# Massachusetts Births 2001

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2001 Highlights: Trends

- **The teen birth rate continues its steady decline of the last ten years**. In 2001, the teen birth rate was 24.3 births per 1,000 females ages 15-19, compared to 25.8 in 2000. The teen birth rate has declined 31% since 1990.

- **The infant mortality rate increased from 2000 to 2001, from an all-time low of 4.6 infant deaths per 1,000 live births in 2000 to 5.0 in 2001**. This increase was not statistically significant. Despite the increase between 2000 and 2001, the overall trend of decreasing infant mortality remains stable in Massachusetts. The infant mortality rate has decreased by 29% since 1990.

- **Cesarean section delivery rates continue to increase in Massachusetts**. In 2001, 25.6% of all births to Massachusetts residents were delivered by c-section. This is an 8% increase from the 2000 c-section rate. Since 1997, c-section rates have increased by an average of 7% per year.

- **The percentage of women smoking during pregnancy decreased** from 9.7% in 2000 to 9.1% in 2001. The rate of smoking during pregnancy has decreased 53% since 1990 (19.3%).

- **The ten-year trend of increasing numbers of multiple births continues**. The percentage of multiple births increased slightly from 4.3% of births in 2000 to 4.4% in 2001. The percentage of multiple births in Massachusetts has increased 69% since 1990 (2.6%).

Number and Rate of Births

**The number of births to Massachusetts residents declined by about 1% between 2000 and 2001**, from 81,582 to 81,014. Since 1990, the number of births in Massachusetts has declined by 12%, and the birth rate among women of reproductive age has declined by 9% (from 62.1 to 56.8 births per 1,000 females ages 15-44).

Infant Mortality

**The infant mortality rate (IMR) in 2001 was 5.0 infant deaths per 1,000 births, compared with 4.6 in 2000.** The infant mortality rate has decreased 29% since 1990. There were a total of 407 infant deaths in 2001, compared with 377 in 2000.

**The IMR decreased among black non-Hispanics (12.8 to 12.1), but increased for Hispanics (5.2 to 7.3) and white non-Hispanics (3.8 to 4.1) from 2000 to 2001.** The IMR for Asians decreased from 4.1 to 3.1. Note: the IMR for Asians should be interpreted with caution due to the small number of infant deaths involved.

Pregnancy-Associated Mortality

**In 2001, 21 pregnancy-associated deaths, including 4 maternal deaths, occurred in Massachusetts**. The pregnancy-associated mortality ratio (PAMR) was 25.5 pregnancy-associated deaths per 100,000 live births occurring in Massachusetts, and the maternal mortality ratio (MMR) was 4.9 maternal deaths per 100,000 live births occurring in Massachusetts. Although there was some fluctuation in the PAMR and the MMR between 1990 and 2001, the differences are not statistically significant due to the small number of occurrences.

*(Note: A "Pregnancy-associated death" is the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of the cause of death. A "maternal death" is the death of a woman while pregnant or within 42 days of pregnancy, the cause of which is related to the pregnancy or its management. See Glossary for detailed definitions.)*

Teen Births

**Teen births decreased between 2000 and 2001,** from a total of 5,305 births to females ages 15-19 to 4,979 births. The rate in 2001 was 24.3 births per 1,000 females ages 15-19, a 6% decrease from the 2000 rate of 25.8. The teen birth rate in Massachusetts has declined by 31% since 1990.

**The low birthweight percentage among births to teen mothers (ages 15-19) was 9.8% in 2001**, compared with 7.0% among births to mothers ages 20 and older in 2001.

Among Massachusetts municipalities in 2001, **teen birth rates were highest in Lawrence** (**95.2** per 1,000 females ages 15-19), Holyoke (87.9), Chelsea (80.8), Southbridge (77.3), and Springfield (71.4).

Low Birthweight

**The percentage of low birthweight infants (LBW; weighing less than 5.5 pounds) increased to 7.2% in 2001 (from 7.1% in 1999 and 2000).** Since 1990, the percentage of low birthweight infants has increased by 24%, from 5.8% in 1990 to 7.2% in 2001.

Between 2000 and 2001, the percentage of low birthweight infants increased slightly for white non-Hispanics (6.4% to 6.6%), decreased by 7% for black non-Hispanics (12.0% to 11.2%), and remained the same for Hispanics (8.2%) and Asians (7.3%).

Between 2000 and 2001, the percentage of low birthweight births remained the same (5.1%) among singletons, decreased slightly among twins (50.0% to 49.2%), and increased slightly among triplet and higher order births (92.5% to 93.3%). For the second year in a row, LBW decreased slightly among all multiple births (53.0 % to 52.0%), after a four-year trend in increasing rate of LBW among multiples. Very low birthweight (VLBW; infants weighing less than 3.3 pounds) remained stable between 2000 and 2001 (1.4%). For the second year in a row, Black non-Hispanic infants, who have the highest percentage of VLBW, experienced a small decrease in VLBW, from 3.6% in 1999 to 3.4% in 2000 to 3.2% in 2001.

Preterm Deliveries

**The percentage of preterm infants (delivered before the 37th week of gestation) decreased from 8.3% in 2000 to 8.0% in 2001.** Preterm rates decreased for all race and Hispanic ethnicity groups, but decreases were greatest for Asians (a 15% decrease; from 7.4% to 6.3%) and black non-Hispanics (a 5% decrease; from 12.7% to 12.1%).

**The percentage of infants delivered very early (before the 28th week of gestation) remained the same in 2001 as in 2000 (0.6%).** As in 2000, the percentage of infants delivered before 28 weeks of gestation among black non-Hispanics in 2001 (2.0%) was more than double that of any other group.

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

**Continuing the trend of the past 20 years**, the percentage of births to white mothers decreased slightly, while the **percentage of births to other race/ethnicity groups increased**. In 2001, 73.0% of births were white non-Hispanic, 11.6% Hispanic, 7.2% black non-Hispanic, 5.9% Asian, 2.1% were other races, and 0.2% were of unknown race.

The percentage of births to non-U.S.-born mothers increased 6% between 2000 and 2001 – from 20.9% to 22.1%. **In 2001, more than 1 of every 5 births to Massachusetts residents was to a mother born outside the continental U.S., Puerto Rico, and the U.S. Territories.**

Smoking

**The percentage of women who smoked during pregnancy decreased from 9.7% in 2000 to 9.1% in 2001.** Decreases in smoking during pregnancy occurred among all race and Hispanic ethnicity groups.

Prenatal Care

**Adequacy of prenatal care increased from 83.3% in 2000 to 85.2% in 2001**. 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 previous reports. Beginning with this year's report, the 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 delivery rates are increasing**. The cesarean section rate among births to Massachusetts residents was 25.6% in 2001, an increase of 8% from 2000 (23.8%). Increases were among both primary and repeat c-sections. The primary c-section rate increased by 6%, from 17.7% to 18.7%, and the repeat c-section rate increased by 7%, from 75.2% to 80.6%. Accordingly, the rate of vaginal births after cesarean section (VBAC) deliveries decreased substantially, from 24.8% in 2000 to 19.4% in 2001, a decrease of 22%.

Breastfeeding

**The rate of mothers breastfeeding or intending to breastfeed increased from 73.8% in 2000 to 75.3% in 2001.** The breastfeeding rate increased for all major race/Hispanic ethnicity groups, but the largest increase between 2000 and 2001 was among Asians (5% increase; from 76.4% to 79.8%), followed by Hispanics (4% increase; from 75.4% to 78.1%), black non-Hispanics (3% increase; from 73.3% to 75.8%) and white non-Hispanics (1% increase; from 73.3% to 74.3%).

Public Source of Prenatal Care Payment

The percentage of mothers paying for prenatal care through a public source **increased** between 2000 and 2001, **from 27.5% to 27.8%.**

Multiple Births

**The percentage of multiple births (twins, triplets, and higher order) continues to increase; 4.4% of births in 2001 were multiples, compared with 4.3% in 2000.** This percentage has risen steadily since 1990 (2.6%). The increase between 2000 and 2001 is mostly attributable to mothers ages 35 and over, but there was also a small increase among mothers under age 35. The percentage of multiples among births to mothers ages 35+ (7.0%) is almost double the percentage for mothers under age 35 (3.7%).

Comparison of Massachusetts and U.S. Indicators

**Massachusetts perinatal health indicators in 2001 were generally better than those for the U.S. in 2001.**

According to final U.S. birth statistics for 2001 and preliminary U.S. death statistics for 2001, comparisons were as follows:

- The **birth rate** for women ages 15-44 in Massachusetts (56.8) was **15% lower** than the U.S. birth rate (66.9).
- The **infant mortality rate (IMR)** in Massachusetts (5.0) was **28% lower** than the U.S. IMR (6.9).
- The **teen birth rate** in Massachusetts (24.3) was **47% lower** than the U.S. teen birth rate (45.8).
- The **low birthweight** rate in Massachusetts (7.2%) was **7% lower** than the U.S. low birthweight rate (7.7%).
- The **percentage of women receiving prenatal care in the first trimester** in Massachusetts (84.3%) **was slightly higher** than the U.S. percentage (83.4%).

Comparison of Massachusetts and U.S. Indicators **(cont.)**

- The **cesarean section delivery rate** in Massachusetts (25.6%) was **5% higher** than the U.S. c-section rate (24.4%).

Special Notes on this Year's Publication

**Additions**: This year's publication adds a focus on adequacy of prenatal care. Three new tables (18-20) and a revised Figure 13 in Chapter 5 provide detailed data on adequacy of prenatal care in Massachusetts using the newly implemented Adequacy of Prenatal Care Utilization Index. In addition, this year's publication includes a new chapter (Chap. 2) on teen births in Massachusetts, in place of the annual supplement published in previous years.

Birth Data Availability

Detailed information on 2001 births in Massachusetts is also available on the Department's free, Internet-based public health information service, **MassCHIP**. To register as a user, visit the MassCHIP website at http://masschip.state.ma.us or call 1-888-MASCHIP (within MA only) or (617) 624-5541. This report is available on the DPH website at: http://www.state.ma.us/dph/pubstats.htm.

# CHAPTER 1

# BIRTH CHARACTERISTICS

## Birth Numbers and Rates

In 2001, 81,014 births occurred to Massachusetts residents (Table 1). The number of resident live births in Massachusetts has decreased by 12% since 1990 (92,461 births).

In 2001, the birth rate was 56.8 births per 1,000 women ages 15-44 years. In the past decade, this rate decreased by 12% from 1990 to 1996, increased by 5% from 1996 to 2000, and decreased by less than 1% from 2000 to 2001 (Table 1).

The Massachusetts birth rate in 2001 was 15% below the U.S. birth rate of 66.9 per 1,000 women ages 15-44 (National Vital Statistics Reports, Vol. 51, No. 2, December 18, 2002, p.5).

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

In 2001, of all live births to Massachusetts residents, 73.0% (59,115) were to White non-Hispanic mothers; 11.6% (9,410) were to Hispanic mothers; 7.2% (5,862) were to Black non-Hispanic mothers; and 5.9% (4,784) were to Asian mothers (Table 2A).

The racial diversity of mothers in Massachusetts has increased. From 1990 to 2001, the percentage of births to white women decreased from 87.4 to 84.8, while the percentage of births to mothers of Asian or other races increased from 4.0 to 6.5. The percentage of births to black mothers fluctuated during the 1990s, decreasing from 8.3 in 1990 to 7.4 in 1996, and increasing back to 8.1 by 2001 (Table 1).

In 2001, 25% of births in Massachusetts were to women born outside of the continental United States. The percentage of non-U.S.-born (born outside of the U.S. states, Puerto Rico, and U.S. territories) mothers varied by race: 91% of Asian births were to non-U.S.-born women; 45% of Hispanic births were to non-U.S.-born women, and another 23% were to women born in Puerto Rico or other U.S. Territories; and 45% of Black non-Hispanic births were to women who were non-U.S.-born.

## Teen Births

In 2001, there were 4,979 births to women ages 15-19, compared with 5,305 births for this age group in 2000 (Table 1). The number of teen births has steadily decreased since 1990, with an overall decrease of 31% (7,258 teen births in 1990).

The teen birth rate (births per 1,000 women ages 15-19) was 24.3 in 2001, a decrease of 6% from 2000 (25.8) (Table 1). In contrast, the 2001 U.S. teen birth rate was 45.8 (National Vital Statistics Report Vol. 51, No. 2, Dec. 18, 2002, p. 3). The Massachusetts 2001 teen birth rate was 47% below the U.S. teen birth rate.

Teen birth rates in Massachusetts have been steadily decreasing since 1990. The teen birth rate in Massachusetts decreased by 31% from 1990 to 2001 (Table 1).

Statewide, in 2001, 2.1% of births were to women under age 18, and 6.2% were to women under the age of 20 (Table 2A). The percentage of births to teenagers varied by race and ethnicity, partially reflecting differences in the percentage of teenage women within each racial/ethnic population group. The highest percentage of births to women under 18 was for

Hispanics (7.1%), followed by non-Hispanic blacks (4.1%), Asians (1.8%), and non-Hispanic whites (1.1%) (Table 2A).

In maternal ancestry categories, Puerto Ricans and Cambodians had the highest teen birth percentages in 2001. For Puerto Rican women, 25% of births were to women under age 20, and 11% to women under age 18 (Table 2B). For Cambodians, these percentages were 21% and 8%, respectively.

**Low Birthweight**

In 2001, 7.2% of infants born to Massachusetts women were low birthweight – weighing less than 2,500 grams or 5.5 pounds (Table 1). This percentage increased slightly, from 7.1% in 2000.

In 2001, the low birthweight rate in Massachusetts was 8% below the national figure of 7.7%. The percentage of low birthweight births increased nationwide from 2000 to 2001, from 7.6% to 7.7% (National Vital Statistics Reports, Vol. 51, No. 2, December 18, 2002, p. 18).

The percentage of low birthweight infants varied by mother's race and ethnicity. Non-Hispanic black mothers had the highest proportion of low birthweight infants: 11.2%; followed by Hispanic mothers: 8.2%; Asian mothers: 7.3%; and non-Hispanic white mothers: 6.6% (Table 2A). The low birthweight percentage for non-Hispanic black mothers decreased by 7% from 12.0% in 2000 to 11.2% in 2001, while percentages remained constant for other race groups.

In maternal ancestry categories, the highest percentages of low birthweight in 2001 occurred among mothers who identified their ancestries as Cambodian (11.5%), African-American (11.3%), West Indian/Caribbean (11.2%), and Puerto Rican (10.1%). The highest percentages of very low birthweight (less than 1,500 grams or 3.3 pounds), occurred among mothers who identified their ancestry as: West Indian/Caribbean (4.2%), Haitian (3.4%), African (2.7%), and African-American (2.6%) (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. It improves upon the Kessner Index in various ways, the most important being the ability to distinguish between inadequate prenatal care due to the timing of initiation and inadequate care due to insufficient prenatal care visits.

Table 1 provides a comparison of values based on the two indices between 1996 and 2001. The values for the APNCU Index are consistently higher than those calculated with the Kessner Index. (Table 1). Please 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 2001, out of all Massachusetts resident live births, 85.2% of mothers received adequate prenatal care, increasing from 83.3% in 2000 (Table 1).

In 2001, 84.3% of women received prenatal care during the first trimester of pregnancy.

The percentage of adequate prenatal care varied by mother's race and Hispanic ethnicity, ranging from 74.0% for non-Hispanic black mothers to 88.2% for non-Hispanic white mothers. The rates for Hispanic and Asian mothers were 77.0% and 81.4%, respectively (Table 2A).

Adequacy of prenatal care also varied by maternal ancestry category. Mothers reporting their ancestries as Chinese and European were the groups most likely to receive adequate prenatal care – 88.0% and 87.9%, respectively, while Cambodian and Cape Verdean mothers were least likely to receive adequate prenatal care -- 60.9% and 66.5%, respectively (Table 2B).

**Cesarean Section Deliveries**

In 2001, 25.6% of births to resident Massachusetts women were delivered by Cesarean section (Table 2A). The Cesarean section rate increased by 8% from 2000 (23.8%) to 2001 (25.6%), and increased 6% from 1999 (22.4%) to 2000. The C-section rate in Massachusetts in 2001 was higher than the nationwide rate of 24.4% (National Vital Statistics Reports, Vol. 51, No. 2, December 18, 2002, p.3).

Non-Hispanic black women had the highest percentage of Cesarean section deliveries, at 27.5%, and Hispanic women had the lowest percentage, at 21.9% (Table 2A). With regard to maternal ancestry, the highest percentage of Cesarean section deliveries occurred among Brazilian women (37.8%) and the lowest percentage among Cambodian women (13.3%) (Table 2B).

**Breastfeeding**

In 2001, 75.3% of Massachusetts mothers reported that they were breastfeeding or intending to breastfeed their infants (Table 2A). This represents a 33% increase since 1990 (56.6%, data not shown).

The percentage of mothers breastfeeding differed slightly by maternal race and Hispanic ethnicity, with the highest percentage reported among Asians (79.8%) and the lowest among non-Hispanic whites (74.3%) (Table 2A). There was more variation among mothers of different self-identified ancestry groups. The highest rates of breastfeeding were among Asian Indians (96.5%), Brazilians (94.0%), and Salvadorans (93.6%) (Table 2B). In contrast, only 50.9% of Cambodians and 51.3% of women identifying themselves as "Other Portuguese" 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 15-19, the percentage was 61.8%, while for women ages 45 and above the percentage was highest, at 84.4% (Figure 2).

**Birth Characteristics in the 30 Largest Massachusetts Cities and Towns**

In 2001, among live births to residents of the 30 largest municipalities in the Commonwealth:

Crude birth rates (number of births per 1,000 population) were highest in Lawrence (20.9), Lowell (16.5), Brockton (16.5), and Lynn (16.1). Crude birth rates were lowest in Cambridge (9.8) and Newton (9.9) (Table 3A).

Four communities (Waltham, Springfield, New Bedford, and Peabody) recorded low birthweight percentages that were at least 25% higher than the statewide average of 7.2% (Table 3A).

Over 90% of mothers living in Arlington, Brookline, Framingham, Newton and Weymouth received adequate prenatal care. In contrast, fewer than 70% of mothers living in Pittsfield (53.6%) and Lowell (66.8%) received adequate prenatal care (Table 3A).

The birth rate for teens was highest in Lawrence (95.2 births per 1,000 females ages 15 to 19 years) and in Springfield (71.4). These two communities had rates approximately three times the statewide rate of 24.3. (Table 3A).

Three communities had 2001 infant mortality rates in excess of 10 deaths per 1,000 live births: Lawrence (11.3), Taunton (11.2), and Pittsfield (10.2). Infant mortality rates should be interpreted with caution in these communities since they are based on a small number of infant deaths (Lawrence: 17; Taunton: 9; Pittsfield: 5) (Table 3A).

Based on a three-year infant mortality rate from 1999-2001, the communities with the highest IMRs were: Fall River (8.8), Worcester (8.7), Peabody (8.4), and Lawrence (8.1) (Table 3A).

**Birth Characteristics in Community Health Network Areas**

In 2001, among live resident births in the 27 Massachusetts Community Health Network Areas (CHNAs):

Two CHNAs had crude birth rates of 15 births or more per 1,000 residents: Greater Lawrence Community Health Network,15.5, and Community Partners for Health (Milford),15.2 (Table 3B).

