
Vital and Health Statistics

Trends in Low Birth Weight: United States, 1975–85

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National and regional trends in rates of low, moderately low, and very low birth weight are analyzed for the period 1975–85. Also reviewed are 1985 rates of low, moderately low, and very low birth weight in relation to a number of maternal and infant characteristics, as well as changes in low birth weight rates between 1980 and 1985 for many of these characteristics.

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Symbols

- Data not available
 - ... Category not applicable
 - Quantity zero
 - 0.0 Quantity more than zero but less than 0.05
 - Z Quantity more than zero but less than 500 where numbers are rounded to thousands
 - * Figure does not meet standard of reliability or precision
 - # Figure suppressed to comply with confidentiality requirements
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Trends in Low Birth Weight: United States, 1975–85

by Selma M. Taffel, Division of Vital Statistics

Introduction

Background

The incidence of low birth weight (less than 2,500 grams, or 5½ pounds) has been carefully monitored in the United States, because it is one of the major predictors of infant morbidity and mortality. For singleton infants born in 1980, the risk of dying in the first year of life was 94 times higher for babies weighing less than 1,500 grams (very low birth weight) than for those weighing at least 2,500 grams, and 7 times higher for those weighing 1,500–2,499 grams (moderately low birth weight) than for those weighing more. Of white babies who died in the first year of life, 53 percent weighed less than 2,500 grams; the comparable proportion of black babies who died was 63 percent. The risk of dying at less than 1 year of age declines dramatically with increasing birth weight, regardless of gestational age, live-birth order, maternal age, maternal education, or month prenatal care began (1).

A recent review of the studies of surviving low-birth-weight infants indicates that such babies are three times as likely as those of normal weight to have neurodevelopmental handicaps, twice as likely to have a serious congenital anomaly, and more likely to develop lower respiratory tract conditions, and, in general, are at increased risk of having a serious or prolonged illness (2).

The information presented in this report is derived from entries on live-birth certificates. For 1985, rates for all low birth weight (LBW) and those for its two components, moderately low birth weight (MLBW) (1,500–2,499 grams, or 3 pounds 4 ounces to 5 pounds 8 ounces) and very low birth weight (VLBW) (less than 1,500 grams, or 3 pounds 4 ounces), are examined in relation to a number of maternal and infant characteristics. Also reviewed are national and regional changes between 1975 and 1985 in the incidence of LBW and VLBW, as well as 1980–85 changes in LBW in relation to period of gestation; maternal age, marital status, and educational attainment; and month of pregnancy prenatal care began. Special consideration is given to the relationship between period of gestation and birth weight. For ease in discussion, the terms “women” and “mothers” are sometimes used interchangeably for “births.”

While this report was in preparation, data for the years 1986 and 1987 on low birth weight and its components became

available. Information for these years is therefore included in trend tables and graphs to show more current trends.

Highlights

Between 1975 and 1985, the incidence of low birth weight in the United States declined by 9 percent, from 73.9 to 67.5 low-birth-weight babies per 1,000 live births, but 86 percent of this decline occurred between 1975 and 1980. Although LBW declined for both white and black births between 1975 and 1980, the decline was nearly twice as great for white (9 percent) as for black births (5 percent). The decline in LBW rates in the 1980–85 period was 1 percent or less for both white and black births. Between 1985 and 1987, LBW rates increased by slightly less than 1 percent for white births and by 2 percent for black births.

Moderately low birth weight declined by 9 percent between 1975 and 1980 and by an additional 3 percent between 1980 and 1985. In both periods, MLBW declined for both white and black births. From 1985 to 1987, MLBW rose by 1 percent for white births and by 2 percent for black births.

The incidence of very low birth weight remained almost unchanged between 1975 and 1980 (11.6 very-low-birth-weight babies per 1,000 live births in 1975, compared with 11.5 in 1980) but increased by 5 percent (from 11.5 to 12.1) from 1980 to 1985. The increase in VLBW was about twice as great for black as for white babies (9 percent, compared with 4 percent). The increase in VLBW for this latter period reflects a rise in the VLBW rate for premature births as well as a shift to shorter gestational periods for VLBW babies. There was no change in the incidence of VLBW for white births from 1985 to 1987, but it rose 3 percent for black births.

There were declines in LBW rates in all regions in the 1975–85 period, but the declines were greatest in the Northeast. Rates of VLBW declined only in the Northeast and Midwest regions between 1975 and 1980 and rose in all regions between 1980 and 1985. For both LBW and VLBW, changes were more favorable in the 1975–85 decade for white than for black births in all regions, thus increasing the racial differential in each region.

For all characteristics examined, rates of low birth weight, moderately low birth weight, and very low birth weight are substantially higher for black than for white births. The racial differential is most pronounced for very low birth weight. In 1985, the VLBW rate was 2.8 times as high for black as for white babies, and rates of LBW and MLBW were 2.1–2.2 times as high for black as for white births.

More than half of all LBW and MLBW babies and more than 9 in 10 VLBW babies are born before 37 weeks of gestation (preterm). Of LBW babies who were full term, only 3 percent weighed less than 1,500 grams, but of those born preterm, 27 percent weighed this little. For both preterm and full-term LBW babies, the proportion weighing less than 1,500 grams is higher for black than for white babies.

As the gestational period lengthens, the incidence of low birth weight declines rapidly. The risk of LBW and MLBW is higher for white than for black babies before 36 weeks of gestation but is higher for black babies at longer gestational periods; the risk of very low birth weight is higher for white babies only up to 32 weeks of gestation. One of the main reasons that LBW, MLBW, and VLBW rates are higher for black than for white births is that black babies are more likely to have a short gestation.

Between 1981 and 1985, the rate of full-term LBW declined by 7 percent, but the rate of preterm LBW increased by 2 percent. Thus the small decline in the overall rate of LBW in the 1981–85 period is due entirely to the reduction in the rate of full-term LBW.

Rates of LBW, MLBW, and VLBW are lowest for mothers in their late twenties and rise as maternal age increases or decreases. Age differences are far more pronounced for white than for black mothers. All LBW rates are substantially higher for young women having a second or higher order birth than for first-time mothers, reflecting the close spacing of many second and subsequent births.

In 1985, babies born 1–1½ years after the previous live birth were two-thirds more likely to have a low birth weight and about 80 percent more likely to have a very low birth weight than babies born 2–4 years after the previous live birth. This differential is less but is still substantial when the comparison is limited to full-term births (at least 37 weeks of gestation).

Between 1980 and 1985, the risk of low birth weight declined by 4 percent for mothers with 16 years or more of schooling but declined by only 1 percent or rose by up to 3 percent for women with less education. Women with at least 16 years of schooling are the least likely to bear an LBW, MLBW, or VLBW baby, but differences in outcome by educational attainment are distinctly less pronounced for black than for white mothers.

The decline in the rate of low birth weight between 1980 and 1985 was greater for unmarried than for married mothers (6 percent, compared with 4 percent), reflecting a shift to older ages of childbearing and higher levels of educational attainment for unmarried women. Regardless of marital status, the decline in rates is less for black than for white mothers. In 1985, unmarried black mothers were 1.6–1.9 times as likely to bear an LBW, MLBW, or VLBW baby as were unmarried white mothers; the racial differential was even greater for married mothers.

The relationship between month prenatal care began and risk of low birth weight can be misleading unless women who deliver prematurely are excluded from the comparison. For full-term births (at least 37 weeks of gestation), the risk of LBW, MLBW, or VLBW is about twice as high for mothers starting care in the third trimester of pregnancy as for mothers beginning care in the first 2 months of pregnancy. However, adjustment for differences in mothers' educational attainment reduces this differential.

Changes in low birth weight

National trends

Between 1975 and 1985, the rate of low birth weight declined in the United States, from 73.9 to 67.5 LBW babies per 1,000 live births. Most of this decline (86 percent) occurred between 1975 and 1980. However, from 1985 to 1987, the rate of LBW increased by 2 percent, to 69.0 (table 1).

There was a substantial reduction in low birth weight for both white and black births in the 1975–80 period, but the reduction was nearly twice as great for white births (9 percent, compared with 5 percent), slightly increasing the racial differential in rates. In 1975, the black rate (130.9) was 2.1 times as high as the white rate (62.6); in 1980, the LBW rate was 124.9 for black births, 2.2 times the rate of 57.0 for white births. Between 1980 and 1985, low birth weight declined by only 1 percent for both white and black births. There was a reversal in this downward trend for both races between 1985 and 1987. The low birth weight rate increased by slightly less than 1 percent for white births (to 56.8) and by 2 percent for black births (to 127.1) (table 1 and figure 1).

In recent years growing attention has been paid to the incidence of very low birth weight, because infants weighing this little are at greatest risk of dying or of having a serious illness. Infants weighing less than 1,500 grams comprise only about 1 percent of all live births, but they account for almost 40 percent of all infant deaths (1).

Between 1975 and 1980, the incidence of VLBW remained almost unchanged (11.6 per 1,000 live births in 1975 and 11.5 in 1980), but between 1980 and 1985, the VLBW rate increased by 5 percent, to 12.1. Between 1985 and 1987, the VLBW rate again increased, to 12.4 (table 1). The VLBW rate for white births declined slightly between 1975 and 1980 (from 9.2 to 9.0) but then rose to 9.4 in 1985 and remained at this level in 1987. For black births, there was a rise in the VLBW rate during both periods, from 23.7 to 24.4 between 1975 and 1980, with further increases to 26.5 by 1985 and 27.3 by 1987 (table 1 and figure 1).

The overall decline in low birth weight in the 1975–85 period is thus attributable to the decline in the MLBW component. The rate of MLBW declined from 62.3 to 56.9 between 1975 and 1980 and declined further to 55.4 by 1985. The overall decline in MLBW during the 1975–85 decade was somewhat higher for white (12 percent) than for black births (9 percent).

Between 1985 and 1987, the MLBW rate rose by 1 percent for white births (to 47.4) and by 2 percent for black births (to 99.8). The overall increase in LBW rates in the 1985–87

period reflects increases in both the moderate and very low birth weight components.

Concomitant with the decline in low birth weight in the 1975–85 decade, there was a reduction in the proportion of babies born weighing 2,500–3,499 grams and a distinct shift to birth weights of 3,500 grams (7 pounds 12 ounces) or more (table A and figure 2). By 1985, 41 percent of newborns weighed at least 3,500 grams, up from 37 percent in 1975. Because the increase in higher birth weights was of about the same magnitude for white as for black births, there was no narrowing of the racial difference. In 1985, as in 1975, the proportion of white newborns weighing at least 3,500 grams was 1.7 times the comparable proportion of black newborns (44 percent, compared with 26 percent in 1985). Birth weight distributions changed very little between 1985 and 1987 for either racial group.

