

Series 20

No. 30



Vital and Health Statistics

From the CENTERS FOR DISEASE CONTROL AND PREVENTION / National Center for Health Statistics

Fetal Mortality by Maternal Education and Prenatal Care, 1990

July 1996



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Center for Health Statistics



Copyright information

All material appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

Suggested citation

Hoyert DL. Fetal mortality by maternal education and prenatal care, 1990. National Center for Health Statistics. Vital Health Stat 20(30). 1996.

Library of Congress Catalog Card Number

Fetal mortality by maternal education and prenatal care, 1990
p. cm. — (Vital and health statistics. Series 20, Data from the national vital statistics system ; no. 30)

ISBN (invalid) 8040605145

1. Fetal death—United States—Statistics. 2. Prenatal care—United States—Statistics. 3. Education—United States—Statistics. 4. United States—Statistics, Medical. I. United States. National Center for Health Statistics. II. Series.

HB1335, A18 no. 30

[RG632.U6]

304.6'4'0973021 s—dc20

[614.5'992]

96-14345

CIP

For sale by the U.S. Government Printing Office
Superintendent of Documents
Mail Stop: SSOP
Washington, DC 20402-9328

Vital and Health Statistics

Fetal Mortality by Maternal Education and Prenatal Care, 1990

Series 20:
No. 30

The risk for experiencing a fetal loss differs by both maternal and fetal characteristics. In this report, data for two maternal factors, education and use of prenatal care, are presented. Fetal mortality for 1990 varied by the educational attainment of women, with higher rates for those with less education. Fetal mortality rates were high for women who received no prenatal care during pregnancy compared with women who received some prenatal care.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Center for Health Statistics
Hyattsville, Maryland
July 1996
DHHS Publication No. (PHS) 96-1858

National Center for Health Statistics

Edward J. Sondik, Ph.D., *Director*

Jack R. Anderson, *Deputy Director*

Jacob J. Feldman, Ph.D., *Associate Director for Analysis, Epidemiology, and Health Promotion*

Gail F. Fisher, Ph.D., *Associate Director for Planning and Extramural Programs*

Jack R. Anderson, *Acting Associate Director for International Statistics*

Stephen E. Nieberding, *Associate Director for Management*

Charles J. Rothwell, *Associate Director for Data Processing and Services*

Monroe G. Sirken, Ph.D., *Associate Director for Research and Methodology*

Division of Vital Statistics

Mary Anne Freedman, M.A., *Director*

James A. Weed, Ph.D., *Deputy Director*

Harry M. Rosenberg, Ph.D., *Chief, Mortality Statistics Branch*

Robert J. Armstrong, *Acting Chief, Statistical Resources Branch*

Nicholas F. Pace, *Acting Chief, Systems and Programming Branch*

Contents

- Highlights 1
- Introduction..... 2
 - Fetal death reporting system..... 2
- Fetal mortality patterns..... 3
 - Maternal education 3
 - Prenatal care 4
 - Prenatal care and maternal education..... 5
- References..... 8
 - List of detailed tables 9

Appendix

- Technical notes 26

Text figures

- 1. Fetal mortality rates by maternal education, race, and Hispanic origin, 1990..... 3
- 2. Fetal mortality rates by prenatal care and period of gestation: Total of 37 States, 1990 5
- 3. Fetal mortality rates by prenatal care, maternal education, and period of gestation: Total of 35 States, 1990 6

Text tables

- A. Fetal mortality rates by educational attainment and age of women: Total of 37 States, 1990..... 4
- B. Fetal mortality rates by educational attainment and total-birth order: Total of 37 States, 1990..... 4
- C. Fetal mortality rates by prenatal care total-birth order: Total of 37 States, 1990 6

Fetal Mortality by Maternal Education and Prenatal Care, 1990

by Donna L. Hoyert, Ph.D., Division of Vital Statistics

Highlights

One of the principal data sets that make up the National Vital Statistics System of the United States features fetal deaths. Fetal deaths, involuntary losses of fetuses during pregnancy, along with infant deaths are two poor outcomes of pregnancy. In fact, fetal deaths represent close to half of the deaths that occur during the period between the 20th week of pregnancy and the first year of life. The risk for experiencing a fetal loss differs by both maternal and fetal characteristics.

In this report, data for two maternal factors, education and use of prenatal care, are presented. Both items have routinely

been reported to the data system since 1968; however, neither item has been published in a National Center for Health Statistics (NCHS) publication prior to data year 1990.

Fetal mortality for 1990 varied by the educational attainment of women, with higher rates for those with less schooling. This inverse relationship was evident for women aged 20–34 and 35–49 years; and for the white population of all ages combined. This mortality differential by education persisted when several other characteristics were taken into account.

Analyses of prenatal care, particularly the timing of prenatal care, are complicated by factors such as differential selection into prenatal care and differences in opportunities to obtain prenatal care. However, this report shows that fetal mortality rates were high for women who received no prenatal care during pregnancy as compared with women who received some prenatal care. This association between prenatal care and fetal mortality held for all ages, race and ethnic groups, birth order, length of gestation, and education among women aged 25 years and over.

NOTES: This report was prepared in the Division of Vital Statistics under the general direction of Harry M. Rosenberg, Ph.D., Chief of the Mortality Statistics Branch. Marian F. MacDorman, Ph.D., Mortality Statistics Branch, and staff of the Office of Analysis and Epidemiology, provided peer review for this report. Sherry L. Murphy provided content review. The Registration Methods Branch and the Technical Services Branch provided consultation to State vital statistics offices regarding collection of the vital statistics data on which this report is based. This report was edited by Demarius V. Miller and typeset by Annette F. Holman of the Publications Branch, Division of Data Services.

Introduction

One of the principal data sets that make up the National Vital Statistics System of the United States concerns fetal deaths. The National Vital Statistics System encompasses several data bases of statistical information on vital events such as fetal deaths, births, marriages, divorces, and deaths. These data sources allow the Federal Government, the research community, and the public at large to be aware of and to monitor basic trends occurring within our population. Fetal deaths, involuntary losses of fetuses during pregnancy, along with infant deaths are two poor outcomes of pregnancy. In fact, fetal deaths represent close to half of the deaths that occur during the period between the 20th week of pregnancy and the first year of life. The risk for experiencing a fetal loss differs by both maternal and fetal characteristics.

In this report, two maternal factors, education and use of prenatal care, are featured. Both items have routinely been reported in the data system since 1968; however, neither item has been published in a National Center for Health Statistics (NCHS) publication prior to data year 1990.

Fetal death reporting system

NCHS adopted the World Health Organization (WHO) definition of “fetal death” as the recommended standard for use in the early 1950’s. The following inclusive definition was developed by the WHO in 1950 in order to end confusion arising from the use of such terms as stillbirth, spontaneous abortion, and miscarriage:

Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles (1).

The States use a consistent definition of fetal death, but the registration of a fetal death in most States is required only for those fetal deaths occurring at 20 or more weeks of gestation. National fetal-death statistics are compiled from State fetal death reports received by NCHS every year, and typically are tabulated for those deaths of 20 or more weeks of

gestation. Statistics on induced terminations of pregnancy (abortions) are excluded in national fetal-death statistics and are not included in this report.

The States included in the tables in this report were chosen on the basis of the completeness of reporting of the selected variables featured in this report. States were included in [tables 1–5](#) only if reporting was at least 80 percent complete for education. Similarly, States were included in [tables 6–9](#) only if reporting was at least 80 percent complete for prenatal care and in [table 10](#) if reporting was at least 80 percent complete for both education and prenatal care. For [tables 2](#) and [7](#), some additional States were dropped because they either did not have an item identifying Hispanic origin or reporting was not 90 percent complete for that item. For 1990 data, this selection process resulted in [tables 1](#) and [3–5](#) including data for 37 States, representing 70 percent of all fetal deaths of 20 weeks gestation or more in the United States; [tables 6, 8, and 9](#) including data for a slightly different group of 37 States, representing 74 percent of fetal deaths in the United States; [table 2](#) including data for 31 States, representing 64 percent of fetal deaths; [table 7](#) including data for 31 States, representing 68 percent of fetal deaths; and [table 10](#) including data for 35 States, representing 68 percent of fetal deaths. For details on the specific States included and characteristics of these States, see the [Technical notes](#).

