121	77.2	2,312	74.5	3,433	75.3
Puerto Rico / US Terr.	149	10.3	226	7.3	375	8.2
Non-U.S.-born	183	12.6	566	18.2	749	16.4
Prenatal care funding						
Public	1,063	74.9	2,341	77.0	3,404	76.3
Private, other	357	25.1	698	23.0	1,055	23.7
Pregnancy-Related Factors						
Adequacy of Prenatal Care[3]						
Adequate Total[4]	997	69.3	2,200	71.9	3,197	71.1
Adequate Intensive	490	34.1	1,048	34.3	1,538	34.2
Adequate Basic	507	35.3	1,152	37.7	1,659	36.9
Intermediate	121	8.4	304	9.9	425	9.5
Inadequate/None	320	22.3	555	18.1	875	19.5
Unknown	16	1.1	46	1.5	62	1.4
Parity[6]						
1	1,348	93.0	2,561	82.7	3,909	86.0
2	96	6.6	465	15.0	561	12.3
3+	5	0.3	69	2.2	74	1.6
Smoking during Pregnancy						
Yes	165	11.3	485	15.6	650	14.3
No	1,289	88.7	2,615	84.4	3,904	85.7
Birth Outcomes						
Birthweight						
< 500 g	5	0.3	7	0.2	12	0.3
500-1,499 g	30	2.1	41	1.3	71	1.6
1,500-2,499 g	133	9.2	248	8.0	381	8.4
LBW (<2,499 g)	168	11.6	296	10.0	464	10.3
2,500-3,999 g	1,221	84.3	2,612	84.3	3,833	84.3
4000+ g	59	4.1	192	6.2	251	5.5
Gestational age						
< 28 weeks	16	1.1	24	0.8	40	0.9
< 37 weeks	161	11.2	297	9.6	458	10.1
37-42 weeks	1,279	88.8	2,791	90.4	4,070	89.8
43+ weeks	1	--[5]	1	--[5]	2	--[5]
Plurality						
Singleton	1,425	98.0	3,055	98.4	4,480	98.3
Multiple birth	29	2.0	50	1.6	79	1.7

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 women 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 + Adeq. Intensive. 5. Calculations based on fewer than five events are excluded. 6. Number of live births including the current birth.

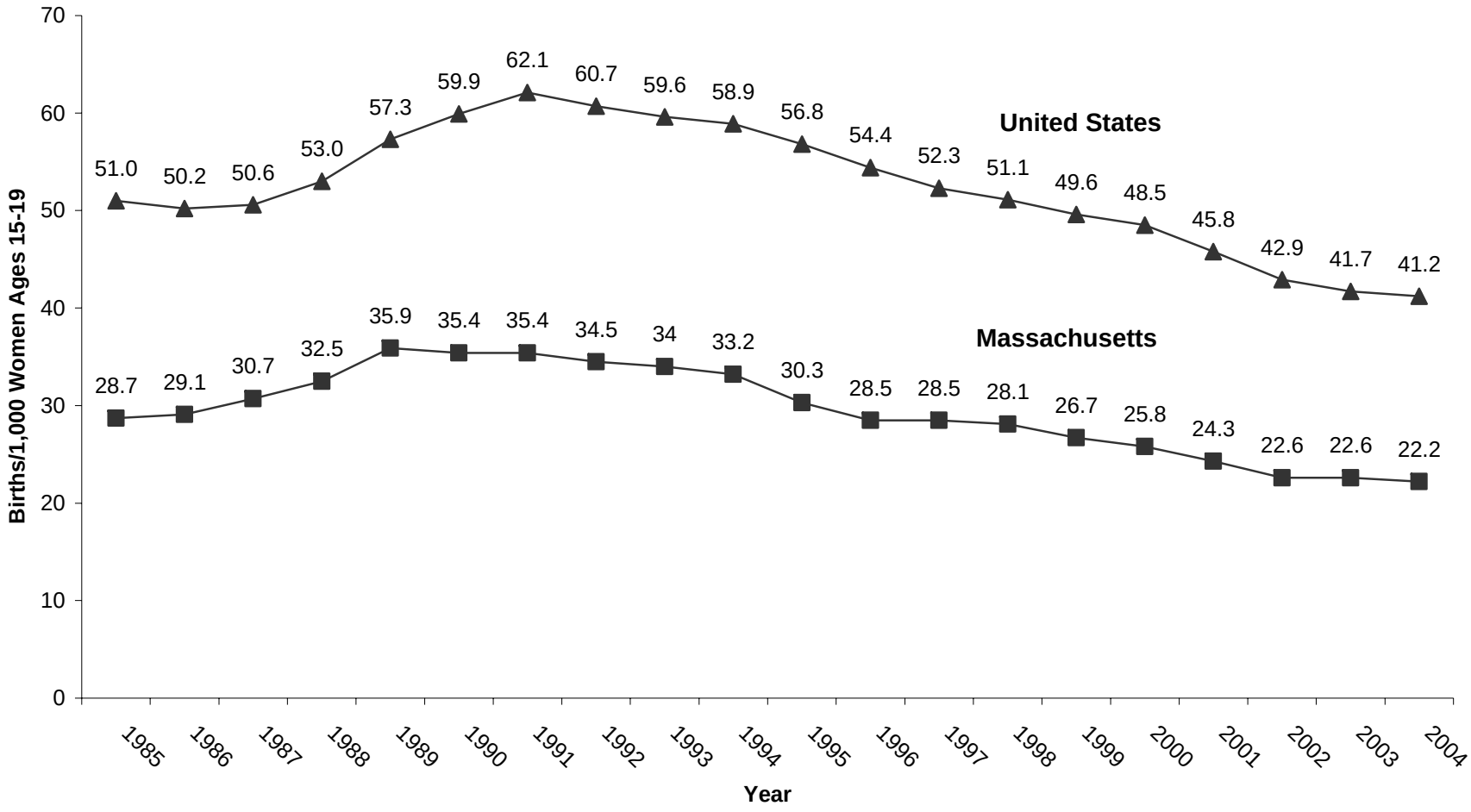
Figure 6. Comparison of Teen vs. Adult Births, Selected Characteristics, Massachusetts: 2004



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 group, "10-14" 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: Unmarried = Includes those women who were unmarried 300 days before giving birth, 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.).