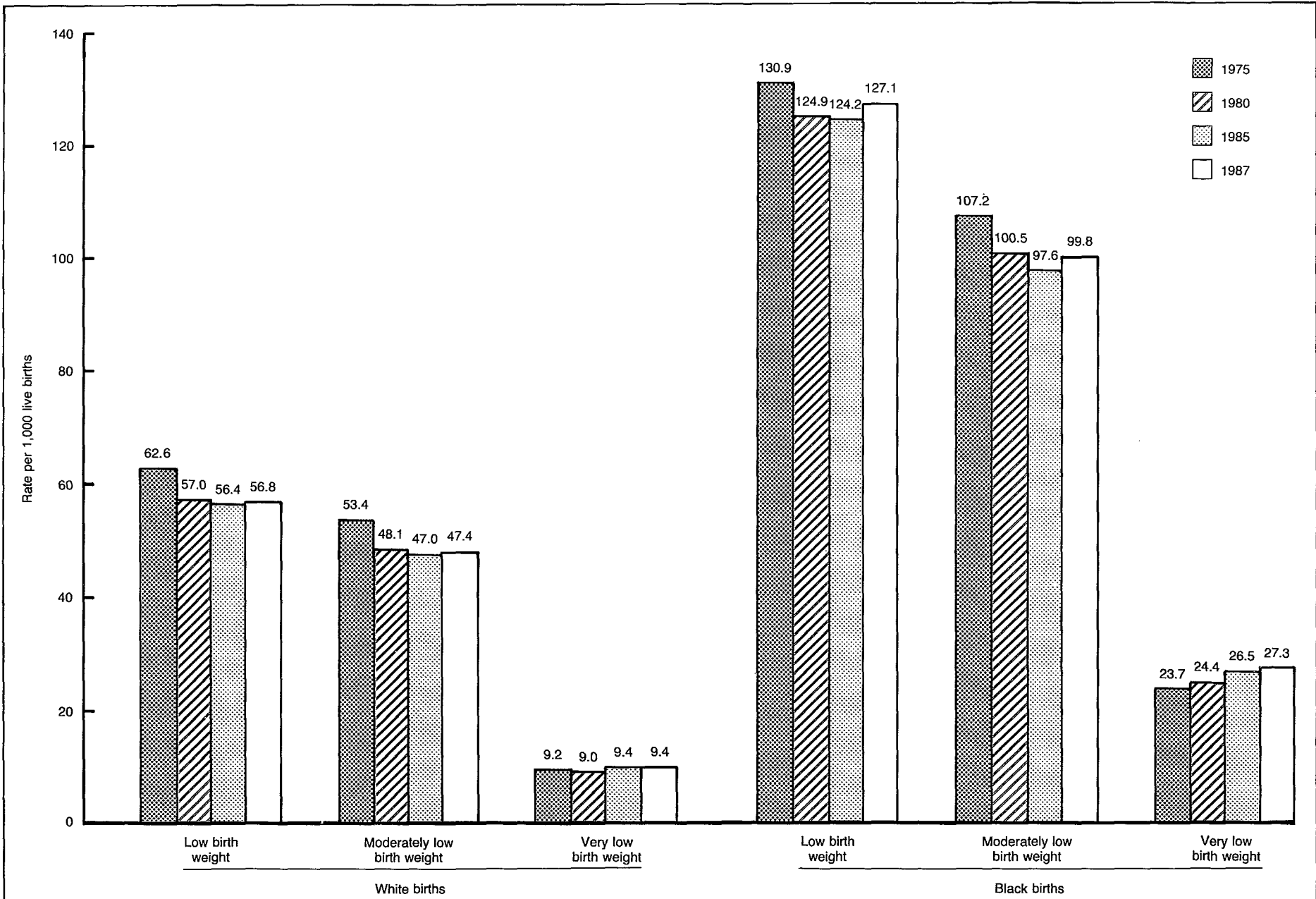
Regional trends

The rate of low birth weight in the United States declined by 7 percent (from 73.9 to 68.4) in the 1975–80 period. The decline was of approximately the same magnitude in the Northeast (9 percent) as in the Midwest and West (8 percent). The lowest decline was in the South (6 percent). During this period, declines in low birth weight were substantially higher for white than for black births in all regions, which resulted in a widening of the differential between black and white births in each region (table B).

Between 1980 and 1985, there were much smaller declines in three regions and an increase in one region in the rate of low birth weight. The rate for the Northeast declined the most (4 percent), with considerably lower declines in the Midwest (1 percent) and the South (2 percent); low birth weight rose by 1 percent in the West.

Although the incidence of very low birth weight declined by 1 percent (from 11.6 to 11.5) between 1975 and 1980 in the United States as a whole, it rose by 4 percent in the West, remained unchanged in the South, and declined 2–3 percent in the Northeast and Midwest regions. In all regions, changes in the 1975–80 period were more favorable for white than for black births (table B).

Very low birth weight rates rose in all regions between 1980 and 1985, with the greatest increase in the South (8 percent). The large increase in the South reflects substantial rises for both white (8 percent) and black (10 percent) births. Very low birth weight rose 2 percent in the Northeast, 6 percent in the Midwest, and 4 percent in the West.



NOTE: Low birth weight is weight less than 2,500 grams (5 pounds 8 ounces); moderately low birth weight is 1,500–2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces); very low birth weight is less than 1,500 grams (3 pounds 4 ounces).

Figure 1. Rates of low, moderately low, and very low birth weight for white and black births: United States, selected years, 1975–87

Table A. Number of live births and percent distribution by birth weight, according to race of child: United States, selected years, 1975-87

Race of child and year	All live births	Birth weight									
		All birth weights	Less than 1,000 grams	1,000-1,499 grams	1,500-1,999 grams	2,000-2,499 grams	2,500-2,999 grams	3,000-3,499 grams	3,500-3,999 grams	4,000-4,499 grams	4,500 grams or more
All races ¹		Percent distribution									
1975	3,144,198	100.0	0.5	0.6	1.4	4.8	17.9	37.9	27.4	7.8	1.6
1980	3,612,258	100.0	0.5	0.6	1.3	4.4	16.3	37.0	29.1	8.9	1.8
1985	3,760,561	100.0	0.6	0.6	1.3	4.2	15.9	36.7	29.6	9.2	1.9
1986	3,756,547	100.0	0.6	0.6	1.3	4.3	15.9	36.7	29.5	9.2	1.9
1987	3,809,394	100.0	0.6	0.6	1.3	4.3	16.0	36.7	29.5	9.1	1.9
White		Percent distribution									
1975	2,551,996	100.0	0.4	0.5	1.2	4.1	16.2	37.8	29.3	8.6	1.8
1980	2,898,732	100.0	0.4	0.5	1.1	3.7	14.6	36.6	31.1	9.9	2.1
1985	2,991,373	100.0	0.4	0.5	1.1	3.6	14.1	36.1	31.7	10.3	2.2
1986	2,970,439	100.0	0.4	0.5	1.1	3.6	14.2	36.1	31.6	10.3	2.1
1987	2,992,488	100.0	0.4	0.5	1.1	3.7	14.2	36.1	31.6	10.3	2.1
Black		Percent distribution									
1975	511,581	100.0	1.1	1.2	2.6	8.1	25.7	38.4	18.4	3.8	0.7
1980	589,616	100.0	1.2	1.2	2.5	7.6	24.3	38.4	19.8	4.3	0.8
1985	608,193	100.0	1.4	1.2	2.4	7.4	23.6	38.4	20.3	4.5	0.8
1986	621,221	100.0	1.4	1.3	2.5	7.4	23.6	38.2	20.3	4.5	0.8
1987	641,567	100.0	1.5	1.3	2.4	7.5	23.5	38.0	20.4	4.5	0.9

¹Includes races other than white and black.

²Includes births with unknown birth weight, which are excluded from the computation of the percent distribution.

Table B. Rates of low birth weight and very low birth weight, by mother's region of residence and race of child: United States, 1975, 1980, and 1985

Mother's region of residence and race of child	Low birth weight ¹					Very low birth weight ²				
	1975	1980	1985	1975-80	1980-85	1975	1980	1985	1975-80	1980-85
All races ³										
	Rate per 1,000 live births			Percent change		Rate per 1,000 live births			Percent change	
United States	73.9	68.4	67.5	-7.4	-1.3	11.6	11.5	12.1	-0.9	5.2
Northeast	75.3	68.8	66.1	-8.6	-3.9	12.1	11.9	12.1	-1.7	1.7
Midwest	69.1	63.9	63.4	-7.5	-0.8	11.3	11.0	11.6	-2.7	5.5
South	81.9	77.0	75.6	-6.0	-1.8	12.8	12.8	13.8	-	7.8
West	65.1	59.9	60.7	-8.0	1.3	9.3	9.7	10.1	4.3	4.1
White										
United States	62.6	57.0	56.4	-8.9	-1.1	9.2	9.0	9.4	-2.2	4.4
Northeast	65.1	58.4	55.3	-10.3	-5.3	9.9	9.6	9.3	-3.0	-3.1
Midwest	59.3	53.8	53.4	-9.3	-0.7	9.1	8.7	9.2	-4.4	5.7
South	65.5	60.6	59.9	-7.5	-1.2	9.4	9.1	9.8	-3.2	7.7
West	60.5	55.0	55.7	-9.1	1.3	8.4	8.6	9.1	2.4	5.8
Black										
United States	130.9	124.9	124.2	-4.6	-0.6	23.7	24.4	26.5	3.0	8.6
Northeast	133.4	124.6	122.4	-6.6	-1.8	25.1	25.1	27.3	-	8.8
Midwest	135.5	130.2	128.4	-3.9	-1.4	25.9	26.1	27.8	0.8	6.5
South	129.9	124.8	124.4	-3.9	-0.3	22.8	23.8	26.2	4.4	10.1
West	120.4	113.8	118.3	-5.5	4.0	21.3	22.8	24.3	7.0	6.6

¹Less than 2,500 grams (5 pounds 8 ounces).

²Less than 1,500 grams (3 pounds 4 ounces).

³Includes races other than white and black.

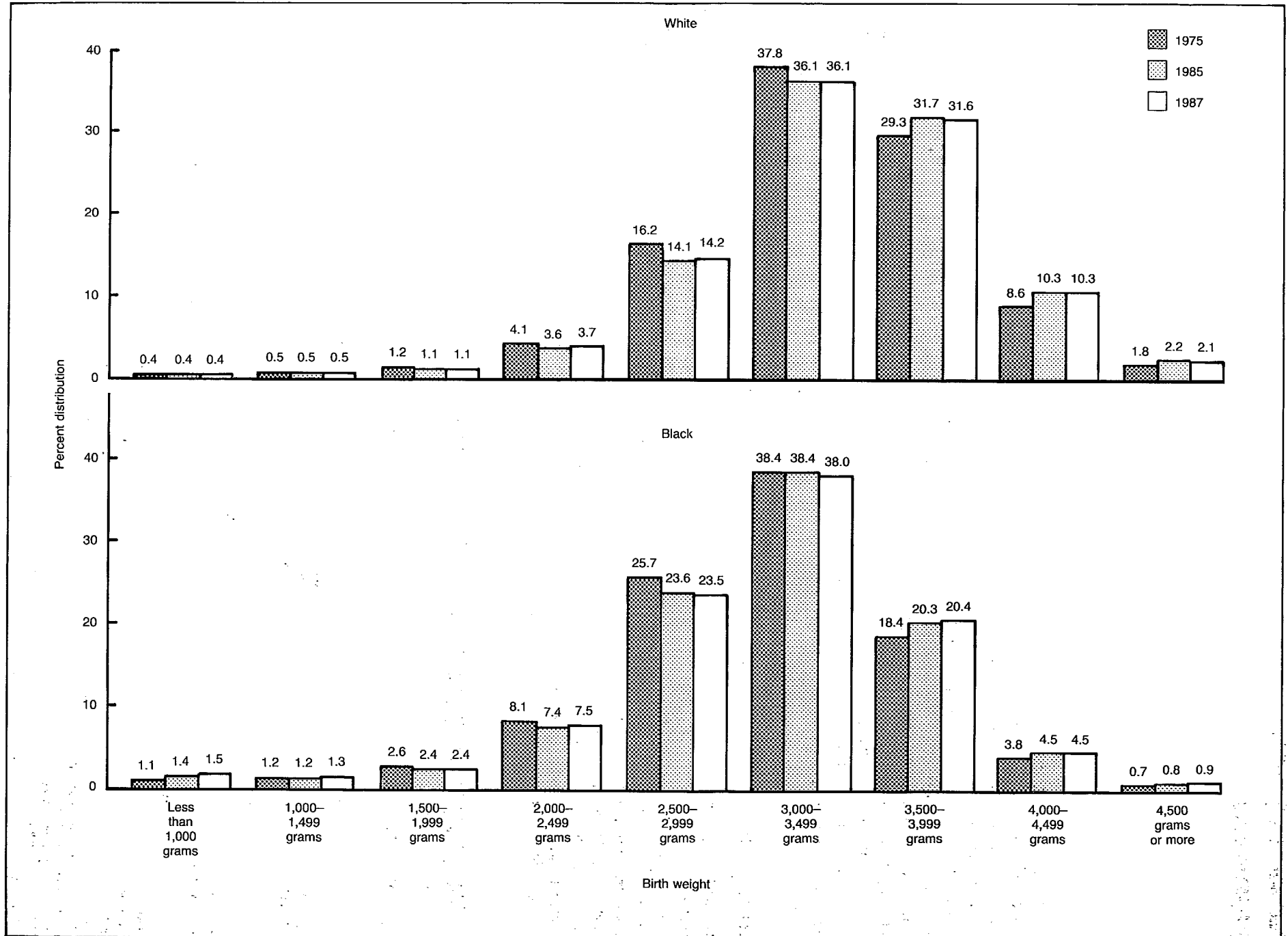


Figure 2. Percent distribution of live births by birth weight for white and black births: United States, 1975, 1985, and 1987

Maternal and infant characteristics

Low birth weight, moderately low birth weight, and very low birth weight rates differ substantially according to period of gestation; age, educational attainment, and marital status of the mother; month prenatal care began; race of the child; live-birth order; and interval since last live birth. The following sections focus on such variations in rates for 1985. In addition, important changes in LBW rates in recent years for several of these characteristics are discussed. Year-to-year comparisons of the incidence of very low birth weight for many of these characteristics may not be valid because of the small annual number of such births, and therefore are not included.

Period of gestation

In recent years, increased attention has been focused on the gestational period of low-birth-weight babies. The low birth weight of infants born before 37 weeks of gestation (preterm) is due to insufficient time *in utero* for full growth, while the low birth weight of full-term newborns (at least 37 weeks of gestation) is considered to be caused by intra-uterine growth retardation. Low-birth-weight infants who are small for their gestational age, whether full-term or preterm, have a much higher rate of congenital malformations than

do low-birth-weight infants whose weight is more consistent with their gestational age (2,3). Low-birth-weight infants with short gestations have a greatly increased risk of dying within the first year of life (1).