Fetal mortality rates, expressed as the number of fetal deaths per 1,000 total live births and fetal deaths to women in the specified group, are shown in the tables. The denominator for the rates shown in these tables is a proxy estimate of pregnancies (excluding induced abortions) that are exposed to the risk of being a fetal death. The rates provide a measure of the risk of having a fetal death for reported pregnancies (i.e., pregnancies ending in a live birth or fetal death of 20 or more weeks of gestation). In [tables 6, 8, and 10](#), fetal mortality rates are shown by period of gestation. For example, the denominators of the rates by gestation include all live births for all periods of gestation, live births of 20 or more weeks of gestation for the 20–27 weeks period of gestation, and live births of 28 or more weeks of gestation for the 28 or more weeks gestational period.

All text tables include ratios of rates to show the relative risk of fetal mortality for women of differing characteristics or behavior.

Fetal mortality patterns

Maternal education

Fetal mortality varied by educational attainment of women (table 1). Generally, the risk of fetal loss was greater for women with less schooling. For example, fetal mortality rates declined from 7.8 fetal deaths per 1,000 live births and fetal deaths for women with less than 12 years of schooling to 6.7 for women with 12 or more years of schooling. However, the relationship was not linear when examined by detailed educational categories (figure 1). Fetal mortality rates for women with 0–8 and 9–11 years of schooling were not substantially different from one another; but the rate markedly decreased from 7.9 for women with 9–11 years of schooling to 5.4 for women with 16 or more years of schooling, a reduction of 32 percent.

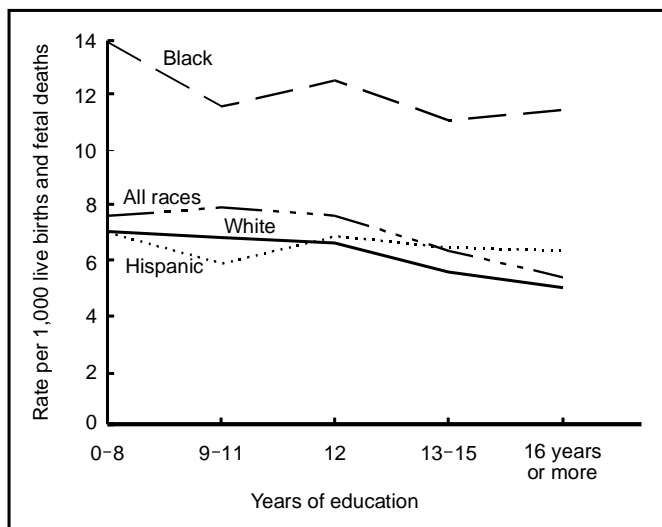


Figure 1. Fetal mortality rates by maternal education, race, and Hispanic origin, 1990

The relationship between fetal mortality and education differed by maternal age (table A). For women under 20 years of age, fetal mortality rates did not vary by maternal education. For women aged 20–34 years, rates declined from 7.2 for less than 12 years of schooling to 6.4 for 12 or more years of schooling, an 11 percent decrease; and for women aged 35–49 years, from 12.5 to 9.2, a 26-percent decrease.

The association between fetal mortality and maternal education also differed by race and by Hispanic origin (figure

1). For the white population, rates declined by 14 percent from 6.9 for women with less than 12 years of schooling to 5.9 for women with 12 or more years of schooling (table 1). For the black population, the rates were 11.8 and 12.0, respectively. For Hispanic women (table 2), the rate was 6.5 for those with less than 12 years of schooling and 6.7 for those with 12 or more years of schooling.

The analysis in the following three sections was restricted to women aged 25 years and over in order to exclude women who were too young to have had the opportunity to complete 16 or more years of schooling. With the exception of some relationships by marital status, the general patterns evident with this select group of women were the same as those evident with women of all ages.

Marital status

The association between fetal mortality and maternal education varied by marital status for women 25 years of age and over (table 3). For married women, rates decreased from 6.1 fetal deaths per 1,000 live births and fetal deaths for those with less than 12 years of schooling to 5.3 for those with 12 or more years of schooling. For unmarried women, the rate for those with less than 12 years of schooling was almost the same as the rate for those with 12 or more years of schooling.

Among married women, the pattern of fetal mortality by maternal education was different for the white and black populations. For married white women, rates decreased with higher educational attainment (6.7 for those with less than 12 years of schooling to 5.1 for those with 12 or more years of schooling), but rates did not differ by educational attainment for black married women (9.4 and 9.6). For unmarried women of either racial group, rates for those with less than 12 years of schooling did not differ from those with 12 or more years of schooling.

Metropolitan, nonmetropolitan residence

Among women aged 25 years and over, the general relationship between fetal mortality and education was the same regardless of residence (table 4). Fetal mortality was inversely related to education for women living in metropolitan counties and for women living in nonmetropolitan counties. In metropolitan counties, rates decreased from 8.2 fetal deaths per 1,000 live births and fetal deaths for women with less than 12 years of schooling to 6.5 for those women with 12 or more years of schooling, a 21-percent decrease. In nonmet-

Table A. Fetal mortality rates by educational attainment and age of women: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age of woman	Years of school completed by woman						Ratio of rates for less than 12 years of education to 12 or more years of education
	Total		Less than 12 years		12 years or more		
	Rate	Confidence interval	Rate	Confidence interval	Rate	Confidence interval	
All ages	7.0	(6.91, 7.10)	7.8	(7.60, 8.00)	6.7	(6.64, 6.85)	1.16
Under 20 years	8.2	(7.90, 8.45)	8.1	(7.79, 8.46)	8.3	(7.81, 8.75)	0.98
20–34 years	6.5	(6.42, 6.62)	7.2	(6.97, 7.46)	6.4	(6.25, 6.47)	1.13
35–49 years	9.6	(9.27, 10.01)	12.5	(11.37, 13.63)	9.2	(8.79, 9.57)	1.36

ropolitan counties, rates declined from 9.8 for women with less than 12 years of schooling to 6.7 for women with 12 or more years of schooling, a 32-percent decrease.

Fetal mortality patterns by education and residence differ for white and black women. In metropolitan areas, rates for white women declined from 7.3 for women with less than 12 years of schooling to 5.7 for those with 12 or more years of schooling, a 22-percent decrease. For black women in metropolitan areas, the rates were not substantially different by educational attainment of the women. For nonmetropolitan areas, the rates for white women were 9.0 for those with less than 12 years of schooling and 6.2 for those with 12 or more years of schooling, a decline of 31 percent; and for black women, the comparable rates did not differ statistically for those with less than 12 years of schooling compared with those who had 12 or more years of schooling.

Total-birth order

The association between education and fetal mortality varies by birth order for women aged 25 years and over. For women with a total-birth order of 1, the rate for those with less than 12 years of schooling was 10.0 fetal deaths per 1,000 live births and fetal deaths compared with 6.1 for those with 12 or more years of schooling, a 39-percent decrease ([tables B and 5](#)). Comparable rates for women with a total-birth order of 2 decreased from 6.9 to 5.4, respectively, or by 22 percent; but

for those with more than two pregnancies, the comparable rates were not substantially different by maternal education.

The association between fetal mortality and education by birth order varied by race. Among white women, maternal education was inversely associated with fetal mortality at birth orders 1 (decline in rates of 43 percent) and 2 (decline of 25 percent). For black women, rates at all birth orders did not differ by maternal education.

Prenatal care

Assessing the role of prenatal care in fetal mortality is complicated by several factors, including differences in the health and behavior of women who begin prenatal care early in their pregnancy and those who began prenatal care later in their pregnancy and differences in opportunities to obtain prenatal care because the length of pregnancy differs (2,3). These two factors are discussed to some extent in the following text, and [tables 6, 8, and 10](#) show the association of fetal mortality and prenatal care by period of gestation. A more extensive analysis than attempted in this descriptive report would address potential biases in more detail (2,3). Lastly, fetal death reports and live birth certificates include limited information on the content of prenatal care (i.e., obstetric procedures) but do not include information on the quality of care (2,4).