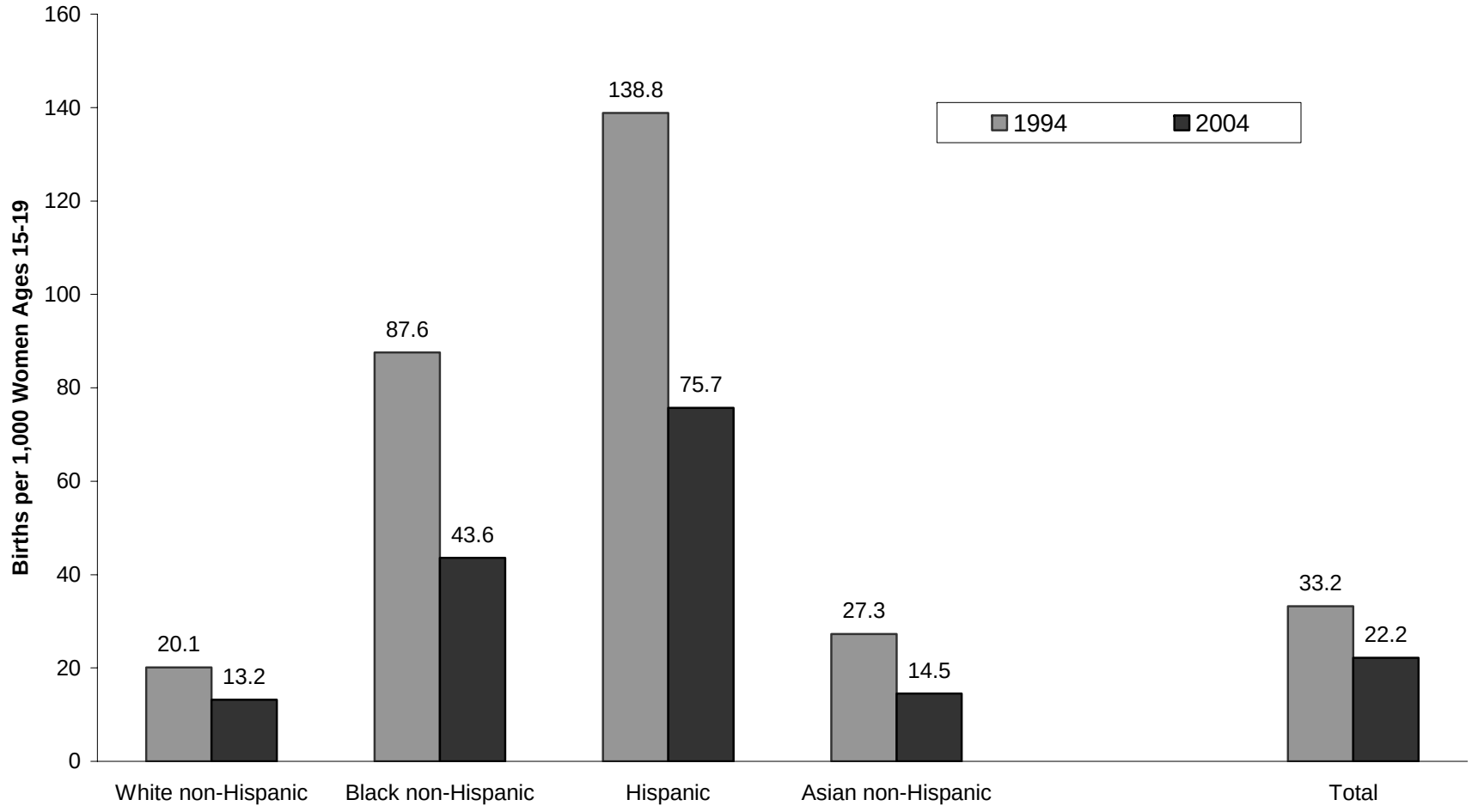
Figure 7. Trend in Birth Rates Among Women Ages 15-19, Massachusetts and the United States: 1985-2004



Teen birth rate is the number of births to women ages 15-19 per 1,000 women 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, 2000) and intercensal population estimates based on MISER (Massachusetts Institute for Social and Economic Research) population estimates for 1991 through 1998 and DPH population estimates for 1999. 2000-2004 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

Figure 8. Birth Rates Among Women Ages 15-19 by Mother's Race/Hispanic Ethnicity, Massachusetts: 1994 and 2004



Teen birth rate is number of births to women ages 15-19 per 1,000 women ages 15-19
Population data sources: denominators for 1994 rates are based on the 1993 MISER Population Estimates. 2004 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

Table 11. Resident Teen Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2004

Municipality	Total Population Rank	Female Population, age 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		**205,277**	**4,559**	**22.2**	**46.7**	**13.0**	**32.9**	**7.4**
Arlington	29	767	7	9.1	71.4	14.3	14.3	0.0
Attleboro	30	1,151	37	32.2	64.9	16.2	10.8	8.1
Barnstable	25	1,287	21	16.3	85.7	4.8	9.5	0.0
Boston	1	22,240	578	26.0	12.6	41.2	34.1	11.9
Brockton	6	3,304	161	48.7	30.4	35.4	19.3	14.9
Brookline	17	1,382	3	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	5	3,733	25	6.7	28.0	44.0	16.0	12.0
Chicopee	21	1,809	64	35.4	71.9	3.1	25.0	0.0
Fall River	8	2,915	171	58.7	71.9	3.5	14.6	9.9
Framingham	14	1,925	44	22.9	52.3	4.5	40.9	2.3
Haverhill	16	1,793	56	31.2	57.1	3.6	37.5	1.8
Lawrence	13	2,847	226	79.4	11.1	0.9	87.2	0.9
Lowell	4	3,913	194	49.6	31.4	3.6	34.5	30.4
Lynn	9	2,990	135	45.2	18.5	7.4	57.8	16.3
Malden	18	1,391	28	20.1	64.3	21.4	3.6	10.7
Medford	20	1,749	16	9.1	50.0	12.5	18.8	18.8
Methuen	28	1,264	38	30.1	57.9	2.6	39.5	0.0
New Bedford	7	2,978	183	61.5	48.1	6.0	36.1	9.3
Newton	11	3,411	9	2.6	88.9	0.0	11.1	0.0
Peabody	24	1,300	24	18.5	58.3	4.2	37.5	0.0
Pittsfield	27	1,361	59	43.4	72.9	13.6	8.5	5.1
Plymouth	23	1,577	27	17.1	92.6	0.0	3.7	3.7
Quincy	10	1,950	34	17.4	52.9	17.7	14.7	14.7
Revere	26	1,215	42	34.6	40.5	11.9	40.5	7.1
Somerville	12	2,087	36	17.3	47.2	11.1	36.1	5.6
Springfield	3	6,037	428	70.9	14.7	24.5	57.2	3.5
Taunton	19	1,652	54	32.7	64.8	3.7	16.7	13.0
Waltham	15	2,251	18	8.0	33.3	11.1	50.0	5.6
Weymouth	22	1,331	27	20.3	81.5	3.7	3.7	11.1
Worcester	2	6,918	250	36.1	44.0	8.4	42.8	4.4

Table 11 (cont.). Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2004

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	**76.3**	**92.8**	**10.2**	**10.1**	**34.2**	**36.9**	**9.5**	**19.5**
Arlington	57.1	100.0	0.0	14.3	16.7	16.7	0.0	66.7
Attleboro	59.4	100.0	5.6	5.4	19.4	22.2	16.7	41.7
Barnstable	61.9	76.2	14.3	14.3	47.6	42.9	0.0	9.5
Boston	78.9	96.0	12.2	12.8	35.2	42.8	7.8	14.3
Brockton	87.0	98.1	14.9	18.0	34.2	25.5	9.9	30.4
Brookline	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	64.0	88.0	4.0	8.0	48.0	28.0	4.0	20.0
Chicopee	80.3	90.6	9.4	12.7	28.6	46.0	6.4	19.0
Fall River	83.8	90.6	10.6	5.9	70.5	12.7	1.2	15.7
Framingham	77.3	72.7	6.8	2.3	50.0	40.9	6.8	2.3
Haverhill	75.0	87.5	8.9	7.1	33.9	42.9	7.1	16.1
Lawrence	84.4	96.5	11.1	12.4	27.0	43.4	14.6	15.0
Lowell	78.4	94.3	10.4	9.3	29.4	28.4	13.9	28.4
Lynn	90.2	89.6	6.7	8.9	32.8	27.6	13.4	26.1
Malden	67.9	96.4	10.7	3.6	25.0	42.9	7.1	25.0
Medford	62.5	87.5	12.5	6.3	25.0	56.3	6.3	12.5
Methuen	68.4	92.1	13.2	15.8	39.5	39.5	5.3	15.8
New Bedford	85.5	92.9	7.3	6.0	28.6	40.6	12.6	18.3
Newton	33.3	44.4	0.0	0.0	44.4	22.2	11.1	22.2
Peabody	87.5	83.3	16.7	20.8	25.0	29.2	12.5	33.3
Pittsfield	78.0	91.5	6.8	5.1	8.5	47.5	28.8	15.3
Plymouth	73.1	100.0	0.0	3.7	44.4	14.8	14.8	25.9
Quincy	73.5	88.2	5.9	14.7	23.5	55.9	8.8	11.8
Revere	71.4	97.6	9.5	9.5	52.4	16.7	0.0	31.0
Somerville	69.4	88.9	8.3	8.3	34.3	37.1	8.6	20.0
Springfield	89.4	96.0	12.9	10.7	27.2	38.8	10.4	23.6
Taunton	76.5	90.7	14.8	9.3	32.7	26.9	17.3	23.1
Waltham	66.7	77.8	16.7	16.7	38.9	22.2	16.7	22.2
Weymouth	59.3	88.9	0.0	0.0	33.3	40.7	7.4	18.5
Worcester	74.5	94.0	11.2	9.6	31.9	36.3	14.1	17.7

