Massachusetts Births 1999

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EXECUTIVE SUMMARY

Highlights

In 1999, 80,866 infants were born to women residing in Massachusetts, an 11% increase in the number of births since 1980, but 13% below the peak number of births in 1990. In 1999, 74.7% of Massachusetts births were to non-Hispanic white women, 10.9% to Hispanic women, 7.2% to non-Hispanic black women and 5.1% to Asian women.

The majority of births were to women over age 30 years. The birth rate among teenagers (ages 15-19) and women in their 20s declined in 1999. The fastest growing age-specific birth rates in Massachusetts in the 1990s were for women ages 40 years and older.

The infant mortality rate (IMR) was 5.2 per 1,000 live births in 1999, essentially the same as in 1998 (5.1). Infants born to non-Hispanic black mothers continue to have the highest IMR -- 12.3 deaths per 1,000 live births. The IMR was 4.7 deaths per 1,000 live births for non-Hispanic whites. The IMR among Hispanics declined 18% from to 5.5 deaths per 1,000 live births in 1999.

Although it is difficult to examine trends in adequacy of prenatal care due to changes in data recorded on the birth certificate and calculation adjustments, women in some larger urban communities such as Brockton, Lawrence, Lowell, Lynn, Springfield, and Worcester had much lower rates of adequate prenatal care services than the statewide average. 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.

Cesarean section was the method of delivery for 22.4% of Massachusetts resident mothers in 1999, up 7% from the 1998 rate of 20.9%. For women with a previous Cesarean section, 28.2% had a vaginal birth after Cesarean section delivery (VBAC), down from 32.7% in 1998.

Many women smokers stopped smoking or decreased their daily consumption of cigarettes during pregnancy. Among women who smoked prior to becoming pregnant, 42.4% reportedly quit during pregnancy, 25.9% decreased the amount they smoked, 31.1% smoked at the same level, and fewer than 1% increased their smoking.

In Massachusetts in 1999, 10.9% of women who gave birth had less than a high school education; 26.2% had a high school diploma or GED; 24.7% had some college education; and 38.1% had at least a college degree. Women with more education were more likely to receive adequate prenatal care, more likely to breastfeed, and more likely to have multiple births. They were less likely to smoke during pregnancy and less likely to receive publicly financed prenatal care.

Massachusetts perinatal health indicators were generally better than those for the U.S. The 1999 Massachusetts IMR was 28% lower than the final 1998 U.S. rate. The 1999 Massachusetts low birthweight (LBW) rate was 7% lower than the 1999 preliminary U.S. rate; the teen birth rate was 46% lower than the 1999 preliminary U.S. rate; and use of prenatal care in the first trimester was a little over 1% higher than the 1999 preliminary U.S. rate.

Birth Rates

In 1999, 55.2 births occurred for every 1,000 Massachusetts women ages 15-44 years. This represents an 11% decrease since 1990. The Massachusetts birth rate was 16% below the preliminary U.S. rate of 65.8 births per 1,000 women ages 15-44 years.

The teen birth rate is declining; there were 26.6 live births for every 1,000 women ages 15-19 years in 1999, a 25% decrease since 1990. This rate was 46% below the national teen birth rate of 49.6 per 1,000 women ages 15-19.

Age-specific birth rates were highest for 30-34 year old and 25-29 year old mothers at 104.5 and 81.2 births per 1,000 women, respectively. The birth rates for women ages 30 years and over increased in 1999, as they have throughout the 1990s. Continuing the trend that was first observed in 1996, there were more births to women ages 30 years and over than to women under age 30 years.

Infant Mortality Rates (IMR)

In 1999, 418 infant deaths occurred among Massachusetts residents, 4 more than the number of infant deaths in 1998. The 1999 IMR was 5.2 deaths per 1,000 live births, compared with 5.1 in 1998. This rate was 28% below the 1998 U.S. final rate of 7.2 deaths per 1,000 live births.

Between 1980 and 1999, the infant mortality rate in Massachusetts decreased by 51% for whites and 39% for blacks. Infants born to non-Hispanic black mothers continue to have the highest IMR, 12.3 per 1,000 live births, more than double the IMR for non-Hispanic white mothers (4.7 deaths per 1,000 live births). The 1999 IMR for Hispanics declined 18% to 5.5 deaths per 1,000 live births from 1998 (6.7 deaths per 1,000 live births). Asian mothers had the lowest infant mortality rate, 1.9 per 1,000 live births, compared to the other race/ethnicity groups. Caution should be used when interpreting this rate since it is based on a small number of deaths.

Among non-Hispanic white mothers, the neonatal mortality rate (deaths to infants less than 28 days old) was 3.7 deaths per 1,000 live births in 1999, a slight increase from 3.5 in 1998. During this same time period, the neonatal mortality rate increased to from 8.5 in 1998 to 9.9 in 1999 for non-Hispanic black infants, while remaining about the same or declining for other race/ethnicity groups. The post neonatal mortality rate, representing the number of deaths to infants between 28 and 364 days old, was 1.1 in 1999 and 1.2 in 1998. The post neonatal mortality rate for non-Hispanic black infants remains approximately twice as high (2.4 deaths per 1,000 live births) as for other race/ethnicity groups.

Among the 30 largest communities in Massachusetts, no community had an infant mortality rate in excess of 10 deaths per 1,000 live births in 1999, or for the last 3-year period, 1997-1999. The highest infant mortality rates in 1999 occurred in Fall River (9.1 deaths per 1,000 live births) and Springfield (8.8 deaths per 1,000 live births). Infant mortality rates should be interpreted with caution in individual communities with a small number of infant deaths.

Low Birthweight and Prematurity

In 1999, 7.1% (5,708) of infants born to Massachusetts women were low birthweight (less than 2,500 grams or 5.5 pounds). This rate was slightly higher than the 1998 rate of 7.0% in Massachusetts, and was 7% below the national preliminary 1999 figure of 7.6%.

The proportion of low birthweight infants varied by mother's race and ethnicity. Non-Hispanic black women had the highest proportion of low birthweight infants (12.2%); Hispanic mothers delivered 8.2% low birthweight infants; Asian mothers, 7.3% low birthweight infants; and non-Hispanic white mothers delivered 6.4% low birthweight infants. The Massachusetts low birthweight rate for non-Hispanic black women (12.2%) was lower than the 1999 U.S. preliminary rate for all black women (13.1%). The rate of low birthweight for Massachusetts Hispanic women (8.2%) was higher than the corresponding preliminary 1999 U.S. rate of 6.4%. This may be due to differences in the composition of the Hispanic population in Massachusetts and the nation as a whole. In Massachusetts, the Hispanic population is composed mainly of people who identify their ethnicity as Puerto Rican, Dominican, and Central American. The U.S. Hispanic population has a much greater percentage of people of Mexican and Cuban descent who have relatively low rates of low birthweight. The Massachusetts low birthweight rate for Puerto Ricans, 8.9% in 1999, was lower than the U.S. Puerto Rican low birthweight of 9.7% in 1998.

In 1999, 7.6% (6,136) of infants born to Massachusetts resident women were preterm (premature), born before the 37th week of pregnancy; and 91.6% of infants were born at normal gestational age – delivered between the 37th and 42nd weeks of pregnancy.

Adequacy of Prenatal Care

In 1999, 79.4% of women who gave birth in Massachusetts received adequate prenatal care. 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. Non-Hispanic white women had the highest percentage of adequate prenatal care: 83.1%. The percentage of non-Hispanic black women receiving adequate prenatal care was 68.7%, and the percentage of Hispanic women was 66.5%. The percentage of all Asian women with adequate prenatal care was 72.8%. Cambodian women, however, had the lowest percentage of adequate prenatal care, 46.7%.

Adequacy of prenatal care also varied among the 30 largest Massachusetts communities. At least 85% of mothers in Arlington, Brookline, Framingham, Newton, Quincy, and Weymouth received adequate prenatal care. In contrast, fewer than 70% of mothers received adequate prenatal care in seven communities: Brockton, Lawrence, Lowell, Lynn, Pittsfield, Springfield, and Worcester.

Women whose prenatal care was publicly financed were less likely to receive adequate prenatal care in all race-ethnicity groups. For example, only 61.0% of non-Hispanic black women whose prenatal care was publicly financed received adequate prenatal care, while 80.4% of non-Hispanic black women with private insurance received adequate prenatal care.

Another measure of access to prenatal care is the percentage of women who began receiving their prenatal care in the first trimester of their pregnancy. A higher percentage of Massachusetts women received prenatal care in the first trimester compared to the U.S. as a whole: 84.3% in Massachusetts versus 83.2% nationwide.

Cesarean Section Deliveries

In 1999, Cesarean section was the method of delivery for 22.6% of the births that occurred in Massachusetts (22.4% for Massachusetts resident mothers), up 7% from the 1998 rate of 21.0%. (Calculations are based on births with known method of delivery.) Facilities with low rates of Cesarean section deliveries were: Heywood Hospital (15.4%, 82 Cesarean section deliveries performed); Hale Hospital (17.0%, 60 Cesarean section deliveries performed); Saint Vincent Hospital (17.2%, 335 Cesarean section deliveries performed); Lawrence General Hospital (17.6%, 252 Cesarean section deliveries performed); and Franklin Medical Center (17.9%, 96 Cesarean section deliveries performed). Ten hospitals had Cesarean section delivery rates of 25% or more (Beth Israel Deaconess Medical Center, Boston Regional Medical Center, Brigham and Women's Hospital, Fairview Hospital, Holy Family Hospital and Medical Center, Morton Hospital, Nantucket Cottage Hospital, New England Medical Center Hospital, Saints Memorial Medical Ctr.-St. John's Campus, and St. Elizabeth's Medical Center of Boston). However, for the sixth consecutive year, there were no hospitals that reported Cesarean section as the method of delivery for 30% or more of its births.

In 1999, 28.2% (2,461) of women with a previous Cesarean section, had a vaginal birth after Cesarean delivery (VBAC). The rate of VBACs has increased since 1990 (22.3%); reached 34.0% in 1996, and declined since then.

New Additions to this Year's Publication

In this year's publication, two new tables and one new figure are provided to give more detailed perinatal information to our readers. Table 11 provides information on very low birthweight and low birthweight by plurality and maternal age from 1990 to 1999. Table 16 provides information on Cesarean section deliveries for singleton births by licensed maternity facility and number of previous births. Cesarean section rates are presented for the following categories: first birth; second or later birth without prior Cesarean section; and second or later birth with prior Cesarean section.

Figure 7 provides information on timing of infant deaths from 1990 to 1999. Data are presented in the following categories: infant death within 1 day of birth; 1-27 days; and 28-364 days.

Birth Data Availability

Detailed information on 1999 births in Massachusetts is also available on the Department's free, Internet-accessible data warehouse, **MassCHIP**. To register as a user, visit the Massachusetts Department of Public Health website at http://www.state.ma.us/dph/ose/mchphome.htm or call 1-888-MASCHIP (within MA only) or (617) 624-5541.

CHAPTER 1

BIRTH CHARACTERISTICS

Birth Numbers and Rates

In 1999, 80,866 births occurred to Massachusetts residents (Table 1). This number represents an 11% increase since 1980 (72,591 births). However, since 1990, the number of births to Massachusetts residents has decreased. Overall, the number of births decreased by 13% from 1990 to 1999. The birth rate in 1999 was 55.2 births per 1,000 women of ages 15-44 years. This was 16% below the U.S. birth rate of 65.8 per 1,000 women of the same ages (National Vital Statistics Report, Vol. 48, No. 14, August 8, 2000, p.2). In Massachusetts, the birth rate has increased by 3% since 1980, but since 1990, it has declined (except for a slight increase – 2% -- between 1996 and 1998). For the fourth year in a row, there were more births to women ages 30 years and above than to women under age 30 (53.3% vs. 46.7%, Figure 1).

Distribution of Births by Race and Hispanic Ethnicity

In 1999, 74.7% of births (60,402) were to non-Hispanic white mothers; 10.9% (8,815) were to Hispanic mothers; 7.2% (5,844) were to non-Hispanic black mothers; and 5.1% (4,138) were to Asian mothers (Table 2A). Since 1980, the racial diversity of mothers has increased. From 1980 to 1999, the percentage of births to white women decreased from 91.2 to 85.7, while the percentage of births to black women increased from 6.4 to 8.1, and the percentage of births to mothers of Asian or other races increased almost four-fold, from 1.5 to 5.7 (Table 1). Since 1990, the number of births to non-Hispanic white women has declined from 72,456 to 60,402 (data not shown).

In 1999, 19.5% of births in Massachusetts were to women born outside of the U.S. (outside of the 50 U.S. states, Washington DC, and Puerto Rico/U.S. territories). See Table 2A. The percentage of non-U.S.-born mothers varied by race: 91.8% of Asian births were to non-U.S.-born women; 42.4% of Hispanic births were to non-U.S.-born women; 41.8% of non-Hispanic black births were to non-U.S.-born women; and 8.1% of non-Hispanic white births were to non-U.S.-born women. For Hispanic births, besides the 42.4% of mothers born outside of the U.S., 24.8% of mothers were born in Puerto Rico and other U.S. territories.

Teen Births

In 1999, there were 5,515 births to women ages 15-19, compared with 5,823 births for this age group in 1998 (Table 1). The number of teen births has steadily decreased since 1990, with an overall decrease of 24% (7,258 teen births in 1990). The teen birth rate (births per 1,000 women ages 15-19) has also steadily decreased since 1990. In 1999, for every 1,000 female residents of Massachusetts ages 15-19, there were 26.6 births, down from 28.1 in 1998. The teen birth rate in Massachusetts decreased by 25% from 1990 to 1999 (Table 1).

Statewide, 2.4% of births were to women under age 18, and 6.9% were to women under the age of 20 (Table 2A). The percentage of births to teenagers varied by race and ethnicity, partially reflecting differences in the percentage of teenage women within each racial/ethnic group. The highest percentage of births to women under 18 was for Hispanics (8.0%), followed by non-Hispanic blacks (4.6%), Asians (2.1%), and non-Hispanic whites (1.3%). See Table 2A. In maternal ancestry categories, Puerto Ricans and Cambodians had the highest teen birth percentages. For Puerto Rican women, 28% of births were to women under age 20, and 12.3%

to women under age 18 (Table 2B). For Cambodians, these percentages were 21.2% and 9.3%, respectively.

Low Birthweight

In 1999, 7.1% of infants born to Massachusetts women were low birthweight (less than 2,500 grams or 5.5 pounds). See Table 1. This is a slight increase from the 1998 figure of 7.0%. The low birthweight rate in Massachusetts was 7% below the national figure of 7.6%.

The percentage of low birthweight births also varied by mother's race and ethnicity. Non-Hispanic black mothers had the highest proportion of low birthweight infants: 12.2%; followed by Hispanic mothers: 8.2%; Asian mothers: 7.3%; and non-Hispanic white mothers: 6.4% (Table 2A). The highest percentages of low birthweight occurred among mothers who identified their ancestries as African-American (13.1%), West Indian/Caribbean (11.8%), and Asian Indian (9.8%). The highest percentages of very low birthweight (less than 1,500 grams or 3.3 pounds), occurred among mothers who identified their ancestries as: West Indian/Caribbean (4.1%), African-American (3.8%), and African (3.4%) (Table 2B).

Prenatal Care

In 1999, almost 80% of women received adequate prenatal care (Table 1). (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.) The percentage of adequate prenatal care varied greatly by mother's race and ethnicity. For non-Hispanic white women, 83.1% received adequate prenatal care, in contrast with 68.7% of non-Hispanic black mothers, 66.5% of Hispanic mothers, and 72.8% of Asian mothers (Table 2A). Mothers reporting their ancestries as European and Chinese were the groups most likely to receive adequate prenatal care – 83.6% and 80.7%, respectively. Cambodians and Salvadorans were least likely to receive adequate prenatal care, with only 46.7% of Cambodian and 58.8% of Salvadoran mothers receiving adequate prenatal care (Table 2B).

Statewide, in 1999, 84.3% of women received prenatal care during the first three months of pregnancy. Non-Hispanic white mothers born in the U.S. (88.4%) and Puerto Rico/U.S. territories (90.0%) had the highest percentage of first trimester care, 88.4% and 90.0% respectively (Table 2A). Cambodian women had the lowest percentage of first trimester casre, 57.0% (Table 2B).

Cesarean Section Deliveries

In 1999, 22.4% of births to resident Massachusetts women were delivered by Cesarean section. Non-Hispanic black women had the highest percentage of Cesarean section deliveries, at 24.2%, and Asian women had the lowest percentage, at 18.8% (Table 2A). The highest percentage of Cesarean section deliveries occurred among Brazilian women (31.2%) and the lowest percentage among Cambodian women (10.6%). See Table 2B.

Breastfeeding

In 1999, 72.4% of Massachusetts mothers reported that they were breastfeeding or intending to breastfeed their infants (Table 2A). This represents a 28% increase since 1990 (56.6%, data not shown). The percentage of mothers breastfeeding differed slightly by maternal race and Hispanic ethnicity, with the highest percentage reported among Asians (76.0%) and the lowest among non-Hispanic blacks (71.0%). There was more variation among mothers of different self-identified ancestry groups – the highest rates of breastfeeding were found for Asian Indians (95.4%), Brazilians (92.0%), and Salvadorans (90.1%) (Table 2B). In contrast, only 48.1% of women identifying themselves as "Other Portuguese," and only 49.7% of Cambodians 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 the lowest, at 58.0%. For women ages 45 and above, the percentage was highest, at 86.2% (Figure 2).

Birth Characteristics in the 30 Largest Massachusetts Cities and Towns

In 1999, among the 30 largest communities in the Commonwealth, the crude birth rates (number of births per 1,000 population) were highest in Lawrence (20.1), Lynn (16.6), and Haverhill (16.1). Crude birth rates were lowest in Newton and Brookline (9.7 in each) (Table 3A). Plymouth had the highest percentage of births to non-Hispanic white mothers, 94.4%. Communities with the highest percentage of births to non-Hispanic black women were: Boston, 32.4%; Brockton, 25.7%; and Springfield, 23.0%. In two of the 30 largest communities, 60% or more of 1999 births were to Hispanic women: Lawrence, 70.5%; and Holyoke, 64.5%. In four other communities, the percentage of births to Hispanic women was over 20%: Springfield, 38.2%; Lynn, 30.4%; Worcester, 24.7%; and Boston, 21.4% (Table 3A).

Four communities (Worcester, Springfield, Lynn, Peabody) recorded low birthweight percentages that were 25% higher than the statewide average of 7.1%. Adequacy of prenatal care varied by community, with 85% or more of the mothers in Arlington, Brookline, Framingham, Newton, Quincy, and Weymouth receiving adequate prenatal care. In contrast, fewer than 70% of mothers received adequate prenatal care in seven communities: Lawrence, 54.4%; Lowell, 60.5%; Springfield, 61.9%; Pittsfield, 62.9%; Worcester, 63.7%; Brockton, 66.0%; and Lynn, 67.7%. The birth rate for teens was highest in Lawrence (103.9 births per 1,000 females ages 15 to 19 years) and in Holyoke (100.5 births per 1,000 females ages 15 to 19 years). These two communities had rates at almost four times the statewide rate of 26.6. The next highest teen birth rate (Springfield, 86.7/1,000) was almost 15% lower than that of Holyoke (Table 3A).

In 1999, of the 30 largest communities, no community had an infant mortality rate in excess of 10 deaths per 1,000 live births. The highest infant mortality rates in 1999 occurred in Fall River (9.1 deaths per 1,000 live births) and Springfield (8.8 deaths per 1,000 live births). Infant mortality rates should be interpreted with caution in communities with a small number of infant deaths - none of the 30 largest communities has an average infant mortality rate in excess of 10 deaths per 1,000 live births for the period of 1997 to 1999 (Table 3A).

Birth Characteristics in Community Health Network Areas

Among the 27 Massachusetts Community Health Network Areas (CHNAs), only the Greater Lawrence Community Health Network had a crude birth rate of 15 births or more per 1,000 population (15.6). See Table 3B. In four CHNAs, Alliance for Community Health (Boston/Chelsea/Revere/Winthrop), The Community Health Connection (Springfield), Community Wellness Coalition (Worcester), and the North Shore Community Health Network, greater than 8.0% of the resident births were low birthweight – about 10% higher than the statewide average of 7.1%. In four of the CHNAs, fewer than 70% of mothers received adequate prenatal care: Community Wellness Coalition (Worcester): 67.1%; Greater Lawrence Community Health Network: 67.2%; The Community Health Connection (Springfield): 69.1%; and Community Health Network of Berkshire County: 69.9%. (See the Glossary in the Appendix for a description of the CHNAs.)

The teen birth rates for the CHNAs of Greater Lawrence Community Health Network, The Community Health Connection (Springfield), and Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) were the highest in the state. Community Health Network of Southern Worcester County had the highest infant mortality rate in 1999: 8.9 deaths per 1,000 live births. Because of the relatively small number of infant deaths, mortality rates in individual CHNAs should be interpreted with caution. Three of the CHNAs (Partners for a Healthier Community (Fall River); Community Wellness Coalition (Worcester); and The Community Health Connection (Springfield) had 3-year average (1997-1999) infant mortality rates that were 35% higher than the state average (Table 3B).

Tobacco Use

In 1999, 10.7% of births were to mothers who reported smoking cigarettes during their pregnancies. This represents a 45% decline from 1990 (19.3%, data not shown), and a decline of 8% from the previous year, 1998 (11.6%, data not shown). Smoking prevalence during pregnancy differed by mother's race and Hispanic ethnicity. Non-Hispanic white women had the highest prevalence of smoking during pregnancy (11.7%), followed by non-Hispanic black women (9.6%), Hispanic women (8.2%), and, finally, Asian women (1.6%). See Figure 3.

The majority (81.6%) of women who gave birth in 1999 were non-smokers prior to pregnancy, and 99.9% of them continued to abstain from smoking during pregnancy (Figure 4). (Seventy-two women started smoking during pregnancy.) A substantial number (6,287) of women quit smoking during pregnancy (42% of all women who smoked prior to pregnancy). Approximately 19% of women who gave birth reported smoking prior to pregnancy. Almost half of them were "light" smokers (1-10 cigarettes daily); 44% were "moderate" smokers (11-20 cigarettes daily); and 8% were "heavy" smokers (21 or more cigarettes daily). The percentage of women who were able to quit smoking during pregnancy was 58.1% for "light" smokers, 30.4% for "moderate" smokers, and 16.0% for the heaviest smokers (Figure 4). Among moderate and heavy smokers, 77.8% either quit or reduced their daily number of cigarettes 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 were ages 30 years and older in 1980 as compared to 53.3% in 1999. In 1999, there were more births to women ages 30 years and older (43,083) than to women under age 30 years (37,783) (Table 4).

In Massachusetts, the age-specific birth rate for women ages 15-44 years decreased 11.3% from 1990 (62.2 per 1,000 women) to 1999 (55.2 per 1,000 women). See Table 4. In 1999, the age-specific birth rates were highest for 30-34 year old (104.5 per 1,000) and 25-29 year old mothers (81.2 per 1,000). The birth rates for women ages 30 years and older have increased steadily throughout the 1990s (data not shown).

Since 1990, birth rates have increased for every age group of women ages 30 and above while decreasing for every age group of women under 30 (Table 4). The age groups with the largest increases in birth rates from 1990 to 1999 were women ages 45-49 years (62.5% increase), and women ages 40-44 years (52.2% increase). In 1995, the birth rate for Massachusetts resident women ages 30-44 years surpassed the rate for women younger than age 30 years for the first time in Massachusetts history (Figure 1).

In 1999, there were 26.6 births to teens (ages 15-19 years) per 1,000 females ages 15-19 years in the state. In contrast, the U.S. rate was 49.6 teen births (ages 15-19 years) per 1,000 females ages 15-19 years in the U.S. (National Vital Statistics Report, Vol. 48, No. 14, August 8, 2000, p. 3). The 1999 Massachusetts teen birth rate was 46% below the 1999 national rate. In 1999, there were 73 births to mothers ages 12-14 years and there were 124 births to women 45 years of age or older (Table 4). *(Please note: 1999 Massachusetts birth rates for women ages 15-19 years in this publication use 1998 population estimates released by the Massachusetts Institute for Social and Economic Research (MISER) in September, 2000. Furthermore, 1998 birth rates have been re-calculated using 1998 population estimates, and therefore may differ from previously published data. They may also differ from rates given in federal publications that use U.S. Census population estimates).*

Parity

Parity is defined as the total number of live infants ever born to a woman, including the current birth. In 1999, 44.3% of all Massachusetts women who gave birth did so for the first time. One-third (33.7%) had a second child. Approximately 17% of births to teenage women ages 15 to 19 years were a second or higher birth (Table 5).