Beginning in 1981, weeks of gestation have been imputed for birth records with incomplete information on date of last normal menstrual period (LMP), which is the basis for computing period of gestation (4). Before 1981, period of gestation was computed only when the day, month, and year of LMP were all reported. Because of this change, comparisons of birth weight rates by period of gestation are made for the period 1981–85, rather than 1980–85. In 1985, all States asked for the date of last normal menstrual period on the birth certificate, but in 1981, New Mexico did not.

In 1985, more than half of all LBW babies (59 percent) were born before 37 weeks of gestation. Slightly more than half (52 percent) of babies of moderately low birth weight were preterm, and, as would be expected, nearly all (93 percent) of VLBW babies were born before term. There was practically no difference between black and white LBW, MLBW, or VLBW babies in the incidence of prematurity. Prematurity increased by 4–5 percent for both white and black LBW and MLBW babies and by 1 percent for VLBW white and black babies during the 1981–85 period (table C).

Table C. Percent distribution of low-, moderately-low-, and very-low-birth-weight births by period of gestation, according to race of child: Total of 49 reporting States and the District of Columbia, 1981, and United States, 1985

Period of gestation and race of child	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	1981	1985	1981–85	1981	1985	1981–85	1981	1985	1981–85
	Percent distribution		Percent change	Percent distribution		Percent change	Percent distribution		Percent change
All races⁴									
All gestations	100.0	100.0	...	100.0	100.0	...	100.0	100.0	...
Under 37 weeks	56.4	58.6	3.9	49.5	51.6	4.2	91.5	92.6	1.2
37 weeks and over	43.6	41.4	-5.0	50.5	48.4	-4.2	8.5	7.4	-12.9
White									
All gestations	100.0	100.0	...	100.0	100.0	...	100.0	100.0	...
Under 37 weeks	55.9	58.1	3.9	49.4	51.6	4.5	91.7	92.6	1.0
37 weeks and over	44.1	41.9	-5.0	50.6	48.4	-4.3	8.3	7.4	-10.8
Black									
All gestations	100.0	100.0	...	100.0	100.0	...	100.0	100.0	...
Under 37 weeks	58.0	60.4	4.1	50.1	52.0	3.8	91.6	92.8	1.3
37 weeks and over	42.0	39.6	-5.7	49.9	48.0	-3.8	8.4	7.2	-14.3

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500–2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

NOTE: For 1981, excludes data for New Mexico, which did not require reporting of date of last normal menstrual period.

In 1985, 82 percent of all low-birth-weight babies weighed 1,500–2,499 grams, and 18 percent weighed less than 1,500 grams. Of LBW babies who were full term, only 3 percent weighed less than 1,500 grams, but of those born preterm, more than one-fourth (27 percent) weighed less than 1,500 grams. Black LBW babies are more likely than white LBW babies of comparable gestational periods to weigh less than 1,500 grams.

The incidence of low birth weight declines rapidly as the gestational period lengthens. In 1985, the rate of low birth weight was 768.0 per 1,000 births for gestations of less than 28 weeks, compared with just 14.6 for gestations of 41 weeks. The rate of low birth weight increased (to 21.0) for gestations of 42 weeks and over (table 2).

Overall rates of low birth weight are shown apportioned between full-term and preterm LBW in table D. The rate of full-term LBW declined by 7 percent between 1981 and 1985 while the rate of preterm LBW increased by slightly more than 2 percent. These changes were similar for white and black births. Thus the overall decline in low birth weight in this period is wholly attributable to the decline in full-term low birth weight. Because of the concomitant decrease in full-term and increase in preterm LBW, the proportion of all LBW babies who were born preterm rose from 56 percent in 1981 to 59 percent in 1985, continuing the trend of an increase in the proportion of preterm low birth weight observed in the 1970's (5).

The risk of low birth weight is greater for white than for black births before 36 weeks of gestation but is higher for black births at longer periods (figure 3). However, the rate of low birth weight in 1985 was 7 percent higher for preterm black (418.0 per 1,000) than for preterm white births (389.0), reflecting the much greater risk of LBW for black babies beginning at 36 weeks' gestation. Full-term black babies were 2.3 times as likely as full-term white babies to have a low birth weight (57.9 per 1,000, compared with 25.0) (table 2).

Rates of moderately low birth weight are also generally higher for white than for black births before 36 weeks of gestation. However, for preterm births as a group (gestational ages up to 37 weeks), rates of MLBW were nearly identical

for white and black births (290.6, compared with 286.6), but black babies who were full-term were 2.3 times as likely as white babies to weigh 1,500–2,499 grams (55.7, compared with 24.3) (table 2).

The risk of very low birth weight is less for black than for white babies before 32 weeks of gestation. For both full-term and preterm births as a group, black babies are substantially more likely to weigh less than 1,500 grams than are white babies. However, for both racial groups, the risk of very low birth weight for full-term deliveries is minimal—less than 1 per 1,000 white births and about 2 per 1,000 black births.

The increase of 5 percent in the VLBW rate in the first half of the 1980's is due to the small increase in the proportion of preterm births as well as to the increase in the VLBW rate for preterm births.

Between 1981 and 1985, the decline in rates of low birth weight for both black and white births was substantially greater for full-term than for preterm deliveries (5–7 percent, compared with 1 percent or less) (table 2). Thus the small overall decline in LBW rates for both black and white births in this period is due mainly to the decline in low birth weight for babies with longer gestational periods.

Age of mother and live-birth order

Rates of LBW, MLBW, and VLBW are lowest for mothers 25–29 years of age and increase with increasing and decreasing age (table E and figure 4). The 1985 LBW rate of 128.5 for the youngest mothers (under 15 years of age) was 2.2 times as high as the rate for women 25–29 years old (59.2); the rate for women 40 years and older (83.7) was 1.4 times as high as that for women aged 25–29 years. These age differentials are similar for MLBW, but VLBW rates tend to be relatively higher for very young mothers.

Additionally, differences by age of mother for LBW, MLBW, and VLBW rates are greater for white than for black mothers. For example, the LBW rate in 1985 for white mothers 15–19 years of age was 1.5 times the rate for those aged 25–29 years (76.4, compared with 50.2); for black mothers,

Table D. Rates of full-term and preterm low birth weight, by race of child: Total of 49 reporting States and the District of Columbia, 1981, and United States, 1985

Low birth weight	All races ¹			White			Black		
	1981	1985	1981–85	1981	1985	1981–85	1981	1985	1981–85
	Rate per 1,000 live births	Rate per 1,000 live births	Percent change	Rate per 1,000 live births	Rate per 1,000 live births	Percent change	Rate per 1,000 live births	Rate per 1,000 live births	Percent change
All low birth weight ^{2,3}	66.4	65.5	-1.4	55.2	54.7	-0.9	122.4	120.6	-1.5
Full-term low birth weight ⁴	29.0	27.1	-6.6	24.3	22.9	-5.8	51.4	47.8	-7.0
Preterm low birth weight ⁵	37.5	38.4	2.4	30.9	31.8	2.9	71.0	72.8	2.5

¹Includes races other than white and black.

²Excludes births with unknown period of gestation.

³Less than 2,500 grams (5 pounds 8 ounces).

⁴Less than 2,500 grams and gestation of 37 weeks and over.

⁵Less than 2,500 grams and gestation of less than 37 weeks.

NOTE: For 1981, excludes data for New Mexico, which did not require reporting of date of last normal menstrual period.

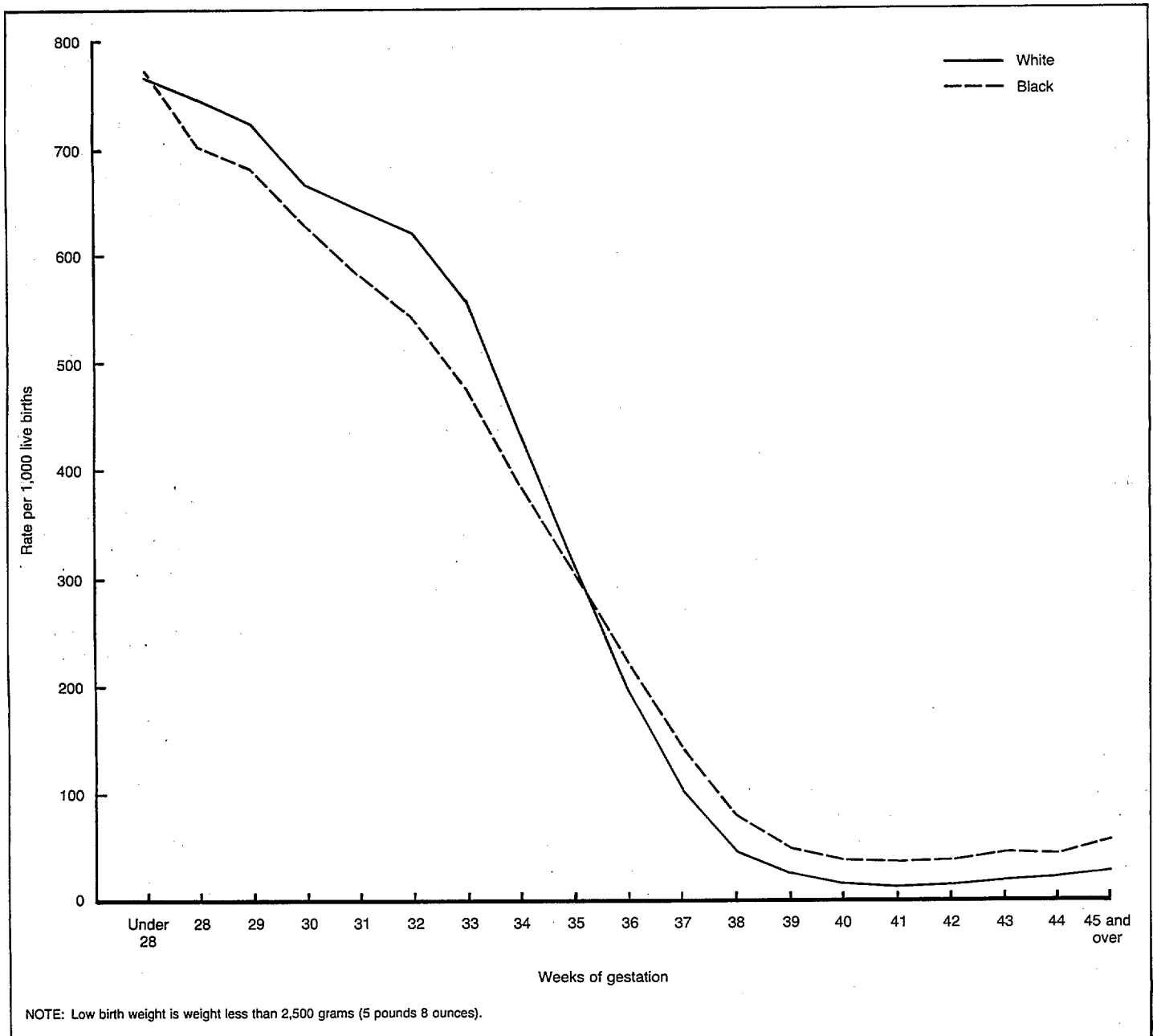


Figure 3. Rates of low birth weight, by period of gestation, for white and black births: United States, 1985

the teenage rate (133.4) was only 1.1 times as high as the rate for mothers aged 25–29 years (119.8) (table E and figure 4).

Increased maternal educational attainment is associated with a lower risk of low birth weight, as is discussed in the next section. For mothers 20 years and older, the rate of low birth weight is far lower for those with 16 years of schooling or more than for those with less education (figure 5). However, the reduction in risk with increased schooling is greater for white than for black births for all age groups. Regardless of the mother's age, at each level of schooling, black babies are consistently at higher risk of low birth weight (table 3).

Low birth weight declined between 1980 and 1985 for

women under 25 years of age but generally rose for mothers aged 25 years and over. By far the largest decline (12 percent) was for girls under 15 years of age (table 4). Declines for women aged 15–24 years were 3 percent or less, but rates for mothers 25–34 years of age increased by up to 3 percent. A similar pattern is evident for both white and black births, but both the declines and the increases in rates are much larger for black births.