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 DPH 2000 population estimates, based on the U.S. Census 2000 population counts (see Technical Notes in Appendix). 2. Birth rates represent the number of births per 1,000 females age 15-19. 3. Mothers who designated themselves as Asian, American Indian, or Other. 4. See Glossary under "Prenatal Care Payment Source." 5. Calculations based on fewer than five teen births overall 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 12. Trends in Teen Birth Rates for Selected Communities[1], Ranked by 2004 Teen Birth Rate[2], Massachusetts: 1994, 2003, 2004

		1994[3]		2003		2004	
2004 Rank	Municipality	Number of Teen Births	Teen Birth Rate	Number of Teen Births	Teen Birth Rate	Number of Teen Births	Teen Birth Rate
	State Total	**6,412**	**33.2**	**4,639**	**22.6**	**4,559**	**22.2**
1	Lawrence	338	134.2	236	82.9	226	79.4
2	Holyoke	196	143.6	139	91.9	115	76.0
3	Springfield	563	105.0	479	79.3	428	70.9
4	Southbridge	50	90.3	37	66.5	38	68.3
5	Chelsea	97	116.0	68	61.7	73	66.2
6	New Bedford	265	87.4	169	56.7	183	61.5
7	Fall River	166	60.2	163	55.9	171	58.7
8	Lowell	237	67.2	174	44.5	194	49.6
9	Brockton	204	75.5	148	44.8	161	48.7
10	Fitchburg	106	66.8	75	49.4	70	46.1
11	Lynn	197	85.9	145	48.5	135	45.2
12	Pittsfield	48	36.0	72	52.9	59	43.4
13	Worcester	345	56.2	263	38.0	250	36.1
14	Chicopee	69	40.7	59	32.6	64	35.4
15	Revere	49	50.7	50	41.2	42	34.6
16	Everett	39	41.9	41	39.4	34	32.7
17	Taunton	87	59.1	58	35.1	54	32.7
18	Attleboro	49	48.2	45	39.1	37	32.1
19	Haverhill	76	50.8	53	29.6	56	31.2
20	Methuen	52	42.9	29	22.9	38	30.1
21	Boston	982	53.3	573	25.8	578	26.0
22	Framingham	53	28.1	38	19.7	44	22.9
23	Westfield	39	24.1	24	13.3	32	17.8
24	Quincy	42	21.2	43	22.1	34	17.4
25	Somerville	73	42.9	46	22.0	36	17.2

1. Selected communities include the 25 Massachusetts cities and towns with the greatest number of teen births. Ranking is by 2004 teen birth rate. 2. Rates are per 1,000 females ages 15-19 per city/town.
3. Source for 1994 births and rates: Massachusetts Community Health Information Profile (MassCHIP), MDPH, v3.0 r313, January 2006; natality dataset and MISER 1994 population estimate.

CHAPTER 3

FETO-INFANT AND MATERNAL MORTALITY

Overall Changes in the Infant Mortality Rate

In 2004, there were 372 infant deaths (deaths of children less than one year of age) among Massachusetts residents, 11 fewer infant deaths than in 2003, and the lowest number of infant deaths in Massachusetts history (Table 13A).

The infant mortality rate (IMR) in 2004 was 4.7 deaths per 1,000 live births, which was 2.1% lower than the 2003 rate of 4.8, and 33% lower than the 1990 IMR**.** The 2004 IMR is the second lowest rate ever recorded for the state[13] (Table 13A).

The U.S. infant mortality rate for 2004 was not available for comparison at the time of publication.

Race and Ethnicity Patterns in Infant Mortality Rates

The 2004 IMR for white infants (both Hispanic and non-Hispanic) was 4.3 deaths per 1,000 live births in 2003, which was the same as in the previous year (Table 13A). The IMR for black infants (Hispanic and non-Hispanic) was 11.0 deaths per 1,000 live births, which was a 7% decrease from the 2003 rate.

Compared with 1980, there has been a substantial decline in IMRs among black and white infants. In 2004, when compared with 1980, the IMR decreased by 56% for whites and 41% for blacks. However, the IMR for black infants, 11.0 deaths per 1,000 live births, has been consistently more than twice as high as the IMR for white infants from 1980 to 2004 (Figure 9).

Black non-Hispanics continued to have the highest IMR (11.4 per 1,000 live births) among the race and Hispanic ethnicity groups. Black non-Hispanic infants died at more than 2 times the rate of white non-Hispanic infants, and Hispanic infants died at about 1.6 times the rate of white non-Hispanic infants. Asian infants had the lowest infant mortality rate of all groups in 2004 with an IMR of 2.7 deaths per 1,000 live births (Table 13B). However, caution should be used when interpreting this rate, since it is based on a small number of deaths.

In 2004, the IMR decreased for all race and ethnicity groups except Hispanics. The Hispanic IMR increased 32%, from 5.6 in 2003 to 7.4 in 2004 (not statistically significant). The change for Hispanics may be a result of year to year fluctuation rather than a trend since the 2004 rate is similar to the 2001 and 2002 rates (7.3 and 7.1 respectively). The white non-Hispanic IMR declined by 7% from 4.1 in 2003 to 3.8 in 2004. The IMR for Black non-Hispanics decreased 10%, from 12.7 in 2003 to 11.4 deaths per 1000 live births in 2004.

Neonatal and Post Neonatal Mortality Rates

Infant mortality is divided into two parts based upon the infant's age at death. Neonatal mortality is defined as deaths of infants fewer than 28 days old, and post neonatal mortality is defined as deaths of infants between 28 and 364 days old. Separate rates are calculated for these two periods.

The overall neonatal mortality rate was 3.7 deaths per 1,000 live births in 2004, which is an increase of 3% from the 2003 neonatal mortality rate of 3.6 (Table 13B).

[13] The lowest IMR recorded was 4.6 deaths per 1,000 live births in 2000.

As was true for infant mortality, neonatal mortality differs by race and ethnicity. The neonatal mortality rate increased by 44% for Hispanics from 3.9 in 2003 to 5.6 in 2004, and for Asians by 16% from 1.9 in 2003 to 2.2 deaths per 1,000 live births in 2004. The neonatal mortality rate for black non-Hispanics decreased by 12%, from 9.5 in 2003 to 8.4 in 2004 and for white non-Hispanics by 3%, from 3.1 in 2003 to 3.0 in 2004 (Table 13B).

The overall post neonatal mortality rate was 1.1 in 2004, which was an 8.3% decrease from 2003 (1.2) (Table 13B). Among race and Hispanic ethnicity groups, Black non-Hispanics and Hispanics had the highest post neonatal mortality rates (3.0 and 1.8 deaths per 1,000 live births, respectively). The post neonatal mortality rate for black non-Hispanics was almost 4 times that of white non-Hispanics (3.0 vs. 0.8).

Trends in the Time of Infant Deaths

In 2004, 77% of infant deaths occurred in the neonatal period, the first 27 days after birth. From 1990 to 2004, the percentage of infant deaths that occurred in the post neonatal period (28-364 days) declined by 26% (31% to 23%). The neonatal mortality period can be divided into the very early neonatal period, which is death within the first day after birth, and the later neonatal mortality, which is death within 1 to 27 days after birth. From 1990 to 2004, the percentage of infant deaths that occurred in the very early neonatal period rose 27%, from 44% to 56%, and the percentage of infant deaths occurring later in the neonatal period (from 1-27 days) decreased by 6% (from 22.9% to 21.5%) (Figure 11).

(Information about the causes of infant death will be available in the upcoming report, *Massachusetts Deaths 2004*.)

Feto-Infant Mortality

Infant mortality is only part of the spectrum of adverse pregnancy outcomes. Starting with *Massachusetts Births 2003*, we have broadened our coverage of adverse pregnancy outcomes to include data on fetal deaths, also referred to as stillbirths. A stillbirth is defined as a fetal death of 20 weeks or greater gestational age resulting in the delivery of an infant that does not breathe or show any other evidence of life, such as a heart beat, and does not respond to resuscitation[14, 15].