In general, for 1999, the likelihood of giving birth to a second or higher child increased with increasing mother's age. However, there were exceptions for two age groups. In contrast with 1998 Massachusetts births, women ages 30-34 years were more likely to give birth to a first child (38.3%) than a second (37.7%). In addition, women ages 45 years and older were about equally as likely to be giving birth for the first or second time (31.5%, and 30.6%, respectively). See Table 5.

Plurality

Plurality represents the number of births to a woman produced in the same gestational period. In 1999, 95.8% of all births were singletons, 3.9% were twins and 0.3% were triplets or higher order multiple births (Table 6). The total percentage of multiple births (twins, triplets or more) was 4.2% in 1999. The total percentage of multiple births has increased by 62% since 1990 (2.6%). The increase since 1990 in the percentage of multiple births varies by age. For women under age 35 years, the percentage of multiple births increased from 2.5% in 1990 to 3.6% in

1999, an increase of 44%. Among women ages 35 yearsand older, the percentage of multiple births increased by 86% from 3.5% in 1990 to 6.5% in 1999 (Table 6).

Education

In 1999, 10.9% of women who gave birth had less than a high school education; 26.2% had a high school diploma or GED; 24.7% had some college education; and 38.1% had at least a college degree. Maternal educational attainment varied by race: 46.4% of Asian women and 44.5% of non-Hispanic white women had at least a college degree, while 15.1% of non-Hispanic black women and 9.5% of Hispanic women had at least a college degree (Table 7).

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

Table 1. Trends in Birth Characteristics, Massachusetts: 1980, 1985, 1990-1999

Characteristic		1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Births[1]	#[2]	72,591	81,781	92,461	88,176	87,202	84,627	83,758	81,562	80,164	80,321	81,406	80,866
	Rate[3]	53.4	57.5	62.1	59.4	59.1	57.6	57.0	55.5	54.6	54.7	55.6	55.2
Race of Mother													
White[4]	#	66,220	71,854	80,775	76,983	76,052	73,704	72,980	71,083	69,485	69,503	70,452	69,305
	%	91.2	87.9	87.4	87.3	87.2	87.1	87.1	87.2	86.7	86.5	86.5	85.7
Black	#	4,626	5,099	7,729	7,352	7,203	6,916	6,713	6,299	5,946	6,182	6,337	6,524
	%	6.4	6.2	8.3	8.3	8.3	8.2	8.0	7.7	7.4	7.7	7.8	8.1
Asian/Other[5]	#	1,069	1,741	3,688	3,566	3,582	3,664	3,790	3,817	3,950	4,217	4,248	4,615
	%	1.5	2.1	4.0	4.0	4.1	4.3	4.5	4.7	4.9	5.3	5.2	5.7
Unknown	#	676	3,087	269	275	365	343	275	363	783	419	369	422
	%	0.9	3.8	0.3	0.3	0.4	0.4	0.3	0.4	1.0	0.5	0.5	0.5
Teen Births (Ages 15-19)	#	7,694	6,859	7,258	6,892	6,555	6,469	6,412	5,990	5,758	5,801	5,823	5,515
	Rate[3]	28.1	28.7	35.4	35.4	34.5	34.0	33.2	30.3	28.5	28.5	28.1	26.6
Births to Unmarried Mothers	#	11,356	15,044	22,837	22,852	22,612	22,345	22,302	20,857	20,253	20,640	21,191	21,448
	%	15.6	18.4	24.7	25.9	25.9	26.4	26.6	25.6	25.3	25.7	26.0	26.5
Low Birthweight	#	4,413	4,751	5,388	5,199	5,137	5,202	5,335	5,174	5,105	5,617	5,655	5,708
	%	6.1	5.8	5.8	5.9	5.9	6.2	6.4	6.4	6.4	7.0	7.0	7.1
Adequate Prenatal Care[6]	**%**	82.0	79.4	80.1	81.6	82.9	83.8	84.3	84.2	79.9	80.0	79.8	79.4
	%	79.6	78.6	78.8	81.2	82.7	83.6	84.1	83.6	75.7	79.0	79.4	78.8

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. 1999 birth rates are calculated using the 1998 MISER population estimates (released in September 2000). 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] Other races include American Indian and others not specified. [6] Percentages in upper row are based on births with known scores of adequacy of prenatal care; bottom row percentages are based on total numbers of births. In subsequent tables and figures, percentage with adequate prenatal care is computed only on births with known adequacy scores. Adequacy of prenatal care has been recalculated for 1996, 1997, 1998 and 1999, which reflects computational adjustments to make Massachusetts data more comparable to the calculations recommended by the National Center for Health Statistics.

Table 2A. Birth Characteristics by Maternal Race/Hispanic Ethnicity, Massachusetts: 1999

Race and Hispanic Ethnicity (by mother's birthplace)	Births[1]		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breast Feeding[4]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate		First Trimester					
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
State Total	**80,866**	**100.0**	**1,926**	**2.4**	**5,588**	**6.9**	**1,120**	**1.4**	**5,708**	**7.1**	**63,728**	**79.4**	**67,732**	**84.3**	**18,080**	**22.4**	**57,394**	**72.4**
U.S. States / D.C.	62,857	77.7	1,445	2.3	4,248	6.8	854	1.4	4,348	6.9	51,028	81.8	54,160	86.7	14,192	22.6	42,858	69.8
Puerto Rico/U.S. Terr.[6]	2,255	2.8	263	11.7	550	24.4	41	1.8	216	9.6	1,462	65.3	1,600	71.4	430	19.1	1,499	66.8
Non-U.S.-Born[7]	15,754	19.5	218	1.4	790	5.0	225	1.4	1,144	7.3	11,238	71.8	11,972	76.4	3,458	22.0	13,037	83.5
Non-Hispanic White	**60,402**	**74.7**	**786**	**1.3**	**2,686**	**4.4**	**704**	**1.2**	**3,833**	**6.4**	**49,903**	**83.1**	**52,845**	**87.9**	**13,762**	**22.8**	**42,416**	**71.9**
U.S. States / D.C.	55,443	91.8	761	1.4	2,567	4.6	652	1.2	3,546	6.4	46,055	83.5	48,793	88.4	12,695	22.9	38,332	70.8
Puerto Rico/U.S. Terr.[6]	41	0.1	0	0.0	1	--[5]	3	--[5]	6	14.6	33	82.5	36	90.0	15	36.6	25	75.8
Non-U.S.-Born[7]	4,918	8.1	25	0.5	118	2.4	49	1.0	281	5.7	3,815	78.0	4,016	82.0	1,052	21.4	4,059	84.1
Non-Hispanic Black	**5,844**	**7.2**	**268**	**4.6**	**719**	**12.3**	**210**	**3.6**	**712**	**12.2**	**3,990**	**68.7**	**4,263**	**73.2**	**1,410**	**24.2**	**4,125**	**71.0**
U.S. States / D.C.	3,390	58.0	241	7.1	607	17.9	133	3.9	454	13.4	2,298	68.1	2,461	72.9	727	21.5	2,027	60.3
Puerto Rico/U.S. Terr.[6]	14	0.2	0	0.0	1	--[5]	1	--[5]	1	--[5]	11	84.6	11	84.6	1	--[5]	12	85.7
Non-U.S.-Born[7]	2,440	41.8	27	1.1	111	4.5	76	3.1	257	10.5	1,681	69.3	1,791	73.7	682	28.0	2,086	85.7
Hispanic	**8,815**	**10.9**	**709**	**8.0**	**1,746**	**19.8**	**136**	**1.5**	**721**	**8.2**	**5,831**	**66.5**	**6,324**	**72.0**	**1,783**	**20.3**	**6,600**	**75.0**
U.S. States / D.C.	2,885	32.7	353	12.2	867	30.1	52	1.8	256	8.9	1,948	67.9	2,135	74.4	550	19.1	1,827	63.5
Puerto Rico/U.S. Terr.[6]	2,189	24.8	261	11.9	546	24.9	36	1.6	207	9.5	1,410	64.8	1,544	70.9	413	18.9	1,454	66.5
Non-U.S.-Born[7]	3,741	42.4	95	2.5	333	8.9	48	1.3	258	6.9	2,473	66.3	2,645	70.9	820	22.0	3,319	88.8
Asian	**4,138**	**5.1**	**86**	**2.1**	**215**	**5.2**	**44**	**1.1**	**301**	**7.3**	**2,993**	**72.8**	**3,200**	**77.8**	**778**	**18.8**	**3,128**	**76.0**
U.S. States / D.C.	334	8.1	37	11.1	54	16.2	5	1.5	28	8.4	246	73.9	260	78.1	63	18.9	267	80.7
Puerto Rico/U.S. Terr.[6]	4	--[5]	0	0.0	0	0.0	0	0.0	0	0.0	3	--[5]	3	--[5]	0	0.0	3	--[5]
Non-U.S.-Born[7]	3,800	91.8	49	1.3	161	4.2	39	1.0	273	7.2	2,744	72.7	2,937	77.7	715	18.8	2,858	75.6
Other[8]	**1,477**	**1.8**	**75**	**5.1**	**218**	**14.8**	**25**	**1.7**	**137**	**9.3**	**967**	**65.8**	**1,050**	**71.3**	**328**	**22.2**	**1,082**	**73.5**
U.S. States / D.C.	645	43.7	51	7.9	149	23.1	11	1.7	61	9.5	443	69.1	468	72.8	141	21.9	371	57.7
Puerto Rico/U.S. Terr.[6]	6	0.4	2	--[5]	2	--[5]	1	--[5]	2	--[5]	4	--[5]	5	83.3	1	--[5]	4	--[5]
Non-U.S.-Born[7]	826	55.9	22	2.7	67	8.1	13	1.6	74	9.0	520	63.2	577	70.0	186	22.5	707	85.9
Unknown[9]	**190**	**0.2**	**2**	**--[5]**	**4**	**--[5]**	**1**	**--[5]**	**4**	**5.1**	**44**	**62.9**	**50**	**71.4**	**19**	**17.9**	**43**	**67.2**

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. In the first category, "Births", percentages are based on column totals, percentages of mother's birthplace categories are based on subtotals of each race/Hispanic ethnicity category. For all other categories, percentages are based on row totals. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low birthweight: less than 2,500 grams or 5.5 pounds. 4. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 5. Calculations based on fewer than five events are excluded. 6. The category "Puerto Rico/U.S. Territories" includes women born in Puerto Rico, the U.S. Virgin Islands, and Guam. In 1999, 96.4% of the births in this category were to women born in Puerto Rico. 7. 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. 8. Other: Mothers who designated themselves as Other race. 9. Unknown: Mothers who did not indicate a race/ethnicity.

Table 2B. Birth Characteristics by Major Maternal Ancestries, Massachusetts: 1999

Maternal Ancestry	Births[1]		Teen Births				Birthweight				Prenatal Care				Cesarean Section		Breast Feeding[4]	
			<18 Years		<20 Years		Very Low[2]		Low[3]		Adequate		1st Trimester					
	#	%[5]	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
State Total	80,866	100.0	1,926	2.4	5,588	6.9	1,120	1.4	5,708	7.1	63,728	79.4	67,732	84.3	18,080	22.4	57,394	72.4
Puerto Rican	4,418	5.5	545	12.3	1,238	28.0	77	1.7	395	8.9	2,862	65.2	3,155	71.8	817	18.5	2,792	63.3
Dominican	1,555	1.9	73	4.7	215	13.8	22	1.4	116	7.5	1,023	66.0	1,119	72.1	371	24.0	1,351	87.1
Salvadoran	658	0.8	18	2.7	79	12.0	7	1.1	42	6.4	386	58.8	413	62.9	96	14.6	593	90.1
Other Central American	719	0.9	24	3.3	66	9.2	8	1.1	47	6.5	467	65.0	490	68.2	148	20.7	634	88.2
Other Hispanic[6]	1,465	1.8	49	3.3	148	10.1	22	1.5	121	8.3	1,093	75.0	1,147	78.7	351	24.0	1,230	84.2
Chinese	1,179	1.5	1	--[5]	10	0.8	9	0.8	69	5.9	947	80.7	980	83.4	247	20.9	937	79.7
Vietnamese	683	0.8	13	1.9	44	6.4	6	0.9	45	6.6	469	69.1	510	75.1	125	18.3	384	56.2
Cambodian	557	0.7	52	9.3	118	21.2	3	--[5]	42	7.6	258	46.7	315	57.0	59	10.6	277	49.7
Asian Indian	717	0.9	0	0.0	4	--[5]	10	1.4	70	9.8	560	79.0	596	84.1	173	24.2	678	95.4
Other Asian/PI[7]	1,092	1.4	20	1.8	46	4.2	20	1.8	93	8.5	826	75.8	867	79.5	192	17.6	930	85.5
Cape Verdean	783	1.0	45	5.7	128	16.3	9	1.2	64	8.2	493	63.2	525	67.2	162	20.7	531	68.1
Brazilian	799	1.0	14	1.8	46	5.8	6	0.8	54	6.8	579	72.6	616	77.3	249	31.2	735	92.0
Other Portuguese	1,353	1.7	43	3.2	125	9.2	10	0.7	68	5.0	1,048	77.8	1,099	81.5	286	21.2	650	48.1
Haitian	1,017	1.3	7	0.7	53	5.2	19	1.9	100	9.8	698	69.1	742	73.2	293	28.8	871	85.7
W. Indian /Carib.[8]	663	0.8	23	3.5	59	8.9	27	4.1	78	11.8	481	72.7	511	77.2	157	23.8	559	84.3
African-American	2,885	3.6	207	7.2	527	18.3	110	3.8	378	13.1	1,971	68.7	2,106	73.4	624	21.7	1,736	60.3
African[9]	820	1.0	6	0.7	16	2.0	28	3.4	78	9.5	528	64.8	573	70.0	228	27.9	711	86.7
Middle Easterner[10]	790	1.0	5	0.6	22	2.8	13	1.6	50	6.3	603	76.4	647	82.0	163	20.7	695	88.0
Native American	262	0.3	19	7.3	40	15.3	2	--[5]	19	7.3	186	71.3	200	76.3	53	20.2	168	64.1
European	14,543	18.0	82	0.6	319	2.2	130	0.9	813	5.6	12,084	83.6	12,715	87.9	3,337	23.0	11,698	81.3

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). 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. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. 5. Calculations based on fewer than five events are excluded. 6. Other Hispanic includes Mexican, Cuban, Colombian, and Other South American. 7. Other Asian and Pacific Islander includes Korean, Filipino, Japanese, Laotian, Thai, Pakistani and Hawaiian. 8. West Indian and Caribbean include Jamaican and Barbadian. 9. African includes Nigerian and other African. 10. Middle Easterner includes Lebanese, Iranian, and Israeli.

Table 3A. Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 1999

Municipality	Rank	Population	Crude Birth Rate[2]	Mother's Race and Ethnicity				Very Low Birthweight (<1500 g)	Low Birthweight (<2500 g)
				Non-Hispanic White	Non-Hispanic Black	Hispanic	Asian or Other[3]		
				%	%	%	%	%	%
STATE TOTAL		6,291,263	12.9	74.7	7.2	10.9	6.9	1.4	7.1
Arlington	27	43,066	13.0	87.0	2.5	1.8	8.6	1.1	4.7
Barnstable	26	46,461	10.3	85.0	4.4	2.7	7.9	1.5	8.2
Boston	1	563,876	14.2	35.4	32.4	21.4	10.6	1.9	8.5
Brockton	7	91,008	15.9	45.6	25.7	11.4	17.1	1.9	8.6
Brookline	15	60,639	9.7	75.0	3.1	2.4	19.2	2.0	7.3
Cambridge	5	96,292	11.0	59.0	15.5	8.7	16.8	1.6	8.0
Chicopee	22	53,003	11.2	81.2	1.7	15.6	1.3	2.5	7.6
Fall River	9	89,276	12.3	85.5	5.2	5.1	4.0	1.2	7.7
Framingham	14	66,554	15.0	66.4	4.7	18.3	10.5	1.4	6.7
Haverhill	18	57,186	16.1	82.6	2.5	12.8	2.0	0.7	8.4
Holyoke	30	41,081	14.7	31.0	3.2	64.5	1.3	1.8	8.3
Lawrence	13	70,325	20.1	22.8	2.3	70.5	4.2	1.3	8.3
Leominster	29	41,875	13.7	69.4	5.9	18.3	6.3	1.2	8.6
Lowell	4	106,449	15.7	48.7	4.7	18.8	27.7	2.3	8.5
Lynn	11	83,464	16.6	45.6	12.5	30.4	11.4	1.4	8.9
Malden	20	53,703	14.7	56.7	12.1	7.9	23.2	1.3	7.6
Medford	17	57,983	11.0	78.8	10.3	3.9	6.1	1.3	6.6
Methuen	28	42,050	12.8	78.4	2.0	16.2	3.4	1.9	7.8
New Bedford	6	94,835	13.4	70.1	6.6	14.0	8.9	1.3	7.5
Newton	8	90,506	9.7	84.8	1.4	3.7	10.2	0.8	6.4
Peabody	24	50,979	11.0	87.0	0.9	6.6	5.3	1.8	8.9
Pittsfield	25	46,691	10.5	86.8	6.9	1.2	5.1	--[5]	6.5
Plymouth	23	51,103	14.0	94.4	1.1	1.5	2.9	0.8	4.2
Quincy	10	87,018	12.4	70.6	3.8	2.3	23.3	1.1	7.8
Somerville	12	78,112	12.1	60.2	10.9	18.5	10.3	0.8	5.2
Springfield	3	150,414	15.8	34.5	23.0	38.2	4.3	1.6	8.9
Taunton	19	54,297	14.6	86.5	4.3	6.5	2.5	1.3	6.9
Waltham	16	59,165	11.5	65.5	8.4	13.4	12.5	1.2	6.2
Weymouth	21	53,670	14.0	91.2	2.0	1.9	4.9	0.9	7.6
Worcester	2	169,091	14.6	56.3	9.9	24.7	9.1	2.2	9.1

Table 3A.(cont'd) Resident Birth Characteristics, 30 Largest Municipalities[1], Massachusetts: 1999

Municipality	Birth					Deaths			
	Adequate Prenatal Care	Public Payment for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[4]		Neonatal Mortality Rate[4]	
	%	%	%	#	Rate[2]	1999	1997-1999	1999	1997-1999
STATE TOTAL	79.4	26.8	26.5	5,515	26.6	5.2	5.2	4.1	4.0
Arlington	88.7	3.9	6.6	5	5.8	--[5]	--[5]	--[5]	--[5]
Barnstable	80.5	34.9	27.6	27	21.1	--[5]	8.8	--[5]	4.7
Boston	79.2	48.3	44.2	761	41.0	7.4	7.2	6.4	5.6
Brockton	66.0	52.9	51.5	169	60.9	4.1	6.2	3.4	5.3
Brookline	91.3	4.4	5.3	2	--[5]	--[5]	--[5]	--[5]	--[5]
Cambridge	82.5	16.3	20.4	44	14.5	--[5]	2.9	--[5]	1.6
Chicopee	71.6	41.4	42.2	63	36.5	--[5]	8.5	--[5]	6.8
Fall River	77.3	49.2	45.5	150	52.8	9.1	7.3	5.5	5.4
Framingham	87.6	26.8	20.1	54	27.8	6.0	3.7	6.0	3.7
Haverhill	81.3	27.4	31.4	82	49.6	--[5]	5.3	--[5]	3.8
Holyoke	70.9	67.9	67.0	147	100.5	--[5]	5.9	--[5]	4.5
Lawrence	54.4	67.2	62.3	277	103.9	5.7	9.2	5.0	7.3
Leominster	78.3	27.2	30.1	60	52.1	--[5]	4.5	--[5]	3.9
Lowell	60.5	48.9	48.9	235	62.9	8.4	5.9	5.4	4.2
Lynn	67.7	57.7	49.5	174	67.9	5.8	8.3	4.3	5.6
Malden	78.4	25.5	20.3	33	28.5	--[5]	6.9	--[5]	5.6
Medford	84.9	14.4	16.8	11	6.2	--[5]	4.3	--[5]	3.7
Methuen	73.5	24.4	28.5	42	32.8	--[5]	3.6	--[5]	--[5]
New Bedford	70.9	60.5	54.5	221	72.4	6.3	5.8	--[5]	2.9
Newton	87.7	4.8	6.4	8	2.0	--[5]	3.1	--[5]	2.3
Peabody	79.1	18.9	18.2	28	19.2	--[5]	7.1	--[5]	4.7
Pittsfield	62.9	42.6	42.2	48	33.1	--[5]	3.9	--[5]	3.9
Plymouth	83.5	18.7	21.0	34	19.4	--[5]	5.4	--[5]	3.9
Quincy	87.2	23.9	19.6	34	16.9	--[5]	4.3	--[5]	3.4
Somerville	77.0	28.9	27.9	64	38.5	--[5]	2.8	--[5]	2.5
Springfield	61.9	62.6	63.2	485	86.7	8.8	9.2	5.5	7.1
Taunton	76.9	32.8	33.1	83	53.0	7.5	6.7	--[5]	4.2
Waltham	78.7	20.5	20.0	31	14.6	--[5]	4.4	--[5]	3.9
Weymouth	93.3	16.5	17.0	31	22.2	--[5]	3.2	--[5]	2.7
Worcester	63.7	44.6	43.6	304	46.2	8.1	7.8	6.5	6.1

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 MISER 1998 population estimates (released in September 2000). 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. 1999 birth rates are calculated using the 1998 MISER population estimates (released in September 2000). 3. Mothers who designated themselves as Asian, American Indian or Other. 4. Deaths per 1,000 live births. 5. Calculations based on fewer than 5 events are excluded.

