

BOSTON NATALITY 2004



A REVIEW OF 2002 BIRTH DATA

Prepared by the Boston Public Health Commission
David Mulligan, Chair
John Auerbach, Executive Director

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A Review of 2002 Birth Data*
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2004

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Boston Natality 2004:
A Review of 2002 Birth Data

HIGHLIGHTS

- The number of births to Boston residents in 2002 was 8,005, a 2.7% decrease compared with the number (8,231) in 2001.
- Close to one-third (30.1%) of Boston births in 2002 were to Black women; 35.0% were to White women; 21.7% were to Latinas; 8.0% were to Asian women; and 3.9% were to women of another race/ethnicity.
- In 2002, 46.5% of Boston resident births were to women who were born in a country other than the United States, and almost one-fourth of births (23.5%) were to women whose primary language was other than English. The most common of these languages was Spanish, reported on 13.3% of birth certificates.
- Most Boston births in 2002 (72.1%) were to women between the ages of 20 and 34; 3.0% were to adolescents 15-17 years old, 5.3% were to women 18-19 years old, 15.4% were to women 35-39 years old and 4.0% were to women 40 years of age or older.
- Close to half (48.9%) of all Boston births in 2002 were to women having their first child; 28.9% were to women having their second child, and 13.1% were to women having their third. Fewer than one in ten (9.1%) births were to women having their fourth or later child.
- Only 4.5% of births were to women who reported smoking during pregnancy, a decline of 70.0% between 1992 and 2002.
- Eighty-one percent of Boston births were to women who received prenatal care during the first three months of pregnancy. A slightly higher percentage (83.4%) of births occurred to women who received adequate prenatal care as defined by Kotelchuck's Adequacy of Prenatal Care Utilization Index. A significantly higher percentage (90.9%) of births to White women obtained adequate prenatal care, compared with births to Black women (75.3%), Latinas (83.5%), and Asian women (84.5%).
- Boston has experienced a statistically significant increase, from 2.8% in 1991 to 4.0% in 2002, in the percentage of its resident births that are composed of twin, triplet, or higher-order multiples. The increase was attributable to a significant increase in multiple births to women under 20 years of age and women between ages 30-34.
- The low birthweight (LBW) rate for Boston increased from 8.6% in 2001 to 9.5% in 2002. The one-year change was statistically significant.
- The low birthweight rate among Black births was 13.7% in 2002, significantly higher than the low birthweight rates among Asian births (7.8%), Latino births (8.3%), and White births (7.2%).
- Allston/Brighton (6.7%), Back Bay/Beacon Hill/the West End (7.1%), East Boston (7.1%), and Jamaica Plain (6.5%) had lower LBW rates than did the city as a whole, and North Dorchester (11.7%), Roxbury (11.8%), and Mattapan (13.1%) had higher LBW rates.

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HIGHLIGHTS

- Births to Boston women born in the United States had a significantly higher rate of LBW (10.4%) than did births to Boston women born in other countries (8.5%).
- Approximately 10.1% of births to Boston residents in 2002 were preterm births (PTB); that is, born before 37 weeks gestation. Preterm birth has increased significantly since 1994, the most recent low point.
- Preterm birth is least common among births to women ages 20-24 and most common among births to adolescents 15-17 years old. The level of PTB for Black births (13.3%) was significantly higher than those for Asian births (7.3%), Latino births (9.9%), and White births (8.2%).
- Fifty-six Boston infants died in 2002, resulting in an infant mortality rate (IMR) of 7.0 deaths per 1,000 live births. The IMR was 7.4 in 2001, but the one-year change was not statistically significant.
- In 2002, Black Boston infants under the age of 1 were about 2.7 times as likely as White infants to die, with an IMR of 12.4 deaths per 1,000 live births, compared with an IMR of 4.6 for White infants and 6.5 for Latino infants. This disparity is related to the more frequent occurrence of extreme prematurity among Black births.

BOSTON NATALITY 2004

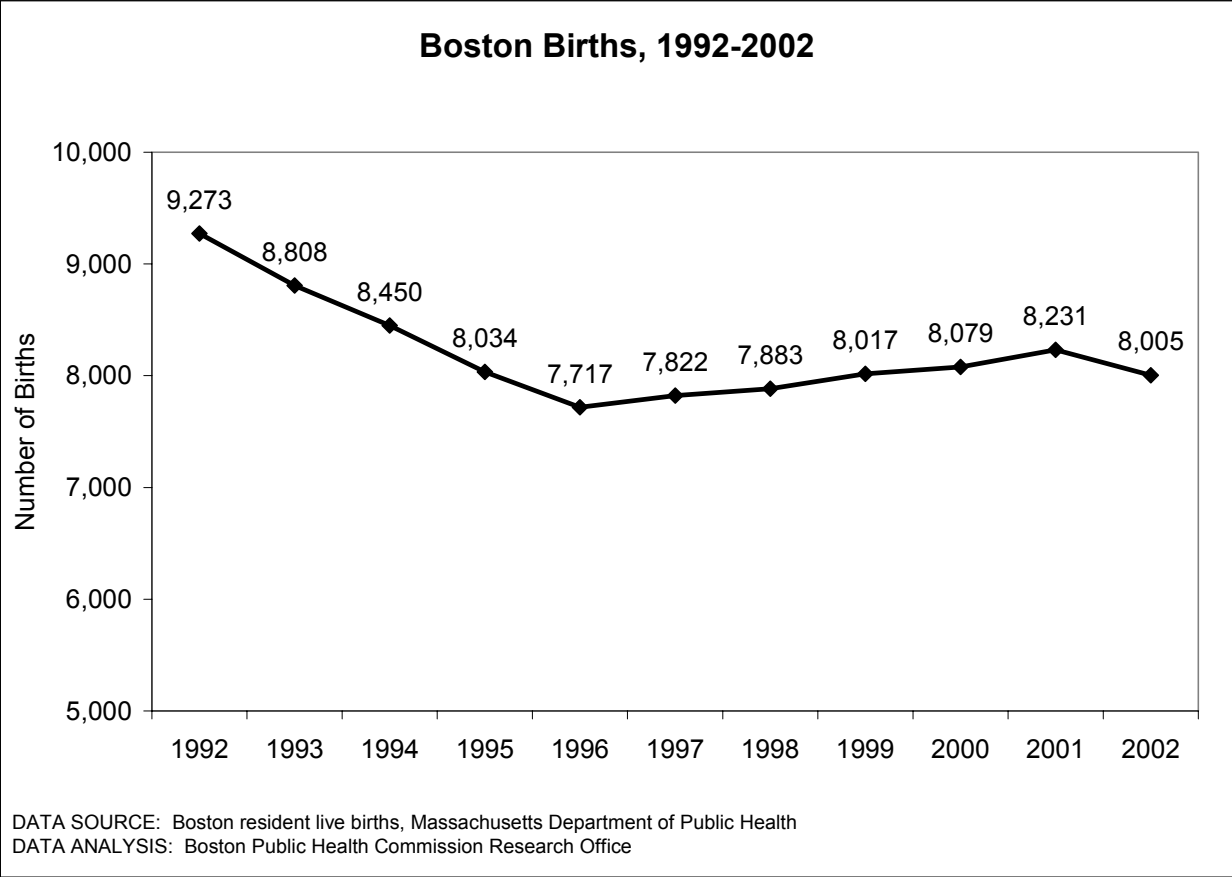
Introduction

This report summarizes birth certificate data for births occurring to residents of the city of Boston in 2002. The statistics presented concern the number and characteristics of births, birth rates, maternal lifestyle characteristics, medical utilization patterns by pregnant women, and infant health characteristics. 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 critical to understanding population growth and change in Boston. Data on maternal characteristics such as smoking are useful for understanding birth outcomes. Information on use of prenatal care and obstetric procedures can also help to explain birth outcomes. Monitoring birth outcomes, especially levels of low birthweight and preterm birth, is important because these variables are predictors of infant mortality and morbidity.

BIRTHS

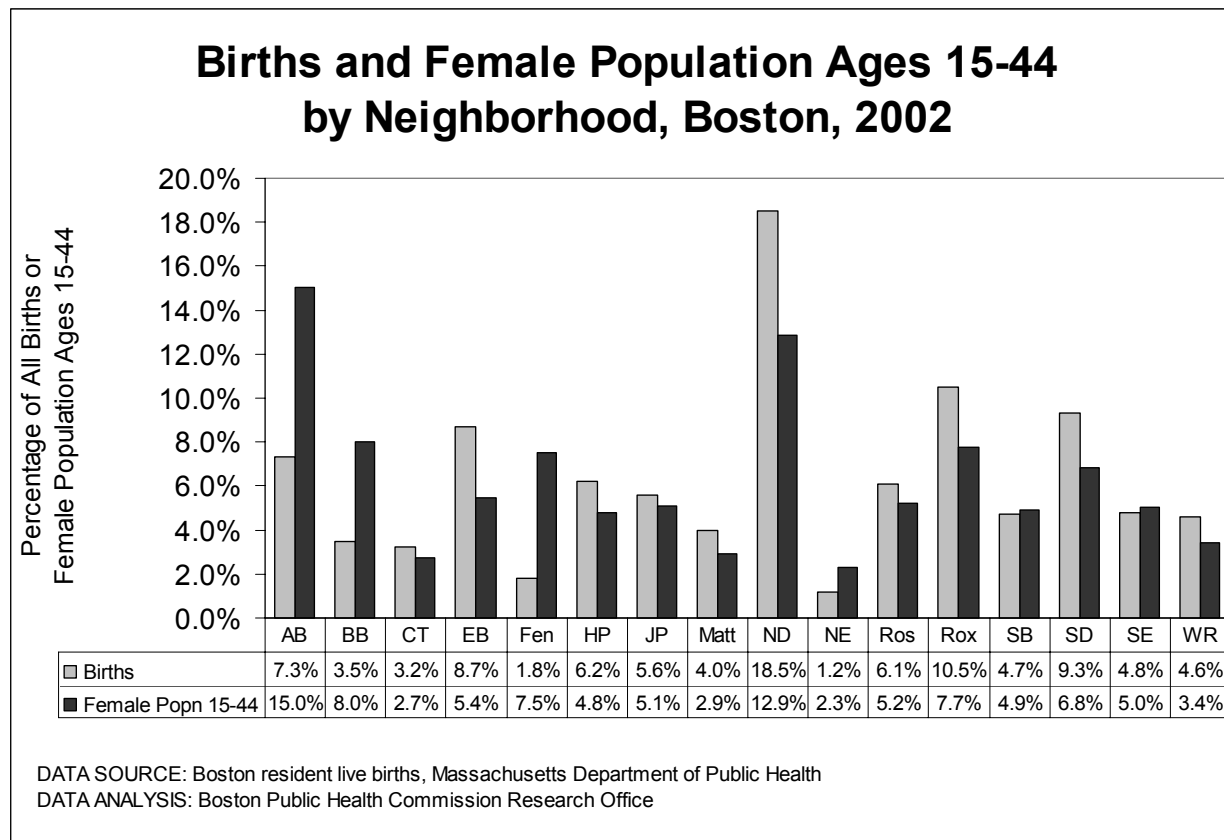
Trend



- Boston had 8,005 resident live births in 2002, down 2.7% from 2001 and 13.7% from 1992.
- In 2002, 4,071 (50.9%) male babies and 3,934 (49.1%) female babies were born (data not shown).

BIRTHS

Neighborhood



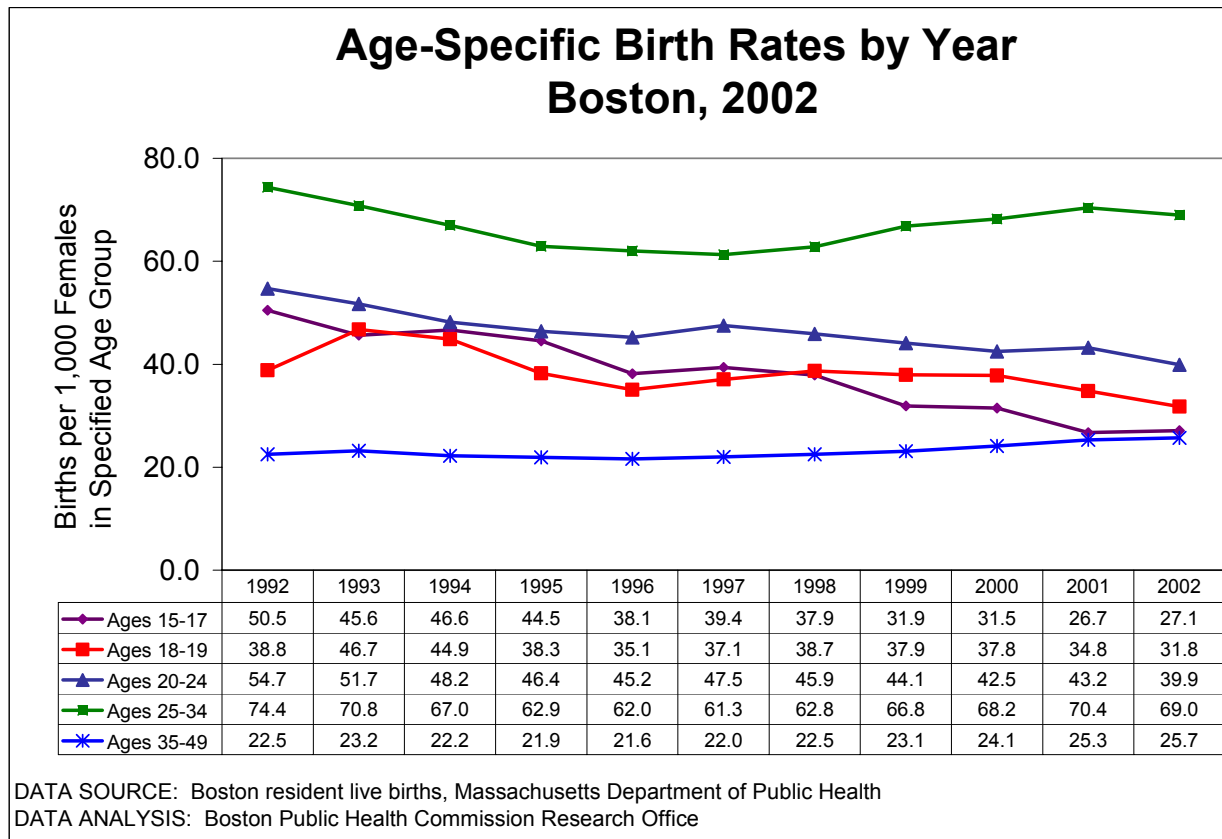
- North Dorchester, with 12.9% of Boston's female population of childbearing age, had 18.5% (n=1,466) of the city's births in 2002.
- Charlestown, East Boston, Hyde Park, Jamaica Plain, Mattapan, North Dorchester, Roslindale, Roxbury, South Dorchester, and West Roxbury all also had larger percentages of Boston's births than they have of the city's childbearing population.
- Allston/Brighton, the Back Bay (which includes Beacon Hill and the West End), the Fenway, the North End, South Boston, and the South End have larger percentages of Boston's childbearing population than they had of the city's births in 2002.

KEY

AB = Allston/Brighton	ND = North Dorchester
BB = The 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

BIRTHS

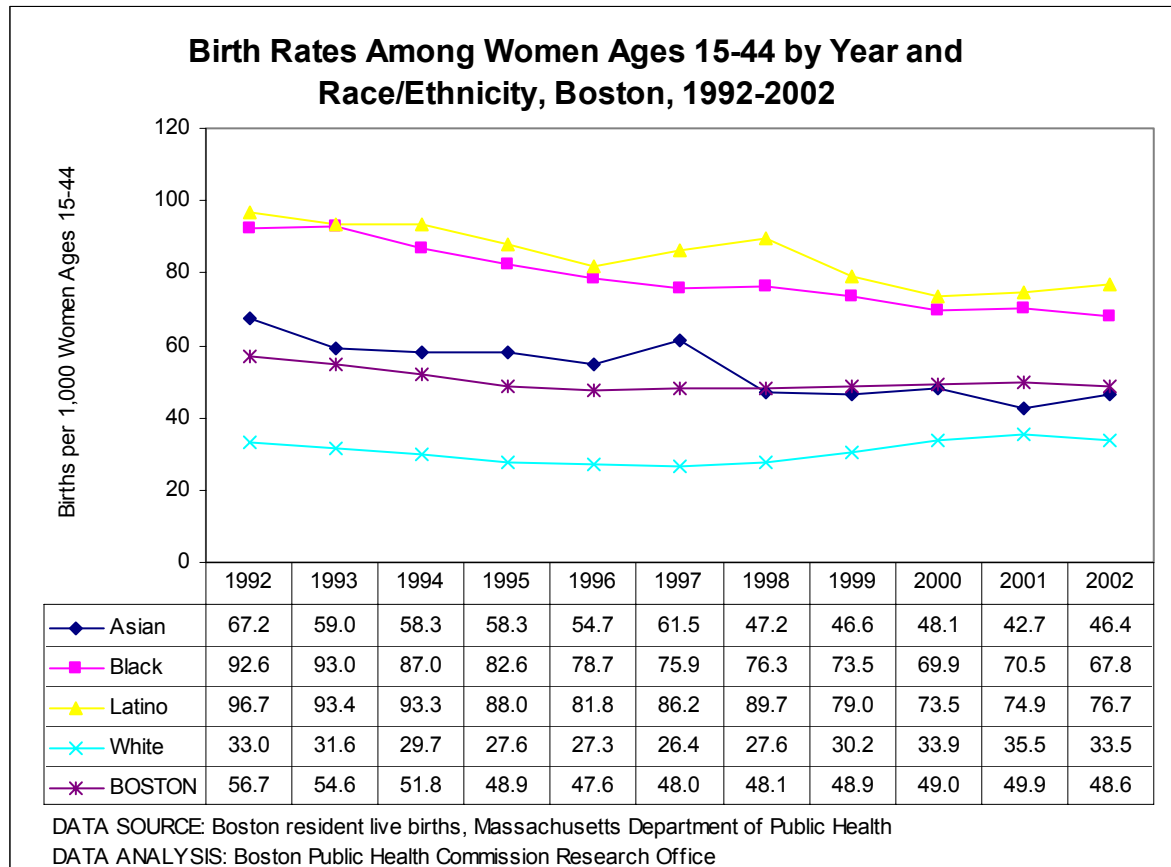
Birth Rates



- In 2002, women ages 25-34 had the city's highest birth rate.
- From 1992 to 2002, the birth rate fell 46.3% for adolescents ages 15-17 years old, 18.0% for women ages 18-19 years, 27.1% for women ages 20-24 years, and 7.3% for women ages 25-34 years. All these decreases were statistically significant.
- From 1992 to 2002, the birth rate for women 35-49 years old increased 14.2%, and this increase was statistically significant ($p < .05$). Even so, the birth rate for women 35-49 years was the lowest among Boston women.

BIRTHS

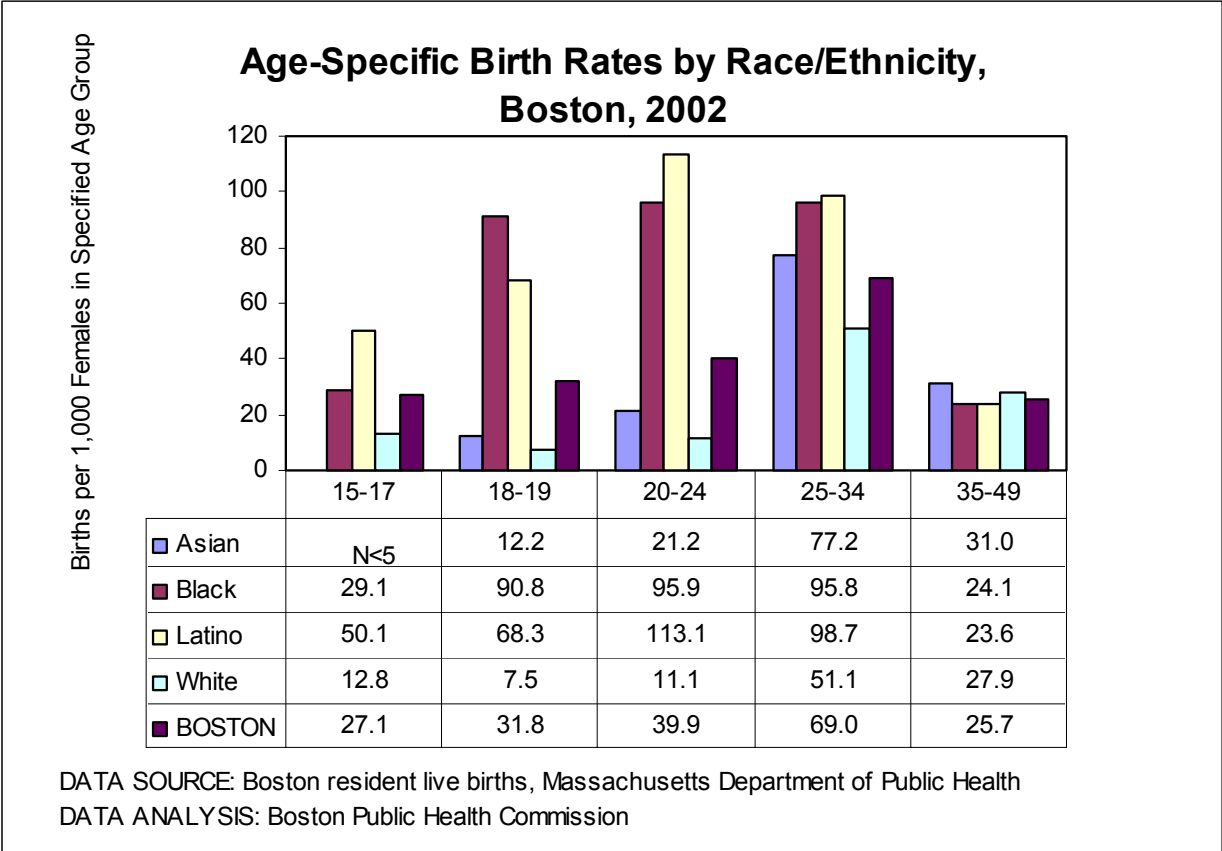
Birth Rates



- The birth rates for Boston overall and for all racial/ethnic groups except Whites have fallen considerably over the past decade.
- The birth rate for Boston overall fell 14.3% between 1992 and 2002. This decline was statistically significant.
- The birth rates for Asians, Blacks, and Latinos fell 31.0%, 26.8%, and 20.7% respectively during the same time period. These declines were statistically significant.
- Latinos and Blacks continue to have the highest birth rates compared with other racial/ethnic groups. The birth rates for Blacks and Latinos in 2002 were significantly higher than the birth rate for their White counterparts.

BIRTHS

Birth Rates

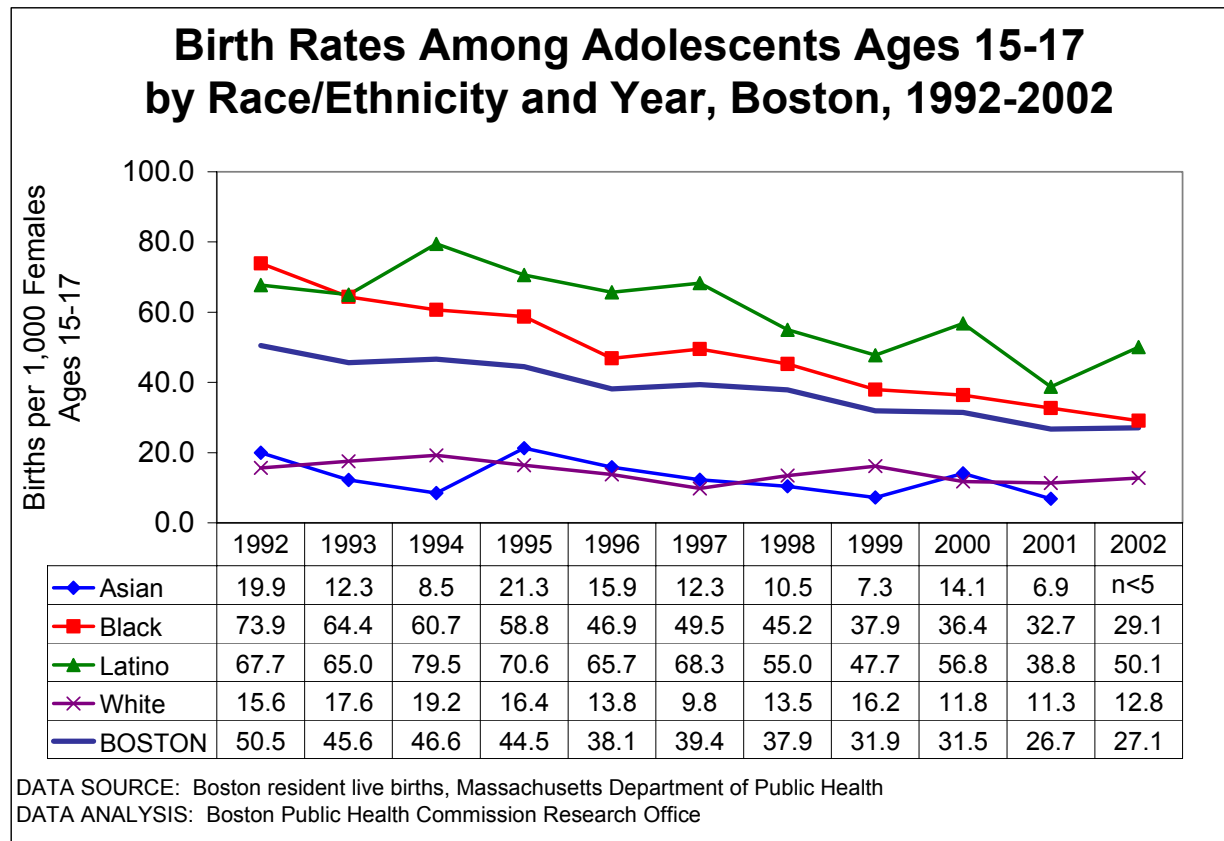


- Birth rate differences by race/ethnicity depend, in part, upon maternal age. In 2002, the greatest difference between the births rates for Blacks and Latinos compared with those of Whites occurred in the 20-24 year old age group.
- Births rates among women 35-49 varied the least by race/ethnicity.

BIRTHS

Birth Rates

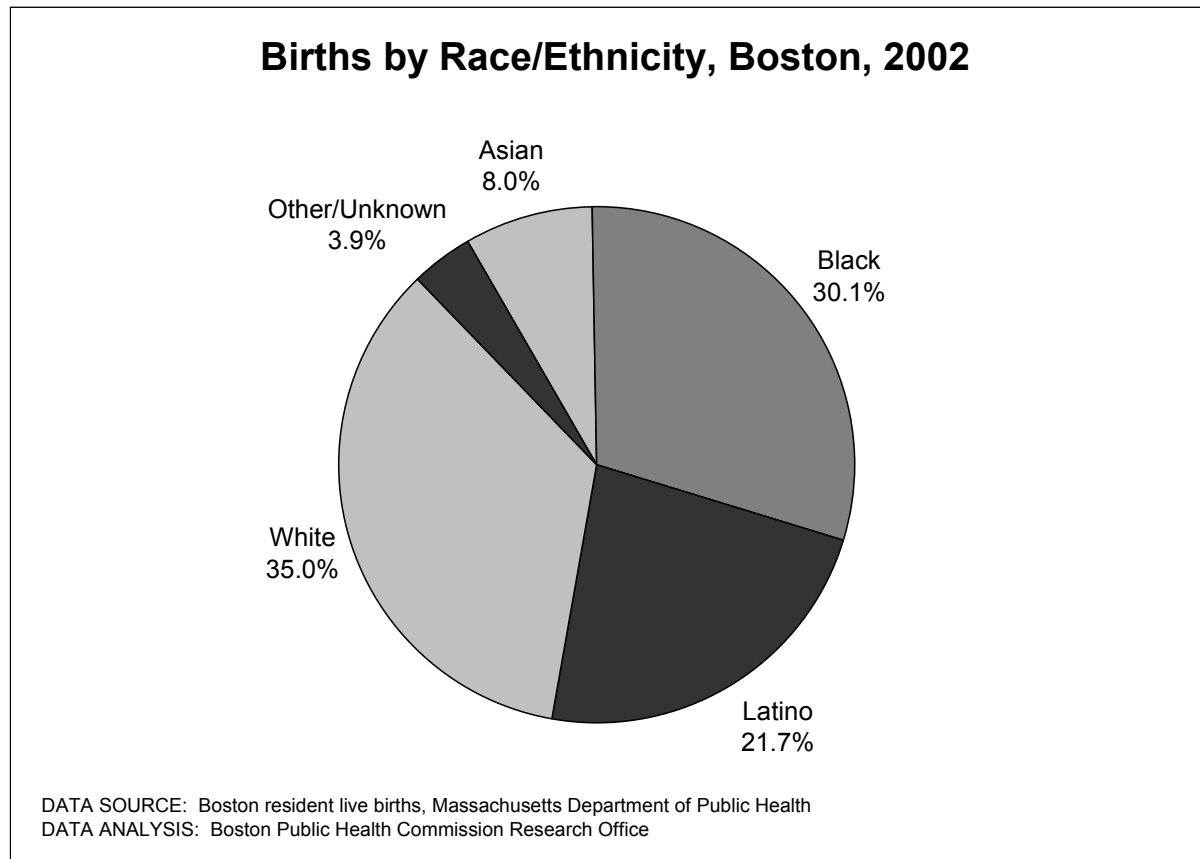
Boston Natality no longer includes births to 18 and 19 year-olds in the adolescent category. Beginning with the 2003 edition, data pertaining to their births are presented with those of adult Boston women, because childbearing by older teens is often more similar in nature to that of older adults than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



- Boston's birth rate in 2002 for 15-17 year-olds was 27.1 per 1,000 females ages 15-17, slightly above the national rate of 23.2 for this age group.
- Boston's rate of childbearing by 15-17 year-olds steeply declined over the past decade, falling 46.3% from the 1992 rate of 50.5. This decline was statistically significant.
- Birth rates for 15-17 year-olds continue to be substantially higher for Latinas and Blacks than for Whites and Asians, but all groups have had declines in recent years. The birth rates in 2002 for 15-17 year old Blacks and Latinas were significantly higher than the rate for their White counterparts. The adolescent birth rate for Latinas was also significantly higher than that for Blacks.

