Massachusetts Births 2003

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2003 Highlights

- **In 2003, Massachusetts had the second lowest Infant Mortality Rate (IMR) in its history.** The IMR was 4.8 infant deaths per 1,000 live births, compared with 4.9 in 2002.

- **The Cesarean section delivery rate in Massachusetts, 29.3%, was the highest** rate ever reported.

- **The percentage of low birthweight (LBW) infants** (less than 2,500 grams or 5.5 pounds), **7.6%, was the highest it has been since at least 1980.**

- **In 2003 in Massachusetts, the average age of mothers giving birth for the first time was 28.01 years, which was the oldest in state history**.

- **The Massachusetts teen birth rate has decreased steadily from 35.4 births per 1,000 women ages 15-19 in 1990 to 22.6 in 2002, and remained the same in 2003**.

- **Births in five ethnicity groups have increased more than 10% since 2002: Japanese, Mexican, Cuban, Colombian, and "Other Central American"[1].** Despite a very small percent (less than 1%) decrease in overall births from 2002, certain groups have experienced large increases in the numbers of births

- **The percentage of women smoking during pregnancy continued its steady decline over the last 14 years.** It decreased from 7.9% in 2002 to 7.7% in 2003. The percentage of smoking during pregnancy has decreased 60% since 1990, when it was 19.3%.

- **The percentage of breastfeeding among mothers in Massachusetts increased from 76.1% in 2002 to 78.1% in 2003, continuing its steady increase over the last 14 years.** The rate of breastfeeding has increased 50% since 1989, when it was 52.2%.

- **The percentage of preterm infants** (delivered before the 37th week of gestation) **increased 2% from 8.5% in 2002 to 8.7% in 2003.**

- **Disparities by race, ethnicity, education and community persist:**

    - Black non-Hispanic IMR is over 3 times that of the white non-Hispanic (12.7 vs. 4.1).
    - Teen birth rate for Hispanics is about 6 times that for white non-Hispanics (78.3 vs. 13.7).
    - Cambodian (54.0%), Cape Verdean (65.9%), and Haitian (66.4%) mothers are less likely to receive prenatal care in their first trimester compared with mothers in other ethnicity groups (State average: 83.9%).
    - Less educated women are much more likely to smoke during their pregnancies, more likely to deliver LBW infants, and less likely to receive adequate prenatal care.

[1] "Other Central American" is an ancestry choice for mothers whose ancestry is not among those of the Central American territories and countries explicitly listed (Puerto Rican, Dominican, Mexican, Cuban, and Salvadoran). The majority of mothers who choose "Other Central American include those who were born in Guatemala and Honduras, for example.

Number and Rate of Births

The number of births to Massachusetts residents declined by less than 1% (0.6%) from 2002 to 2003, from 80,624 to 80,167. Since 1990, the number of births in Massachusetts has declined by 13%, and the birth rate among women of reproductive age has declined by 9% (from 62.2 to 56.2 births per 1,000 females ages 15-44). **The average age of mothers at first birth was 29.8 years** in 2003 compared with 27.7 years in 1999.

Infant Mortality

The infant mortality rate (IMR) in 2003 was 4.8 infant deaths per 1,000 live births, compared with 4.9 in 2002. There was a total of 383 infant deaths in 2003, compared with 397 in 2002. The infant mortality rate has decreased 31% since 1990, from 7.0 deaths per 1,000 live births to 4.8 deaths per 1,000 live births.

Black non-Hispanic mothers continued to have the highest IMR (12.7 per 1,000 live births). Black non-Hispanics were the only group to experience an *increase* in IMR (9%) in 2003; whereas, IMR decreased by 21% for Hispanics (7.0 to 5.5), by 10% for Asians (3.0 to 2.7), and by 2% for white non-Hispanics (4.1 to 4.0).

Pregnancy-Associated Mortality and Maternal Mortality Ratios[2]

In 2003, there were 15 pregnancy-associated deaths, including 4 maternal deaths. The 2003 pregnancy-associated mortality ratio (PAMR) was 18.5 deaths per 100,000 live births and the maternal mortality ratio (MMR) was 4.9 per 100,000 live births. Since 1990, the annual PAMR fluctuated from a low of 18.0 in 1990 to a high of 32.8 in 2001. However, due to the small number of deaths, the differences are not statistically significant.

Teen Births

In 2003, 4,639 births occurred to Massachusetts resident women ages 15-19, which was a difference of only **3 fewer births than in this age group in 2002**. Although the overall number of births declined less than 1%, the teen birth rate remained steady. The Massachusetts teen birth rate had decreased steadily from 35.4 births per 1,000 women ages 15-19 in 1990 to the current low of 22.6 in 2002, and remained the same in 2003. The Massachusetts teen birth rate in 2003 was 46% below the preliminary U.S. teen birth rate of 41.7 births per 1,000 women ages 15-19.

The annual number of births to **young teens (ages 12-14)** continued to decline in 2003, from a peak of 155 in 1994 to the current low of 56 (a rate of 0.27 births per 1000 females aged 10-14), this represents a 23% decline in births in this age group from 1994. The 2003 U.S. birth rate for

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

younger teens was 0.70 live births per 1000 females aged 10-14 years, 61% above the Massachusetts birth rate for young teens.

The percentage of low birthweight among births to teen mothers was 10.3% in 2003, compared with 7.4% among births to mothers ages 20 and older in 2002.

In 2003, among Massachusetts municipalities with the highest number of teen births, **teen birth rates were** highest **in Holyoke (91.9), Lawrence (82.9), and Springfield (79.3).** These communities had rates over three times the statewide rate of 22.6 teen births per 1,000 females 15-19.

Low Birthweight (LBW)

The percentage of low birthweight infants (less than 2,500 grams or 5.5 pounds) increased to 7.6% in 2003 from 7.5% in 2002. Since 1990, the percentage of low birthweight infants has increased by 31%, from 5.8%.

Between 2002 and 2003, black non-Hispanics were the only group to experience a *decrease* in the percentage of low birthweight infants (4%); whereas, LBW increased by 3% for white non-Hispanics (6.8% to 7.0%), by 1% for Asians (8.0% to 8.1%), and remained the same for Hispanics (8.3%).

Between 2002 and 2003, the percentage of low birthweight infants increased slightly among singletons (5.2% to 5.3%) and among multiple births (53.0% to 55.6%).

Very low birthweight (VLBW; infants weighing less than 3.3 pounds) has remained stable since 1999, at 1.4%. For the third year in a row, black non-Hispanic infants continue to have the highest percentage of VLBW at 3.1%, the same as in 2002.

Preterm Deliveries

The percentage of preterm infants (infants delivered before the 37th week of gestation) increased 2% from 8.5% in 2002 to 8.7% in 2003. Preterm rates decreased for all race and Hispanic ethnicity groups, except for white non-Hispanics rates, which increased by 6% from 2002. Preterm rates were lowest for Asians (7.1%) and highest for black non-Hispanics (12.0%).

The percentage of infants delivered very early (before the 28th week of gestation) has remained the same since 1997 at 0.6%. Black non-Hispanic women had the highest proportion of infants delivered very early, 1.7%, which was more than double that of any other race group.

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

The percentage of births to white non-Hispanic and black non-Hispanic mothers has decreased since 1990. From 1990 to 2003, it decreased by 8%, from 78.4% to 71.9% for white non-Hispanic mothers, and by 4% for black non-Hispanic mothers, from 7.7% to 7.4%. The percentage of births to Asian mothers increased by 73%, from 3.7% to 6.5%. The percent of births to Hispanic mothers increased by 33%, from 9.1% to 12.2%.

The percentage of births to non-U.S.-born mothers increased 3% between 2002 and 2003 – from 23.3% to 24.1%. **In 2003, almost 1 out of 4 births to Massachusetts residents was to a mother born outside the continental U.S., Puerto Rico, and the U.S. Territories.**

Smoking

The percentage of women who smoked during pregnancy continues its steady decline from 7.9% in 2002 to 7.7% in 2003. Decreases in smoking during pregnancy occurred among all races and Hispanic ethnicity groups except for Asians.

Prenatal Care

Adequacy of prenatal care decreased by less than 1% from 84.7% in 2002 to 84.5% in 2003. Adequacy of prenatal care is a measure of the timing and number of prenatal care visits, not an assessment of the quality of prenatal care. [Please note: these data are not comparable to data published in reports prior to 2001. Beginning with the 2001 report, the Adequacy of Prenatal Care Utilization (APNCU) Index is used to measure adequacy of prenatal care, replacing the Kessner Index. Please see Chapter 5 for more detail.]

Cesarean Sections

The Cesarean section delivery rate continues to increase. The cesarean section (c-section) rate among births to Massachusetts residents was 29.3% in 2003, an increase of 4% from 2002 (28.1%). There were increases in both primary and repeat c-sections. The primary c-section rate increased by 4%, from 20.5% to 21.4%, and the repeat c-section rate increased by 3%, from 85.3% to 87.5%. Concomitantly, the rate of vaginal births after cesarean section (VBAC) deliveries decreased substantially, from 14.7% in 2002 to 12.5% in 2003, a decrease of 15%.

Breastfeeding

The percentage of mothers breastfeeding increased from 76.1% in 2002 to 78.1% in 2003**, continuing the trend of steady increase from the last 14 years**. The breastfeeding rate increased for all major race/Hispanic ethnicity groups, with the exception of Hispanics, for whom the breastfeeding rate decreased slightly by less than 1%. The largest increase in the percentage of mothers breastfeeding was seen among black non-Hispanic mothers (up 3.2% from the previous year).

Public Source of Prenatal Care Payment

The percentage of mothers whose source of payment for prenatal care was public **increased** between 2002 and 2003, **from 28.5% to 28.9%, continuing its steady increase since 1996.**

Mothers whose prenatal care source of payment was Medicaid were more likely to be very young mothers, to deliver LBW infants, to be unmarried, and likely to receive adequate prenatal care, to breastfeed, and to deliver by Cesarean section than mothers whose prenatal care was privately funded.

Multiple Births

In 2003, 95.3% of all births were singletons, 4.4% were twins (3,551 births) and 0.3% were triplets (241 births), and two sets of quadruplets. The total percentage of **multiple births (twins, triplets or more) was 4.7% in 2003, which was a slight decrease of 4% from 2002 (4.9%).** The percentage of multiples among births to mothers ages 35+ (7.1%) was almost double the percentage for mothers under age 35 (4.1%).

A Comparison of Massachusetts and U.S. Indicators

Most Massachusetts perinatal health indicators in 2003 were better than those for the U.S. in 2003.

According to preliminary U.S. birth statistics for 2003:

- The **birth rate** for women ages 15-44 in Massachusetts (56.2 births per 1,000 women 15-44 years) was **15% lower** than the U.S. birth rate (66.1).

- The **teen birth rate** in Massachusetts (22.6 births per 1,000 women ages 15-19) was **46% lower** than the U.S. teen birth rate (41.7).

- The **low birthweight** rate in Massachusetts (7.6%) was **3% lower** than the U.S. low birthweight rate (7.9%).

- The **preterm** rate in Massachusetts (8.7%) was **29% lower** than the U.S. preterm rate (12.3%).

- The **percentage of women receiving prenatal care in the first trimester** in Massachusetts (83.9%) **was slightly lower** than the U.S. percentage (84.1%).

- The **cesarean section delivery rate** in Massachusetts (29.3%) was **6% higher** than the U.S. c-section rate (27.6%).

- According to preliminary U.S. death statistics for 2003, the **infant mortality rate (IMR)** in Massachusetts (4.8) was **30% lower** than the U.S. IMR (6.9).

Birth Data Availability

Detailed information on 2003 births in Massachusetts is 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 617-624-5629.

This report is also available on the DPH website at: http://www.mass.gov/dph/pubstats.htm.

CHAPTER 1

BIRTH CHARACTERISTICS

Birth Numbers and Rates

In 2003, 80,167 births occurred to Massachusetts residents (Table 1). The number of resident live births in Massachusetts has decreased by 13% since 1990 when it was 92,461 births.

In 2003, the fertility rate was 56.2 births per 1,000 women ages 15-44 years. This rate remained the same as last year's, but the rate has decreased by 9% since 1990 when it was 62.1 (Table 1).

The Massachusetts fertility rate in 2003 was 15% below the preliminary U.S. rate of 66.1 per 1,000 women ages 15-44 (National Vital Statistics Reports, Vol. 53, No. 9, November 23, 2004, p. 2).

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

In 2003, of all live births to Massachusetts residents, 71.9% (57,604) were to white non-Hispanic mothers; 12.2% (9,764) were to Hispanic mothers; 7.4% (5,902) were to black non-Hispanic mothers; 6.5% (5,224) were to Asian mothers; and 1.9% (1,548) were American Indian or "Other Race" (Table 2A). Race and Hispanic ethnicity are reported by the mothers themselves.

The proportion of white and black non-Hispanic births has decreased somewhat since 1990. At the same time, the proportion of Asians and Hispanic births has increased greatly. The percentage of all births to white non-Hispanic decreased by 8%, from 78.4% to 71.9% since 1990, and the percentage of all births to black non-Hispanic mothers decreased by 4%, from 7.7% to 7.4%. The percentage of all births to Asian mothers increased by 76%, from 3.7% to 6.5%. The percent of births to Hispanic mothers increased by 34%, from 9.1% to 12.2%.

In 2003, 26.6% of births in Massachusetts were to women born outside of the fifty United States, including 2.5% of births to women born in Puerto Rico and other U.S. Territories, and 24.1% of non-US-born mothers. White non-Hispanic mothers had the smallest percentage of births to non-US-born mothers at 10.6%. The percentage of births to non-US-born mothers was greater for other race and Hispanic ethnicity groups: 89.9% for Asian births; 48.9% for Hispanic births, and 47.4% for black non-Hispanic births. Among Hispanic births, 19.5% were to women born in Puerto Rico and other U.S. Territories. (Table 2A).

Emerging Populations

Despite a very small percent (less than 1%) decrease in overall births from 2002, certain groups have experienced large increases in the numbers of births. Births to five ethnicity groups have increased more than 10% since 2002: Japanese, Mexican, Cuban, Colombian, and Other Central American. Births to Other Central American mothers have increased by 22% since last year. Within this category, mothers born in Guatemala and Honduras had the largest increases (up 26%, and up 19%, respectively). Births to Colombian mothers have increased by 21% since last year, while births to Cuban and Mexican mothers have increased by 19% and 16%, respectively. Births to Japanese mothers increased by 12% from 180 births in 2002 to 201 in 2003.

Teen Births

In 2003, there were almost the same number of births to women ages 15-19 (teen births), 4,639 compared with 4,642 births for this age group in 2002 (Table 1). The number of teen births has been decreasing since 1990, with an overall decrease of 36% (7,258 teen births in 1990).

The teen birth rate (births per 1,000 women ages 15-19) was 22.6 in 2003, which was the same as in the previous year (Table 1). In contrast, the 2003 U.S. teen birth rate was 45.8 (National Vital Statistics Reports, Vol. 53, No. 9, November 23, 2004, p. 3), more than double the Massachusetts teen birth rate.

Statewide, in 2003, 1.9% of births were to women under age 18, and 5.9% were to women under the age of 20 (Table 2A). The highest percentage of births to women under 18 among racial and ethnic groups was for Hispanics (6.3%), followed by black non-Hispanics (3.4%), Asians (1.3%), and white non-Hispanics (1.0%) (Table 2A).

Among maternal ethnicity categories, Puerto Ricans and Cambodians had the highest teen birth percentages in 2003. For Puerto Rican women, 24.8% of births were to women under age 20 and 10.3% to women under age 18 (Table 2B). For Cambodians, these percentages were 18.8% and 7.8%, respectively.

Low Birthweight

In 2003, 7.6% of infants born to Massachusetts women were low birthweight (that is, they weighed less than 2,500 grams or 5.5 pounds) (Table 1). This percentage increased 1%, from 7.5% in 2002, making the 2003 the highest LBW percent since 1980[3].

In 2003, the low birthweight percent in Massachusetts was 4% below the national figure of 7.9%. The percentage of low birthweight births increased nationwide as well from 2002 to 2003, from 7.8% to 7.9%, which was the highest it had been in the U.S. in three decades (National Vital Statistics Reports, Vol. 53, No. 9, November 23, 2004, p. 2).

The percentage of low birthweight infants varied by mother's race and ethnicity. Black non-Hispanic mothers had the highest proportion of low birthweight infants (12.1%); followed by Hispanic mothers (8.3%); Asian mothers (8.1%); and white non-Hispanic mothers (7.0%) (Table 2A). The low birthweight percentage increased for white non-Hispanic infants by 3% from 2002 to 2003, for Asians by 1%, and remained the same for Hispanics. The percentage of low birthweight infants for black non-Hispanic mothers decreased by 4% from 12.6% in 2002 to 12.1% in 2003.

Among maternal ethnicity groups, the highest percentage of low birthweight infants in 2003 occurred among mothers who identified their ancestries as African-American (13.3%), Haitian (10.8%), Puerto Rican (10.1%), Cape Verdean (9.9%), Cambodian and Asian Indian (9.8%). The highest percentages of very low birthweight (VLBW) (less than 1,500 grams or 3.3 pounds), occurred among mothers who identified their ethnicity as African-American (3.0%), Other African, and Haitian (2.7%) (Table 2B).

[3] 1980 is the earliest year on which there is a recorded birthweight.

Prenatal Care

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

Table 1 provides a comparison of values based on the two indices between 1996 and 2003. 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 2003, 84.5% of infants had mothers who received adequate prenatal care, which was a very slight decrease from 84.7% in 2002. The percentage of women receiving prenatal care during the first trimester of pregnancy also decreased slightly from 84.2% in 2002 to 83.9% (Table 2A).

The percentage of adequate prenatal care varied by mother's race and Hispanic ethnicity, ranging from a low of 76.1% for black non-Hispanic mothers to a high of 86.8% for white non-Hispanic mothers. The rates for Hispanic and Asian mothers were 78.5% and 81.9%, respectively (Table 2A). The percentage of adequate prenatal care increased only for black non-Hispanics, from 74.8% to 76.1% (a 2% increase), while it decreased slightly for white non-Hispanics and Hispanics from 2002 to 2003, and remained constant for Asians.

Adequacy of prenatal care also varied by maternal ancestry. Mothers reporting their ancestries as Chinese, European, and Other Portuguese (not Cape Verdean or Brazilian) were the groups most likely to receive adequate prenatal care – 89.0%, 87.5%, and 87.4%, respectively, while Cambodian and Cape Verdean mothers were least likely to receive adequate prenatal care – 62.8% and 69.4%, respectively (Table 2B).

Cesarean Section Deliveries

In 2003, the Cesarean section delivery rate rose for the sixth straight year to an all time high. In 2003, 29.3% of births to resident Massachusetts women were delivered by Cesarean section, which is a 4% increase over the 2002 percentage (28.1%), which also was an all time high (Table 2A). The Cesarean section percentage continues to increase: 6% from 1999 (22.4%) to 2000 (23.8%); 8% from 2000 to 2001 (25.6%), 10% from 2001 to 2002 (28.1%), and 4% in the last year. However, this year, the percentage of increase was lower than in other recent years. The Cesarean section rate in Massachusetts in 2003 was 6% higher than the nationwide rate of 27.6%. The nationwide rate for 2003 was also the highest ever recorded (National Vital Statistics Reports, Vol. 53, No. 9, November 24, 2004, p. 2).

The percentage of Cesarean sections increased in all racial and ethnic groups in the last year. Black non-Hispanic women had the highest percentage of Cesarean section deliveries 30.8%[4],

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

and Hispanic women had the lowest percentage 25.8% (Table 2A). With regard to maternal ethnicity groups, the highest percentage of Cesarean section deliveries occurred to Brazilian women (38.0%) and the lowest percentage was among Cambodian women (16.3%) (Table 2B).

Breastfeeding

In 2003, 78.1% of Massachusetts mothers reported that they were breastfeeding or intending to breastfeed their infants (Table 2A). This represents a 38% increase since 1990 (56.6%).

The percentage of mothers breastfeeding differed by maternal race and Hispanic ethnicity, with the highest percentage reported among Asians (82.1%) and the lowest among white non-Hispanics (77.0%) (Table 2A). There was more variation among mothers of different self-identified ancestry groups. The highest rates of breastfeeding were among Asian Indians (96.7%), Brazilians (94.5%), and Salvadorans (94.3%) (Table 2B). In contrast, only 50.4% of women identifying as Cambodians and 49.2% of "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 63.6%, while for women ages 45 and above the percentage was 90.9% (Figure 2).

Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2003, among live births to residents of the 30 largest municipalities (see Table 3A for the list of communities) in the Commonwealth:

- The crude birth rates (number of births per 1,000 residents) were highest in Lawrence (19.1), Lynn (16.8), Lowell (16.1), Springfield (15.9), and Brockton (15.8). The crude birth rates in these cities were 25% or more above the state level (12.6): 52% above in Lawrence, 33% in Lynn, and 26% in Brockton. Crude birth rates were the lowest in Newton (9.1) and Barnstable (9.8), which were below the state level by 38% and 29% respectively. (Table 3A).

- Seven communities (in descending order with percentages above statewide average in parenthesis): Peabody (50%), Lowell (38%), Brockton (34%), New Bedford (32%), Methuen (29%), Fall River (29%), and Springfield (25%) recorded low birthweight percentages that were at least 25% higher than the statewide average of 7.6% (Table 3A). Low birthweight percentages were lowest in Arlington and Haverhill (5.9% and 5.5%, respectively).

- Over 90% of mothers living in Brookline, Arlington, Weymouth, Newton, and Quincy received adequate prenatal care. In contrast, fewer than 70% of mothers living in Pittsfield (59.8%) and Lowell (67.8%) received adequate prenatal care (Table 3A).

- The birth rate for teens was highest in Lawrence (82.9 births per 1,000 females ages 15 to 19 years) and in Springfield (79.3) (Table 3A). Both of these communities experienced increases in their teen birth rates in 2003 from the previous year. The Lawrence rate was almost 4 times the state rate of 22.6, and the Springfield rate was 3.5 times the state rate.