Table 3B: Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 1999

CHNA	Population	Crude Birth Rate[1]	Mother's Race and Ethnicity: Non-Hispanic White %	Non-Hispanic Black %	Hispanic %	Asian or Other[2] %	Very Low Birthweight (<1500 g) %	Low Birthweight (<2500 g) %
STATE TOTAL	6,291,263	12.9	74.7	7.2	10.9	6.9	1.4	7.1
Community Health Network of Berkshire County	138,938	9.3	89.5	3.2	3.5	3.2	0.7	6.6
Upper Valley Health Web (Franklin County)	87,167	9.9	93.7	0.6	2.7	2.2	0.6	4.4
Partnership for Health in Hampshire County (Northampton)	156,532	8.0	87.0	1.5	5.6	5.6	1.3	7.4
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	156,760	12.0	69.6	1.8	27.2	1.3	2.0	7.3
The Community Health Connection (Springfield)	292,714	13.0	55.9	14.8	25.5	3.7	1.3	8.2
Community Health Network of Southern Worcester County	114,693	11.8	89.7	0.8	7.3	1.8	1.6	7.5
Community Partners for Health (Milford)	150,141	14.9	95.7	0.5	1.6	2.0	1.0	5.6
Community Health Network of Greater Metro West (Framingham)	366,847	14.6	86.0	1.8	5.9	6.1	1.2	6.1
Community Wellness Coalition (Worcester)	283,166	13.7	68.9	6.7	16.5	7.8	1.9	8.0
Fitchburg/Gardner Community Health Network	261,025	12.5	83.6	2.2	10.1	3.8	1.0	6.5
Greater Lowell Community Health Network	271,240	14.3	73.2	2.5	9.0	14.9	1.9	7.3
Greater Lawrence Community Health Network	176,819	15.6	53.9	1.6	39.9	4.4	1.2	7.4
Greater Haverhill Community Health Network	141,633	14.4	90.5	1.4	6.4	1.6	1.2	7.8
Community Health Network North (Beverly/Gloucester)	119,363	11.3	94.4	0.5	1.4	3.5	0.9	6.9
North Shore Community Health Network	277,854	13.0	72.0	5.8	15.7	6.3	1.7	8.1
Greater Woburn/Concord/Littleton Community Health Network	212,366	12.4	85.0	1.7	2.6	9.8	1.0	5.7
North Suburban Health Alliance (Medford/Malden/Melrose)	258,793	13.2	78.3	7.0	5.3	8.9	1.1	6.5
Greater Cambridge/Somerville Community Health Network	274,988	11.7	69.7	9.1	9.4	11.7	1.2	6.5
West Suburban Health Network (Newton/Waltham)	260,082	11.3	84.5	2.6	4.7	8.0	1.0	6.7
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	710,372	14.2	39.8	26.9	22.1	11.1	1.9	8.3
Blue Hills Community Health Alliance (Greater Quincy)	367,516	12.8	82.1	5.5	2.2	10.1	1.2	7.2
Greater Brockton Community Health Network	232,912	13.6	72.0	13.2	5.9	8.8	1.7	7.7
South Shore Community Partners in Prevention (Plymouth)	178,277	14.6	96.2	0.8	0.9	2.0	1.6	5.6
Greater Attleboro-Taunton Health & Education Response	234,841	14.2	91.9	2.2	2.8	2.7	1.2	5.9
Partners for a Healthier Community (Fall River)	138,621	10.7	88.7	3.9	3.8	3.2	1.3	7.6
Greater New Bedford Health & Human Services Coalition	199,706	11.1	80.3	4.4	8.4	6.5	1.1	6.9
Cape and Islands Community Health Network	227,897	10.0	90.4	2.2	2.0	4.9	1.5	6.8

Table 3B.(cont'd) Resident Birth Characteristics, Community Health Network Areas (CHNAs), Massachusetts: 1999

CHNA	Births					Deaths			
	Adequate Prenatal Care	Public Payment for Prenatal Care	Unmarried	Teen Mothers 15 to 19 years		Infant Mortality Rate[4]		Neonatal Mortality Rate[4]	
	%	%	%	#	Rate[3]	1999	1997-1999	1999	1997-1999
STATE TOTAL	79.4	26.8	26.5	5,515	26.6	5.2	5.2	4.1	4.0
Community Health Network of Berkshire County	69.9	36.5	35.9	123	23.6	--[5]	4.1	--[5]	2.8
Upper Valley Health Web (Franklin County)	76.9	31.8	30.9	83	29.3	--[5]	4.9	--[5]	3.4
Partnership for Health in Hampshire County (Northampton)	82.1	22.1	25.0	78	7.7	4.0	3.3	--[5]	2.6
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	74.5	44.3	43.2	251	43.9	4.8	5.6	3.7	4.3
The Community Health Connection (Springfield)	69.1	47.1	46.4	561	53.4	7.1	7.2	4.7	5.5
Community Health Network of Southern Worcester County	74.0	25.3	31.1	125	32.3	8.9	6.0	8.9	5.3
Community Partners for Health (Milford)	85.2	10.0	12.7	70	13.2	4.9	4.1	3.6	2.6
Community Health Network of Greater Metro West (Framingham)	87.0	10.7	11.0	127	11.9	3.4	4.3	2.6	3.3
Community Wellness Coalition (Worcester)	67.1	31.5	32.3	345	33.4	7.2	7.7	5.7	6.1
Fitchburg/Gardner Community Health Network	78.3	23.6	26.1	272	30.6	4.0	3.7	2.8	2.7
Greater Lowell Community Health Network	72.2	26.0	27.6	289	32.3	7.5	5.0	5.4	3.8
Greater Lawrence Community Health Network	67.2	40.6	39.3	327	51.6	5.1	6.3	4.7	4.9
Greater Haverhill Community Health Network	83.2	17.2	21.1	124	28.6	4.4	4.3	3.9	3.7
Community Health Network North (Beverly/Gloucester)	87.6	14.2	15.2	59	14.4	--[5]	4.2	--[5]	3.5
North Shore Community Health Network	74.9	32.5	29.4	265	32.2	4.4	6.3	3.3	4.4
Greater Woburn/Concord/Littleton Community Health Network	84.4	5.2	8.0	43	7.1	1.9	2.4	--[5]	1.8
North Suburban Health Alliance (Medford/Malden/Melrose)	83.3	16.8	16.4	85	12.2	3.8	5.1	3.5	4.4
Greater Cambridge/Somerville Community Health Network	83.4	16.4	17.6	122	18.2	4.0	3.0	3.4	2.4
West Suburban Health Network (Newton/Waltham)	86.6	7.6	8.6	53	5.3	3.1	3.4	2.7	2.9
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	78.6	45.8	41.5	887	39.9	6.6	6.3	5.7	4.9
Blue Hills Community Health Alliance (Greater Quincy)	89.9	14.3	14.2	126	12.4	3.4	4.4	3.0	3.5
Greater Brockton Community Health Network	75.8	30.7	32.3	223	27.4	5.4	5.1	5.0	4.6
South Shore Community Partners in Prevention (Plymouth)	88.7	12.4	15.6	91	14.6	6.9	5.8	5.7	4.9
Greater Attleboro-Taunton Health & Education Response	82.1	20.6	20.5	210	26.9	7.2	5.7	5.4	4.1
Partners for a Healthier Community (Fall River)	79.9	42.9	38.5	180	39.8	8.8	7.3	6.1	5.6
Greater New Bedford Health & Human Services Coalition	75.7	45.7	41.5	277	38.1	5.4	4.5	2.3	2.1
Cape and Islands Community Health Network	80.9	28.5	23.9	119	19.7	5.7	5.6	3.9	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). 1999 birth rates are calculated using the 1998 MISER population estimates (released in September 2000). 2. Mothers who designated themselves as Asian, American Indian or Other. 3. Births per 1,000 female residents ages 15-19. 4. Deaths per 1,000 live births. 5. Calculations based on fewer than 5 events are excluded.

Table 4. Age-Specific and Crude Birth Rates, Massachusetts: 1990 and 1999

Mother's Age	1990 Births[1]	1990 Rate	1999 Births	1999 Rate[2]	Percent Change in Rate
12-14	124	1.3	73	0.6	-53.8
15-19	7,258	35.8	5,515	26.6	-25.7
20-24	18,115	70.5	11,813	50.4	-28.5
25-29	29,913	107.5	20,382	81.2	-24.5
30-34	25,687	92.1	26,330	104.5	13.5
35-39	9,795	40.1	13,973	53.0	32.2
40-44	1,522	6.9	2,656	10.5	52.2
45+	46	0.3[3]	124	0.5[3]	62.5
Birth rate, ages 15-44[4]	92,290	62.2	80,669	55.2	-11.3
Crude Birth Rate[5]	92,461	15.4	80,866	12.9	-16.5

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. 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. 1999 birth rates are calculated using the 1998 MISER population estimates (released in September 2000). 3. Denominator is female population ages 45-49. 4. Rate represents the total number of births to women age 15-44 per 1,000 women age 15 to 44. 5. Births per 1,000 residents (females and males). Includes births to mothers of all age groups and mothers for whom age is unknown.

Figure 1. Trends in the Number of Births by Mother's Age Group, Massachusetts: 1980-1999

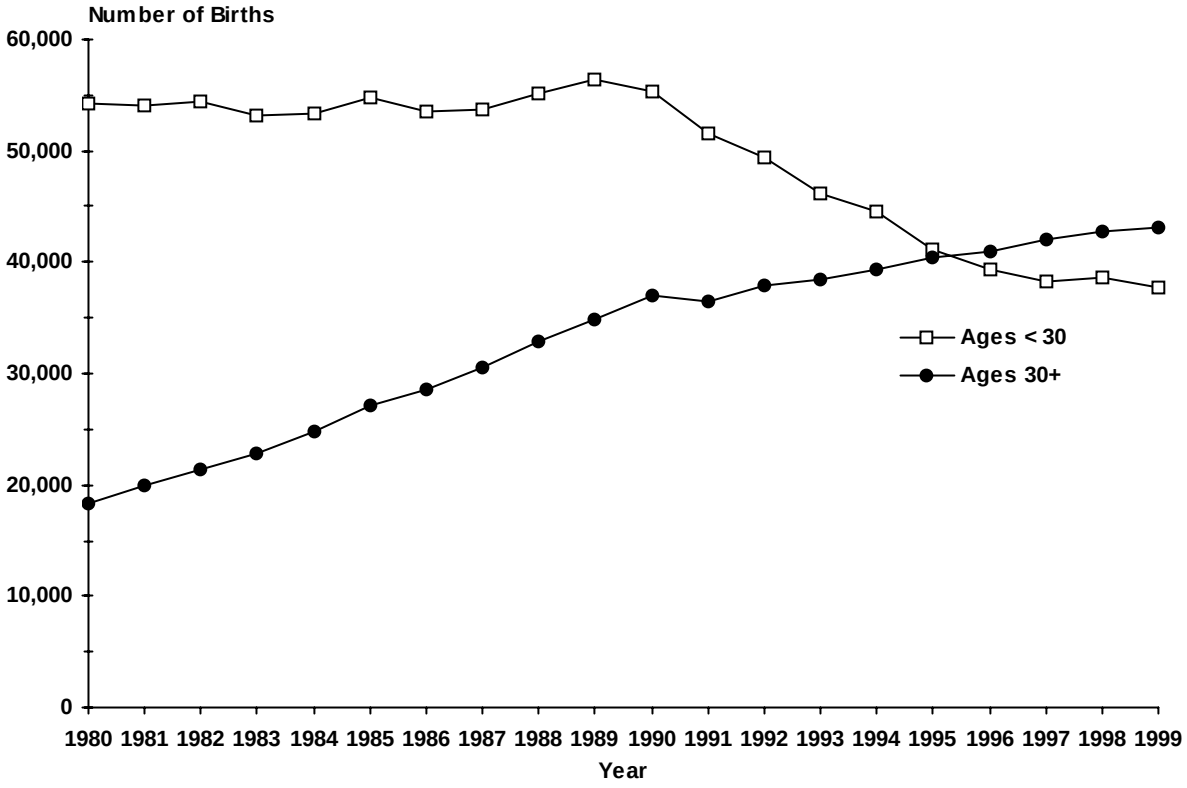
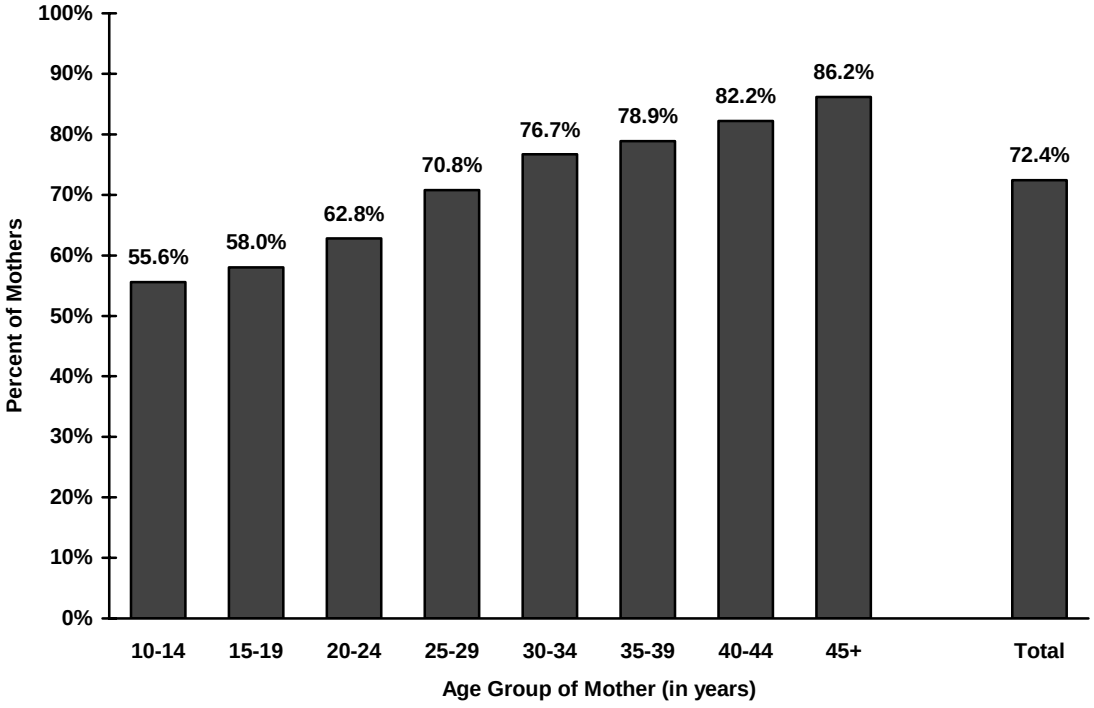
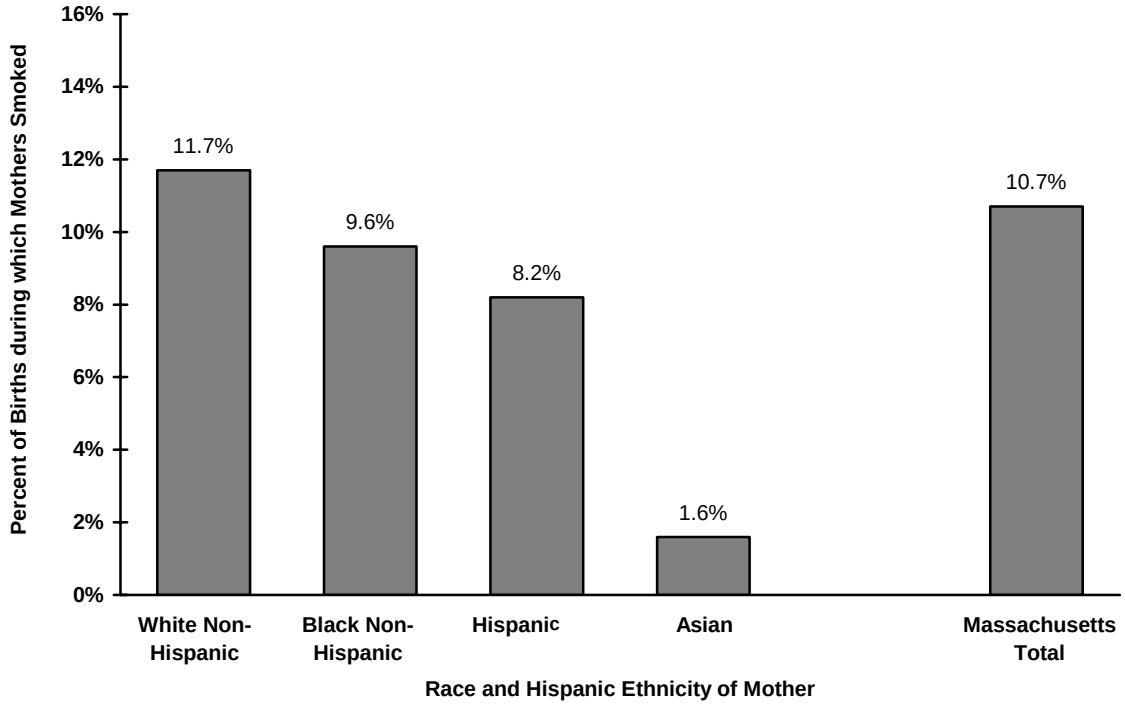


Figure 2. Percent of Mothers Breastfeeding or Intending to Breastfeed[1] by Age Group, Massachusetts[2]: 1999



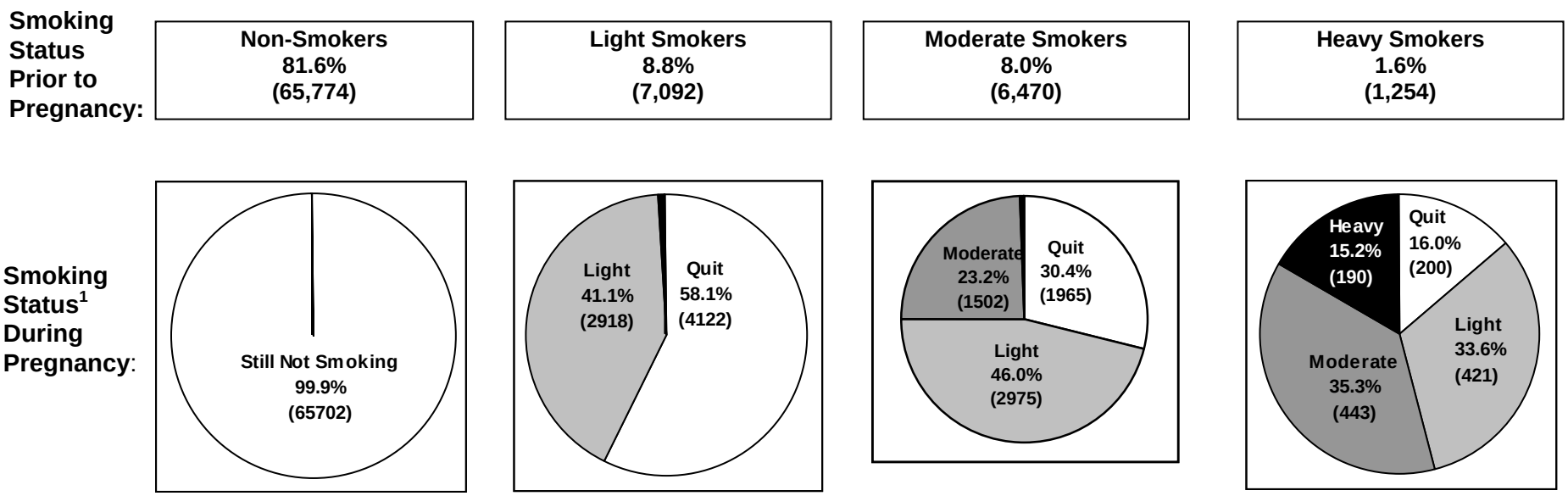
NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Information about breastfeeding was reported by the mother at the time the birth certificate was completed.
2. For race-specific breastfeeding rates see Table 14.

Figure 3. Smoking Prevalence[1] During Pregnancy, by Race and Hispanic Ethnicity of Mother, Massachusetts: 1999



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Based on information provided on the birth certificate by mother. Mothers with more than one delivery are counted for each birth.
NOTE: Maternal smoking is self-reported, usually following childbirth; these data should be interpreted cautiously.

Figure 4. The Distribution of Smoking Status during Pregnancy by Smoking Status Prior to Pregnancy, Massachusetts: 1999



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

58.1% of Light Smokers quit smoking (0.7% increased)

76.4% of Moderate Smokers decreased the number of cigarettes smoked daily or quit (0.4% increased)

84.9% 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.
Not all percentages add up to 100 due to a small number of mothers with unknown smoking status.
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: 1999

Age of Mother (years)		Total Births	1st	2nd	3rd	4th	5th+
STATE TOTAL	#[2]	80,866	35,844	27,213	11,948	3,903	1,958
	%[3]	100.0	44.3	33.7	14.8	4.8	2.4
10-14	#	73	73	0	0	0	0
	%	100.0	100.0	0.0	0.0	0.0	0.0
15-19	#	5,515	4,603	793	97	20	2
	%	100.0	83.5	14.4	1.8	0.4	0.0
20-24	#	11,813	6,293	3,781	1,291	340	108
	%	100.0	53.3	32.0	10.9	2.9	0.9
25-29	#	20,382	9,929	6,640	2,594	845	374
	%	100.0	48.7	32.6	12.7	4.1	1.8
30-34	#	26,330	10,089	9,937	4,353	1,312	639
	%	100.0	38.3	37.7	16.5	5.0	2.4
35-39	#	13,973	4,012	5,100	3,111	1,131	619
	%	100.0	28.7	36.5	22.3	8.1	4.4
40-44	#	2,656	806	924	483	244	199
	%	100.0	30.3	34.8	18.2	9.2	7.5
45+	#	124	39	38	19	11	17
	%	100.0	31.5	30.6	15.3	8.9	13.7

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. Number and Percentage Distribution of Births[1] by Plurality and Age, Massachusetts: 1990-1999

		Singletons		Multiples						Total births	
				Twins		Triplets or more		Total Multiples			
Age Group	Year	#	%	#	%	#	%	#	%	#	%
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	80,170	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
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
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

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.

Table 7. Selected Birth Characteristics by Maternal Education, Massachusetts: 1999

	Less than High School		High School Graduate		Some College		College Graduate		More than College	
	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]
State Total	8,792	10.9	21,153	26.2	19,916	24.7	20,630	25.6	10,109	12.5
Race										
Non-Hispanic White	3,439	5.7	14,519	24.1	15,538	25.7	18,196	30.2	8,650	14.3
Non-Hispanic Black	925	15.8	2,219	38.0	1,814	31.1	669	11.5	210	3.6
Hispanic	3,333	37.9	3,012	34.2	1,627	18.5	552	6.3	280	3.2
Asian	693	16.8	876	21.2	647	15.6	1,035	25.0	885	21.4
Age										
20-29	3,972	12.4	11,004	34.3	9,474	29.5	5,780	18.0	1,882	5.9
30-39	1,486	3.7	7,709	19.2	9,528	23.7	13,959	34.8	7,465	18.6
40+	115	4.2	443	16.1	560	20.3	885	32.1	757	27.4
Non-U.S.-born[2]	2,932	33.4	4,643	22.0	3,198	16.1	2,957	14.4	1,979	19.6
Unmarried	6,390	72.7	8,779	41.5	4,881	24.5	1,023	5.0	330	3.3
Publicly-financed prenatal care	6,627	76.1	9,156	43.9	4,275	21.8	894	4.5	227	2.3
Very low birthweight[3]	150	1.7	325	1.5	285	1.4	230	1.1	125	1.2
Low birthweight[4]	835	9.5	1,605	7.6	1,359	6.8	1,226	6.0	671	6.6
Adequate prenatal care	5,159	59.0	15,827	75.3	16,142	81.4	17,716	86.4	8,788	87.4
Cesarean section delivery	1,475	16.8	4,663	22.1	4,772	24.0	4,746	23.0	2,385	23.6
Breastfeeding[5]	4,837	55.5	12,655	60.7	13,929	71.1	16,936	84.4	8,957	90.5
Multiple births	169	1.9	728	3.4	847	4.3	1,015	4.9	619	6.1
Smoking during pregnancy	2,226	25.4	3,753	17.8	2,131	10.7	392	1.9	95	0.9

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. For state total, race and age categories, percentages are based on row totals. For all other categories, percentages are based on column totals. 2. Includes women born outside of the 50 U.S. States, Washington D.C., and Puerto Rico/U.S. territories (the U.S. Virgin Islands, and Guam). 3. Very low birthweight: less than 1,500 grams or 3.3 pounds. 4. Low birthweight: less than 2,500 grams or 5.5 pounds. 5. Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed.

CHAPTER 2

INFANT MORTALITY

Overall Changes in Infant Mortality Rate

In 1999, there were 418 infant deaths (deaths of children less than one year of age) among Massachusetts residents, 4 more than the number of infant deaths in 1998. The infant mortality rate (IMR) in 1999 was 5.2 deaths per 1,000 live births, approximately the same as the 1998 rate of 5.1, and a 26% decrease since 1990 (Table 8A). The 1999 Massachusetts IMR is 28% below the 1998 U.S. final rate of 7.2 (National Vital Statistics Report, Vol. 48, No. 11, July 24, 2000, p. 87).

Race and Ethnicity Patterns in Infant Mortality Rates

The IMR for whites was 4.8 deaths per 1,000 live births in 1999, approximately the same as in 1998 (Table 8A). The IMR for black infants was 11.4 deaths per 1,000 live births, a 23% increase from the previous year (9.3 in 1998). Since 1980, there has been a substantial decline in IMRs among black and white infants. From 1980 to 1999, the IMR decreased by 51% for whites and 39% for blacks. However, the IMR for black infants was consistently more than twice as high as the IMR for white infants during this time period. The 1999 IMR for all 'other' races (including Asian and American Indian) was 1.9, although caution should be used in interpreting these results since they are based on only 9 deaths.

The Massachusetts death certificate was revised in 1989 to include a Hispanic identifier. This revision enables the calculation of non-Hispanic non-Hispanic white black, and Hispanic infant mortality rates (Table 8B). Infants born to non-Hispanic black mothers continue to have the highest IMR (12.3 per 1,000 live births). From 1998 to 1999, the IMR for Hispanics declined 18% from 6.7 to 5.5 deaths per 1,000 live births. The 1999 IMR for Hispanic infants is 17% higher than the non-Hispanic white rate and 55% below the non-Hispanic black rate.

Asian mothers had the lowest rates of infant mortality compared to the other race/ethnicity groups (Table 8B). This is consistent with prior years with the exception of 1995. In 1999 the Asian IMR was 1.9 deaths per 1,000 live births. (Caution should be used when interpreting this rate since it is based on a small number of deaths.)

Neonatal and Post Neonatal Mortality Rates

The overall neonatal mortality rate (deaths among infants less than 28 days old) was 4.1 per 1,000 live births in 1999, a slight increase from 3.9 in 1998 (Table 8B). The neonatal mortality rate increased from 8.5 in 1998 to 9.9 in 1999 for non-Hispanic black infants while remaining about the same or declining for other race/ethnicity groups.

The overall post neonatal mortality rate (deaths among infants between 28 and 364 days old), was 1.1 in 1999 and 1.2 in 1998. The post neonatal mortality rate for non-Hispanic black infants remains approximately twice as high (2.4 deaths per 1,000 live births) as for all other race/ethnicity groups.

Trends in the Time of Infant Deaths

Since 1990 the percentage of all infant deaths that occurred in the post neonatal period (28-364 days) has declined from 31% to 21% (Figure 7). During the same time period, the percentage of infant deaths that occurred in the early neonatal period (within the first 24 hours after birth)

rose from 44% to 50% of all infant deaths while the percentage occurring from 1-27 days rose from 25% to 30% of infant deaths.

(Cause-specific infant death information will be available in **Massachusetts Deaths 1999**.)