MATERNAL CHARACTERISTICS

Race/Ethnicity

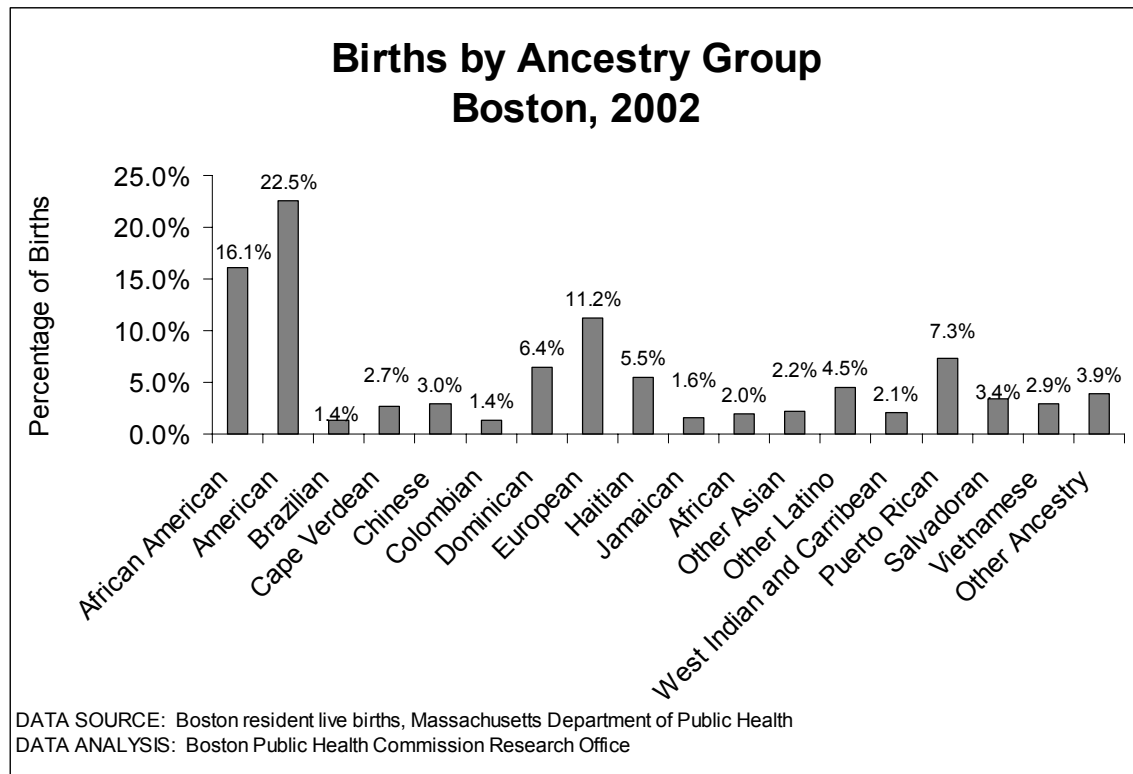


- Boston's population of childbearing women is diverse, and the majority of the city's births in 2002 (63.7%) were to women of color.
- In 2002, there were 642 Boston births to women identifying themselves as Asian, 2,412 to women identifying themselves as Black, 1,834 to Latinas, 2,804 to women identifying themselves as White, and 313 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.



- Among all Boston resident births in 2002, regardless of race/ethnicity, the most frequently reported maternal ancestry was “American” (n=1,792) (22.5%), followed by African-American (n=1,283) (16.1%).
- In addition to the 17 largest ancestry groups shown in the chart at left, 310 births (3.9% of the total), were to women who indicated belonging to other ancestry groups. Each of these groups represented fewer than 100 Boston births in 2002.

MATERNAL CHARACTERISTICS

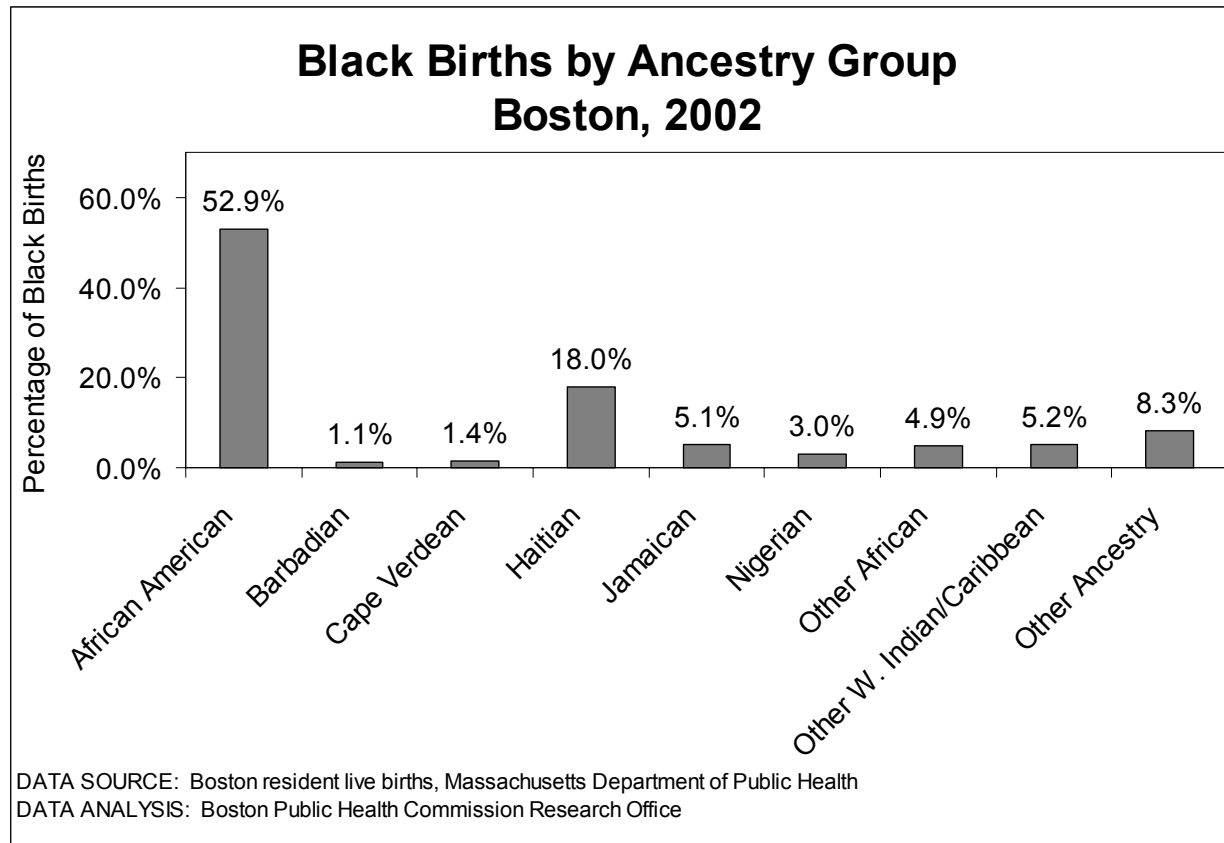
Ancestry: Asians



- Of the 641 Asian births in 2002 for whom information on ancestry was reported, 232 (36.2%) were to women of Vietnamese ancestry, and the same number and percentage were to women of Chinese ancestry.

MATERNAL CHARACTERISTICS

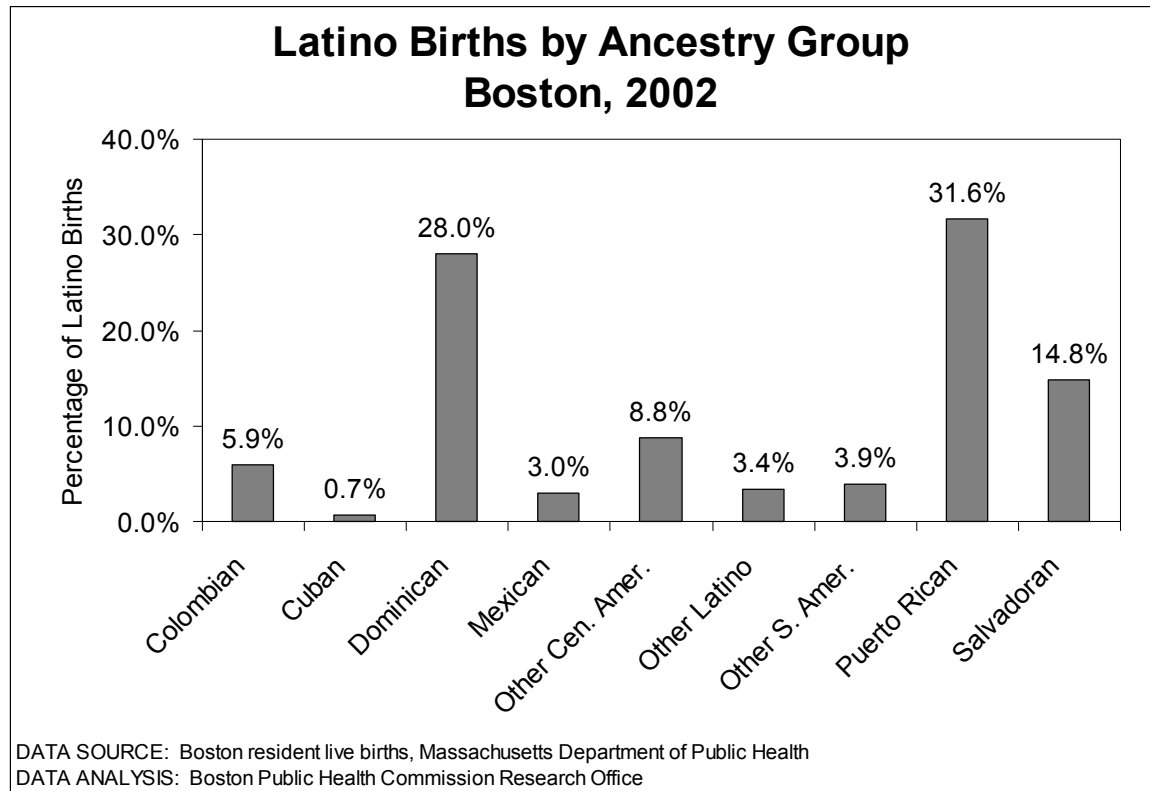
Ancestry: Blacks



- In 2002, among the 2,407 Black births for whom information on ancestry was reported, 1,272 (52.9%) were to women who identified themselves as African-American in origin.
- The next largest group, Haitians, had 433 (18.0%) of Boston's births to Black residents.

MATERNAL CHARACTERISTICS

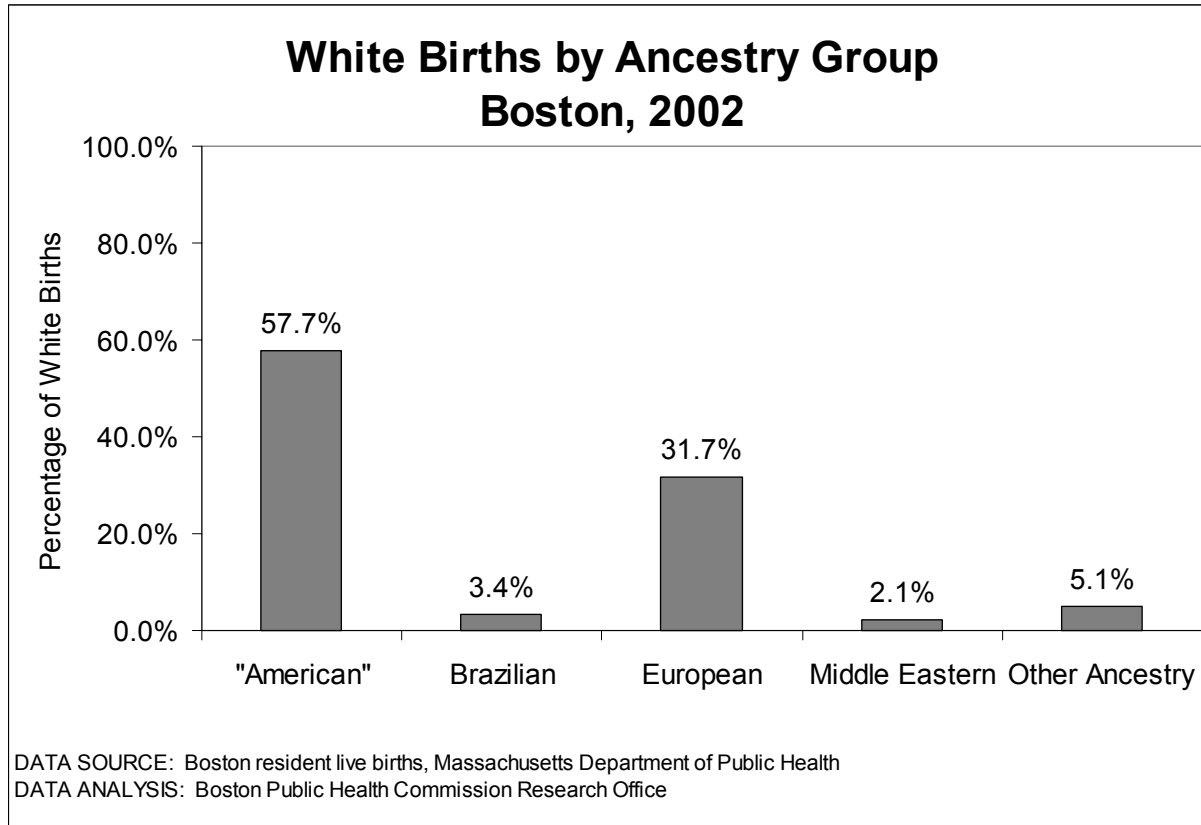
Ancestry: Latinas



- In 2002, there were 1,834 Boston births to Latinas. Of these births, about one-third, (n=580) (31.6%) were to women of Puerto Rican ancestry, about one-quarter, (n=513) (28.0%) were to women of Dominican ancestry, and 271 (14.8%) were to women of Salvadoran ancestry.

MATERNAL CHARACTERISTICS

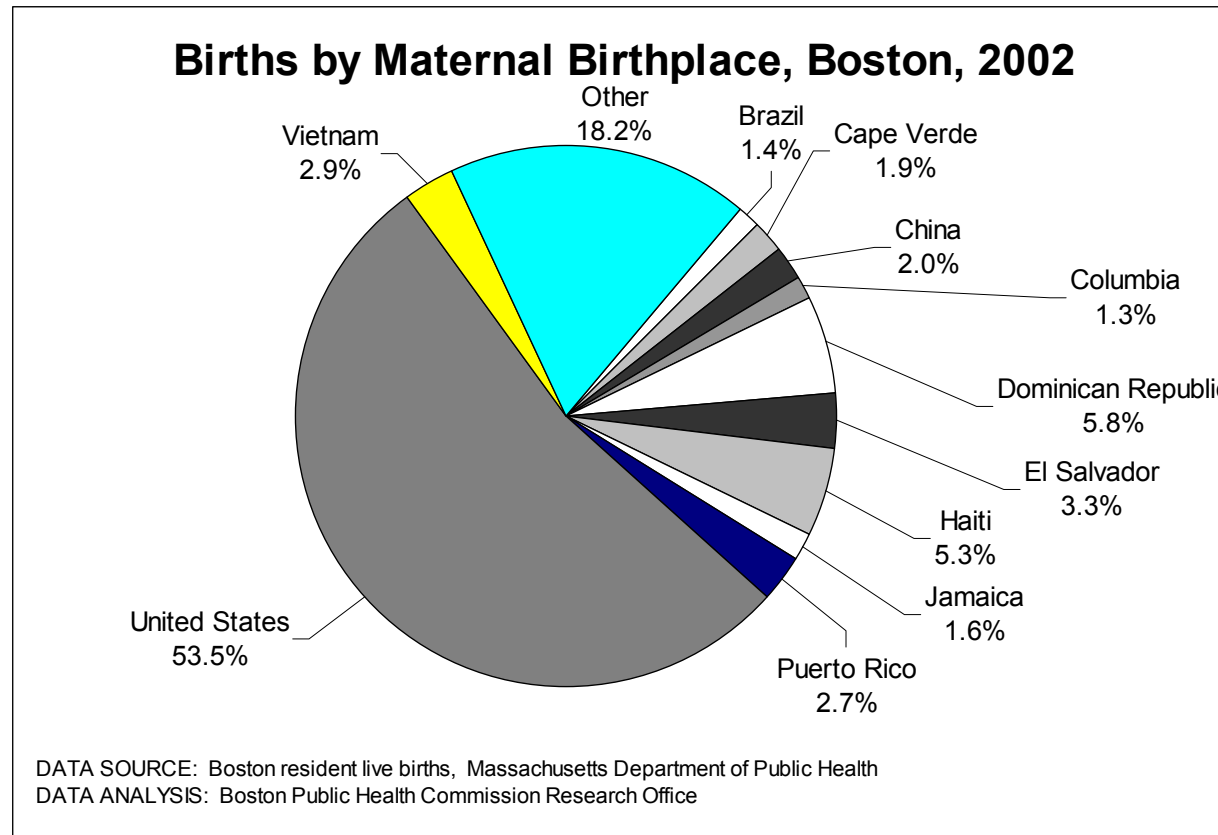
Ancestry: Whites



- A majority (n=1,600) (57.7%) of the 2,774 White births in 2002 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=878) (31.7%) were to women of European ancestry.

MATERNAL CHARACTERISTICS

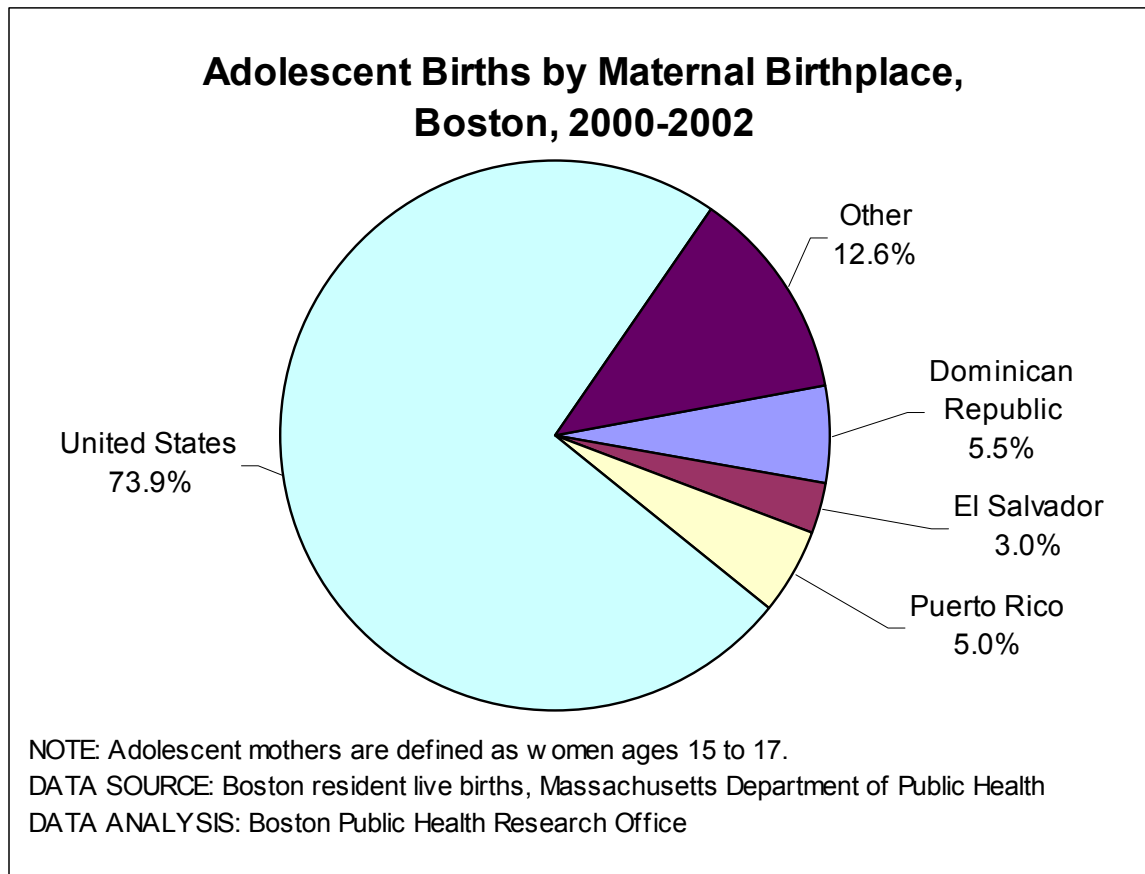
Birthplace



- Of the 8,005 Boston births in 2002, 4,279 (53.5%) were to women born in the United States (includes all 50 states and the District of Columbia), and 3,722 (46.5%) were to women born in other countries.
- Most births to women born outside the United States were to women from the Dominican Republic, who had 464 Boston births (5.8% of Boston births) in 2002. Haiti was the next most frequent birthplace of non-US-born Boston women, with 425 births (5.3% of births).
- In addition to the birthplaces shown in the chart at left, other countries, each with fewer than 100 Boston births, together represented 1,456 (18.2%) of the city's births in 2002.

MATERNAL CHARACTERISTICS

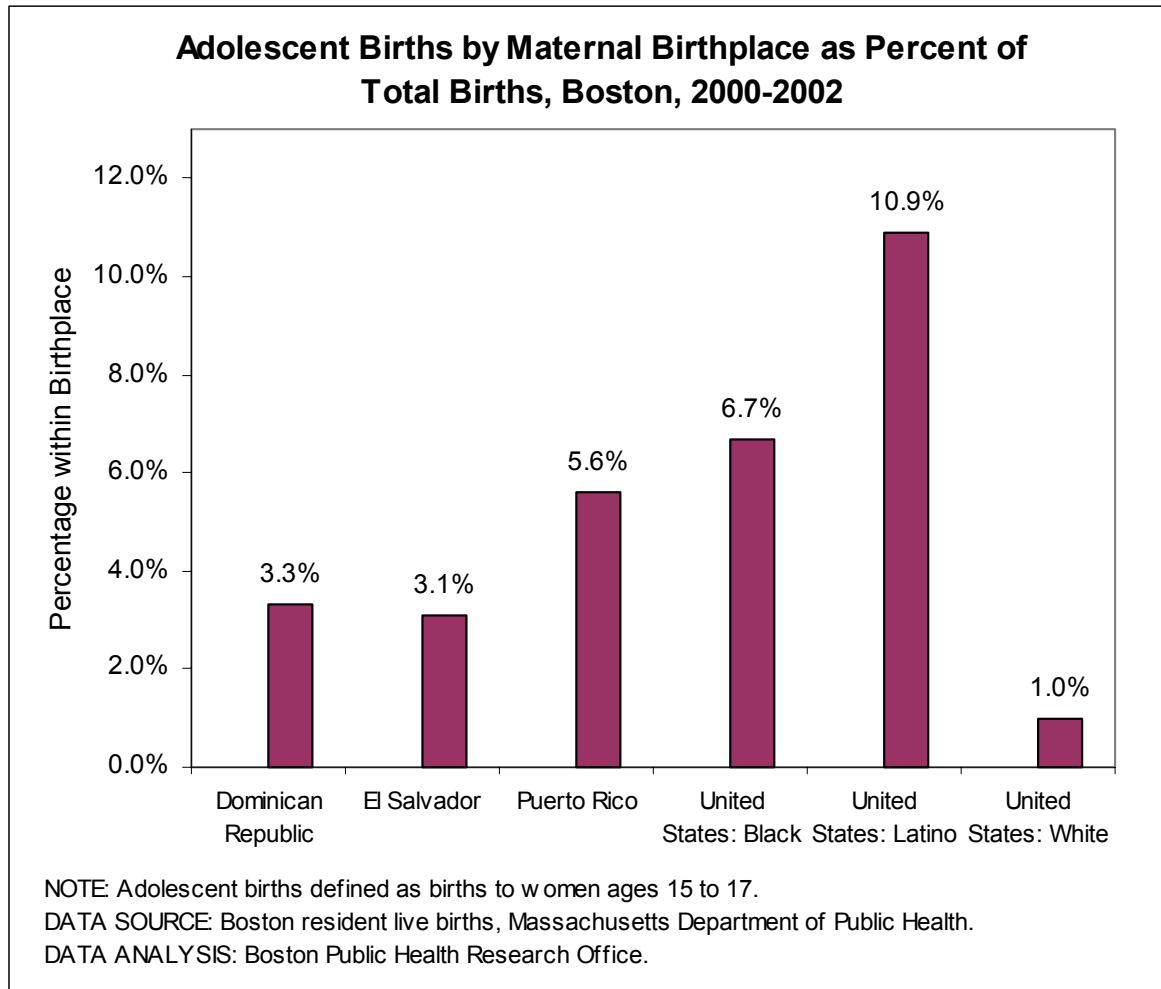
Birthplace



- Between 2000 and 2002, 758 births occurred to Boston adolescents ages 15 to 17. Of these, 560 (73.9%) were to adolescents born in the United States (includes all 50 states and the District of Columbia), and 198 (26.1%) were to adolescents born in other countries.
- Most births to adolescents born outside the United States were to those from the Dominican Republic, who had 42 births (5.5% of Boston adolescent births). Puerto Rico was the next most frequent birthplace of non-US-born Boston adolescent mothers, with 38 births (5.0% of adolescent births).
- In addition to the birthplaces shown in the chart at left, other countries together represented 95 (12.6%) of the city's births to adolescents in 2000-2002.

