# BOSTON NATALITY 2007

## A REVIEW OF 2005 BIRTH DATA

Prepared by the Boston Public Health Commission
Paula Johnson, MD, MPH, Chair
Barbara Ferrer, PhD, MPH, MEd, Executive Director

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# Boston Natality 2007:
# A Review of 2005 Birth Data

# HIGHLIGHTS

- The number of births to Boston residents in 2005 was 7,554, a 2.2% decrease compared with the number (7,721) in 2004 and an overall 14% decline in births since 1993. The fertility rate for women of chlldbearing age in Boston also declined by 16% between 1993 and 1995; the decline was seen in all racial/ethnic groups, except Whites.

- Thirty-five point seven percent of Boston births in 2005 were to White women; close to one third (28.8%) were to Black women; 21.2% were to Latinas; 7.3% were to Asian women; and 7% were to women of another race/ethnicity or whose race/ethnicity was unknown.

- In 2005, 45% of Boston resident births were to women who were born in a country other than the United States, a figure that has remained relatively stable except for slight fluctuations. In addition, almost one-fourth of births (21.8%) were to women whose primary language was other than English. The most common of these languages was Spanish, reported on 13.6% of birth certificates.

- Most Boston births in 2005 (70.0%) were to women between the ages of 20 and 34; 2.4% were to adolescents 15-17 years old, 5.1% were to women 18-19 years old, 17.0% were to women 35-39 years old and 4.5 % were to women 40 years of age or older. From 1993 to 2005, the birth rate for adolescents ages 15-17 decreased by 55%. During the same period, the birth rate for women ages 35-49 increased 16%. The birth rate for Black, Latino, and Asian teens 15-17 years old was significantly higher than the birth rates for White teens in 2005.

- Only 3.6% of births were to women who reported smoking during pregnancy, a decline of 69.2% between 1993 and 2005.

- Eighty-one percent of Boston births were to women who received adequate prenatal care as defined by Kotelchuck's Adequacy of Prenatal Care Utilization Index. A significantly higher percentage (89.0%) of White women obtained adequate prenatal care, compared with Black women (73.4%), Latinas (78.9%), and Asian women (82.9%). Women who did not graduate high school were significantly less likely to receive adequate prenatal care than women who graduated from high school or attended college.

- Boston has experienced a statistically significant increase, from 2.4% in 1993 to 4.1% in 2005, in the percentage of its resident births that are composed of twin, triplet, or higher-order multiples.

- During the past several years, Boston has experienced an increasing trend in C-section delivery. Since 1997, C-section delivery dramatically increased 59%. An increasing trend in C-section delivery is also being experienced at the State and national levels.

- The low birthweight (LBW) rate for Boston increased from 9.0% in 2004 to 9.6% in 2005. The one-year change was not statistically significant.

- The low birthweight rate among Black births was 14.3% in 2005, significantly higher than the low birthweight rates among Asian births (5.8%), Latino births (8.1%), and White births (7.1%). The LBW rate for Black births has consistently been about twice the rate for White births since 1993. Black births also experience higher very low birth rates (VLBW) and extremely low birth rates (ELBWS) than other races/ethnicities.

# HIGHLIGHTS

- East Boston (5.5%), Allston/Brighton (5.7%), and West Roxbury (6.1%) had lower LBW rates than other Boston neighborhoods and the city as a whole. North Dorchester (13.4%), Roxbury (12.8%), Hyde Park (11.5%), and South Dorchester (11.5%) had higher LBW rates.

- Boston women born in the United States had a significantly higher rate of LBW birth (10.6%) than did Boston women born in other countries (8.4%).

- Boston women who smoke during pregnancy are twice as likely to deliver a LBW baby than women who do not smoke during pregnancy. However, Black women who do not smoke are significantly more likely than White women who do smoke to deliver a LBW baby. Black women are also more likely than women of all other race/ethnicity groups to have a LBW baby regardless of level of PNC.

- Between 1998 and 2005, women ages 20-29 and those ages 30-39 experienced increases in multiple births of 15% and 14% respectively. However these increases were not statistically significant.

- Approximately eleven percent (10.9%) of births to Boston residents in 2005 were preterm births (PTB); that is, born before 37 weeks' gestation. Preterm birth has increased since 1994, the most recent low point, but the difference is not statistically significant.

- In 2005, preterm birth was least common among births to women ages 25-29 and 30-34 and most common among births to women ages 40 and over and adolescents ages 15-17. The level of PTB for Black births (15.1%) was significantly higher than those for Asian births (7.1%), Latino births (9.4%), and White births (8.8%).

- Thirty-nine Boston infants died in 2005, resulting in an infant mortality rate (IMR) of 5.2 deaths per 1,000 live births. The IMR was 6.0 in 2004, but the one-year decline was not statistically significant.

- In 2005, Black Boston infants under the age of 1 were 2.1 times as likely as White infants to die, with an IMR of 8.7 deaths per 1,000 live births, compared with an IMR of 4.1 for White infants and 3.1 for Latino infants. This disparity is related to the more frequent occurrence of extreme prematurity among Black births.

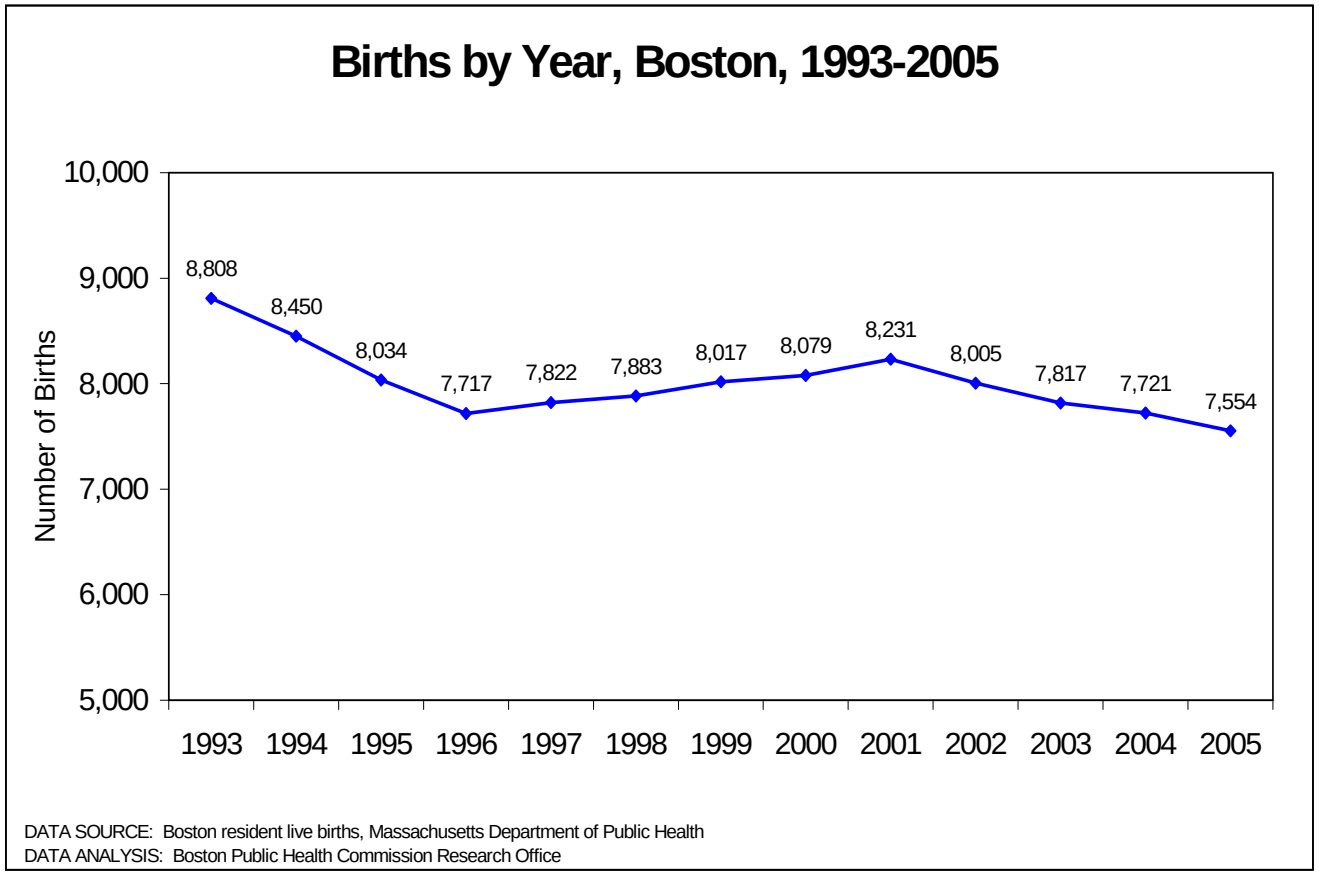
**Introduction**

This report presents data about births and infant deaths among Boston residents in 2005. The data summarizes the number and characteristics of births, birth rates, maternal lifestyle characteristics, medical utilization patterns by pregnant women, and infant health outcomes. Analyses are presented by such characteristics as maternal age, race, Hispanic ethnicity, maternal birthplace, neighborhood, insurance status, and educational attainment. This report highlights health disparities by race/ethnicity and is intended to provide information relevant to the development of interventions intended to eliminate such disparities.

Current information on birth rates is useful to understanding population growth and change. Data on maternal characteristics such as smoking are useful for understanding birth outcomes. Information on use of prenatal care and obstetric procedures can help explain birth outcomes. Monitoring outcomes of birth, especially levels of low birthweight and preterm birth, is important because these variables are predictors of infant morbidity and mortality.

# BIRTHS

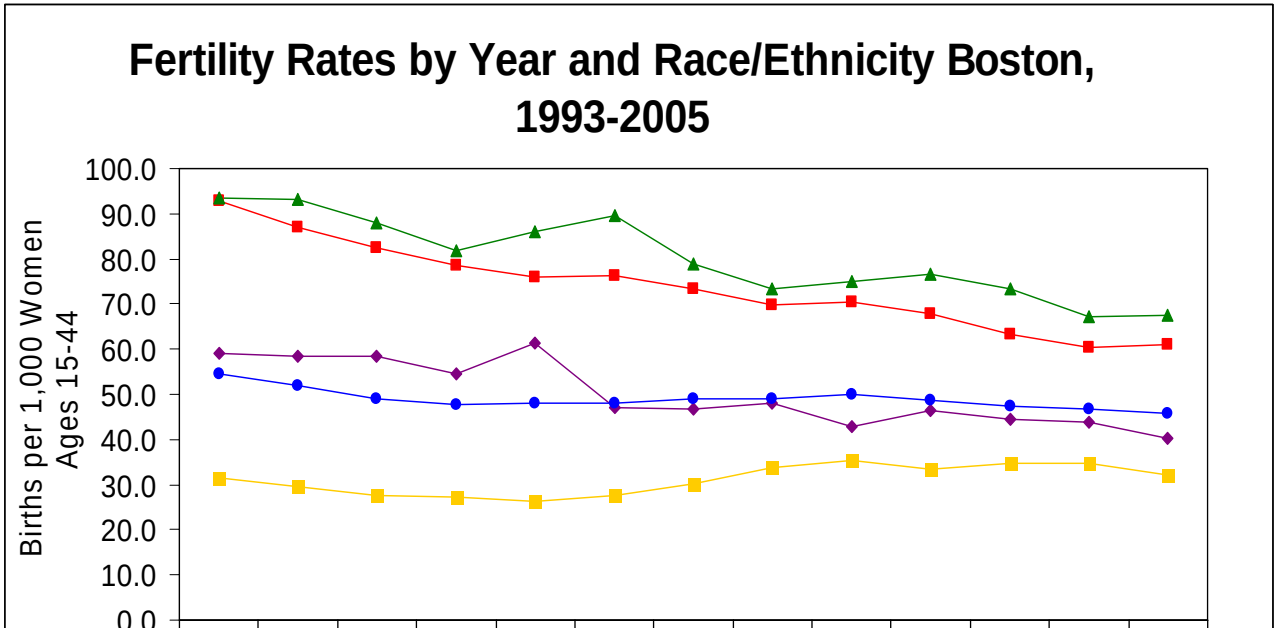
## *Trend*




- Boston had 7,554 resident live births in 2005, down 2.2% from 2004, 8.2% from the slight spike in 2001 and 14.2% from 1993. The declining trend from 1993 to 2005 is similar to the decline in Boston fertility rates shown on the next chart.
- In 2005, 3,917 (51.9%) male babies and 3,637 (48.1%) female babies were born (data not shown).

# BIRTHS

## *Fertility Rates*




| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 59.0 | 58.3 | 58.3 | 54.7 | 61.5 | 47.2 | 46.6 | 48.1 | 42.7 | 46.4 | 44.4 | 43.7 | 40.1 |
| Black | 93.0 | 87.0 | 82.6 | 78.7 | 75.9 | 76.3 | 73.5 | 69.9 | 70.5 | 67.8 | 63.4 | 60.3 | 60.9 |
| Latino | 93.4 | 93.3 | 88.0 | 81.8 | 86.2 | 89.7 | 79.0 | 73.5 | 74.9 | 76.7 | 73.3 | 67.4 | 67.4 |
| White | 31.6 | 29.7 | 27.6 | 27.3 | 26.4 | 27.6 | 30.2 | 33.9 | 35.5 | 33.5 | 34.8 | 34.6 | 32.1 |
| BOSTON | 54.6 | 51.8 | 48.9 | 47.6 | 48.0 | 48.1 | 48.9 | 49.0 | 49.9 | 48.6 | 47.5 | 46.8 | 45.7 |

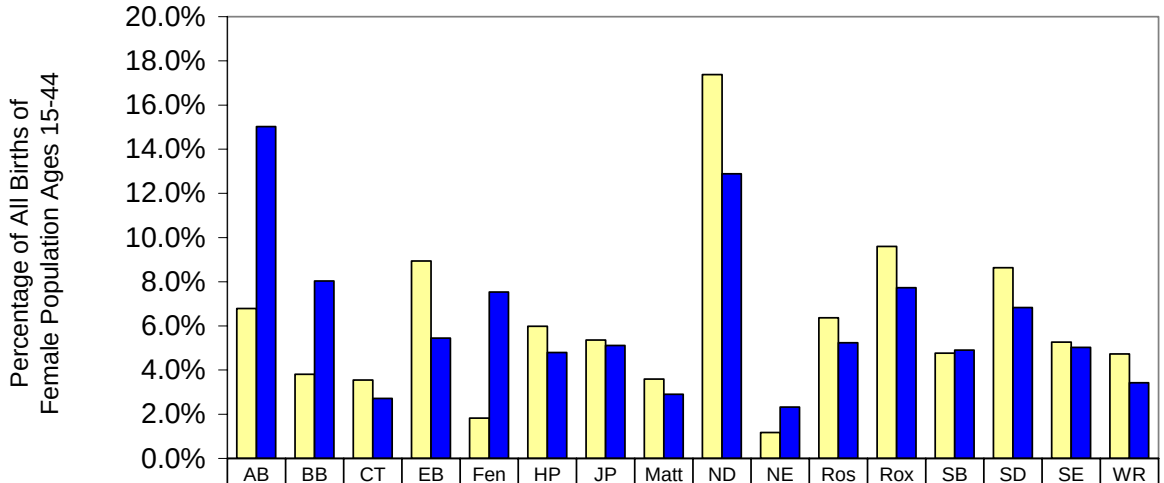
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Fertility rates, sometimes also referred to as birth rates, for women in Boston ages 15-44 have fallen considerably over the past decade for all racial and ethnic groups except for Whites.
- The fertility rate for Boston overall fell 16.3% between 1993 and 2005. This decline was statistically significant.
- Fertility rates for Asians, Blacks, and Latinas fell 32.0%, 34.5%, and 27.8% respectively during the same time period. These declines were statistically significant.
- Latinos and Blacks ages 15-44 continue to have the highest fertility rates compared with other racial/ethnic groups. Fertility rates for Blacks and Latinas in 2005 were significantly higher than the fertility rate for their White counterparts.
- In 2005, the fertility rate for Latino women ages 15-44 was 2.1 times higher than for White women.

# BIRTHS

## *Neighborhood*

### Births and Female Population Ages 15-44 by Neighborhood, Boston, 2005




| | AB | BB | CT | EB | Fen | HP | JP | Matt | ND | NE | Ros | Rox | SB | SD | SE | WR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Births | 6.8% | 3.8% | 3.5% | 8.9% | 1.8% | 6.0% | 5.4% | 3.6% | 17.4% | 1.2% | 6.4% | 9.6% | 4.8% | 8.6% | 5.3% | 4.7% |
| Female Popn 15-44 | 15.0% | 8.0% | 2.7% | 5.4% | 7.5% | 4.8% | 5.1% | 2.9% | 12.9% | 2.3% | 5.2% | 7.7% | 4.9% | 6.8% | 5.0% | 3.4% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- North Dorchester, with 12.9% of Boston's female population of childbearing age, had 17.4% (n=1,313) of the city's births in 2005.
- Charlestown, East Boston, Hyde Park, Jamaica Plain, Mattapan, Roslindale, Roxbury, South Dorchester, the South End, and West Roxbury also had larger percentages of Boston's births than they have of the city's childbearing population.
- Allston/Brighton, Back Bay (also includes Beacon Hill and the West End), Fenway, and the North End have larger percentages of Boston's childbearing population than they had of the city's births in 2005.

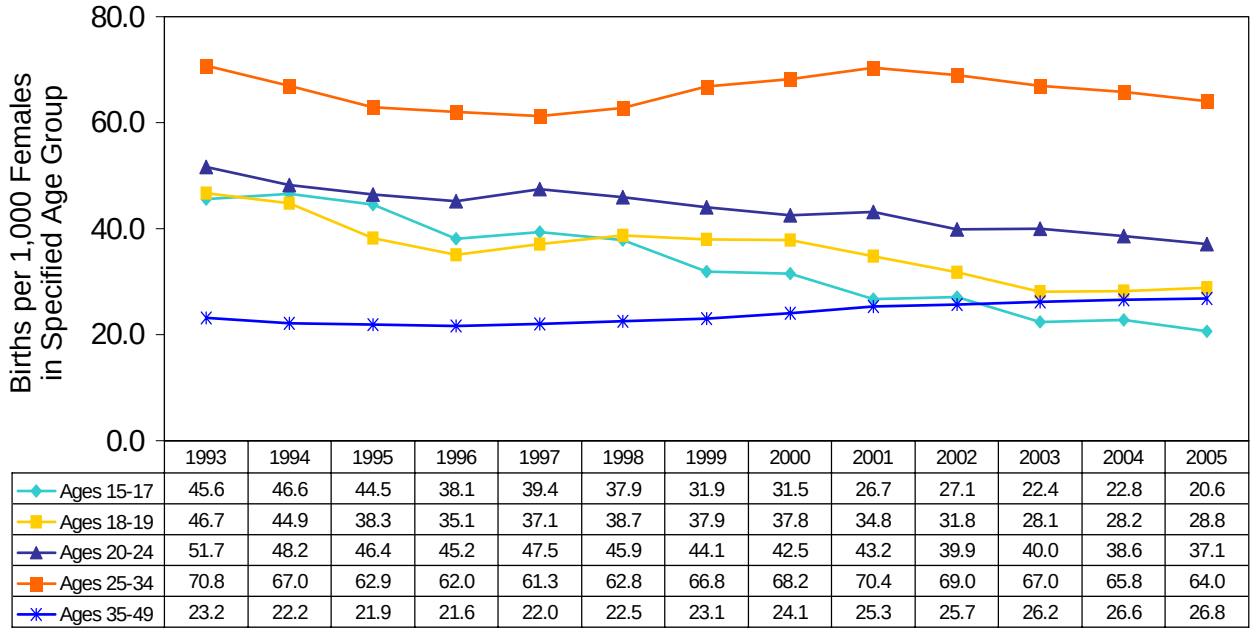
KEY

| | |
|---|---|
| AB = Allston/Brighton | ND = North Dorchester |
| BB = Back Bay* | NE = The North End |
| CT = Charlestown | Ros = Roslindale |
| EB = East Boston | Rox = Roxbury |
| Fen = The Fenway | SB = South Boston |
| HP = Hyde Park | SD = South Dorchester |
| JP = Jamaica Plain | SE = The South End |
| Matt = Mattapan | WR = West Roxbury |

*(also includes Beacon Hill and the West End)

# BIRTHS

## *Birth Rates*



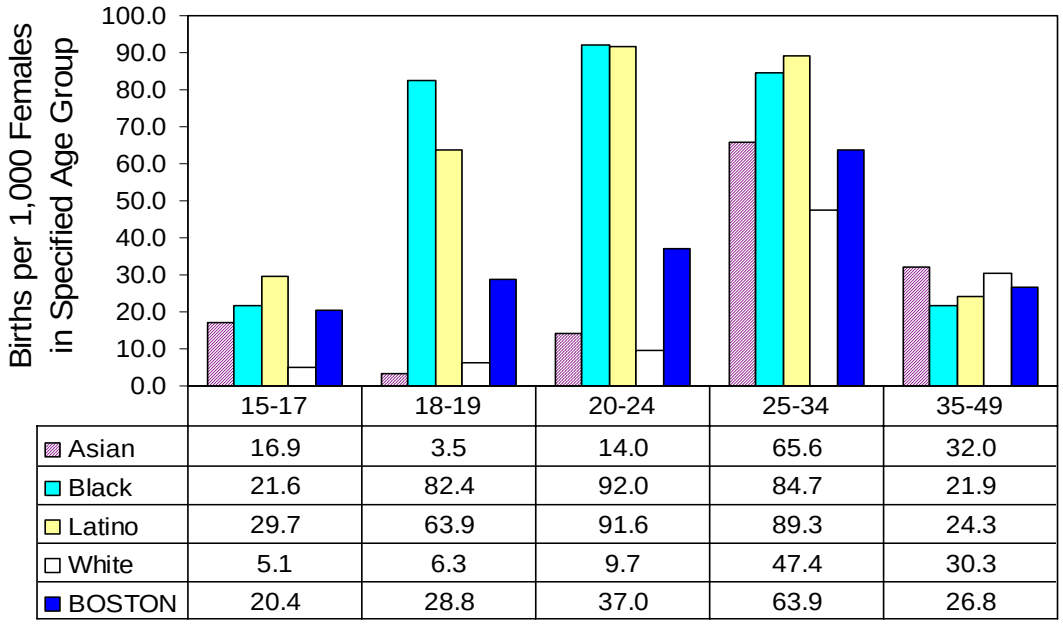

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages 15-17 | 45.6 | 46.6 | 44.5 | 38.1 | 39.4 | 37.9 | 31.9 | 31.5 | 26.7 | 27.1 | 22.4 | 22.8 | 20.6 |
| Ages 18-19 | 46.7 | 44.9 | 38.3 | 35.1 | 37.1 | 38.7 | 37.9 | 37.8 | 34.8 | 31.8 | 28.1 | 28.2 | 28.8 |
| Ages 20-24 | 51.7 | 48.2 | 46.4 | 45.2 | 47.5 | 45.9 | 44.1 | 42.5 | 43.2 | 39.9 | 40.0 | 38.6 | 37.1 |
| Ages 25-34 | 70.8 | 67.0 | 62.9 | 62.0 | 61.3 | 62.8 | 66.8 | 68.2 | 70.4 | 69.0 | 67.0 | 65.8 | 64.0 |
| Ages 35-49 | 23.2 | 22.2 | 21.9 | 21.6 | 22.0 | 22.5 | 23.1 | 24.1 | 25.3 | 25.7 | 26.2 | 26.6 | 26.8 |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, women ages 25-34 have had the city's highest birth rate. This has been the case for every year from 1993-2005.
- From 1993 to 2005, the birth rate fell 54.8% for adolescents ages 15-17 years old, 38.3% for women ages 18-19 years, 28.2% for women ages 20-24 years, and 9.6% for women ages 25-34 years. All these decreases were statistically significant.
- From 1993 to 2005, the birth rate for women 35-49 years old increased 15.5%, and this increase was statistically significant.

# BIRTHS

## *Birth Rates*




| | 15-17 | 18-19 | 20-24 | 25-34 | 35-49 |
|---|---|---|---|---|---|
| Asian | 16.9 | 3.5 | 14.0 | 65.6 | 32.0 |
| Black | 21.6 | 82.4 | 92.0 | 84.7 | 21.9 |
| Latino | 29.7 | 63.9 | 91.6 | 89.3 | 24.3 |
| White | 5.1 | 6.3 | 9.7 | 47.4 | 30.3 |
| BOSTON | 20.4 | 28.8 | 37.0 | 63.9 | 26.8 |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

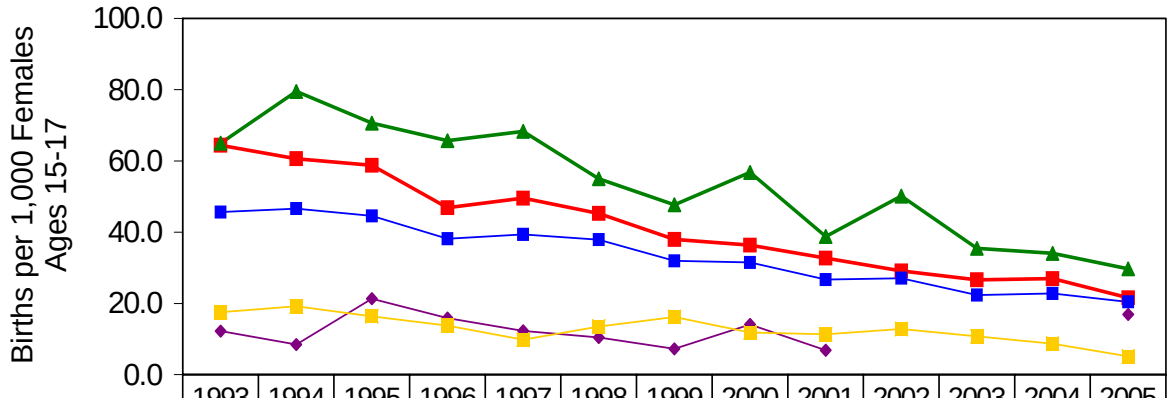
- Birth rate differences by race/ethnicity depend, in part, upon maternal age. In 2005 the birth rate for Blacks was 13 times greater and the birth rate for Latinas 10 times greater than the birth rate for Whites in the 18-19 year old age group.
- Births rates among women 35-49 varied the least by race/ethnicity.

# BIRTHS

## *Birth Rates*

*Boston Natality* no longer includes births to 18 and 19 year-olds in the adolescent category. Beginning with the 2003 edition, data pertaining to their births are presented with those of adult Boston women because childbearing by older teens is often more similar in nature to that of older adults than it is to that of younger adolescents.

### Birth Rates Among Adolescents Ages 15-17 by Race/Ethnicity and Year, Boston, 1993-2005



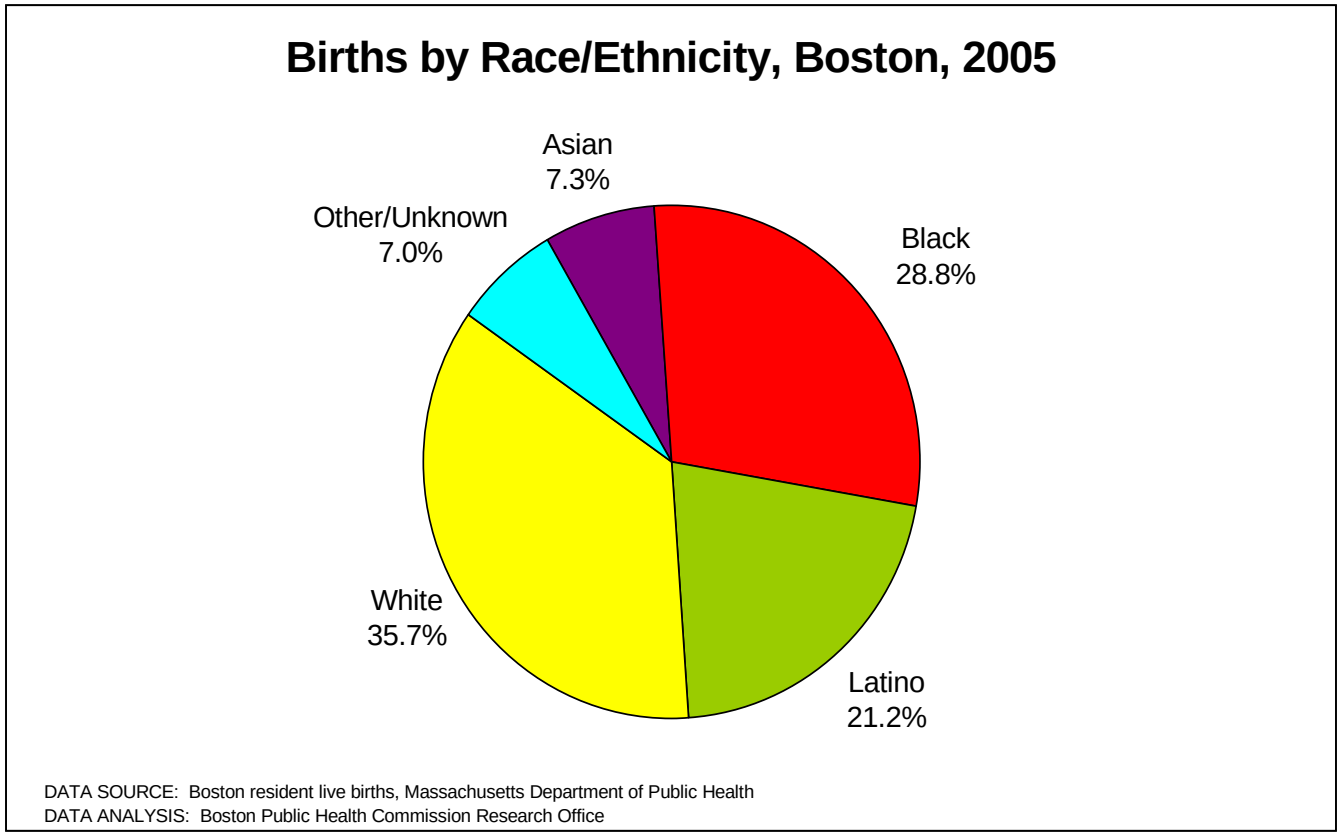

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 12.3 | 8.5 | 21.3 | 15.9 | 12.3 | 10.5 | 7.3 | 14.1 | 6.9 | n<5 | n<5 | n<5 | 16.9 |
| Black | 64.4 | 60.7 | 58.8 | 46.9 | 49.5 | 45.2 | 37.9 | 36.4 | 32.7 | 29.1 | 26.7 | 27.0 | 21.6 |
| Latino | 65.0 | 79.5 | 70.6 | 65.7 | 68.3 | 55.0 | 47.7 | 56.8 | 38.8 | 50.1 | 35.5 | 34.0 | 29.7 |
| White | 17.6 | 19.2 | 16.4 | 13.8 | 9.8 | 13.5 | 16.2 | 11.8 | 11.3 | 12.8 | 10.8 | 8.7 | 5.1 |
| BOSTON | 45.6 | 46.6 | 44.5 | 38.1 | 39.4 | 37.9 | 31.9 | 31.5 | 26.7 | 27.1 | 22.3 | 22.8 | 20.4 |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's birth rate in 2005 for 15-17 year-olds was 20.4 per 1,000 females ages 15-17, slightly less than the national rate of 21.4 for this age group.
- Boston's rate of childbearing by 15-17 year-olds steeply declined over the past decade, falling 55.3% from the 1993 rate of 45.6. This decline was statistically significant.
- Birth rates for 15-17 year-olds continue to be substantially higher for Latinas and Blacks than for Whites, but all groups have had declines in recent years. The birth rates in 2005 for 15-17 year old Blacks and Latinas were significantly higher than the rate for their White counterparts.

# MATERNAL CHARACTERISTICS

## *Race/Ethnicity*

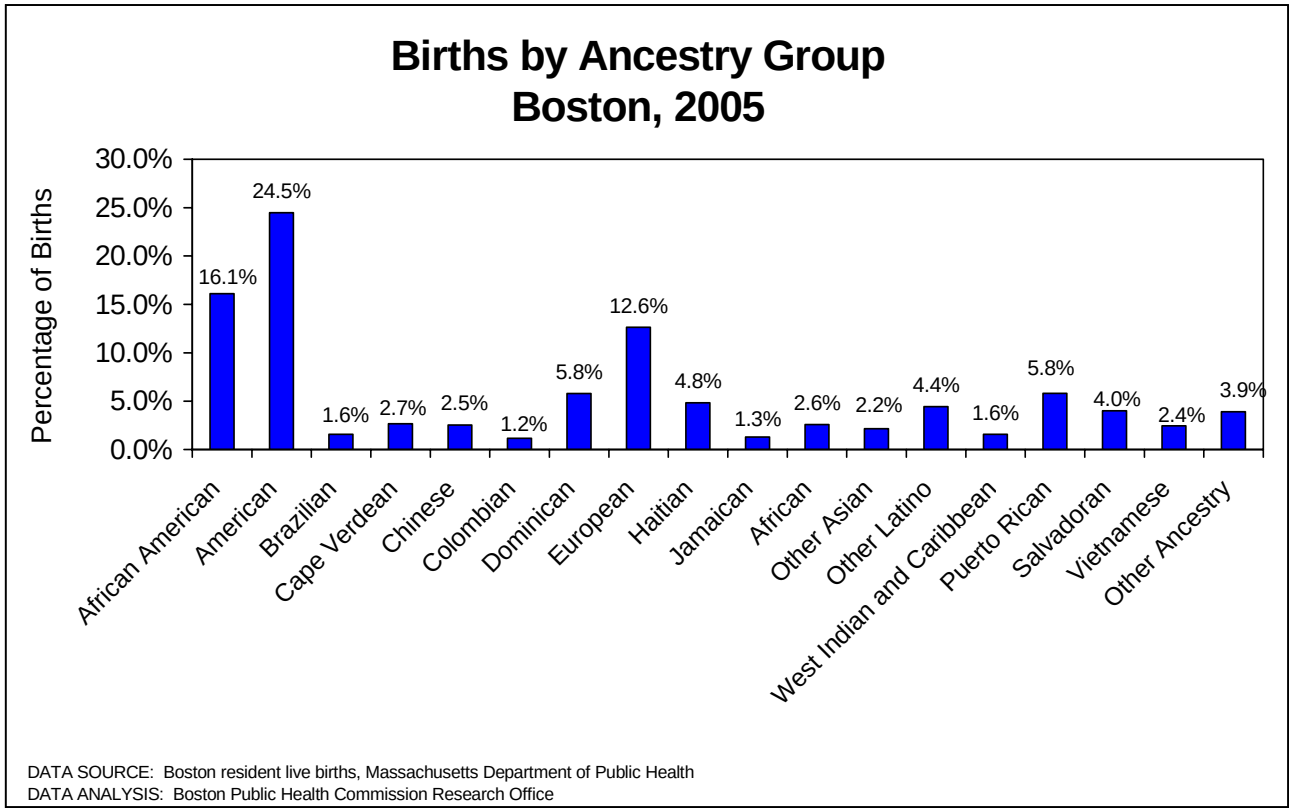



- Boston's population of childbearing women is diverse, and the majority of the city's births in 2005 (57.3%) were to women of color.
- In 2005, there were 554 Boston births to women identifying themselves as Asian, 2,173 to women identifying themselves as Black, 1,602 to Latinas, 2,696 to women identifying themselves as White, and 516 to women identifying themselves as belonging to some other race or for whom information on race/ethnicity was unknown.