More than 8.0% (about 15% higher than the statewide average of 7.2%) of resident births were low birthweight in four CHNAs -- Alliance for Community Health (Boston/Chelsea/Revere/Winthrop), The Community Health Connection (Springfield), Greater Brockton Community Health Network, and Greater New Bedford Health & Human Services Coalition (Table 3B).

Less than 70% of mothers received adequate prenatal care in the Community Health Network of Berkshire County (67%), while over 93% of mothers living within the Community Partners for Health (Milford) and Community Health Network of Greater Metro West (Framingham) received adequate prenatal care (Table 3B).

Teen birth rates among Greater Lawrence Community Health Network, and The Community Health Connection (Springfield) were the highest in the state, approximately double the statewide teen birth rate, while rates were four times lower than the statewide average for West

Suburban Health Network (Newton/Waltham) and Greater Woburn/Concord/Littleton Community Health Network (Table 3B).

Partners for a Healthier Community (Fall River) had the highest infant mortality rate in 2001: 7.9 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).

**Tobacco Use**

In 2001, 9.1% of births were to mothers who reported smoking cigarettes during their pregnancies (Fig. 3). This represents a 53% decline from 1990 (19.3%, data not shown), and a decline of 6% from the previous year, 2000 (9.7%, data not shown).

Smoking prevalence during pregnancy differed by mother's race and Hispanic ethnicity. Non-Hispanic white women had the highest prevalence of smoking during pregnancy (10.1%), followed by non-Hispanic black women (8.3%), Hispanic women (7.4%), and, finally, Asian women (1.5%) (Fig. 3).

The prevalence of smoking during pregnancy decreased with increasing education level of the mother; over 20% of mothers with less than a high school education smoked during pregnancy, compared with less than 1% of women with post-college education (Fig. 3). This was true for all race groups; however, there were larger differences in smoking prevalence between education levels for White non-Hispanics than for other groups.

The majority (84.0%) of women who gave birth in 2001 were non-smokers prior to pregnancy, and 99.9% of them continued to abstain from smoking during pregnancy (Fig. 4). (Sixty-eight women started smoking during pregnancy.) Out of the16% of women who smoked prior to pregnancy, about half of them were "light" smokers (1-10 cigarettes daily); 43% were "moderate" smokers (11-20 cigarettes daily); and 6% were "heavy" smokers (21 or more cigarettes daily). Almost half (44%) of pre-pregnancy smokers quit smoking during pregnancy (data not shown).

**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 were ages 30 years and older in 1980 as compared to 55% in 2001. Beginning in 1996, the number of births to mothers ages 30 years and older exceeded the number of births to mothers under age 30. This trend has continued through 2001 (Fig. 1).

In Massachusetts, the birth rate (births to women ages 15-44 years per 1,000 women ages 15-44) decreased 9% from 1990 (62.2) to 2001 (56.8) (Table 4). In 2001, the age-specific birth rates were highest for 30-34 year old (107.6 per 1,000) and 25-29 year old mothers (86.2 per 1,000). The birth rates for women ages 30 years and older have increased steadily throughout the 1990s (data not shown).

Since 1990, birth rates have increased for every age group of women ages 30 and above and decreased for every age group of women under 30 (Table 4). The largest birth rate increases

have been for mothers in the oldest age groups, while the largest decreases have been among the youngest age groups (Table 4).

In 2001, there were 78 births to mothers ages 12-14 years and there were 144 births to women 45 years of age or older (Table 4).

**Plurality**

Plurality represents the number of births in one delivery. In 2001, 95.6% of all births were singletons, 4.2% were twins and 0.3% were triplets or higher order multiple births. The total percentage of multiple births (twins, triplets or more) was 4.4% in 2001 (Table 6).

The percentage of multiple births out of all live births has increased by 69% since 1990 (2.6%). The increase since 1990 in the percentage of multiple births varies by age. For women under age 35 years, the percentage of multiple births increased from 2.5% in 1990 to 3.7% in 2001, an increase of 48%. The percentage of multiple births for women ages 35 years and older has increased at double that rate (100%), from 3.5% in 1990 to 7.0% in 2001 (Table 6).

**Education**

In 2001, 10.1% of women who gave birth had less than a high school education; 26.3% had a high school diploma or GED; 23.1% had some college education; and 40.5% had at least a college degree (Table 7).

Maternal educational attainment varied by race; 51% of Asian women and 48% of non-Hispanic white women had at least a college degree, compared with 16% of non-Hispanic black women and 10% 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; and more likely to be married. They were less likely to smoke during pregnancy and less likely to receive publicly financed prenatal care (Table 7).

**Healthy People 2010 Objectives**

Healthy People 2010 (HP2010) sets targets for each measurable objective. Table 8 presents the most recent Massachusetts data for HP2010 Maternal, Infant, and Child Health objectives, and measures the state's progress toward meeting the targets set for 2010.

Out of 16 objectives presented, Massachusetts has already met the 2010 target for two indicators: the postneonatal mortality rate and breastfeeding. For eight objectives, the 2001 Massachusetts indicators are within 25% of the target goals: infant mortality rate, fetal mortality rate, perinatal mortality rate, preterm, early and adequate prenatal care, prenatal care beginning in the first trimester, very low birthweight infants born at Level III hospitals, and smoking during pregnancy. For six objectives, Massachusetts is still over 25% away from achieving the targets: neonatal 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, 1985, 1990-2001

| Characteristic | | 1980 | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Births**[1] | **n**[2] | 72,591 | 81,781 | 92,461 | 88,176 | 87,202 | 84,627 | 83,758 | 81,562 | 80,164 | 80,321 | 81,406 | 80,866 | 81,582 | 81,014 |
| | **Rate**[3] | 53.4 | 57.5 | 62.1 | 59.4 | 59.1 | 57.6 | 57.0 | 55.5 | 54.6 | 54.7 | 55.6 | 55.9 | 57.2 | 56.8 |
| **Race of Mother** | | | | | | | | | | | | | | | |
| **White**[4] | **n** | 66,220 | 71,854 | 80,775 | 76,983 | 76,052 | 73,704 | 72,980 | 71,083 | 69,485 | 69,503 | 70,452 | 69,305 | 69,371 | 68,728 |
| | **%**[5] | 91.2 | 87.9 | 87.4 | 87.3 | 87.2 | 87.1 | 87.1 | 87.2 | 86.7 | 86.5 | 86.5 | 85.7 | 85.0 | 84.8 |
| **Black** | **n** | 4,626 | 5,099 | 7,729 | 7,352 | 7,203 | 6,916 | 6,713 | 6,299 | 5,946 | 6,182 | 6,337 | 6,524 | 6,445 | 6,555 |
| | **%**[5] | 6.4 | 6.2 | 8.3 | 8.3 | 8.3 | 8.2 | 8.0 | 7.7 | 7.4 | 7.7 | 7.8 | 8.1 | 7.9 | 8.1 |
| **Asian/Other**[6] | **n** | 1,069 | 1,741 | 3,688 | 3,566 | 3,582 | 3,664 | 3,790 | 3,817 | 3,950 | 4,217 | 4,248 | 4,615 | 5,205 | 5,279 |
| | **%**[5] | 1.5 | 2.1 | 4.0 | 4.0 | 4.1 | 4.3 | 4.5 | 4.7 | 4.9 | 5.3 | 5.2 | 5.7 | 6.4 | 6.5 |
| **Unknown** | **n** | 676 | 3,087 | 269 | 275 | 365 | 343 | 275 | 363 | 783 | 419 | 369 | 422 | 561 | 452 |
| | **%**[5] | 0.9 | 3.8 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.4 | 1.0 | 0.5 | 0.5 | 0.5 | 0.7 | 0.6 |
| **Teen Births** | **n** | 7,694 | 6,859 | 7,258 | 6,892 | 6,555 | 6,469 | 6,412 | 5,990 | 5,758 | 5,801 | 5,823 | 5,515 | 5,305 | 4,979 |
| **(Ages 15-19)** | **Rate**[3] | 28.1 | 28.7 | 35.4 | 35.4 | 34.5 | 34.0 | 33.2 | 30.3 | 28.5 | 28.5 | 28.1 | 26.7 | 25.8 | 24.3 |
| **Births to Unmarried Mothers** | **n** | 11,356 | 15,044 | 22,837 | 22,852 | 22,612 | 22,345 | 22,302 | 20,857 | 20,253 | 20,640 | 21,191 | 21,448 | 21,621 | 21,620 |
| | **%** | 15.6 | 18.4 | 24.7 | 25.9 | 25.9 | 26.4 | 26.6 | 25.6 | 25.3 | 25.7 | 26.0 | 26.5 | 26.5 | 26.7 |
| **Low Birthweight** | **n** | 4,413 | 4,751 | 5,388 | 5,199 | 5,137 | 5,202 | 5,335 | 5,174 | 5,105 | 5,617 | 5,655 | 5,708 | 5,711 | 5,795 |
| | **%** | 6.1 | 5.8 | 5.8 | 5.9 | 5.9 | 6.2 | 6.4 | 6.4 | 6.4 | 7.0 | 7.0 | 7.1 | 7.1 | 7.2 |
| **Preterm** | **n** | | | 6,732 | 6,009 | 6,313 | 6,201 | 6,492 | 6,438 | 5,705 | 5,831 | 6,117 | 6,136 | 6,582 | 6,412 |
| | **%** | | | 7.4 | 6.8 | 7.3 | 7.4 | 7.8 | 7.9 | 7.2 | 7.3 | 7.6 | 7.6 | 8.3 | 8.0 |
| **Adequate Prenatal Care** | | | | | | | | | | | | | | | |
| **Kessner Index**[7] | **%** | 82.0 | 79.4 | 80.1 | 81.6 | 82.9 | 83.8 | 84.3 | 84.2 | 79.9 | 80.0 | 79.8 | 79.4 | 79.1 | 80.4 |
| **APNCU Index**[8] | **%** | | | | | | | | | 83.3 | 82.9 | 82.9 | 82.9 | 83.3 | 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. 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 and 2001 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 all births, including those to mothers of unknown race. 6. Other races include American Indian and others not specified. 7. 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. 8. Beginning with this year's publication, 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/Hispanic Ethnicity and Birthplace, Massachusetts: 2001

| Race and Hispanic Ethnicity (by mother's birthplace) | Births[1] | | Teen Births | | | | Birthweight | | | | Prenatal Care | | | | Cesarean Section | | Breastfeeding[5] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <18 Years | | <20 Years | | Very Low[2] | | Low[3] | | Adequate[4] | | First Trimester | | | | | |
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| **State Total** | **81,014** | **100.0** | **1,705** | **2.1** | **5,057** | **6.2** | **1,114** | **1.4** | **5,795** | **7.2** | **68,481** | **85.2** | **67,821** | **84.3** | **20,639** | **25.6** | **59,911** | **75.3** |
| U.S. States / D.C. | 60,746 | 75.0 | 1,255 | 2.1 | 3,760 | 6.2 | 816 | 1.3 | 4,302 | 7.1 | 52,531 | 87.1 | 52,338 | 86.8 | 15,657 | 25.9 | 42,812 | 72.0 |
| Puerto Rico/U.S. Terr.[7] | 2,258 | 2.8 | 205 | 9.1 | 490 | 21.7 | 53 | 2.4 | 219 | 9.7 | 1,736 | 77.4 | 1,677 | 74.8 | 507 | 22.5 | 1,576 | 70.1 |
| Non-U.S.-Born[8] | 17,916 | 22.1 | 244 | 1.4 | 804 | 4.5 | 234 | 1.3 | 1,251 | 7.0 | 14,139 | 79.6 | 13,730 | 77.1 | 4,454 | 24.9 | 15,519 | 87.0 |
| **Non-Hispanic White** | **59,115** | **73.0** | **634** | **1.1** | **2,335** | **4.0** | **690** | **1.2** | **3,883** | **6.6** | **51,810** | **88.2** | **51,723** | **88.0** | **15,456** | **26.2** | **42,978** | **74.3** |
| U.S. States / D.C. | 53,345 | 90.2 | 606 | 1.1 | 2,189 | 4.1 | 637 | 1.2 | 3,527 | 6.6 | 46,965 | 88.6 | 46,967 | 88.5 | 13,971 | 26.3 | 37,972 | 72.8 |
| Puerto Rico/U.S. Terr.[7] | 47 | 0.1 | 2 | --[6] | 4 | --[6] | 1 | --[6] | 6 | 12.8 | 36 | 76.6 | 40 | 85.1 | 8 | 17.0 | 35 | 81.4 |
| Non-U.S.-Born[8] | 5,661 | 9.6 | 26 | 0.5 | 141 | 2.5 | 45 | 0.8 | 335 | 5.9 | 4,757 | 84.6 | 4,666 | 82.9 | 1,463 | 25.9 | 4,967 | 88.3 |
| **Non-Hispanic Black** | **5,862** | **7.2** | **240** | **4.1** | **636** | **10.8** | **188** | **3.2** | **654** | **11.2** | **4,276** | **74.0** | **4,136** | **71.2** | **1,607** | **27.5** | **4,416** | **75.8** |
| U.S. States / D.C. | 3,217 | 54.9 | 210 | 6.5 | 550 | 17.1 | 96 | 3.0 | 393 | 12.3 | 2,365 | 74.5 | 2,269 | 71.2 | 815 | 25.4 | 2,069 | 64.8 |
| Puerto Rico/U.S. Terr.[7] | 19 | 0.3 | 1 | --[6] | 1 | --[6] | 4 | --[6] | 6 | 31.6 | 16 | 84.2 | 15 | 78.9 | 5 | 26.3 | 14 | 77.8 |
| Non-U.S.-Born[8] | 2,618 | 44.7 | 29 | 1.1 | 84 | 3.2 | 87 | 3.3 | 252 | 9.6 | 1,889 | 73.2 | 1,845 | 71.2 | 784 | 30.0 | 2,333 | 89.2 |
| **Hispanic** | **9,410** | **11.6** | **671** | **7.1** | **1,653** | **17.6** | **161** | **1.7** | **775** | **8.2** | **7,203** | **77.0** | **6,939** | **74.1** | **2,063** | **21.9** | **7,336** | **78.1** |
| U.S. States / D.C. | 2,989 | 31.8 | 341 | 11.4 | 786 | 26.3 | 63 | 2.1 | 296 | 9.9 | 2,297 | 77.2 | 2,220 | 74.6 | 608 | 20.4 | 1,947 | 65.4 |
| Puerto Rico/U.S. Terr.[7] | 2,184 | 23.2 | 202 | 9.2 | 483 | 22.1 | 48 | 2.2 | 207 | 9.5 | 1,680 | 77.4 | 1,619 | 74.5 | 492 | 22.5 | 1,524 | 69.9 |
| Non-U.S.-Born[8] | 4,237 | 45.0 | 128 | 3.0 | 384 | 9.1 | 50 | 1.2 | 272 | 6.4 | 3,226 | 76.7 | 3,100 | 73.4 | 963 | 22.8 | 3,865 | 91.3 |
| **Asian** | **4,784** | **5.9** | **85** | **1.8** | **221** | **4.6** | **52** | **1.1** | **348** | **7.3** | **3,879** | **81.4** | **3,716** | **77.9** | **1,055** | **22.1** | **3,794** | **79.8** |
| U.S. States / D.C. | 432 | 9.0 | 40 | 9.3 | 88 | 20.4 | 8 | 1.9 | 30 | 6.9 | 346 | 80.1 | 329 | 76.2 | 95 | 22.0 | 355 | 82.6 |
| Puerto Rico/U.S. Terr.[7] | 1 | --[6] | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | --[6] |
| Non-U.S.-Born[8] | 4,333 | 90.6 | 44 | 1.0 | 132 | 3.0 | 42 | 1.0 | 314 | 7.3 | 3,517 | 81.5 | 3,370 | 78.1 | 958 | 22.2 | 3,438 | 79.5 |
| **Other[9]** | **1,698** | **2.1** | **71** | **4.2** | **201** | **11.8** | **18** | **1.1** | **127** | **7.5** | **1,256** | **75.3** | **1,254** | **74.9** | **435** | **25.7** | **1,341** | **80.1** |
| U.S. States / D.C. | 648 | 38.2 | 55 | 8.5 | 139 | 21.5 | 9 | 1.4 | 50 | 7.7 | 512 | 80.3 | 510 | 79.8 | 153 | 23.7 | 432 | 67.2 |
| Puerto Rico/U.S. Terr.[7] | 4 | --[6] | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 4 | --[6] | 3 | --[6] | 2 | --[6] | 2 | --[6] |
| Non-U.S.-Born[8] | 1,044 | 61.5 | 16 | 1.5 | 62 | 5.9 | 9 | 0.9 | 77 | 7.4 | 739 | 72.1 | 740 | 71.8 | 280 | 26.9 | 907 | 88.2 |
| **Unknown[10]** | **145** | **0.2** | **4** | --[6] | **11** | **7.6** | **5** | **7.2** | **8** | **11.6** | **57** | **90.5** | **53** | **82.8** | **23** | **33.8** | **46** | **83.6** |