The State Law of Massachusetts[15] mandates the reporting of a stillbirth that occurs in a hospital at twenty weeks' gestation or more, or which weighs three hundred and fifty grams or more. The Registry of Vital Records and Statistics maintains a file of fetal deaths for each calendar year. Feto-infant mortality is the term used for combined fetal and infant deaths.

Birthweight-Specific Feto-Infant Mortality[16]

Birthweight is one of the most important predictors of survival.[17] In Massachusetts, the highest feto-infant mortality rates are among the lowest birthweight categories. In 2004, fetuses or infants weighing less than 500 grams (1 pound and 2 ounces) have less than an 8% possibility

[14] Hankins, G., Willinger, M., and Spong, C.Y., "Introduction", *Seminars in Perinatology, Stillbirth After 20 Weeks*, Vol.26, No. 1, February 2002.
[15] Massachusetts General Laws, Chapter 111, Section 202, online: http://www.mass.gov/legis/laws/mgl/111-202.htm
[16] Birthweights for infant deaths come from the linked birth and infant death file (death cohort) for 2004, which consists of all infant deaths that occurred in 2004, whether the births occurred in 2003 or 2004. The fetal death file contains birthweights.

of surviving their first year, compared with infants weighing 2,500 grams or more (five and one-half pounds), who have a greater than 99% chance of surviving their first year in Massachusetts. Table 13C presents the birthweight-specific feto-infant mortality rates for Massachusetts from 1998 to 2004. Feto-infant mortality rates are greatest for birthweights less than 500 grams. The feto-infant mortality rate for this group in 2004 is 923.1 deaths per 1,000 live births plus fetal deaths, which means that 77 out of 1,000 fetuses or infants weighing less than 500 grams survive one year. On the other hand, more than 99% of infants who weigh five and one-half pounds or more survive their first year.

Trends in Feto-Infant Mortality

Table 13C shows birthweight-specific feto-infant mortality for the six years from 1998 to 2004. In 2004, the rate for the "less than 500" gram birthweight declined 2.2% from 2003 (943.5 to 923.1). The feto-infant mortality rate for the combined birthweight categories of 599-1499 increased 2.1%, the rate for the combined groups 1500-2499 increased by 2.8%, and the groups of 2500 grams or greater by 2.5%.

Figure 12 illustrates the feto-infant mortality rates from 1998 to 2004 as well as the fetal and infant contributions to the feto-infant mortality rate. The feto-infant mortality rate went from 10.3 feto-infant deaths per 1,000 fetal deaths and live births in 2003 to 9.5 in 2004. The infant mortality rate component of feto-infant mortality remained the same as it was in 2003, 4.5 infant deaths per 1,000 fetal deaths and live births. The fetal mortality component decreased from 5.8 fetal deaths per 1,000 fetal deaths and live births in 2003 to 5.1 fetal deaths per 1,000 fetal deaths and live births in 2004.

Feto-Infant Deaths by Birthweight and Gestational Age

Table 13D shows the number and proportion of the combined feto-infant deaths for each year that: 1) occurred at fewer than 24 weeks gestation or weighing less than 500 grams; and 2) occurred at 24 weeks or later and weighed 500 grams or more. From 1998 to 2004, fetal deaths made up a minimum of 49% (2001) and a maximum of 56% (2003) of the combined feto-infant deaths. The proportion of fetal deaths that occurred at fewer than 24 weeks gestation or weighing less than 500 grams decreased by 14% from 26% in 2003 to 23% in 2004.

Pregnancy-Associated and Maternal Mortality Ratios

In 2004, there were 13 pregnancy-associated deaths, including 5 maternal deaths (Fig. 13). A pregnancy-associated death is the death of a woman while pregnant or within one year of the termination of pregnancy, irrespective of cause. The deaths of women who die from a cause related to pregnancy or childbirth either during pregnancy or up to 42 days after pregnancy termination are categorized as maternal deaths and are a subset of pregnancy-associated deaths (see Technical Notes for further information).

The 2004 pregnancy-associated mortality ratio (PAMR) was 16.4 deaths per 100,000 live births and the maternal mortality ratio (MMR) was 6.3 per 100,000 live births (Figure 13). Since 1990, the annual PAMR fluctuated from a low of 18.0 in 1990 to a high of 32.8 in 2001. However, due to the small number of cases, the differences are not statistically significant.

[17] *Explaining the 2001-02 Infant Mortality Increase: Data from the Linked Birth/Infant Death Data Set*, M.F. MacDorman, et al, National Vital Statistics report, Volume 53, Number 12, January 24, 2005.

Table 13A. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2004

INFANT MORTALITY (less than one year of age)

	State Total[2]		White		Black		Asian/Other[3]	
Year	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate**
1980	748	10.3	655	9.8	87	18.6	5	4.6
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	372	4.7	282	4.3	74	11.0	15	2.5

Table 13A (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2004

NEONATAL MORTALITY (birth to 27 days)

	State Total[2]		White		Black		Asian/Other[3]	
Year	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**
1980	550	7.6	483	7.2	62	13.3	5	4.6
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	288	3.7	221	3.4	54	8.0	13	2.2

Table 13A (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2004

POST NEONATAL MORTALITY (28-364 days)

	State Total[2]		White		Black		Asian/Other[3]	
Year	n	Rate[4]	n	Rate[4]	n	Rate[4]	n	Rate[4]
1980	198	2.7	172	2.6	25	5.3	0	0.0
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	84	1.1	61	0.9	20	3.0	3	--[5]

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 2004 are presented in Table 12B. 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 fewer than five events are excluded.

Table 13B. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2004

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]**
1990	649	7.0	442	6.1	98	13.7	77	9.1	24	7.0	8	9.5
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	372	4.7	209	3.8	69	11.4	73	7.4	15	2.7	6	3.5

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]**
1990	446	4.8	298	4.1	75	10.5	49	5.8	19	5.5	5	5.5
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	288	3.7	166	3.0	51	8.4	55	5.6	12	2.2	4	--[4]

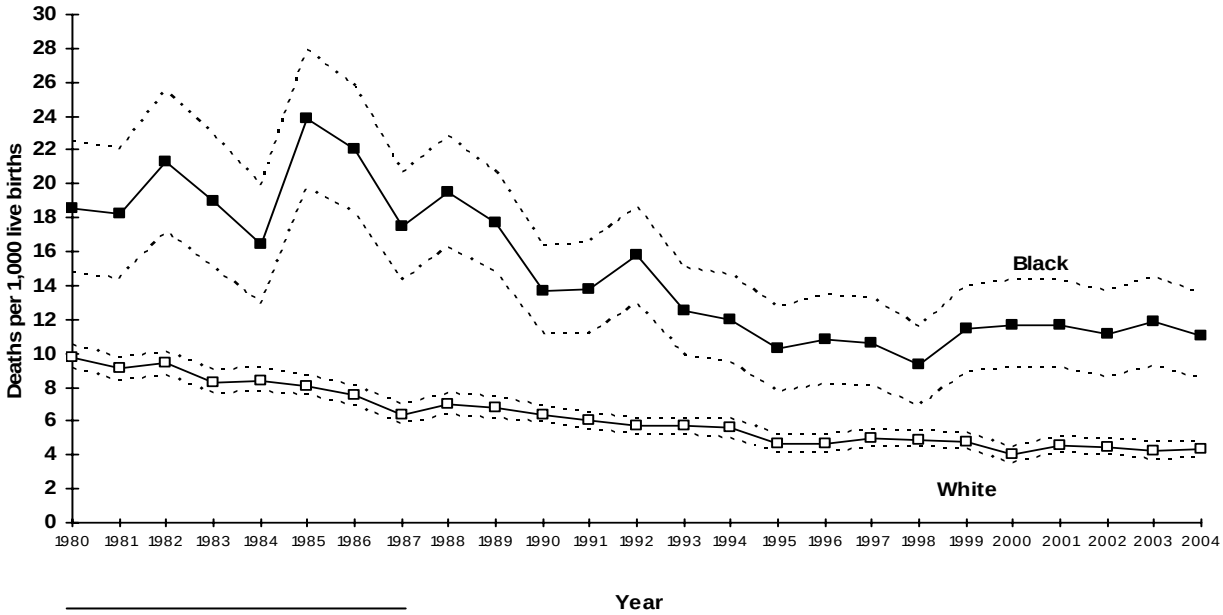
Table 13B (cont.). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2004