Table 8A. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-1999

INFANT MORTALITY

	State Total[2]		White		Black		Asian/Other[3]	
Year	#	Rate[4]	#	Rate[4]	#	Rate[4]	#	Rate[4]
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

NEONATAL MORTALITY

	State Total[2]		White		Black		Asian/Other[3]	
Year	#	Rate[4]	#	Rate[4]	#	Rate[4]	#	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

Table 8A (cont'd). Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race[1], Massachusetts: 1980-1999

POST NEONATAL MORTALITY

Year	State Total[2]		White		Black		Asian/Other[3]	
	#	Rate[4]	#	Rate[4]	#	Rate[4]	#	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]

1. Hispanic origin could not be identified from the Massachusetts death certificate before 1989; thus, Hispanic trend data are not available. Most Hispanics are included in the race category of white. Hispanic infant mortality data for the years 1990 through 1999 are presented in Table 8B. 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 8B. Trends in Infant, Neonatal, and Post Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1989-1999

INFANT MORTALITY

	State Total[1]		Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian		Other[2]	
Year	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	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]

NEONATAL MORTALITY

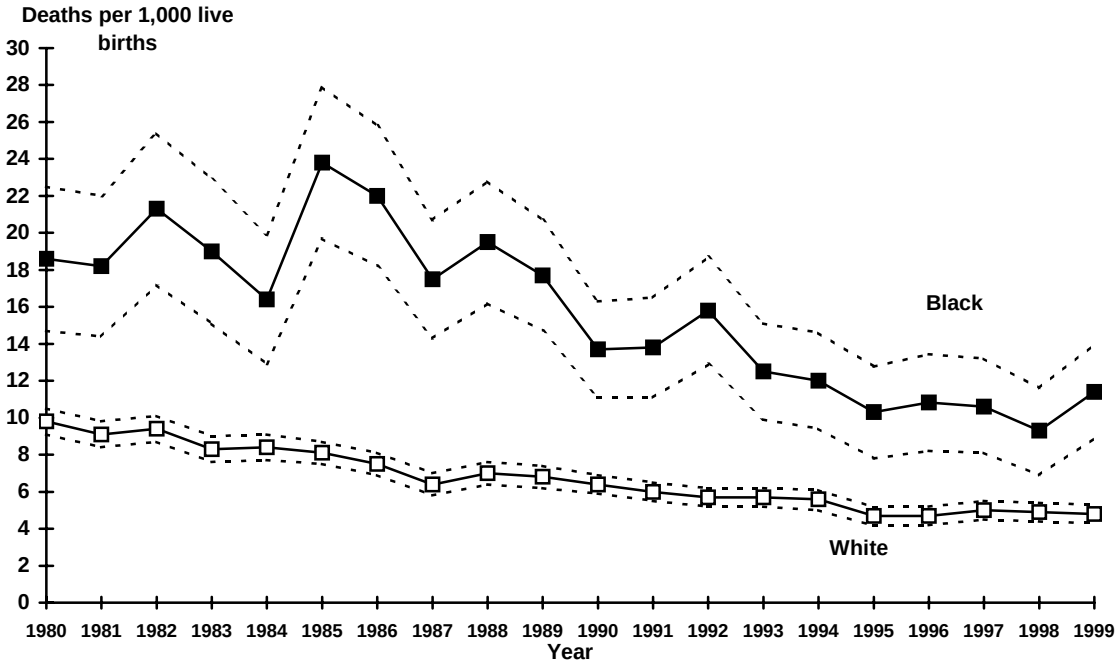
	State Total[1]		Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian		Other[2]	
Year	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]
1990	446	4.8	298	4.1	75	10.5	49	5.8	19	5.5	5	5.5
1991	401	4.5	266	3.9	72	10.7	53	6.2	10	3.0	0	0.0
1992	415	4.8	274	4.0	76	11.4	51	6.0	10	3.0	4	--[4]
1993	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]

POST NEONATAL MORTALITY

	State Total[1]		Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian		Other[2]	
Year	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	Rate[3]	#	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

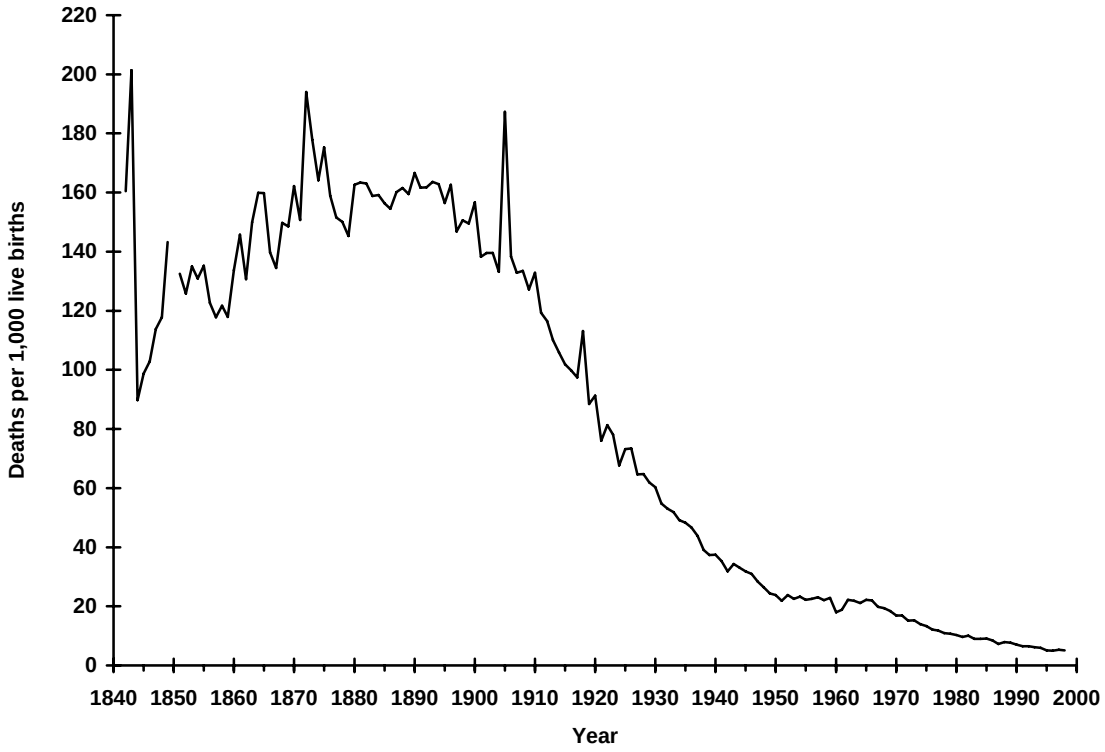
1. Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race. 2. Other: American Indian and Other races. 3. Rates are expressed per 1,000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

Figure 5. Infant Mortality Rates and 95% Confidence Intervals[1] by Race[2], Massachusetts: 1980-1999



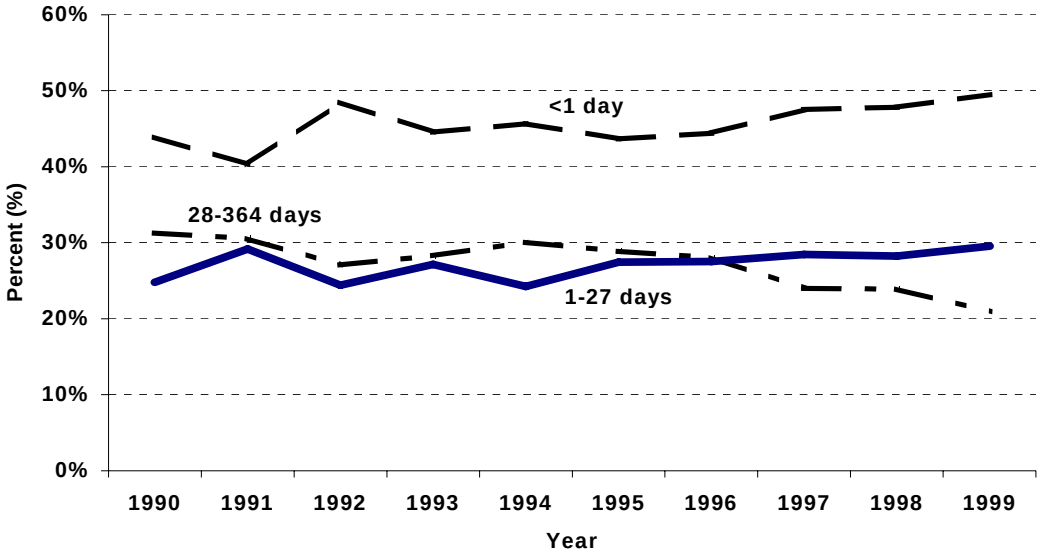
1. See Appendix for explanation
2. For rate computations, infant births of unknown race are allocated into race categories according to the distribution of the births of known race.
3. On tables and graphs which include data prior to June 1986, the race classifications do not include ethnicity; most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

Figure 6. Infant Mortality Rates, Massachusetts: 1842-1999[1]



1. Data not available for 1850.

Figure 7. Trends in the Timing of Infant Deaths, 1990-1999



CHAPTER 3

BIRTHWEIGHT AND GESTATIONAL AGE

Overall Birthweight Distribution

In 1999, 7.1% (5,708) of infants were low birthweight (less than 2,500 grams or 5.5 pounds), and 11.9% were 4,000 grams (8.8 pounds) or more (Table 9). The low birthweight rate in Massachusetts was 7% below the national preliminary figure of 7.6% (National Vital Statistics Report, Vol. 48, No. 14, August 8, 2000, p. 2). The low birthweight rate in Massachusetts was slightly higher than the 1998 rate of 7.0%. In 1999, 1.4% (1,120) of infants born to Massachusetts resident women were very low birthweight (less than 1,500 grams or 3.3 pounds), approximately the same as in 1998 (1.3%) (Table 11).

Patterns of Birthweight by Race and Ethnicity

The proportion of low birthweight infants varied by mother's race and ethnicity (Table 10). Non-Hispanic black women had the highest proportion of low birthweight infants: 12.2%; Hispanic mothers delivered 8.2% low birthweight infants; Asian mothers, 7.3% low birthweight infants; and non-Hispanic white mothers delivered 6.4% low birthweight infants. The proportion of low birthweight deliveries increased slightly for all ethnicity groups except Asian (data not shown).

The proportion of very low birthweight infants also varied by mother's race and ethnicity. Non-Hispanic black women had the highest proportion of very low birthweight infants: 3.6%; Hispanic mothers delivered 1.5% very low birthweight infants; non-Hispanic white, 1.2%; and Asian mothers, 1.1% (Table 9).

Non-Hispanic white mothers delivered the highest proportion of high birthweight infants, with 13.3% weighing 4,000 grams or more.

The Massachusetts low birthweight rate for non-Hispanic black women, 12.2%, was lower than the U.S. rate for all black women, 13.1%. The rate of low birthweight for Massachusetts Hispanic women (8.2%) was higher than the corresponding preliminary 1999 U.S. rate of 6.4% (National Vital Statistics Report, Vol. 48, No. 14, August 8, 2000, p. 2). This may be due to differences in the composition of the Hispanic population between Massachusetts and the nation as a whole. In Massachusetts, the Hispanic population is comprised mainly of Puerto Ricans, Dominicans, and Central Americans. The U.S. Hispanic population has a much greater percentage of Mexicans and Cubans who have relatively low rates of low birthweight. The Massachusetts low birthweight rate for Puerto Ricans, 8.9% in 1999, (Table 2B) was lower than the U.S. Puerto Rican low birthweight of 9.7% in 1998 (NCHS, Health United States, 2000, Table 12, page 138).

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 women under age 20 years or over age 35 years, and lowest among women between the ages of 25 to 34 years (Table 10). Non-Hispanic black women delivered higher percentages of low birthweight infants than other race/ethnicity groups for women in age groups of 18 to 39 years.

Birthweight and Smoking

Cigarette smoking during pregnancy increases the likelihood of delivering a low birthweight infant. During 1999 in Massachusetts, 10.9% of smoking mothers delivered low birthweight infants while only 6.6% of non-smoking mothers had low birthweight deliveries. Approximately 1 out of 6 (17.4%) black women who smoked during their pregnancy delivered a low birthweight infant (Figure 8).

Low Birthweight and Plurality

The percentage of low birthweight (LBW) and very low birthweight (VLBW) rises dramatically for twins and higher order births. In 1999, 5.0% of singleton births were LBW, whereas 51.6% of twins, and 90.6% of higher order births were LBW (Table 11). Similarly, 0.9% of singletons, 10.3% of twins, and 26.5% of higher order births were VLBW. The percentage of VLBW singleton infants remained approximately the same from 1990 to 1999, while LBW increased slightly in this group: 4.7% in 1990 to 5.0% in 1999. The percentage of VLBW and LBW deliveries for twins increased from 1990 to 1999, particularly to women ages 35 years and above. For these women, the VLBW rate rose from 6.8% to 9.3% while the LBW rate increased from 43.8% to 49.5%.

Preterm Deliveries

In 1999, 7.6% (6,136) of infants born to Massachusetts resident women were preterm (premature) infants, born before the mother had completed the 37th week of pregnancy (Table 12). The percent of prematurity was approximately the same as in 1998 (7.5%).

The proportion of early gestational age varied by mother's race and ethnicity. Non-Hispanic black women had the highest proportion of early deliveries, 11.8%; Hispanic women had 8.7% early deliveries; Asian women, 7.4%; and non-Hispanic white women, 7.1% (Table 12).

Normal Term Deliveries

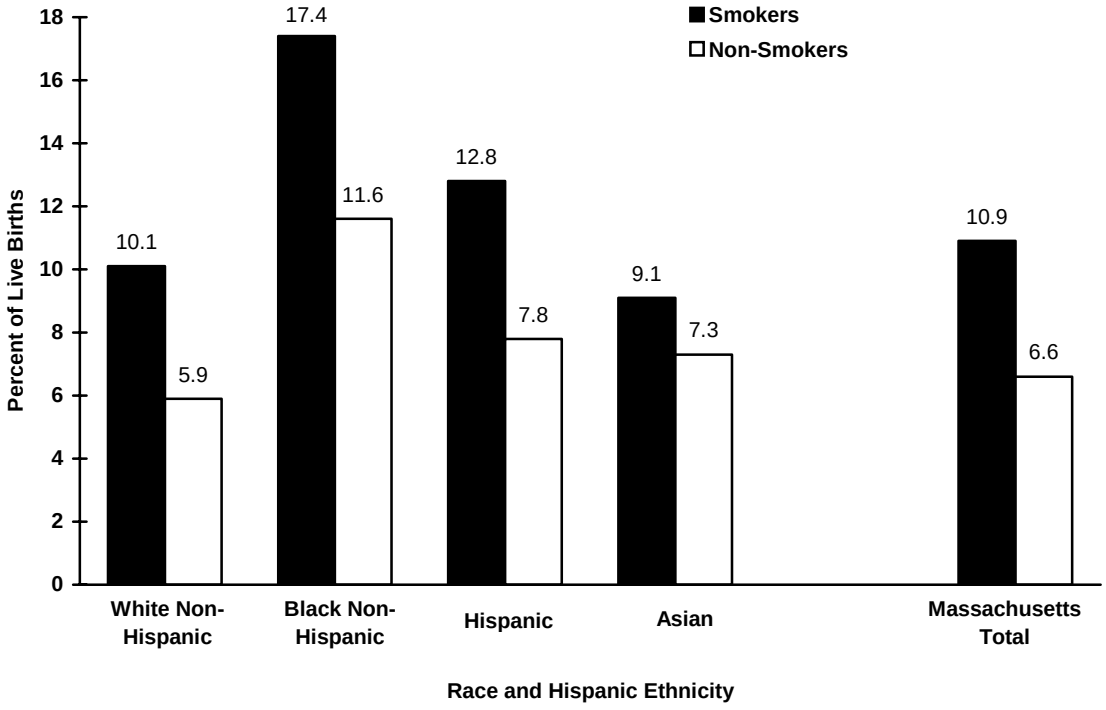
A normal gestational age infant is defined as a baby delivered between the completion of the 37th and 42nd week of pregnancy. In 1999, 91.6% of infants were born at normal gestational age (Table 12). Asian and non-Hispanic white women had the highest proportion of normal gestational age deliveries, 92.1%; Hispanic women, 90.9%; and non-Hispanic black women, 87.8%.

Table 9. Births by Birthweight, Race and Hispanic Ethnicity, Massachusetts: 1999

Birthweight (in grams)	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown
	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#
State Total	80,866	100.0	60,402	100.0	5,844	100.0	8,815	100.0	4,138	100.0	1,477	100.0	190
<500	121	0.1	68	0.1	37	0.6	9	0.1	3	--[2]	3	--[2]	1
500-999	433	0.5	266	0.4	94	1.6	49	0.6	14	0.3	10	0.7	0
1000-1499	566	0.7	370	0.6	79	1.4	78	0.9	27	0.7	12	0.8	0
1500-1999	1,178	1.5	840	1.4	115	2.0	131	1.5	62	1.5	30	2.0	0
2000-2499	3,410	4.2	2,289	3.8	387	6.6	454	5.2	195	4.7	82	5.6	3
2500-2999	11,722	14.5	7,787	12.9	1,105	18.9	1,617	18.3	926	22.4	274	18.6	13
3000-3499	28,559	35.3	20,664	34.2	2,139	36.6	3,438	39.0	1,759	42.5	534	36.2	25
3500-3999	25,018	30.9	19,943	33.0	1,403	24.0	2,315	26.3	921	22.3	411	27.8	25
4000-4499	8,071	10.0	6,767	11.2	399	6.8	605	6.9	190	4.6	101	6.8	9
4500-4999	1,365	1.7	1,152	1.9	70	1.2	96	1.1	27	0.7	18	1.2	2
>=5000	155	0.2	125	0.2	10	0.2	15	0.2	3	--[2]	2	--[2]	0
Unknown	268	0.3	131	0.2	6	0.1	8	0.1	11	0.3	0	0.0	112
VLBW[3] (0-1499 g)	1,120	1.4	704	1.2	210	3.6	136	1.5	44	1.1	25	1.7	1
LBW[4] (0-2499 g)	5,708	7.1	3,833	6.4	712	12.2	721	8.2	301	7.3	137	9.3	4

NOTE: Percentages for detailed birthweight rows ("<500" through "Unknown") are calculated based on all births including those with unknown birthweight. Percentages for VLBW and LBW rows are calculated based on births with known birthweights only.
1. Percentages are based on column totals. 2. Calculations based on fewer than five events are excluded. 3. VLBW: Very Low Birthweight. 4. LBW: Low Birthweight.

Figure 8. Low Birthweight[1] Among Smoking and Nonsmoking[2] Mothers, by Race and Hispanic Ethnicity, Massachusetts: 1999



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

1. Low birthweight: less than 2,500 grams or 5.5 pounds.
2. Based on information provided on the birth certificate by the mother.

Table 10. Low Birthweight[1] by Maternal Age, Race and Hispanic Ethnicity, Massachusetts: 1999

Mother's Age (in years)	Total LBW Infants		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown
	#	%[3]	#	%[3]	#	%[3]	#	%[3]	#	%[3]	#	%[3]	#
State Total[2]	5,708	7.1	3,833	6.4	712	12.2	721	8.2	301	7.3	137	9.3	4
<18	197	10.2	76	9.7	36	13.4	63	8.9	15	17.4	6	8.0	1
18-19	306	8.4	138	7.3	45	10.0	100	9.6	10	7.8	13	9.1	0
20-24	821	7.0	406	6.0	152	11.3	201	7.4	33	6.4	29	7.6	0
25-29	1,305	6.4	901	6.0	160	10.7	141	6.6	71	5.6	30	8.0	2
30-34	1,715	6.5	1,291	5.9	165	12.4	126	8.9	100	7.4	32	10.5	1
35-39	1,080	7.8	813	7.0	128	16.7	72	10.6	49	7.6	18	10.9	0
40+	284	10.3	208	9.0	26	14.4	18	14.6	23	19.3	9	27.3	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: 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.

Table 11. Low Birthweight by Plurality, Massachusetts: 1990-1999

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]	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
All Ages																					
	1990	752	0.8	4,224	4.7	189	8.2	1,075	46.8	28	28.3	88	88.9	217	9.1	1,163	48.5	969	1.1	5,387	5.8
	1991	752	0.9	4,045	4.7	223	9.8	1,079	47.3	26	29.2	75	84.3	249	10.5	1,154	48.7	1,001	1.1	5,199	5.9
	1992	656	0.8	3,959	4.7	192	8.3	1,062	45.7	39	29.8	116	88.5	231	9.4	1,178	48.0	887	1.0	5,137	5.9
	1993	673	0.8	3,919	4.8	216	9.2	1,105	47.1	73	36.0	178	87.7	289	11.3	1,283	50.4	962	1.1	5,202	6.2
	1994	687	0.8	4,015	5.0	223	9.5	1,122	47.9	66	30.8	198	92.5	289	11.3	1,320	51.6	976	1.2	5,335	6.4
	1995	674	0.9	3,867	4.9	227	9.4	1,128	46.6	63	31.8	179	90.4	290	11.1	1,307	49.9	964	1.2	5,174	6.4
	1996	657	0.9	3,674	4.8	227	8.8	1,264	49.1	45	24.5	167	90.8	272	9.9	1,431	51.9	929	1.2	5,105	6.4
	1997	731	0.9	3,938	5.1	292	10.3	1,439	50.5	75	28.6	240	91.6	367	11.8	1,679	54.0	1,098	1.4	5,617	7.0
	1998	690	0.9	3,819	4.9	298	9.6	1,570	50.7	82	28.5	266	92.4	380	11.2	1,836	54.2	1,070	1.3	5,655	7.0
	1999	731	0.9	3,869	5.0	324	10.3	1,617	51.6	65	26.5	222	90.6	389	11.5	1,839	54.5	1,120	1.4	5,708	7.1
Ages <35																					
	1990	646	0.8	3,666	4.6	164	8.5	915	47.3	21	30.0	62	88.6	185	9.2	977	48.8	831	1.0	4,643	5.7
	1991	647	0.9	3,499	4.7	189	10.2	898	48.3	25	32.9	65	85.5	214	11.1	963	49.8	861	1.1	4,462	5.8
	1992	551	0.8	3,378	4.6	166	8.8	870	46.0	29	28.7	92	91.1	195	9.8	962	48.3	746	1.0	4,340	5.8
	1993	561	0.8	3,307	4.7	168	9.2	881	48.2	56	35.9	136	87.2	224	11.3	1,017	51.2	785	1.1	4,324	6.0
	1994	567	0.8	3,397	5.0	181	9.9	891	48.5	47	28.7	150	91.5	228	11.4	1,041	52.0	795	1.1	4,438	6.3
	1995	543	0.8	3,187	4.9	196	11.0	852	47.9	52	36.9	135	95.7	248	12.9	987	51.4	791	1.2	4,174	6.2
	1996	501	0.8	2,937	4.7	194	10.2	944	49.9	32	27.1	111	94.1	226	11.2	1,055	52.5	727	1.1	3,992	6.1
	1997	566	0.9	3,179	5.1	214	11.0	1,030	53.0	46	27.1	153	90.0	260	12.3	1,183	55.9	826	1.3	4,362	6.8
	1998	540	0.9	3,086	4.9	248	11.4	1,148	52.5	60	35.3	153	90.0	308	13.1	1,301	55.2	848	1.3	4,387	6.8
	1999	569	0.9	3,082	5.0	231	10.8	1,124	52.6	49	32.9	138	92.6	280	12.3	1,262	55.2	849	1.3	4,344	6.8
Ages 35+																					
	1990	106	1.0	558	5.1	25	6.8	160	43.8	7	24.1	26	89.7	32	8.1	186	47.2	138	1.2	744	6.6
	1991	105	1.0	545	5.0	34	8.1	181	42.9	1	--[3]	10	76.9	35	8.0	191	43.9	140	1.2	736	6.4
	1992	104	0.9	580	5.0	26	6.0	192	44.4	10	33.3	24	80.0	36	7.8	216	46.8	140	1.2	796	6.6
	1993	112	0.9	612	5.1	48	9.3	224	43.4	17	36.2	42	89.4	65	11.5	266	47.2	177	1.4	878	7.0
	1994	120	1.0	618	4.9	42	8.3	231	45.6	19	38.0	48	96.0	61	11.0	279	50.1	181	1.4	897	6.9
	1995	130	1.0	679	5.1	31	4.8	276	43.0	11	19.3	44	77.2	42	6.0	320	45.8	172	1.2	999	7.2
	1996	156	1.1	737	5.4	33	4.9	320	47.1	13	19.7	56	84.8	46	6.2	376	50.5	202	1.4	1,113	7.7
	1997	165	1.1	759	5.2	78	8.6	409	45.3	29	31.5	87	94.6	107	10.8	496	49.9	272	1.7	1,255	8.1
	1998	150	1.0	733	4.8	50	5.5	422	46.2	22	18.6	113	95.8	72	7.0	535	51.8	222	1.4	1,268	7.8
	1999	162	1.0	787	5.0	93	9.3	493	49.5	16	16.7	84	87.5	109	10.0	577	52.8	271	1.6	1,364	8.2

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

Table 12. Births by Gestational Age[1], Race and Hispanic Ethnicity, Massachusetts: 1999

Gestational Age	Total		Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian		Other[3]		Unknown
(weeks completed)	#	%[2]	#	%[2]	#	%[2]	#	%[2]	#	%[2]	#	%[2]	#
State Total	80,866	100.0	60,402	100.0	5,844	100.0	8,815	100.0	4,138	100.0	1,477	100.0	190
<20	21	0.0	10	0.0	7	0.1	3	--[7]	1	--[7]	0	0.0	0
20-23	148	0.2	84	0.1	42	0.7	16	0.2	2	--[7]	3	--[7]	1
24-27	312	0.4	187	0.3	70	1.2	33	0.4	10	0.2	12	0.8	0
28-31	694	0.9	461	0.8	95	1.6	95	1.1	30	0.7	13	0.9	0
32-35	2,749	3.4	1,944	3.2	280	4.8	339	3.8	135	3.3	49	3.3	2
36	2,212	2.7	1,555	2.6	195	3.3	276	3.1	127	3.1	59	4.0	0
37-39[4]	30,727	38.0	22,429	37.1	2,371	40.6	3,516	39.9	1,752	42.3	628	42.5	31
40	29,267	36.2	22,433	37.1	1,829	31.3	3,029	34.4	1,468	35.5	471	31.9	37
41	11,644	14.4	8,993	14.9	763	13.1	1,179	13.4	504	12.2	200	13.5	5
42	2,396	3.0	1,829	3.0	166	2.8	280	3.2	86	2.1	35	2.4	0
43	77	0.1	55	0.1	6	0.1	12	0.1	3	--[7]	0	0.0	1
44+	18	0.0	15	0.0	0	0.0	2	--[7]	0	0.0	1	--[7]	0
Unknown[5]	601	0.7	407	0.7	20	0.3	35	0.4	20	0.5	6	0.4	113
Very early gestation, <28 weeks	481	0.6	281	0.5	119	2.0	52	0.6	13	0.3	15	1.0	1
Preterm, <37 weeks[6]	6,136	7.6	4,241	7.1	689	11.8	762	8.7	305	7.4	136	9.2	3

NOTE: Percentages for detailed gestational age category rows ("<20" through "Unknown") are calculated based on all births including those with unknown gestational age. Percentages for "Very early gestation" and "Preterm" rows are calculated based on births with known gestational age only.
1. A clinical estimate of the number of weeks of pregnancy completed; as estimated by the attendant at birth or the postnatal physician. 2. Percentages are based on column total. 3. Other races include American Indian and others not specified. 4. Normal gestational age is defined as 37-42 weeks. 5. Estimate of gestational age not provided. 6. Also known as early gestational age, premature delivery, or preterm delivery.
7. Calculations based on fewer than five events are excluded.