MATERNAL CHARACTERISTICS

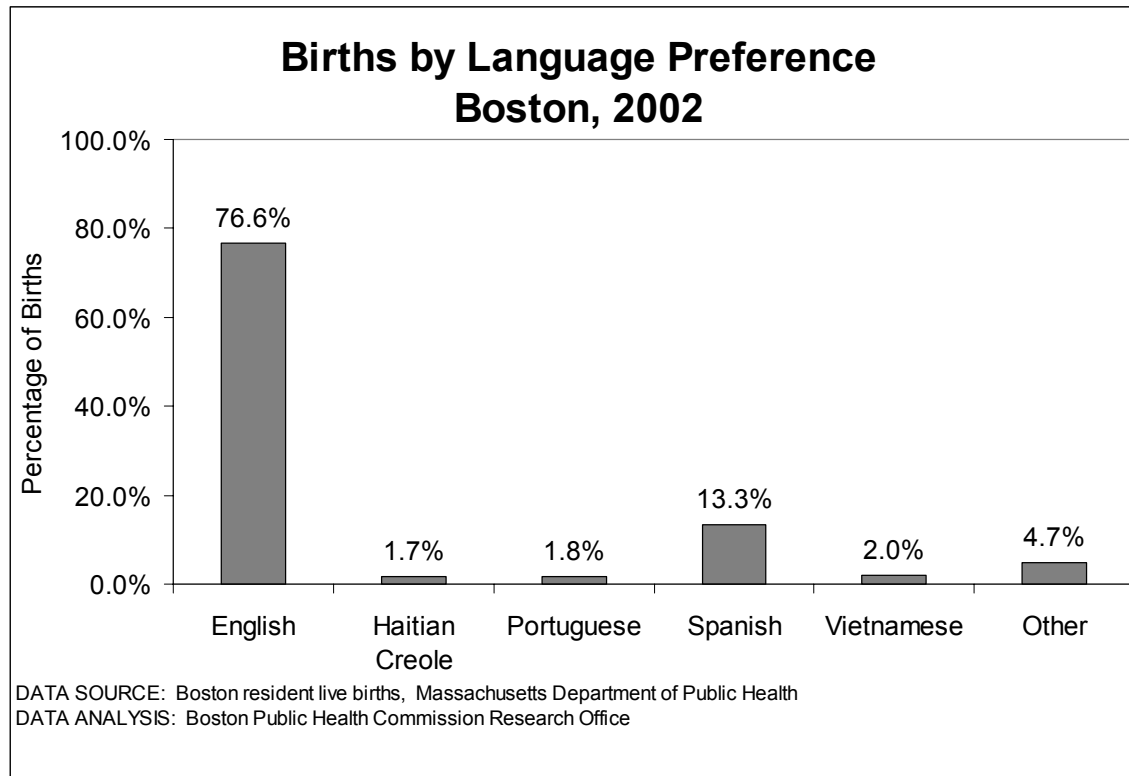
Birthplace



- Between 2000 and 2002, 24,315 total births occurred to Boston women. Births to adolescents represented 3.1% of the total.
- The percentage of births to adolescents varied considerably by maternal birthplace and race/ethnicity. Adolescent births to Latinas (n=156) born in the United States represented 10.9% of all births to U.S.-born Latinas. In contrast, adolescent births to Latinas born in Puerto Rico (n=38) represented 5.6% of all births to women born in Puerto Rico, and adolescent births to women born in the Dominican Republic (n=42) represented 3.3% of all births to women from the Dominican Republic.
- Adolescent births to U.S.-born Blacks (n=296) represented 6.7% of all births to U.S.-born Blacks. Adolescent births to U.S.-born Whites (n=68) represented 1.0% of all births to U.S.-born Whites.

MATERNAL CHARACTERISTICS

Language Preference



- English was the mother’s preferred language noted on 76.6% of all Boston birth certificates (n=6,127 births).
- Spanish was the mother’s preferred language indicated on 13.3% of all birth certificates (n=1,061 births).
- Vietnamese, the language preference indicated for 159 births, Portuguese (n=141 births), and Haitian Creole (n=134 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 100 birth certificates as the mother’s preferred language.

MATERNAL CHARACTERISTICS

Language Preference

Births by Language Preference and Neighborhood Boston, 2002								
	English	Cantonese	Haitian Creole	Portuguese	Spanish	Vietnamese	Other	Total
Allston/Brighton	71.6%	1.4%	1.0%	5.3%	9.5%	--	11.2%	100.0%
Back Bay	94.0%	--	--	--	2.5%	--	3.5%	100.0%
Charlestown	83.3%	--	--	--	12.4%	--	4.3%	100.0%
East Boston	45.9%	--	--	3.5%	47.7%	1.0%	1.9%	100.0%
Fenway	68.3%	--	--	--	15.5%	--	16.2%	100.0%
Hyde Park	80.7%	--	6.3%	--	9.8%	--	3.2%	100.0%
Jamaica Plain	74.6%	--	--	--	21.9%	--	3.5%	100.0%
Mattapan	87.2%	--	8.0%	--	3.5%	--	1.3%	100.0%
North Dorchester	74.6%	--	1.4%	4.1%	9.3%	6.9%	3.7%	100.0%
North End	90.3%	--	--	--	--	--	9.7%	100.0%
Roslindale	83.0%	--	1.3%	1.0%	11.4%	--	3.3%	100.0%
Roxbury	76.3%	0.8%	0.7%	0.7%	16.2%	0.7%	4.6%	100.0%
South Boston	85.9%	--	--	--	8.8%	--	5.3%	100.0%
South Dorchester	85.2%	--	3.1%	--	5.0%	4.4%	2.3%	100.0%
South End	74.3%	6.8%	--	--	6.8%	--	12.1%	100.0%
West Roxbury	88.9%	--	1.6%	--	4.9%	--	4.6%	100.0%

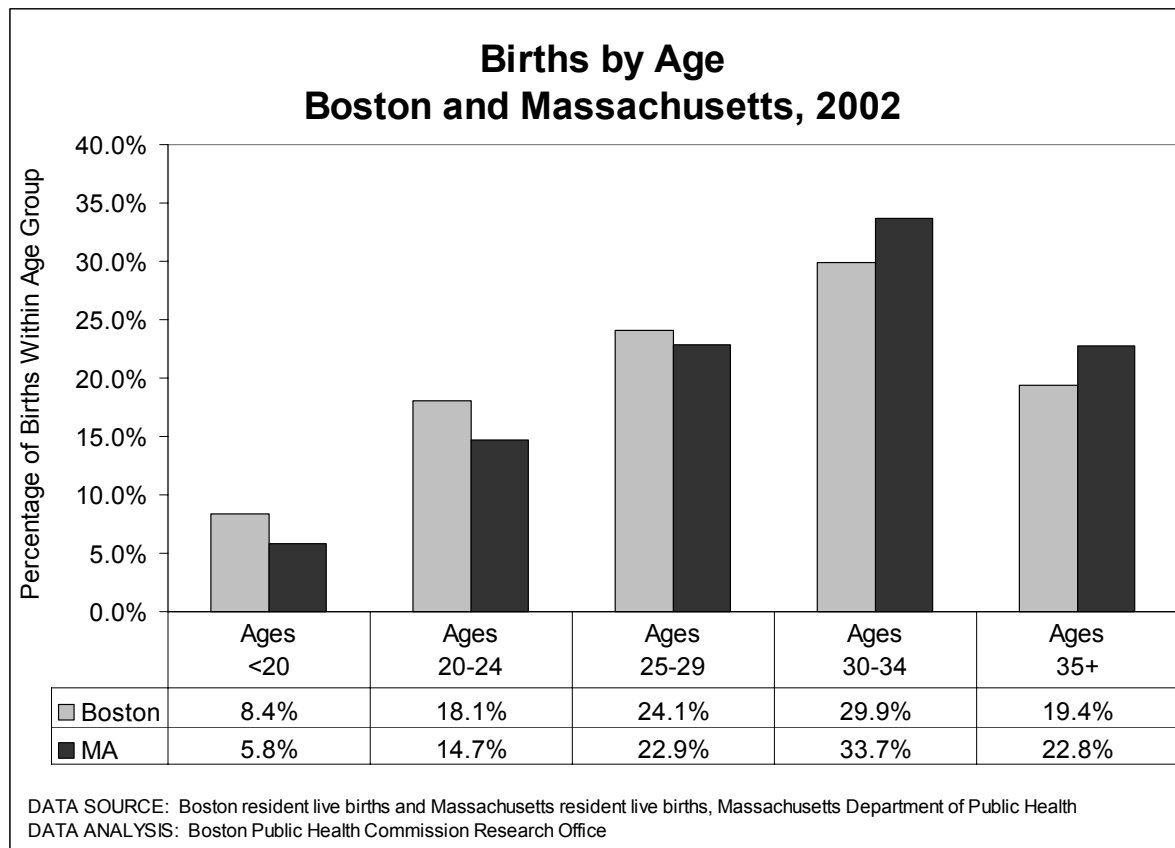
"--" <5 of neighborhood's birth certificates reported this language.

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

- In 2002, 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 45.9% in East Boston to 94.0% in the Back Bay/Beacon Hill/West End area.
- The percentage of birth records with Spanish as the mother's preferred language also ranged widely, from 2.5% in the Back Bay/Beacon Hill/West End to 47.7% in East Boston.
- The Cantonese language in the South End, and Haitian Creole in Mattapan and Hyde Park, reflect other substantial language groups among Boston women giving birth in 2002. Portuguese in Allston/Brighton, and Vietnamese in North Dorchester, were also noted in significant numbers of 2002 birth records as the mother's preferred language.

MATERNAL CHARACTERISTICS

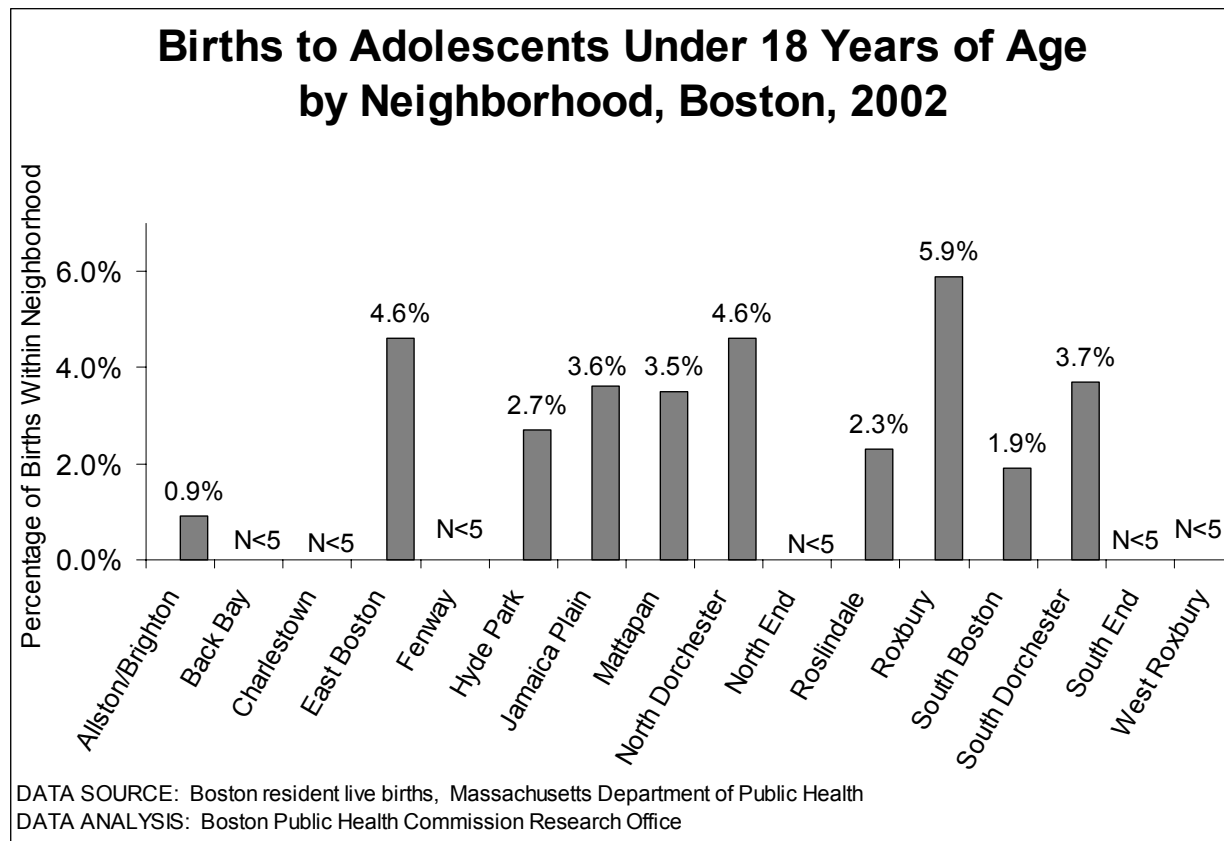
Age



- Boston women who gave birth in 2002 were younger, as a group, than their Massachusetts counterparts. The state as a whole had higher percentages of births to women ages 30 and older, while Boston had higher percentages of births to women under age 30.

MATERNAL CHARACTERISTICS

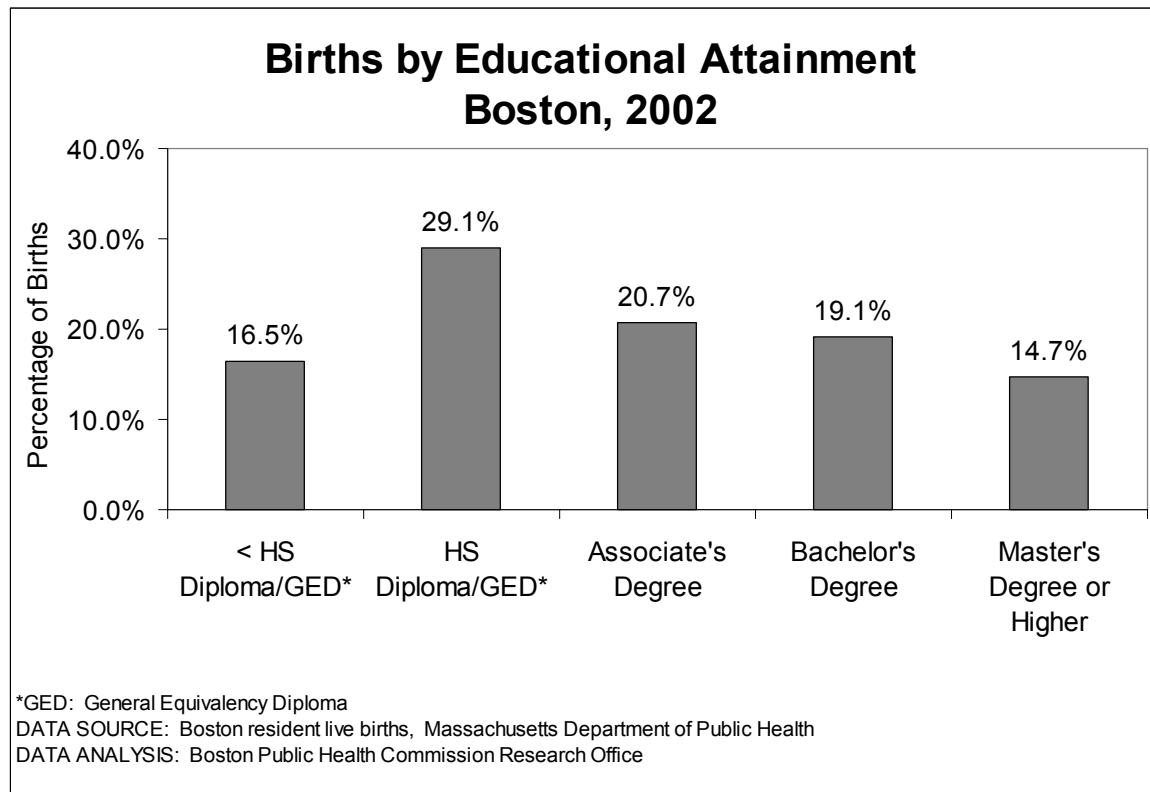
Age



- In 2002, 253 Boston births (3.2% of all births) were to adolescents under the age of 18. These included 12 births to adolescents under age 15.
- Among all Boston neighborhoods, Roxbury, North Dorchester, and East Boston had the highest percentages of births to adolescents.

MATERNAL CHARACTERISTICS

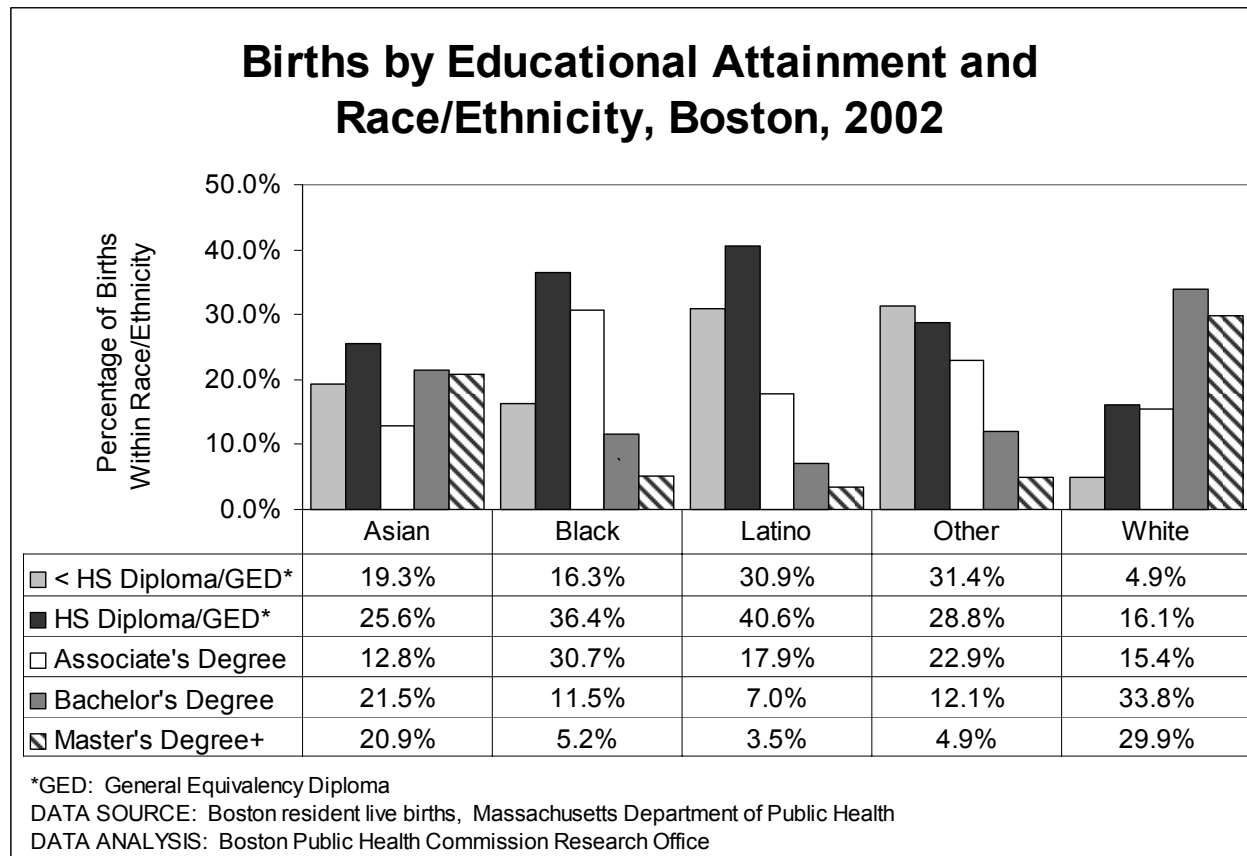
Educational Attainment



- About one in six Boston births in 2002 (n=1,317) (16.5%) were to women without a high school diploma or equivalent.
- Close to one-third (n=2,323) (29.1%) of births were to women who had completed high school. Over half (n=4,355) (54.5%) were to women with at least some college education.

MATERNAL CHARACTERISTICS

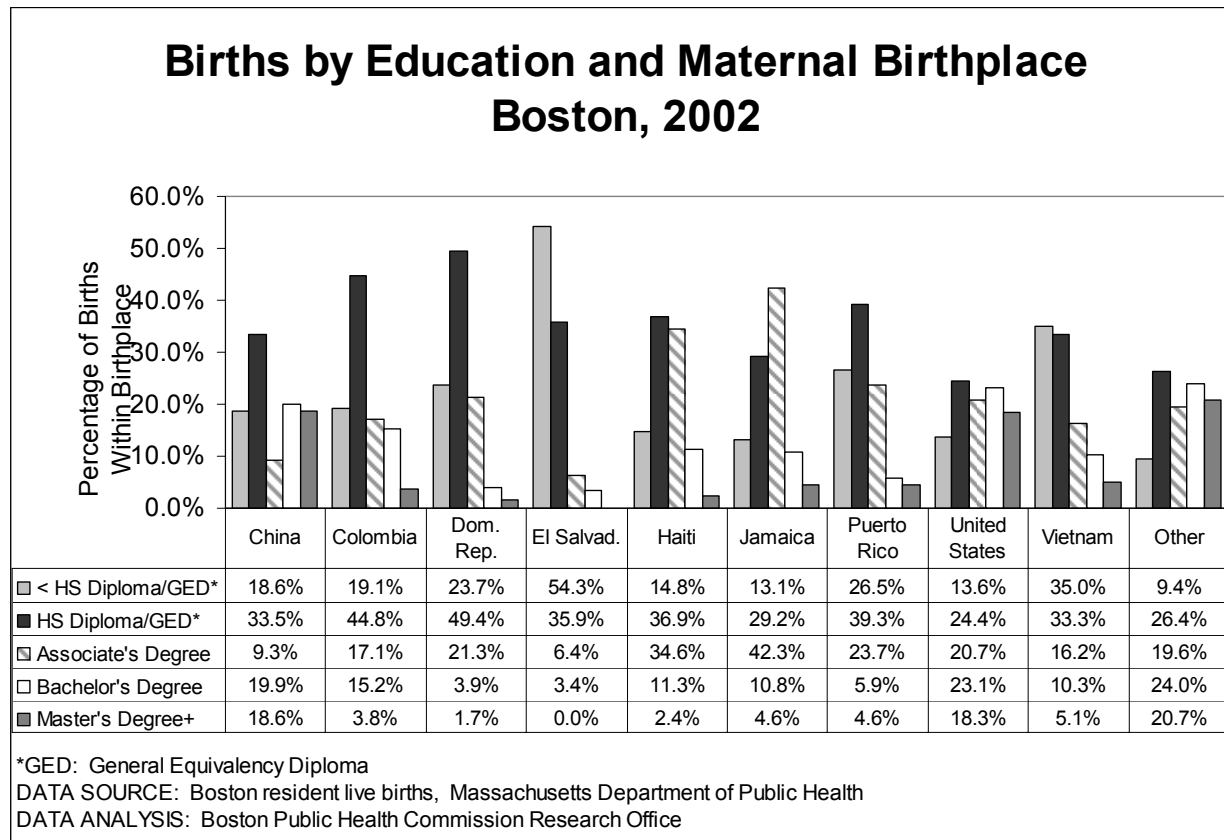
Educational Attainment



- 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 do White and Asian women.
- In 2002, 42.4% (n=272) of Asian births and 63.7% (n=1,785) of White births were to women with at least a bachelor's degree education. In contrast, 16.7% (n=401) of Black births and 10.5% (n=193) of Latino births were to women with at least a bachelor's degree education.
- Fewer than one in twenty (4.9%) (n=137) 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 [(30.9%) (n=567) for Latinas, (19.3%) (n=124) for Asians, and (16.3%) (n=392) for Blacks].

MATERNAL CHARACTERISTICS

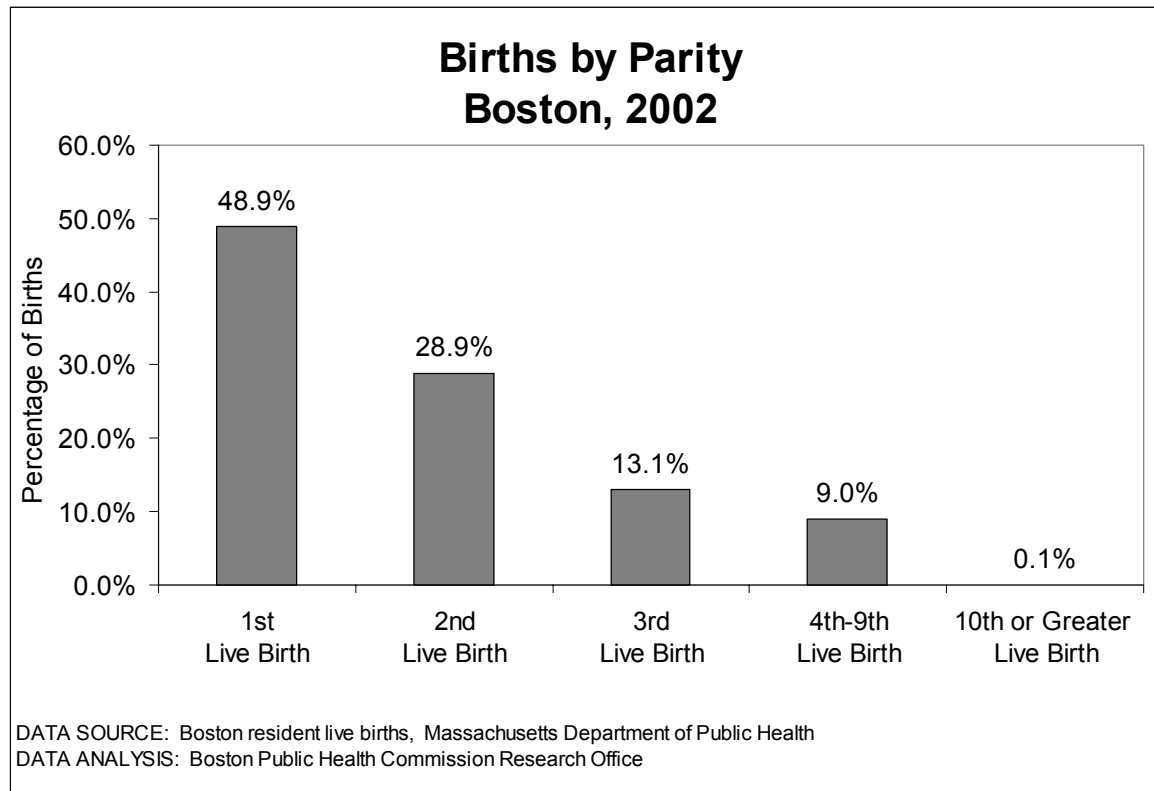
Educational Attainment



- In 2002, the highest percentage of births to women without a high school education was among women from El Salvador (n=144) (54.3%). Low educational attainment was also common among women from Vietnam (n=82) (35.0%) and Puerto Rico (n=58) (26.5%).
- Completion of high school or its equivalent was the most common level of educational attainment for women from all countries except El Salvador, Vietnam, and Jamaica. Though mothers from El Salvador and Vietnam typically had poor education, mothers from Jamaica most commonly had an Associate's degree.

MATERNAL CHARACTERISTICS

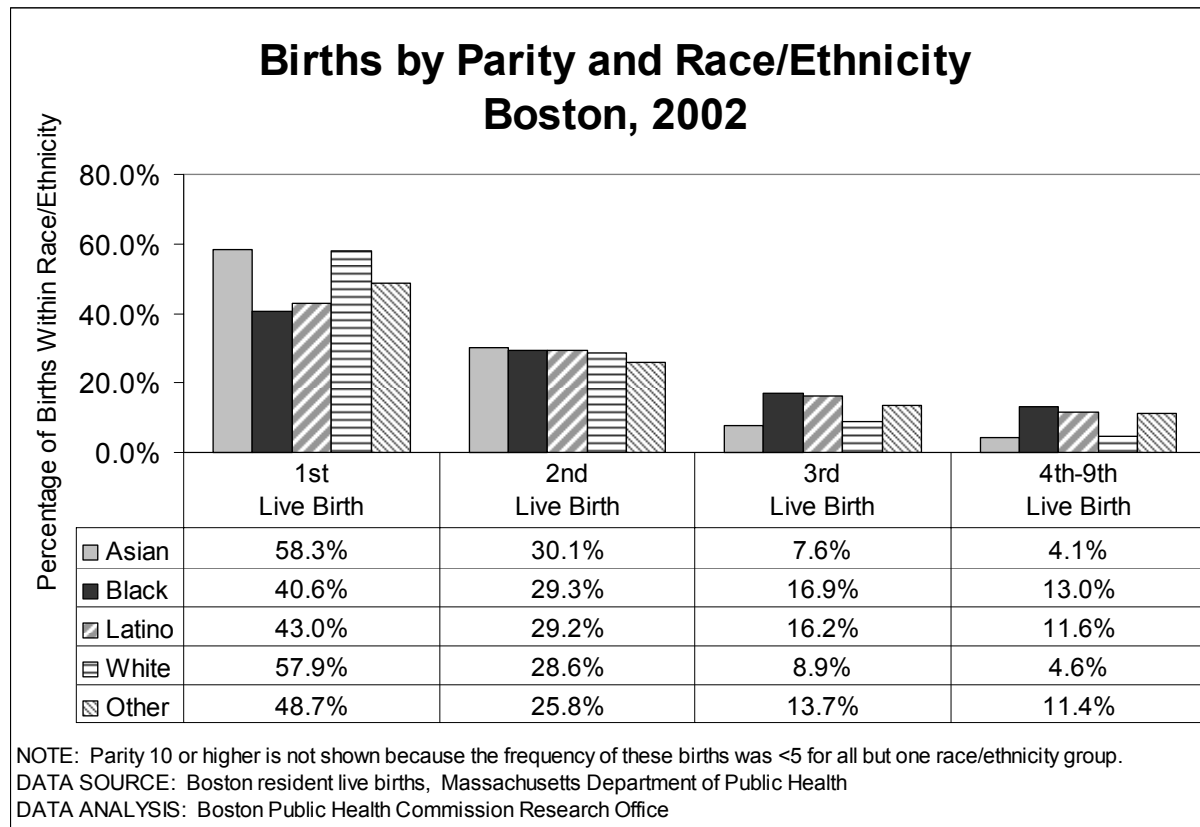
Parity



- In 2002, first births accounted for close to half (n=3,914) (48.9%) of all Boston births.
- More than nine in ten Boston births in 2002 (n=7,274) (90.9%) were to women having their first, second, or third baby.