- Three communities had 2003 infant mortality rates (IMR) in excess of 10 deaths per 1,000 live births: Lowell (11.8), Barnstable (10.7), and Arlington (10.7). Infant mortality rates should be interpreted with caution in these communities since they are based on a small number of infant deaths (Lowell: 20, Barnstable: 5, and Arlington: 6) (Table 3A).

- Based on a three-year infant mortality rate (IMR) from 2001-2003, the communities with the highest IMRs were: Lowell (9.0), Taunton (8.3), New Bedford (8.1), and Lawrence (7.6) (Table 3A).

Birth Characteristics in Community Health Network Areas

In 2003, among resident live births in the 27 Massachusetts Community Health Network Areas (CHNAs):

- Four CHNAs had crude birth rates of 14 births or more per 1,000 residents. They were: Community Wellness Coalition (Worcester) (14), Community Health Network of Greater Metro West (Framingham) (14), Community Partners for Health (Milford) (14.3), and Greater Lawrence Community Health Network (15.0) (Table 3B).

- More than 8.8% of resident births in four CHNAs were low birthweight -- The Community Health Connection (Springfield) (8.9%), Greater Lowell Community Health Network (8.9%), and, Partners for a Healthier Community (Fall River) (9.6%). These percentages were 15% or more higher than the statewide average of 7.6% (Table 3B).

- Less than 70% of mothers received adequate prenatal care in the Community Health Network of Berkshire County (69.8%), while over 90% of mothers living within the Blue Hills Community Health Alliance (Greater Quincy) (90.3%), Greater Haverhill Community Health Network (90.5%), and Community Health Network North (Beverly/Gloucester) (94.1%) received adequate prenatal care (Table 3B).

- Teen birth rates among the Community Health Connection (Springfield) (51.1), the Greater Lawrence Community Health Network (44.2), Partners for a Healthier Community (Fall River) (42.1), Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) (40.1), and, the Greater New Bedford Health & Human Services Coalition (34.6) were the highest in the state, ranging from more than double the statewide teen birth rate in Community Health Connection (Springfield) to one- and one-half times the state teen birth rate in the Greater New Bedford Health & Human Services Coalition. Teen birth rates were less than one-fourth the statewide average for West Suburban Health Network (Newton/Waltham) (4.0) and the Greater Woburn/ Concord/ Littleton Community Health Network (5.4) (Table 3B).

- The Community Health Network of Southern Worcester County CHNA had the highest infant mortality rate in 2003 among CHNAs: 7.6 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 2003, 7.7% of births were to mothers who reported smoking cigarettes during their pregnancies (Figure 3). This represents a 60% decline from 1990 (19.3%), and a decline of 3% from 2002 (7.9%).

Smoking prevalence during pregnancy differed by mother's race and Hispanic ethnicity. White non-Hispanic women had the highest prevalence of smoking during pregnancy (8.6%), followed by black non-Hispanic women (6.5%), Hispanic women (5.9%), and, finally, Asian women (1.4%) (Figure 3). The percentage of mothers who smoked during pregnancy decreased for all racial and ethnic groups, with black non-Hispanics and Hispanics experiencing the largest declines: 10% and 6%, respectively.

The prevalence of smoking during pregnancy generally decreased with higher maternal education; 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 (Figure 3). This pattern was the same for white non-Hispanic women, black non-Hispanic women, and Hispanic women.

The majority (85.8%) of women who gave birth in 2003 were non-smokers prior to pregnancy, and 99.9% of them continued to abstain from smoking during pregnancy (Figure 4). (Fifty-three women started smoking during pregnancy.) Out of the14% of women who smoked prior to pregnancy, 53.6% were "light" smokers (1-10 cigarettes daily); 40.8% were "moderate" smokers (11-20 cigarettes daily); and 5.6% were "heavy" smokers (21 or more cigarettes daily). Almost half (46.7%) of pre-pregnancy smokers quit smoking during pregnancy.

Patterns in Number and Rate of Births by Age Group

There has been a marked change in the age distribution of Massachusetts resident mothers since 1980. Approximately 25% of women giving birth in 1980 were ages 30 years and compared with 56% in 2003. Beginning in 1996, the number of births to mothers aged 30 years and older exceeded the number of births to mothers under age 30. This trend has continued through 2003 (Figure 1).

In Massachusetts, the fertility rate (births to women ages 15-44 years per 1,000 women ages 15-44) decreased 9.6% from 1990 (62.2) to 2003 (56.2) (Table 4). In 2003, the age-specific birth rates were highest for 30-34 year old (107.2 per 1,000) and 25-29 year old mothers (83.6 per 1,000).

Since 1990, birth rates have increased for every 5-year age group of women ages 30 and above and decreased for every 5-year age group of women under 30 (Table 4). The largest birth rate increases have been for mothers in the age groups of women over 30, while the largest decreases have been among the youngest age groups, 15-19 and 12-14 (Table 4).

In 2003, there were 56 births to mothers ages 12-14 years (a decrease of 17 births from 2002) and there were 159 births to women 45 years of age or older (a decrease of 16 births from 2002) (Table 4).

Plurality

Plurality is the number of births in one delivery. In 2003, 95.3% (76,367 births) of all births were singletons, 4.4% were twins (3,551 births) and 0.3% were triplets (241 births), and two were quadruplets. The total percentage of multiple births (twins, triplets or more) was 4.7% in 2003,

which was a decrease of 4% from 2002 (4.9%) (Table 6). This decline is a reversal of the constant increases in multiples since 1990.

The percentage of multiple births has increased by 81% since 1990 (2.6%) and this increase varies by age. For women under 35 years, the percentage of multiple births increased from 2.5% in 1990 to 4.1% in 2003, an increase of 64%. The percentage of multiple births to women ages 35 years and older increased from 3.5% in 1990 to 7.1% in 2003, which was an increase of 103% (Table 6). Almost all of the 2003 decrease in multiples occurred to women 35 years and older. There was a net increase of 1 birth among multiples for women less than 35 (10 more twins and 9 fewer triplets).

Education

In 2003, 9.9% of women who gave birth had less than a high school education; 24.7% had a high school diploma or GED; 22.4% had some college education; and 43.0% had a college degree or more (Table 7).

Maternal educational attainment varied by race and Hispanic ethnicity; 53.9% of Asian women and 50.5% of white non-Hispanic women had at least a college degree, compared with 18.6% of black non-Hispanic women and 10.3% of Hispanic women (Table 7).

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

Interpregnancy Intervals

The interpregnancy interval (IPI) is defined as the time (in months) between the initiation of the current pregnancy and the completion of the previous pregnancy. Research has shown that infants conceived with both a shorter and longer than an "optimal range"[5] of interpregnancy intervals (IPI) are more likely to have a higher risk of adverse perinatal outcomes.

The Massachusetts IPIs[6] derived from 2003 birth records conform to the findings mentioned above, that is, both a short[7] IPI (less than 12 months) and an IPI over 35 months were associated with higher proportions of low birthweight and premature deliveries; whereas, an IPI between 12 to 35 months was associated with lower proportions of low birthweight and premature deliveries (Table 8A and Figure 5A).

In 2003, 42,329 (out of 80,167 total, 52.8%) Massachusetts resident mothers delivered their second or higher order live infant. One percent were teen mothers, 69% were 20 to 34 years

[5] "Optimal range" of interpregnancy interval is the range in which adverse perinatal outcomes are minimized in the population such as the percentages of low birthweight and premature deliveries.
[6] For each mother delivering her 2nd or higher order live infant in 2003, the IPI was derived by calculating the months between the date of last menstrual period of current pregnancy and the date of birth of last live birth. Mothers delivering multiples were included only once.
[7] Short IPI is defined variously in the literature, including values 'less than 6', 'less than 12', and 'less than 18' months. In this report 12 months is used.

old, and 29% were aged 35 and older (Table 8B). Mothers having a subsequent pregnancy[8] while they are still teens represent 13.5% of all teens giving birth in 2003 (632 out of 4,695 teen mothers in 2003).

Among mothers having a subsequent pregnancy (yielding a live birth in 2003), teen pregnancies were 3.7 times as likely to have been initiated within 12 months after the previous birth as compared with mothers 35 years and older (43% vs. 12%, Table 8B). Among race and Hispanic ethnicity groups, subsequent pregnancies to black non-Hispanic mothers were the most likely to have been initiated 36 months or later after the previous live birth (53%, compared with 33% among white non-Hispanics, Table 8B).

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

Short Interpregnancy Interval (less than 12 months)

Sixteen percent of all subsequent pregnancies in Massachusetts were initiated within 12 months after delivery of the previous child; that is, within a short interpregnancy interval (IPI). The proportion of mothers with ***short IPI,*** increased slightly with increasing education. This proportion varied little by the source of payment for their delivery care (public or private). Mothers living in the Boston (16.7%) and the Western Executive Office of Health and Human Services (EOHHS) region (16.6%) had the highest proportion of short IPI. Those living in the communities of Billerica (21%), Weymouth (21%) and Holyoke (21%) were the most likely to have had a short IPI.

Interpregnancy Interval: 12 to 35 Months

Forty-six percent of the current subsequent pregnancies were initiated between 12 to 35 months after the previous delivery. This proportion increased more rapidly with increased maternal education (37% for mothers with high school education or less, 49% for mothers with a college degree or some college education, and 60% for those with more than college education, Table 8B). White non-Hispanics were 1.5 times as likely to have begun the subsequent pregnancy between 12 to 35 months after the previous birth, as compared with Black non-Hispanics (50% vs. 33%). Among mothers delivering their subsequent child, those having private funds to pay for delivery care were 1.4 times more likely to have begun their subsequent pregnancy between 12 to 35 months later than mothers with public funding for their delivery care (36% vs. 50%) (Table 8B).

Mothers living in the Metrowest EOHHS region were 1.4 times as likely to have begun their pregnancy between 12 to 35 months after previous birth as those living in the Boston EOHHS region (53% vs. 38%). Mothers in the communities of Needham (69%), Wellesley (61%), and Arlington (58%) were the most likely to have begun their pregnancy between 12 to 35 months after the previous birth (Table 8B).

Interpregnancy Interval: 36 Months or More

[8] The term "subsequent pregnancy" refers to a 2nd or higher pregnancy.

Thirty-eight percent of all subsequent pregnancies in 2003 were initiated 36 months or more after the delivery of the previous child. This proportion decreased with increasing maternal education (48% for mothers with high school education or less, 36% for mothers with a college degree or some college education, and 23% for those with more than college education, Table 8B). Also, mothers with public funding for delivery care were 1.4 times more likely to have begun their current pregnancy 36 months or later, after previous birth than mothers with private funding (48% vs. 34%).

Mothers living in the Boston EOHHS region were the most likely to have had their subsequent pregnancy initiated 36 months and after (47%); whereas, those living in the Metrowest EOHHS region were the least likely (31%). Mothers in the communities of Chelsea (60%), Revere (52%), and Lynn (50%) mothers were the most likely to have begun their subsequent pregnancies 36 months or more after delivering the previous child (Table 8B).

Healthy People 2010 Objectives

Healthy People 2010 (HP2010) sets targets for each measurable objective[8]. Table 9 presents the most recent Massachusetts data for HP2010 Maternal, Infant, and Child Health objectives and measures the state's progress toward meeting the targets set for 2010.

Out of 16 objectives presented, Massachusetts has already met the 2010 target for two indicators: the postneonatal mortality rate and breastfeeding. For nine objectives, the 2002 Massachusetts indicators are within 25% of the target goals: infant mortality rate, fetal mortality rate, neonatal mortality rate, perinatal mortality rate, preterm birth, early and adequate prenatal care, prenatal care beginning in the first trimester, very low birthweight infants born at Level III hospitals, and smoking during pregnancy. For five objectives, Massachusetts is still more than 25% away from achieving the targets: 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).

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

Table 1. Trends in Birth Characteristics, Massachusetts: 1980, 1990-2003

Characteristic		1980	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Births[1]	**n**[2]	72,591	92,461	88,176	87,202	84,627	83,758	81,562	80,164	80,321	81,406	80,866	81,582	81,014	80,624	80,167
	Rate[3]	53.4	62.1	59.4	59.1	57.6	57.0	55.5	54.6	54.7	55.6	55.9	57.2	56.8	56.5	56.2
Race of Mother																
White[4]	**n**	66,220	80,775	76,983	76,052	73,704	72,980	71,083	69,485	69,503	70,452	69,305	69,371	68,728	67,874	67,586
	%[5]	91.2	87.4	87.3	87.2	87.1	87.1	87.2	86.7	86.5	86.5	85.7	85.0	84.8	84.2	84.3
Black	**n**	4,626	7,729	7,352	7,203	6,916	6,713	6,299	5,946	6,182	6,337	6,524	6,445	6,555	6,649	6,561
	%[5]	6.4	8.3	8.3	8.3	8.2	8.0	7.7	7.4	7.7	7.8	8.1	7.9	8.1	8.2	8.2
Asian/Other[6]	**n**	1,069	3,688	3,566	3,582	3,664	3,790	3,817	3,950	4,217	4,248	4,615	5,205	5,279	5,793	5,688
	%[5]	1.5	4.0	4.0	4.1	4.3	4.5	4.7	4.9	5.3	5.2	5.7	6.4	6.5	7.2	7.1
Unknown	**n**	676	269	275	365	343	275	363	783	419	369	422	561	452	308	332
	%[5]	0.9	0.3	0.3	0.4	0.4	0.3	0.4	1.0	0.5	0.5	0.5	0.7	0.6	0.4	0.4
Teen Births (Ages 15-19)	**n**	7,694	7,258	6,892	6,555	6,469	6,412	5,990	5,758	5,801	5,823	5,515	5,305	4,979	4,642	4,639
	Rate[3]	28.1	35.4	35.4	34.5	34.0	33.2	30.3	28.5	28.5	28.1	26.7	25.8	24.3	22.6	22.6
Births to Unmarried Mothers	**n**	11,356	22,837	22,852	22,612	22,345	22,302	20,857	20,253	20,640	21,191	21,448	21,621	21,620	21,604	22,262
	%	15.6	24.7	25.9	25.9	26.4	26.6	25.6	25.3	25.7	26.0	26.5	26.5	26.7	26.8	27.8
Low Birthweight	**n**	4,413	5,388	5,199	5,137	5,202	5,335	5,174	5,105	5,617	5,655	5,708	5,711	5,795	6,060	6,115
	%	6.1	5.8	5.9	5.9	6.2	6.4	6.4	6.4	7.0	7.0	7.1	7.1	7.2	7.5	7.6
Preterm	**n**	6,732	6,313	6,492	6,438	5,705	5,831	6,117	6,136	5,831	6,117	6,136	6,582	6,412	6,795	6,963
	%	7.4	7.3	7.8	7.9	7.2	7.3	7.6	7.6	7.3	7.6	7.6	8.3	8.0	8.5	8.7
Adequate Prenatal Care																
Kessner Index[7]	**%**	82.0	80.1	81.6	82.9	83.8	84.3	84.2	79.9	80.0	79.8	79.4	79.1	80.4	79.9	79.9
APNCU Index[8]	**%**								83.3	82.9	82.9	82.9	83.3	85.2	84.7	84.5

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. 2000-2003 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 last 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 and Hispanic Ethnicity and Birthplace, Massachusetts: 2003

Race and Hispanic Ethnicity (by mother's birthplace)	Births		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breastfeeding[5]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate[4]		First Trimester					
	n	%[1]	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
State Total	**80,167**	**100.0**	**1,529**	**1.9**	**4,695**	**5.9**	**1,115**	**1.4**	**6,115**	**7.6**	**67,173**	**84.5**	**66,789**	**83.9**	**23,392**	**29.3**	**61,388**	**78.1**
U.S. States / D.C.	58,744	73.3	1,170	2.0	3,572	6.1	833	1.4	4,493	7.7	50,058	85.9	50,272	86.1	17,215	29.5	42,971	74.9
Puerto Rico/U.S. Terr.[7]	1,983	2.5	159	8.0	398	20.1	34	1.7	201	10.2	1,546	79.0	1,542	78.6	535	27.2	1,412	72.3
Non-U.S.-Born[8]	19,357	24.1	198	1.0	721	3.7	238	1.2	1,401	7.3	15,516	80.9	14,917	77.6	5,618	29.2	17,004	88.3
White non-Hispanic	**57,604**	**71.9**	**593**	**1.0**	**2,223**	**3.9**	**714**	**1.2**	**4,038**	**7.0**	**49,704**	**86.8**	**49,980**	**87.2**	**17,235**	**30.1**	**43,338**	**77.0**
U.S. States / D.C.	51,389	89.2	559	1.1	2,093	4.1	655	1.3	3,665	7.1	44,444	87.0	44,826	87.6	15,360	30.0	37,859	75.5
Puerto Rico/U.S. Terr.[7]	49	0.1	3	--[6]	6	--[6]	2	--[6]	4	--[6]	47	95.9	46	93.9	10	20.4	33	76.7
Non-U.S.-Born[8]	6,110	10.6	30	0.5	122	2.0	51	0.8	357	5.9	5,172	85.2	5,063	83.4	1,851	30.4	5,445	89.7
Black non-Hispanic	**5,902**	**7.4**	**201**	**3.4**	**557**	**9.4**	**185**	**3.1**	**715**	**12.1**	**4,405**	**76.1**	**4,195**	**71.9**	**1,808**	**30.8**	**4,644**	**79.5**
U.S. States / D.C.	3,077	52.1	171	5.6	467	15.2	108	3.5	423	13.8	2,346	77.7	2,252	74.1	868	28.4	2,144	70.8
Puerto Rico/U.S. Terr.[7]	22	0.4	0	0.0	0	0.0	0	0.0	5	22.7	16	72.7	16	72.7	5	22.7	17	77.3
Non-U.S.-Born[8]	2,797	47.4	30	1.1	89	3.2	76	2.7	285	10.2	2,038	74.2	1,922	69.5	933	33.4	2,483	89.2
Hispanic	**9,764**	**12.2**	**619**	**6.3**	**1,581**	**16.2**	**128**	**1.3**	**805**	**8.3**	**7,581**	**78.5**	**7,358**	**76.0**	**2,507**	**25.8**	**7,840**	**80.8**
U.S. States / D.C.	3,080	31.5	353	11.5	814	26.4	47	1.5	299	9.7	2,380	78.2	2,319	75.9	718	23.5	2,095	68.5
Puerto Rico/U.S. Terr.[7]	1,906	19.5	156	8.2	392	20.6	32	1.7	191	10.0	1,480	78.7	1,477	78.4	519	27.5	1,358	72.1
Non-U.S.-Born[8]	4,778	48.9	110	2.3	375	7.8	49	1.0	315	6.6	3,721	78.5	3,562	75.1	1,270	26.7	4,387	92.1
Asian	**5,224**	**6.5**	**69**	**1.3**	**182**	**3.5**	**60**	**1.2**	**421**	**8.1**	**4,253**	**81.9**	**4,044**	**77.9**	**1,386**	**26.6**	**4,266**	**82.1**
U.S. States / D.C.	513	9.8	56	10.9	102	19.9	11	2.2	43	8.4	394	77.4	384	75.4	106	20.8	423	83.4
Puerto Rico/U.S. Terr.[7]	4	--[6]	0	0.0	0	0.0	0	0.0	1	--[6]	2	--[6]	2	--[6]	1	--[6]	4	--[6]
Non-U.S.-Born[8]	4,694	89.9	12	0.3	79	1.7	47	1.0	375	8.0	3,851	82.5	3,651	78.1	1,275	27.2	3,839	82.0
Other[9]	**1,548**	**1.9**	**45**	**2.9**	**146**	**9.4**	**24**	**1.6**	**126**	**8.2**	**1,178**	**76.7**	**1,158**	**75.2**	**432**	**28.1**	**1,259**	**82.8**
U.S. States / D.C.	591	38.2	29	4.9	90	15.2	10	1.7	57	9.7	452	77.3	449	76.4	146	25.0	419	72.1
Puerto Rico/U.S. Terr.[7]	2	--[6]	0	0.0	0	0.0	0	0.0	0	0.0	1	--[6]	1	--[6]	0	0.0	0	0.0
Non-U.S.-Born[8]	953	61.6	16	1.7	56	5.9	14	1.5	68	7.1	724	76.5	707	74.7	286	30.0	840	89.6
Unknown[10]	**125**	**0.2**	**2**	--[6]	**6**	**4.8**	**4**	--[6]	**10**	**13.2**	**52**	**78.8**	**54**	**81.8**	**24**	**32.4**	**41**	**68.3**

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

1. This column "Births %", the percentages of the race/Hispanic groups (bolded) are based on the state total (including births of unknown race/ethnicity), and the birthplace percents for the race/ethnicities are based on the total number in race/Hispanic ethnicity category. For all other categories, percentages are based on row totals. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low birthweight: less than 2,500 grams or 5.5 pounds. 4. Beginning with last 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 Ethnicity, Massachusetts: 2003

Maternal Ancestry	Births[1]		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breastfeeding[5]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate[4]		1st Trimester					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
State Total	**80,167**	**100.0**	**1,529**	**1.9**	**4,695**	**5.9**	**1,115**	**1.4**	**6,115**	**7.6**	**67,173**	**84.5**	**66,789**	**83.9**	**23,392**	**29.3**	**61,388**	**78.1**
American	36,818	45.9	463	1.3	1,694	4.6	492	1.3	2,720	7.4	31,745	86.6	32,214	87.8	10,828	29.6	27,381	74.6
European	14,700	18.3	63	0.4	258	1.8	122	0.8	868	5.9	12,791	87.5	12,701	86.7	4,485	30.6	12,107	83.4
Puerto Rican	4,318	5.4	445	10.3	1,069	24.8	73	1.7	434	10.1	3,323	78.0	3,284	76.8	1,100	25.7	2,912	68.1
African-American	2,689	3.4	142	5.3	398	14.8	81	3.0	357	13.3	2,040	77.4	1,990	75.0	758	28.4	1,895	71.0
Dominican	1,852	2.3	83	4.5	218	11.8	22	1.2	112	6.1	1,505	81.5	1,471	79.7	511	27.7	1,621	87.6
Brazilian	1,655	2.1	29	1.8	80	4.8	15	0.9	91	5.5	1,391	84.9	1,327	81.0	624	38.0	1,556	94.5
Other Portuguese[6]	1,412	1.8	31	2.2	119	8.4	9	0.6	84	6.0	1,225	87.4	1,198	85.5	435	31.0	691	49.2
Chinese	1,356	1.7	4	0.3	11	0.8	11	0.8	77	5.7	1,203	89.0	1,117	82.6	381	28.1	1,151	85.1
Asian Indian	1,175	1.5	0	0.0	5	0.4	13	1.1	115	9.8	980	83.6	978	83.4	391	33.4	1,130	96.7
Haitian	1,145	1.4	14	1.2	42	3.7	31	2.7	123	10.8	814	73.1	749	66.4	388	33.9	999	87.4
Other Central American[6]	1,023	1.3	23	2.2	94	9.2	9	0.9	71	6.9	762	75.1	686	67.6	257	25.2	948	93.0
Other African[6]	901	1.1	5	0.6	16	1.8	21	2.3	70	7.8	655	73.3	621	69.4	298	33.1	835	92.8
Vietnamese	879	1.1	7	0.8	23	2.6	13	1.5	71	8.1	713	81.8	687	78.6	195	22.3	583	66.4
Salvadoran	833	1.0	33	4.0	81	9.7	5	0.6	65	7.9	608	74.3	575	70.0	162	19.6	783	94.3
Cape Verdean	788	1.0	27	3.4	92	11.7	17	2.2	78	9.9	541	69.4	515	65.9	190	24.3	621	79.2
Cambodian	565	0.7	44	7.8	106	18.8	10	1.8	55	9.8	353	62.8	304	54.0	92	16.3	284	50.4
Other South American[6]	537	0.7	8	1.5	33	6.1	7	1.3	33	6.2	424	79.7	418	78.6	170	31.9	493	92.5
Mexican	496	0.6	9	1.8	37	7.5	4	0.8	32	6.5	375	75.8	366	73.9	123	24.9	446	90.5
Colombian	454	0.6	6	1.3	25	5.5	4	0.9	34	7.5	376	83.9	356	79.1	137	30.6	428	94.5
Other Middle Eastern[6]	425	0.5	1	0.2	6	1.4	5	1.2	24	5.6	336	79.6	350	82.9	116	27.5	395	93.6
Other and Missing[7]	6,146	7.7	92	1.5	288	4.7	151	2.5	601	9.9	5,013	84.1	4,882	81.4	1,751	28.8	4,129	82.4

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

1. In the first category, "Births", percentages are based on column total (state total of births, including births for which maternal ethnicity is unknown and other). For all other categories, percentages are based on row totals. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low birthweight: less than 2,500 grams or 5.5 pounds. 4. The Adequacy of Prenatal Care Utilization Index has replaced the Kessner Index as the measure of adequate prenatal care. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 6. "Other" refers to groups not specified on the parents' worksheet. See the Glossary entry "ethnicity" for the complete list of ethnicities. 7. This group includes other ethnicities specified that had fewer than 400 births, missing ethnicity, and "Other Ethnicity".