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

1. In the first category, "Births", percentages of race/Hispanic ethnicity are based on state total of births (including births of unknown race/ethnicity), percentages of mother's birthplace categories are based on subtotals of each 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 this year's publication, 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: 2001

| 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 | %[5] | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| **State Total** | **81,014** | **100.0** | **1,705** | **2.1** | **5,057** | **6.2** | **1,114** | **1.4** | **5,795** | **7.2** | **68,481** | **85.2** | **67,821** | **84.3** | **20,639** | **25.6** | **59,911** | **75.3** |
| **Puerto Rican** | 4,532 | 5.6 | 478 | 10.5 | 1,125 | 24.8 | 99 | 2.2 | 456 | 10.1 | 3,459 | 76.7 | 3,315 | 73.5 | 984 | 21.7 | 2,979 | 65.8 |
| **Dominican** | 1,619 | 2.0 | 79 | 4.9 | 217 | 13.4 | 31 | 1.9 | 122 | 7.5 | 1,243 | 77.1 | 1,228 | 76.1 | 414 | 25.6 | 1,424 | 88.1 |
| **Salvadoran** | 799 | 1.0 | 28 | 3.5 | 88 | 11.0 | 11 | 1.4 | 52 | 6.5 | 580 | 73.7 | 548 | 68.8 | 117 | 14.6 | 748 | 93.6 |
| **Other Central American** | 849 | 1.0 | 32 | 3.8 | 85 | 10.0 | 6 | 0.7 | 48 | 5.7 | 636 | 75.4 | 608 | 71.9 | 157 | 18.5 | 768 | 90.7 |
| **Other Hispanic[7]** | 1,611 | 2.0 | 54 | 3.4 | 138 | 8.6 | 14 | 0.9 | 97 | 6.0 | 1,285 | 80.3 | 1,240 | 77.5 | 391 | 24.3 | 1,417 | 88.4 |
| **Chinese** | 1,254 | 1.5 | 7 | 0.6 | 14 | 1.1 | 8 | 0.6 | 71 | 5.7 | 1,100 | 88.0 | 1,045 | 83.6 | 283 | 22.6 | 1,039 | 83.2 |
| **Vietnamese** | 764 | 0.9 | 10 | 1.3 | 34 | 4.5 | 5 | 0.7 | 50 | 6.5 | 638 | 83.8 | 608 | 79.8 | 153 | 20.0 | 479 | 62.7 |
| **Cambodian** | 593 | 0.7 | 50 | 8.4 | 125 | 21.1 | 13 | 2.2 | 68 | 11.5 | 358 | 60.9 | 320 | 54.2 | 79 | 13.3 | 302 | 50.9 |
| **Asian Indian** | 948 | 1.2 | 0 | 0.0 | 1 | --[6] | 11 | 1.2 | 83 | 8.8 | 785 | 83.2 | 783 | 83.0 | 288 | 30.5 | 910 | 96.5 |
| **Other Asian/PI[8]** | 1,293 | 1.6 | 18 | 1.4 | 49 | 3.8 | 14 | 1.1 | 81 | 6.3 | 1,053 | 81.6 | 1,014 | 78.6 | 280 | 21.7 | 1,127 | 87.4 |
| **Cape Verdean** | 814 | 1.0 | 42 | 5.2 | 111 | 13.6 | 9 | 1.1 | 69 | 8.5 | 532 | 66.5 | 517 | 64.1 | 215 | 26.5 | 600 | 73.9 |
| **Brazilian** | 1,282 | 1.6 | 19 | 1.5 | 86 | 6.7 | 16 | 1.2 | 87 | 6.8 | 1,046 | 81.9 | 1,036 | 81.1 | 484 | 37.8 | 1,205 | 94.0 |
| **Other Portuguese** | 1,394 | 1.7 | 30 | 2.2 | 112 | 8.0 | 8 | 0.6 | 80 | 5.8 | 1,198 | 86.4 | 1,162 | 83.7 | 326 | 23.5 | 712 | 51.3 |
| **Haitian** | 1,026 | 1.3 | 10 | 1.0 | 25 | 2.4 | 35 | 3.4 | 96 | 9.4 | 691 | 68.6 | 680 | 66.9 | 329 | 32.2 | 895 | 87.2 |
| **W. Indian /Carib.[9]** | 689 | 0.9 | 14 | 2.0 | 38 | 5.5 | 29 | 4.2 | 77 | 11.2 | 535 | 78.6 | 512 | 75.1 | 181 | 26.3 | 607 | 88.1 |
| **African-American** | 2,775 | 3.4 | 179 | 6.5 | 479 | 17.3 | 71 | 2.6 | 312 | 11.3 | 2,029 | 74.1 | 1,955 | 71.0 | 678 | 24.5 | 1,803 | 65.1 |
| **African[10]** | 950 | 1.2 | 8 | 0.8 | 28 | 2.9 | 26 | 2.7 | 86 | 9.1 | 715 | 75.9 | 692 | 73.5 | 284 | 29.9 | 857 | 90.2 |
| **Middle Easterner[11]** | 952 | 1.2 | 3 | --[6] | 21 | 2.2 | 8 | 0.8 | 71 | 7.5 | 784 | 82.6 | 787 | 82.9 | 230 | 24.3 | 839 | 88.2 |
| **Native American** | 260 | 0.3 | 10 | 3.8 | 35 | 13.5 | 4 | --[6] | 14 | 5.4 | 199 | 78.0 | 198 | 77.3 | 65 | 25.2 | 177 | 68.9 |
| **European** | 15,013 | 18.5 | 68 | 0.5 | 295 | 2.0 | 113 | 0.8 | 792 | 5.3 | 13,115 | 87.9 | 13,026 | 87.3 | 3,900 | 26.1 | 12,116 | 81.8 |

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 ancestry is unknown). 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 this year's publication, 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. Other Hispanic includes Mexican, Cuban, Colombian, and Other South American. 8. Other Asian and Pacific Islander includes Korean, Filipino, Japanese, Laotian, Thai, Pakistani and Hawaiian. 9. West Indian and Caribbean include Jamaican and Barbadian. 10. African includes Nigerian and other African. 11. Middle Easterner includes Lebanese, Iranian, and Israeli.

## Table 3A. Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2001

| Municipality | Rank (by pop. size) | Population | Crude Birth Rate[2] | Mother's Race and Ethnicity | | | | Very Low Birthweight (<1500 g) | Low Birthweight (<2500 g) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Non-Hispanic White | Non-Hispanic Black | Hispanic | Asian or Other[4] | | |
| | | | | %[3] | %[3] | %[3] | %[3] | % | % |
| STATE TOTAL | | 6,349,097 | 12.8 | 73.0 | 7.2 | 11.6 | 8.0 | 1.4 | 7.2 |
| Arlington | 29 | 42,389 | 13.7 | 85.9 | 1.2 | 2.2 | 10.5 | 2.1 | 8.3 |
| Attleboro | 30 | 42,068 | 14.9 | 85.1 | 1.9 | 4.8 | 7.8 | 2.6 | 8.8 |
| Barnstable | 25 | 47,821 | 10.3 | 84.2 | 3.6 | 4.5 | 7.5 | 1.6 | 6.3 |
| Boston | 1 | 589,141 | 14.0 | 36.0 | 30.5 | 21.7 | 11.5 | 2.0 | 8.6 |
| Brockton | 6 | 94,304 | 16.5 | 44.0 | 29.5 | 9.0 | 17.5 | 1.9 | 8.8 |
| Brookline | 17 | 57,107 | 10.5 | 74.5 | 2.8 | 3.5 | 19.0 | --[5] | 6.4 |
| Cambridge | 5 | 101,355 | 9.8 | 57.6 | 15.1 | 9.2 | 17.9 | 0.6 | 6.7 |
| Chicopee | 21 | 54,653 | 10.6 | 78.2 | 2.6 | 17.0 | 2.2 | --[5] | 8.5 |
| Fall River | 8 | 91,938 | 13.3 | 83.3 | 5.9 | 6.2 | 4.3 | 1.4 | 8.1 |
| Framingham | 14 | 66,910 | 15.1 | 69.1 | 6.2 | 14.9 | 9.8 | 1.8 | 8.0 |
| Haverhill | 16 | 58,969 | 15.3 | 82.4 | 2.1 | 11.5 | 3.4 | 1.2 | 6.0 |
| Lawrence | 13 | 72,043 | 20.9 | 19.8 | 2.2 | 73.8 | 4.1 | 2.7 | 8.2 |
| Lowell | 4 | 105,167 | 16.5 | 47.2 | 5.7 | 17.6 | 29.2 | 1.8 | 8.7 |
| Lynn | 9 | 89,050 | 16.1 | 42.2 | 12.9 | 31.6 | 13.3 | 1.4 | 7.0 |
| Malden | 18 | 56,340 | 14.1 | 54.6 | 13.0 | 8.4 | 23.8 | 1.6 | 6.5 |
| Medford | 20 | 55,765 | 11.2 | 76.8 | 9.4 | 3.4 | 10.4 | 1.1 | 6.4 |
| Methuen | 28 | 43,789 | 12.6 | 75.1 | 1.5 | 18.5 | 4.9 | 2.2 | 6.8 |
| New Bedford | 7 | 93,768 | 13.8 | 65.8 | 7.4 | 16.7 | 9.8 | 1.7 | 9.4 |
| Newton | 11 | 83,829 | 9.9 | 82.9 | 1.7 | 3.0 | 12.2 | 0.6 | 5.3 |
| Peabody | 24 | 48,129 | 12.0 | 85.2 | 1.0 | 6.8 | 6.8 | 1.2 | 9.1 |
| Pittsfield | 27 | 45,793 | 10.7 | 85.7 | 6.1 | 5.1 | 3.1 | 3.1 | 8.8 |
| Plymouth | 23 | 51,701 | 13.2 | 94.9 | 1.0 | 1.2 | 2.8 | 1.0 | 5.1 |
| Quincy | 10 | 88,025 | 12.9 | 66.8 | 4.6 | 2.6 | 25.6 | 1.1 | 6.1 |
| Revere | 26 | 47,283 | 14.2 | 62.4 | 5.1 | 18.4 | 14.2 | 1.9 | 8.2 |
| Somerville | 12 | 77,478 | 11.3 | 64.7 | 9.5 | 15.3 | 10.6 | 0.8 | 6.9 |
| Springfield | 3 | 152,082 | 15.8 | 31.2 | 21.3 | 43.2 | 4.2 | 1.5 | 9.4 |
| Taunton | 19 | 55,976 | 14.3 | 85.8 | 4.6 | 5.5 | 4.0 | 2.4 | 8.2 |
| Waltham | 15 | 59,226 | 11.6 | 60.8 | 6.6 | 18.7 | 13.7 | 1.2 | 10.0 |
| Weymouth | 22 | 53,988 | 13.0 | 90.1 | 1.6 | 2.4 | 5.9 | 1.6 | 7.3 |
| Worcester | 2 | 172,648 | 14.9 | 58.2 | 10.5 | 22.3 | 8.8 | 1.9 | 8.6 |

## Table 3A.(cont'd) Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2001

| Municipality | 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] | 2001 | 1999-2001 | 2001 | 1999-2001 |
| STATE TOTAL | 85.2 | 27.8 | 26.7 | 4,979 | 24.3 | 5.0 | 4.9 | 3.8 | 3.8 |
| Arlington | 91.6 | 5.4 | 6.9 | 5 | 6.5 | --[5] | --[5] | 0.0 | --[5] |
| Attleboro | 83.7 | 23.1 | 19.4 | 39 | 33.9 | --[5] | 3.9 | --[5] | 3.9 |
| Barnstable | 88.9 | 33.8 | 26.3 | 36 | 28.0 | --[5] | 6.2 | --[5] | 4.1 |
| Boston | 82.9 | 47.2 | 42.7 | 702 | 31.6 | 7.4 | 7.2 | 5.5 | 5.7 |
| Brockton | 75.0 | 52.7 | 53.0 | 170 | 51.5 | 5.2 | 5.0 | 3.9 | 3.7 |
| Brookline | 93.1 | 5.9 | 6.3 | 4 | --[5] | 0.0 | --[5] | 0.0 | --[5] |
| Cambridge | 87.8 | 17.3 | 16.5 | 16 | 4.3 | --[5] | 3.8 | 0.0 | 1.9 |
| Chicopee | 81.3 | 44.2 | 41.7 | 73 | 40.4 | --[5] | 5.1 | --[5] | 4.5 |
| Fall River | 82.2 | 54.4 | 47.8 | 155 | 53.2 | 7.3 | 8.8 | 7.3 | 7.1 |
| Framingham | 91.2 | 28.6 | 19.9 | 46 | 23.9 | 8.9 | 6.7 | 8.9 | 6.3 |
| Haverhill | 85.3 | 28.9 | 28.6 | 62 | 34.6 | --[5] | 3.0 | --[5] | 2.6 |
| Lawrence | 73.8 | 67.9 | 63.5 | 271 | 95.2 | 11.3 | 8.1 | 8.0 | 6.2 |
| Lowell | 66.8 | 46.3 | 46.9 | 215 | 54.9 | 5.2 | 6.4 | 4.6 | 5.0 |
| Lynn | 71.7 | 58.4 | 48.8 | 158 | 52.8 | 5.6 | 6.6 | 4.2 | 4.9 |
| Malden | 85.7 | 30.6 | 22.3 | 28 | 20.1 | --[5] | 3.7 | 0.0 | 2.1 |
| Medford | 89.0 | 14.6 | 16.3 | 7 | 4.0 | --[5] | 4.3 | --[5] | 3.7 |
| Methuen | 82.9 | 25.6 | 28.4 | 49 | 38.8 | 0.0 | 6.0 | 0.0 | 6.0 |
| New Bedford | 78.1 | 59.4 | 50.5 | 185 | 62.1 | 7.7 | 6.2 | 3.9 | 3.4 |
| Newton | 94.1 | 4.3 | 4.2 | 7 | 2.1 | --[5] | 3.1 | --[5] | 1.9 |
| Peabody | 78.3 | 21.4 | 19.3 | 22 | 16.9 | --[5] | 8.4 | --[5] | 6.6 |
| Pittsfield | 53.6 | 50.3 | 47.5 | 49 | 36.0 | 10.2 | 4.8 | --[5] | --[5] |
| Plymouth | 84.4 | 16.3 | 16.6 | 20 | 12.7 | --[5] | 5.3 | --[5] | 2.9 |
| Quincy | 88.2 | 25.6 | 17.7 | 30 | 15.4 | --[5] | 3.9 | --[5] | 3.3 |
| Revere | 82.9 | 39.5 | 32.5 | 50 | 41.2 | 9.0 | 5.7 | 7.5 | 5.2 |
| Somerville | 82.9 | 33.3 | 28.0 | 42 | 20.1 | --[5] | 4.7 | --[5] | 4.0 |
| Springfield | 70.5 | 62.6 | 66.1 | 431 | 71.4 | 6.2 | 7.0 | 3.3 | 4.0 |
| Taunton | 83.2 | 30.5 | 32.1 | 63 | 38.1 | 11.2 | 7.2 | 8.7 | 4.6 |
| Waltham | 88.9 | 22.7 | 21.7 | 23 | 10.2 | --[5] | 4.4 | --[5] | 2.4 |
| Weymouth | 91.1 | 15.5 | 16.7 | 22 | 16.5 | --[5] | 3.2 | --[5] | 3.2 |
| Worcester | 89.8 | 45.4 | 41.7 | 269 | 38.9 | 8.2 | 8.7 | 6.6 | 6.7 |

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 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. 2001 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: 2001

| CHNA | Population | Crude Birth Rate[1] | Mother's Race and Ethnicity: Non-Hispanic White % [3] | Non-Hispanic Black % [3] | Hispanic % [3] | Asian or Other[2] % [3] | Very Low Birthweight (<1500 g) % | Low Birthweight (<2500 g) % |
|---|---|---|---|---|---|---|---|---|
| **STATE TOTAL** | 6,349,097 | 12.8 | 73.0 | 7.2 | 11.6 | 8.0 | 1.4 | 7.2 |
| Community Health Network of Berkshire County | 134,953 | 9.2 | 90.6 | 2.9 | 3.6 | 2.5 | 1.9 | 7.6 |
| Upper Valley Health Web (Franklin County) | 86,889 | 10.5 | 90.5 | 0.9 | 4.4 | 3.0 | 1.0 | 6.6 |
| Partnership for Health in Hampshire County (Northampton) | 150,077 | 8.5 | 87.4 | 1.6 | 5.2 | 5.4 | 1.0 | 5.9 |
| The Community Health Connection (Springfield) | 291,665 | 13.1 | 53.8 | 13.7 | 28.4 | 3.9 | 1.2 | 8.4 |
| Community Health Network of Southern Worcester County | 113,702 | 12.4 | 87.7 | 1.1 | 8.8 | 2.4 | 1.0 | 5.8 |
| Community Partners for Health (Milford) | 152,117 | 15.2 | 94.0 | 0.6 | 2.4 | 2.9 | 1.4 | 6.2 |
| Community Health Network of Greater Metro West (Framingham) | 374,478 | 14.0 | 85.0 | 1.8 | 5.6 | 7.6 | 1.5 | 6.9 |
| Community Wellness Coalition (Worcester) | 289,834 | 13.9 | 69.8 | 7.0 | 14.9 | 8.1 | 1.8 | 7.8 |
| Fitchburg/Gardner Community Health Network | 250,362 | 13.1 | 82.5 | 2.4 | 10.2 | 4.7 | 1.3 | 6.2 |
| Greater Lowell Community Health Network | 270,083 | 14.5 | 70.7 | 2.9 | 8.9 | 17.3 | 1.3 | 7.7 |
| Greater Lawrence Community Health Network | 182,025 | 15.5 | 49.7 | 1.6 | 43.6 | 5.0 | 1.9 | 7.2 |
| Greater Haverhill Community Health Network | 144,275 | 13.9 | 89.3 | 1.2 | 6.1 | 2.9 | 1.0 | 5.4 |
| Community Health Network North (Beverly/Gloucester) | 118,280 | 10.4 | 93.4 | 0.8 | 2.0 | 3.5 | 1.9 | 7.0 |
| North Shore Community Health Network | 278,839 | 12.9 | 69.0 | 6.2 | 17.2 | 7.5 | 1.0 | 7.0 |
| Greater Woburn/Concord/Littleton Community Health Network | 208,406 | 12.1 | 83.1 | 1.7 | 1.7 | 13.2 | 1.1 | 6.5 |
| North Suburban Health Alliance (Medford/Malden/Melrose) | 261,844 | 13.2 | 76.3 | 6.7 | 6.6 | 10.4 | 1.3 | 6.8 |
| Greater Cambridge/Somerville Community Health Network | 278,402 | 11.0 | 70.7 | 8.0 | 8.4 | 12.7 | 1.1 | 6.7 |
| West Suburban Health Network (Newton/Waltham) | 253,187 | 11.4 | 82.1 | 2.5 | 6.4 | 8.8 | 0.6 | 6.5 |
| Alliance for Community Health (Boston/Chelsea/Revere/Winthrop) | 746,914 | 13.9 | 39.7 | 25.3 | 23.2 | 11.5 | 1.8 | 8.3 |
| Blue Hills Community Health Alliance (Greater Quincy) | 365,457 | 12.6 | 78.0 | 6.2 | 2.4 | 13.1 | 1.1 | 6.6 |
| Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) | 159,254 | 11.6 | 66.7 | 1.9 | 29.5 | 1.8 | 1.0 | 7.8 |
| Greater Brockton Community Health Network | 232,260 | 13.8 | 68.8 | 15.9 | 4.9 | 10.3 | 2.0 | 8.3 |
| South Shore Community Partners in Prevention (Plymouth) | 180,609 | 13.7 | 96.2 | 0.7 | 1.0 | 1.9 | 1.0 | 6.0 |
| Greater Attleboro-Taunton Health & Education Response | 242,659 | 13.5 | 90.8 | 2.1 | 3.1 | 3.7 | 1.8 | 7.5 |
| Partners for a Healthier Community (Fall River) | 140,256 | 11.7 | 86.9 | 4.5 | 4.7 | 3.7 | 1.2 | 7.5 |
| Greater New Bedford Health & Human Services Coalition | 195,533 | 11.5 | 77.4 | 5.0 | 10.0 | 7.5 | 1.6 | 8.4 |
| Cape and Islands Community Health Network | 246,737 | 9.4 | 88.7 | 2.5 | 2.7 | 5.6 | 1.1 | 6.1 |