MATERNAL CHARACTERISTICS

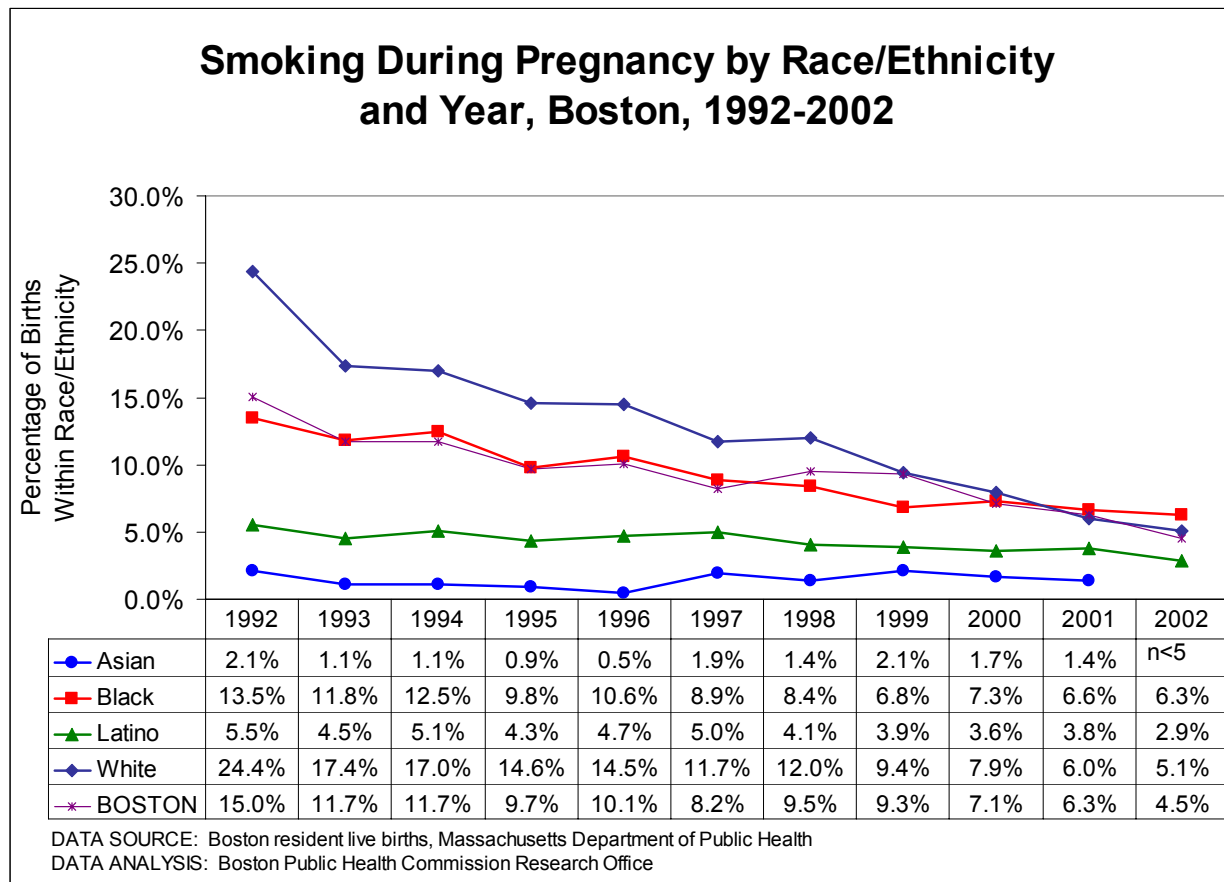
Parity



- More than half of Asian and White births in 2002 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

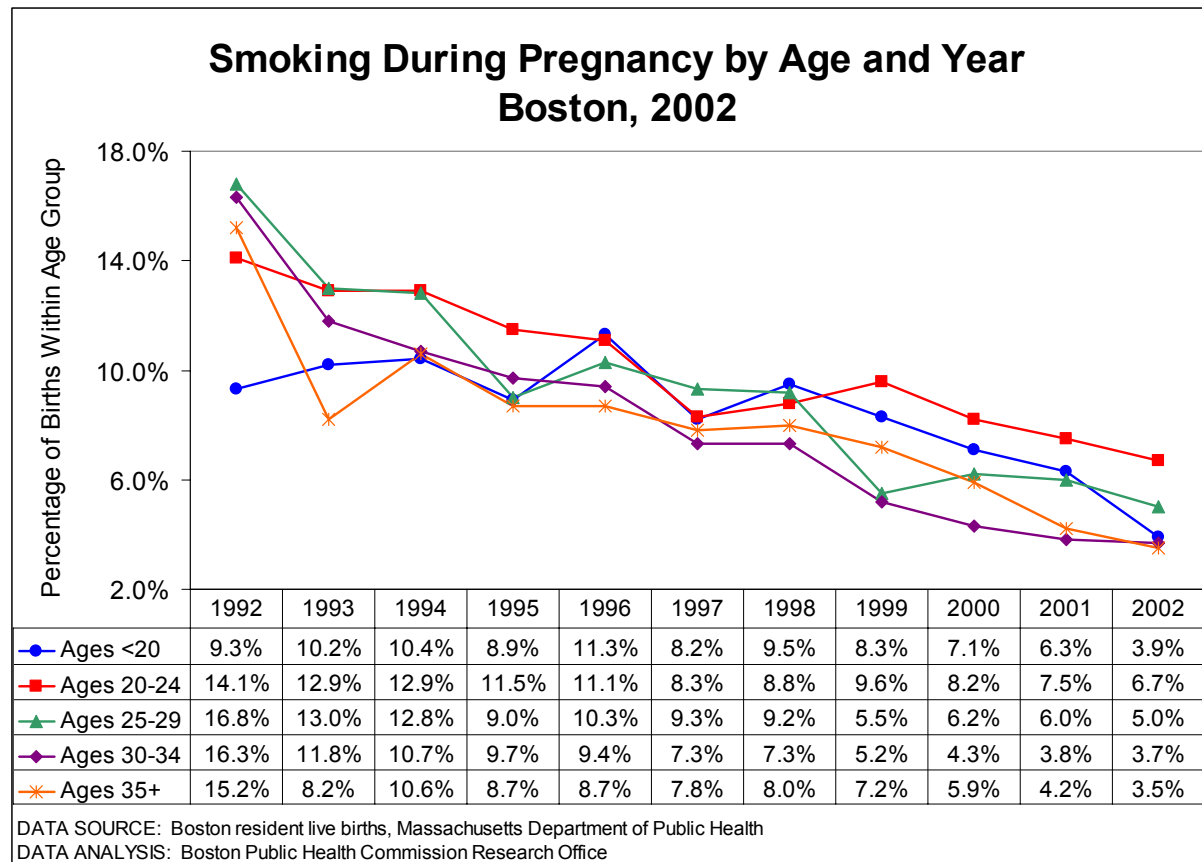
Smoking



- Self-reported maternal smoking during pregnancy declined 70.0% between 1992 and 2002, to 4.5% of all births (n=363). The decrease was a statistically significant change.
- The biggest decline between 1992 and 2002 was among Whites, whose reported prenatal smoking prevalence fell 79.1% (n=144 in 2002). There was a 53.3% decrease among Blacks (n=151 in 2002) and a 47.3% decline among Latinos (n=53 in 2002). The number of births to Asian mothers who reported smoking was so low that a rate could not be calculated.
- Since 2001, the prevalence of reported smoking among Blacks has surpassed that among Whites, reversing a 9-year trend.

MATERNAL CHARACTERISTICS

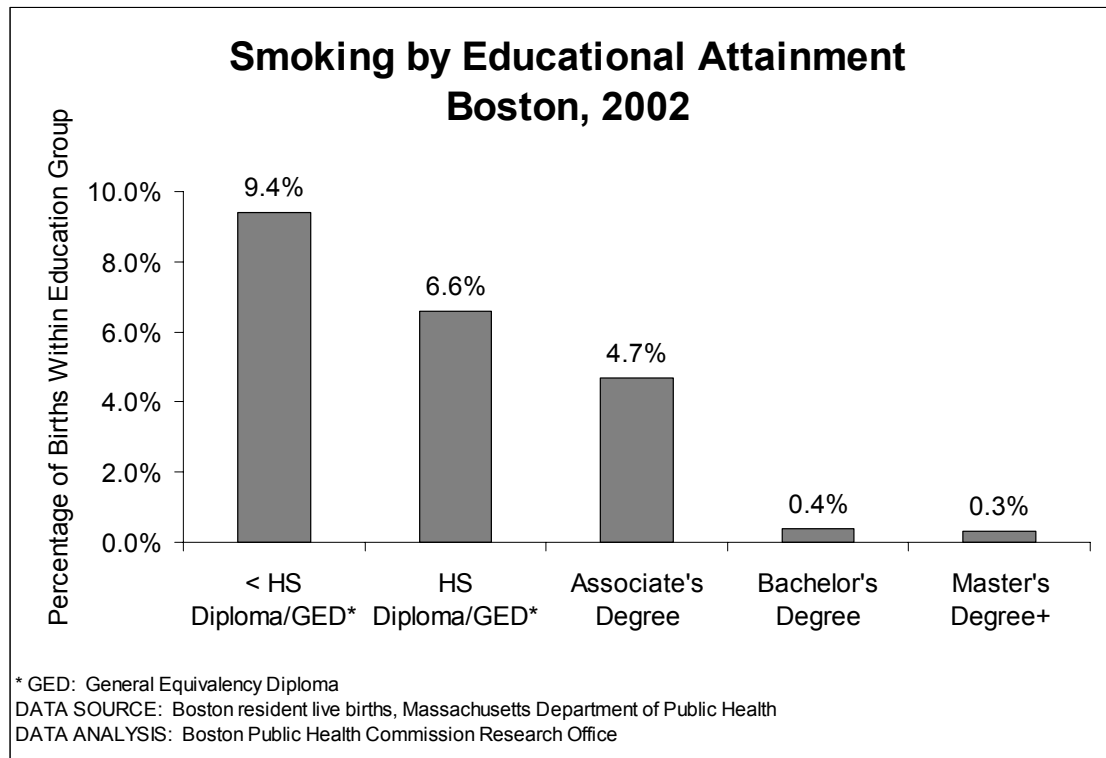
Smoking



- Births to women in their early twenties had the highest level of prenatal smoking (n=97) of births to Boston women in 2002.
- The lowest level of prenatal smoking was among births to women ages 35 and older (n=55).
- Between 1992 and 2002, 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

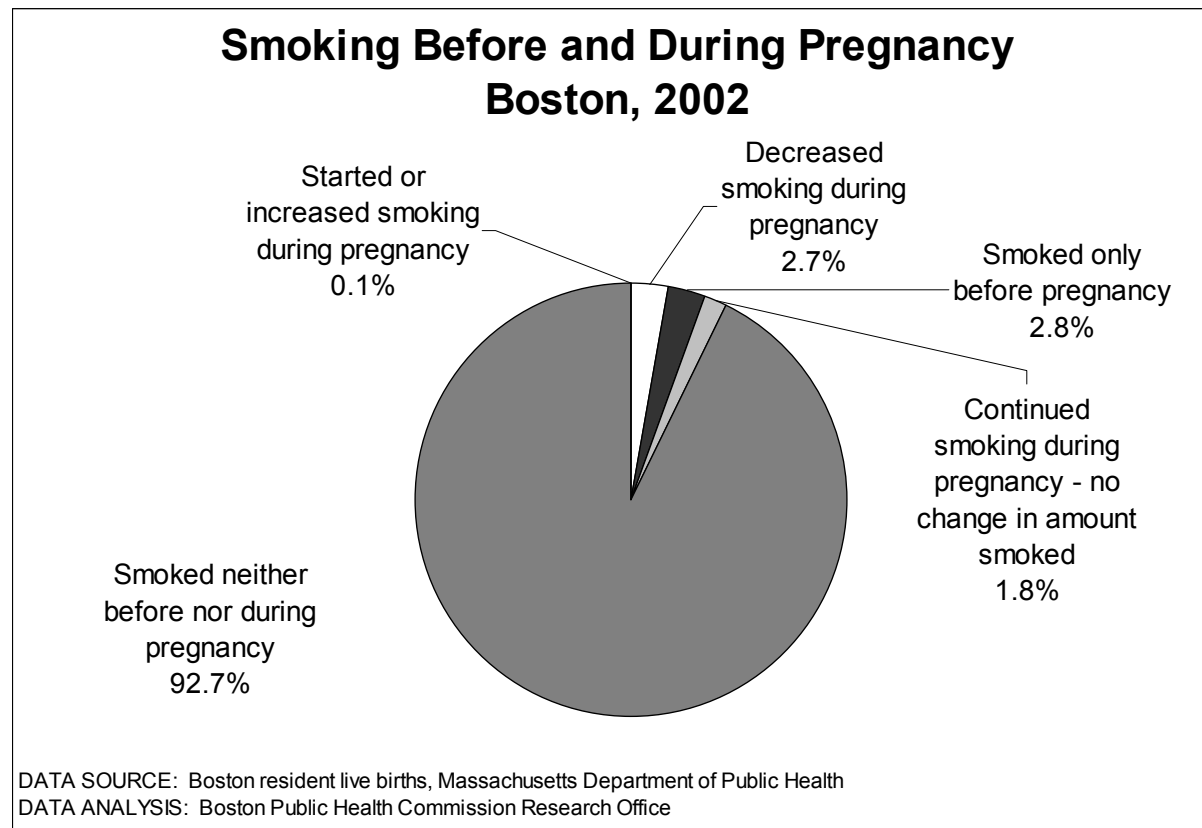
Smoking



- Births to women with at least a bachelor's degree were significantly less likely to have been exposed to smoking during pregnancy than were births to 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

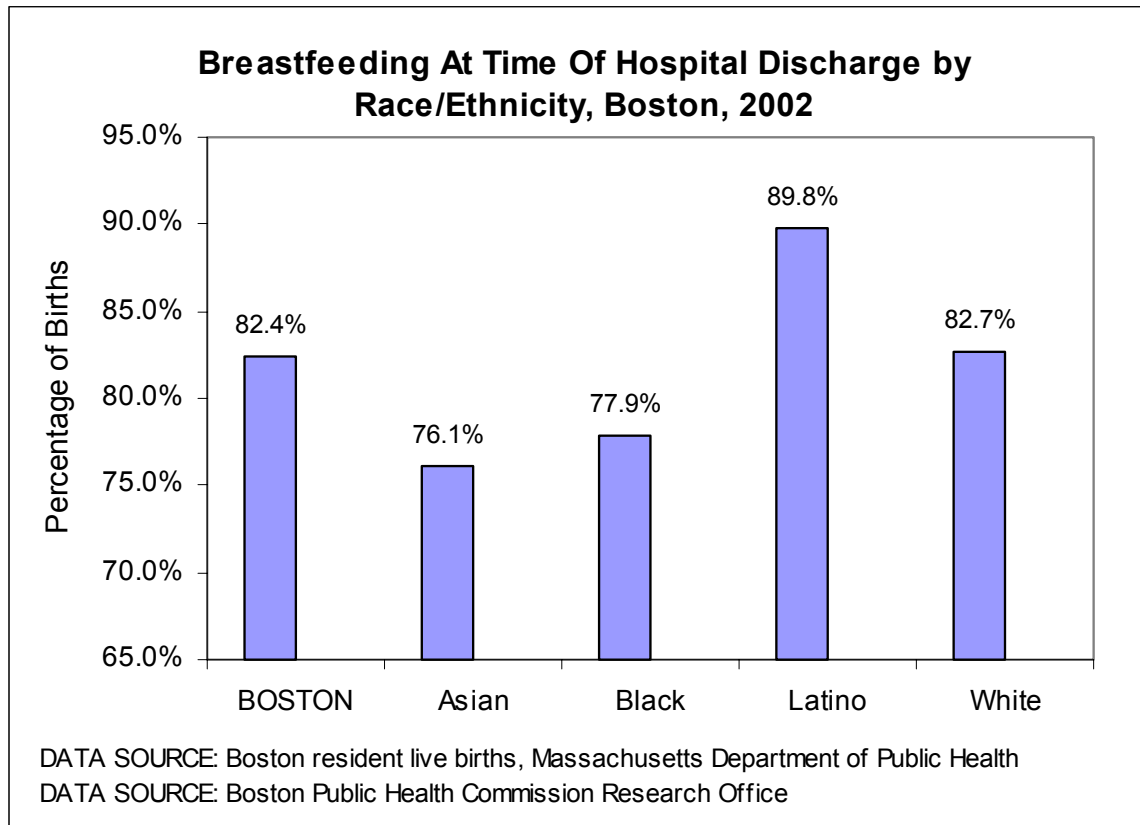
Smoking



- The vast majority of Boston resident births (n=7,412) (92.7%) were to women who said they had neither smoked before nor during pregnancy.
- 2.8% (n=223) of births were to women who stated that they had smoked only before pregnancy.
- 2.7% (n=212) of births were to women who reported cutting back during pregnancy on the number of cigarettes they smoked. The average reduction was 9.1 cigarettes per day.
- The remaining percentages of births were to women who either smoked the same amount they had before pregnancy (n=142) (1.8%), or began or increased smoking during pregnancy (n=7) (0.1%).

MATERNAL CHARACTERISTICS

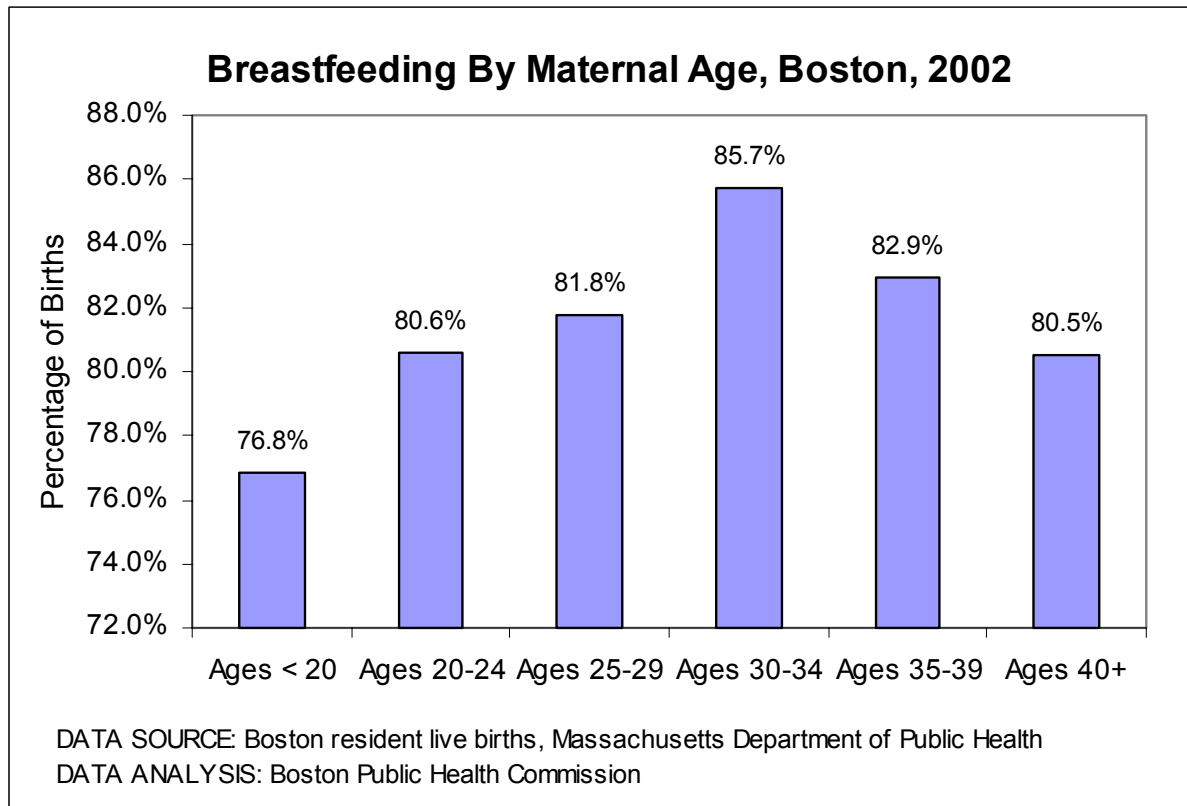
Breastfeeding



- The majority of infants (82.4%) (n=6,584) born in 2002 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 Asian mothers.

MATERNAL CHARACTERISTICS

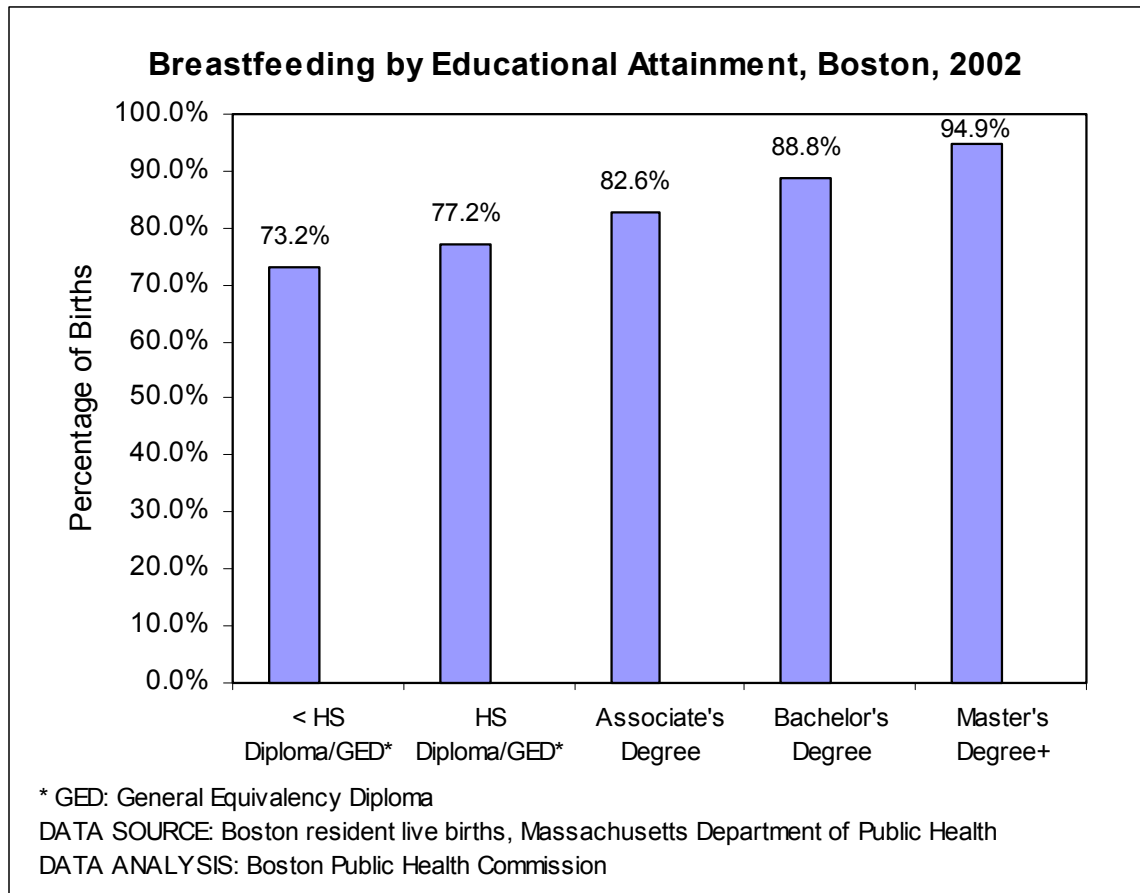
Breastfeeding



- Infants born to women in their early thirties were more commonly breastfed at the time of hospital discharge than were infants born to mothers of other ages.
- Over 85% (n=2,049) of infants born to mothers ages 30-34 were breastfed at the time of hospital discharge.
- Breastfeeding at the time of hospital discharge was least common among infants born to mothers under 20 years of age.

MATERNAL CHARACTERISTICS

Breastfeeding



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

MATERNAL CHARACTERISTICS

Payment Source for Prenatal Care

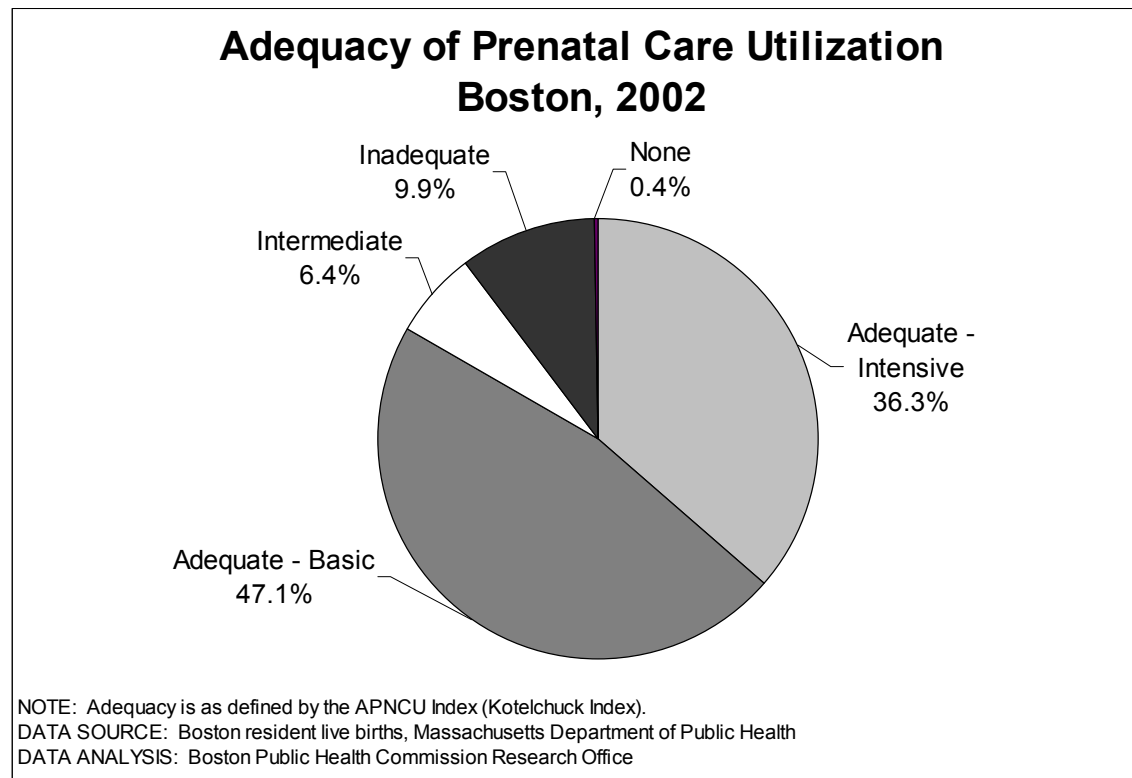
Payment Source for Prenatal Care Boston, 2002	
Source of Payment	Percentage of Births
Private Insurance	50.8
Health maintenance organization	43.9
Commercial Insurance	4.4
Blue Cross/Blue Shield	2.5
Public Insurance	47.7
Medicaid/SCHIP (MassHealth)	39.6
Healthy Start	3.0
Other Government	4.2
Free Care Pool	0.7
Medicare	0.1
Other Insurance	1.5
Other	1.0
Self-Pay	0.5
Worker's Compensation	N<5
DATA SOURCE: Boston resident live births. Massachusetts Department of Public Health DATA ANALYSIS: Boston Public Health Commission Research Office	

- In 2002, 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 (39.6%).

MATERNAL CHARACTERISTICS

Adequacy of Prenatal Care

Beginning with 2001 data, prenatal care adequacy is being reported for Boston births in terms of the Adequacy of Prenatal Care Utilization (APNCU) Index. Also known as the Kotelchuck Index, this measure offers a number of advantages over the older Kessner Index,¹ among them the ability to distinguish between late entry into prenatal care and an inadequate number of visits as reasons for inadequate care. It is also the standard used by the federal Healthy People 2010 goals and objectives for the nation.