# MATERNAL CHARACTERISTICS

## *Ancestry*

In addition to mother's self-reported race, the Massachusetts birth certificate records mother's self-reported ancestry. This section of the report presents information about the regions and countries from which Boston mothers and their ancestors emigrated. The table below provides information about the most common ancestries for births to Boston mothers of all race/ethnicity groups. Subsequent tables provide information on Boston mothers' ancestries by race/ethnicity.



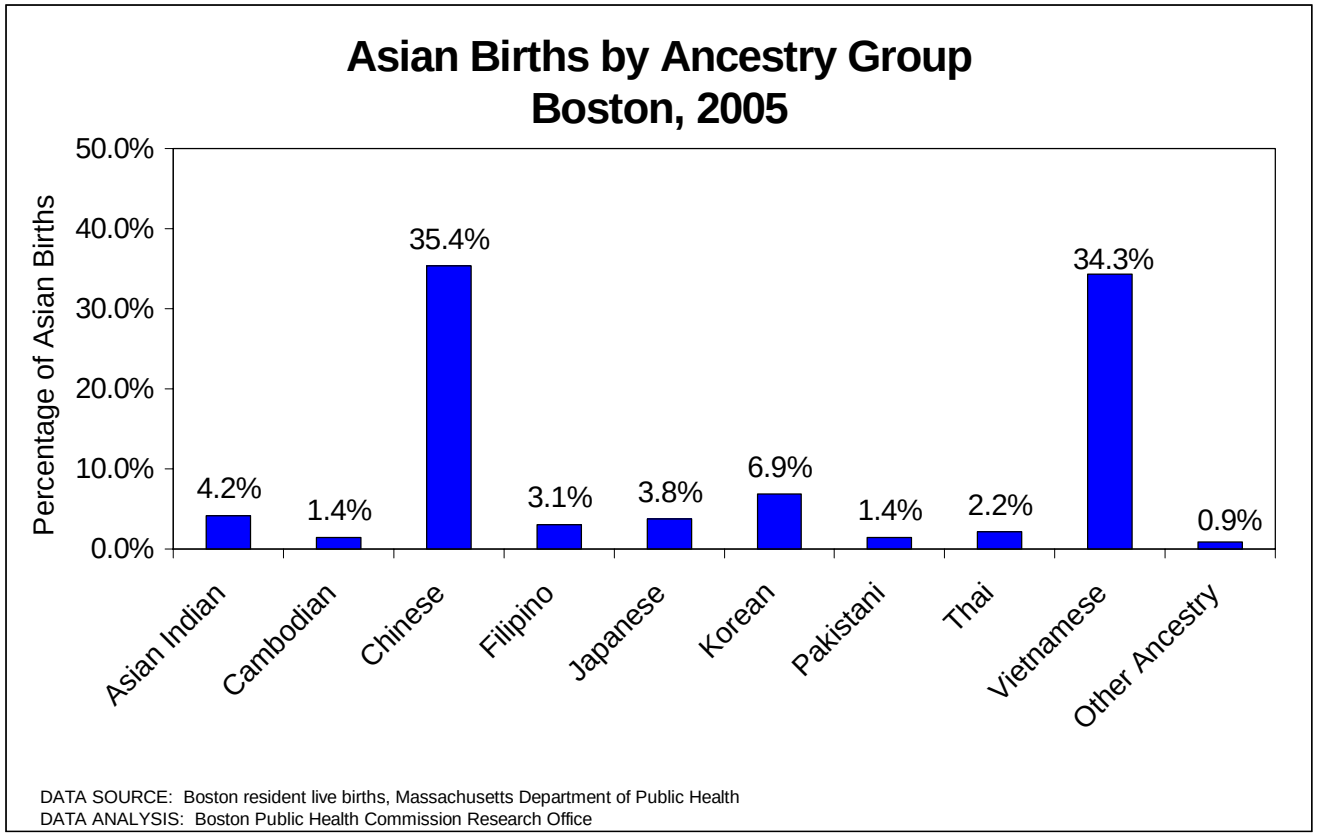

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Among all Boston resident births in 2005, regardless of race/ethnicity, the most frequently reported maternal ancestry was "American" (n=1,848) (24.5%), followed by African-American (n=1,217) (16.1%).

- In addition to the 17 largest ancestry groups shown in the chart at left, 296 births (3.9% of the total) were to women who indicated belonging to other ancestry groups.

# MATERNAL CHARACTERISTICS

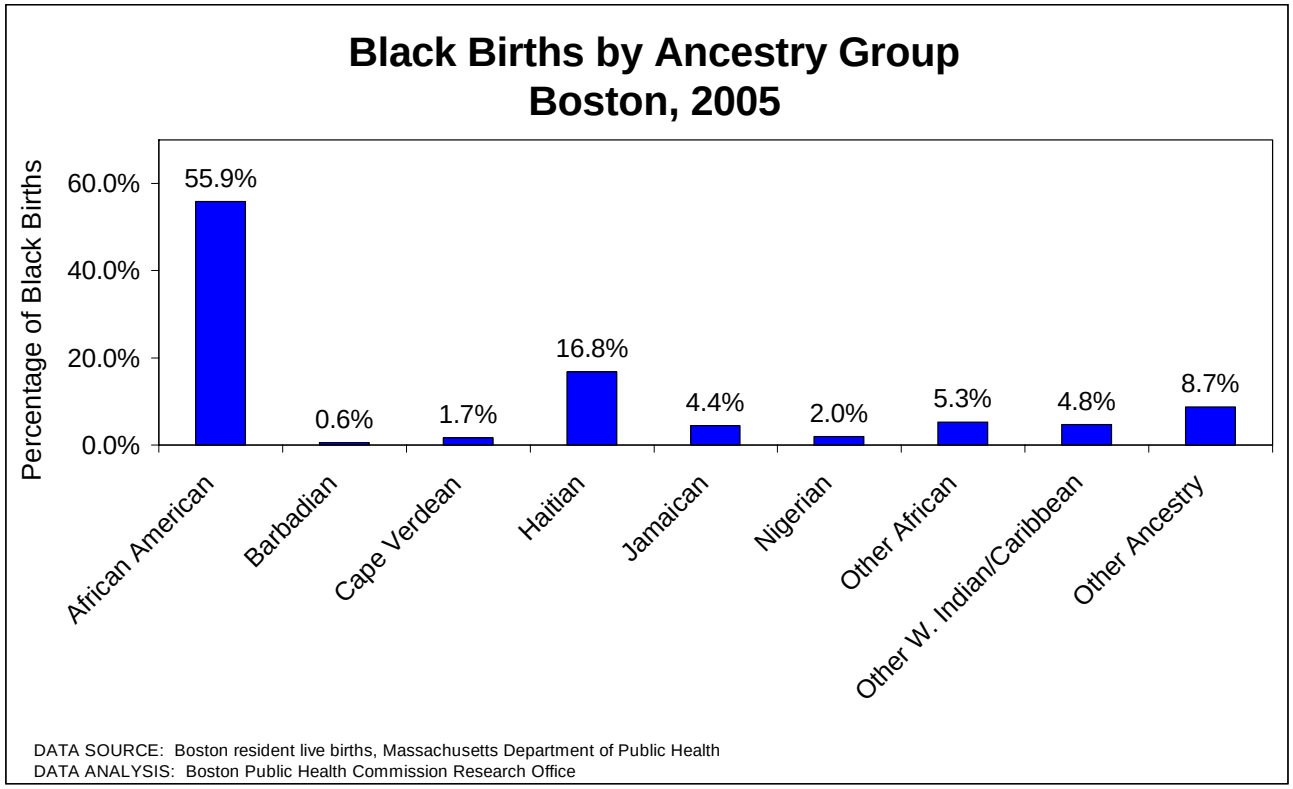
## *Ancestry: Asians*




- Of the 540 Asian births in 2005 for whom information on ancestry was reported, 191 (35.4%) were to women of Chinese ancestry, and 185 (34.3%) were to women of Vietnamese ancestry.

# MATERNAL CHARACTERISTICS

## *Ancestry: Blacks*




- In 2005, among the 2,168 Black births for whom information on ancestry was reported, 1,212 (55.9%) were to women who identified themselves as African-American in origin.
- The next largest group, Haitians, had 364 (16.8%) of Boston's births to Black residents.

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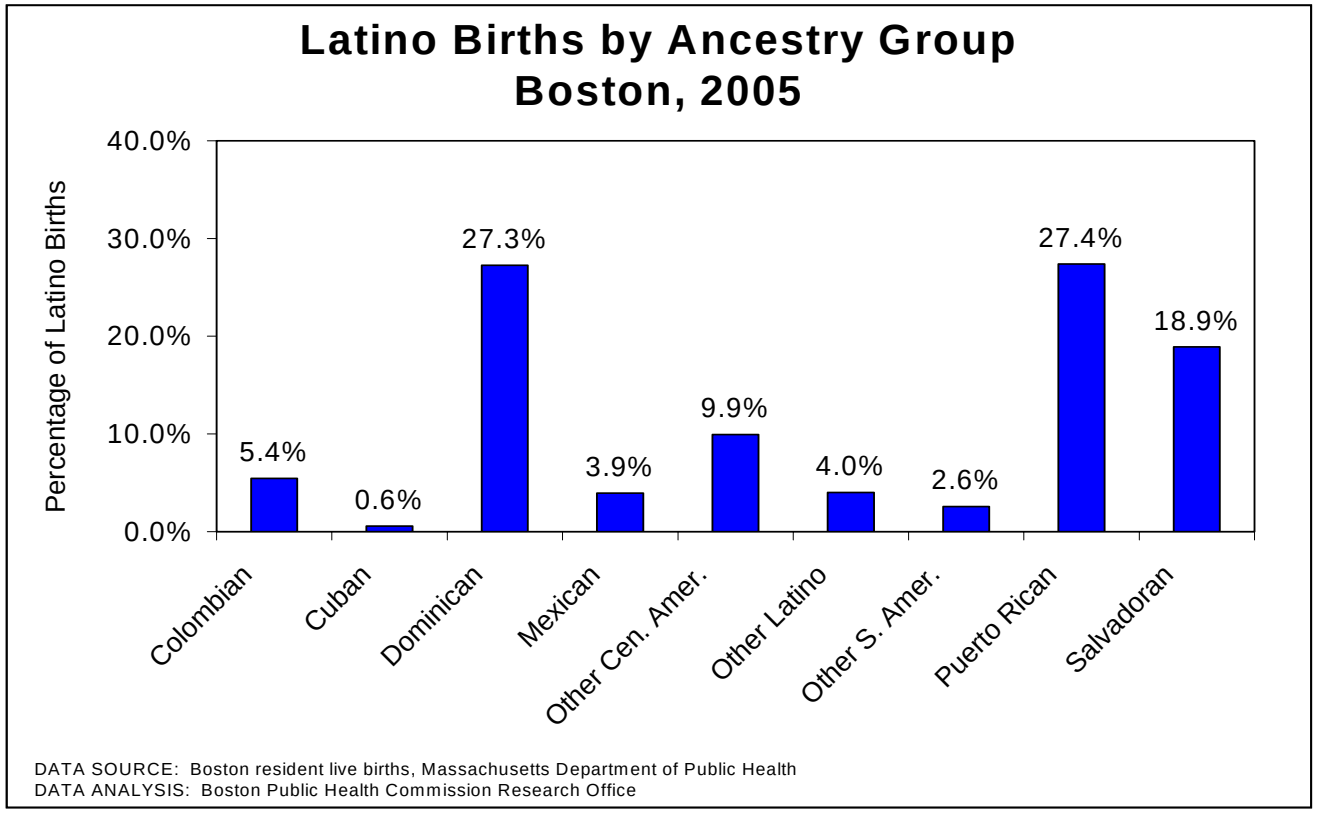
# MATERNAL CHARACTERISTICS

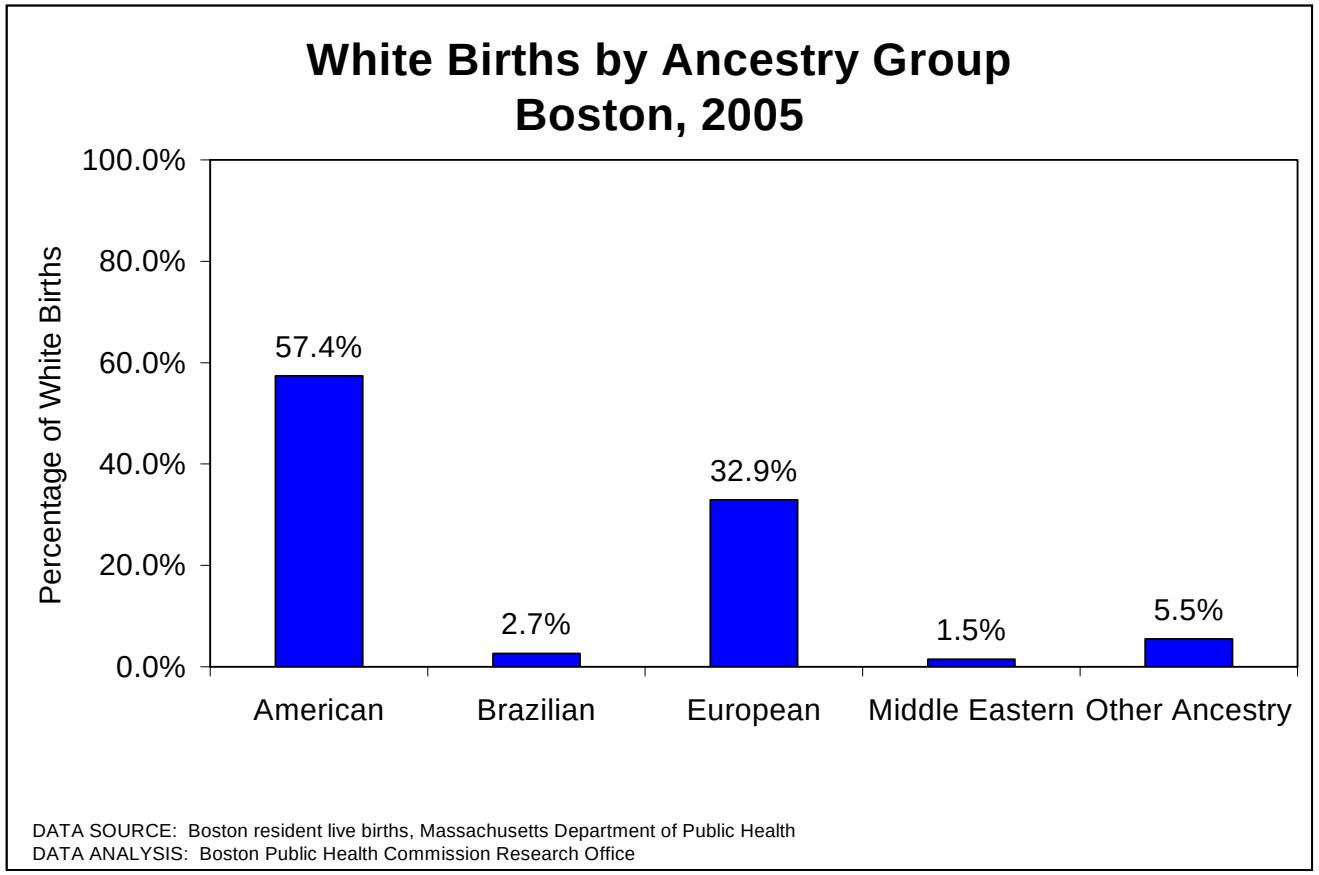
## *Ancestry: Latinas*




- In 2005, there were 1,602 Boston births to Latinas. Of these births, slightly more than one quarter were to women of Puerto Rican ancestry (n=439) and women of Dominican ancestry (n=437).

# MATERNAL CHARACTERISTICS

## *Ancestry: Whites*

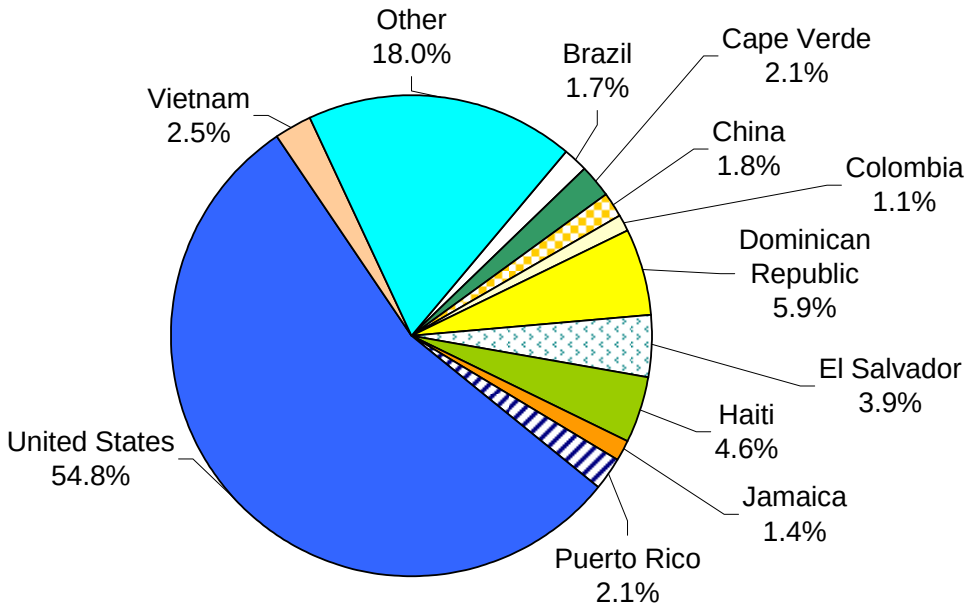



- A majority (n=1,533) (57.4%) of the 2,672 White births in 2005 for whom information on ancestry was reported were to women who reported their ancestry as "American."
- Close to a third of births to White women (n=880) (32.9%) were to women of European ancestry.

# MATERNAL CHARACTERISTICS

## *Birthplace*

**Births by Maternal Birthplace, Boston, 2005**

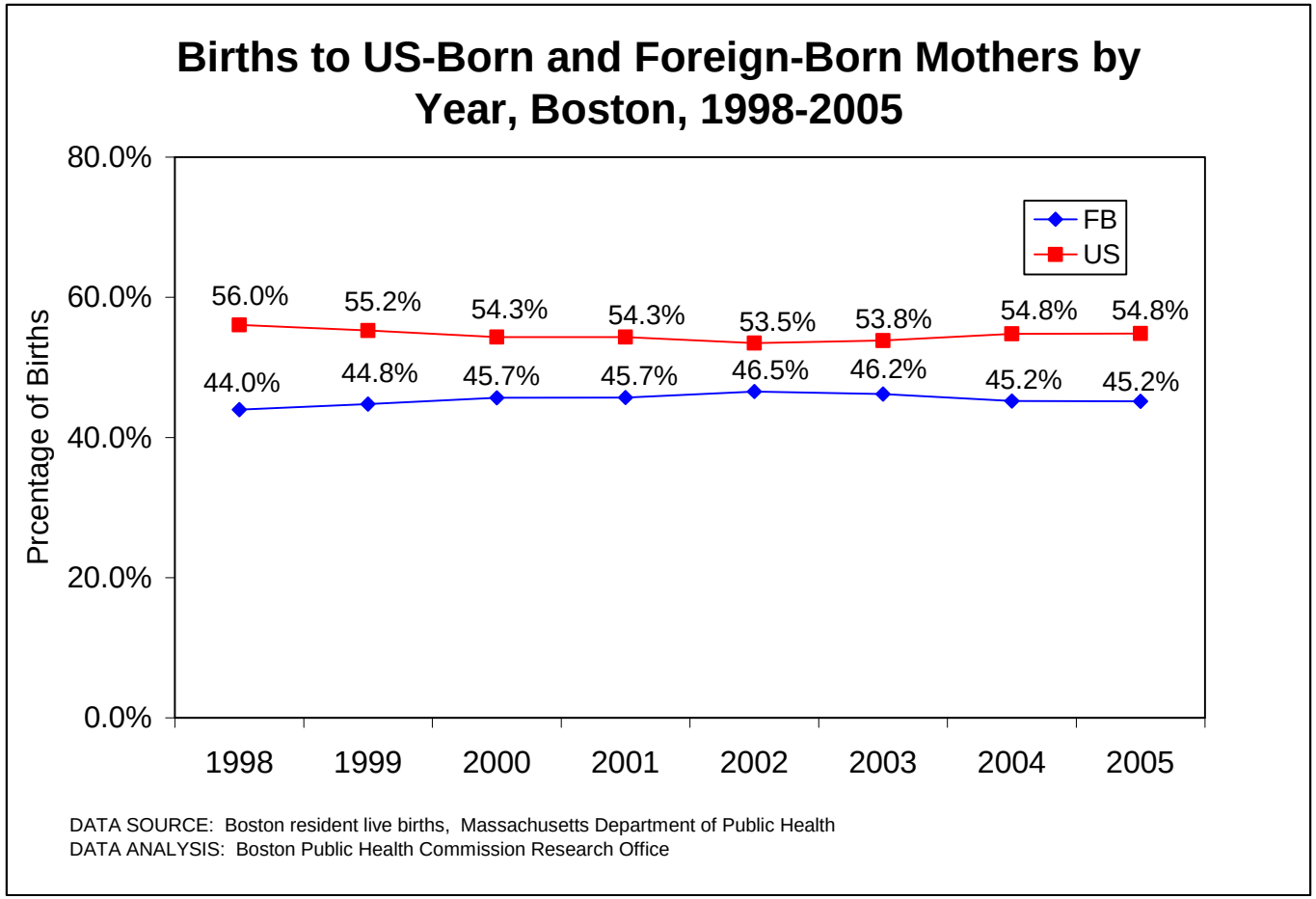



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Of the 7,554 Boston births in 2005 4,140 (54.8%) were to women born in the United States (includes all 50 states and the District of Columbia), and 3,412 (45.1%) were to women born in other countries.
- Women from the Dominican Republic had 443 births (5.9% of Boston births) in 2005. Haiti was the next most frequent birthplace of non-US-born Boston women, with 349 births (4.6% of births).
- In addition to the birthplaces shown in the chart to the left, other countries, each with fewer than 100 Boston births, cumulatively represented 1,356 (18.0%) of the city's births in 2005.

# MATERNAL CHARACTERISTICS

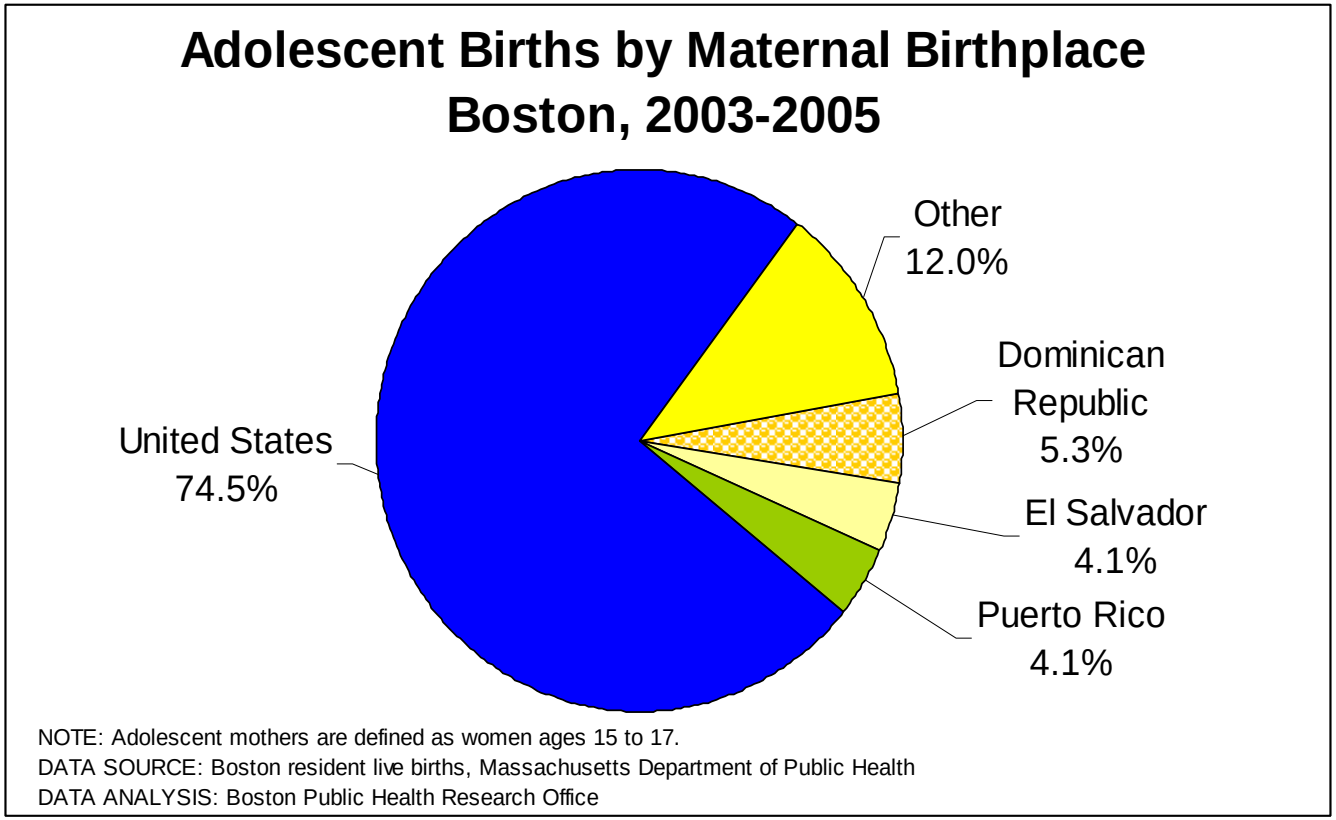
## *Birthplace*




- The percentage of US-born and foreign-born births during 1998-2005 have each remained stable.
- US-born births have continued to account for about 54%-55% of all Boston births each year, except in 1998.

# MATERNAL CHARACTERISTICS

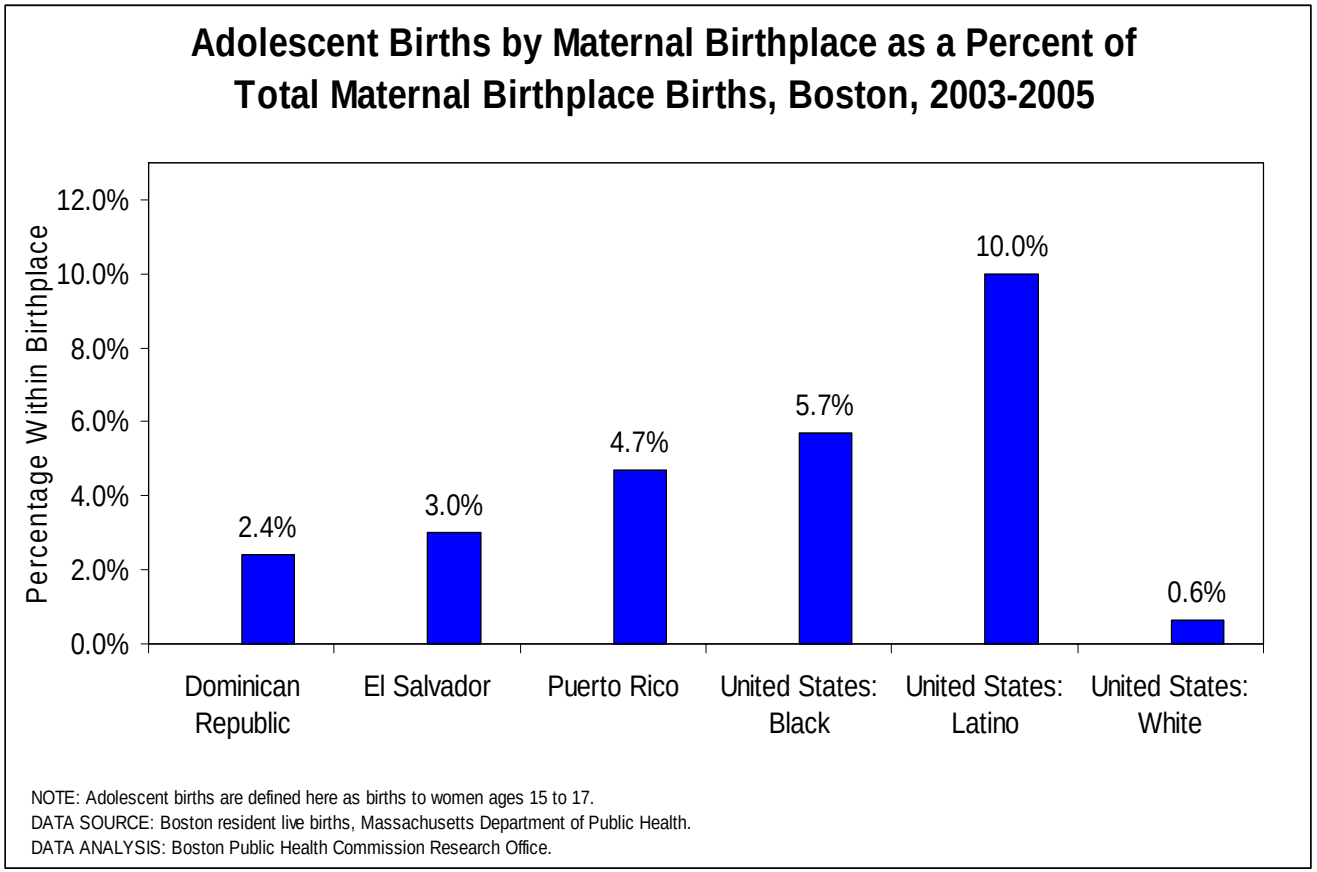
## *Birthplace*




- Between 2003 and 2005, 585 births occurred to Boston adolescents ages 15 to 17. Of these, 436 (74.5%) were to adolescents born in the United States (includes all 50 states and the District of Columbia), and 149 (25.5%) were to adolescents born in other countries.
- Adolescents from the Dominican Republic had 31 births (5.3% of Boston adolescent births for those individual maternal birthplaces that were used for this analysis). Puerto Rico and El Salvador were the next most frequent birthplace of non-US-born Boston adolescent mothers, with 24 births each (4.1% of adolescent births).
- In addition to the birthplaces shown in the chart to the left, other countries together represented the remaining adolescent births during 2003-2005.

# MATERNAL CHARACTERISTICS

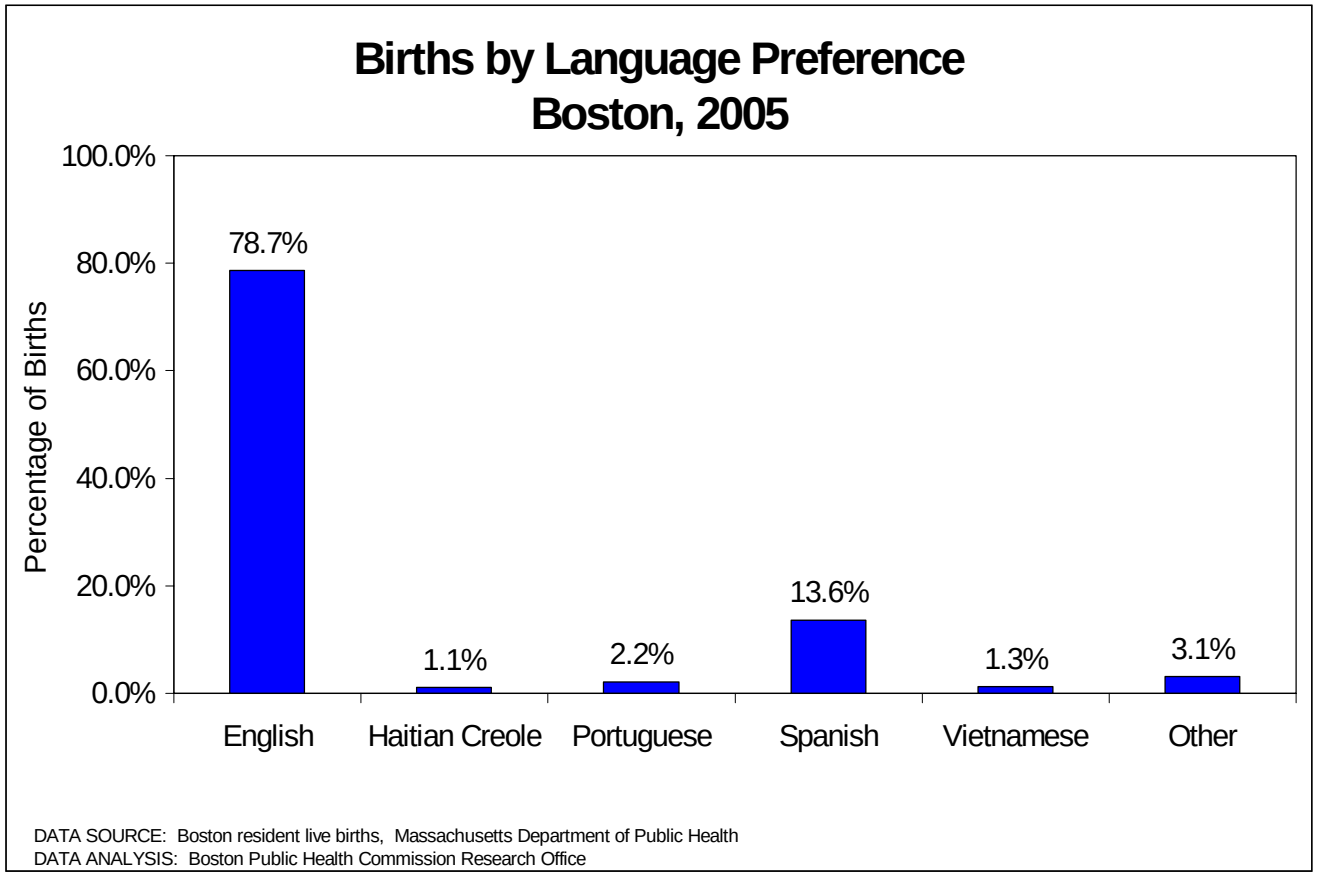
## *Birthplace*




- Between 2003 and 2005, 22,920 total births occurred to Boston women. Births to adolescents ages 15-17 represented 2.8% of the total.
- The percentage of births to adolescents varied considerably by maternal birthplace and race/ethnicity. Adolescent births to Latinas (n=119) born in the United States represented 10.0% of all births to U.S.-born Latinas. In contrast, adolescent births to Latinas born in Puerto Rico (n=24) represented 4.7% of all births to Latino women born in Puerto Rico, and adolescent births to women born in the Dominican Republic (n=31) represented 2.4% of all births to women from the Dominican Republic.
- Births to U.S.-born Black adolescents (n=224) represented 5.7% of all births to U.S.-born Blacks. Adolescent births to U.S.-born Whites (n=43) represented 0.6% of all births to U.S.-born Whites.