Table B. Fetal mortality rates by educational attainment and total-birth order: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Total-birth order	Years of school completed by woman						Ratio of rates for less than 12 years of school to rates for 12 or more years of school
	Total		Less than 12 years		12 years or more		
	Rate	Confidence interval	Rate	Confidence interval	Rate	Confidence interval	
All birth orders	6.8	(6.71, 6.94)	8.4	(8.10, 8.80)	6.6	(6.44, 6.69)	1.29
1	6.3	(6.09, 6.56)	10.0	(8.79, 11.22)	6.1	(5.86, 6.34)	1.64
2	5.5	(5.33, 5.72)	6.9	(6.20, 7.70)	5.4	(5.18, 5.58)	1.29
3	6.3	(6.07, 6.55)	6.2	(5.55, 6.80)	6.3	(6.04, 6.55)	0.98
4	7.4	(7.10, 7.79)	7.6	(6.80, 8.33)	7.4	(7.03, 7.81)	1.02
5 and over	11.1	(10.66, 11.50)	11.2	(10.46, 11.93)	11.1	(10.58, 11.61)	1.01

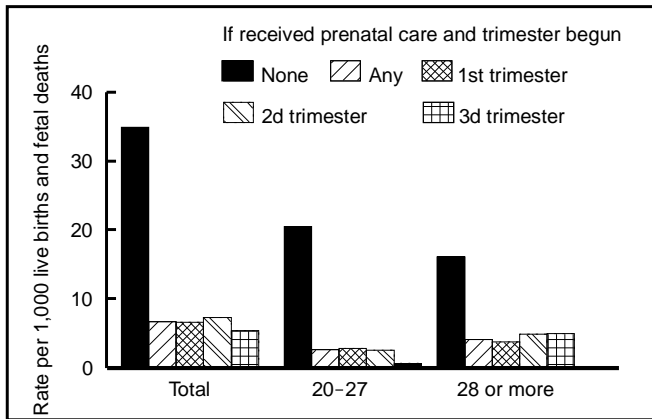


Figure 2. Fetal mortality rates by prenatal care and period of gestation: Total of 37 States, 1990

Fetal mortality rates varied by prenatal care. For periods of gestation of 20 or more weeks, women who received no prenatal care during pregnancy had a relatively high risk of experiencing a fetal loss, 34.9 fetal deaths per 1,000 live births and fetal deaths; in contrast, the risk for those who received prenatal care during pregnancy was 6.7 (table 6 and figure 2). Regardless of the length of gestation, rates were substantially lower when prenatal care was obtained than when it was not.

The relationship between fetal mortality and prenatal care was similar for different age and race groups. Regardless of maternal age, fetal mortality rates were about 5 times greater for those who received no prenatal care than for those who did. Similarly, rates were between 4 and 5 times greater for those receiving no prenatal care for both white and black women. For Hispanic women (table 7), fetal mortality was roughly 3 times greater for those receiving no prenatal care compared with those who did.

Timing of prenatal care

The trimester in which prenatal care begins, particularly for pregnancies terminating with a fetal death, can be related to the length of gestation. For example, initiating prenatal care in the third trimester is not an option for those women who experience a fetal death before the third trimester of their pregnancies. The information on fetal death reports permits the examination of prenatal care while controlling for gestational period, but it does not indicate why care began when it did (e.g., if a problem precipitated the care or if a woman was being vigilant in obtaining routine care). Among women receiving prenatal care, fetal mortality rates were greater for those beginning prenatal care during the second trimester of pregnancy, 7.3 per 1,000, than for those beginning care during either the first (6.6) or the third trimester (5.5) (table 6 and figure 2). However, this curvilinear pattern results from the combination of the patterns for two groups: fetal deaths of 20–27 weeks of gestation and fetal deaths of 28 or more weeks of gestation.

Fetal mortality rates for pregnancies ending between 20 and 27 weeks declined when prenatal care began later in

pregnancy, with a rate of 2.8 for care initiated in the first trimester and a rate of 2.5 for care initiated in the second trimester. In part, higher rates for those beginning prenatal care in the first trimester may reflect the experience of women who sought attention early in their pregnancy for medical problems. Prenatal care beginning in the third trimester is only possible in a small number of cases for pregnancies ending between 20 and 27 weeks of gestation.

For pregnancies ending at 28 or more weeks of gestation, rates increased when prenatal care was delayed until the second or third trimester. When care was received in the first trimester, the rate was 3.7 compared with 5.0 when care was received in the third trimester.

Marital status

Fetal mortality patterns by prenatal care were similar for married and unmarried women (table 8). For married women, the fetal mortality rate for those who did not obtain prenatal care was 21.9 fetal deaths per 1,000 live births and fetal deaths or nearly 4 times the rate for those who did receive care, 5.7. For unmarried women, the rate for those who did not receive prenatal care (42.1) was 4.5 times the rate for those who did (9.4). Rates were substantially greater for women receiving no prenatal care than those who did at all gestational periods, marital statuses, and race groups.

Total-birth order

The relationship between fetal mortality and prenatal care is affected by total-birth order (tables C and 9). The association of prenatal care with fetal mortality was strongest for women with birth orders of one, and became weaker as birth orders increased. For example, the ratio of the rates for those receiving no prenatal care to those receiving prenatal care was 6.2 for birth order of one compared with 3.8 for birth order of five or more. The same general pattern held for white women at all birth orders and black women through birth order four.

Prenatal care and maternal education

Among women 25 years of age and over experiencing a live birth or fetal death, those women with more education were more likely to have obtained prenatal care, particularly in the first trimester, while those with less than 12 years of schooling were more likely to have received no prenatal care (data not shown). For the 259,185 women with less than 12 years of schooling, 12,123, or 5 percent, obtained no prenatal care, 59 percent began care in the first trimester, 28 percent in the second trimester, and 8 percent in the third trimester. In comparison, for the women with 13 or more years of schooling, less than 1 percent received no prenatal care, 91 percent initiated care in the first trimester, 8 percent in the second trimester, and 1 percent in the third trimester.

The pattern of fetal mortality by prenatal care varied by educational attainment (figure 3 and table 10). At each level of educational attainment, fetal mortality rates were greatest when no prenatal care was received. For women with less than 12 years of schooling, the rate of 29.7 fetal deaths per 1,000

Table C. Fetal mortality rates by prenatal care and total-birth order: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Total-birth order	Prenatal care						Ratio of rates for no care to rates for any care
	All fetal deaths		No prenatal care		Any care		
	Rate	Confidence interval	Rate	Confidence interval	Rate	Confidence interval	
All birth orders	7.5	(7.41, 7.60)	36.5	(34.96, 37.96)	6.9	(6.83, 7.01)	5.29
1	7.3	(7.15, 7.48)	41.9	(38.70, 45.05)	6.8	(6.62, 6.94)	6.16
2	6.4	(6.23, 6.56)	34.2	(31.15, 37.18)	6.0	(5.79, 6.11)	5.70
3	7.1	(6.91, 7.35)	32.2	(28.95, 35.48)	6.6	(6.41, 6.83)	4.88
4	8.3	(7.95, 8.60)	30.1	(26.32, 33.91)	7.6	(7.33, 7.97)	3.96
5 or more	12.0	(11.58, 12.40)	40.1	(36.48, 43.64)	10.7	(10.30, 11.10)	3.75

live births and fetal deaths when no prenatal care was received was almost 4 times the rate of 7.7 when prenatal care was received. For women with 13 or more years of schooling, the rate for those receiving no care (43.1) was almost 8 times the rate for those receiving care (5.6).

The pattern was similar by race with fetal mortality rates greatest for women receiving no prenatal care. For white women with less than 12 years of schooling, the rate for receiving no prenatal care was 3.5 times the rate for those receiving care. For white women with 12 years of schooling, the rate for those receiving no care was 5.6 times the rate for those receiving care and among white women with 13 or more years of schooling, the rate for those receiving no care was 7.6

times the rate for those receiving care. For black women with less than 12 years of schooling, the rate for women receiving no care was 3.5 times the rate for women receiving care. For black women with 12 years of schooling and for black women with 13 or more years of schooling, the rate for those receiving no prenatal care was 5.3 times the rate for those receiving prenatal care.