Within each age group, there are large differences in the incidences of low, moderately low, and very low birth weight by the birth order of the child. As indicated in table 5, LBW, MLBW, and VLBW rates are substantially higher for teenagers and women in their early twenties having a third or higher order birth than for women in these age

Table E. Rates of low, moderately low, and very low birth weight, by age of mother and race of child: United States, 1985

Age of mother	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
All ages	67.5	56.4	124.2	55.4	47.0	97.6	12.1	9.4	26.5
Under 15 years	128.5	104.6	147.5	96.7	75.0	113.0	31.9	29.6	34.5
15-19 years	92.7	76.4	133.4	75.2	62.8	106.2	17.5	13.6	27.2
15-17 years	102.2	83.7	138.5	81.7	67.6	109.6	20.5	16.1	28.9
18-19 years	87.4	72.8	129.7	71.6	60.4	103.8	15.8	12.4	25.9
20-24 years	69.0	57.5	120.3	56.9	48.1	95.3	12.1	9.3	25.0
25-29 years	59.2	50.2	119.8	48.8	42.1	93.3	10.4	8.0	26.5
30-34 years	60.5	52.1	123.8	49.5	43.3	95.4	11.0	8.8	28.5
35-39 years	69.0	60.3	126.8	56.3	49.7	98.7	12.7	10.6	28.1
40 years and over	83.7	73.9	136.5	69.0	61.5	110.3	14.7	12.4	26.3

¹Less than 2,500 grams (5 pounds 8 ounces).
²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).
³Less than 1,500 grams (3 pounds 4 ounces).
⁴Includes races other than white and black.

groups having their first child. By contrast, rates are higher for women in their thirties having their first baby than for those having a second or higher order birth. The lowest incidence of LBW, MLBW, and VLBW is for women 25-29 years old having their second child.

The very high rates of LBW associated with higher birth orders for younger mothers reflect to some extent the closer spacing of such births. Also, young mothers are more likely to be socially disadvantaged than are older mothers (6). The incidence of LBW, MLBW, and VLBW and the interval between births are discussed in a later section.

The largest declines in low birth weight in the period 1980-85 were for teenagers having a second or higher order birth (4 percent) and for women 35 years and older having their first or second child (5-8 percent). The rate of childbearing for women aged 35 years and older has increased substantially during the past few years, with sizable increases in the proportion of mothers who are college graduates.

Educational attainment of mother

Women with the highest levels of schooling are the least likely to bear a low-birth-weight baby (table F). In 1985, mothers with only 9-11 years of schooling were 2.2-2.3 times as likely to have an LBW, MLBW, or VLBW infant as were women with 16 years of schooling or more. The slightly lower LBW, MLBW, and VLBW rates for women with 0-8 years of schooling than for women with 9-11 years of schooling reflect higher rates of fetal death for the least educated women, an indication that a higher proportion of pregnancies for such women result in fetal death rather than in a live LBW baby (7). Also, a substantial proportion of foreign-born Asian and Hispanic mothers, whose births are generally at low risk for LBW, have less than 9 years of schooling (8,9).

The reduction in low, moderately low, and very low birth weight with increased schooling is distinctly less pronounced for black than for white babies. For example, the

VLBW rate in 1985 for white babies whose mothers had 9-11 years of schooling (13.4 per 1,000) was 1.9 times the rate for white mothers who had 16 years of schooling or more (7.0), but the VLBW rate for the less educated group was only 1.2 times as high as that for the more educated group among black mothers (28.6, compared with 23.6).

For each level of schooling, black mothers have far higher levels of LBW, MLBW, and VLBW than do white mothers—and this racial differential in rates increases with added years of schooling. One possible explanation for this disparity is that black mothers have a lower average family income than do white mothers with comparable levels of education. Data from the 1983 National Health Interview Survey of the National Center for Health Statistics indicate that white women who had graduated from college had higher family incomes than did black women with similar levels of education (10).

Between 1980 and 1985, the risk of low birth weight declined by 4 percent for mothers with at least 16 years of schooling but stayed virtually the same or increased for women with less education (table 4).

The number of years of schooling a mother has completed correlates highly with a number of other variables discussed in this report (race, age, marital status, and interval between births). However, there is an inverse relationship between educational attainment and low birth weight, independent of race, age, birthplace, or marital status of mother or timing of prenatal care (7). A recent study of maternal weight gain during pregnancy found that the more years of schooling the mother had completed, the higher her weight gain was likely to be and, in turn, the higher the weight gain, the lower the risk of low birth weight (11). Thus, inadequate nutrition of less educated women may be one explanation for their greater risk of bearing an LBW infant. Additionally, better educated women have, on the average, a longer interval between live births, which also reduces the risk of LBW, as discussed in the next section.

Other factors noted by researchers that help to explain the more favorable birth weight for babies of better educated women include their lower prevalence of heavy smoking during

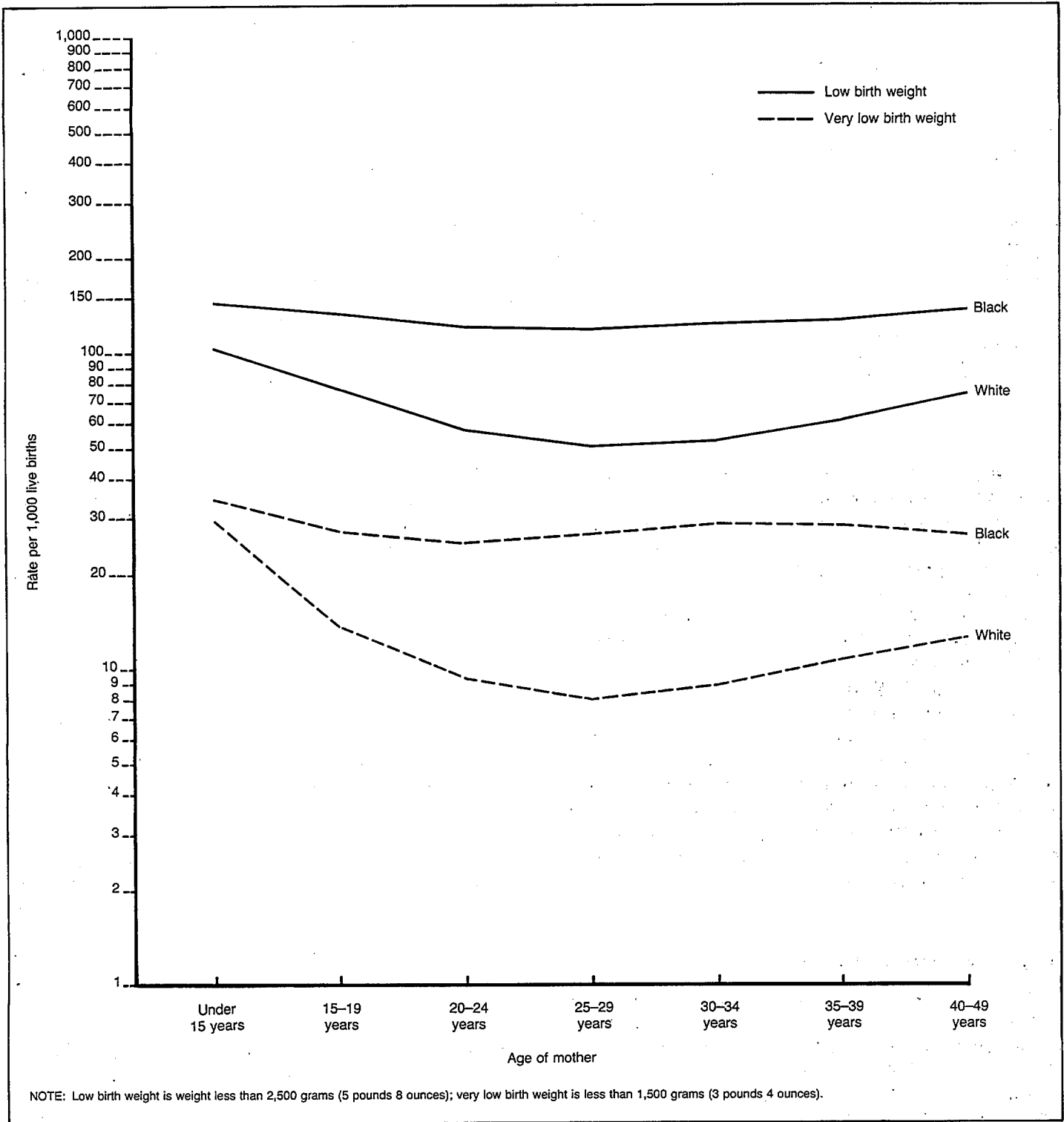


Figure 4. Rates of low and very low-birth weight, by age of mother, for white and black births: United States, 1985

pregnancy and their higher average height; both of these factors are associated with a higher birth weight (12-14).

In both 1980 and 1985, the birth certificates of California, Texas, and Washington did not include educational attainment of the mother.

Interval since last live birth

There is a substantial difference in the risk of low birth weight between babies born less than 18 months after a previous live birth and births spaced further apart (table G). Babies

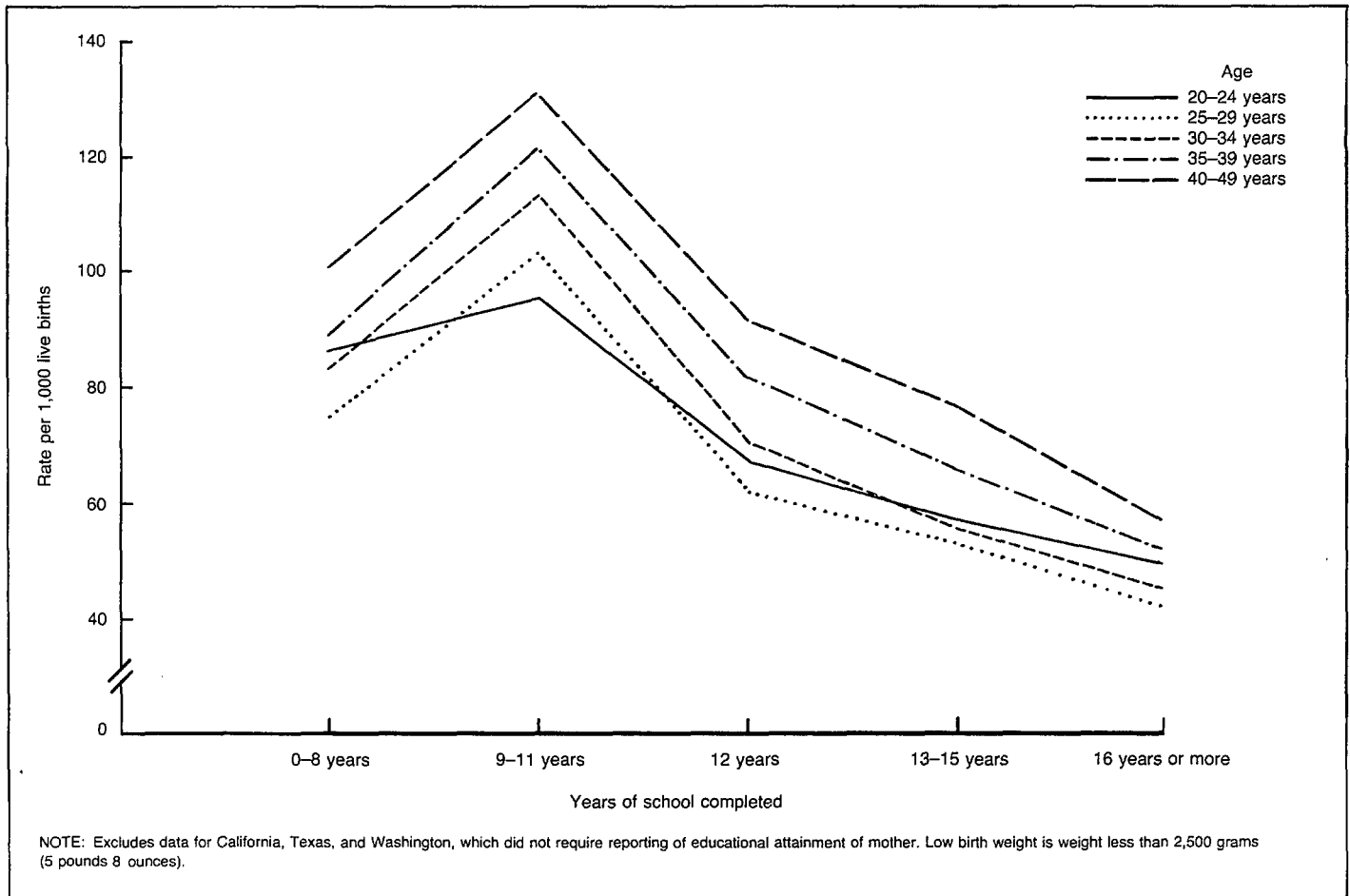


Figure 5. Rates of low birth weight, by educational attainment and age of mother: Total of 47 reporting States and the District of Columbia, 1985

Table F. Rates of low, moderately low, and very low birth weight, by educational attainment of mother and race of child: Total of 47 reporting States and the District of Columbia, 1985

Years of school completed	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
Total ⁵	69.0	56.7	124.9	56.5	47.3	98.0	12.5	9.4	26.9
0-8 years	93.1	82.1	136.0	77.0	68.5	109.6	16.2	13.6	26.5
9-11 years	101.4	83.9	145.6	83.7	70.5	117.0	17.7	13.4	28.6
12 years	68.4	56.6	121.6	56.1	47.4	95.5	12.2	9.2	26.1
13-15 years	55.9	46.4	106.1	45.7	38.9	81.4	10.2	7.5	24.7
16 years or more	45.3	40.5	94.9	37.0	33.5	71.2	8.2	7.0	23.6

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

⁵Includes births with educational attainment of mother not stated.

