

# BOSTON NATALITY 2003



## A REVIEW OF 2001 BIRTH DATA

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

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A Review of 2001 Birth Data*  
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Boston Natality 2003:  
A Review of 2001 Birth Data



## HIGHLIGHTS

- The number of births to Boston residents in 2001 was 8,231, a 1.9% increase over the number (8,079) in 2000.
- Close to one-third (30.5%) of Boston births in 2001 were to Black women; 36.0% were to White women; 21.7% were to Latinas; 7.2% were to Asian women; and 4.5% were to women of another race/ethnicity.
- Over one-fourth of Boston births (27.3%) were to women whose primary language was other than English. The most common of these languages was Spanish, reported by 15.2% of Boston women. In 2001, 45.7% of Boston resident births were to women who were born in a country other than the United States.
- Most Boston births in 2001 (72.6%) were to women between the ages of 20 and 34; 14.8% were to women 35-39 years old, 8.7% were to young women under 20 years of age, and 3.8% were to women 40 years of age or older.
- Close to half (47.5%) of all Boston births in 2001 were to women having their first child; 28.9% were having their second, and 14.4% their third. Fewer than one in ten (9.3%) were having their fourth or later child.
- Only 6.3% of Boston women who gave birth in 2001 reported smoking during pregnancy, a decline of 64.0% between 1992 and 2001.
- More than four out of every five Boston women (82.9%) had adequate prenatal care utilization as defined by the Kotelchuck index. A significantly higher percentage (90.0%) of White women obtained adequate prenatal care, compared with Black women (74.5%), Latinas (84.4%), and Asian women (85.1%).
- Boston has experienced a statistically significant increase, from 2.8% in 1991 to 4.0% in 2001, in the proportion 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 over age 30.
- The low birthweight (LBW) rate for Boston declined from 9.0% in 2000 to 8.6% in 2001. This one-year change was not statistically significant.
- Low birthweight among births to Black women was 12.1% in 2001, significantly higher than the rates for births to Asian women (5.4%), Latinas (7.6%), and White women (7.0%).
- Boston women born in the United States had a significantly higher rate of LBW (9.8%) than did Boston women born in another country (7.1%).

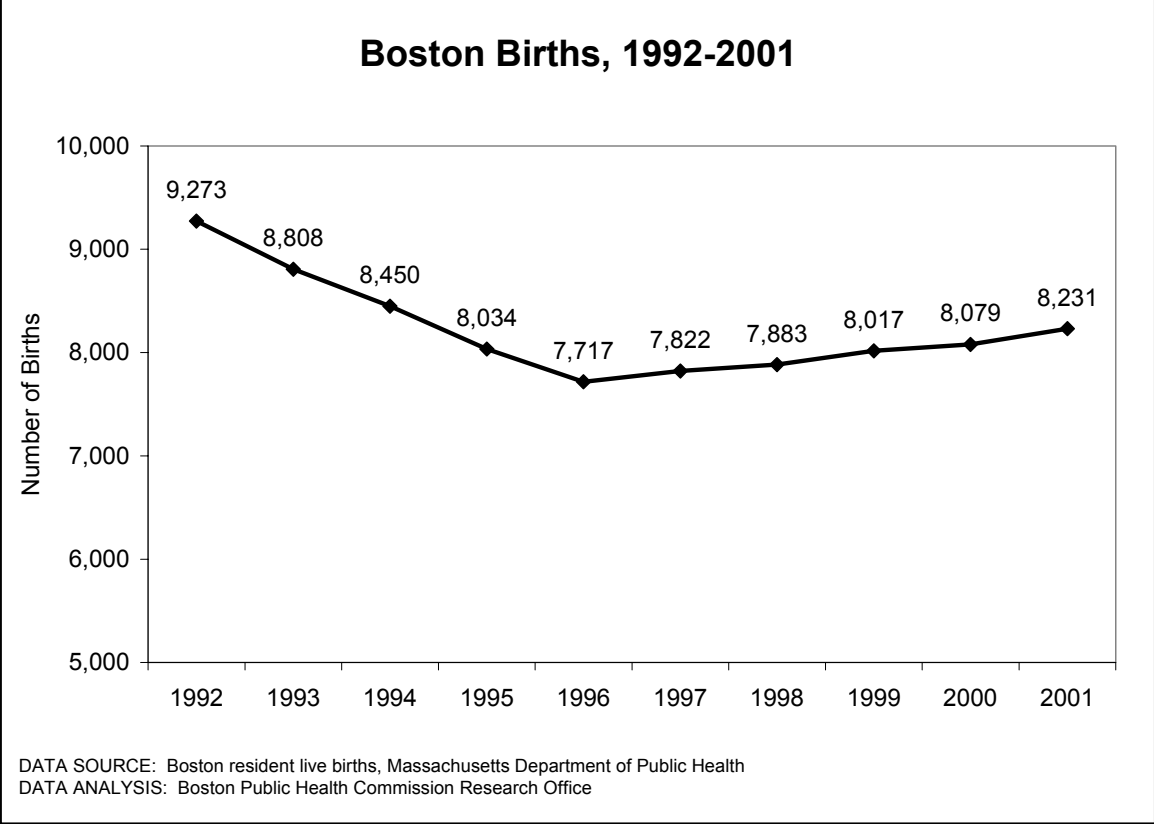
# BOSTON NATALITY 2003

## HIGHLIGHTS

- One in ten births to Boston residents in 2001 occurred too early (at less than 37 completed weeks' gestation), with significantly more frequent preterm birth occurring among births to Black women.
- Sixty-one Boston infants died in 2001, resulting in an infant mortality rate (IMR) of 7.4 deaths per 1,000 live births. The IMR was 6.7 in 2000, but the one-year change was not statistically significant.
- Two-thirds of Boston's infant deaths occurred among the two percent of infants born weighing less than 1,500 grams (3.3 pounds).
- In 2001, Black Boston infants under the age of one were more than 2.6 times as likely to die as White infants, with an IMR of 13.5 deaths per 1,000 live births, compared with an IMR of 5.1 for White infants and 5.6 for Latino infants. This disparity was related to the more frequent occurrence of extreme prematurity among Black births. If there had been no more preterm birth among Black infants than among White ones in 2001, there would have been about 13 Black infant deaths, not the 34 that actually occurred.
- Mortality rates were higher for the infants of smokers of all race/ethnicity groups than for nonsmokers of the same race/ethnicity.

## BIRTHS

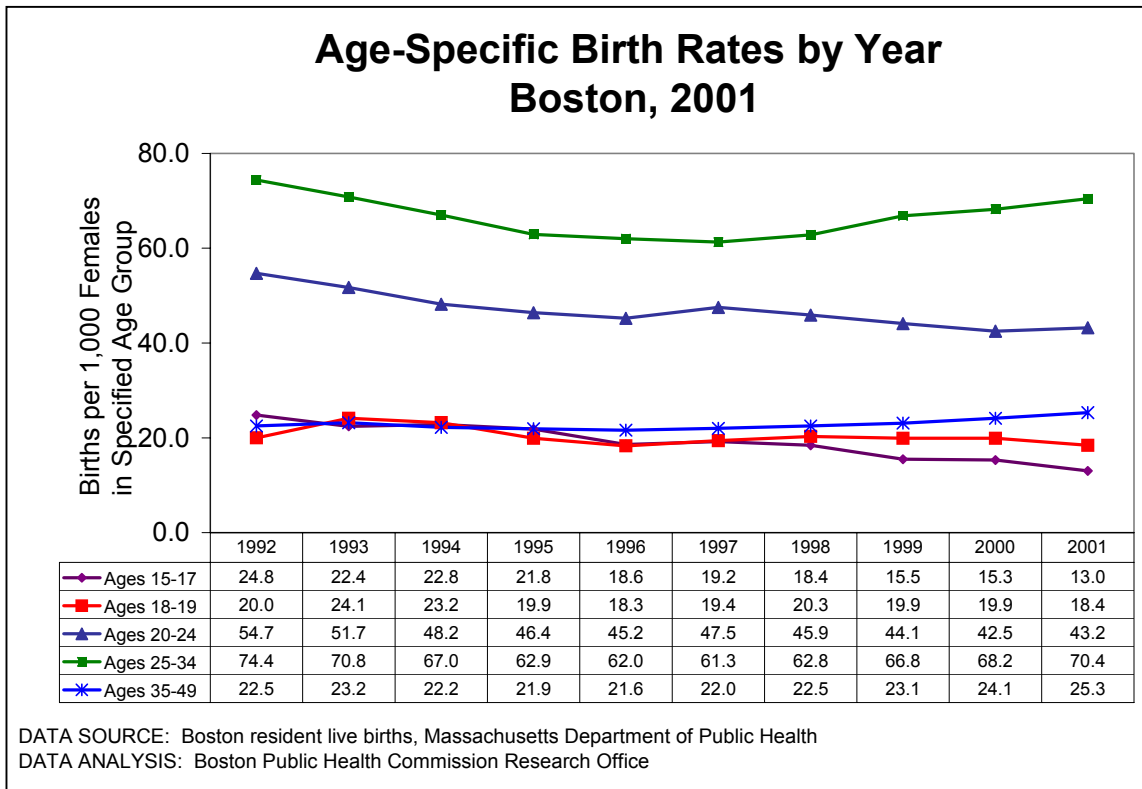
### Trend



- Boston had 8,231 resident live births in 2001, an increase of 1.9% over the number (8,079) in 2000.
- 2001 was the fifth consecutive year in which the number of births to Boston residents increased.

## BIRTHS

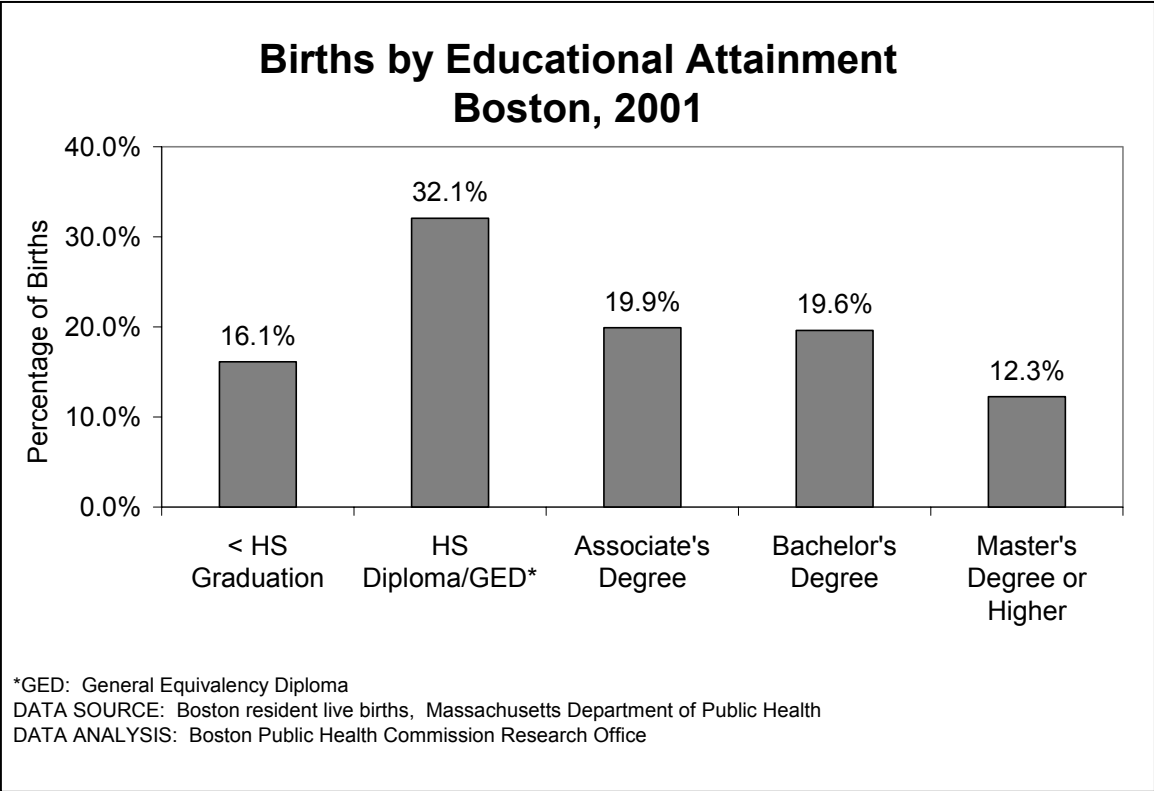
### Birth Rates



- In 2001, women ages 25-34 had the city’s highest birth rate, even though their rate fell significantly between 1992 and 2001.
- While Boston’s lowest birth rate for nonteens was among women ages 35-49, theirs was the only rate that rose significantly between 1992 and 2001.
- The birth rate for adolescents ages 15-17 fell 47.6% during the same time period, and that change was statistically significant.
- The decline in the birth rate for 20-24 year-olds was also statistically significant. Only the rate for 18-19 year-olds did not change significantly during this period.

**BIRTHS**

***Birth Rates***

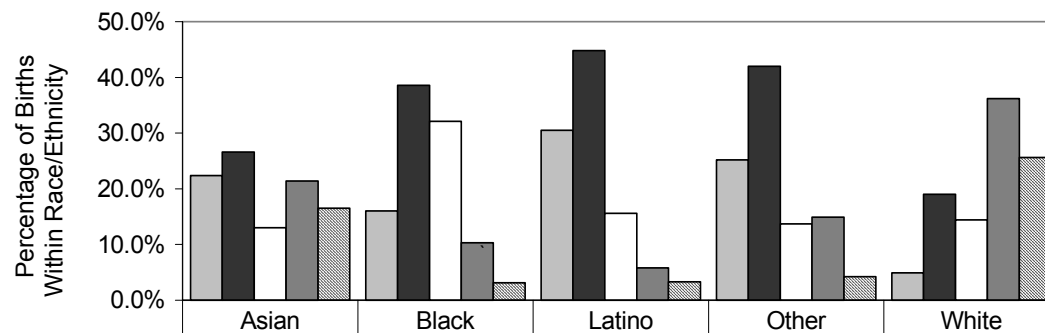


- Boston’s birth rate for 15-17 year-olds was 13.0 per 1,000 females ages 15-17 in 2001, well below the national rate of 24.7 for this age group.
- Boston’s rate of childbearing by 15-17 year-olds has been following a steeply downward trend for the past decade. The 2001 rate is 47.6% lower than the rate in 1992.
- Birth rates for 15-17 year-olds continue to be substantially higher for Latinas and Black adolescents than for White and Asian adolescents, but all groups have had steep declines in recent years.

## MATERNAL CHARACTERISTICS

### *Race/Ethnicity*

**Births by Educational Attainment and Race/Ethnicity, Boston, 2001**



	Asian	Black	Latino	Other	White
■ < HS Graduation	22.4%	16.0%	30.5%	25.2%	4.9%
■ HS Diploma/GED*	26.6%	38.6%	44.8%	42.0%	19.0%
□ Associate's Degree	13.0%	32.1%	15.6%	13.7%	14.4%
■ Bachelor's Degree	21.4%	10.3%	5.8%	14.9%	36.2%
■ Master's Degree+	16.5%	3.1%	3.3%	4.2%	25.6%

\*GED: General Equivalency Diploma

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

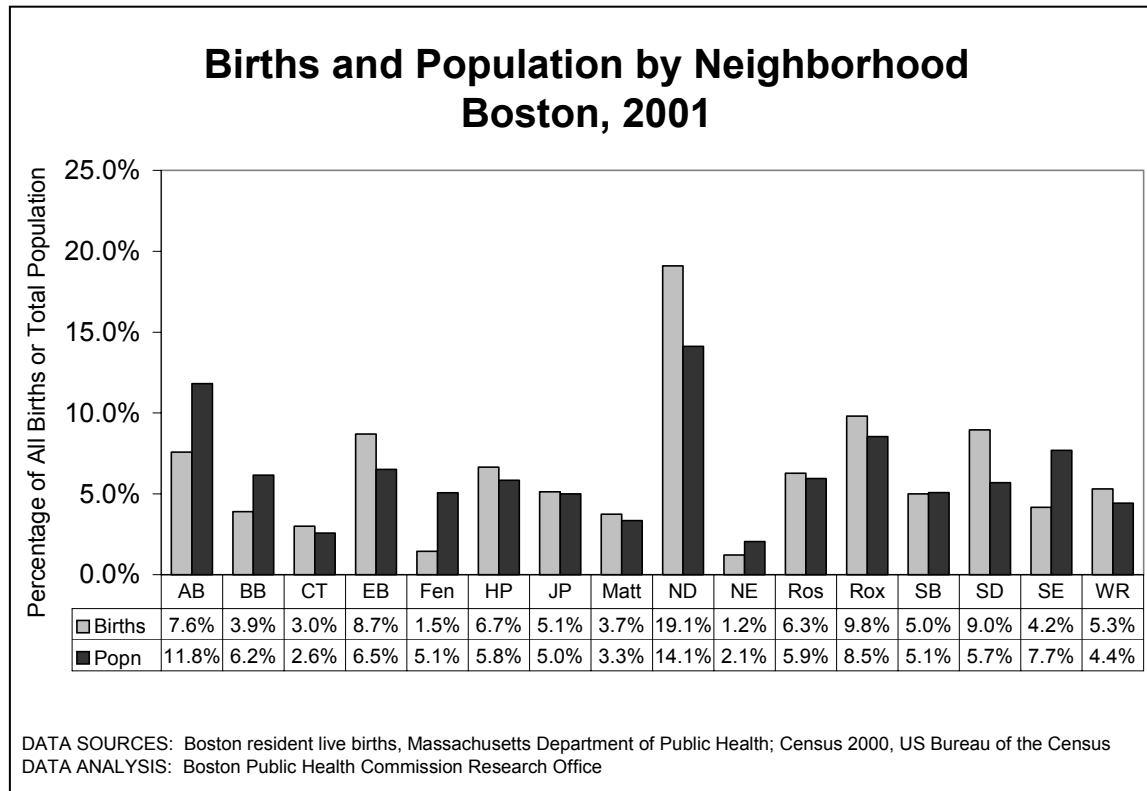
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's population of childbearing women is diverse, and a solid majority of the city's births in 2001 (59.4%) were to women of color.
- In 2001, there were 593 Boston births to Asian women, 2,512 to Black women, 1,786 to Latinas, 2,966 to White women, and 374 to women of other or unknown race/ethnicity.

## MATERNAL CHARACTERISTICS

### Ancestry

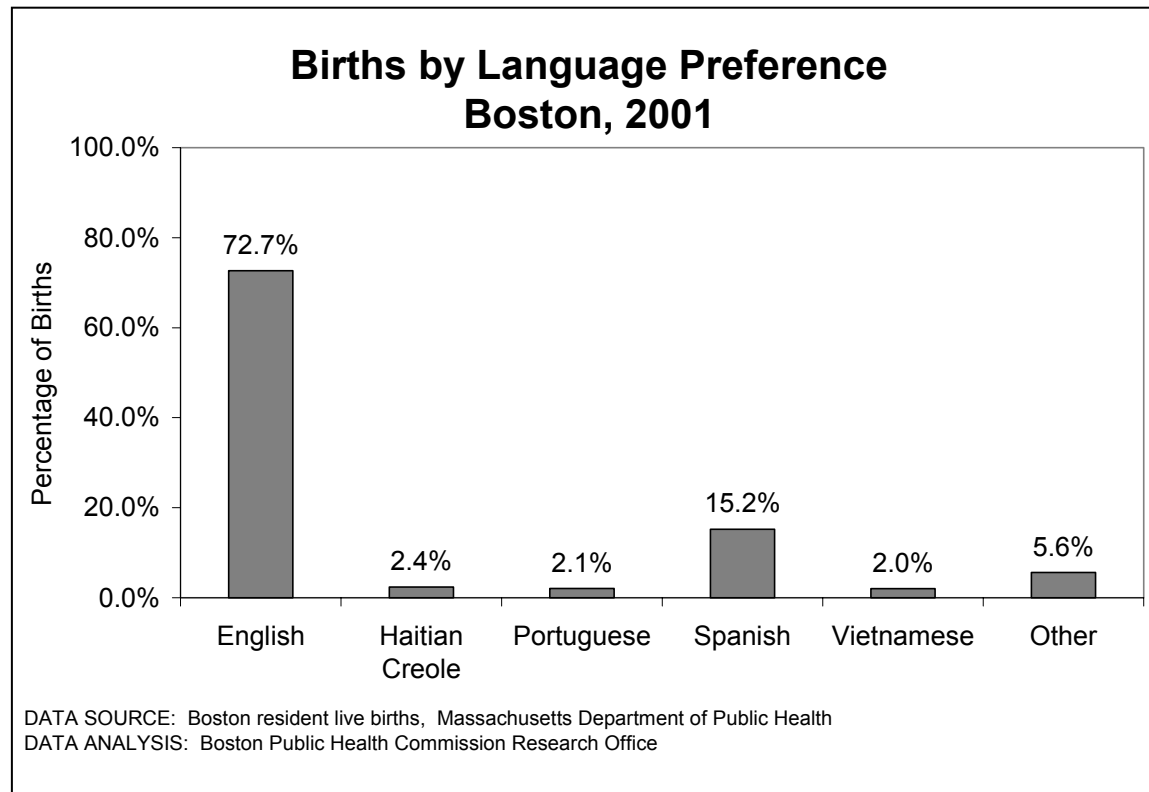
In addition to women’s self-reported race, the Massachusetts birth certificate records women’s self-reported ancestry. For each of the major race groups, information about the regions and countries from which Boston residents and their ancestors came is presented in this section of the report. The table below provides information about the most common ancestries for Boston women of all race/ethnicity groups.