CHAPTER 4

ADEQUACY OF PRENATAL CARE

IMPORTANT TECHNICAL NOTE: Changes in Adequacy of Prenatal Care Calculations

There have been two significant changes in the calculation of the Adequacy of Prenatal Care, also known as the Kessner Index. It is a measure of the timing and number of prenatal care visits, not an assessment of the quality of prenatal care. Until 1996, the month of the first prenatal care visit was recorded on the birth certificate. Starting in 1996, the new birth certificate records the exact date of the first visit. This change reduced the estimated number of women receiving prenatal care in the first trimester.

The second important change related to adequacy of prenatal care took place in 1998. Adjustments in the calculation of Adequacy of Care were made in order to make Massachusetts data more comparable to the calculations recommended by the National Center for Health Statistics. Thus, although trend data are provided in Figure 9, readers should consider data prior to 1996 separately from data for 1996 to the present.

Changes in Adequacy of Prenatal Care, 1980-1995. In 1980, 82.7% of white women and 73.2% of black women received adequate prenatal care (Figure 9). The percentage of white women receiving adequate prenatal care remained fairly constant during the 1980s. In contrast, the proportion of black women receiving adequate care declined from approximately seven out of ten women (73.2%) in 1980 to six out of ten women in 1985 but has been increasing since 1989. The percentage of black women receiving adequate prenatal care rose from 60.0% in 1990 to 70.7% in 1995. The percentage of white women receiving adequate prenatal care rose from 82.5% in 1990 to 85.7% in 1995. (Note that because there was not a separate Hispanic origin question asked on the birth certificate prior to June 1986, Hispanics are counted within the race categories of black and white for all time trend tables. For reference, when a separate Hispanic origin question is asked in addition to a race question most Hispanics classify themselves as white or other race.)

Adequacy of Prenatal Care, White and Black Women: 1996-1999. In 1999, the percentage of white women receiving adequate prenatal care was 80.9% (Figure 9). This was a slight decrease from 81.5% in 1998. The percentage of black women receiving adequate prenatal care has increased slightly from 1996 to 1999. In 1999, 67.8% of black women received adequate prenatal care, an increase of 3% since 1996 (65.6%). Despite this increase, the rate for black women was still substantially less than the rate for white women in 1999.

Adequacy of Prenatal Care and Low Birthweight

The percentage of low birthweight deliveries declined with increased adequacy of prenatal care in most race/ethnicity groups. Statewide, the percentage of low birthweight births to women receiving adequate prenatal care was 6.7%; for women receiving intermediate prenatal care, it was 7.9%; and for women receiving late or no prenatal care, it was 10.5%. In all categories of prenatal care adequacy, non-Hispanic black mothers had the highest percentage of low birthweight infants (Table 13). Among women who received late or no prenatal care, 9.5% of the infants born to non-Hispanic

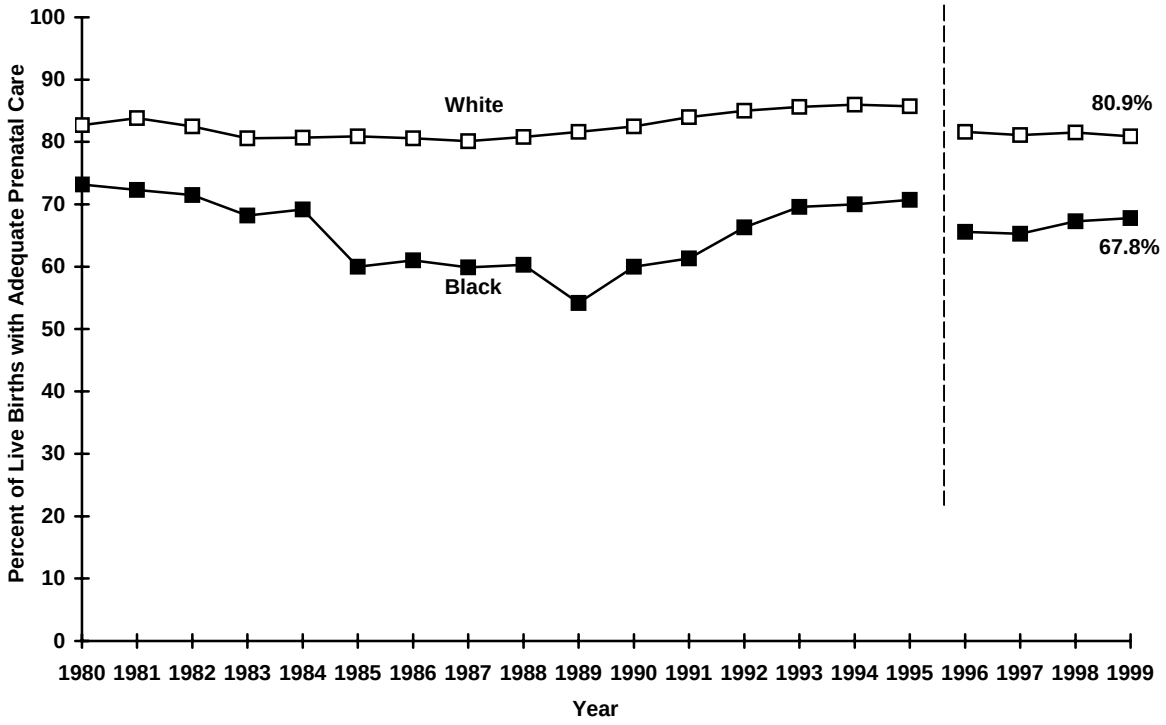
white women were low birthweight; 14.1% of infants born to non-Hispanic black women were low birthweight; 10.6% of the infants born to Hispanic women were low birthweight; and among Asian mothers who received late or no prenatal care, 9.5% of their infants were low birthweight (Table 13).

In contrast, only 6.7% of Massachusetts women who received adequate prenatal care delivered low birthweight infants (Table 13). For women with adequate prenatal care, the low birthweight rate was 6.0% for non-Hispanic white women, 12.1% for non-Hispanic black women, 7.8% for Hispanic women, and 7.2% for Asian women.

Adequacy of Prenatal Care in Selected Population Groups

Adequacy of prenatal care increased with age of the mother. Among women who were less than 18 years of age at delivery, only 54.9% received adequate prenatal care. Among women who were 35 years of age or older at delivery, 84.2% received adequate prenatal care (Figure 10). Other selected population groups that had lower than the state average of adequate prenatal care (79.4%) included: women ages 20 years or older with fewer than 12 years of education (60.7%); unmarried women (65.8%); mothers who smoked during pregnancy (68.2%); and non-U.S.-born mothers (71.8%). First-time mothers and mothers who reported that they were breastfeeding or planning to breastfeed had slightly higher percentages of prenatal care adequacy than the statewide rate.

Figure 9. Trends in Adequacy of Prenatal Care[1] by Race[2], Massachusetts: 1980-1999



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

1. Due to changes beginning in 1996 in the collection of information on Adequacy of Prenatal Care, caution should be used when comparing these data over time. 2. On tables and graphs which include data prior to June 1986, the race classifications do not include ethnicity; most Hispanics are included in the race category of whites.

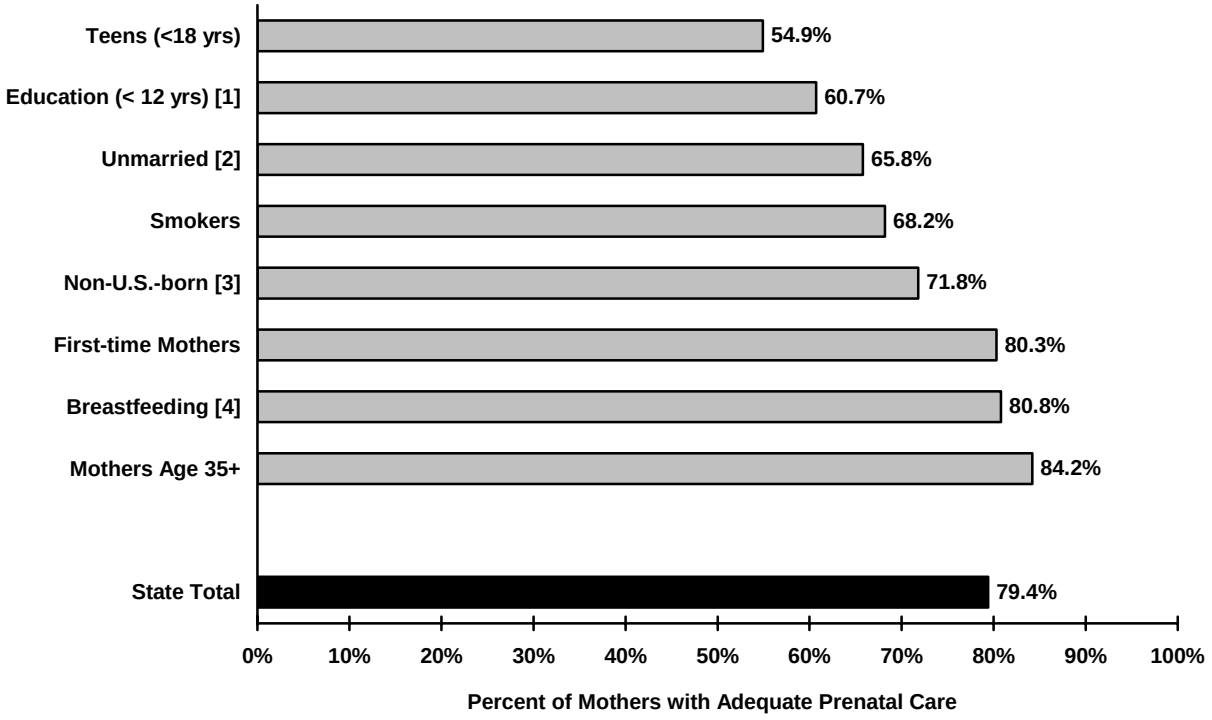
Table 13. Low Birthweight by Adequacy of Prenatal Care, Race and Hispanic Ethnicity, Massachusetts: 1999

Race, Ethnicity, and Birthweight		Total[1]	Adequacy of Prenatal Care[2]		
			Adequate	Intermediate	Late/None
STATE TOTAL	Total Births	80,303	63,728	13,689	2,886
	# LBW[3]	5,648	4,261	1,086	301
	% LBW	7.0	6.7	7.9	10.5
White	Total Births	60,066	49,903	8,672	1,491
non- Hispanic	# LBW[3]	3,792	3,007	644	141
	% LBW	6.3	6.0	7.4	9.5
Black	Total Births	5,812	3,990	1,372	450
non-Hispanic	# LBW[3]	708	484	161	63
	% LBW	12.2	12.1	11.7	14.1
Hispanic	Total Births	8,772	5,831	2,291	650
	# LBW[3]	712	457	186	69
	% LBW	8.1	7.8	8.1	10.6
Asian	Total Births	4,113	2,993	941	179
	# LBW[3]	299	216	66	17
	% LBW	7.3	7.2	7.0	9.5
Other	Total Births	1,470	967	390	113
	# LBW[3]	135	97	27	11
	% LBW	9.2	10.0	6.9	9.7
Unknown	Total Births	70	44	23	3
	# LBW[3]	2	0	2	0

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

1. All data are based on the 80,303 births with known Adequacy of Prenatal Care data. 2. A detailed explanation of the levels of prenatal care is presented in the Glossary. 3. Low birthweight: less than 2,500 grams or 5.5 pounds.

Figure 10. Adequacy of Prenatal Care for Selected Population Characteristics, Massachusetts: 1999



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Women 20 years of age and older. 2. Marital status at time of birth. 3. Non-U.S.-born includes women born outside of the 50 U.S. states, District of Columbia, and U.S. territories (Puerto Rico, U.S. Virgin Islands, Guam). 4. Mother was or was intending to breastfeed at the time the birth certificate was completed.

CHAPTER 5

PRENATAL CARE SOURCE OF PAYMENT

Prenatal Care Payment Source

In 1999, 72.1% of all Massachusetts women had their prenatal care paid for by private insurers, such as Blue Cross/Blue Shield, health maintenance organizations (HMOs), and commercial insurers (Figure 11). Public entitlement programs, including Medicaid/MassHealth and Healthy Start (a Massachusetts-funded program), covered the prenatal care expenses for 26.8% of Massachusetts women who gave birth in 1999. An additional 0.5% of women paid for their prenatal care themselves.

Characteristics of Women Who Use Publicly Financed and Privately Insured Prenatal Care

Maternal and birth characteristics vary according to whether prenatal care was financed through public programs or through private insurance. Differences in characteristics between those served by public programs and those covered by private insurance may reflect different levels of risk rather than the quality of care received. Among women whose prenatal care was funded by Medicaid/MassHealth, 20.1% were under the age of 20. In contrast, only 2.5% of women whose prenatal care was privately insured were under age 20 (Table 14).

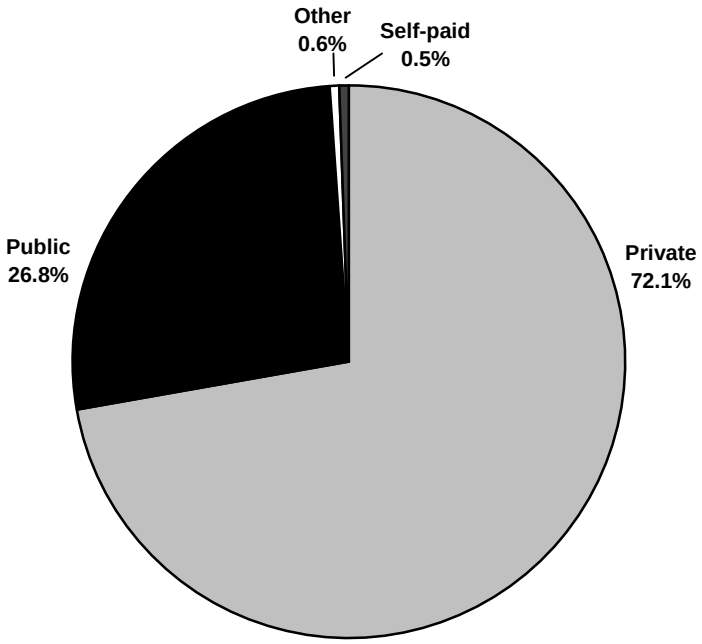
Women whose prenatal care was publicly funded had a higher proportion of low birthweight deliveries (8.5%) than women whose prenatal care was privately insured (6.4%). This difference can be seen within all race/ethnicity groups (Table 14).

Similarly, women whose prenatal care was publicly financed were less likely to receive adequate prenatal care. This was true overall and within each race/ethnicity group. For example, only 61.0% of non-Hispanic black women whose prenatal care was publicly financed received adequate prenatal care, while 80.4% of non-Hispanic black women with private insurance received adequate prenatal care (Table 14). Only 67.6% of non-Hispanic white women with publicly financed prenatal care received adequate care, while 86.4% of non-Hispanic white women with private insurance received adequate prenatal care.

In all race/ethnicity groups, women whose prenatal care was publicly financed were less likely to deliver by Cesarean section. Overall, the Cesarean section rate was 19.4% for women with publicly funded prenatal care and 23.7% for women with private insurance (Table 14). Asian women with publicly funded prenatal care had the lowest Cesarean section rate, 13.0%.

Women whose prenatal care was publicly funded were less likely to report breastfeeding or an intent to breastfeed than women who had private insurance. Among Asian women, for example, 57.1% of those whose prenatal care was publicly funded reported an intent to breastfeed compared to 83.1% among those whose prenatal care was privately financed (Table 14).

Figure 11. Distribution of Prenatal Care Payment Source[1], Massachusetts: 1999



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Private: Blue Cross/Blue Shield, commercial insurance and HMO's. Public: Medicaid, Medicare, Healthy Start, free care, and other government sources. Other: Worker's Compensation and other sources.

Table 14. Birth Characteristics by Source of Prenatal Care Payment, Race and Hispanic Ethnicity, Massachusetts: 1999

Race, Ethnicity, and Payment Source	Births[1]		Teen Births				Birthweight			
			<18 Years		<20 Years		Very Low[2]		Low[3]	
	#	%	#	%	#	%	#	%	#	%
STATE TOTAL[4]	80,866	100.0	1,926	2.4	5,588	6.9	1,120	1.4	5,708	7.2
Public	21,211	26.8	1,364	6.4	4,001	18.9	335	1.6	1,800	8.5
Medicaid[5]	18,907	23.9	1,310	6.9	3,798	20.1	304	1.6	1,640	8.7
Other Public[6]	2,304	2.9	54	2.3	203	8.8	31	1.3	160	6.9
Private[7]	57,069	72.1	507	0.9	1,420	2.5	698	1.2	3,655	6.4
Non-Hispanic White	60,402	100.0	786	1.3	2,686	4.4	704	1.2	3,833	6.3
Public	9,798	16.6	451	4.6	1,606	16.4	110	1.1	734	7.5
Medicaid[5]	8,921	15.1	435	4.9	1,546	17.3	108	1.2	681	7.6
Other Public[6]	877	1.5	16	1.8	60	6.8	2	--[8]	53	6.0
Private[7]	48,534	82.4	304	0.6	962	2.0	529	1.1	2,906	6.0
Non-Hispanic Black	5,844	100.0	268	4.6	719	12.3	210	3.6	712	12.2
Public	3,313	57.0	187	5.6	549	16.6	111	3.4	402	12.1
Medicaid[5]	2,986	51.4	180	6.0	521	17.4	95	3.2	357	12.0
Other Public[6]	327	5.6	7	2.1	28	8.6	16	4.9	45	13.8
Private[7]	2,423	41.7	74	3.1	154	6.4	85	3.5	283	11.7
Hispanic	8,815	100.0	709	8.0	1,746	19.8	136	1.5	721	8.2
Public	6,160	70.1	610	9.9	1,519	24.7	99	1.6	514	8.3
Medicaid[5]	5,296	60.2	581	11.0	1,417	26.8	87	1.6	471	8.9
Other Public[6]	864	9.8	29	3.4	102	11.8	12	1.4	43	5.0
Private[7]	2,492	28.3	86	3.5	205	8.2	34	1.4	187	7.5
Asian	4,138	100.0	86	2.1	215	5.2	44	1.1	301	7.3
Public	1,090	26.5	61	5.6	162	14.9	6	0.6	77	7.1
Medicaid[5]	996	24.2	61	6.1	159	16.0	6	0.6	70	7.0
Other Public[6]	94	2.3	0	0.0	3	--[8]	0	0.0	7	7.4
Private[7]	2,969	72.2	23	0.8	48	1.6	35	1.2	218	7.3
Other/Unknown[9]	1,477	100.0	75	5.1	218	14.8	25	1.7	137	9.3
Public	835	56.7	54	6.5	163	19.5	9	1.1	73	8.7
Medicaid[5]	695	47.2	52	7.5	153	22.0	8	1.2	61	8.8
Other Public[6]	140	9.5	2	--[8]	10	7.1	1	--[8]	12	8.6
Private[7]	604	41.0	20	3.3	51	8.4	15	2.5	59	9.8

Table 14 (cont'd). Birth Characteristics by Source of Prenatal Care Payment, Race, and Hispanic Ethnicity, Massachusetts: 1999

Race, Ethnicity, and Payment Source	Prenatal Care: Adequate #	Adequate %	Began 1st Trimester #	Began 1st Trimester %	Cesarean Section #	Cesarean Section %	Breastfeeding[10] #	Breastfeeding[10] %
STATE TOTAL[4]	63,728	79.4	67,732	84.3	18,080	22.4	57,394	72.4
Public	13,501	64.0	14,691	69.5	4,108	19.4	12,988	61.3
Medicaid[5]	12,093	64.3	13,176	70.0	3,590	19.0	11,092	58.7
Other Public[6]	1,408	61.4	1,515	66.0	519	22.5	1,897	82.4
Private[7]	48,560	85.3	51,266	90.0	13,501	23.7	43,734	76.7
Non-Hispanic White	49,903	83.1	52,845	87.9	13,762	22.8	42,416	71.9
Public	6,587	67.6	7,116	72.9	1,958	20.0	5,188	53.0
Medicaid[5]	5,974	67.3	6,463	72.7	1,734	19.4	4,493	50.4
Other Public[6]	613	70.3	653	74.8	224	25.5	695	79.4
Private[7]	41,822	86.4	44,156	91.1	11,407	23.5	36,778	75.8
Non-Hispanic Black	3,990	68.7	4,263	73.2	1,410	24.2	4,125	71.0
Public	2,006	61.0	2,203	66.8	713	21.6	2,146	64.8
Medicaid[5]	1,843	62.1	2,019	67.9	631	21.2	1,887	63.2
Other Public[6]	163	50.3	184	56.6	82	25.1	259	79.2
Private[7]	1,946	80.4	2,017	83.3	674	27.9	1,933	79.9
Hispanic	5,831	66.5	6,324	72.0	1,783	20.3	6,600	75.0
Public	3,787	61.7	4,152	67.6	1,121	18.2	4,464	72.5
Medicaid[5]	3,288	62.4	3,617	68.6	962	18.2	3,707	70.0
Other Public[6]	499	57.8	535	61.9	159	18.4	757	87.6
Private[7]	1,971	79.3	2,083	83.8	638	25.6	2,034	81.7
Asian	2,993	72.8	3,200	77.8	778	18.8	3,128	76.0
Public	630	58.1	680	62.7	142	13.0	622	57.1
Medicaid[5]	567	57.2	616	62.2	127	12.8	549	55.1
Other Public[6]	63	67.0	64	68.1	15	16.0	73	77.7
Private[7]	2,324	78.5	2,477	83.6	618	20.8	2,465	83.1
Other/Unknown[9]	967	65.8	1,050	71.3	328	22.2	1,082	73.5
Public	485	58.2	532	63.8	171	20.5	561	67.3
Medicaid[5]	415	59.7	453	65.2	133	19.2	450	64.8
Other Public[6]	70	50.7	79	56.8	38	27.1	111	79.3
Private[7]	464	77.1	496	82.1	152	25.2	491	81.3

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

1. In the "Births" category, percentages are based on race/ethnicity totals (group column). For all other categories, percentages are based on Birth totals (row total) excluding unknowns for each characteristic. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low Birthweight: less than 2,500 grams or 5.5 pounds. 4. Total births does not equal Public + Private. Other categories of prenatal care payment are also included in Total: Workers' Compensation, self-paid, and other. 5. Medicaid/MassHealth. 6. Other Public: Healthy Start, other government programs, and free care. 7. Private: Blue Cross/Blue Shield, commercial insurance, and HMO. 8. Calculations based on fewer than five events are excluded. 9. Other: Mothers who self-designated other races or for whom race was unknown. 10. Mother was intending to breastfeed at the time the birth certificate was completed.