# MATERNAL CHARACTERISTICS

## *Language Preference*




- English was the mother's preferred language noted on 78.7% of all Boston birth certificates with preferred language specified (n=5937 births) in 2005.
- Spanish was the mother's preferred language indicated on 13.6% of all birth certificates with preferred language specified (n=1,027 births).
- Portuguese, the language of preference indicated for 164 births, Vietnamese (n=96 births), and Haitian Creole (n=86 births) were the next most common language preferences.
- Languages included in the "Other" category were American Sign, Arabic, Cambodian, Cantonese, Mandarin, Russian, and others. Each of these was indicated on fewer than 50 birth certificates.

# MATERNAL CHARACTERISTICS

## *Language Preference*

| Births by Maternal Language Preference by Neighborhood, 2005 | | | | | | |
|---|---|---|---|---|---|---|
| | English | Haitian Creole | Portuguese | Spanish | Vietnamese | Other |
| Allston/Brighton | 72.6% | -- | 8.6% | 11.6% | -- | 6.5% |
| Back Bay | 97.3% | 0.0% | 0.0% | 2.4% | -- | 0.3% |
| Charlestown | 87.1% | -- | 0.0% | 8.1% | 0.0% | 4.0% |
| East Boston | 35.4% | 0.0% | 4.9% | 54.6% | -- | 4.7% |
| Fenway | 79.7% | 0.0% | -- | 13.0% | 0.0% | 6.5% |
| Hyde Park | 83.6% | 4.4% | -- | 7.3% | -- | 1.5% |
| Jamaica Plain | 80.6% | 0.0% | -- | 17.4% | 0.0% | 1.5% |
| Mattapan | 87.6% | 4.8% | 0.0% | 7.7% | 0.0% | 0.0% |
| North Dorchester | 78.4% | 0.8% | 4.2% | 9.7% | 4.4% | 2.5% |
| North End | 96.7% | 0.0% | 0.0% | -- | 0.0% | 0.0% |
| Roslindale | 82.4% | 1.0% | 1.9% | 12.8% | -- | 1.7% |
| Roxbury | 81.5% | 0.8% | -- | 13.9% | 0.0% | 3.3% |
| South Boston | 85.3% | 0.0% | -- | 9.4% | -- | 2.2% |
| South Dorchester | 87.2% | 3.1% | 0.8% | 4.7% | 4.1% | 0.2% |
| South End | 81.4% | -- | -- | 6.3% | 0.0% | 11.3% |
| West Roxbury | 91.6% | 2.5% | -- | 3.6% | 0.0% | 1.7% |

"--" <5 of neighborhood's birth certificates reported this language.

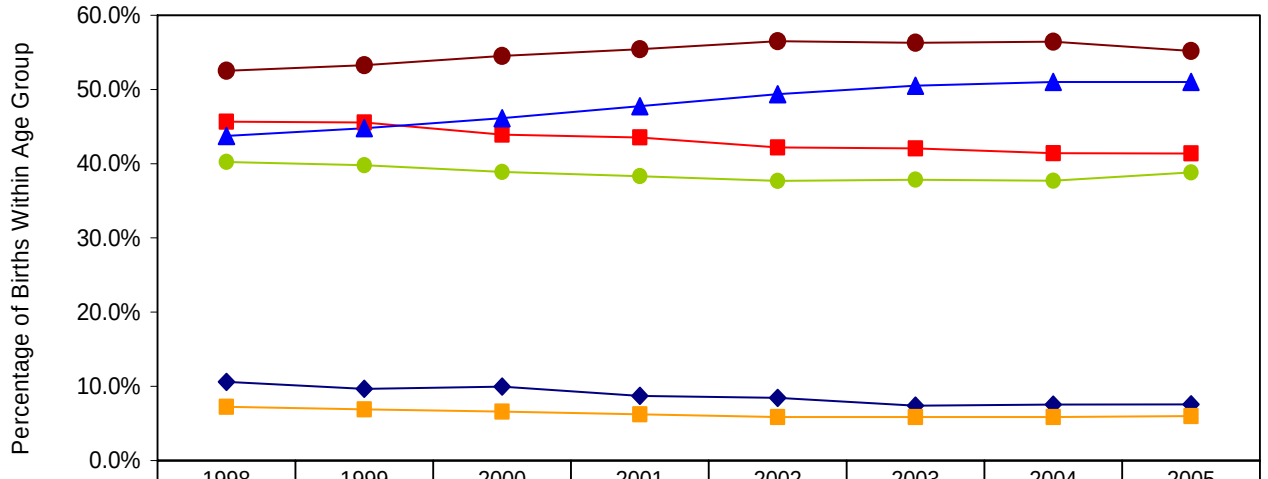
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, English was the most common language preference on Boston birth certificates in all neighborhoods except East Boston, where Spanish was preferred. The percentage of birth certificates on which English was indicated as the preferred language ranged from a low of 35.4% in East Boston to a high of 97.3% in the Back Bay.
- The percentage of birth records with Spanish as the mother's preferred language also ranged widely, from 2.4% in Back Bay to 54.6% in East Boston.
- The Portuguese language in Allston/Brighton, Haitian Creole in Mattapan and Hyde Park, and Vietnamese in North and South Dorechester reflect other substantial language groups among Boston women giving birth in 2005.

# MATERNAL CHARACTERISTICS

## *Age*

### Births by Age and Year, Boston and Massachusetts 1998-2005



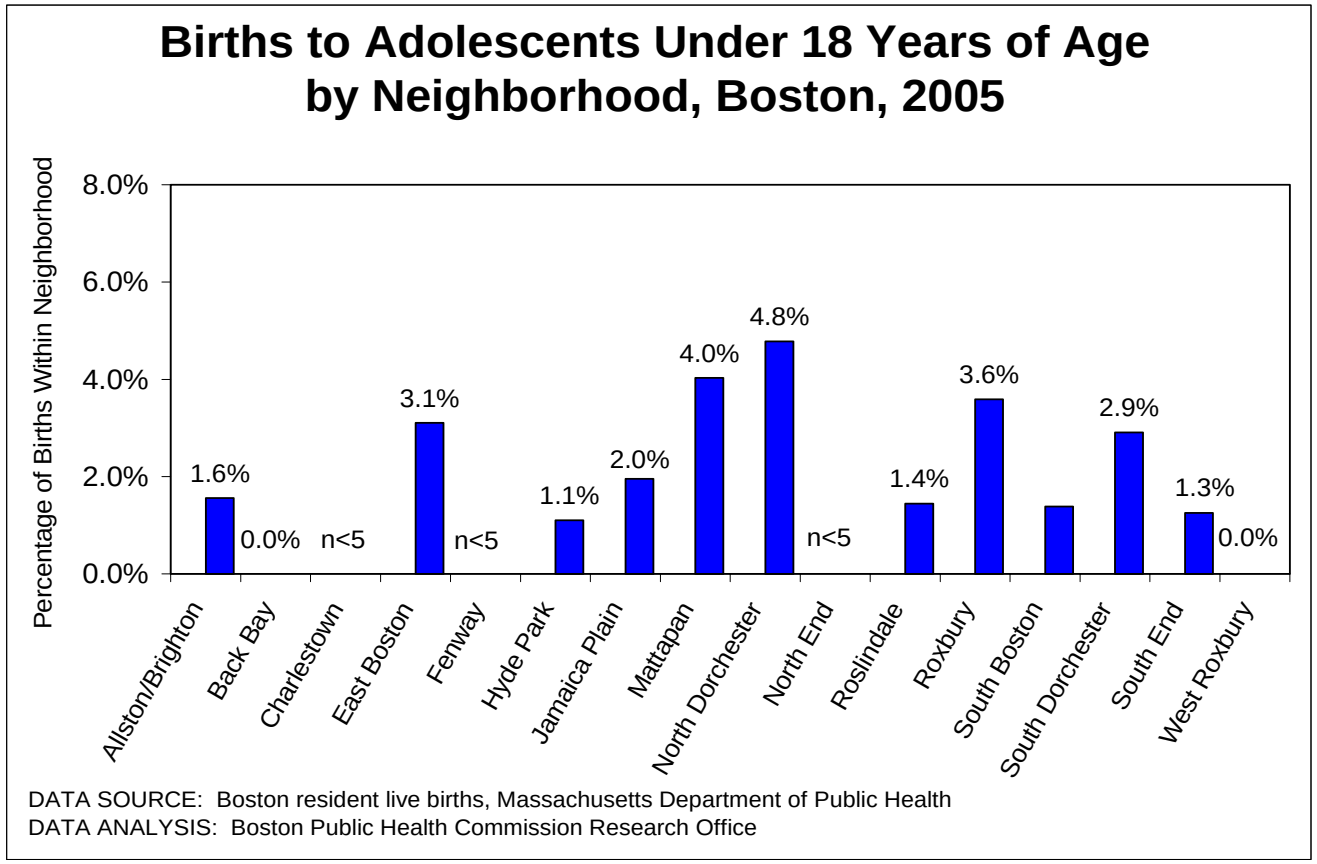

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| Boston <20 | 10.6% | 9.7% | 10.0% | 8.7% | 8.4% | 7.4% | 7.6% | 7.6% |
| Boston 20-29 | 45.7% | 45.5% | 43.9% | 43.5% | 42.2% | 42.1% | 41.4% | 41.4% |
| Boston 30+ | 43.7% | 44.8% | 46.1% | 47.7% | 49.4% | 50.5% | 51.0% | 51.0% |
| MA <20 | 7.3% | 6.9% | 6.6% | 6.2% | 5.8% | 5.9% | 5.9% | 6.0% |
| MA 20-29 | 40.2% | 39.8% | 38.9% | 38.3% | 37.7% | 37.8% | 37.7% | 38.8% |
| MA 30+ | 52.5% | 53.3% | 54.5% | 55.4% | 56.5% | 56.3% | 56.4% | 55.2% |

DATA SOURCE: Boston resident live births and Massachusetts resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston had higher percentages of births to women under age 30 while Massachusetts had higher percentages of births to women ages 30 and older.
- Between 1998 and 2005, the percentage of births to women under the age of 20 declined for both Boston and Massachusetts by 28.3% and 17.8%, respectively. Both of these declines were statistically significant. The percentage of Boston births to women ages 30 and older increased about 17%, a statistically significant increase.

# MATERNAL CHARACTERISTICS

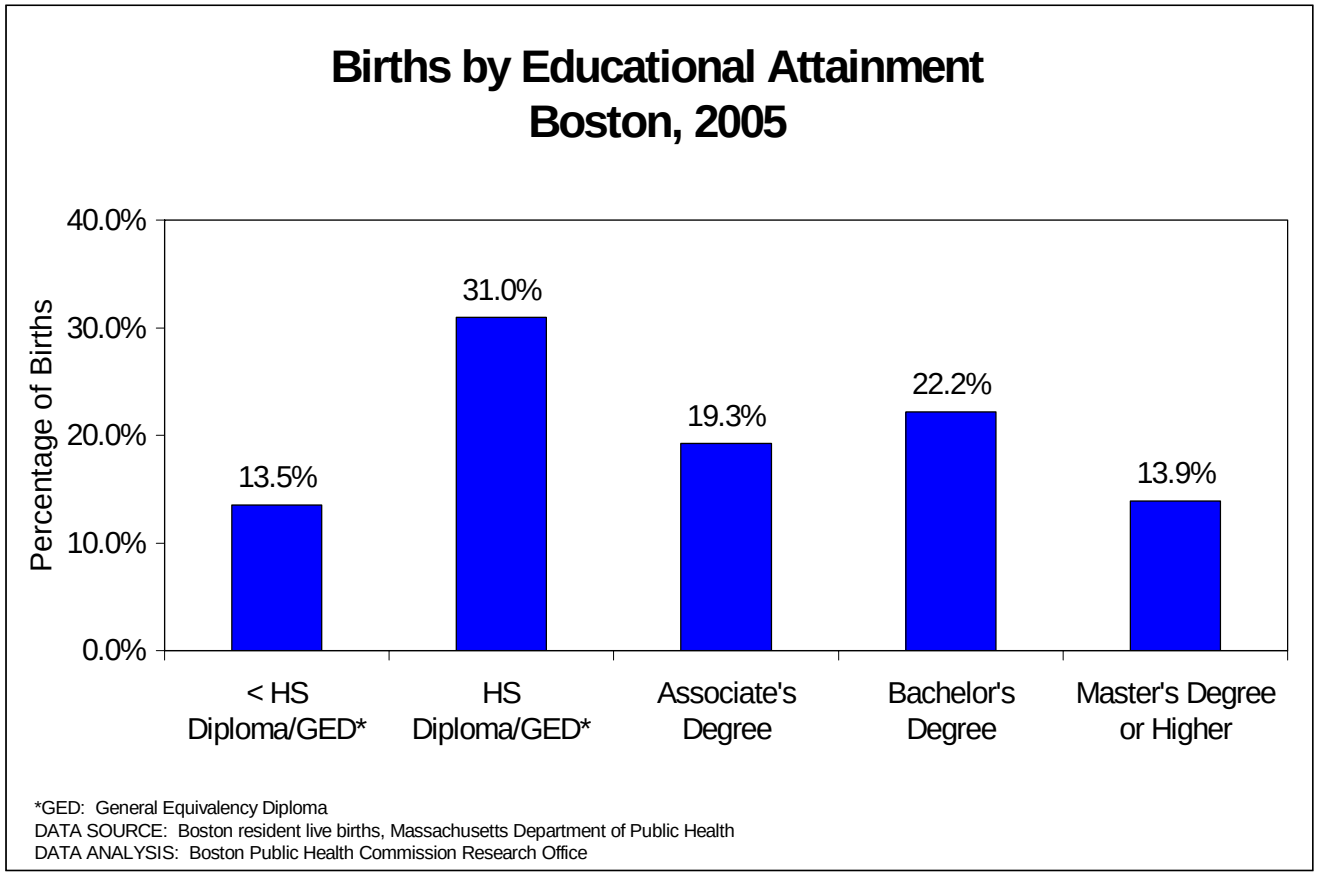
## *Age*




- In 2005, 183 Boston births (2.4% of all births) were to adolescents under the age of 18. These included 7 births to adolescents under age 15.
- Among all Boston neighborhoods, North Dorchester, Mattapan, and Roxbury had the highest percentages of births to adolescents.

# MATERNAL CHARACTERISTICS

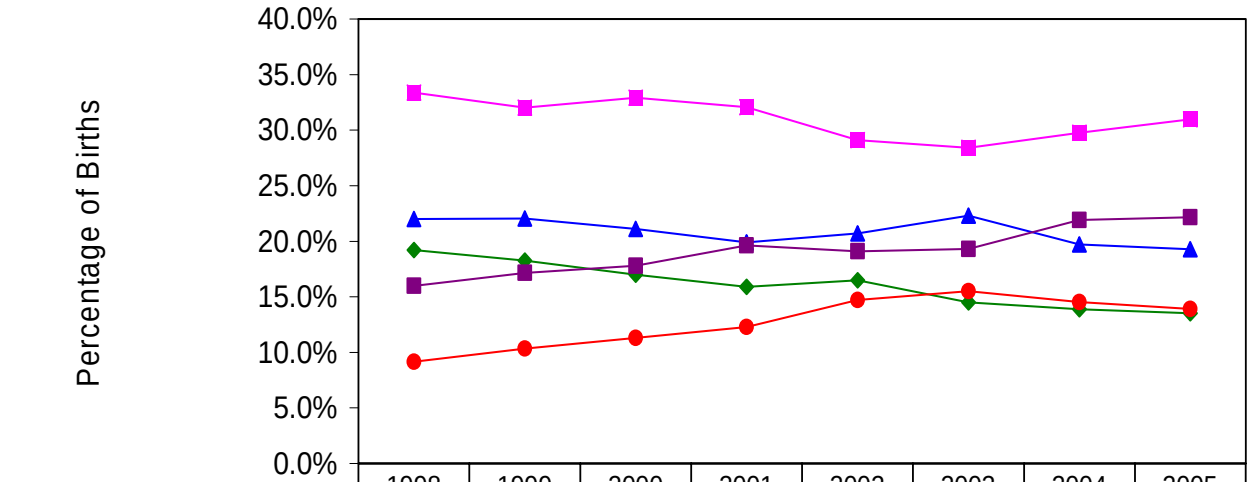
## *Educational Attainment*




- About one in seven Boston births in 2005 (n=1,021) (13.5%) were to women without a high school diploma or equivalent.
- More than half (n=4,181) (55.4%) of births were to women who had attained an associate's or higher degree.

# MATERNAL CHARACTERISTICS

## *Educational Attainment*




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| < HS Diploma/GED* | 19.2% | 18.3% | 17.0% | 15.9% | 16.5% | 14.5% | 13.9% | 13.5% |
| HS Diploma/GED* | 33.4% | 32.0% | 32.9% | 32.1% | 29.1% | 28.4% | 29.8% | 31.0% |
| Associate's Degree | 22.0% | 22.0% | 21.1% | 19.9% | 20.7% | 22.3% | 19.7% | 19.3% |
| Bachelor's Degree | 16.0% | 17.2% | 17.8% | 19.6% | 19.1% | 19.3% | 21.9% | 22.2% |
| Master's Degree or Higher | 9.2% | 10.3% | 11.3% | 12.3% | 14.7% | 15.5% | 14.5% | 13.9% |

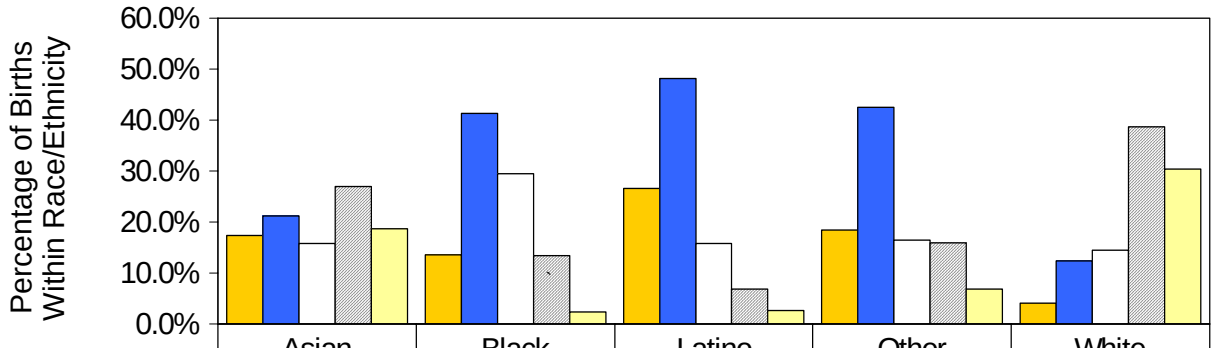
*GED: General Equivalency Diploma
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston births to women without a high school diploma or equivalent declined about 30% between 1998 and 2005, and this decline was statistically significant
- Births to women with a Bachelor's Degree or higher increased significantly between 1998 and 2005 (39%). However, the increase was greatest for those with a Master's Degree or higher, 51%, and also statistically significant.

# MATERNAL CHARACTERISTICS

## *Educational Attainment*

**Births by Educational Attainment and Race/Ethnicity**
**Boston, 2005**




| | Asian | Black | Latino | Other | White |
|---|---|---|---|---|---|
| < HS Diploma/GED* | 17.4% | 13.5% | 26.5% | 18.4% | 4.1% |
| HS Diploma/GED* | 21.2% | 41.3% | 48.2% | 42.4% | 12.4% |
| Associate's Degree | 15.8% | 29.5% | 15.7% | 16.5% | 14.5% |
| Bachelor's Degree | 27.0% | 13.4% | 6.9% | 15.9% | 38.6% |
| Master's Degree+ | 18.7% | 2.4% | 2.7% | 6.8% | 30.3% |

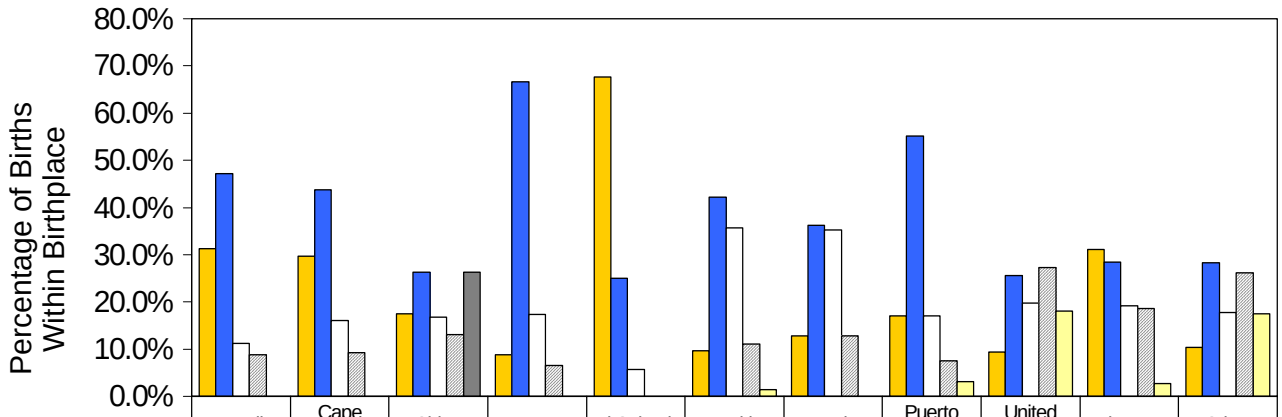
*GED: General Equivalency Diploma
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The level of education of Boston women who give birth differs by race/ethnicity, with Latinas and Black women generally having lower levels of educational attainment than Asian and White women.
- In 2005, 61.5% (n=339) of Asian births and 83.4% (n=2,251) of White births were to women with associate degrees or higher. In contrast, 45.3% (n=953) of Black births and 25.3% (n=405) of Latino births were to women with associate degrees or higher.
- One in twenty-five (4.1%) (n=110) White births were to women with less than a high school education, a significantly lower percentage than among births to women in the other race/ethnicity groups [(26.5%) (n=425) for Latinas, (17.4%) (n=96) for Asians, and (13.5%) (n=293) for Blacks)].

# MATERNAL CHARACTERISTICS

## *Educational Attainment*

**Births by Education and Maternal Birthplace**
**Boston, 2005**



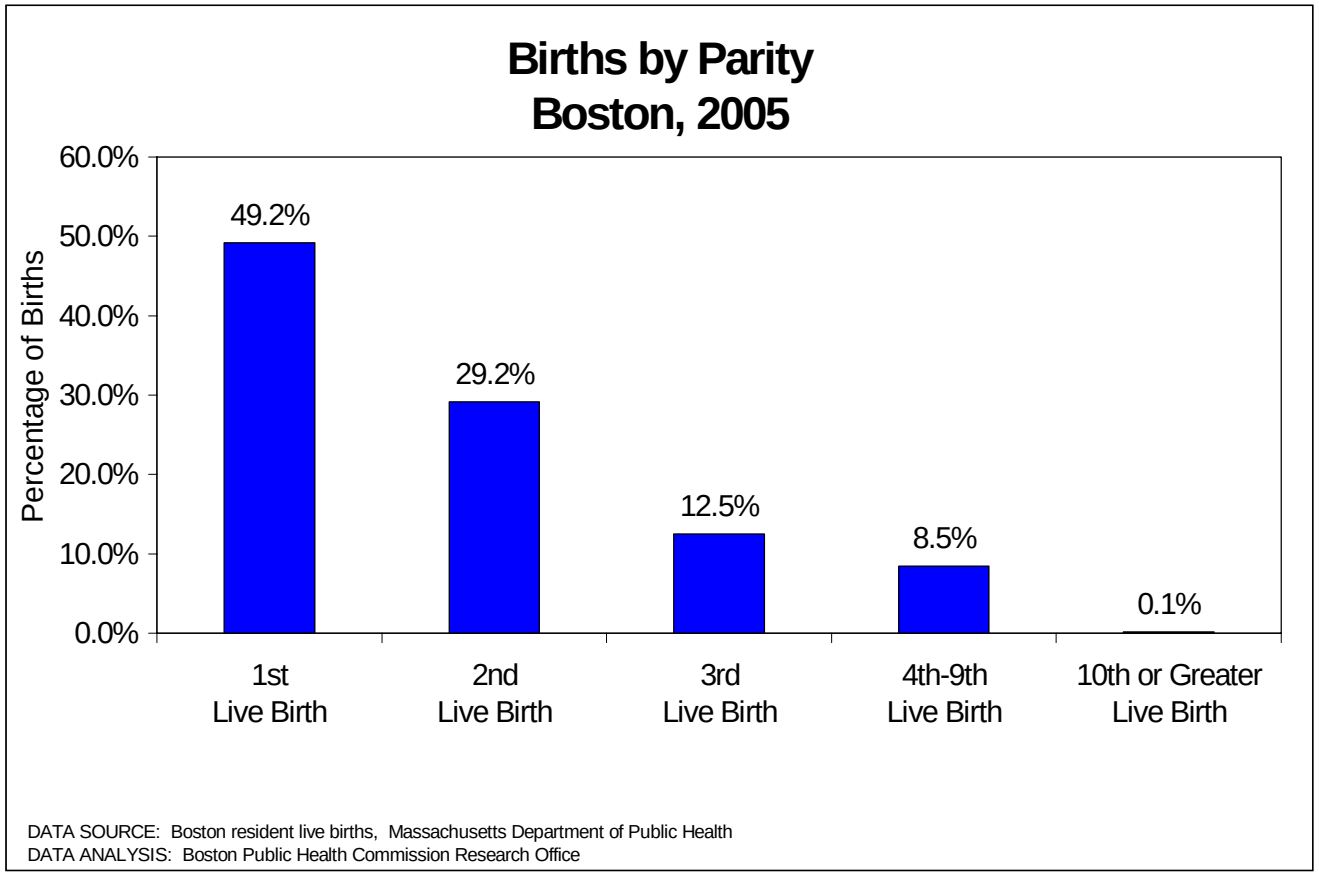

| | Brazil | Cape Verdean | China | Dom. Rep. | El Salvad. | Haiti | Jamaica | Puerto Rico | United States | Vietnam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| < HS Diploma/GED* | 31.2% | 29.6% | 17.5% | 8.8% | 67.6% | 9.6% | 12.7% | 17.1% | 9.4% | 31.1% | 10.3% |
| HS Diploma/GED* | 47.2% | 43.8% | 26.3% | 66.6% | 25.0% | 42.2% | 36.3% | 55.1% | 25.5% | 28.4% | 28.2% |
| Associate's Degree | 11.2% | 16.0% | 16.8% | 17.4% | 5.7% | 35.7% | 35.3% | 17.1% | 19.8% | 19.1% | 17.8% |
| Bachelor's Degree | 8.8% | 9.3% | 13.1% | 6.5% | n<5 | 11.0% | 12.7% | 7.6% | 27.3% | 18.6% | 26.2% |
| Master's Degree+ | n<5 | n<5 | 26.3% | n<5 | n<5 | 1.4% | n<5 | 3.2% | 18.0% | 2.7% | 17.4% |

*GED: General Equivalency Diploma
NOTE: Maternal birthplaces with at least 100 births are presented.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, the highest percentage of births to women without a high school education was among women from El Salvador (n=200), (67.6.%). Low educational attainment was also common among women from Vietnam (n=57), (31.1%), Brazil (n=39), (31.2%), and Cape Verde (n=48) (29.6%).

# MATERNAL CHARACTERISTICS

## *Parity*

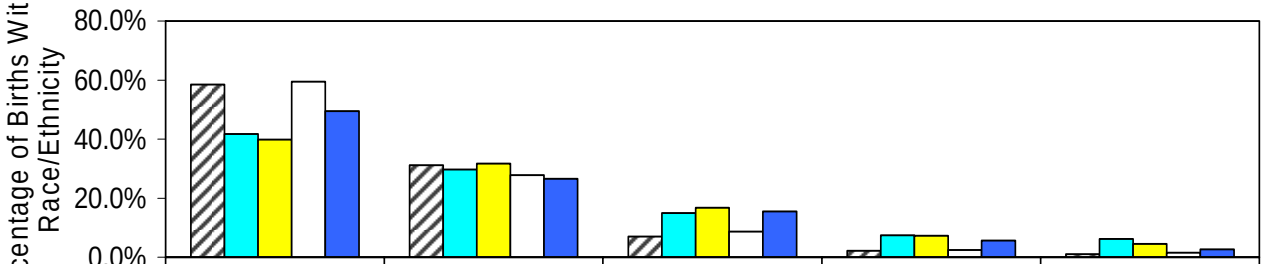



- In 2005, first births accounted for close to half (n=3,716) (49.2%) of all Boston births.
- More than nine in ten Boston births in 2005 (n=6,864) (90.9%) were to women having their first, second, or third baby.

# MATERNAL CHARACTERISTICS

## *Parity*

**Births by Parity and Race/Ethnicity**
**Boston, 2005**




| | 1st Live Birth | 2nd Live Birth | 3rd Live Birth | 4th-9th Live Birth | 10th or Greater Live Birth |
|---|---|---|---|---|---|
| Asian | 58.5% | 31.2% | 7.1% | 2.2% | 1.1% |
| Black | 41.8% | 29.7% | 14.9% | 7.4% | 6.2% |
| Latino | 39.8% | 31.7% | 16.7% | 7.2% | 4.5% |
| White | 59.5% | 27.8% | 8.7% | 2.5% | 1.5% |
| Other | 49.5% | 26.6% | 15.5% | 5.6% | 2.7% |

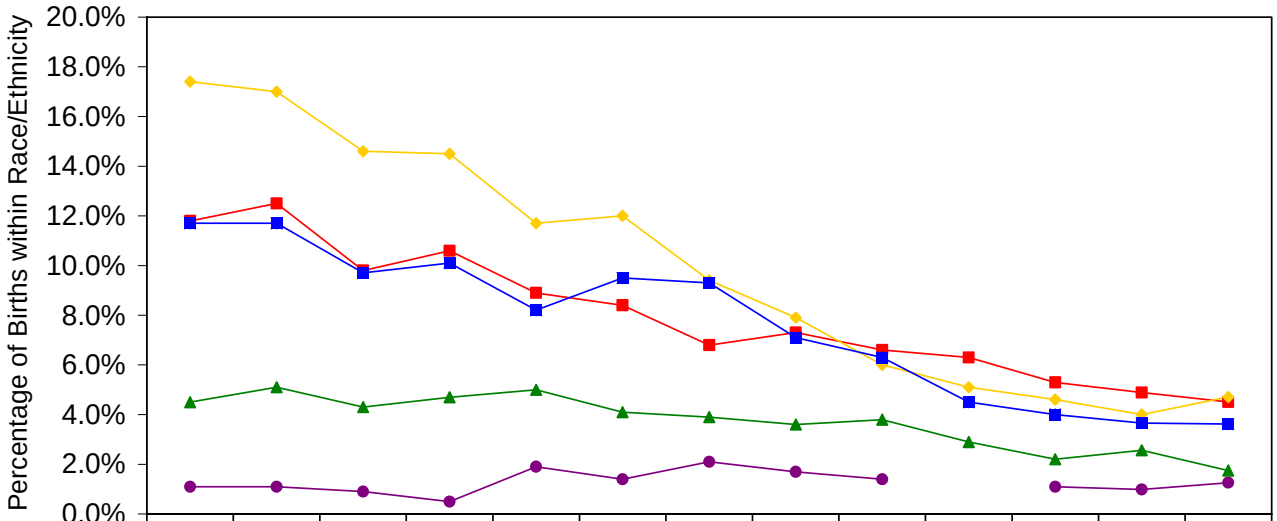
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- More than half of Asian and White births in 2005 were to women who were primiparous, that is, having their first baby.
- Generally equal proportions of births in each race/ethnicity group were to women having their second child.
- Higher percentages of Black and Latino births were third-born or greater, compared with Asian and White births.

# MATERNAL CHARACTERISTICS

## *Smoking*

### Smoking During Pregnancy by Race/Ethnicity and Year, Boston, 1993-2005



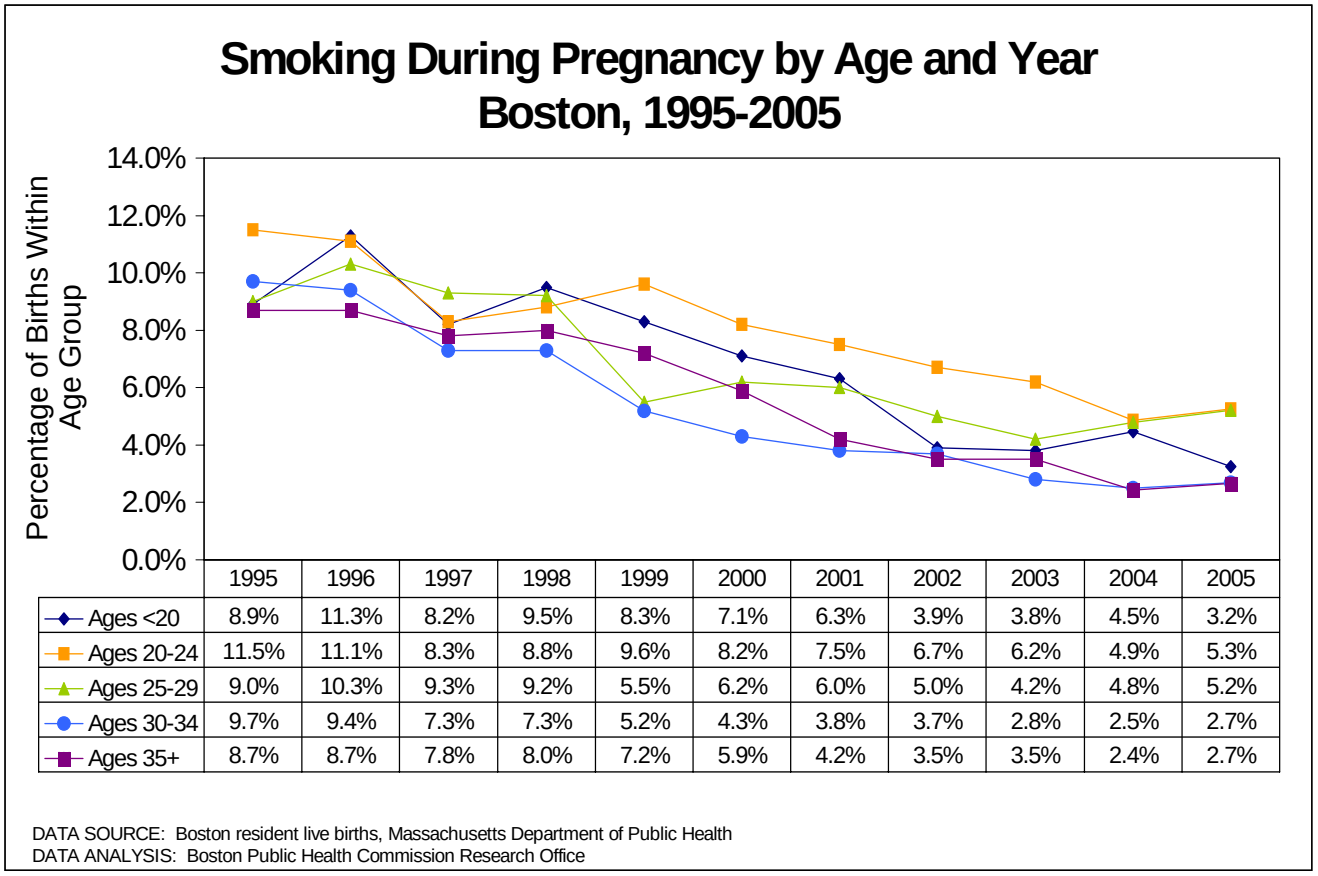

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 1.1% | 1.1% | 0.9% | 0.5% | 1.9% | 1.4% | 2.1% | 1.7% | 1.4% | n<5 | 1.1% | 1.0% | 1.3% |
| Black | 11.8% | 12.5% | 9.8% | 10.6% | 8.9% | 8.4% | 6.8% | 7.3% | 6.6% | 6.3% | 5.3% | 4.9% | 4.5% |
| Latino | 4.5% | 5.1% | 4.3% | 4.7% | 5.0% | 4.1% | 3.9% | 3.6% | 3.8% | 2.9% | 2.2% | 2.6% | 1.8% |
| White | 17.4% | 17.0% | 14.6% | 14.5% | 11.7% | 12.0% | 9.4% | 7.9% | 6.0% | 5.1% | 4.6% | 4.0% | 4.7% |
| BOSTON | 11.7% | 11.7% | 9.7% | 10.1% | 8.2% | 9.5% | 9.3% | 7.1% | 6.3% | 4.5% | 4.0% | 3.7% | 3.6% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The percentage of self-reported maternal smoking during pregnancy declined 69.2% between 1993 and 2005 to about 4.0% of all births (n=273). The decrease was a statistically significant change.
- The biggest decline between 1993 and 2005 was among Whites, whose reported prenatal smoking prevalence fell 73.0% (n=127 in 2005). There was a 61.9% decrease among Blacks (n=98 in 2005) and a 60.0% decline among Latinas (n=28 in 2005).
- From 2001 to 2004, the prevalence of reported smoking among Blacks surpassed that among Whites, reversing a 9-year trend. In 2005, the prevalence of reported smoking among Whites was slightly higher than that of Blacks.