Table 3A. Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2003

Municipality	Rank (by pop. size)	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity				Very Low Birthweight (<1500 g)	Low Birthweight (<2500 g)
				White non-Hispanic	Black non-Hispanic	Hispanic	Asian or Other[4]		
				%[3]	%[3]	%[3]	%[3]	%	%
STATE TOTAL		**6,349,097**	**12.6**	**71.9**	**7.4**	**12.2**	**8.4**	**1.4**	**7.6**
Arlington	29	42,389	13.2	82.0	2.1	3.4	12.5	1.1	5.9
Attleboro	30	42,068	14.8	82.0	3.2	7.1	7.7	--[5]	7.4
Barnstable	25	47,821	9.8	83.7	2.6	4.1	9.6	1.3	6.6
Boston	1	589,141	13.3	37.2	28.8	22.3	11.5	1.8	9.0
Brockton	6	94,304	15.8	41.1	34.4	7.8	16.3	1.6	10.2
Brookline	17	57,107	12.1	73.7	2.2	5.2	19.0	0.9	7.4
Cambridge	5	101,355	10.6	55.9	17.0	9.0	17.7	1.0	6.8
Chicopee	21	54,653	11.0	79.2	2.2	15.7	2.8	1.2	6.8
Fall River	8	91,938	13.7	80.6	6.3	7.8	5.2	1.7	9.8
Framingham	14	66,910	14.9	67.3	5.1	14.8	12.8	1.0	6.9
Haverhill	16	58,969	15.2	80.0	2.7	13.8	3.5	--[5]	5.5
Lawrence	13	72,043	19.1	16.5	2.4	77.0	3.9	1.6	8.5
Lowell	4	105,167	16.1	47.9	7.0	16.3	28.7	2.5	10.5
Lynn	9	89,050	16.8	41.2	10.5	38.2	10.2	1.3	7.0
Malden	18	56,340	14.2	53.1	13.2	8.2	25.3	1.0	7.5
Medford	20	55,765	10.5	76.0	10.1	3.8	10.1	1.2	8.1
Methuen	28	43,789	14.0	69.9	3.3	20.1	6.7	2.8	9.8
New Bedford	7	93,768	14.0	66.0	5.4	19.4	8.8	2.5	10.0
Newton	11	83,829	9.1	82.3	1.6	3.0	13.0	0.9	7.1
Peabody	24	48,129	10.9	86.1	0.9	8.2	4.6	2.3	11.4
Pittsfield	27	45,793	11.5	84.3	6.8	5.7	3.2	1.7	8.3
Plymouth	23	51,701	14.2	94.1	1.2	2.2	2.2	1.5	6.3
Quincy	10	88,025	13.4	64.5	5.3	2.7	27.0	1.1	6.4
Revere	26	47,283	14.9	56.7	6.4	25.9	11.0	1.1	7.3
Somerville	12	77,478	11.9	60.5	10.6	16.2	12.7	1.5	8.7
Springfield	3	152,082	15.9	30.4	21.3	43.6	4.7	1.6	9.5
Taunton	19	55,976	13.3	84.5	5.3	6.7	3.4	1.4	8.5
Waltham	15	59,226	12.4	56.7	8.4	20.2	14.7	1.8	8.6
Weymouth	22	53,988	13.5	89.0	1.9	2.1	6.2	2.2	8.3
Worcester	2	172,648	15.0	55.8	11.1	23.0	10.1	1.9	9.0

Table 3A.(cont'd) Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2003

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]	2003	2001-2003	2003	2001-2003
STATE TOTAL	**84.5**	**28.9**	**27.8**	**4,639**	**22.6**	**4.8**	**4.9**	**3.6**	**3.7**
Arlington	92.3	6.6	7.1	7	9.1	10.7	5.3	8.9	3.6
Attleboro	77.6	22.8	25.0	45	39.1	0.0	--[5]	0.0	--[5]
Barnstable	86.9	42.3	32.8	29	22.5	10.7	7.1	--[5]	4.3
Boston	84.6	45.6	43.1	573	25.8	6.1	6.9	4.7	5.2
Brockton	75.1	57.2	49.6	148	44.8	5.4	5.5	4.0	4.6
Brookline	93.3	6.3	4.5	1	--[5]	--[5]	3.6	--[5]	3.6
Cambridge	88.2	16.1	17.6	27	7.2	--[5]	4.4	--[5]	2.5
Chicopee	85.7	44.6	43.7	59	32.6	--[5]	5.5	--[5]	4.4
Fall River	85.4	59.8	54.1	163	55.9	5.5	6.5	4.0	6.0
Framingham	87.0	32.6	21.4	38	19.7	5.0	6.4	--[5]	5.4
Haverhill	88.6	27.2	31.0	53	29.6	--[5]	4.9	--[5]	4.2
Lawrence	84.2	61.4	61.8	236	82.9	5.8	7.6	5.1	5.6
Lowell	67.8	50.0	45.8	174	44.5	11.8	9.0	8.3	6.3
Lynn	76.9	58.2	48.8	145	48.5	8.7	6.8	5.3	5.0
Malden	86.4	33.9	24.5	29	20.8	--[5]	4.6	--[5]	2.9
Medford	89.5	22.6	17.3	15	8.6	--[5]	2.7	0.0	--[5]
Methuen	87.3	20.0	27.0	29	22.9	--[5]	--[5]	--[5]	--[5]
New Bedford	77.8	60.0	57.3	169	56.7	9.1	8.1	5.3	4.1
Newton	90.8	5.3	6.5	3	--[5]	--[5]	3.3	--[5]	2.5
Peabody	86.6	24.6	22.6	24	18.5	--[5]	5.6	--[5]	4.9
Pittsfield	59.8	46.1	47.8	72	52.9	--[5]	6.5	--[5]	3.2
Plymouth	80.4	17.4	21.7	28	17.8	6.8	4.7	6.8	3.3
Quincy	90.2	29.8	21.3	43	22.1	5.1	4.6	4.2	3.7
Revere	81.8	47.8	38.7	50	41.2	--[5]	4.4	--[5]	4.0
Somerville	84.2	35.0	30.7	46	22.0	--[5]	2.2	--[5]	1.9
Springfield	73.1	69.4	65.8	479	79.3	4.5	6.8	2.5	4.2
Taunton	80.1	36.3	36.3	58	35.1	--[5]	8.3	--[5]	7.0
Waltham	84.3	25.4	22.6	26	11.6	--[5]	4.8	--[5]	4.3
Weymouth	91.4	16.1	19.1	28	21.0	8.2	4.2	6.9	3.8
Worcester	73.1	44.0	43.6	263	38.0	4.3	7.1	3.1	5.3

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

1. The 30 largest municipalities are the cities 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. 2003 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: 2003

CHNA	Population	Crude Birth Rate[1]	Mother's Race and Ethnicity: White non-Hispanic %[3]	Black non-Hispanic %[3]	Hispanic %[3]	Asian or Other[2] %[3]	Very Low Birthweight (<1500 g) %	Low Birthweight (<2500 g) %
STATE TOTAL	**6,349,097**	**12.6**	**71.9**	**7.4**	**12.2**	**8.4**	**1.4**	**7.6**
Community Health Network of Berkshire County	134,953	9.5	89.2	3.4	4.2	3.0	1.5	7.6
Upper Valley Health Web (Franklin County)	86,889	9.9	93.5	0.8	2.7	2.2	1.6	6.5
Partnership for Health in Hampshire County (Northampton)	150,077	8.5	86.4	1.6	5.9	5.9	0.6	6.0
The Community Health Connection (Springfield)	291,665	13.1	52.6	14.1	28.9	4.3	1.6	8.9
Community Health Network of Southern Worcester County	113,702	12.8	89.7	1.2	6.8	2.2	1.3	6.3
Community Partners for Health (Milford)	152,117	14.3	91.6	0.9	3.4	4.1	0.9	6.0
Community Health Network of Greater Metro West (Framingham)	374,478	14.0	83.4	1.7	5.6	9.2	1.3	7.0
Community Wellness Coalition (Worcester)	289,834	14.0	67.6	7.4	15.3	9.7	1.8	8.7
Fitchburg/Gardner Community Health Network	250,362	13.0	81.5	2.7	10.8	4.8	1.4	7.1
Greater Lowell Community Health Network	270,083	13.9	69.1	3.9	8.7	18.2	1.8	8.9
Greater Lawrence Community Health Network	182,025	15.0	47.4	2.1	44.2	6.3	1.7	8.1
Greater Haverhill Community Health Network	144,275	13.1	88.8	1.4	7.5	2.3	1.0	6.0
Community Health Network North (Beverly/Gloucester)	118,280	10.8	93.6	0.7	2.3	3.4	1.5	8.5
North Shore Community Health Network	278,839	13.1	67.8	5.3	20.6	6.2	1.3	8.0
Greater Woburn/Concord/Littleton Community Health Network	208,406	11.1	81.3	1.9	2.5	14.1	1.1	6.3
North Suburban Health Alliance (Medford/Malden/Melrose)	261,844	12.7	73.8	7.8	7.2	11.1	1.2	7.5
Greater Cambridge/Somerville Community Health Network	278,402	11.7	67.0	9.3	9.0	14.5	1.2	7.2
West Suburban Health Network (Newton/Waltham)	253,187	11.1	79.3	3.1	7.1	10.4	1.0	7.1
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	746,914	13.5	40.5	23.6	24.3	11.5	1.6	8.5
Blue Hills Community Health Alliance (Greater Quincy)	365,457	12.9	77.7	6.3	2.3	13.3	1.6	7.5
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	159,254	12.0	68.3	2.0	28.0	1.7	1.2	7.3
Greater Brockton Community Health Network	232,260	13.6	67.1	18.4	4.3	9.9	1.2	7.9
South Shore Community Partners in Prevention (Plymouth)	180,609	13.3	95.6	0.9	1.2	1.9	1.5	6.8
Greater Attleboro-Taunton Health & Education Response	242,659	13.3	88.7	2.9	3.5	4.7	1.1	7.4
Partners for a Healthier Community (Fall River)	140,256	12.0	84.8	5.0	5.9	4.1	1.6	9.6
Greater New Bedford Health & Human Services Coalition	195,533	11.9	77.1	3.9	11.9	6.8	1.8	8.2
Cape and Islands Community Health Network	246,737	9.4	86.7	3.3	3.9	5.9	1.1	5.7

Table 3B.(cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 2003

CHNA Number and CHNA	Births					Deaths			
	Adequate Prenatal Care[6]	Public Payment[7] for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[8]		Neonatal Mortality Rate[8]	
	%	%	%	n	Rate[4]	2003	2001-2003	2003	2001-2003
STATE TOTAL	**84.5**	**28.9**	**27.8**	**4,639**	**22.6**	**4.8**	**4.9**	**3.6**	**3.7**
1. Community Health Network of Berkshire County	69.8	41.0	38.5	122	25.8	4.7	4.8	--[5]	2.9
2. Upper Valley Health Web (Franklin County)	86.8	34.0	33.5	68	23.7	--[5]	2.7	--[5]	2.3
3. Partnership for Health in Hampshire County (Northampton)	88.4	24.4	27.9	73	8.1	--[5]	4.2	--[5]	2.9
4. The Community Health Connection (Springfield)	78.5	53.5	49.0	537	51.1	6.0	6.5	3.9	4.2
5. Community Health Network of Southern Worcester County	83.5	26.7	31.2	100	27.3	7.6	5.9	4.8	4.0
6. Community Partners for Health (Milford)	88.0	11.5	13.5	65	14.4	2.8	5.3	--[5]	4.2
7. Community Health Network of Greater Metro West (Framingham)	87.1	14.2	11.8	108	10.9	3.8	4.4	3.2	3.8
8. Community Wellness Coalition (Worcester)	75.5	31.0	32.1	292	28.2	4.2	6.0	3.5	4.9
9. Fitchburg/Gardner Community Health Network	83.6	24.2	27.6	212	25.9	4.3	4.4	2.8	2.9
10. Greater Lowell Community Health Network	76.6	28.5	27.1	221	25.8	6.9	5.3	4.3	3.6
11. Greater Lawrence Community Health Network	86.1	37.0	39.1	273	43.7	4.8	5.0	3.3	3.6
12. Greater Haverhill Community Health Network	90.5	19.1	21.5	74	17.6	3.7	4.6	3.2	3.7
13. Community Health Network North (Beverly/Gloucester)	94.1	17.6	15.1	32	8.6	5.5	4.5	5.5	4.0
14. North Shore Community Health Network	82.5	35.9	30.9	220	26.5	6.8	4.9	4.6	3.7
15. Greater Woburn/Concord/Littleton Community Health Network	88.1	6.5	8.2	29	5.4	2.2	1.9	--[5]	1.4
16. North Suburban Health Alliance (Medford/Malden/Melrose)	88.8	22.5	18.3	99	14.3	4.2	3.4	3.0	2.4
17. Greater Cambridge/Somerville Community Health Network	88.3	18.2	17.6	86	10.9	3.7	4.1	3.4	2.8
18. West Suburban Health Network (Newton/Waltham)	88.8	9.9	10.1	39	4.0	3.9	3.0	3.2	2.5
19. Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	85.2	43.4	40.6	695	26.3	5.5	6.3	4.3	4.7
20. Blue Hills Community Health Alliance (Greater Quincy)	90.3	16.7	16.0	114	11.8	6.0	4.3	5.5	3.7
21. Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	84.1	48.5	44.5	236	40.1	3.1	5.1	--[5]	3.9
22. Greater Brockton Community Health Network	82.5	35.1	32.8	194	23.5	4.8	4.5	3.5	3.7
23. South Shore Community Partners in Prevention (Plymouth)	87.1	13.2	16.8	73	13.0	5.4	3.4	4.6	2.6
24.Greater Attleboro-Taunton Health & Education Response	82.1	22.1	22.3	163	21.4	2.5	4.6	2.2	4.0
25. Partners for a Healthier Community (Fall River)	87.5	52.3	46.4	187	42.1	4.8	6.3	3.6	5.7
26. Greater New Bedford Health & Human Services Coalition	78.1	44.1	43.6	226	34.6	6.9	6.7	4.3	3.6
27. Cape and Islands Community Health Network	84.5	31.8	26.1	101	16.4	6.1	5.8	4.3	4.0

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). 2003 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 2003

Mother's Age	1990 Births[1]	1990 Rate	2003 Births	2003 Rate[2]	Percent Change in Rate
12-14	124	1.3	56	0.4	-69.2
15-19	7,258	35.1	4,639	22.6	-35.6
20-24	18,115	69.5	11,894	57.9	-16.7
25-29	29,913	107.2	18,436	83.6	-22.0
30-34	25,687	93.9	26,829	107.2	14.2
35-39	9,795	40.1	14,889	54.3	35.4
40-44	1,522	6.9	3,260	12.2	76.8
45+[3]	46	0.3	159	0.7	133.3
Birth rate, ages 15-44[4]	92,290	62.2	79,947	56.2	-9.6
Crude Birth Rate[5]	92,461	15.4	80,167	12.6	-18.2

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. 2003 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts (see Technical Notes in Appendix). 3. Denominator is female population ages 45-49. 4. Rate represents the total number of births to women age 15-44 per 1,000 women age 15 to 44. 5. Births per 1,000 residents (male and female). Includes births to mothers of all age groups and mothers for whom age is unknown.

Figure 1. Trends in the Number of Births by Mother's Age Group, Massachusetts: 1980-2003

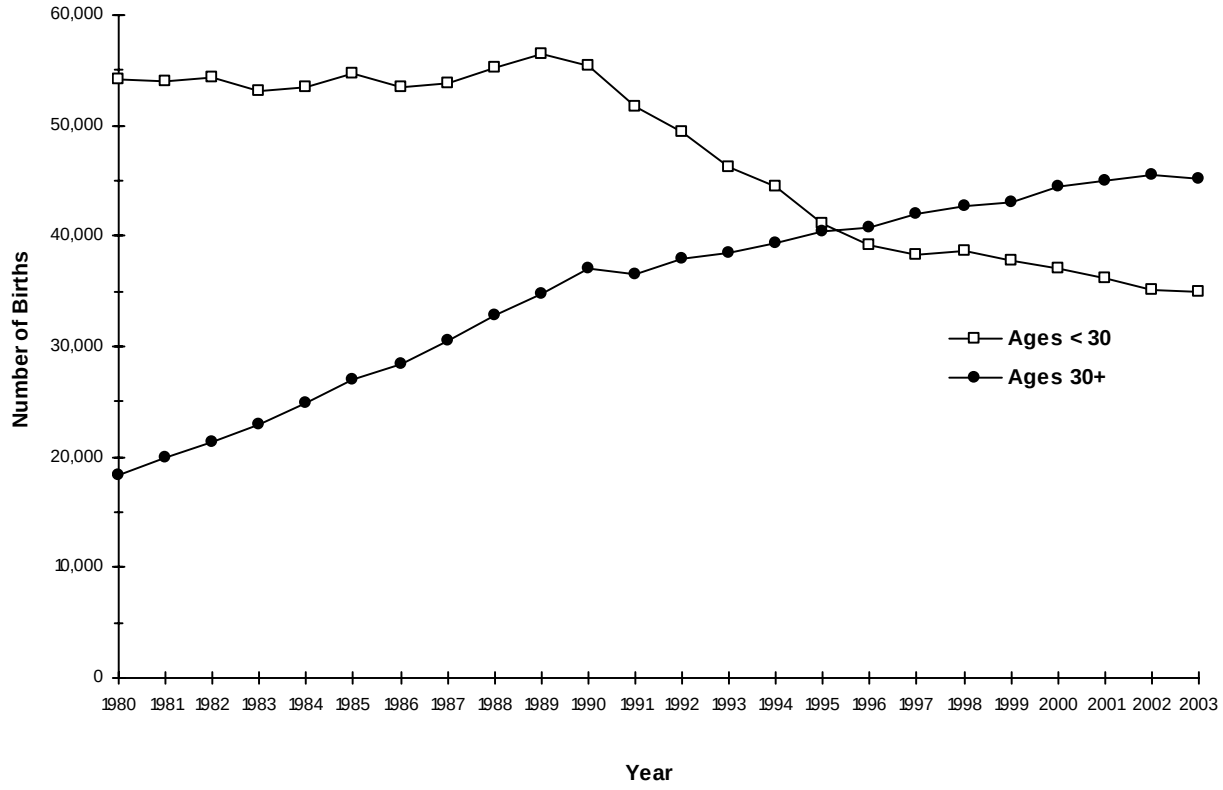
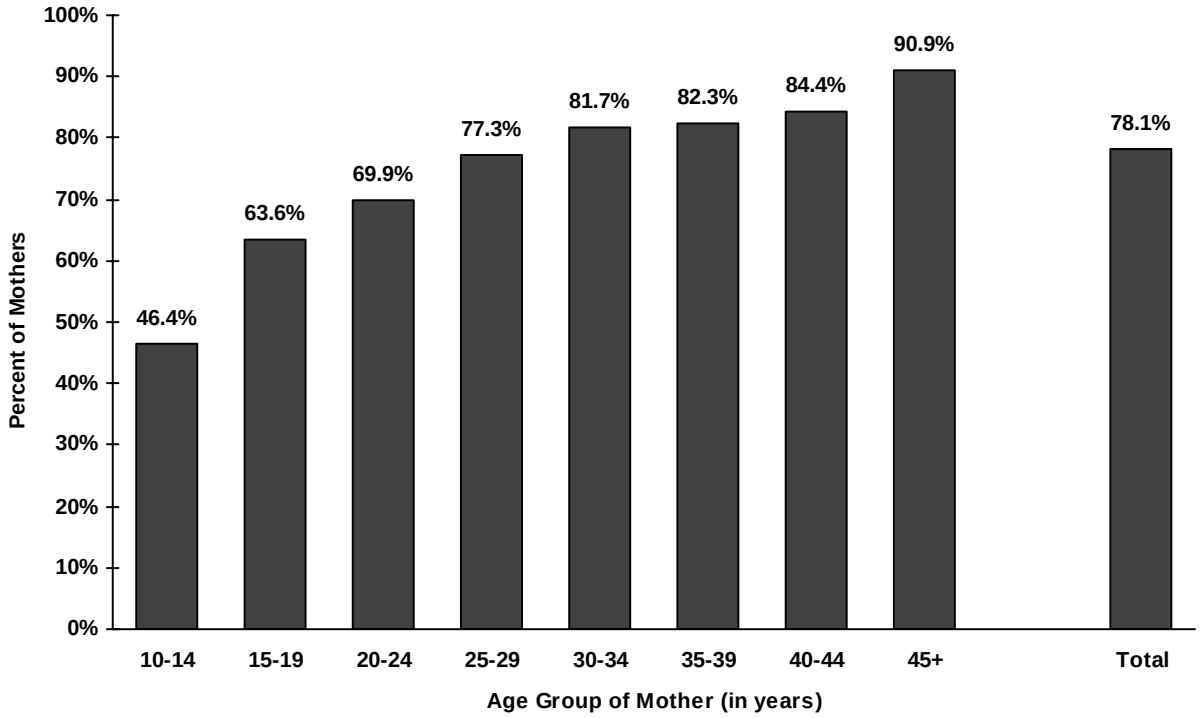