NOTE: Excludes data for California, Texas, and Washington, which did not require reporting of educational attainment of mother.

born within 1 year after the previous live birth were 4.7 times as likely to have a low birth weight as were babies born within an interval of 2-4 years (206.9 per 1,000, compared with 44.3). However, only about 2 percent of all second or higher order births occur within 1 year after the previous live birth. An additional 11 percent of second and higher order births occur within 1-1½ years after the previous live

birth. These births also have a higher risk of low birth weight than do those spaced at the optimum interval of 2-4 years (73.9, compared with 44.3). It has been suggested that a short time between pregnancies is related to intrauterine impoverishment, because there is insufficient time for the restoration of maternal nutrients necessary for adequate fetal development (15).

Table G. Rates of low, moderately low, and very low birth weight, by interval since last live birth and race of child: Total of 49 reporting States and the District of Columbia, 1985

Interval since last live birth	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
All second and higher order births ^{5,6}	57.9	45.7	116.0	47.7	38.2	92.3	10.2	7.4	23.6
Less than 12 months ⁶	206.9	166.2	300.5	135.7	113.9	185.9	71.2	52.4	114.6
12-17 months	73.9	57.9	131.7	61.5	48.3	109.1	12.4	9.6	22.6
18-23 months	49.6	39.3	104.8	41.7	33.2	86.2	7.9	6.1	18.6
24-47 months	44.3	35.9	98.5	37.5	30.7	81.2	6.8	5.1	17.3
48 months or more	61.5	49.4	110.3	51.5	42.1	88.7	10.1	7.3	21.5

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

⁵Includes births with interval not stated.

⁶Excludes births with zero-month interval (multiple births).

NOTE: Excludes data for Texas, which did not require reporting of date of last live birth.

Although the risk of LBW, MLBW, and VLBW increases substantially for shortened birth intervals for both white and black births, the increase in risk is less for black than for white babies. For example, white babies born within an interval of 1-1½ years are about 60 percent more likely to have a low birth weight than are those born within 24-47 months after the previous live birth; the comparable differential for black births is only 34 percent.

However, there are several confounding factors to consider when examining the relationship between birth interval and birth weight. Intervals of less than 12 months include babies born prematurely, who are, as previously indicated, far more likely to have a low birth weight than are full-term newborns. Another confounding factor is the possibility of an intervening fetal death between any given birth and the previous live birth, which may also adversely affect birth weight because of the shortened interpregnancy interval. Table H shows the risk of LBW, MLBW, and VLBW for full-term births for which the outcome of the preceding pregnancy was a live birth, with no intervening fetal deaths. For intervals of less than 1 year, the LBW rate was 65.6 per 1,000, 3.3 times the rate for intervals of 24-47 months (19.6); for intervals of 12-17 months, the rate was 33.2, 1.7 times the rate for intervals of 24-47 months. Even larger differentials by interval are evident for rates of very low birth weight.

One reason for the elevated risk of LBW for younger mothers having a second or higher order birth (as noted previously) is the large proportion of closely spaced births for this age group. In 1985, 35 percent of second-order full-term births, 47 percent of third-order full-term births, and 61 percent of fourth-order full-term births to teenagers occurred within 1½ years after the previous live birth.

In a previous study of birth spacing (16), it was found that the elevation in low birth weight associated with closely spaced births could not be attributed solely to the fact that women with shorter birth intervals are also more likely to be young or to have low educational attainment. These more current data also indicate that for both white and black births, regardless of the mother's marital status, age, or years of school completed, the percent of low birth weight for full-term

Table H. Rates of low, moderately low, and very low birth weight for full-term births, by interval since last live birth and race of child: Total of 49 reporting States and the District of Columbia, 1985

Interval since last live birth and race of child	Low birth weight ¹	Moderately low birth weight ²	Very low birth weight ³
	Rate per 1,000 live births		
All second and higher order births ^{4,5}	24.7	24.0	0.7
Less than 12 months ⁵	65.6	61.9	3.8
12-17 months	33.2	32.2	0.9
18-23 months	21.4	20.8	0.6
24-47 months	19.6	19.1	0.5
48 months or more	27.6	26.8	0.8
White ⁵	19.6	19.1	0.5
Less than 12 months ⁵	50.5	47.9	2.7
12-17 months	25.8	25.1	0.7
18-23 months	17.0	16.5	0.5
24-47 months	16.0	15.6	0.4
48 months or more	22.3	21.8	0.6
Black ⁵	52.7	51.0	1.7
Less than 12 months ⁵	106.6	99.7	6.8
12-17 months	62.8	60.9	1.8
18-23 months	48.0	47.1	0.9
24-47 months	46.2	44.9	1.3
48 months or more	51.2	49.4	1.7

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black and births with interval not stated.

⁵Excludes births with zero-month interval (multiple births).

NOTE: Excludes data for Texas, which did not require reporting of date of last live birth or fetal death. Full-term births are births of 37 weeks of gestation and over. Excludes live births where there was an intervening fetal death following the previous live birth.

births is highest for intervals of less than 18 months (figures 6 and 7—data not shown for marital status).

In 1985, only the birth certificate of Texas did not include the date of the last live birth, which is the basis for determining the interval since the last live birth.

Marital status of mother

In 1985, the rate of low birth weight for births to unmarried women was about twice that for births to married women

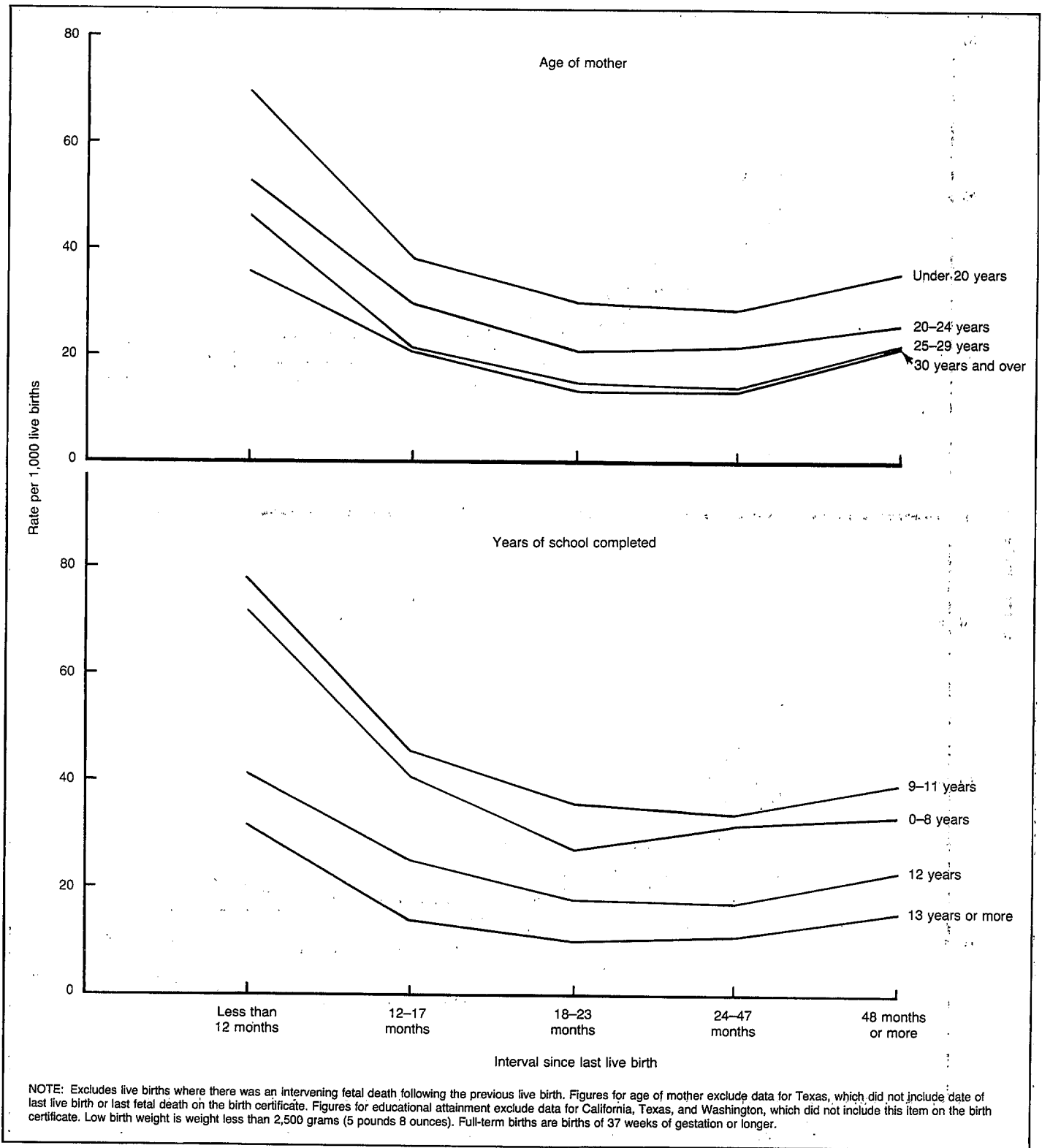


Figure 6. Rates of low birth weight for full-term white births, by interval since last live birth, age, and educational attainment of mother: Total of reporting areas, 1985

(109.4 per 1,000, compared with 55.7) (table J). However, the difference in rates by marital status is considerably smaller for black than for white births. The rate of LBW was 68 percent higher for white unmarried mothers than for white married mothers (86.0, compared with 51.3) but only 39

percent higher for unmarried than for married black mothers (139.9, compared with 100.5). This difference by marital status is even more pronounced for VLBW, but only for white mothers.

Much of the difference in the incidence of low birth

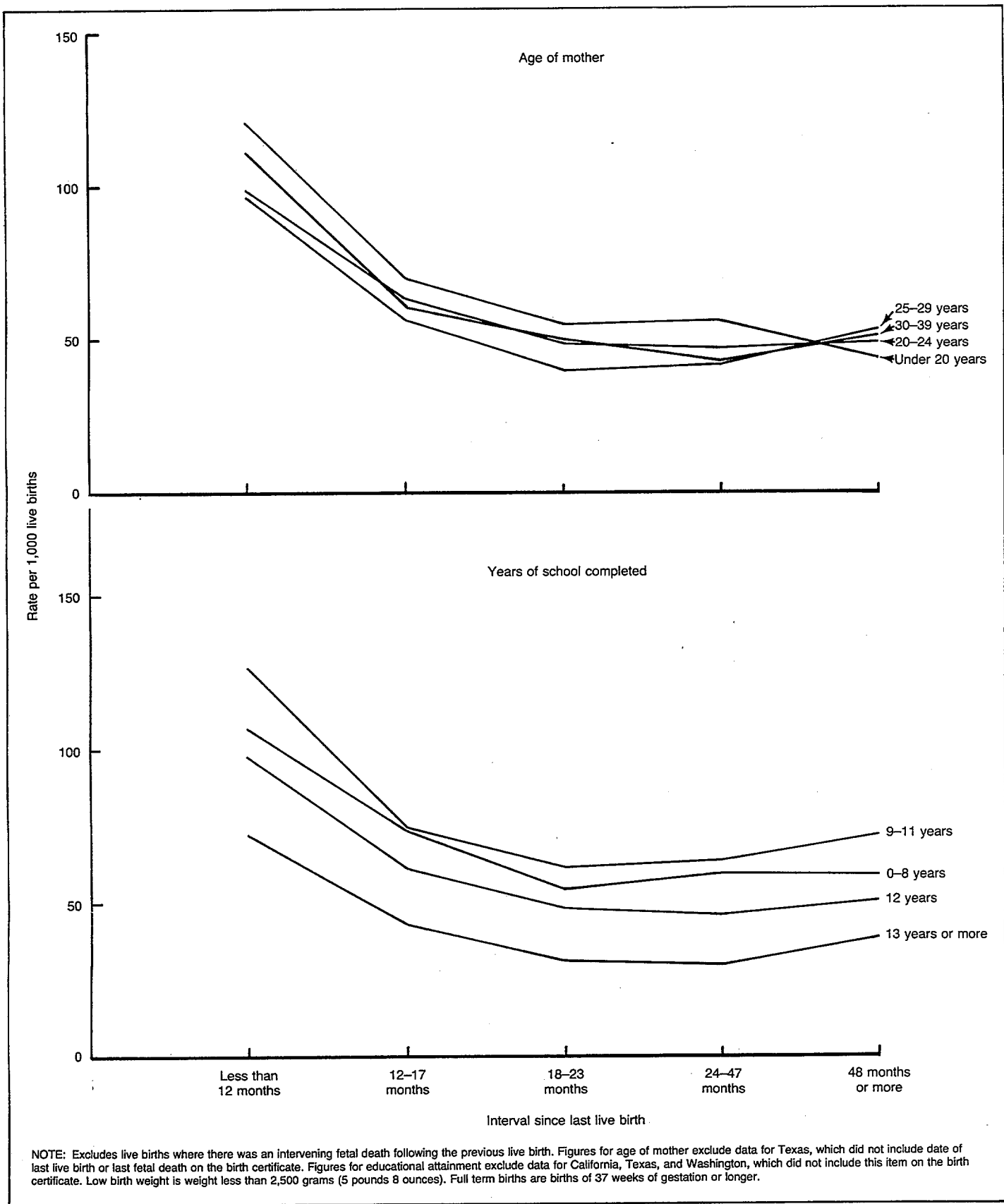


Figure 7. Rates of low birth weight for full-term black births, by interval since last live birth, age, and educational attainment of mother: Total of reporting areas, 1985