- Among all Boston women who gave birth in 2001, regardless of race/ethnicity, the most frequently reported ancestry (25.6%) was “American,” and the next largest group (15.4%) was African-American.
- In addition to the 16 largest ancestry groups shown in the chart at left, 874 Boston women (10.6% of the total), indicated that they belonged to another ancestry group. Each of these had fewer than 100 Boston births in 2001.

## MATERNAL CHARACTERISTICS

### *Ancestry: Asians*



- Of the 593 births to Asian Boston residents in 2001, 217 (36.6%) were to women of Vietnamese ancestry.
- Births to Boston women of Chinese ancestry numbered 193 in 2001, the second-largest Asian ancestry group.



## MATERNAL CHARACTERISTICS

### *Ancestry: Blacks*

Payment Source for Prenatal Care Boston, 2001	
Source of Payment	Percentage of Births
<b>Private Insurance</b>	<b>51.5</b>
Health maintenance organization	42.3
Commercial Insurance	6.2
Blue Cross/Blue Shield	3.0
<b>Public Insurance</b>	<b>47.2</b>
Medicaid/CommonHealth (MassHealth)	39.2
Healthy Start	3.8
Other Government	3.7
Free Care Pool	0.4
Medicare	0.1
<b>Other Insurance</b>	<b>1.3</b>
Other	0.5
Self-Pay	0.8
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 2001, among the 2,512 births to Black women, 50.5% were to women who identified themselves as African American in origin.
- The next largest group, Haitians, had 16.0% of Boston's births to Black residents.

**MATERNAL CHARACTERISTICS**

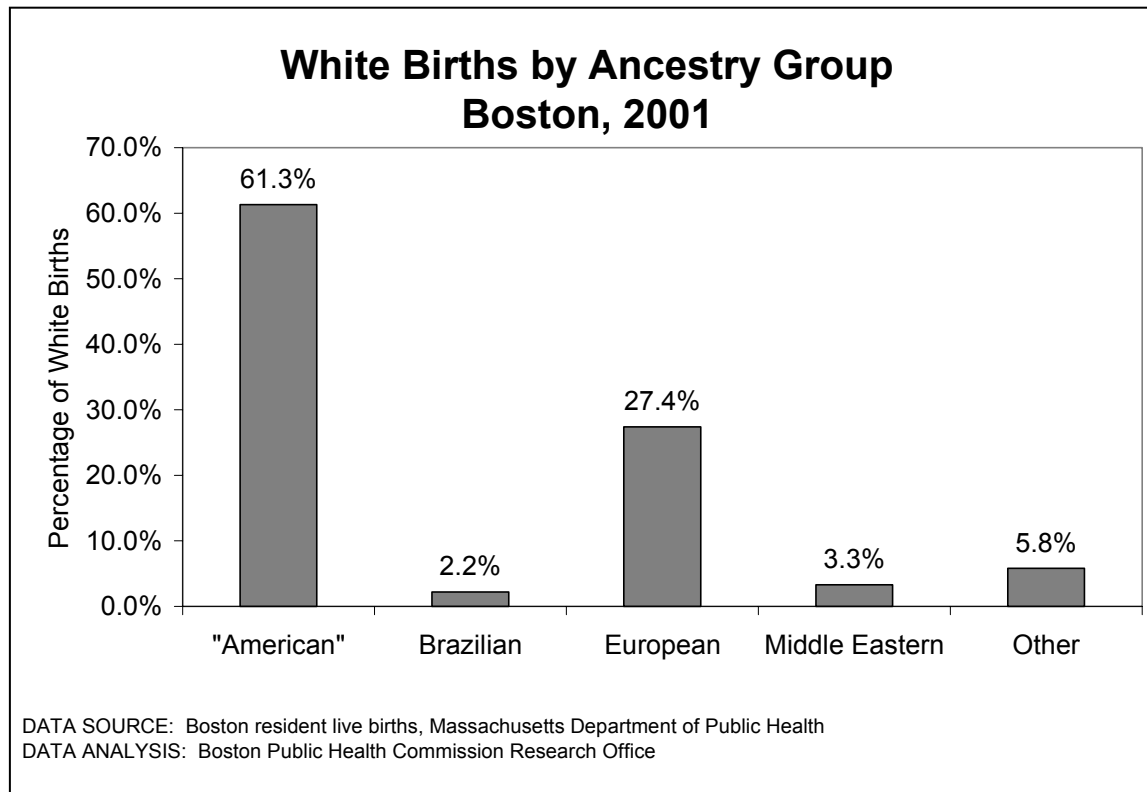
**Ancestry: Latinas**

Adjusted Odds Ratios for Adequate Prenatal Care Boston, 2001				
		Adequate Prenatal Care		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
<b>Race/Ethnicity</b>				
	Asian	1.36	1.03	1.80
	Black	0.64	0.54	0.75
	Latino	1.74	1.41	2.14
	Other	0.67	0.50	0.88
	White*	1.00		
<b>Plurality</b>				
	Singleton*	1.00		
	Twins or Higher	1.52	1.07	2.15
<b>Smoking During Pregnancy</b>				
	No*	1.00		
	Yes	0.59	0.47	0.75
<b>Maternal Birthplace</b>				
	US*	1.00		
	Other**	0.59	0.51	0.68
<b>Marital Status</b>				
	Married*	1.00		
	Single	0.84	0.72	0.97
<b>Educational Attainment</b>				
	Less Than High School Diploma	0.75	0.64	0.88
	HS Graduate/GED*	1.00		
	At Least Some College	1.39	1.20	1.62
<b>Parity</b>				
	First Live Birth*	1.00		
	Second or More Birth	0.92	0.82	1.04
<b>Insurance Coverage</b>				
	Private*	1.00		
	Public	0.39	0.33	0.45
*Reference group				
**Includes Guam, Puerto Rico, and the Virgin Islands				
NOTES: Adequacy is as defined by the APNCU (Kotelchuck) Index.				
Maternal ages was not a significant predictor of prenatal care adequacy.				
DATA SOURCE: Boston resident live births. Massachusetts Department of Public Health				
DATA ANALYSIS: Boston Public Health Commission Research Office				

- In 2001, there were 1,786 Boston births to Latinas. Of these, about one-quarter (24.4%) were to women of Dominican ancestry, one in five (20.3%) were to women of Puerto Rican ancestry, and 14.6% were to women of Salvadoran ancestry.

## MATERNAL CHARACTERISTICS

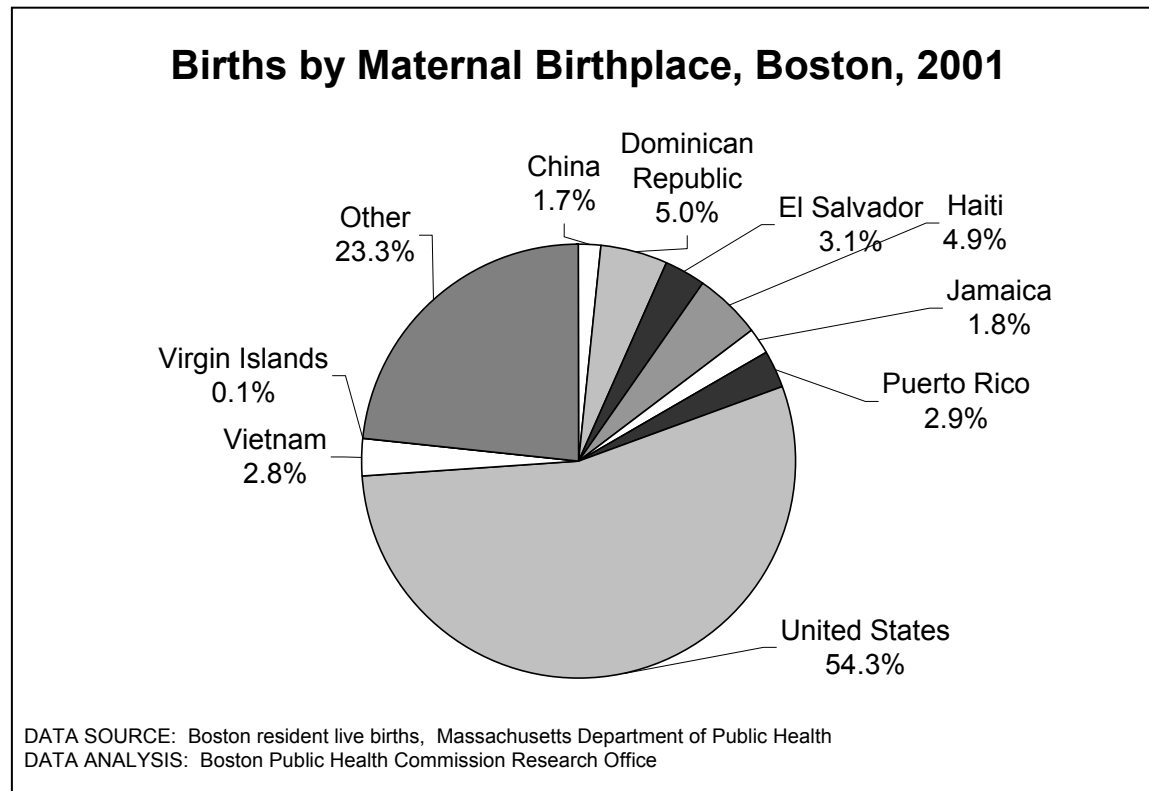
### *Ancestry: Whites*



- A majority (61.3%) of the 2,966 births to White Boston women in 2001 were to women who reported their ancestry to be “American.”
- Close to four in ten (38.7%) stated that they were of European, Middle Eastern, Brazilian, or other ancestry.

## MATERNAL CHARACTERISTICS

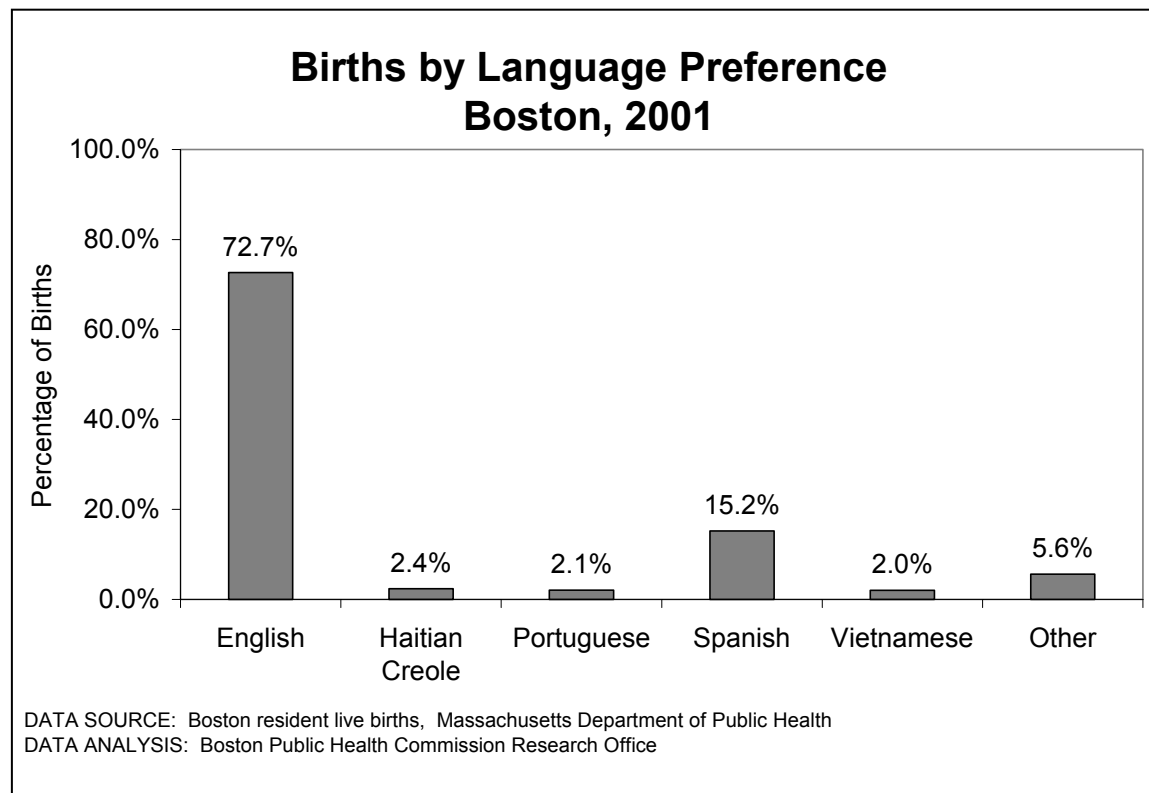
### *Birthplace*



- Of the 8,231 Boston births in 2001, 4,471 (54.3%) were to women born in the United States; 45.7% were to women born in other countries.
- The largest number of births to women born outside the United States were to women from the Dominican Republic, who had 412 Boston births (5.0% of Boston births) in 2001. Haiti was the next most frequent birthplace of non-US-born Boston women, with 407 births (4.9% of births).
- In addition to the birthplaces shown in the chart at left, other countries, each with fewer than 100 Boston births, together represented 23.3% of the city's births in 2001.

## MATERNAL CHARACTERISTICS

### *Language Preference*



- English was the preferred language noted on 5,971 Boston birth certificates (72.7% of all births).
- Spanish was the mother’s preferred language for 1,250 births (15.2% of the total).
- Haitian Creole, the language preference indicated for 197 births, Portuguese (170 births), and Vietnamese (166 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 were indicated on less than 100 birth certificates to be the mother’s preferred language.

## MATERNAL CHARACTERISTICS

### Language Preference

Births by Language Preference and Neighborhood Boston, 2001								
	English	Cantonese	Haitian Creole	Portuguese	Spanish	Vietnamese	Other	Total
Allston/Brighton	68.2%	--	--	5.1%	11.8%	--	14.9%	100.0%
Back Bay/Beacon Hill/West End	94.0%	--	--	--	--	--	6.0%	100.0%
Charlestown	75.8%	--	--	--	17.2%	--	7.0%	100.0%
East Boston	41.9%	--	--	--	49.6%	--	8.5%	100.0%
Fenway	70.3%	--	--	--	15.3%	--	14.4%	100.0%
Hyde Park	77.4%	--	7.6%	--	11.1%	--	3.9%	100.0%
Jamaica Plain	70.7%	--	--	--	25.2%	--	4.1%	100.0%
Mattapan	79.1%	--	10.3%	--	7.6%	--	3.0%	100.0%
North Dorchester	69.5%	--	--	5.0%	13.2%	6.1%	6.2%	100.0%
North End	89.9%	--	--	--	--	--	10.1%	100.0%
Roslindale	73.1%	--	--	--	15.4%	--	11.5%	100.0%
Roxbury	76.3%	--	--	--	15.8%	--	7.9%	100.0%
South Boston	81.0%	--	--	--	11.8%	--	7.2%	100.0%
South Dorchester	80.7%	--	--	--	6.3%	6.1%	6.9%	100.0%
South End	70.7%	8.6%	--	--	8.9%	--	11.8%	100.0%
West Roxbury	84.7%	--	--	--	5.4%	--	9.9%	100.0%

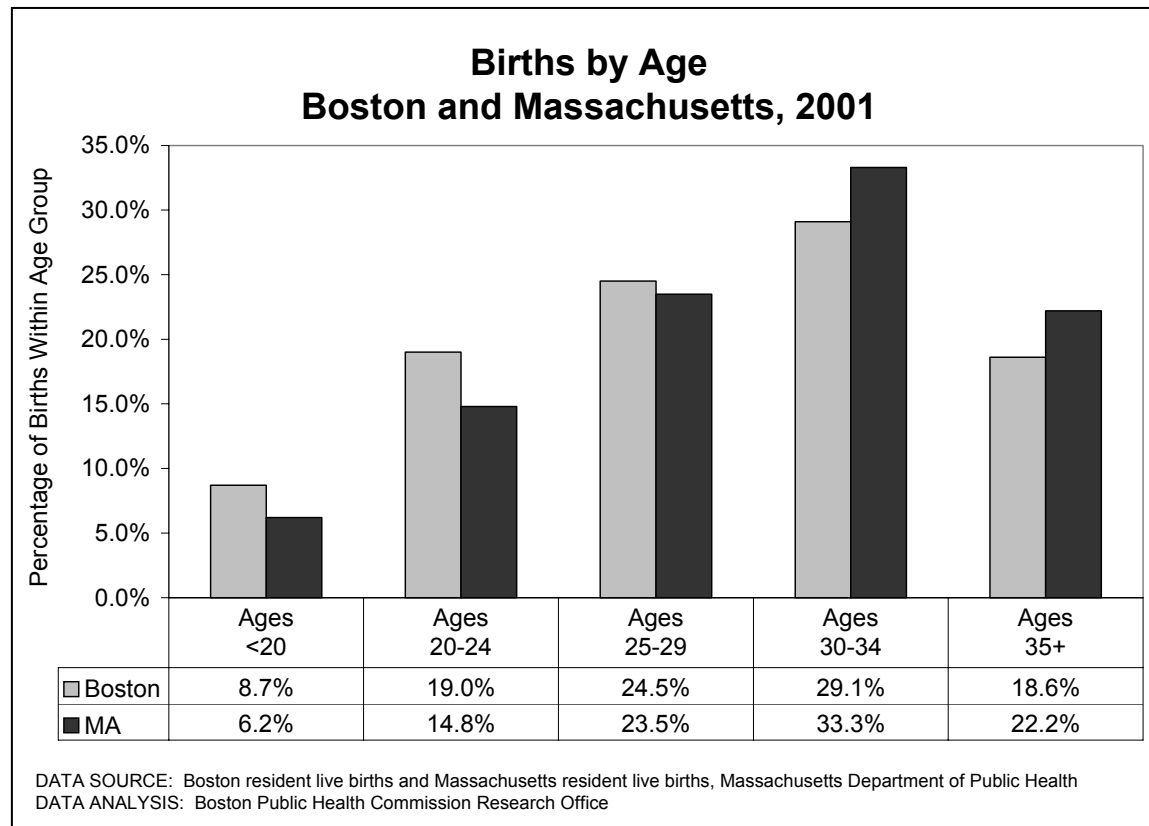
"--" <5.0% of neighborhood's birth certificates reported this language.

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

- In 2001, English was the most often noted language preference on Boston birth certificates in all neighborhoods except East Boston. The percentage reporting an English language preference ranged from a low of 41.9% in East Boston to a high of 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 less than five percent in the Back Bay/Beacon Hill/West End and the North End to 49.6% in East Boston.
- The Cantonese language in the South End, and Haitian Creole in Hyde Park and Mattapan, reflect other substantial language groups among Boston women giving birth in 2001. Portuguese in Allston/Brighton and North Dorchester, and Vietnamese in North and South Dorchester, were also noted in significant numbers of 2001 birth records as the mother's preferred language.

