

**VITAL and HEALTH STATISTICS**

DATA FROM THE NATIONAL VITAL STATISTICS SYSTEM

# Natality Statistics Analysis

**United States - 1964**

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An analytical study of recent fertility trends in terms of period and cohort measures. Discusses variations in fertility of major population groups by race and place of residence, including Puerto Rico and the Virgin Islands. Also a discussion of characteristics of live births including birth weight, period of gestation, attendant at birth, month of birth, plurality, sex, and legitimacy.

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Washington, D.C.

February 1967

U.S. DEPARTMENT OF  
HEALTH, EDUCATION, AND WELFARE

John W. Gardner  
Secretary

Public Health Service  
William H. Stewart  
Surgeon General



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## NATALITY RATES AND RATIOS, 1964

TOTAL NUMBER OF LIVE BIRTHS—4,027,490

<p>CRUDE BIRTH RATE ..... 21.0 (per 1,000 population)</p> <p>CRUDE RATE OF NATURAL INCREASE ..... 11.6 (per 1,000 population)</p> <p>INTRINSIC RATE OF NATURAL INCREASE .. 15.6 (per 1,000 women)</p> <p>GROSS REPRODUCTION RATE.....1,564</p> <p>NET REPRODUCTION RATE..... 1,507</p> <p>TOTAL FERTILITY RATE..... 3,201.8</p> <p>GENERAL FERTILITY RATE..... 104.8 (per 1,000 women 15-44 years)</p> <p>CUMULATIVE BIRTH RATE BY AGE OF WOMEN, JANUARY 1, 1965 (per 1,000 women)</p> <p>15-19 years..... 86</p> <p>20-24 years..... 888</p> <p>25-29 years..... 2,121</p> <p>30-34 years..... 2,817</p> <p>35-39 years..... 2,931</p> <p>40-44 years..... 2,831</p> <p>45-49 years..... 2,552</p> <p>50-54 years..... 2,316</p>	<p>PREMATURE BIRTHS (under 37 weeks' ges- tation)..... 6.9 (per 100 live births)</p> <p>IMMATURE BIRTHS (2,500 grams or less).... 8.2 (per 100 live births)</p> <p>MEDIAN WEIGHT AT BIRTH..... 3,290 (in grams)</p> <p>HOSPITAL DELIVERIES..... 97.5 (per 100 live births)</p> <p>PLURAL BIRTHS..... 19.9 (per 1,000 live births)</p> <p>SEX RATIO..... 1,047 (males per 1,000 female live births)</p> <p>ESTIMATED LEGITIMATE FERTILITY RATE..... 140.9 (per 1,000 married women 15-44 years)</p> <p>ESTIMATED ILLEGITIMATE FERTILITY RATE..... 23.4 (per 1,000 unmarried women 15-44 years)</p> <p>ESTIMATED PERCENT COMPLETENESS OF BIRTH REGISTRATION..... 98.9</p>
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### SYMBOLS

Data not available-----	---
Category not applicable-----	...
Quantity zero-----	-
Quantity more than 0 but less than 0.05-----	0.0
Figure does not meet standards of reliability or precision-----	*

## NOTES TO TABLES

1. *Alaska and Hawaii.*—All tables showing time series include data for Alaska beginning 1959 and for Hawaii beginning 1960.
2. *50-percent sample.*—All data for the years 1951-54 and 1956-65 are derived from 50-percent samples of birth records. Statistics for these years were obtained by multiplying the sample figures by 2.
3. *Not stated data.*—For 1964, births with age of mother and color not stated were allocated during data processing on the basis of characteristics of births that were similar to the not stated cases in other respects. Before 1963, color not stated was assigned as white. For other characteristics, not stated information was distributed in proportion to the known information unless otherwise noted in the particular table.
4. *Adjustment for underregistration of births.*—Adjustment for failure to register births was discontinued in 1960, when it was estimated that 98.9 percent of all births were registered. However, cohort rates in table 2 make allowances for both the underregistration of births and the underenumeration of the base population.
5. *Population bases.*—Except as noted, birth rates shown in this report are based on populations present in the respective areas. The populations for the United States exclude the Armed Forces overseas and persons living abroad but include the Armed Forces stationed in each area. Rates for 1940, 1950, and 1960 are based on the population enumerated as of April 1 and estimated as of July 1 for all other years.

*THIS REPORT presents and interprets important features of statistics for births in the United States in 1964 which are based on information obtained from microfilm copies of the original certificates of live birth.*

*The year 1964 was the 11th consecutive year in which the number of births exceeded four million. The birth rate continued its decline from a peak in 1957.*

*This decline was due in part to the shift toward younger ages of childbearing that occurred in the 1950's. The same women who had relatively high birth rates at younger ages in the 1950's compensated with relatively lower birth rates at ages over 25 in the 1960's. Declines in fertility at the younger childbearing ages (under 25 years) may be due to the postponement of marriage and childbearing to later ages or to a reduction in the number of children couples will have.*

*Other findings of the report include:*

*Women who had completed the childbearing period by the end of 1964 (those 50 years of age) had an average of 2.3 children. Younger women will exceed this figure by a wide margin. By the end of 1964, women aged 30 had already borne 2.7 children.*

*There is a potential for a rise in the annual number of births in the near future due to the increasing size of the young childbearing population. In 1965 there were about 6.8 million women in the age group 20-24 years. By 1970 there will be approximately 8.6 million, an increase of 26 percent.*

*Differences in fertility between white and nonwhite women have been fairly constant in recent years. Both groups reached peak fertility in 1957 and since then have shown declines in their birth rates.*

*Declines in the birth rate occurred in every State between 1960 and 1964.*

*Over 97 percent of all live births in the entire United States were delivered in hospitals or clinics. The proportions were 99 percent for white births and 89 percent for nonwhite births. In several of the Southern States over 20 percent of the nonwhite births were not attended by doctors.*

*About 8 out of every 100 births were classified as immature, that is, weighing less than 2,501 grams (5 pounds, 9 ounces). The median birth weight for all live births was 3,290 grams (7 pounds, 4 ounces).*

*An estimated 7 percent of all births were illegitimate in 1964.*

# NATALITY STATISTICS ANALYSIS, 1964

Arthur A. Campbell, Alice Clague, and Frank Godley, *Division of Vital Statistics*

## INTRODUCTION

The purpose of this report is to present and interpret important features of 1964 birth statistics for the United States. These statistics are shown in detail in Volume I of *Vital Statistics of the United States, 1964*.<sup>1</sup>

Birth statistics for 1964 are based on information reported on the birth certificates of 54 reporting areas in the United States and of Puerto Rico and the Virgin Islands. Registrars in these areas send copies of all birth certificates to the Division of Vital Statistics, where a 50-percent sample of the certificates is selected. All tabulations are based on this sample.

Most of the statistics presented here do not include an adjustment for the failure to register some births. This adjustment was discontinued in 1960, when it was estimated that 98.9 percent of all births were registered. However, the cohort fertility rates which are cited in the description of recent trends in fertility make allowances for both the underregistration of births and the underenumeration of the base population.

Additional details concerning technical aspects of birth statistics may be found in the Technical Appendix of Volume I of *Vital Statistics of the United States, 1964*.<sup>1</sup>

## RECENT TRENDS IN FERTILITY

The year 1964 was the 11th consecutive year in which over four million children were born in the United States. As the various time series in table 1 show, the downturn in fertility which be-

gan in the late 1950's continued through 1964. In that year, 4,027,490 children were born, the birth rate was 21.0 births per 1,000 population, and the fertility rate was 104.8 births per 1,000 women 15-44 years of age.

Although the recent declines in the fertility rate have been fairly rapid (averaging about 4 percent per year between 1961 and 1964) the 1964 rate of 104.8 is still well above the levels of 76 to 79 observed in the period 1933-39. Even the provisional 1965 fertility rate of 96.7 is high in relation to the depressed fertility rates of the 1930's.

In spite of relatively high fertility rates, however, the birth rate per 1,000 total population is now approaching the low values observed in the 1930's, as comparisons of figures in table 1 indicate. In the period 1933-39, the number of births per 1,000 population varied between 18 and 19. In comparison, the 1964 rate was 21.0, and the provisional rate for 1965 is 19.4.

Recent birth rates are so much closer to pre-war levels than are recent fertility rates because the childbearing population (assumed to consist of women 15-44 years of age) is a smaller proportion of the total population than it was before the war. In the middle of the 1933-39 period (1936), the childbearing population constituted 24 percent of the total population; in 1964, the comparable proportion was 20 percent. As a result of the decline in this proportion, the substantially higher fertility of today's women is only large enough to maintain the birth rate of the total population at a level close to the low rates of the 1930's. If the ratio of the birth rate to the fertility

Table 1. Live births, birth rates, and fertility rates: United States, 1909-65

[Notes to tables given on page VII]

Year	Live births	Birth rate <sup>1</sup>	Fertility rate <sup>1</sup>
	Number	Rate per 1,000 population	Rate per 1,000 women aged 15-44 years
<u>Registered births</u>			
1965 <sup>2</sup> -----	3,767,000	19.4	96.7
1964-----	4,027,490	21.0	104.8
1963-----	4,098,020	21.7	108.4
1962-----	4,167,362	22.4	112.1
1961-----	4,268,326	23.3	117.2
1960-----	4,257,850	23.7	118.0
1959-----	4,244,796	24.0	118.8
<u>Births adjusted for underregistration<sup>3</sup></u>			
1959-----	4,295,000	24.3	120.2
1958-----	4,255,000	24.5	120.2
1957-----	4,308,000	25.3	122.9
1956-----	4,218,000	25.2	121.2
1955-----	4,104,000	25.0	118.5
1954-----	4,078,000	25.3	118.1
1953-----	3,965,000	25.1	115.2
1952-----	3,913,000	25.1	113.9
1951-----	3,823,000	24.9	111.5
1950-----	3,632,000	24.1	106.2
1949-----	3,649,000	24.5	107.1
1948-----	3,637,000	24.9	107.3
1947-----	3,817,000	26.6	113.3
1946-----	3,411,000	24.1	101.9
1945-----	2,858,000	20.4	85.9
1944-----	2,939,000	21.2	88.8
1943-----	3,104,000	22.7	94.3
1942-----	2,989,000	22.2	91.5
1941-----	2,703,000	20.3	83.4
1940-----	2,559,000	19.4	79.9
1939-----	2,466,000	18.8	77.6
1938-----	2,496,000	19.2	79.1
1937-----	2,413,000	18.7	77.1
1936-----	2,355,000	18.4	75.8
1935-----	2,377,000	18.7	77.2
1934-----	2,396,000	19.0	78.5
1933-----	2,307,000	18.4	76.3
1932-----	2,440,000	19.5	81.7
1931-----	2,506,000	20.2	84.6
1930-----	2,618,000	21.3	89.2
1929-----	2,582,000	21.2	89.3
1928-----	2,674,000	22.2	93.8
1927-----	2,802,000	23.5	99.8
1926-----	2,839,000	24.2	102.6
1925-----	2,909,000	25.1	106.6
1924-----	2,979,000	26.1	110.9
1923-----	2,910,000	26.0	110.5
1922-----	2,882,000	26.2	111.2
1921-----	3,055,000	28.1	119.8
1920-----	2,950,000	27.7	117.9
1919-----	2,740,000	26.1	111.2
1918-----	2,948,000	28.2	119.8
1917-----	2,944,000	28.5	121.0
1916-----	2,964,000	29.1	123.4
1915-----	2,965,000	29.5	125.0
1914-----	2,966,000	29.9	126.6
1913-----	2,869,000	29.5	124.7
1912-----	2,840,000	29.8	125.8
1911-----	2,809,000	29.9	126.3
1910-----	2,777,000	30.1	126.8
1909-----	2,718,000	30.0	126.8

<sup>1</sup>For 1917-19 and 1941-46, based on population including Armed Forces abroad.<sup>2</sup>Provisional estimates.<sup>3</sup>For 1915-32, figures include adjustments for States not in the registration area. For years prior to 1915, estimates are based on the number of births registered in the 10 original registration States. Estimates for 1909-34 were prepared by P. K. Whelpton. See National Office of Vital Statistics, "Births and Birth Rates in the Entire United States, 1909 to 1948," Vital Statistics—Special Reports, Vol. 33, No. 8, 1950.

rate had remained unchanged since 1933-39, the birth rate in 1964 would have been 25.3 rather than only 21.0.

The factors associated with the long-term rise and subsequent decline in fertility are discussed in detail in *Natality Statistics Analysis, 1963*.<sup>2</sup> Inasmuch as fertility data for 1964 were consistent with that interpretation of recent trends, the analysis will not be repeated in this report. However, a summary of the interpretation is presented in the following paragraphs. Readers wishing more detail may refer to the earlier report.

### Cohort Fertility Rates

An adequate description of trends in fertility requires the use of cohort fertility rates. These rates are designed to follow the fertility of groups of women as they proceed through the child-bearing years of life. The groups to which these rates relate are called "cohorts" and are identified by the year of birth of the women included in them. (The birth years by which cohorts are identified end on June 30. The cohort of 1920, for example, was born in the 12 months preceding June 30, 1920. This convention has been adopted for technical reasons stated on pages 106-108 of reference 3.) Thus these women always carry the same designation, regardless of their ages. This feature facilitates comparisons over periods of time. For example, statements can be made about the fertility of the 1920 cohort when its members were 30 years of age in 1950 and when they were 40 years of age in 1960. The same group of women is referred to in both years.

One of the most commonly used cohort measures is the "cumulative fertility rate." This is the average number of children ever born in a cohort up to an exact age. For example, the cumulative fertility rate of 377 for the 1930 cohort by exact age 20 (assumed to have been attained on January 1, 1950) means that by the time the women of this cohort reached their 20th birthday they had borne 377 children per 1,000 women.

Series of cumulative fertility rates make it possible to see trends in the average number of children ever born by different ages in the reproductive period. Such series are presented in figure 1. They show the long-term decline in cumu-

lative rates, which ended with the low rates of the 1909 cohort, and the subsequent rise, which appears to be ending with the cohorts of the 1930's.

Of particular interest is the trend in the cumulative fertility rate by age 50, often called the "completed fertility rate." Figure 1 shows the long-term decline in completed fertility from 3,818 births per 1,000 women for the 1875 cohort to 2,230 for the cohort of 1909. It is difficult to predict how high completed fertility will be for some of the cohorts still in the reproductive years of life, but projections based on women's expectations of their future childbearing indicate that the cohorts of 1931-35 will complete their families with 3,100 to 3,500 births per 1,000 women. It now seems probable that the cohorts of 1940 and later years will show some reductions in completed fertility. (See *Natality Statistics Analysis, 1963*,<sup>2</sup> for a discussion of the evidence concerning future trends in completed fertility.)

### Period Fertility Rates

To a major degree, the postwar rise in fertility rates was a consequence of the trend toward larger families (that is, higher completed fertility). But this is not the whole story, for "period fertility rates" (that is, fertility measures relating to births occurring in particular calendar years as contrasted with cohort rates) were also influenced by the inflationary effects of certain changes in the timing of births. The extent to which annual measures of fertility were inflated in the postwar period can best be appreciated by an inspection of the trend in the "total fertility rate," shown in figure 2 and table 2.

The total fertility rate is the sum of age-specific birth rates for single years of age observed in a single calendar year. An important conceptual advantage of the total fertility rate is that it states the number of births 1,000 women would have if they experienced a given set of age-specific birth rates throughout the reproductive age span. The rate of 3,197 for 1964, for example, means that if 1,000 women were to have the same birth rate at each single year of age that was observed in 1964 they would have a total of 3,197 children by the time they reached the end of the reproductive period (assumed to be 50 years of age).