Timing of prenatal care

Fetal mortality varies by both the timing of prenatal care and educational attainment among women aged 25 years and

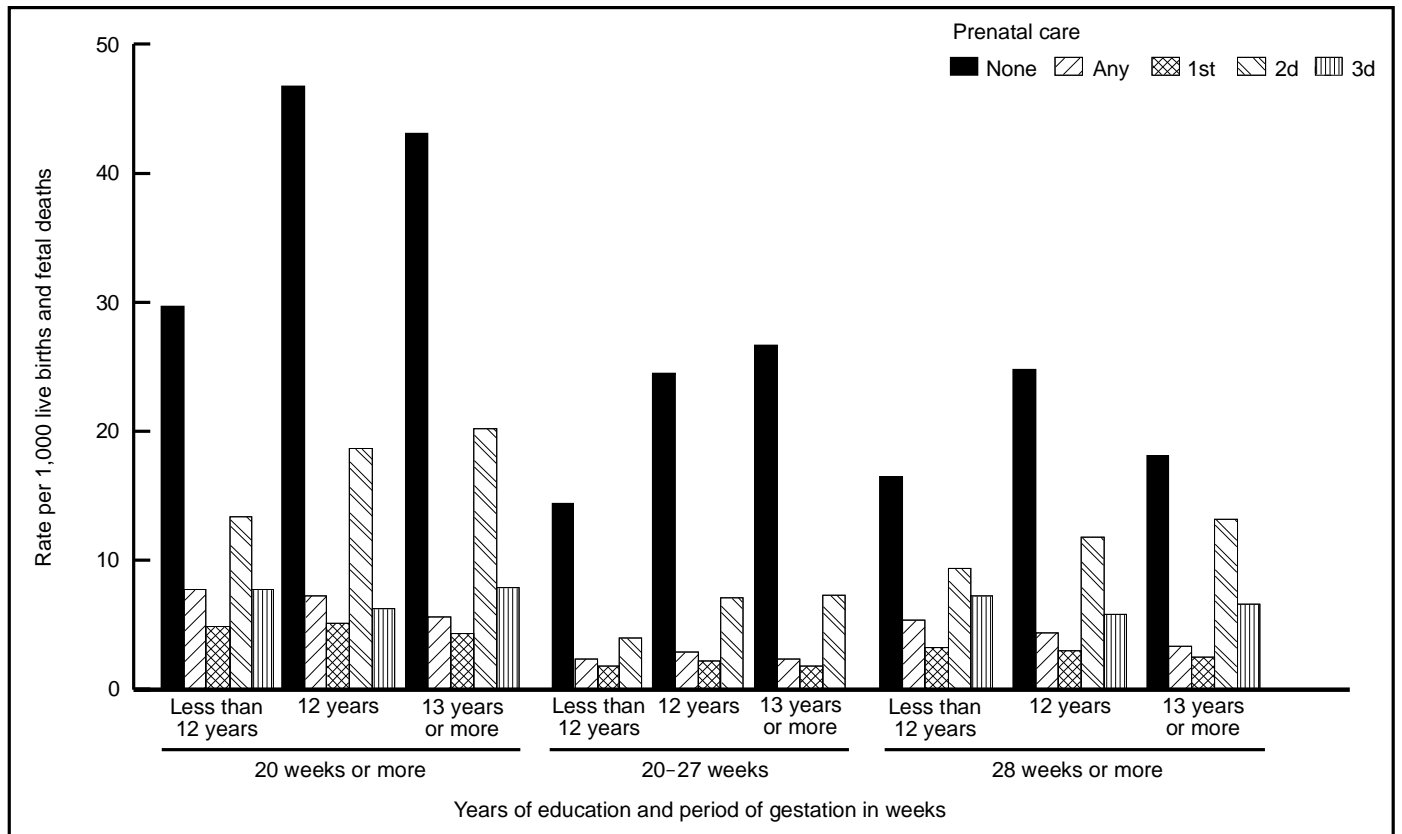


Figure 3. Fetal mortality rates by prenatal care, maternal education, and period of gestation: Total of 35 States, 1990

over. However, as stated above, the opportunity for and timing of prenatal care may be influenced by the length of the pregnancy.

In pregnancies of 20–27 weeks of gestation, fetal mortality rates were greater when prenatal care began in the second rather than the first trimester regardless of the women's educational attainment. For women with less than 12 years of schooling, the rate for those beginning care in the second trimester was more than double the rate for those beginning care in the first trimester; for women with 12 years of schooling, the rate was more than triple; for women with 13 or more years of schooling, the rate was quadruple for those receiving care in the second trimester compared with the first trimester.

For pregnancies of 28 weeks of gestation or more, fetal mortality rates were lower when care began in the first trimester than in the second or third trimester for each

educational attainment level; however, rates were greatest for those women beginning prenatal care in the second trimester. For women with less than 12 years of schooling, the fetal mortality rate was more than double when care began in the third trimester rather than the first trimester. For women with 12 years of schooling, the fetal mortality rate was nearly double when care began in the third trimester rather than the first trimester. For women with 13 or more years of schooling, the fetal mortality rate for those who began care in the third trimester was nearly three times the rate for those who began care in the first trimester.

As stated earlier, one of the limitations the data presents is a lack of information on why prenatal care was initiated (2). Further analysis could examine additional characteristics distinguishing women beginning prenatal care during different trimesters.

References

1. National Office of Vital Statistics. International recommendations on definitions of live birth and fetal deaths. Washington: Public Health Service. 1950.
2. Kleinman JC. Methodological issues in the analysis of vital statistics. In: Reproductive and perinatal epidemiology, CRC Press. 1991.
3. Kiely JL, Brett KM, Yu S, Rowley DL. Low birth weight and intrauterine growth retardation. In: From data to action: CDC's public health surveillance for women, infants, and children. 1995.
4. Brett KM, Schoendorf KC, Kiely JL. Differences between black and white women in the use of prenatal care technologies. *Am J Obstet Gynecol* 170: 41–6. 1994.
5. National Center for Health Statistics. Model State Vital Statistics Act and Model State Vital Statistics Regulations. Washington: Public Health Service. 1978.
6. National Center for Health Statistics. Vital statistics of the United States, 1990, vol II, mortality, part A. Washington: Public Health Service. 1994.
7. Hoyert DL. Effect on mortality rates of the 1989 change in tabulating race. National Center for Health Statistics. *Vital Health Stat* 20(25). 1994.
8. National Center for Health Statistics. Vital statistics of the United States, 1990, vol I, natality. Washington: Public Health Service. 1994.
9. National Center for Health Statistics. Public-use data tape documentation: 1990 detail natality. Hyattsville, MD: Public Health Service. 1993.
10. Greb AE, Pauli RM, Kirby RS. Accuracy of fetal death reports: Comparison with data from an independent stillbirth assessment program. *Am J Public Health* 77:1, 202–06. 1987.