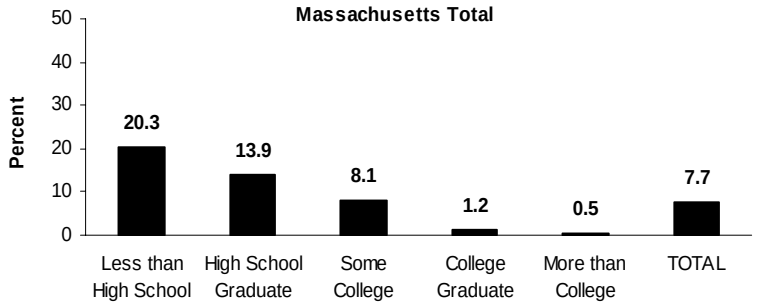
Figure 2. Percent of Mothers Breastfeeding or Intending to Breastfeed[1] by Age Group, Massachusetts [2]: 2003

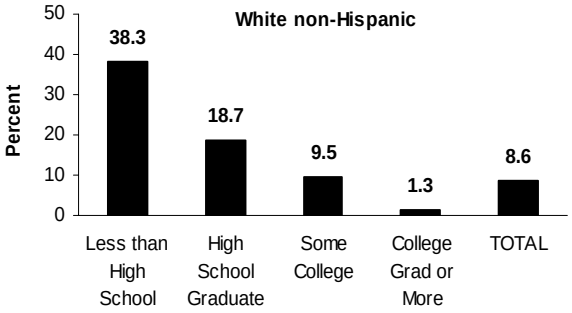


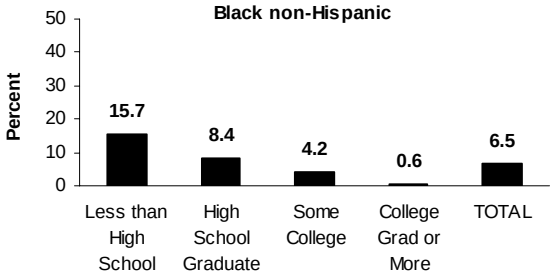
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

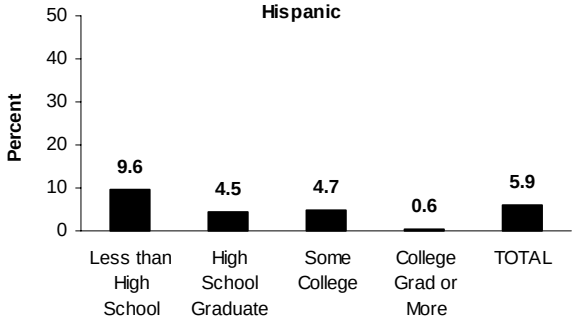
1. Information about breastfeeding is reported by the mother at the time the birth.
2. For race-specific breastfeeding rates see Table 2A.

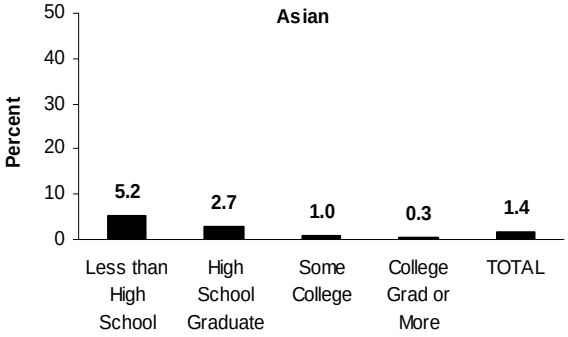
Figure 3. Percent of Mothers who Smoked During Pregnancy[1], by Mother's Race/Hispanic Ethnicity and Educational Attainment, Massachusetts: 2003







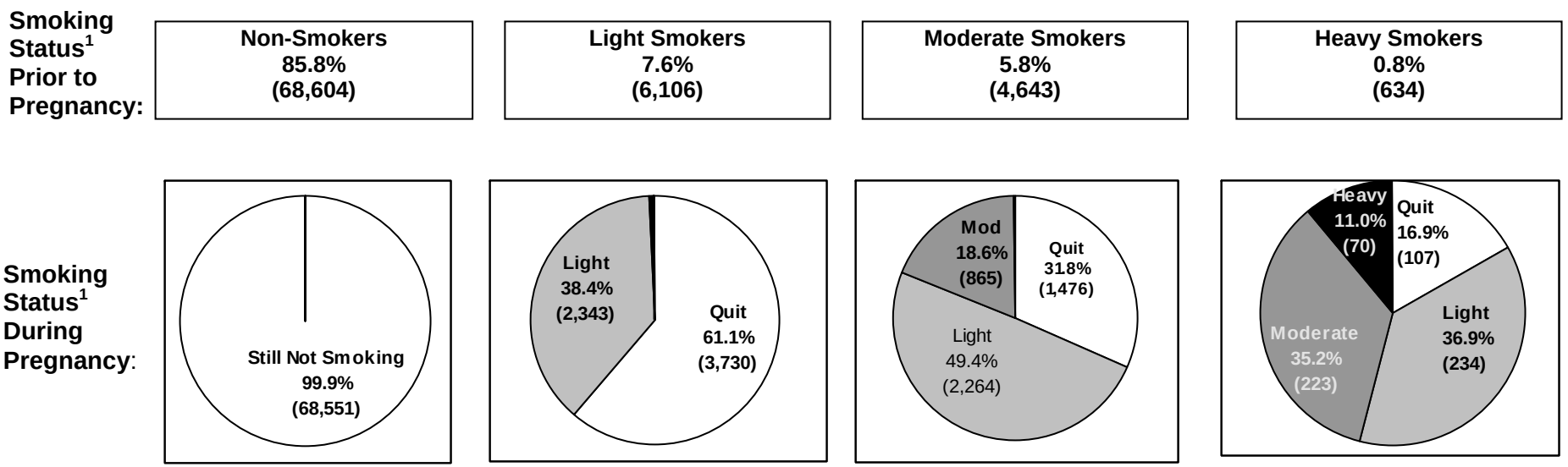




NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Based on information provided on parent worksheet. Due to self-reported nature, data on smoking prevalence should be interpreted cautiously. Mothers with more than one delivery are counted for each birth. 2. Caution should be used with Asian data because of small numbers.

Figure 4. Distribution of Smoking Status[1] during Pregnancy by Smoking Status Prior to Pregnancy, Massachusetts: 2003



99.9% of Non-Smokers continued not smoking (0.1% started smoking)

61.1 % of Light Smokers quit smoking (0.6% increased)

81.2% of Moderate Smokers decreased the number of cigarettes smoked daily or quit (0.5% increased)

89.0% of Heavy Smokers decreased the number of cigarettes smoked daily or quit

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

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

Table 5. Parity[1] by Age of Mother, Massachusetts: 2003

Age of Mother (years)		Total Births	1st	2nd	3rd	4th	5th+
STATE TOTAL	n[2]	80,167	35,286	27,800	11,448	3,619	1,806
	%[3]	100.0	44.1	34.8	14.3	4.5	2.3
10-14	n	56	56	0	0	0	0
	%	100.0	100.0	0.0	0.0	0.0	0.0
15-19	n	4,639	3,950	603	68	5	0
	%	100.0	85.4	13.0	1.5	0.1	0.0
20-24	n	11,894	6,662	3,741	1,143	250	61
	%	100.0	56.2	31.6	9.6	2.1	0.5
25-29	n	18,436	9,045	5,911	2,379	713	343
	%	100.0	49.2	32.1	12.9	3.9	1.9
30-34	n	26,829	10,390	10,564	3,979	1,258	570
	%	100.0	38.8	39.5	14.9	4.7	2.1
35-39	n	14,889	4,216	5,787	3,214	1,067	571
	%	100.0	28.4	39.0	21.6	7.2	3.8
40-44	n	3,260	911	1,142	637	316	244
	%	100.0	28.0	35.1	19.6	9.7	7.5
45+	n	159	53	51	28	10	17
	%	100.0	33.3	32.1	17.6	6.3	10.7

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

1. The number of live births including this birth. 2. State totals include births of unknown parity and unknown mother's age. 3. Percents may not sum to 100.0 due to rounding.

Table 6. Trends in Number and Percent Distribution of Births[1] by Plurality and Age, Massachusetts: 1990-2003

Age Group	Year	Singletons		Multiples[2]						Total births	
				Twins		Triplets or more		Total Multiples			
		n	%	n	%	n	%	n	%	n	%
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
	2002	76,673	95.1	3,708	4.6	243	0.3	3,951	4.9	80,624	100.0
	2003	76,367	95.3	3,551	4.4	249	0.3	3,800	4.7	80,167	100.0
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
	2002	59,736	96.0	2,379	3.8	127	0.2	2,506	4.0	62,242	100.0
	2003	59,347	95.9	2,389	3.9	118	0.2	2,507	4.1	61,854	100.0
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
	2002	16,936	92.1	1,329	7.2	116	0.6	1,445	7.9	18,381	100.0
	2003	17,015	92.9	1,162	6.3	131	0.7	1,293	7.1	18,308	100.0

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: 2003

	Less than High School		High School Graduate		Some College		College Graduate		More than College	
	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]
State Total	**7,915**	**9.9**	**19,762**	**24.7**	**17,944**	**22.4**	**21,484**	**26.9**	**12,882**	**16.1**
Race										
White non-Hispanic	2,856	5.0	12,434	21.6	13,189	22.9	18,258	31.7	10,818	18.8
Black non-Hispanic	753	12.8	2,113	35.8	1,937	32.8	800	13.6	294	5.0
Hispanic	3,353	34.4	3,642	37.3	1,762	18.1	690	7.1	313	3.2
Asian	667	12.8	1,019	19.5	721	13.8	1,539	29.5	1,276	24.4
Age										
20-29	3,723	12.3	10,660	35.2	8,230	27.2	5,546	18.3	2,117	7.0
30-39	1,478	3.6	6,752	16.2	8,730	21.0	14,751	35.4	9,903	23.8
40+	138	4.1	551	16.2	693	20.3	1,165	34.2	860	25.2
Non-U.S.-born[2]	3,130	39.6	5,850	29.6	3,664	20.4	3,929	18.3	2,752	21.4
Unmarried	5,762	72.8	9,458	47.9	5,144	28.7	1,414	6.6	433	3.4
Publicly-financed prenatal care	6,230	80.0	10,093	52.1	4,756	26.9	1,286	6.1	291	2.3
Very low birthweight[3]	124	1.6	313	1.6	251	1.4	285	1.3	131	1.0
Low birthweight[4]	736	9.3	1,645	8.3	1,330	7.4	1,517	7.1	868	6.7
Adequate prenatal care[5]	5,517	70.7	15,824	80.9	15,155	85.1	18,990	88.8	11,591	90.4
Cesarean section delivery	1,761	22.4	5,541	28.2	5,554	31.1	6,574	30.7	3,922	30.5
Breastfeeding[6]	4,900	62.5	13,248	68.1	13,312	75.3	18,341	87.3	11,518	92.0
Multiple births	164	2.1	712	3.6	864	4.8	1,286	6.0	770	6.0
Smoking during pregnancy	1,609	20.3	2,746	13.9	1,451	8.1	254	1.2	58	0.5

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

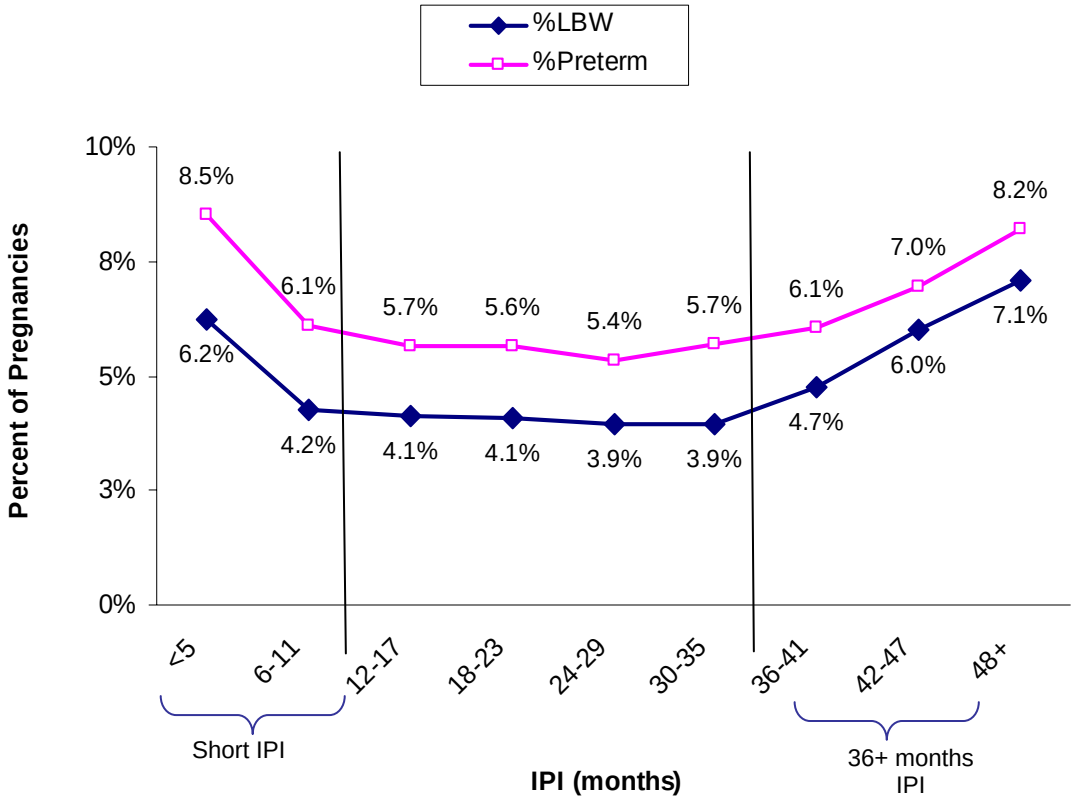
1. For state total, race and age categories, percentages are based on row totals. For all other categories, percentages are based on state column totals. 2. Includes women born outside of the 50 U.S. States, Washington D.C., and Puerto Rico/U.S. territories (the U.S. Virgin Islands, and Guam). 3. Very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

Table 8A. Interpregnancy Intervals[1] (IPI) and Birth Outcomes. Pregnancies to Multiparous[2] Mothers, Massachusetts: 2003

	IPI (months)	Pregnancies	Birth Weight (BW)				Gestational Age (GA)			
			Low Birthweight (<2,500 g)		Very Low Birthweight (<1,500 g)		Preterm[3] (<37 wk)		Very Early[4] (<28 wk)	
			n	% LBW[5]	n	% VLBW	n	% Preterm	n	% VEGA
	State Total	42,329	2,162	**5.1**	357	**0.8**	2,773	**6.6**	166	**0.4**
	<5	1,879	117	**6.2**	27	**1.4**	159	**8.5**	14	**0.7**
	6-11	4,836	205	**4.2**	34	**0.7**	295	**6.1**	19	**0.4**
	12-17	6,101	251	**4.1**	36	**0.6**	344	**5.7**	21	**0.3**
	18-23	5,492	225	**4.1**	28	**0.5**	309	**5.6**	12	**0.2**
	24-29	4,519	178	**3.9**	24	**0.5**	241	**5.4**	10	**0.2**
	30-35	3,396	134	**3.9**	17	**0.5**	192	**5.7**	10	**0.3**
	36-41	2,705	128	**4.7**	20	**0.7**	163	**6.1**	8	**0.3**
	42-47	2,119	127	**6.0**	18	**0.8**	147	**7.0**	5	**0.2**
	48+	11,282	797	**7.1**	153	**1.4**	923	**8.2**	67	**0.6**
Short	**< 12**	6,715	322	**4.8**	61	**0.9**	454	**6.8**	33	**0.5**
	12-35	19,508	788	**4.0**	105	**0.5**	1,086	**5.6**	53	**0.3**
	36+	16,106	1,052	**6.5**	191	**1.2**	1,233	**7.7**	80	**0.5**

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

Figure 5A. Interpregnancy Interval (IPI)[1] vs. LBW[2] and Preterm[3] Pregnancies to Multiparous Mothers[4], Massachusetts: 2003



NOTE: Percentages are calculated based on pregnancies to mothers who gave birth to their 2nd or later child in 2003 and with known values for the characteristic(s) of interest, unless otherwise stated.

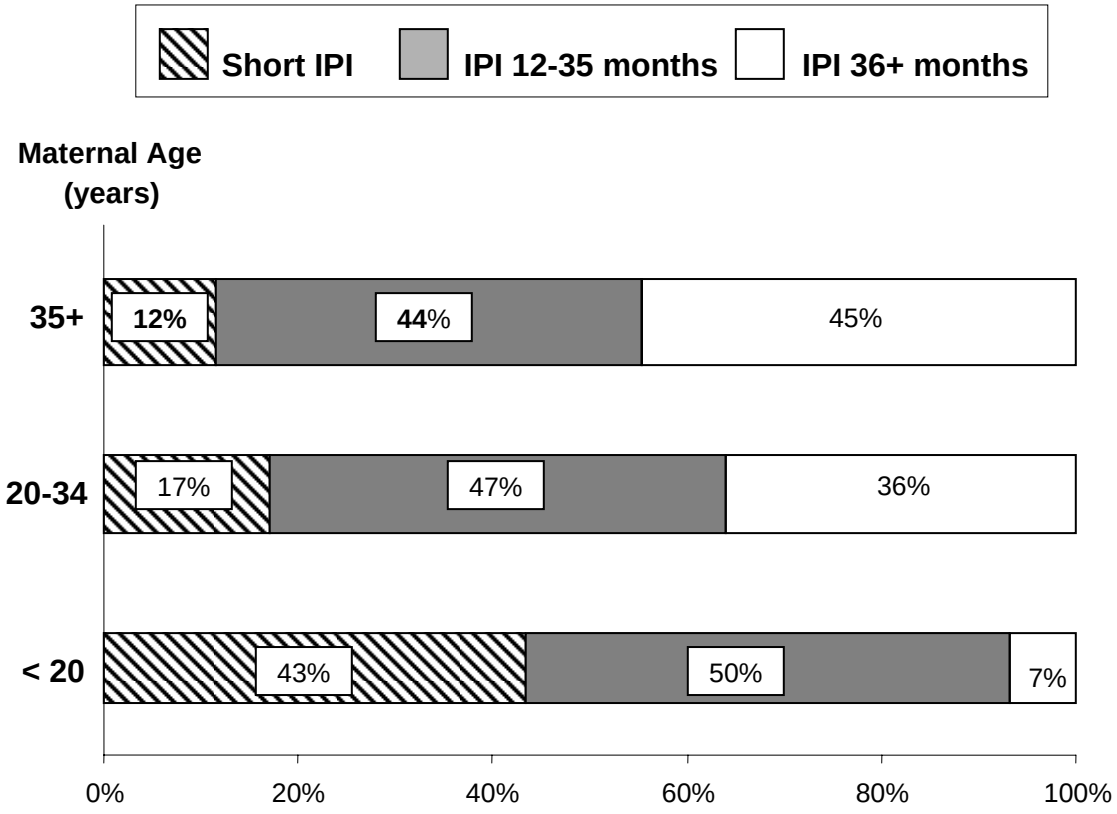
1. See Table 8A.
2. Low birthweight: less than 2,500 grams or 5.5 pounds.
3. Preterm delivery is defined as gestational age less than 37 weeks. It is also known as premature delivery.
4. Multiparous is defined a shaving given birth 2 or more times.