## Table 3B.(cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2001

| 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] | 2001 | 1999-2001 | 2001 | 1999-2001 |
| **STATE TOTAL** | 85.2 | 27.8 | 26.7 | 4,979 | 24.3 | 5.0 | 4.9 | 3.8 | 3.8 |
| Community Health Network of Berkshire County | 67.0 | 40.3 | 36.0 | 105 | 22.2 | 4.0 | 2.4 | --[5] | --[5] |
| Upper Valley Health Web (Franklin County) | 85.7 | 31.2 | 31.9 | 73 | 25.5 | 5.5 | 3.8 | 5.5 | 3.0 |
| Partnership for Health in Hampshire County (Northampton) | 88.8 | 21.2 | 25.1 | 61 | 6.7 | 3.9 | 4.0 | --[5] | 2.9 |
| The Community Health Connection (Springfield) | 76.2 | 47.5 | 48.9 | 506 | 48.1 | 4.7 | 5.4 | 2.9 | 3.3 |
| Community Health Network of Southern Worcester County | 91.1 | 26.0 | 31.7 | 122 | 33.3 | 4.2 | 5.1 | --[5] | 4.1 |
| Community Partners for Health (Milford) | 93.7 | 11.3 | 13.4 | 79 | 17.5 | 7.3 | 5.6 | 6.1 | 4.5 |
| Community Health Network of Greater Metro West (Framingham) | 93.1 | 12.5 | 10.5 | 101 | 10.2 | 5.7 | 4.3 | 5.3 | 3.7 |
| Community Wellness Coalition (Worcester) | 91.6 | 32.1 | 31.1 | 308 | 29.7 | 6.4 | 6.9 | 5.4 | 5.4 |
| Fitchburg/Gardner Community Health Network | 85.4 | 24.6 | 28.2 | 239 | 29.2 | 4.3 | 4.0 | 2.7 | 2.8 |
| Greater Lowell Community Health Network | 75.1 | 25.2 | 27.4 | 260 | 30.3 | 3.8 | 5.2 | 3.3 | 4.1 |
| Greater Lawrence Community Health Network | 80.0 | 42.6 | 41.1 | 327 | 52.3 | 6.4 | 6.1 | 4.6 | 5.1 |
| Greater Haverhill Community Health Network | 87.0 | 19.9 | 21.5 | 97 | 23.0 | 3.0 | 3.6 | --[5] | 2.9 |
| Community Health Network North (Beverly/Gloucester) | 90.2 | 14.7 | 13.8 | 37 | 9.9 | 6.5 | 3.6 | 5.7 | 3.1 |
| North Shore Community Health Network | 76.3 | 33.5 | 30.1 | 245 | 29.6 | 3.9 | 5.3 | 3.3 | 4.1 |
| Greater Woburn/Concord/Littleton Community Health Network | 88.0 | 5.9 | 7.7 | 26 | 4.8 | --[5] | 2.6 | --[5] | 2.1 |
| North Suburban Health Alliance (Medford/Malden/Melrose) | 88.1 | 18.8 | 16.1 | 79 | 11.4 | 3.5 | 3.4 | 2.3 | 2.8 |
| Greater Cambridge/Somerville Community Health Network | 88.1 | 18.0 | 16.2 | 71 | 9.0 | 4.9 | 4.5 | 2.6 | 3.3 |
| West Suburban Health Network (Newton/Waltham) | 93.0 | 8.2 | 7.9 | 41 | 4.2 | 2.4 | 2.9 | --[5] | 2.0 |
| Alliance for Community Health (Boston/Chelsea/Revere/Winthrop) | 83.2 | 44.8 | 40.3 | 847 | 32.1 | 6.8 | 6.3 | 5.0 | 5.0 |
| Blue Hills Community Health Alliance (Greater Quincy) | 91.4 | 15.4 | 13.3 | 113 | 11.7 | 2.6 | 2.9 | 2.0 | 2.5 |
| Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) | 80.0 | 45.9 | 44.5 | 259 | 44.0 | 7.1 | 5.3 | 4.9 | 3.9 |
| Greater Brockton Community Health Network | 82.2 | 32.4 | 34.2 | 211 | 25.5 | 4.7 | 5.3 | 3.7 | 4.6 |
| South Shore Community Partners in Prevention (Plymouth) | 88.8 | 12.9 | 13.8 | 65 | 11.5 | 3.2 | 4.9 | 2.4 | 3.7 |
| Greater Attleboro-Taunton Health & Education Response | 85.9 | 20.1 | 20.0 | 166 | 21.8 | 6.7 | 5.3 | 5.5 | 4.1 |
| Partners for a Healthier Community (Fall River) | 84.8 | 47.3 | 42.3 | 188 | 42.3 | 7.9 | 8.7 | 7.3 | 7.2 |
| Greater New Bedford Health & Human Services Coalition | 76.7 | 44.7 | 39.4 | 239 | 36.6 | 7.1 | 5.8 | 3.6 | 3.1 |
| Cape and Islands Community Health Network | 86.2 | 29.8 | 23.7 | 114 | 18.5 | 6.0 | 6.0 | 4.3 | 4.4 |

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). 2001 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 2001

| Mother's Age | 1990 Births[1] | 1990 Rate | 2001 Births | 2001 Rate[2] | Percent Change in Rate |
|---|---|---|---|---|---|
| **12-14** | 124 | 1.3 | 78 | 0.6 | -53.8 |
| **15-19** | 7,258 | 35.8 | 4,979 | 24.3 | -32.1 |
| **20-24** | 18,115 | 70.5 | 12,029 | 58.5 | -17.0 |
| **25-29** | 29,913 | 107.5 | 19,015 | 86.2 | -19.8 |
| **30-34** | 25,687 | 92.1 | 26,948 | 107.6 | 16.8 |
| **35-39** | 9,795 | 40.1 | 14,750 | 53.8 | 34.2 |
| **40-44** | 1,522 | 6.9 | 3,069 | 11.5 | 66.7 |
| **45+[3]** | 46 | 0.3 | 144 | 0.6 | 100.0 |
| **Birth rate, ages 15-44[4]** | 92,290 | 62.2 | 80,790 | 56.8 | -8.7 |
| **Crude Birth Rate[5]** | 92,461 | 15.4 | 81,014 | 12.8 | -16.9 |

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. 2001 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 (females and males). 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: 1980-2001**

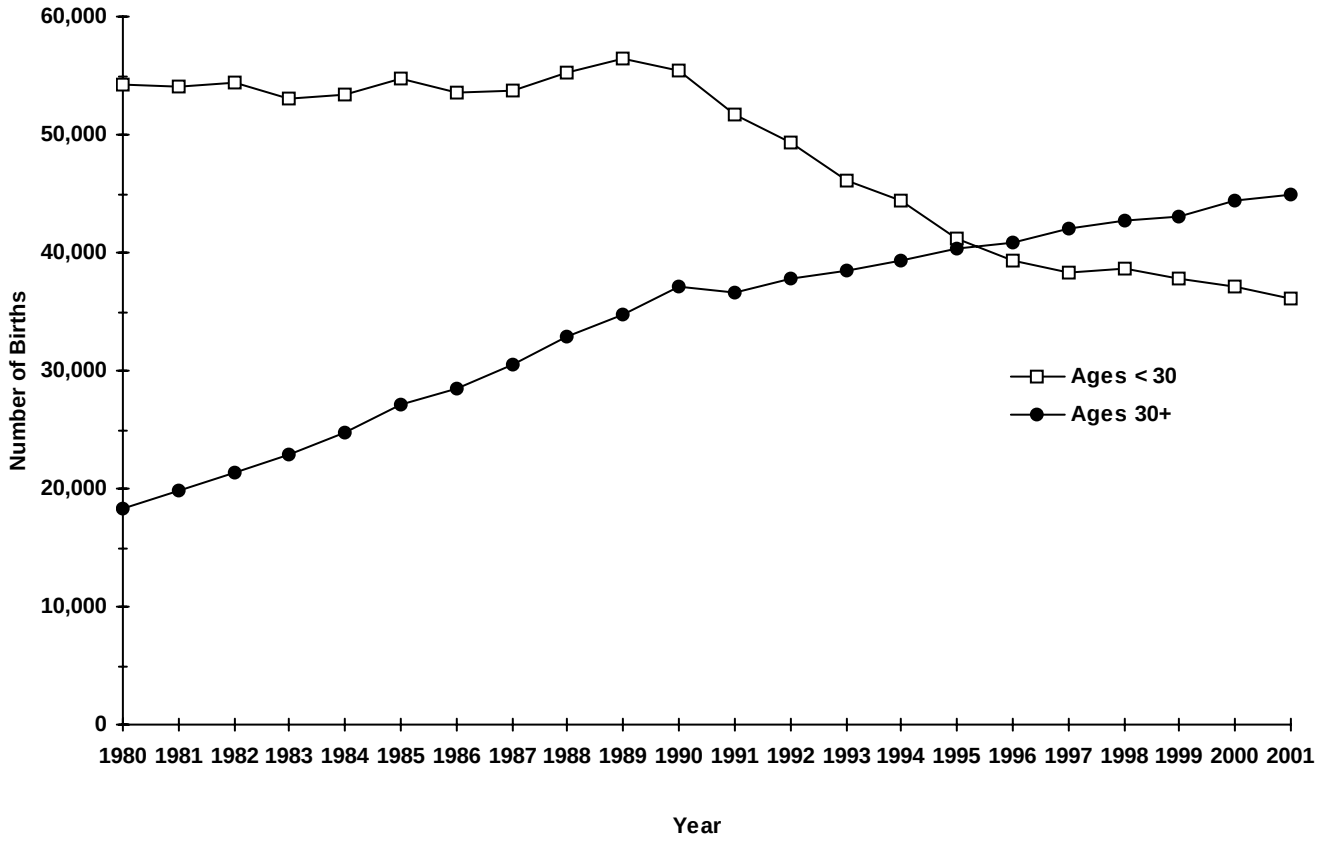
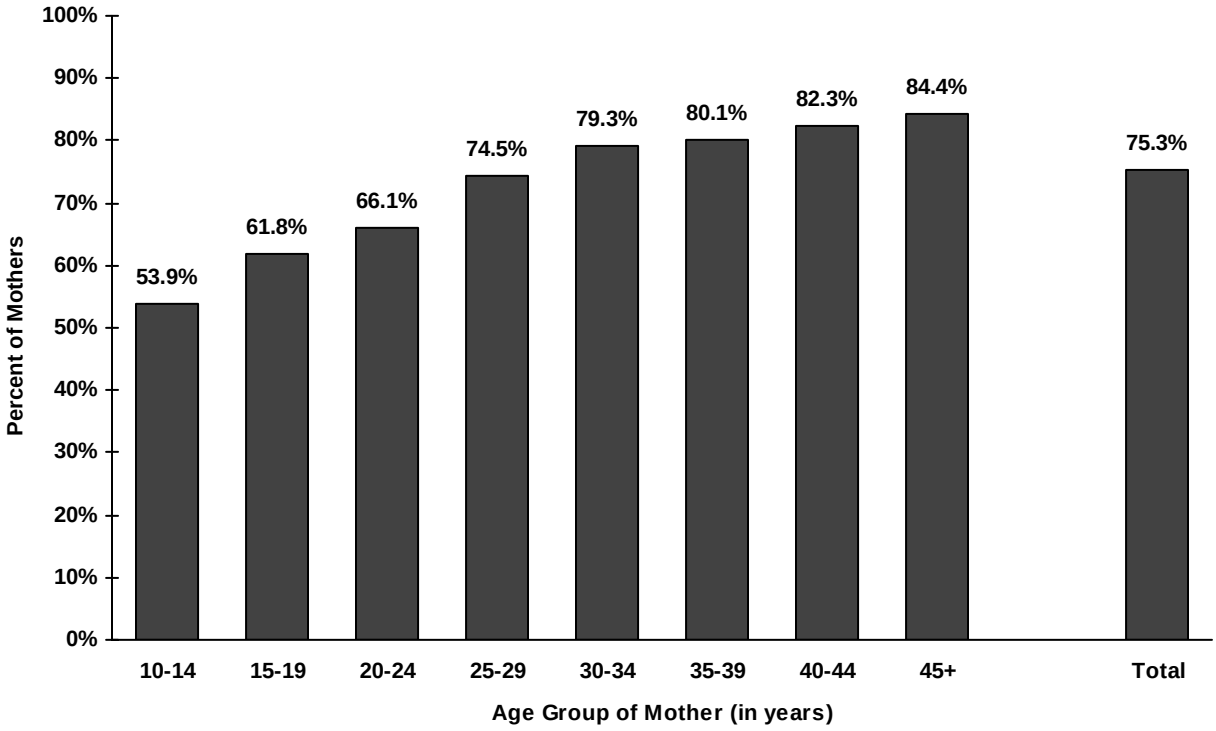


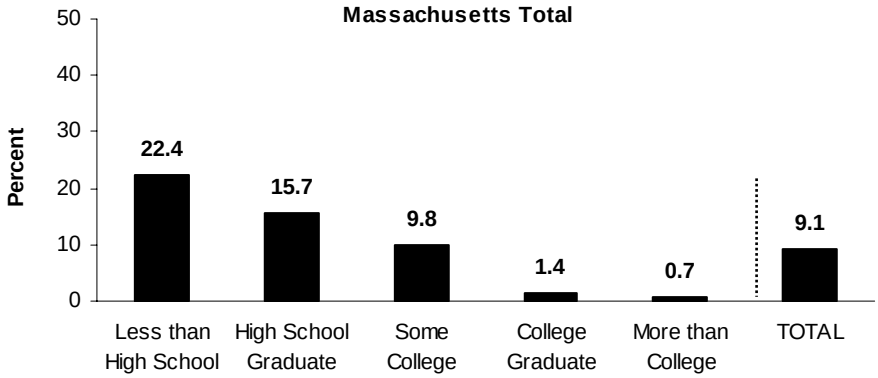
**Figure 2. Percent of Mothers Breastfeeding or Intending to Breastfeed[1] by Age Group, Massachusetts [2]: 2001**

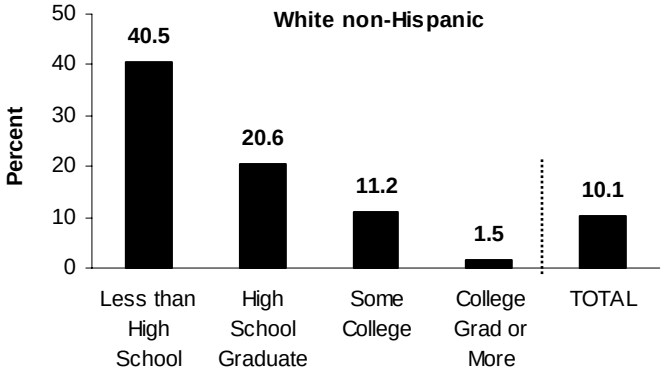


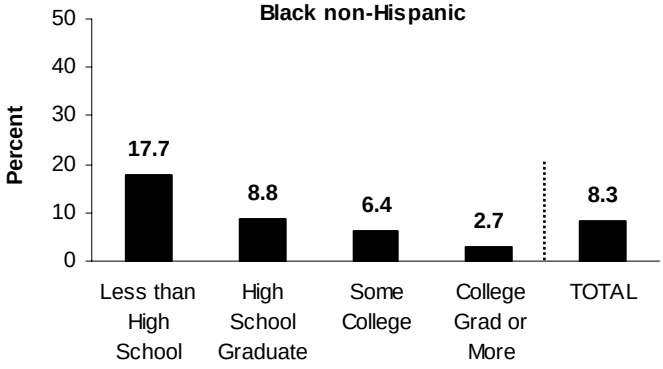

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

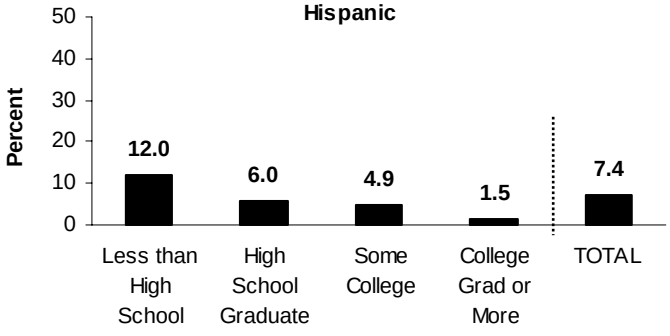
1. Information about breastfeeding was reported by the mother at the time the birth certificate was completed.
2. For race-specific breastfeeding rates see Table 2A.

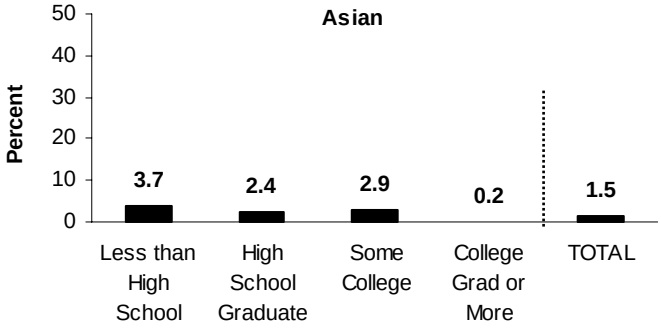
## Figure 3. Percent of Mothers who Smoked During Pregnancy, by Mother's Race/Hispanic Ethnicity and Educational Attainment, Massachusetts: 2001



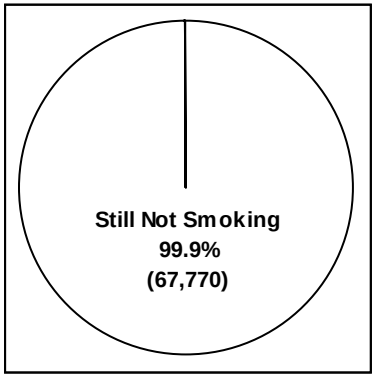
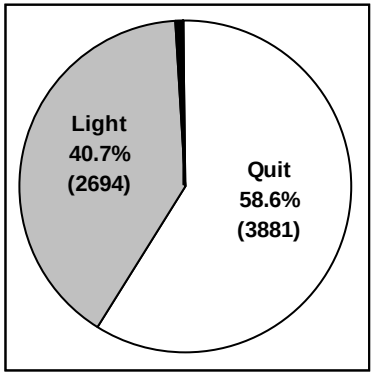
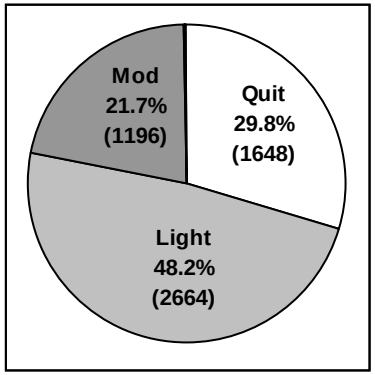
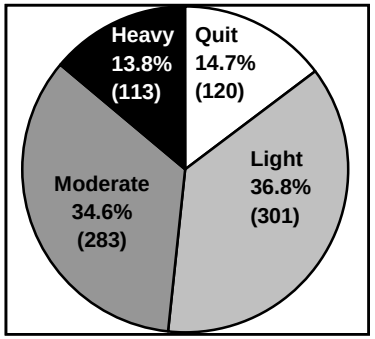




NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Based on information provided on the birth certificate as reported by the mother. Due to self-reported nature, data on smoking prevalence should be interpreted cautiously. Mothers with more than one delivery are counted for each birth.

## Figure 4. Distribution of Smoking Status[1] during Pregnancy by Smoking Status Prior to Pregnancy, Massachusetts: 2001

| Smoking Status[1] Prior to Pregnancy: | Non-Smokers 84.0% (67,838) | Light Smokers 8.2% (6,625) | Moderate Smokers 6.8% (5,525) | Heavy Smokers 1.0% (817) |
|---|---|---|---|---|
| Smoking Status[1] During Pregnancy: |  |  |  |  |
| | 99.9% of Non-Smokers continued not smoking (0.1% started smoking) | 58.6% of Light Smokers quit smoking (0.8% increased) | 78.0% of Moderate Smokers decreased the number of cigarettes smoked daily or quit (0.3% increased) | 86.2% 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: 2001

| Age of Mother (years) | | Total Births | 1st | 2nd | 3rd | 4th | 5th+ |
|---|---|---|---|---|---|---|---|
| **STATE TOTAL** | **n[2]** | 81,014 | 35,032 | 27,971 | 11,927 | 3,873 | 1,945 |
| | **%[3]** | 100.0 | 43.4 | 34.6 | 14.8 | 4.8 | 2.4 |
| **10-14** | **n** | 78 | 77 | 1 | 0 | 0 | 0 |
| | **%** | 100.0 | 98.7 | --[4] | 0.0 | 0.0 | 0.0 |
| **15-19** | **n** | 4,979 | 4,182 | 666 | 102 | 13 | 5 |
| | **%** | 100.0 | 84.2 | 13.4 | 2.1 | 0.3 | 0.1 |
| **20-24** | **n** | 12,029 | 6,462 | 3,840 | 1,278 | 316 | 90 |
| | **%** | 100.0 | 53.9 | 32.0 | 10.7 | 2.6 | 0.8 |
| **25-29** | **n** | 19,015 | 9,003 | 6,301 | 2,450 | 821 | 370 |
| | **%** | 100.0 | 47.5 | 33.3 | 12.9 | 4.3 | 2.0 |
| **30-34** | **n** | 26,948 | 10,395 | 10,416 | 4,222 | 1,255 | 582 |
| | **%** | 100.0 | 38.7 | 38.8 | 15.7 | 4.7 | 2.2 |
| **35-39** | **n** | 14,750 | 4,038 | 5,615 | 3,239 | 1,165 | 640 |
| | **%** | 100.0 | 27.5 | 38.2 | 22.0 | 7.9 | 4.4 |
| **40-44** | **n** | 3,069 | 833 | 1,074 | 615 | 296 | 240 |
| | **%** | 100.0 | 27.2 | 35.1 | 20.1 | 9.7 | 7.8 |
| **45+** | **n** | 144 | 41 | 58 | 21 | 6 | 18 |
| | **%** | 100.0 | 28.5 | 40.3 | 14.6 | 4.2 | 12.5 |

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

1. The number of live births including this birth. 2. State totals include births of unknown parity and unknown mother's age. 3. Percents may not sum to 100.0 due to rounding. 4. Calculations based on fewer than 5 events are excluded.