List of detailed tables

1. Fetal deaths and fetal mortality rates by educational attainment, age, and race of woman: Total of 37 States, 1990	10	7. Fetal deaths and fetal mortality rates by trimester prenatal care began, age of women, and Hispanic origin of woman, and by race of woman for women of non-Hispanic origin: Total of 31 States, 1990	18
2. Fetal deaths and fetal mortality rates by educational attainment, age, and Hispanic origin of woman, and by race of woman for non-Hispanic origin: Total of 31 States, 1990	11	8. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, marital status, and race of woman: Total of 37 States, 1990	20
3. Fetal deaths and fetal mortality rates by educational attainment, race, and marital status of women aged 25 years and over: Total of 37 States, 1990	13	9. Fetal deaths and fetal mortality rates by total-birth order, trimester prenatal care began, and race of woman: Total of 37 States, 1990	21
4. Fetal deaths and fetal mortality rates for women aged 25 years and over by educational attainment of women, metropolitan and nonmetropolitan counties in selected States: Total of 37 States, 1990	14	10. Fetal deaths and fetal mortality rates for womans aged 25 years and over by trimester prenatal care began, period of gestation, educational attainment of women, and race of woman: Total of 35 States, 1990	22
5. Fetal deaths and fetal mortality rates for women aged 25 years and over by educational attainment of women, race of woman, and total-birth order: Total of 37 States, 1990	15		
6. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, race of woman, and age of woman: Total of 37 States, 1990	16		

Table 1. Fetal deaths and fetal mortality rates by educational attainment, age, and race of woman: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age and race of woman	Total	Years of school completed by woman						
		Less than 12 years				12 years or more		
		Total	0–8 years	9–11 years	Total	12 years	13–15 years	16 years or more
Number								
All races ¹	22,098	6,043	1,672	4,371	16,055	9,078	4,115	2,863
Under 20 years	3,424	2,224	386	1,838	1,200	1,063	137	–
20–34 years	16,083	3,347	1,013	2,334	12,736	7,150	3,426	2,159
35–49 years	2,591	467	273	194	2,124	865	553	706
White	15,775	4,127	1,338	2,789	11,648	6,338	2,969	2,341
Under 20 years	2,115	1,386	256	1,130	729	655	74	–
20–34 years	11,698	2,408	858	1,550	9,290	5,059	2,487	1,744
35–49 years	1,962	334	224	110	1,628	623	407	598
Black	5,598	1,695	221	1,475	3,903	2,530	1,015	358
Under 20 years	1,232	786	117	670	446	387	59	–
20–34 years	3,872	808	78	730	3,064	1,931	841	292
35–49 years	494	87	23	64	407	218	121	68
Rate								
All races ¹	7.0	7.8	7.6	7.9	6.7	7.6	6.3	5.4
Under 20 years	8.2	8.1	7.7	8.2	8.3	8.2	9.0	*
20–34 years	6.5	7.2	6.9	7.4	6.4	7.2	6.0	5.0
35–49 years	9.6	12.5	12.4	12.7	9.2	12.4	8.9	7.1
White	6.2	6.9	7.1	6.8	5.9	6.6	5.6	5.0
Under 20 years	7.2	7.2	6.5	7.4	7.2	7.2	7.0	*
20–34 years	5.7	6.4	6.5	6.3	5.6	6.2	5.3	4.6
35–49 years	8.7	11.5	12.3	10.1	8.3	11.0	7.9	6.8
Black	12.0	11.8	13.9	11.6	12.0	12.5	11.1	11.5
Under 20 years	10.8	10.6	12.2	10.4	11.2	10.9	14.3	*
20–34 years	11.8	12.5	15.0	12.3	11.7	12.3	10.5	11.4
35–49 years	18.5	19.2	21.3	18.5	18.3	22.5	17.1	12.5

– Quantity zero.

* Figure does not meet standard of reliability or precision.

¹Includes races other than white and black.

Table 2. Fetal deaths and fetal mortality rates by educational attainment, age, and Hispanic origin of woman, and by race of woman for non-Hispanic origin: Total of 31 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks; see [Technical notes](#). Not stated education values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age and race of woman	Years of school completed by woman							
	Total	Less than 12 years			12 years or more			
		Total	0–8 years	9–11 years	Total	12 years	13–15 years	16 years or more
	Number							
All origins ¹	19,966	5,541	1,564	3,977	14,425	8,154	3,718	2,553
Under 20 years	3,105	2,024	350	1,674	1,081	953	128	–
20–34 years	14,532	3,073	952	2,121	11,459	6,428	3,099	1,931
35–49 years	2,329	443	262	181	1,886	773	491	622
Hispanic total	3,153	1,770	1,000	770	1,383	911	334	138
Under 20 years	518	384	124	260	134	119	15	–
20–34 years	2,244	1,140	680	460	1,104	702	290	112
35–49 years	391	248	196	52	143	88	28	27
Mexican	2,339	1,437	835	603	902	618	211	72
Under 20 years	385	298	100	198	87	76	11	–
20–34 years	1,681	945	575	370	736	487	185	64
35–49 years	273	197	161	37	76	54	14	8
Puerto Rican	106	34	7	27	72	48	19	5
Under 20 years	25	14	3	10	11	10	1	–
20–34 years	72	17	2	15	55	36	14	4
35–49 years	9	3	1	1	6	1	4	1
Cuban	64	8	1	7	56	24	19	12
Under 20 years	5	3	–	3	2	2	–	–
20–34 years	48	2	–	2	46	20	17	9
35–49 years	11	2	1	1	9	2	2	4
Central and South American	248	138	87	50	110	65	23	22
Under 20 years	35	29	8	21	6	5	1	–
20–34 years	172	93	67	26	79	48	20	11
35–49 years	41	17	13	3	24	12	2	10
Other Hispanic	396	147	67	80	249	157	63	29
Under 20 years	68	41	14	27	27	26	1	–
20–34 years	271	79	35	44	192	112	55	25
35–49 years	57	29	19	10	29	19	6	4
Non-Hispanic total ²	16,219	3,665	566	3,098	12,554	6,985	3,258	2,311
Under 20 years	2,491	1,580	220	1,360	911	803	108	–
20–34 years	11,863	1,883	274	1,608	9,980	5,531	2,710	1,739
35–49 years	1,865	197	71	126	1,668	654	442	573
White	10,954	2,120	330	1,790	8,834	4,710	2,279	1,846
Under 20 years	1,397	887	118	770	510	454	56	–
20–34 years	8,192	1,137	172	965	7,055	3,789	1,901	1,365
35–49 years	1,365	96	41	56	1,269	465	322	481
Black	4,632	1,370	153	1,216	3,262	2,095	857	310
Under 20 years	1,033	652	93	558	381	333	48	–
20–34 years	3,215	642	46	597	2,573	1,600	719	254
35–49 years	384	64	12	52	320	168	95	57
	Rate							
All origins ¹	7.1	7.8	7.5	8.0	6.9	7.7	6.5	5.5
Under 20 years	8.3	8.2	7.6	8.4	8.4	8.2	9.5	*
20–34 years	6.6	7.2	6.7	7.5	6.5	7.3	6.1	5.1
35–49 years	9.8	12.7	12.4	13.2	9.3	12.5	9.0	7.2
Hispanic total	6.6	6.5	7.0	5.9	6.7	6.9	6.4	6.3
Under 20 years	6.4	6.0	5.6	6.2	7.9	7.7	*	*
20–34 years	6.2	6.1	6.5	5.5	6.3	6.5	6.2	6.0
35–49 years	11.3	12.6	12.9	11.7	9.5	11.6	6.7	8.1
Mexican	6.3	6.3	6.8	5.8	6.3	6.4	6.2	6.1
Under 20 years	5.9	5.7	5.3	5.9	6.8	6.4	*	*
20–34 years	6.0	5.9	6.3	5.4	6.1	6.1	6.1	6.3
35–49 years	10.6	11.8	12.2	10.5	8.3	10.6	*	*
Puerto Rican	5.9	5.0	*	5.1	6.4	7.8	*	*
Under 20 years	6.6	*	*	*	*	*	*	*
20–34 years	5.5	*	*	*	5.8	7.3	*	*
35–49 years	*	*	*	*	*	*	*	*

Table 2. Fetal deaths and fetal mortality rates by educational attainment, age, and Hispanic origin of woman, and by race of woman for non-Hispanic origin: Total of 31 States, 1990—Con.