# MATERNAL CHARACTERISTICS

## *Smoking*



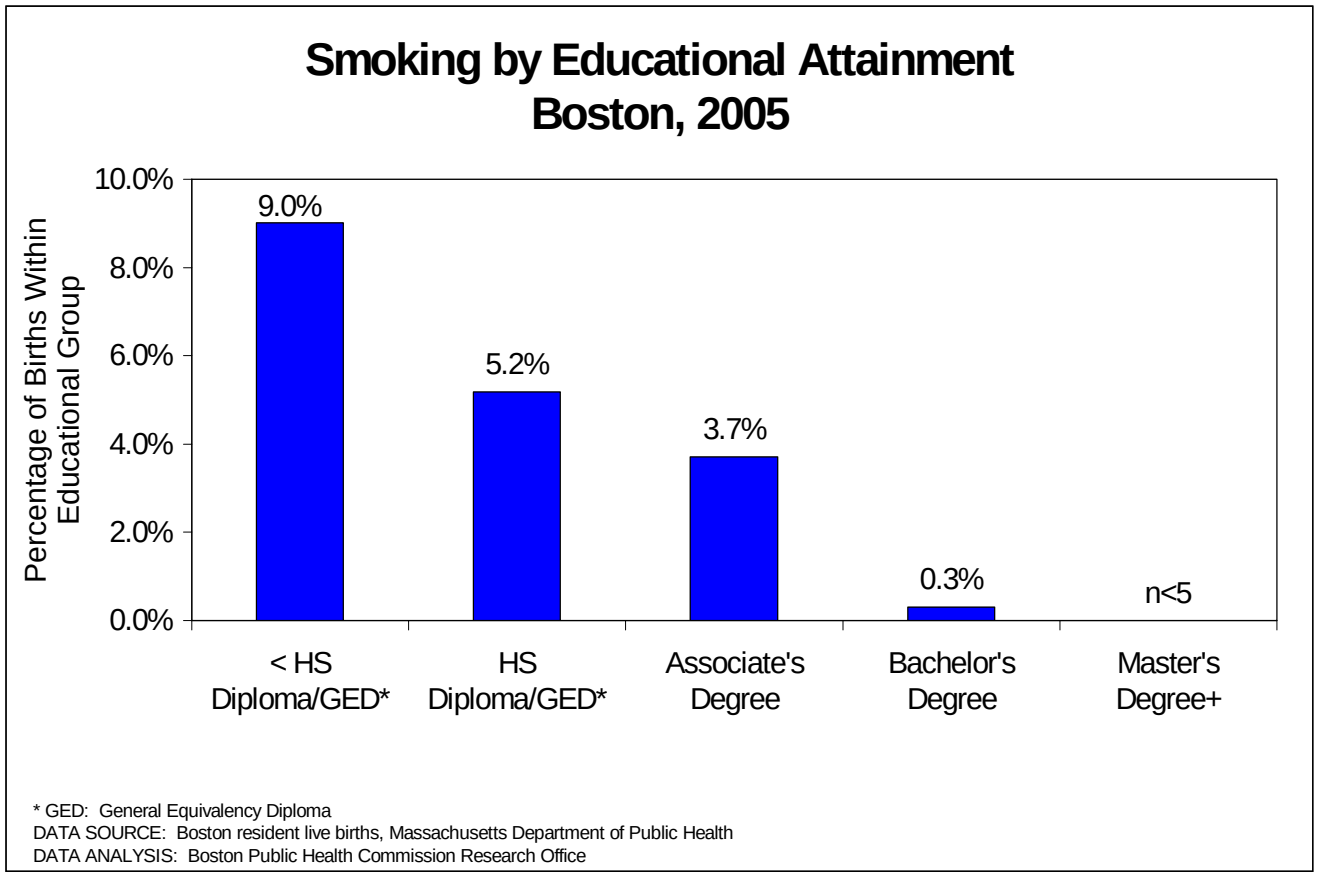

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages <20 | 8.9% | 11.3% | 8.2% | 9.5% | 8.3% | 7.1% | 6.3% | 3.9% | 3.8% | 4.5% | 3.2% |
| Ages 20-24 | 11.5% | 11.1% | 8.3% | 8.8% | 9.6% | 8.2% | 7.5% | 6.7% | 6.2% | 4.9% | 5.3% |
| Ages 25-29 | 9.0% | 10.3% | 9.3% | 9.2% | 5.5% | 6.2% | 6.0% | 5.0% | 4.2% | 4.8% | 5.2% |
| Ages 30-34 | 9.7% | 9.4% | 7.3% | 7.3% | 5.2% | 4.3% | 3.8% | 3.7% | 2.8% | 2.5% | 2.7% |
| Ages 35+ | 8.7% | 8.7% | 7.8% | 8.0% | 7.2% | 5.9% | 4.2% | 3.5% | 3.5% | 2.4% | 2.7% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Births to women in their twenties had the highest level of prenatal smoking (n=155) of all births to Boston women in 2005.
- The lowest level of prenatal smoking was among women ages 30 and over (n=100).
- Between 1993 and 2005, the percentage of births that were to women who reported smoking during pregnancy declined for all age groups. These changes in smoking status were statistically significant for all age groups.

# MATERNAL CHARACTERISTICS

## *Smoking*

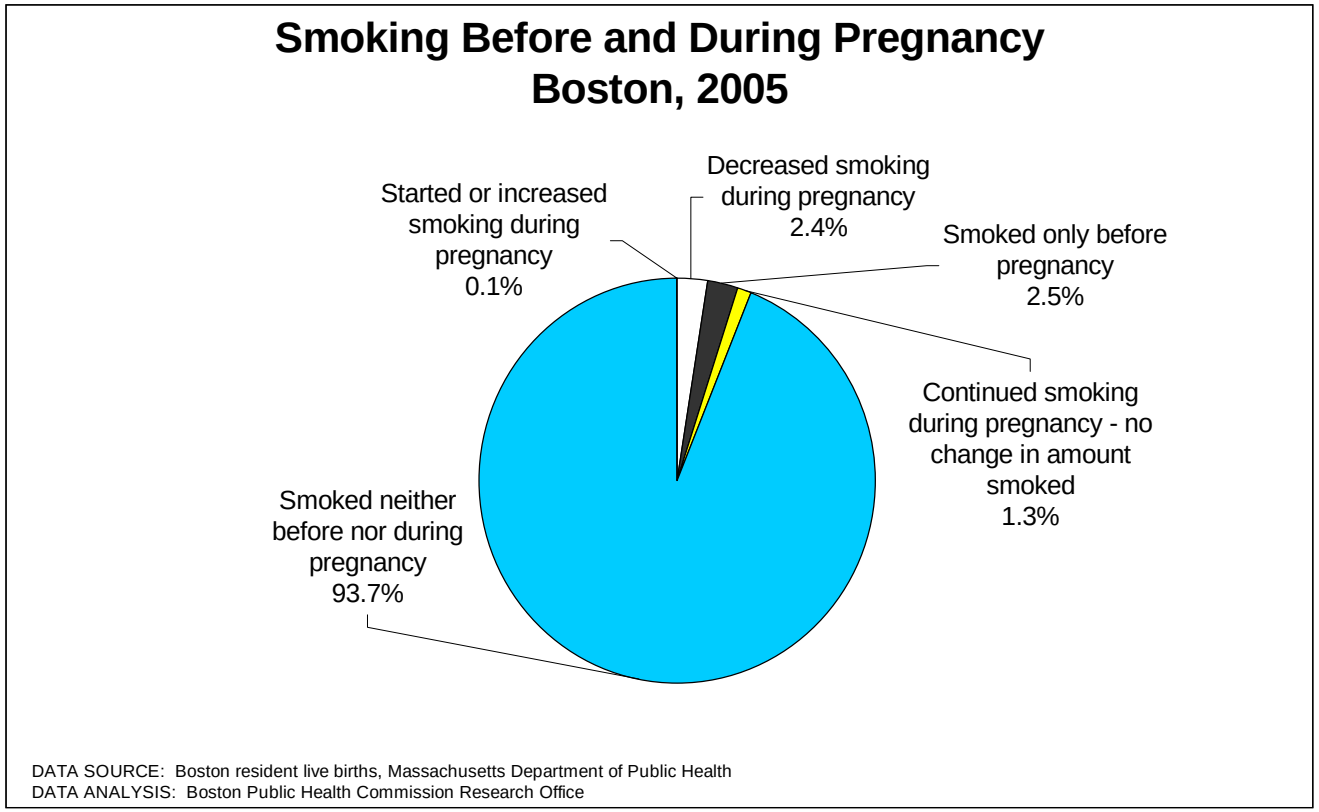



* GED: General Equivalency Diploma
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Women with at least a Bachelor's degree were significantly less likely to have smoked during pregnancy than were women with less education.
- The negative relationship between maternal education and reported smoking during pregnancy is statistically significant at lower levels of education as well, so that as maternal education decreases, reported smoking during pregnancy increases.

# MATERNAL CHARACTERISTICS

## *Smoking*

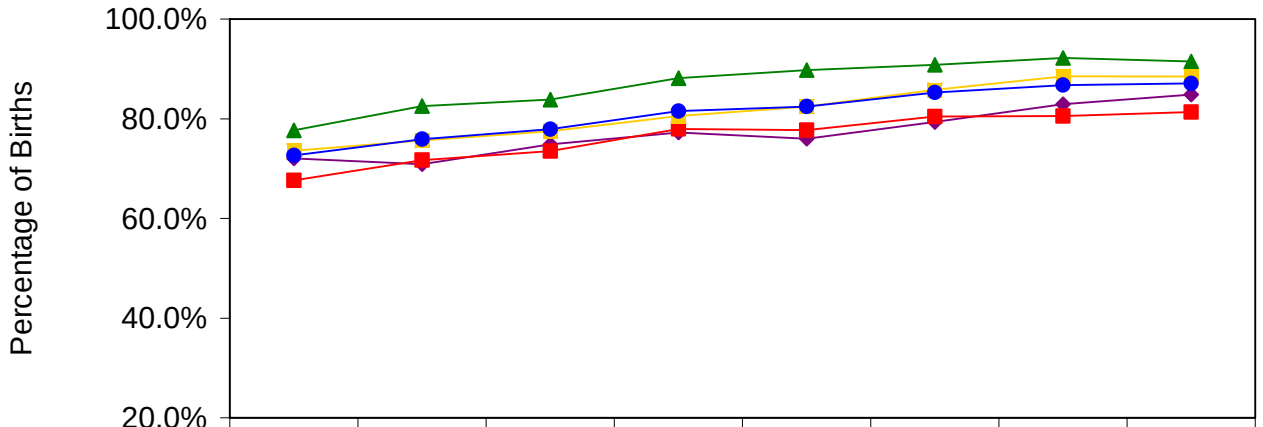



- The vast majority of Boston resident births (n=7,080) (93.7%) were to women who said they had smoked neither before nor during pregnancy.
- 2.5% (n=187) of births were to women who stated that they had smoked only before pregnancy.
- 2.4% (n=183) of births were to women who reported cutting back during pregnancy on the number of cigarettes they smoked.
- The remaining percentages of births were to women who either smoked the same amount they had before pregnancy (n=95) (1.3%), or began or increased smoking during pregnancy (n=9) (0.1%).

# MATERNAL CHARACTERISTICS

## *Breastfeeding*

**Breastfeeding At Time of Hospital Discharge by Race/Ethnicity, Boston, 1998-2005**



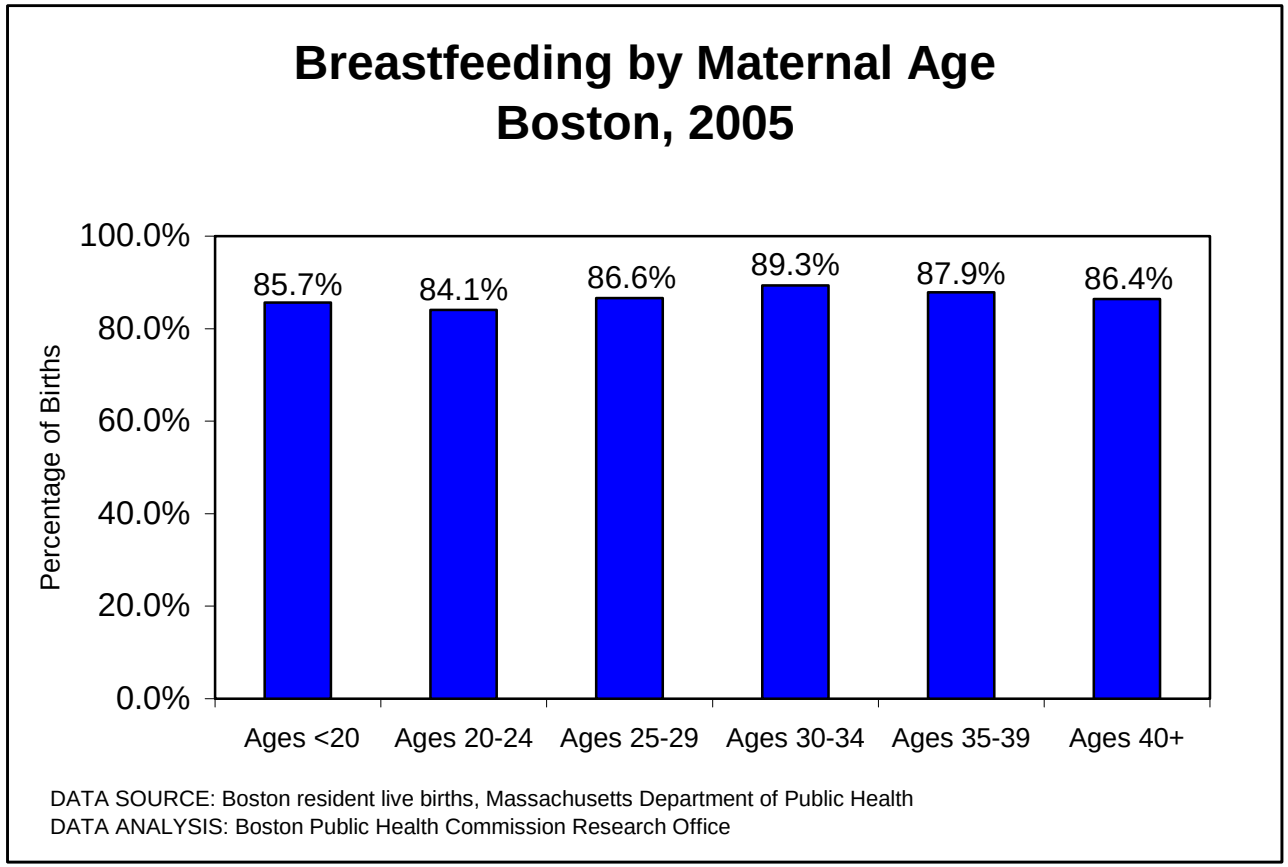

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| Asian | 72.0% | 70.9% | 74.9% | 77.2% | 76.0% | 79.3% | 82.9% | 84.8% |
| Black | 67.6% | 71.7% | 73.5% | 77.9% | 77.7% | 80.5% | 80.5% | 81.4% |
| Latino | 77.7% | 82.6% | 83.8% | 88.1% | 89.7% | 90.8% | 92.2% | 91.5% |
| White | 73.6% | 75.6% | 77.5% | 80.5% | 82.5% | 85.8% | 88.5% | 88.5% |
| BOSTON | 72.7% | 75.9% | 77.9% | 81.5% | 82.4% | 85.3% | 86.7% | 87.1% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The majority of infants (87.1%) (n=6,560) born in 2005 were breastfed at the time of their discharge from the hospital.
- Breastfeeding was most common among infants born to Latinas, and least common among infants born to Black mothers.
- Breastfeeding at time of hospital discharge has increased for all races/ethnicities.

# MATERNAL CHARACTERISTICS

## *Breastfeeding*

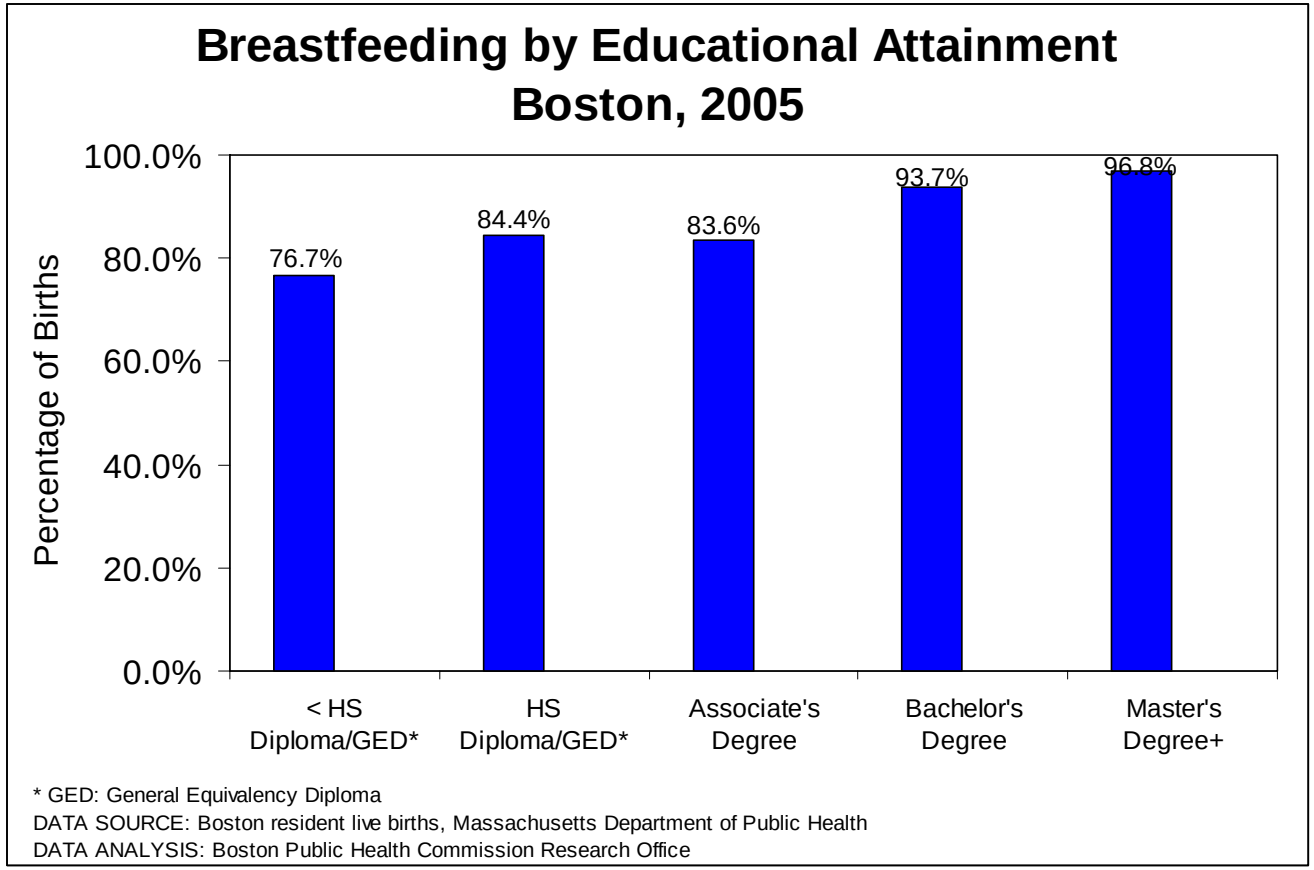



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Infants born to women ages 30-34 were more commonly breastfed at the time of hospital discharge than were infants born to mothers of other ages.
- Breastfeeding at the time of hospital discharge was least common among infants born to mothers ages 20-24.

# MATERNAL CHARACTERISTICS

## *Breastfeeding*




- Breastfeeding was most common among infants born to mothers with a Master's degree or more education.
- The lowest level of breastfeeding was among infants born to mothers with less than a high school diploma.

# MATERNAL CHARACTERISTICS

## *Payment Source for Prenatal Care*

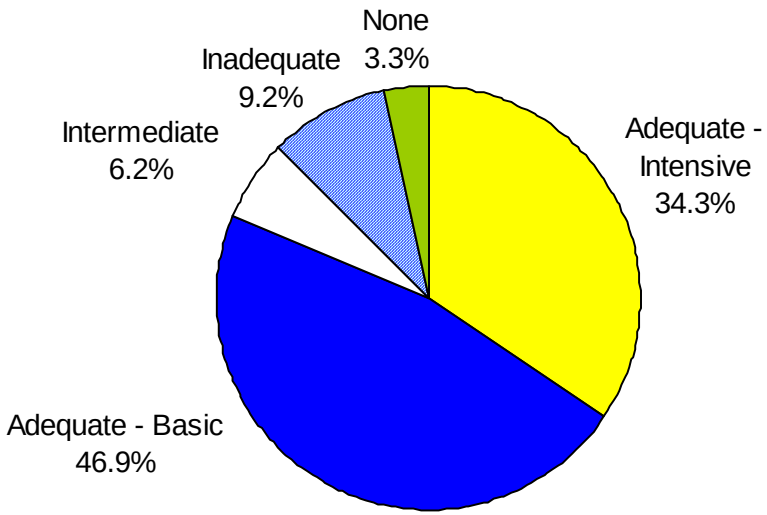
| Payment Source for Prenatal Care, Boston, 2005 | |
|---|---|
| **Source of Payment** | **Percentage of Births** |
| **Private Insurance** | **52.4** |
| Health maintenance organization | 48.5 |
| Commercial Insurance | 2.7 |
| Blue Cross/Blue Shield | 1.3 |
| **Public Insurance** | **46.5** |
| Medicaid/SCHIP (MassHealth) | 38.1 |
| Healthy Start | 6.0 |
| Other Government | 1.3 |
| Free Care Pool | 0.7 |
| Medicare | 0.4 |
| **Other Insurance** | **1.1** |
| Other | 0.8 |
| Self-Pay | 0.3 |
| Worker's Compensation | n<5 |
| | |
| DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health<br>DATA ANALYSIS: Boston Public Health Commission Research Office | |

- In 2005, payment sources for the prenatal care (PNC) of Boston residents were closely divided between private insurers and publicly funded sources such as MassHealth, the state of Massachusetts' combined program for Medicaid and the state Children's Health Insurance Program.
- Other sources of payment for prenatal care include self-pay and miscellaneous other payers.
- Of prenatal care paid for by private insurance, most was covered by health maintenance organizations.
- MassHealth was the largest public payer for prenatal care, covering close to four in ten Boston births (38.1%).

# MATERNAL CHARACTERISTICS

## *Adequacy of Prenatal Care Utilization*

**Adequacy of Prenatal Care Utilization**
**Boston, 2005**



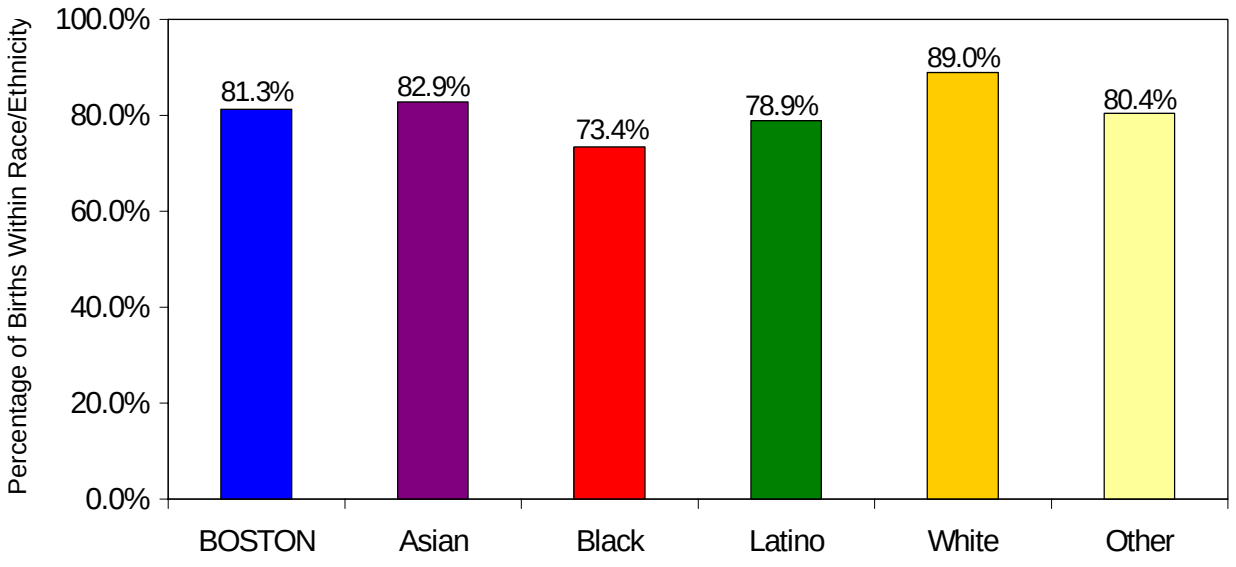

NOTE: Adequacy is as defined by the APNCU Index (Kotelchuck Index).
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, 81.2% (n=6,139) of Boston births were to women whose prenatal care utilization was adequate, defined as an appropriate number of visits for the length of gestation and a relatively early initiation of prenatal care.

- Women whose care falls into the **Adequate-Basic** category typically have had low-risk pregnancies that required only routine prenatal visits. Those whose utilization falls into the **Adequate-Intensive** category typically have had more frequent visits to monitor pregnancy risks or manage complications of pregnancy. Women who fall into the **Intermediate** category have usually had less frequent visits than those in the Adequate-Basic category. In order for a woman to fall into the **Inadequate** category for prenatal care, she would have had to start prenatal care month 5 or later of pregnancy and to have received less than 50% of expected prenatal visits.

# MATERNAL CHARACTERISTICS

## *Adequacy of Prenatal Care Utilization*

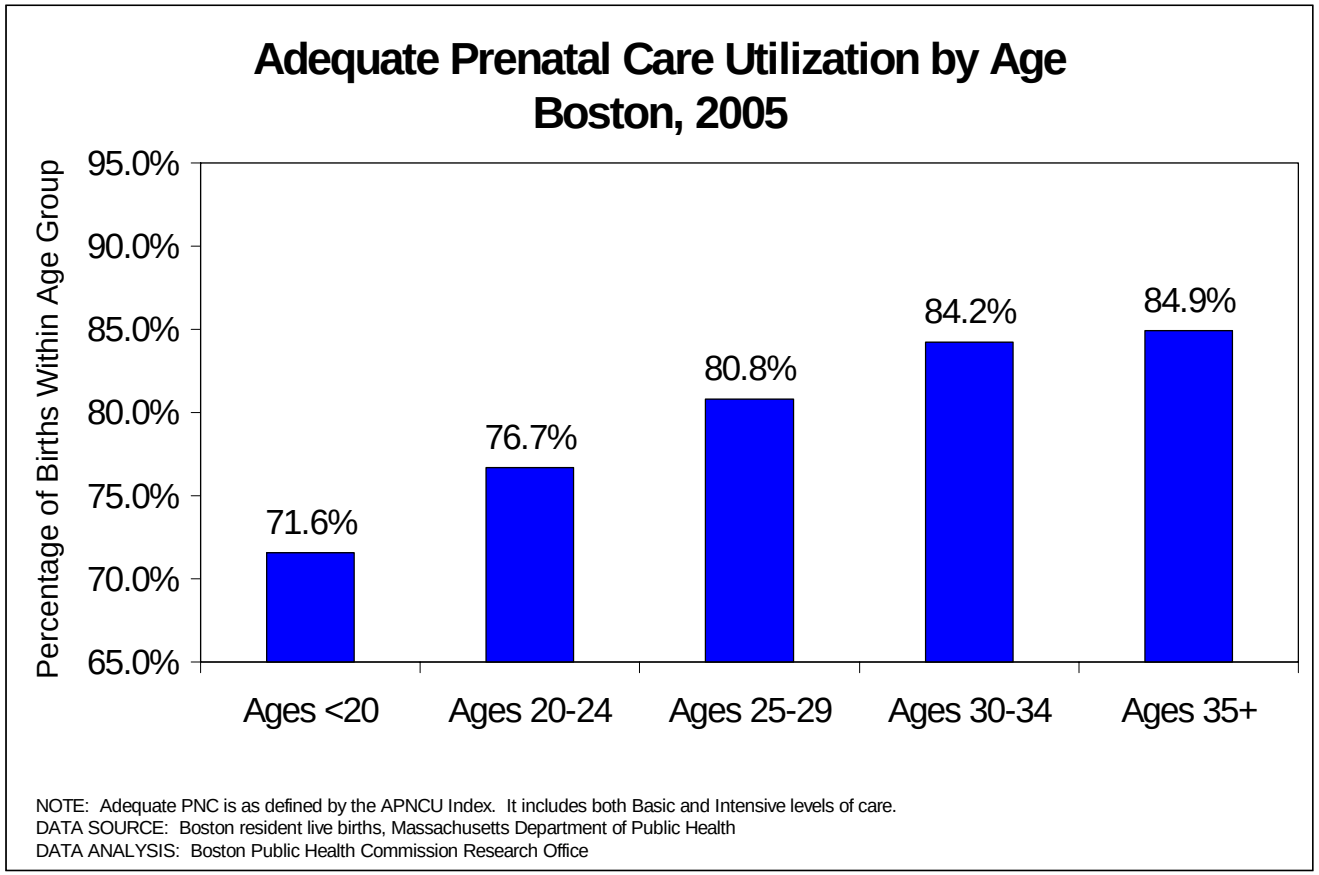



NOTE: Adequate PNC is as defined by the APNCU Index. It includes both Basic and Intensive levels of care.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The majority of births to Boston women in all race/ethnicity groups had adequate prenatal care (includes Adequate-Basic and Adequate-Intensive) in 2005, but the highest percentage of adequate prenatal care was among births to White women. Almost 90% (n=2,400) of births to White women had adequate care.
- Black, Latino, and Asian women were significantly less likely to receive adequate prenatal care than White women.

# MATERNAL CHARACTERISTICS

## *Adequacy of Prenatal Care Utilization*

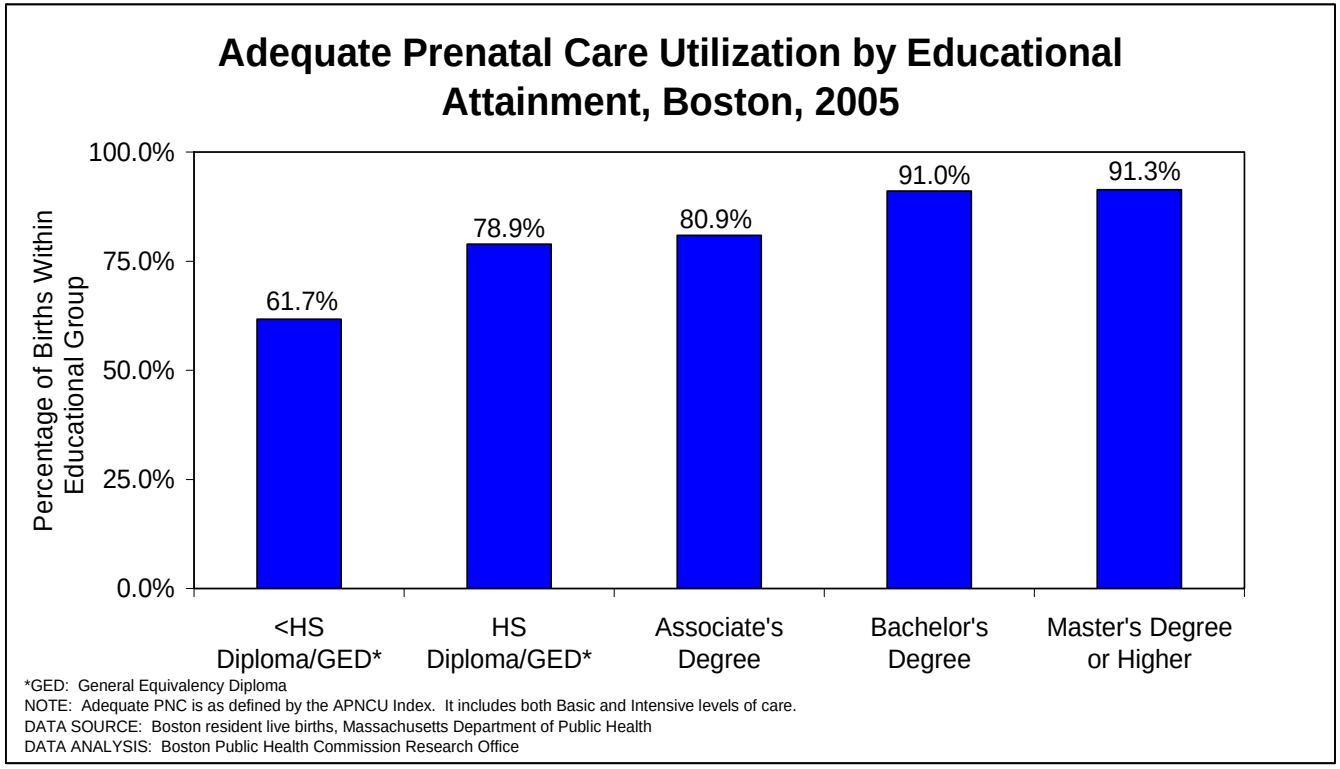



NOTE: Adequate PNC is as defined by the APNCU Index. It includes both Basic and Intensive levels of care.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, women ages 35 and over had the highest percentage of adequate (Adequate-Basic and Adequate-Intensive) prenatal care utilization.
- Women less than 20 years old had the lowest percentage of adequate prenatal care utilization.