CHAPTER 6

CESAREAN SECTION DELIVERIES BY HOSPITAL

Overall Cesarean Section[1] Delivery by Facility

Cesarean section was the method of delivery for 22.6% of the 1999 occurrence births, up 8% from the 1998 rate of 21.0% (Table 15). Calculations are based on births with known method of delivery. (Note: facility-specific highlights in this chapter focus on facilities with at least 40 births in the category of interest. Data for all facilities are provided in Tables 15 and 16.)

Facilities with low rates of Cesarean section deliveries were: Heywood Hospital (15.4%, 82 Cesarean section deliveries performed); Hale Hospital (17.0%, 60 Cesarean section deliveries performed); Saint Vincent Hospital (17.2%, 335 Cesarean section deliveries performed); Lawrence General Hospital (17.6%, 252 Cesarean section deliveries performed); and Franklin Medical Center (17.9%, 96 Cesarean section deliveries performed). Ten hospitals had Cesarean section delivery rates of 25% or more (Beth Israel Deaconess Medical Center, Boston Regional Medical Center, Brigham and Women's Hospital, Fairview Hospital, Holy Family Hospital and Medical Center, Morton Hospital, Nantucket Cottage Hospital, New England Medical Center Hospital, Saints Memorial Medical Center-St. John's Campus, and St. Elizabeth's Medical Center of Boston). There were seven such hospitals in 1998.

Primary Cesarean section delivery rates were lowest at Heywood Hospital, Lawrence General Hospital, Berkshire Medical Center, Beverly Hospital, Franklin Medical Center, Mercy Hospital, and Lowell General Hospital. Primary Cesarean section delivery rates were over 20% at seven hospitals: Beth Israel Deaconess Medical Center, Boston Regional Medical Center, Fairview Hospital, Holy Family Hospital and Medical Center, Nantucket Cottage Hospital, New England Medical Center Hospital, and Saints Memorial Medical Center-St. John's Campus (Table 15). There were two such hospitals in 1998.

Repeat Cesarean section delivery rates were lowest at Saint Vincent Hospital and Cooley Dickinson Hospital. Hospitals with high rates of repeat Cesarean section deliveries include: South Shore Hospital (80.1%), Mercy Hospital (81.5%), Lawrence General Hospital (81.6%), New England Medical Center Hospital (81.8%), Newton Wellesley Hospital (82.7%), North Adams Regional Hospital (83.7%), and Massachusetts General Hospital (86.9%) (Table 15).

Cesarean Section Deliveries for Singleton Births

Cesarean section was the method of delivery for 22.9% of singleton births to mothers who gave birth to their first child in a Massachusetts licensed maternal facility in 1999 (Table 16). Lawrence General Hospital, Heywood Hospital, and Mary Lane Hospital had the lowest rates: 14.8%, 17.3% and 17.7% (only 14 Cesarean section deliveries performed) respectively. Boston Regional Medical Center and Holy Family Hospital and Medical Center had the highest rates: 31.0% and 30.1% respectively.

Cesarean section was the method of delivery for 6.8% of singleton births to mothers having their second or later birth who had no prior Cesarean section. Berkshire Medical Center, Cape Cod Hospital and

[1] Percentages of delivery by method in Table 15 are calculated in following manner:

- Percentage of total Cesarean sections = (Total Cesarean Births / All Births) x 100.
- Percentage primary Cesarean sections = (Primary Cesarean Sections / (All Births - Repeat Cesarean Sections - VBACs)) x 100.
- Percentage repeat Cesarean sections = (Repeat Cesarean Sections / (Repeat Cesarean Sections + VBACs)) x 100.
- Percentage of vaginal birth after Cesarean section delivery, that is, VBACs = (VBAC deliveries / (Repeat Cesarean Sections + VBAC)) x 100. Please note: the sum of the percentages of repeat Cesarean section deliveries + VBACs = 100% of all deliveries of mothers with a prior Cesarean section.

Heywood Hospital had the lowest rates: 3.6%, 3.7% and 3.7% respectively (Table 16). Mary Lane Hospital and Boston Medical Center had the highest rates: 11.5% (only 14 Cesarean section deliveries performed) and 11.2% respectively. Cesarean section was the method of delivery for 71.0% of the singleton births to mothers having their second or later birth who had prior Cesarean sections. Saint Vincent Hospital had the lowest rate: 49.4%. Massachusetts General Hospital and North Adams Regional Hospital had the highest rates: 85.5% and 83.7% respectively (Table 16).

Vaginal Birth after Cesarean Section (VBAC) Deliveries

In 1999, among women with a previous Cesarean section, 28.2% (2,461) had a vaginal birth after a Cesarean section delivery (VBAC) (Table 15). In 1998, 32.7% (2,823) had a VBAC, and in 1997, 33.5% (2,764) had a VBAC. In 1996, the VBAC rate was 34.0%; in 1995, the VBAC rate was 31.6%; in 1994, 30.2%; in 1993, 27.4%; in 1992, 24.8%; in 1991, 24.1%; and in 1990, 22.3% (trend data not shown).

Since the sum of the percentage of repeat cesarean section deliveries and VBACs equals 100% of all births to mothers with a prior Cesarean section, facilities with the lowest repeat Cesarean section delivery rates had the highest VBAC rates. In total, four hospitals had VBAC rates over 40%, compared to thirteen in 1998.

Table 15. Cesarean Section Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 1999

Facility	Occurrence Births[2]	Total C-Sections		Primary C-Section[2]		Repeat C-Section[2]		VBACs[2]	
		#	%[3,4]	#	%[3,5]	#	%[3,6]	#	%[7]
STATE TOTAL	**81,253**	**18,364**	**22.6**	**12,112**	**16.7**	**6,252**	**71.8**	**2,461**	**28.2**
Anna Jaques Hospital	964	191	19.8	129	14.7	62	72.9	23	27.1
Baystate Medical Center	4,910	990	20.2	648	14.8	342	64.7	187	35.3
Berkshire Medical Center	840	163	19.4	89	12.3	74	64.3	41	35.7
Beth Israel Deaconess Medical Center	5,085	1,338	26.3	923	20.7	415	65.8	216	34.2
Beverly Hospital	2,596	488	18.9	288	12.6	200	67.8	95	32.2
Boston Medical Center	1,824	427	23.4	287	17.6	140	72.5	53	27.5
Boston Regional Medical Center	127	34	26.8	24	21.6	10	62.5[8]	6	37.5[8]
Brigham and Women's Hospital	9,787	2,432	25.0	1,728	19.8	704	71.5	281	28.5
Brockton Hospital	1,320	256	19.4	169	14.2	87	65.4	46	34.6
Cambridge Hospital	666	132	19.8	85	14.1	47	73.4	17	26.6
Cape Cod Hospital	970	211	21.8	117	14.1	94	66.7	47	33.3
Caritas Good Samaritan Medical Center	1,080	241	22.3	152	16.1	89	66.9	44	33.1
Caritas Norwood Hospital	622	148	23.8	90	16.7	58	70.7	24	29.3
Charlton Memorial Hospital	1,576	310	19.7	183	13.0	127	77.0	38	23.0
Cooley Dickinson Hospital	875	170	19.4	124	15.6	46	59.0	32	41.0
Deaconess-Waltham Hospital	402	74	18.5	51	13.7	23	76.7[8]	7	23.3[8]
Emerson Hospital	1,478	320	21.7	199	15.4	121	65.8	63	34.2
Fairview Hospital	169	47	27.8	32	21.2	15	83.3[8]	3	--[9]
Falmouth Hospital	622	140	22.9	87	16.0	53	79.1	14	20.9
Franklin Medical Center	535	96	17.9	62	12.6	34	77.3	10	22.7
Hale Hospital	353	60	17.0	44	13.7	16	50.0[8]	16	50.0[8]
Harrington Memorial Hospital	432	96	22.2	64	16.6	32	68.1	15	31.9
Heywood Hospital	532	82	15.4	48	10.0	34	64.2	19	35.8
Holy Family Hospital and Medical Center	1,314	364	27.7	248	21.5	116	73.0	43	27.0
Holyoke Hospital	483	96	19.9	61	14.1	35	71.4	14	28.6
Jordan Hospital	778	189	24.3	114	16.7	75	78.1	21	21.9
Lawrence General Hospital	1,429	252	17.6	150	11.5	102	81.6	23	18.4
Leominster Hospital	1,405	332	23.7	185	15.3	147	79.0	39	21.0
Lowell General Hospital	2,052	403	19.6	237	12.9	166	75.8	53	24.2
Martha's Vineyard Hospital	121	23	19.0	18	16.4	5	45.5[8]	6	54.5[8]
Mary Lane Hospital	226	46	20.4	34	16.4	12	63.2[8]	7	36.8[8]

Table 15 (cont'd). Cesarean Section Deliveries and Vaginal Births After Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 1999

Facility	Occurrence Births[2]	Total C-Sections		Primary C-Section[2]		Repeat C-Section[2]		VBACs[2]	
		#	%[3,4]	#	%[3,5]	#	%[3,6]	#	%[7]
Massachusetts General Hospital	2,738	623	22.8	444	17.5	179	86.9	27	13.1
Melrose-Wakefield Hospital	2,225	553	24.9	332	17.2	221	75.4	72	24.6
Mercy Hospital	800	146	18.3	93	12.7	53	81.5	12	18.5
Metrowest Medical Center-Framingham Union Campus	2,425	560	23.1	369	16.9	191	77.6	55	22.4
Milford-Whitinsville Regional Hospital	602	124	20.6	79	14.9	45	62.5	27	37.5
Morton Hospital	686	176	25.7	96	16.7	80	72.7	30	27.3
Mount Auburn Hospital	1,246	242	19.4	173	15.3	69	61.1	44	38.9
Nantucket Cottage Hospital	88	22	25.0	19	22.4	3	--[9]	0	0.0
New England Medical Center Hospital	1,578	443	28.1	308	21.8	135	81.8	30	18.2
Newton Wellesley Hospital	3,643	882	24.2	639	19.1	243	82.7	51	17.3
North Adams Regional Hospital	304	75	24.7	34	13.3	41	83.7	8	16.3
North Shore Medical Center - Salem Hospital	1,736	336	19.4	220	13.9	116	78.4	32	21.6
Saint Vincent Hospital	1,962	335	17.2	243	13.7	92	50.0	92	50.0
Saints Memorial Medical Ctr.-St. John's Campus	652	165	25.3	120	20.2	45	78.9	12	21.1
South Shore Hospital	3,914	962	24.6	608	17.5	354	80.1	88	19.9
St. Elizabeth's Medical Center of Boston	1,527	395	25.9	265	19.7	130	71.0	53	29.0
St. Luke's Hospital	1,530	356	23.4	205	15.4	151	77.0	45	23.0
Sturdy Memorial Hospital	1,062	243	22.9	147	16.1	96	64.4	53	35.6
Tobey Hospital	498	90	18.1	68	14.7	22	66.7[8]	11	33.3[8]
UMass Memorial Medical Center-West Campus	4,053	925	22.8	614	17.1	311	67.3	151	32.7
Winchester Hospital	2,411	560	23.3	366	17.1	194	74.9	65	25.1

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Boston Regional Medical Center closed to births on February 6, 1999. Name change: Caritas Good Samaritan Medical Center from Good Samaritan Medical Center.
1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definitions of occurrence births, primary and repeat Cesarean sections, and VBACs. The percentages provided in this table are based on occurrence births and may differ from data presented elsewhere in this book which are based on resident births. 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. Percentage of total Cesarean sections= (total Cesarean births/all births) x 100. 5. Percentage primary Cesarean sections=(primary Cesarean sections/all births-repeat Cesarean sections-VBACs) x 100. 6. Percentage repeat Cesarean sections= (repeat Cesarean sections/(repeat Cesarean sections + VBACs)) x100. 7. Percentage VBACs= (VBAC deliveries/(repeat Cesarean sections + VBAC)) x 100. 8. This percentage is based on less than 40 total births and should be interpreted with caution. 9. Calculations based on fewer than five events are excluded.

Table 16. Cesarean Section Deliveries for Singleton Births by Licensed Maternity Facility[1] and Number of Previous Births, Massachusetts: 1999

Facility	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section		Births[2]	C-section		Births[2]	C-section	
		#	%[3]		#	%[3]		#	%[3]
STATE TOTAL	**35,067**	**8,046**	**22.9**	**34,703**	**2,372**	**6.8**	**8,305**	**5,897**	**71.0**
Anna Jaques Hospital	419	86	20.5	437	30	6.9	73	53	72.6
Baystate Medical Center	1,965	407	20.7	2,215	156	7.0	508	325	64.0
Berkshire Medical Center	305	64	21.0	394	14	3.6	115	74	64.3
Beth Israel Deaconess Medical Center	2,126	549	25.8	1,960	157	8.0	588	390	66.3
Beverly Hospital	1,013	193	19.1	1,194	57	4.8	278	184	66.2
Boston Medical Center	734	165	22.5	841	94	11.2	183	135	73.8
Boston Regional Medical Center	58	18	31.0	47	4	--[5]	16	10	62.5[4]
Brigham and Women's Hospital	4,445	1,065	24.0	3,650	276	7.6	903	637	70.5
Brockton Hospital	562	125	22.2	601	38	6.3	131	85	64.9
Cambridge Hospital	355	68	19.2	235	11	4.7	64	47	73.4
Cape Cod Hospital	401	89	22.2	408	15	3.7	133	86	64.7
Caritas Good Samaritan Medical Center	422	108	25.6	496	34	6.9	129	85	65.9
Caritas Norwood Hospital	260	67	25.8	264	12	4.5	80	56	70.0
Charlton Memorial Hospital	666	120	18.0	704	42	6.0	163	125	76.7
Cooley Dickinson Hospital	421	97	23.0	358	17	4.7	78	46	59.0
Deaconess-Waltham Hospital	188	34	18.1	169	11	6.5	28	21	75.0[4]
Emerson Hospital	723	147	20.3	529	28	5.3	178	116	65.2
Fairview Hospital	76	22	28.9	69	6	8.7	18	15	83.3[4]
Falmouth Hospital	255	59	23.1	270	19	7.0	65	51	78.5
Franklin Medical Center	230	47	20.4	249	11	4.4	44	34	77.3
Hale Hospital	151	31	20.5	164	11	6.7	32	16	50.0[4]
Harrington Memorial Hospital	188	48	25.5	195	14	7.2	47	32	68.1
Heywood Hospital	208	36	17.3	269	10	3.7	53	34	64.2
Holy Family Hospital and Medical Center	612	184	30.1	505	40	7.9	155	112	72.3
Holyoke Hospital	166	33	19.9	252	22	8.7	46	32	69.6
Jordan Hospital	311	84	27.0	359	24	6.7	95	74	77.9
Lawrence General Hospital	642	95	14.8	624	42	6.7	116	93	80.2
Leominster Hospital	521	122	23.4	646	40	6.2	182	145	79.7
Lowell General Hospital	843	165	19.6	963	52	5.4	207	156	75.4
Martha's Vineyard Hospital	65	16	24.6	45	2	--[5]	10	4	--[5]
Mary Lane Hospital	79	14	17.7	122	14	11.5	19	12	63.2[4]

Table 16 (cont'd). Cesarean Section Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 1999

Facility	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section		Births[2]	C-section		Births[2]	C-section	
		#	%[3]		#	%[3]		#	%[3]
Massachusetts General Hospital	1,321	278	21.0	1,062	89	8.4	186	159	85.5
Melrose-Wakefield Hospital	929	237	25.5	948	65	6.9	281	209	74.4
Mercy Hospital	287	62	21.6	434	26	6.0	65	53	81.5
Metrowest Medical Center-Framingham Union Campus	1,377	306	22.2	741	37	5.0	237	182	76.8
Milford-Whitinsville Regional Hospital	268	61	22.8	252	12	4.8	72	45	62.5
Morton Hospital	285	65	22.8	271	15	5.5	110	80	72.7
Mount Auburn Hospital	619	127	20.5	486	33	6.8	111	67	60.4
Nantucket Cottage Hospital	50	17	34.0	35	2	--[5]	3	3	--[5]
New England Medical Center Hospital	671	163	24.3	580	46	7.9	151	121	80.1
Newton Wellesley Hospital	1,534	456	29.7	1,694	125	7.4	276	227	82.2
North Adams Regional Hospital	118	25	21.2	135	7	5.2	49	41	83.7
North Shore Medical Center - Salem Hospital	720	128	17.8	796	55	6.9	145	113	77.9
Saint Vincent Hospital	805	169	21.0	940	61	6.5	178	88	49.4
Saints Memorial Medical Ctr.-St. John's Campus	320	83	25.9	261	25	9.6	57	45	78.9
South Shore Hospital	1,589	422	26.6	1,757	113	6.4	423	335	79.2
St. Elizabeth's Medical Center of Boston	684	174	25.4	601	55	9.2	171	118	69.0
St. Luke's Hospital	624	133	21.3	671	52	7.7	190	145	76.3
Sturdy Memorial Hospital	421	109	25.9	463	27	5.8	147	94	63.9
Tobey Hospital	212	41	19.3	243	22	9.1	33	22	66.7[4]
UMass Memorial Medical Center-West Campus	1,639	385	23.5	1,771	128	7.2	431	284	65.9
Winchester Hospital	1,049	247	23.5	1,025	74	7.2	245	181	73.9

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Boston Regional Medical Center closed to births on February 6, 1999. Name change: Caritas Good Samaritan Medical Center from Good Samaritan Medical Center.
1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. Occurrence births (See Glossary for definition.) 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. This percentage is based on less than 40 total births and should be interpreted with caution. 5. Calculations based on fewer than five events are excluded.

CHAPTER 7

BIRTHS BY HOSPITAL AND COMMUNITY

In 1999, 81,765 births occurred in Massachusetts, a decrease of 14.0% since 1990 *(The percentages and rates provided in Tables 15, 16, and 17 are based on occurrence births and differ from data presented elsewhere in this report, which are based on resident births).*

Low Birthweight Variation by Facility

In 1999, at least 10% of the births at seven hospitals were low birthweight. These hospitals were: Baystate Medical Center, Beth Israel Deaconess Medical Center, Boston Medical Center, Brigham and Women's Hospital, New England Medical Center, St. Elizabeth's Medical Center of Boston, and UMass Memorial Medical Center West Campus (Table 17).

Publicly Funded Delivery Variation by Facility

In four hospitals, 50% or more of the deliveries were paid with public funds: Boston Medical Center (86.8%), Lawrence General Hospital (61.1%), Mercy Hospital (52.1%), and St. Luke's Hospital (51.5%) (Table 17). In seven facilities less than 10% of deliveries were paid with public funds: Boston Regional Medical Center, Emerson Hospital, Mount Auburn Hospital, Newton Wellesley Hospital, North Shore Birth Center, South Shore Hospital, The Birthplace at Wellesley, and Winchester Hospital.

Prenatal Care Adequacy Variation by Facility

In 1999, the facilities with the lowest reported rate of adequacy of prenatal care were: Boston Medical Center (50.8%), Lawrence General Hospital (56.3%), Cambridge Birth Center (60.0%), Cambridge Hospital (60.0%), UMass Memorial Medical Center-West Campus (60.9%), Caritas Good Samaritan Medical Center (63.4%), Lowell General Hospital (64.9%), and North Shore Medical Center - Salem Hospital (64.9%).

Table 17. Birth Characteristics by Licensed Maternity Facility[1], Massachusetts: 1999

Facility	Location	Occurrence Births[2] (#)	Low Birthweight (%)	Public Payment for Delivery[3] (%)	Adequate Prenatal Care (%)
STATE TOTAL[4]		**81,765**	**7.1**	**26.2**	**79.3**
Anna Jaques Hospital	Newburyport	964	5.1	14.0	83.5
Baystate Medical Center	Springfield	4,910	10.3	40.3	71.4
Berkshire Medical Center	Pittsfield	840	5.2	32.0	65.2
Beth Israel Deaconess Medical Center	Boston	5,085	12.5	16.5	81.3
Beverly Hospital	Beverly	2,596	4.8	23.3	85.7
Boston Medical Center	Boston	1,824	11.4	86.8	50.8
Boston Regional Medical Center	Stoneham	127	7.9	6.3	74.8
Brigham and Womens Hospital	Boston	9,787	10.4	18.1	97.6
Brockton Hospital	Brockton	1,320	5.4	41.9	68.5
Cambridge Birth Center	Cambridge	61	--[5]	27.9	60.0
Cambridge Hospital	Cambridge	666	3.3	49.2	60.0
Cape Cod Hospital	Barnstable	970	4.9	33.8	81.8
Caritas Good Samaritan Medical Center	Brockton	1,080	5.7	39.6	63.4
Caritas Norwood Hospital	Norwood	622	3.2	14.0	88.6
Charlton Memorial Hospital	Fall River	1,576	6.3	34.2	80.7
Cooley Dickinson Hospital	Northampton	875	3.6	21.2	87.0
Deaconess-Waltham Hospital	Waltham	402	3.0	25.1	82.3
Emerson Hospital	Concord	1,478	3.0	2.9	87.7
Fairview Hospital	Great Barrington	169	4.1	32.7	76.8
Falmouth Hospital	Falmouth	622	4.6	29.4	75.2
Franklin Medical Center	Greenfield	535	3.2	38.9	79.4
Hale Hospital	Haverhill	353	6.5	51.6	76.2
Harrington Memorial Hospital	Southbridge	432	4.9	44.9	84.0
Heywood Hospital	Gardner	532	2.6	36.3	67.3
Holy Family Hospital and Medical Center	Methuen	1,314	3.8	18.1	74.5
Holyoke Hospital	Holyoke	483	4.3	48.7	72.7
Jordan Hospital	Plymouth	778	2.8	25.5	74.9
Lawrence General Hospital	Lawrence	1,429	6.2	61.1	56.3
Leominster Hospital	Leominster	1,405	4.7	31.2	81.3
Lowell General Hospital	Lowell	2,052	5.0	34.0	64.9
Martha's Vineyard Hospital	Oak Bluffs	121	0.0	31.4	88.4

Table 17. (cont'd) Births Characteristics by Licensed Maternity Facility[1], Massachusetts: 1999

Facility	Location	Occurrence Births[2] (#)	Low Birthweight (%)	Public Payment for Delivery[3] (%)	Adequate Prenatal Care (%)
Mary Lane Hospital	Ware	226	5.3	36.7	79.6
Massachusetts General Hospital	Boston	2,738	9.4	31.7	71.6
Melrose-Wakefield Hospital	Melrose	2,225	4.6	16.9	86.2
Mercy Hospital	Springfield	800	3.1	52.1	69.5
Metrowest Medical Center-Framingham Union Campus	Framingham	2,425	4.5	17.8	91.4
Milford-Whitinsville Regional Hospital	Milford	602	2.5	22.5	82.9
Morton Hospital	Taunton	686	5.0	37.0	75.6
Mount Auburn Hospital	Cambridge	1,246	3.5	9.6	86.1
Nantucket Cottage Hospital	Nantucket	88	--[5]	21.6	79.1
New England Medical Center Hospital	Boston	1,578	22.1	30.9	78.7
Newton Wellesley Hospital	Newton	3,643	3.8	1.1	82.7
North Adams Regional Hospital	North Adams	304	3.9	41.8	83.6
North Shore Birth Center	Beverly	84	0.0	9.5	78.6
North Shore Medical Center - Salem Hospital	Salem	1,736	5.2	32.6	64.9
Saint Vincent Hospital	Worcester	1,962	4.6	18.9	79.4
Saints Memorial Medical Ctr.-St. John's Campus	Lowell	652	4.3	33.6	66.2
South Shore Hospital	Weymouth	3,914	4.1	8.5	95.7
St. Elizabeth's Medical Center of Boston	Boston	1,527	10.1	28.0	81.8
St. Luke's Hospital	New Bedford	1,530	5.4	51.5	73.7
Sturdy Memorial Hospital	Attleboro	1,062	2.8	20.6	81.9
The Birthplace At Wellesley	Wellesley	84	0.0	--[5]	79.5
Tobey Hospital	Wareham	498	3.3	36.6	76.1
Umass Memorial Medical Center-West Campus	Worcester	4,053	10.4	29.3	60.9
Winchester Hospital	Winchester	2,411	4.3	4.8	79.9
All Other Hospitals		2	0.0	50.0	0.0
Home Births, Enroute, Other		281	12.6	35.3	48.5

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Boston Regional Medical Center closed to births on February 6, 1999. Name change: Caritas Good Samaritan Medical Center from Good Samaritan Medical Center.
1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definition of occurrence births. 3. Public payment for delivery includes Medicaid/Commonhealth, Medicare, Healthy Start, other government programs, and free care.
4. The percentages provided in this row are based on occurrence births and may differ from data presented elsewhere in this book which are based on resident births. 5. Calculations based on values of 1-4 for medical characteristics of facilities with less than 200 births are suppressed based Guidelines for Release of Births Data, Bureau of Health Statistics, Research and Evaluation, Massachusetts Department of Public Health.