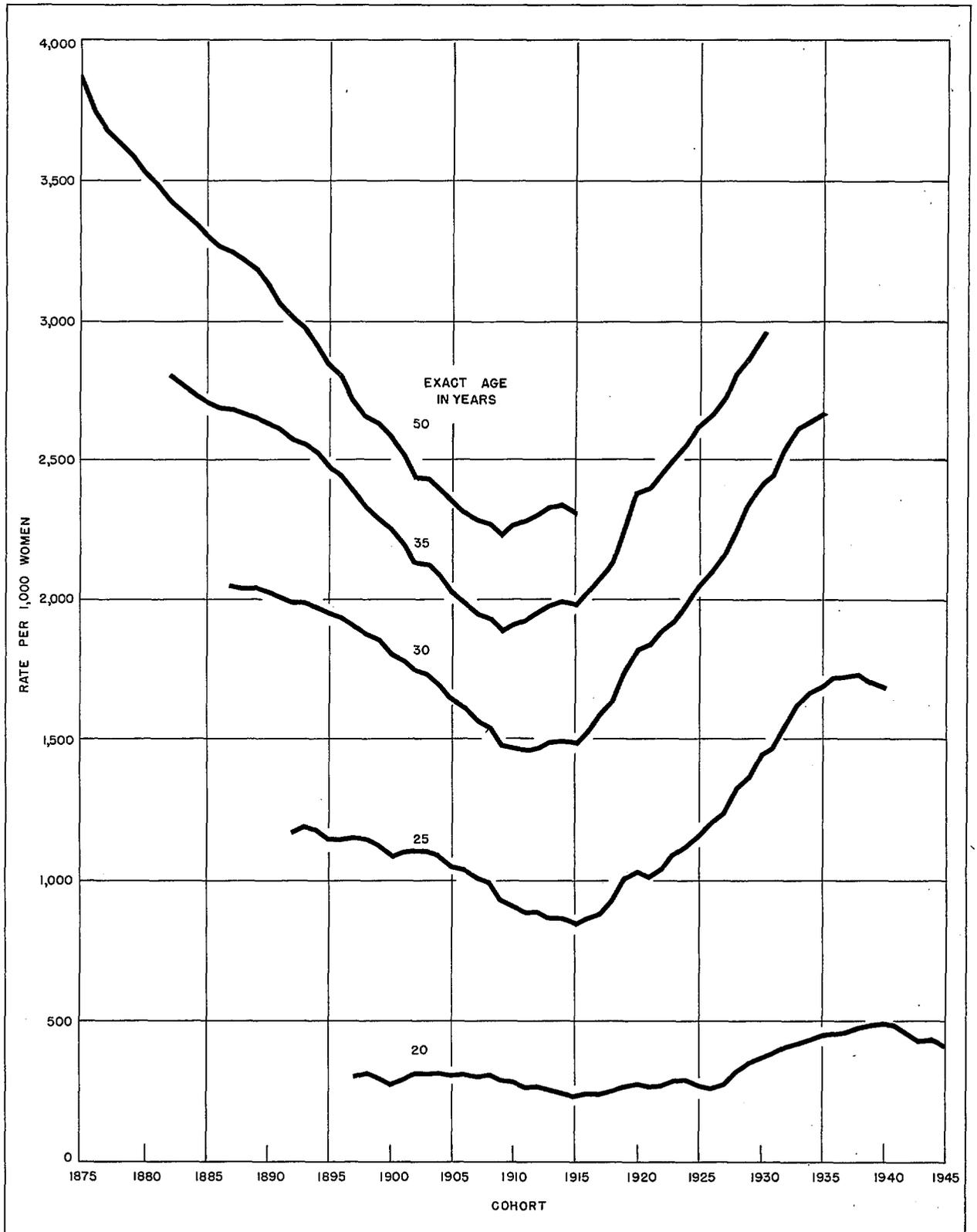


Figure 1. Cumulative birth rates by exact age.

(Rates based on births adjusted for underregistration for all years, including 1960-64, and on population estimates adjusted for underenumeration)

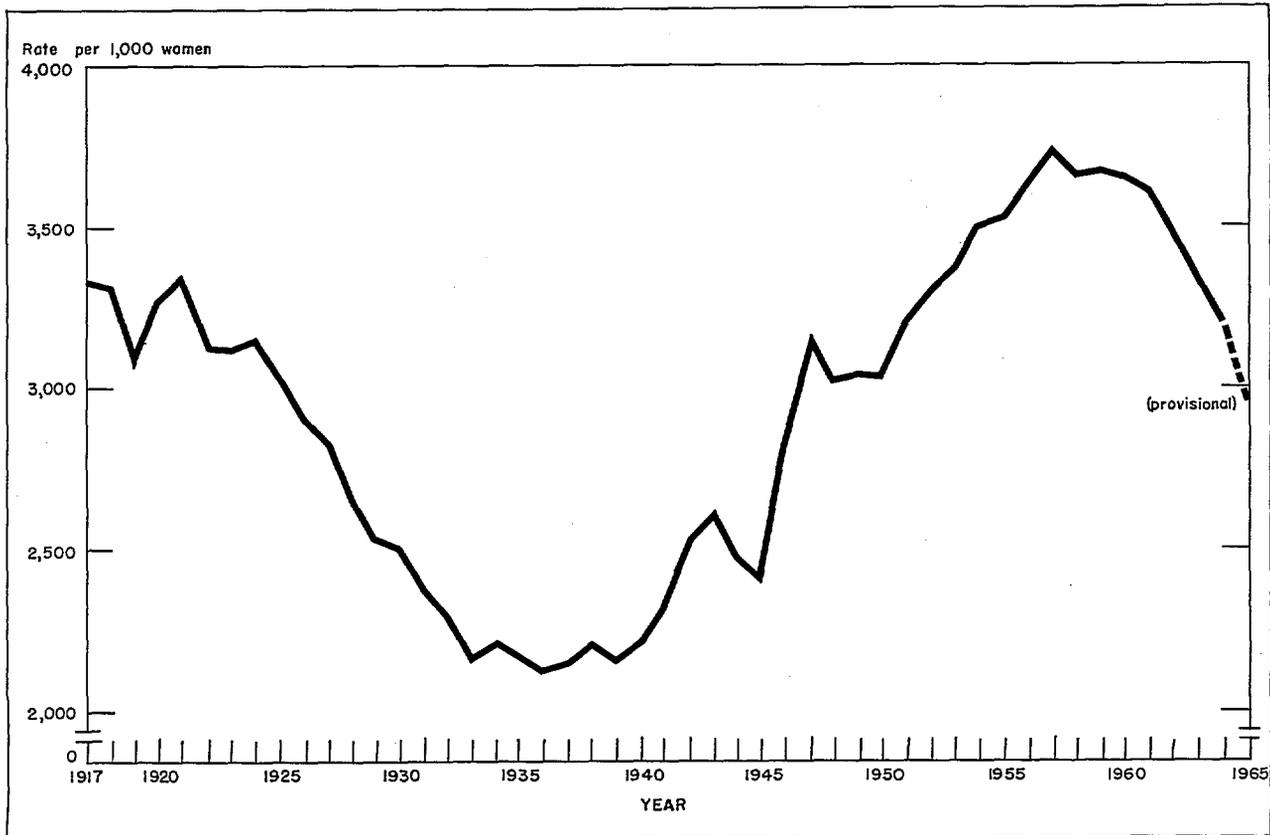


Figure 2. Total fertility rates.

(Rates based on births adjusted for underregistration for all years, including 1960-64, and on population estimates adjusted for underenumeration)

This feature makes it possible to compare the total fertility rate with the completed fertility rate. Such comparisons give some idea of the extent to which fertility in a given year may be distorted by factors that can have only a temporary effect. For example, the total fertility rate for 1957 was 3,724. This was the highest rate observed in this country since the beginning of the series in 1917. However, there was evidence from a 1955 interview survey of married women that no actual group of women then in the childbearing population expected to have as many as 3,700 children per 1,000 women by the end of the reproductive period. (See projected cumulative fertility rates for ages 45-49 in table 10-7 on pages 356 and 357 of reference 4.) This meant that the 1957

rate of 3,724 was "inflated" in the sense that such a high rate could not be maintained for a long time. The total fertility rate would soon have to descend to a level more compatible with the experience of actual groups of women living through the childbearing period.

The recent decline of the total fertility rate to values close to 3,000 represents in part an inevitable decline from the inflated levels of 3,500-3,700 observed throughout the period between 1954 and 1962. The total fertility rate had been distorted upward for at least 9 years and could no longer remain at such high levels because of the average couple's desire for families of moderate size.

Table 2. Total fertility rates: United States, 1917-65

[Notes to tables given on page VII]

Year	Rate per 1,000 women	Year	Rate per 1,000 women
1965-----	12,950	1940-----	2,214
1964-----	3,197	1939-----	2,154
1963-----	3,331	1938-----	2,200
1962-----	3,476	1937-----	2,147
1961-----	3,620	1936-----	2,119
1960-----	3,655	1935-----	2,163
1959-----	3,669	1934-----	2,205
1958-----	3,654	1933-----	2,149
1957-----	3,724	1932-----	2,288
1956-----	3,634	1931-----	2,376
1955-----	3,521	1930-----	2,509
1954-----	3,501	1929-----	2,524
1953-----	3,378	1928-----	2,656
1952-----	3,307	1927-----	2,826
1951-----	3,209	1926-----	2,910
1950-----	3,030	1925-----	3,027
1949-----	3,030	1924-----	3,144
1948-----	3,013	1923-----	3,116
1947-----	3,158	1922-----	3,125
1946-----	2,829	1921-----	3,349
1945-----	2,392	1920-----	3,273
1944-----	2,466	1919-----	3,078
1943-----	2,616	1918-----	3,313
1942-----	2,532	1917-----	3,332
1941-----	2,314		

<sup>1</sup>Provisional estimate.

NOTE: The total fertility rate is the sum of age-specific birth rates for single years of age for women 14-49 years of age. The birth rates for single years of age used to compute total fertility rates are based on births adjusted for underregistration for all years (including 1960-65) and on population estimates adjusted for underenumeration. Hence, they are not precisely comparable to the birth rates and fertility rates shown in table 1. For method of adjusting the population bases, see the Methodological Appendix in National Office of Vital Statistics, "Fertility Tables for Birth Cohorts of American Women," by P. K. Whelpton and A. A. Campbell, Vital Statistics—Special Reports, Vol. 51, No. 1, 1960.

### Timing of Births

The temporary inflation of the total fertility rate in the postwar period was brought about by two overlapping shifts in the timing of births.

First, the cohorts of 1916-25 (approximately) were having higher birth rates at the older child-bearing ages than the cohorts preceding them.

The members of these cohorts reached the early ages of childbearing during the 1930's and early 1940's, when economic conditions and war may have made it advisable or necessary to postpone marriage and childbearing. By 1950, however, when the women in these cohorts were 25-34 years of age, they were having children at the highest rates observed at these ages since the

cohorts of the 1890's. By 1960 they were 35-44 years of age, and the inflationary effect of their higher fertility had virtually run its course.

A second and more important change in the timing of births was the trend toward younger marriage and younger childbearing by the cohorts of 1926-35 (approximately). The women in these groups were 15-24 years of age in 1950, their marriage rates were high, and their birth rates at these ages were higher than any previously observed in this country in a series going back to 1917. Their higher fertility at the younger ages kept annual birth rates high throughout the 1950's.

Because these women had such high birth rates at younger ages in the 1950's, they are having relatively low rates at the older childbearing ages in the 1960's. This means that cohorts with relatively low birth rates at the older childbearing ages (the 1926-35 cohorts, approximately) have replaced cohorts with relatively high rates at these ages (the cohorts of 1916-25, approximately). The result is that fertility rates at ages 25 and over are substantially lower in the 1960's than in the 1950's. This can be seen from comparisons of age-specific birth rates presented in figure 3 and table 3.

Younger childbearing increases the proportion of women who have all the children they want by a given age and thereby reduces the proportion of women who want additional children at later ages. This effect is illustrated by figure 4, which shows the proportions of women who have had various numbers of children by age 30. The proportion who have had three children or more has doubled in 20 years. This shift toward more children has greatly reduced the proportions of childless women and of those with one child, and since 1955 it has also brought down the proportion of women with only two children.

Between January 1, 1957, and January 1, 1965, the proportion of 30-year-old women with three children or more rose from 36 to 50 percent. This means that the proportion with fewer than three children by age 30 has dropped from 64 to 50 percent. Because most of the women who want additional births are among those with fewer than three children, the reduction in this proportion implies a reduction in birth rates after age 30.

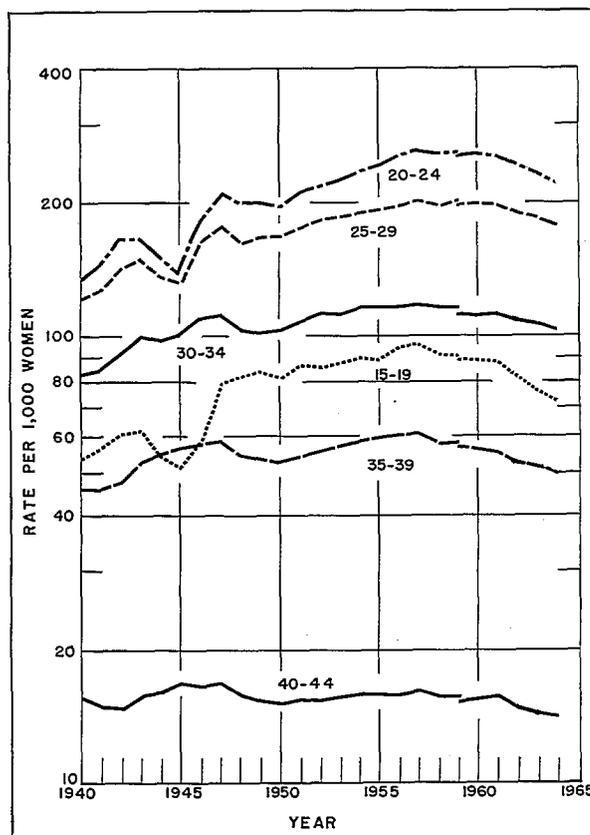


Figure 3. Birth rates by age of mother.