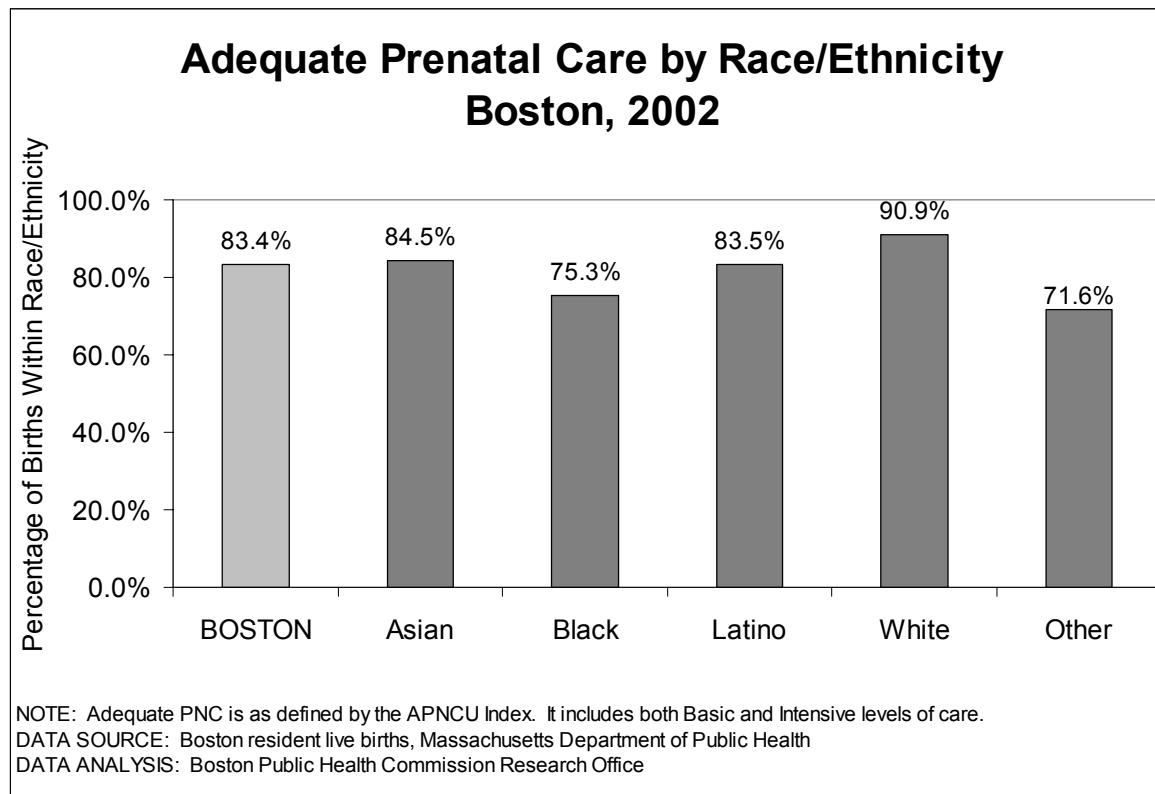


- In 2002, 83.4% (n=6,578) of Boston births were to women who received adequate prenatal care, defined as an appropriate number of visits for the length of gestation and a relatively early initiation of prenatal care.
- Women whose care falls into the **Adequate – Basic** category typically have had 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.

¹ Additional information about the measurement of prenatal care adequacy can be found in Technical Notes.

MATERNAL CHARACTERISTICS

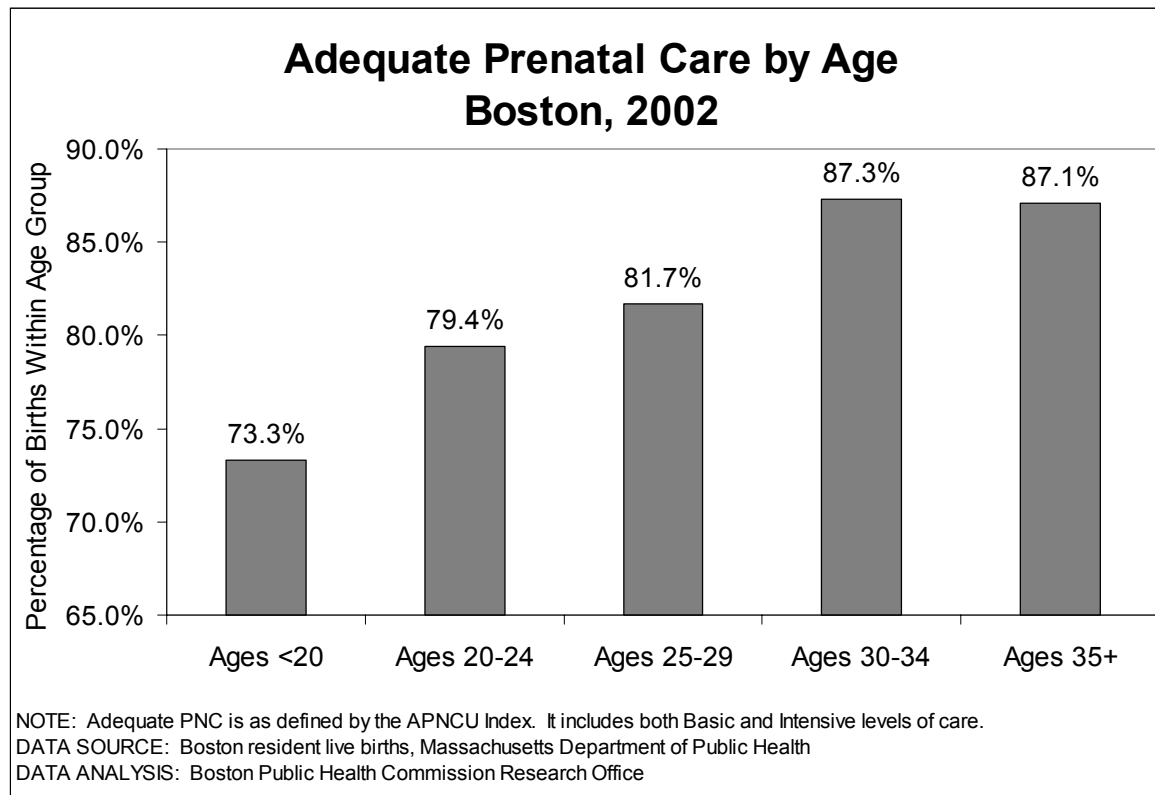
Adequacy of Prenatal Care



- Most births to Boston women in all race/ethnicity groups had adequate prenatal care (includes Adequate-Basic and Adequate-Intensive) in 2002, but the highest percentage of adequate prenatal care was among births to White women. Almost 91% (n=2,538) of births to White women had adequate care.
- Adequate prenatal care was significantly more common among births to White women than among births to Asian and Black women and Latinas.
- Births to women of Other race/ethnicity had the lowest percentage of adequate care (71.6%) (n=217) in 2002.

MATERNAL CHARACTERISTICS

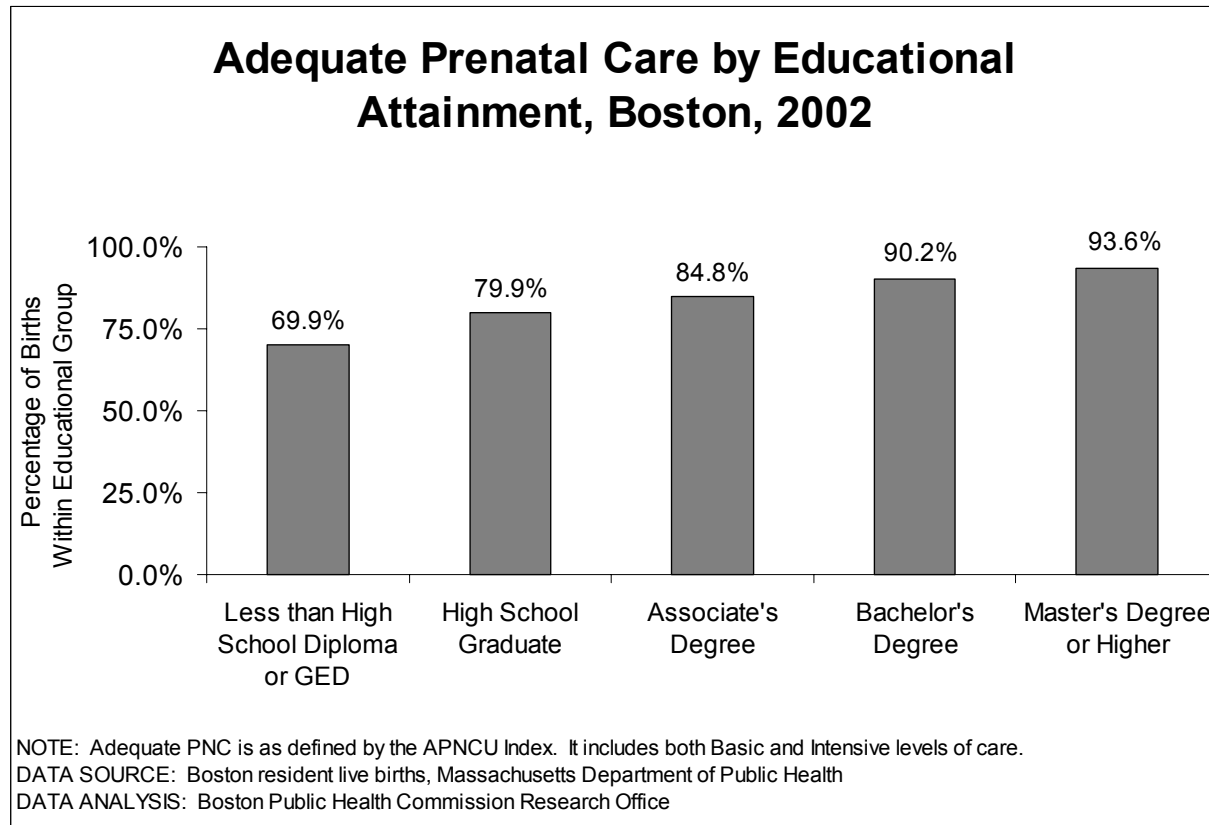
Adequacy of Prenatal Care



- In 2002, births to women ages 30 to 34 had the highest percentage of adequate (Adequate-Basic and Adequate-Intensive) prenatal care.
- Births to women less than 20 years old had the lowest percentage of adequate prenatal care.

MATERNAL CHARACTERISTICS

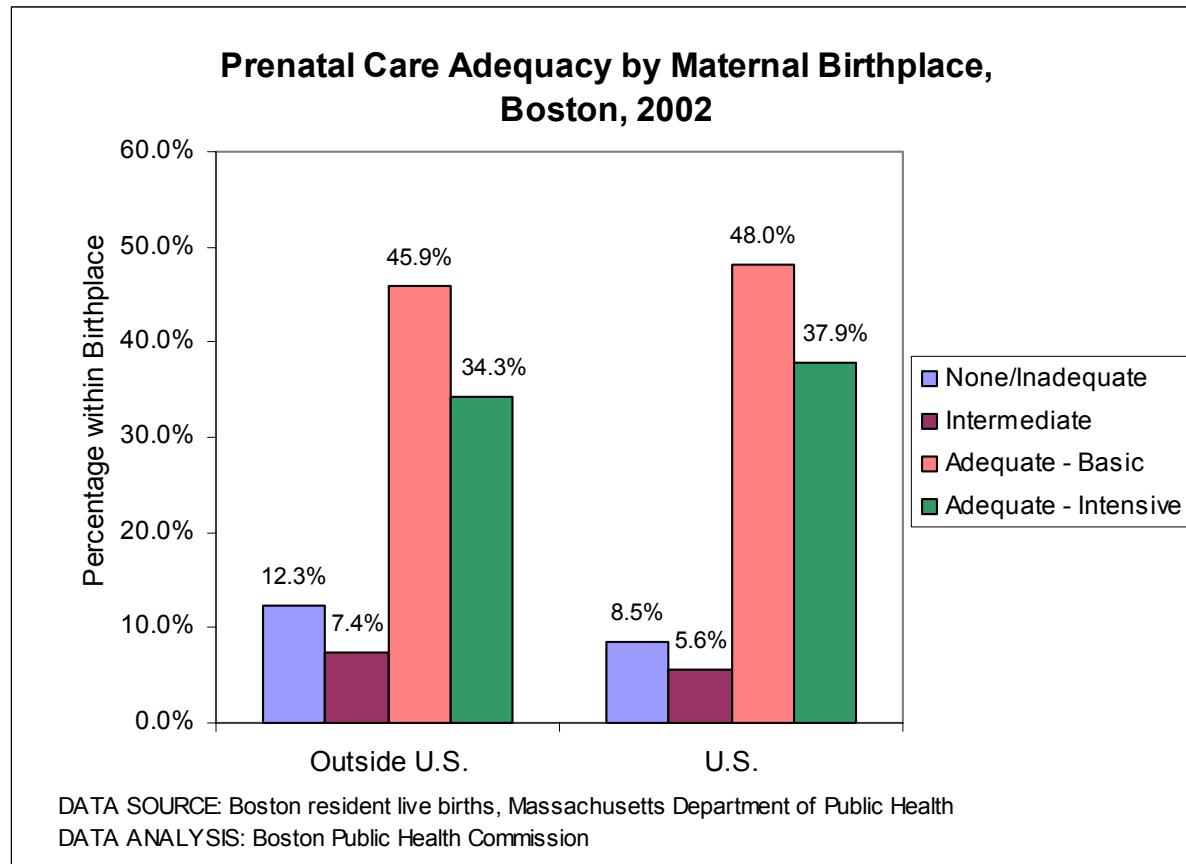
Adequacy of Prenatal Care



- 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 education or GED had the lowest percentage of adequate prenatal care in 2002. Slightly less than 70% (n=900) of births to poorly educated women received adequate prenatal care, though almost 94% (n=1,097) of births to women with at least a Master's degree received adequate prenatal care.

MATERNAL CHARACTERISTICS

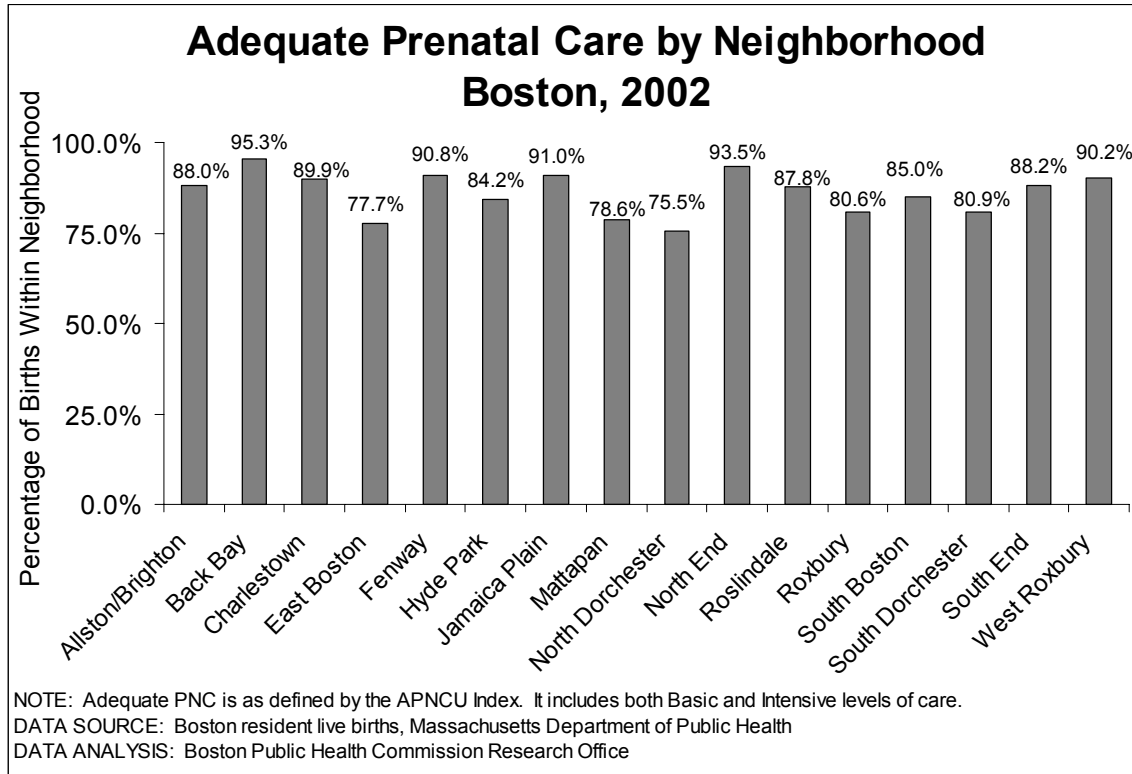
Adequacy of Prenatal Care



- Births to 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 than did births to women born outside the U.S.

MATERNAL CHARACTERISTICS

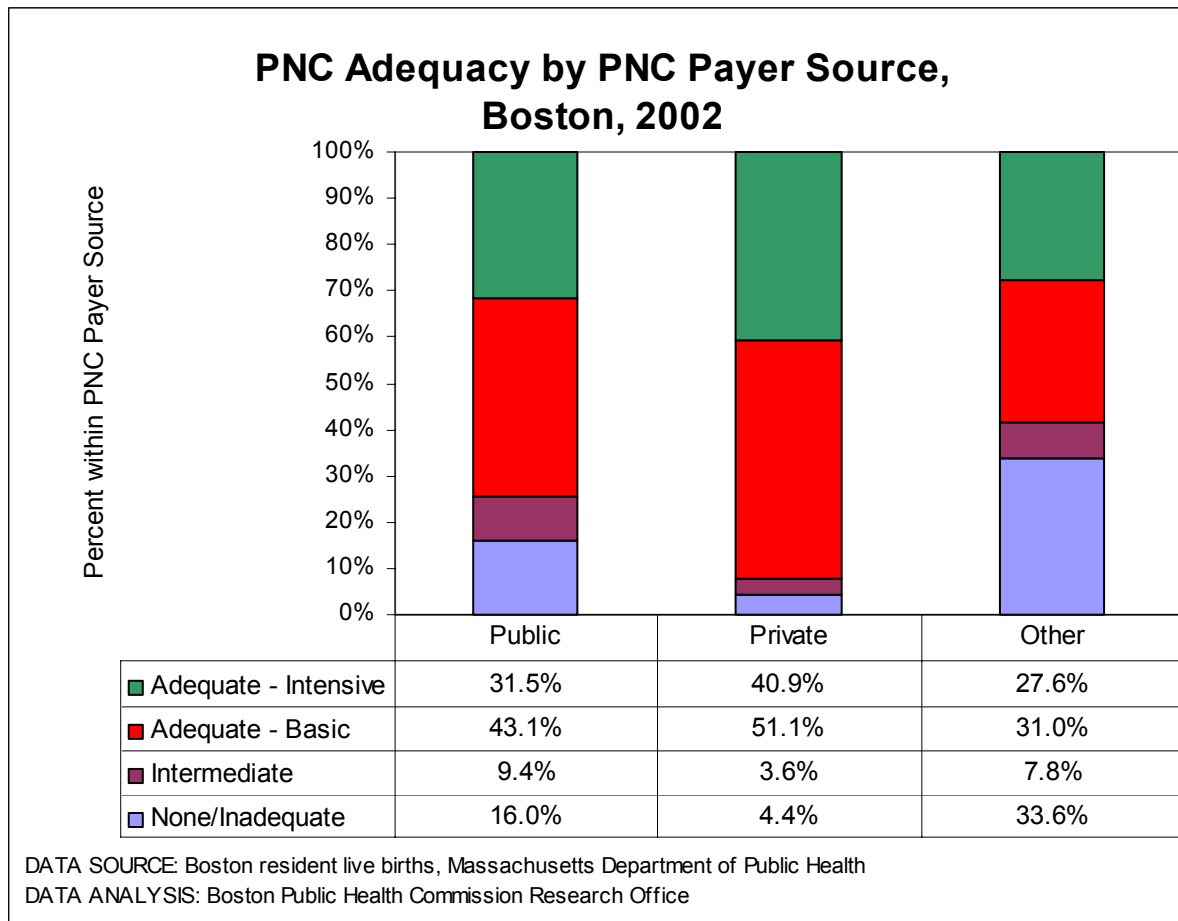
Adequacy of Prenatal Care



- Adequacy of prenatal care also varied by neighborhood in 2002. The percentage of births to women who received adequate prenatal care ranged from a low of 75.5% (n=1,087) in North Dorchester to a high of 95.3% (n=265) in the Back Bay.

MATERNAL CHARACTERISTICS

Adequacy of Prenatal Care



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

MATERNAL CHARACTERISTICS

Adequacy of Prenatal Care

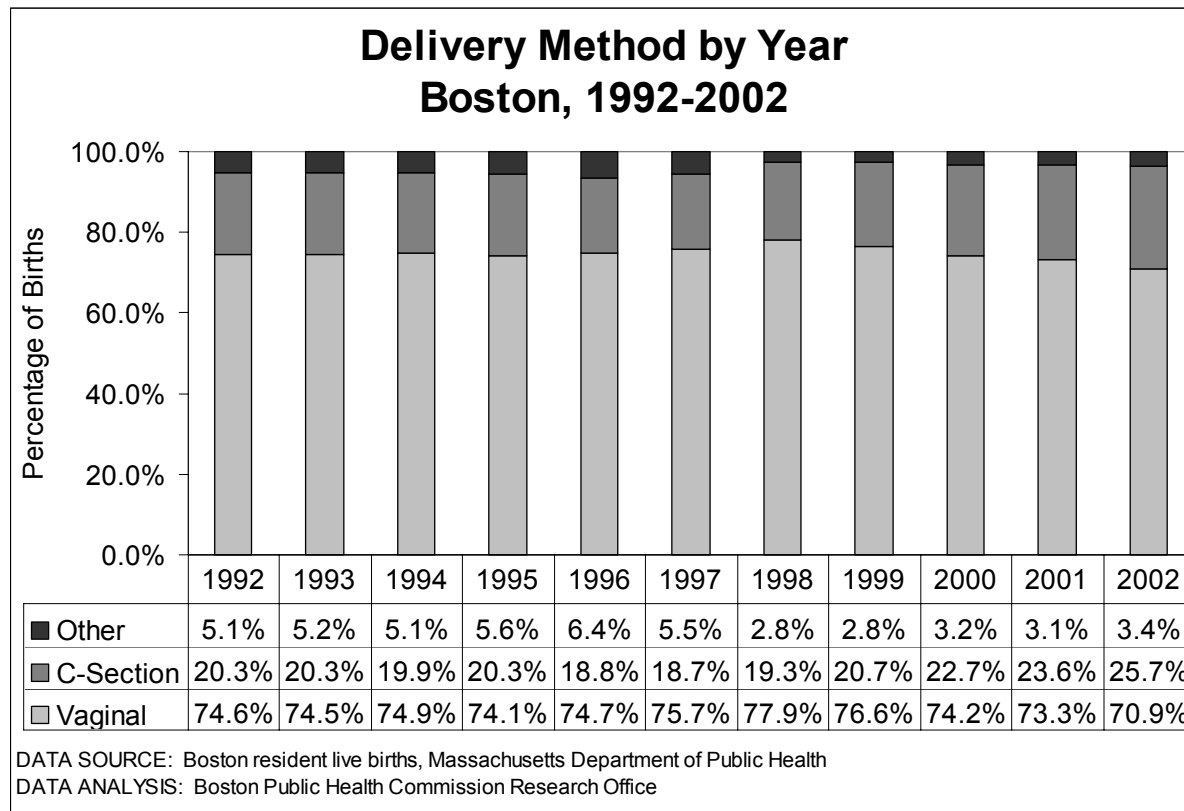
Logistic regression is a statistical technique that can be used to assess factors that may be related to the likelihood that births will receive adequate prenatal care. An advantage of logistic regression is that multiple factors can be measured simultaneously, making comparisons across groups possible. The results indicate how strong an association each factor or characteristic has while the others are being held constant. It is then possible to say, “With these other characteristics taken into account, births with X characteristic are more (or less) likely to receive adequate prenatal care than are births without that characteristic.”

Adjusted Odds Ratios for Adequate Prenatal Care Boston, 2002				
		Adequate Prenatal Care		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
Maternal Age				
One Year Increase		1.014	1.003	1.025
Race/Ethnicity				
	Asian	0.94	0.71	1.24
	Black	0.52	0.44	0.63
	Latino	1.21	0.98	1.50
	Other	0.56	0.41	0.76
	White*	1.00		
Plurality				
	Singleton*	1.00		
	Twins or Higher	2.76	1.73	4.41
Smoking During Pregnancy				
	No*	1.00		
	Yes	0.40	0.31	0.51
Maternal Birthplace				
	US*	1.00		
	Other**	0.65	0.57	0.76
Educational Attainment				
	Less Than High School Diploma	0.64	0.54	0.75
	HS Graduate/GED*	1.00		
	At Least Some College	1.30	1.11	1.52
Insurance Coverage				
	Private or Other*	1.00		
	Public	0.47	0.41	0.55
*Reference group				
**Includes Guam, Puerto Rico, and the Virgin Islands				
NOTES: Adequacy is as defined by the APNCU (Kotelchuck) Index.				
Marital status and parity were not significant predictors of prenatal care adequacy.				
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health				
DATA ANALYSIS: Boston Public Health Commission Research Office				

- In 2002, maternal age was significantly related to the odds of a birth’s receiving prenatal care, taking all other factors shown in the table to the left into account. Here, the odds ratio is interpreted to mean that for each additional year of maternal age, the odds of a birth’s receiving adequate prenatal care increased about 1.4%. Mother’s race was also related to prenatal care adequacy. Births to Black women were about 52% as likely, and births to Other race women were about 56% as likely, as births to White women to receive adequate PNC.
- Twins or higher order births were 176% more likely than singletons to obtain adequate care. Births to women who smoked during pregnancy were about 40% as likely as births to nonsmokers to receive adequate prenatal care, and births to women born in a country outside the US were about 65% as likely as births to US-born women to do so.
- Births to college-educated women were 30% more likely than births to women with a high school diploma to obtain adequate prenatal care, and births to women without a high school diploma were about 64% as likely as births to women with a high school diploma to receive adequate prenatal care.
- Finally, births to women with public insurance for their prenatal care were only about 47% as likely as births to women with private or Other insurance to reach an adequate level of prenatal care.