# MATERNAL CHARACTERISTICS

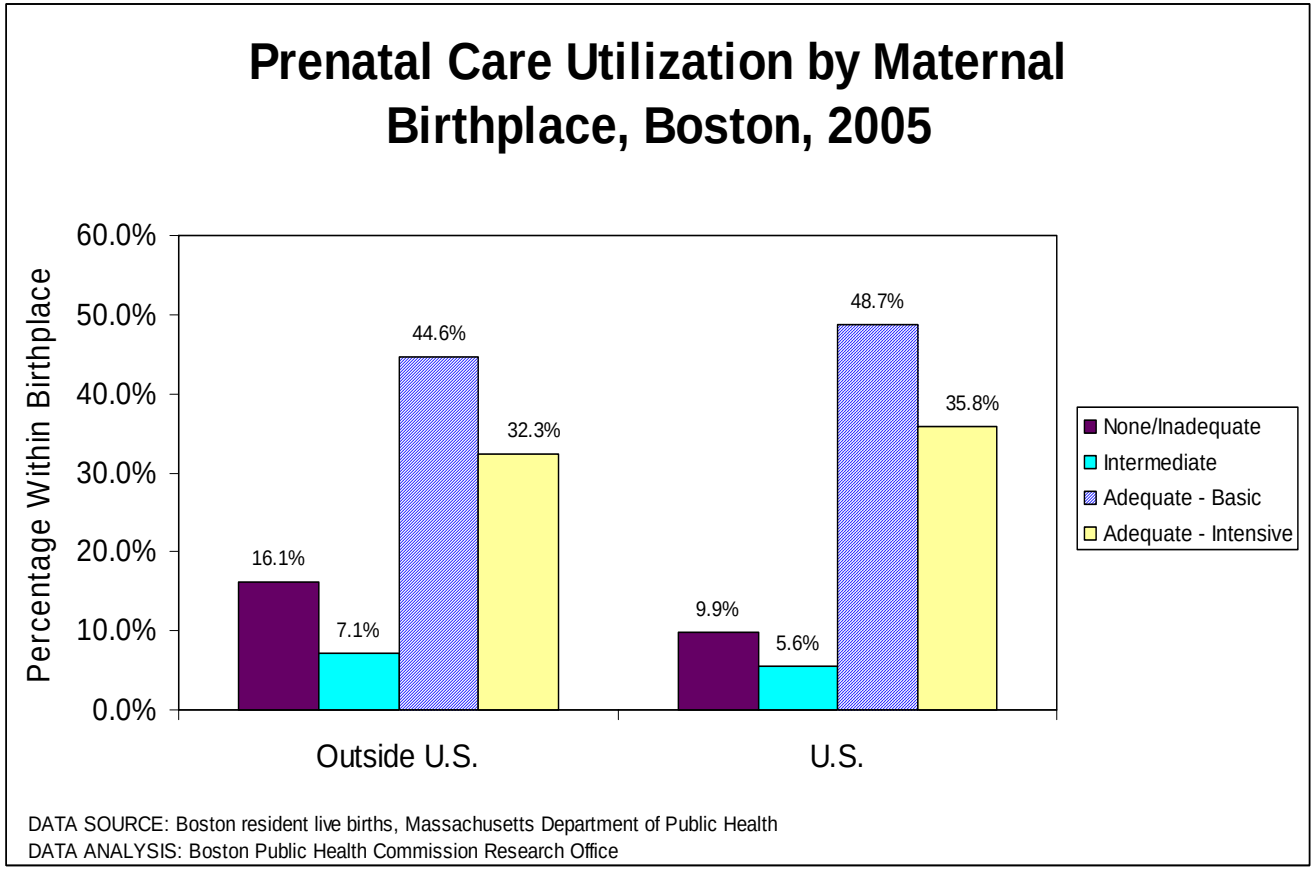
## *Adequacy of Prenatal Care Utilization*




- Prenatal care adequacy is higher among births to women with more education.
- Births to Boston women who did not have at least a high school diploma or GED had the lowest percentage of adequate prenatal care utilization in 2005. Less than 70% (n=630) of births to these women had adequate prenatal care, in comparison to 91.3% (n=960) of births to women with at least a Master's degree who received adequate prenatal care.

# MATERNAL CHARACTERISTICS

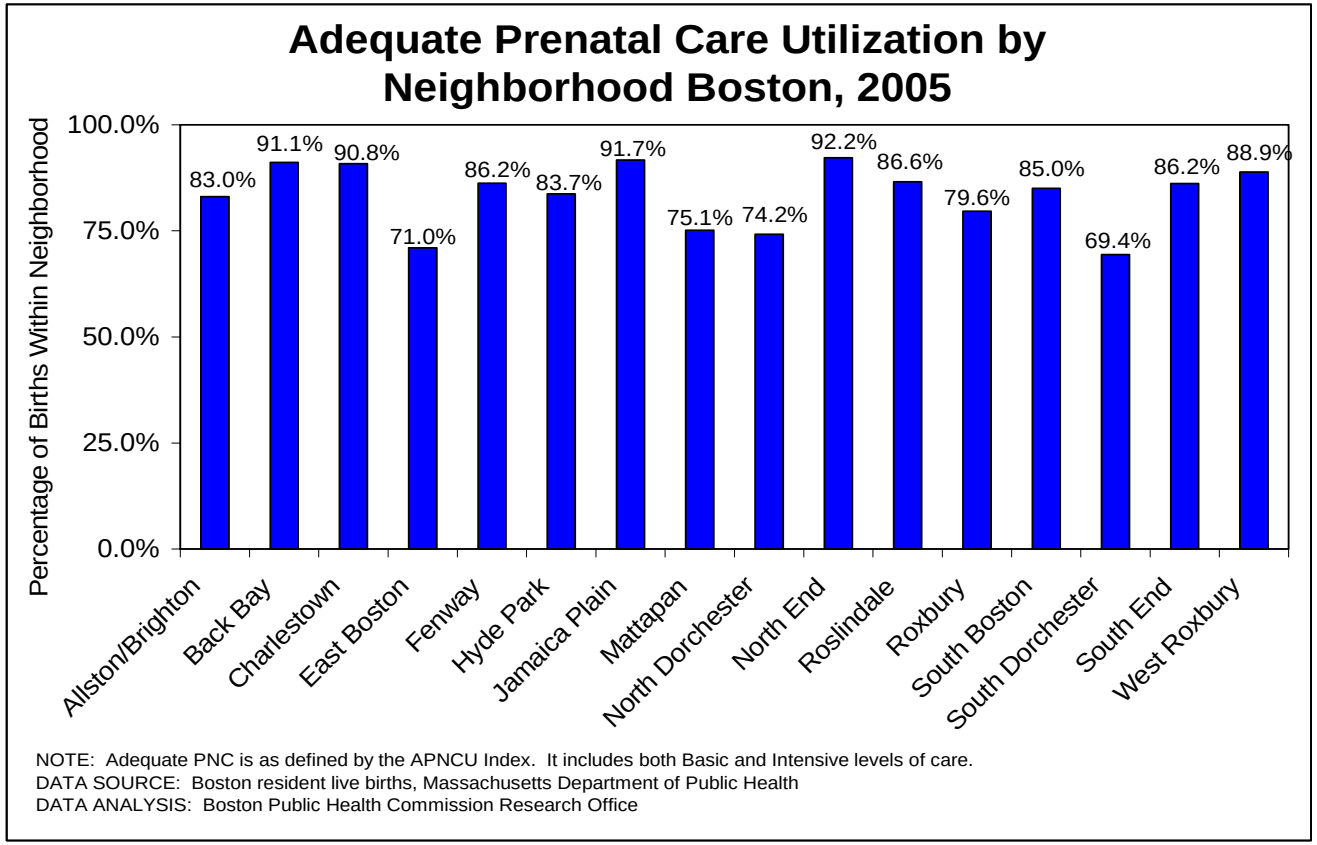
## *Adequacy of Prenatal Care Utilization*




- Boston women born in the U.S. (includes all 50 states and the District of Columbia) had slightly higher percentages of Adequate-Basic and Adequate-Intensive prenatal care utilization than did births to women born outside the U.S.

# MATERNAL CHARACTERISTICS

## *Adequacy of Prenatal Care Utilization*



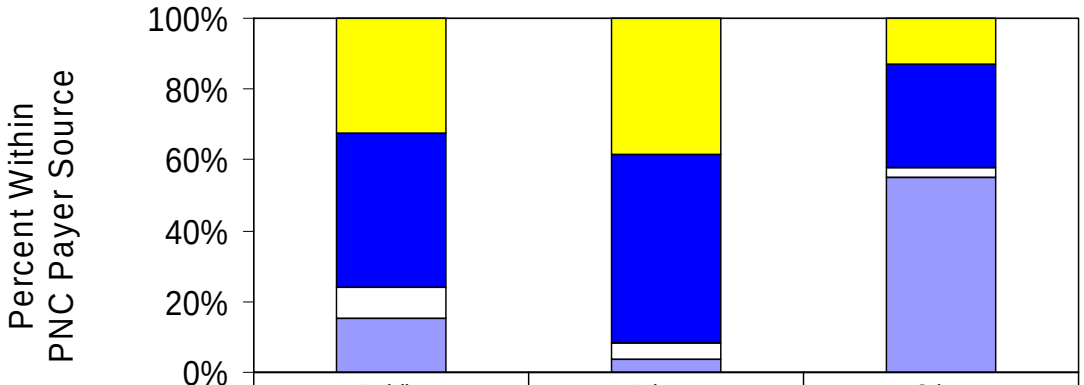

NOTE: Adequate PNC is as defined by the APNCU Index. It includes both Basic and Intensive levels of care.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Adequacy of prenatal care also varied by neighborhood in 2005. The percentage of births to women who received adequate prenatal care ranged from a low of 69.4% (n=503) in South Dorchester to a high of 92.2% (n=83) in the North End.

# MATERNAL CHARACTERISTICS

## *Adequacy of Prenatal Care Utilization*

### PNC Utilization by PNC Payer Source
### Boston, 2005



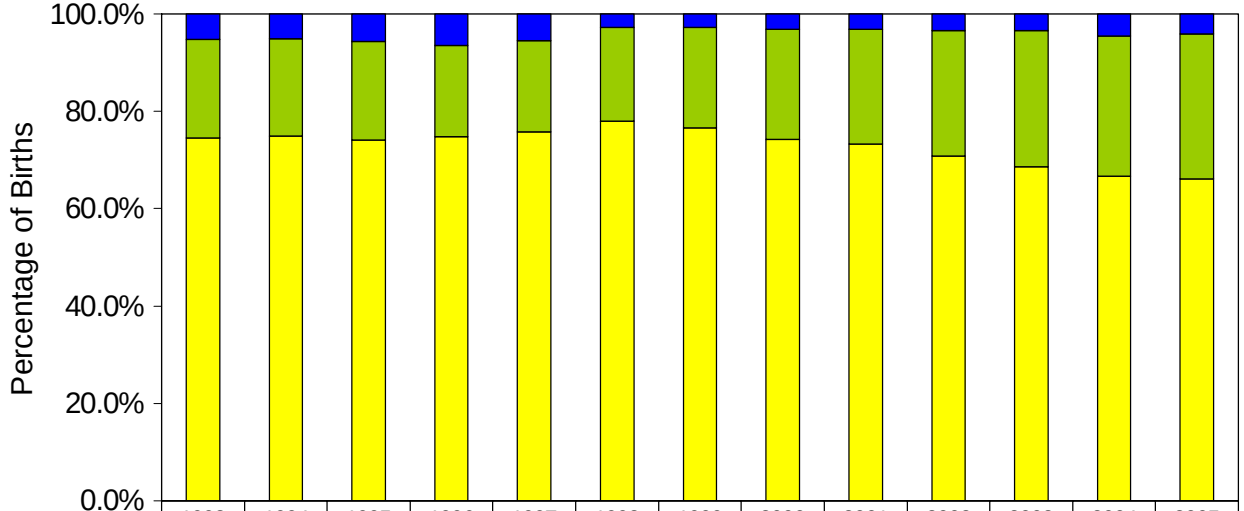

| | Public | Private | Other |
|---|---|---|---|
| Adequate - Intensive | 32.6% | 38.5% | 12.8% |
| Adequate - Basic | 43.4% | 53.3% | 29.5% |
| Intermediate | 8.9% | 4.4% | 2.6% |
| None/Inadequate | 15.1% | 3.8% | 55.1% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The type of payer for prenatal care is associated with adequacy of prenatal care utilization.
- Women whose prenatal care was paid for by public sources had higher percentages of prenatal care utilization at the Intermediate or Inadequate/None levels than did women whose prenatal care was paid for by private insurance.
- Women whose prenatal care was paid for by Other sources (such as self-pay) had a much higher percentage of utilization at the Inadequate/None level than did women whose care was paid for by public or private sources.

# MATERNAL CHARACTERISTICS

## Delivery Method



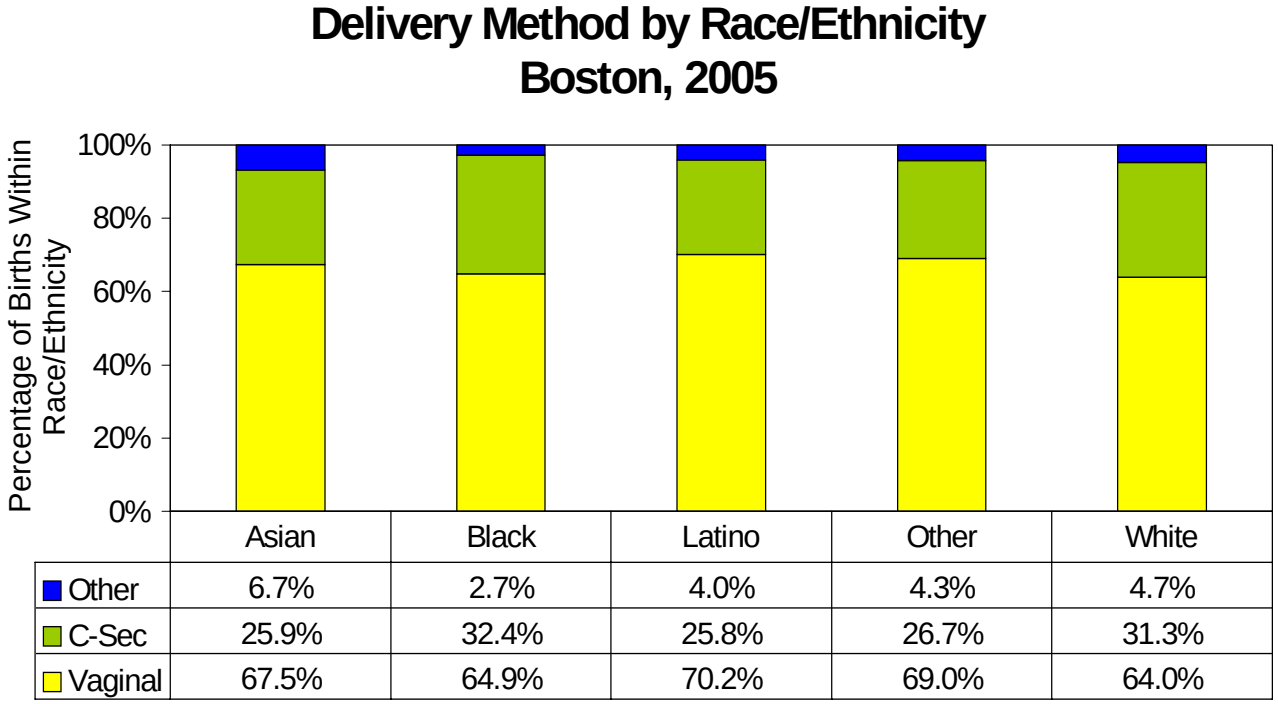

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other | 5.2% | 5.1% | 5.6% | 6.4% | 5.5% | 2.8% | 2.8% | 3.2% | 3.1% | 3.4% | 3.5% | 4.6% | 4.1% |
| C-Section | 20.3% | 19.9% | 20.3% | 18.8% | 18.7% | 19.3% | 20.7% | 22.7% | 23.6% | 25.7% | 27.9% | 28.7% | 29.8% |
| Vaginal | 74.5% | 74.9% | 74.1% | 74.7% | 75.7% | 77.9% | 76.6% | 74.2% | 73.3% | 70.9% | 68.6% | 66.6% | 66.1% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Slightly more than two-thirds (n=4,978) of Boston births in 2005 were vaginal deliveries. This level has declined approximately 18.7% since its most recent high point in 1998.
- The use of Cesarean section, or surgical delivery, has risen about 54.6% since its most recent low point in 1997.
- Forceps or vacuum-assisted deliveries have become less common in Boston since the most recent high point for their use in 1996.

# MATERNAL CHARACTERISTICS

## *Delivery Method*



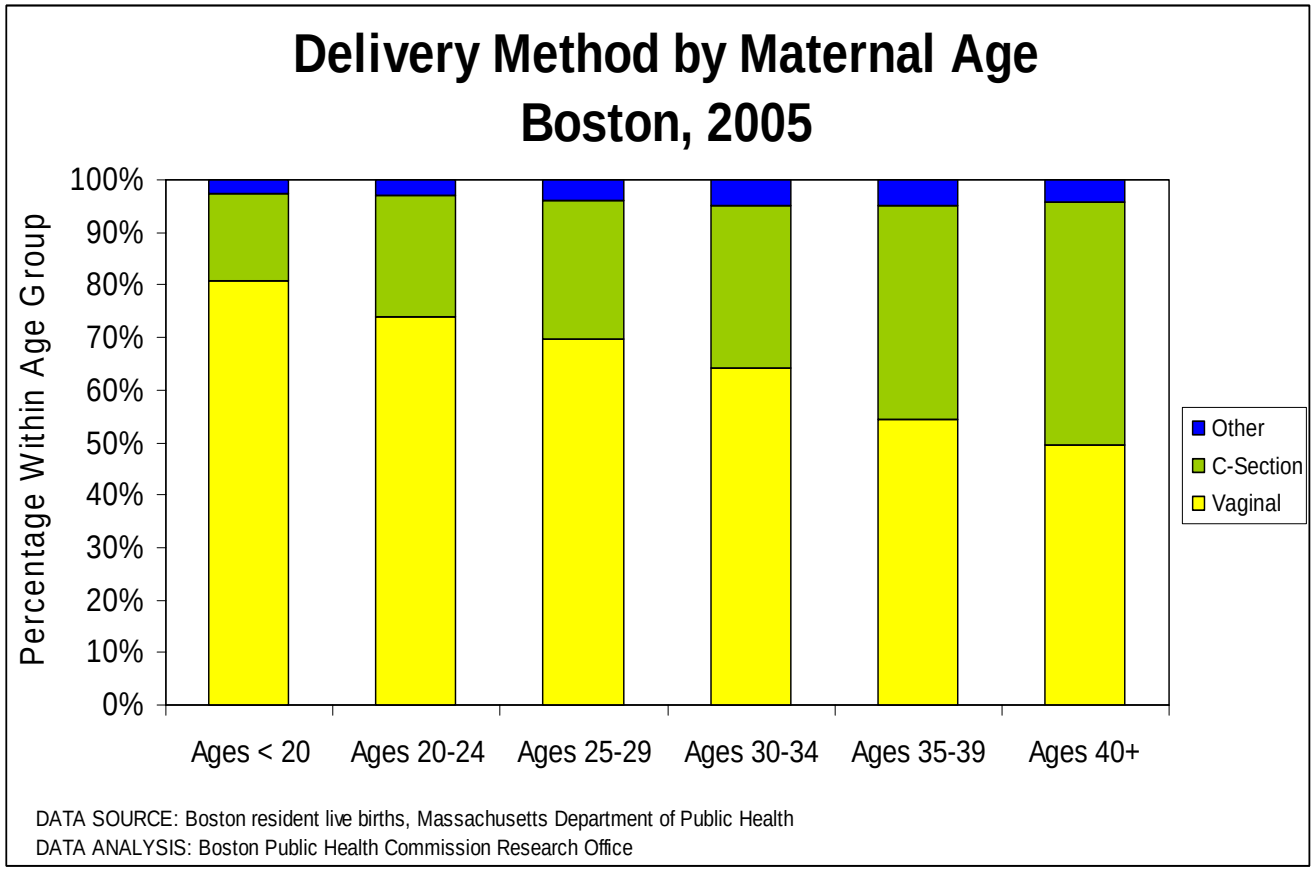

| | Asian | Black | Latino | Other | White |
|---|---|---|---|---|---|
| Other | 6.7% | 2.7% | 4.0% | 4.3% | 4.7% |
| C-Sec | 25.9% | 32.4% | 25.8% | 26.7% | 31.3% |
| Vaginal | 67.5% | 64.9% | 70.2% | 69.0% | 64.0% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, Cesarean section deliveries were more common among births to Black women and White women than among births to Latinas and women of other race/ethnicity groups.
- Vaginal deliveries were most common among births to Latinas than among births to women of other race/ethnicity groups.

# MATERNAL CHARACTERISTICS

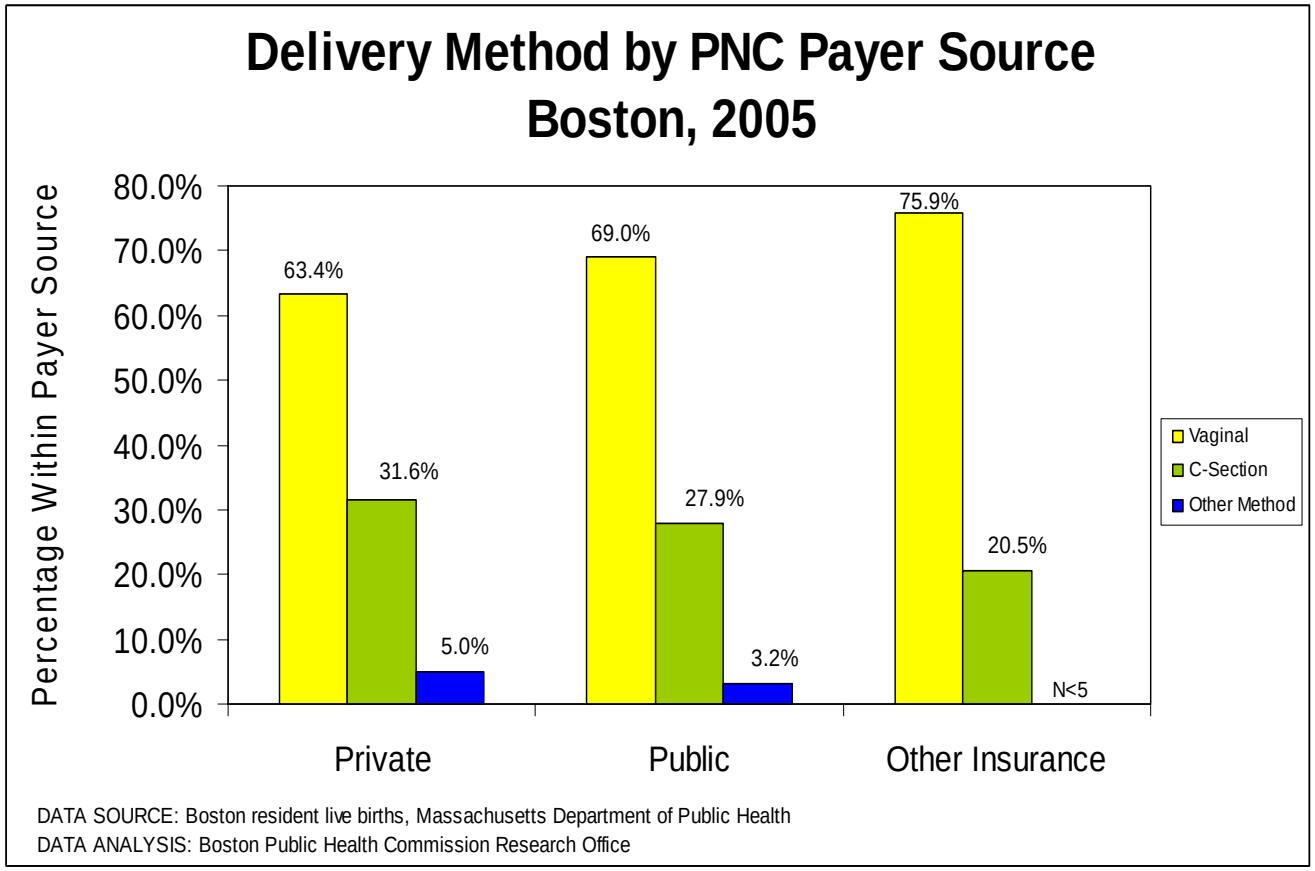
## *Delivery Method*




- Data from 2005 indicate that the mix of different delivery methods changed with increasing maternal age.
- Vaginal deliveries decreased as a percentage of total births as maternal age increased. Among women ages 20 and under, vaginal births made up 80.7% (n=459) of all births. In contrast, among women ages 40 and over, vaginal births comprised barely a majority (49.6%) (n=168) of all births.
- As vaginal births decreased with advancing maternal age, Cesarean births increased. Among women ages 20 and under, Cesarean births made up 16.9% (n=96) of all births, though among women ages 40 and older, Cesarean births made up 46.3% (n=157) of births.

# MATERNAL CHARACTERISTICS

## *Delivery Method*

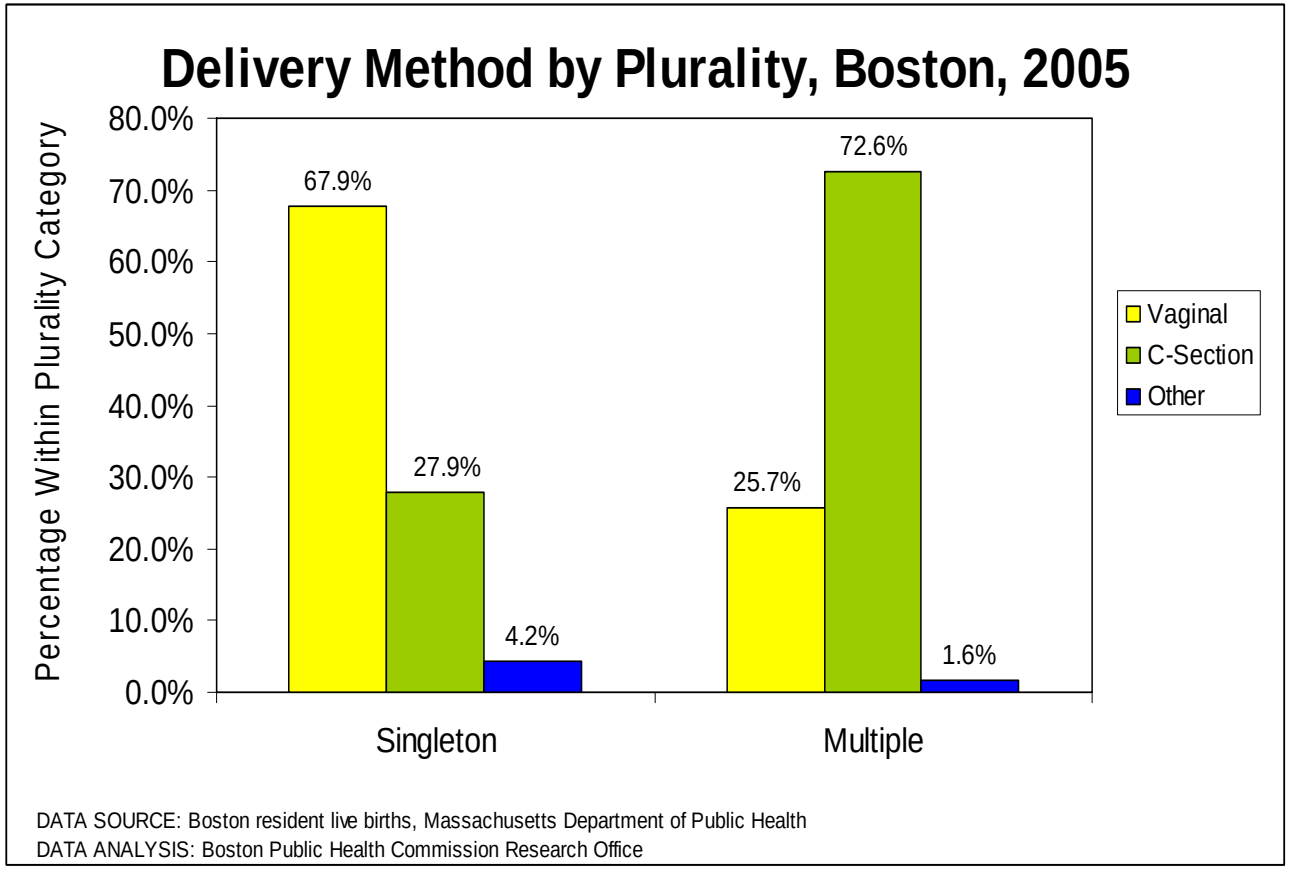



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Delivery method in 2005 was associated with payer source for prenatal care.
- Cesarean births were most common among births for which prenatal care was paid by private sources, and were least common among births paid by other insurance.

# MATERNAL CHARACTERISTICS

## *Delivery Method*

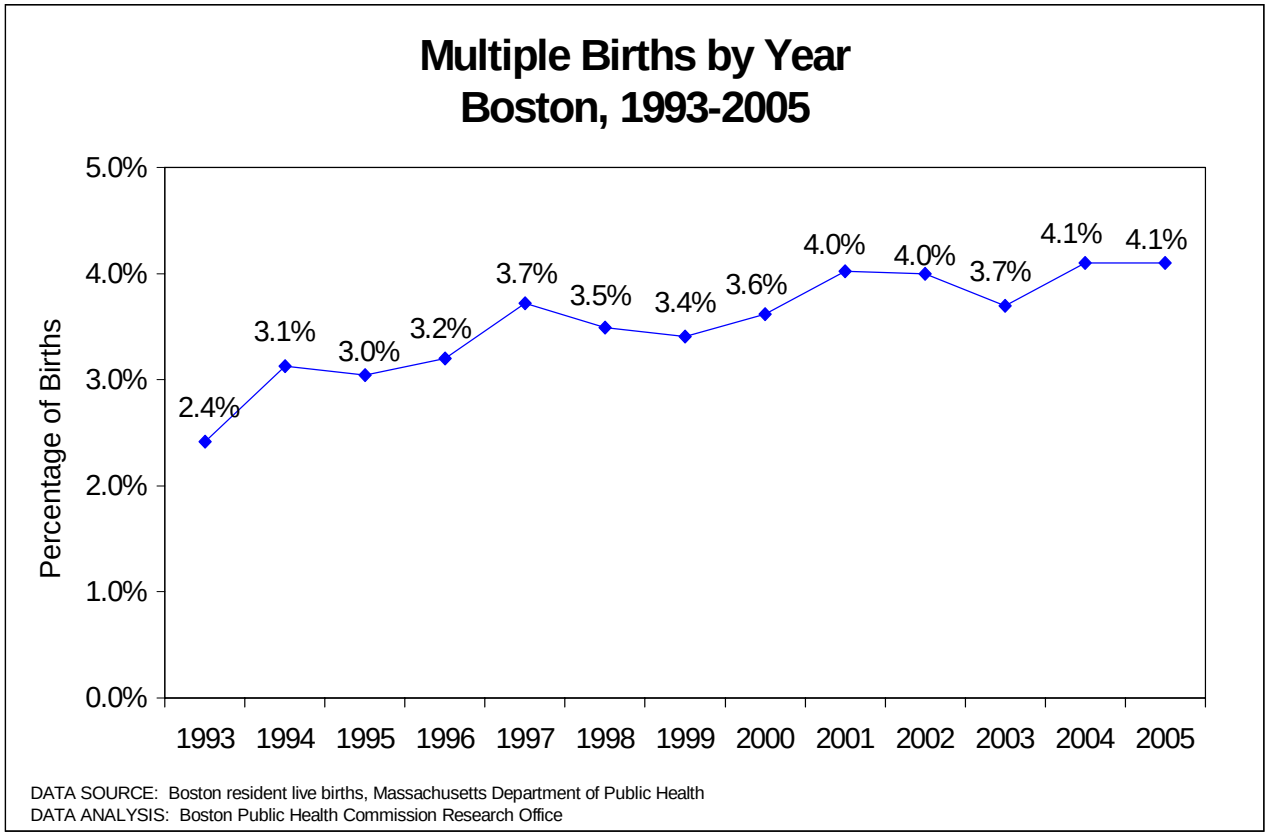



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Singleton births in 2005 were much more likely than multiple births to be delivered vaginally.
- More than two-thirds (67.9%) (n=4,899) of singleton births were delivered vaginally in 2005, compared with only 25.7% (n=79) of twins, triplets, or higher order births.