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]**
1990	203	2.2	144	2.0	23	3.2	28	3.3	5	1.5	3	--[4]
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	84	1.1	43	0.8	18	3.0	18	1.8	3	--[4]	2	--[4]

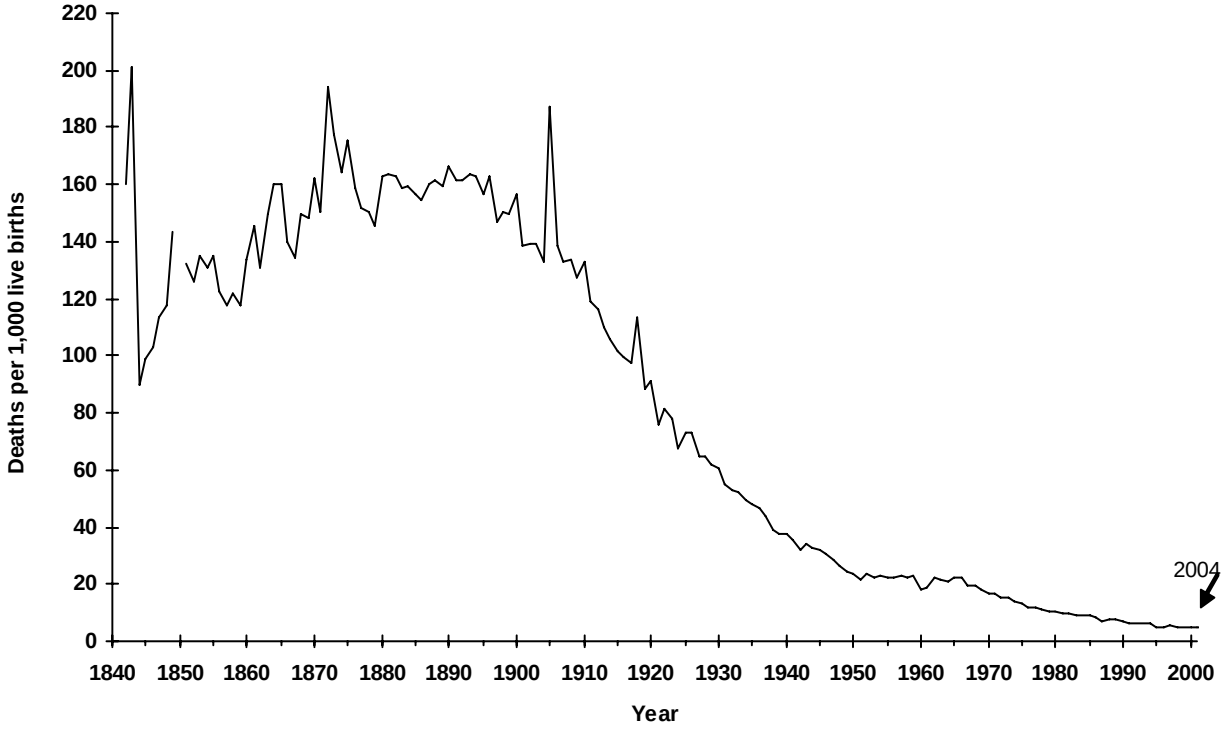
1. Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Other: American Indian and Other races. 3. Rates are expressed per 1,000 live births.
4. Calculations based on fewer than five events are excluded.

Figure 9. Infant Mortality Rates and 95% Confidence Intervals[1] by Race[2], Massachusetts: 1980-2004



1. See Appendix for an explanation of confidence intervals.
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 that include data prior to June 1986, the race classifications do not include ethnicity; most Hispanics are included in the race category of whites.

Figure 10. Infant Mortality Rates
Massachusetts: 1842-2004[1]



1. Data not available for 1850.

Figure 11. Trends in the Timing of Infant Deaths
Massachusetts: 1990-2004

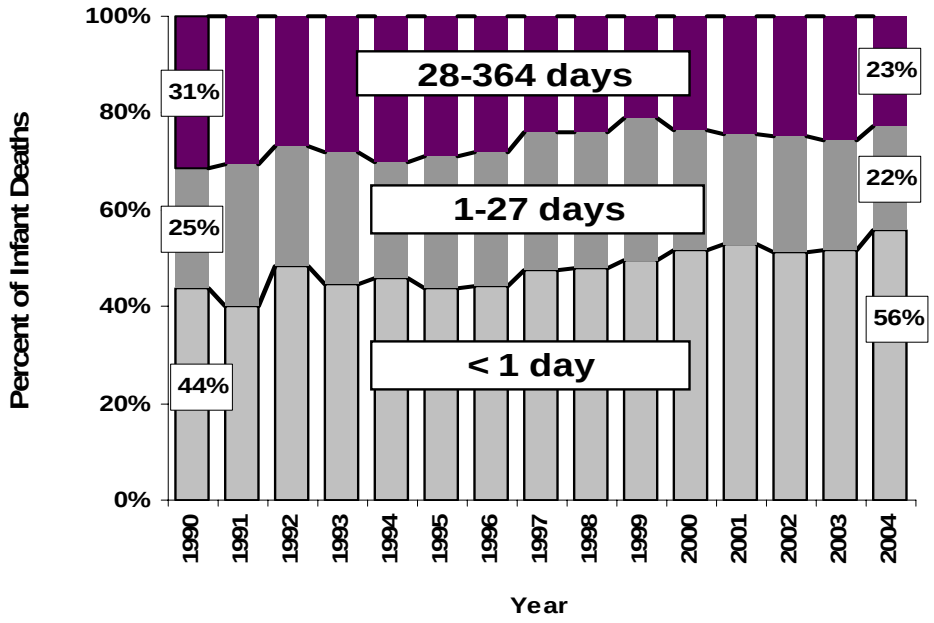
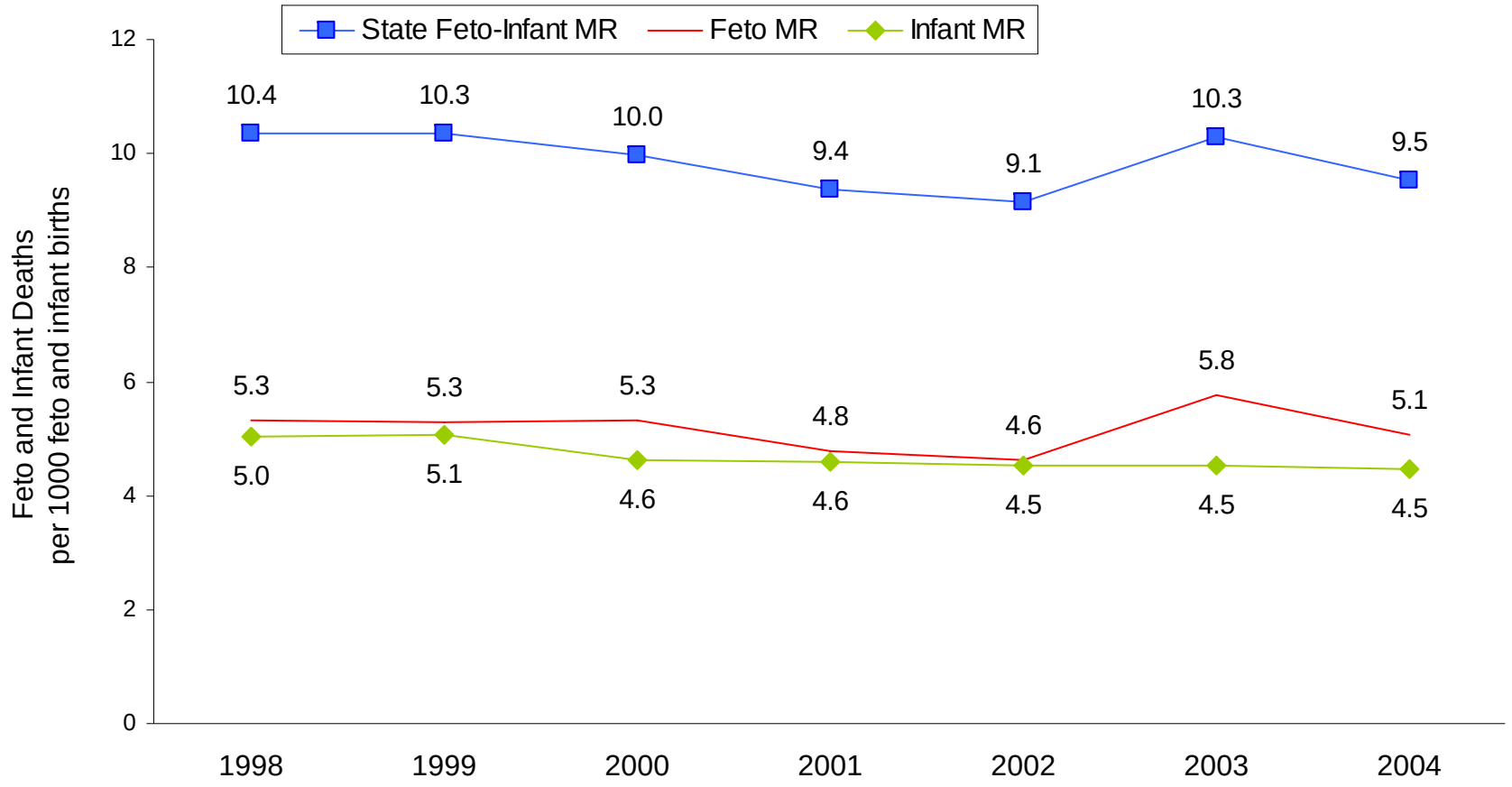