MATERNAL CHARACTERISTICS

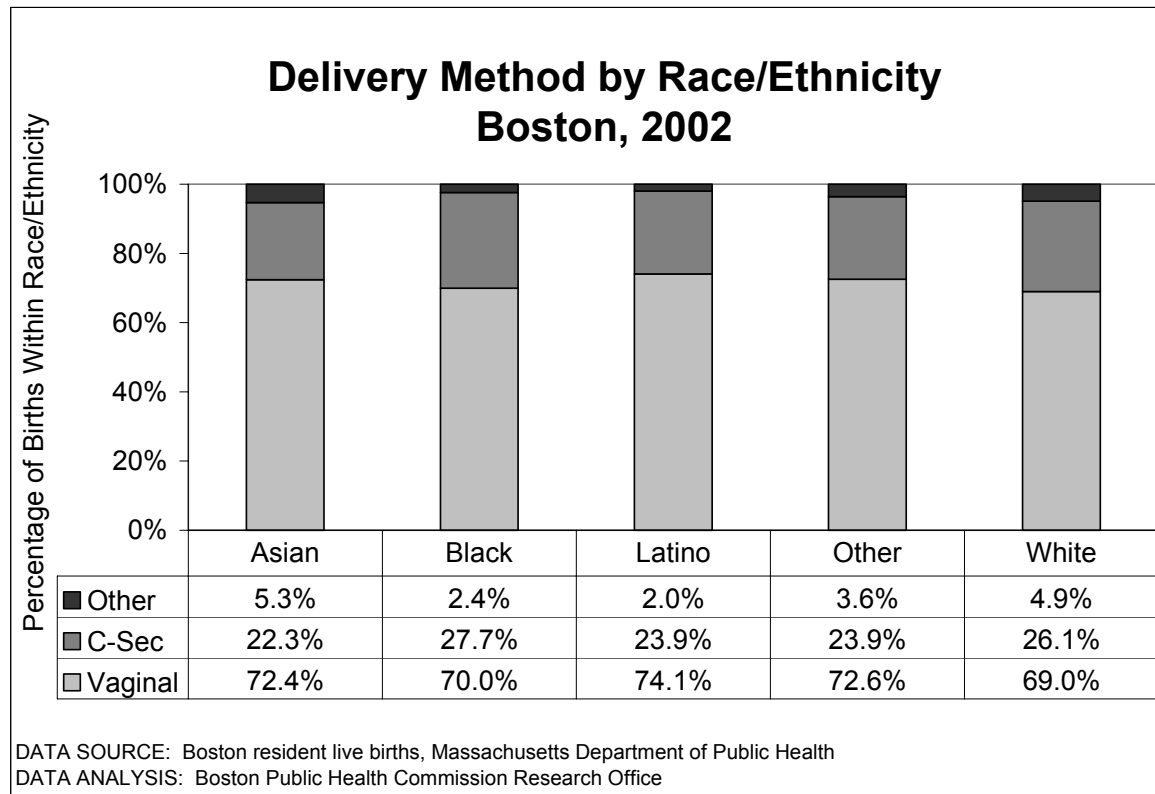
Delivery Method



- About three-quarters (n=5,658) of Boston births in 2002 were vaginal deliveries. This level has declined approximately 9.0% since its most recent high point in 1998.
- The use of Cesarean section, or surgical delivery, has risen about 37.4% 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

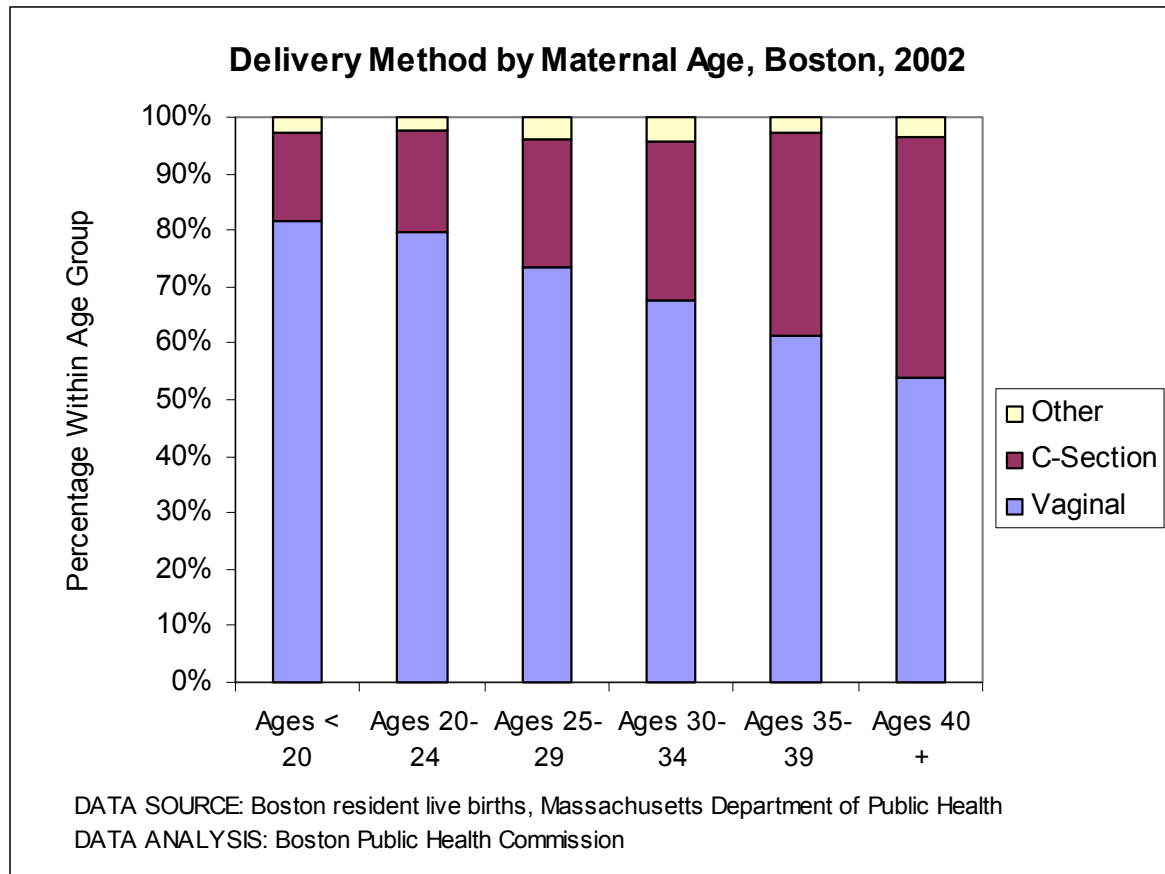
Delivery Method



- In 2002, Cesarean section deliveries were more common among births to Black women than among births to 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

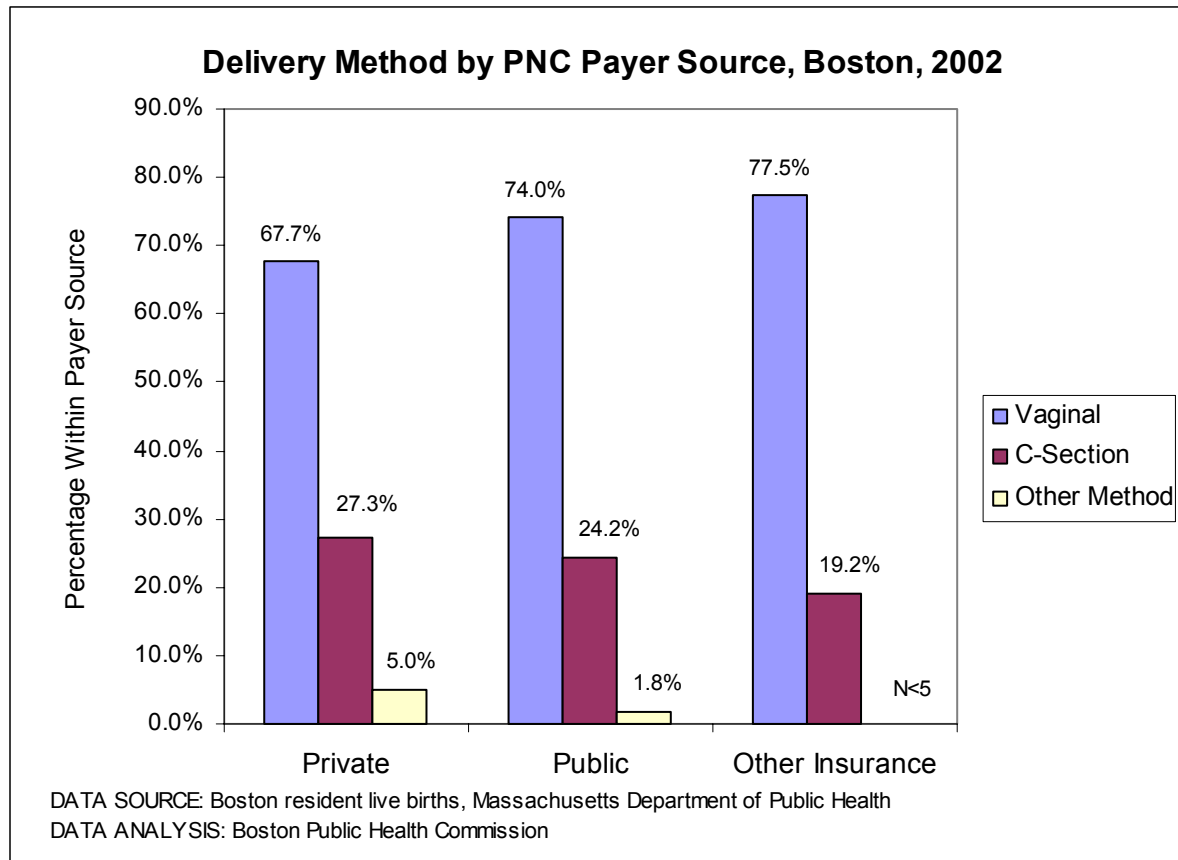
Delivery Method



- Data from 2002 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 81.5% (n=550) of all births. In contrast, among women ages 40 and over, vaginal births comprised barely a majority (53.8%) (n=171) of all births.
- As vaginal births decreased with advancing maternal age, Cesarean births increased. Among women ages 20 and under, Cesarean births made up 15.9% (n=107) of all births, though among women ages 40 and older, Cesarean births made up 42.8% (n=136) of births.

MATERNAL CHARACTERISTICS

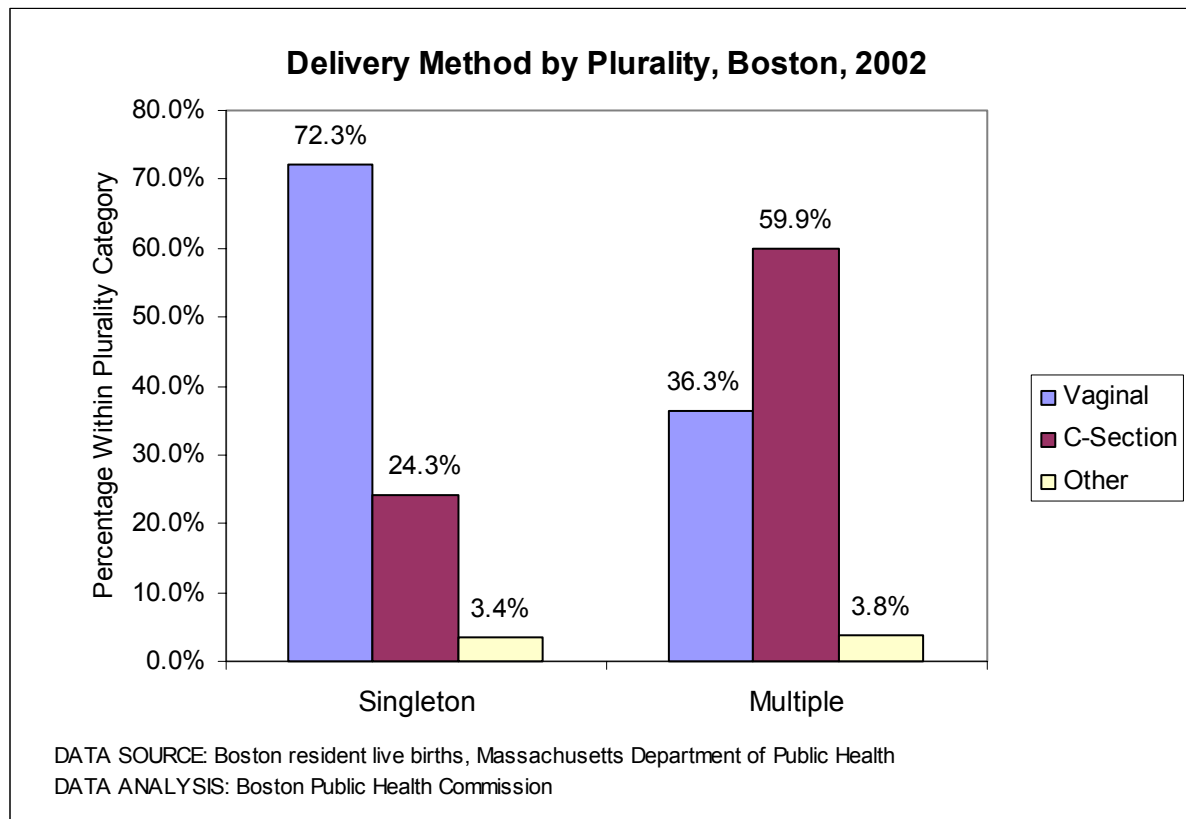
Delivery Method



- Delivery method was associated with payer source for prenatal care.
- Vaginal births made up the highest percentage of total births among births for which prenatal care was paid by Other insurance, such as workers compensation and self-pay.
- Vaginal births made up the smallest percentage of total births among births for which prenatal care was paid by private insurance such as Blue Cross/Blue Shield and health maintenance organizations.
- 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

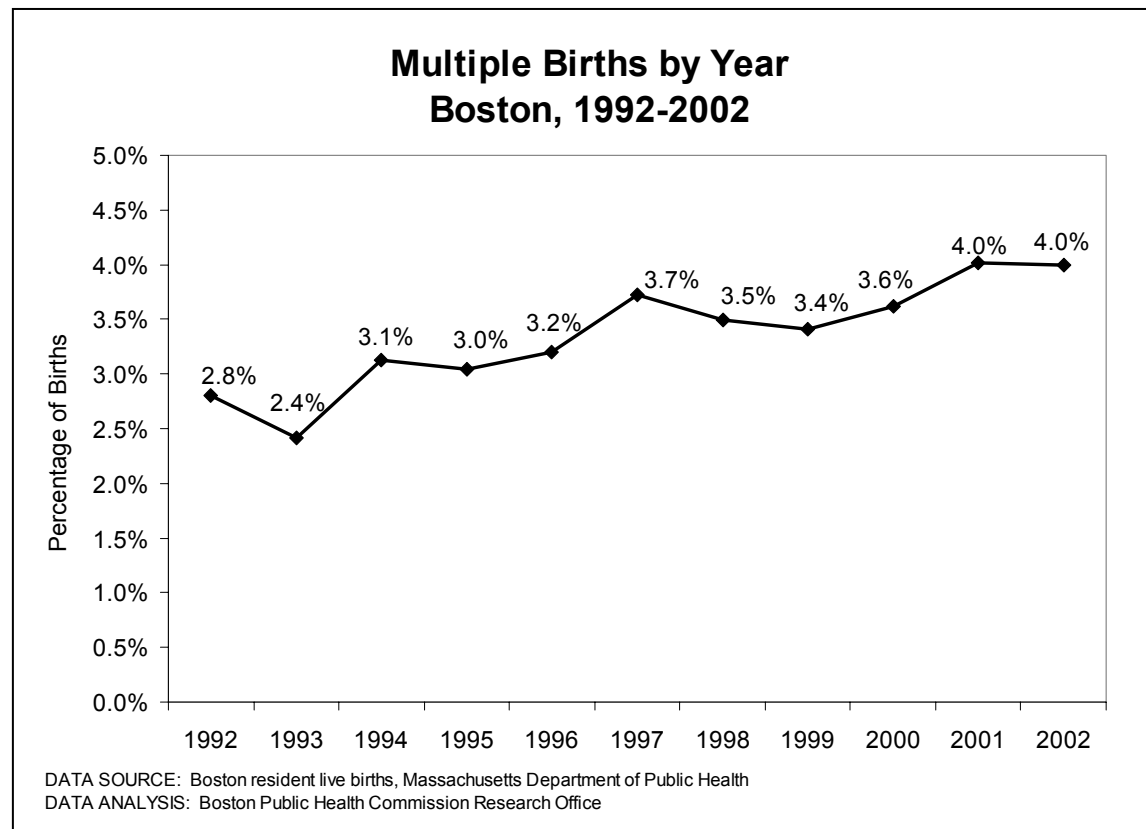
Delivery Method



- Singleton births in 2002 were much more likely than plural births to be delivered vaginally.
- Almost three-quarters (72.3%) (n=5,543) of singleton births were delivered vaginally in 2002, compared with only 36.3% (n=115) of twins, triplets, or higher order births.

INFANT CHARACTERISTICS

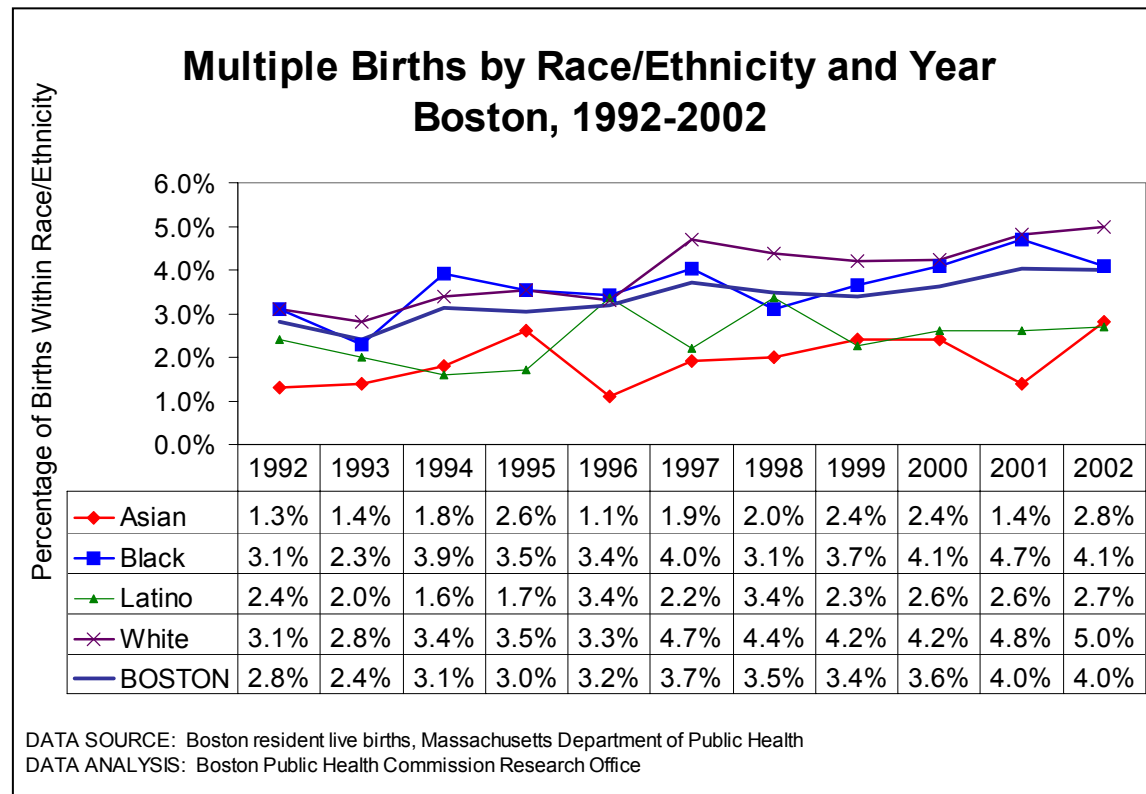
Multiple Births



- Births that are twin, triplet, or higher-order multiple gestations have risen from 2.8% (n=258) of all Boston resident births in 1992 to 4.0% (n=320) in 2002. This difference is statistically significant.
- The overall increase in multiple births over time is attributable to significant increases among Boston women less than 20 years of age and among women 30 to 34 years of age and older (data not shown).
- The percentage of multiple births increased 82.2% among Boston women less than 20 years of age, and 40.6% among Boston women 30 to 34 years of age (data not shown). Percentages of multiple births among women of other age groups also increased between 1992 and 2002 but the differences were not statistically significant.

INFANT CHARACTERISTICS

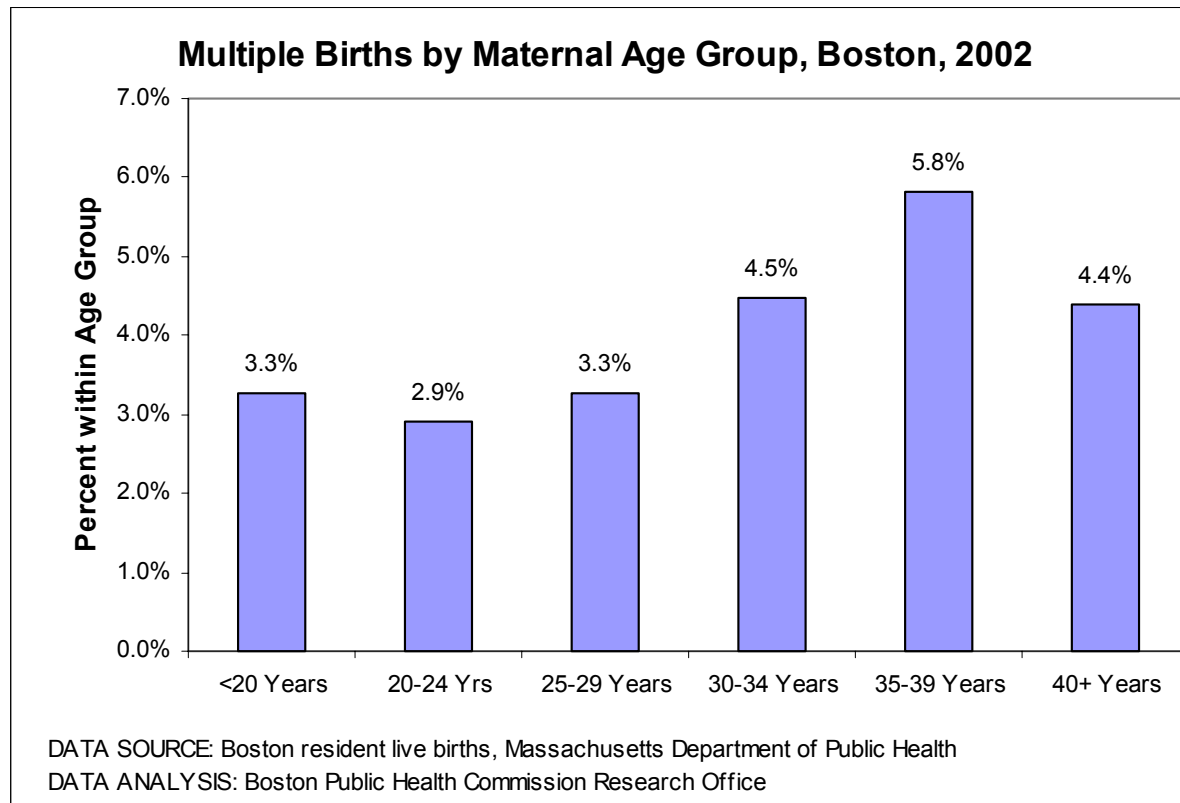
Multiple Births



- Multiple births are more common among Whites than among other racial/ethnic groups.
- Multiple births have increased in recent years as a percentage of all births across all racial/ethnic groups.

INFANT CHARACTERISTICS

Multiple Births

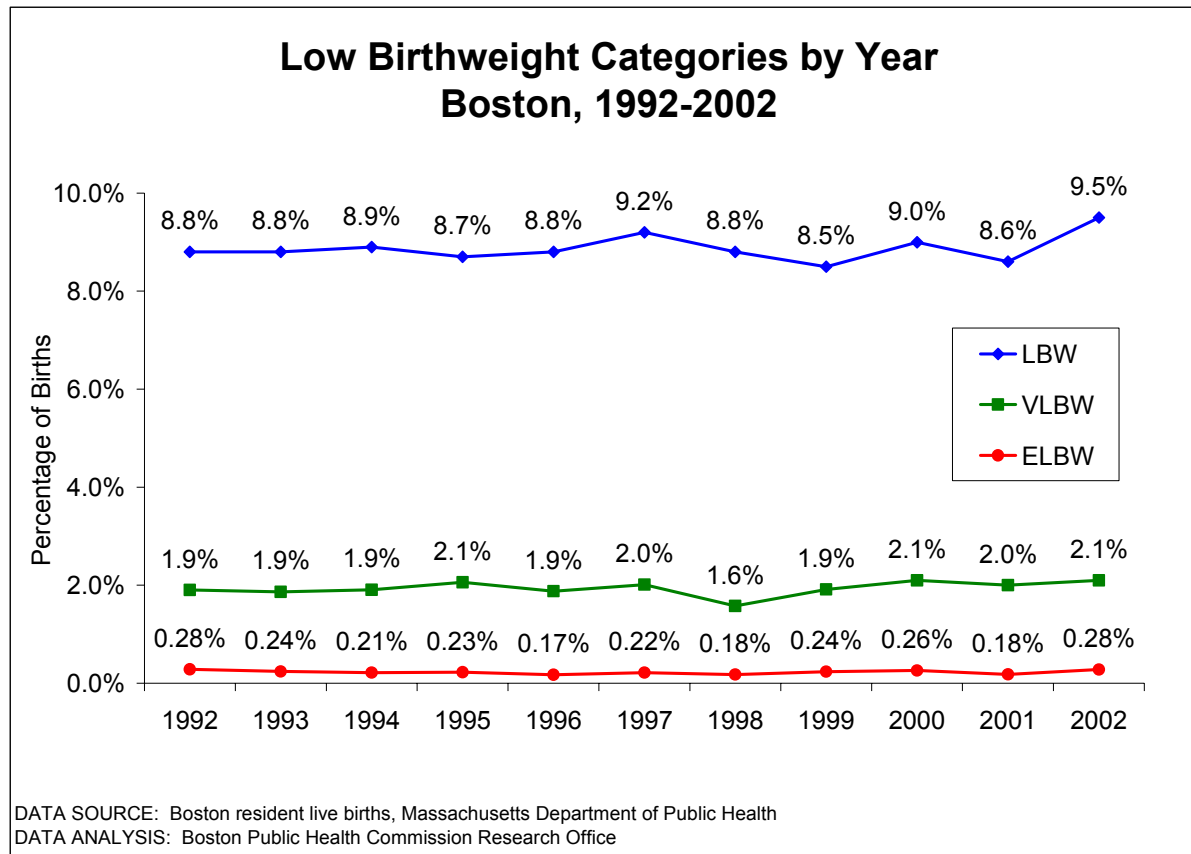


- Multiple births were most common among births to women ages 35-39 years old. Almost 6% (n=72) of births to women in this age group were multiple births.
- Multiple births were least common among births to women in their early twenties. A little less than 3% (n=42) of births to women in this age group were multiple births.

INFANT CHARACTERISTICS

Low Birthweight

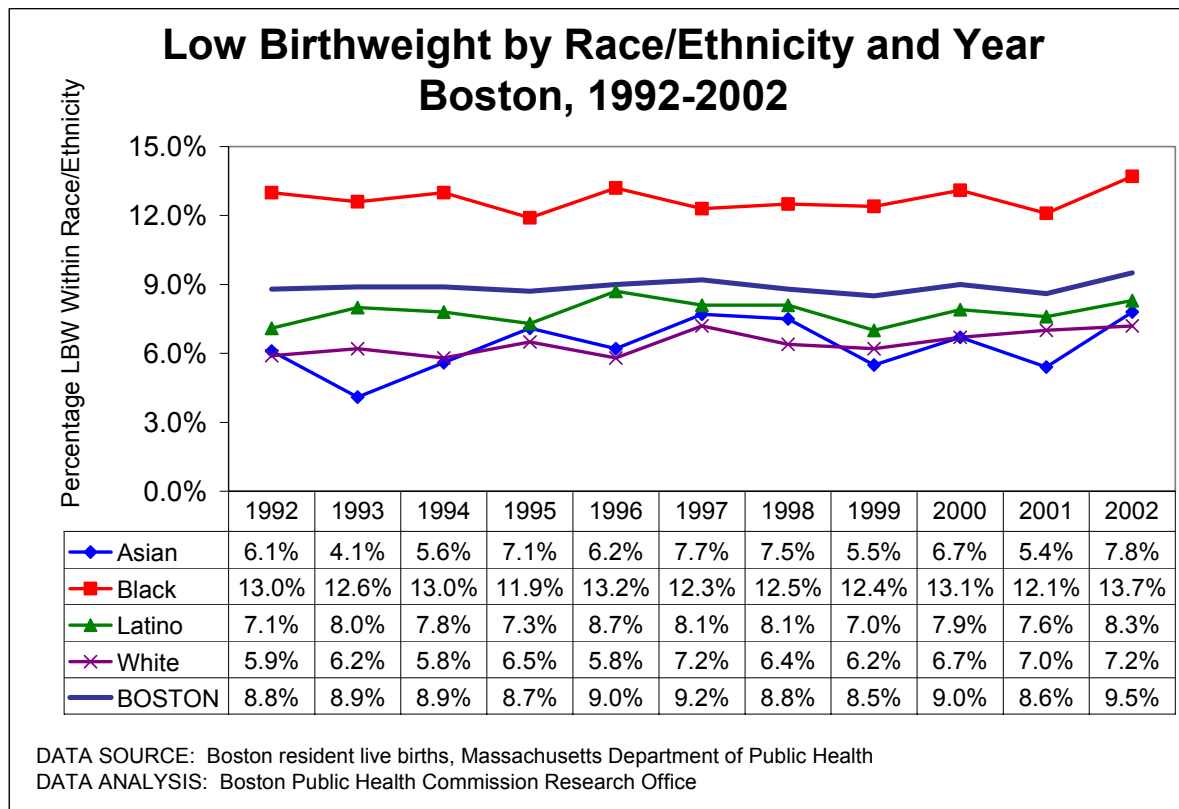
Normal birthweight babies weigh at least 2,500 grams (5.5 pounds) at delivery. Infants who weigh less are considered to be of low birthweight (LBW). These infants may be preterm, meaning they were born too early, or they may be small for their gestational age. Within the LBW group are very low birthweight (VLBW) births, which weigh less than 1,500g (3.3 pounds), and extremely low birthweight (ELBW) births, which 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.



- Boston's rate of low birthweight births increased slightly but significantly between 2001 and 2002. 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.