## MATERNAL CHARACTERISTICS

### Age

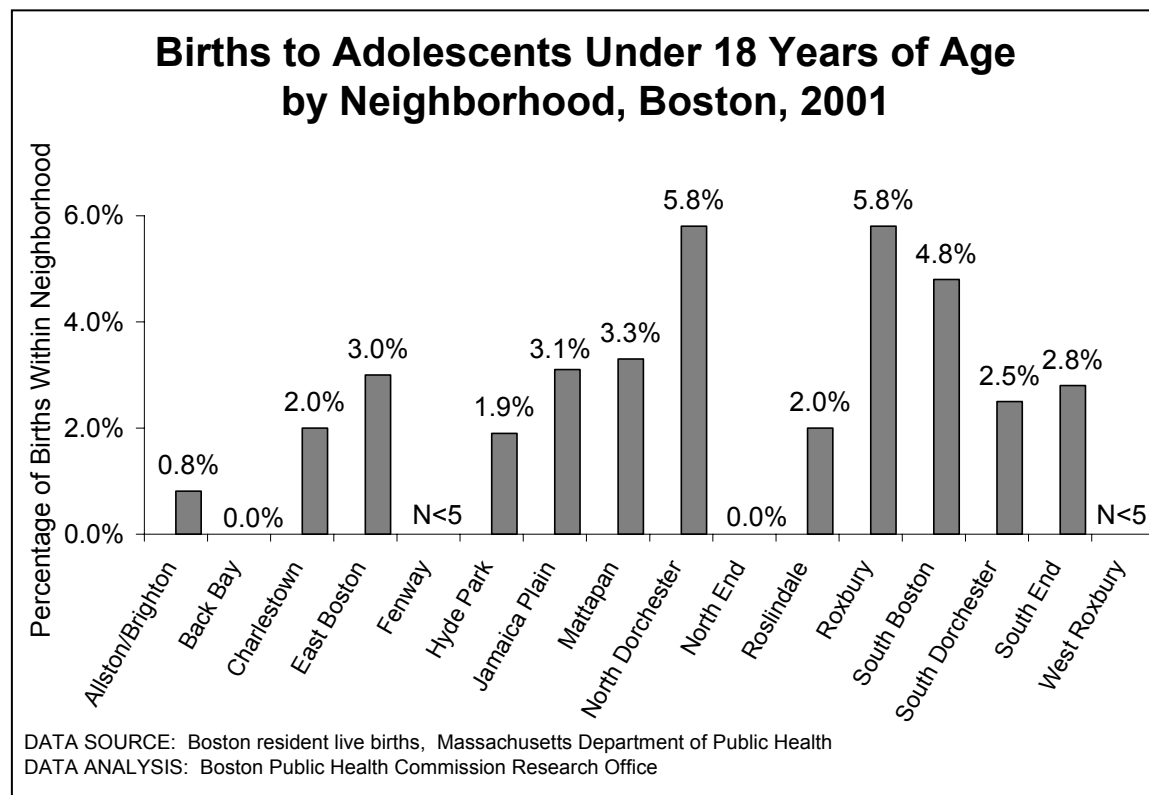


- Boston women who gave birth in 2001 were younger, as a group, than their Massachusetts counterparts. The state as a whole had higher percentages of births to women ages 30 and older, while Boston had higher percentages of births to women under age 30.

## MATERNAL CHARACTERISTICS

### Adolescents

Beginning with this edition of the report, *Boston Natality* no longer includes births to 18 and 19 year-olds in the adolescent category. Data pertaining to their births will now be presented with that 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.

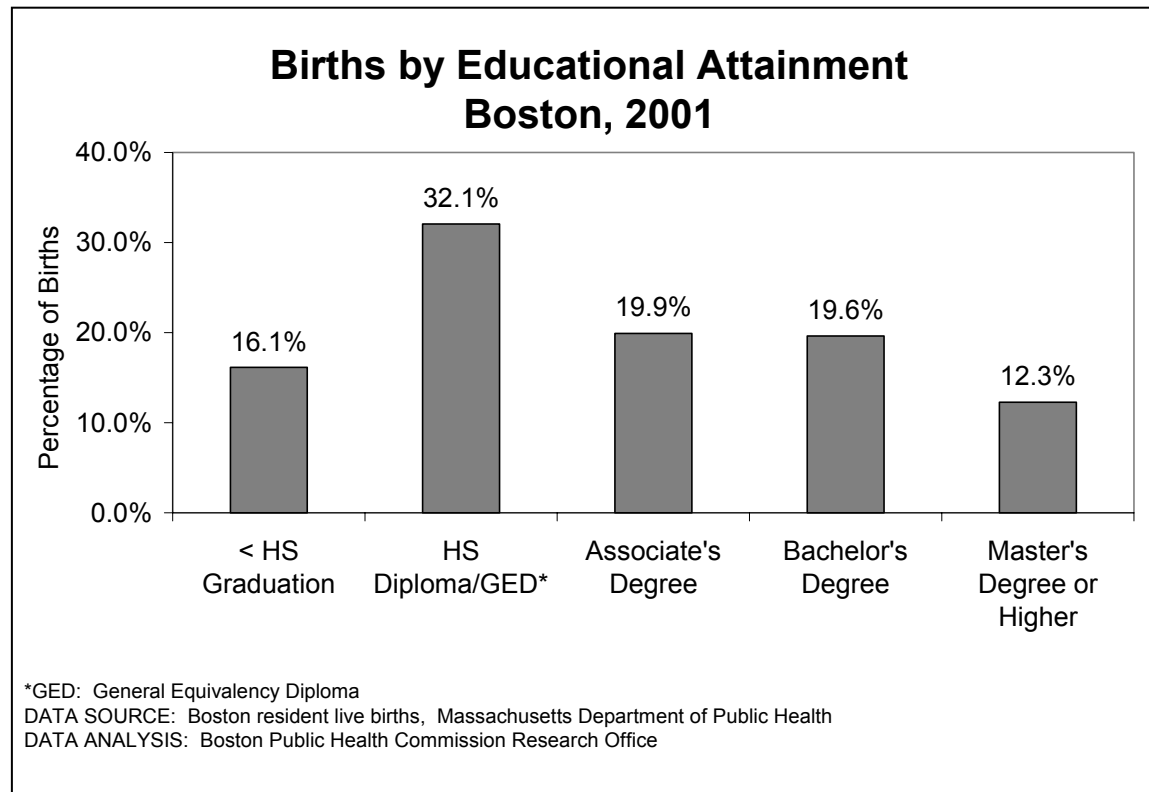


- In 2001, 254 Boston births (3.1% of all births) were to adolescents under the age of 18. These included 16 births to adolescents under age 15.
- Among all Boston neighborhoods, North Dorchester, Roxbury, and South Boston had the highest percentages of births to adolescents, compared with the other Boston neighborhoods.



## MATERNAL CHARACTERISTICS

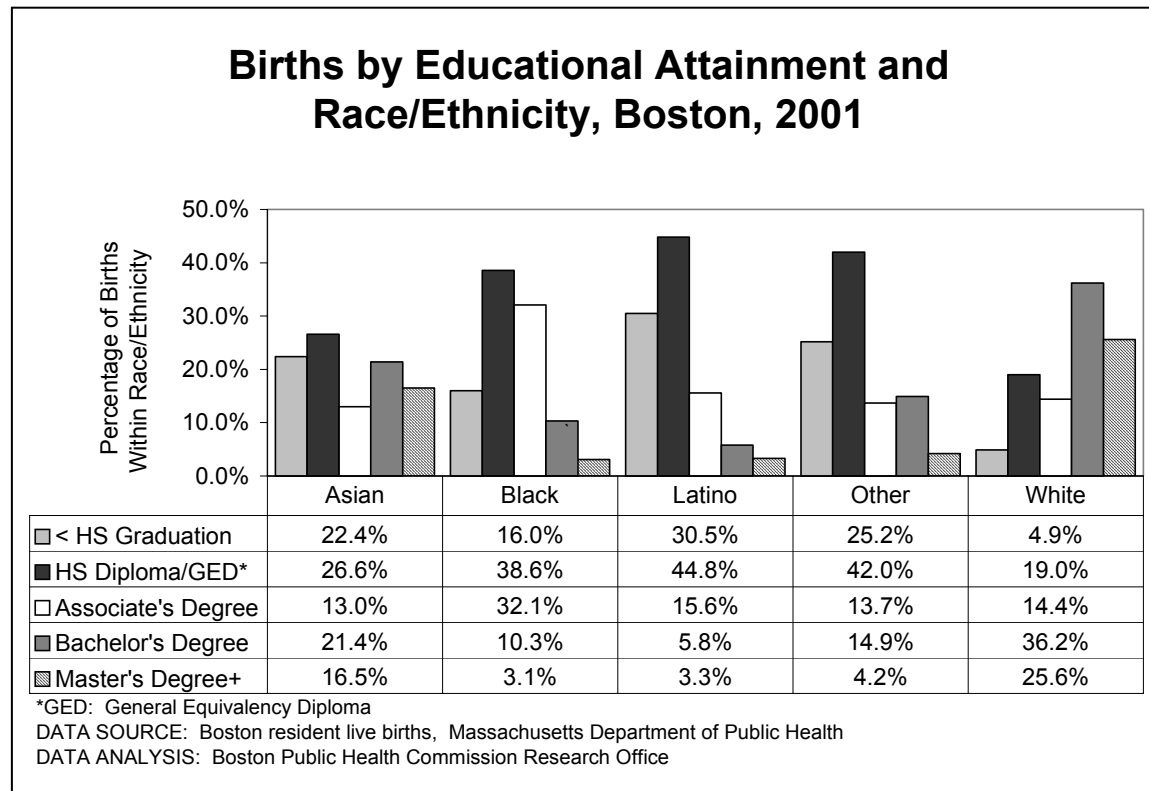
### *Educational Attainment*



- Almost one in six Boston births in 2001 (16.1%) were to women without a high school diploma or equivalent.
- About one-third (32.1%) were to women who had completed high school. Over half were to women with at least some college education.

## MATERNAL CHARACTERISTICS

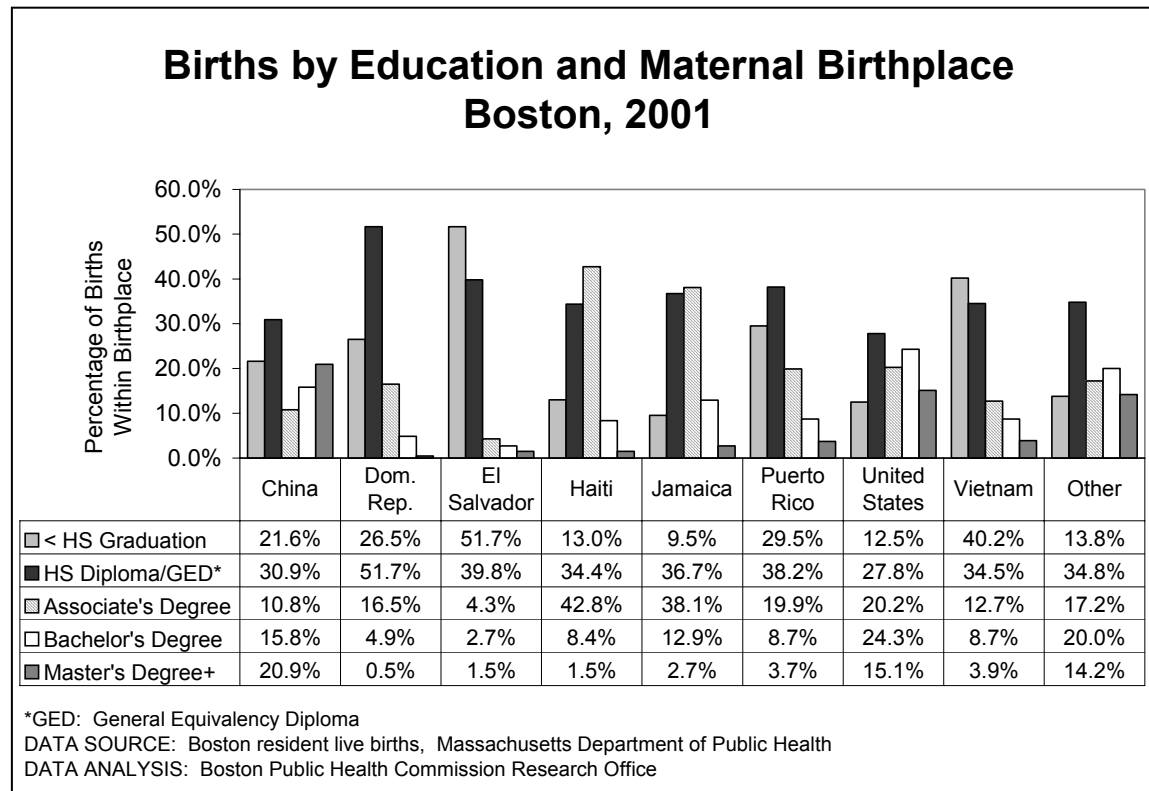
### *Educational Attainment*



- 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 White and Asian women.
- In 2001, 37.9% of Asian births and 61.8% of White births were to women with at least a bachelor's degree or higher education; 13.4% of Black births and 9.1% of births to Latinas were to women with a bachelor's degree or higher education.
- Fewer than one in twenty (4.9%) White Boston women who gave birth in 2001 had less than a high school education, a significantly lower percentage than those of the other race/ethnicity groups.

## MATERNAL CHARACTERISTICS

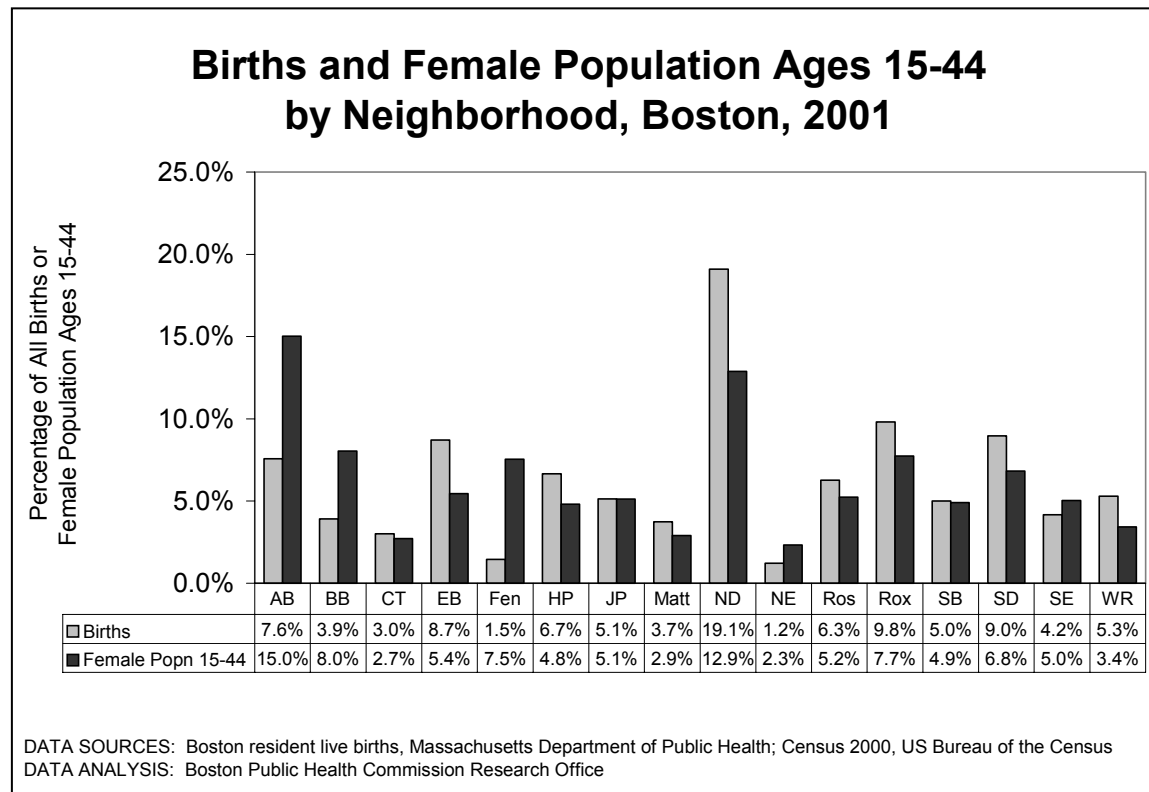
### *Educational Attainment*



- In 2001, the highest percentage of births to women without a high school education was among women from El Salvador (51.7%). Low educational attainment was also common among women from Vietnam (40.2%) and Puerto Rico (29.5%).
- Completion of high school or its equivalent was the most frequent level of educational attainment for women from all countries except Haiti and Jamaica. There, the associate's degree was the most commonly achieved educational level.
- Completion of college or postgraduate education was most common among women born in the United States, China, or the "Other" group of nations.

## MATERNAL CHARACTERISTICS

### Neighborhood

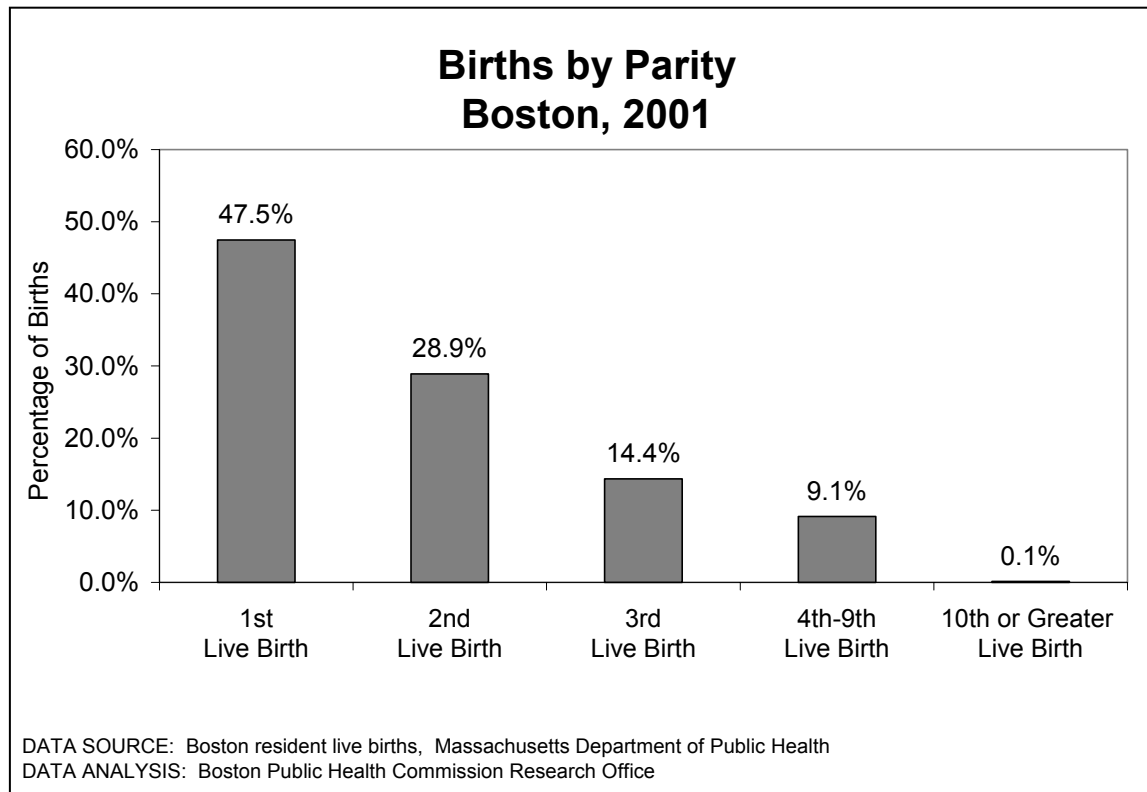


- North Dorchester, with 12.9% of Boston’s female population of childbearing age, had 19.1% of the city’s births in 2001.
- Charlestown, East Boston, Hyde Park, Mattapan, North Dorchester, Roslindale, Roxbury, South Boston, South Dorchester, and West Roxbury all also had a larger percentage of Boston’s 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, and the South End have a larger percentage of Boston’s population than they had of the city’s births in 2001.

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

## MATERNAL CHARACTERISTICS

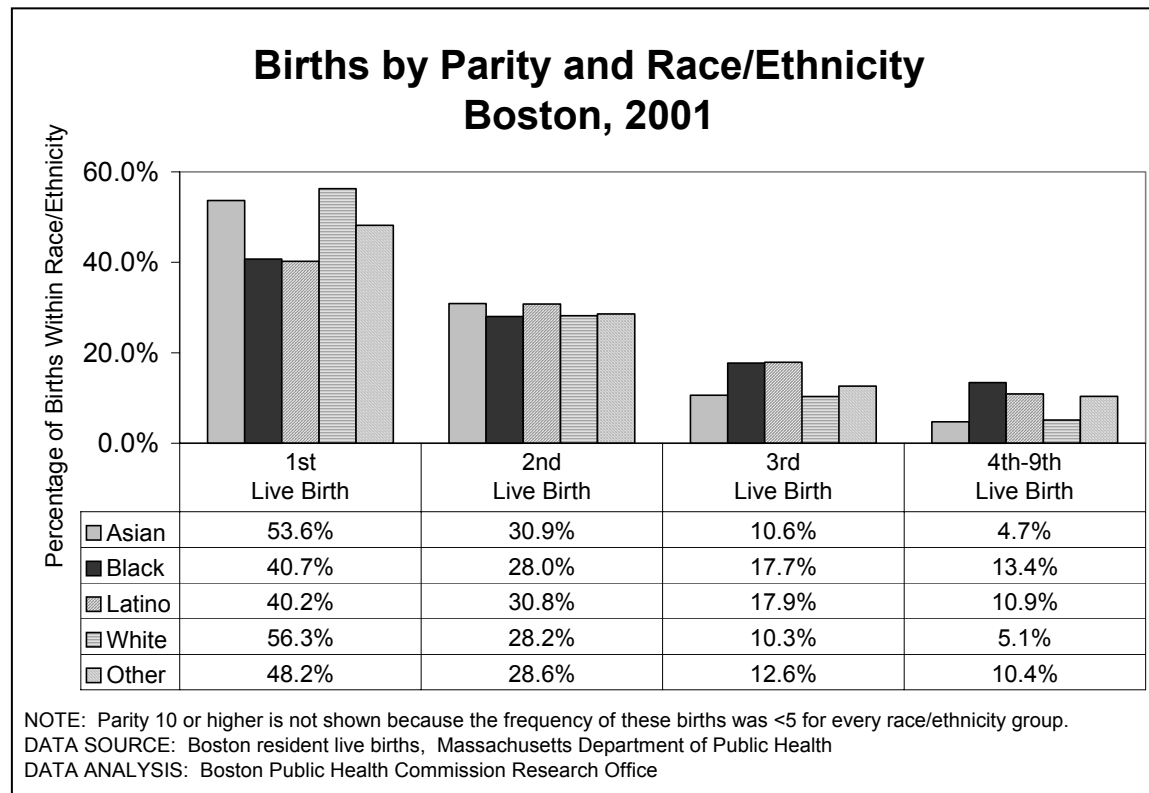
### *Parity*



- In 2001, first births accounted for close to half (47.5%) of all Boston births.
- More than nine in ten Boston births in 2001 (90.8%) were to women having their first, second, or third baby.