Table 8B. Interpregnancy Interval[1] (IPI) by Maternal Characteristics Pregnancies to Multiparous Mothers[2], Massachusetts: 2003

	Total Pregnancies Parity >1	IPI					
		Short (< 12 months)		(12-35 months)		(36+ months)	
		N	%	N	%	N	%
State Total[3]	**42,329**	**6,715**	**15.9%**	**19,508**	**46.1%**	**16,106**	**38.0%**
Age							
< 20	632	274	43.4%	315	49.8%	43	6.8%
20-34	29,401	5,017	17.1%	13,810	47.0%	10,574	36.0%
35+	12,296	1,424	11.6%	5,383	43.8%	5,489	44.6%
Race Ethnicity							
White non-Hispanic	30,220	4,988	16.5%	15,137	50.1%	10,095	33.4%
Black non-Hispanic	3,318	449	13.5%	1,098	33.1%	1,771	53.4%
Hispanic	5,564	827	14.9%	1,969	35.4%	2,768	49.7%
Asian non-Hispanic	2,430	341	14.0%	1,017	41.9%	1,072	44.1%
Education							
High school or less	15,071	2,314	15.4%	5,529	36.7%	7,228	48.0%
College or some college	20,996	3,351	16.0%	10,201	48.6%	7,444	35.5%
More than college	6,206	1,044	16.8%	3,751	60.4%	1,411	22.7%
Delivery Payment Source							
Public	12,464	1,994	16.0%	4,484	36.0%	5,986	48.0%
Private	28,750	4,529	15.8%	14,493	50.4%	9,728	33.8%
EOHHS Region of Residency							
Western	5,131	853	16.6%	2,209	43.1%	2,069	40.3%
Central	5,843	873	14.9%	2,702	46.2%	2,268	38.8%
Northeast	8,944	1,426	15.9%	4,114	46.0%	3,404	38.1%
Metrowest	9,327	1,553	16.7%	4,917	52.7%	2,857	30.6%
Southeast	8,226	1,268	15.4%	3,736	45.4%	3,222	39.2%
Boston	4,858	742	15.3%	1,830	37.7%	2,286	47.1%
Town of Residency[4]		**10 Largest by %**		**10 Largest by %**		**10 Largest by %**	
		Billerica	(20.7%)	Needham	(68.8%)	Chelsea	(60.3%)
		Weymouth	(20.5%)	Wellesley	(61.1%)	Revere	(51.6%)
		Holyoke	(20.5%)	Arlington	(57.7%)	Lynn	(49.8%)
		Quincy	(19.8%)	Natick	(57.5%)	Fall River	(49.7%)
		Natick	(19.4%)	Chelmsford	(57.4%)	Everett	(49.6%)
		Westfield	(19.3%)	Franklin	(56.6%)	Malden	(49.6%)
		Dracut	(18.9%)	Brookline	(56.2%)	Lawrence	(48.8%)
		Springfield	(18.6%)	Braintree	(54.9%)	Brockton	(48.8%)
		Lowell	(18.6%)	Mansfield	(52.8%)	New Bedford	(48.0%)
		Methuen	(18.4%)	Shrewsbury	(52.2%)	Randolph	(47.2%)

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

Figure 5B. Interpregnancy Interval (IPI)[1] Distribution by Maternal Age
Pregnancies to Multiparous[2] Mothers, Massachusetts: 2003



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

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

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

Healthy People 2010 Objectives (Focus Area 16: Maternal, Infant and Child Health[2])	HP2010 Target	Massachusetts				Has Massachusetts achieved HP2010 target? ✓ = YES ○ = NO, but within 25% of target ● = NO, > 25% from target
		2000	2001	2002	2003	
Fetal, Infant, and Maternal Deaths						
16-1a. Fetal Mortality Rate[3]	4.1	5.3	4.7	4.6	5.7	●
16-1b. Perinatal Mortality Rate[4]	4.5	5.4	5.6	4.7	5.8	●
16-1c. Infant Mortality Rate[5]	4.5	4.6	5.0	4.9	4.8	○
16-1d. Neonatal Mortality Rate[6]	2.9	3.5	3.8	3.7	3.6	○
16-1e. Postneonatal Mortality Rate[7]	1.2	1.1	1.2	1.2	1.2	✓
16-4. Maternal Mortality Ratio[8]	3.3	1.2	4.9	2.4	4.9	●
Risk Factors						
16-10a. Low Birthweight[9] (%)	5.0	7.1	7.2	7.5	7.6	●
16-10b. Very Low Birthweight[10] (%)	0.9	1.4	1.4	1.4	1.4	●
16-11a. Preterm[11] (%)	7.6	8.3	8.0	8.5	8.7	○
Prenatal Care						
16-6a. Care beginning in first trimester (%)	90	83.8	84.3	84.2	83.9	○
16-6b. Early and adequate care[12] (%)	90	83.3	85.2	85.0	84.5	○
Obstetrical Care						
16-8. Very Low Birthweight[10] Infants born at Level III Hospitals[13] (%)	90	83.4	79.1	81.2	79.1	○
16-9a. Cesarean Sections: Low-Risk[14] Women Giving Birth for the First Time (%)	15	20.5	22.0	24.0	25.0	●
16-9b. Cesarean Sections: Low-Risk[14] Women with Prior Cesarean Section (%)	63	72.7	79.2	84.2	86.7	●
Breastfeeding						
16-19a. Breastfeeding[15] (%)	75	73.8	75.3	76.1	78.1	✓
Prenatal Substance Exposure						
16-17c. Abstinence from Smoking (%)	99	90.3	90.9	92.1	92.3	○

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

1. National health promotion and disease prevention agenda established by the U.S. Dept. of Health and Human Services. 2. Goal: to improve the health and well-being of women, infants, children, and families. 3. Number of fetal deaths per 1,000 fetal deaths plus live births. 4. Number of fetal and infant deaths in perinatal period (from 28 weeks gestation (inclusive) to 6 days (inclusive) after birth per 1,000 fetal deaths plus live births. 5. Number of infant deaths (under one year of age) per 1,000 live births. 6. Number of deaths to infants less than 28 days of age per 1,000 live births. 7. Number of deaths to infants 28-364 days of age per 1,000 live births. 8. See Definition of Rates section in Appendix. 9. Less than 2,500 grams, or 5.5 pounds. 10. Less than 1,500 grams, or 3.3 pounds. 11. Born before completion of 37th week of gestation. 12. Based on Adequacy of Prenatal Care Utilization Index (see glossary). 13. Facilities for high-risk deliveries and neonates that can provide care to very small infants, including mechanical ventilation and neonatal surgery and special care for transferred patients and for which a full-time neonatologist serves as the director. 14. "Low-risk"= full term birth, singleton, vertex presentation. 15. HP2010 specifies objective as mother breastfeeding in "early postpartum period." Massachusetts data is based on mother's self-report of current breastfeeding or intention to breastfeed.

CHAPTER 2

TEEN BIRTH CHARACTERISTICS

Birth Numbers and Rates

In 2003, the number of births to Massachusetts women ages 15-19 (4,639) was almost the same as the number for this age group in 2002 (4,642) (Table 1). The number of resident live teen births in Massachusetts has decreased by 29% since 1992 (6,555 births). In 2003, about one-third of the teen births were to women ages 15-17 (1,473 births), and two-thirds were to women ages 18-19 (3,166) (Table 10).

The annual number of births to young teens (ages 12-14) continued to decline in 2003, from a peak of 155 in 1994 to the current low of 56. This represents a 23% decline in births in this age group from 2002 (Table 4).

The Massachusetts teen birth rate decreased by 36% from 35.4 births per 1,000 women ages 15-19 in 1990 to 22.6 in 2002, and remained the same in 2003 (Table 1). The Massachusetts teen birth rate in 2003 was 46% below the preliminary U.S. teen birth rate of 41.7 births per 1,000 women ages 15-19 (National Vital Statistics Reports, Vol. 53, No. 9, November 23, 2004, p. 3) (Figure 7).

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

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

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

In 2003, 55.4% of births to young teens (ages 12-14) were to Hispanic mothers (31 births); 21.4% were to white non-Hispanic mothers (12 births); and 19.6% were to black non-Hispanic mothers (11 births).

In 2003, 47.7% of births to Massachusetts residents ages 15-19 were to white non-Hispanic mothers; 33.5% were to Hispanic mothers; 11.8% were to black non-Hispanic mothers; 3.9% were to Asian mothers; and 3.2% were to mothers of other races (Table 10).

In 2003, birth rates among resident teen women were in the same relative order by race and Hispanic ethnicity as they were in 1993 (Hispanic and black non-Hispanic women had the highest teen birth rates, while Asian and white non-Hispanic women had the lowest), and they have decreased for all groups compared with 1993 rates. However, black non-Hispanics have had the greatest decrease, 55% from 1993 (88.7) to 2003 (40.3); the Hispanic teen birth rate has decreased by 40% (from 130.0 to 78.3); and the Asian teen birth rate has decreased by 38% (from 26.5 to 16.5). The white non-Hispanic teen birth rate declined the least at 36% (from 21.5 to 13.7) (Figure 8).

In 2003, there were slight increases in teen birth rates for some groups compared with the previous year. In 2003, teen birth rates for white non-Hispanics increased by 2% from 2002 (13.7 vs. 13.4). The Hispanic teen birth rate increased 3% over its 2002 rate (78.3 vs. 76.4). The black teen birth rate declined from 45.9 to 40.3 (12%) and the Asian teen birth rate decreased from 18.6 to 16.5 (11.3%).

Seventy-six percent of teen births were to mothers who were born in the 50 U.S. states or the District of Columbia. Eight percent of teen births were to mothers born in Puerto Rico or other U.S. Territories, and the percentage of births to non-U.S.-born teen mothers was 15% (Table 10).

Low Birthweight

In 2003, 9.3% of the infants born to women under age 20 were low birthweight (less than 2,500 grams or 5.5 pounds) as compared with 7.5% of infants born to Massachusetts women ages 20 and older (Figure 6).

The percentage of low birthweight infants was 39% greater for teen mothers ages 15-17 (11.1%) than for teens ages 18-19 (8.0%) (Table 10).

Preterm

In 2002, 9.1% of infants born to women under age 20 were preterm (born before the mother had completed the 37th week of pregnancy) as compared with 8.7% of infants born to Massachusetts women ages 20 and older (Figure 6).

The percentage of preterm infants was 11% greater for teen mothers ages 15-17 (8.8%) than for teens ages 18-19 (7.9%) (Table 10).

Prenatal Care

In 2003, of the births to women under age 20, 72.0% of the mothers received adequate prenatal care, compared with 85.3% of births to women ages 20 and over, which is 18% greater (Figure 6). (Adequacy of prenatal care is a measure of the timing and number of prenatal care visits.)

The percentage of women ages 15-17 that received inadequate prenatal care (21.1%) was 23% greater for women ages 18-19 (17.1%) (Table 10). Seventy-five percent of women less than 20 years of age had their prenatal care funded by public sources, compared with 26% of women ages 20 and over (Figure 6).

Teen Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 2003, 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 (82.9), Springfield (79.3), New Bedford (56.7), Fall River (55.9), and Pittsfield (52.9). These rates range from over two times to almost four times the statewide teen birth rate of 22.6. In 2003, all but New Bedford experienced increases in teen birth rates from the previous year.

- In 2003, teen birth rates were lowest in Arlington (9.1), Medford (8.6), and Cambridge (7.2). Newton and Brookline had less than 5 teen births each (Table 11).

- Among births to teen mothers, eleven communities (Peabody, Arlington, Weymouth, Barnstable, Lowell, Malden, Framingham, Haverhill, Lawrence, New Bedford, and, Worcester) recorded low birthweight percentages that were at least 25% higher than the statewide average of 9.3% for teen mothers (Table 11).

- Over 85% of mothers ages 15-19 living in Somerville and Springfield had their prenatal care paid for by a public source. Only 45% of mothers ages 15-19 living in Methuen had their prenatal care paid for by a public source (Table 11).

- Over 80% of mothers ages 15-19 living in Cambridge, Haverhill, Framingham, Lawrence, Quincy, and Chicopee received adequate prenatal care. In contrast, fewer than 55% of teen mothers living in Peabody, Pittsfield, and Lowell received adequate prenatal care (Table 11).

Communities with Highest Teen Births

Among the communities with the greatest number of teen births, teen birth rates were highest in Holyoke (91.9), Lawrence (82.9), Springfield (79.3), Southbridge (66.5), and Chelsea (61.7). These communities had rates of almost three to greater than 4 times the statewide rate of 22.6 teen births per 1,000 females 15-19 (Table 12).

Tobacco Use

In 2003, 16.8% of teen births were to mothers who reported smoking cigarettes during their pregnancies (Table 10). In comparison, only 7.1% of mothers ages 20 and over reported smoking during pregnancy (Figure 6).

For teen mothers ages 18-19, 18.2% smoked cigarettes during their pregnancies compared with 13.7% of mothers ages 15-17 (Table 10).

Parity

In 2003, 85.4% 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 13.0%, and only 1.6% were the mother's third or greater live-born infants (Table 10).

As expected, mothers ages 18-19 had the greatest percentage of previous live births; almost three times higher (18.0% v. 7.3%) than teens ages 15-17 (Table 10).

Plurality

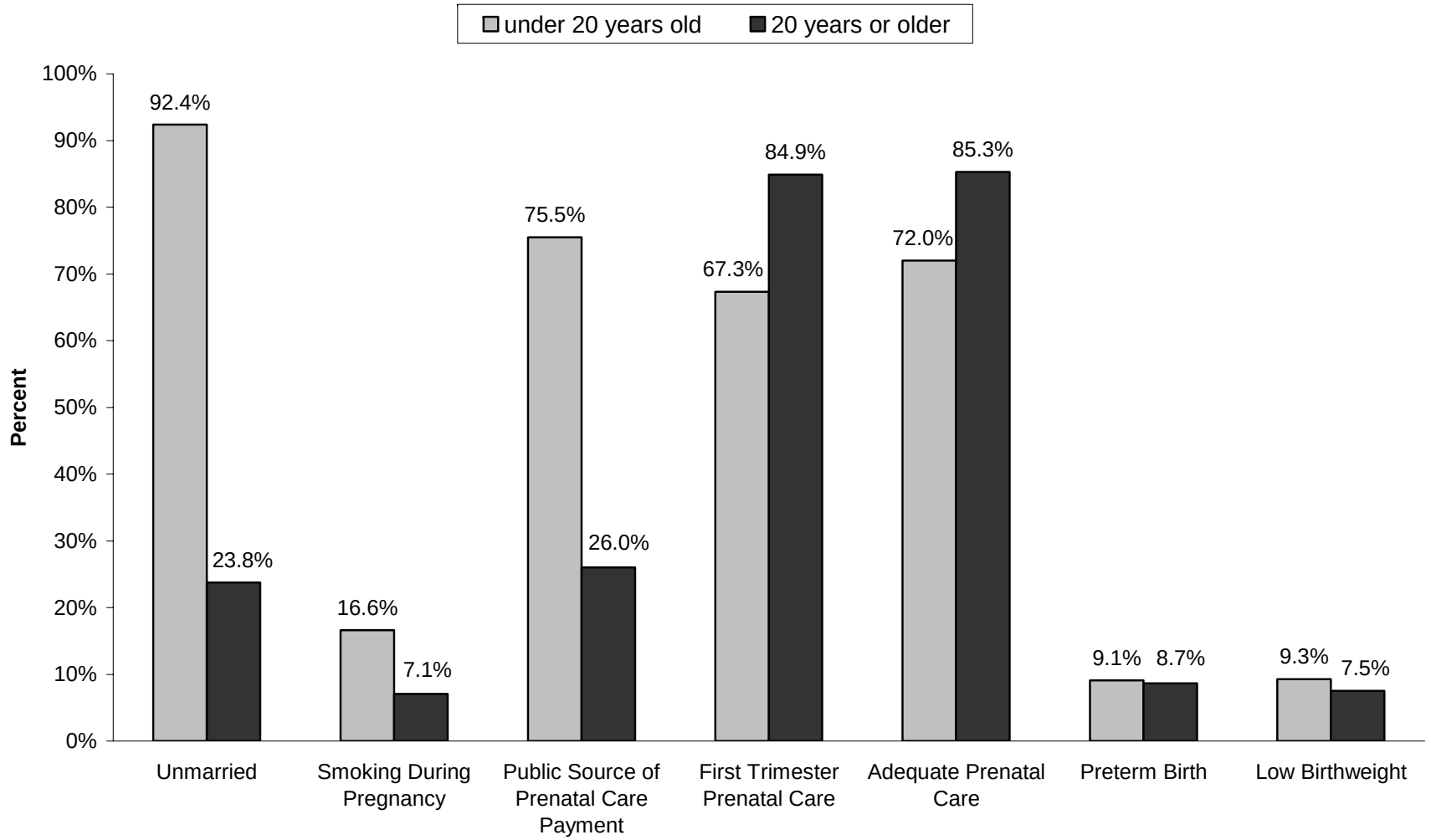
Plurality represents the number of births to a woman in one delivery. In 2003, 98.6% of all births to mothers ages 15-19 were singletons, and 1.4% were twins or higher order multiple births (Table 10).

Table 10. Summary of Selected Teen Birth Characteristics, Massachusetts: 2003

	Age 15-17		Age 18-19		Combined Ages 15-19	
	N	%[1]	N	%[1]	N	%[1]
State total	1,473	31.8%	3,166	68.2%	4,639	100.0%
Maternal Demographics						
Race/Hispanic Ethnicity	N	%[2]	N	%[2]	N	%[2]
White non-Hispanic	581	39.5%	1,630	51.5%	2,211	47.7%
Black non-Hispanic	190	12.9%	356	11.3%	546	11.8%
Asian	67	4.6%	113	3.6%	180	3.9%
Hispanic	588	40.0%	962	30.4%	1,550	33.5%
Other	45	3.1%	101	3.2%	146	3.2%
Birthplace						
U.S. States / D.C.	1,130	76.8%	2,402	75.9%	3,532	76.2%
Puerto Rico / US Terr.	149	10.1%	239	7.6%	388	8.4%
Non-U.S.-born	192	13.1%	523	16.5%	715	15.4%
Prenatal care funding						
Public	1,049	72.8%	2,374	76.4%	3,423	75.3%
Private, other	392	27.2%	732	23.6%	1,124	24.7%
Pregnancy-Related Factors						
Adequacy of Prenatal Care[3]						
Adequate Total[4]	1,001	68.9%	2,306	73.8%	3,307	72.2%
Adequate Intensive	481	33.1%	1,076	34.4%	1,557	34.0%
Adequate Basic	520	35.8%	1,230	39.3%	1,750	38.2%
Intermediate	144	9.9%	285	9.1%	429	9.4%
Inadequate/None	307	21.1%	535	17.1%	842	18.4%
Unknown	21	1.4%	40	1.3%	61	1.3%
Parity[6]						
1	1,360	92.7%	2,590	82.0%	3,950	85.4%
2	104	7.1%	499	15.8%	603	13.0%
3+	3	--[5]	70	2.2%	73	1.6%
Smoking during Pregnancy						
Yes	202	13.7%	576	18.2%	778	16.8%
No	1,268	86.3%	2,585	81.8%	3,853	83.2%
Birth Outcomes						
Birthweight						
< 500 g	6	0.4%	7	0.2%	13	0.3%
500-1,499 g	26	1.8%	46	1.5%	72	1.6%
1,500-2,499 g	130	8.9%	213	6.7%	343	7.4%
LBW (<2,499 g)	162	11.1%	266	8.0%	428	9.3%
2,500-3,999 g	1,245	84.9%	2,715	85.9%	3,960	85.6%
4000+ g	60	4.1%	178	5.6%	238	5.1%
Gestational age						
< 28 weeks	20	1.4%	27	0.9%	47	1.0%
< 37 weeks	128	8.8%	247	7.9%	375	8.2%
37-42 weeks	1,298	89.7%	2,853	91.2%	4,151	90.8%
43+ weeks	1	--[5]	0	0.0%	1	--[5]
Plurality						
Singleton	1,455	98.8%	3,118	98.5%	4,573	98.6%
Multiple birth	18	1.2%	48	1.5%	66	1.4%

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. Percents are based on state total of the age group. 3. Based on Adequacy of Prenatal Care Utilization (APNCU) Index. 4. Adequate Total = Adequate Basic + Adeq. Intensive. 5. Calculations based on fewer than five events are excluded. 6. Number of live births including the current birth.

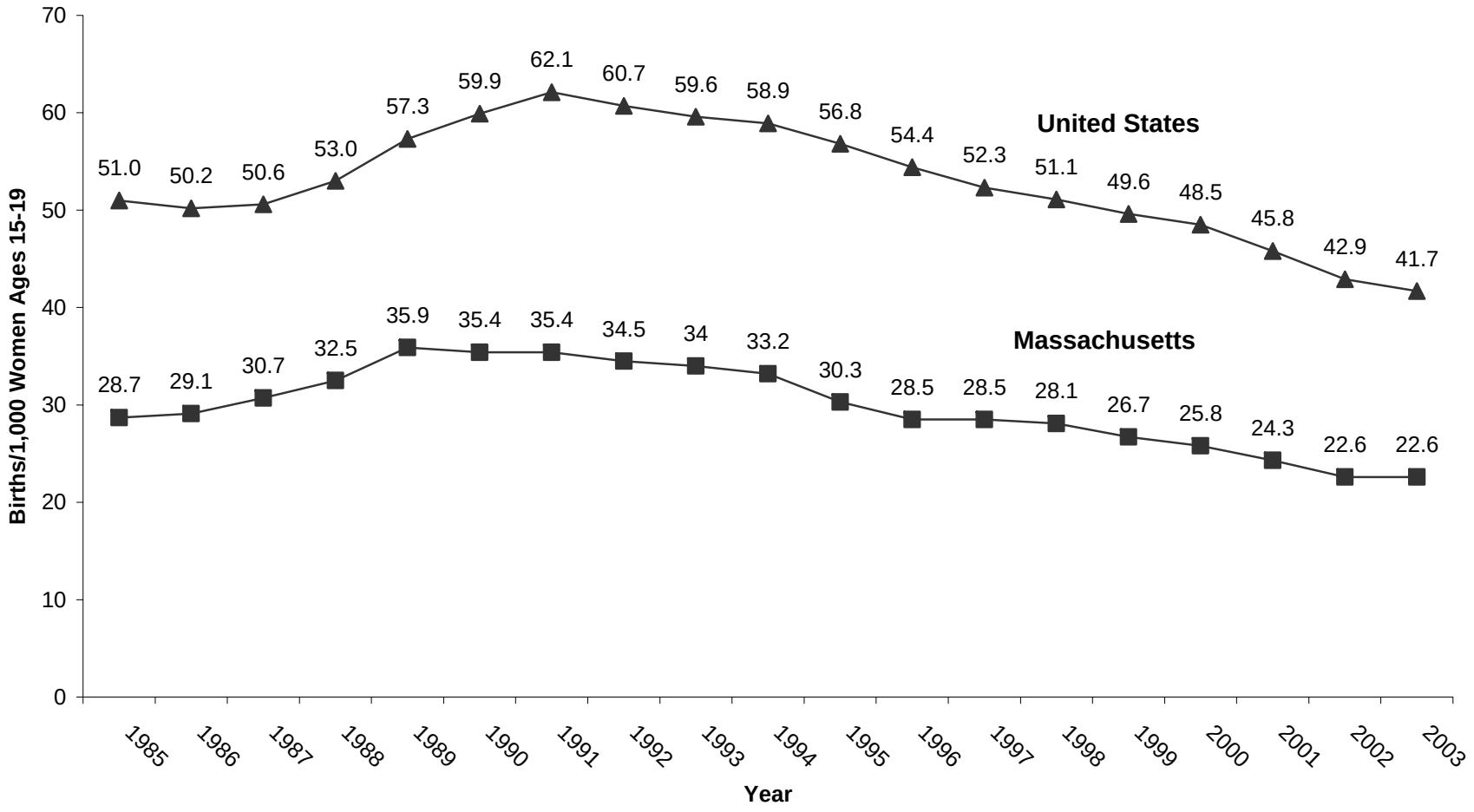
Figure 6. Comparison of Teen vs. Adult Births, Selected Characteristics, Massachusetts: 2003



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.).