## Table 6. Trends in Number and Percent Distribution of Births[1] by Plurality and Age, Massachusetts: 1990-2001

| 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** | | | | | | | | | | | |
| | **1990** | 90,049 | 97.4 | 2,312 | 2.5 | 99 | 0.1 | 2,411 | 2.6 | 92,460 | 100.0 |
| | **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 |
| **Ages <35** | | | | | | | | | | | |
| | **1990** | 79,081 | 97.5 | 1,946 | 2.4 | 70 | 0.1 | 2,016 | 2.5 | 81,097 | 100.0 |
| | **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 |
| **Ages 35+** | | | | | | | | | | | |
| | **1990** | 10,968 | 96.5 | 366 | 3.2 | 29 | 0.3 | 395 | 3.5 | 11,363 | 100.0 |
| | **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 |

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: 2001

| | 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** | 8,138 | 10.1 | 21,261 | 26.3 | 18,668 | 23.1 | 21,771 | 26.9 | 10,955 | 13.6 |
| **Race** | | | | | | | | | | |
| **Non-Hispanic White** | 3,000 | 5.1 | 13,741 | 23.3 | 14,250 | 24.1 | 18,791 | 31.8 | 9,256 | 15.7 |
| **Non-Hispanic Black** | 863 | 14.7 | 2,199 | 37.6 | 1,846 | 31.5 | 707 | 12.1 | 240 | 4.1 |
| **Hispanic** | 3,250 | 34.6 | 3,664 | 39.0 | 1,599 | 17.0 | 618 | 6.6 | 273 | 2.9 |
| **Asian** | 675 | 14.1 | 1,006 | 21.1 | 661 | 13.8 | 1,372 | 28.7 | 1,060 | 22.2 |
| **Age** | | | | | | | | | | |
| **20-29** | 3,784 | 12.2 | 11,159 | 36.0 | 8,549 | 27.6 | 5,634 | 18.2 | 1,856 | 6.0 |
| **30-39** | 1,395 | 3.4 | 7,667 | 18.4 | 9,170 | 22.1 | 15,053 | 36.2 | 8,290 | 19.9 |
| **40+** | 119 | 3.7 | 543 | 17.0 | 650 | 20.4 | 1,074 | 33.6 | 806 | 25.3 |
| **Non-U.S.-born[2]** | 2,900 | 35.7 | 5,739 | 27.0 | 3,302 | 17.7 | 3,638 | 16.7 | 2,291 | 20.9 |
| **Unmarried** | 5,912 | 72.7 | 9,363 | 44.0 | 4,753 | 25.5 | 1,182 | 5.4 | 358 | 3.3 |
| **Publicly-financed prenatal care** | 6,267 | 78.1 | 10,050 | 48.2 | 4,345 | 23.7 | 1,065 | 5.1 | 257 | 2.4 |
| **Very low birthweight[3]** | 129 | 1.6 | 382 | 1.8 | 246 | 1.3 | 243 | 1.1 | 108 | 1.0 |
| **Low birthweight[4]** | 775 | 9.5 | 1,737 | 8.2 | 1,248 | 6.7 | 1,351 | 6.2 | 664 | 6.1 |
| **Adequate prenatal care[5]** | 5,687 | 70.7 | 17,141 | 81.2 | 15,949 | 86.0 | 19,575 | 90.4 | 10,018 | 91.9 |
| **Cesarean section delivery** | 1,591 | 19.6 | 5,269 | 24.8 | 5,058 | 27.2 | 5,775 | 26.6 | 2,913 | 26.7 |
| **Breastfeeding[6]** | 4,812 | 59.6 | 13,771 | 65.7 | 13,293 | 72.3 | 18,078 | 85.7 | 9,860 | 90.7 |
| **Multiple births** | 174 | 2.1 | 788 | 3.7 | 817 | 4.4 | 1,193 | 5.5 | 629 | 5.7 |
| **Smoking during pregnancy** | 1,825 | 22.4 | 3,339 | 15.7 | 1,834 | 9.8 | 309 | 1.4 | 77 | 0.7 |

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, race and age categories, percentages are based on row totals. For all other categories, percentages are based on 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 this year's 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 8. Comparison of Massachusetts Perinatal Health Indicators to 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 |
|---|---|---|---|---|---|---|
| | | 1998 | 1999 | 2000 | 2001 | |
| **Fetal, Infant, and Maternal Deaths** | | | | | | |
| 16-1a. Fetal Mortality Rate[3] | 4.1 | 5.4 | 5.2 | 5.3 | 4.7 | ○ |
| 16-1b. Perinatal Mortality Rate[4] | 4.5 | 5.9 | 6.0 | 5.4 | 5.6 | ○ |
| 16-1c. Infant Mortality Rate[5] | 4.5 | 5.1 | 5.2 | 4.6 | 5.0 | ○ |
| 16-1d. Neonatal Mortality Rate[6] | 2.9 | 3.9 | 4.1 | 3.5 | 3.8 | ● |
| 16-1e. Postneonatal Mortality Rate[7] | 1.2 | 1.2 | 1.1 | 1.1 | 1.2 | ✓ |
| 16-4. Maternal Mortality Ratio[8] | 3.3 | 3.7 | 0.0 | 1.2 | 4.9 | ● |
| **Risk Factors** | | | | | | |
| 16-10a. Low Birthweight[9] (%) | 5.0 | 7.0 | 7.1 | 7.1 | 7.2 | ● |
| 16-10b. Very Low Birthweight[10] (%) | 0.9 | 1.3 | 1.4 | 1.4 | 1.4 | ● |
| 16-11a. Preterm[11] (%) | 7.6 | 7.6 | 7.6 | 8.3 | 8.0 | ○ |
| **Prenatal Care** | | | | | | |
| 16-6a. Care beginning in first trimester (%) | 90 | 84.3 | 84.3 | 83.8 | 84.3 | ○ |
| 16-6b. Early and adequate care[12] (%) | 90 | 82.9 | 82.9 | 83.3 | 85.2 | ○ |
| **Obstetrical Care** | | | | | | |
| 16-8. Very Low Birthweight[10] Infants born at Level III Hospitals[13] (%) | 90 | 80.3 | 82.5 | 83.4 | 79.1 | ○ |
| 16-9a. Cesarean Sections: Low-Risk[14] Women Giving Birth for the First Time (%) | 15 | 17.6 | 18.8 | 20.5 | 22.0 | ● |
| 16-9b. Cesarean Sections: Low-Risk[14] Women with Prior Cesarean Section (%) | 63 | 63.8 | 68.8 | 72.7 | 79.2 | ● |
| **Breastfeeding** | | | | | | |
| 16-19a. Breastfeeding[15] (%) | 75 | 70.9 | 72.4 | 73.8 | 75.3 | ✓ |
| **Prenatal Substance Exposure** | | | | | | |
| 16-17c. Abstinence from Smoking (%) | 99 | 88.5 | 89.3 | 90.3 | 90.9 | ○ |

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 livebirths. 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 livebirths. 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 at the time the birth certificate is completed.

# CHAPTER 2

# TEEN BIRTH CHARACTERISTICS

## Introduction

*Massachusetts Births 2001* has been expanded this year to include a chapter that focuses on births to women ages 15-19, the "teen births". In 2001, in addition to the births to 15-19 year olds, there were 78 births to younger mothers ages 12 to 14, which represents a 7.8% decline in births in this age group from 2000 (data not shown).

## Birth Numbers and Rates

In 2001, 4,979 births occurred to Massachusetts resident women ages 15-19, compared with 5,305 births for this age group in 2000 (Table 9). The number of resident live teen births in Massachusetts has decreased by 28% since 1991 (6,892 births) (Table 11).

About one-third of the teen births were to women ages 15-17 (1,627 births), and two-thirds were to women ages 18-19 (3,352 births) (Table 9).

In 2001, the teen birth rate was 24.3 births per 1,000 women ages 15-19 years, a decrease of 6% from 2000 (25.8) (Table 1). The Massachusetts teen birth rate has decreased steadily from 35.4 births per 1000 women ages 15-19 in 1990 to 24.3 in 2001 (Figure 6).

The Massachusetts teen birth rate in 2001 was 47% below the U.S. teen birth rate of 45.8 births per 1,000 women ages 15-19 (National Vital Statistics Reports, Vol. 51, No. 2, December 18, 2002, p.3) (Figure 6).

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

In 2001, of all live births to Massachusetts resident teens ages 15-19, 46.7% (2,319) were to White non-Hispanic mothers; 32.3% (1,607) were to Hispanic mothers; 12.6% (624) were to Black non-Hispanic mothers; 4.4% (219) were to Asian mothers; and 4.0% (199) were to mothers of other races (Table 9).

In 2001, the birth rates among resident teen women were in the same relative order by race and Hispanic ethnicity as they were in 1990, and they have decreased for all groups. However, Black non-Hispanics have had the greatest decrease, 48% from 1990 (89.2) to 2001 (46.0); the White non-Hispanic birth rate has decreased by 40% (from 24.0 to 14.4); the Asian teen birth rate has decreased by 39% (from 32.7 to 20.1). The Hispanic teen birth rate has declined the least at 33% (from 120.7 to 81.2) (Figure 7).

Seventy-five percent of teen births were to mothers who were born in the 50 U.S. states or D.C. Almost 10% of teen births were to mothers born in Puerto Rico or U.S. Territories. The percentage of births to non-U.S.-born teen mothers was 16% (Table 9).

## Low Birthweight

In 2001, 9.8% of the infants born to women under age 20 were low birthweight – weighing less than 2,500 grams or 5.5 pounds (Figure 5) as compared to 7.0% of infants born to Massachusetts women ages 20 and older. The percentage of low birthweight infants born to teen mothers increased slightly from 2000 (9.3%) to 2001 (9.8%).

The percentage of low birthweight infants was 9% greater for teen mothers ages 18-19 (10.0%) than for mothers ages 15-17 (9.2%) (Table 9).

## Prenatal Care

In 2001, of the births to women under age 20, 70.2% of the mothers received adequate prenatal care, compared with 86.2% of births to women ages 20 and over (Figure 5). (Adequacy of prenatal care is a measure of the timing and number of prenatal care visits.)

The percentage of women ages 15-17 who received inadequate prenatal care (23.3%) was 23% greater than that of women ages 18-19 (18.9%) (Table 9).

Over 75% of women under 20 years of age had their prenatal care funded by public sources, compared with 25% of women ages 20 and over (Figure 5).

## Teen Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2001, among live births to women ages 15-19 who were residents of the 30 largest cities and towns in the Commonwealth:

Teen birth rates (number of births per 1,000 females 15-19) were highest in Lawrence (95.2), Springfield (71.4), New Bedford (62.1), Lowell (55.0), and Fall River (53.2). These communities had rates two to three times the statewide rate of 24.3.

Teen birth rates were lowest in Newton (2.1) and Medford (4.0) (Table 10). (Note: a teen birth rate was not calculated for Brookline, due to the small number of teen births. Brookline had the fewest teen births (4) of the 30 largest cities and towns in 2001.)

Eight communities (Waltham, Malden, Peabody, New Bedford, Boston, Cambridge, Methuen, and Pittsfield) recorded low birthweight percentages that were at least 25% higher than the statewide average of 9.8% (Table 10).

Over 80% of mothers ages 15-19 living in Waltham, Weymouth, Medford, Worcester, Plymouth, Cambridge, and Somerville received adequate prenatal care. In contrast, fewer than 60% of teen mothers living in Pittsfield, Attleboro, and Lowell, received adequate prenatal care (Table 10).

## Tobacco Use

In 2001, over 18% of teen births were to mothers who reported smoking cigarettes during their pregnancies (Table 9).

For teen mothers ages 18-19, 20% smoked cigarettes during their pregnancies compared to 14% of mothers ages 15-17. In comparison, 9% of mothers ages 20 and over reported smoking during pregnancy.

## Parity

In 2001, 84.2% 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 13.4, and only 2.4% were the mother's third or greater live-born infants (Table 9).

As expected, mothers ages 18-19 had the greatest percentage of previous live births, almost three times more (20% v. 7%).

## Plurality

Plurality represents the number of births to a woman in one delivery. In 2001, 99% of all births to mothers ages 15-19 were singletons, and 1% were twins or higher order multiple births (Table 9).

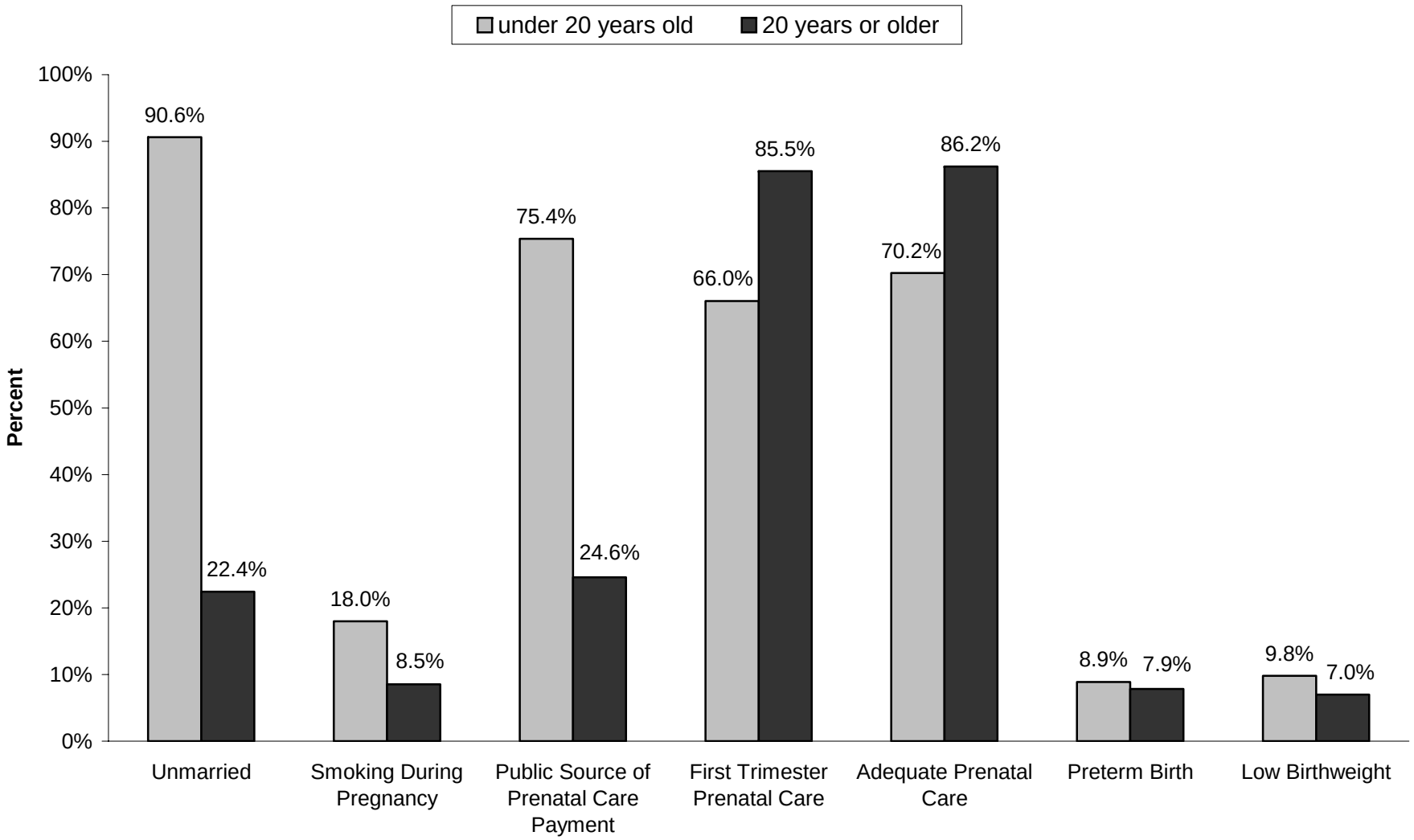
While the percentage of twins or higher order multiples was small overall, the percentage of multiple births to mothers 18-19 was almost twice that of mothers 15-17 (1.6% v. 0.9%) (Table 9).