## MATERNAL CHARACTERISTICS

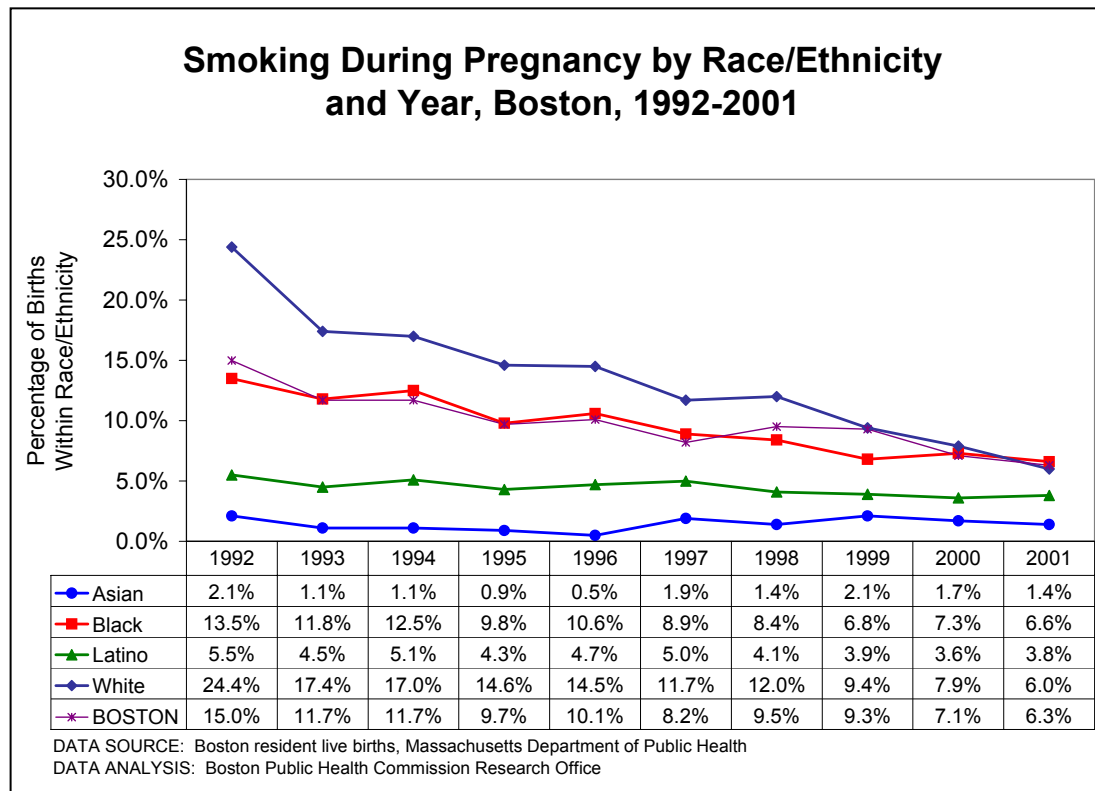
### Parity



- Asian and White women who gave birth in 2001 had, as a group, lower parity than other women. More than half were primiparous, that is, having their first baby.
- Roughly equal proportions of women in each race/ethnicity group were having their second child, but Black women and Latinas had substantially higher percentages of third and subsequent births compared with Asian and White women.

## MATERNAL CHARACTERISTICS

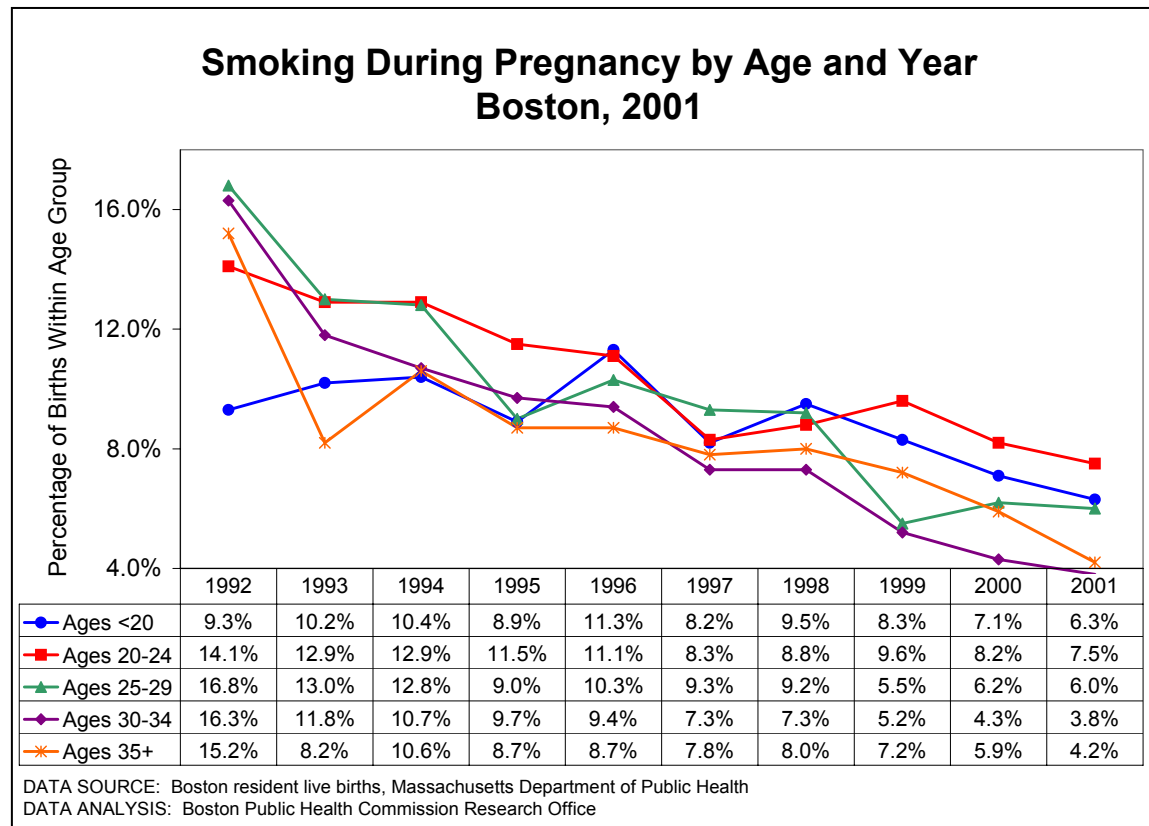
### Smoking



- Self-reported smoking during pregnancy by Boston women declined 58.0% between 1992 and 2001, to 6.3% overall. The decrease was a statistically significant change.
- The biggest decline between 1992 and 2001 was among White women, whose prenatal smoking prevalence fell 75.4%. There was a 51.1% decrease among Black women, a 33.3% drop among Asian women, and a 30.9% decline among Latinas.

## MATERNAL CHARACTERISTICS

### Smoking

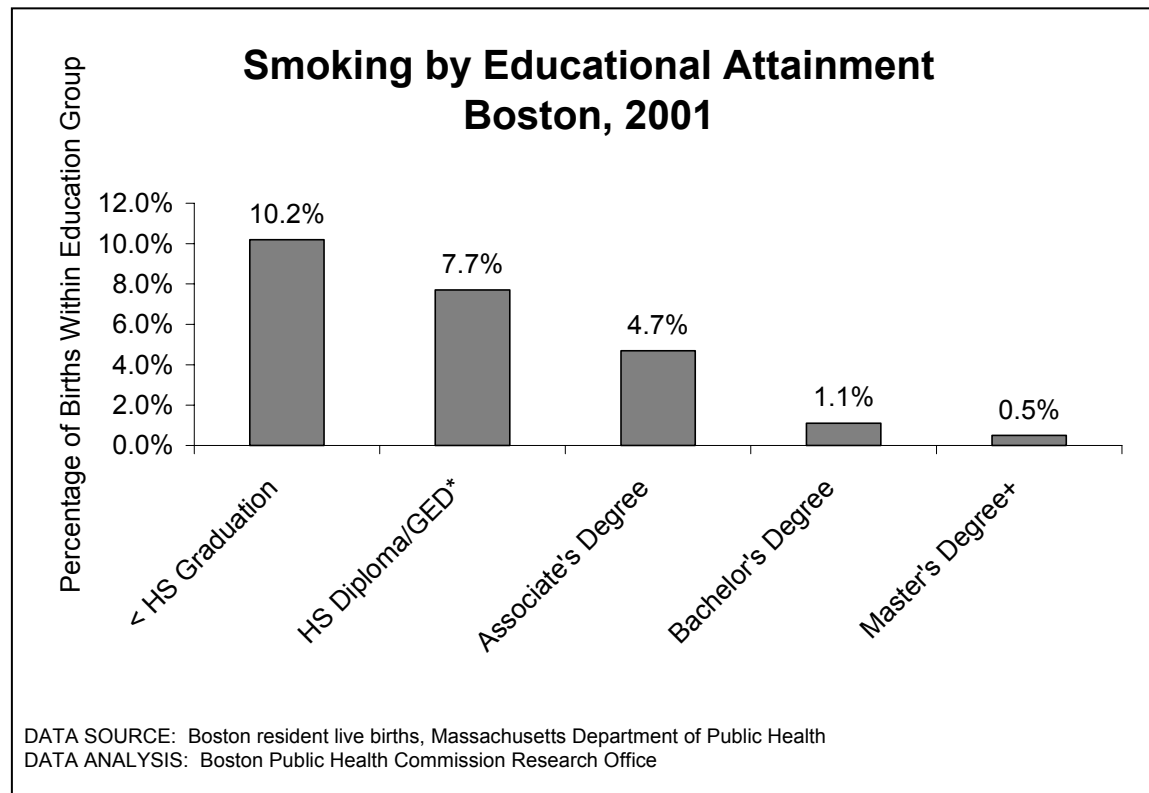


- Women in their early twenties had the highest prenatal smoking rate of all Boston women who gave birth in 2001.
- The lowest level of smoking during pregnancy was among those ages 30-34.
- Between 1992 and 2001, the percentage of births that were to women who reported smoking during pregnancy declined for all age groups. These changes in smoking status were statistically significant for all age groups.



## MATERNAL CHARACTERISTICS

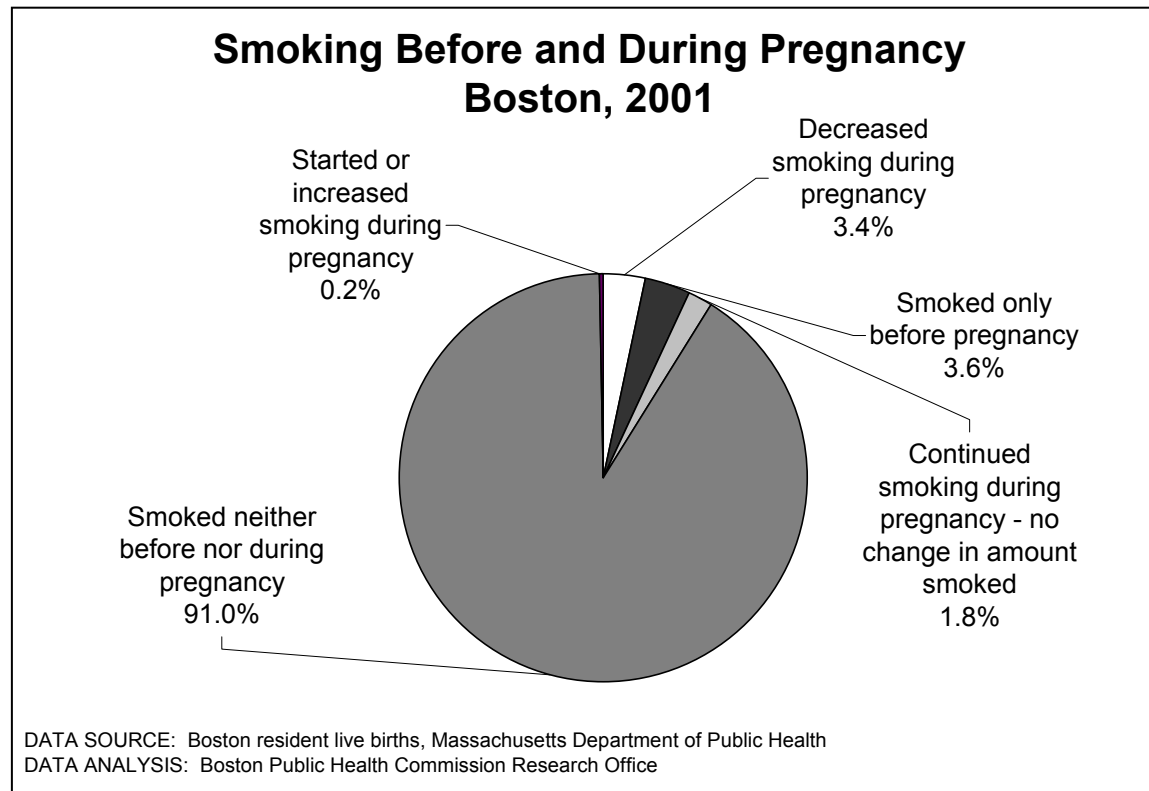
### Smoking



- Smoking during pregnancy is less frequently reported by highly educated Boston women than by women with less education.
- A linear relationship is apparent in the 2001 data: for every increase in educational attainment, there is a decrease in self-reported smoking during pregnancy.

## MATERNAL CHARACTERISTICS

### Smoking



- Among Boston women who gave birth in 2001, most (91.0%) said they did not smoke either before or during their pregnancy.
- 3.6% stated that they had smoked only before pregnancy, not while they were pregnant.
- 3.4% reported cutting back during pregnancy on the number of cigarettes they smoked. The average reduction among these women was 9.3 cigarettes per day.
- The remaining two percent of women either smoked the same amount they had before pregnancy (1.8%), increased the amount they smoked (0.1%), or actually began smoking during pregnancy (0.1%).

## MATERNAL CHARACTERISTICS

### *Payment Source for Prenatal Care*

<b>Payment Source for Prenatal Care Boston, 2001</b>	
<b>Source of Payment</b>	<b>Percentage of Births</b>
<b>Private Insurance</b>	<b>51.5</b>
Health maintenance organization	42.3
Commercial Insurance	6.2
Blue Cross/Blue Shield	3.0
<b>Public Insurance</b>	<b>47.2</b>
Medicaid/CommonHealth (MassHealth)	39.2
Healthy Start	3.8
Other Government	3.7
Free Care Pool	0.4
Medicare	0.1
<b>Other Insurance</b>	<b>1.3</b>
Other	0.5
Self-Pay	0.8
Worker's Compensation	N<5

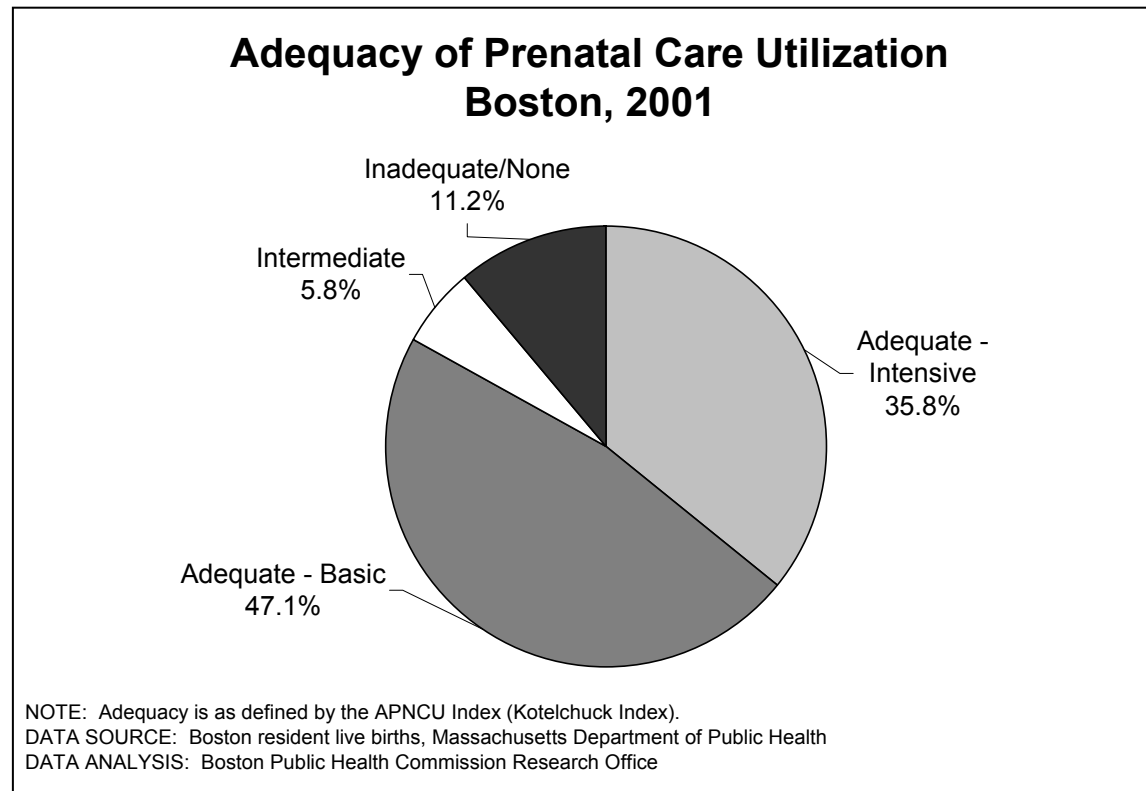
DATA SOURCE: Boston resident live births. Massachusetts Department of Public Health  
 DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2001, payment sources for the prenatal care (PNC) of Boston residents were closely divided between private insurers and publicly funded sources such as MassHealth.
- Other sources of payment for prenatal care included worker's compensation, self-pay, and miscellaneous other payors.
- Of prenatal care paid for by private insurance, most was covered by health maintenance organizations.
- Medicaid/CommonHealth was the largest public payor for prenatal care, covering close to four in ten Boston births (39.2%).

## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care Utilization*

Beginning with 2001 data, prenatal care is reported 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,<sup>1</sup> among them the ability to distinguish between late entry into prenatal care and an inadequate number of visits as reasons for inadequate PNC utilization. It is also the standard used by the federal Healthy People 2010 goals and objectives for the nation.

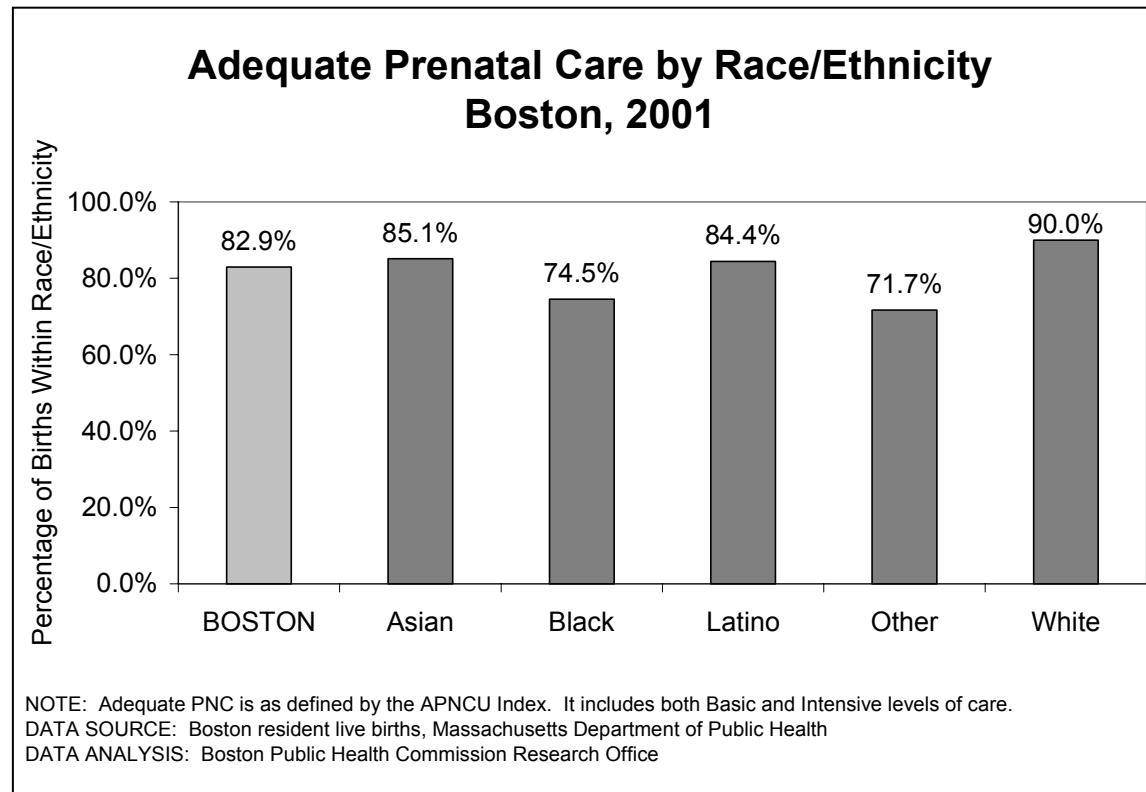


- In 2001, 82.9% of Boston births were to women who received adequate prenatal care, defined as an appropriate number of visits for the length of gestation and a relatively early initiation of prenatal care.
- The Adequate category includes two groups: (1) women with the Basic level of adequacy, i.e., those whose number and timing of visits meets but does not substantially exceed the American College of Obstetricians and Gynecologists standards, and (2) women whose utilization is defined as Intensive, meaning they had more than 110% of the expected number of visits, either because of a high-risk or complicated pregnancy or for some other reason.