Table 13C. Feto-Infant Mortality Rate[1] by Birthweight, Massachusetts: 1998-2004

Birthweight (in grams)	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
<500	996.5	962.8	943.2	940.2	938.3	943.5	923.1
500-749	553.4	576.5	544.1	500.0	487.0	525.5	523.4
750-999	228.8	170.8	247.2	182.2	146.9	188.6	220.7
1,000-1,249	85.0	104.9	112.4	125.4	83.0	131.4	142.9
1,250-1,499	64.0	64.4	65.8	84.6	84.6	95.8	67.7
1,500-1,999	48.6	53.9	35.2	41.8	40.3	38.3	31.3
2,000-2,499	13.8	10.8	15.2	15.3	12.2	11.9	16.4
2,500-4,000	2.6	2.4	2.4	2.2	2.6	2.5	2.3
4,001+	2.8	1.8	2.3	1.5	1.5	1.7	2.5
Unknown birthweight (N)	*(23)*	*(26)*	*(34)*	*(37)*	*(23)*	*(17)*	*(30)*
State Feto-Infant Rate	**10.4**	**10.3**	**9.9**	**9.7**	**9.1**	**10.3**	**9.5**

[1] Fetal and Infant deaths per 1,000 live births plus fetal deaths.

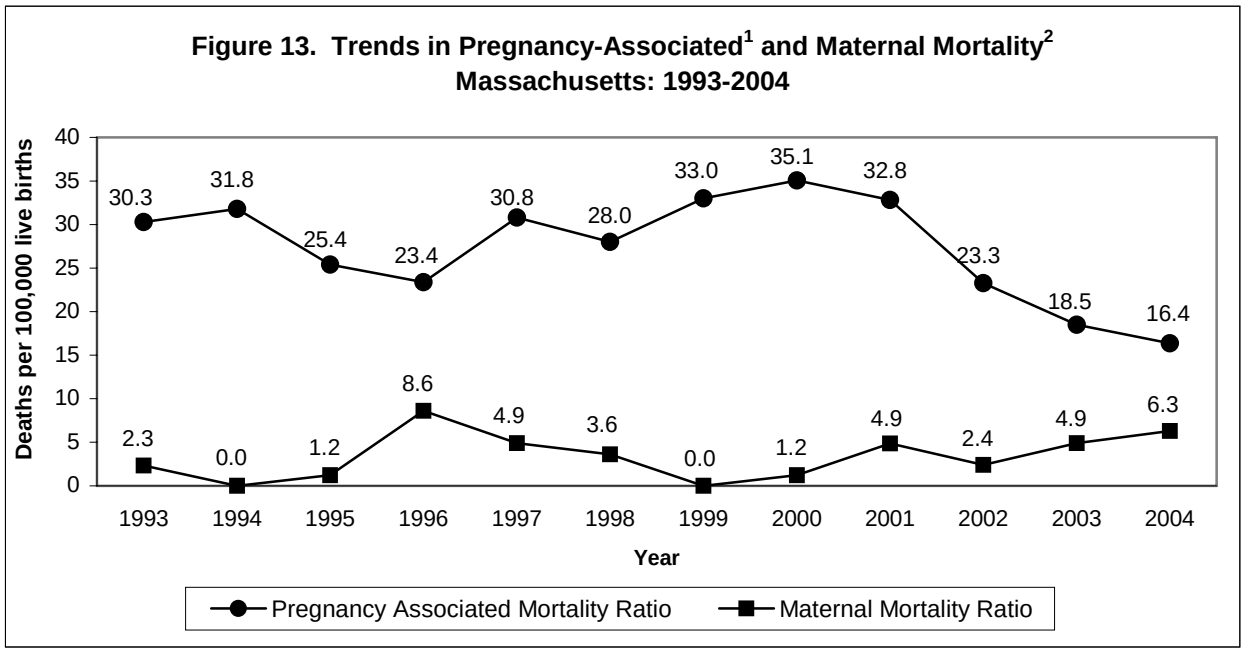
Figure 12. Feto-Infant Mortality Rate
Massachusetts: 1998-2004



* Calculation of Infant Mortality Rate in this section differs from previous section in the inclusion of fetal deaths in the denominator.
Note: Total Feto, Infant, and Feto-Infant Mortality Rates include cases 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 13D. Fetal and Infant Deaths by Birthweight and Gestational Age, Massachusetts: 1998-2004

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%)
1999	214 (25.4%)	215 (25.6%)	196 (23.3%)	216 (25.7%)	841 (100%)
2000	203 (25.1%)	234 (28.9%)	168 (20.7%)	205 (25.3%)	810 (100%)
2001	174 (22.0%)	214 (27.1%)	197 (24.9%)	206 (26.0%)	791 (100%)
2002	165 (22.3%)	210 (28.3%)	185 (25.0%)	181 (24.4%)	741 (100%)
2003	218 (26.3%)	246 (29.6%)	189 (22.8%)	177 (21.3%)	830 (100%)
2004	177 (22.7%)	240 (30.8%)	182 (23.3%)	181 (23.2%)	780 (100%)



Number of Pregnancy-Associated[1] and Maternal Deaths[2], 1993-2004

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Pregnancy-Associated Deaths[1]	26	27	21	19	25	23	27	29	27	19	15	13
Maternal Deaths[2]	2	0	1	7	4	3	0	1	4	2	4	5

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

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. 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). 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. 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.)

CHAPTER 4

BIRTHWEIGHT AND GESTATIONAL AGE

Birthweight Distribution

In 2004, 7.8% (6,125) of Massachusetts infants were low birthweight (LBW) (less than 2,500 grams or 5.5 pounds), and at the other end of the weight distribution, 10.4% (8,135) were 4,000 grams (8.8 pounds) or more (Table 14).

The low birthweight percent in 2004 increased 3%, from 7.6% in 2003 to 7.8%. LBW continues its increasing trend since 1969[18]. The increase in low birthweight infants can be linked directly to the increase in multiple births and the aging of the population giving birth. The trend in low birthweight infants in Massachusetts is consistent with national trends.

In 2004, 1.5% (1,148) of infants born to Massachusetts resident women were very low birthweight (VLBW) (less than 1,500 grams or 3.3 pounds). This percentage increased 7% from 2003 (1.4%) which it had been since 1999.

The low birthweight rate in Massachusetts was 4% below the U.S. rate of 8.1%[3].