## Table 9. Summary of Selected Teen Birth Characteristics, Massachusetts: 2001

| | Age 15-17 | | Age 18-19 | | Age 15-19 | |
|---|---|---|---|---|---|---|
| | N | %[1] | N | %[1] | N | %[1] |
| **State total** | 1,627 | 32.7% | 3,352 | 67.3% | 4,979 | 100.0% |
| | **Maternal Demographics** | | | | | |
| **Race/Hispanic Ethnicity** | | | | | | |
| **White non-Hispanic** | 618 | 38.1% | 1,701 | 50.9% | 2,319 | 46.7% |
| **Black non-Hispanic** | 228 | 14.0% | 396 | 11.8% | 624 | 12.6% |
| **Asian** | 83 | 5.1% | 136 | 4.1% | 219 | 4.4% |
| **Hispanic** | 625 | 38.5% | 982 | 29.4% | 1,607 | 32.3% |
| **Other** | 69 | 4.3% | 130 | 3.9% | 199 | 4.0% |
| **Birthplace** | | | | | | |
| **U.S. States / D.C.** | 1,200 | 73.8% | 2,505 | 74.8% | 3,705 | 74.5% |
| **Puerto Rico / US Terr.** | 191 | 11.7% | 285 | 8.5% | 476 | 9.6% |
| **Non-U.S.-born** | 235 | 14.5% | 560 | 16.7% | 795 | 16.0% |
| **Prenatal care funding[2]** | | | | | | |
| **Public** | 1,205 | 75.5% | 2,482 | 75.2% | 3,687 | 74.3% |
| **Private, other** | 390 | 24.5% | 819 | 24.8% | 1,209 | 24.7% |
| | **Pregnancy related factors** | | | | | |
| **Adequacy of Prenatal Care[3]** | | | | | | |
| **Adequate Total[4]** | 1,097 | 68.2% | 2,380 | 71.7% | 3,477 | 70.6% |
| **Adequate Intensive** | 545 | 33.9% | 1,105 | 33.3% | 1,650 | 33.5% |
| **Adequate Basic** | 552 | 34.3% | 1,275 | 38.4% | 1,827 | 37.1% |
| **Intermediate** | 137 | 8.5% | 310 | 9.3% | 447 | 9.1% |
| **Inadequate/None** | 375 | 23.3% | 628 | 18.9% | 1,003 | 20.4% |
| **Unknown** | 18 | 1.1% | 34 | 1.0% | 52 | 1.0% |
| **Parity[6]** | | | | | | |
| **1** | 1,503 | 92.7% | 2,679 | 80.1% | 4,182 | 84.2% |
| **2** | 106 | 6.5% | 560 | 16.7% | 666 | 13.4% |
| **3+** | 13 | 0.8% | 107 | 3.2% | 120 | 2.4% |
| **Smoking during Pregnancy** | | | | | | |
| **Yes** | 234 | 14.4% | 670 | 20.0% | 904 | 18.2% |
| **No** | 1,389 | 85.6% | 2,674 | 80.0% | 4,063 | 81.8% |
| | **Birth outcomes** | | | | | |
| **Birthweight** | | | | | | |
| **< 500 gms** | 3 | --[5] | 7 | 0.2% | 10 | 0.2% |
| **500-1,499 gms** | 28 | 1.7% | 57 | 1.7% | 85 | 1.7% |
| **1,500-2,499 gms** | 119 | 7.3% | 272 | 8.1% | 391 | 7.9% |
| | | | | | | |
| **LBW (0-2,499 gms)** | 150 | 9.2% | 336 | 10.0% | 486 | 9.8% |
| | | | | | | |
| **2,500-3,999 gms** | 1,392 | 85.8% | 2,811 | 84.0% | 4,203 | 84.6% |
| **4000+ gms** | 80 | 4.9% | 198 | 5.9% | 278 | 5.6% |
| **Gestational age** | | | | | | |
| **< 28 weeks** | 14 | 0.9% | 38 | 1.1% | 52 | 1.1% |
| **< 37 weeks** | 128 | 7.9% | 261 | 7.9% | 389 | 7.9% |
| **37-42 weeks** | 1,469 | 91.2% | 3,018 | 90.9% | 4,487 | 91.1% |
| **43+ weeks** | 0 | 0.0% | 2 | --[5] | 2 | --[5] |
| **Plurality** | | | | | | |
| **Singleton** | 1,613 | 99.1% | 3,299 | 98.4% | 4,912 | 98.7% |
| **Multiple birth** | 14 | 0.9% | 53 | 1.6% | 67 | 1.3% |

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. For state total row, percentages are based on total births to women ages 15-19. For the rest of the table, percentages are based on all births for a given age group and characteristic. 2. See Glossary for definitions of categories. 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.

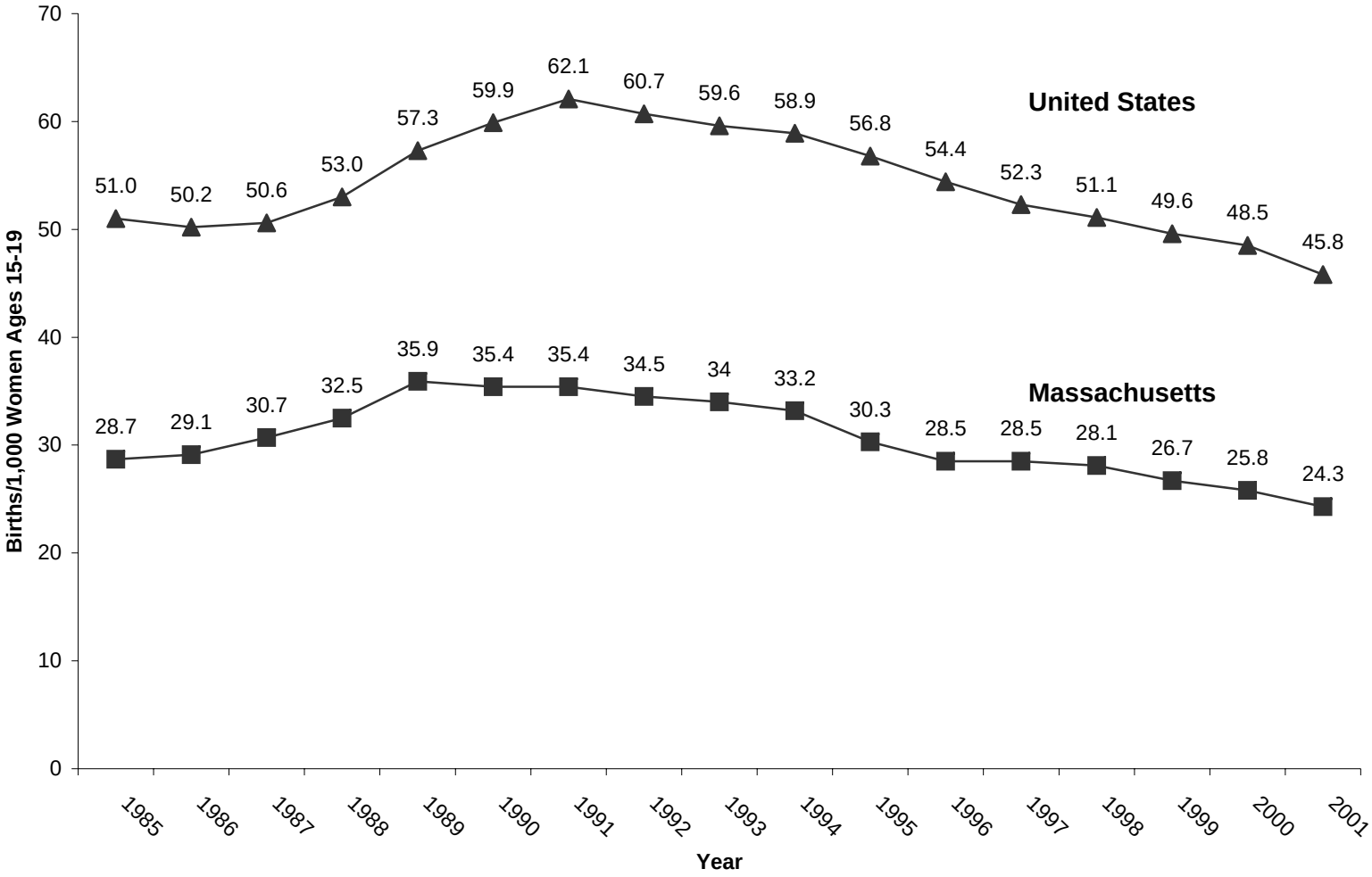
**Figure 5. Comparison of Teen vs. Adult Births, Selected Characteristics, Massachusetts: 2001**




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

Definitions: Unmarried = marital status at time of 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.).

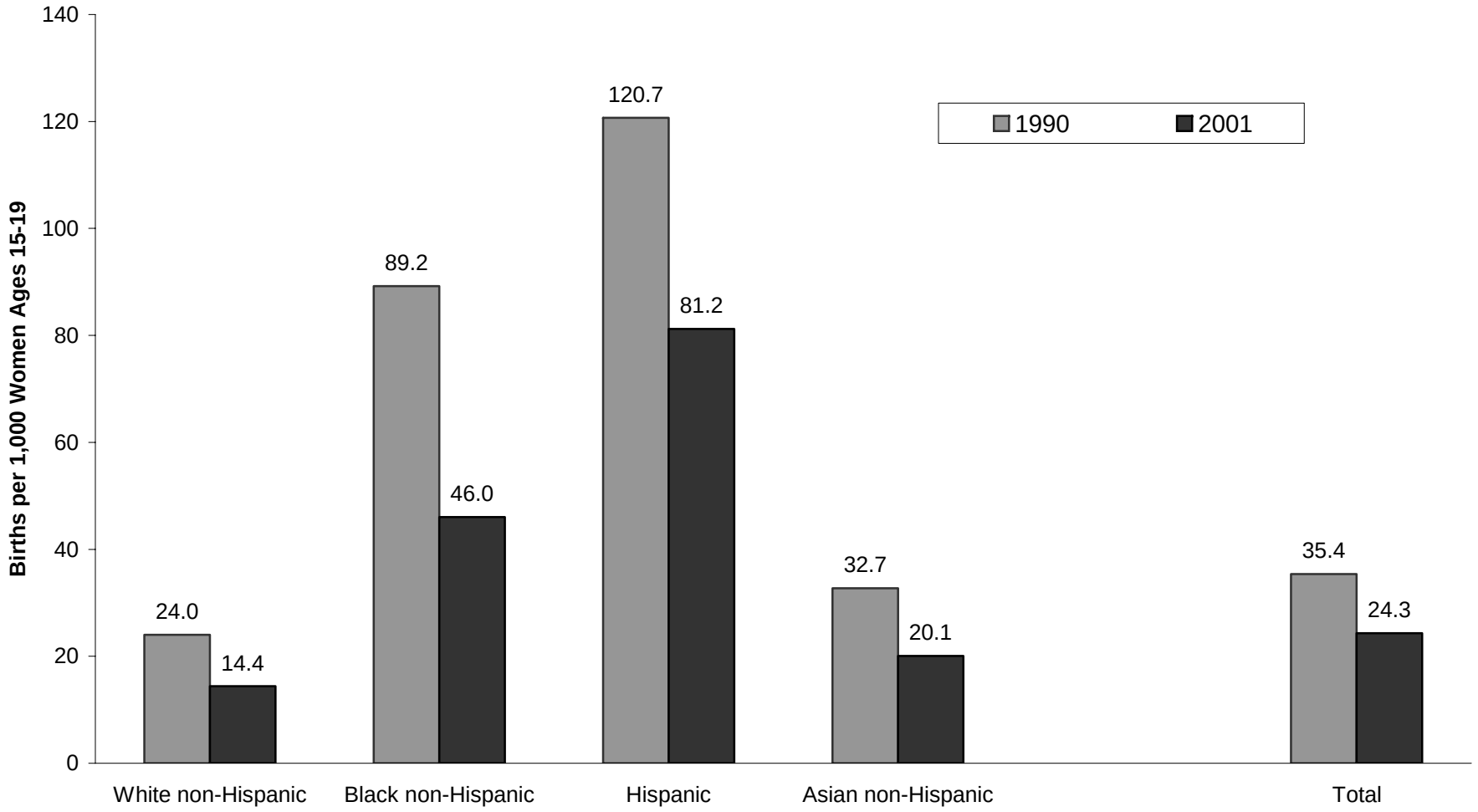
**Figure 6. Trend in Birth Rates Among Women Ages 15-19, Massachusetts and the United States: 1985-2001**




Teen birth rate is 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 and 2001 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

**Figure 7. Birth Rates Among Women Ages 15-19 by Mother's Race/Hispanic Ethnicity, Massachusetts: 1990 and 2001**




Teen birth rate is number of births to women ages 15-19 per 1,000 women ages 15-19
Population data sources: denominators for 1990 rates are based on the 1990 U.S. Census. 2001 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

## Table 10. Resident Teen Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2001

| Municipality | Total Population Rank | Female Population, age 15-19 | Number of Teen Births | Teen Birth Rate[2] | Mother's Race and Hispanic Ethnicity (% of births) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | White non-Hispanic | Black non-Hispanic | Hispanic | Asian or other[3] |
| **State Total** | | **205,277** | **4,979** | **24.3** | **46.6** | **12.5** | **32.3** | **8.4** |
| Arlington | 29 | 767 | 5 | 6.5 | 60.0 | 20.0 | 20.0 | 0.0 |
| Attleboro | 30 | 1,151 | 39 | 33.9 | 66.7 | 5.1 | 10.3 | 15.4 |
| Barnstable | 25 | 1,287 | 36 | 28.0 | 75.0 | 8.3 | 11.1 | 5.6 |
| Boston | 1 | 22,240 | 702 | 31.6 | 13.1 | 42.7 | 33.9 | 10.3 |
| Brockton | 6 | 3,304 | 170 | 51.5 | 41.8 | 25.9 | 10.6 | 21.8 |
| Brookline | 17 | 1,382 | 4 | --[5] | --[5] | --[5] | --[5] | --[5] |
| Cambridge | 5 | 3,733 | 16 | 4.3 | 37.5 | 18.8 | 37.5 | 6.3 |
| Chicopee | 21 | 1,809 | 73 | 40.4 | 53.4 | 9.6 | 37.0 | 0.0 |
| Fall River | 8 | 2,915 | 155 | 53.2 | 71.0 | 9.0 | 11.0 | 8.4 |
| Framingham | 14 | 1,925 | 46 | 23.9 | 43.5 | 4.4 | 47.8 | 4.4 |
| Haverhill | 16 | 1,793 | 62 | 34.6 | 64.5 | 6.5 | 27.4 | 0.0 |
| Lawrence | 13 | 2,847 | 271 | 95.2 | 13.3 | 1.9 | 80.8 | 3.7 |
| Lowell | 4 | 3,913 | 215 | 55.0 | 30.7 | 2.8 | 27.9 | 37.7 |
| Lynn | 9 | 2,990 | 158 | 52.8 | 27.2 | 7.0 | 43.0 | 22.8 |
| Malden | 18 | 1,391 | 28 | 20.1 | 42.9 | 21.4 | 25.0 | 10.7 |
| Medford | 20 | 1,749 | 7 | 4.0 | 42.9 | 0.0 | 28.6 | 28.6 |
| Methuen | 28 | 1,264 | 49 | 38.8 | 59.2 | 4.1 | 36.7 | 0.0 |
| New Bedford | 7 | 2,978 | 185 | 62.1 | 53.0 | 8.7 | 28.1 | 10.3 |
| Newton | 11 | 3,411 | 7 | 2.1 | 28.6 | 28.6 | 42.9 | 0.0 |
| Peabody | 24 | 1,300 | 22 | 16.9 | 86.4 | 0.0 | 4.6 | 9.1 |
| Pittsfield | 27 | 1,361 | 49 | 36.0 | 73.5 | 10.2 | 12.2 | 4.1 |
| Plymouth | 23 | 1,577 | 20 | 12.7 | 80.0 | 10.0 | 5.0 | 5.0 |
| Quincy | 10 | 1,950 | 30 | 15.4 | 80.0 | 10.0 | 3.3 | 6.7 |
| Revere | 26 | 1,215 | 50 | 41.2 | 38.0 | 10.0 | 38.0 | 14.0 |
| Somerville | 12 | 2,087 | 42 | 20.1 | 54.8 | 16.7 | 26.2 | 2.4 |
| Springfield | 3 | 6,037 | 431 | 71.4 | 14.9 | 21.1 | 61.3 | 2.6 |
| Taunton | 19 | 1,652 | 63 | 38.1 | 66.7 | 4.8 | 15.9 | 12.7 |
| Waltham | 15 | 2,251 | 23 | 10.2 | 47.8 | 8.7 | 34.8 | 8.7 |
| Weymouth | 22 | 1,331 | 22 | 16.5 | 86.4 | 0.0 | 13.6 | 0.0 |
| Worcester | 2 | 6,918 | 269 | 38.9 | 47.2 | 7.4 | 40.2 | 5.2 |

## Table 10 (cont.). Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2001

| 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** | **75.3** | **90.5** | **9.8** | **8.9** | **33.5** | **37.1** | **9.1** | **20.4** |
| Arlington | 60.0 | 60.0 | 0.0 | 0.0 | 20.0 | 20.0 | 0.0 | 60.0 |
| Attleboro | 62.5 | 94.9 | 7.7 | 12.8 | 33.3 | 20.5 | 12.8 | 33.3 |
| Barnstable | 88.6 | 94.4 | 2.8 | 0.0 | 22.2 | 50.0 | 11.1 | 16.7 |
| Boston | 79.3 | 92.3 | 12.7 | 10.0 | 31.4 | 41.6 | 7.6 | 19.4 |
| Brockton | 75.3 | 95.9 | 9.4 | 8.2 | 33.5 | 35.3 | 11.2 | 20.0 |
| Brookline | --[5] | 75.0 | 0.0 | 0.0 | --[5] | --[5] | 0.0 | 0.0 |
| Cambridge | 50.0 | 93.8 | 12.5 | 18.8 | 25.0 | 56.3 | 6.3 | 12.5 |
| Chicopee | 79.2 | 90.4 | 8.2 | 11.0 | 36.6 | 36.6 | 5.6 | 21.1 |
| Fall River | 77.9 | 92.3 | 9.7 | 9.1 | 63.9 | 11.0 | 0.7 | 24.5 |
| Framingham | 69.6 | 80.4 | 8.7 | 8.7 | 34.1 | 43.2 | 0.0 | 22.7 |
| Haverhill | 70.0 | 83.9 | 4.8 | 3.2 | 33.9 | 40.3 | 9.7 | 16.1 |
| Lawrence | 86.2 | 91.5 | 10.7 | 8.5 | 27.0 | 40.4 | 8.9 | 23.7 |
| Lowell | 77.6 | 93.0 | 11.2 | 9.4 | 21.2 | 29.3 | 14.6 | 34.9 |
| Lynn | 86.5 | 93.0 | 7.0 | 8.9 | 38.2 | 29.3 | 11.5 | 21.0 |
| Malden | 78.6 | 78.6 | 21.4 | 10.7 | 39.3 | 28.6 | 7.1 | 25.0 |
| Medford | 57.1 | 57.1 | 0.0 | 0.0 | 57.1 | 28.6 | 0.0 | 14.3 |
| Methuen | 65.3 | 85.7 | 12.2 | 8.2 | 32.7 | 38.8 | 8.2 | 20.4 |
| New Bedford | 82.8 | 90.8 | 13.0 | 13.0 | 34.1 | 36.8 | 8.2 | 20.9 |
| Newton | 71.4 | 71.4 | 0.0 | 0.0 | 0.0 | 57.1 | 14.3 | 28.6 |
| Peabody | 63.6 | 81.8 | 18.2 | 9.1 | 36.4 | 27.3 | 18.2 | 18.2 |
| Pittsfield | 79.6 | 91.8 | 12.2 | 10.2 | 22.5 | 32.7 | 32.7 | 12.2 |
| Plymouth | 63.2 | 100.0 | 10.0 | 15.0 | 47.4 | 36.8 | 0.0 | 15.8 |
| Quincy | 83.3 | 90.0 | 6.7 | 10.0 | 33.3 | 43.3 | 10.0 | 13.3 |
| Revere | 80.0 | 90.0 | 6.0 | 4.0 | 46.0 | 24.0 | 4.0 | 26.0 |
| Somerville | 71.4 | 85.7 | 4.8 | 2.4 | 47.6 | 33.3 | 4.8 | 14.3 |
| Springfield | 83.3 | 96.1 | 10.9 | 11.4 | 28.6 | 35.1 | 10.5 | 25.8 |
| Taunton | 73.8 | 87.3 | 4.8 | 6.4 | 27.9 | 37.7 | 11.5 | 23.0 |
| Waltham | 65.2 | 91.3 | 21.7 | 21.7 | 26.1 | 60.9 | 0.0 | 13.0 |
| Weymouth | 59.1 | 81.8 | 9.1 | 13.6 | 50.0 | 36.4 | 4.6 | 9.1 |
| Worcester | 78.4 | 88.1 | 7.8 | 6.0 | 25.2 | 60.2 | 7.1 | 7.5 |