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

## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care Utilization*

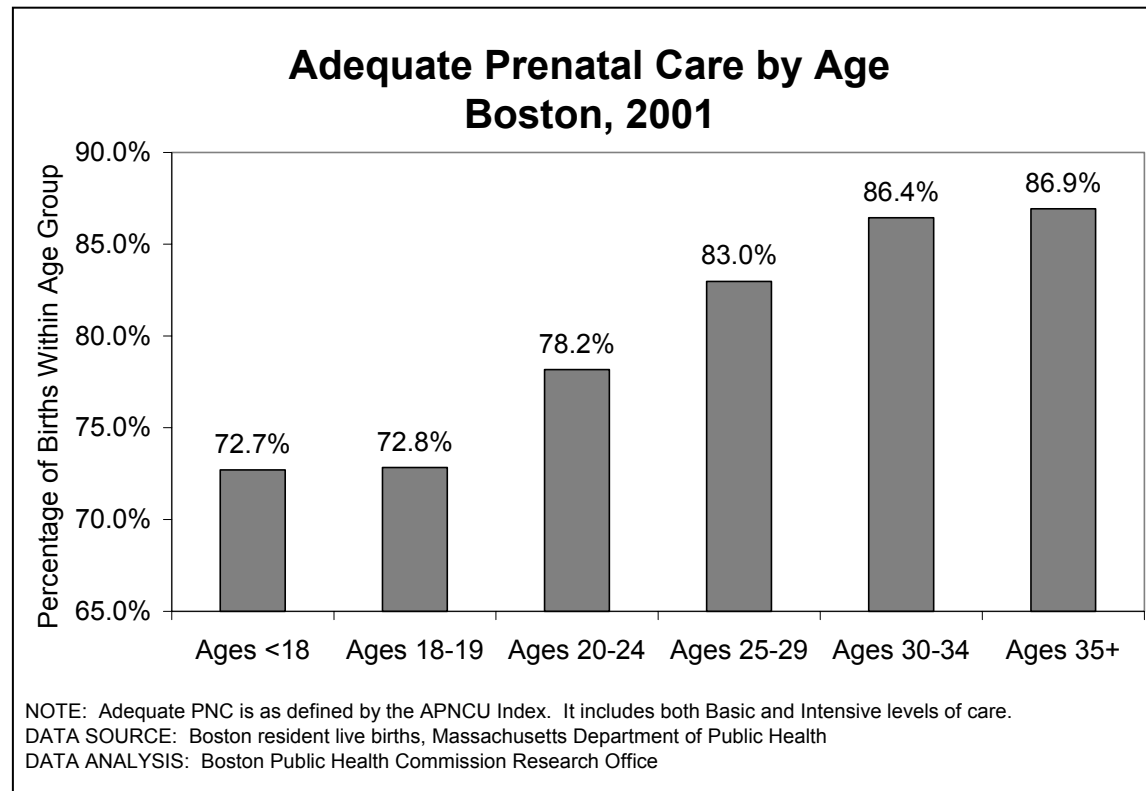


- Most Boston women in all race/ethnicity groups received adequate prenatal care in 2001. The highest percentage was among White women, 90.0% of whom obtained adequate care.
- However, there were significant differences by race/ethnicity.<sup>2</sup> Women belonging to the Other race/ethnicity group had the lowest level (71.1%) of adequate care, followed by Black women, with 74.5% adequacy.

<sup>2</sup> Every comparison by race/ethnicity of prenatal care utilization adequacy was statistically significant ( $p < 0.05$ ) except that of Asian women compared with Latinas and of Black women compared with Other women.

## MATERNAL CHARACTERISTICS

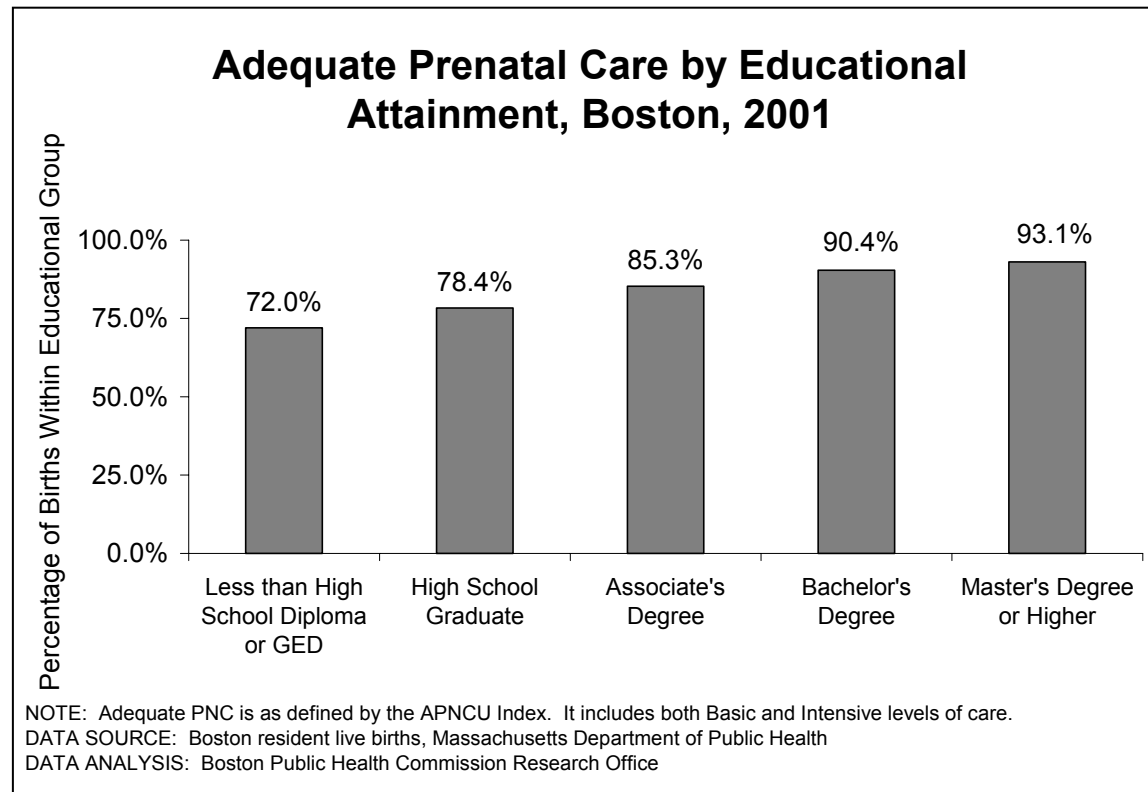
### *Adequacy of Prenatal Care Utilization*



- In 2001, women 30 years of age or older had the highest levels of adequate prenatal care: 86.4% for women ages 30-34 and 86.9% for women age 35 or older.
- Lower percentages of younger women received adequate prenatal care. For nonteens, the relationship between age and prenatal care adequacy was linear: the younger the age, the lower the percentage of women receiving adequate prenatal care.

## MATERNAL CHARACTERISTICS

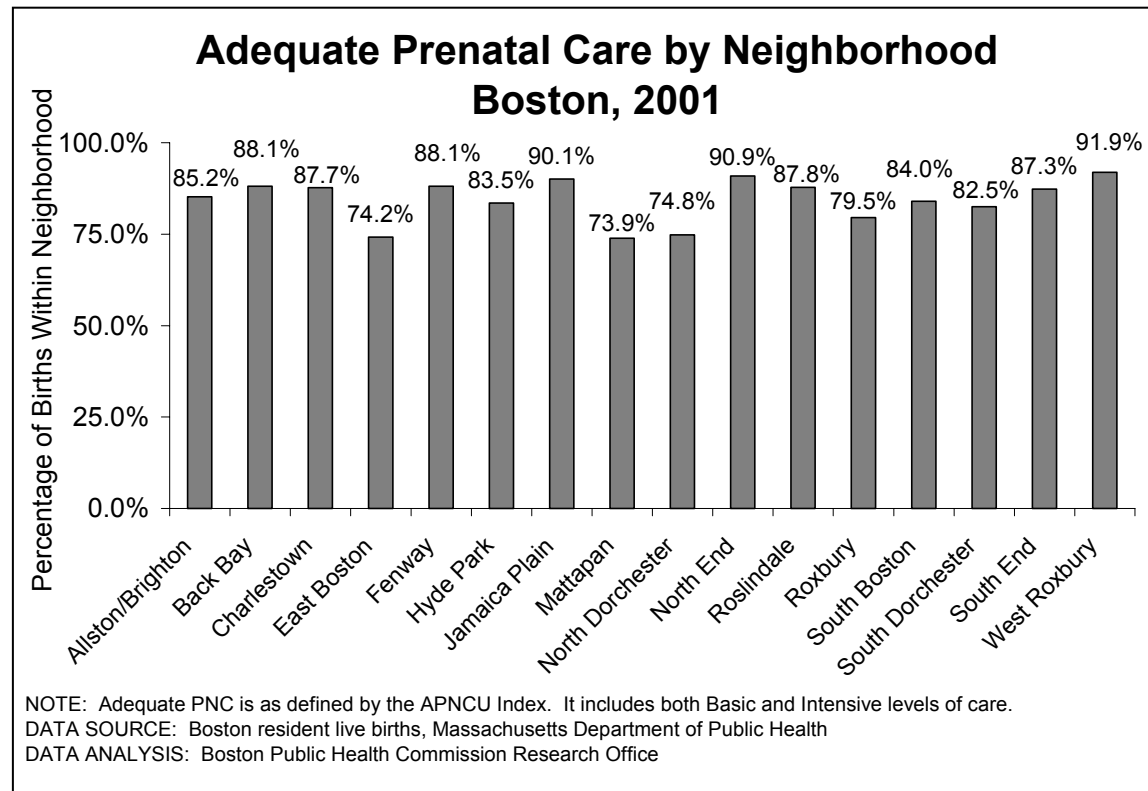
### *Adequacy of Prenatal Care Utilization*



- The adequacy of prenatal care utilization increases as women attain higher educational levels.
- Boston women who did not have at least a high school education had the lowest level of prenatal care adequacy in 2001; prenatal care adequacy rose linearly with educational attainment.

## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care Utilization*



- Adequacy of prenatal care also varied by neighborhood in 2001. The percentage of births that were to women who received adequate prenatal care ranged from a low of 73.9% in Mattapan to a high of 91.9% in West Roxbury.



## MATERNAL CHARACTERISTICS

### Adequacy of Prenatal Care Utilization

Logistic regression is a statistical technique that can be used to assess factors that may be related to the likelihood that women will have adequate prenatal care utilization. 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 all of the others are being held constant. It is then possible to say, “With these other characteristics taken into account, women who have X characteristic are more (or less) likely to receive an adequate level of prenatal care than women who do not have that characteristic.”

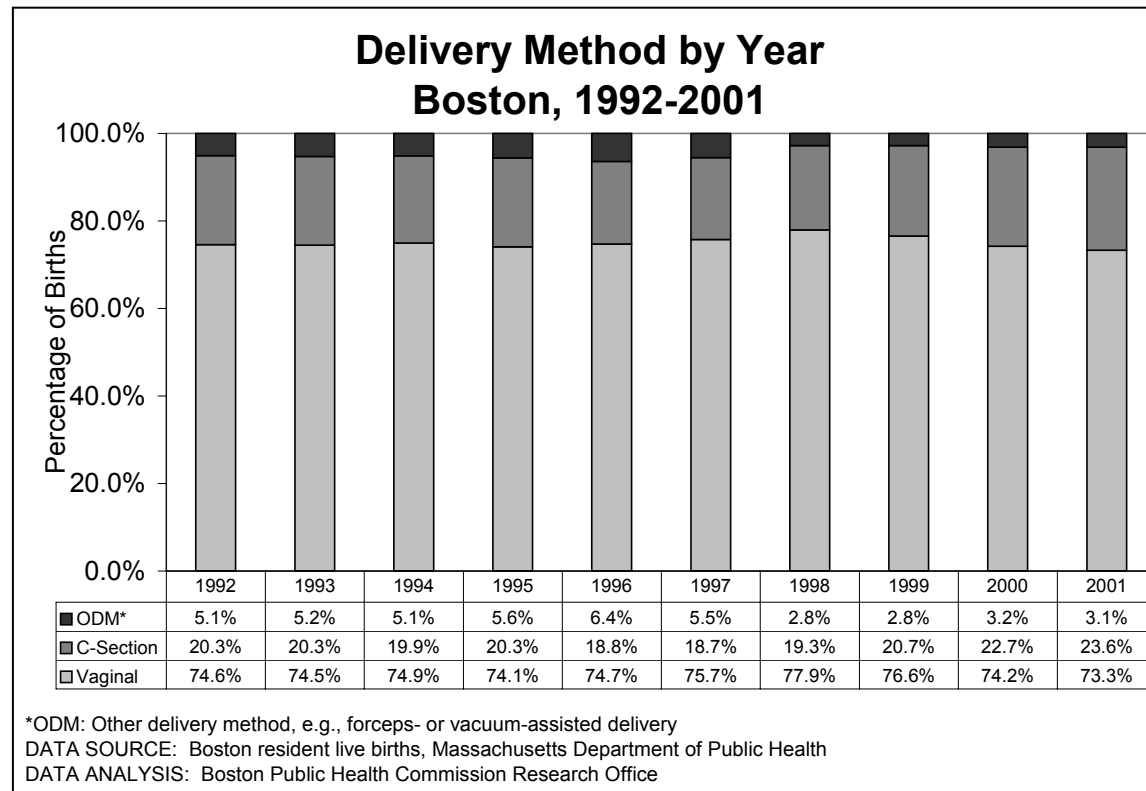
Adjusted Odds Ratios for Adequate Prenatal Care Boston, 2001				
		Adequate Prenatal Care		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
<b>Race/Ethnicity</b>				
	Asian	1.29	0.97	1.72
	Black	0.63	0.53	0.75
	Latino	1.72	1.39	2.12
	Other	0.65	0.49	0.87
	White*	1.00		
<b>Plurality</b>				
	Singleton*	1.00		
	Twins or Higher	1.59	1.10	2.28
<b>Smoking During Pregnancy</b>				
	No*	1.00		
	Yes	0.60	0.47	0.76
<b>Maternal Birthplace</b>				
	US*	1.00		
	Other**	0.60	0.52	0.69
<b>Marital Status</b>				
	Married*	1.00		
	Single	0.84	0.73	0.98
<b>Educational Attainment</b>				
	Less Than High School Diploma	0.78	0.67	0.92
	HS Graduate/GED*	1.00		
	At Least Some College	1.42	1.22	1.65
<b>Insurance Coverage</b>				
	Private*	1.00		
	Public	0.39	0.33	0.45
*Reference group				
**Includes Guam, Puerto Rico, and the Virgin Islands				
NOTES: Adequacy is as defined by the APNCU (Kotelchuck) Index.				
Asian race, maternal age, and parity were not significant predictors of prenatal care utilization.				
DATA SOURCE: Boston resident live births. Massachusetts Department of Public Health				
DATA ANALYSIS: Boston Public Health Commission Research Office				

- Black women and women belonging to the Other race/ethnicity group were significantly<sup>3</sup> less likely than White women to have adequate prenatal care utilization. The odds ratio of 0.63 means that Black women were 63% as likely as the reference group—White women—to have had an adequate level of prenatal care.
- Smokers and women born in a country outside the US were only 60% as likely as nonsmokers and US-born women to have received an adequate level of prenatal care.
- Unmarried women were significantly less likely than married ones to receive an adequate level of care, as were women with less than a high school education. College-educated women had a 42% higher likelihood of having adequate care utilization, compared with women who had only a high school diploma.
- Women with public insurance for their prenatal care were only 39% as likely as women with private insurance to reach an adequate level of PNC utilization.
- Latinas were significantly more likely than White women to have adequate PNC utilization.
- Women who had twins or triplets were 59% more likely than women who gave birth to one infant to obtain adequate care.

<sup>3</sup> Statistical significance was defined as an odds ratio with a confidence interval that did not encompass 1.00.

## MATERNAL CHARACTERISTICS

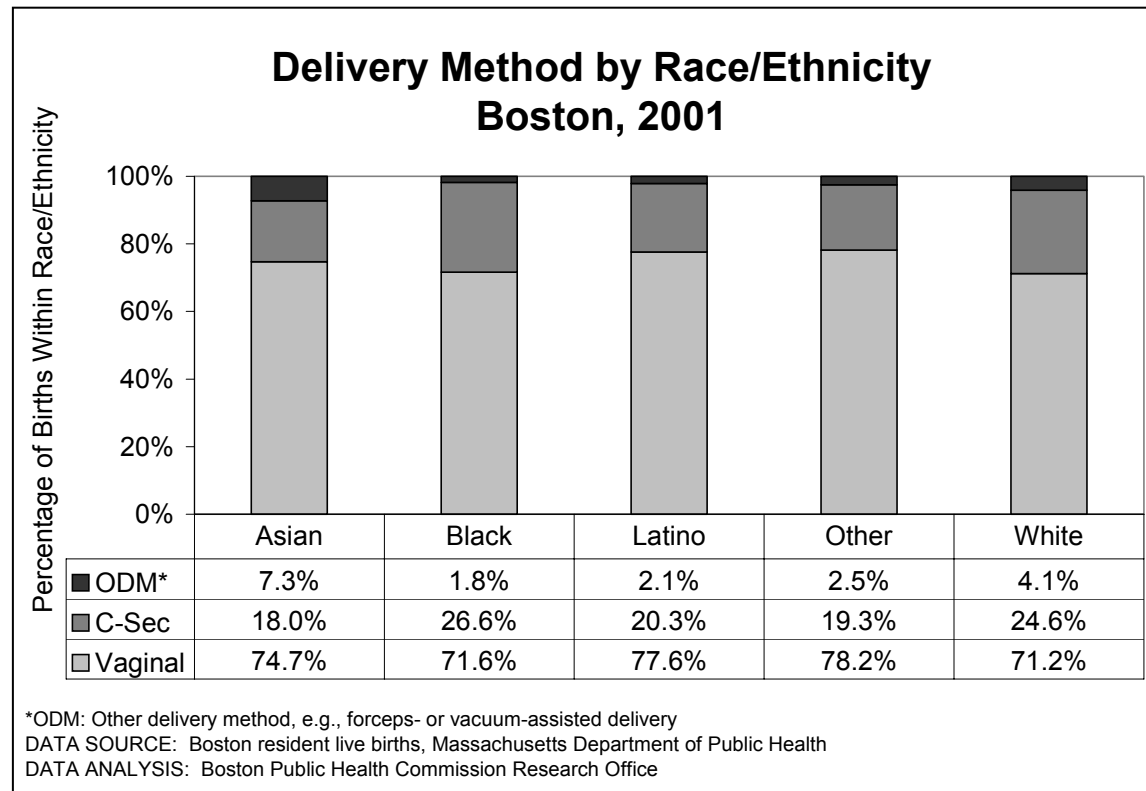
### *Delivery Method*



- About three-quarters of Boston births are vaginal deliveries. This level has declined 4.6 percentage points since 1998, while the use of Caesarean section, or surgical delivery, has risen.
- Forceps- or vacuum-assisted deliveries have become less frequent in Boston since 1997.