Table J. Rates of low, moderately low, and very low birth weight, by marital status of mother and race of child: United States, 1985

Marital status of mother	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
Total	67.5	56.4	124.2	55.4	47.0	97.6	12.1	9.4	26.5
Married	55.7	51.3	100.5	46.2	43.0	78.2	9.5	8.3	22.2
Unmarried	109.4	86.0	139.9	87.8	70.4	110.5	21.5	15.5	29.4

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500–2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

weight by marital status can be explained by the generally younger ages and lower educational attainment of unmarried women. However, a higher risk of LBW for out-of-wedlock births, even when demographic and socioeconomic differences are taken into account, has been observed for some time (7). A potent reason for the higher risk of LBW for unmarried than for married mothers with equivalent years of schooling is that they smoke more than married mothers at all levels of educational attainment (13).

As shown in figure 8, white unmarried mothers are far more likely than white married mothers of matched educational attainment to bear a low-birth-weight baby. Differentials in LBW by marital status for equivalent years of schooling are smaller, but still quite substantial, for black mothers.

Although the risk of low birth weight declined for both married and unmarried mothers between 1980 and 1985, the decline was greater for unmarried women (6 percent, compared with 4 percent) (table 4). In this period, LBW rates declined by 3 percent for white married mothers and by 5 percent for white unmarried mothers, but by only 2 percent for black married and unmarried mothers. One explanation for the large decline in risk of LBW for unmarried mothers is that the proportion of unmarried mothers who were in their teens declined during this period, from 41 percent to 34 percent. Also, the proportion of unmarried mothers who had completed 12 years or more of schooling increased from 50 to 55 percent. However, in 1985, the LBW rate for white unmarried mothers with at least 12 years of schooling was still about 80 percent higher than for white married mothers (84.8, compared with 46.8) and nearly 40 percent higher for unmarried than for married black mothers with this level of educational attainment (132.2, compared with 96.8).

There is also a substantial racial differential in the incidence of LBW for both unmarried and married mothers. Black unmarried mothers were 1.6 to 1.9 times as likely to bear an LBW, MLBW, or VLBW infant as were white unmarried mothers. The racial differential is even greater for married mothers. The risk of LBW or MLBW was 1.8 to 2.0 times as high for black as for white married mothers. The risk of VLBW was 2.7 times as high for married black as for married white mothers (table J).

Prenatal care

Whether there is an association between when a woman starts prenatal care and low birth weight is difficult to ascertain, because when prenatal care begins is related to other factors that affect birth weight. Women at high risk of delivering an LBW baby—those who are young, unmarried, or with little education—are more likely to delay prenatal care (17). Also, women who deliver prematurely may have started care early in pregnancy, although their babies are far more likely than others to have a low birth weight because of their shortened gestation. This in effect biases the comparison of the risk of low birth weight between women starting care early and those who start care in the third trimester of pregnancy, because the latter group includes only women with full-term births.

Table K shows the risk of LBW, MLBW, or VLBW according to month prenatal care began for births at gestational ages of at least 37 weeks. All of these births were to mothers whose pregnancies lasted long enough that they could begin care as late as the third trimester. It is evident that the likelihood of LBW, MLBW, or VLBW increases as care is delayed for both white and black full-term births. The risk of such adverse outcomes is almost twice as high for mothers starting care in the third trimester as for mothers beginning care in the first or second month of pregnancy. However, the increase in all LBW rates with delayed care is not generally as pronounced for black as for white full-term births. In addition, at comparable levels of care, black babies are far more likely to have an LBW, MLBW, or VLBW outcome than are white babies. For example, when prenatal care started in the first through third months of pregnancy, black babies were 2.3–2.4 times as likely as white babies to weigh less than 2,500 grams.

During the 1981–85 period, there was a decline in the rate of low birth weight for all levels of prenatal care (table L). The decline was 5–6 percent for care beginning in the first or third trimester of pregnancy and 9 percent for care beginning in the second trimester. However, although there was also a substantial decline (11 percent) in the LBW rate for mothers who did not receive any prenatal care, the 1985 LBW rate for these mothers was still at least two-thirds higher than the rate for any group who received care.

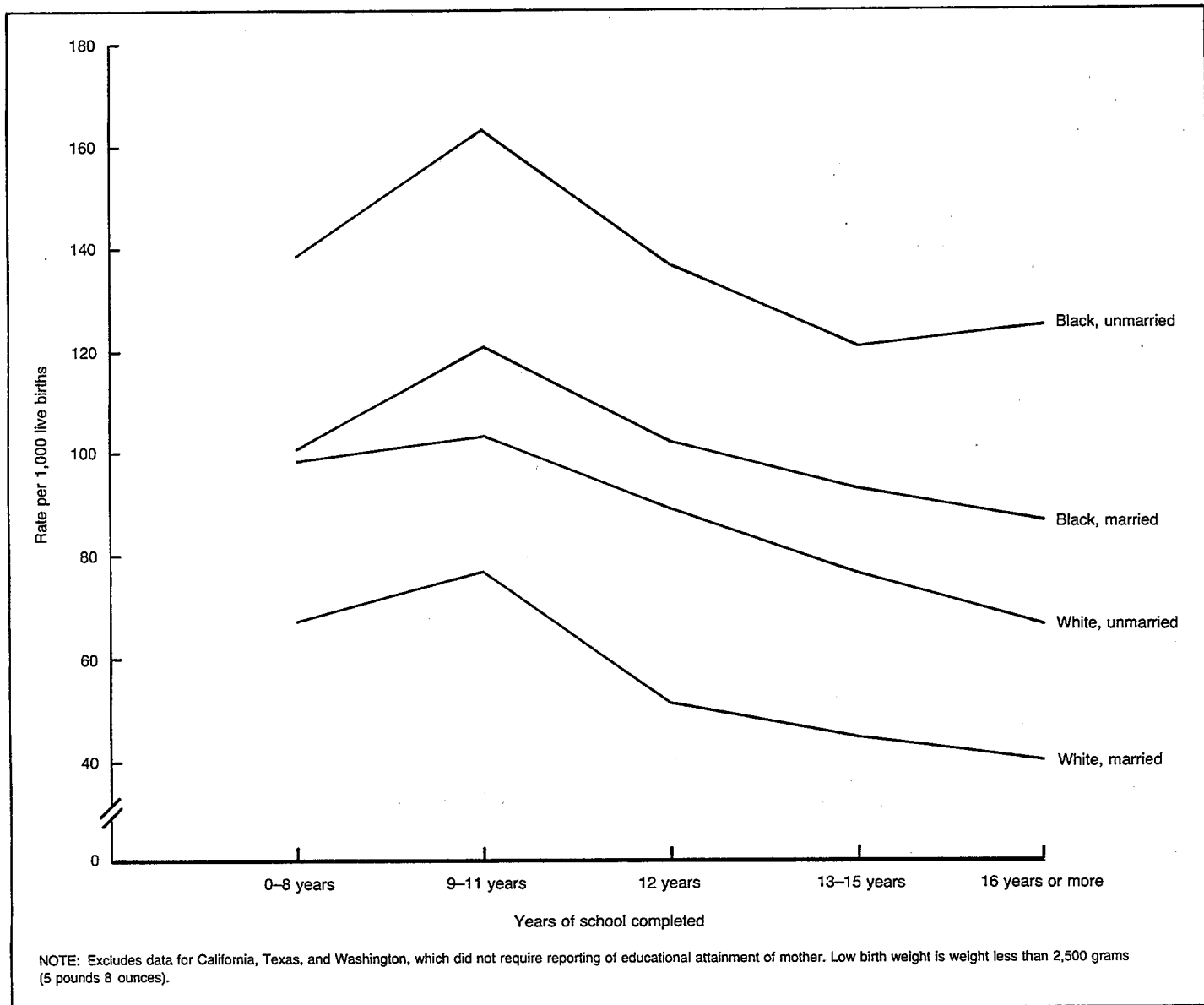


Figure 8. Rates of low birth weight for women aged 20 years and over, by educational attainment and marital status of mother and race of child: Total of 47 reporting States and District of Columbia, 1985

Table K. Rates of low, moderately low, and very low birth weight for full-term births, by month of pregnancy prenatal care began and race of child: United States, 1985

Month of pregnancy prenatal care began	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
Total ⁵	30.0	25.0	57.9	29.1	24.3	55.7	0.9	0.7	2.2
1st and 2d month	24.6	21.3	50.3	24.0	20.7	48.8	0.7	0.6	1.5
3d month	30.1	25.2	57.1	29.3	24.5	55.1	0.9	0.6	2.0
4th-6th month	38.5	32.1	60.1	37.5	31.2	58.3	1.1	0.9	1.9
7th-9th month	46.3	38.8	69.1	44.7	37.8	66.1	1.6	1.1	3.0
No prenatal care	78.3	61.9	115.4	72.5	58.0	105.0	5.8	3.9	10.4

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

⁵Includes births with month of pregnancy prenatal care began not stated.

NOTE: Full-term births are births of 37 weeks of gestation and over.

Table L. Rates of low birth weight for full-term births, by month of pregnancy prenatal care began and race of child: Total of 49 reporting States and the District of Columbia, 1981, and United States, 1985

Month of pregnancy prenatal care began ²	All races ¹			White			Black		
	1981	1985	1981-85	1981	1985	1981-85	1981	1985	1981-85
	Rate per 1,000 live births		Percent change	Rate per 1,000 live births		Percent change	Rate per 1,000 live births		Percent change
1st and 2d month	26.1	24.6	- 5.7	22.6	21.3	- 5.8	52.3	50.3	- 3.8
3d month	31.7	30.1	- 5.0	26.7	25.2	- 5.6	59.8	57.1	- 4.5
4th-6th month	42.2	38.5	- 8.8	34.4	32.1	- 6.7	67.8	60.1	- 11.4
7th-9th month	48.8	46.3	- 5.1	39.4	38.8	- 1.5	76.4	69.1	- 9.6
No prenatal care	88.2	78.3	- 11.2	68.8	61.9	- 10.0	130.6	115.4	- 11.6

¹Includes races other than white and black.

²Refers only to full-term births (37 weeks of gestation and over).

NOTE: For 1981, excludes data for New Mexico, which did not require reporting of date of last normal menstrual period. Low birth weight is weight less than 2,500 grams (5 pounds 8 ounces).

Table M. Observed and adjusted rates of low, moderately low, and very low birth weight for full-term births, by month of pregnancy prenatal care began and race of child: Total of 47 reporting States and the District of Columbia, 1985

Month of pregnancy prenatal care began and race of child	Low birth weight ¹		Moderately low birth weight ²		Very low birth weight ³	
	Observed	Adjusted ⁴	Observed	Adjusted ⁴	Observed	Adjusted ⁴
All races ⁵						
	Rate per 1,000 live births					
1st-2d month	25.0	25.0	24.4	24.4	0.7	0.7
3d month	30.7	28.2	29.9	27.5	0.8	0.8
4th-6th month	40.0	34.6	38.9	33.6	1.1	1.0
7th-9th month	49.2	41.5	47.4	39.6	1.8	1.8
No prenatal care	86.5	68.5	79.4	63.1	7.1	5.4
White						
1st-2d month	21.5	21.5	20.9	20.9	0.5	0.5
3d month	25.5	23.5	24.9	23.0	0.6	0.6
4th-6th month	32.9	27.8	32.1	27.0	0.8	0.8
7th-9th month	40.9	33.7	39.6	32.7	1.3	0.9
No prenatal care	67.6	51.9	62.8	47.6	4.9	4.3
Black						
1st-2d month	50.9	50.9	49.3	49.3	1.6	1.6
3d month	57.3	55.0	55.3	53.1	1.9	1.9
4th-6th month	60.2	57.4	58.4	55.5	1.9	1.9
7th-9th month	69.7	64.9	66.6	60.9	3.1	4.1
No prenatal care	116.1	101.6	105.2	93.3	10.9	8.3

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Adjusted to reflect the educational attainment of mothers who began prenatal care in the 1st and 2d months of pregnancy. See appendix IV.