Patterns of Birthweight by Race and Ethnicity

The proportion of low birthweight infants varied by mother's race and ethnicity (Table 14). Black non-Hispanic women had the highest proportion of low birthweight infants: 12.1%. Hispanic mothers delivered 8.5% low birthweight infants, white non-Hispanic mothers delivered 7.3% low birthweight infants, and Asian mothers delivered 6.9% low birthweight infants.

While the percentage of LBW infant deliveries for the state as a whole increased by 3% from 2003, the proportion of low birthweight deliveries for black non-Hispanics remained the same (12.1%), and decreased by 15% for Asians, from 8.1% to 6.9%. The proportion of LBW births for Hispanics and white non-Hispanics increased by about 2% and by 4% respectively from 2003.

The proportion of very low birthweight infants (less than 1,500 grams) also varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of very low birthweight infants, 3.5%, compared with 1.6% of Hispanics, 1.0% of Asians, and 1.2% of white non-Hispanics (Table 14).

The Massachusetts 2004 low birthweight percentage for black non-Hispanic women, 12.1%, was lower than the U.S. rate for all black women (the U.S. rate includes black Hispanics), 13.6%. The rate of low birthweight for Massachusetts Hispanic women (8.5%) was higher than the corresponding U.S. rate of 6.8%[3]. This may be due to the difference in the proportion of Puerto Rican births between the U.S. and Massachusetts, because Puerto Rican infants have tended to have the highest rate of LBW among Hispanic groups. In Massachusetts in 2004 Puerto Rican births made up 44% of the Hispanic births and Puerto Rican was the largest ethnic group among Hispanics. On the other hand, in the U.S., Puerto Rican births were 6% of the Hispanic births in 2003[19]. The largest Hispanic ethnic birth group in the U.S. is Mexican, which was 72% of U.S.

[18] It was 7.6% in 1969 and 7.9% in 1968.
[19] The latest national data available stratified by Hispanic groups is 2003.

Hispanic births in 2003. Nationally, in 2003, the Puerto Rican LBW percentage was 10.0% (MA was 10.1% for Puerto Ricans); the LBW percentage for Mexican infants was more than one-third lower at 6.3%. (*Births: Final Data for 2003*, National Vital Statistics Reports, Vol. 54, No. 2, September 8, 2005). The Massachusetts low birthweight rate for Puerto Rican mothers was 10.6% in 2004 (Table 2B), compared with 11.5% among mothers in Puerto Rico in 2003 (*Births: Final Data for 2003*, National Vital Statistics Reports, Vol. 54, No. 2, September 8, 2005, Table C).

White non-Hispanic mothers delivered the highest proportion of high birthweight infants (4,000 grams or 8.8 pounds and more): 11.8%, which was a 5% decline (Table 14). This proportion has continued to decline since 1999. This rate for white non-Hispanic mothers was 12.6% in 2002 and 12.4% in 2003.

Birthweight and Smoking

Cigarette smoking during pregnancy increases the likelihood of delivering a low birthweight infant. During 2004 in Massachusetts, infants born to mothers who smoked during pregnancy were 1.6 times as likely to be low birthweight as infants born to non-smoking mothers (12.2% vs. 7.5%, Figure 14). The percentage of low birthweight infants whose mothers smoked during pregnancy varied by race and Hispanic ethnicity. Among mothers who smoked during pregnancy, black non-Hispanics had the highest percentage of LBW infants (17.1%), followed by Hispanic mothers (14.3%), Asian mothers (12.3%), and white non-Hispanic mothers (11.5%). Among those mothers who *did not smoke* during pregnancy, black non-Hispanics also had the highest proportion of LBW infants at 11.8%.

Birthweight and Age of Mother

In general, the relation between mother's age and percentage low birthweight follows a "U-shaped" distribution: the percentage of low birthweight infants is highest among both the youngest mothers (under age 24 years) and the oldest mothers (over age 35 years), while it is lowest for mothers between 25 and 34 years of age (Table 15).

Low Birthweight and Plurality

The increase in low birthweight in Massachusetts over the past decade can be attributed in part to the increase in multiple births in Massachusetts. The percentage of low birthweight (LBW) and very low birthweight (VLBW) rises for twins and higher order births. In 2004, 5% of singleton births were LBW, whereas 53% of twins and 95% of higher order births were LBW (Table 16). Similarly, 1% of singletons, 9% of twins, and 34% of higher order births were VLBW. The percentage of VLBW singleton infants has remained relatively constant since 1994, while LBW has increased by 8% for singletons: 5.0% in 1994 to 5.4% in 2004. The percentage of VLBW deliveries for triplets or higher order multiples increased by 12% since 1994, and it increased by 21% from 2003 to 2004.

Preterm Deliveries

In 2004, 9.2% (7,222) of infants born to Massachusetts resident women were preterm (premature, that is, born before the mother had completed the 37th week of pregnancy) (Table 17). The number of preterm infants born in 2004 increased by 4% from the previous year (6,963).

The proportion of preterm births varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of preterm infants, 13.0%. The preterm rate for white non-Hispanic women was 9.2% and 8.7% for Hispanic women. Asian women had the lowest preterm rate, 6.7% (Table 17).

The percentage of infants delivered very early (before the 28th week of gestation) has remained the same since 1997 at 0.6%. Black non-Hispanic women had the highest proportion of infants delivered very early (1.6%), which was more than double that of any other race and ethnicity group (Table 17).

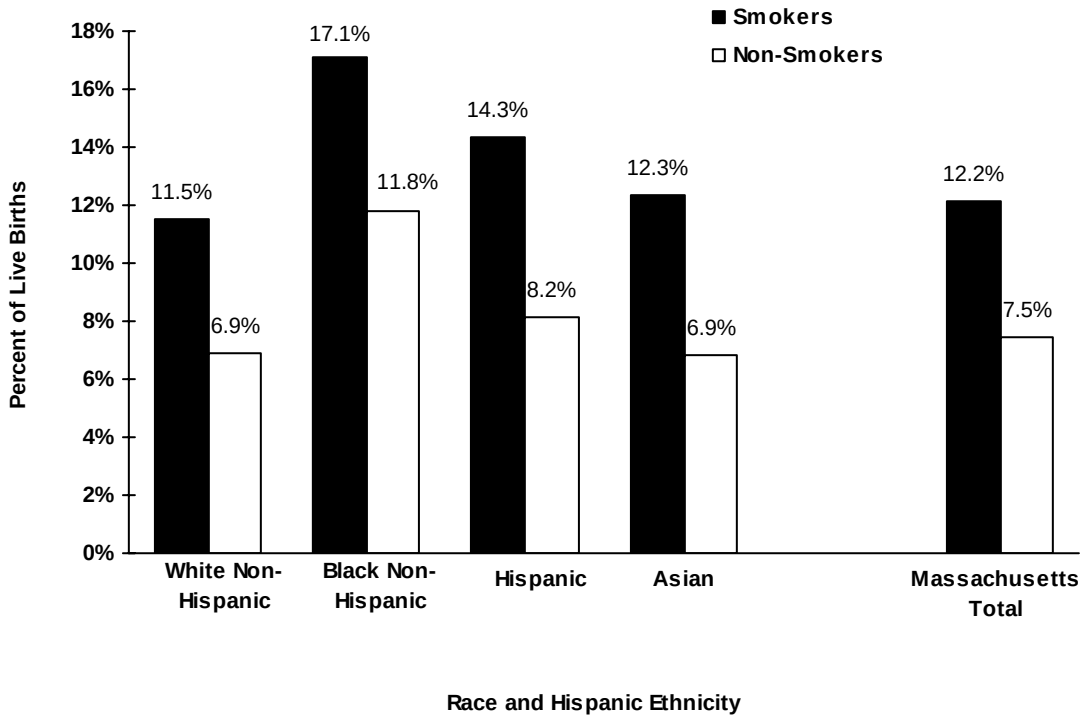
Table 14. Births by Birthweight, Race and Hispanic Ethnicity, Massachusetts: 2004