## MATERNAL CHARACTERISTICS

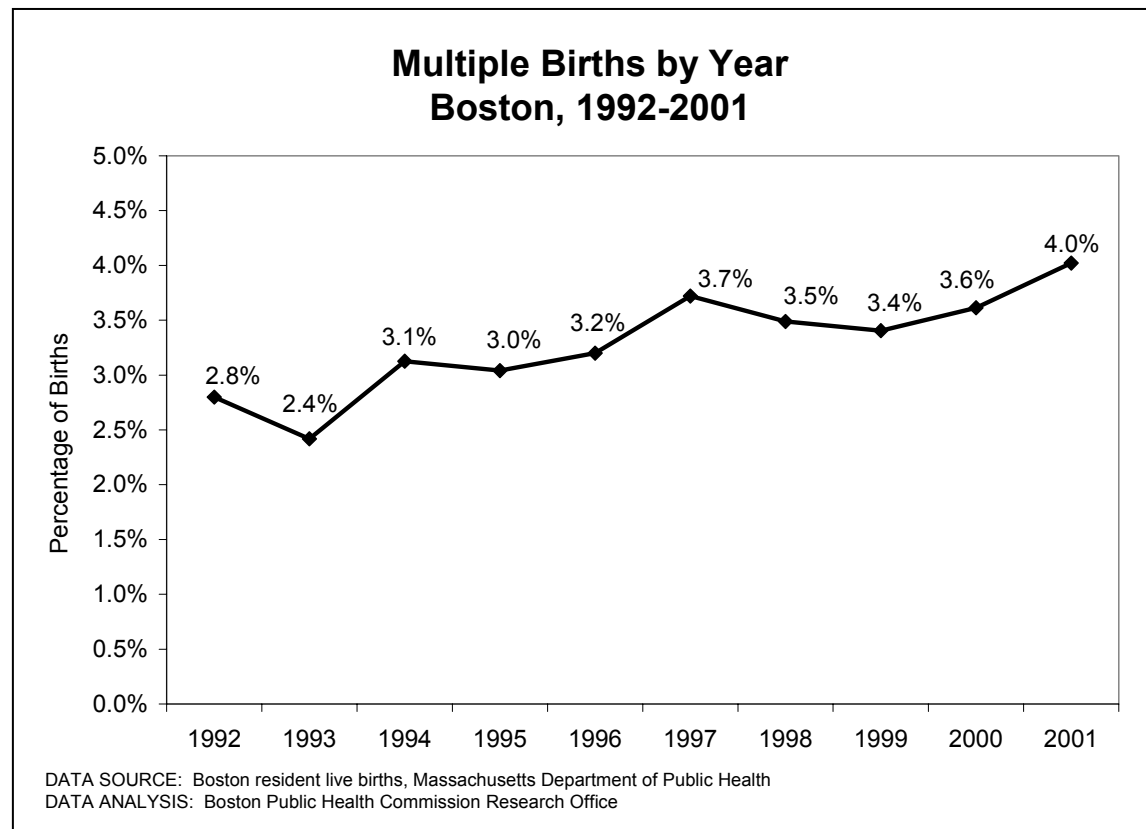
### *Delivery Method*



- In 2001, Caesarean section deliveries were more common among Black and White Boston women than among women of other race/ethnicity groups. The difference between Black and all other women was statistically significant.
- Vaginal deliveries were most frequent among Latinas and women belonging to the Other race/ethnicity group. These differences were also statistically significant.
- Caesarean deliveries tended to increase with increasing maternal age, as did the Other category, which included forceps- and vacuum-assisted deliveries (data not shown).

## INFANT CHARACTERISTICS

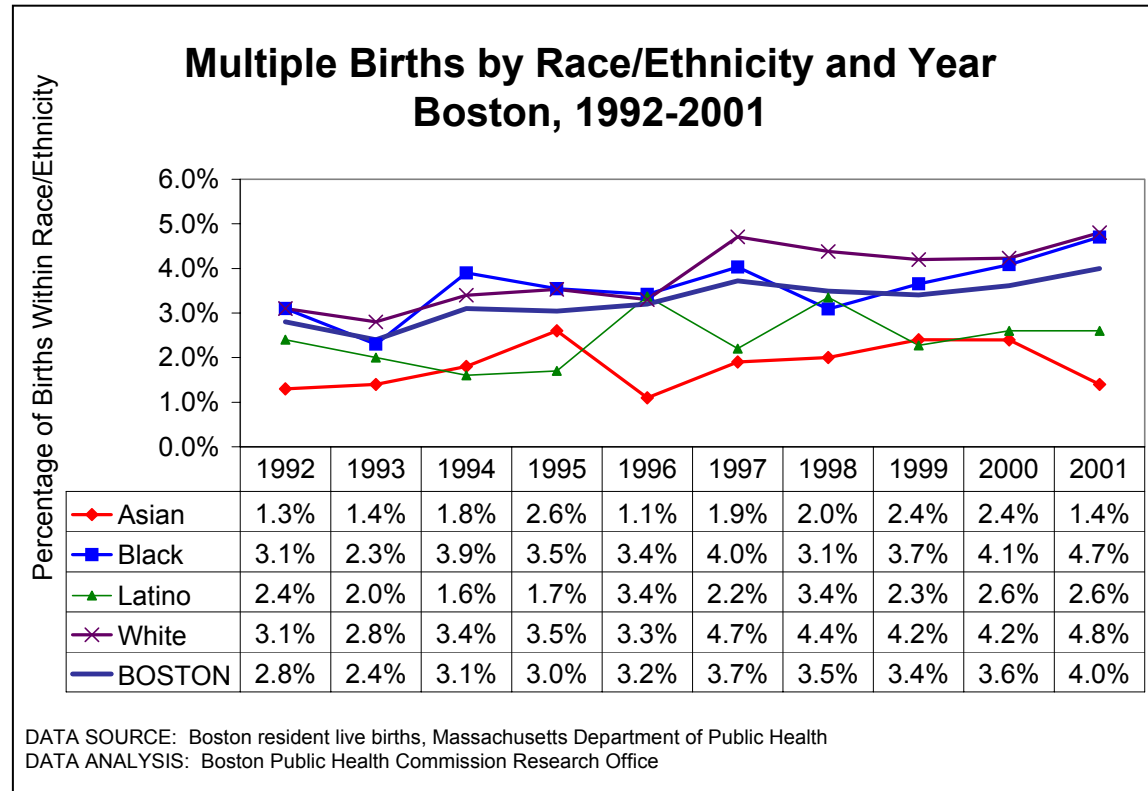
### *Multiple Births*



- Births that are twin, triplet, or higher-order multiple gestations have risen from 2.8% of all Boston resident births in 1992 to 4.0% in 2001. This difference is statistically significant.
- The overall increase in multiple births over time is attributable to an increase among Boston women 30 years of age and older.
- The frequency of multiple births did not change significantly among women under 30, but among women 30-34, multiple births were 36.6% more common in 2001 than in 1992. For women 35-39, the change between 1992 and 2001 was 63.2%, and for women age 40 and older, it was 263.6% (data not shown). All of these comparisons were statistically significant.

## INFANT CHARACTERISTICS

### Multiple Births

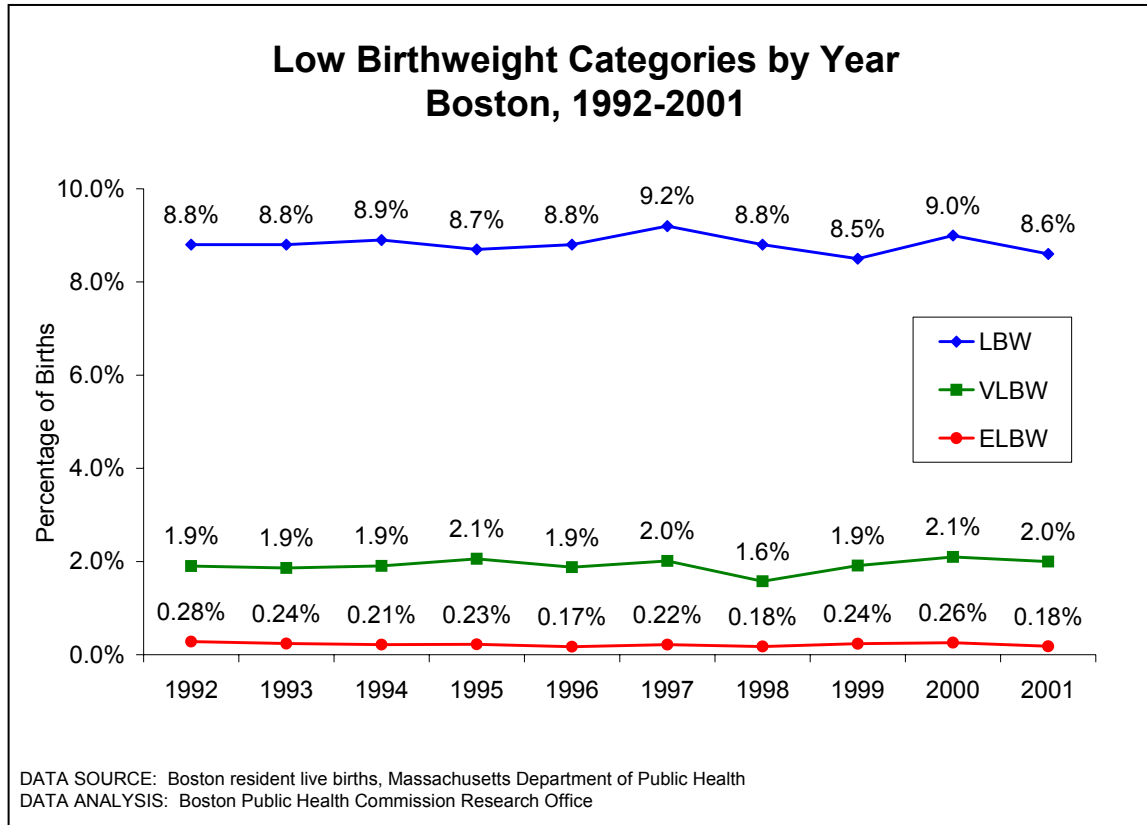


- Black and White Boston women continue to have higher proportions of births that are multiple gestations than do Asians and Latinas.
- Multiple births have increased in recent years as a percentage of all births to Black and White women.

## INFANT CHARACTERISTICS

### Low Birthweight

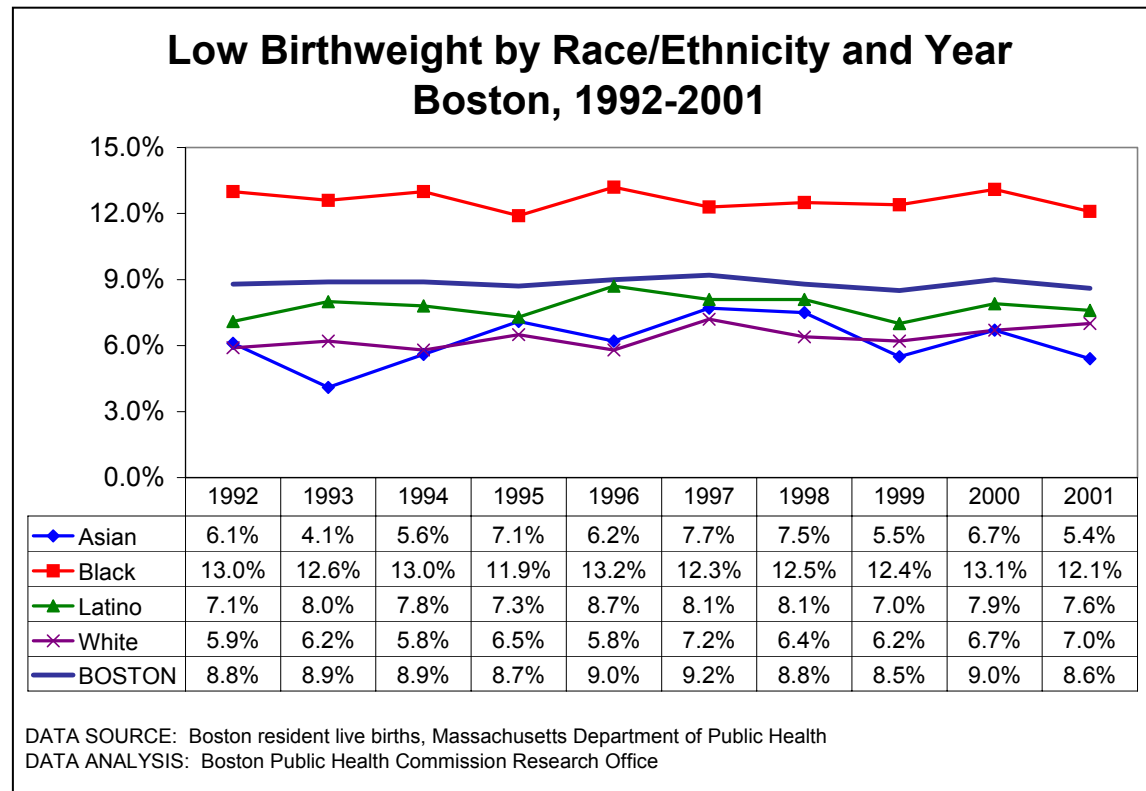
Normal birthweight babies weigh at least 2,500 grams (5.5 pounds) at delivery. Infants who weigh less are considered to be of low birthweight (LBW). These infants may be preterm, meaning they were born too early, or small for their gestational age. Within the LBW group are very low birthweight (VLBW)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

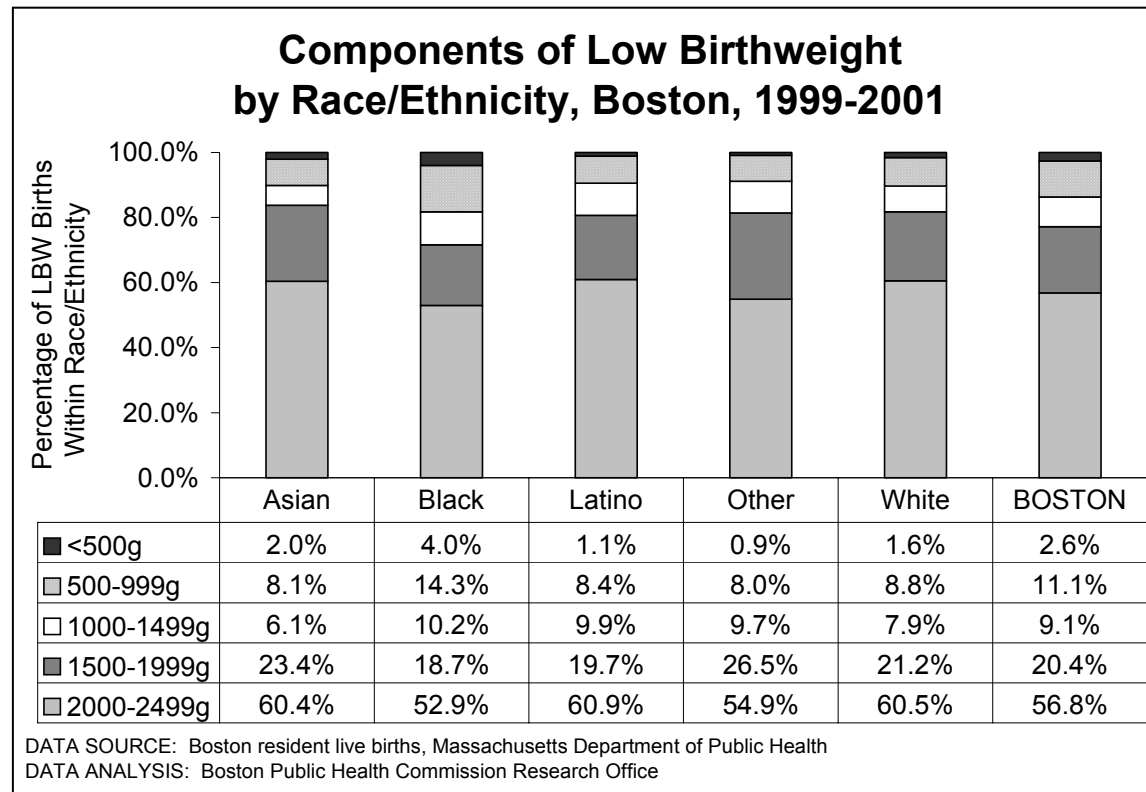
### *Low Birthweight*



- The persistently elevated LBW rate for 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 2001 was more than double the rate for Asians and was also much higher than the rates for Latino and White infants. These differences were all statistically significant.

## INFANT CHARACTERISTICS

### Low Birthweight



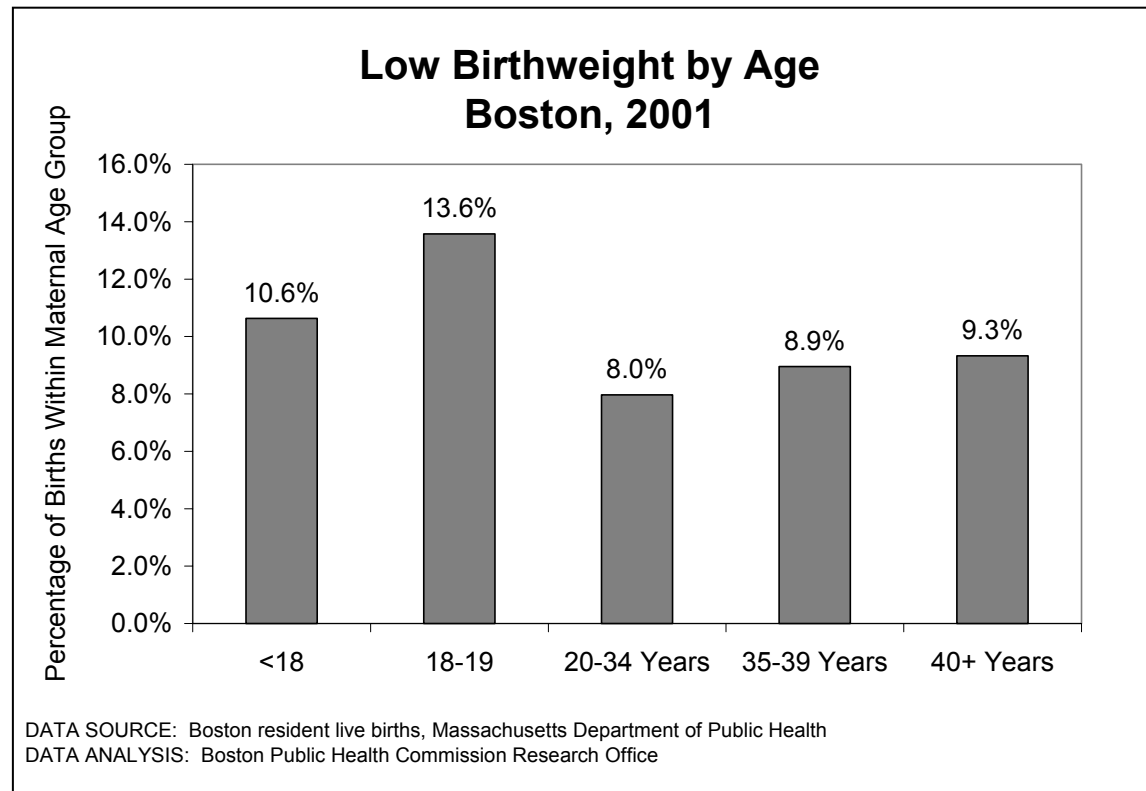
- In addition to higher total LBW, Black Boston residents have a higher proportion of their low birthweight births occurring at the very low end of the birthweight range, where mortality is high.
- Of Black LBW births during the period 1999-2001,<sup>3</sup> 28.5% weighed less than 1,500g, compared with 16.2% of Asian LBW births, 19.4% of Latino LBW births, 18.6% of Other LBW births, and 18.3% of White LBW births.