(For 1959-64 based on registered live births; for 1940-59, on live births adjusted for underregistration. Semilogarithmic scale)

### Fertility at Younger Ages

The explanation offered in the preceding section accounts only for the decline in fertility at the older childbearing ages. Fertility has also fallen at the younger childbearing ages (under 25 years of age, approximately), as is shown by the age-specific birth rates in table 3 and figure 3. One or both of two tendencies could account for this trend:

1. *Postponement of births to later ages.*— Perhaps today's young couples are shifting their childbearing to somewhat later ages than the cohorts immediately preceding them. This would amount to a re-

Table 3. Birth rates by age of mother: United States, 1940-64

[Notes to tables given on page VII]

Year	Age of mother							
	10-14 years	15-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years <sup>1</sup>
<u>Registered births</u>								
Rate per 1,000 women								
1964-----	0.9	72.9	219.8	178.8	103.5	49.9	13.8	0.8
1963-----	0.9	76.5	231.3	185.4	105.9	51.2	14.2	0.9
1962-----	0.8	81.3	243.8	191.3	108.7	52.6	14.8	0.9
1961-----	0.9	88.0	253.6	197.8	113.3	55.6	15.6	0.9
1960-----	0.8	89.1	258.1	197.4	112.7	56.2	15.5	0.9
1959-----	0.9	89.1	257.5	198.6	114.4	57.3	15.3	0.9
<u>Births adjusted for underregistration</u>								
1959-----	0.9	90.4	260.1	200.5	115.6	58.2	15.5	1.1
1958-----	0.9	91.4	258.2	198.3	116.2	58.3	15.7	0.9
1957-----	1.0	96.3	260.6	199.4	118.9	59.9	16.3	1.1
1956-----	1.0	94.6	253.7	194.7	117.3	59.3	16.3	1.0
1955-----	0.9	90.5	242.0	190.5	116.2	58.7	16.1	1.0
1954-----	0.9	90.6	236.2	188.4	116.9	57.9	16.2	1.0
1953-----	1.0	88.2	224.6	184.1	113.4	56.6	15.8	1.0
1952-----	0.9	86.1	217.6	182.0	112.6	55.8	15.5	1.3
1951-----	0.9	87.6	211.6	175.3	107.9	54.1	15.4	1.1
1950-----	1.0	81.6	196.6	166.1	103.7	52.9	15.1	1.2
1949-----	1.0	83.4	200.1	165.4	102.1	53.5	15.3	1.3
1948-----	1.0	81.8	200.3	163.4	103.7	54.5	15.7	1.3
1947-----	0.9	79.3	209.7	176.0	111.9	58.9	16.6	1.4
1946-----	0.7	59.3	181.8	161.2	108.9	58.7	16.5	1.5
1945-----	0.8	51.1	138.9	132.2	100.2	56.9	16.6	1.6
1944-----	0.8	54.3	151.8	136.5	98.1	54.6	16.1	1.4
1943-----	0.8	61.7	164.0	147.8	99.5	52.8	15.7	1.5
1942-----	0.7	61.1	165.1	142.7	91.8	47.9	14.7	1.6
1941-----	0.7	56.9	145.4	128.7	85.3	46.1	15.0	1.7
1940-----	0.7	54.1	135.6	122.8	83.4	46.3	15.6	1.9

<sup>1</sup>Rates computed by relating births to mothers aged 45 years and over to women aged 45-49 years.

versal of the trend toward earlier child-bearing.

2. *Smaller families.*—Perhaps young couples will have fewer children altogether than the couples who began their families earlier in the postwar period.

At the present time, there is no reason for preferring either of these explanations to the ex-

clusion of the other. Both are probably correct to a limited extent. (See *Natality Statistics Analysis, 1963*,<sup>2</sup> for a discussion of the evidence concerning trends in fertility at the younger childbearing ages.)

The downward trend in the fertility of younger women is illustrated by the cumulative fertility rates for ages 18-24 for the cohorts of 1910 and later (fig. 5). Recent cohorts have had fewer

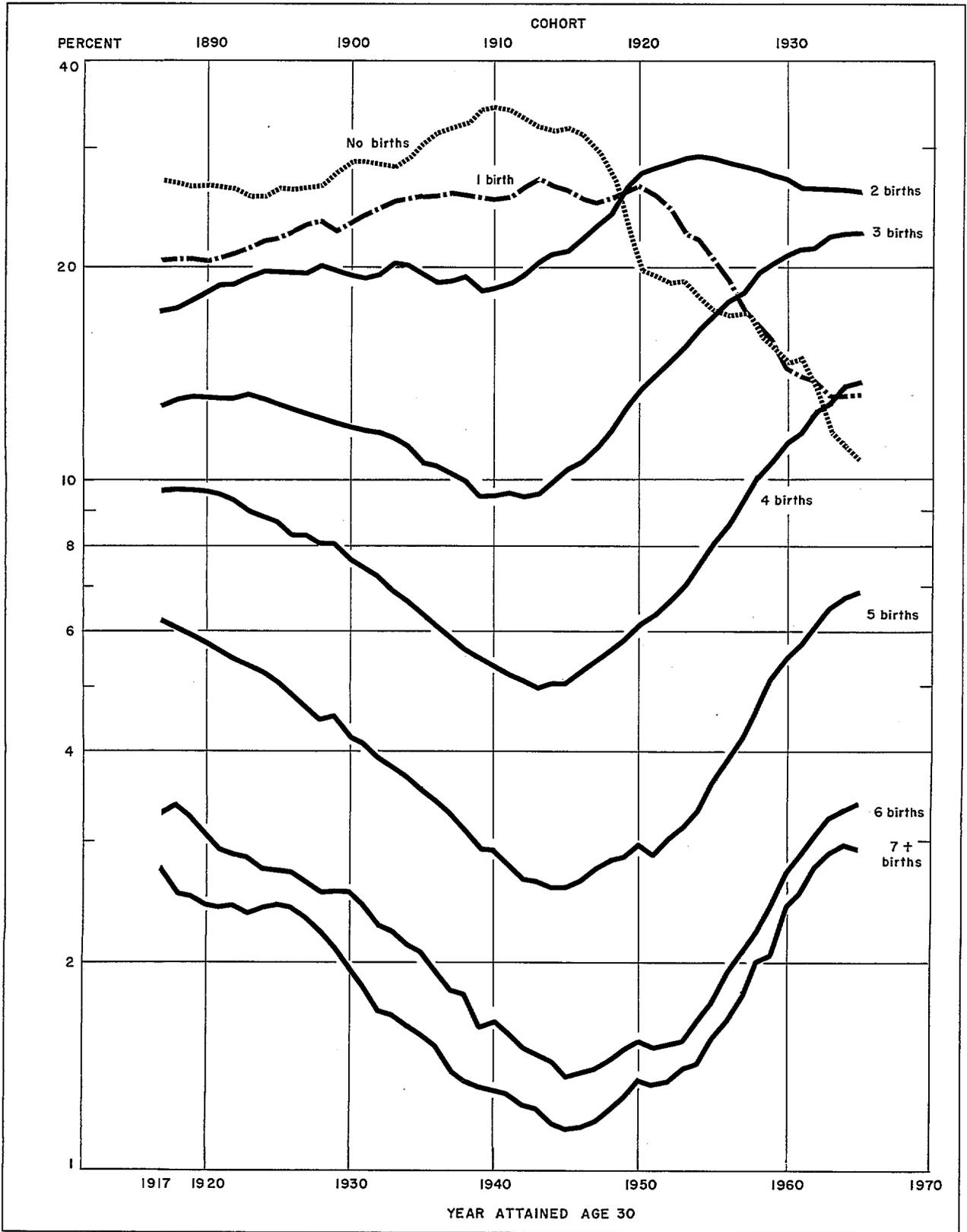


Figure 4. Percentage of women with specified number of births by exact age 30 on January 1.  
 (Semilogarithmic scale)

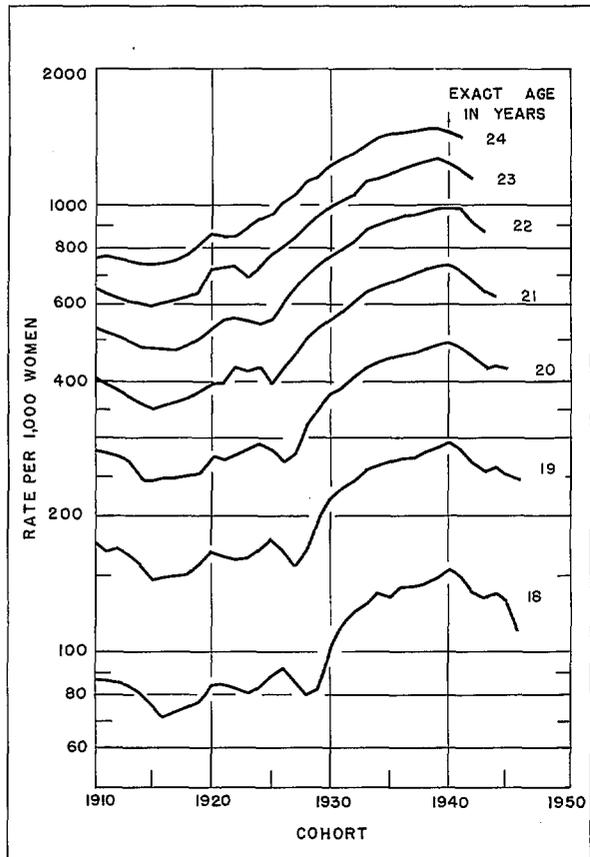


Figure 5. Cumulative birth rates by exact ages 18-24 years.

(Rates based on births adjusted for underregistration for all years, including 1960-64, and on population estimates adjusted for underenumeration. Semilogarithmic scale)

children than the cohorts immediately preceding them, but their cumulative fertility is still well above the levels observed for the cohorts of 1910-20.

The recent experience of the 1947 cohort is of interest because this was the largest cohort born in the early postwar period. There has been some speculation that when the women of this cohort became old enough to marry, they would be unable to find husbands at the appropriate ages (generally 2 to 3 years older) because of the different sizes of the cohorts involved. Speaking approximately, the women of the 1947 cohort would ordinarily marry men from the 1944 cohort, but there were 23 percent fewer children born in 1944 than in 1947, so there are proportionately

fewer men available for marriage. Some of this slack is undoubtedly taken care of by women marrying younger men. But the sharp drop in the cumulative fertility rate for the 1947 cohort at age 18 (fig. 5) may result from a corresponding drop in the marriage rate for these women. Unfortunately, statistics on marriages are not sufficiently detailed to test this explanation. However, cumulative birth rates at ages 16 and 17 (not shown) also make the same dip for the 1947 cohort and a recovery for the 1948 cohort.

### Influence of Contraceptive Pills

The effects of the increased use of the contraceptive pill on recent trends in fertility are not yet known. Certainly the pill has had some effect independent of the many factors enumerated above, but we do not know how large it has been. To a considerable extent, the decline in fertility is the expected result of certain shifts in the ages at which women bear children. The recent tendency for couples to have their children somewhat later in life and, possibly, to have fewer children altogether has undoubtedly been aided by the use of the pill, but there is no evidence concerning the pill's independent effect on these trends. (See *Natality Statistics Analysis, 1963*,<sup>2</sup> for estimates of numbers of women using contraceptive pills and a discussion of the possible influence on fertility of the pill.)

### The Childbearing Population

The only factor influencing future births about which we can be reasonably certain is the size of the childbearing population. The large number of babies born in 1947 became 18 years of age in 1965. Those born in 1948 and subsequent years will soon follow them and greatly increase the number of young people in the younger childbearing ages. There were 6.8 million women at ages 20-24 in 1965. By 1970 there will be 8.6 million women in this age group, 26 percent more, according to the Census Bureau's projections.<sup>5</sup>

It is quite possible that the increasing number of young people will offset declining birth rates enough to produce an upturn in the annual number of children born. Even the Census Bureau's low

series of projections shows a rise in annual numbers of births starting in the late 1960's and proceeding through the 1970's.

In summary, there is a potential for an increase in the annual number of births within the next 5 or 10 years. When a rise will begin and how great it will be are questions that can receive only speculative answers at present.

## THE FERTILITY OF MAJOR POPULATION GROUPS

The foregoing discussion deals with fertility trends in the United States as a whole. Obviously the same description does not necessarily apply to all components of the population. In this section of the report, attention will be directed toward the fertility of certain major population groups.

The kinds of groups available for comparative analysis are necessarily limited by the information collected on birth certificates. Consequently, comparisons of the fertility of certain important groups in our society cannot be made. For example, it is impossible to discover from birth registration data whether fertility is declining more rapidly among low-income families than among moderate- and high-income families. Nor is it possible to investigate trends in fertility among women classified by educational attainment. It would be highly desirable, for many purposes, to present such analyses, but the birth certificates of most registration areas do not ask for the information needed to make this possible. However, Puerto Rico has requested information pertaining to the educational attainment of the mother and father on its birth certificates since 1962. Minnesota also instituted this practice on the 1965 revised form of its birth certificate.

At present, the only major population groups whose fertility can be studied on the basis of information collected on birth certificates are those identified by race and residence. The next section compares fertility in the white and nonwhite populations, and the two following sections present data for States, geographic divisions, and certain metropolitan areas.

## Fertility by Color

The fertility of the nonwhite population has been higher than that of the white population in all years for which relevant data are available. In 1964, the excess of the fertility rate (births per 1,000 women 15-44 years of age) for nonwhites over that for whites was 42 percent.

In general, both the white and nonwhite populations have followed similar trends, as the fertility rates shown in figure 6 indicate. However, the postwar rise in fertility was somewhat more rapid for the nonwhite population. Measuring from the low prewar levels observed in 1933-39, the rise to the 1957 peak was 58 percent for the white population and 65 percent for the nonwhite. So far, fertility rates for the two major population groups have shown no tendency to converge.

In considering fertility trends in the nonwhite population, the question arises as to whether this group has shown the same kinds of changes in the timing of births and completed fertility that have been described for the total population. Only approximate answers can be given to such questions at the present time because cohort fertility tables have not been developed for the nonwhite population.

It is clear from census data that the completed fertility of nonwhite cohorts has risen substantially—probably by a greater relative amount than for white cohorts. Among nonwhite women who had ever married, the lowest completed fertility rate was 2,742 children ever born per 1,000 women for the cohorts of 1906-10 (approximately). This rate was computed from reports of women who were 50-54 years of age at the time of the 1960 census.<sup>6</sup> In 1964 a Census Bureau survey showed that ever-married nonwhite women 30-34 years of age had already borne an average of 3,841 children per 1,000 women.<sup>7</sup> This rate relates to the cohorts of 1930-34 (approximately). So by 1964 nonwhite wives in the cohorts of 1930-34 had already borne 40 percent more children than were borne altogether by wives in the cohorts of 1906-10. By the time the cohorts of 1930-34 reach the end of the childbearing period, their fertility will exceed that of the 1906-10 cohorts by an even greater amount.

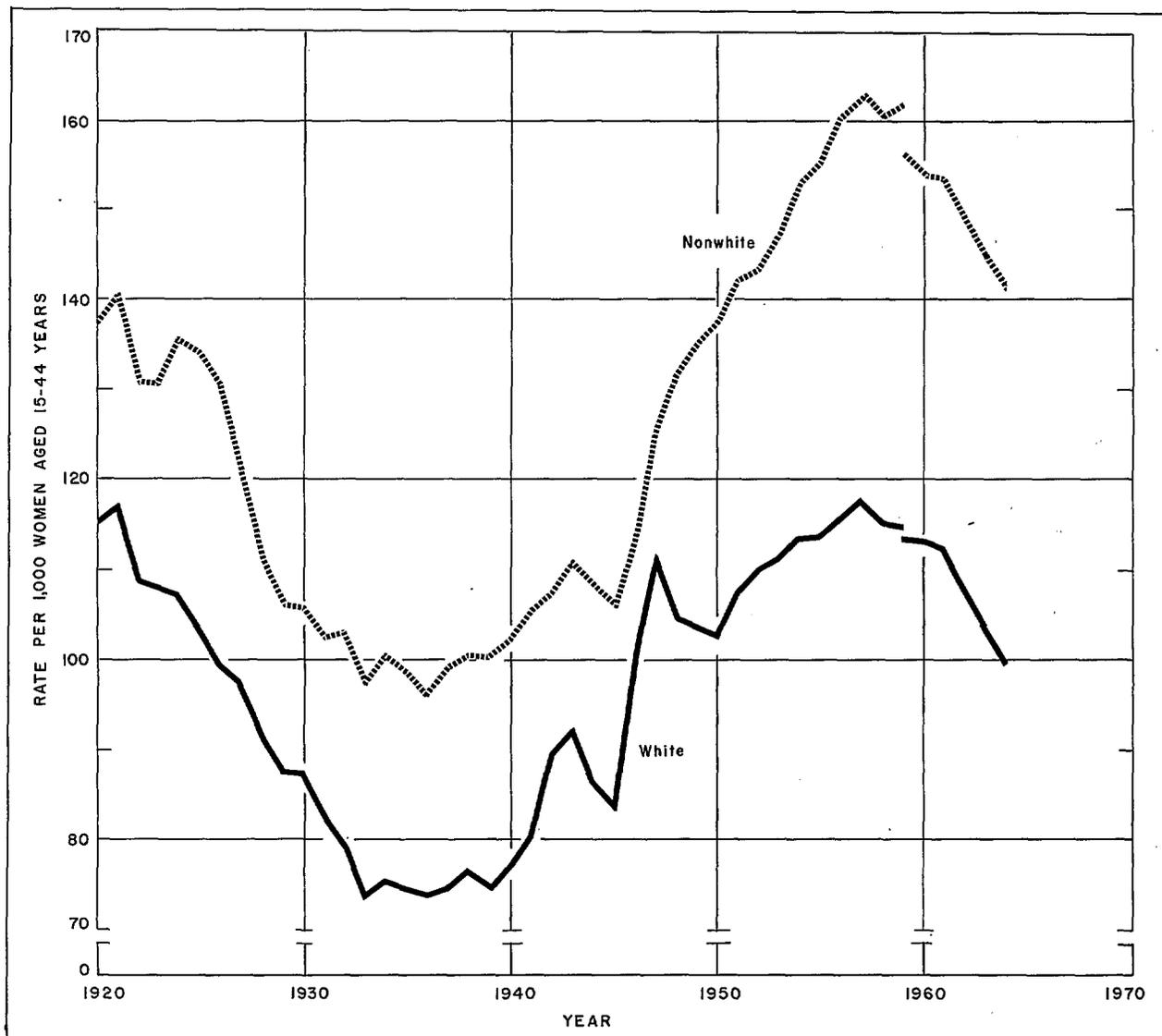


Figure 6. Fertility rates by color.