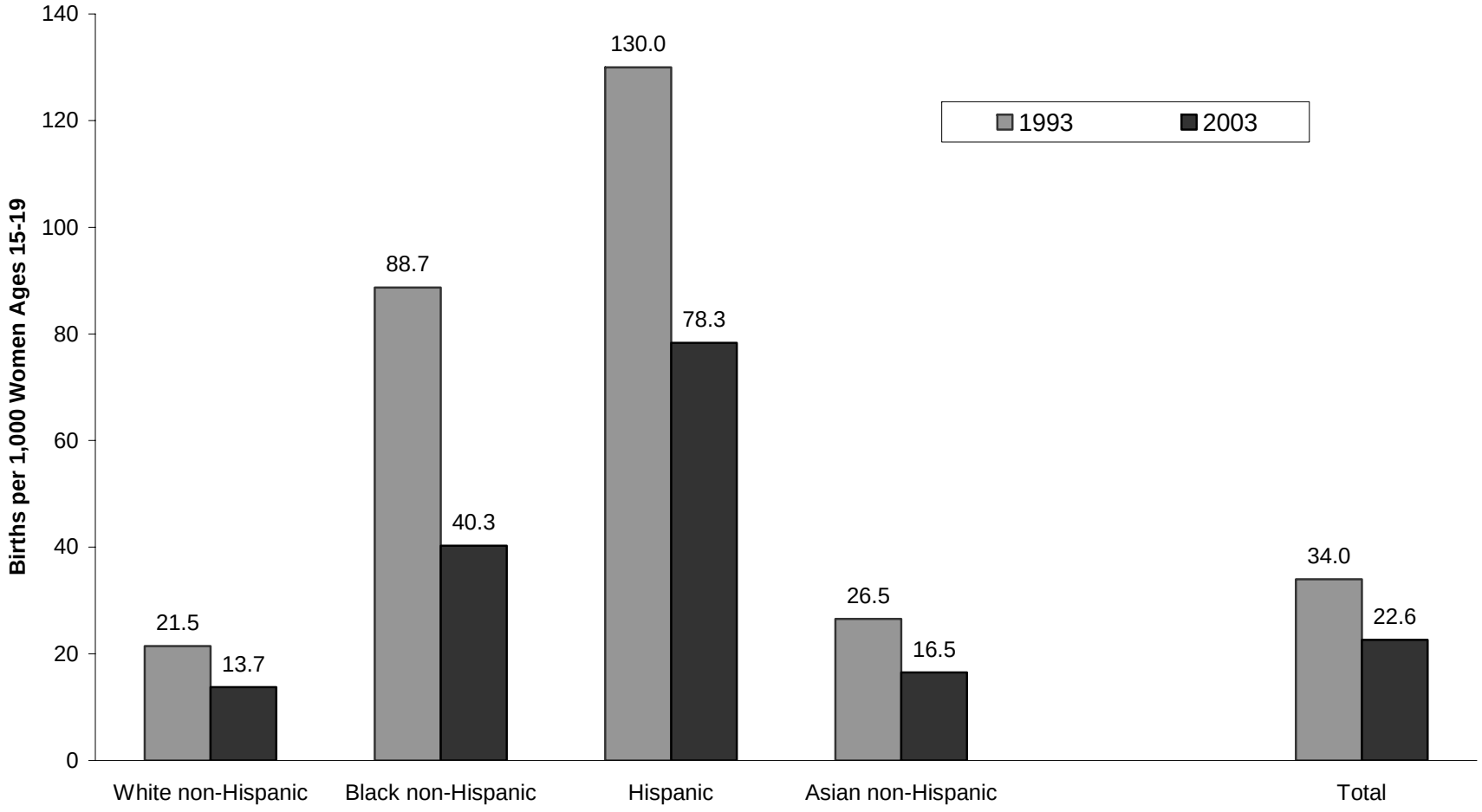
Figure 7. Trend in Birth Rates Among Women Ages 15-19, Massachusetts and the United States: 1985-2003



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. 2000-2003 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

Figure 8. Birth Rates Among Women Ages 15-19 by Mother's Race/Hispanic Ethnicity, Massachusetts: 1993 and 2003



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. 2003 birth rates are calculated using DPH 2000 population estimates, based on U.S. Census 2000 population counts.

Table 11. Resident Teen Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 2003

Municipality	Total Population Rank	Female Population, age 15-19	Number of Teen Births	Teen Birth Rate[2]	Mother's Race and Hispanic Ethnicity (% of teen births)			
					White non-Hispanic	Black non-Hispanic	Hispanic	Asian or other[3]
State Total		**205,277**	**4,639**	**22.6**	**47.7**	**11.8**	**33.5**	**7.0**
Arlington	29	767	7	9.1	57.1	28.6	14.3	0.0
Attleboro	30	1,151	45	39.1	68.9	4.4	8.9	17.8
Barnstable	25	1,287	29	22.5	65.5	6.9	17.2	10.3
Boston	1	22,240	573	25.8	11.7	41.4	38.9	7.7
Brockton	6	3,304	148	44.8	33.8	26.4	14.9	25.0
Brookline	17	1,382	1	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	5	3,733	27	7.2	37.0	25.9	25.9	11.1
Chicopee	21	1,809	59	32.6	57.6	3.4	37.3	1.7
Fall River	8	2,915	163	55.9	77.3	4.3	9.2	9.2
Framingham	14	1,925	38	19.7	44.7	5.3	47.4	2.6
Haverhill	16	1,793	53	29.6	67.9	3.8	24.5	3.8
Lawrence	13	2,847	236	82.9	7.2	1.7	89.0	2.1
Lowell	4	3,913	174	44.5	28.7	1.7	32.8	36.8
Lynn	9	2,990	145	48.5	32.4	9.0	43.4	15.2
Malden	18	1,391	29	20.8	72.4	6.9	6.9	13.8
Medford	20	1,749	15	8.6	53.3	20.0	26.7	0.0
Methuen	28	1,264	29	22.9	37.9	3.4	51.7	6.9
New Bedford	7	2,978	169	56.7	56.8	3.6	33.7	5.3
Newton	11	3,411	3	--[5]	--[5]	--[5]	--[5]	--[5]
Peabody	24	1,300	24	18.5	70.8	0.0	29.2	0.0
Pittsfield	27	1,361	72	52.9	77.8	11.1	9.7	1.4
Plymouth	23	1,577	28	17.8	85.7	3.6	10.7	0.0
Quincy	10	1,950	43	22.1	53.5	14.0	11.6	18.6
Revere	26	1,215	50	41.2	50.0	6.0	26.0	18.0
Somerville	12	2,087	46	22.0	39.1	19.6	39.1	2.2
Springfield	3	6,037	479	79.3	14.2	22.3	61.4	1.9
Taunton	19	1,652	58	35.1	77.6	5.2	13.8	3.4
Waltham	15	2,251	26	11.6	46.2	7.7	42.3	3.8
Weymouth	22	1,331	28	21.0	89.3	0.0	3.6	7.1
Worcester	2	6,918	263	38.0	49.8	5.7	37.3	7.2

Table 11 (cont.). Resident Teen Birth Characteristics, 30 Largest Municipalities, Massachusetts: 2003

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**	**92.3**	**9.3**	**9.2**	**34.0**	**38.2**	**9.4**	**18.4**
Arlington	--[5]	85.7	14.3	--[5]	71.4	--[5]	--[5]	--[5]
Attleboro	67.5	93.3	8.9	--[5]	28.9	33.3	15.6	22.2
Barnstable	69.0	86.2	13.8	--[5]	17.2	58.6	--[5]	17.2
Boston	75.9	94.9	7.7	8.1	32.2	44.3	8.0	15.5
Brockton	84.7	92.6	8.8	10.8	36.7	35.4	8.8	19.1
Brookline	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	57.7	96.3	11.1	--[5]	46.2	34.6	--[5]	--[5]
Chicopee	81.4	93.2	8.5	8.6	20.3	67.8	--[5]	11.9
Fall River	82.9	91.4	7.5	8.0	64.0	14.3	3.7	18.0
Framingham	64.9	68.4	13.2	--[5]	42.1	39.5	--[5]	13.2
Haverhill	59.6	96.2	13.2	9.6	47.2	34.0	--[5]	17.0
Lawrence	71.5	91.5	12.3	11.9	35.2	47.9	5.9	11.0
Lowell	83.7	92.5	13.8	9.8	21.4	28.9	20.2	29.5
Lynn	80.4	89.0	7.6	6.9	36.4	30.8	10.5	22.4
Malden	72.4	75.9	13.8	17.2	37.9	31.0	--[5]	20.7
Medford	60.0	73.3	6.7	--[5]	--[5]	33.3	--[5]	40.0
Methuen	44.8	86.2	6.9	--[5]	37.9	31.0	--[5]	20.7
New Bedford	79.6	95.3	12.1	13.8	31.7	41.8	9.5	17.1
Newton	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]	--[5]
Peabody	65.2	100.0	33.3	25.0	29.2	25.0	--[5]	33.3
Pittsfield	83.3	97.2	11.1	12.7	12.5	41.7	27.8	18.1
Plymouth	51.9	96.4	3.6	--[5]	17.9	46.4	--[5]	21.4
Quincy	78.6	90.7	7.0	--[5]	40.5	42.9	--[5]	11.9
Revere	67.4	88.0	2.0	--[5]	50.0	14.0	--[5]	34.0
Somerville	89.1	91.3	8.7	13.0	32.6	37.0	--[5]	21.7
Springfield	91.6	95.4	9.8	11.8	30.5	36.7	11.2	21.7
Taunton	75.9	91.4	6.9	10.3	29.8	38.6	12.3	19.3
Waltham	60.0	88.5	0.0	--[5]	28.0	40.0	--[5]	24.0
Weymouth	50.0	89.3	14.3	--[5]	42.3	19.2	--[5]	34.6
Worcester	77.8	94.7	11.4	9.5	30.8	39.2	16.0	14.1

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. The 30 largest municipalities are the cities and towns in Massachusetts with the largest populations according to DPH 2000 population estimates, based on the U.S. Census 2000 population counts (see Technical Notes in Appendix). 2 Birth rates represent the number of births per 1,000 females age 15-19. 3 Mothers who designated themselves as Asian, American Indian, or Other. 4. See Glossary under "Prenatal Care Payment Source." 5. Calculations based on fewer than five teen births overall are excluded. 6. Less than 2,500 grams or 5.5 pounds. 7. Less than 37 weeks gestational age. 8. Based on Adequacy of Prenatal Care Utilization (APNCU) Index. Please see Glossary and Technical Notes in the Appendix for definitions of index and adequacy categories.

Table 12. Trends in Teen Birth Rates for Selected Communities[1], Ranked by 2003 Teen Birth Rate[2], Massachusetts: 2003, 2002, 1993

		2003		2002		1993[3]	
2003 Rank	Municipality	Number of Teen Births	Teen Birth Rate	Number of Teen Births	Teen Birth Rate	Number of Teen Births	Teen Birth Rate
	State Total	4,639	22.6	**4,642**	**22.6**	**6,555**	**31.7**
1	Holyoke	139	91.9	124	82.0	199	137.5
2	Lawrence	236	82.9	227	79.7	304	110.5
3	Springfield	479	79.3	423	70.1	567	95.3
4	Southbridge	37	66.5	28	50.4	51	87.6
5	Chelsea	68	61.7	90	81.7	81	88.5
6	New Bedford	169	56.7	175	58.8	260	75.4
7	Fall River	163	55.9	158	54.2	179	56.0
8	Pittsfield	72	52.9	61	44.8	49	32.0
9	Fitchburg	75	49.4	67	44.1	100	56.2
10	Lynn	145	48.5	162	54.2	191	78.2
11	Brockton	148	44.8	163	49.3	207	65.0
12	Lowell	174	44.5	228	58.3	264	69.4
13	Revere	50	41.2	51	42.0	32	30.0
14	Everett	41	39.4	30	28.8	27	26.6
15	Attleboro	45	39.1	32	27.8	56	48.5
16	Worcester	263	38.0	226	32.7	395	58.2
17	Leominster	43	35.2	39	32.0	64	57.6
18	Taunton	58	35.1	57	34.5	88	56.5
19	Chicopee	59	32.6	60	33.2	63	33.7
20	Haverhill	53	29.6	67	37.4	83	53.3
21	Salem	34	27.9	25	20.5	44	34.6
22	Boston	573	25.8	664	29.9	1005	46.6
23	Quincy	43	22.1	31	15.9	47	20.2
24	Somerville	46	22.0	50	24.0	65	29.7
25	Framingham	38	19.7	41	21.3	40	17.9

1. Selected communities include the 25 Massachusetts cities and towns with the greatest number of teen births. Ranking is by 2003 teen birth rate. 2. Rates are per 1,000 females ages 15-19 per city/town.
3. Source for 1993 births and rates: Massachusetts Community Health Information Profile (MassCHIP), MDPH, v2.8 r270, January 2003; natality dataset and MISER 1993 population estimate.

CHAPTER 3

FETO-INFANT AND MATERNAL MORTALITY

Overall Changes in the Infant Mortality Rate

In 2003, there were 383 infant deaths (deaths of children less than one year of age) among Massachusetts residents, 12 fewer infant deaths than in 2002, and the second lowest number of infant deaths in Massachusetts since 1980 (Table 13A).

The infant mortality rate (IMR) in 2003 was 4.8 deaths per 1,000 live births, which was slightly lower than the 2002 rate of 4.9, and a 31% decrease since 1990. **The 2003 IMR is the second lowest rate ever recorded for the state** (Table 13A).

The **infant mortality rate (IMR)** in Massachusetts (4.8) was **30% lower** than the preliminary 2003 U.S. IMR (6.9) (National Vital Statistics Report, Vol. 53, No. 15, February 28, 2005, p. 3).

Race and Ethnicity Patterns in Infant Mortality Rates

The 2003 IMR for white infants (both Hispanic and non-Hispanic) was 4.3 deaths per 1,000 live births in 2003, which was a 4% decline from the previous year (Table 13A). The IMR for black infants (Hispanic and non-Hispanic) was 11.8 deaths per 1,000 live births, which was a 6% increase from the 2002 rate.

Since 1980, there has been a substantial decline in IMRs among black and white infants. From 1980 to 2003, the IMR decreased by 56% for whites and 37% for blacks. **However, the IMR for black infants, 11.8 deaths per 1,000 live births, has been consistently more than twice as high as the IMR for white infants during this time period** (Figure 9).

Black non-Hispanics continued to have the highest IMR (12.7 per 1,000 live births) among the race/Hispanic origin groups. Black non-Hispanic infants died at more than 3 times the rate of white non-Hispanic infants, and Hispanic infants died at about 1.4 times the rate of white non-Hispanic infants. Asian infants had the lowest infant mortality rate of all groups in 2003 with an IMR of 2.7 deaths per 1,000 live births (Table 13B). However, caution should be used when interpreting this rate, since it is based on a small number of deaths.

The white non-Hispanic IMR remained unchanged since 2002 at 4.1 deaths. The IMR decreased by 20% for Hispanics (7.0 to 5.6), and by 10% for Asians (3.0 to 2.7). The IMR for Black non-Hispanics increased 9%, from 11.6 in 2002 to 12.7 deaths per 1000 live births in 2003.

Neonatal and Post Neonatal Mortality Rates

Neonatal and post neonatal are elements of the total IMR. Neonatal mortality is defined as deaths of infants fewer than 28 days old, and post neonatal mortality is defined as deaths of infants between 28 and 364 days old.

The overall neonatal mortality rate was 3.6 deaths per 1,000 live births in 2003, which is a decrease of 3% from the 2002 neonatal mortality rate of 3.7 (Table 13B).

As was true for infant mortality, neonatal mortality differs by race/ethnicity groups. The neonatal mortality rate increased by 16% for black non-Hispanics from 8.2 in 2002 to 9.5 in 2003. The rate for Hispanics decreased by 25%, from 5.2 in 2002 to 3.9 in 2003,and the rate for white non-Hispanics decreased by 3%, from 3.2 in 2002 to 3.1 in 2003 (Table 13B).

The overall post neonatal mortality rate was 1.2 in 2003, which was the same as it was in 2002 (Table 13B). The post neonatal mortality rate for black non-Hispanic infants decreased by 6% from 3.4 in 2002 to 3.2 in 2003. The post neonatal mortality rate for Hispanic infants decreased 5% in 2003, from 1.8 deaths per 1,000 live births to 1.7 in 2003.

Trends in the Time of Infant Deaths

In 2003, three-fourths of all infant deaths occurred in the first 27 days of life, the neonatal period. From 1990 to 2003, the percentage of all infant deaths that occurred in the post neonatal period (28-364 days) declined from 31% to 26%. During the same time period, the percentage of infant deaths that occurred in the very early neonatal period (within the first day after birth) rose from 44% to 52% of all infant deaths, and the percentage of infant deaths occurring later in the neonatal period (from 1-27 days) remained about the same (23%) (Figure 11).

(Information about the causes of infant death will be available in the upcoming report, *Massachusetts Deaths 2003*.)

Feto-Infant Mortality

Infant mortality is only part of the spectrum of adverse pregnancy outcomes. This year we are broadening our coverage of adverse pregnancy outcomes to include data on stillbirths. A stillbirth is defined as a fetal death 20 weeks or greater gestational age resulting in the delivery of an infant that does not breathe or show any other evidence of life, such as a heart beat, and does not respond to resuscitation[9].

The State Law of Massachusetts[10] mandates the reporting of a stillbirth that occurs in a hospital at twenty weeks' gestation or more, or which weighs three hundred and fifty grams or more. The Registry of Vital Records and Statistics maintains a file of fetal deaths for each calendar year. Feto-infant mortality is the term used for combined fetal and infant deaths.

Birthweight-Specific Feto-Infant Mortality

Birthweight is one of the most important predictors of survival.[11] In Massachusetts, the highest feto-infant mortality rates are among the lowest birthweight categories. Fetuses or infants weighing less than 500 grams (1 pound and 2 ounces) have less than a 6% possibility of surviving their first year, compared with infants weighing 2,500 grams or more (five and one-half pounds), who have a greater than 99% chance of surviving their first year. Table 13C presents the birthweight-specific feto-infant mortality rates for Massachusetts from 1998 to 2003. Feto-infant mortality rates are greatest for birthweights less than 500 grams. The feto-infant mortality rate for this group in 2003 is 943.5 deaths per 1,000 live births plus fetal deaths, that is, fewer than 60 out of 1,000 fetuses or infants weighing less than 500 grams survive one year. On the other hand, more than 99% of infants who weigh five and one-half pound or more survive their first year.

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[9] Hankins, G., Willinger, M., and Spong, C.Y., "Introduction", *Seminars in Perinatology, Stillbirth After 20 Weeks*, Vol.26, No. 1, February 2002.

[10] Massachusetts General Laws, Chapter 111, Section 202, online: http://www.mass.gov/legis/laws/mgl/111-202.htm

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

Trends in Feto-Infant Mortality

Table 13C shows the trend in birthweight-specific feto-infant mortality from 1998 to 2003. The rates for the less than 500 gram and the 500-749 gram groups have declined about 5% each since 1998. In fact, the feto-infant mortality rates for all except the "1,000 - 1,249 grams" and "1,250 -1,500 grams" groups have experienced declines. The "1,000-1,249" and "1,250-1,500" groups' feto-infant mortality rates have both increased by about 50% since 1993.

While the infant mortality rate (IMR) has decreased slightly from 2002 to 2003 (4.9 per 1,000 live births to 4.8 per 1,000 live births), the feto-infant mortality rate has *increased* from 9.1 feto-infant deaths per 1,000 fetal deaths and live births in 2002 to 10.3 in 2003, which is an increase of 12.5%. This year's increase was a change in direction of the feto-infant mortality rate, which had been decreasing every year since 1998.

Figure 12 illustrates the contribution of fetal and infant deaths to the overall feto-infant morality rate. For 2003, fetal deaths accounted for the overall increase in the feto-infant mortality rate, since the infant death rate[12] remained the same as it was in 2002 (4.5 deaths per 1,000 live births and fetal deaths). While the decline in the feto-infant mortality rate from 1998 and 2002 was due to decreases in both fetal and infant mortality rates, the increase from last year to this year was due to the increase in fetal deaths reported in Massachusetts.