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks; see [Technical notes](#). Not stated education values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age and race of woman	Years of school completed by woman							
	Total	Less than 12 years			12 years or more			
		Total	0–8 years	9–11 years	Total	12 years	13–15 years	16 years or more
Cuban	6.9	*	*	*	7.3	7.7	*	*
Under 20 years	*	*	*	*	*	*	*	*
20–34 years	6.3	*	*	*	7.0	7.3	*	*
35–49 years	*	*	*	*	*	*	*	*
Central and South American	5.4	5.9	6.0	5.8	4.9	5.2	3.7	5.7
Under 20 years	7.9	8.1	*	11.0	*	*	*	*
20–34 years	4.7	5.3	5.9	4.2	4.1	4.5	3.6	*
35–49 years	8.9	*	*	*	9.9	*	*	*
Other Hispanic	11.6	12.3	27.0	8.5	11.2	11.6	10.7	10.2
Under 20 years	9.9	8.3	*	6.7	13.6	14.3	*	*
20–34 years	10.9	12.1	24.9	8.5	10.4	10.3	10.7	10.6
35–49 years	24.4	55.2	*	*	15.7	*	*	*
Non-Hispanic total ²	7.0	8.5	8.7	8.5	6.7	7.5	6.3	5.2
Under 20 years	8.5	8.7	9.2	8.7	8.2	8.0	9.1	*
20–34 years	6.5	8.0	7.8	8.0	6.3	7.2	5.9	4.9
35–49 years	9.2	13.2	12.6	13.6	8.9	12.1	8.8	6.9
White	6.0	7.4	8.4	7.2	5.8	6.5	5.4	4.8
Under 20 years	7.5	7.9	8.0	7.9	6.8	6.8	7.0	*
20–34 years	5.6	6.8	7.7	6.7	5.4	6.2	5.1	4.4
35–49 years	8.3	11.9	16.6	9.9	8.1	10.9	7.8	6.7
Black	11.9	11.7	12.5	11.7	11.9	12.3	11.1	11.8
Under 20 years	10.8	10.5	12.0	10.3	11.3	11.0	13.9	*
20–34 years	11.8	12.5	12.5	12.6	11.6	12.1	10.6	11.6
35–49 years	17.6	18.0	*	18.9	17.5	21.4	16.1	12.7

– Quantity zero.

*Figure does not meet standard of reliability or precision.

¹Figures for origin not stated included in “All origins” but not distributed among origins.

²Includes races other than white and black.

Table 3. Fetal deaths and fetal mortality rates by educational attainment, race, and marital status of women aged 25 years and over: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

<i>Race and marital status of women</i>	<i>Years of school completed by woman</i>							
	<i>Total</i>	<i>Less than 12 years</i>			<i>12 years or more</i>			
		<i>Total</i>	<i>0–8 years</i>	<i>9–11 years</i>	<i>Total</i>	<i>12 years</i>	<i>13–15 years</i>	<i>16 years or more</i>
					Number			
All races ¹	12,892	2,222	909	1,313	10,670	5,047	2,935	2,688
Married	9,581	1,132	613	588	8,301	3,539	2,330	2,443
Unmarried	3,311	1,120	300	747	2,347	1,520	597	219
White	9,676	1,626	763	863	8,050	3,648	2,197	2,204
Married	8,243	1,079	579	536	7,048	2,996	1,949	2,099
Unmarried	1,433	558	187	335	995	656	245	96
Black	2,725	472	73	399	2,253	1,280	646	327
Married	1,095	97	24	72	991	478	307	208
Unmarried	1,630	384	50	336	1,254	806	335	111
					Rate			
All races ¹	6.8	7.6	7.4	7.7	5.9	6.9	5.6	4.8
Married	6.0	6.1	7.2	5.8	5.3	6.0	5.1	4.7
Unmarried	11.4	10.5	8.0	10.8	10.3	10.9	9.4	9.3
White	6.1	6.9	7.2	6.7	5.3	6.1	5.1	4.6
Married	5.8	6.7	7.8	6.1	5.1	5.7	4.9	4.5
Unmarried	8.0	7.5	5.8	8.0	7.8	8.4	7.3	6.3
Black	13.4	12.4	14.9	12.0	11.4	12.9	9.8	10.1
Married	10.7	9.4	12.6	8.5	9.6	11.5	8.3	8.5
Unmarried	16.3	13.6	16.6	13.3	13.6	14.0	12.0	16.6

¹Includes races other than white and black.

Table 4. Fetal deaths and fetal mortality rates for women aged 25 years and over by educational attainment of women, metropolitan and nonmetropolitan counties in selected States: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Area and race of woman ¹	Years of school completed by woman							
	Total	Less than 12 years			12 years or more			
		Total	0–8 years	9–11 years	Total	12 years	13–15 years	16 years or more
					Number			
Total of States	12,892	2,222	909	1,313	10,670	5,047	2,935	2,688
White	9,676	1,626	763	863	8,050	3,648	2,197	2,204
Black	2,725	472	73	399	2,253	1,280	646	327
Metropolitan counties	10,448	1,790	787	1,003	8,658	3,965	2,382	2,311
White	7,668	1,295	658	637	6,373	2,786	1,717	1,870
Black	2,366	399	60	339	1,967	1,089	588	290
Nonmetropolitan counties	2,444	432	125	307	2,012	1,074	554	384
White	2,008	332	107	225	1,676	858	479	339
Black	359	72	13	59	287	189	61	38
					Rate			
Total of States	6.8	8.4	8.2	8.6	6.6	7.7	6.2	5.4
White	6.1	7.6	7.9	7.3	5.8	6.7	5.6	5.0
Black	13.4	14.4	17.3	14.0	13.2	15.0	11.4	11.8
Metropolitan counties	6.8	8.2	8.0	8.3	6.5	7.8	6.2	5.4
White	5.9	7.3	7.8	6.9	5.7	6.6	5.4	5.0
Black	13.3	14.1	15.9	13.8	13.1	14.9	11.4	11.4
Nonmetropolitan counties	7.1	9.8	10.1	9.7	6.7	7.4	6.5	5.7
White	6.5	9.0	9.5	8.8	6.2	6.7	6.1	5.3
Black	14.6	16.1	*	14.6	14.3	14.9	11.8	16.4

* Figure does not meet standard of reliability or precision.

¹Totals for geographic areas include races other than white and black.

Table 5. Fetal deaths and fetal mortality rates for women aged 25 years and over by educational attainment of women, race of woman, and total-birth order: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Race and total-birth order of women	Total	Years of school completed by woman						
		Less than 12 years			12 years or more			
		Total	0–8 years	9–11 years	Total	12 years	13–15 years	16 years or more
		Number						
All races ¹								
Total-birth order	12,892	2,222	909	1,313	10,670	5,047	2,935	2,688
1	2,757	262	114	148	2,500	994	669	837
2	3,071	331	123	207	2,733	1,226	709	798
3	2,657	375	128	247	2,270	1,112	655	504
4	1,763	377	157	220	1,388	719	394	276
5 and over	2,645	885	392	494	1,772	993	507	272
White								
Total-birth order	9,676	1,626	763	863	8,050	3,648	2,197	2,204
1	2,195	213	97	116	1,984	780	518	685
2	2,425	267	107	160	2,158	942	545	670
3	2,023	278	103	175	1,739	806	510	423
4	1,270	279	140	140	992	495	285	213
5 and over	1,763	588	317	272	1,177	624	339	215
Black								
Total-birth order	2,725	472	73	399	2,253	1,280	646	327
1	436	36	9	27	411	189	121	101
2	530	50	9	40	473	252	140	81
3	554	82	14	68	464	283	129	53
4	444	82	11	71	358	211	101	47
5 and over	761	225	30	194	545	342	156	47
		Rate						
All races ¹								
Total-birth order	6.8	8.4	8.2	8.6	6.6	7.7	6.2	5.4
1	6.3	10.0	9.4	10.5	6.1	8.0	5.9	4.9
2	5.5	6.9	6.7	7.1	5.4	6.3	4.8	4.8
3	6.3	6.2	5.4	6.7	6.3	6.9	6.2	5.4
4	7.4	7.6	7.7	7.5	7.4	7.9	7.1	6.7
5 and over	11.1	11.2	10.9	11.5	11.1	11.9	10.5	9.8
White								
Total-birth order	6.1	7.6	7.9	7.3	5.8	6.7	5.6	5.0
1	5.8	9.7	9.2	10.1	5.5	7.1	5.3	4.5
2	5.0	6.5	6.6	6.5	4.9	5.6	4.3	4.6
3	5.6	5.4	4.8	5.8	5.7	6.0	5.8	5.1
4	6.5	6.8	7.7	6.1	6.4	6.8	6.3	5.9
5 and over	9.8	10.1	10.7	9.6	9.6	10.3	9.1	8.8
Black								
Total-birth order	13.4	14.4	17.3	14.0	13.2	15.0	11.4	11.8
1	14.7	19.1	*	18.3	14.8	19.2	12.3	12.4
2	10.9	12.3	*	11.6	10.6	12.6	8.9	9.1
3	11.8	13.4	*	12.7	11.4	13.3	9.4	9.4
4	13.6	12.9	*	12.6	13.6	14.0	11.9	17.0
5 and over	16.8	15.6	17.4	15.2	17.7	17.8	17.0	20.4

* Figure does not meet standard of reliability or precision.