# INFANT CHARACTERISTICS

## *Multiple Births*



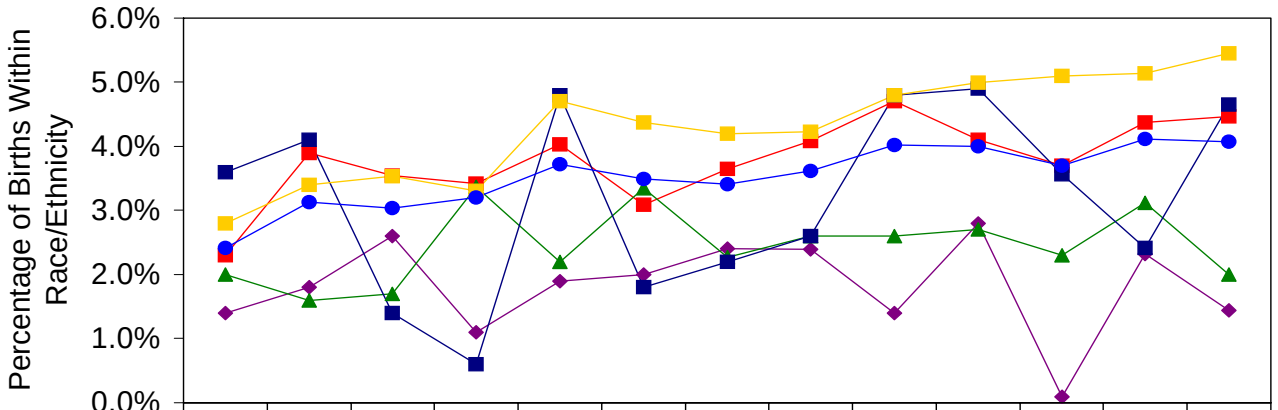

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Births that are twin, triplet, or higher-order multiple gestations have risen from 2.4% (n=212) of all Boston resident births in 1993 to 4.1% (n=308) in 2005. This difference is statistically significant.
- The overall increase in multiple births over time is attributable to significant increases among Boston women ages 25-29, and 30-34, between 1993 and 2005 (data not shown).
- Between 1993 and 2005, the percentage of births that were multiple gestations increased 110% among Boston women less than 20 years of age (data not shown).

# INFANT CHARACTERISTICS

## *Multiple Births*

### Multiple Births by Race/Ethnicity and Year Boston, 1993-2005



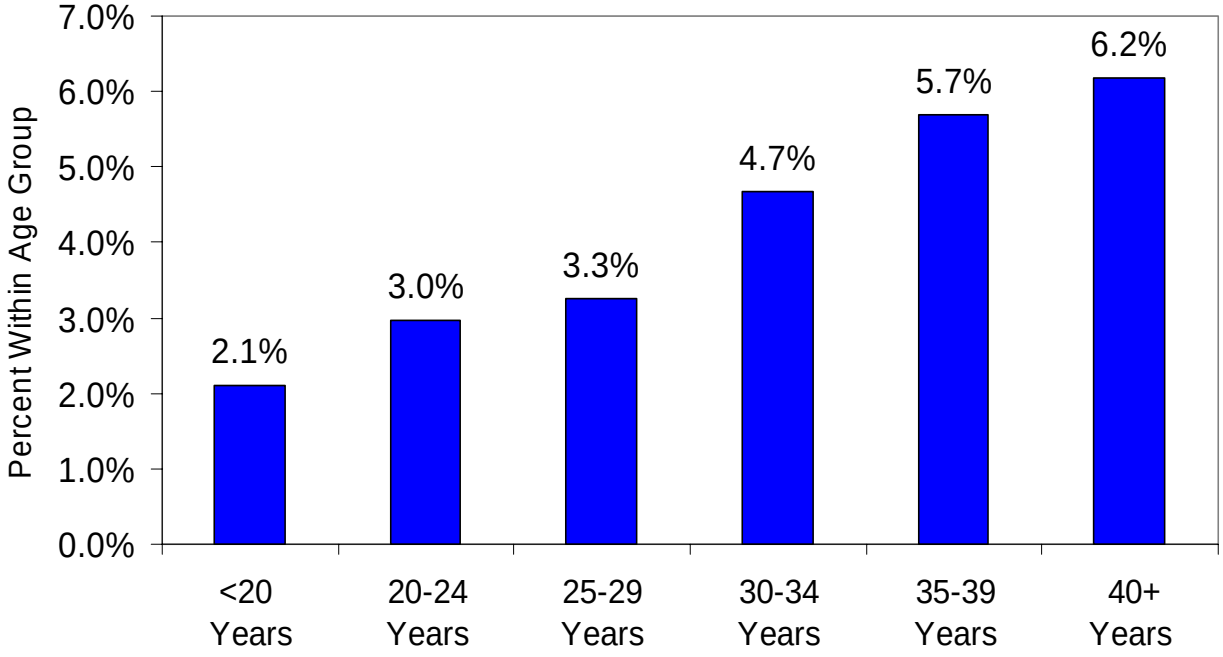

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 1.4% | 1.8% | 2.6% | 1.1% | 1.9% | 2.0% | 2.4% | 2.4% | 1.4% | 2.8% | 0.1% | 2.3% | 1.4% |
| Black | 2.3% | 3.9% | 3.5% | 3.4% | 4.0% | 3.1% | 3.7% | 4.1% | 4.7% | 4.1% | 3.7% | 4.4% | 4.5% |
| Latino | 2.0% | 1.6% | 1.7% | 3.4% | 2.2% | 3.4% | 2.3% | 2.6% | 2.6% | 2.7% | 2.3% | 3.1% | 2.0% |
| Other | 3.6% | 4.1% | 1.4% | 0.6% | 4.8% | 1.8% | 2.2% | 2.6% | 4.8% | 4.9% | 3.6% | 2.4% | 4.7% |
| White | 2.8% | 3.4% | 3.5% | 3.3% | 4.7% | 4.4% | 4.2% | 4.2% | 4.8% | 5.0% | 5.1% | 5.1% | 5.5% |
| BOSTON | 2.4% | 3.1% | 3.0% | 3.2% | 3.7% | 3.5% | 3.4% | 3.6% | 4.0% | 4.0% | 3.7% | 4.1% | 4.1% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Multiple births are more common among Whites than among other racial/ethnic groups.
- Multiple births have increased in recent years across most racial/ethnic groups.

# INFANT CHARACTERISTICS

## *Multiple Births*




DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, multiple births were most common among women ages 35-39, and ages 40+ accounting for about 6% of all births to women in these age groups.
- Multiple births were least common among births to women under the age of 20. Only about 2% (n=12) of births to teenagers were multiple births.

# INFANT CHARACTERISTICS

## *Multiple Births*

**Multiple Births by Age and Year, Boston, 1998-2005**

| Age | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| <20 | 2.4% | 0.5% | 0.5% | 1.4% | 3.3% | 1.7% | 2.2% | 2.1% |
| 20-29 | 2.7% | 2.7% | 2.5% | 2.8% | 3.1% | 3.0% | 2.9% | 3.1% |
| 30-39 | 4.4% | 4.7% | 5.2% | 5.3% | 4.9% | 4.5% | 5.2% | 5.0% |
| 40+ | 7.0% | 5.2% | 7.5% | 10.3% | 4.4% | 5.5% | 7.8% | 6.2% |

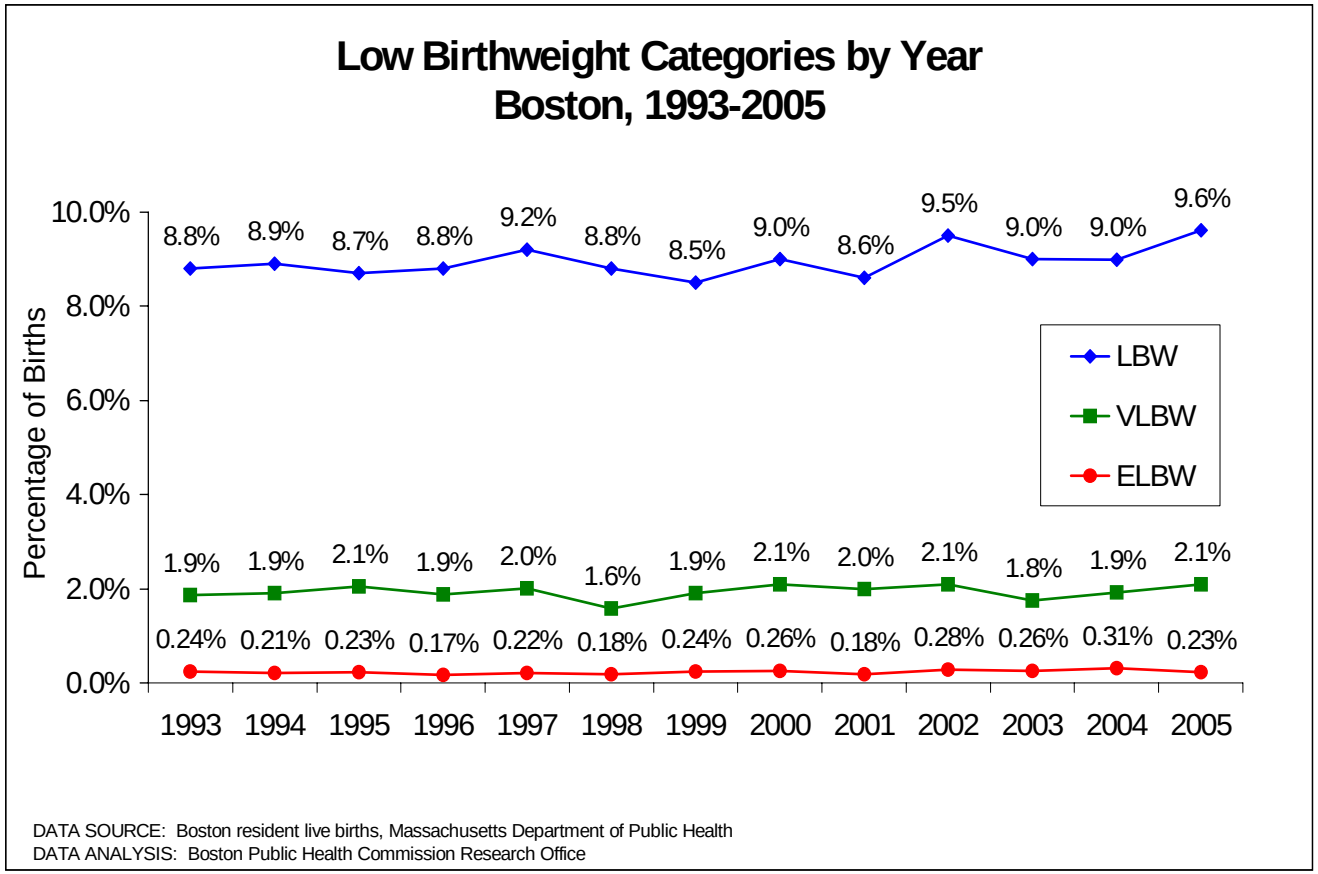
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Women ages 30 and over tend to have a greater percentage of multiple births than women of other ages.
- Between 1998 and 2005, women ages 20-29 and those ages 30-39 experienced increases in multiple births, but not significantly, of 15% and 14% respectively.
- Between 1998 and 2005, women less than age 20, and those ages 40 and over experienced declines in multiple births, but not significantly.

# INFANT CHARACTERISTICS

## *Low Birthweight*

Normal birthweight babies weigh at least 2,500 grams (5.5 pounds) at delivery. Infants who weigh less are considered to be of low birthweight (LBW). These infants may be preterm, meaning they were born too early, or they may be small for their gestational age or both. Within the LBW group are very low birthweight (VLBW) infants, who weigh less than 1,500g (3.3 pounds), and extremely low birthweight (ELBW) infants, who weigh less than 500g (1.1 lb). Two-thirds of Boston's infant deaths are among the two percent of infants born weighing less than 1,500 grams.



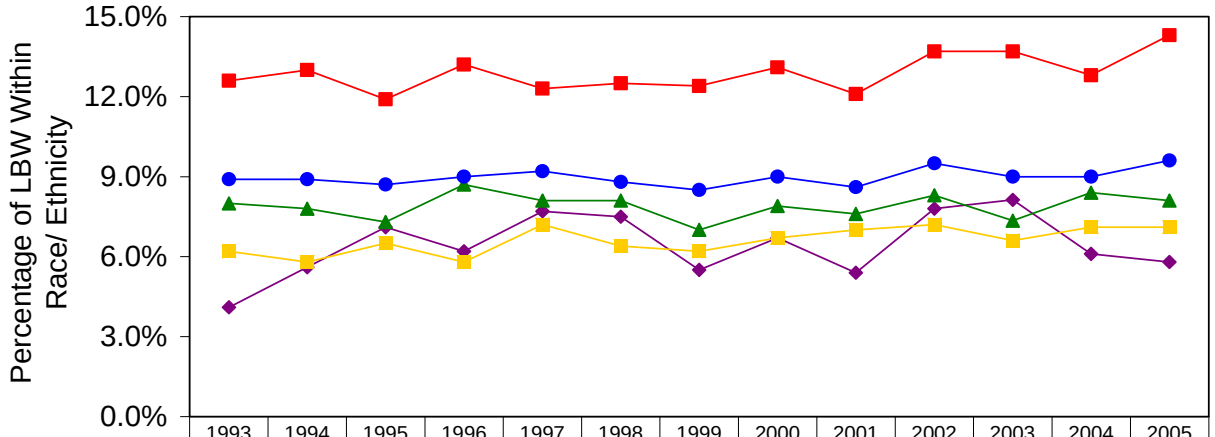

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's rate of low birthweight increased, but not significantly, between 2004 and 2005, from 9.0% to 9.6% in 2005.
- The rate of very low birthweight has fluctuated between 1.9% and 2.1% of all births for most years.
- Extremely low birthweight remains a very small percentage of Boston births. However, disparities exist in the occurrence of ELBW that strongly influence the differences seen in infant mortality rates across race/ethnicity groups (data not shown).

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight by Race/Ethnicity and Year**
**Boston, 1993-2005**




| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 4.1% | 5.6% | 7.1% | 6.2% | 7.7% | 7.5% | 5.5% | 6.7% | 5.4% | 7.8% | 8.1% | 6.1% | 5.8% |
| Black | 12.6% | 13.0% | 11.9% | 13.2% | 12.3% | 12.5% | 12.4% | 13.1% | 12.1% | 13.7% | 13.7% | 12.8% | 14.3% |
| Latino | 8.0% | 7.8% | 7.3% | 8.7% | 8.1% | 8.1% | 7.0% | 7.9% | 7.6% | 8.3% | 7.4% | 8.4% | 8.1% |
| White | 6.2% | 5.8% | 6.5% | 5.8% | 7.2% | 6.4% | 6.2% | 6.7% | 7.0% | 7.2% | 6.6% | 7.1% | 7.1% |
| BOSTON | 8.9% | 8.9% | 8.7% | 9.0% | 9.2% | 8.8% | 8.5% | 9.0% | 8.6% | 9.5% | 9.0% | 9.0% | 9.6% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

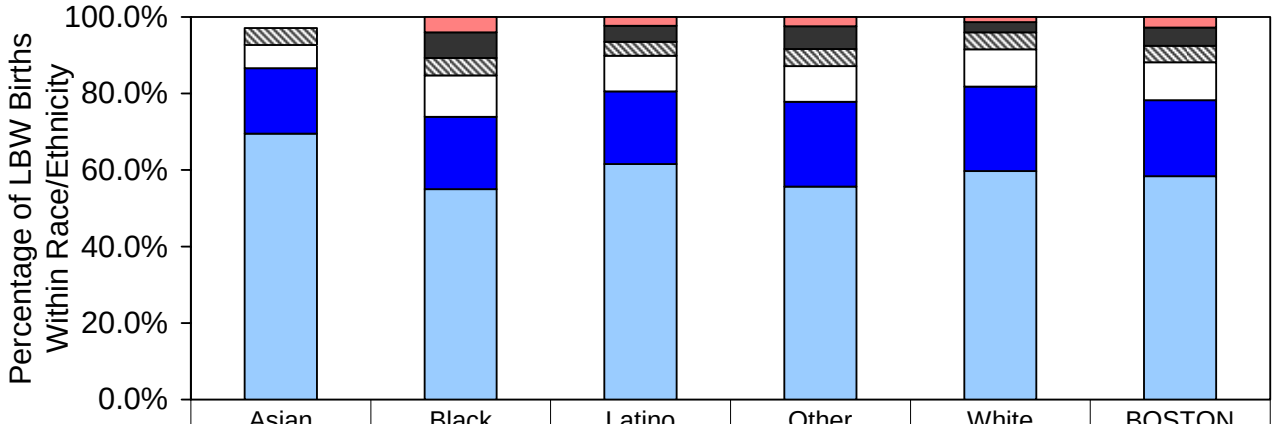
- The persistently elevated LBW rate of Black Boston residents is one of the earliest of a broad range of health disparities affecting Black Bostonians across their lifespan. It reflects adverse circumstances, many of which are poorly understood, affecting women's capacity to maintain a healthy pregnancy long enough for a fetus to reach maturity.

- The LBW rate for Black infants in 2005 (14.3%) (n=310) was double that for White infants (7.1%) (n=191) and was higher than those of infants from other racial/ethnic groups. All of these differences were statistically significant.

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Components of Low Birthweight by Race/Ethnicity, Boston, 2000-2005**



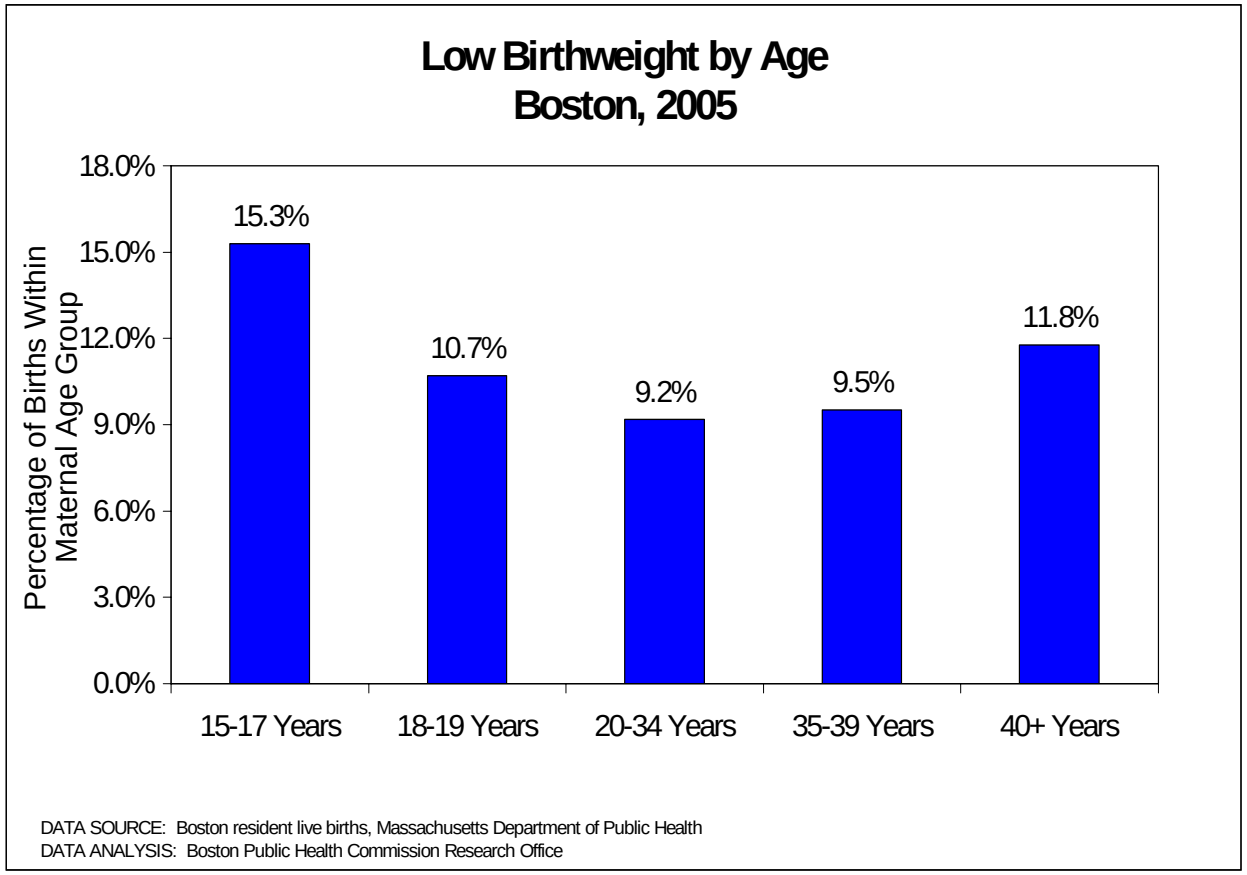

| | Asian | Black | Latino | Other | White | BOSTON |
|---|---|---|---|---|---|---|
| <500g | n<5 | 4.0% | 2.3% | 2.5% | 1.4% | 2.7% |
| 500-749g | n<5 | 6.6% | 4.2% | 5.9% | 2.7% | 4.8% |
| 750-999g | 4.5% | 4.6% | 3.7% | 4.4% | 4.4% | 4.3% |
| 1000-1499g | 6.1% | 10.8% | 9.3% | 9.4% | 9.8% | 9.9% |
| 1500-1999g | 17.1% | 18.9% | 19.0% | 22.2% | 22.0% | 19.8% |
| 2000-2499g | 69.5% | 55.0% | 61.5% | 55.7% | 59.7% | 58.4% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In addition to a higher LBW rate, Black births have a higher percentage of their low birthweight births occurring at the very low end of the birthweight range, where mortality is high.
- Of Black LBW births during the period 2000-2005, 26.1% (n=484) weighed less than 1,500g, compared with 13.4% (n=33) of Asian LBW births, 19.4% (n=159) of Latino LBW births, 18.2% (n=216) of White LBW births, and 22.2% (n=45) of Other LBW births.

# INFANT CHARACTERISTICS

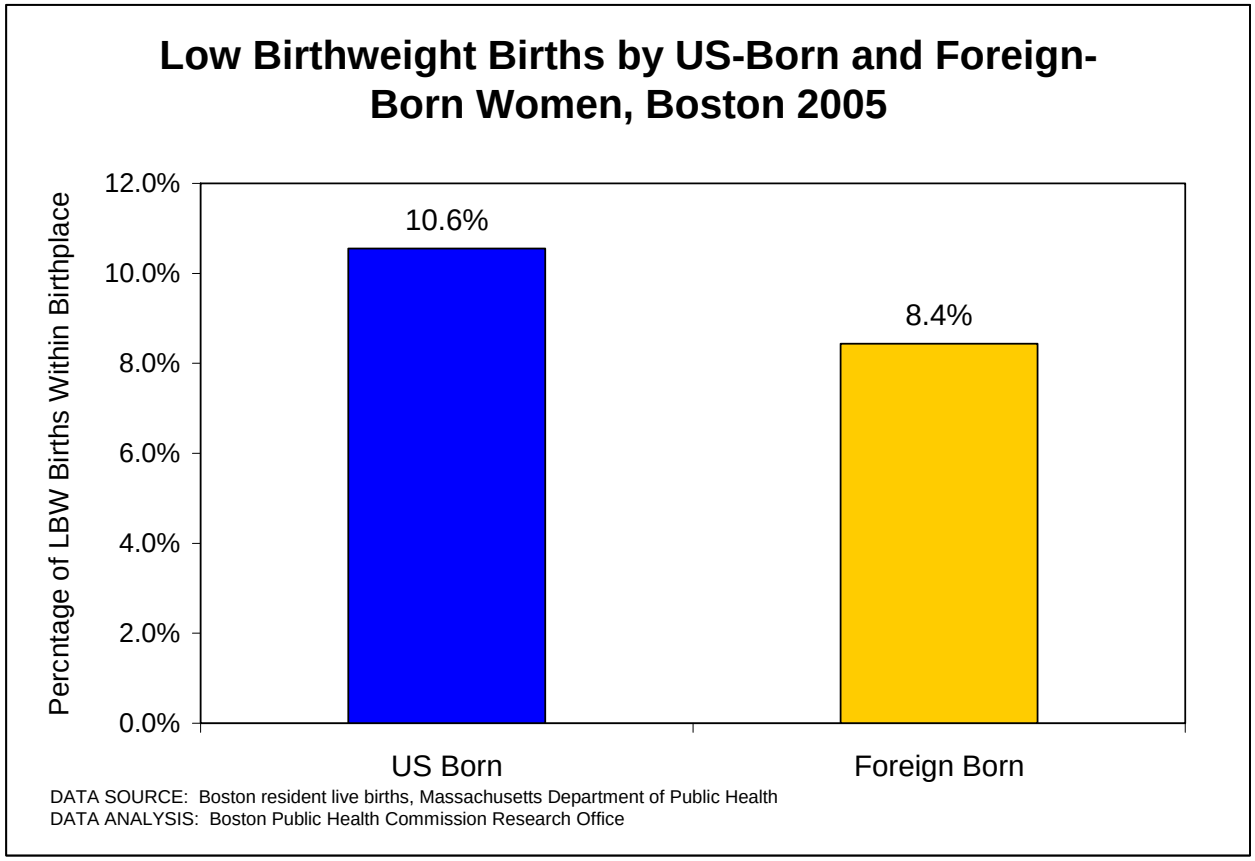
## *Low Birthweight*




- In 2005, LBW rates in Boston were lowest in births to women between 20 and 39 years of age.
- The differences in LBW by maternal age were statistically significant for mothers ages 15-17 (n=28) compared with women ages 20-34 (n=492).

# INFANT CHARACTERISTICS

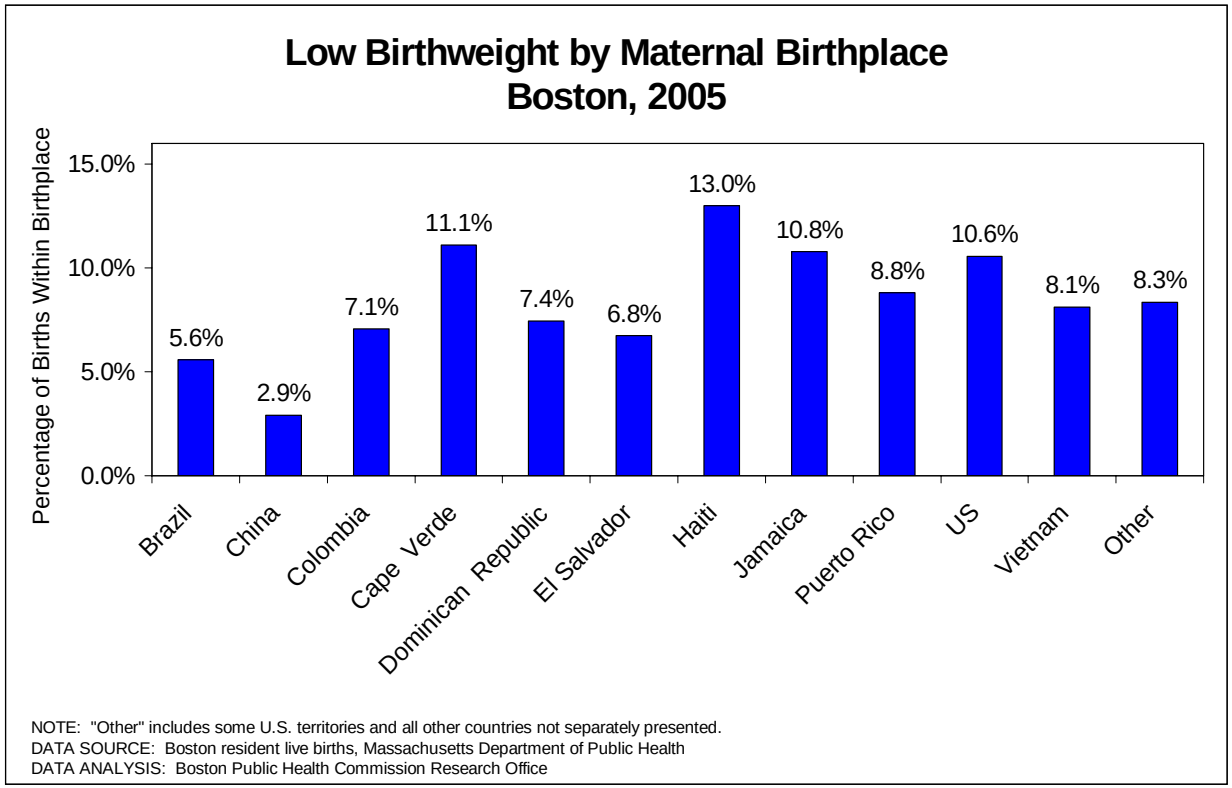
## *Low Birthweight*




- Low Birthweight births are generally more common among US-born women than those who are foreign born.

# INFANT CHARACTERISTICS

## *Low Birthweight*



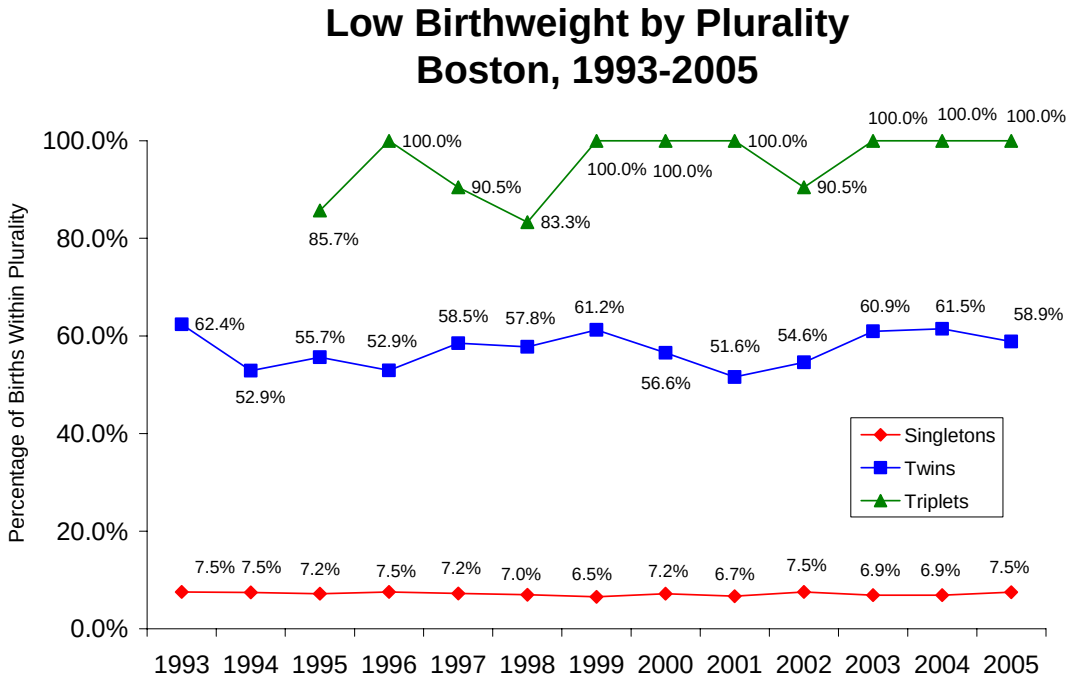

NOTE: "Other" includes some U.S. territories and all other countries not separately presented.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Overall, LBW was more common (10.6%) (n=438) among infants of US-born women than among infants of women born outside of the United States (8.4%) (n=287) (data not shown). This difference was statistically significant. For this analysis, US-born is defined as including all 50 states and the District of Columbia.

- LBW was most common among US-born Black births (15.4%) (n=210), (data not shown), followed by births to Jamaican women (10.8%) (n=11), and births to Haitian women (13.0%) (n=46).

# INFANT CHARACTERISTICS

## *Low Birthweight*

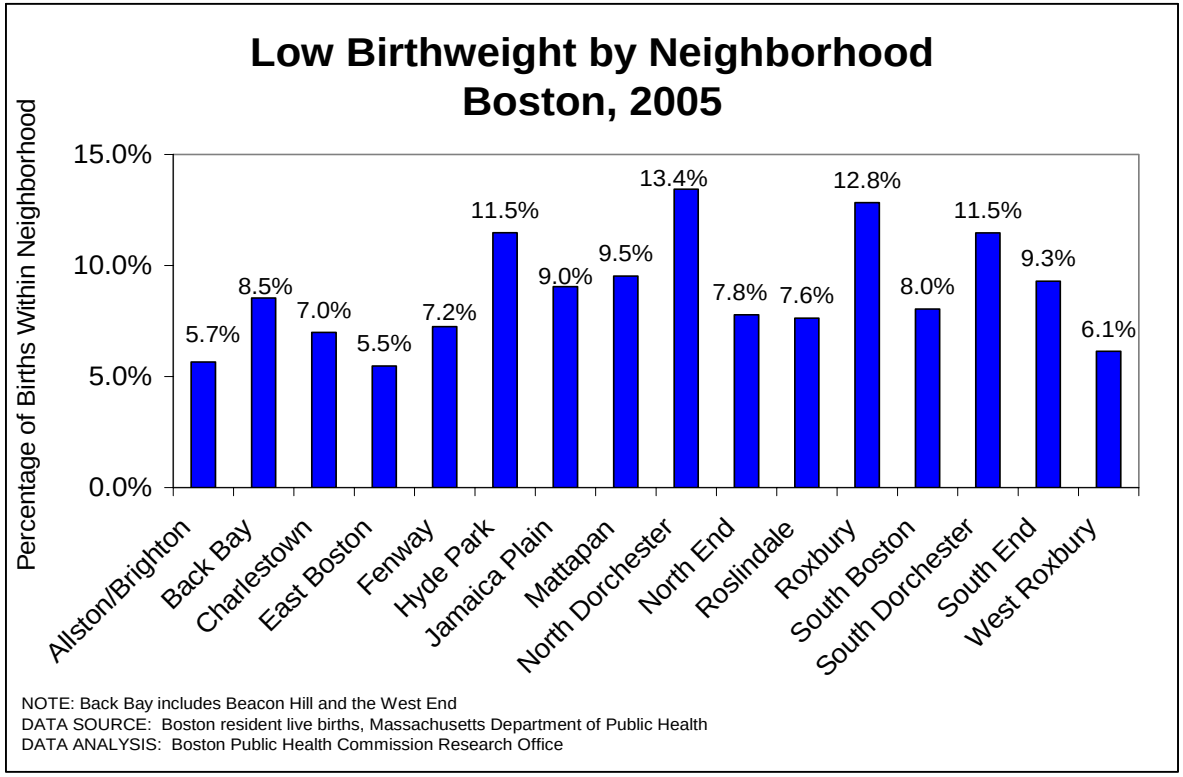



NOTE: There were no triplet births in 1993 or 1994.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Plurality, or the number of infants born of one pregnancy, strongly influences the occurrence of low birthweight.
- In Boston, the LBW percentage for singleton births (6.5%-7.5%) has been far lower than the percentage for twins (51.6%-62.4%) and triplets (83.3%-100.0%) every year from 1993 through 2005.
- The one-year change in percentage of LBW between 2004 and 2005 was not statistically significant for any of the categories shown.