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
STATE TOTAL	**81,765**	**80,866**	**5,708**	**5,588**	**418**	**332**
Abington	0	189	18	9	1	1
Acton	1	261	11	2	0	0
Acushnet	0	96	--[1]	5	0	0
Adams	0	78	7	9	0	0
Agawam	0	279	20	11	1	1
Alford	0	1	0	0	0	0
Amesbury	0	236	14	19	4	4
Amherst	4	175	13	9	0	0
Andover	0	354	17	3	2	2
Aquinnah (Gay Head)	0	2	0	0	0	0
Arlington	2	560	26	5	1	1
Ashburnham	0	60	--[1]	5	0	0
Ashby	0	34	--[1]	3	2	2
Ashfield	1	17	--[1]	0	0	0
Ashland	0	252	13	2	2	1
Athol	0	118	5	17	0	0
Attleboro	1,063	562	27	33	3	3
Auburn	1	158	6	7	1	1
Avon	0	45	--[1]	0	0	0
Ayer	2	117	5	3	0	0
Barnstable	975	479	39	28	3	2
Barre	3	61	--[1]	5	0	0
Becket	1	14	0	1	0	0
Bedford	1	203	12	1	0	0
Belchertown	0	164	15	12	0	0
Bellingham	1	197	19	9	5	4
Belmont	1	280	18	3	3	3
Berkley	0	99	7	7	0	0
Berlin	1	48	--[1]	3	0	0
Bernardston	0	23	--[1]	4	0	0
Beverly	2,681	487	35	25	0	0
Billerica	3	556	44	14	4	3
Blackstone	0	101	--[1]	9	0	0
Blandford	0	12	0	0	0	0
Bolton	0	70	--[1]	0	0	0
Boston	22,576	8,017	679	775	59	51
Bourne	0	242	13	9	0	0
Boxborough	0	62	--[1]	2	0	0
Boxford	0	96	6	0	0	0
Boylston	0	42	--[1]	1	0	0
Braintree	0	447	35	12	2	2

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Brewster	1	61	--[1]	2	1	0
Bridgewater	0	303	13	7	1	1
Brimfield	1	34	--[1]	2	0	0
Brockton	2,405	1,451	125	173	6	5
Brookfield	0	38	--[1]	2	0	0
Brookline	2	589	43	2	1	1
Buckland	0	17	0	1	0	0
Burlington	1	323	21	2	0	0
Cambridge	1,980	1,062	85	44	4	3
Canton	0	288	11	1	0	0
Carlisle	1	64	6	0	0	0
Carver	1	130	10	5	2	2
Charlemont	0	11	0	1	0	0
Charlton	0	156	13	5	2	2
Chatham	1	39	5	0	1	1
Chelmsford	1	395	28	7	3	3
Chelsea	2	641	48	92	0	0
Cheshire	0	26	--[1]	3	0	0
Chester	0	15	0	2	0	0
Chesterfield	1	10	0	0	0	0
Chicopee	2	595	45	64	4	4
Chilmark	0	6	0	0	0	0
Clarksburg	0	16	--[1]	1	0	0
Clinton	0	154	9	7	0	0
Cohasset	0	106	11	0	1	1
Colrain	0	11	--[1]	1	0	0
Concord	1,480	158	--[1]	0	0	0
Conway	0	12	0	0	0	0
Cummington	1	9	--[1]	0	0	0
Dalton	1	69	5	5	0	0
Danvers	0	269	14	7	1	1
Dartmouth	2	229	17	12	1	0
Dedham	0	285	17	10	1	1
Deerfield	1	53	--[1]	2	0	0
Dennis	1	136	15	12	0	0
Dighton	0	66	5	7	0	0
Douglas	0	101	--[1]	4	1	1
Dover	0	68	10	0	0	0
Dracut	0	360	22	17	4	4
Dudley	0	100	7	5	0	0
Dunstable	0	40	--[1]	0	0	0
Duxbury	0	192	10	2	0	0
East Bridgewater	0	183	10	1	1	1
East Brookfield	0	27	--[1]	3	0	0
East Longmeadow	0	133	10	3	1	1

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Eastham	0	39	--[1]	2	0	0
Easthampton	2	186	8	17	1	0
Easton	0	278	28	5	2	2
Edgartown	0	49	6	3	0	0
Egremont	0	8	--[1]	0	0	0
Erving	0	15	--[1]	0	0	0
Essex	1	34	0	2	0	0
Everett	1	520	26	33	1	1
Fairhaven	0	139	10	6	1	1
Fall River	1,576	1,097	84	152	10	6
Falmouth	623	275	20	19	3	2
Fitchburg	3	566	39	94	3	2
Florida	0	3	0	0	0	0
Foxborough	0	236	17	5	0	0
Framingham	2,428	1,000	67	54	6	6
Franklin	0	504	28	5	3	1
Freetown	1	85	6	4	0	0
Gardner	532	235	13	32	0	0
Georgetown	0	121	11	3	0	0
Gill	0	16	0	0	0	0
Gloucester	0	350	13	17	4	4
Goshen	0	2	0	0	0	0
Gosnold	0	1	0	0	0	0
Grafton	0	207	11	5	2	2
Granby	0	66	5	1	2	2
Granville	0	17	--[1]	1	0	0
Great Barrington	169	75	8	6	0	0
Greenfield	536	193	9	26	2	1
Groton	1	165	15	0	0	0
Groveland	0	83	--[1]	0	0	0
Hadley	0	35	--[1]	4	0	0
Halifax	0	105	6	6	2	2
Hamilton	0	115	9	0	0	0
Hampden	0	49	--[1]	2	2	1
Hancock	0	5	0	0	0	0
Hanover	0	191	--[1]	0	1	1
Hanson	0	129	9	10	1	1
Hardwick	0	34	--[1]	1	1	0
Harvard	0	50	--[1]	0	0	0
Harwich	0	90	8	1	1	0
Hatfield	2	26	--[1]	0	0	0
Haverhill	354	921	77	85	2	1
Hawley	0	1	0	0	0	0
Heath	0	6	0	0	0	0
Hingham	0	279	9	5	0	0

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Hinsdale	0	31	--[1]	2	0	0
Holbrook	0	116	7	6	2	2
Holden	2	166	10	3	0	0
Holland	0	23	--[1]	1	0	0
Holliston	1	153	10	1	0	0
Holyoke	484	603	50	149	3	1
Hopedale	2	73	--[1]	0	1	1
Hopkinton	0	200	13	1	0	0
Hubbardston	0	64	--[1]	3	1	1
Hudson	3	260	14	8	0	0
Hull	1	112	7	6	0	0
Huntington	0	23	--[1]	3	0	0
Ipswich	0	162	14	8	0	0
Kingston	0	180	15	3	3	2
Lakeville	0	123	9	5	0	0
Lancaster	1	68	--[1]	1	1	1
Lanesborough	0	25	--[1]	2	0	0
Lawrence	1,432	1,411	117	280	8	7
Lee	0	53	--[1]	2	0	0
Leicester	0	121	13	5	3	2
Lenox	2	42	--[1]	1	0	0
Leominster	1,410	575	49	60	2	1
Leverett	1	12	0	0	0	0
Lexington	1	241	16	1	1	1
Leyden	0	5	0	1	0	0
Lincoln	3	100	--[1]	2	1	1
Littleton	1	125	--[1]	3	0	0
Longmeadow	1	136	8	2	1	1
Lowell	2,708	1,676	142	238	14	9
Ludlow	1	206	16	9	0	0
Lunenburg	0	108	7	5	0	0
Lynn	2	1,387	123	179	8	6
Lynnfield	0	131	11	1	0	0
Malden	1	788	60	33	4	4
Manchester-by-the-Sea	0	48	--[1]	1	0	0
Mansfield	0	397	17	7	2	0
Marblehead	1	283	15	2	1	1
Marion	0	51	--[1]	0	0	0
Marlborough	1	562	30	26	3	3
Marshfield	2	402	19	4	0	0
Mashpee	0	131	5	11	0	0
Mattapoisett	0	71	5	1	0	0
Maynard	0	135	9	5	0	0
Medfield	0	162	7	0	0	0
Medford	3	638	42	11	4	3

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Medway	0	203	12	0	0	0
Melrose	2,226	359	23	3	1	1
Mendon	1	77	--[1]	1	0	0
Merrimac	0	82	--[1]	1	0	0
Methuen	1,314	537	42	42	2	2
Middleborough	0	261	17	15	3	3
Middlefield	0	3	0	0	0	0
Middleton	0	86	--[1]	1	0	0
Milford	602	360	31	23	1	1
Millbury	0	135	8	6	0	0
Millis	0	150	15	1	0	0
Millville	0	42	--[1]	0	0	0
Milton	1	325	27	6	3	3
Monroe	0	1	0	0	0	0
Monson	0	105	8	3	0	0
Montague	1	110	5	9	1	1
Monterey	1	14	--[1]	1	0	0
Montgomery	0	3	0	0	0	0
Mount Washington	0	1	0	0	0	0
Nahant	0	34	--[1]	0	0	0
Nantucket	89	122	10	6	4	4
Natick	2	472	35	6	1	1
Needham	1	382	29	2	0	0
New Ashford	0	3	--[1]	0	0	0
New Bedford	1,533	1,267	94	224	8	4
New Braintree	0	10	--[1]	1	0	0
New Marlborough	0	21	--[1]	0	0	0
New Salem	0	13	0	0	0	0
Newbury	0	84	8	1	0	0
Newburyport	964	214	18	8	1	1
Newton	3,646	874	56	8	1	1
Norfolk	0	133	--[1]	0	0	0
North Adams	307	164	7	30	0	0
North Andover	0	366	22	4	2	2
North Attleboro	0	382	16	14	5	5
North Brookfield	0	42	--[1]	5	0	0
North Reading	0	181	16	1	2	2
Northampton	880	223	20	13	1	1
Northborough	1	187	10	4	2	1
Northbridge	0	197	10	15	0	0
Northfield	0	33	--[1]	0	0	0
Norton	0	261	18	9	0	0
Norwell	0	109	8	1	0	0
Norwood	622	353	28	4	0	0
Oak Bluffs	121	48	5	2	0	0

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Oakham	0	16	0	1	0	0
Orange	1	80	--[1]	13	0	0
Orleans	0	28	--[1]	1	0	0
Otis	0	13	0	1	0	0
Oxford	1	149	15	12	2	2
Palmer	0	130	11	19	0	0
Paxton	0	37	0	1	0	0
Peabody	0	561	50	28	4	3
Pelham	1	14	--[1]	1	0	0
Pembroke	0	282	23	11	3	3
Pepperell	2	168	12	6	0	0
Peru	0	5	0	1	0	0
Petersham	0	8	0	0	0	0
Phillipston	0	13	0	1	0	0
Pittsfield	843	491	32	48	1	1
Plainfield	0	3	0	1	0	0
Plainville	0	95	--[1]	3	0	0
Plymouth	780	716	30	34	4	2
Plympton	0	29	--[1]	1	0	0
Princeton	1	35	--[1]	1	1	0
Provincetown	1	19	0	1	0	0
Quincy	4	1,083	84	35	4	3
Randolph	1	408	41	21	0	0
Raynham	0	156	5	12	2	2
Reading	0	317	10	0	1	1
Rehoboth	0	116	12	7	1	1
Revere	1	622	55	29	5	5
Richmond	1	35	--[1]	7	0	0
Rochester	0	45	--[1]	3	0	0
Rockland	1	253	18	16	2	2
Rockport	0	63	--[1]	6	0	0
Rowe	0	5	0	0	0	0
Rowley	0	65	--[1]	1	1	1
Royalston	0	7	0	1	0	0
Russell	0	26	--[1]	3	0	0
Rutland	0	86	--[1]	6	0	0
Salem	1,737	504	38	46	2	1
Salisbury	0	90	9	8	1	1
Sandisfield	0	7	0	0	0	0
Sandwich	1	211	6	5	0	0
Saugus	0	253	21	5	0	0
Savoy	0	7	0	0	0	0
Scituate	1	248	10	2	3	3
Seekonk	1	125	8	11	2	1
Sharon	0	180	9	3	1	0

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Sheffield	0	28	0	0	0	0
Shelburne	1	13	0	3	0	0
Sherborn	0	58	--[1]	0	0	0
Shirley	0	76	--[1]	6	1	1
Shrewsbury	0	464	27	10	1	1
Shutesbury	2	18	--[1]	0	0	0
Somerset	1	134	11	11	0	0
Somerville	4	949	49	65	4	4
South Hadley	0	132	6	9	0	0
Southampton	0	47	--[1]	0	0	0
Southborough	0	147	5	0	0	0
Southbridge	433	219	20	44	4	4
Southwick	1	89	--[1]	2	0	0
Spencer	0	154	9	18	2	2
Springfield	5,721	2,383	213	496	21	13
Sterling	0	83	--[1]	3	1	1
Stockbridge	2	12	0	1	0	0
Stoneham	127	267	19	4	0	0
Stoughton	1	315	15	16	1	1
Stow	0	95	6	0	1	1
Sturbridge	3	91	--[1]	3	1	1
Sudbury	1	263	10	1	0	0
Sunderland	2	30	0	2	0	0
Sutton	0	86	--[1]	3	0	0
Swampscott	0	181	16	2	0	0
Swansea	0	139	9	11	3	3
Taunton	687	795	55	83	6	3
Templeton	0	76	--[1]	7	0	0
Tewksbury	0	393	23	9	3	1
Tisbury	0	41	--	2	0	0
Tolland	0	3	0	0	0	0
Topsfield	0	55	--[1]	0	0	0
Townsend	0	109	8	2	0	0
Truro	0	9	0	0	0	0
Tyngsborough	0	176	9	4	0	0
Tyringham	0	0	0	0	0	0
Upton	0	112	--[1]	0	0	0
Uxbridge	0	182	5	4	0	0
Wakefield	0	334	22	1	0	0
Wales	0	23	0	2	0	0
Walpole	0	278	20	4	1	1
Waltham	404	681	42	31	4	3
Ware	226	108	12	11	0	0
Wareham	498	235	15	25	2	0
Warren	1	45	--[1]	6	0	0

Table 18A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 1999

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Warwick	0	10	0	2	0	0
Washington	0	1	0	1	0	0
Watertown	0	371	31	6	1	0
Wayland	1	150	7	0	0	0
Webster	0	207	16	18	1	1
Wellesley	85	340	20	1	2	2
Wellfleet	1	20	--[1]	0	0	0
Wendell	0	6	0	0	0	0
Wenham	0	38	10	0	0	0
West Boylston	0	64	5	3	1	0
West Bridgewater	0	77	12	2	0	0
West Brookfield	0	43	--[1]	3	0	0
West Newbury	0	50	5	1	0	0
West Springfield	1	330	22	30	1	1
West Stockbridge	0	10	0	0	0	0
West Tisbury	1	20	--[1]	1	0	0
Westborough	1	213	16	4	1	0
Westfield	3	437	25	27	2	2
Westford	0	278	13	3	1	1
Westhampton	0	10	0	0	0	0
Westminster	0	63	--[1]	1	0	0
Weston	1	117	9	0	0	0
Westport	1	111	8	8	0	0
Westwood	1	202	14	1	1	1
Weymouth	3,916	752	57	31	2	2
Whately	0	6	--[1]	0	0	0
Whitman	1	213	16	9	3	3
Wilbraham	1	118	10	0	0	0
Williamsburg	0	24	--[1]	1	1	0
Williamstown	1	24	0	0	0	0
Wilmington	1	330	18	10	1	1
Winchendon	0	126	8	17	0	0
Winchester	2,416	271	11	2	0	0
Windsor	0	14	--[1]	1	0	0
Winthrop	0	196	10	5	1	0
Woburn	1	498	44	18	2	1
Worcester	6,029	2,473	225	306	20	16
Worthington	0	11	--[1]	0	0	0
Wrentham	0	161	14	3	1	0
Yarmouth	0	213	15	16	0	0
Unknown	3	2	--[1]	0	0	0

1. Values of 1-4 for medical characteristics of communities with less than 200 births are suppressed based on Guidelines for Release of Birth Data, Bureau of
Health Statistics, Research and Evaluation, Massachusetts Department of Public Health.

Table 18B. Birth Characteristics, Occurrence and Resident Births and Infant Deaths by County, Massachusetts: 1999

County Name	Occurrence Births	Resident Births			Deaths	
		Number	Low Birthweight	Teen (< 20 years)	Infant	Neonatal
STATE TOTAL	**81,765**	**80,866**	**5,708**	**5,588**	**418**	**332**
Barnstable	1,604	1,992	130	107	9	5
Berkshire	1,328	1,296	85	123	1	1
Bristol	4,865	6,534	440	628	46	31
Dukes	122	167	15	8	0	0
Essex	8,486	9,751	744	786	43	37
Franklin	546	717	33	65	3	2
Hampden	6,216	5,749	452	828	36	25
Hampshire	1,117	1,271	93	82	5	3
Middlesex	17,457	19,077	1,226	707	81	67
Nantucket	89	122	10	6	4	4
Norfolk	4,635	8,403	596	181	31	25
Plymouth	3,690	6,559	423	356	38	32
Suffolk	22,579	9,476	792	901	65	56
Worcester	9,028	9,750	668	810	56	44

Table 18C. Birth Characteristics, Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs): 1999

Community Health Network Area	Occurrence Births	Resident Births			Deaths	
		Number	Low Birthweight	Teen (< 20 years)	Infant	Neonatal
STATE TOTAL	**81,765**	**80,866**	**5,708**	**5,588**	**418**	**332**
Community Health Network of Berkshire County	1,328	1,296	85	123	6	4
Upper Valley Health Web (Franklin County)	546	863	38	84	5	5
Partnership for Health in Hampshire County (Northampton)	1,117	1,248	92	79	7	6
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	490	1,879	137	254	12	11
The Community Health Connection (Springfield)	5,725	3,813	312	572	27	19
Community Health Network of Southern Worcester County	439	1,351	101	129	11	9
Community Partners for Health (Milford)	606	2,235	124	73	11	6
Community Health Network of Greater Metro West (Framingham)	2,439	5,362	324	128	22	16
Community Wellness Coalition (Worcester)	6,032	3,867	308	347	33	28
Fitchburg/Gardner Community Health Network	1,956	3,257	210	273	14	10
Greater Lowell Community Health Network	2,712	3,874	282	292	15	12
Greater Lawrence Community Health Network	2,746	2,754	202	330	13	8
Greater Haverhill Community Health Network	1,318	2,042	158	127	7	5
Community Health Network North (Beverly/Gloucester)	2,682	1,352	93	59	8	6
North Shore Community Health Network	1,740	3,603	291	270	22	16
Greater Woburn/Concord/Littleton Community Health Network	3,907	2,636	147	43	7	5
North Suburban Health Alliance (Medford/Malden/Melrose)	2,358	3,404	218	86	20	16
Greater Cambridge/Somerville Community Health Network	1,987	3,222	209	123	8	6
West Suburban Health Network (Newton/Waltham)	4,138	2,949	197	53	8	6
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	22,581	10,065	835	903	52	39
Blue Hills Community Health Alliance (Greater Quincy)	4,546	4,690	337	127	23	18
Greater Brockton Community Health Network	2,407	3,170	245	228	18	17
South Shore Community Partners in Prevention (Plymouth)	784	2,609	147	92	10	8
Greater Attleboro-Taunton Health & Education Response	1,751	3,343	196	210	20	14
Partners for a Healthier Community (Fall River)	1,578	1,481	112	182	9	9
Greater New Bedford Health & Human Services Coalition	2,034	2,218	152	280	12	6
Cape and Islands Community Health Network	1,815	2,281	155	121	14	10

APPENDIX

TECHNICAL NOTES

1. TITLE CHANGE AND DATA AVAILABILITY:

Effective with this year's publication, the ***Advance Data: Births*** series has been renamed the ***Massachusetts Births***. This and other Department of Public Health publications and materials can be accessed on the Internet at:

http://www.state.ma.us/dph/ose/mchphome.htm

Detailed information on 1999 births in Massachusetts, as well as access to other Department of Public Health data, is available on the Department's free, Internet-accessible data warehouse, **MassCHIP**. To register as a user, visit our website above or call 1-888-MASCHIP (within MA only) or (617) 624-5541.

2. DATA CAUTIONS:

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

Differences with previously published data
Numbers and rates in this publication may differ from those contained in previous reports because of updates of birth and death certificate files. 1998 birth rates were recalculated using 1998 population estimates released by the Massachusetts Institute for Social and Economic Research (MISER) in Septmember 2000. See Section 3 for details.

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

3. CHANGES IN THE COLLECTION OF RACE AND ETHNICITY INFORMATION:

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

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

4. POPULATION ESTIMATES:

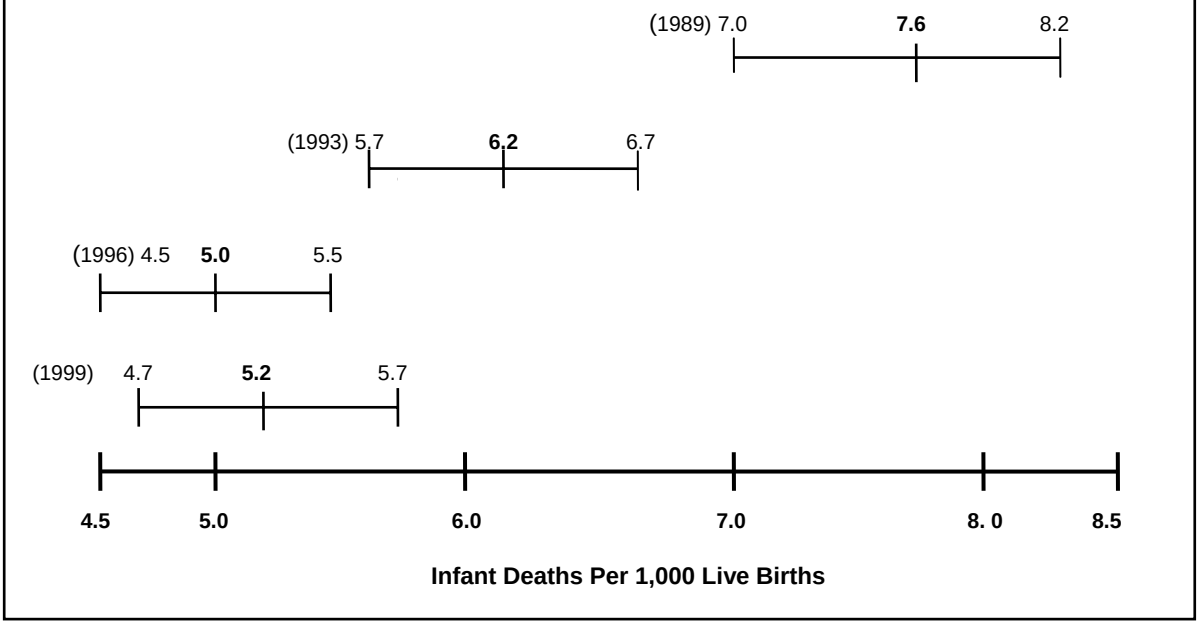
The Massachusetts Institute for Social and Economic Research (MISER), is the source of all population estimates used in this report to calculate population based rates (for example, teen birth rates and fertility rates). The most recent year for which MISER population estimates are available is 1998. Therefore, all 1999 birth rates are calculated using 1998 MISER population estimates (released in September 2000) as denominators. Furthermore, some differences may exist between previously published 1998 birth rates due to the updating of the 1998 rates with 1998 denominators.