¹Includes races other than white and black.

Table 6. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, race of woman, and age of woman: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods of gestation, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 or more weeks of gestation]

Period of gestation, age of women, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
Number						
All gestational periods						
All races ¹	23,361	2,259	21,103	16,016	4,360	727
Under 20 years	3,768	587	3,181	2,026	1,008	147
20–34 years	16,906	1,479	15,427	11,984	2,948	495
35–49 years	2,687	192	2,495	2,006	404	85
White	16,029	1,076	14,953	11,760	2,748	445
Under 20 years	2,189	261	1,928	1,262	586	80
20–34 years	11,856	695	11,160	8,946	1,903	311
35–49 years	1,984	120	1,864	1,551	259	54
Black	6,628	1,142	5,486	3,761	1,465	260
Under 20 years	1,507	312	1,195	728	402	65
20–34 years	4,548	759	3,790	2,675	944	171
35–49 years	573	70	504	362	118	24
20–27 weeks						
All races ¹	9,584	1,302	8,365	6,851	1,457	57
Under 20 years	1,707	381	1,340	978	350	12
20–34 years	6,799	833	6,027	5,002	986	39
35–49 years	1,078	86	999	873	120	6
White	6,125	556	5,619	4,726	860	33
Under 20 years	912	154	764	567	191	6
20–34 years	4,436	351	4,123	3,501	598	24
35–49 years	777	51	731	659	70	2
Black	3,196	723	2,496	1,930	544	22
Under 20 years	762	219	548	392	150	6
20–34 years	2,187	467	1,737	1,369	354	14
35–49 years	247	35	213	171	40	2
28 weeks or more						
All races ¹	13,777	973	12,726	9,177	2,889	660
Under 20 years	2,061	211	1,836	1,049	654	133
20–34 years	10,107	656	9,392	6,990	1,953	449
35–49 years	1,609	106	1,496	1,137	282	77
White	9,904	526	9,330	7,042	1,881	407
Under 20 years	1,277	109	1,162	696	393	73
20–34 years	7,420	349	7,035	5,452	1,300	283
35–49 years	1,207	69	1,133	894	188	51
Black	3,432	426	2,984	1,837	913	234
Under 20 years	745	95	644	336	250	58
20–34 years	2,361	297	2,049	1,310	585	154
35–49 years	326	35	290	192	77	21
All gestational periods						
Rate						
All races ¹	7.2	34.9	6.7	6.6	7.3	5.5
Under 20 years	8.6	36.0	7.5	8.4	6.9	4.1
20–34 years	6.7	33.2	6.2	6.1	7.1	5.5
35–49 years	9.9	47.6	9.4	8.9	11.7	11.8
White	6.2	27.5	5.9	5.8	6.5	4.8
Under 20 years	7.3	28.1	6.6	7.3	6.2	3.5
20–34 years	5.8	25.4	5.5	5.4	6.3	4.8
35–49 years	8.9	46.0	8.4	8.1	10.2	10.2
Black	12.6	48.0	10.9	11.8	9.9	7.7
Under 20 years	11.7	46.7	9.8	11.7	8.4	5.5
20–34 years	12.4	47.9	10.8	11.3	10.0	8.4
35–49 years	19.3	56.4	17.7	17.4	18.3	19.0

Table 6. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, race of woman, and age of woman: Total of 37 States, 1990—Con.

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods of gestation, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 or more weeks of gestation]

Period of gestation, age of women, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
20–27 weeks		Rate				
All races ¹	3.0	20.4	2.7	2.8	2.5	0.4
Under 20 years	3.9	23.7	3.2	4.1	2.4	*
20–34 years	2.7	19.0	2.5	2.6	2.4	0.4
35–49 years	4.0	22.0	3.8	3.9	3.5	*
White	2.4	14.4	2.2	2.3	2.1	0.4
Under 20 years	3.1	16.8	2.6	3.3	2.0	*
20–34 years	2.2	13.0	2.0	2.1	2.0	0.4
35–49 years	3.5	20.1	3.3	3.5	2.8	*
Black	6.1	31.1	5.0	6.1	3.7	0.7
Under 20 years	6.0	33.4	4.5	6.3	3.2	*
20–34 years	6.0	30.1	5.0	5.8	3.8	*
35–49 years	8.4	29.2	7.6	8.3	6.3	*
28 weeks or more						
All races ¹	4.3	16.1	4.1	3.8	4.9	5.0
Under 20 years	4.8	14.0	4.4	4.4	4.6	3.7
20–34 years	4.1	15.7	3.8	3.6	4.8	5.0
35–49 years	6.0	28.2	5.7	5.1	8.2	10.8
White	3.9	14.0	3.7	3.5	4.5	4.4
Under 20 years	4.3	12.4	4.0	4.0	4.2	3.2
20–34 years	3.6	13.3	3.5	3.3	4.3	4.4
35–49 years	5.4	27.9	5.2	4.7	7.5	9.7
Black	6.7	20.0	6.1	5.9	6.3	7.0
Under 20 years	5.9	16.0	5.4	5.5	5.3	4.9
20–34 years	6.6	20.8	6.0	5.7	6.3	7.6
35–49 years	11.3	31.3	10.4	9.5	12.2	16.7

* Figure does not meet standard of reliability or precision.

¹Includes races other than white and black.

Table 7. Fetal deaths and fetal mortality rates by trimester prenatal care began, age of women, and Hispanic origin of woman, and by race of women of non-Hispanic origin: Total of 31 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated trimester values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age and origin of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
Number						
All origins ¹	21,229	2,053	19,176	14,479	4,021	676
Under 20 years	3,449	552	2,897	1,836	929	132
20–34 years	15,355	1,326	14,028	10,835	2,730	463
35–49 years	2,425	174	2,251	1,809	361	81
Hispanic total	3,139	372	2,768	1,776	799	193
Under 20 years	517	101	416	236	152	28
20–34 years	2,234	230	2,004	1,310	554	140
35–49 years	388	42	345	228	93	24
Mexican	2,329	294	2,035	1,238	643	154
Under 20 years	385	85	300	162	115	23
20–34 years	1,673	176	1,496	926	457	113
35–49 years	271	34	237	148	71	18
Puerto Rican	110	16	94	70	22	2
Under 20 years	25	2	22	15	6	1
20–34 years	76	12	63	48	14	1
35–49 years	9	1	7	6	1	–
Cuban	62	1	60	55	5	–
Under 20 years	5	1	4	2	2	–
20–34 years	46	–	46	45	1	–
35–49 years	11	–	11	10	1	–
Central and South American	249	17	233	169	46	18
Under 20 years	35	4	30	23	6	1
20–34 years	172	11	161	120	28	13
35–49 years	42	1	41	26	11	4
Other Hispanic	389	41	348	254	77	17
Under 20 years	67	8	59	34	22	3
20–34 years	267	28	239	180	47	12
35–49 years	55	5	50	39	8	3
Non-Hispanic total ²	17,405	1,589	15,816	12,240	3,112	464
Under 20 years	2,820	429	2,391	1,541	749	101
20–34 years	12,638	1,033	11,605	9,194	2,102	309
35–49 years	1,947	125	1,822	1,506	261	55
White	11,172	599	10,572	8,586	1,753	233
Under 20 years	1,461	140	1,321	879	393	49
20–34 years	8,332	392	7,940	6,565	1,220	155
35–49 years	1,379	67	1,312	1,143	140	29
Black	5,622	959	4,663	3,207	1,242	214
Under 20 years	1,303	281	1,023	630	343	50
20–34 years	3,863	622	3,242	2,296	801	145
35–49 years	456	56	400	284	97	19
Rate						
All origins ¹	7.4	34.3	6.8	6.7	7.5	5.5
Under 20 years	8.7	36.7	7.6	8.5	7.1	4.0
20–34 years	6.9	32.2	6.4	6.2	7.3	5.5
35–49 years	10.1	47.2	9.5	9.1	11.5	12.2
Hispanic total	6.6	19.8	6.1	6.2	6.1	5.1
Under 20 years	6.4	22.3	5.5	6.0	5.4	3.2
20–34 years	6.2	17.5	5.8	5.8	5.8	5.1
35–49 years	11.2	38.7	10.3	9.9	11.1	11.1
Mexican	6.3	18.4	5.8	5.8	6.0	4.8
Under 20 years	5.9	21.8	4.9	5.3	5.0	3.1
20–34 years	6.0	15.8	5.6	5.6	5.9	4.9
35–49 years	10.6	37.6	9.6	9.0	10.7	*
Puerto Rican	6.0	*	5.3	5.5	5.5	*
Under 20 years	6.6	*	6.0	*	*	*
20–34 years	5.7	*	4.8	4.9	*	*
35–49 years	*	*	*	*	*	*