(Rates per 1,000 women aged 15-44 years. For 1959-64 based on registered live births; for 1920-59, on live births adjusted for underregistration)

Comparable statistics for white ever-married women, in contrast, show a rise of only 22 percent from the cohorts of 1906-10 to those of 1930-34. This is based on an average of 2,317 children ever borne by white ever-married women 50-54 years old in 1960<sup>6</sup> and an average of 2,825 for comparable women 30-34 years old in 1964.<sup>7</sup>

Although these statistics are not ideal for comparing trends in completed fertility for cohorts of white and nonwhite women since they

relate to ever-married women rather than all women and since the younger cohorts have not yet completed their fertility, they are the best data available at the present time. The contrast between the rise in the rates for the ever-married white and nonwhite women is large enough to support the hypothesis that the completed fertility rates for cohorts of nonwhite women have risen more rapidly than those for cohorts of white women.

It is evident that the fertility of the nonwhite population was temporarily inflated during the 1950's by the same kinds of factors that have been described for the total population. The total fertility rate of the nonwhite population reached a high of nearly 4,800 in 1957, and it seems unlikely that any cohort of nonwhite women then in the childbearing years of life would have such a high *completed* fertility rate. The evidence for this belief is less firm for the nonwhite population than for the total population, but a 1960 fertility survey suggests that currently married women in the cohorts of 1926-30 will have about 3,900 births per 1,000 women.<sup>8</sup> Even if this proves to be an understatement of the eventual rate, it seems unlikely that the completed fertility rate for all nonwhite women in any recent cohort will be as high as 4,800.

What gave rise to the inflation of total fertility rates to the levels of 4,700-4,800 in the late 1950's? For nonwhite women, the rise in the age-specific birth rates of older women appears to have played a greater part in the inflation of fertility than was the case for the white population. This can be seen from table 4, which shows the percentage change in age-specific rates for white and nonwhite women for the periods 1940-59 and 1959-64.<sup>a</sup> At ages 25 and over, the percentage increase in birth rates was considerably greater for nonwhite than for white women. Below age 25, the reverse was true: rates for white women rose faster than those for nonwhite.

These data suggest that the shift of childbearing from older to younger ages was not as great for the nonwhite population as it was for the white population. This may have been due partly to the fact that birth rates were already quite high for younger nonwhite women.

Since 1959 the age-specific birth rates for both white and nonwhite women have declined. So far the declines have been somewhat faster for

white women, but the differences in trends at most ages are not great.

At the higher birth orders, however, nonwhite rates have been falling faster than white rates. For example, between 1959 and 1964, the number of fifth and higher order births per 1,000 women 15-44 years of age dropped by 13 percent for the nonwhite population and 6 percent for the white population. This comparison is based on the following figures:

	1959	1964	Percent change, 1959-64
White-----	16.0	15.0	-6
Nonwhite-----	48.8	42.3	-13

The more rapid decline of nonwhite birth rates at the higher birth orders probably results from a greater ability to prevent unwanted births. A 1960 survey of attitudes and behavior associated with family planning showed that nonwhite couples tend to want fewer children than white couples but have been much less successful than white couples in controlling their fertility to the extent desired.<sup>9</sup> Perhaps the ability of nonwhite couples to control their fertility is improving.

Comparisons of certain characteristics of white and nonwhite births (such as sex ratio, plurality, and period of gestation) are presented in later sections of this report.

### Fertility by States and Geographic Areas

*Levels.*—Comparisons of birth rates by State for 1964 are presented in figure 7, which shows the State birth rate and its standing in relation to the national birth rate. Although the majority of the State birth rates were close to the national average, a belt of high birth rate States extends from the South through the Southwest. Birth rates were also high in the outlying States of Alaska and Hawaii. On the other end of the scale, there were States with low birth rates scattered throughout other parts of the country. The lowest rate was 17.9 births per 1,000 population in Oregon.

The birth rates of the four geographic regions varied less than the rates for individual States.

<sup>a</sup>The year 1959 is used in these comparisons rather than the peak fertility year of 1957 because two sets of rates are available for 1959: one is comparable to the rates for 1940 (based on births adjusted for underregistration), and the other is comparable to the rates for 1964 (based on registered births only). Also, rates for 1959 were not very different from those for 1957.

Table 4. Birth rates adjusted and not adjusted for underregistration and percent change, by color and age of mother: United States, 1940, 1959, and 1964

[Notes to tables given on page VII]

Color and age	Rates adjusted for underregistration			Rates not adjusted for underregistration		
	1940	1959	Percent change	1959	1964	Percent change
<u>White</u>						
15-19 years-----	45.3	79.8	76	79.2	63.4	-20
20-24 years-----	131.4	253.3	93	251.7	212.9	-15
25-29 years-----	123.6	196.7	59	195.5	175.7	-10
30-34 years-----	83.4	112.0	34	111.3	100.1	-10
35-39 years-----	45.3	55.7	23	55.1	47.6	-14
40-44 years-----	15.0	14.8	-1	14.7	12.9	-12
<u>Nonwhite</u>						
15-19 years-----	121.7	167.1	37	160.5	138.7	-14
20-24 years-----	168.5	308.9	83	297.9	269.3	-10
25-29 years-----	116.3	227.3	95	220.2	200.8	-9
30-34 years-----	83.5	143.3	72	138.1	126.8	-8
35-39 years-----	53.7	78.5	46	75.0	67.5	-10
40-44 years-----	21.5	23.3	8	21.2	20.8	-2

The birth rate in the West (21.1 per 1,000) was about the same as the national average (21.0). This is because the low birth rates in three continental Pacific Coast States were offset by high birth rates in the outlying States of Alaska and Hawaii and in the Mountain States. The birth rate in the North Central Region was also the same as the national average. This leaves deviant birth rates on the high side in the South (22.1) and on the low side in the Northeast (19.7).

Regional differences in the birth rate, however, do not necessarily correspond to differences in the fertility of women. Although the birth rate is an appropriate measure of the impact of fertility on population growth, it has long been discredited as a measure of fertility, for it is affected by the proportions of women at the child-bearing ages. It is also affected by the proportion of women who are married and by the timing of their births.

Table 5 shows regional fertility differentials in terms of more refined measures than the birth rate. Varying proportions of women in each 5-year age group between ages 15 and 44 are taken into account by computing an adjusted birth rate. The adjustment increases the comparative fertility of the Northeast and North Central Regions, reduces that of the South, and does not appreciably affect that of the West. The net effect of adjusted birth rates is to bring the regions closer together than do comparisons of unadjusted birth rates.

The adjustment is based on the indirect method of standardization, the standard age-specific birth rates being those for the total United States in 1960. This set of rates is weighted by the proportions of the regional population who were women in 5-year age groups between the ages of 15 and 44 at the time of the 1960 census. Although regional age-sex structures have changed since the 1960 census, the adjustments of the 1964 birth

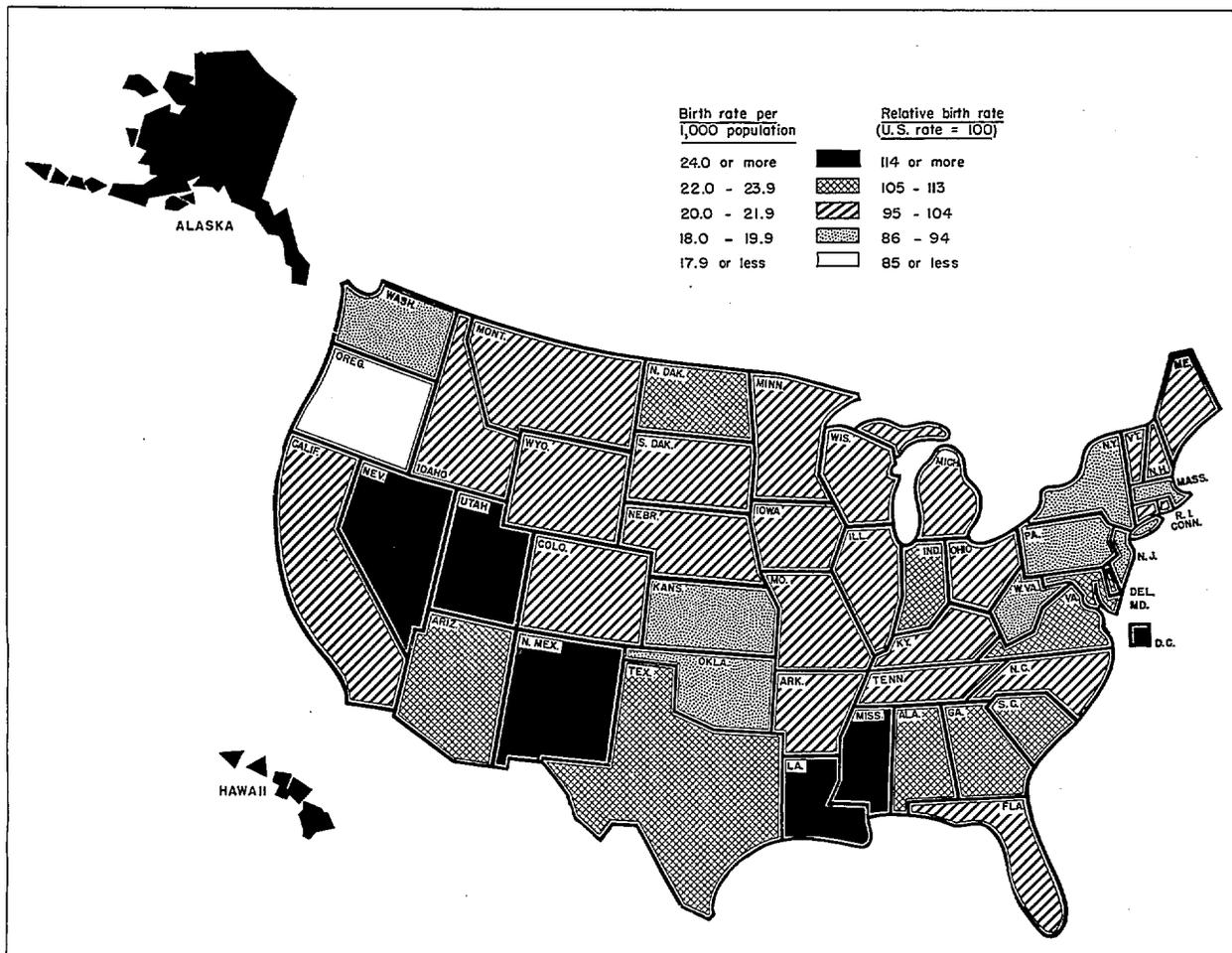


Figure 7. Birth rates by State, 1964.

(By State of residence)

rates are considered to be approximately correct. They show that the age-sex structure favors high birth rates in the South and low birth rates in the Northeast and North Central Regions.

Table 5 also shows regional fertility differences in terms of the number of children ever born to women aged 15-44 by June 1964. This retrospective measure of fertility reflects the birth rates of these women in all of their child-bearing years to date, not just in 1964. These previous years differ from 1964 in that regional differences in the birth rate were formerly larger and have since converged. Owing to this convergence, regional differences in the number of children ever born should exceed regional differences in the 1964 birth rate.

Compared with a base of 100 for the United States as a whole, regional indexes of the number of children ever born per woman range from 88 in the Northeast to 106 in the North Central Region. That this index of fertility varies more than the adjusted birth rate by region is seen in the sum of the deviations (without regard to sign) from 100. The deviations of the four regions' indexes sum to 8 for the adjusted birth rate and 26 for the number of children ever born.

A further refinement is introduced by studying the fertility of only those women who had ever married by June 1964. Table 5 shows that this refinement slightly reduces the range of the regional differences to 93-104. This reduction is

Table 5. Measures of fertility by geographic region:<sup>1</sup> United States, 1964

[Notes to tables given on page VII]

Measure of fertility	All regions	Region			
		North-east	North Central	South	West
Birth rate per 1,000 total population					
Birth rate, unadjusted-----	21.0	19.7	21.0	22.1	21.1
Birth rate, age-sex adjusted-----	21.0	20.1	21.4	21.4	20.9
Number of children ever born					
Children ever born per woman aged 15-44 <sup>2</sup> -----	1.93	1.69	2.05	2.02	1.99
Children ever born per ever-married woman aged 15-44 <sup>3</sup> -----	2.51	2.33	2.62	2.57	2.45
Index					
Birth rate, unadjusted-----	100	94	100	105	100
Birth rate, age-sex adjusted-----	100	96	102	102	100
Children ever born per woman aged 15-44 <sup>2</sup> -----	100	88	106	105	103
Children ever born per ever-married woman aged 15-44 <sup>3</sup> -----	100	93	104	102	98

<sup>1</sup>By place of residence as of mid-1964.<sup>2</sup>U.S. Bureau of the Census, "Fertility of the Population, June 1964 and March 1962," Current Population Reports, Population Characteristics, Series P-20, No. 147, table 4, p. 15. Figures are standardized for age.<sup>3</sup>Ibid., p. 16. Figures are standardized for age.

brought about by omitting never-married women, whose fertility is low. By geographic region, never-married women constitute the greatest proportion of women 15-44 years of age in the Northeast and the smallest in the West. Removal of the never-married women from the population aged 15-44 increases the average number of children ever born in all regions but relatively more in the Northeast and relatively less in the West.

*Recent trends.*—The decline of the birth rate in recent years has been general, affecting every State and geographic region of the United States. Between 1960 and 1964, the declines averaged 11.4 percent but varied widely from State to State. In general, the States in the West and North Central

Regions experienced more rapid declines than States in the South and Northeast. Table 6 and figure 8 show the percentage decline of the birth rate in each State between 1960 and 1964. The largest declines took place in the eight Mountain States, where they averaged 17.2 percent. The second largest declines took place in the West North Central States. Declines were least in the East South Central Division, where they averaged 9.0 percent. Figure 8 shows these relative declines.

Since the birth rate is affected by population composition, notably by proportions in the child-bearing ages, comparative declines in the birth rate are affected by changes in these proportions.