CONFIDENCE INTERVALS AND INFANT MORTALITY RATES

Beginning in the 1992 Advance Data: Births publication, 95% confidence intervals were added to the calculation of infant mortality rates (IMRs). The confidence interval (CI) provides a measure of stability of the IMR and a basis for comparing rates to determine if they are statistically different. Rates can be compared for the same group in different years, or for different groups in the same year. The width of the CI reflects the stability of the IMR. For example, a narrow CI reflects high stability, and a wide interval reflects low stability. If the CIs around two IMRs being compared do not overlap, the difference between the two rates is statistically significant. The following table and chart illustrate the concept of statistically significant differences using actual data from 1989, 1993, 1996, and 1999.

Comparison of Infant Mortality Rates and Confidence Intervals for Selected Years

Year	IMR (per 1,000 births)	95% Confidence Interval
1989	7.6	(7.0-8.2)
1993	6.2	(5.7-6.7)
1996	5.0	(4.5-5.5)
1999	5.2	(4.7-5.7)



The difference between the 1993 IMR and 1996 IMR is statistically significant -- the confidence intervals do not overlap. The same is true for the differences between the 1989 IMR and the annual IMRs for 1993, 1996, and 1999.

95% Confidence Intervals for Infant Mortality Rates, by Race and Hispanic Ethnicity, Massachusetts: 1990-1999

	Total[1]		Non-Hispanic White		Non-Hispanic Black		Hispanic		Asian	
Year	#	**Rate**[2] (C.I).	#	**Rate**[2](C.I).	#	**Rate**[2](C.I).	#	**Rate**[2](C.I).	#	**Rate**[2](C.I).
1990	649	**7.0** (6.5, 7.5)	442	**6.1** (5.5, 6.7)	98	**13.7** (11.0, 16.4)	77	**9.1** (7.1, 11.1)	24	**7.0** (4.2, 10.0)
1991	577	**6.5** (6.0, 7.0)	381	**5.5** (4.9, 6.1)	101	**15.0** (12.1, 17.9)	80	**9.4** (7.3, 11.5)	14	**4.2** (2.0, 6.4)
1992	569	**6.5** (6.0, 7.0)	371	**5.5** (4.9, 6.1)	110	**16.4** (13.4, 19.4)	67	**7.9** (6.0, 9.8)	16	**4.9** (2.5, 7.3)
1993	523	**6.2** (5.7, 6.7)	346	**5.3** (4.7, 5.9)	84	**13.1** (10.3, 15.9)	77	**9.3** (7.2, 11.4)	13	**3.9** (1.8, 6.0)
1994	499	**6.0** (5.4, 6.5)	343	**5.3** (4.7, 5.9)	79	**12.6** (9.8, 15.4)	64	**7.6** (5.7, 9.4)	8	**2.4** (0.7, 4.0)
1995	419	**5.1** (4.6, 5.6)	275	**4.4** (3.8, 4.9)	65	**11.1** (8.4, 13.8)	58	**7.2** (5.3, 9.0)	19	**5.5** (3.0, 8.0)
1996	403	**5.0** (4.5, 5.5)	289	**4.7** (4.1, 5.2)	63	**11.4** (8.6, 14.2)	40	**5.1** (3.5, 6.7)	8	**2.2** (0.7, 3.7)
1997	425	**5.3** (4.8, 5.8**)**	294	**4.8** (4.2, 5.3**)**	64	**11.7** (8.8, 14.5)	55	**6.7** (4.9, 8.4)	10	**2.6** (1.0, 4.2)
1998	414	**5.1** (4.6, 5.6**)**	294	**4.6** (4.1, 5.2**)**	64	**10.6** (7.9, 13.3)	55	**6.7** (5.0, 8.4)	10	**2.7** (1.0, 4.3)
1999	418	**5.2** (4.7, 5.7**)**	285	**4.7** (4.2, 5.3**)**	72	**12.3** (9.5, 15.1)	49	**5.5** (4.0, 7.1)	8	**1.9** (0.6, 3.3)

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

In 1999, the non-Hispanic black infant mortality rate was 12.3 deaths per 1,000 live births (95% CI: 9.5,15.1), which was 2.6 times greater than the non-Hispanic white infant mortality rate of 4.7 (95% CI: 4.2, 5.3). The difference in these two rates was statistically significant. The rate of infant mortality for non-Hispanic blacks was also significantly elevated compared to both Hispanic and Asians in 1999.

DEFINITION OF RATES

Age-Specific Birth Rate

The number of children born to women in a specific age group divided by the population of women in that specific age group, multiplied by 1,000. (Also see Crude Birth Rate, Fertility Rate, and Teen Birth Rate)

Birth Rate

Births per 1,000 population. (Also see Age-specific Birth Rate, Crude Birth Rate, Fertility Rate, and Teen Birth Rate)

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

Cesarean Section Rates

$$\text{Total C-section rate} = \frac{\text{Number of C-section births}}{\text{Number of occurrence births}} \times 100$$

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

$$\text{Repeat C-section rate} = \frac{\text{Number of repeat C-section births}}{\text{(Number of repeat C-section births+number of VBACs)}} \times 100$$

$$\text{VBAC rate} = \frac{\text{Number of VBACs}}{\text{(Number of repeat C-section births+number of VBACs)}} \times 100$$

NOTE: the rates presented in Table 15 are for occurrence births but can be calculated for resident births as well. VBAC: Vaginal birth after Cesarean section.

Crude Birth Rate

The number of births in a year divided by the population, multiplied by 1,000.

Fertility Rate

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

General Fertility Ratio

Same as Fertility Rate.

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

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

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

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

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

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

Teen Birth Rate

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

Total Rate of Change
The total rate of change is calculated as follows:

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

where

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

Population Estimates for Massachusetts Communities, 1998

TOWN NAME	COUNTY	CHNA	POPULATION
Abington	Plymouth	22	15,531
Acton	Middlesex	15	19,980
Acushnet	Bristol	26	10,970
Adams	Berkshire	1	8,778
Agawam	Hampden	4	29,457
Alford	Berkshire	1	410
Amesbury	Essex	12	15,997
Amherst	Hampshire	3	40,827
Andover	Essex	11	31,857
Aquinnah (Gay Head)	Dukes	27	234
Arlington	Middlesex	17	43,066
Ashburnham	Worcester	9	6,280
Ashby	Middlesex	9	2,683
Ashfield	Franklin	2	1,863
Ashland	Middlesex	7	14,081
Athol	Worcester	2	11,269
Attleboro	Bristol	24	40,412
Auburn	Worcester	8	15,581
Avon	Norfolk	22	4,401
Ayer	Middlesex	9	5,210
Barnstable	Barnstable	27	46,461
Barre	Worcester	9	5,122
Becket	Berkshire	1	1,701
Bedford	Middlesex	15	11,898
Belchertown	Hampshire	3	12,642
Bellingham	Norfolk	6	15,743
Belmont	Middlesex	17	25,787
Berkley	Bristol	24	5,680
Berlin	Worcester	9	2,338
Bernardston	Franklin	2	2,052
Beverly	Essex	13	40,476
Billerica	Middlesex	10	38,304
Blackstone	Worcester	6	9,159
Blandford	Hampden	4	1,172
Bolton	Worcester	9	4,274
Boston	Suffolk	19	563,876
Bourne	Barnstable	27	16,857
Boxborough	Middlesex	15	4,645
Boxford	Essex	12	8,763
Boylston	Worcester	8	3,739
Braintree	Norfolk	20	34,278
Brewster	Barnstable	27	10,044
Bridgewater	Plymouth	22	25,680
Brimfield	Hampden	5	3,325
Brockton	Plymouth	22	91,008
Brookfield	Worcester	5	3,168
Brookline	Norfolk	19	60,639
Buckland	Franklin	2	1,899
Burlington	Middlesex	15	25,208
Cambridge	Middlesex	17	96,292
Canton	Norfolk	20	20,196
Carlisle	Middlesex	15	4,489
Carver	Plymouth	23	11,577
Charlemont	Franklin	2	1,230
Charlton	Worcester	5	11,149
Chatham	Barnstable	27	6,742
Chelmsford	Middlesex	10	35,093
Chelsea	Suffolk	19	28,747
Cheshire	Berkshire	1	3,851
Chester	Hampden	21	1,459
Chesterfield	Hampshire	3	1,084
Chicopee	Hampden	21	53,003
Chilmark	Dukes	27	759
Clarksburg	Berkshire	1	1,825
Clinton	Worcester	9	13,506
Cohasset	Norfolk	20	7,604
Colrain	Franklin	2	1,800
Concord	Middlesex	15	19,463
Conway	Franklin	2	1,765
Cummington	Hampshire	3	819
Dalton	Berkshire	1	6,777
Danvers	Essex	14	25,758
Dartmouth	Bristol	26	31,278
Dedham	Norfolk	18	23,019
Deerfield	Franklin	2	5,397
Dennis	Barnstable	27	14,222
Dighton	Bristol	24	6,382
Douglas	Worcester	6	6,381
Dover	Norfolk	18	5,897
Dracut	Middlesex	10	28,527
Dudley	Worcester	5	9,902
Dunstable	Middlesex	10	2,911
Duxbury	Plymouth	23	15,398
East Bridgewater	Plymouth	22	13,590
East Brookfield	Worcester	5	2,188
East Longmeadow	Hampden	4	14,693
Eastham	Barnstable	27	4,816
Easthampton	Hampshire	3	15,834
Easton	Bristol	22	22,503
Edgartown	Dukes	27	3,890
Egremont	Berkshire	1	1,234
Erving	Franklin	2	1,458
Essex	Essex	13	3,165
Everett	Middlesex	16	36,866
Fairhaven	Bristol	26	15,985
Fall River	Bristol	25	89,276
Falmouth	Barnstable	27	29,186
Fitchburg	Worcester	9	40,032
Florida	Berkshire	1	823
Foxborough	Norfolk	7	16,595
Framingham	Middlesex	7	66,554
Franklin	Norfolk	6	28,892
Freetown	Bristol	26	9,253
Gardner	Worcester	9	21,454
Georgetown	Essex	12	7,637
Gill	Franklin	2	1,635
Gloucester	Essex	13	29,456
Goshen	Hampshire	3	897
Gosnold	Dukes	27	145
Grafton	Worcester	8	14,787
Granby	Hampshire	3	5,917
Granville	Hampden	4	1,477
Great Barrington	Berkshire	1	8,056
Greenfield	Franklin	2	17,805
Groton	Middlesex	9	9,175
Groveland	Essex	12	5,974
Hadley	Hampshire	3	4,459
Halifax	Plymouth	23	7,469
Hamilton	Essex	13	8,472
Hampden	Hampden	4	4,552
Hancock	Berkshire	1	701
Hanover	Plymouth	23	13,591
Hanson	Plymouth	23	9,292
Hardwick	Worcester	9	2,692
Harvard	Worcester	9	13,706
Harwich	Barnstable	27	11,194
Hatfield	Hampshire	3	3,105
Haverhill	Essex	12	57,186
Hawley	Franklin	2	306
Heath	Franklin	2	807
Hingham	Plymouth	20	21,101
Hinsdale	Berkshire	1	2,101
Holbrook	Norfolk	22	11,164
Holden	Worcester	8	16,058

Population Estimates for Massachusetts Communities, 1998, continued

TOWN NAME	COUNTY	CHNA	POPULATION
Holland	Hampden	5	2,360
Holliston	Middlesex	7	14,984
Holyoke	Hampden	21	41,081
Hopedale	Worcester	6	6,165
Hopkinton	Middlesex	7	12,083
Hubbardston	Worcester	9	3,726
Hudson	Middlesex	7	17,706
Hull	Plymouth	20	11,266
Huntington	Hampshire	21	2,245
Ipswich	Essex	13	12,074
Kingston	Plymouth	23	10,625
Lakeville	Plymouth	24	9,445
Lancaster	Worcester	9	7,410
Lanesborough	Berkshire	1	3,165
Lawrence	Essex	11	70,325
Lee	Berkshire	1	5,822
Leicester	Worcester	8	10,320
Lenox	Berkshire	1	4,705
Leominster	Worcester	9	41,875
Leverett	Franklin	2	2,014
Lexington	Middlesex	15	31,751
Leyden	Franklin	2	753
Lincoln	Middlesex	15	8,985
Littleton	Middlesex	15	7,842
Longmeadow	Hampden	4	15,210
Lowell	Middlesex	10	106,449
Ludlow	Hampden	21	18,104
Lunenburg	Worcester	9	9,303
Lynn	Essex	14	83,464
Lynnfield	Essex	14	11,991
Malden	Middlesex	16	53,703
Manchester	Essex	13	5,505
Mansfield	Bristol	24	20,455
Marblehead	Essex	14	21,093
Marion	Plymouth	26	5,918
Marlborough	Middlesex	7	33,980
Marshfield	Plymouth	23	23,225
Mashpee	Barnstable	27	10,107
Mattapoisett	Plymouth	26	6,150
Maynard	Middlesex	7	10,659
Medfield	Norfolk	7	12,078
Medford	Middlesex	16	57,983
Medway	Norfolk	6	11,679
Melrose	Middlesex	16	26,598
Mendon	Worcester	6	4,908
Merrimac	Essex	12	6,472
Methuen	Essex	11	42,050
Middleborough	Plymouth	24	19,937
Middlefield	Hampshire	3	437
Middleton	Essex	11	6,292
Milford	Worcester	6	24,904
Millbury	Worcester	8	12,412
Millis	Norfolk	7	7,699
Millville	Worcester	6	2,788
Milton	Norfolk	20	27,309
Monroe	Franklin	2	94
Monson	Hampden	4	9,240
Montague	Franklin	2	7,629
Monterey	Berkshire	1	868
Montgomery	Hampden	4	735
Mt. Washington	Berkshire	1	150
Nahant	Essex	14	3,798
Nantucket	Nantucket	27	7,705
Natick	Middlesex	7	31,940
Needham	Norfolk	18	27,851
New Ashford	Berkshire	1	201
New Bedford	Bristol	26	94,835
New Braintree	Worcester	9	1,040
New Marlborough	Berkshire	1	1,553
New Salem	Franklin	2	822
Newbury	Essex	12	6,543
Newburyport	Essex	12	16,705
Newton	Middlesex	18	90,506
Norfolk	Norfolk	7	10,478
North Adams	Berkshire	1	16,589
North Andover	Essex	11	26,295
North Attleboro	Bristol	24	26,491
North Brookfield	Worcester	5	5,037
North Reading	Middlesex	16	12,594
Northampton	Hampshire	3	29,816
Northborough	Worcester	7	13,299
Northbridge	Worcester	6	13,879
Northfield	Franklin	2	2,912
Norton	Bristol	24	16,317
Norwell	Plymouth	20	10,129
Norwood	Norfolk	20	28,878
Oak Bluffs	Dukes	27	3,602
Oakham	Worcester	9	1,797
Orange	Franklin	2	7,826
Orleans	Barnstable	27	6,453
Otis	Berkshire	1	1,152
Oxford	Worcester	5	13,475
Palmer	Hampden	4	12,548
Paxton	Worcester	8	4,654
Peabody	Essex	14	50,979
Pelham	Hampshire	3	1,470
Pembroke	Plymouth	23	15,863
Pepperell	Middlesex	9	11,657
Peru	Berkshire	1	853
Petersham	Worcester	2	1,198
Phillipston	Worcester	2	1,958
Pittsfield	Berkshire	1	46,691
Plainfield	Hampshire	3	577
Plainville	Norfolk	7	8,073
Plymouth	Plymouth	23	51,103
Plympton	Plymouth	23	2,670
Princeton	Worcester	9	3,531
Provincetown	Barnstable	27	3,249
Quincy	Norfolk	20	87,018
Randolph	Norfolk	20	32,212
Raynham	Bristol	24	11,233
Reading	Middlesex	16	24,106
Rehoboth	Bristol	24	10,131
Revere	Suffolk	19	39,987
Richmond	Berkshire	1	1,822
Rochester	Plymouth	26	4,603
Rockland	Plymouth	23	17,464
Rockport	Essex	13	8,252
Rowe	Franklin	2	371
Rowley	Essex	12	5,296
Royalston	Worcester	2	1,127
Russell	Hampden	4	1,770
Rutland	Worcester	9	5,818
Salem	Essex	14	40,210
Salisbury	Essex	12	7,212
Sandisfield	Berkshire	1	745
Sandwich	Barnstable	27	19,600
Saugus	Essex	14	25,644
Savoy	Berkshire	1	656
Scituate	Plymouth	20	16,808
Seekonk	Bristol	24	14,061
Sharon	Norfolk	20	17,047
Sheffield	Berkshire	1	3,282
Shelburne	Franklin	2	2,256
Sherborn	Middlesex	7	4,297
Shirley	Middlesex	9	7,830

Population Estimates for Massachusetts Communities, 1998, continued

TOWN NAME	COUNTY	CHNA	POPULATION
Shrewsbury	Worcester	8	29,053
Shutesbury	Franklin	2	2,024
Somerset	Bristol	25	17,822
Somerville	Middlesex	17	78,112
South Hadley	Hampshire	3	18,070
Southampton	Hampshire	3	5,183
Southborough	Worcester	7	7,988
Southbridge	Worcester	5	17,681
Southwick	Hampden	4	8,852
Spencer	Worcester	5	12,036
Springfield	Hampden	4	150,414
Sterling	Worcester	9	7,505
Stockbridge	Berkshire	1	2,292
Stoneham	Middlesex	16	21,742
Stoughton	Norfolk	22	29,034
Stow	Middlesex	7	5,467
Sturbridge	Worcester	5	8,244
Sudbury	Middlesex	7	15,603
Sunderland	Franklin	2	3,730
Sutton	Worcester	6	7,992
Swampscott	Essex	14	14,917
Swansea	Bristol	25	16,182
Taunton	Bristol	24	54,297
Templeton	Worcester	9	7,050
Tewksbury	Middlesex	10	30,268
Tisbury	Dukes	27	3,507
Tolland	Hampden	4	326
Topsfield	Essex	13	6,433
Townsend	Middlesex	9	9,575
Truro	Barnstable	27	1,783
Tyngsborough	Middlesex	10	10,266
Tyringham	Berkshire	1	398
Upton	Worcester	6	5,373
Uxbridge	Worcester	6	12,278
Wakefield	Middlesex	16	25,201
Wales	Hampden	5	1,721
Walpole	Norfolk	7	23,266
Waltham	Middlesex	18	59,165
Ware	Hampshire	3	9,855
Wareham	Plymouth	26	20,714
Warren	Worcester	5	4,785
Warwick	Franklin	2	773
Washington	Berkshire	1	561
Watertown	Middlesex	17	31,731
Wayland	Middlesex	7	13,067
Webster	Worcester	5	16,120
Wellesley	Norfolk	18	28,734
Wellfleet	Barnstable	27	2,557
Wendell	Franklin	2	1,084
Wenham	Essex	13	5,530
West Boylston	Worcester	8	7,471
West Bridgewater	Plymouth	22	6,805
West Brookfield	Worcester	5	3,502
West Newbury	Essex	12	3,848
West Springfield	Hampden	4	28,854
West Stockbridge	Berkshire	1	1,432
West Tisbury	Dukes	27	2,135
Westborough	Worcester	7	16,555
Westfield	Hampden	21	40,868
Westford	Middlesex	10	19,422
Westhampton	Hampshire	3	1,525
Westminster	Worcester	9	7,053
Weston	Middlesex	18	11,076
Westport	Bristol	25	15,341
Westwood	Norfolk	18	13,834
Weymouth	Norfolk	20	53,670
Whately	Franklin	2	1,310
Whitman	Plymouth	22	13,196
Wilbraham	Hampden	4	13,414
Williamsburg	Hampshire	3	2,717
Williamstown	Berkshire	1	8,967
Wilmington	Middlesex	15	20,237
Winchendon	Worcester	9	9,383
Winchester	Middlesex	15	20,903
Windsor	Berkshire	1	777
Winthrop	Suffolk	19	17,123
Woburn	Middlesex	15	36,965
Worcester	Worcester	8	169,091
Worthington	Hampshire	3	1,298
Wrentham	Norfolk	7	10,395
Yarmouth	Barnstable	27	22,649

1. 1998 MISER population estimates (released September 2000).

Population Estimates for Massachusetts Community Health Network Areas (CHNA) and Counties, 1998[1]

CHNA	POPULATION	COUNTY	POPULATION
1. Community Health Network of Berkshire County	138,938	Barnstable	205,920
2. Upper Valley Health Web (Franklin County)	87,167	Berkshire	138,938
3. Partnership for Health in Hampshire County (Northampton)	156,532	Bristol	528,904
4. The Community Health Connection (Springfield)	292,714	Dukes	14,272
5. Community Health Network of Southern Worcester County	114,693	Essex	715,669
6. Community Partners for Health (Milford)	150,141	Franklin	71,615
7. Community Health Network of Greater Metro West (Framingham)	366,847	Hampden	454,635
8 .Community Wellness Coalition (Worcester)	283,166	Hampshire	158,777
9. Fitchburg/Gardner Community Health Network	261,025	Middlesex	1,464,685
10. Greater Lowell Community Health Network	271,240	Nantucket	7,705
11. Greater Lawrence Community Health Network	176,819	Norfolk	657,683
12. Greater Haverhill Community Health Network	141,633	Plymouth	470,158
13. Community Health Network North (Beverly/Gloucester)	119,363	Suffolk	649,733
14. North Shore Community Health Network	277,854	Worcester	752,569
15. Greater Woburn/Concord/Littleton Community Health Network	212,366		
16. North Suburban Health Alliance (Medford/Malden/Melrose)	258,793	**STATE**	**6,291,263**
17. Greater Cambridge/Somerville Community Health Network	274,988		
18. West Suburban Health Network (Newton/Waltham)	260,082		
19. Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	710,372		
20. Blue Hills Community Health Alliance (Greater Quincy)	367,516		
21. Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	156,760		
22. Greater Brockton Community Health Network	232,912		
23. South Shore Community Partners in Prevention (Plymouth)	178,277		
24. Greater Attleboro-Taunton Health & Education Response	234,841		
25. Partners for a Healthier Community (Fall River)	138,621		
26. Greater New Bedford Health & Human Services Coalition	199,706		
27. Cape and Islands Community Health Network	227,897		

1. 1998 population estimates from MISER (released September 2000).

GLOSSARY

Adequacy of Prenatal Care

The Index of Adequacy of Prenatal Care (also known as the Kessner Index) has five categories (adequate, intermediate, inadequate, no prenatal care, and unknown), based on the trimester in which prenatal care began and the number of prenatal visits. The general classification scheme for full-term infants is as follows:

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

This classification is adjusted for gestational age to allow for proper classification of premature births.

Birthweight

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

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

Birthweight Categories

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

Cesarean Section or C-Section

Primary: A mother's first Cesarean section delivery.
Repeat: A Cesarean delivery that has been preceded by at least one Cesarean delivery.

Community Health Network Areas (CHNAs)

The Department of Public Health, in collaboration with health service providers, coalition members, and interested citizens, has designated 27 areas for community health planning. It is the Department's intention to foster in each of these areas the development of Community Health Networks -- consortia of health care providers, human service agencies, schools, churches, youth, parents, elders, advocacy groups, and individual consumers -- to address the

health needs of the community. These community coalitions will participate in monitoring outcomes and progress of strategies and responses to those health needs.

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

A Community Health Network Area (CHNA) is defined as an aggregation of cities and towns. (The city of Boston constitutes its own Community Health Network area). In the current publication, we have presented some data by CHNA. To determine which cities and towns make up a particular CHNA, the table on pages 90-92 provides the appropriate CHNA code for each city and town.

The data published in this volume reflect the new definitions of CHNAs instituted in January 1997 and the new CHNA names.

Confidence Intervals

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

Ethnicity

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

Gravidity

The number of pregnancies experienced by a woman.

Healthy Start

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

Infant

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

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

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

Low Birthweight (LBW)
See Birthweight Categories.

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

Neonatal
Infants under 28 days of age.

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

Non-U.S.-Born Women
See Mother's Birthplace.

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

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

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

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

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

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

Resident Birth
The birth of an infant whose mother reports that her usual place of residence is in Massachusetts. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Vital statistics data may be presented in terms either of residence or occurrence. All data in this publication, except the data in Table 15, 16, 17, and 18 are resident data. Resident data include all events that occur to residents of the Commonwealth, wherever they occur. Occurrence data include all events that occur within the state, whether to residents or nonresidents. There is an exchange agreement among the 50 states, District of Columbia, Puerto Rico, Virgin Islands, Guam, and Canada that provides for exchange of copies of birth and death records. These records are used for statistical purposes only, and allow each state or province to track the births and deaths of its residents.

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

Very Low Birthweight (VLBW)
See Birthweight Categories.

Massachusetts Birth Certificate: 1999

Massachusetts Births 1999 Evaluation Form

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