⁵Includes races other than white and black.

NOTE: Excludes births to residents of California, Texas, and Washington, which did not require reporting of educational attainment of mother. Full-term births are births of 37 weeks of gestation and over.

Mothers who start care in the first trimester of pregnancy have, on the average, higher levels of educational attainment than do mothers who delay care to the second or third trimester or mothers who receive no care. Thus, the lower incidence of LBW when care starts in early pregnancy is to some extent a reflection of this higher proportion of better educated women. If all mothers are assumed to have the same educational attainment as mothers who start care in the first or second month of pregnancy, the incidence of LBW for women starting care late in pregnancy or receiving no care is reduced substantially (table M).

Before adjustment for differences in years of schooling, the incidence of LBW was 97 percent higher for care starting in the third trimester than for care starting in the first or

second month of pregnancy. After adjustment, this differential was 66 percent. Although there are large reductions in LBW and MLBW incidence for both white and black births when educational attainment is taken into account, the reductions are relatively much greater for white births. Adjustment for differences in the mother's educational attainment decreases the risk of VLBW for care starting in late pregnancy for white but not for black babies. For mothers having no prenatal care, LBW, MLBW, and VLBW rates are all reduced for both white and black babies after differences in educational attainment are eliminated.

Although the differential is reduced, there still remains a substantial increase in the risk of LBW, MLBW, and VLBW when care is delayed or when there is no care.

Summary

A common theme throughout this study is the substantial and persistent difference between black and white babies in the risk of low birth weight. In 1975, black babies were 2.1 times as likely as white babies to have a birth weight of less than 2,500 grams. Low birth weight declined more for white than for black births in the 1975-85 period, increasing the racial differential to 2.2. It remained at this level in 1986 and 1987.

Although relatively more black than white mothers are represented in subgroups at high risk of LBW (unmarried, less than 20 years of age, with less than 12 years of education, or with late or no care during pregnancy), this only partly explains the greater risk of LBW for black babies. Regardless of age of mother, month prenatal care began, years of schooling completed, or marital status, black mothers are generally twice as likely to have an LBW baby and two to three times as likely to have a VLBW baby.

Although increased years of schooling lowers the risk of low birth weight for both black and white babies in high-risk categories, the racial gap in LBW incidence actually increases with added years of schooling.

One of the major reasons for the greater prevalence of low birth weight among black babies is their higher risk of being born prematurely. Although the incidence of low birth weight was only 7 percent higher for black than for white premature births in 1985, black babies were more than twice as likely to be born before 37 weeks of gestation (17.5 percent of black births, compared with 8.2 percent of white births). According to a recently published study of premature births in one Boston hospital, the lower maternal hematocrit of black mothers explained a substantial part of the higher black incidence of prematurity (18). Data from the National Health and Nutrition Examination Survey indicate that black women in the childbearing ages, regardless of poverty status, have a significantly lower hematocrit than do their white counter-

parts (19). However, much is still unknown about the causes of prematurity.

The differential between black and white women in the risk of low and very low birth weight after controlling for age, education, marital status, and prenatal care may to some extent reflect differences in personal finances, health status, and lifestyle. Data from the 1982 National Survey of Family Growth indicate that sources of prenatal care differ substantially for black and white women. Fewer than half of black women receive care from a private doctor, compared with about 80 percent of white women (20). Black women are generally more likely than white women of similar prepregnancy weight to gain less than 16 pounds during their pregnancy (11). Black married women who have had at least one child are more likely to work during pregnancy than are white married women who have had the same number of children, and they are more likely to be blue-collar workers (21). As noted earlier, black mothers have a lower average family income than do white mothers at comparable levels of education (10).

There are undoubtedly many other racial differences in nutritional status, lifestyle, and environmental conditions, not yet quantified, that have an important impact on birth weight. Beginning with the 1989 data year, a wealth of new information relevant to the etiology of low birth weight will become available from the revised U.S. Certificate of Live Birth, to be implemented by almost all States in 1989. Included on the new certificate are questions relating to medical risk factors of pregnancy, such as anemia and cardiac disease, and lifestyle factors—tobacco and alcohol use and weight gain during pregnancy—that are closely related to birth weight. This new information, combined with other socioeconomic and health data from the birth certificate, should help clarify the reasons for the large and persistent racial differentials in the incidence of low birth weight.

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Table 1. Rates of low, moderately low, and very low birth weight, by race of child: United States, 1975-87

Year	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
1975	73.9	62.6	130.9	62.3	53.4	107.2	11.6	9.2	23.7
1976	72.6	61.3	129.7	61.1	52.2	105.6	11.5	9.1	24.0
1977	70.7	59.3	127.9	59.4	50.5	104.2	11.3	8.9	23.8
1978	71.1	59.4	128.5	59.4	50.3	104.2	11.7	9.1	24.3
1979	69.4	58.0	125.5	57.9	48.9	101.8	11.5	9.0	23.7
1980	68.4	57.0	124.9	56.9	48.1	100.5	11.5	9.0	24.4
1981	68.1	56.7	125.3	56.5	47.7	100.6	11.6	9.0	24.7
1982	67.5	56.3	124.0	55.8	47.1	98.9	11.8	9.2	25.1
1983	68.2	56.7	125.9	56.3	47.4	100.4	11.9	9.3	25.5
1984	67.2	55.9	123.6	55.3	46.7	98.1	11.9	9.2	25.6
1985	67.5	56.4	124.2	55.4	47.0	97.6	12.1	9.4	26.5
1986	68.1	56.4	125.3	56.0	47.2	98.6	12.1	9.3	26.6
1987	69.0	56.8	127.1	56.6	47.4	99.8	12.4	9.4	27.3
	Percent change								
1975-80	- 7.4	- 8.9	- 4.6	- 8.7	- 9.9	- 6.3	- 0.9	- 2.2	3.0
1980-85	- 1.3	- 1.1	- 0.6	- 2.6	- 2.3	- 2.9	5.2	4.4	8.6
1985-87	2.2	0.7	2.3	2.2	0.9	2.3	2.5	-	3.0

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

Table 2. Rates of low, moderately low, and very low birth weight, by period of gestation and race of child: Total of 49 reporting States and the District of Columbia, 1981, and United States, 1985

Period of gestation and race of child	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	1981	1985	1981-85	1981	1985	1981-85	1981	1985	1981-85
	Rate per 1,000 live births	Rate per 1,000 live births	Percent change	Rate per 1,000 live births	Rate per 1,000 live births	Percent change	Rate per 1,000 live births	Rate per 1,000 live births	Percent change
All races ⁴	68.1	67.5	-0.9	56.5	55.4	-1.9	11.6	12.1	4.3
Under 28 weeks	777.5	768.0	-1.2	107.9	99.5	-7.8	669.6	668.5	-0.2
28-31 weeks	668.8	662.8	-0.9	335.2	333.7	-0.4	333.5	329.2	-1.3
32-35 weeks	411.5	406.7	-1.2	378.7	373.5	-1.4	32.8	33.2	1.2
36 weeks	196.3	197.2	0.5	190.1	191.2	0.6	6.2	6.0	-3.2
37-39 weeks	50.0	46.6	-6.8	48.8	45.4	-7.0	1.2	1.2	-
40 weeks	19.6	17.3	-11.7	18.8	16.8	-10.6	0.7	0.6	-14.3
41 weeks	16.6	14.6	-12.0	15.6	14.0	-10.3	1.0	0.6	-40.0
42 weeks	22.4	21.0	-6.3	21.3	19.9	-6.6	1.1	1.1	-
Under 37 weeks	397.7	394.2	-0.9	292.0	287.5	-1.5	105.8	106.8	0.9
37 weeks and over	32.0	30.0	-6.3	31.0	29.1	-6.1	1.0	0.9	-10.0
White	56.6	56.4	-0.4	47.5	47.0	-1.1	9.0	9.4	4.4
Under 28 weeks	780.9	767.0	-1.8	87.5	82.9	-5.3	693.4	684.1	-1.3
28-31 weeks	694.8	683.2	-1.7	345.3	341.5	-1.1	349.5	341.6	-2.3
32-35 weeks	422.9	418.9	-0.9	391.0	387.0	-1.0	31.8	31.9	0.3
36 weeks	187.0	190.6	1.9	181.4	185.3	2.1	5.6	5.3	-5.4
37-39 weeks	43.1	40.2	-6.7	42.1	39.3	-6.7	0.9	0.9	-
40 weeks	16.2	14.1	-13.0	15.7	13.6	-13.4	0.5	0.4	-20.0
41 weeks	13.2	11.7	-11.4	12.5	11.2	-10.4	0.7	0.5	-28.6
42 weeks	17.7	17.2	-2.8	16.9	16.4	-3.0	0.8	0.8	-
Under 37 weeks	392.2	389.0	-0.8	293.3	290.6	-0.9	98.9	98.4	-0.5
37 weeks and over	26.4	25.0	-5.3	25.7	24.3	-5.4	0.8	0.7	-12.5
Black	125.3	124.2	-0.9	100.6	97.6	-3.0	24.7	26.5	7.3
Under 28 weeks	774.9	772.5	-0.3	138.9	122.5	-11.8	636.0	650.0	2.2
28-31 weeks	631.6	636.4	0.8	321.8	323.6	0.6	309.8	312.8	1.0
32-35 weeks	395.1	391.9	-0.8	358.8	354.4	-1.2	36.4	37.5	3.0
36 weeks	226.9	221.1	-2.6	218.9	212.4	-3.0	8.0	8.7	8.8
37-39 weeks	80.7	76.5	-5.2	78.6	74.2	-5.6	2.1	2.3	9.5
40 weeks	40.5	38.4	-5.2	38.5	36.9	-4.2	2.1	1.5	-28.6
41 weeks	40.9	35.1	-14.2	37.7	33.4	-11.4	3.2	1.6	-50.0
42 weeks	51.2	43.8	-14.5	48.5	40.8	-15.9	2.7	3.0	11.1
Under 37 weeks	418.9	418.0	-0.2	293.8	286.6	-2.5	125.2	131.4	5.0
37 weeks and over	61.9	57.9	-6.5	59.6	55.7	-6.5	2.3	2.2	-4.3

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

NOTE: For 1981, excludes data for New Mexico, which did not require reporting of first day of last normal menstrual period.

Table 3. Rates of low, moderately low, and very low birth weight, by age and educational attainment of mother and race of child: Total of 47 reporting States and the District of Columbia, 1985

Age and years of school completed by mother	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
	Rate per 1,000 live births								
20-24 years of age ⁵	71.0	58.5	121.2	58.3	49.0	95.5	12.7	9.5	25.8
0-8 years	86.2	79.8	129.4	73.2	67.9	108.1	13.0	11.9	21.3
9-11 years	95.6	81.1	143.0	79.9	68.9	115.5	15.8	12.1	27.5
12 years	67.0	54.8	118.1	55.1	45.9	93.5	11.9	8.9	24.6
13-15 years	56.4	44.7	101.4	45.6	37.3	77.5	10.8	7.4	23.9
16 years or more	49.6	41.9	95.7	39.9	34.6	69.7	9.7	7.3	26.0
25-29 years of age ⁵	59.9	50.1	119.9	49.4	42.2	93.1	10.5	7.9	26.8
0-8 years	74.7	67.7	111.1	64.0	58.6	92.7	10.7	9.1	18.4
9-11 years	103.5	84.6	160.4	86.0	72.4	127.8	17.4	12.2	32.5
12 years	62.0	52.6	119.9	51.4	44.4	93.9	10.6	8.2	26.0
13-15 years	52.7	44.5	104.1	43.4	37.4	79.8	9.4	7.1	24.3
16 years or more	41.9	36.8	92.7	34.4	30.8	69.0	7.5	6.1	23.8
30-34 years of age ⁵	61.1	52.0	124.3	50.0	43.3	96.0	11.1	8.7	28.4
0-8 years	83.2	71.6	130.9	67.2	58.4	101.1	16.0	13.2	29.8
9-11 years	113.3	91.9	164.6	95.5	79.6	133.6	17.8	12.3	31.1
12 years	70.2	59.8	128.5	57.4	50.2	98.2	12.7	9.6	30.3
13-15 years	55.7	47.9	112.5	45.9	40.2	86.9	9.8	7.6	25.6
16 years or more	45.4	41.4	95.1	37.1	34.1	72.4	8.3	7.3	22.6
35-39 years of age ⁵	70.7	61.1	127.2	57.6	50.4	99.3	13.1	10.7	27.9
0-8 years	88.5	82.6	118.9	72.9	68.5	94.3	15.6	14.1	24.7
9-11 years	121.8	105.5	158.7	101.0	87.8	130.0	20.7	17.7	28.7
12 years	81.9	70.5	133.3	66.9	58.8	103.9	15.0	11.7	29.4
13-15 years	66.1	57.9	118.2	54.0	47.9	90.8	12.1	9.9	27.4
16 years or more	51.8	47.4	99.9	42.3	39.0	75.8	9.5	8.4	24.1
40-49 years of age ⁵	85.6	74.7	135.5	70.5	61.6	111.2	15.1	13.1	24.2
0-8 years	103.4	91.8	134.8	81.7	71.8	107.8	21.7	20.1	27.0
9-11 years	131.4	123.8	144.1	111.4	105.4	119.9	20.0	18.4	24.2
12 years	91.7	79.1	148.2	76.7	67.1	119.3	15.1	12.0	28.9
13-15 years	76.5	68.8	123.1	62.4	55.9	104.5	14.1	12.9	18.7
16 years or more	57.4	52.0	99.3	46.8	41.8	83.9	10.6	10.2	15.5

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

⁵Includes births with educational attainment of mother not stated.