INFANT CHARACTERISTICS

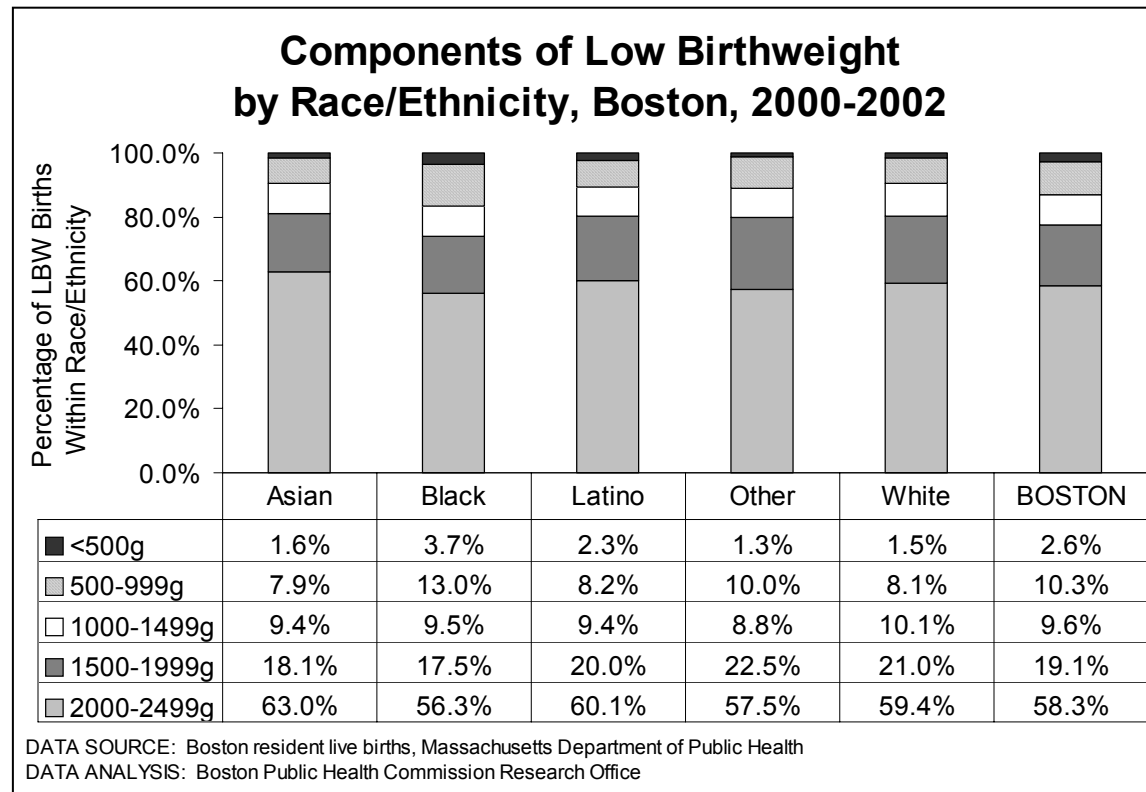
Low Birthweight



- 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 the 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 2002 (13.7%) (n=330) was close to double that for White infants (7.2%) (n=202) and was higher than those of infants from other racial/ethnic groups. All of these differences were statistically significant.

INFANT CHARACTERISTICS

Low Birthweight

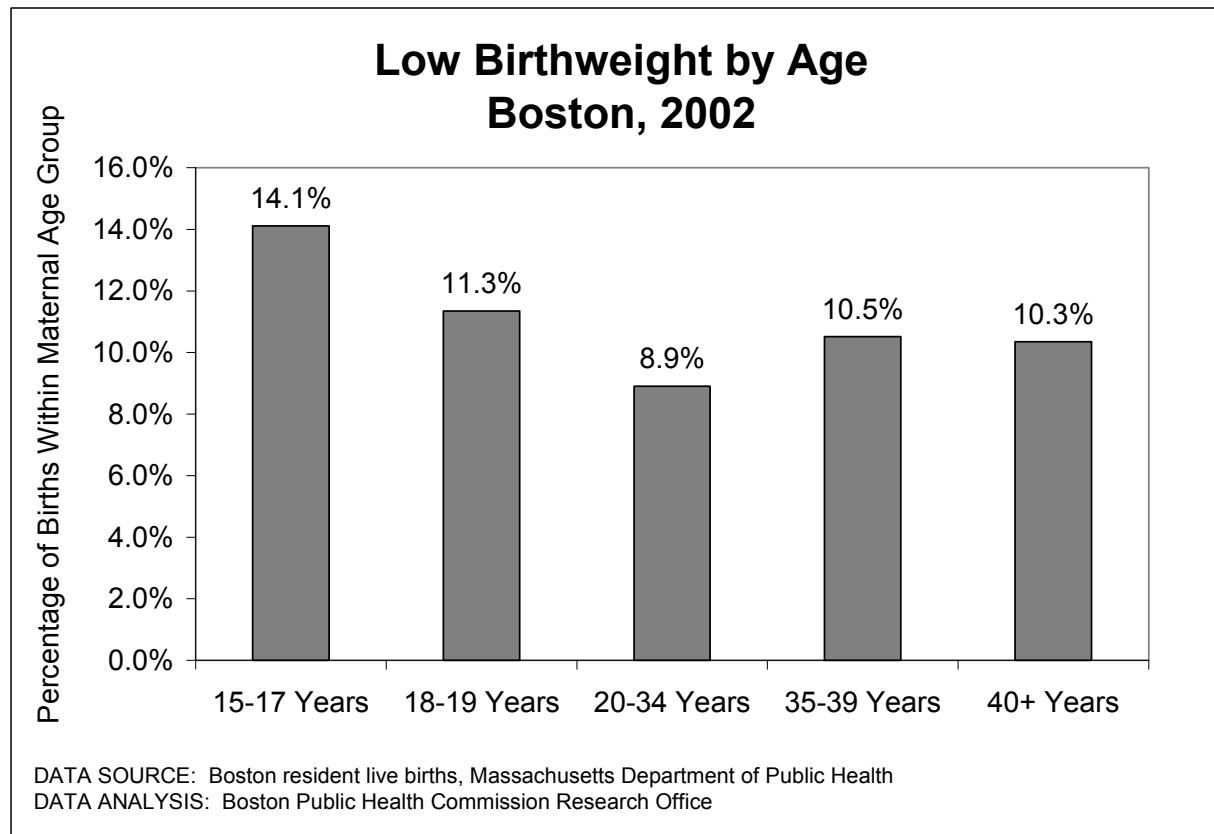


- In addition to a higher LBW rate, Black births have a higher percentage of their low birthweight births occurring at the very low end of the birthweight range, where mortality is high.
- Of Black LBW births during the period 2000-2002², 26.0% (n=252) weighed less than 1,500g, compared with 14.7% (n=24) of Asian LBW births, 18.0% (n=117) of White LBW births, 19.5% (n=85) of Latino LBW births, and 21.0% (n=16) of Other LBW births.

² Three years of data have been combined to obtain sufficient numbers in all race/ethnicity groups for the presentation of birthweight category percentages.

INFANT CHARACTERISTICS

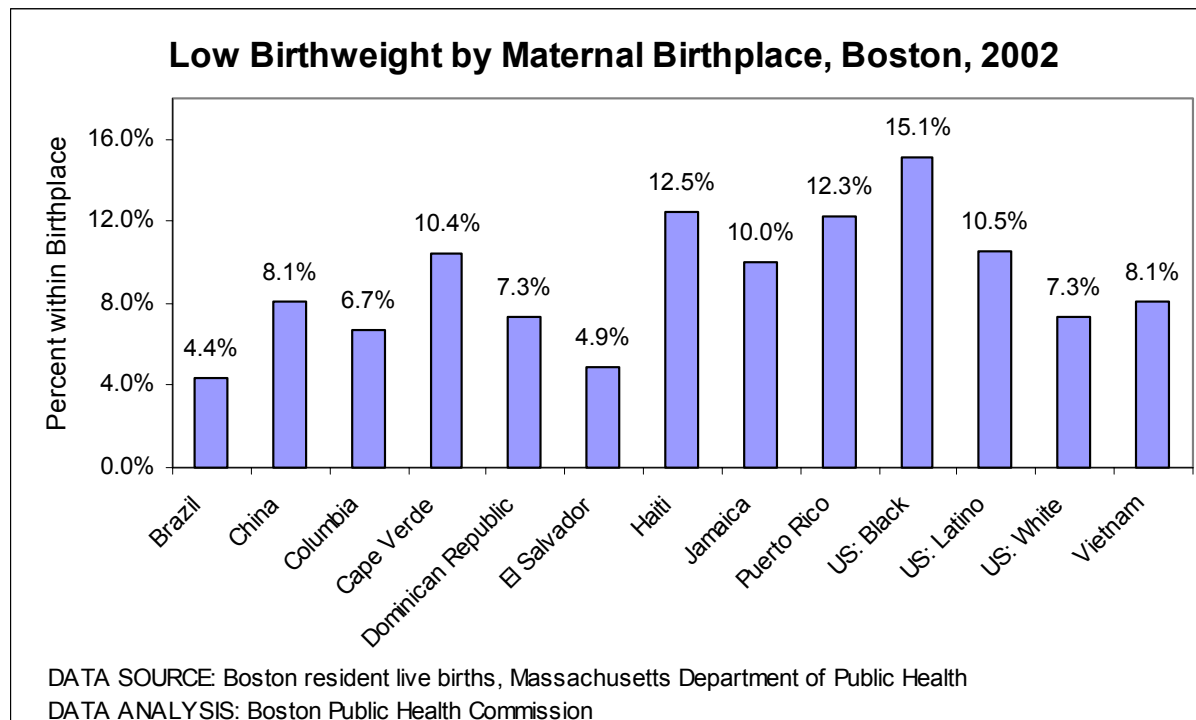
Low Birthweight



- LBW rates in Boston are consistent with the national pattern, where the highest LBW levels are found in births to the youngest and oldest mothers.
- In 2002, the differences in low birthweight by maternal age were statistically significant for 15-17 year olds (n=34) compared with 20-34 year-olds (n=514).

INFANT CHARACTERISTICS

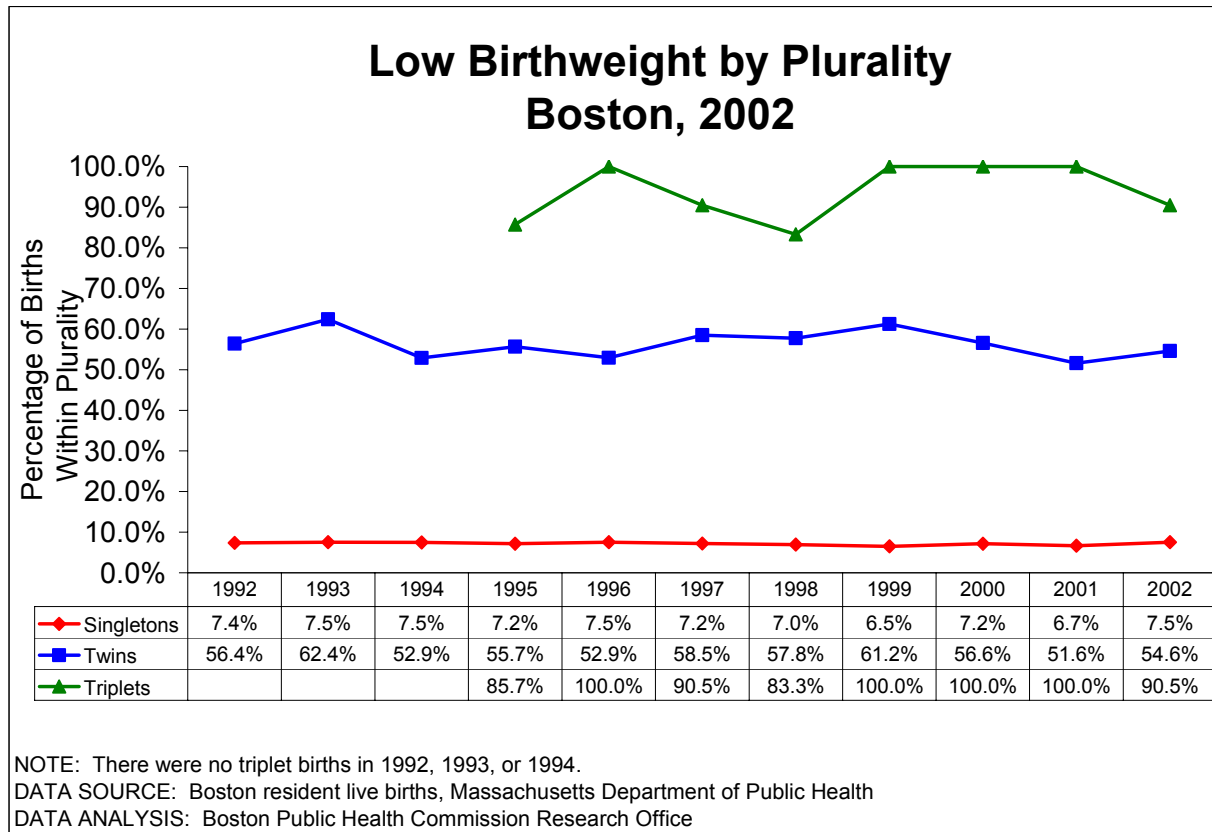
Low Birthweight



- Overall, low birthweight was more common (10.4%) (n=443) among infants of US-born women than among infants of women born outside of the United States (8.5%) (n=318) (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.
- Low birthweight was most common among US-born Black births (15.1%) (n=215), followed by births to Haitian women (12.5%) (n=53), and births to Puerto Rican women (12.3%) (n=27).

INFANT CHARACTERISTICS

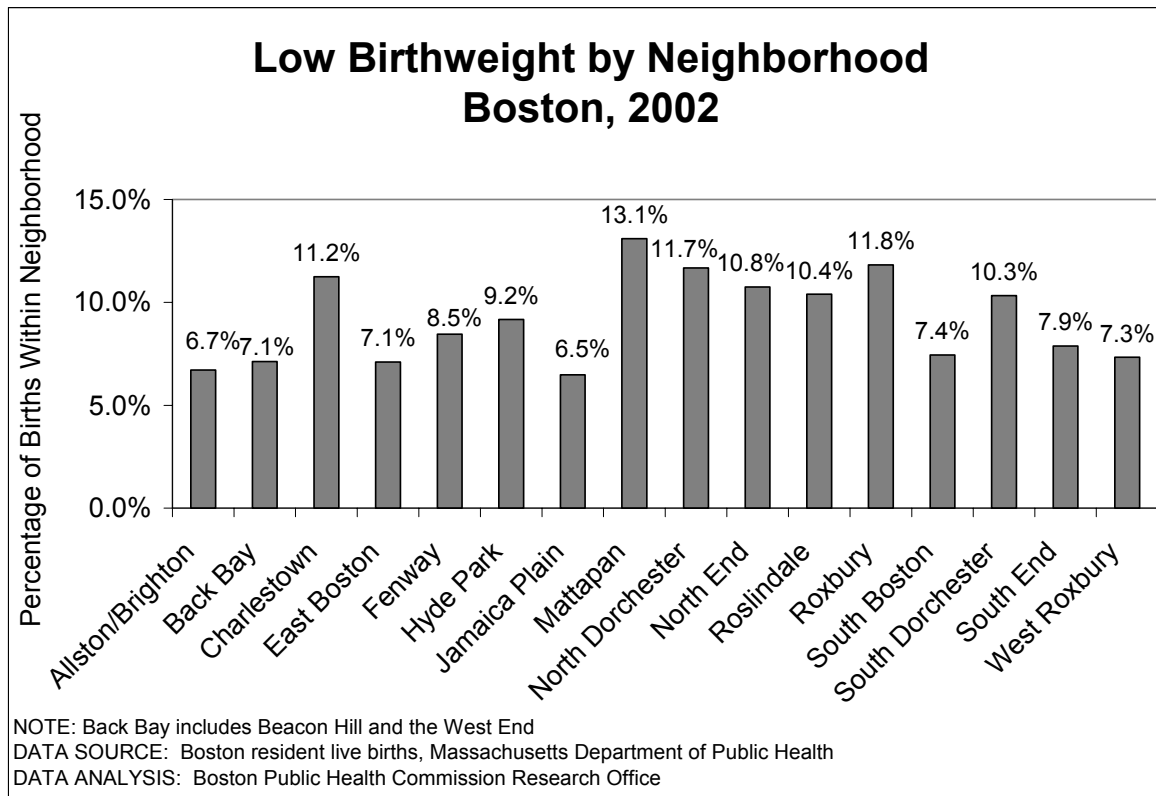
Low Birthweight



- 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 those for twins (51.6% - 61.2%) and triplets (83.3% - 100.0%) every year from 1992 through 2002.
- The one-year change in percentage of LBW between 2001 and 2002 was statistically significant for singleton births, for whom LBW increased from 6.7% (n=525) to 7.5% (n=577).

INFANT CHARACTERISTICS

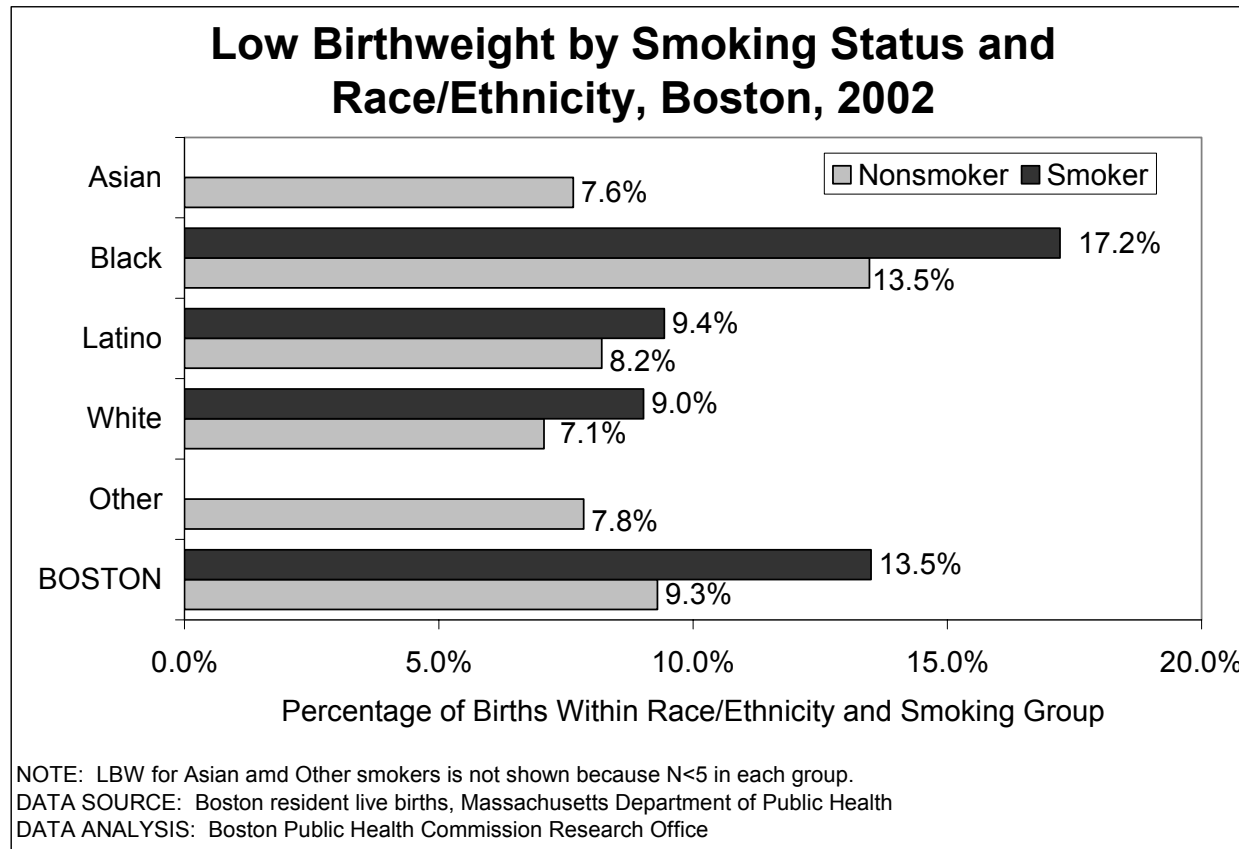
Low Birthweight



- Boston's highest rates of LBW in 2002 were for Mattapan, Roxbury, and North Dorchester.
- The city's lowest rates were for Jamaica Plain, Allston/Brighton, the Back Bay, and East Boston.

INFANT CHARACTERISTICS

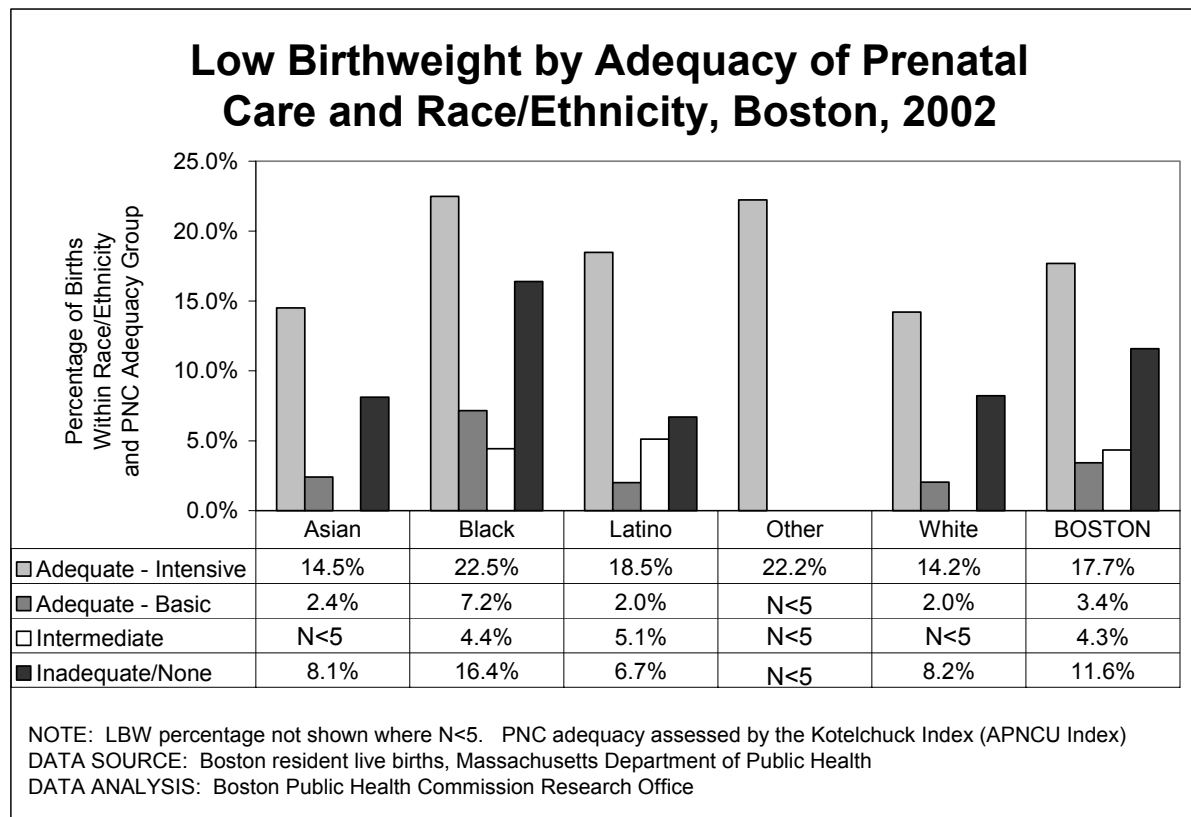
Low Birthweight



- 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 illustrate 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

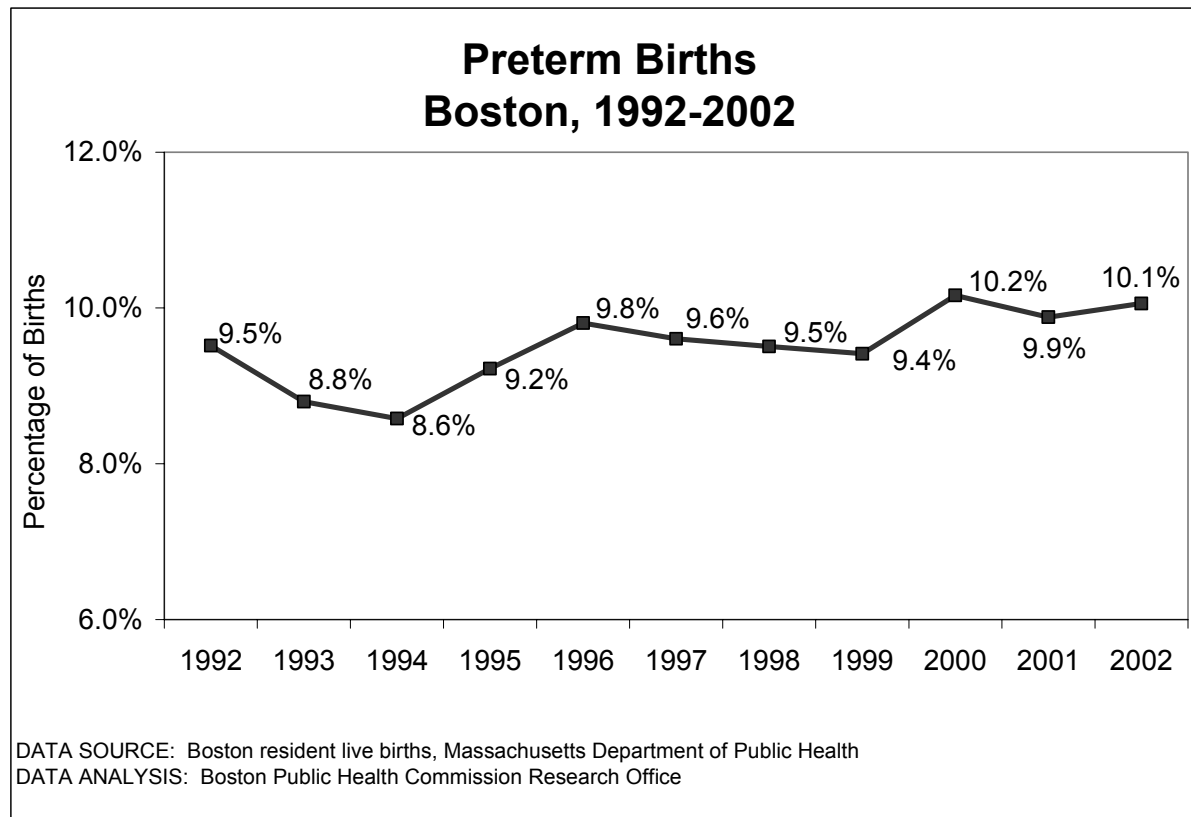


- For Boston overall in 2002 and for all race/ethnicity groups, the percentage of low birthweight was highest for births accompanied by **Adequate-Intensive** prenatal care. Births receiving more than routine prenatal care typically involve complicated or high-risk pregnancies requiring close medical management.
- The lowest LBW percentages for every race/ethnicity group except Blacks were in the **Adequate-Basic** PNC group. LBW ranged from 2.0% of births to White mothers and Latinas to 7.2% of births to Black women at this care level. Among Black births, the percentage of LBW was lowest at the **Intermediate** level of care.
- For all race/ethnicity groups except Other (for whom small numbers preclude the calculation of LBW percentages for most levels of care), percentages of LBW are higher at the **Adequate-Intensive** and the **Inadequate/None** levels of prenatal care.

INFANT CHARACTERISTICS

Preterm Birth

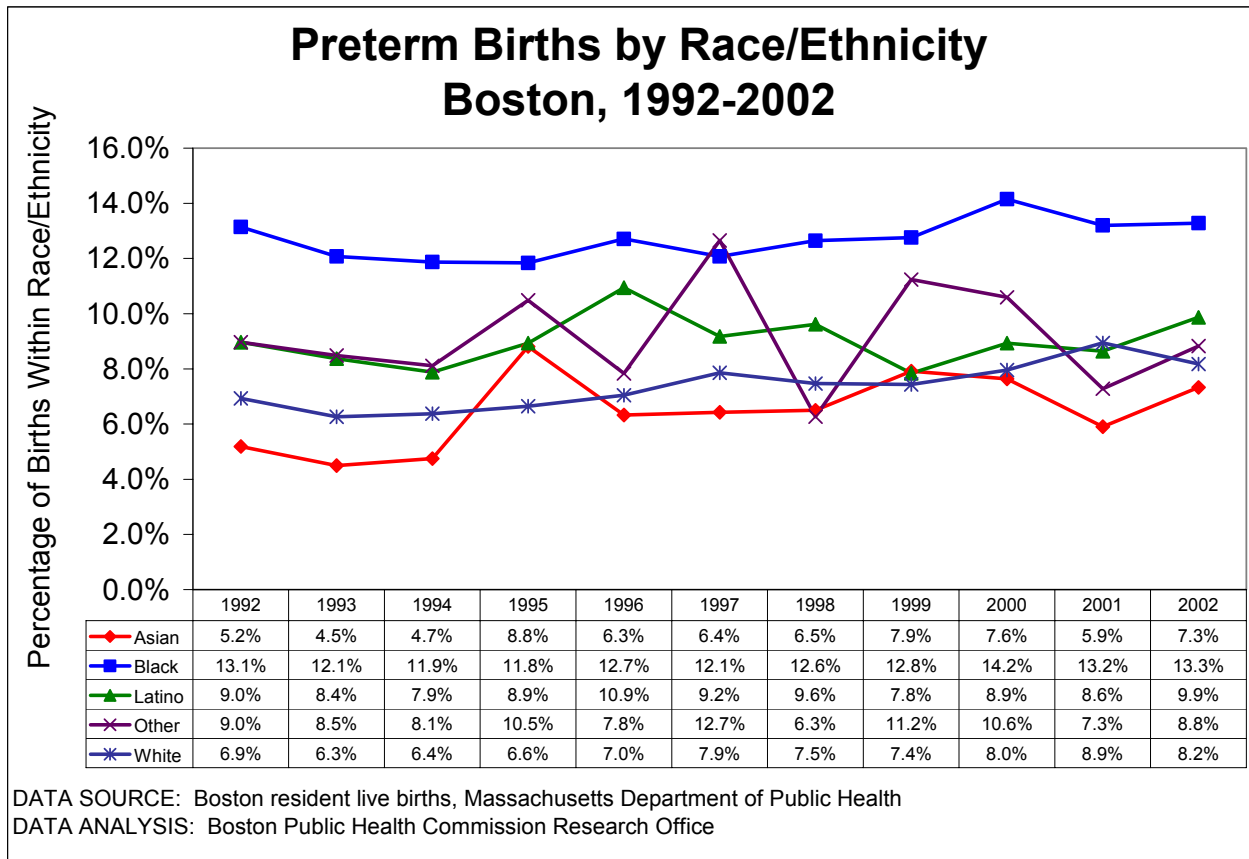
A preterm birth (PTB) is one that occurs at less than 37 completed weeks' gestation. Infants born too early are at substantially increased risk of illness and death, and the earlier they are born, the higher their risk. Preterm birth and low birthweight are highly correlated, with 68.1% of LBW births in 2002 also being preterm, and 64.4% of preterm births also being LBW.