Table 6. Birth rates and percent change: United States, each geographic division and State, 1960 and 1964

[Notes to tables given on page VII]

Division and State <sup>1</sup>	1960	1964	Percent change
	Birth rate per 1,000 population		
United States-----	23.7	21.0	-11.4
<u>Geographic division</u>			
New England <sup>2</sup> -----	22.5	20.2	-10.2
Middle Atlantic-----	21.5	19.5	-9.3
East North Central-----	24.2	21.3	-12.0
West North Central-----	24.0	20.6	-14.2
South Atlantic-----	24.2	21.9	-9.5
East South Central-----	24.4	22.2	-9.0
West South Central-----	25.4	22.4	-11.8
Mountain-----	27.3	22.6	-17.2
Pacific-----	23.6	20.5	-13.1
<u>New England</u>			
Maine-----	24.0	21.5	-10.4
New Hampshire-----	22.8	21.1	-7.5
Vermont-----	24.1	21.2	-12.0
Massachusetts <sup>2</sup> -----	22.4	19.6	-12.5
Rhode Island-----	21.4	19.7	-7.9
Connecticut-----	22.4	20.6	-8.0
<u>Middle Atlantic</u>			
New York-----	21.4	19.6	-8.4
New Jersey-----	21.8	19.8	-9.2
Pennsylvania-----	21.3	19.1	-10.3
<u>East North Central</u>			
Ohio-----	23.8	20.8	-12.6
Indiana-----	24.2	22.0	-9.1
Illinois-----	23.7	21.2	-10.5
Michigan-----	25.0	21.7	-13.2
Wisconsin-----	25.2	21.6	-14.3
<u>West North Central</u>			
Minnesota-----	25.7	21.8	-15.2
Iowa-----	23.3	20.1	-13.7
Missouri-----	22.7	20.1	-11.5
North Dakota-----	26.3	22.4	-14.8
South Dakota-----	25.9	21.8	-15.8
Nebraska-----	24.3	20.8	-14.4
Kansas-----	23.3	19.5	-16.3

<sup>1</sup>By place of residence.

<sup>2</sup>Figures for 1964 exclude 1,800 live births in Massachusetts.

Table 6. Birth rates and percent change: United States, each geographic division and State, 1960 and 1964—Con.

[Notes to tables given on page VII]

Division and State <sup>1</sup>	1960	1964	Percent change
<u>South Atlantic</u>			
	Birth rate per 1,000 population		
Delaware-----	25.9	23.3	-10.0
Maryland-----	24.9	22.9	-8.0
District of Columbia-----	26.0	24.0	-7.7
Virginia-----	24.1	22.1	-8.3
West Virginia-----	21.2	19.8	-6.6
North Carolina-----	24.1	21.9	-9.1
South Carolina-----	25.1	22.3	-11.2
Georgia-----	25.3	23.4	-7.5
Florida-----	23.3	20.0	-14.2
<u>East South Central</u>			
Kentucky-----	23.8	21.5	-9.7
Tennessee-----	23.0	21.1	-8.3
Alabama-----	24.7	22.4	-9.3
Mississippi-----	27.2	24.5	-9.9
<u>West South Central</u>			
Arkansas-----	22.7	21.4	-5.7
Louisiana-----	27.7	24.8	-10.5
Oklahoma-----	21.9	19.3	-11.9
Texas-----	26.0	22.5	-13.5
<u>Mountain</u>			
Montana-----	25.9	21.4	-17.4
Idaho-----	25.7	20.3	-21.0
Wyoming-----	25.8	21.1	-18.2
Colorado-----	24.5	20.7	-15.5
New Mexico-----	32.3	26.6	-17.6
Arizona-----	28.2	23.0	-18.4
Utah-----	29.5	24.1	-18.3
Nevada-----	25.5	24.6	-3.5
<u>Pacific</u>			
Washington-----	22.9	19.1	-16.6
Oregon-----	21.7	17.9	-17.5
California-----	23.7	20.7	-12.7
Alaska-----	33.4	29.1	-12.9
Hawaii-----	27.2	24.8	-8.8

<sup>1</sup>By place of residence.

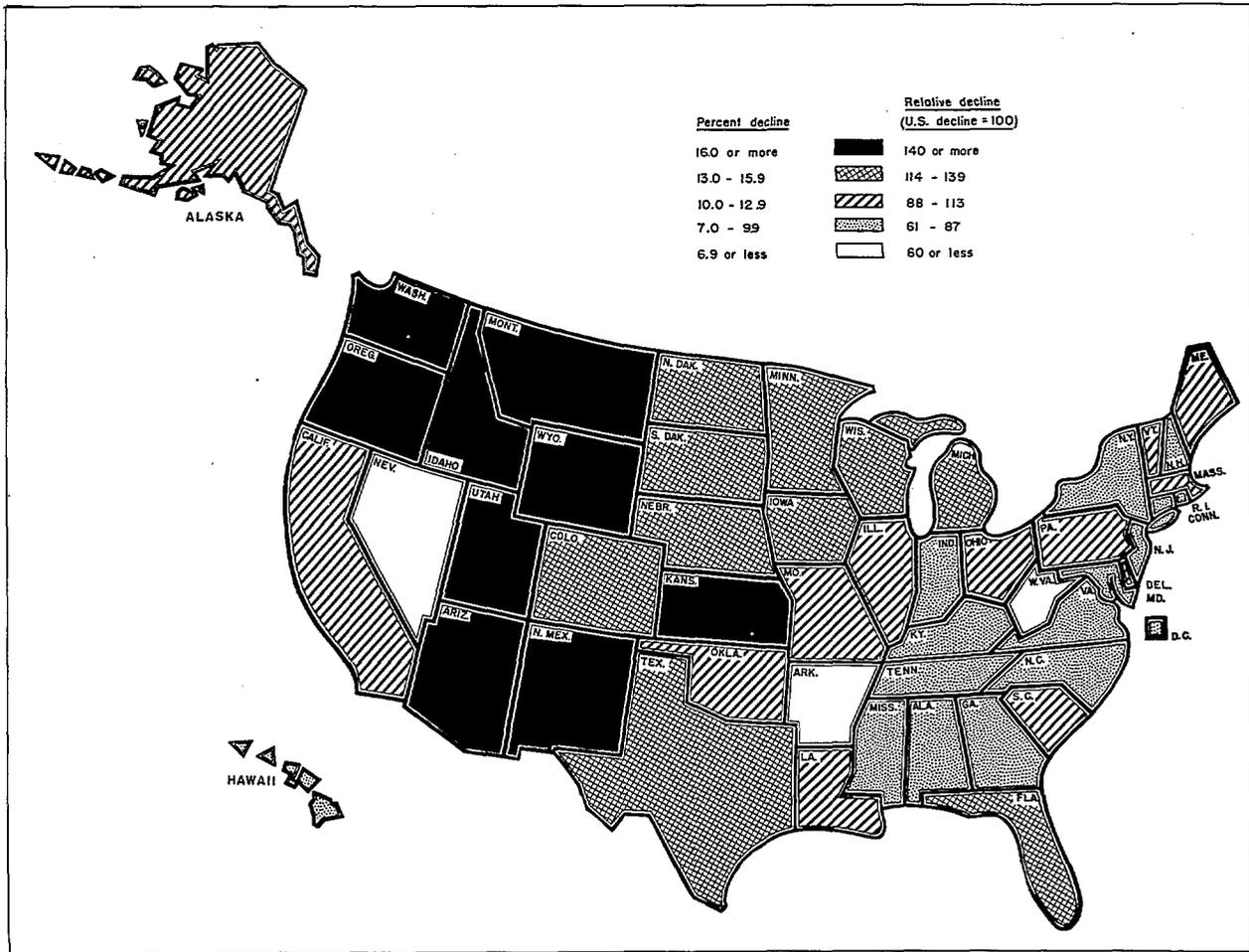


Figure 8. Percent change in birth rates by State, 1960-64.  
(By State of residence)

In the Mountain Division, for example, the 1960-64 decrease in the proportion of the total population of reproductive age (18-44) was 2.2 percent.<sup>10</sup> This in itself would account for a decline of the birth rate during the period of about 2.2 percent, which is approximately one-eighth of the total decline. In general, the 1960-64 decline of a State birth rate was to some extent explained by a decline in the proportion of its population of reproductive age.

In addition to the age composition, the color composition of State populations may affect the comparative declines of their birth rates. The previous section of this report, "Fertility by Color," showed that since 1959 age-specific birth rates have been declining more rapidly for white

women than for nonwhite. The magnitude of recent declines in the birth rate by geographic division is consistent with this relationship. Between 1960 and 1964 declines in the birth rate were smallest in the East South Central Division and the Middle and South Atlantic Divisions, which generally have high proportions of nonwhite persons. In areas with smaller proportions of nonwhite persons, birth rates have tended to decline somewhat more rapidly.

The 1960-64 decline of the birth rate was also related to the level of the birth rate at the beginning of the period. Birth rates have declined most in areas where they were highest and least in areas where they were lowest. As a result, regional differences in birth rates have diminished.

In 1960, for example, birth rates by geographic division ranged between 91 and 115 percent of the national average. In 1964 this range had narrowed to 93-108 percent. In table 7 these figures are represented by an index birth rate for each of the nine geographic divisions, the index for the Nation as a whole being 100.

Table 7. Index of birth rates by geographic division: United States, 1960 and 1964

[Notes to tables given on page VII]

Division <sup>1</sup>	1960	1964
United States-----	100	100
New England <sup>2</sup> -----	95	96
Middle Atlantic-----	91	93
East North Central-----	102	101
West North Central-----	101	98
South Atlantic-----	102	104
East South Central-----	103	106
West South Central-----	107	107
Mountain-----	115	108
Pacific-----	100	98

<sup>1</sup>By place of residence.

<sup>2</sup>Figures for 1964 exclude 1,800 live births in Massachusetts.

Reductions of the variation between States can also be seen with the use of the coefficient of variation, which is the standard deviation of State birth rates as a percentage of the average birth rate for all States. In 1964, the coefficient of variation was 9.5 percent; it was 10.1 percent in 1960 and 15.6 percent in 1940.

#### Fertility by Metropolitan Residence

There were 2,587,410 births registered to residents of metropolitan counties of the United States during 1964, or 64 percent of the total. Metropolitan counties are those defined by the U.S. Bureau of the Census as being in standard metropolitan statistical areas (SMSA's). Essentially, an SMSA is a county containing a city of 50,000 inhabitants or more; further details of the definition are given in the Technical Appendix of Volume I of *Vital Statistics of the United States, 1964*.<sup>1</sup>

Birth rates for large SMSA's varied according to the geographic region in which they were situated, as shown in table 8. They were high in the South and North Central Regions and low in the Northeast. Birth rates for SMSA's in the West Region were close to the national average of 21.0 per 1,000 population.

Although the majority of the SMSA's (21 of 37) had birth rates above the national figure, the average SMSA birth rate unweighted by population size was 21.2 per 1,000. This is very close to the national birth rate. Thus birth rates give about the same impetus to population growth in the large SMSA's as in the Nation as a whole.

Between 1960 and 1964 birth rates declined most in the metropolitan areas where they were highest. Table 8 shows the percent decline of the birth rate during this period for the 37 largest SMSA's. The annual birth rates for 1960 and 1964 are also given in that table. To insure comparability, the 1960 territory of the SMSA is used and subsequent annexations are disregarded.

The average decline of the birth rate in the 37 largest SMSA's was 12.1 percent, or 1.06 times the national decline between 1960 and 1964. Declines during this period exceeded the national average of 11.4 percent in 22 of the 37 largest SMSA's. In the 3 largest SMSA's—New York, Los Angeles, and Chicago—however, declines were less than the national average.

The more rapid declines of birth rates in the largest SMSA's were insufficient to offset their more rapid population growth as compared with the total United States. According to recent Census Bureau estimates, the population of the 37 largest SMSA's shown here increased by 7.4 percent between 1960 and 1964 and the total population increased by 6.7 percent.<sup>11</sup>

Although the birth rates cited above show the contribution of fertility to population growth in metropolitan areas, they are inadequate measures of fertility. Census Bureau data on the number of children ever borne by ever-married women of reproductive age show that fertility was lower in metropolitan areas than in other areas. Among women aged 15-44 who had ever married, those living in metropolitan areas had borne an average of 2.4 children by June 1964; the comparable figure for those living in nonmetropolitan areas was

Table 8. Birth rates for standard metropolitan statistical areas and percent change:  
United States, 1960 and 1964

[Notes to tables given on page VII]

Region and SMSA <sup>1</sup>	1964	1960	Percent change
<u>Northeast</u>			
Birth rate per 1,000 population			
Boston-Lowell-Lawrence, Mass <sup>2</sup> -----	20.1	22.5	-10.7
Buffalo, N.Y.-----	20.0	23.6	-15.3
Newark, N.J.-----	19.8	21.2	-6.6
New York, N.Y.-----	19.5	20.5	-4.9
Paterson-Clifton-Passaic, N.J.-----	18.5	20.2	-8.4
Philadelphia, Pa.-N.J.-----	20.3	22.7	-10.6
Pittsburgh, Pa.-----	18.2	21.3	-14.6
Providence, R.I.-----	19.3	21.1	-8.5
Rochester, N.Y.-----	21.8	22.7	-4.0
<u>North Central</u>			
Chicago, Ill.-----	21.9	24.6	-11.0
Cincinnati, Ohio-Ky.-----	22.7	25.7	-11.7
Cleveland, Ohio-----	20.5	22.9	-10.5
Columbus, Ohio-----	23.0	26.6	-13.5
Dayton, Ohio-----	21.4	25.1	-14.7
Detroit, Mich.-----	20.9	24.6	-15.0
Indianapolis, Ind.-----	23.7	27.0	-12.2
Kansas City, Mo.-Kans.-----	21.6	25.8	-16.3
Milwaukee, Wis.-----	22.1	26.0	-15.0
Minneapolis-St. Paul, Minn.-----	23.9	27.5	-13.1
St. Louis, Mo.-Ill.-----	21.9	25.0	-12.4
<u>South</u>			
Atlanta, Ga.-----	23.5	25.6	-8.2
Baltimore, Md.-----	21.9	24.5	-10.6
Dallas, Tex.-----	22.6	25.8	-12.4
Houston, Tex.-----	23.0	26.8	-14.2
Louisville, Ky.-Ind.-----	21.8	25.9	-15.8
Miami, Fla.-----	17.8	21.0	-15.2
New Orleans, La.-----	24.0	27.0	-11.1
San Antonio, Tex.-----	25.3	28.6	-11.5
Tampa-St. Petersburg, Fla.-----	17.3	19.9	-13.1
Washington, D.C.-Md.-Va.-----	24.2	26.0	-6.9
<u>West</u>			
Denver, Colo.-----	21.2	25.6	-17.2
Los Angeles-Long Beach, Calif.-----	20.9	23.1	-9.5
Portland, Oreg.-Wash.-----	17.7	21.1	-16.1
San Bernadino-Riverside-Ontario, Calif.-----	21.4	24.7	-13.4
San Diego, Calif.-----	21.6	26.1	-17.2
San Francisco-Oakland, Calif.-----	20.9	23.4	-10.7
Seattle, Wash.-----	19.0	23.0	-17.4

<sup>1</sup>By place of residence; SMSA's are those established in 1960.

<sup>2</sup>Figures for 1964 exclude 1,800 live births in Massachusetts and a smaller but unknown number in the Boston-Lowell-Lawrence SMSA.