<sup>3</sup> 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

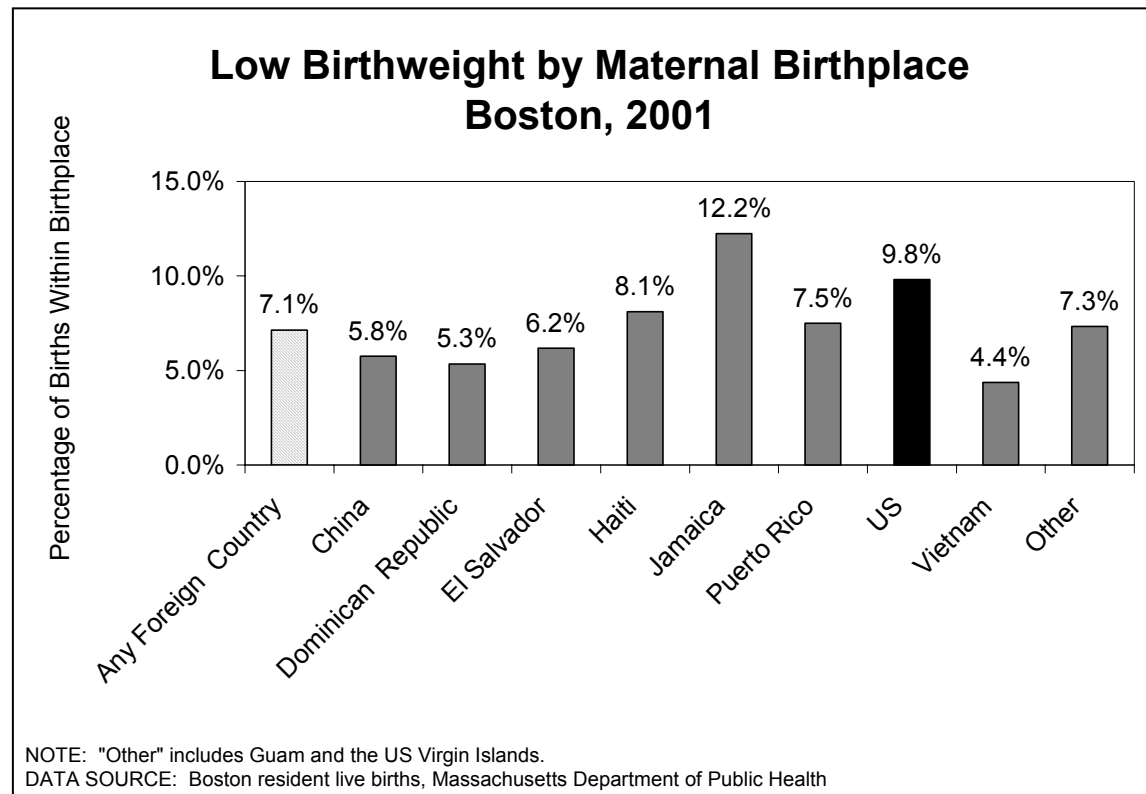
### *Low Birthweight*



- LBW rates in Boston are consistent with the national pattern, where the lowest LBW rates are found in births to women in their twenties and early thirties.
- In 2001, the differences in low birthweight by maternal age were statistically significant only for 18-19 year-olds compared with 20-34 year-olds and for 18-19 year-olds compared with 35-39 year-olds.

## INFANT CHARACTERISTICS

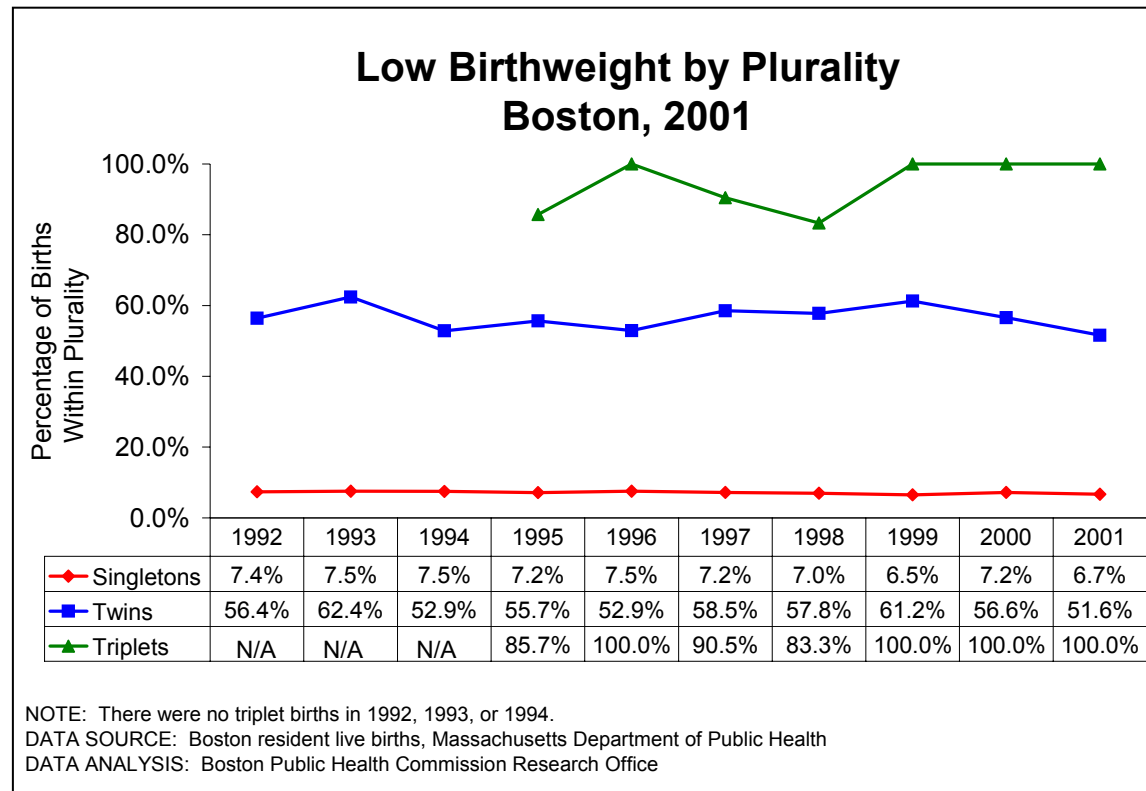
### *Low Birthweight*



- In 2001, low birthweight was more common (9.8% of births) in the infants of US-born Boston women than in the infants of women born in another country (7.1%). This difference was statistically significant.
- Of countries with at least 100 Boston births in 2001, only births to Jamaica-born women were more frequently LBW (12.2%) than births to US-born women.

## INFANT CHARACTERISTICS

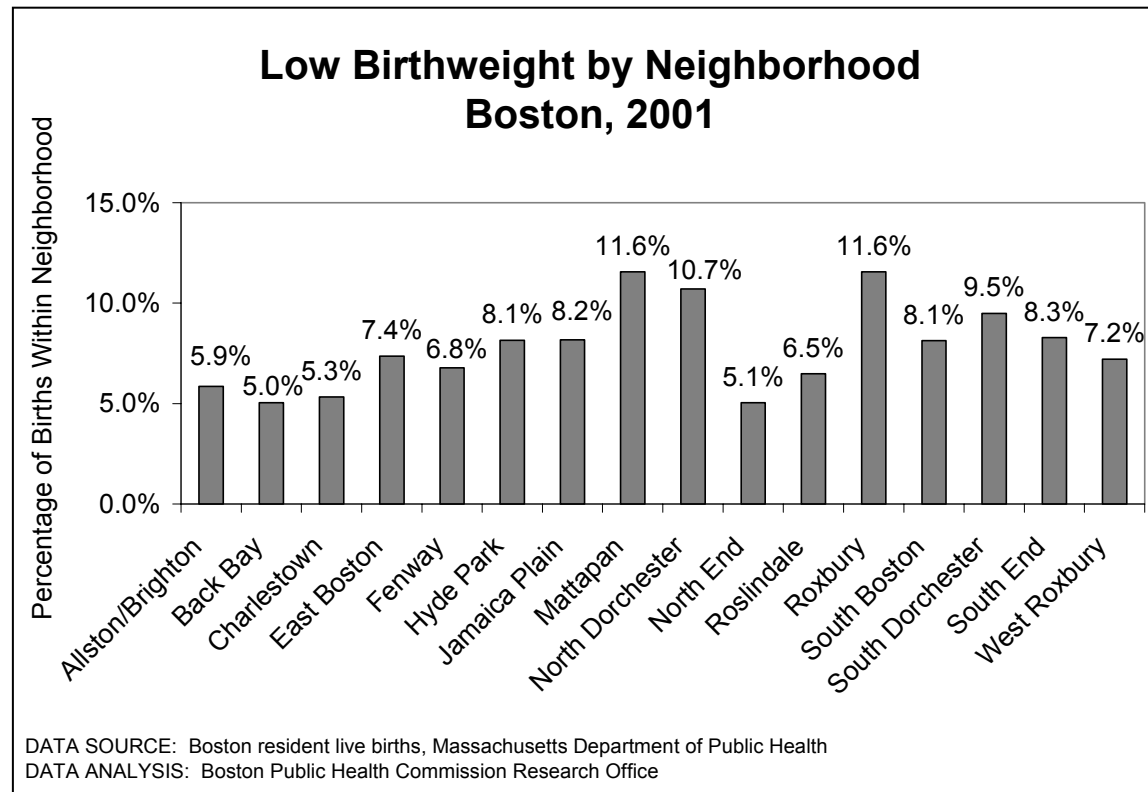
### Low Birthweight



- Plurality, or the number of infants born of one pregnancy, strongly influences the occurrence of low birthweight.
- In Boston, the LBW rate for singleton births (6.5% - 7.5%) has been far lower than that for twins (51.6% - 61.2%) or triplets (83.3% - 100.0%) every year from 1992 through 2001.
- The one-year change in LBW between 2000 and 2001 was not statistically significant for any of the plurality groups.

## INFANT CHARACTERISTICS

### *Low Birthweight*

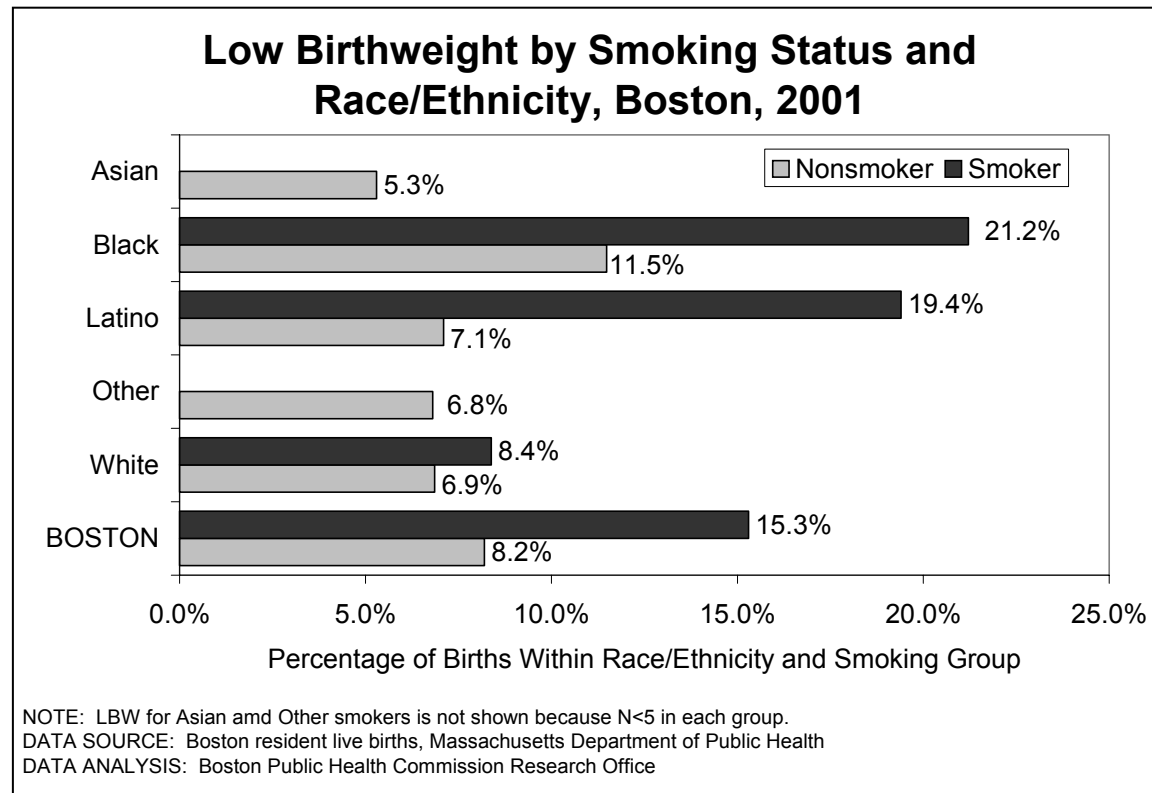


- Boston's highest rates of LBW in 2001 were for Mattapan, Roxbury, and North Dorchester.
- The city's lowest rates were for the Back Bay<sup>4</sup>, the North End, and Charlestown.

<sup>4</sup> The Back Bay neighborhood includes Beacon Hill and the West End.

## INFANT CHARACTERISTICS

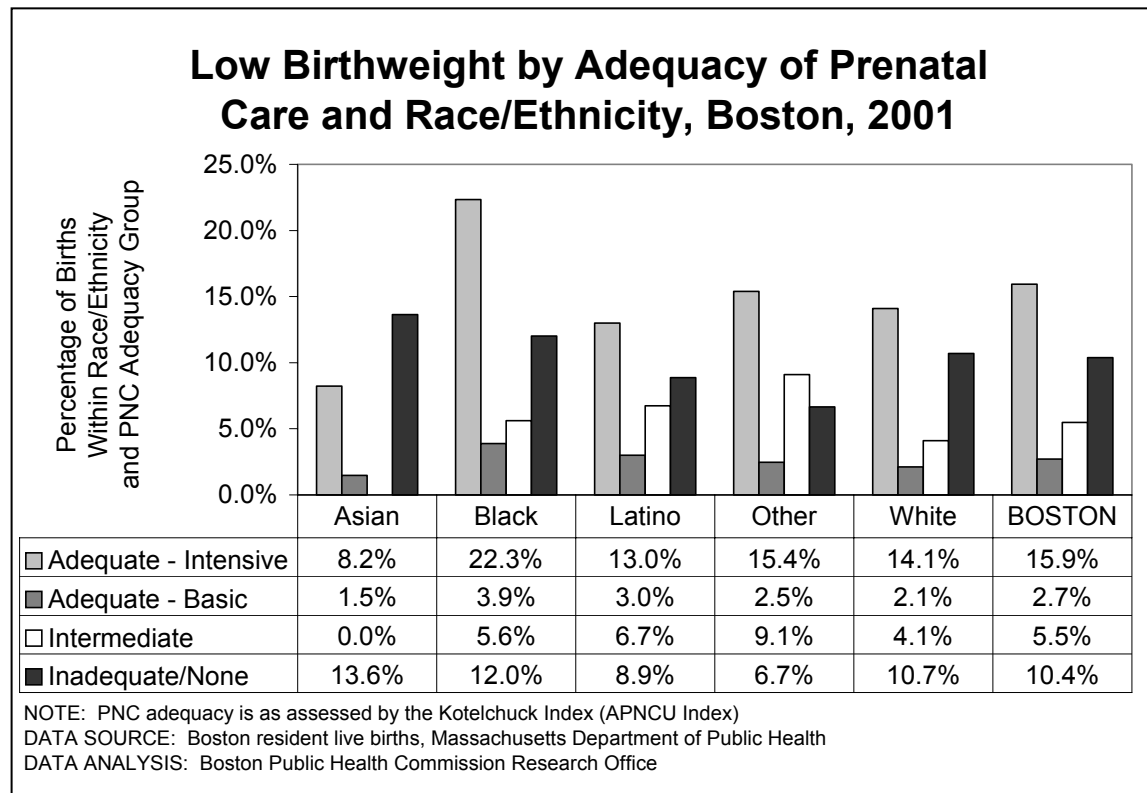
### *Low Birthweight*



- Cigarette smoking has been associated with a higher risk of prematurity, which can be measured in terms of low birthweight, preterm birth, or intra-uterine growth retardation (LBW shown here).
- The higher LBW levels in births to smokers was statistically significant for Boston overall and for Black women and Latinas. It was not significant for White women.

## INFANT CHARACTERISTICS

### Low Birthweight

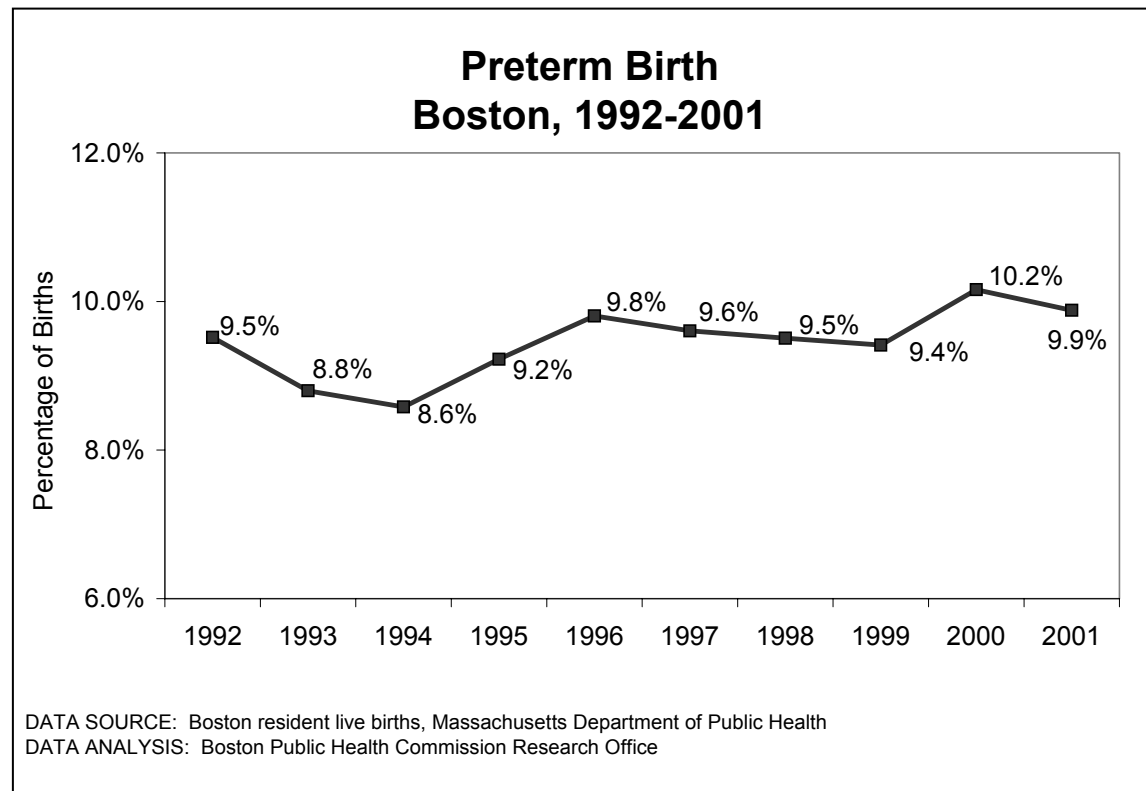


- For Boston overall in 2001 and for all race/ethnicity groups except Asian women, low birthweight was highest (15.9%) for women who received prenatal care at the **Adequate - Intensive** level. Women receiving more than routine PNC care typically have complicated or high-risk pregnancies requiring close medical management.
- The lowest LBW rates for every race/ethnicity group except Asians were in the **Adequate - Basic** PNC group. LBW ranged from 1.5% of births to Asian women to 3.9% of births to Black women at this care level.
- Higher rates of LBW were also associated with inadequate or no PNC for women in all race/ethnicity groups except women of Other race.

## INFANT CHARACTERISTICS

### *Preterm Birth*

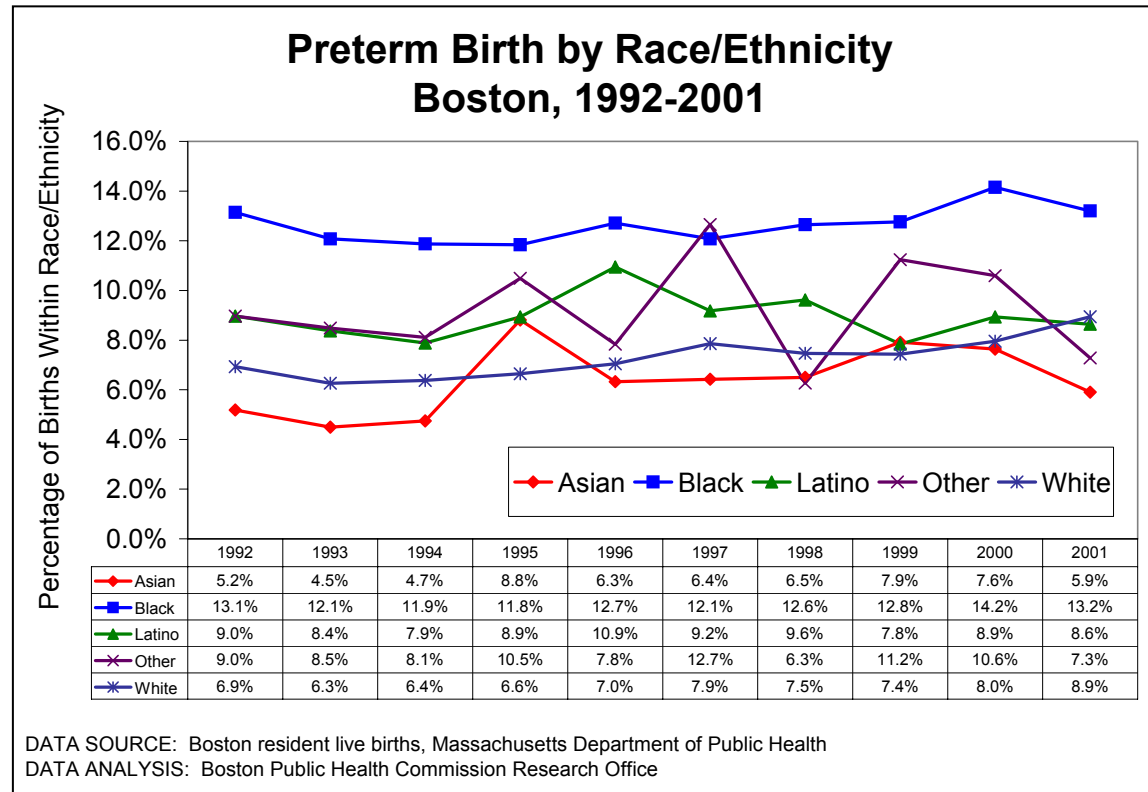
A preterm birth (PTB) is one that occurs at less than 37 completed weeks' gestation. Infants born too early are at substantially increased risk of illness and death, and the earlier they are born, the higher their risk. Preterm birth and low birthweight are highly correlated, with 69.7% of LBW births in 2001 also being preterm, and 60.5% of preterm births also being LBW.