# INFANT CHARACTERISTICS

## *Low Birthweight*

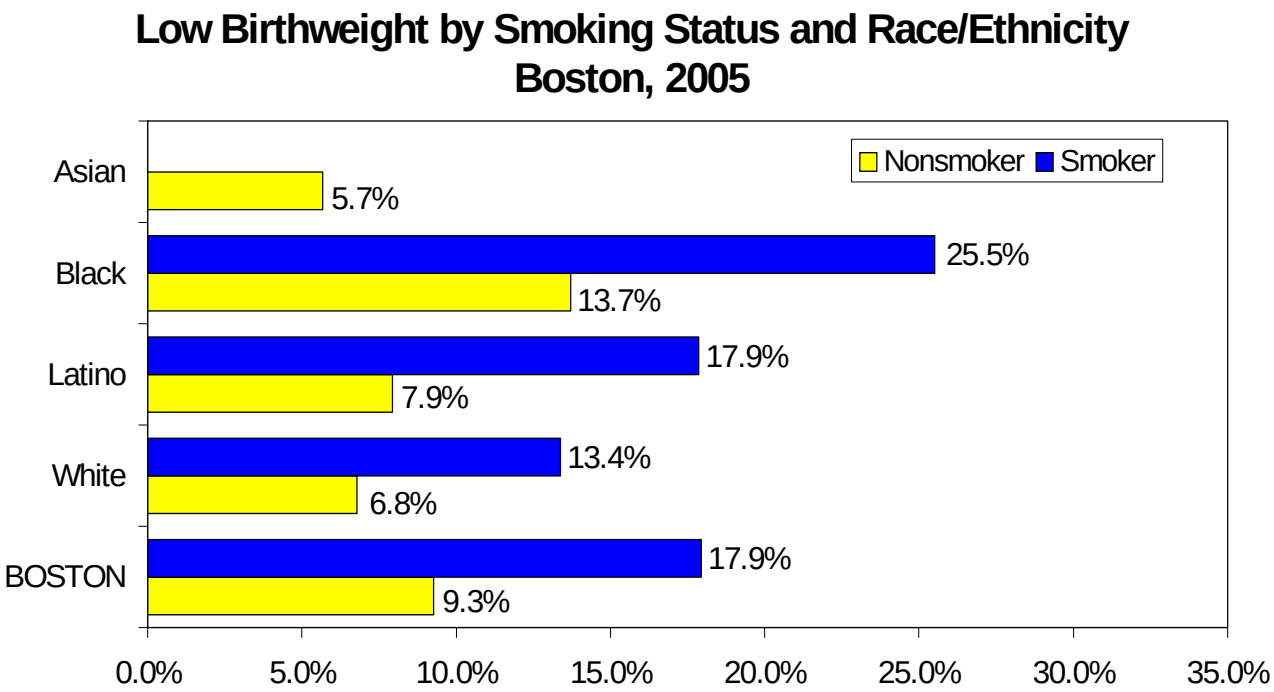



NOTE: Back Bay includes Beacon Hill and the West End
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's highest rates of LBW in 2005 were for North Dorchester, Roxbury, Hyde Park, and South Dorchester.
- The city's lowest rates were for Allston/Brighton, East Boston, and West Roxbury.

# INFANT CHARACTERISTICS

## *Low Birthweight*



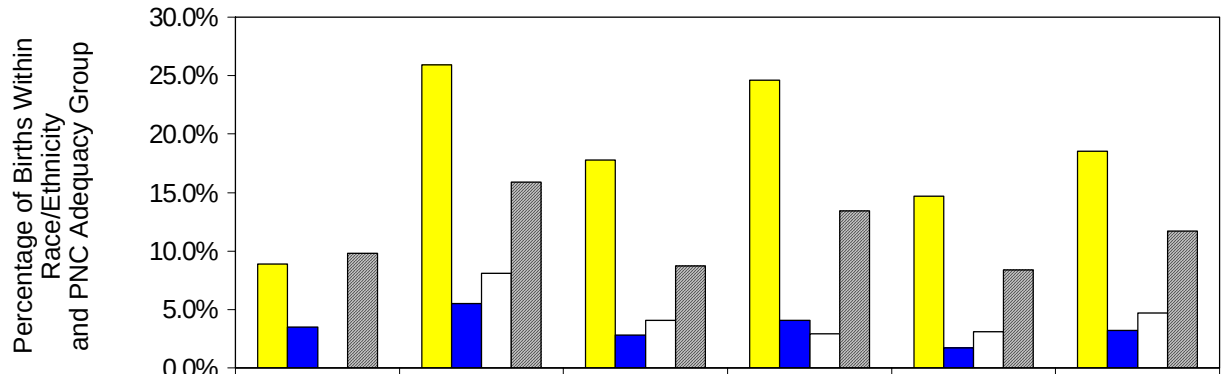

NOTE: LBW for Asian and Other smokers is not shown because n<5 in each group.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Cigarette smoking has been associated with a higher risk of prematurity, measured in terms of low birthweight, preterm birth, and/or intrauterine growth retardation.
- The higher percentage of LBW births to smokers relative to non-smokers was statistically significant for Boston overall.
- The data also illustrates a large disparity in LBW by race/ethnicity. The percentage of LBW births to Black non-smokers was higher than that to White smokers.

# INFANT CHARACTERISTICS

## *Low Birthweight*

### Low Birthweight by Adequacy of Prenatal Care and Race/Ethnicity, Boston, 2005




| | Asian | Black | Latino | Other | White | BOSTON |
|---|---|---|---|---|---|---|
| Adequate - Intensive | 8.9% | 25.9% | 17.8% | 24.6% | 14.7% | 18.5% |
| Adequate - Basic | 3.5% | 5.5% | 2.8% | 4.1% | 1.7% | 3.2% |
| Intermediate | n<5 | 8.1% | 4.1% | 2.9% | 3.1% | 4.7% |
| Inadequate/None | 9.8% | 15.9% | 8.7% | 13.4% | 8.4% | 11.7% |

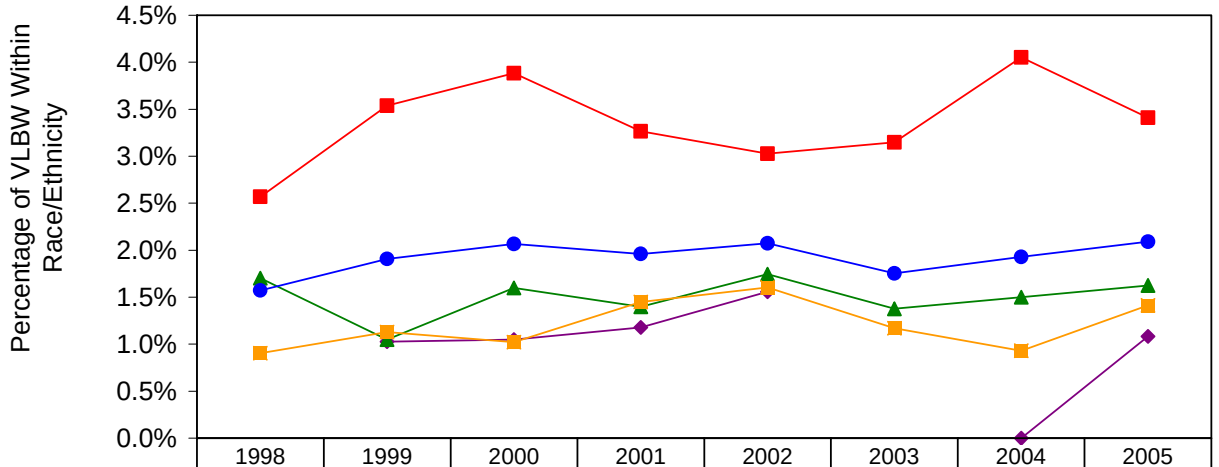
NOTE: LBW percentage are not shown where n<5. PNC adequacy was assessed by the Kotelchuck Index (APNCU Index).
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- For Boston overall in 2005 and for all race/ethnicity groups, the percentage of low birthweight was highest for births accompanied by **Adequate-Intensive** prenatal care. Births receiving more than routine prenatal care typically involve complicated or high-risk pregnancies requiring close medical management.
- The lowest LBW percentages for every race/ethnicity group except for Other, were in the **Adequate-Basic** PNC group. LBW ranged from 1.7% of births to White mothers to 5.5% of births to Black mothers at this care level.
- LBW percentages were highest for births to Black mothers regardless of the prenatal care received.

# INFANT CHARACTERISTICS

## *Low Birthweight*

### Very Low Birthweight by Race/Ethnicity and Year
### Boston, 1998-2005




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| Asian | n<5 | 1.0% | 1.0% | 1.2% | 1.6% | n<5 | 0.0% | 1.1% |
| Black | 2.6% | 3.5% | 3.9% | 3.3% | 3.0% | 3.1% | 4.1% | 3.4% |
| Latino | 1.7% | 1.0% | 1.6% | 1.4% | 1.7% | 1.4% | 1.5% | 1.6% |
| White | 0.9% | 1.1% | 1.0% | 1.4% | 1.6% | 1.2% | 0.9% | 1.4% |
| BOSTON | 1.6% | 1.9% | 2.1% | 2.0% | 2.1% | 1.8% | 1.9% | 2.1% |

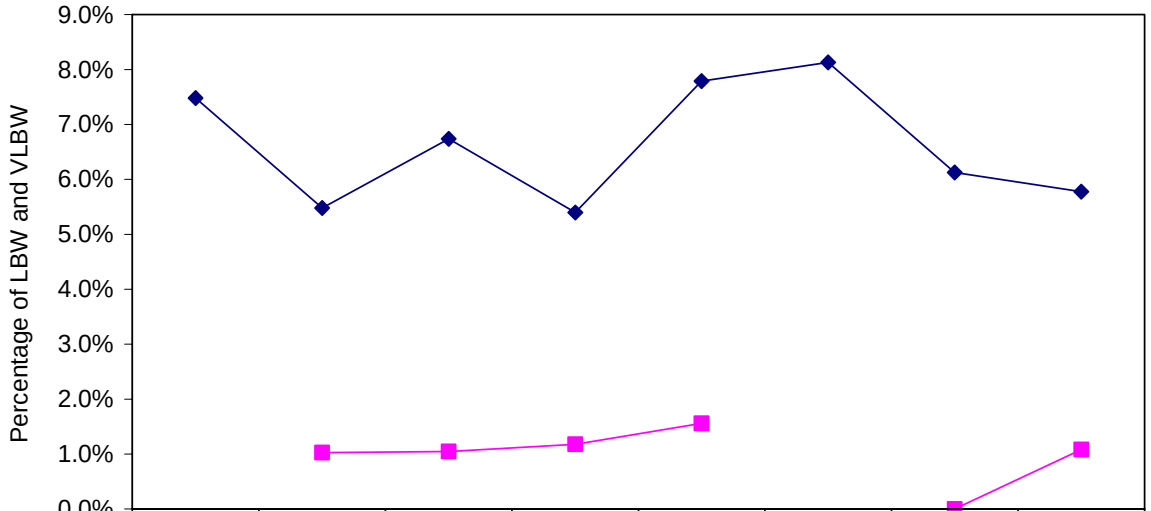
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Although very low birthweight (VLBW) is experienced by all races/ethnicities shown, a greater percentage of Black infants are born VLBW.
- The VLBW rate for Black infants in 2005 (3.4%) (n=74) was double that for White infants (1.4%) (n= 38).
- In each of the years shown, the VLBW rate for Black infants is significantly higher than all other races/ethnicities.
- From 1998 to 2005, VLBW increased for all races/ethnicities except Latinos. However, none of the increases were statistically significant.

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight and Very Low Birthweight of Asian Infants by Year, Boston, 1998-2005**




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| LBW | 7.5% | 5.5% | 6.7% | 5.4% | 7.8% | 8.1% | 6.1% | 5.8% |
| VLBW | n<5 | 1.0% | 1.0% | 1.2% | 1.6% | n<5 | 0.0% | 1.1% |

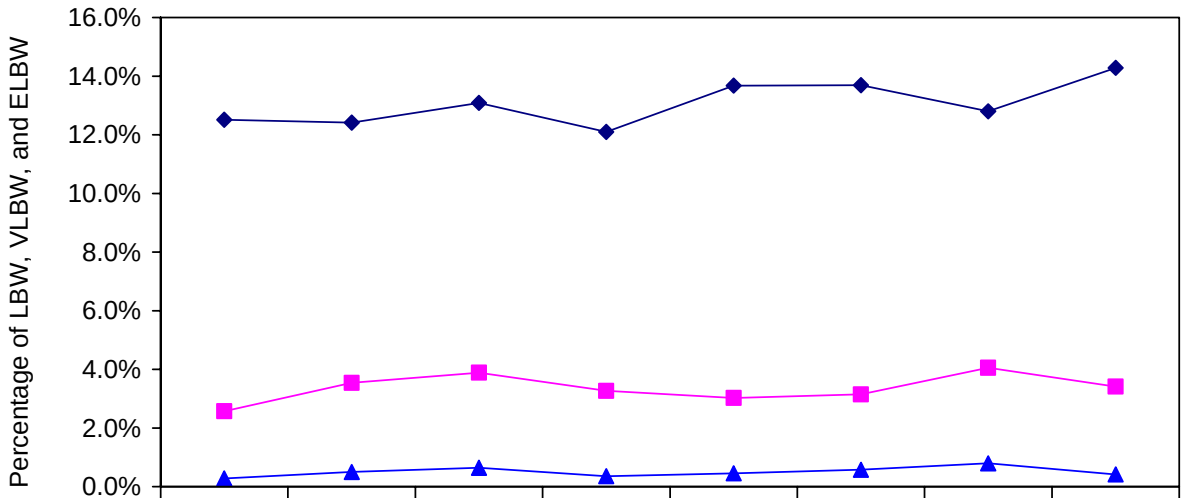
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- LBW and VLBW rates for Asian infants are the generally the lowest among races/ethnicities.
- The LBW rate for Asian infants appeared to be on a downward trend since the rate fell 23% between 1998 and 2005. This decline, however, was not statistically significant.
- Except in 2002, Asian VLBW births ranged from 0% to about 1% .

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight, Very Low Birthweight, and Extremely Low Birthweight of Black Infants by Year, Boston, 1998-2005**




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| LBW | 12.5% | 12.4% | 13.1% | 12.1% | 13.7% | 13.7% | 12.8% | 14.3% |
| VLBW | 2.6% | 3.5% | 3.9% | 3.3% | 3.0% | 3.1% | 4.1% | 3.4% |
| ELBW | 0.3% | 0.5% | 0.6% | 0.4% | 0.5% | 0.6% | 0.8% | 0.4% |

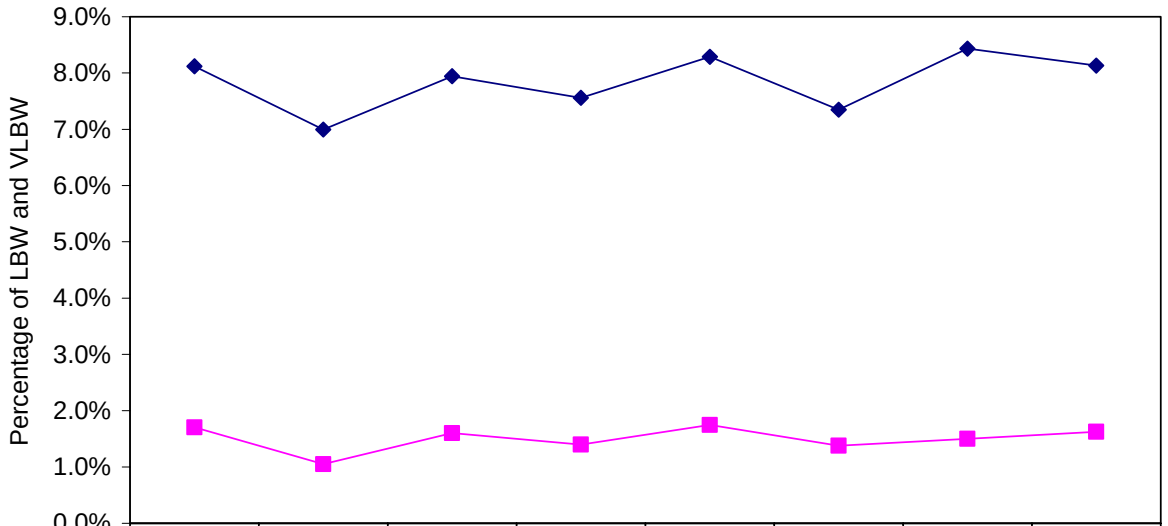
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Black infants have the highest LBW, VLBW, and ELBW rates of all races/ethnicities.
- From 1998-2005, Black infants experienced increases of about 30% in each of the three LBW categories. None of the increases, however, were significant.

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight and Very Low Birthweight of Latino Infants by Year, Boston, 1998-2005**




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| LBW | 8.1% | 7.0% | 7.9% | 7.6% | 8.3% | 7.3% | 8.4% | 8.1% |
| VLBW | 1.7% | 1.0% | 1.6% | 1.4% | 1.7% | 1.4% | 1.5% | 1.6% |

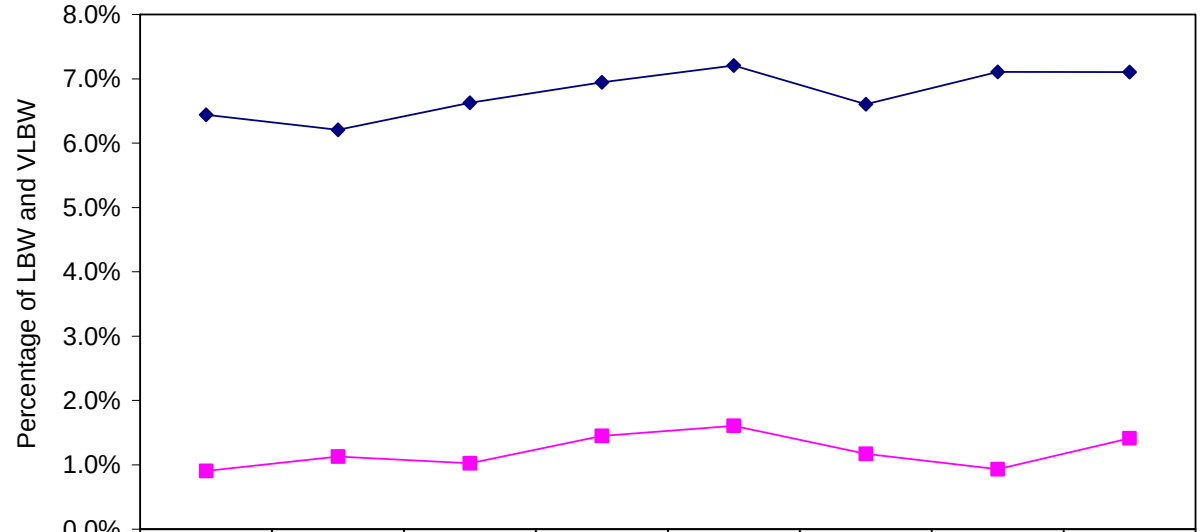
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- During 1998 -2005, The LBW rate for Latino infants fluctuated between 7.0% and 8.4% with rates of about 8% for most years.
- Between 1998 and 2005, LBW rates remained unchanged.
- VLBW rates for Latino infants remained below 2.0% for every year during the 1998-2005 period.

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight and Very Low Birthweight of White Infants by Year, Boston, 1998-2005**




| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| LBW | 6.4% | 6.2% | 6.6% | 6.9% | 7.2% | 6.6% | 7.1% | 7.1% |
| VLBW | 0.9% | 1.1% | 1.0% | 1.4% | 1.6% | 1.2% | 0.9% | 1.4% |

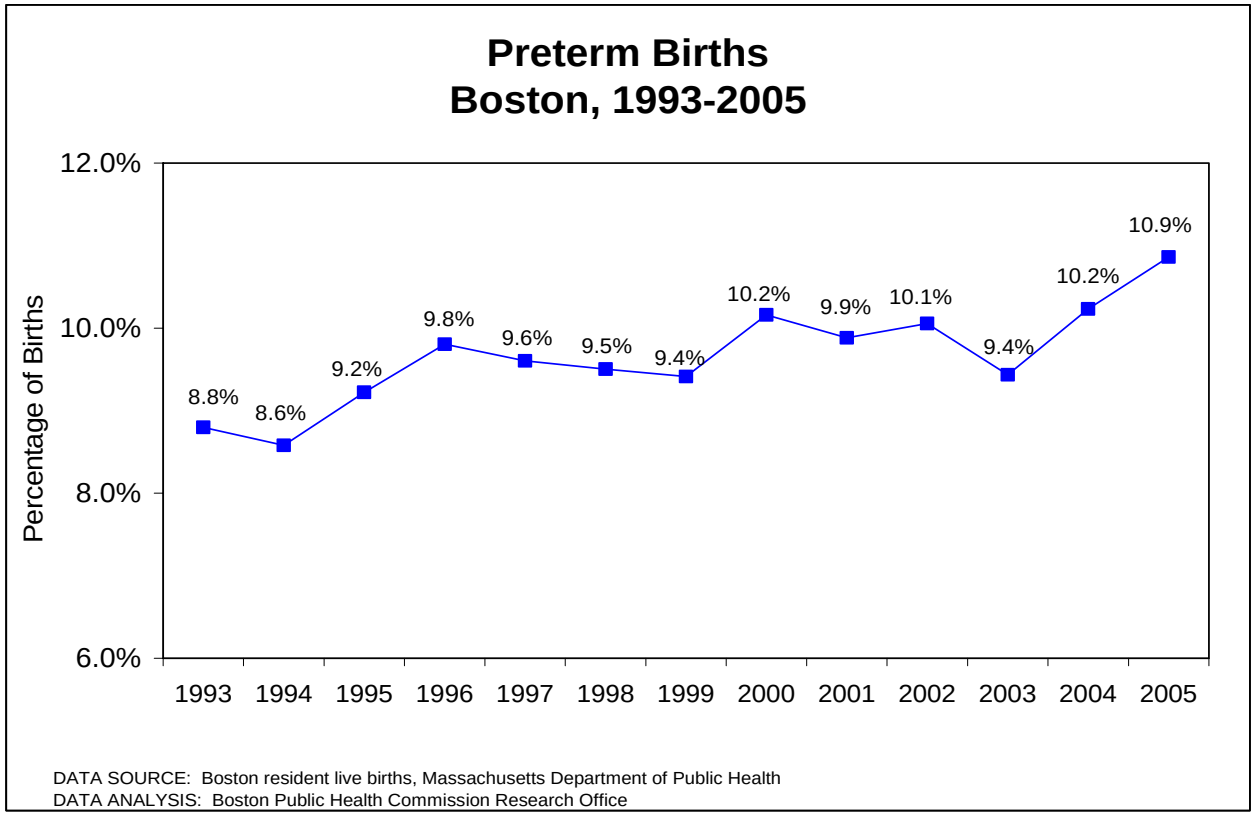
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- With the exception of 1998 and 1999, LBW rates for White infants remained stable at around 7% for most years of the 1998-2005 period. Between 1998 and 2005, the rates increased 10.9% but the increase was not statistically significant.
- VLBW rates for White infants continue to account for less than 2% of White infant births annually.

# INFANT CHARACTERISTICS

## *Preterm Birth*

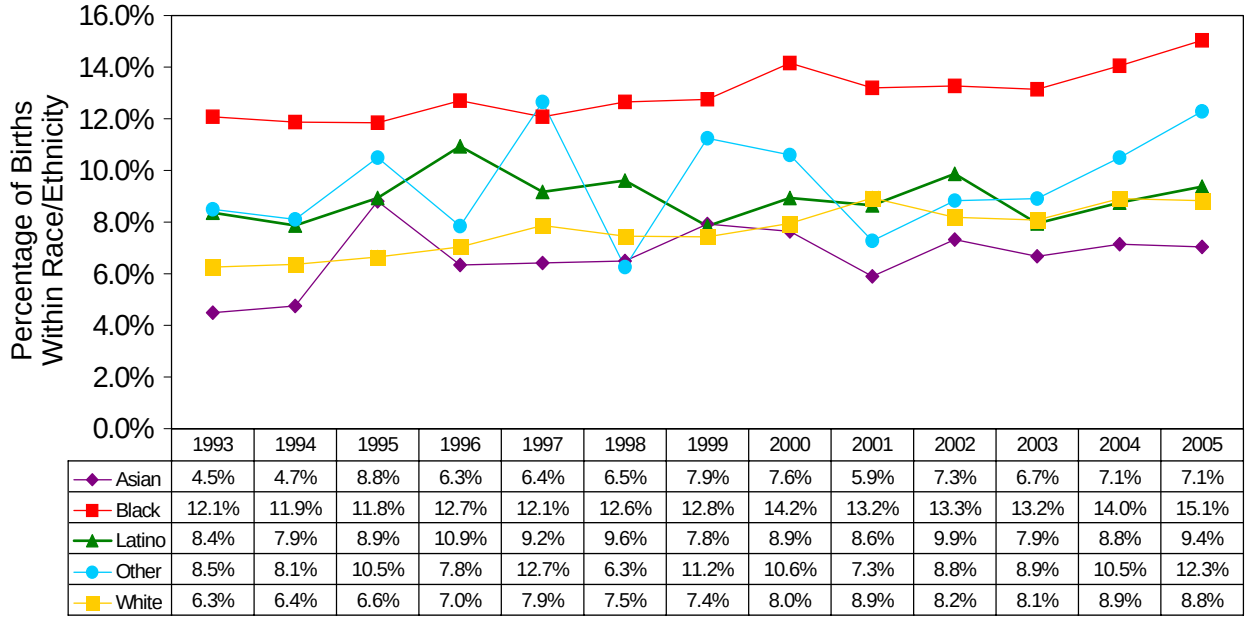
A preterm birth (PTB) is one that occurs at less than 37 completed weeks' gestation. Infants born too early are at substantially increased risk of illness and death; the earlier they are born, the higher their risk. Preterm birth and low birthweight are highly correlated, with 69.2% of LBW births in 2005 also being preterm, and 61.2% of preterm births also being LBW.




- Between 1993 and 2005, preterm births ranged between 8.8% and 10.9% of Boston births.
- The percentage of preterm birth for 2005 (10.9%) (n=818) was significantly different from that for 1993 (8.8%) (n=767).

# INFANT CHARACTERISTICS

## *Preterm Birth*



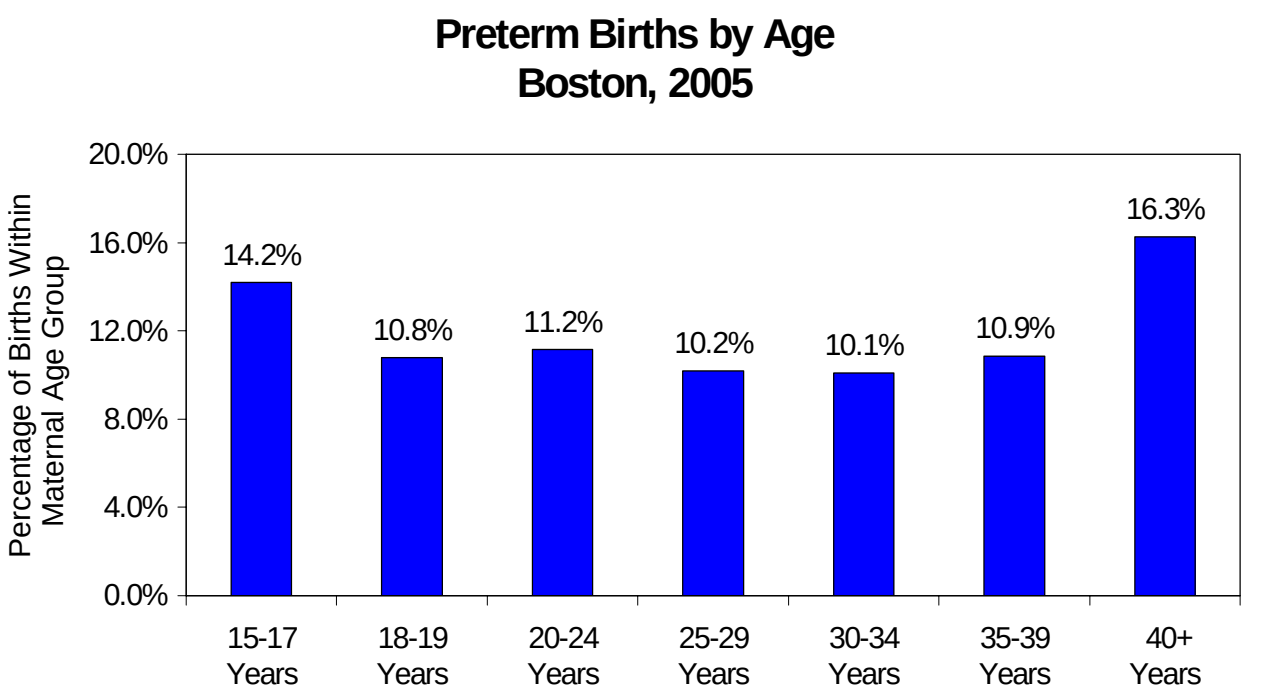

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asian | 4.5% | 4.7% | 8.8% | 6.3% | 6.4% | 6.5% | 7.9% | 7.6% | 5.9% | 7.3% | 6.7% | 7.1% | 7.1% |
| Black | 12.1% | 11.9% | 11.8% | 12.7% | 12.1% | 12.6% | 12.8% | 14.2% | 13.2% | 13.3% | 13.2% | 14.0% | 15.1% |
| Latino | 8.4% | 7.9% | 8.9% | 10.9% | 9.2% | 9.6% | 7.8% | 8.9% | 8.6% | 9.9% | 7.9% | 8.8% | 9.4% |
| Other | 8.5% | 8.1% | 10.5% | 7.8% | 12.7% | 6.3% | 11.2% | 10.6% | 7.3% | 8.8% | 8.9% | 10.5% | 12.3% |
| White | 6.3% | 6.4% | 6.6% | 7.0% | 7.9% | 7.5% | 7.4% | 8.0% | 8.9% | 8.2% | 8.1% | 8.9% | 8.8% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- As with low birthweight, PTB are more common for Black Boston women. For every year between 1993 and 2005, except 1997, the percentage of preterm birth was highest for Blacks.
- During the period 1993-2005, Asian, Latino, and White infants were less likely to be born preterm than were Black infants, and these differences were statistically significant.

# INFANT CHARACTERISTICS

## *Preterm Birth*

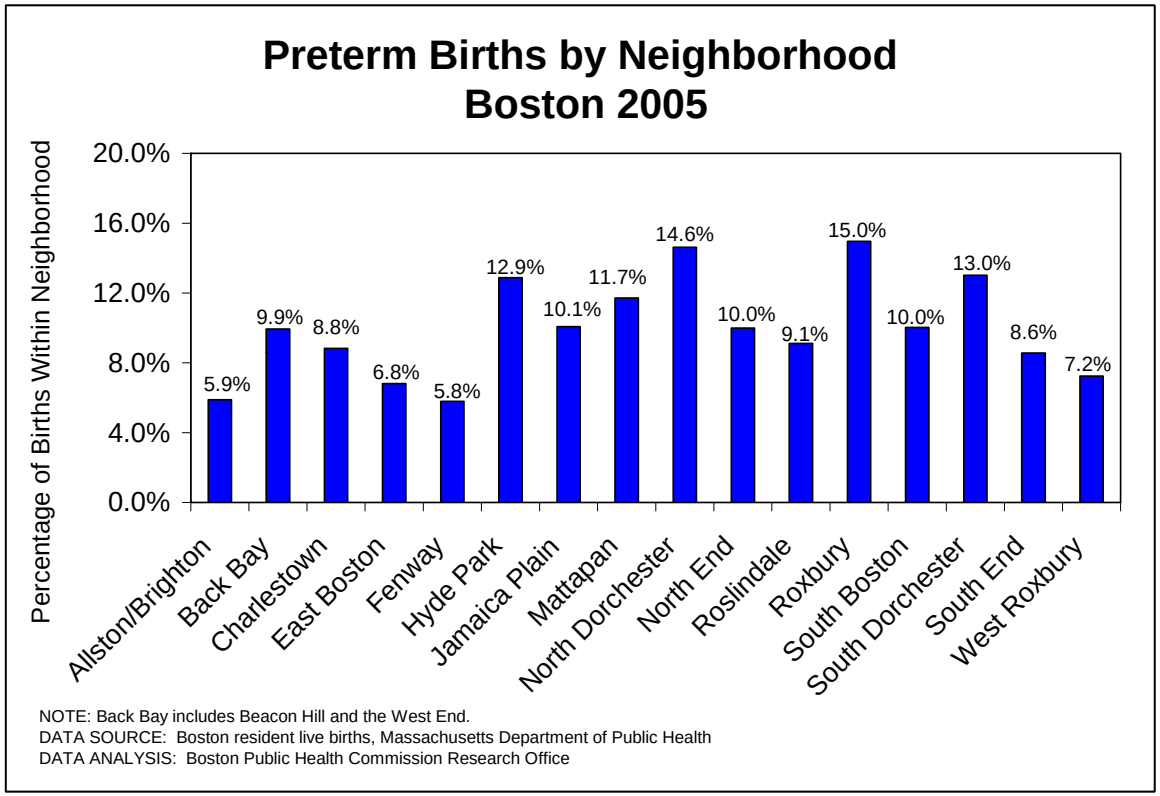



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Overall, about one in every ten Boston births in 2005 was preterm (10.9%) (n=818) (Data not shown).
- PTB was least common among births to 30-34 year olds and 25-29 year olds, and most common among births to women ages 40 and over.

# INFANT CHARACTERISTICS

## *Preterm Birth*




NOTE: Back Bay includes Beacon Hill and the West End.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's neighborhood with the highest percentage of preterm birth in 2005 was Roxbury (15.0%) (n=108), followed by North Dorchester (14.6%) (n=192), South Dorchester (13.0%) (n=85), and Hyde Park (12.9%) (n=58).

# LOGISTIC REGRESSION ANALYSIS

## *Introduction*

The descriptive statistics (numbers, percentages, and rates) presented in BPHC annual health reports are useful in their capacity to portray individual characteristics (for example, low birthweight, the prevalence of smoking during pregnancy, or the adequacy of prenatal care). However, they are limited in their ability to look at multiple characteristics at one time. This is often of value in comparing one group with another or examining changes over time. It requires the ability to assess the importance of one factor as though other relevant factors were the same in each group, thus making the groups comparable to one another. To achieve this, multivariate statistical techniques such as logistic regression are used.

Logistic regression is a type of mathematical modeling that produces an estimate of the odds of having a particular outcome (for example, a low birthweight birth) given that a woman has a particular characteristic such as smoking during pregnancy, versus the odds of having a low birthweight given that she does not smoke during pregnancy. Logistic regression estimates these odds, and the ratio of one to the other while controlling for other relevant factors such as age, type of insurance, maternal birthplace, or education. The resulting statistic, the odds ratio, compares the two groups—smokers and nonsmokers—and their likelihood of having a low birthweight birth as though they were identical in age, race/ethnicity, education, etc. In this example, when the odds of having a low birthweight birth are not roughly equal for smokers and nonsmokers, the magnitude of the difference between them is assessed statistically, and if it is unlikely to have been due to change, the finding is considered statistically significant.

Like all statistical techniques, logistic regression has inherent limitations. Although this method can help to identify likelihood that the selected outcome and variables of interest are present together, it does not define which caused the other to occur or whether there is any causal relationship between them. Another limitation that exists when using the Boston birth data is the number and nature of the variables that can be used in a regression model. If a variable of interest is rare within the group being studied, or if the group itself is small, this makes the groups more difficult to compare since a difference is less noticeable statistically. For this reason, logistic regression may fail to identify small but real differences between groups.