Table 9. Live births by sex and sex ratio at birth, by color and plurality: United States, 1964

[Notes to tables given on page VII]

Color and plurality	Male	Female	Ratio
	Number		Males per 1,000 females
Total-----	2,060,162	1,967,328	1,047
Single-----	2,019,630	1,927,704	1,048
Plural-----	40,532	39,624	1,023
White-----	1,727,416	1,641,744	1,052
Single-----	1,695,472	1,610,726	1,053
Plural-----	31,944	31,018	1,030
Nonwhite-----	332,746	325,584	1,022
Single-----	324,158	316,978	1,023
Plural-----	8,588	8,606	998

2.7.<sup>12</sup> The lower fertility of the metropolitan population is also shown by percentage who had ever borne 5 children or more. In the age group 35-44, which is near the completion of child-bearing, 14.4 percent of the metropolitan wives had borne 5 children or more and 23.1 percent of the nonmetropolitan.<sup>13</sup>

## CHARACTERISTICS OF BIRTHS

The following sections deal with certain characteristics of births for which all or most registration areas provide information. The characteristics for which data can be presented are necessarily limited by the information collected on the birth certificate; there are certain important characteristics, especially those relating to the health of the newborn child or its mother, for which there is little or no useful information at present.

### Sex Ratio

The sex ratio of infants born in 1964 was 1,047 males per 1,000 females, slightly lower than

at any time in the past 25 years. Between 1940 and 1963, the sex ratio at birth varied within a narrow range between 1,048 and 1,058.

The sex ratio for nonwhite births was lower than for white births regardless of other factors under consideration. In 1964 the sex ratio for white births was 1,052 and that for nonwhite births was 1,022. However, there were wide differences between the sex ratios for various nonwhite groups.

	<i>Sex ratio</i>
All nonwhite groups----	1,022
Negro-----	1,020
Indian-----	1,016
Chinese-----	1,122
Japanese-----	1,073
Other races-----	1,038

A comparison between the sex ratio for single and plural births shows that single births had a higher proportion of males than live births in plural deliveries. There was a considerable difference between white and nonwhite births regardless of plurality (see table 9).

Table 10. Sex ratio at birth, by live-birth order, race, and age of mother: United States, 1964

[Notes to tables given on page VII]

Race and age of mother	Live-birth order						
	Total	First	Second	Third	Fourth	Fifth	Sixth and over
<u>Total</u>	Males per 1,000 females						
All ages-----	1,047	1,058	1,048	1,050	1,042	1,037	1,026
15-19 years-----	1,056	1,065	1,035	1,032	1,034	1,118	1,378
20-24 years-----	1,050	1,054	1,053	1,046	1,036	1,058	1,000
25-29 years-----	1,047	1,049	1,049	1,053	1,047	1,033	1,032
30-34 years-----	1,039	1,066	1,030	1,056	1,037	1,025	1,031
35-39 years-----	1,039	1,047	1,056	1,050	1,052	1,046	1,022
40-44 years-----	1,029	1,064	1,052	1,060	1,023	1,038	1,014
<u>White</u>							
All ages-----	1,052	1,061	1,052	1,053	1,046	1,041	1,037
15-19 years-----	1,066	1,074	1,042	1,046	1,084	833	1,154
20-24 years-----	1,053	1,056	1,055	1,048	1,041	1,073	1,014
25-29 years-----	1,051	1,050	1,052	1,055	1,053	1,037	1,037
30-34 years-----	1,046	1,063	1,041	1,061	1,041	1,034	1,039
35-39 years-----	1,044	1,053	1,049	1,046	1,048	1,041	1,040
40-44 years-----	1,044	1,073	1,067	1,073	1,026	1,056	1,029
<u>Nonwhite</u>							
All ages-----	1,022	1,035	1,021	1,032	1,019	1,020	1,004
15-19 years-----	1,026	1,030	1,019	1,013	997	1,285	1,500
20-24 years-----	1,034	1,039	1,039	1,039	1,022	1,038	990
25-29 years-----	1,022	1,038	1,008	1,035	1,011	1,017	1,025
30-34 years-----	1,002	1,090	929	1,004	1,007	974	1,015
35-39 years-----	1,016	998	1,122	1,093	1,098	1,087	976
40-44 years-----	959	981	917	929	982	894	968
<u>Negro</u>							
All ages-----	1,020	1,031	1,021	1,030	1,017	1,017	1,005
15-19 years-----	1,024	1,026	1,020	1,015	995	1,292	1,458
20-24 years-----	1,032	1,034	1,038	1,040	1,017	1,042	991
25-29 years-----	1,019	1,033	1,006	1,024	1,011	1,010	1,027
30-34 years-----	1,003	1,090	925	1,008	1,017	970	1,014
35-39 years-----	1,011	1,011	1,109	1,084	1,080	1,068	978
40-44 years-----	960	916	945	915	1,000	911	969

Table 11. Number of live births in plural deliveries and ratio of plural live births to total live births: United States, 1944, 1950, and 1956-64

[Notes to tables given on page VII]

Year	Number of live births in plural deliveries	Ratio per 1,000 live births
1964-----	80,156	19.9
1963-----	81,158	19.8
1962-----	81,306	19.5
1961-----	86,100	20.2
1960-----	86,684	20.4
1959-----	87,654	20.6
1958-----	86,610	20.6
1957-----	87,158	20.5
1956-----	88,816	21.3
1950-----	74,456	20.9
1944-----	56,362	20.2

As in the past, the sex ratio for 1964 generally decreased with age of mother and live-birth order; however, this relationship did not usually hold true for a cross-classification of any single birth order with age of mother, as shown in table 10.

### Plural Births

Over the past 20 years there has been no noticeable trend in the rate of occurrence of plural births (see table 11). Ninety-eight percent of the births occurred in single deliveries. Very little change can be seen in the relationship between age of mother and the occurrence of plural births. The incidence of plural births increased with age of mother through age 39 and decreased slightly over 40 (see table 12).

While 1 in 50 live births occurred in a plural delivery, this was not true for all races; 1 in every 54 white live births was from a plural delivery but 1 in only 38 nonwhite live births. Orientals had a lower twinning rate than white persons.

Since the frequency of twins increased with higher birth order, the high Negro twinning rates may be due partly to the large proportion of higher order births among them.

Table 12. Ratio of plural live births to total live births, by color and age of mother: United States, 1964

[Notes to tables given on page VII]

Age of mother	Total	White	Non-white
Ratio of plural live births per 1,000 total live births			
All ages-----	19.9	18.7	26.3
15-19 years-----	12.5	11.8	14.8
20-24 years-----	16.7	15.6	23.3
25-29 years-----	21.5	20.0	30.7
30-34 years-----	26.9	25.2	36.2
35-39 years-----	29.4	27.6	39.2
40-44 years-----	24.0	22.3	32.9

### Attendant at Birth and Place of Delivery

In 1964 the vast majority of live births were classified as having been delivered by physicians in hospitals. This group consists of all births in hospitals and those births delivered in "clinics" by physicians.

Using this definition, figures for 1963 and 1964 show no change in the proportion of white births delivered by physicians in hospitals, but for non-white births the proportion rose from 87.9 to 89.0 percent.

In 1964 there were more white births delivered by physicians in hospitals than nonwhite births, as the following figures show:

	All births	White births	Nonwhite births
Total-----	100.0	100.0	100.0
Physician in hospital-----	97.5	99.1	89.0
Physician not in hospital-----	0.7	0.4	2.0
Midwife-----	1.5	0.3	8.0
Other and not specified-----	0.3	0.2	1.0

The largest increases in the proportions of nonwhite births delivered by physicians in hospitals occurred in the geographic divisions where these proportions were smallest—the South Atlantic (82.4 to 83.9 percent) and the East South Central (65.4 to 67.4 percent).

In certain geographic divisions there were small declines in the proportion of hospital births. In five of the nine divisions, over 99 percent of all births occurred in hospitals.

Table 13 is a percentage distribution of 1964 births by place of delivery and person in attendance as recorded on the birth certificate. Since this table makes a distinction between births occurring in hospitals and those in clinics, it indicates that 2.2 percent of the births classified as occurring in hospitals were reported to have occurred in clinics. Further, while most hospital births were delivered by physicians, a very small proportion were delivered by midwives (0.1 percent for the United States) and 2.4 percent were delivered by other and unspecified persons. It seems likely that most of the attendants in the latter category were physicians whose handwriting was so illegible that their titles were not distinguishable.

Many of the midwives belong to a group of registered nurses trained in obstetrics who are known as "certified nurse midwives." New York had the largest number of babies delivered in hospitals by midwives (1,886). The remainder of the 3,902 were delivered in several other States. Usually the number for a State is less than 300—a group small enough that one or two persons could reasonably deliver all of them in a year. No complete investigation of these births has been made. If the number of deliveries conducted by nurse midwives in hospitals increases, more attention will be focused on them in the future.

Only 4.8 percent of all births occurred outside hospitals; 2.9 percent of these were delivered by physicians, 1.5 percent by midwives, and 0.3 percent by other and unspecified persons.

In some States where a large proportion of births occur outside hospitals, most of them are delivered by midwives—Alabama, Georgia, and Mississippi. There are other States where a large proportion of births occur outside hospitals but they have the benefit of a physician in attendance—Arizona, Kansas, and Nevada. Arkansas, South Carolina, and Texas have large numbers of births

outside hospitals delivered by both physicians and midwives.

### Birth Weight and Period of Gestation

The weight of an infant at birth is one of the most easily obtained indicators of his maturity and, at certain levels, a good predictor of his future health. Infants weighing less than 2,501 grams or more than 5,000 grams have high risks of neonatal mortality. It has recently been shown that the "immature" babies (those weighing less than 2,501 grams or 5 pounds, 9 ounces) also have higher risks of morbidity if they survive and may, in fact, never quite catch up in physical and intellectual growth with the more mature members of their cohort.<sup>14</sup>

In *Natality Statistics Analysis, United States, 1962*,<sup>15</sup> there is a detailed discussion of the trends in birth weight and gestation distributions since 1950. Since there have been no noticeable changes in the trend since 1962, further discussion is unnecessary; therefore this section considers several of the environmental and biologic variables that are associated with variation in birth weight and gestation.

There is an important differential in birth weight between white and nonwhite babies. The median weight for white infants (3,320 grams) in 1964 was 190 grams higher than for nonwhite infants (3,130 grams). This was due to a much larger proportion of immature births among nonwhite babies (13.9 percent) than among white (7.1 percent).

This differential can probably be attributed to poorer access to good prenatal care, poorer nutrition on the part of the mother, and generally lower socioeconomic status of the nonwhite population.

*Sex and plurality.*—Birth weight was influenced by both sex and plurality of the baby, as is shown in table 14. Among both white and nonwhite infants, boys had a higher median birth weight than girls. This was true for babies born in single and plural deliveries. Infants from plural deliveries had considerably lower birth weight than single births. This was due in part to the large proportion born prematurely (before 37 weeks of gestation).

Table 13. Percentage distribution of live births, by place of delivery and attendant: United States and each State, 1964

[Notes to tables given on page VII]

State <sup>1</sup>	Place of delivery and attendant							
	Hospitals <sup>2</sup>				Clinics, other specified and unknown places			
	Total	Physician	Nurse midwife	Other and not specified	Total	Physician	Nurse midwife	Other and not specified
United States-----	95.2	92.7	0.1	2.4	4.8	2.9	1.5	0.3
Alabama-----	84.0	81.7	0.2	2.1	16.0	3.3	12.2	0.5
Alaska-----	92.6	80.8	0.0	11.7	7.4	2.6	2.1	2.7
Arizona-----	87.9	87.7	0.0	0.2	12.1	10.2	0.8	1.0
Arkansas-----	83.3	79.2	0.1	4.0	16.7	9.4	6.7	0.5
California-----	98.4	90.5	0.0	7.9	1.6	1.3	0.0	0.3
Colorado-----	98.7	98.3	0.0	0.4	1.3	1.0	0.1	0.2
Connecticut-----	98.5	91.5	0.0	7.1	1.5	1.4	-	0.1
Delaware-----	99.0	97.0	0.0	2.0	1.0	0.3	0.5	0.1
District of Columbia-----	99.2	99.2	-	0.1	0.8	0.7	-	0.0
Florida-----	92.4	91.7	0.3	0.4	7.6	4.1	3.1	0.4
Georgia-----	87.1	80.2	0.1	6.8	12.9	4.6	6.7	1.6
Hawaii-----	99.4	99.1	-	0.3	0.6	0.4	0.0	0.2
Idaho-----	99.4	98.3	-	1.1	0.6	0.2	0.0	0.4
Illinois-----	98.5	97.0	-	1.5	1.5	0.6	0.0	0.9
Indiana-----	98.8	94.2	-	4.5	1.2	1.1	-	0.1
Iowa-----	99.7	99.2	0.0	0.5	0.3	0.3	0.0	0.0
Kansas-----	85.4	85.0	0.0	0.4	14.6	14.5	0.0	0.1
Kentucky-----	93.7	93.0	0.4	0.3	6.3	4.2	1.8	0.3
Louisiana-----	96.0	94.5	0.1	1.4	4.0	1.8	2.1	0.1
Maine-----	91.1	90.4	-	0.6	8.9	8.3	-	0.6
Maryland-----	98.8	96.9	0.1	1.9	1.2	0.7	0.4	0.0
Massachusetts-----	99.8	93.9	0.0	6.0	0.2	0.1	-	0.0
Michigan-----	98.2	98.1	0.0	0.1	1.8	1.8	0.0	0.0
Minnesota-----	99.6	98.8	0.0	0.8	0.4	0.3	0.0	0.1
Mississippi-----	68.8	67.9	0.2	0.8	31.2	9.1	21.5	0.6
Missouri-----	94.0	93.3	0.0	0.7	6.0	5.5	0.4	0.2
Montana-----	99.3	97.8	0.1	1.4	0.7	0.2	0.3	0.1
Nebraska-----	98.3	96.8	-	1.4	1.7	1.6	0.0	0.1
Nevada-----	90.2	89.1	-	1.0	9.8	9.7	-	0.2
New Hampshire-----	99.7	99.6	-	0.1	0.3	0.2	-	0.0
New Jersey-----	97.3	96.0	0.0	1.3	2.7	2.5	0.0	0.2
New Mexico-----	92.7	90.7	1.0	0.9	7.3	4.9	1.7	0.8
New York-----	97.8	94.2	0.5	3.0	2.2	1.9	-	0.3
North Carolina-----	92.5	91.0	0.1	1.4	7.5	3.7	3.5	0.3
North Dakota-----	91.3	91.1	-	0.2	8.7	8.6	0.0	0.1
Ohio-----	99.4	98.0	-	1.4	0.6	0.6	0.0	0.1
Oklahoma-----	93.8	93.2	0.0	0.6	6.2	5.4	0.6	0.2
Oregon-----	98.3	97.8	-	0.5	1.7	1.4	0.0	0.3
Pennsylvania-----	95.6	91.3	-	4.3	4.4	4.2	0.0	0.2
Rhode Island-----	99.8	97.8	-	2.0	0.2	0.2	-	0.0
South Carolina-----	82.7	81.6	0.1	1.0	17.3	7.6	8.8	0.9
South Dakota-----	99.0	98.2	0.1	0.7	1.0	0.3	0.4	0.2
Tennessee-----	92.7	91.4	0.1	1.3	7.3	5.1	1.8	0.4
Texas-----	88.0	87.7	0.1	0.2	12.0	7.7	3.9	0.4
Utah-----	98.0	96.3	-	1.7	2.0	1.5	-	0.5
Vermont-----	99.4	98.7	-	0.7	0.6	0.6	-	0.0
Virginia-----	94.5	93.8	0.1	0.7	5.5	1.8	3.3	0.3
Washington-----	99.3	98.6	-	0.7	0.7	0.6	0.0	0.1
West Virginia-----	94.6	94.2	0.1	0.3	5.4	4.8	0.3	0.2
Wisconsin-----	99.3	98.7	0.0	0.6	0.7	0.6	0.0	0.0
Wyoming-----	99.6	99.1	-	0.4	0.4	0.3	0.0	0.1

<sup>1</sup>By State of occurrence.