Feto-Infant Deaths by Birthweight and Gestational Age

Table 13D shows the number and proportion (percent of the combined feto-infant deaths for each year) that: 1) occurred at fewer than 24 weeks gestation or weighing less than 500 grams; and 2) occurred at 24 weeks or later and weighed 500 grams or more. It can be seen that from 1998 to 2002, fetal deaths made up between 51 to 54% of the combined feto-infant deaths. In 2003, fetal deaths contributed 56% to the overall deaths, almost 10% more than in 2002 (51%). In 2003, there were decreases in all infant deaths regardless of gestational age and birthweight and concomitant increases in fetal deaths regardless of birthweight and gestational age. The largest increase in proportion from 2002 to 2003 was in fetal deaths that occurred at fewer than 24 weeks gestation or weighing less than 500 grams (22% in 2002 to 26% in 2003), and the largest decrease in proportion was that of infant deaths that that occurred at 24 weeks or later and weighed 500 grams or more (24% in 2002 to 21% in 2003).

Pregnancy-Associated and Maternal Mortality Ratios

In 2003, there were 15 pregnancy-associated deaths, including 4 maternal deaths (Fig. 13). A pregnancy-associated death is the death of a woman while pregnant or within one year of the termination of pregnancy, irrespective of cause. The deaths of women who die from a cause related to pregnancy or childbirth either during pregnancy or up to 42 days after pregnancy termination are categorized as maternal deaths and are a subset of pregnancy-associated deaths. (See technical notes for further information.)

[12] Note that the infant death rate expressed here differs from the infant mortality rate (IMR) in that the denominator for the infant death rate here is live births *plus fetal deaths*, unlike the standard IMR, which uses live births as the denominator.

The 2003 pregnancy-associated mortality ratio (PAMR) was 18.5 deaths per 100,000 live births and the maternal mortality ratio (MMR) was 4.9 per 100,000 live births (Figure 13). Since 1990, the annual PAMR fluctuated from a low of 18.0 in 1990 to a high of 32.8 in 2001. However, due to the small number of cases, the differences are not statistically significant.

Table 13A. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2003

INFANT MORTALITY (less than one year of age)

	State Total[2]		White		Black		Asian/Other[3]	
Year	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate**
1980	748	10.3	655	9.8	87	18.6	5	4.6
1981	710	9.6	616	9.1	85	18.2	8	6.1
1982	764	10.1	656	9.4	102	21.3	5	3.3
1983	682	9.0	579	8.3	89	19.0	12	7.4
1984	699	8.9	601	8.4	82	16.4	13	7.5
1985	745	9.1	608	8.1	126	23.8	11	6.1
1986	695	8.4	560	7.5	123	22.0	11	4.6
1987	608	7.2	486	6.4	110	17.5	12	4.5
1988	693	7.9	546	7.0	133	19.5	13	3.8
1989	697	7.6	549	6.8	131	17.7	17	4.8
1990	649	7.0	519	6.4	106	13.7	24	6.5
1991	577	6.5	461	6.0	102	13.8	14	3.9
1992	569	6.5	438	5.7	114	15.8	17	4.7
1993	523	6.2	423	5.7	87	12.5	13	3.5
1994	499	6.0	407	5.6	81	12.0	11	2.9
1995	419	5.1	333	4.7	65	10.3	21	5.5
1996	403	5.0	329	4.7	65	10.8	8	2.0
1997	425	5.3	349	5.0	66	10.6	10	2.4
1998	414	5.1	345	4.9	59	9.3	10	2.3
1999	418	5.2	334	4.8	75	11.4	9	1.9
2000	377	4.6	280	4.0	76	11.7	19	3.6
2001	407	5.0	314	4.5	77	11.7	16	3.0
2002	397	4.9	306	4.5	74	11.1	17	2.9
2003	383	4.8	290	4.3	78	11.8	15	2.6

Table 13A. (cont'd) Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2003

NEONATAL MORTALITY (birth to 27 days)

	State Total[2]		White		Black		Asian/Other[3]	
Year	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**	**n**	**Rate[4]**
1980	550	7.6	483	7.2	62	13.3	5	4.6
1981	510	6.9	442	6.5	59	12.4	5	3.8
1982	573	7.6	494	7.1	75	15.7	3	--[5]
1983	482	6.3	411	5.9	63	13.4	7	4.3
1984	472	6.0	411	5.8	49	9.8	8	4.6
1985	538	6.6	447	6.0	85	16.0	5	2.8
1986	478	5.8	383	5.2	89	15.9	5	2.1
1987	432	5.1	343	4.6	80	12.7	9	3.4
1988	477	5.4	383	4.9	87	12.8	6	1.8
1989	479	5.2	376	4.7	95	12.8	8	2.3
1990	446	4.8	347	4.3	80	10.3	9	5.1
1991	401	4.5	319	4.1	72	9.8	10	2.8
1992	415	4.8	325	4.3	79	10.9	11	3.1
1993	375	4.4	300	4.1	66	9.5	9	2.4
1994	349	4.2	280	3.8	60	8.9	9	2.4
1995	298	3.6	237	3.3	50	7.9	11	2.9
1996	290	3.6	249	3.5	35	5.8	5	1.2
1997	323	4.0	271	3.9	45	7.2	7	1.7
1998	315	3.9	261	3.7	47	7.4	7	1.6
1999	332	4.1	265	3.8	61	9.3	6	1.3
2000	288	3.5	214	3.1	58	8.9	14	2.7
2001	308	3.8	239	3.5	59	9.0	10	1.9
2002	299	3.7	235	3.4	51	7.6	13	2.2
2003	285	3.6	217	3.2	58	8.8	10	1.8

Table 13A (cont'd) Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-2003

POST NEONATAL MORTALITY (28-364 days)

	State Total[2]		White		Black		Asian/Other[3]	
Year	n	Rate[4]	n	Rate[4]	n	Rate[4]	n	Rate[4]
1980	198	2.7	172	2.6	25	5.3	0	0.0
1981	200	2.7	174	2.6	26	5.8	3	--[5]
1982	191	2.5	162	2.3	27	5.6	2	--[5]
1983	200	2.7	168	2.4	26	5.6	5	3.1
1984	227	2.9	190	2.6	33	6.6	5	2.9
1985	207	2.5	161	2.1	41	7.8	6	3.3
1986	217	2.6	177	2.3	34	6.1	6	2.5
1987	176	2.1	143	1.8	30	4.8	3	--[5]
1988	216	2.5	163	2.1	46	6.7	7	2.0
1989	218	2.4	173	2.1	36	4.9	9	2.5
1990	203	2.2	172	2.1	26	3.4	5	1.4
1991	176	2.0	142	1.8	30	4.1	4	--[5]
1992	154	1.8	113	1.5	35	4.8	6	1.7
1993	148	1.7	123	1.7	21	3.0	4	--[5]
1994	150	1.8	127	1.7	21	3.1	2	--[5]
1995	121	1.5	96	1.3	15	2.4	10	2.6
1996	113	1.4	80	1.1	30	5.0	3	--[5]
1997	102	1.3	78	1.1	21	3.4	3	--[5]
1998	99	1.2	84	1.2	12	1.9	3	--[5]
1999	86	1.1	69	1.0	14	2.1	3	--[5]
2000	89	1.1	66	0.9	18	2.8	5	1.0
2001	99	1.2	75	1.1	18	2.7	6	1.1
2002	98	1.2	71	1.0	23	3.4	4	--[5]
2003	98	1.2	73	1.1	20	3.0	5	0.9

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 2003 are presented in Table 12B. 2. Deaths of infants of unknown race are included in the total calculation. For rate computations, infants of unknown race are allocated into the race categories according to the distribution of births of known race. 3. Other: American Indian and Other races. 4. Rates are expressed per 1,000 live births. 5. Calculations based on fewer than five events are excluded.

Table 13B. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2003

INFANT MORTALITY (less than one year of age)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1990	649	7.0	442	6.1	98	13.7	77	9.1	24	7.0	8	9.5
1991	577	6.5	381	5.5	101	15.0	80	9.4	14	4.2	1	--[4]
1992	569	6.5	371	5.5	110	16.4	67	7.9	16	4.9	5	5.1
1993	523	6.2	346	5.3	84	13.1	77	9.3	13	3.9	3	--[4]
1994	499	6.0	343	5.3	79	12.6	64	7.6	8	2.4	5	5.3
1995	419	5.1	275	4.4	65	11.1	58	7.2	19	5.5	2	--[4]
1996	403	5.0	289	4.7	63	11.4	40	5.1	8	2.2	2	--[4]
1997	425	5.3	294	4.8	64	11.7	55	6.7	10	2.6	2	--[4]
1998	414	5.1	287	4.6	59	10.6	58	6.7	10	2.7	0	0.0
1999	418	5.2	285	4.7	72	12.3	49	5.5	8	1.9	4	--[4]
2000	377	4.6	232	3.8	74	12.8	48	5.2	19	4.1	4	--[4]
2001	407	5.0	245	4.1	71	12.1	69	7.3	15	3.1	7	4.1
2002	397	4.9	239	4.1	69	11.6	67	7.0	16	3.0	6	3.8
2003	383	4.8	235	4.1	75	12.7	55	5.6	14	2.7	4	--[4]

NEONATAL MORTALITY (birth to 27 days)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1990	446	4.8	298	4.1	75	10.5	49	5.8	19	5.5	5	5.5
1991	401	4.5	266	3.9	72	10.7	53	6.2	10	3.0	0	0.0
1992	415	4.8	274	4.0	76	11.4	51	6.0	10	3.0	4	--[4]
1993	375	4.4	245	3.7	64	10.0	55	6.7	9	2.7	2	--[4]
1994	349	4.2	240	3.7	58	9.3	40	4.7	7	2.1	4	--[4]
1995	298	3.6	198	3.1	50	8.5	39	4.8	10	2.9	1	--[4]
1996	290	3.6	222	3.6	34	6.2	27	3.5	5	1.4	1	--[4]
1997	323	4.0	228	3.7	44	8.0	43	5.2	7	1.8	1	--[4]
1998	315	3.9	218	3.5	47	8.5	43	5.0	7	1.9	0	0.0
1999	332	4.1	226	3.7	58	9.9	39	4.4	5	1.2	4	--[4]
2000	288	3.5	177	2.9	57	9.9	37	4.0	14	3.0	3	--[4]
2001	308	3.8	190	3.2	56	9.5	49	5.2	10	2.1	3	--[4]
2002	299	3.7	185	3.2	49	8.2	50	5.2	13	2.4	2	--[4]
2003	285	3.6	179	3.1	56	9.5	38	3.9	10	1.9	2	--[4]

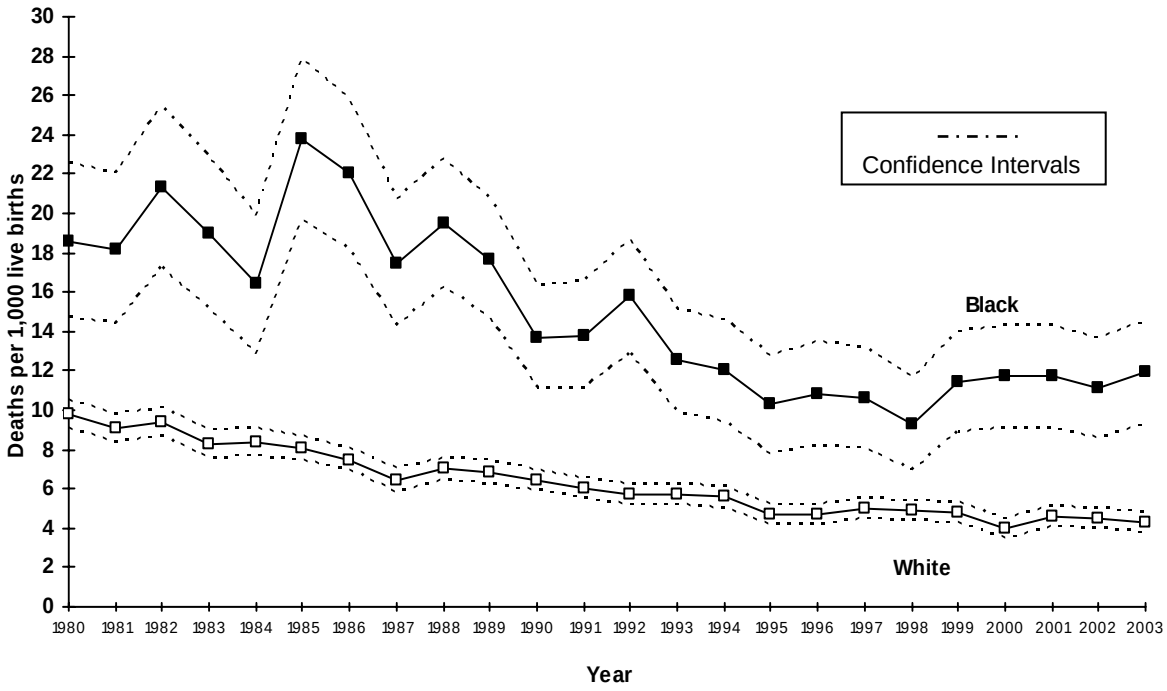
Table 13B. (cont'd) Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1990-2003

POST NEONATAL MORTALITY (28-364 days)

	State Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[2]	
Year	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**	**n**	**Rate[3]**
1990	203	2.2	144	2.0	23	3.2	28	3.3	5	1.5	3	--[4]
1991	176	2.0	115	1.7	29	4.3	27	3.2	4	--[4]	1	--[4]
1992	154	1.8	97	1.4	34	5.1	16	1.9	6	1.8	1	--[4]
1993	148	1.7	101	1.5	20	3.1	22	2.7	4	--[4]	1	--[4]
1994	150	1.8	103	1.6	21	3.3	24	2.8	1	--[4]	1	--[4]
1995	121	1.5	77	1.2	15	2.6	19	2.3	9	2.6	1	--[4]
1996	113	1.4	67	1.1	29	5.3	13	1.7	3	--[4]	1	--[4]
1997	102	1.3	66	1.1	20	3.7	12	1.5	3	--[4]	1	--[4]
1998	99	1.2	69	1.1	12	2.2	15	1.7	3	--[4]	0	0.0
1999	86	1.1	59	1.0	14	2.4	10	1.1	3	--[4]	0	0.0
2000	89	1.1	55	0.9	17	2.9	11	1.2	5	1.1	1	--[4]
2001	99	1.2	55	0.9	15	2.6	20	2.1	5	1.0	4	--[4]
2002	98	1.2	54	0.9	20	3.4	17	1.8	3	--[4]	4	--[4]
2003	98	1.2	56	1.0	19	3.2	17	1.7	4	--[4]	2	--[4]

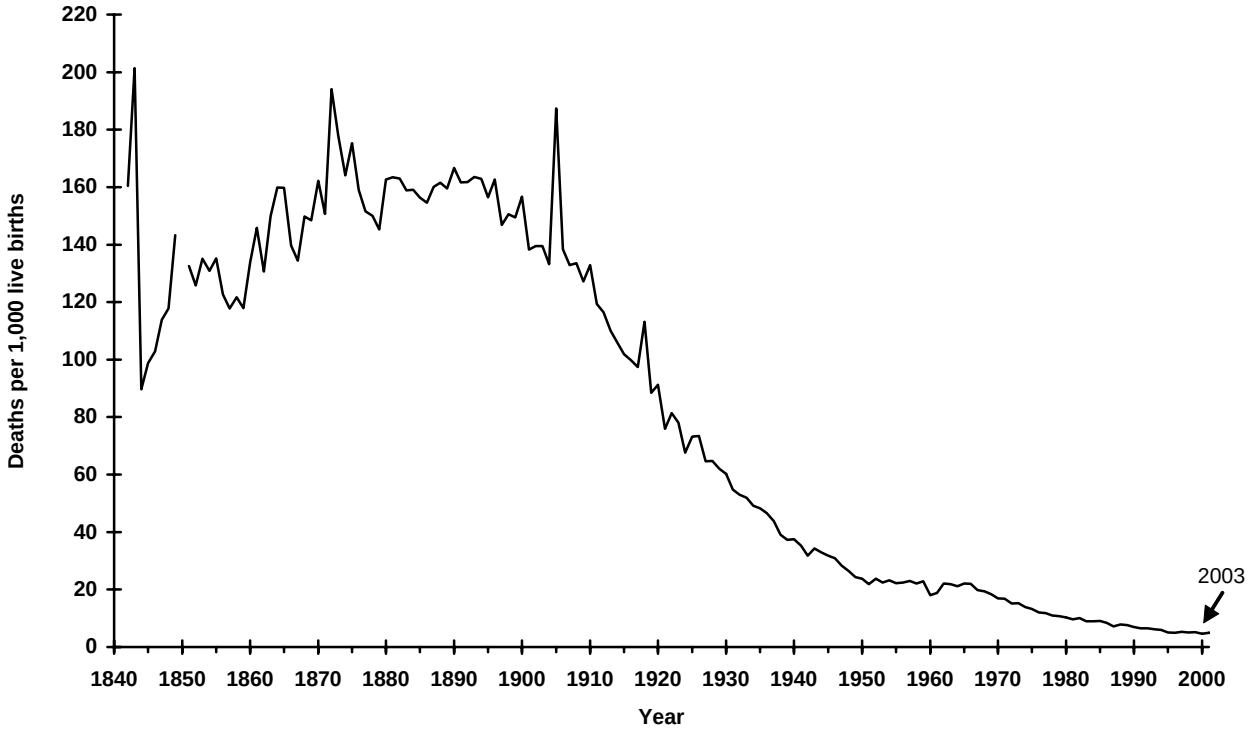
1. Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Other: American Indian and Other races. 3. Rates are expressed per 1,000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

Figure 9. Infant Mortality Rates and 95% Confidence Intervals[1] by Race[2], Massachusetts: 1980-2003



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

Figure 10. Infant Mortality Rates
Massachusetts: 1842-2003[1]



1. Data not available for 1850.

Figure 11. Trends in the Timing of Infant Deaths
Massachusetts: 1990-2003

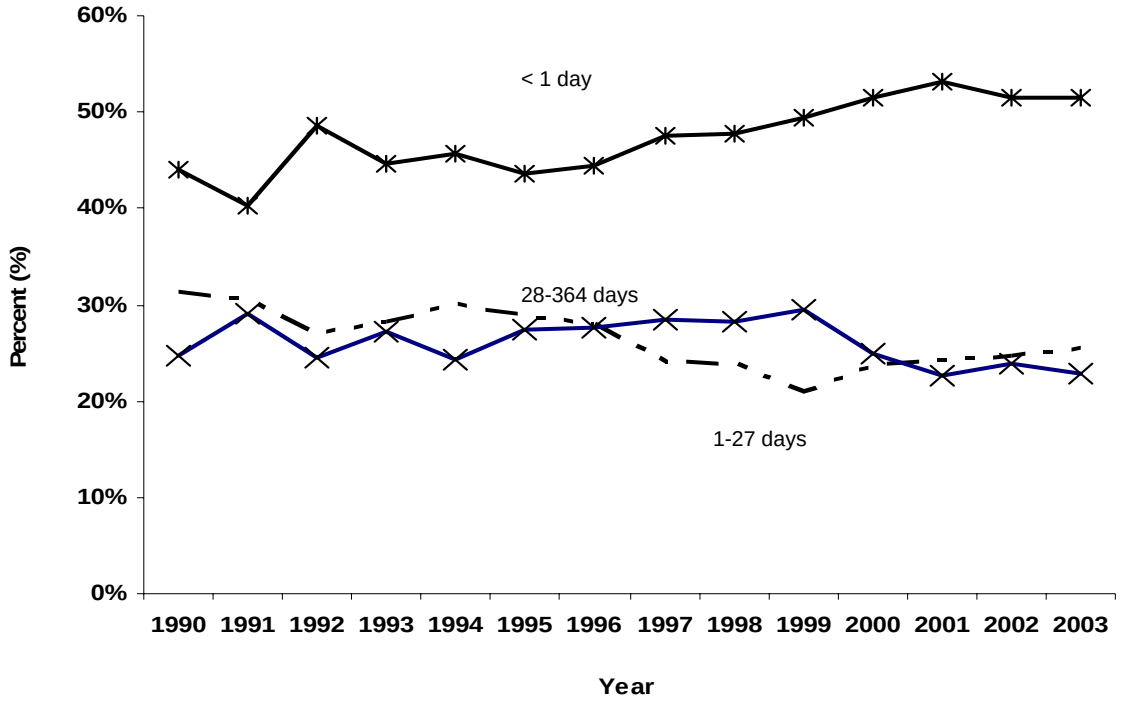
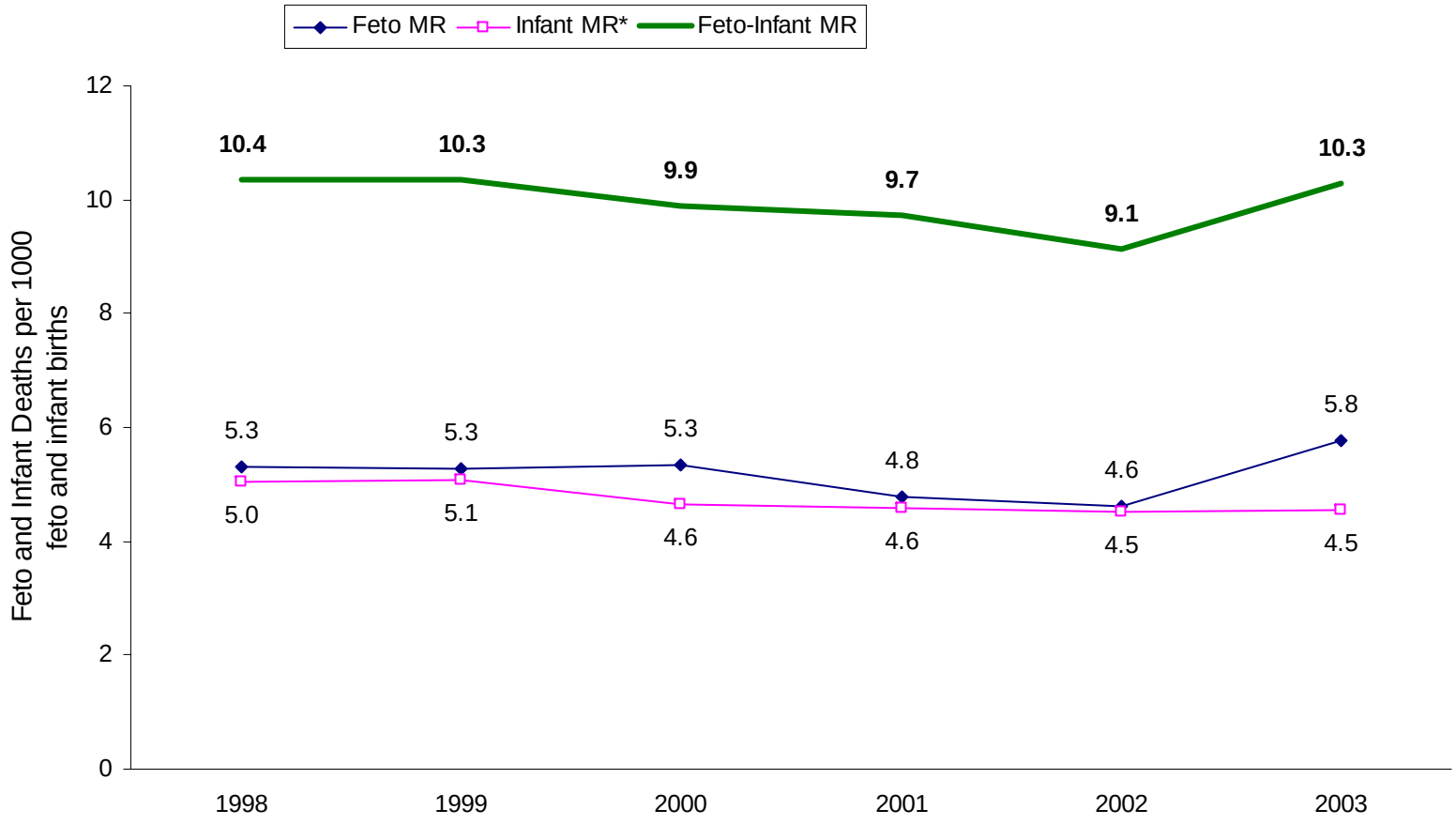