- Preterm birth has ranged between 8.6% and 10.2% of Boston births for the past decade.
- The percentage of preterm birth for 2002 (10.1%) (n=804) is not significantly different from that for 1992 (9.5%) (n=871), but is significantly higher than the percentage for 1994 (8.6%) (n=720).

INFANT CHARACTERISTICS

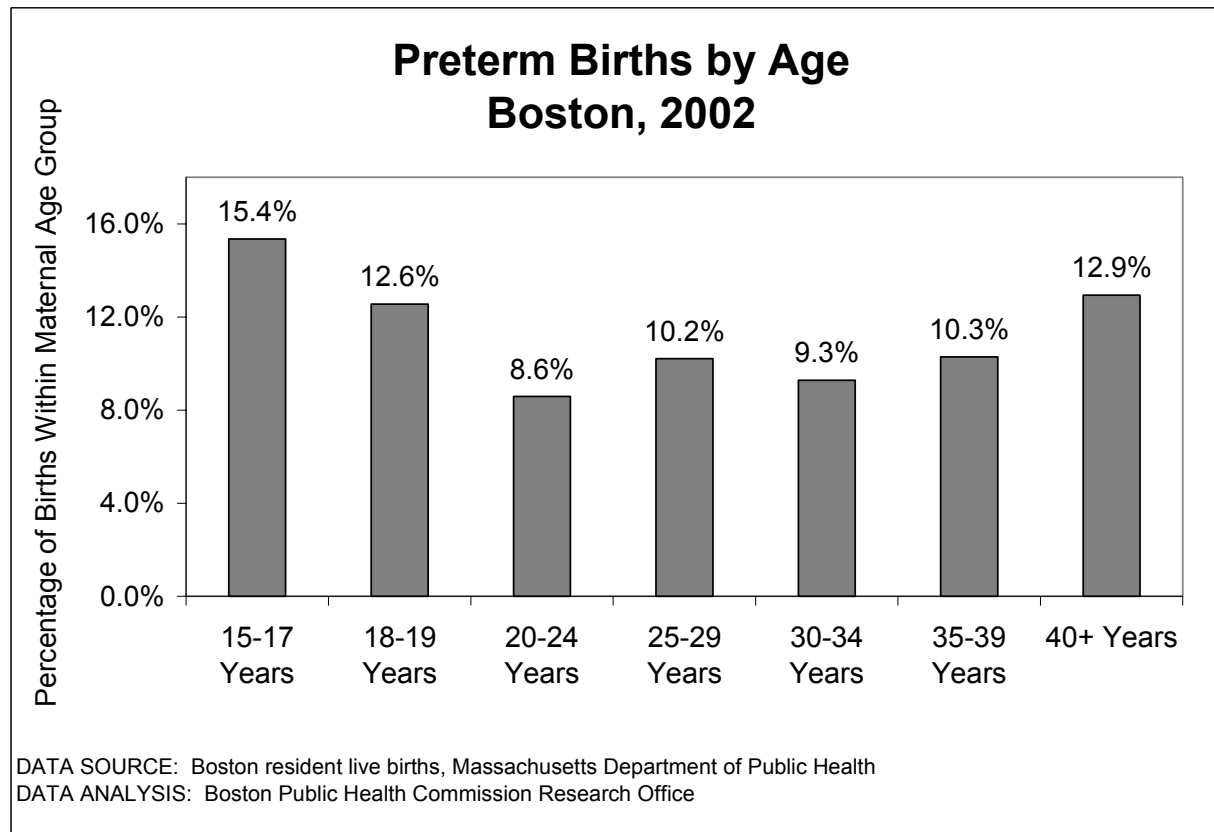
Preterm Birth



- As with low birthweight, preterm births are more common for Black Boston women. For every year between 1992 and 2002, except 1997, the percentage of preterm birth was highest for Blacks.
- During the period 1992-2002, Asian, Latino, and White infants were less likely to be born preterm than were Black infants, and these differences were statistically significant.

INFANT CHARACTERISTICS

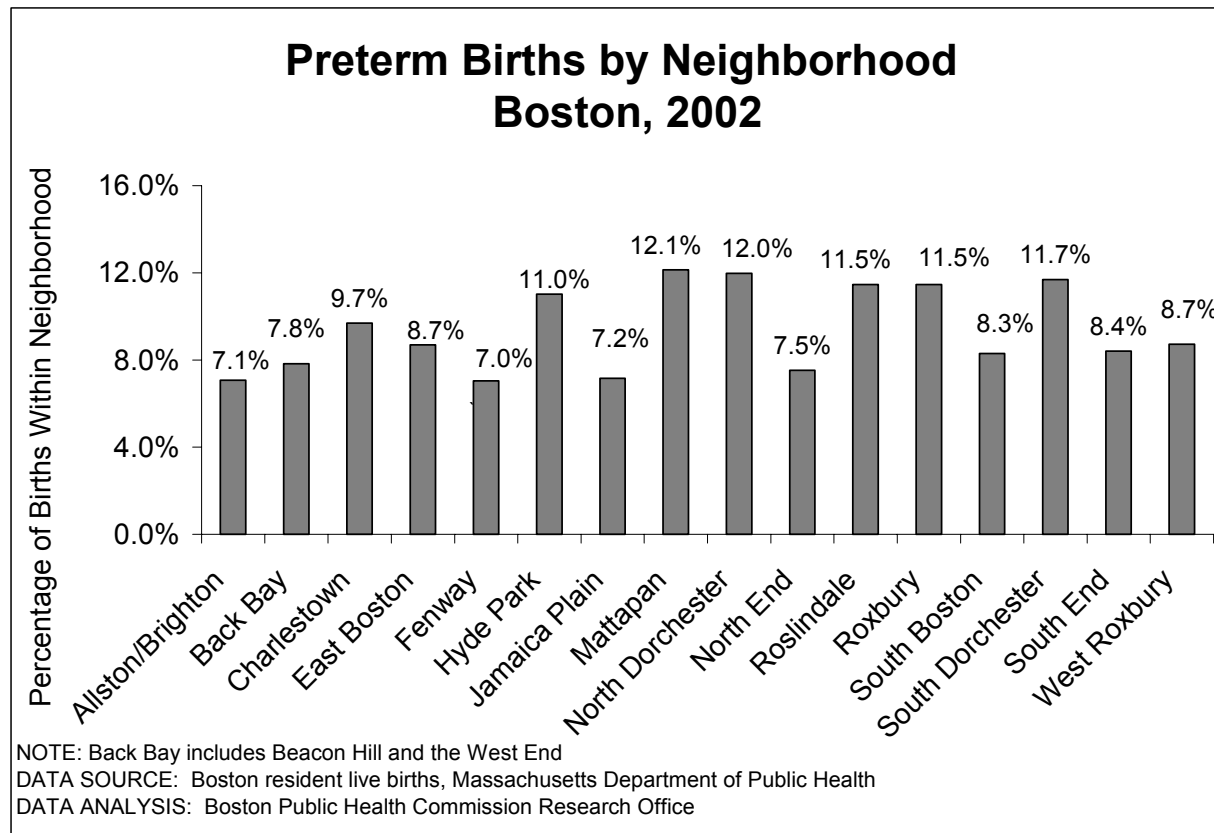
Preterm Birth



- Overall, about one in every ten Boston births in 2002 was preterm (10.1%) (n=804).
- Preterm birth (PTB) was least common among women in their early twenties and most common among adolescents 15-17 years old. The percentage of PTB among adolescents ages 15-17 was 79.1% higher than the percentage of PTB among women 20 to 24 years old.

INFANT CHARACTERISTICS

Preterm Birth



- Boston's neighborhood with the highest percentage of preterm birth (PTB) in 2002 was Mattapan (12.1%) (n=38), followed by North Dorchester (12.0%) (n=176) and South Dorchester (11.7%) (n=86).

INFANT CHARACTERISTICS

Preterm Birth

Logistic regression was used to examine the relationship between preterm birth (PTB) and several characteristics reported on the birth certificate. An advantage of this statistical technique is that it permits the influence of one characteristic to be estimated while that of all others under consideration is held constant.

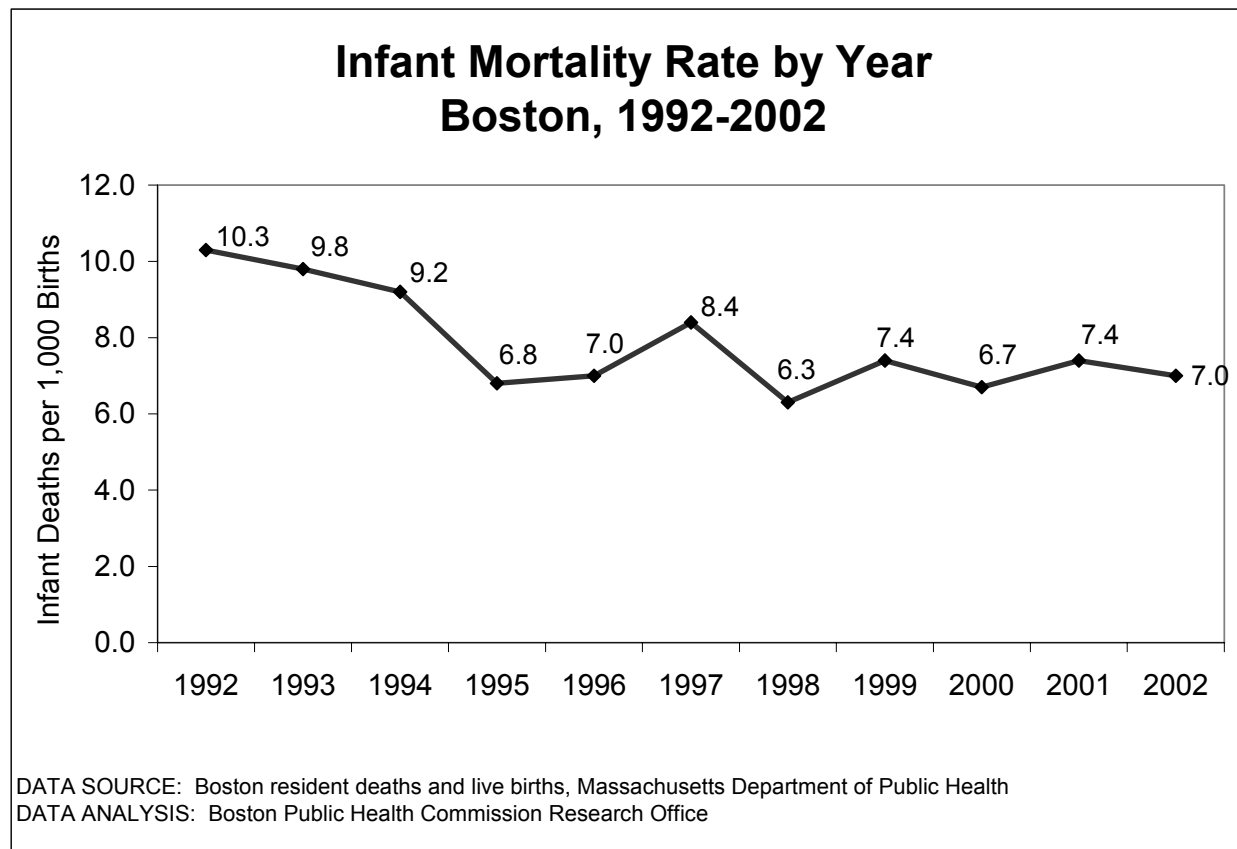
Adjusted Odds Ratios for Preterm Birth, Boston, 2002				
		Preterm Birth		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
Race/Ethnicity				
	Asian	1.293	0.895	1.867
	Black	1.866	1.502	2.318
	Latino	1.596	1.230	2.072
	Other	1.179	0.736	1.887
	White*	1.000		
Age				
	<20 Years	1.595	1.178	2.160
	20-24 Years*	1.000		
	25-29 Years	1.427	1.107	1.839
	30-34 Years	1.357	1.044	1.764
	35-39 Years	1.456	1.084	1.955
	40 or Older	2.107	1.397	3.178
Marital Status				
	Married*	1.000		
	Single	1.286	1.056	1.566
Maternal Birthplace				
	US*	1.000		
	Other**	0.776	0.645	0.933
Plurality				
	Singleton*	1.000		
	Twins or Higher	16.559	12.974	21.134
Smoking During Pregnancy				
	Smoker	1.763	1.288	2.413
	Non-Smoker*	1.000		
*Reference group.				
**Includes Puerto Rico, Guam, and the Virgin Islands				
NOTE: Insurance status, parity, and maternal education 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 with preterm birth in this analysis was, not surprisingly, the number of infants in the pregnancy. All other factors (race, age, etc.) being equal, twins or other multiple births were about 16.6 times as likely as singletons to be delivered prematurely.
- Black births were about 87% more likely, and Latino births were about 60% more likely, to be premature than were White births. Both of these differences were statistically significant.
- Maternal age was also significantly related to the likelihood of preterm birth. Relative to births to women ages 20-24, the odds of premature delivery for infants of women less than 20 years of age increased 60%, the odds for infants to women ages 25-29 increased 43%, the odds for infants to women ages 30-34 increased 36%, the odds for infants to women ages 35-39 increased 46%, and the odds for infants to women ages 40 and older increased 111%. All these differences were statistically significant.
- Births to mothers born outside the US were 22% less likely to be born premature. Births to unmarried mothers were 29% more likely to be premature.
- Finally, births to mothers who reported smoking during pregnancy were 76% more likely to be premature.

INFANT MORTALITY

Trend

Infant mortality is defined as the death of a liveborn 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.



- In 2002, there were 56 deaths of Boston infants, yielding an infant mortality rate (IMR) of 7.0 per thousand live births. The one-year decrease from 7.4 per thousand in 2001 was not statistically significant.
- Infant mortality also decreased between 1992 and 2002, but this trend was not statistically significant.

INFANT MORTALITY

Perinatal Periods of Risk Analysis

Brian McCarthy, MD's **Perinatal Periods of Risk (PPOR)** method of analyzing fetal and infant deaths was first used in developing countries by the World Health Organization. It has since been adopted by many health departments as a way to identify points at which these deaths can be prevented.

	Late Fetal	Neonatal	Postneonatal
<1,500 grams	Maternal Health	Maternal Health	Maternal Health
≥1,500 grams	Maternal Care	Neonatal Care	Infant Care

- PPOR analysis apportions the late fetal and infant deaths of a community into four domains based on weight at delivery and age at death.
- For example, the death of a 22-week fetus weighing 430 grams would be counted in the Maternal Health domain, while that of a 7.5 pound infant who dies 4 months after delivery would be counted in the Infant Care category.

- An “excess” mortality rate based on the mortality of the lowest-risk subpopulation in that community is then calculated. Any domain with high excess mortality can then be the focus of prevention efforts.
- Two premises drive PPOR analysis.
 - The first is that the relation of weight to age at death is suggestive of the reason(s) that a death occurred: for very small fetuses and infants, the inference would be that something about the mother’s health status may have made having a healthy, full-term pregnancy impossible. For larger fetus who die before birth, the inference would be that perhaps the health care the woman received could have prevented the loss, and so on.
 - The second premise is that all subpopulations in a community should have the same low mortality rate. If there is an excess among one or more groups, it should be possible to eliminate that disparity.

INFANT MORTALITY

Perinatal Periods of Risk Analysis

- In Boston, **Maternal Health** is the PPOR dimension with the highest excess mortality (3.7 deaths per thousand live births and fetal deaths). These are very small fetuses and infants who die at any point between 20 weeks’ gestation and the end of the first year of life.
- Excesses in **Maternal Health**-related mortality suggest that many late fetal and infant deaths can be prevented if the health of women prior to and during pregnancy is improved.

PPOR Dimension=>	Maternal Health	Maternal Care	Neonatal Care	Infant Care
Excess Boston Deaths 1996-2000³	3.7	0.7	-0.2 ⁴	0.7
Underlying Assumption	Deficits in women’s health before and during pregnancy are associated with an increased risk of very low birthweight delivery and fetal or infant death.	Inadequate maternal care is associated with fetal death at normal or close to normal delivery weights.	Neonatal care deficiencies are associated with an increased risk of death for liveborn infants of normal or close to normal birthweight.	Problems in the area of infant care are associated with an increased risk of death of normal or close to normal birthweight babies.
Examples of Prevention Efforts	Ensuring that women are in optimal health prior to beginning a pregnancy: --Reduction of stressors --Women’s health care --Planning of pregnancies --Preconception care	Early and adequate prenatal care, including immediate control of emerging health problems during pregnancy	Access to high-quality obstetrical services	Training in parenting skills: --When to seek medical care --Safe home and auto environments --Back-to-sleep education --Licensing and oversight of daycare facilities

³ Per thousand live births and fetal deaths at 20 or more weeks gestation

⁴ This negative number indicates that the reference group had a slightly higher rate of death in the neonatal period than did other Boston women.

INFANT MORTALITY

Perinatal Periods of Risk Analysis

**PPOR Subpopulation Excess Mortality
Boston, 1996-2000**

Race and Age Group	Maternal Health	Maternal Care	Newborn Care	Infant Care	Overall
BOSTON	3.7	0.7	-0.2	0.4	4.6
White women <20	1.9	2.8	0.9	1.1	6.8
White women 20+	Reference group				
Black women <20	10.4	0.3	-0.4	0.8	11.1
Black women 20+	10.6	2.3	-0.6	1.3	13.7
Latinas <20	1.1	-2.1	-1.0	0.0	-2.0
Latinas 20+	-1.3	-1.3	0.0	-0.2	-2.8
Asian women <20	10.6	-2.9	-1.0	-0.8	6.0
Asian women 20+	-1.1	-1.1	0.3	-0.3	-2.3

- Equally important is the assessment of excess mortality in subpopulations. Using White non-teens, the lowest-risk subpopulation, as the reference group, excess mortality in each race/ethnicity and age combination was calculated for each of the four PPOR dimensions.
- This results in the identification of problem areas for Boston, for example, with **Maternal Health**-related mortality for Black and Asian teens and Black adults. This information can be used to guide prevention efforts.

NOTE: The Asian group includes Pacific Islanders and the Other race/ethnicity group.

DATA SOURCE: Boston resident live births and infant and fetal deaths, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission Research Office

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, 2002**

	Births	Deaths	IMR
Asian	642	0	--*
Black	2,412	30	12.4
Latino	1,834	12	6.5
White	2,804	13	4.6
Other/Unknown	313	1	--*
TOTAL	8,005	56	7.0

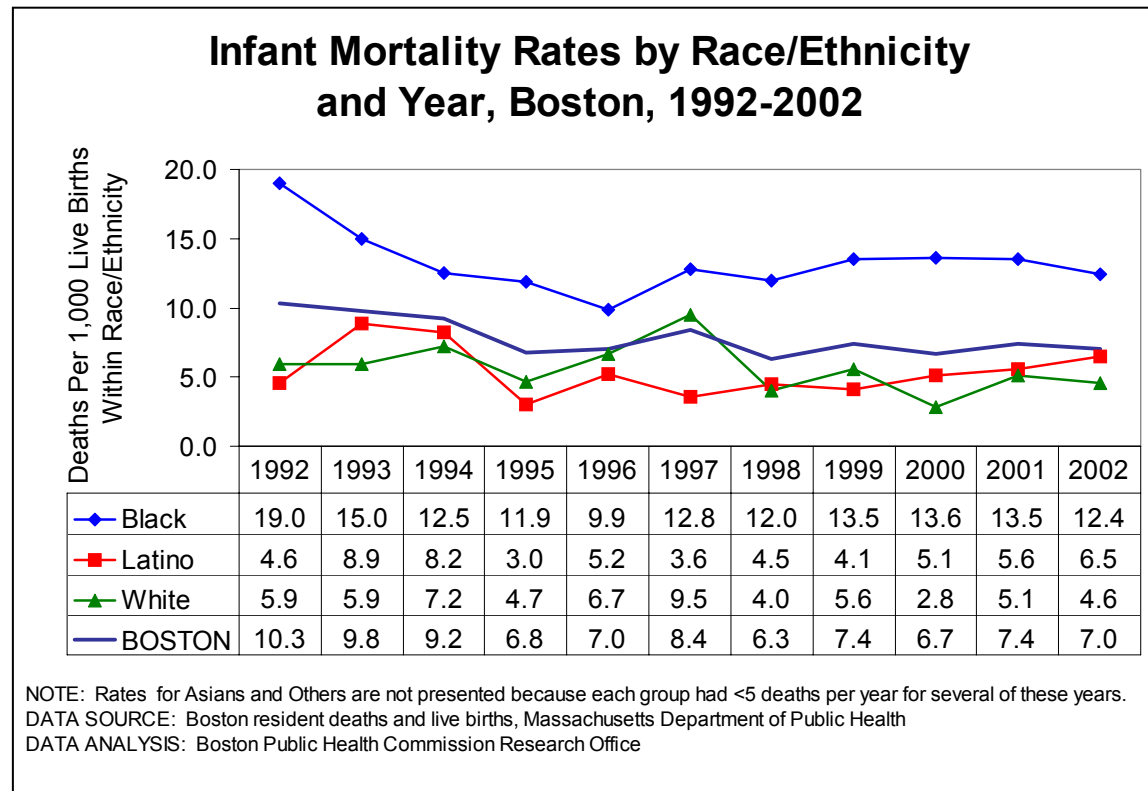
Infant mortality rate: deaths per 1,000 live births
 *Rates not calculated when the number of deaths is <5.

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

- The 2002 IMR for Boston’s Black infants was 12.4 deaths per thousand live births, significantly higher than the IMR for White infants.
- Boston’s Asian population, with 8% of the city’s births, had no infant deaths in 2002.
- Black residents, with 30.2% of births, had 53.6% of all infant deaths.
- The Latino percentage of Boston births in 2002 was 22.9%, while its percentage of infant deaths was 21.4%.
- Whites had 35.1% of Boston’s births in 2002, but only 23.2% of its infant deaths.

INFANT MORTALITY

Disparities



- Although the 2002 IMRs for Black and White infants are lower than they were in 1992, neither change over time represented a statistically significant decline. Similarly, the change in the Latino IMR between 1992 and 2002 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, 1992-2002

	Black	White	Ratio
1992	19.0	5.9	3.2
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	11.2	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

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 1992 and 2002 was in 1997, when the value 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, 1997-2002

	<500g	<750g	<1,000g	<1,500g	<2,000g	<2,500g	2,500g+
Asian	0.08%	0.19%	0.47%	1.00%	2.30%	6.79%	93.21%
Black	0.48%	1.39%	2.02%	3.31%	5.72%	12.73%	87.27%
Latino	0.18%	0.48%	0.80%	1.53%	3.25%	7.84%	92.16%
Other	0.10%	0.52%	0.89%	1.78%	3.61%	8.47%	91.53%
White	0.11%	0.40%	0.66%	1.21%	2.65%	6.76%	93.24%

- Mortality is high in very small births: about ninety percent of infants born weighing less than 500 grams (1.1 pounds) die, compared with fewer than two in a thousand babies of normal birthweight (2,500g, 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.

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

APPENDIX

Healthy People 2010

Healthy People 2010 Objectives
Selected Maternal and Infant Health Indicators

OBJECTIVE	HP 2010 TARGET
Prenatal Care	
Care beginning in first trimester	90% of births
Risk Factors	
Low Birthweight (LBW)	no more than 5% of births
by Race/Ethnicity:	
White, non-Hispanic	no more than 6.5% of births
Black, non-Hispanic	no more than 13.1% of births
Hispanic	no more than 6.4% of births
Asian	no more than 7.2% of births
Very Low Birthweight (VLBW)	no more than 0.9% of births
Preterm*	no more than 7.6% of births
by Race/Ethnicity:	
White, non-Hispanic	no more than 9.9% of births
Black, non-Hispanic	no more than 17.6% of births
Hispanic	no more than 11.2% of births
Asian	no more than 10.2% of births
Infant Deaths	
Infant Mortality Rate	no more than 4.5 deaths per 1,000 births
by Race/Ethnicity:	
White, non-Hispanic	no more than 6.0 deaths per 1,000 births
Black, non-Hispanic	no more than 13.7 deaths per 1,000 births
Hispanic	no more than 6.0 deaths per 1,000 births
Asian	no more than 5.0 deaths per 1,000 births
Neonatal Mortality Rate	no more than 2.9 deaths per 1,000 births
by Race/Ethnicity:	
White, non-Hispanic	no more than 3.9 deaths per 1,000 births
Black, non-Hispanic	no more than 9.4 deaths per 1,000 births
Hispanic	no more than 4.0 deaths per 1,000 births
Asian	no more than 3.2 deaths per 1,000 births
Postneonatal Mortality Rate	no more than 1.5 deaths per 1,000 births
by Race/Ethnicity:	
White, non-Hispanic	no more than 2.1 deaths per 1,000 births
Black, non-Hispanic	no more than 4.5 deaths per 1,000 births
Hispanic	no more than 2.0 deaths per 1,000 births
Asian	no more than 1.8 deaths per 1,000 births

*Born before completion of 37 weeks gestation

Note: Asian includes Pacific Islanders.

DATA SOURCE: Available at <http://wonder.cdc.gov/DATA2010/OD16.HTM>. Accessed November 1, 2002.

APPENDIX

Technical Notes

This section provides additional information about the terms, concepts, and sources used in *Boston Natality 2004: A Review of 2002 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 2004: A Review of 2002 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 1992 through 2002. In general, Boston-specific data are presented for the eleven-year time span of 1992 through 2002, either year by year or for 2002 only.

APPENDIX

Technical Notes

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.

APPENDIX

Technical Notes

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 2004: A Review of 2002 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.

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Technical Notes

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.

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Accidents and adverse effects: Causes of death that include accidents such as motor-vehicle-related injuries. ICD-9 CM codes include E800.0-E940.9; ICD-10 codes include V01-X59, Y85-Y86. Homicides and suicides are excluded.

Adolescent births: Births to young women between 10 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.

APPENDIX

Glossary

Embryo: The product of conception from fertilization through the eighth week of development (approximately the tenth week of pregnancy), after which it is referred to as a fetus.

Fetus: The term used from the end of the eighth week after fertilization (end of the tenth week of pregnancy) to the moment of birth.

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.

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.

Homicide: A death intentionally caused by a person other than the deceased. ICD-9CM codes E960.0-E969.9; ICD-10 codes X85-Y09, Y87.1.

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.

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

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).

APPENDIX

Glossary

Miscarriage: Spontaneous abortion. The spontaneous expulsion of embryo or fetus before 20 completed weeks' gestation.

Morbidity: Illness, disease, or injury.

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

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 ratio 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. Usually 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.

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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.

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

SIDS: See Sudden Infant Death Syndrome.

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.

Sudden Infant Death Syndrome (SIDS): The unexpected and unexplained death of an apparently well infant, often occurring during sleep. SIDS is the most common cause of infant death between the second week and the end of the first year of life and occurs most frequently in the third and fourth months of life, in premature infants, in males, and in African-American infants. ICD-9-CM code 798.0; ICD-10 code R95.

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

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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).

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.