<sup>2</sup>Hospital births here include only those births occurring in hospitals or in institutions, but in previous publications of natality statistics they include, in addition, births delivered by physicians in clinics.

Table 14. Median birth weight in single and plural deliveries, by color and sex: United States, 1964

[Notes to tables given on page VII]

Color and sex	Total	Single	Plural
<u>White</u>			
Median birth weight in grams			
Both sexes-	3,320	3,330	2,450
Male-----	3,380	3,390	2,490
Female-----	3,260	3,270	2,400
<u>Nonwhite</u>			
Both sexes-	3,130	3,140	2,290
Male-----	3,180	3,200	2,320
Female-----	3,070	3,090	2,250

<sup>1</sup>Computed to nearest 10 grams on basis of exact conversion of interval limits from pounds and ounces.

*Age and live-birth order.*—Maternal age and live-birth order both were positively correlated with birth weight, as shown in table 15. In general, median birth weight increased consistently with age of mother and live-birth order.

Whether white or nonwhite, mothers less than 15 years old had children with relatively low weight. A majority of these children were illegitimate, and both the mothers' immaturity and their reluctance to seek early prenatal care probably were factors affecting the weight of the babies.

With increasing age, however, first births had a higher median weight. This trend was reversed for women over 30. This was true for both white and nonwhite women. There are increased risks of certain complications of pregnancy in primiparae who are over 35 years of age. When the fetus is subjected to these complications there

appear to be increases in stillbirths, immaturity, neonatal deaths, and abnormalities.

Very close spacing of births also appears to be detrimental. Since we do not have information on the length of time between births, this can only be inferred from young maternal age and high birth order. For white mothers 15-19 years of age, the highest median weight was for first births. For each order thereafter median weight decreased. For mothers who had had more than four children, the median weight of the latest was only 3,060 grams. This was the lowest weight of any group among the white mothers.

Close spacing of births does not appear to have any effect on young nonwhite women, who have children with very low birth weight regardless of birth order.

There are some small declines in birth weight with increasing maternal age after age 30 for some categories of lower order births. However, this tendency does not extend to the higher order births.

*Gestation.*—The best method so far developed to estimate length of pregnancy from information on the birth certificate is to measure it from the beginning of the mother's last menstrual period (LMP). For 1964, LMP was available on the certificates of only 4 of the 54 registration areas: Baltimore, District of Columbia, New York City, and California. Other States are adding this item to their certificates, and more accurate data on gestation should be available for a larger number of areas in the near future; at present, however, they request only the physician's estimate of the length of pregnancy.

A major limitation of the gestation data for the United States as a whole is shown by a tremendous concentration at 40 weeks of gestation. According to the table shown on p. 29, 67 percent of the births occurred at 40 weeks of gestation. This heaping is probably due to a tendency to look at a normal healthy baby weighing 6 to 9 pounds and decide that it is full term and, therefore, 40 weeks. However, the chances that a baby will arrive exactly "on time" are small. Two weeks in either direction is considered a reasonable margin of error. A comparison with data from LMP reporting areas supports this contention. These data show that only 23 percent

Table 15. Median birth weight, by live-birth order, color, and age of mother: United States, 1964

[Notes to tables given on page VII]

Color and age of mother	Total <sup>1</sup>	Live-birth order				
		First	Second	Third	Fourth	Fifth and over
<u>Total</u>	Median birth weight in grams <sup>2</sup>					
All ages-----	3,290	3,250	3,290	3,320	3,330	3,340
Under 15 years-----	3,050	3,050	3,010	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
15-19 years-----	3,210	3,220	3,190	3,160	3,120	3,060
20-24 years-----	3,280	3,260	3,300	3,290	3,260	3,220
25-29 years-----	3,320	3,240	3,320	3,350	3,340	3,310
30-39 years-----	3,340	3,210	3,300	3,330	3,360	3,370
40-49 years-----	3,360	3,200	3,270	3,300	3,340	3,410
<u>White</u>						
All ages-----	3,320	3,270	3,320	3,340	3,360	3,390
Under 15 years-----	3,200	3,190	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
15-19 years-----	3,270	3,270	3,260	3,230	3,210	3,060
20-24 years-----	3,310	3,280	3,330	3,330	3,310	3,300
25-29 years-----	3,340	3,260	3,340	3,360	3,370	3,360
30-39 years-----	3,360	3,230	3,310	3,350	3,380	3,410
40-49 years-----	3,390	3,220	3,280	3,310	3,360	3,450
<u>Nonwhite</u>						
All ages-----	3,130	3,050	3,100	3,140	3,160	3,210
Under 15 years-----	2,960	2,960	2,970	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
15-19 years-----	3,030	3,030	3,030	3,050	3,050	3,060
20-24 years-----	3,110	3,070	3,110	3,130	3,150	3,130
25-29 years-----	3,170	3,090	3,150	3,180	3,190	3,200
30-39 years-----	3,210	3,040	3,150	3,150	3,190	3,240
40-49 years-----	3,240	3,030	3,170	3,160	3,180	3,270

<sup>1</sup>Includes not stated live-birth order, which is not distributed.

<sup>2</sup>Computed to nearest 10 grams on basis of exact conversion of interval limits from pounds and ounces.

<sup>3</sup>Fewer than 250 cases in age of mother and birth order.

of the babies were born after exactly 40 weeks of gestation.

Completed weeks of gestation	United States	LMP areas
All periods-----	100.0	100.0
Under 20 weeks-----	0.0	0.1
20-27 weeks-----	0.6	0.7
28-31 weeks-----	0.8	1.2
32-35 weeks-----	2.4	5.0
36 weeks-----	3.0	3.4
37-39 weeks-----	17.2	39.3
40 weeks-----	67.3	23.1
41-42 weeks-----	7.3	21.3
43 weeks and over-----	1.3	5.9

The length of the period of gestation is also used to define prematurity. A birth is defined as premature if it occurred after fewer than 37 weeks of gestation. For the United States as a whole, 6.9 percent of the births were premature in 1964. For the LMP areas, the comparable proportion was 10.4 percent.

All further discussion of period of gestation is based on the four areas reporting LMP. Data for the other States and for the United States can be obtained from Volume I of *Vital Statistics of the United States, 1964*.<sup>1</sup>

The sex of the child does not appear to affect the length of time *in utero*. The median length of gestation was about a week longer for white boys and girls (40.0 and 40.2 weeks, respectively) than for nonwhite boys and girls (39.2 and 39.3 weeks).

Plural births had shorter periods of gestation than single births for both white and nonwhite deliveries, as shown by the following median numbers of weeks:

Color of child	Single	Plural
White-----	40.1	37.8
Nonwhite-----	39.3	36.8

There is normally a close relationship between the period of gestation and the infant's birth weight. The median weight at each gestation interval increased through the completion of 42 weeks. For babies that were 3 weeks or more overdue there was a slight decrease in the median weight, as shown in table 16.

Table 16. Median birth weight, by color and period of gestation: Baltimore, California, District of Columbia, and New York City combined, 1964

[Notes to tables given on page VII]

Period of gestation <sup>1</sup>	Total	White	Non-white
	Median birth weight in grams <sup>2</sup>		
All periods---	3,266	3,301	3,103
20-27 weeks-----	957	899	1,860
28-31 weeks-----	1,831	1,739	1,993
32-35 weeks-----	2,629	2,620	2,646
36 weeks-----	2,873	2,888	2,836
37-39 weeks-----	3,196	3,220	3,092
40 weeks-----	3,365	3,390	3,245
41-42 weeks-----	3,458	3,488	3,291
43 weeks and over-----	3,425	3,466	3,253

<sup>1</sup>The period of gestation is measured from the first day of the last menstrual period. "All periods" includes not stated period of gestation, which is not distributed.

<sup>2</sup>Computed to nearest 10 grams on basis of exact conversion of interval limits from pounds and ounces.

NOTE: Refers only to births occurring within the selected registration areas.

From the previous discussion one would expect that nonwhite infants would weigh less at a given length of gestation than white infants. This was true only for infants born alive after the 35th week of gestation. Nonwhite babies born earlier than 32 weeks weighed considerably more than white babies. Many investigators have shown this, and some hypothesize that the nonwhite fetus matures more rapidly at these early ages.

For the LMP areas, births can be divided into four maturity groups, as shown by the following percentages:

Length of gestation	Birth weight	
	Immature	Mature
Premature-----	4.4	5.9
Mature-----	3.7	86.0

Eighty-six percent of all newborn infants were mature by both criteria. For the remaining three groups (14.0 percent of the births) there are varying risks. Studies conducted in New York City<sup>16</sup> and Baltimore<sup>17</sup> have shown that the highest risk of neonatal death is among babies with immature weight. Those who are gestationally mature have somewhat lower risks of death. The other high-risk group, babies weighing 2,501 grams or more but having been *in utero* fewer than 37 weeks, have higher risks of neonatal death than the completely mature births. While these risks are higher than normal, they are not nearly as high as for either of the groups of infants weighing less than 2,501 grams. It is apparently more important that an infant weigh at least 2,501 grams than that he complete more than 37 weeks of gestation.

### Season of Birth

Table 17 shows the monthly indexes of births in the United States since the latter half of the 1930's. This is the ratio of the actual number of births in a month to the average monthly number for each calendar year. Adjustments have been made for the varying number of days per month.

In 1964, as in past years, the monthly indexes showed two peaks, a minor peak in February and a major peak in September. Below-average indexes were observed for January-May and November and December; the intervening months, June-October, had above-average indexes. The maximum index occurred in September (107.7) and the minimum in April (94.9).

In the 30 years since 1935, the seasonal pattern of births in the United States has changed little. The minor peak of the bimodal distribution has always been in February and the major peak in September. The difference separating these peaks has widened slightly with a diminution of the February peak and an accentuation of the September peak.

While the pattern of monthly births has been fairly stable, the degree of monthly fluctuation has tended to increase. The standard deviations of the monthly indexes within calendar years have exhibited a long-term increase, which appears to have ended in the 1950's. The standard deviation of the monthly indexes rose from 3.6 in 1935 to 4.8 in 1953 and has since declined to 4.0 in 1964. The major contributions to these trends can be traced to two population segments—the nonwhite group and persons in the South Geographic

Table 17. Monthly index of live births: United States, 1935-64

[Notes to tables given on page VII]

Month of occurrence	1964	1963	1962	1961	1960	1955-59	1950-54	1945-49	1940-44	1935-39
Total----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
January-----	97.4	96.4	96.4	96.3	96.3	96.6	97.8	99.1	99.9	100.0
February-----	99.8	98.5	98.5	98.6	98.5	98.7	99.7	100.2	101.6	102.5
March-----	97.4	98.0	98.1	98.0	97.8	97.3	97.7	98.1	99.5	101.4
April-----	94.9	95.0	94.9	94.8	94.7	93.9	93.2	93.5	95.7	97.3
May-----	95.9	94.2	94.0	94.1	94.1	94.1	92.9	92.8	94.3	96.6
June-----	100.7	97.3	97.5	97.5	97.7	98.1	99.0	98.8	98.6	98.6
July-----	105.0	103.2	103.4	103.4	103.6	104.2	104.7	103.3	103.5	104.2
August-----	104.0	106.9	106.7	106.7	106.5	106.6	106.6	105.9	105.8	105.5
September-----	107.7	108.6	108.7	108.7	108.6	108.4	107.7	107.0	106.3	105.3
October-----	102.1	102.9	102.9	103.0	103.2	103.1	102.8	102.8	100.8	98.7
November-----	98.0	99.4	99.4	99.4	99.5	99.5	99.4	100.1	97.8	95.6
December-----	97.0	99.6	99.6	99.5	99.4	99.3	98.5	98.1	96.5	94.4

NOTE: Ratio of monthly daily average to calendar year daily average multiplied by 100.

Region—both of which have unusually large amounts of seasonal variation. The nonwhite group and the South have accounted for most of the change in the amount of seasonal variation. Details of these differentials may be found in an earlier report.<sup>18</sup>

*Effect of seasonality on birth and fertility rates.*—Variations in the monthly incidence of births within the calendar year can be analyzed into several components: the trend-cycle (T), the seasonal component (S), and the irregular movements (I). The BLS Seasonal Factor Method<sup>19</sup> is used for this purpose with data for the 10-year period 1955-64.

Factor (T) is approximated by a 12-month moving average of the observed monthly number of births. It is then removed by division, leaving (S) x (I). Fitting a smoothed curve to these residual components removes the randomly distributed factor (I), leaving (S).

Table 18 shows the seasonal factor (S) for each month of 1964. These factors yield seasonally adjusted monthly birth rates when divided into the unadjusted monthly rates. The seasonally adjusted rates may be interpreted as those that would result from the elimination of the characteristic seasonal pattern of births for the 10-year period ending with 1964. To facilitate comparisons, the rates based on a monthly incidence of births are inflated to an annual basis. The trend of these rates suggests that the year's decline did not really begin until August, before which fairly stable rates prevailed.

### Illegitimacy

An estimated 275,700 illegitimate live births occurred in the United States in 1964. This is almost 7 percent of the 4,027,490 children born in that year. The increase of 16,300 illegitimate

Table 18. Seasonal factors and seasonally adjusted birth rates and fertility rates, by month of occurrence: United States, 1964

[Notes to tables given on page VII]

Month of occurrence	Seasonal factor <sup>1</sup>	Seasonally adjusted rates <sup>2</sup>	
		Births per 1,000 population	Births per 1,000 women aged 15-44
Total-----	100.0	21.0	104.8
January-----	96.6	21.4	106.5
February-----	98.5	21.4	106.9
March-----	97.8	21.1	105.0
April-----	95.0	21.1	105.1
May-----	95.1	21.3	106.0
June-----	97.9	21.7	108.0
July-----	103.3	21.4	106.5
August-----	106.7	20.5	102.1
September-----	108.1	20.9	104.2
October-----	102.9	20.8	103.6
November-----	99.0	20.7	103.3
December-----	99.2	20.5	101.9

<sup>1</sup>Based on 1955-64 data using the BLS Seasonal Factor Method (1964) of the U.S. Department of Labor.

<sup>2</sup>The quotient of the unadjusted rate and the seasonal factor; monthly rates are inflated to an annual basis.

births between 1963 and 1964 follows the pattern of an annual increase in the number of illegitimate births seen in almost every year since 1938 (the first year for which estimates of the number of illegitimate births were made for the entire country).

All data on illegitimate births for the United States as a whole are based on the reports of illegitimacy from 34 States and the District of Columbia. In making estimates for the entire United States, the States are grouped into nine geographic divisions. The ratio of illegitimate births to total live births for the residents of reporting States in each division is then applied to all live births occurring to residents of that division. The sum of the estimates for the nine divisions is the estimate for the United States. These estimates are prepared for white and non-white births separately.

Trends in the number of illegitimate births are affected by two factors: (1) changes in the rate of illegitimacy—that is, in the risk that an unmarried woman will have an illegitimate child—and (2) changes in the number of unmarried women.

The illegitimacy rate, illegitimate births per 1,000 unmarried women 15-44 years of age, measures the risk of an unmarried woman having an illegitimate child. In figure 9 the trend in this rate since 1940 is shown for all unmarried women of childbearing age as a group and for certain 5-year age groups separately.

The continuous upward trend in the illegitimacy rate for women 15-44 during most of these years shows that much of the increase in the number of illegitimate births is due to an increasing risk. Since 1957, however, there has been relatively little change in the rates from year to year. In other words, since 1957 an increasing number of unmarried women, rather than an increased risk, has accounted for the rise in the number of illegitimate births.

In 1964, for example, there were 23.4 illegitimate births per 1,000 unmarried women aged 15-44. If there had been the same number of unmarried women 15-44 years old in 1964 as in 1960, then this rate would have produced only 240,800 illegitimate births (12.7 percent fewer than there actually were).