For this report, the two outcomes that have been selected for analysis are (1) bearing a child of low birthweight (less than 2,500 grams or 5.5 pounds and (2) receiving adequate prenatal care. Results are presented and discussed on the pages that immediately follow.

# LOGISTIC REGRESSION ANALYSIS

## *Low Birthweight Birth*

Logistic regression was used to examine the relationship between low birthweight and several characteristics reported on the birth certificate.

**Adjusted Odds Ratios for Low Birthweight Birth, Boston, 2005**

| | LBW Birth | | |
|---|---|---|---|
| | Adjusted Odds Ratio | Lower 95% CI | Upper 95% CI |
| Race/Ethnicity | | | |
| Asian | 1.18 | 0.78 | 1.78 |
| Black | 2.37 | 1.83 | 3.07 |
| Latino | 1.40 | 1.04 | 1.90 |
| Other | 1.92 | 1.34 | 2.75 |
| White* | 1.00 | | |
| Educational Attainment | | | |
| Less Than High School Diploma | 0.85 | 0.65 | 1.11 |
| HS Graduate/GED* | 1.00 | | |
| associate degree | 0.84 | 0.66 | 1.06 |
| College or higher | 0.61 | 0.46 | 0.80 |
| Plurality | | | |
| Singleton* | 1.00 | | |
| Twins or Higher | 23.41 | 17.89 | 30.62 |
| Gravidity | | | |
| 1st preg* | 1.00 | | |
| 2nd preg | 0.82 | 0.67 | 1.02 |
| 3rd preg | 0.59 | 0.44 | 0.79 |
| 4 or more | 0.98 | 0.75 | 1.28 |
| Insurance | | | |
| Private* | 1.00 | | |
| Public | 0.73 | 0.59 | 0.89 |
| Smoking During Pregnancy | | | |
| Smoker | 2.29 | 1.58 | 3.29 |
| Non-Smoker* | 1.00 | | |

*Reference group.

NOTE: Maternal age, marital status, parity, maternal birthplace, and adequate PNC were not significant predictors.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission Research Office

- The strongest association found with low birthweight in this analysis was the number of infants in the pregnancy. Other factors being equal, twins or other multiple births were 23.4 times as likely as singletons to be born low birthweight.
- Births of Black infants were about twice as likely, and those of Latino infants were about 40% more likely, to be low birthweight than were births of White infants. Both of these differences were statistically significant.
- Births to women in their third pregnancy were 59% as likely to be low birthweight as births to women in their first pregnancy.
- Women who were college graduates or post graduates were about 61% as likely to have low birthweight births as women who graduated from high school or had a GED. This was the only category of educational attainment that was statistically significant.
- Births to women who smoked were twice as likely to be low birthweight than births to women who did not smoke.

# LOGISTIC REGRESSION ANALYSIS
## *Adequate Prenatal Care*

Logistic regression was used to examine the relationship between adequate prenatal care and selected characteristics on the birth certificate.

**Adjusted Odds Ratios for Adequate Prenatal Care, Boston, 2005**

| | Adequate PNC | | |
|---|---|---|---|
| | Adjusted Odds Ratio | Lower 95% CI | Upper 95% CI |
| Race/Ethnicity | | | |
| Asian | 1.11 | 0.83 | 1.48 |
| Black | 0.75 | 0.62 | 0.92 |
| Latino | 1.23 | 0.98 | 1.54 |
| Other | 1.06 | 0.79 | 1.42 |
| White* | 1.00 | | |
| Age | | | |
| <20 Years | 0.75 | 0.58 | 0.97 |
| 20-24 Years* | 1.00 | | |
| 25-29 Years | 1.01 | 0.82 | 1.23 |
| 30-34 Years | 0.99 | 0.80 | 1.22 |
| 35-39 Years | 1.09 | 0.85 | 1.40 |
| 40 or Older | 0.98 | 0.67 | 1.41 |
| Gravidity | | | |
| 1st preg* | 1.00 | | |
| 2nd preg | 1.01 | 0.85 | 1.19 |
| 3rd preg | 0.95 | 0.77 | 1.17 |
| 4 and more preg | 0.78 | 0.63 | 0.97 |
| Maternal Birthplace | | | |
| US* | 1.00 | | |
| Foreign** | 0.63 | 0.54 | 0.73 |
| Educational Attainment | | | |
| Less Than High School Diploma | 0.52 | 0.44 | 0.61 |
| HS Graduate/GED* | 1.00 | | |
| Associate degree | 0.94 | 0.78 | 1.13 |
| College or higher | 1.27 | 1.01 | 1.59 |
| Plurality | | | |
| Singleton* | 1.00 | | |
| Twins or Higher | 3.32 | 1.91 | 5.76 |
| Insurance status | | | |
| Private* | 1.00 | | |
| Public | 0.52 | 0.44 | 0.61 |
| Smoking During Pregnancy | | | |
| Smoker | 0.37 | 0.27 | 0.49 |
| Non-Smoker* | 1.00 | | |

*Reference group. **Includes US territories

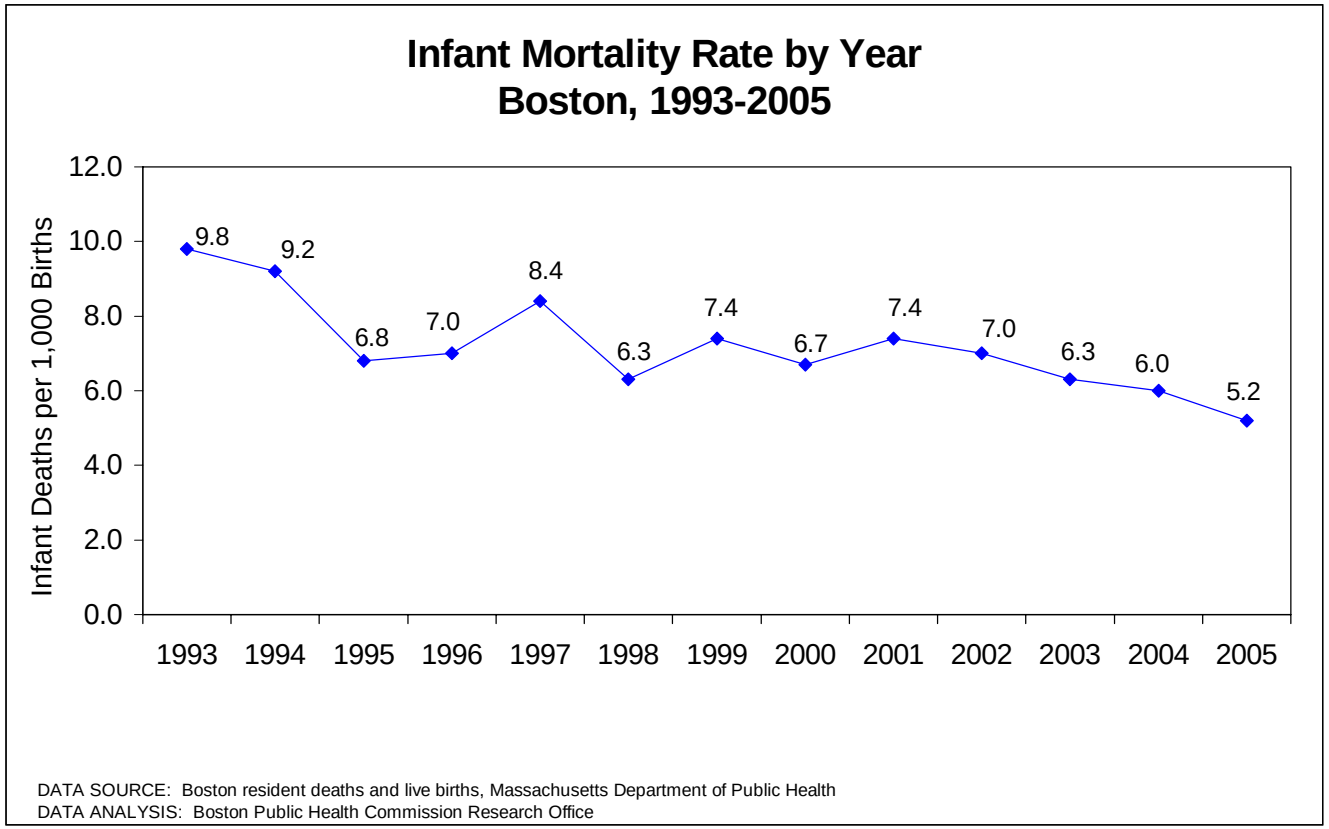
NOTE: Marital status and parity were not significant predictors.
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, maternal age was significantly related to the odds of prenatal care utilization for women under the age of 20. Births to women under the age of 20 were 75% as likely to have received adequate prenatal care as births to women ages 20-24.
- Mother's race was significantly related to prenatal care adequacy in the case of Black women. Births to Black women were about 75% as likely to have received adequate prenatal care as births to White women.
- Births to women born in a country outside of the US were about 63% as likely to have received adequate prenatal care as births to US-born women.
- Women without a high school diploma were 52% as likely as women with a high school diploma to have had adequate prenatal care.
- Births of twins or higher were 3.3 times more likely than singleton births to have received adequate prenatal care.
- Women who smoked during pregnancy were 37% as likely as women who did not smoke during pregnancy to have had adequate prenatal care.
- Births to women in their fourth pregnancy or higher were 78% as likely as women in their first pregnancy to have received adequate prenatal care.
- Women with public insurance for their prenatal care were about half as likely to have had adequate prenatal care.

# INFANT MORTALITY

## *Trend*

Infant mortality is defined as the death of a live born baby before its first birthday. In Boston, the most frequent causes of infant death are conditions related to prematurity and congenital anomalies. Despite yearly fluctuations because of its relative infrequency, infant mortality is a useful indicator of the health not only of babies, but also of women of childbearing age and the surrounding community.




DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2005, there were 39 deaths of Boston infants, yielding an infant mortality rate (IMR) of 5.2 infant deaths per thousand live births. The one-year decrease from 6.0 per thousand in 2004 was not statistically significant.
- Infant mortality also decreased between 1993 and 2005, but this trend was not statistically significant.

# INFANT MORTALITY

## *Disparities*

Differences across population groups in the occurrence of infant death are important indicators of disparities in women's health, health care access, and the general health of communities. Perhaps more than any other single health measure, infant mortality is considered throughout the world to reflect the impact of economic burdens, racism, and social stressors on individuals and communities.

**Infant Mortality Rates by Race/Ethnicity, Boston, 2005**

| | Births | Deaths | IMR |
|---|---|---|---|
| **Asian** | 554 | n<5 | --* |
| **Black** | 2,173 | 19 | 8.7 |
| **Latino** | 1,602 | 5 | 3.1 |
| **White** | 2,696 | 11 | 4.1 |
| **Other/Unknown** | 516 | 0 | --* |
| | | | |
| **TOTAL** | **7,554** | **39** | **5.2** |

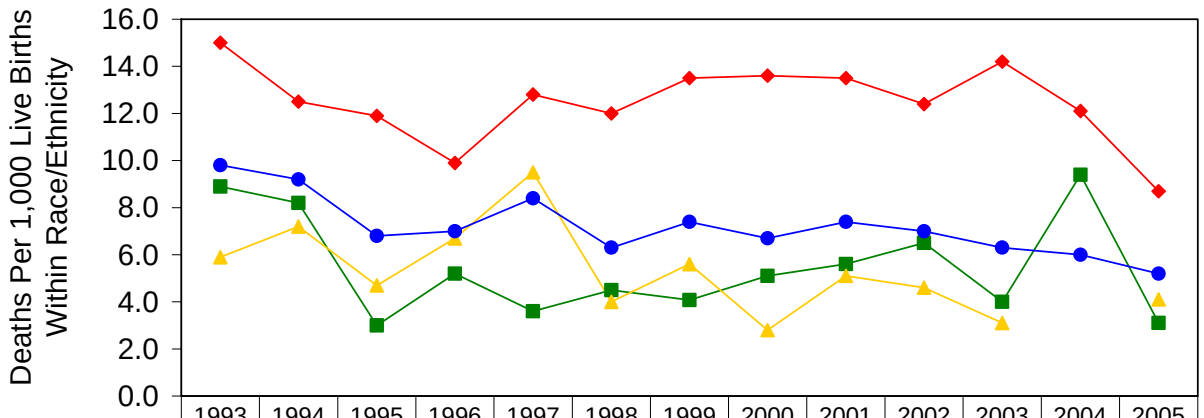
*Infant mortality rate = deaths per 1,000 live births. Rates not calculated when the number of deaths is < 5
DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The 2005 IMR for Boston's Black infants was 8.7 deaths per 1,000 live births, but twice as high as the IMR of White infants.
- Boston's Asian population, with 7.3% of the city's births, had less than 5 infant deaths in 2005.
- Black residents, with 28.8% of births, had 48.7% of all infant deaths.
- The Latino percentage of Boston births in 2005 was 21.2%, while its' percentage of infant deaths was 12.8%.
- Whites had 35.7% of Boston's births in 2005, and 28.2% of its infant deaths.

# INFANT MORTALITY

## *Disparities*

### Infant Mortality Rates by Race/Ethnicity and Year, Boston, 1993-2005




| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Black | 15.0 | 12.5 | 11.9 | 9.9 | 12.8 | 12.0 | 13.5 | 13.6 | 13.5 | 12.4 | 14.2 | 12.1 | 8.7 |
| Latino | 8.9 | 8.2 | 3.0 | 5.2 | 3.6 | 4.5 | 4.1 | 5.1 | 5.6 | 6.5 | 4.0 | 9.4 | 3.1 |
| White | 5.9 | 7.2 | 4.7 | 6.7 | 9.5 | 4.0 | 5.6 | 2.8 | 5.1 | 4.6 | 3.1 | n<5 | 4.1 |
| BOSTON | 9.8 | 9.2 | 6.8 | 7.0 | 8.4 | 6.3 | 7.4 | 6.7 | 7.4 | 7.0 | 6.3 | 6.0 | 5.2 |

NOTE: Rates for Asians and Others are not presented because each group had less than 5 deaths per year for several of these years.
DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Although the 2005 IMRs for Black and White infants are lower than they were in 1993, neither change over time represented a statistically significant decline. Similarly, the change in the Latino IMR between 1993 and 2005 was not statistically significant.

- The relationship between Black infant mortality and that of other groups was consistent over time; at no point did other IMRs exceed those of Black infants.

# INFANT MORTALITY

## *Disparities*

| Black and White Infant Mortality Rates Boston, 1993-2005 | | | |
|---|---|---|---|
| | Black | White | Ratio |
| 1993 | 15.0 | 5.9 | 2.5 |
| 1994 | 12.5 | 7.2 | 1.7 |
| 1995 | 11.9 | 4.7 | 2.5 |
| 1996 | 9.9 | 6.7 | 1.5 |
| 1997 | 12.8 | 9.5 | 1.3 |
| 1998 | 12.0 | 4.0 | 3.0 |
| 1999 | 13.5 | 5.6 | 2.4 |
| 2000 | 13.6 | 2.8 | 4.9 |
| 2001 | 13.5 | 5.1 | 2.6 |
| 2002 | 12.4 | 4.6 | 2.7 |
| 2003 | 14.2 | 3.1 | 4.6 |
| 2004 | 12.1 | n<5 | -- |
| 2005 | 8.7 | 4.1 | 2.1 |

DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- The disparity between the infant mortality rates of Black and White Boston residents can be expressed as a ratio. Over time, this ratio has consistently shown a large excess in Black infant deaths relative to those of Whites.

- The smallest disparity between 1993 and 2005 was in 1997, when the ratio of 1.3 indicated a 30% excess in the Black IMR. The largest disparity occurred in 2000, when there were 4.9 Black infant deaths for every White infant death.

# INFANT MORTALITY

## *Disparities*

In Boston, large differences across racial/ethnic groups exist in the occurrence of preterm birth and low birthweight. These differences have large implications for infants' chances of survival.

### Cumulative Birthweight Distribution By Race/Ethnicity, Boston, 2000-2005

| | <500g | <750g | <1,000g | <1,500g | <2,000g | <2,500g | 2,500g+ |
|---|---|---|---|---|---|---|---|
| Asian | 0.08% | 0.19% | 0.49% | 0.90% | 2.04% | 6.69% | 93.31% |
| Black | 0.54% | 1.41% | 2.02% | 3.46% | 5.97% | 13.25% | 86.75% |
| Latino | 0.18% | 0.51% | 0.80% | 1.54% | 3.05% | 7.94% | 92.06% |
| Other | 0.23% | 0.77% | 1.17% | 2.03% | 4.06% | 9.15% | 90.85% |
| White | 0.09% | 0.28% | 0.58% | 1.26% | 2.79% | 6.93% | 93.07% |

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health
DATA ANALYSIS: Boston Public Health Commission Research Office

- Mortality is high in extremely LBW babies (<500grams or 1.1 pounds). Although clinical and technological advances have been made in keeping infants born weighing less than 500 grams (1.1 pounds) alive, most still die, compared to infants of normal birthweight (2,500grams, or 5.5 pounds or more).
- Extremely premature births are far more common among Black Boston residents than among other race/ethnicity groups, and this fact accounts for much of the excess mortality of Black infants.

# APPENDIX

## *Healthy People 2010*

### Healthy People 2010 Objectives
### Selected Maternal and Infant Health Indicators

| OBJECTIVE | HP 2010 TARGET | BOSTON, 2005 |
|---|---|---|
| **Prenatal Care** | | |
| Care beginning in first trimester | 90% of births | 81.3% of births |
| **Risk Factors** | | |
| Low Birthweight (LBW) | no more than 5% of births | 9.6% of births |
| by Race/Ethnicity: | | |
| White, non-Hispanic | no more than 6.5% of births | 7.1% of births |
| Black, non-Hispanic | no more than 13.1% of births | 14.3% of births |
| Hispanic | no more than 6.4% of births | 8.1% of births |
| Asian | no more than 7.2% of births | 5.8% of births |
| Very Low Birthweight (VLBW) | no more than 0.9% of births | 2.1% of births |
| Preterm* | no more than 7.6% of births | 10.9% of births |
| by Race/Ethnicity: | | |
| White, non-Hispanic | no more than 9.9% of births | 8.8% of births |
| Black, non-Hispanic | no more than 17.6% of births | 15.1% of births |
| Hispanic | no more than 11.2% of births | 9.4% of births |
| Asian | no more than 10.2% of births | 7.1% of births |
| **Infant Deaths** | | |
| Infant Mortality Rate | no more than 4.5 deaths per 1,000 births | 5.2 deaths per 1,000 births |
| by Race/Ethnicity: | | |
| White, non-Hispanic | no more than 6.0 deaths per 1,000 births | 4.1 deaths per 1,000 births |
| Black, non-Hispanic | no more than 13.7 deaths per 1,000 births | 8.7 deaths per 1,000 births |
| Hispanic | no more than 6.0 deaths per 1,000 births | 3.1 deaths per 1,000 births |
| Asian | no more than 5.0 deaths per 1,000 births | n<5 deaths per 1,000 births |
| Neonatal Mortality Rate | no more than 2.9 deaths per 1,000 births | 4.2 deaths per 1,000 births |
| by Race/Ethnicity: | | |
| White, non-Hispanic | no more than 3.9 deaths per 1,000 births | 4.1 deaths per 1,000 births |
| Black, non-Hispanic | no more than 9.4 deaths per 1,000 births | 6.4 deaths per 1,000 births |
| Hispanic | no more than 4.0 deaths per 1,000 births | n<5 deaths per 1,000 births |
| Asian | no more than 3.2 deaths per 1,000 births | n<5 deaths per 1,000 births |
| Postneonatal Mortality Rate | no more than 1.5 deaths per 1,000 births | 0.9 deaths per 1,000 births |
| by Race/Ethnicity: | | |
| White, non-Hispanic | no more than 2.1 deaths per 1,000 births | 0.0 deaths per 1,000 births |
| Black, non-Hispanic | no more than 4.5 deaths per 1,000 births | 2.3 deaths per 1,000 births |
| Hispanic | no more than 2.0 deaths per 1,000 births | n<5 deaths per 1,000 births |
| Asian | no more than 1.8 deaths per 1,000 births | n<5 deaths per 1,000 births |

*Born before completion of 37 weeks gestation
Note: Asian includes Pacific Islanders.
DATA SOURCE: Healthy People 2010 available at http/www.healthypeople.gov/document/pdf/vol2/16MICH.pdf. Accessed July 31, 2007

# APPENDIX

## *Technical Notes*

This section provides additional information about the terms, concepts, and sources used in *Boston Natality 2007: A Review of 2005 Birth Data*. A number of these subjects are also covered in the glossary. Readers may call the Boston Public Health Commission's Research Office at (617) 534-4757 for more information with questions about the report.

### Adolescence

The Boston Public Health Commission does not include 18 and 19 year-old women in the count of Boston adolescent births and the city's adolescent birth rate. The childbearing patterns of these young adults are distinctive from those of adolescents in their early to mid-teens and so are reported separately.

### Rates

Two types of rates have been included in *Boston Natality 2007: A Review of 2005 Birth Data*. They are *Age-Specific Rates (ASR)* and *Infant Mortality Rates (IMRs)*.

*Age-Specific Rates (ASRs)* take into account the size and age distribution of the population. They enable the reader to compare different groups without being concerned that differences in health status of those groups are due to differences in the size of the groups or in distribution of ages. An ASR is calculated by dividing the number of events among people in an age group by the number of people in that age group. ASRs for birth-related rates are calculated for every 1,000 women in any age group. In this report, race/ethnicity specific ASRs are also presented.

*Infant Mortality Rates* (IMRs) are used as a measure of infant deaths within a population. However, unlike mortality rates for adults or children one year of age and over, which are usually calculated as the number of events per 100,000 persons in the population, IMRs are calculated on the basis of every 1,000 live births.

# APPENDIX

# *Technical Notes*

## Statistical Significance

An array of statistical tools are available to determine whether findings, typically differences observed between groups or within a group over a period of time, are large enough that they are not likely to have been due to chance. Essentially, statistical significance testing provides an assessment of how reasonable it would be to conclude that an observed difference is real. It is not capable of overcoming other issues such as non-comparable samples or too few cases in a sample, but is a valuable guide to the interpretation of rates, proportions, and similar measures. In this report, statistically significant rates and percents are reported based on whether the particular finding could be expected to occur in fewer than 5 out 100 similar circumstances, abbreviated as $p<.05$.

Statistical significance is only one measure of significance. There may be findings that have other important relevance clinically or for public health programs, regardless of statistical significance. An absence of statistical significance should not be used to imply an absence of other significance.

## Logistic Regression

Logistic regression is a statistical technique that assesses the impact of several qualities of a population group at the same time. The goal of logistic regression analysis is to design a mathematical model that can predict a particular outcome such as low birthweight or the adequacy of prenatal care, known as the dependent variable. In order to do so, this model must take into account factors that may affect the possibility that this outcome may occur. These factors are called independent variables and can include biological, environmental, or social elements. A successful logistic regression model will include any relevant factors and be able to predict which members of the population are likely to have the outcome of interest.

To indicate how greatly a factor predicts the outcome, a number, called the coefficient, is calculated to represent the relative strength of that relationship. A logistic regression equation integrates relationships like these into a model that includes many variables and their coefficients.

## Time Periods and Small Numbers of Events

This report contains data drawn from the period 1993 through 2005. In general, Boston-specific data are presented for the thirteen-year time span of 1993 through 2005 either year by year or for 2005 only.

Determination of the time period to be used depends largely on the availability and adequacy of the data. In analyzing subgroups within the Boston population there must be a sufficient number of events, such as deaths or births, within the time period to provide reliable rates. Though what is defined as

a "small" number can vary, the BPHC Research Office adheres to the widespread practice of not calculating rates for fewer than five deaths, births, or other events.

## Population

Health status reports often use population statistics for analyzing health data. These population statistics may be drawn from two sources. The first is the census of the population taken every ten years by the federal government, a literal count of all people living in the United States. The second is estimates of the population made by the US Census Bureau or some other source in the intervening years.

Each source has its own advantages, and there are distinct reasons for choosing each one. The census provides the best available actual count of the population. Another important strength of the census is that it presents data to the level of small areas called census tracts, each of which has only a few thousand residents. Census tracts can be combined to produce neighborhood-level analyses.

However, while the 1990 census was the best estimate of the population for the early 1990s, with each passing year it becomes more remote from the population it was intended to represent. Changes in the population in the years following the census cannot be taken into account when using old census data, so this report utilizes population estimates. In this report the 2000 census population for Boston as well as population estimates for the years between the censuses have been used.

Population projections, or estimates, of the population, are developed by the Census Bureau and other institutions using sophisticated statistical methods. The results are designed to take into account in- and out-migration and other changes occurring in the population between census years. And yet, for the purposes of this report, estimates of population changes between census years have some drawbacks. They do not typically account for changes in the racial composition of a community, and they do not generally permit neighborhood-level analyses. Perhaps most importantly, even small errors in the accuracy of projections for neighborhoods or other population subgroups can result in large distortions in their rates.

To provide data on people of Latino ethnicity, who may be of any race, this report uses the 2000 US census for Boston census tracts, produced by the Bureau of the Census, and MISER and Massachusetts Department of Public Health population estimates, for denominators for rate calculations that require population data. This avoids the double-counting which would result if Latinos were included in the White, Black, and Asian racial categories as well as in the Latino categories.

## Population Estimates

Interpolations of population counts were used in calculating birth rates for years between the 1990 and 2000 US censuses. The difference between the 1990 and 2000 US Census numbers by race/ethnicity were divided and applied across the time interval.

## Neighborhoods

BPHC reports attempt to present data for geographic areas that are meaningful to readers, small enough to reveal variations in health patterns throughout the city, and large enough to be statistically reliable. The neighborhood definitions used in these reports were established in consultation with local residents, health care providers, and advocates throughout Boston and are used in all BPHC reports.

## Racial and Ethnic Designations

National, state, and local health data sources usually make available data for only a few large racial and ethnic groups, and the classifications they use are not always consistent with other sources; caution should be used in comparing racial and ethnic data from different sources. The categories used in *Boston Natality 2007: A Review of 2005 Birth Data* are Asian, Black, Latino, Other, and White. These racial and ethnic designations are derived from the source of the data, including the US census, birth and death data from the Massachusetts Department of Public Health, and other sources.

The collection of race/ethnicity data varies with the data source. Some sources may rely on observation and others on self-reporting. Self-reporting is the preferable method. Race and ethnicity on death certificates are usually reported by the funeral director based on information provided by a relative or friend, while birth certificates usually collect information from the mother but may combine information reported by the mother, father, or other relatives.

In considering the racial or ethnic designations used in this report for Boston-specific data, several things should be kept in mind: (1) The concept of race has different meanings in different cultures. (2) Race is not a biological but a social phenomenon. (3) The meanings of racial designations are subject to historical, cultural, and political forces. (4) Finally, racial designations can be inaccurate in describing what they are called upon to describe. The term Black, for example, includes people who might describe themselves as African-American, African, Caribbean, or Haitian.

In the charts which present data by race and ethnicity or in the text which discusses health problems among racial and ethnic populations, it should be kept in mind that, as the CDC has said, "race and ethnicity are not risk factors [for disease]—they are markers used to better understand risk factors." Race is thus a proxy for such factors as socioeconomic status, inadequate access to health care, and racial discrimination. Information on race and ethnicity is included in this report because it can assist public health efforts to recognize disparities between groups for a variety of health outcomes.

Boston-specific data in this report are presented for each race/ethnicity group for which numbers are large enough to allow calculation of percentages or reliable rates.

Since people of Latino heritage may be of any race, the federal and state data sources often report data for Blacks and Whites, including Latinos in those categories. However, this report presents data for Latinas separately, with the data for the other groups (Asian, Black, Other, White) referring only to those who do not also consider themselves Latino.

## Prenatal Care Adequacy

Data about the initiation of prenatal care and the number of prenatal care visits received are assessed using the Adequacy of Prenatal Care Adequacy (APNCU) Index, developed by Milton Kotelchuck, MD, MPH. Also known as the Kotelchuck Index, this replaces the older Kessner Index and offers the capacity to distinguish between inadequacy of PNC due to late entry into care and inadequacy due to too-few visits.

| APNCU Index Category | Month of Pregnancy in Which Prenatal Care (PNC) Was Begun | Percentage of Expected PNC Visits That Were Received |
|---|---|---|
| Adequate Intensive | 1, 2, 3, or 4 | 110% or More |
| Adequate Basic | 1, 2, 3, or 4 | 80% - 109% |
| Intermediate | 1, 2, 3, or 4 | 50% - 79% |
| Inadequate | Month 5 or Later | Less Than 50% |
| NOTE: The expected number of visits uses the American College of Obstetricians and Gynecologists standard, which is based on the timing of PNC initiation and the length of gestation. | | |

# APPENDIX

## *Glossary*

**Adolescent births:** Births to young women between 15 and 17 years of age.

**African American:** Persons self-identified as born in the US who have ancestors of African descent. Racial or ethnic designations from all sources used in this report except death certificates are self-reported.

**Age-specific birth rate:** The number of births per year in a given age group per 1,000 women in that age group.

**Asian:** Persons self-identified as Asian or Pacific Islander (e.g., Chinese, Japanese, Hawaiians, Cambodians, Vietnamese, Asian Indians, Filipinos) who do not identify themselves as Latino.

**Birth**: All births reported in this report are live births; spontaneous or elective abortions and stillbirths are not included.

**Birth rate:** The number of live births per year, per 1,000 persons.

**Birthweight:** The weight of an infant at the time of delivery. It may be recorded in either grams or pounds/ounces. If recorded in pounds/ounces, it is converted to grams for use in this report based on the following formula: 1 pound = 453.6 grams; 1,000 grams = 2 pounds and 3 ounces.

**Black:** Persons self-identified as Black (e.g., African Americans, Haitians, West Indians) who do not identify themselves as Latino.

**Cesarean section:** The delivery of the fetus by an incision through the abdomen into the uterus. Often this procedure is done as a result of pregnancy-related complication such as the fetus being too large for the maternal pelvis. Breech presentations are also often handled by cesarean section.

**Confidence interval:** The range within which lies the true value of a variable, based on a chosen probability. For example, given the probability 95%, one can be ninety-five percent certain that the true value lies between numbers X and Y. The range between X and Y is the confidence interval.

**Extremely Low Birthweight (ELBW)**: Weight of an infant at time of delivery of less than 500 grams (1.1 pounds).

**Fertility Rate:** (sometimes referred to as the "Birth Rate" The number of births to females ages 15-44 years divided by the number females ages 15-44 years in the population times 1,000.

# APPENDIX

## *Glossary*

**Forceps:** An instrument used to grasp the fetal head as an aid in delivery; the delivery of an infant using such an instrument.

**Gestation:** The period of fetal growth in the uterus during pregnancy.

**Gestational age:** Length of pregnancy (in weeks) calculated as the number of weeks following the first day of the woman's last menstrual normal period. Pregnancy is approximately 40 weeks in length.

**Gravidity:** is the number of confirmed pregnancies.

**Latino:** People of any race (Asian, Black, Other, or White) who consider themselves Hispanic or Latino, such as Puerto Rican, Mexican, Cuban, Spanish, and Dominican.

**Infant mortality rate (IMR):** The number of deaths per 1,000 live births among infants less than one year old.

**Kotelchuck Index:** A measure of the adequacy of prenatal care utilization. Formally known as the Adequacy of Prenatal Care Utilization Index. See **Prenatal care** in the Technical Notes section of this report.

**Live birth:** 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.

**Logistic regression:** A statistical technique used to identify associations between independent variables, such as race or sex, and a selected dependent variable, such as preterm birth.

**Low birthweight (LBW):** Weight of an infant at delivery of less than 2,500 grams (5.5 pounds).

**Morbidity:** Illness, disease, or injury.

**Mortality:** The frequency of deaths in a specific time period; death rate.

# APPENDIX

## *Glossary*

**Multiple births:** The birth of two or more offspring from the same pregnancy.

**Neonatal death:** Death of an infant between live birth and 27 days of age.

**Neonatal mortality rate:** The number of neonatal deaths per 1,000 live births.

**Odds ratio:** A number that represents the likelihood of one group having an existing characteristic or an event occur in comparison to another group. An odds ration of 4, for example, means that a particular group (for example, persons who smoke) is four times as likely to experience a certain condition (for example, cancer) as a group with which it is compared (persons who don't smoke).

**Other race**: People self-identified as a race other than Asian, Black, or White (for example, American Indian/Native American, Aleut, Eskimo) and not Latino.

**Parity:** The number of live births a woman has had.

**Perinatal:** Occurring during or pertaining to the period before, during, and after birth. Ususally refers to the 28th week of gestation through the first seven days following delivery.

**Perinatal conditions:** Conditions originating in the perinatal period. Examples of such conditions include: birth trauma, disorders related to short gestation and low birthweight, disorders related to long gestation and high birthweight, respiratory and cardiovascular disorders or infections specific to the perinatal period. ICD-10 codes P00-P96.

**Plurality:** The number of births from the same pregnancy; a singleton (1), twins (2) triplets (3), quadruplets (4), quintuplets (5), sextuplets (6).

**Postneonatal death:** Death at 28 through 364 days of age.

**Postneonatal mortality rate:** The number of postneonatal deaths per 1,000 live births.

**Pregnancy:** The condition of carrying a developing embryo or fetus in the uterus.

**Prenatal care (PNC):** Medical and related services provided during pregnancy to improve the likelihood of a healthy pregnancy, safe delivery, and healthy full-term infant.

# APPENDIX

## *Glossary*

**Preterm birth:** Birth before 37 completed weeks' gestation.

**Private insurance:** Health insurance not paid for by public funds. Types of private insurance include health maintenance organizations (HMOs), Blue Cross/Blue Shield, and commercial insurers.

**Public insurance:** Health insurance paid for by public funds. This includes Medicaid, the state Healthy Start program, other types of governmental programs, and the Uncompensated Care Fund (the Free Care Pool).

**Race, other**: See Other Race

**Singleton**: A pregnancy consisting of a single infant, or such an infant.

**Socioeconomics**: Social and economic characteristics of a population, such as education and poverty levels.

**Term**: Birth at a gestational age of 37 or more completed weeks.

**Trimester**: A period of three months.
First trimester: The first three months of pregnancy.
Second trimester: The middle three months of pregnancy (four to six months).
Third trimester: The final three months of pregnancy (seven to nine months).

**Triplet**: One of three infants from the same pregnancy.

**Twin**: One of two infants from the same pregnancy.

**Vacuum extraction**: The delivery of an infant by the use of an instrument designed to apply suction to the head of the fetus.

**Vaginal birth**: The delivery of an infant through the birth canal.

**Very Low Birthweight (VLBW)**: Weight of an infant at time of delivery of less than 1,500 grams (3.3 pounds).

# APPENDIX

## *Glossary*

**Weight gain**: The total weight in pounds that a woman gains during her pregnancy. The current general guidelines recommend that a woman of normal weight and average height gain no less than 15 pounds and no more than 40 pounds.

**White**: Persons self-identified as White who do not identify themselves as Latino.