Table 13C. Feto-Infant Mortality Rate by Birthweight, Massachusetts: 1998-2003

Birthweight (in grams)	1998	1999	2000	2001	2002	2003
<500	996.5	962.8	928.0	961.5	938.3	943.5
500-749	553.4	576.5	536.4	503.7	487.0	525.5
750-999	228.8	170.8	247.2	190.7	146.9	188.6
1,000-1,249	85.0	104.9	112.4	136.2	83.0	131.4
1,250-1,499	64.0	64.4	69.0	90.6	84.6	95.8
1,500-1,999	48.6	53.9	35.2	42.7	40.3	38.3
2,000-2,499	13.8	10.8	15.2	15.9	12.2	11.9
2,500-4,000	2.6	2.4	2.4	2.3	2.6	2.5
4,001+	2.8	1.8	2.3	2.1	1.5	1.7
Unknown birthweight (N)	*(23)*	*(26)*	*(32)*	*(36)*	*(23)*	*(17)*
State Feto-Infant Rate	**10.4**	**10.3**	**9.9**	**9.7**	**9.1**	**10.3**

* Calculation of Infant Mortality Rate in this section differs from previous section in the inclusion of Fetal deaths in the denominator.

Figure 12. Feto-Infant Mortality Rate
Massachusetts 1998-2003

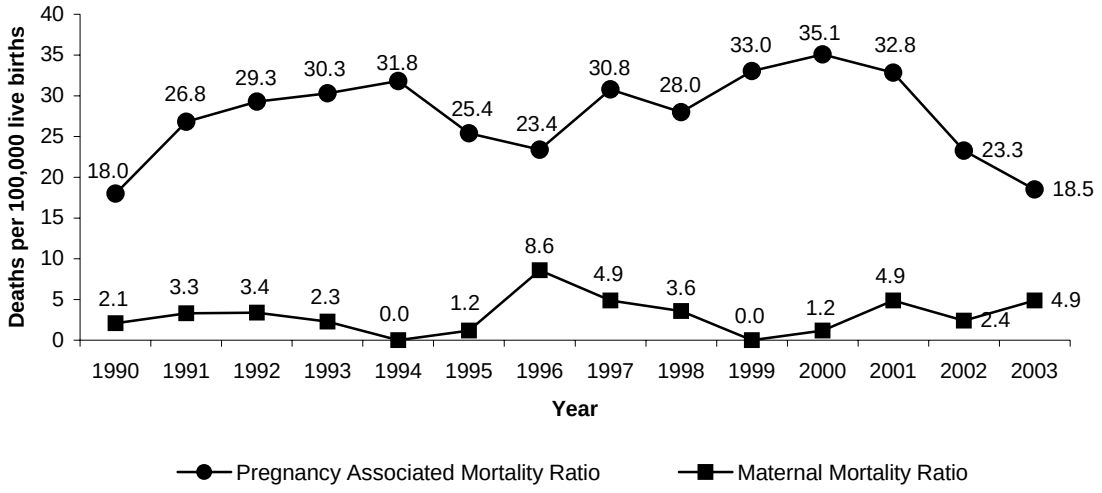


* Calculation of Infant Mortality Rate in this section differs from previous section in the inclusion of fetal deaths in the denominator.
Note: Total Feto, Infant, and Feto-Infant Mortality Rates include cases with unknown birthweight.

Table 13D. Fetal and Infant Deaths by birthweight and gestational age, Massachusetts: 1998-2003

Year	Fetals (<24 wks OR <500 grams)	Fetals (>=24 wks AND >= 500 grams)	Infants (<24 wks OR <500 grams)	Infants (>=24 wks AND >= 500 grams)	Total
1998	216 (25.5%)	219 (25.8)	183 (21.6)	230 (27.1)	848 (100%)
1999	214 (25.4%)	215 (25.6)	196 (23.3)	216 (25.7)	841 (100%)
2000	203 (25.1%)	234 (28.9)	168 (20.7)	205 (25.3)	810 (100%)
2001	174 (22.0%)	214 (27.1)	197 (24.9)	206 (26.0)	791 (100%)
2002	165 (22.3%)	210 (28.3)	185 (25.0)	181 (24.4)	741 (100%)
2003	218 (26.3%)	246 (29.6)	189 (22.8)	177 (21.3)	830 (100%)

Figure 13. Trends in Pregnancy-Associated[1] and Maternal Mortality[2], Massachusetts: 1990-2003



Number of Pregnancy-Associated[1] and Maternal Deaths[2], 1993-2003

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

Birthweight Distribution

In 2003, 7.6% (6,115) of Massachusetts infants were low birthweight (LBW) (less than 2,500 grams or 5.5 pounds), and at the other end of the weight distribution, 10.9% were 4,000 grams (8.8 pounds) or more (Table 14).

The low birthweight percent in 2003 increased 1%, to 7.6% from 7.5% in 2002. LBW continues its increasing trend since 1980[13]. The increase in low birthweight infants can be linked directly to the increase in multiple births and the aging of the population giving birth. The trend in low birthweight infants in Massachusetts is consistent with national trends.

In 2003, 1.4% (1,115) of infants born to Massachusetts resident women were very low birthweight (VLBW) (less than 1,500 grams or 3.3 pounds). This percentage has remained the same since 1999.

The low birthweight rate in Massachusetts was 4% below the U.S. rate of 7.9% (National Vital Statistics Reports, *Births: Preliminary Data for 2003*, Vol. 53, No. 9, November 23, 2004, Table A, p. 2).

Patterns of Birthweight by Race and Ethnicity

The proportion of low birthweight infants varied by mother's race and ethnicity (Table 14). Black non-Hispanic women had the highest proportion of low birthweight infants: 12.1%. Hispanic mothers delivered 8.3% low birthweight infants, Asian mothers, 8.1% low birthweight infants, and white non-Hispanic mothers delivered 7.0% low birthweight infants.

While the percentage of LBW infants increased for the state as a whole, the proportion of low birthweight deliveries in 2003 for black non-Hispanics decreased 4% from 12.6% to 12.1% and the proportion of LBW for Hispanics declined about 1% from 2002, from 8.3 % to 8.2%. The proportion for LBW infants of white non-Hispanic mothers increased 3%, from 6.8% to 7.0%, and the rate for Asians increased 1% from 8.0% to 8.1.

The proportion of very low birthweight infants also varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of very low birthweight infants, 3.1%; compared with 1.3% of Hispanics, 1.2% of Asians, and 1.2% of white non-Hispanics (Table 14).

The Massachusetts 2003 low birthweight percentage for black non-Hispanic women, 12.1%, was lower than the U.S. rate for all black women (the U.S. rate includes black Hispanics), 13.5%. The rate of low birthweight for Massachusetts Hispanic women (8.3%) was higher than the corresponding 2003 U.S. rate of 6.7% (National Vital Statistics Reports, *Births: Preliminary Data for 2003*, Vol. 53, No. 9, November 23, 2004, Table A, p. 2). This may be due to the difference in the proportion of Puerto Rican births between the U.S. and Massachusetts, because Puerto Rican infants have tended to have the highest rate of LBW among Hispanic groups . In Massachusetts in 2003, Puerto Rican births made up 44% of the Hispanic births and was the largest birth ethnic

[13] 1980 is the earliest year on which there is a recorded birthweight.

group among Hispanics. On the other hand, in the U.S., Puerto Rican births were 7% of the Hispanic births in 2002[14]. The largest Hispanic ethnic birth group is the U.S. is Mexican, which was 72% of U.S. Hispanic births in 2002. Nationally, the Puerto Rican LBW percentage was 9.8% in 2002 (MA was 10.1 for Puerto Ricans); the LBW percentage for Mexican infants was more that one-third lower at 6.5%. (2002, National Vital Statistics Reports, Vol. 52, No. 10, December 17, 2004). The Massachusetts low birthweight rate for Puerto Rican mothers was 10.1% in 2003 (Table 2B), compared with 11.5% among Puerto Rican mothers in Puerto Rico in 2003 (National Vital Statistics Reports, Vol. 53, No. 9, November 23, 2004, Table C).

White non-Hispanic mothers delivered the highest proportion of high birthweight infants (4,000 grams or 8.8 pounds and more): 12.4% (Table 14). This proportion continues its slow decline since 1999. In 2002, this rate for white non-Hispanic mothers was 12.6%.

Birthweight and Smoking

Cigarette smoking during pregnancy increases the likelihood of delivering a low birthweight infant. During 2003 in Massachusetts, infants born to mothers who smoked during pregnancy were more than one and one-half times as likely to be low birthweight when compared with infants born to non-smoking mothers (11.5% vs. 7.3%; Figure 14). The percentage of low birthweight among infants whose mothers smoked during pregnancy varied by race and Hispanic ethnicity. Hispanic mothers who smoked during pregnancy had the highest percentage of LBW infants (18.3%), followed by black non-Hispanic mothers (15.5%) and Asian mothers (12.2%). Black non-Hispanics had the highest percentage of LBW among mothers who *did not smoke* during pregnancy at 11.9%, which was higher than the state average for mothers who *smoked* during pregnancy.

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 15).

Low Birthweight and Plurality

The increase in low birthweight in Massachusetts over the past decade can be attributed in part to the dramatic increase in multiple births in Massachusetts. If there had been the same number of multiples as in 2002 (instead of 151 fewer), the LBW would have been 7.7%. As it was, there were still more LBW multiples than last year. The percentage of low birthweight (LBW) and very low birthweight (VLBW) rises dramatically for twins and higher order births. In 2003, 5% of singleton births were LBW, whereas 53% of twins, and 93% of higher order births were LBW (Table 16). Similarly, 0.9% of singletons, 9% of twins, and 29% of higher order births were VLBW. The percentage of VLBW singleton infants has remained relatively constant since 1993, while LBW has

[14] The latest national data available stratified by Hispanic groups is 2002.

increased 10% in this group: 4.8% in 1993 to 5.3% in 2003. The percentage of LBW deliveries for twins increased more than 12% since 1993, and it increased 5.4% from 2002 to 2003.

Preterm Deliveries

In 2003, 8.7% (6,963) of infants born to Massachusetts resident women were preterm (premature, that is, born before the mother had completed the 37th week of pregnancy) (Table 17). This was an increase of 2% from the previous year (6,795).

The proportion of preterm births varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of preterm infants, 12.0%. Hispanic women had 8.4% preterm births; white non-Hispanic women, 8.6%; and Asian women had the lowest, 7.1% (Table 17).

The percentage of infants delivered very early (before the 28th week of gestation) has remained the same since 1997 at 0.6%. Black non-Hispanic women had the highest proportion of infants delivered very early (1.7%), which was more than double that of any other racial and ethnic group (Table 17).

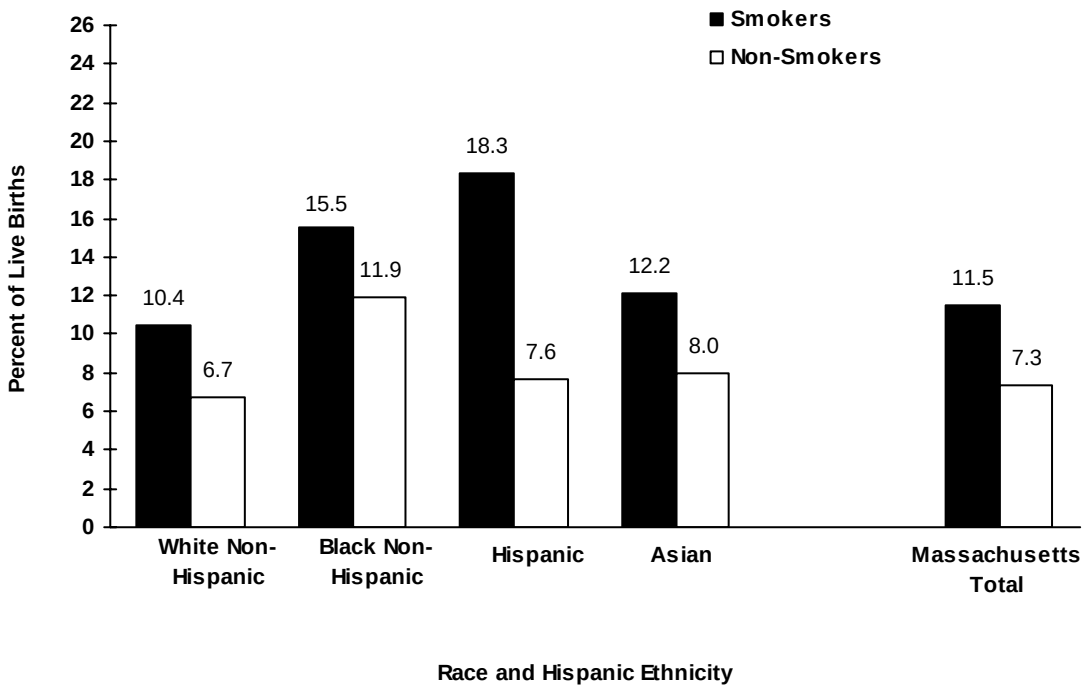
Table 14. Births by Birthweight, Race and Hispanic Ethnicity, Massachusetts: 2003

Birthweight (in grams)	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown race/ethnicity
	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n	%[1]	n
State Total	80,167	100.0	57,604	100.0	5,902	100.0	9,764	100.0	5,224	100.0	1,548	100.0	125
<500	130	0.2	67	0.1	33	0.6	18	0.2	6	0.1	4	--[2]	2
500-999	422	0.5	254	0.4	82	1.4	53	0.5	22	0.4	10	0.6	1
1000-1499	563	0.7	393	0.7	70	1.2	57	0.6	32	0.6	10	0.6	1
1500-1999	1,246	1.6	867	1.5	134	2.3	159	1.6	63	1.2	21	1.4	2
2000-2499	3,754	4.7	2,457	4.3	396	6.7	518	5.3	298	5.7	81	5.2	4
2500-2999	12,032	15.0	7,636	13.3	1,180	20.0	1,769	18.1	1,158	22.2	282	18.2	7
3000-3499	28,952	36.1	20,169	35.0	2,160	36.6	3,885	39.8	2,132	40.8	581	37.5	25
3500-3999	24,178	30.2	18,553	32.2	1,415	24.0	2,547	26.1	1,208	23.1	431	27.8	24
4000-4499	7,398	9.2	6,039	10.5	360	6.1	629	6.4	253	4.8	110	7.1	7
4500-4999	1,217	1.5	1,006	1.7	58	1.0	97	1.0	38	0.7	15	1.0	3
>=5000	123	0.2	102	0.2	8	0.1	11	0.1	1	--[2]	1	--[2]	0
Unknown birthweight	152	0.2	61	0.1	6	0.1	21	0.2	13	0.2	2	--[2]	49
VLBW[3] (0-1,499 g)	1,115	1.4	714	1.2	185	3.1	128	1.3	60	1.2	24	1.6	4
LBW[4] (0-2,499 g)	6,115	7.6	4,038	7.0	715	12.1	805	8.3	421	8.1	126	8.2	10

NOTE: Percentages for detailed birthweight rows ("<500" through "Unknown birthweight") 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 14. Low Birthweight[1] Among Smoking and Nonsmoking[2] Mothers, by Race and Hispanic Ethnicity, Massachusetts: 2003



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 parent worksheet for birth certificates

Table 15. Low Birthweight (LBW)[1] by Maternal Age, Race and Hispanic Ethnicity, Massachusetts: 2003

Mother's Age (in years)	Total LBW Infants		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[4]		Unknown[5]
	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n	%[3]	n
State Total[2]	6,115	7.6	4,038	7.0	715	12.1	805	8.2	421	8.1	126	8.1	10
<18	169	11.1	53	8.9	25	12.4	75	12.1	11	15.9	5	11.1	0
18-19	266	8.4	138	8.5	32	9.0	67	7.0	14	12.4	15	14.9	0
20-24	875	7.4	374	5.6	160	12.6	246	8.2	61	10.2	32	8.6	2
25-29	1,391	7.6	870	7.0	174	11.3	192	7.7	126	8.4	28	6.7	1
30-34	1,899	7.1	1,415	6.6	182	12.4	133	7.7	131	6.9	32	8.4	6
35-39	1,174	7.9	918	7.5	105	12.7	73	9.5	68	7.7	9	4.9	1
40+	**340**	**10.0**	**269**	**9.7**	**37**	**16.2**	**19**	**10.7**	**10**	**5.6**	**5**	**10.0**	**0**

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

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

Table 16. Low Birthweight by Plurality, Massachusetts: 1993-2003

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	**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
	2002	699	0.9	3,972	5.2	342	9.2	1,855	50.2	68	28.0	233	95.9	410	10.4	2,088	53.0	1,109	1.4	6,060	7.5
	2003	713	0.9	4,006	5.3	331	9.3	1,877	52.9	71	28.5	232	93.2	402	10.6	2,109	55.6	1,115	1.4	6,115	7.6
Ages < 35	**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
	2002	537	0.9	3,129	5.2	237	10.0	1,229	51.9	42	33.1	125	98.4	279	11.2	1,354	54.2	816	1.3	4,483	7.2
	2003	539	0.9	3,161	5.3	256	10.7	1,325	55.5	38	32.2	114	96.6	294	11.7	1,439	57.5	833	1.3	4,600	7.5
Ages 35+	**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
	2002	161	1.0	842	5.0	105	7.9	626	47.1	26	22.4	108	93.1	131	9.1	734	50.8	292	1.6	1,576	8.6
	2003	174	1.0	844	5.0	75	6.5	552	47.5	33	25.2	118	90.1	108	8.4	670	51.9	282	1.5	1,514	8.3

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Very Low Birthweight (VLBW): less than 1,500 grams (3.3 lbs.). 2. Low Birthweight (LBW): less than 2,500 grams (5.5 lbs.). 3. Calculations based on fewer than five events are excluded.

Table 17. Births by Gestational Age[1], Race and Hispanic Ethnicity, Massachusetts: 2003

Gestational Age[4]	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other[3]		Unknown
(weeks completed)	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n	%[2]	n
State Total	80,167	100.0	57,604	100.0	5,902	100.0	9,764	100.0	5,224	100.0	1,548	100.0	125
<20	30	0.0	18	0.0	11	0.2	0	0.0	0	0.0	1	--[8]	0
20-23	152	0.2	81	0.1	31	0.5	25	0.3	8	0.2	6	0.4	1
24-27	332	0.4	207	0.4	59	1.0	45	0.5	15	0.3	4	--[8]	2
28-31	715	0.9	491	0.9	86	1.5	82	0.8	41	0.8	14	0.9	1
32-35	3,267	4.1	2,364	4.1	314	5.3	369	3.8	165	3.2	51	3.3	4
36	2,467	3.1	1,772	3.1	204	3.5	293	3.0	142	2.7	54	3.5	2
37-39	37,518	46.8	26,775	46.5	2,786	47.2	4,562	46.7	2,687	51.4	681	44.0	27
40	24,310	30.3	17,528	30.4	1,633	27.7	3,082	31.6	1,545	29.6	496	32.0	26
41	9,822	12.3	7,338	12.7	663	11.2	1,059	10.8	545	10.4	207	13.4	10
42	943	1.2	656	1.1	75	1.3	141	1.4	54	1.0	16	1.0	1
43	23	0.0	14	0.0	4	--[8]	2	--[8]	1	--[8]	2	--[8]	0
44+	4	--[8]	3	--[8]	1	--[8]	0	0.0	0	0.0	0	0.0	0
Unknown[5]	584	0.7	357	0.6	35	0.6	104	1.1	21	0.4	16	1.0	51
Very early gestation, <28 weeks[6]	514	0.6	306	0.5	101	1.7	70	0.7	23	0.4	11	0.7	3
Preterm, <37 weeks[7]	6,963	8.7	4,933	8.6	705	12.0	814	8.4	371	7.1	130	8.5	10

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 **extremely** premature delivery, or **extremely** preterm delivery. 7. Also known as early gestational age, premature delivery, or preterm delivery. 8. Calculations based on fewer than five events are excluded.