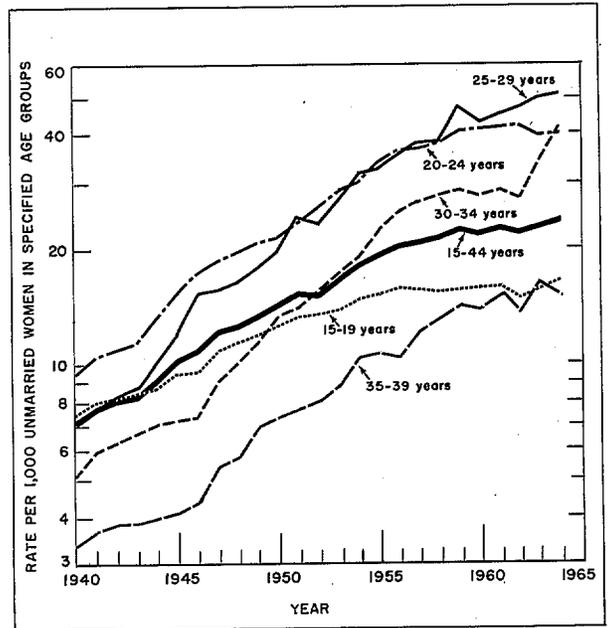


Figure 9. Illegitimate births per 1,000 unmarried women, by age.

(Semilogarithmic scale)

Not all women have the same risk of bearing an illegitimate child. For girls less than 15 years of age the rate was negligible in 1964 (0.6 illegitimate births per 1,000 unmarried women 10-14); for those 15 to 19 years old the rate was 16.5. Women between 20 and 34 years of age had rates  $2\frac{1}{2}$  times the rates for those of 15 to 19 years.

The trends for these different groups of women have differed considerably over the past 25 years. Women under 25 years of age have shown relatively little change in their risk of bearing an illegitimate child since 1959. Older women, in contrast, have shown almost continuous increases in their rates of illegitimacy during the entire period since 1940.

Concern is often expressed because a large proportion of the illegitimate births occur to teenagers. Such statements often imply that they have a higher risk. In fact, as shown above, they have lower risks than older women. The reason that so many illegitimate children are born to women 15-19 years of age is that a high proportion of women in this age group are unmarried.

Recently this situation has been aggravated by the large numbers of children, born during the late 1940's, who have been entering their late teens.

The illegitimacy ratio, illegitimate births per 1,000 live births, is used to describe the relative number of babies affected rather than the number of women. Since it is much easier to compute this measure than the illegitimacy rate (because of difficulty in obtaining accurate estimates of unmarried women), it is more frequently used but is often inappropriate.

In 1964 there were 68.5 illegitimate births per 1,000 live births. For white infants the ratio is 33.9 and for nonwhite infants 245.0. Since 1958 the ratio has risen more rapidly for white births than for nonwhite. Since illegitimacy rates by color are not available, it is impossible to state whether the narrowing of the differential by color is due to a similar tendency for the rates.

Differentials by age are similar for the two color groups. Babies born to the youngest groups of women show the highest proportion illegitimate. This can be accounted for by the low proportion of women married and having legitimate children at ages under 20. For women over 20, even though the unmarried have high rates of illegitimacy, a large proportion are married and having

legitimate children. Therefore the small numbers of unmarried women contribute a small proportion of the total births (see table 19).

The number of illegitimate births and illegitimacy ratios for each State and the number of illegitimate births for certain local areas are shown in *Vital Statistics of the United States, 1964*.<sup>1</sup>

## BIRTHS IN PUERTO RICO AND THE VIRGIN ISLANDS (U.S.)

### Rates of Birth and Natural Increase

The number of live births that occurred in Puerto Rico in 1964, 78,956, was the highest since 1952; it was 2 percent higher than in 1963. The birth rate per 1,000 population, however, was 30.6 in 1964, about the same as in 1963 and the lowest on record. This continues the steady decline since 1947, when the birth rate was 42.2.

As a result of the declining birth rate, the rate of natural increase has also declined in Puerto Rico since 1947. The rate of natural increase is the difference between the birth rate and the death rate per 1,000 population. In 1947 this rate was 30.4, which is as high as the current

Table 19. Estimated number of illegitimate live births and ratios, by color and age of mother: United States, 1964

[Notes to tables given on page VII]

Age of mother	Total	White	Nonwhite	Total	White	Nonwhite
	Number of illegitimate live births			Ratio per 1,000 total live births		
All ages-----	275,700	114,300	161,300	68.5	33.9	245.0
Under 15 years-----	5,800	1,400	4,400	742.1	523.2	856.0
15-19 years-----	111,400	45,200	66,200	190.2	101.7	468.3
15-17 years-----	58,700	21,600	37,100	299.2	160.5	602.0
18-19 years-----	52,700	23,600	29,100	135.3	76.2	365.0
20-24 years-----	87,900	40,600	47,300	61.1	33.1	220.4
25-29 years-----	36,400	14,300	22,100	36.1	16.5	155.0
30-34 years-----	19,500	6,800	12,700	33.3	13.7	140.7
35-39 years-----	11,100	4,400	6,700	35.8	16.9	136.2
40 years and over-----	3,600	1,600	1,900	39.0	20.7	125.2

birth rate. The rate of natural increase declined to 25.8 per 1,000 population in 1960 and to 23.4 in 1964.

The Virgin Islands, in contrast to Puerto Rico, exhibit no downward trend in annual rates of birth or natural increase. The trends, if any, are upward. In 1964 the birth rate was 43.4 per 1,000 population, and the natural increase rate was 35.0, the highest rates ever recorded in the Virgin Islands. The trends of birth and natural increase rates since 1940 are shown in table 20 for the Virgin Islands, Puerto Rico, and the United States.

In 1964 the birth rate for the Virgin Islands was about twice that of the United States and the rate for Puerto Rico about 1½ times. The annual rates of natural increase were even further apart when compared with that of the United States (with an increase of 11.6 per 1,000 in 1964); that for the Virgin Islands was three times as large and that for Puerto Rico was two times as large. In relation to land area, the 1964 natural increase represented an increment of about 11 persons per square mile in the Virgin Islands, 18 per square

mile in Puerto Rico, and less than 1 per square mile in the United States.

### Season of Birth

Like that of the United States, the monthly incidence of births in Puerto Rico tends to have a minor peak early in the year preceding the major peak (see fig. 10). In 1964, monthly indexes of births showed the minor peak occurring in March in both Puerto Rico and the Virgin Islands rather than in February as in the United States. Major peaks occurred in September in Puerto Rico (114.9) and in the United States (107.7) and in November in the Virgin Islands (127.4).

Compared with the United States, however, Puerto Rico and the Virgin Islands exhibit larger month-to-month fluctuations. The standard deviation of the indexes summarizes the amount of fluctuation from month to month. In 1964 the standard deviation was 10.1 for Puerto Rico, 18.9 for the Virgin Islands, and 4.0 for the United States.

Table 20. Rates of birth and natural increase; Puerto Rico, Virgin Islands, and United States, 1940-64

[Notes to tables given on page VII]

Year	Birth rate			Natural increase rate		
	Puerto Rico	Virgin Islands	United States	Puerto Rico	Virgin Islands	United States
1964-----	30.6	43.4	21.0	23.4	35.0	11.6
1963-----	30.7	38.1	21.7	23.8	28.5	12.1
1962-----	31.1	39.4	22.4	24.4	30.2	12.9
1961-----	31.3	34.8	23.3	24.5	25.3	14.0
1960-----	32.5	36.8	23.7	25.8	26.5	14.2
1960-64 <sup>1</sup> -----	31.2	38.5	22.4	24.4	29.1	13.0
1955-59 <sup>1</sup> -----	33.7	35.2	24.6	26.6	24.0	15.2
1950-54 <sup>1</sup> -----	36.6	32.7	24.5	27.7	20.5	15.0
1945-49 <sup>1</sup> -----	41.0	33.5	23.3	28.8	19.4	13.3
1940-44 <sup>1</sup> -----	<sup>2</sup> 39.7	35.3	19.8	<sup>2</sup> 25.4	17.8	9.2

<sup>1</sup>Annual average.

<sup>2</sup>Based on 1943-44 data.

In a study of the season of birth in Puerto Rico from 1941 through 1961, the maximum monthly index was observed to shift from May in the 1941-46 period to August in the 1946-50 period and to September in subsequent 5-year periods.<sup>20</sup>

The 1964 maximum also occurred in September (114.9), but it was nearly equaled by the October monthly index (114.3). This is part of the trend toward births being concentrated in the October-December quarter of the year in Puerto Rico. In previous years the index of births in this quarter had been average (near 100 in the 1946-55 period) or below average (90-100 in the 1941-45 period). There is some evidence that the recent high incidence of births in the final quarter of the year in Puerto Rico was associated with socioeconomic status. This is shown by the following tabulation of the index of births in the October-December quarter of 1962 according to the educational attainment of the mother (this tabulation is not available for Puerto Rico in 1964).

*Index for  
Oct.-Dec.*

No schooling-----	105
Grades 1-4-----	103
Grades 5-8-----	106
Grades 9-11-----	111
Grade 12-----	116
Grade 13 or more-----	107

**Illegitimate Births**

It was previously noted in this report that about 7 percent of the total live births occurring in the United States in 1964 were illegitimate. The percentages were higher in Puerto Rico and the Virgin Islands, 23.1 and 43.3 percent, respectively. The trends in these islands since 1945 are shown in figure 11. While the percentage of illegitimate births steadily declined from 33 to 23 percent in Puerto Rico during this 20-year period, it remained at about 50 percent in the Virgin Islands until the 1960's. Recent levels are fluctuating near 40 percent in the Virgin Islands.

Illegitimate births in Puerto Rico and the Virgin Islands occurred to sizable proportions of

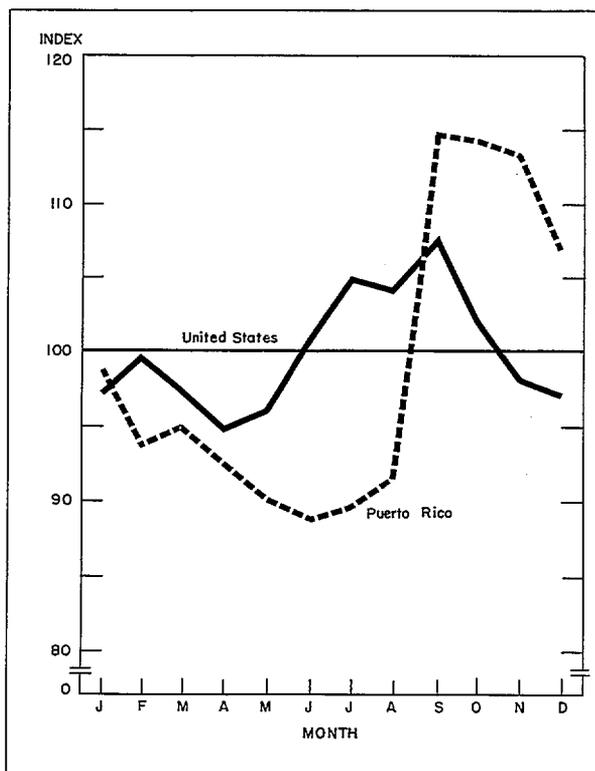


Figure 10. Monthly indexes of live births: Puerto Rico and the United States, 1964.

(Ratio of monthly daily average to the calendar year daily average multiplied by 100)

mothers who were living with a husband in consensual marriage, which is prevalent in Latin American cultures. During 1964, the percentage of Puerto Rican births classified as illegitimate (23.1) was comprised of 18.9 percent to parents who were "living together" (consensually married) and 4.2 percent to parents who were "not living together." Comparable figures are not available for the Virgin Islands and the United States. Tabulations of the Puerto Rican classification were published for the first time in *Vital Statistics of the United States, 1964, Volume I*,<sup>1</sup> and may be compared with an unpublished tabulation of 1962 data, as is shown in table 21 of this report.

Between 1962 and 1964, the percentage of births to consensually married parents declined in Puerto Rico from 20.2 to 18.9. Comparable

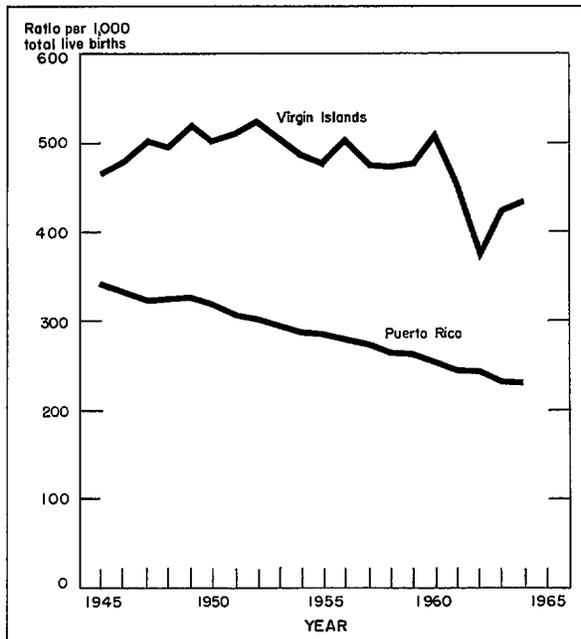


Figure 11. Illegitimacy ratios: Puerto Rico and the Virgin Islands.

(Illegitimate births are those to unmarried or consensually married women)

declines were not observed in the percentage of births to parents "not legally married, not living together." Thus declines in the overall percentage of illegitimate births in this 2-year period were attributed entirely to declines in the percentage of consensually married parents. Declines in the percentage of births to consensually married parents were common to all age groups of mothers but were least (less than 1 percent) within ages 15-29 (see table 21).

Complementing these declines were increases in the percentage of births to legally married parents. The percentage of legitimate births rose from 75.7 to 76.9 percent between 1962 and 1964. The amount of this increase was higher for older mothers (excluding ages under 15), as shown by table 21. Moreover, the special 1962 tabulation shows that above-average percentages of legitimate births are found in the upper socioeconomic strata. Where the mother was at least a high-school graduate, for example, more than 9 out of every 10 births were legitimate in 1962.

It seems likely that recent increases in the percentage of legitimate births in Puerto Rico were due largely to rising percentages of women who were legally married and well educated.

Table 21. Percentage distribution of births by marital status of parents, 1964, and amount of change in distribution, 1962-64, by age of mother: Puerto Rico

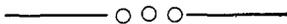
[Notes to tables given on page VII]

Age of mother	Percentage distribution, 1964				Change from 1962 (percentage points)		
	All births	Parents legally married	Parents not legally married		Parents legally married	Parents not legally married	
			Living together	Not living together		Living together	Not living together
All ages---	100.0	76.9	18.9	4.2	+1.2	-1.3	+0.1
Under 15 years-	100.0	50.8	23.0	26.2	+8.2	-11.0	+2.8
15-19 years----	100.0	69.5	23.2	7.3	+0.4	-0.8	+0.3
20-24 years----	100.0	77.5	18.2	4.3	+0.5	-0.7	+0.1
25-29 years----	100.0	80.3	17.0	2.7	+1.0	-0.6	-0.4
30-34 years----	100.0	78.7	18.2	3.1	+2.6	-2.8	+0.2
35-39 years----	100.0	77.1	19.5	3.5	+2.2	-2.6	+0.4
40-44 years----	100.0	78.9	18.8	2.4	+2.6	-2.6	+0.1
45-49 years----	100.0	77.6	21.4	1.0	+7.2	-6.7	-1.0

NOTE: Excludes not stated marital status of parents and not stated age of mother.

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