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. The 30 largest municipalities are the cities and towns in Massachusetts with the largest populations according to 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 events 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 11. Trends in Teen Birth Rates for Selected Communities[1], Ranked by 2001 Teen Birth Rate[2], Massachusetts: 2001, 2000, 1991

| 2001 Rank | Municipality | 2001 | | 2000 | | 1991[3] | |
|---|---|---|---|---|---|---|---|
| | | Number of Teen Births | Teen Birth Rate | Number of Teen Births | Teen Birth Rate | Number of Teen Births | Teen Birth Rate |
| | **State Total** | **4,979** | **24.3** | **5,305** | **25.8** | **6,892** | **35.4** |
| **1** | Lawrence | 271 | 95.2 | 278 | 97.6 | 349 | 135.0 |
| **2** | Holyoke | 133 | 87.9 | 133 | 87.9 | 185 | 134.6 |
| **3** | Chelsea | 89 | 80.8 | 89 | 80.8 | 78 | 88.9 |
| **4** | Southbridge | 43 | 77.3 | 38 | 68.3 | 46 | 84.6 |
| **5** | Springfield | 431 | 71.4 | 466 | 77.2 | 561 | 99.6 |
| **6** | New Bedford | 185 | 62.1 | 195 | 65.5 | 275 | 84.8 |
| **7** | Fitchburg | 91 | 59.9 | 92 | 60.6 | 98 | 59.6 |
| **8** | Lowell | 215 | 55.0 | 248 | 63.4 | 276 | 76.5 |
| **9** | Fall River | 155 | 53.2 | 150 | 51.5 | 203 | 70.4 |
| **10** | Lynn | 158 | 52.8 | 189 | 63.2 | 178 | 76.8 |
| **11** | Brockton | 170 | 51.5 | 218 | 66.0 | 208 | 70.9 |
| **12** | Revere | 50 | 41.2 | 35 | 28.8 | 36 | 35.9 |
| **13** | Chicopee | 73 | 40.4 | 56 | 31.0 | 69 | 40.0 |
| **14** | Salem | 48 | 39.4 | 34 | 27.9 | 42 | 34.7 |
| **15** | Worcester | 269 | 38.9 | 290 | 41.9 | 388 | 60.9 |
| **16** | Methuen | 49 | 38.8 | 35 | 27.7 | 53 | 43.3 |
| **17** | Taunton | 63 | 38.1 | 62 | 37.5 | 96 | 63.9 |
| **18** | Pittsfield | 49 | 36.0 | 58 | 42.6 | 69 | 48.7 |
| **19** | Haverhill | 62 | 34.6 | 68 | 37.9 | 109 | 73.3 |
| **20** | Attleboro | 39 | 33.9 | 47 | 40.8 | 42 | 39.0 |
| **21** | Boston | 702 | 31.6 | 785 | 35.3 | 1082 | 53.7 |
| **22** | Leominster | 37 | 30.3 | 63 | 51.6 | 47 | 43.4 |
| **23** | Framingham | 46 | 23.9 | 45 | 23.4 | 50 | 24.2 |
| **24** | Westfield | 39 | 21.7 | 30 | 16.7 | 47 | 29.2 |
| **25** | Somerville | 42 | 20.1 | 47 | 22.5 | 64 | 31.4 |

1. Selected communities include the 25 Massachusetts cities and towns with the greatest number of teen births. Ranking is by 2001 teen birth rate. 2. Rates are per 1,000 females ages 15-19 per city/town. 3. Source for 1991 births and rates: Massachusetts Community Health Information Profile (MassCHIP), MDPH, v2.8 r270, January 2003; natality dataset and MISER 1991 population estimate.

# CHAPTER 3

# INFANT AND MATERNAL MORTALITY

## Overall Changes in Infant Mortality Rate

In 2001, there were 407 infant deaths (deaths of children less than one year of age) among Massachusetts residents, 30 more infant deaths than in 2000 (Table 12A).

The infant mortality rate (IMR) in 2001 was 5.0 deaths per 1,000 live births. Although the 2001 Massachusetts IMR is 9% greater than the 2000 rate of 4.6 (the lowest number of annual infant deaths in Massachusetts history), it is the second lowest rate since 1980 and is a 29% decrease since 1990 (Table 12A).

The 2001 Massachusetts IMR is 24% below the 2001 U.S. preliminary rate of 6.6 (National Vital Statistics Report, Vol. 50, No. 11, June 26, 2002, p. 1).

## Race and Ethnicity Patterns in Infant Mortality Rates

The 2001 IMR for whites was 4.5 deaths per 1,000 live births in 2001, a 13% increase from the 2000 rate (Table 12A). The IMR for black infants was 11.7 deaths per 1,000 live births, which is the same as the rate in 2000.

Since 1980, there has been a substantial decline in IMRs among black and white infants. From 1980 to 2001, the IMR decreased by 54% for whites and 37% for blacks. However, the IMR for black infants was consistently more than twice as high as the IMR for white infants during this time period. This year the disparity in IMR between white and black infants has decreased, after increasing for two years (Figure 8).

The Massachusetts death certificate was revised in 1989 to include an Hispanic identifier. This revision enables the calculation of non-Hispanic white, non-Hispanic black, and Hispanic infant mortality rates (Table 12B). Infants born to non-Hispanic black mothers continue to have the highest IMR (12.1 per 1,000 live births), although this rate represents a 5% decrease from the 2000 rate (12.8).

The IMR for Hispanics rose 40% from 5.2 deaths per 1,000 live births in 2000 to 7.3 deaths per 1,000 live births in 2001 (Table 12B). The 2001 IMR for Hispanic infants is 44% higher than the non-Hispanic white rate (4.1) and 40% below the non-Hispanic black rate (12.1).

The IMR for white non-Hispanics increased 8% from 2000 (3.8) to 2001 (4.1) (Table 12B).

Asian infants had the lowest mortality rate of all groups in 2001 with an IMR of 3.1 deaths per 1,000 live births (Table 12B). However, caution should be used when interpreting this rate since it is based on a small number of deaths.

## Neonatal and Post Neonatal Mortality Rates

The overall neonatal mortality rate (deaths among infants less than 28 days old) was 3.8 per 1,000 live births in 2001, which is an increase of 9% over the 2000 neonatal mortality rate of 3.5, the lowest neonatal mortality rate in Massachusetts history (Table 12B).

As was true for infant mortality, the direction of change differed by race/ethnicity groups. Decreases occurred for non-Hispanic blacks and Asians, while the rate for non-Hispanic whites and Hispanics increased (Table 12B).

The overall post neonatal mortality rate (deaths among infants between 28 and 364 days old), was 1.2 in 2001, which was a slight increase over the 2000 rate (1.1) (Table 12B). The post neonatal mortality rate for non-Hispanic black infants decreased from 2.9 in 2000 to 2.6 in 2001, although it is still almost three times that of white non-Hispanics. The post neonatal mortality rate for Hispanic infants increased 75% in 2001, from 1.2 per 1,000 live births to 2.1 in 2001.

**Trends in the Time of Infant Deaths**

From 1990 to 2001, the percentage of all infant deaths that occurred in the post neonatal period (28-364 days) declined from 31% to 26% (Figure 10). During the same time period, the percentage of infant deaths that occurred in the early neonatal period (within the first 24 hours after birth) rose from 44% to 57% of all infant deaths, and the percentage of infant deaths occurring later in the neonatal period (from 1-27 days) remained about the same (25%).

(Cause-specific infant death information will be available in the upcoming report, *Massachusetts Deaths 2001*.)

**Pregnancy-Associated and Maternal Mortality Ratios**

In 2001, there were 21 pregnancy-associated deaths, including 4 maternal deaths (Fig. 11). A pregnancy-associated death is the death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause. Women who die from a cause related to pregnancy or childbirth either during pregnancy or up to 42 days after pregnancy termination are called maternal deaths and are a subset of pregnancy-associated deaths. (See technical notes for further information).

The 2001 pregnancy-associated mortality ratio (PAMR) was 25.5 deaths per 100,000 live births and the maternal mortality ratio (MMR) was 4.9 per 100,000 live births (Figure 11). Since 1990, the annual PAMR fluctuated from a low of 18.0 in 1990 to a high of 31.8 in 1994. However, due to the small number of cases, the differences are not statistically significant.

## Table 12A. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2001

### INFANT MORTALITY

| | 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 |

**Table 12A (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2001**

**NEONATAL MORTALITY**

| | 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 |

## Table 12A (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2001

### POST NEONATAL MORTALITY

| Year | State Total[2] | | White | | Black | | Asian/Other[3] | |
|---|---|---|---|---|---|---|---|---|
| | 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 |

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 1999 are presented in Table 9B. 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 12B. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2001

### INFANT MORTALITY

| | State Total[1] | | Non-Hispanic White | | Non-Hispanic Black | | 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 |

### NEONATAL MORTALITY

| | State Total[1] | | Non-Hispanic White | | Non-Hispanic Black | | 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] |

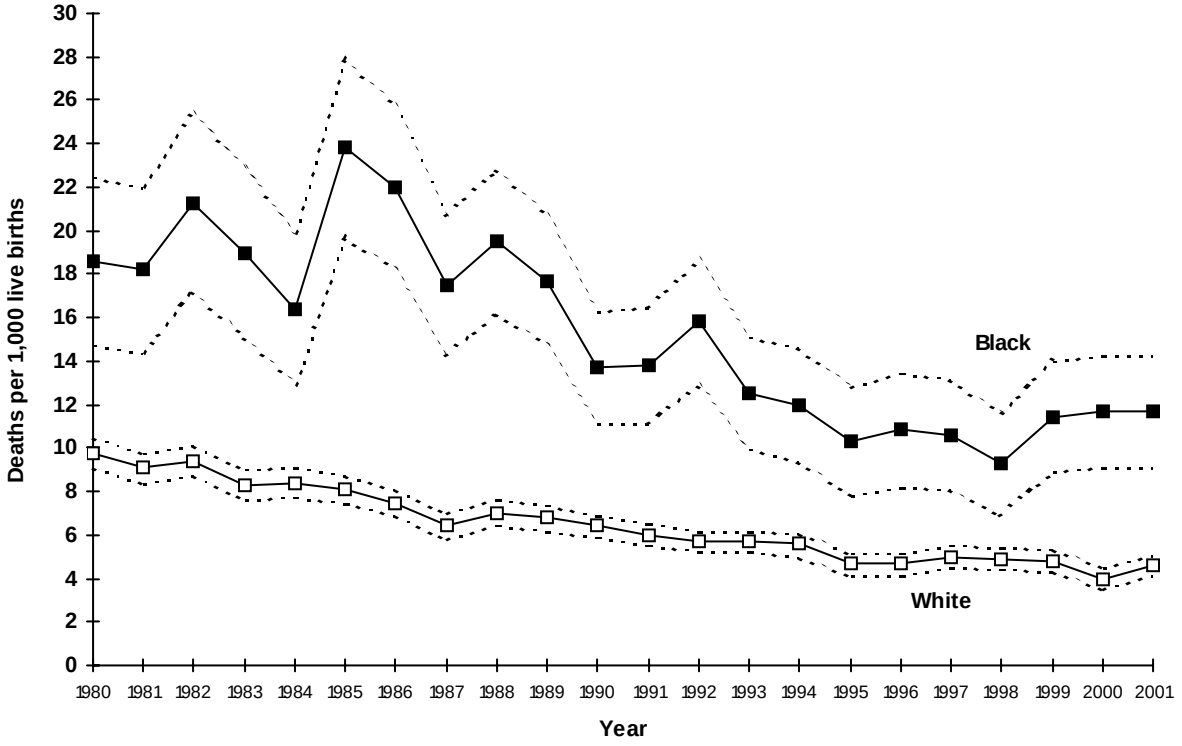
## Table 12B (cont.). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2001

### POST NEONATAL MORTALITY

| | State Total[1] | | Non-Hispanic White | | Non-Hispanic Black | | 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] |

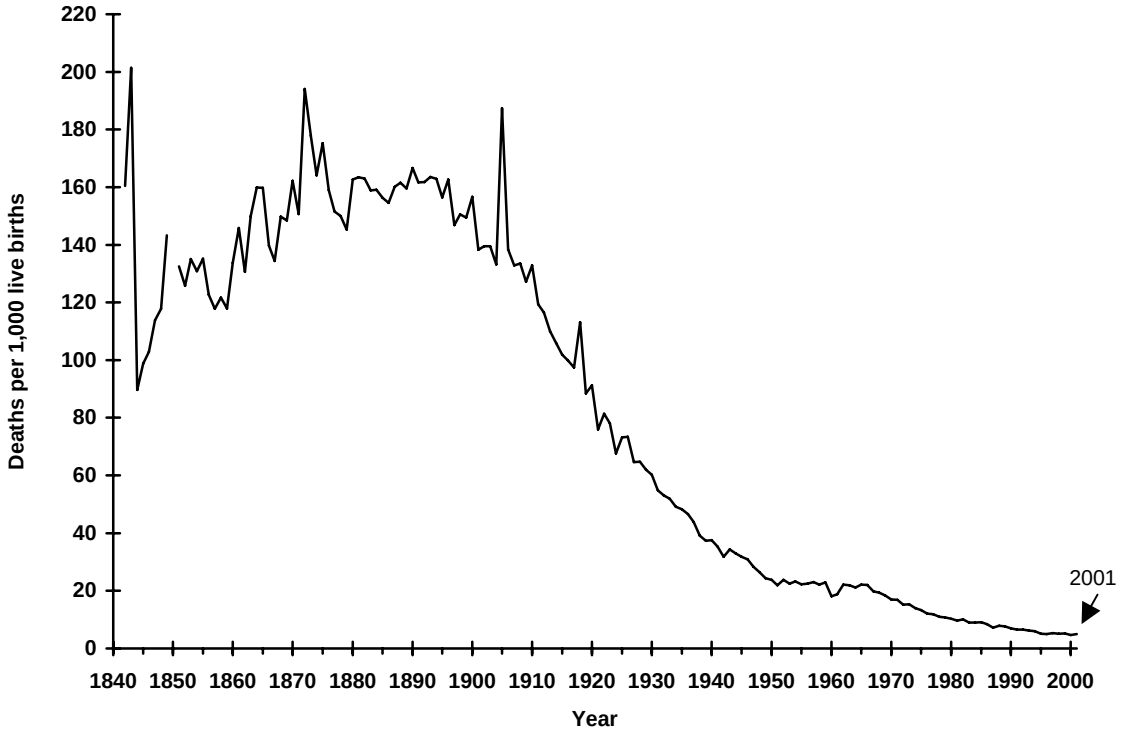
1. Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Other: American Indian and Other races. 3. Rates are expressed per 1,000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

**Figure 8. Infant Mortality Rates and 95% Confidence Intervals[1] by Race[2], Massachusetts: 1980-2001**




1. See Appendix for explanation
2. For rate computations, infant births of unknown race are allocated into race categories according to the distribution of the births of known race.
3. On tables and graphs 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 9. Infant Mortality Rates, Massachusetts: 1842-2001[1]**




1. Data not available for 1850.

**Figure 10. Trends in the Timing of Infant Deaths, 1990-2001**

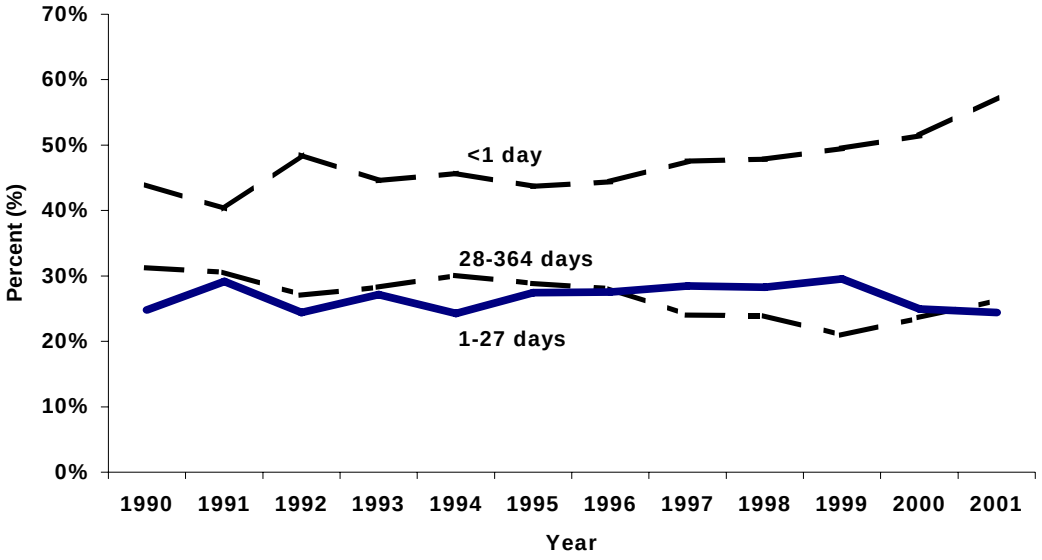
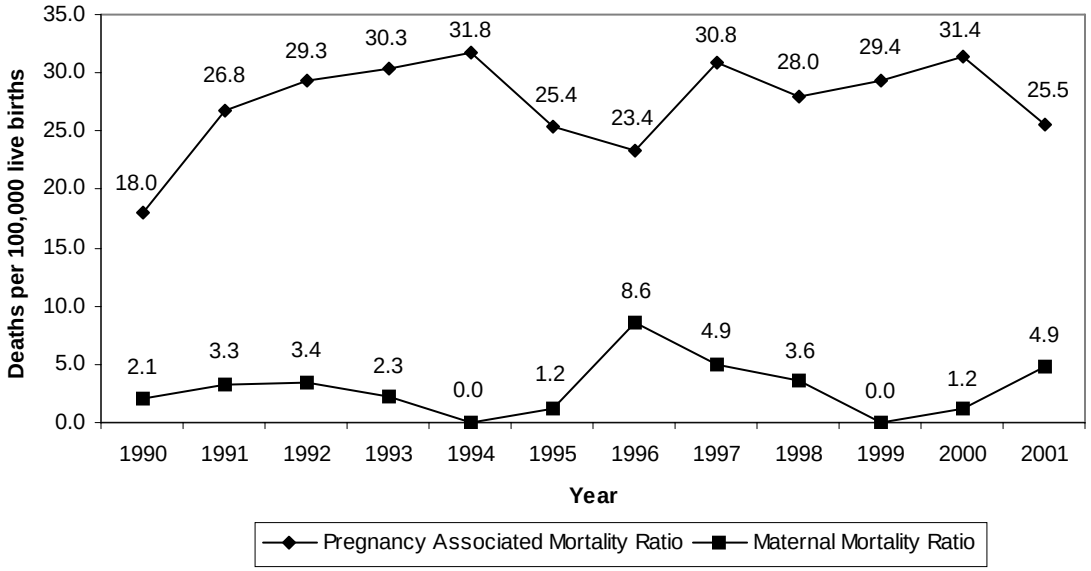


**Figure 11. Trends in Pregnancy-Associated[1] and Maternal Mortality[2], Massachusetts: 1990-2001**




**Number of Pregnancy-Associated[1] and Maternal Deaths[2], 1990-2001**

| Year | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pregnancy-Associated Deaths[1] | 17 | 24 | 26 | 26 | 27 | 21 | 19 | 25 | 23 | 24 | 26 | 21 |
| Maternal Deaths[2] | 2 | 3 | 3 | 2 | 0 | 1 | 7 | 4 | 3 | 0 | 1 | 4 |

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

## Overall Birthweight Distribution

In 2001, 7.2% (5,795) of Massachusetts resident infants were low birthweight (less than 2,500 grams or 5.5 pounds), and 11.2% were 4,000 grams (8.8 pounds) or more (Table 13).