- Preterm birth has ranged between 8.6% and 10.2% of Boston births for the past decade.
- There has been no significant trend either upward or downward during this period.

## INFANT CHARACTERISTICS

### Preterm Birth

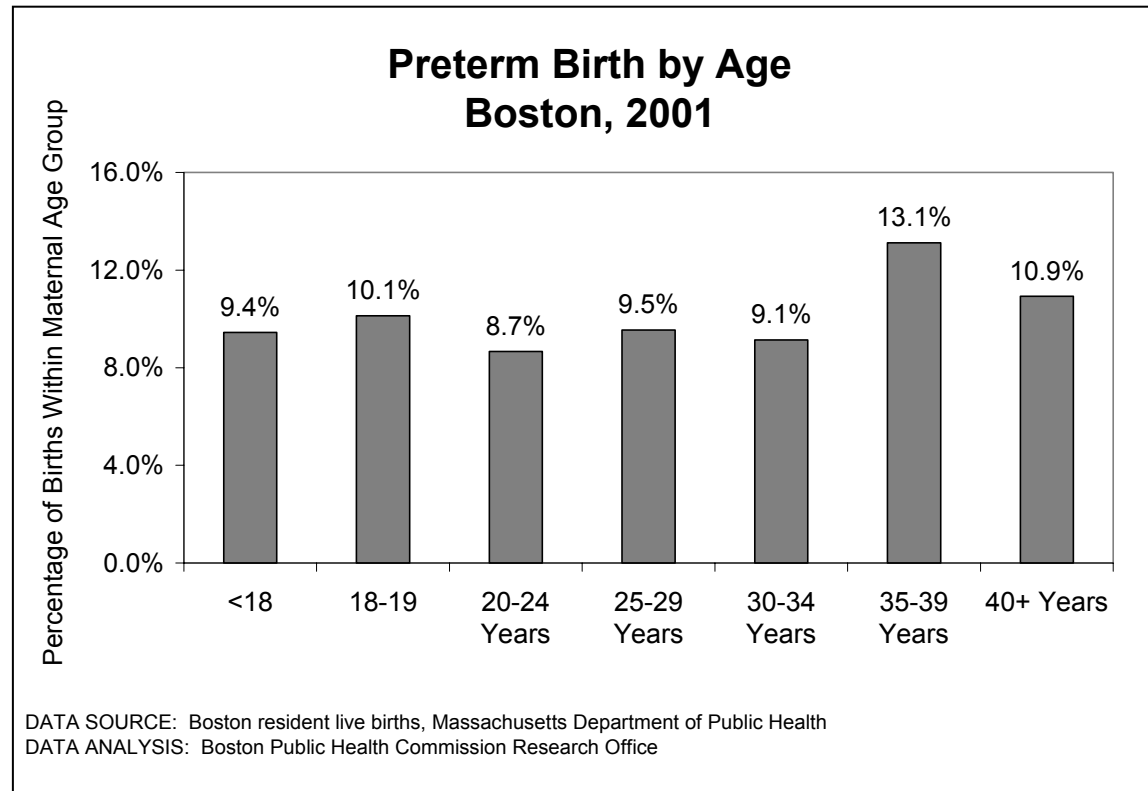


- As with low birthweight, preterm birth is significantly more common in births to Black Boston women. For every year between 1992 and 2001, the rate of preterm birth was highest for Black women, except for Other women in 1997.
- During the period 1992-2001, Asian, Latino, and White infants were less likely to be born preterm than Black infants, and these differences were statistically significant.



## INFANT CHARACTERISTICS

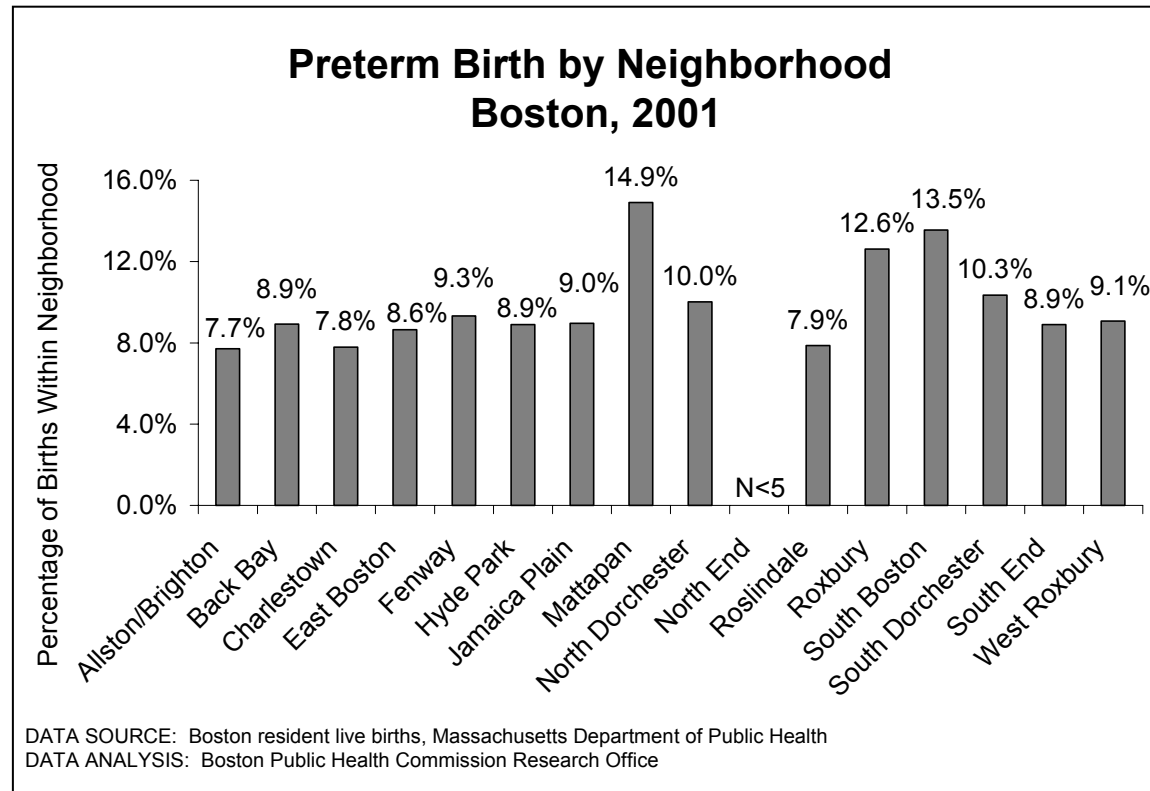
### *Preterm Birth*



- Overall, about one in every ten Boston births in 2001 was preterm (9.9%).
- PTB occurred least frequently among women in their early twenties, and most frequently among women 35-39 years old. The PTB rate among 35-39 year-olds, 13.1%, was statistically significantly higher than that of any other age group except women 40 or older.

## INFANT CHARACTERISTICS

### Preterm Birth



- Residents of Mattapan had Boston's highest preterm birth rate in 2001 (14.9%), followed by residents of South Boston (13.5%) and Roxbury (12.6%).
- Most neighborhood PTB rates were well below the 2001 city average of 9.9% of births.

## INFANT CHARACTERISTICS

### Preterm Birth

Logistic regression was used to examine the relationship between preterm birth and several characteristics reported on the birth certificate. A strength 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.

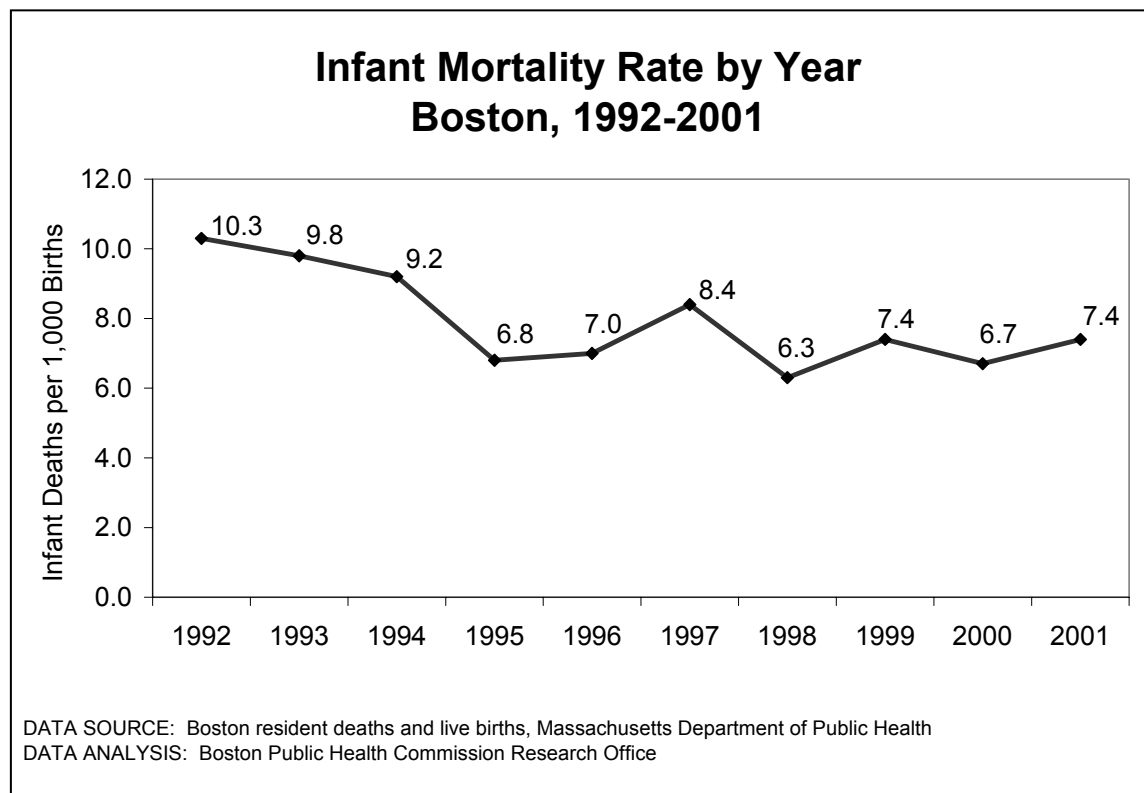
Adjusted Odds Ratios for Preterm Birth				
		Preterm Birth		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
<b>Race/Ethnicity</b>				
	Asian	0.83	0.56	1.24
	Black	1.55	1.26	1.89
	Latino	1.05	0.81	1.36
	Other	0.76	0.48	1.20
	White*	1.00		
<b>Age</b>				
	<35*	1.00		
	35 or Older	1.28	1.06	1.56
<b>Maternal Birthplace</b>				
	US*	1.00		
	Other**	0.80	0.67	0.95
<b>Plurality</b>				
	Singleton*	1.00		
	Twins or Higher	11.80	9.34	14.92
<b>Educational Attainment</b>				
	Less Than High School Graduation	1.34	1.09	1.66
	HS Graduation or Higher*	1.00		
<b>Insurance Coverage</b>				
	Private*	1.00		
	Public	1.27	1.06	1.52
*Reference group				
**Includes Puerto Rico, Guam, and the Virgin Islands				
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, women having twins or other multiple births were 11.8 times as likely as those having one baby to have a preterm delivery.
- Black women were fifty-five percent more likely to have a preterm birth than White women, a statistically significant difference.
- Those with less than a high school education or who had public health insurance had a significantly higher chance of delivering preterm, as well.
- Women 35 years of age or older were twenty-eight percent more likely to have a preterm birth than younger women, again a statistically significant difference.
- A woman's having been born outside the US was associated with a significantly lower risk of PTB.

## 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 2001, there were 61 deaths of Boston infants, yielding an infant mortality rate (IMR) of 7.4 per thousand live births. The one-year increase from 6.7 per thousand in 2000 was not statistically significant.
- Infant mortality appears to have decreased between 1992 and 2001, but this trend does not reach the point of statistical significance.

## 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 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 fetusus 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
<b>Excess Boston Deaths 1996-2000<sup>5</sup></b>	3.7	0.7	-0.2 <sup>6</sup>	0.7
<b>Underlying Assumption</b>	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.
<b>Examples of Prevention Efforts</b>	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

<sup>5</sup> Per thousand live births and fetal deaths at 20 or more weeks gestation

<sup>6</sup> 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

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

- 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.

## 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, 2001**

	<b>Births</b>	<b>Deaths</b>	<b>IMR</b>
<b>Asian</b>	<b>593</b>	<b>1</b>	<b>--*</b>
<b>Black</b>	<b>2,512</b>	<b>34</b>	<b>13.5</b>
<b>Latino</b>	<b>1,786</b>	<b>10</b>	<b>5.6</b>
<b>White</b>	<b>2,966</b>	<b>15</b>	<b>5.1</b>
<b>Other/Unknown</b>	<b>374</b>	<b>1</b>	<b>--*</b>
<b>TOTAL</b>	<b>8,231</b>	<b>61</b>	<b>7.4</b>

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

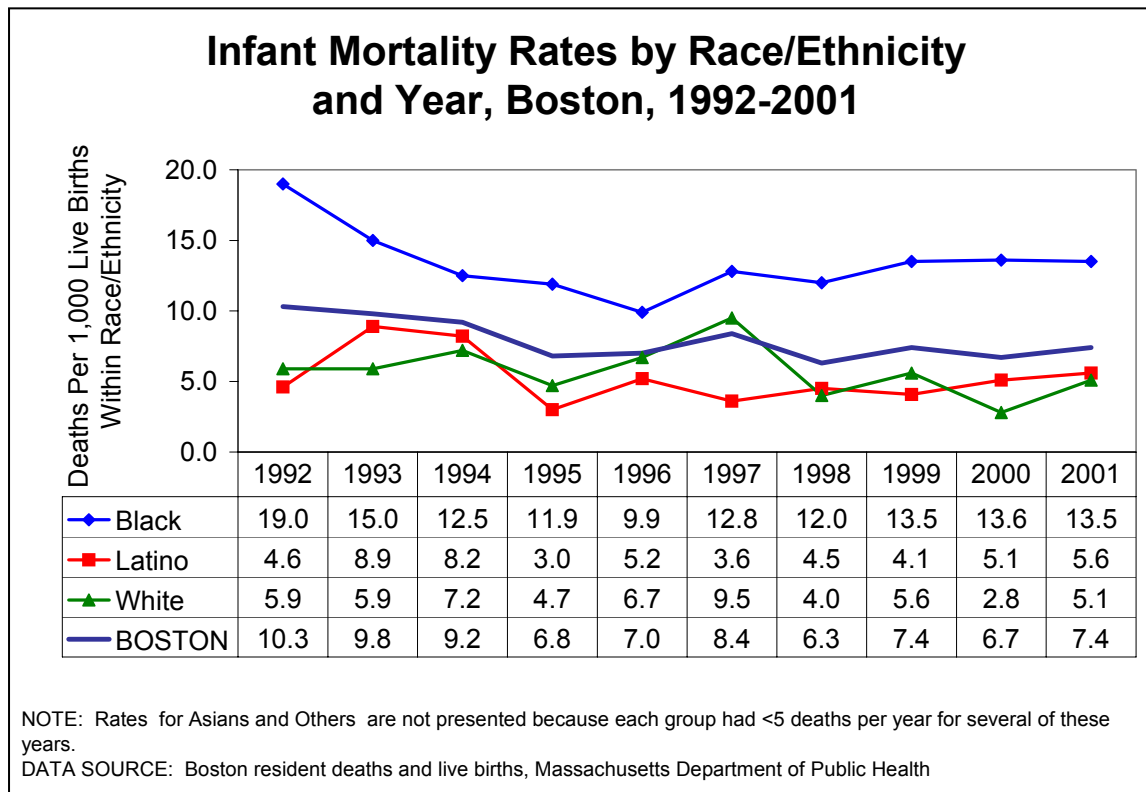
DATA ANALYSIS: Boston Public Health Commission Research Office

- The 2001 IMR for Boston's Black infants was 13.5 deaths per thousand live births, significantly higher than the IMRs for White and Latino infants.
- Boston's Asian population, with 7.2% of the city's births, had just 1.6% of its infant deaths in 2001.
- Black residents, with 30.5% of births, had 55.7% of all infant deaths.
- The Latino percentage of Boston births in 2001 was 21.7%, while its percentage of infant deaths was 16.4%
- Whites had 36.0% of Boston's births in 2001, but only 24.6% of its infant deaths.
- Individuals of Other or Unknown race/ethnicity, with 4.5% of all births, had 1.6% of the city's infant deaths.



## INFANT MORTALITY

### Disparities



- Although the 2001 IMRs for Black and White infants are lower than they were in 1992, neither change over time represented a statistically significant decline. Nor is the higher Latino rate in 2001 compared with 1992 indicative of a significant trend.
- 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 residents.

The IMR for Black infants in the specified year was significantly higher than the IMRs for:

- Latino and White infants in 1992
- White infants in 1993
- Latino and White infants in 1995
- Latino infants in 1997
- Latino and White infants in 1998
- Latino and White infants in 1999
- Latino and White infants in 2000
- White infants in 2001

## INFANT MORTALITY

### *Disparities*

#### Black and White Infant Mortality Rates Boston, 1992-2001

	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	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

- 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 2001 was in 1997, when the value of 1.3 indicated a thirty percent excess in the Black IMR. In 2000, there were 4.9 Black infant deaths for every White infant death.
- Note also that the narrowing of the Black/White disparity in 2001 compared with 2000 is not attributable primarily to a reduction in the Black rate but rather to an increase in the White IMR.

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

## INFANT MORTALITY

### *Disparities*

In Boston, infants born at a given weight have approximately equal chances of survival regardless of their race/ethnicity (data not shown). There are no statistically significant differences in what is called birthweight-specific mortality across the major race/ethnicity groups. However, as has already been noted, there are large differences across groups in the occurrence of preterm birth and low birthweight.

**Cumulative Birthweight Distribution  
By Race/Ethnicity, Boston, 1996-2001**

	<500g	<750g	<1,000g	<1,500g	<2,000g	<2,500g	2,500g+
Asian	0.1%	0.2%	0.4%	0.8%	2.1%	6.4%	93.6%
Black	0.4%	1.3%	2.0%	3.4%	5.8%	12.7%	87.3%
Latino	0.1%	0.4%	0.8%	1.5%	3.2%	7.9%	92.1%
Other	0.1%	0.5%	0.8%	1.8%	3.6%	8.5%	91.5%
White	0.1%	0.4%	0.6%	1.0%	2.4%	6.5%	93.5%

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

- 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.
- **Had there been no more Black prematurity than White in 2001, there would have been approximately 13 Black infant deaths, not the 34 that actually occurred.**

**APPENDIX**

APPENDIX

Healthy People 2010

Healthy People 2010 Objectives  
Selected Maternal and Infant Health Indicators

OBJECTIVE	HP 2010 TARGET
<b>Prenatal Care</b>	
Care beginning in first trimester	90% of births
<b>Risk Factors</b>	
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
<b>Infant Deaths</b>	
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 2003: A Review of 2001 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**

Beginning with this edition of the report, 18 and 19 year-old women are not included 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 2003: A Review of 2001 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.

### **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 noncomparable samples or too few cases in a sample, but is a valuable guide to the interpretation of rates, proportions, and similar measures.

## APPENDIX

### *Technical Notes*

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 2001. In general, Boston-specific data are presented for the ten-year time span of 1992 through 2001, either year by year or for 2001 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. While 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.

## APPENDIX

### *Technical Notes*

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.



## APPENDIX

### *Technical Notes*

#### **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 2003: A Review of 2001 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.

**APPENDIX**

***Technical Notes***

**Prenatal Care Adequacy**

Beginning with this edition of the report, 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.

<b>APNCU Index Category</b>	<b>Month of Pregnancy in Which Prenatal Care (PNC) Was Begun</b>	<b>Percentage of Expected <sup>7</sup> PNC Visits That Were Received</b>
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%

<sup>6</sup>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*

**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.

**Caesarean 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 more likely to experience a certain condition (for example, cancer) than 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.

## APPENDIX

### *Glossary*

**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.

**Trimester:** A period of three months.

First trimester: The first three months of pregnancy.

## APPENDIX

### *Glossary*

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.