NOTE: Excludes data for California, Texas, and Washington, which did not require reporting of educational attainment of mother.

Table 4. Rates of low birth weight, by age, educational attainment, and marital status of mother and race of child: Total of reporting areas, 1980 and 1985

Age, years of school completed, and marital status of mother	All races ¹			White			Black		
	1980	1985	1980-85	1980	1985	1980-85	1980	1985	1980-85
Age	Rate per 1,000 live births		Percent change	Rate per 1,000 live births		Percent change	Rate per 1,000 live births		Percent change
Under 15 years	146.3	128.5	- 12.2	111.5	104.6	- 6.2	172.1	147.5	- 14.3
15-19 years	94.2	92.7	- 1.6	77.2	76.4	- 1.0	139.6	133.4	- 4.4
15-17 years	105.2	102.2	- 2.9	86.8	83.7	- 3.6	142.8	138.5	- 3.0
18-19 years	88.0	87.4	- 0.7	72.4	72.8	0.6	137.1	129.7	- 5.4
20-24 years	69.2	69.0	- 0.3	57.2	57.5	0.5	126.2	120.3	- 4.7
25-29 years	58.2	59.2	1.7	50.3	50.2	- 0.2	112.2	119.8	6.8
30-34 years	58.9	60.5	2.7	51.2	52.1	1.8	111.3	123.8	11.2
35-39 years	69.9	69.0	- 1.3	61.5	60.3	- 2.0	117.1	126.8	8.3
40 years and over	83.4	83.7	0.4	74.0	73.9	- 0.1	123.7	136.5	10.3
Educational attainment									
0-8 years	93.6	93.1	- 0.5	81.8	82.1	0.4	141.1	136.0	- 3.6
9-11 years	100.7	101.4	0.7	82.7	83.9	1.5	146.5	145.6	- 0.6
12 years	66.3	68.4	3.2	55.3	56.6	2.4	119.3	121.6	1.9
13-15 years	55.5	55.9	0.7	46.2	46.4	0.4	106.6	106.1	- 0.5
16 years or more	47.4	45.3	- 4.4	42.8	40.5	- 5.4	90.4	94.9	5.0
Marital status									
Married	57.7	55.7	- 3.5	52.9	51.3	- 3.0	102.6	100.5	- 2.0
Unmarried	115.8	109.4	- 5.5	90.5	86.0	- 5.0	143.0	139.9	- 2.2

¹Includes races other than white and black.

²Excludes data for California, Texas, and Washington, which did not require reporting of educational attainment of mother.

NOTE: Low birth weight is less than 2,500 grams (5 pounds 8 ounces).

Table 5. Rates of low, moderately low, and very low birth weight, by age of mother, live-birth order, and race of child: United States, 1985

Age of mother and live-birth order	Low birth weight ¹			Moderately low birth weight ²			Very low birth weight ³		
	All races ⁴	White	Black	All races ⁴	White	Black	All races ⁴	White	Black
Rate per 1,000 live births									
All ages	67.5	56.4	124.2	55.4	47.0	97.6	12.1	9.4	26.5
Under 20 years ⁵	93.5	76.8	134.0	75.7	63.0	106.5	17.8	13.8	27.5
First child	86.8	72.2	125.6	70.6	59.5	100.1	16.2	12.7	25.4
Second child	110.3	90.8	149.1	89.1	74.0	118.7	21.3	16.7	30.3
Third child and over	146.1	114.9	183.2	113.7	90.8	141.5	32.4	24.1	41.8
20-24 years ⁵	69.0	57.5	120.3	56.9	48.1	95.3	12.1	9.3	25.0
First child	63.9	55.2	112.6	52.6	46.2	88.0	11.3	9.1	24.7
Second child	63.8	53.2	111.7	52.9	44.9	89.2	10.8	8.3	22.6
Third child and over	94.2	75.2	142.5	77.4	62.8	114.2	16.9	12.4	28.3
25-29 years ⁵	59.2	50.2	119.8	48.8	42.1	93.3	10.4	8.0	26.5
First child	61.5	55.2	121.8	51.0	46.6	92.1	10.5	8.7	29.7
Second child	49.6	42.0	105.7	40.8	35.1	82.0	8.8	6.9	23.7
Third child and over	68.7	54.4	129.9	56.7	45.9	103.4	12.0	8.5	26.5
30-34 years ⁵	60.5	52.1	123.8	49.5	43.3	95.4	11.0	8.8	28.5
First child	73.9	67.5	146.3	60.5	56.2	106.8	13.4	11.3	39.5
Second child	51.3	44.6	113.3	41.8	36.9	86.8	9.5	7.7	26.5
Third child and over	60.1	48.5	122.3	49.5	40.6	96.6	10.6	7.9	25.7
35 years and over ⁵	70.7	61.9	128.1	57.8	51.1	100.3	12.9	10.8	27.8
First child	90.5	83.3	157.9	72.2	67.3	113.8	18.3	16.0	44.0
Second child	63.0	56.0	121.4	51.0	45.9	92.7	12.0	10.1	28.7
Third child and over	67.7	57.0	124.1	56.3	48.0	100.0	11.3	9.0	24.1

¹Less than 2,500 grams (5 pounds 8 ounces).

²1,500-2,499 grams (3 pounds 4 ounces to 5 pounds 8 ounces).

³Less than 1,500 grams (3 pounds 4 ounces).

⁴Includes races other than white and black.

⁵Includes births with birth order not stated.

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Appendix I

Source of data and sampling rates

Data for 1975-84 are based on 100 percent of the birth certificates from States participating in the Vital Statistics Cooperative Program (VSCP) and on a 50-percent sample of births from all other States. In 1975, 23 States provided data through the VSCP (Colorado, Florida, Illinois, Iowa, Kansas, Louisiana, Maine, Maryland, Michigan, Missouri, Montana, Nebraska, New Hampshire, New York [exclusive of New York City], North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, and Wisconsin). By 1980, Alabama, Alaska, Arkansas, Connecticut, Hawaii, Idaho, Indiana, Kentucky, Massachusetts, Minnesota, Mississippi, Nevada, New Jersey, Ohio, Pennsylvania, South Dakota, Texas, Utah, Washington, West Virginia, Wyoming, and New York City were included in the VSCP, bringing the total to 44 States.

For the years 1985-87, all States and the District of Columbia participated in the VSCP, and data are based on 100 percent of the birth certificates for all areas.

A discussion of sampling procedures and sampling errors can be found in the Technical Appendix of Volume I of *Vital Statistics of the United States* for these years.

Marital status—National estimates of births to unmarried women for 1980 and 1985 are derived from two sources. For 41 States and the District of Columbia, marital status was reported directly on the birth certificate; for California,

Connecticut, Maryland, Michigan, Montana, Nevada, New York, Ohio, and Texas, marital status was inferred from a comparison of the child's and parent's surnames. An evaluation of this method has been published (22).

Educational attainment of mother—For the years 1980-85, educational attainment of the mother was reported on the birth certificates of 47 States and the District of Columbia. The birth certificates of California, Texas, and Washington lacked this item.

Period of gestation—In 1981, the birth certificates of 49 States and the District of Columbia included a question on the date of the last normal menstrual period (LMP), the basis for the computation of the period of gestation. New Mexico's birth certificate lacked this item. In 1985, all States and the District of Columbia included a question on date of LMP.

Interval since last live birth—In 1985, the birth certificates of 49 States and the District of Columbia included a question on the date of last live birth, the basis for computing the interval since the last live birth. The birth certificate of Texas did not include this item.

All other variables discussed in this report were included on the birth certificates of all States and the District of Columbia.

Appendix II

Definitions of terms

Race of child—Births are classified according to the race or national origin of the parents. When the parents are of different races and one parent is white, the child is assigned the other parent's race. When the parents are of different races and neither parent is white, the child is assigned the father's race—with one exception: If the mother is Hawaiian or part Hawaiian, the child is considered Hawaiian. When the race of one parent is missing on the birth certificate, the child is assigned the race of the other parent. When race is not reported for either parent, the child is assigned the race of the child on the immediately preceding record.

The category "white" comprises births reported as white and births where race is reported as Hispanic. Because the races of the mother and child are identical for most births, for ease and clarity in writing, the race of the child is also used as the mother's racial designation.

Birth weight—The equivalents of the gram intervals in pounds and ounces are as follows:

Less than 500 grams = 1 lb 1 oz or less
500–999 grams = 1 lb 2 oz–2 lb 3 oz
1,000–1,499 grams = 2 lb 4 oz–3 lb 4 oz
1,500–1,999 grams = 3 lb 5 oz–4 lb 6 oz
2,000–2,499 grams = 4 lb 7 oz–5 lb 8 oz
2,500–2,999 grams = 5 lb 9 oz–6 lb 9 oz
3,000–3,499 grams = 6 lb 10 oz–7 lb 11 oz
3,500–3,999 grams = 7 lb 12 oz–8 lb 13 oz

4,000–4,499 grams = 8 lb 14 oz–9 lb 14 oz
4,500–4,999 grams = 9 lb 15 oz–11 lb 0 oz
5,000 grams or more = 11 lb 1 oz or more

Birth weights of less than 2,500 grams are considered to be low birth weight; 1,500–2,499 grams, moderately low birth weight; and less than 1,500 grams, very low birth weight. Infants for whom birth weight was not reported are excluded from the computation of rates and percents.

Period of gestation—The period of gestation is defined as beginning with the first day of the last normal menstrual period (LMP) and ending with the day of birth. The LMP is used as the initial date because it can be more accurately determined than the date of conception, which usually occurs about 2 weeks after the LMP date. Births occurring prior to 37 weeks of gestation are considered to be preterm or premature for purposes of classification. Births occurring at 37 weeks of gestation or longer are referred to in this report as "full-term" births.

Interval since last live birth—Data on the interval since the last live birth are derived from the date of birth and the date of the last live birth. An interval of zero months since the last live birth indicates the second born of a set of twins, the second or third born of a set of triplets, and so forth. Births with an interval of zero months are excluded from the interval category "less than 12 months."

Appendix III

Completeness of reporting

In the period 1975–87, information on birth weight was missing from less than 1 percent of all birth certificates.

Beginning in 1981, weeks of gestation have been imputed for records missing the day of last normal menstrual period (LMP) when there is a valid month and year. Each such record is assigned the gestational period in weeks of the preceding record that has a complete LMP date and the same computed months of gestation and 500 gram birth weight interval. A more complete discussion of this procedure and its implications is presented in a previous report (4). After imputation

of gestational age for records missing the day of LMP, 3.8 percent of the birth records in the reporting area in 1981 and 3.9 percent in 1985 did not contain sufficient information to assign weeks of gestation.

The percent of records with missing information for age, educational attainment, and marital status of mother; live birth order; and month of pregnancy prenatal care began was less than 3 percent for the data years shown. Information for the computation of interval since last live birth was missing from 5 percent of the records for 1985.

Appendix IV

Standardization for educational attainment

To eliminate the effects of differences in educational attainment when assessing the risk of low birth weight, moderately low birth weight, or very low birth weight according to month prenatal care began, the direct method of standardization was used. The distribution of births for each race by the educational attainment of mothers who started prenatal care in the first or second month of pregnancy was used as the standard population. Standardization was performed separately for white and black births using the following formula:

$$m_1 = \frac{m_e p_e}{P} \times 100$$

where

- m_1 = standardized percent low birth weight for given month prenatal care began
- m_e = percent low birth weight for each educational attainment group for given month care began
- p_e = number of births for each educational attainment group for mothers starting care in the first or second month of pregnancy
- P = total number of births to mothers starting care in first or second month of pregnancy

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