The low birthweight rate in 2001 was 7.2%, compared with 7.1% in 2000 (Table 15). In 2001, 1.4% (1,114) of infants born to Massachusetts resident women were very low birthweight (less than 1,500 grams or 3.3 pounds); this percentage has remained the same between 1999 and 2001.

The low birthweight rate in Massachusetts was 7% below the U.S. rate of 7.7% (National Vital Statistics Reports, Vol. 51, No. 2, December 2002, p.18).

## Patterns of Birthweight by Race and Ethnicity

The proportion of low birthweight infants varied by mother's race and ethnicity (Table 13). Non-Hispanic black women had the highest proportion of low birthweight infants: 11.2%; Hispanic mothers delivered 8.2% low birthweight infants; Asian mothers, 7.3% low birthweight infants; and non-Hispanic white mothers delivered 6.6% low birthweight infants.

The proportion of low birthweight deliveries in 2001 remained the same as in 2000 for Hispanic and Asian mothers, while the rate for non-Hispanic blacks decreased from 12.0% to 11.2%, and the rate for non-Hispanic whites increased from 6.4% to 6.6% (data not shown).

The proportion of very low birthweight infants also varied by mother's race and ethnicity. Non-Hispanic black women had the highest proportion of very low birthweight infants: 3.2%; compared with 1.7% of Hispanics, 1.1% of Asians, and 1.2% of white non-Hispanics (Table 13).

Non-Hispanic white mothers delivered the highest proportion of high birthweight infants: 12.8% weighed 4,000 grams (8.8 pounds) or more (Table 13). This is a decrease from 2000, when the rate for non-Hispanic white mothers was 13.1% (data not shown).

The Massachusetts 2001 low birthweight rate for non-Hispanic black women, 11.2%, was lower than the U.S. rate for all black women, 13.1%. The rate of low birthweight for Massachusetts Hispanic women (8.2%) was higher than the corresponding 2001 U.S. rate of 6.5% (National Vital Statistics Report, Vol. 51, No. 2, December 2002, p. 79). This may be due to differences in the composition of the Hispanic population between Massachusetts and the nation as a whole. In Massachusetts, the Hispanic population is comprised mainly of Puerto Ricans, Dominicans, and Central Americans. The U.S. Hispanic population has a much greater percentage of Mexicans and Cubans who tend to have relatively low rates of low birthweight. The Massachusetts low birthweight rate for Puerto Ricans was 10.1% in 2001 (Table 2B), compared with 9.3% among Puerto Ricans nationwide in 2001(National Vital Statistics Report, Vol. 51, No. 2, December 18, 2002, page 57).

## 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 deliveries 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 14).

## Birthweight and Smoking

Cigarette smoking during pregnancy increases the likelihood of delivering a low birthweight infant. During 2001 in Massachusetts, 10.4% of infants born to mothers who smoked during pregnancy were low birthweight, compared with 6.8% of infants born to non-smoking mothers (Figure 12). Approximately 1 out of 6 (17.5%) infants born to black women who smoked during their pregnancy were low birthweight.

## Low Birthweight and Plurality

The increase in low birthweight in Massachusetts over the past decade can in part be attributed to the dramatic increase in multiple births in Massachusetts. The percentage of low birthweight (LBW) and very low birthweight (VLBW) rises dramatically for twins and higher order births. In 2001, 5.1% of singleton births were LBW, whereas 49.2% of twins, and 93.3% of higher order births were LBW (Table 15). Similarly, 0.9% of singletons, 9.2% of twins, and 32.9% of higher order births were VLBW. The percentage of VLBW singleton infants remained approximately the same from 1990 to 2001, while LBW increased slightly in this group: 4.7% in 1990 to 5.1% in 2001. The percentage of VLBW and LBW deliveries for twins decreased slightly from 1999 to 2000, but remained steady in 2001.

## Preterm Deliveries

In 2001, 8% (6,412) of infants born to Massachusetts resident women were preterm (premature), born before the mother had completed the 37th week of pregnancy (Table 16).

The percentage of preterm infants increased slightly from 1999 (7.6%) to 2000 (8.3%) and decreased slightly from 2000 to 2001 (8.0%) (data not shown).

The proportion of preterm births varied by mother's race and ethnicity. Non-Hispanic black women had the highest proportion of preterm infants, 12.1%. Hispanic women had 8.3% preterm deliveries; non-Hispanic white women, 7.6%; and Asian women had the lowest, 6.3% (Table 16).

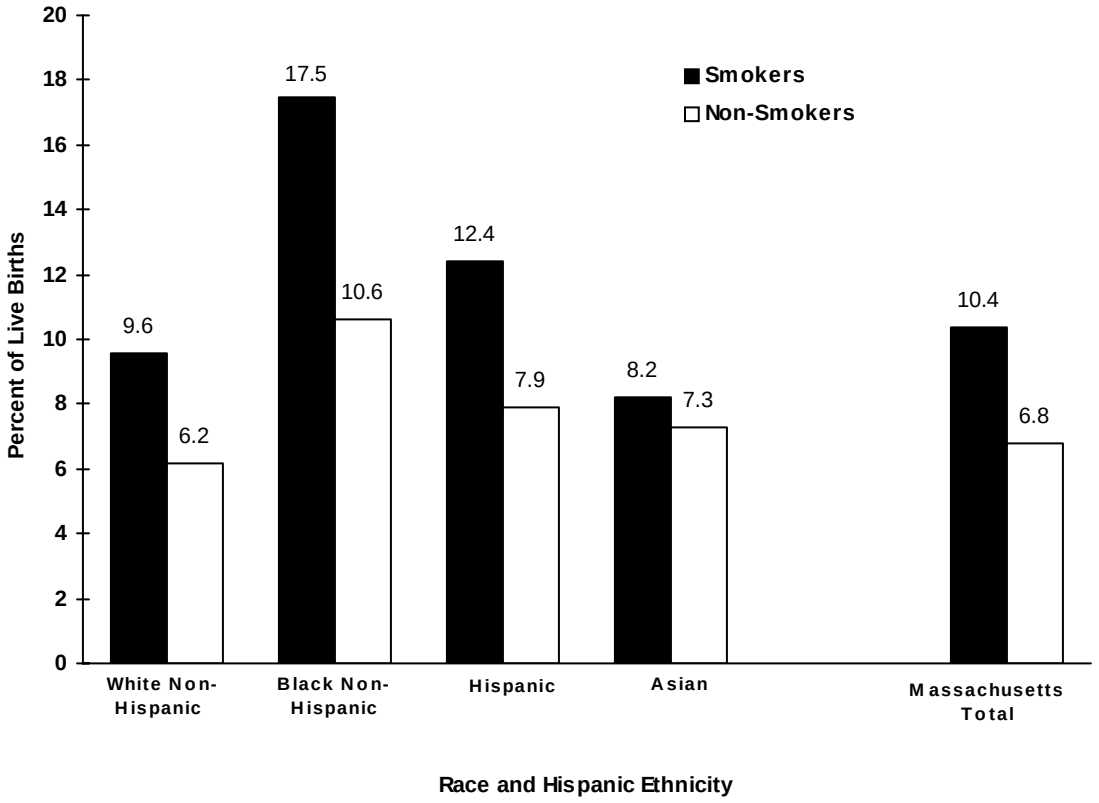
## Table 13. Births by Birthweight, Race and Hispanic Ethnicity, Massachusetts: 2001

| Birthweight (in grams) | Total | | White non-Hispanic | | Black non-Hispanic | | Hispanic | | Asian | | Other | | Unknown |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | %[1] | n | %[1] | n | %[1] | n | %[1] | n | %[1] | n | %[1] | n |
| **State Total** | 81,014 | 100.0 | 59,115 | 100.0 | 5,862 | 100.0 | 9,410 | 100.0 | 4,784 | 100.0 | 1,698 | 100.0 | 145 |
| **<500** | 107 | 0.1 | 70 | 0.1 | 23 | 0.4 | 12 | 0.1 | 1 | --[2] | 1 | --[2] | 0 |
| **500-999** | 440 | 0.5 | 265 | 0.4 | 82 | 1.4 | 59 | 0.6 | 24 | 0.5 | 8 | 0.5 | 2 |
| **1000-1499** | 567 | 0.7 | 355 | 0.6 | 83 | 1.4 | 90 | 1.0 | 27 | 0.6 | 9 | 0.5 | 3 |
| **1500-1999** | 1,185 | 1.5 | 805 | 1.4 | 122 | 2.1 | 148 | 1.6 | 78 | 1.6 | 30 | 1.8 | 2 |
| **2000-2499** | 3,496 | 4.3 | 2,388 | 4.0 | 344 | 5.9 | 466 | 5.0 | 218 | 4.6 | 79 | 4.7 | 1 |
| **2500-2999** | 11,951 | 14.8 | 7,755 | 13.1 | 1,138 | 19.4 | 1,681 | 17.9 | 1,058 | 22.1 | 311 | 18.3 | 8 |
| **3000-3499** | 29,088 | 35.9 | 20,428 | 34.6 | 2,234 | 38.1 | 3,726 | 39.6 | 2,026 | 42.3 | 653 | 38.5 | 21 |
| **3500-3999** | 24,769 | 30.6 | 19,317 | 32.7 | 1,379 | 23.5 | 2,481 | 26.4 | 1,091 | 22.8 | 477 | 28.1 | 24 |
| **4000-4499** | 7,708 | 9.5 | 6,374 | 10.8 | 374 | 6.4 | 636 | 6.8 | 216 | 4.5 | 101 | 5.9 | 7 |
| **4500-4999** | 1,316 | 1.6 | 1,106 | 1.9 | 62 | 1.1 | 91 | 1.0 | 32 | 0.7 | 24 | 1.4 | 1 |
| **>=5000** | 103 | 0.1 | 81 | 0.1 | 8 | 0.1 | 8 | 0.1 | 4 | --[2] | 2 | --[2] | 0 |
| **Unknown** | 284 | 0.4 | 171 | 0.3 | 13 | 0.2 | 12 | 0.1 | 9 | 0.2 | 3 | --[2] | 76 |
| **VLBW[3] (0-1,499 g)** | 1,114 | 1.4 | 690 | 1.2 | 188 | 3.2 | 161 | 1.7 | 52 | 1.1 | 18 | 1.1 | 5 |
| **LBW[4] (0-2,499 g)** | 5,795 | 7.2 | 3,883 | 6.6 | 654 | 11.2 | 775 | 8.2 | 348 | 7.3 | 127 | 7.5 | 8 |

NOTE: Percentages for detailed birthweight rows ("<500" through "Unknown") are calculated based on all 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 12. Low Birthweight[1] Among Smoking and Nonsmoking[2] Mothers, by Race and Hispanic Ethnicity, Massachusetts: 2001**




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, usually following childbirth; 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 birth certificate by the mother.

## Table 14. Low Birthweight (LBW)[1] by Maternal Age, Race and Hispanic Ethnicity, Massachusetts: 2001

| Mother's Age (in years) | Total LBW Infants | | White non-Hispanic | | Black non-Hispanic | | Hispanic | | Asian | | Other[4] | | Unknown |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | %[3] | n | %[3] | n | %[3] | n | %[3] | n | %[3] | n | %[3] | n |
| **State Total[2]** | 5,795 | 7.2 | 3,883 | 6.6 | 654 | 11.2 | 775 | 8.2 | 348 | 7.3 | 127 | 7.5 | 8 |
| **<18** | 158 | 9.3 | 46 | 7.3 | 26 | 10.8 | 65 | 9.7 | 12 | 14.1 | 7 | 9.9 | 2 |
| **18-19** | 336 | 10.0 | 155 | 9.1 | 56 | 14.1 | 97 | 9.9 | 19 | 14.0 | 9 | 6.9 | 0 |
| **20-24** | 973 | 8.1 | 501 | 7.5 | 135 | 10.0 | 248 | 8.3 | 51 | 8.9 | 38 | 9.6 | 0 |
| **25-29** | 1,205 | 6.4 | 769 | 5.8 | 156 | 10.6 | 165 | 7.2 | 88 | 6.0 | 27 | 5.9 | 0 |
| **30-34** | 1,751 | 6.5 | 1,344 | 6.1 | 160 | 11.6 | 111 | 7.1 | 107 | 6.6 | 27 | 6.8 | 2 |
| **35-39** | 1,069 | 7.3 | 820 | 6.7 | 94 | 12.0 | 82 | 10.8 | 59 | 7.9 | 12 | 6.0 | 2 |
| **40+** | 303 | 9.5 | 248 | 9.4 | 27 | 12.1 | 7 | 4.6 | 12 | 8.8 | 7 | 16.7 | 2 |

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.

## Table 15. Low Birthweight by Plurality, Massachusetts: 1990-2001

| 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** | **1990** | 752 | 0.8 | 4,224 | 4.7 | 189 | 8.2 | 1,075 | 46.8 | 28 | 28.3 | 88 | 88.9 | 217 | 9.1 | 1,163 | 48.5 | 969 | 1.1 | 5,387 | 5.8 |
| | **1991** | 752 | 0.9 | 4,045 | 4.7 | 223 | 9.8 | 1,079 | 47.3 | 26 | 29.2 | 75 | 84.3 | 249 | 10.5 | 1,154 | 48.7 | 1,001 | 1.1 | 5,199 | 5.9 |
| | **1992** | 656 | 0.8 | 3,959 | 4.7 | 192 | 8.3 | 1,062 | 45.7 | 39 | 29.8 | 116 | 88.5 | 231 | 9.4 | 1,178 | 48.0 | 887 | 1.0 | 5,137 | 5.9 |
| | **1993** | 673 | 0.8 | 3,919 | 4.8 | 216 | 9.2 | 1,105 | 47.1 | 73 | 36.0 | 178 | 87.7 | 289 | 11.3 | 1,283 | 50.4 | 962 | 1.1 | 5,202 | 6.2 |
| | **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 |
| **Ages < 35** | **1990** | 646 | 0.8 | 3,666 | 4.6 | 164 | 8.5 | 915 | 47.3 | 21 | 30.0 | 62 | 88.6 | 185 | 9.2 | 977 | 48.8 | 831 | 1.0 | 4,643 | 5.7 |
| | **1991** | 647 | 0.9 | 3,499 | 4.7 | 189 | 10.2 | 898 | 48.3 | 25 | 32.9 | 65 | 85.5 | 214 | 11.1 | 963 | 49.8 | 861 | 1.1 | 4,462 | 5.8 |
| | **1992** | 551 | 0.8 | 3,378 | 4.6 | 166 | 8.8 | 870 | 46.0 | 29 | 28.7 | 92 | 91.1 | 195 | 9.8 | 962 | 48.3 | 746 | 1.0 | 4,340 | 5.8 |
| | **1993** | 561 | 0.8 | 3,307 | 4.7 | 168 | 9.2 | 881 | 48.2 | 56 | 35.9 | 136 | 87.2 | 224 | 11.3 | 1,017 | 51.2 | 785 | 1.1 | 4,324 | 6.0 |
| | **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 |
| **Ages 35+** | **1990** | 106 | 1.0 | 558 | 5.1 | 25 | 6.8 | 160 | 43.8 | 7 | 24.1 | 26 | 89.7 | 32 | 8.1 | 186 | 47.2 | 138 | 1.2 | 744 | 6.6 |
| | **1991** | 105 | 1.0 | 545 | 5.0 | 34 | 8.1 | 181 | 42.9 | 1 | --[3] | 10 | 76.9 | 35 | 8.0 | 191 | 43.9 | 140 | 1.2 | 736 | 6.4 |
| | **1992** | 104 | 0.9 | 580 | 5.0 | 26 | 6.0 | 192 | 44.4 | 10 | 33.3 | 24 | 80.0 | 36 | 7.8 | 216 | 46.8 | 140 | 1.2 | 796 | 6.6 |
| | **1993** | 112 | 0.9 | 612 | 5.1 | 48 | 9.3 | 224 | 43.4 | 17 | 36.2 | 42 | 89.4 | 65 | 11.5 | 266 | 47.2 | 177 | 1.4 | 878 | 7.0 |
| | **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 |

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 16. Births by Gestational Age[1], Race and Hispanic Ethnicity, Massachusetts: 2001

| Gestational Age | Total | | Non-Hispanic White | | Non-Hispanic Black | | Hispanic | | Asian | | Other[3] | | Unknown |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (weeks completed) | n | %[2] | n | %[2] | n | %[2] | n | %[2] | n | %[2] | n | %[2] | n |
| **State Total** | 81,014 | 100.0 | 59,115 | 100.0 | 5,862 | 100.0 | 9,410 | 100.0 | 4,784 | 100.0 | 1,698 | 100.0 | 145 |
| **<20** | 19 | 0.0 | 12 | 0.0 | 5 | 0.1 | 2 | --[7] | 0 | 0.0 | 0 | 0.0 | 0 |
| **20-23** | 147 | 0.2 | 94 | 0.2 | 31 | 0.5 | 15 | 0.2 | 6 | 0.1 | 1 | --[7] | 0 |
| **24-27** | 321 | 0.4 | 186 | 0.3 | 55 | 0.9 | 52 | 0.6 | 18 | 0.4 | 8 | 0.5 | 3 |
| **28-31** | 737 | 0.9 | 490 | 0.8 | 101 | 1.7 | 98 | 1.0 | 39 | 0.8 | 7 | 0.4 | 2 |
| **32-35** | 2,889 | 3.6 | 2,048 | 3.5 | 291 | 5.0 | 350 | 3.7 | 127 | 2.7 | 72 | 4.2 | 1 |
| **36** | 2,298 | 2.8 | 1,652 | 2.8 | 223 | 3.8 | 259 | 2.8 | 111 | 2.3 | 53 | 3.1 | 0 |
| **37-39[4]** | 34,874 | 43.0 | 25,004 | 42.3 | 2,612 | 44.6 | 4,264 | 45.3 | 2,244 | 46.9 | 724 | 42.6 | 26 |
| **40[4]** | 27,985 | 34.5 | 20,958 | 35.5 | 1,725 | 29.4 | 3,057 | 32.5 | 1,669 | 34.9 | 549 | 32.3 | 27 |
| **41[4]** | 9,865 | 12.2 | 7,377 | 12.5 | 662 | 11.3 | 1,085 | 11.5 | 508 | 10.6 | 225 | 13.3 | 8 |
| **42[4]** | 1,267 | 1.6 | 896 | 1.5 | 121 | 2.1 | 164 | 1.7 | 48 | 1.0 | 36 | 2.1 | 2 |
| **43** | 36 | 0.0 | 21 | 0.0 | 6 | 0.1 | 6 | 0.1 | 2 | --[7] | 1 | --[7] | 0 |
| **44+** | 28 | 0.0 | 19 | 0.0 | 5 | 0.1 | 3 | --[7] | 1 | --[7] | 0 | 0.0 | 0 |
| **Unknown[5]** | 548 | 0.7 | 358 | 0.6 | 25 | 0.4 | 55 | 0.6 | 11 | 0.2 | 22 | 1.3 | 76 |
| **Very early gestation, <28 weeks** | 488 | 0.6 | 292 | 0.5 | 91 | 1.6 | 69 | 0.7 | 24 | 0.5 | 9 | 0.5 | 3 |
| **Preterm, <37 weeks[6]** | 6,412 | 8.0 | 4,482 | 7.6 | 706 | 12.1 | 776 | 8.3 | 301 | 6.3 | 141 | 8.4 | 6 |

NOTE: Percentages for detailed gestational age category rows ("<20" through "Unknown") are calculated based on all 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 early gestational age, premature delivery, or preterm delivery. 7. Calculations based on fewer than five events are excluded.