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	**78,460**	**100.0**	**55,322**	**100.0**	**6,053**	**100.0**	**9,798**	**100.0**	**5,454**	**100.0**	**1,730**	**100.0**	**103**
<500	125	0.2	59	0.1	32	0.5	23	0.2	4	--[2]	5	0.3	2
500-999	380	0.5	222	0.4	70	1.2	49	0.5	21	0.4	17	1.0	1
1000-1499	643	0.8	406	0.7	111	1.8	81	0.8	32	0.6	12	0.7	1
1500-1999	1,288	1.6	883	1.6	143	2.4	172	1.8	68	1.2	22	1.3	0
2000-2499	3,689	4.7	2,454	4.4	377	6.2	509	5.2	253	4.6	92	5.3	4
2500-2999	12,193	15.5	7,642	13.8	1,211	20.0	1,784	18.2	1,239	22.7	308	17.8	9
3000-3499	28,780	36.7	19,604	35.4	2,279	37.7	3,846	39.3	2,380	43.6	651	37.6	20
3500-3999	23,100	29.4	17,510	31.7	1,395	23.0	2,505	25.6	1,197	21.9	478	27.6	15
4000-4499	6,879	8.8	5,472	9.9	353	5.8	703	7.2	224	4.1	119	6.9	8
4500-4999	1,155	1.5	934	1.7	69	1.1	102	1.0	32	0.6	18	1.0	0
>=5000	101	0.1	83	0.2	7	0.1	10	0.1	0	0.0	1	0.1	0
Unknown birthweight	127	0.2	53	0.1	6	0.1	14	0.1	4	--[2]	7	0.4	43
VLBW[3] (0-1,499 g)	1,148	1.5	687	1.2	213	3.5	153	1.6	57	1.0	34	2.0	4
LBW[4] (0-2,499 g)	6,125	7.8	4,024	7.3	733	12.1	834	8.5	378	6.9	148	8.6	8

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 birthweights only.

1. Percentages are based on column totals. 2. Calculations based on fewer than five events 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.).

Figure 14. Low Birthweight[1] Among Smoking and Nonsmoking[2] Mothers, by Race and Hispanic Ethnicity, Massachusetts: 2004



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Maternal smoking is self-reported on the Parent Worksheet of the Birth Certificate; these data should be interpreted cautiously.

1. Low birthweight: less than 2,500 grams or 5.5 pounds.
2. Based on information provided on the parent worksheet for birth certificates

Table 15. Low Birthweight (LBW)[1] by Maternal Age, Race and Hispanic Ethnicity, Massachusetts: 2004

Mother's Age (in years)	Total LBW Infants		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[4]		Unknown[5]
	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n
State Total[2]	**6,125**	**7.8**	**4,024**	**7.3**	**733**	**12.1**	**834**	**8.5**	**378**	**6.9**	**148**	**8.6**	**8**
<18	171	11.5	49	8.7	26	12.1	73	12.5	9	13.4	14	22.2	0
18-19	296	9.5	129	8.2	46	12.1	95	10.1	9	10.1	16	13.2	1
20-24	938	8.1	436	6.9	166	12.5	256	8.5	45	7.5	34	8.1	1
25-29	1,208	6.8	726	6.1	172	11.4	185	7.4	92	6.3	33	7.0	0
30-34	1,872	7.3	1,397	7.0	186	12.1	126	7.2	135	6.4	24	5.8	4
35-39	1,221	8.2	955	7.9	100	11.8	74	9.1	72	7.6	19	9.9	1
40+	417	12.0	330	11.8	37	15.1	25	12.8	16	9.0	8	14.5	1

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

1. Low Birthweight (LBW): less than 2,500 grams or 5.5 pounds at birth. 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.

Table 16. Low Birthweight by Plurality, Massachusetts: 1994-2004

Age Group	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	**1994**	687	0.8	4,015	5.0	223	9.5	1,122	47.9	66	30.8	198	92.5	289	11.3	1,320	51.6	976	1.2	5,335	6.4
	1995	674	0.9	3,867	4.9	227	9.4	1,128	46.6	63	31.8	179	90.4	290	11.1	1,307	49.9	964	1.2	5,174	6.4
	1996	657	0.9	3,674	4.8	227	8.8	1,264	49.1	45	24.5	167	90.8	272	9.9	1,431	51.9	929	1.2	5,105	6.4
	1997	731	0.9	3,938	5.1	292	10.3	1,439	50.5	75	28.6	240	91.6	367	11.8	1,679	54.0	1,098	1.4	5,617	7.0
	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
Ages < 35	**1994**	567	0.8	3,397	5.0	181	9.9	891	48.5	47	28.7	150	91.5	228	11.4	1,041	52.0	795	1.1	4,438	6.3
	1995	543	0.8	3,187	4.9	196	11.0	852	47.9	52	36.9	135	95.7	248	12.9	987	51.4	791	1.2	4,174	6.2
	1996	501	0.8	2,937	4.7	194	10.2	944	49.9	32	27.1	111	94.1	226	11.2	1,055	52.5	727	1.1	3,992	6.1
	1997	566	0.9	3,179	5.1	214	11.0	1,030	53.0	46	27.1	153	90.0	260	12.3	1,183	55.9	826	1.3	4,362	6.8
	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
Ages 35+	**1994**	120	1.0	618	4.9	42	8.3	231	45.6	19	38.0	48	96.0	61	11.0	279	50.1	181	1.4	897	6.9
	1995	130	1.0	679	5.1	31	4.8	276	43.0	11	19.3	44	77.2	42	6.0	320	45.8	172	1.2	999	7.2
	1996	156	1.1	737	5.4	33	4.9	320	47.1	13	19.7	56	84.8	46	6.2	376	50.5	202	1.4	1,113	7.7
	1997	165	1.1	759	5.2	78	8.6	409	45.3	29	31.5	87	94.6	107	10.8	496	49.9	272	1.7	1,255	8.1
	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

NOTE: 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.). 3. Calculations based on fewer than five events are excluded.

Table 17. Births by Gestational Age[1], Race and Hispanic Ethnicity, Massachusetts: 2004

Gestational Age[4]	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	**78,460**	**100.0**	**55,322**	**100.0**	**6,053**	**100.0**	**9,798**	**100.0**	**5,454**	**100.0**	**1,730**	**100.0**	**103**
<20	24	0.0	8	0.0	7	0.1	7	0.1	2	--[8]	0	0.0	0
20-23	149	0.2	77	0.1	32	0.5	25	0.3	5	0.1	7	0.4	3
24-27	322	0.4	198	0.4	57	0.9	38	0.4	17	0.3	12	0.7	0
28-31	750	1.0	507	0.9	118	1.9	81	0.8	31	0.6	12	0.7	1
32-35	3,296	4.2	2,340	4.2	289	4.8	417	4.3	173	3.2	73	4.2	4
36	2,681	3.4	1,932	3.5	280	4.6	278	2.8	139	2.5	49	2.8	3
37-39	37,810	48.2	26,598	48.1	2,773	45.8	4,756	48.5	2,865	52.5	800	46.2	18
40	23,989	30.6	16,996	30.7	1,757	29.0	2,992	30.5	1,674	30.7	544	31.4	26
41	8,416	10.7	6,043	10.9	643	10.6	1,034	10.6	503	9.2	189	10.9	4
42	716	0.9	439	0.8	76	1.3	137	1.4	34	0.6	30	1.7	0
43	22	0.0	10	0.0	3	--[8]	5	0.1	3	--[8]	1	--[8]	0
44+	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Unknown[5]	285	0.4	174	0.3	18	0.3	28	0.3	8	0.1	13	0.8	44
Very early gestation, <28 weeks[6]	495	0.6	283	0.5	96	1.6	70	0.7	24	0.4	19	1.1	3
Preterm, <37 weeks[7]	7,222	9.2	5,062	9.2	783	13.0	846	8.7	367	6.7	153	8.9	11

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. Normal gestational age is defined as 37-42 weeks. 5. Estimate of gestational age not provided. 6. Also known as extremely premature delivery, or extremely preterm delivery. 7. Also known as early gestational age, premature delivery, or preterm delivery. 8. Calculations based on fewer than five events are excluded.