Table 7. Fetal deaths and fetal mortality rates by trimester prenatal care began, age of women, and Hispanic origin of woman, and by race of women of non-Hispanic origin: Total of 31 States, 1990—Con.

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated trimester values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Age and origin of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
				Rate		
Cuban	6.7	*	6.6	7.0	*	*
Under 20 years	*	*	*	*	*	*
20–34 years	6.1	*	6.1	6.9	*	*
35–49 years	*	*	*	*	*	*
Central and South American	5.4	*	5.2	5.8	3.8	*
Under 20 years	7.9	*	7.2	10.6	*	*
20–34 years	4.7	*	4.5	5.0	3.0	*
35–49 years	9.1	*	9.1	8.2	*	*
Other Hispanic	11.4	57.4	10.4	10.8	9.6	*
Under 20 years	9.8	*	8.9	9.5	8.9	*
20–34 years	10.7	59.8	9.8	10.0	9.2	*
35–49 years	23.6	*	21.8	21.6	*	*
Non-Hispanic total ²	7.3	39.0	6.7	6.6	7.7	5.5
Under 20 years	9.0	41.1	7.9	8.8	7.3	4.2
20–34 years	6.8	37.1	6.3	6.1	7.5	5.5
35–49 years	9.5	48.8	9.0	8.6	11.4	12.3
White	6.1	32.0	5.8	5.7	6.9	4.7
Under 20 years	7.5	32.1	7.0	7.4	6.7	3.8
20–34 years	5.7	30.2	5.4	5.3	6.7	4.5
35–49 years	8.4	48.5	8.1	7.9	9.4	10.3
Black	12.5	46.8	10.9	11.9	9.7	7.2
Under 20 years	11.8	48.6	9.8	12.0	8.3	4.8
20–34 years	12.3	45.4	10.8	11.5	9.8	8.0
35–49 years	18.4	55.1	16.8	16.4	17.9	*

– Quantity zero.

* Figure does not meet standard of reliability or precision.

¹Figures for origin not stated included in “All origins” but not distributed among origins.

²Includes races other than white or black.

Table 8. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, marital status, and race of woman: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 or more weeks of gestation]

Marital status of women, period of gestation, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
All gestational periods						Number
All races ¹	23,361	2,259	21,103	16,016	4,360	727
Married	13,630	491	13,003	10,893	1,838	272
Unmarried	9,731	1,789	8,080	5,081	2,540	459
White	16,029	1,076	14,953	11,760	2,748	445
Married	11,876	422	11,278	9,456	1,581	241
Unmarried	4,153	664	3,670	2,284	1,179	207
Black	6,628	1,142	5,486	3,761	1,465	260
Married	1,767	112	1,650	1,317	287	46
Unmarried	4,861	1,031	3,836	2,443	1,179	214
20–27 weeks						
All races ¹	9,584	1,302	8,365	6,851	1,457	57
Married	5,245	259	5,003	4,428	545	30
Unmarried	4,316	1,030	3,331	2,397	907	27
White	6,125	556	5,619	4,726	860	33
Married	4,408	206	4,166	3,699	443	24
Unmarried	1,702	344	1,422	1,000	414	8
Black	3,196	723	2,496	1,930	544	22
Married	849	69	793	681	108	4
Unmarried	2,344	649	1,706	1,253	435	18
28 weeks or more						
All races ¹	13,777	973	12,726	9,177	2,889	660
Married	8,411	241	8,013	6,487	1,288	238
Unmarried	5,392	761	4,741	2,680	1,630	431
White	9,904	526	9,330	7,042	1,881	407
Married	7,477	220	7,116	5,769	1,134	213
Unmarried	2,443	321	2,249	1,284	766	199
Black	3,432	426	2,984	1,837	913	234
Married	918	45	856	640	176	40
Unmarried	2,517	387	2,126	1,192	740	194
All gestational periods						Rate
All races ¹	7.2	34.9	6.7	6.6	7.3	5.5
Married	5.9	21.9	5.7	5.7	5.8	4.4
Unmarried	10.8	42.1	9.4	9.9	9.1	6.4
White	6.2	27.5	5.9	5.8	6.5	4.8
Married	5.8	22.8	5.6	5.5	6.0	4.7
Unmarried	7.9	31.9	7.3	7.4	7.6	5.0
Black	12.6	48.0	10.9	11.8	9.9	7.7
Married	10.2	35.3	9.7	10.2	8.4	7.2
Unmarried	13.8	50.0	11.5	12.8	10.3	7.9
20–27 weeks						
All races ¹	3.0	20.4	2.7	2.8	2.5	0.4
Married	2.3	11.6	2.2	2.3	1.7	0.5
Unmarried	4.8	24.7	3.9	4.7	3.3	0.4
White	2.4	14.4	2.2	2.3	2.1	0.4
Married	2.2	11.3	2.1	2.2	1.7	0.5
Unmarried	3.3	16.8	2.8	3.3	2.7	*
Black	6.1	31.1	5.0	6.1	3.7	0.7
Married	4.9	22.1	4.7	5.3	3.2	*
Unmarried	6.7	32.2	5.1	6.6	3.8	*

Table 8. Fetal deaths and fetal mortality rates by trimester prenatal care began, period of gestation, marital status, and race of woman: Total of 37 States, 1990—Con.

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 or more weeks of gestation]

Marital status of women, period of gestation, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
28 weeks or more				Rate		
All races ¹	4.3	16.0	4.1	3.8	4.9	5.0
Married	3.7	11.2	3.5	3.4	4.1	3.9
Unmarried	6.1	19.4	5.6	5.3	5.9	6.1
White	3.9	14.0	3.7	3.5	4.5	4.4
Married	3.7	12.3	3.5	3.4	4.3	4.2
Unmarried	4.7	16.2	4.5	4.2	5.0	4.8
Black	6.7	20.0	6.1	5.9	6.3	7.0
Married	5.4	15.6	5.1	5.1	5.2	6.4
Unmarried	7.3	20.9	6.5	6.4	6.6	7.2

* Figure does not meet standard of reliability or precision.

¹Includes races other than white and black.

Table 9. Fetal deaths and fetal mortality rates by total-birth order, trimester prenatal care began, and race of woman: Total of 37 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group]

Race of woman and total-birth order	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
				Number		
All races ¹	23,361	2,259	21,103	16,016	4,360	727
Total-birth order:						
1	7,596	668	6,934	5,271	1,445	218
2	5,868	492	5,375	4,197	1,029	149
3	4,179	374	3,802	2,970	713	119
4	2,474	242	2,225	1,630	504	91
5 or more	3,244	481	2,768	1,949	669	150
White	16,029	1,076	14,953	11,760	2,748	445
1	5,441	368	5,081	3,967	971	143
2	4,135	226	3,914	3,164	655	95
3	2,853	170	2,678	2,173	440	65
4	1,614	110	1,499	1,136	303	60
5 or more	1,987	202	1,781	1,321	378	82
Black	6,628	1,142	5,486	3,761	1,465	260
1	1,923	286	1,635	1,123	443	69
2	1,565	259	1,301	915	334	52
3	1,217	197	1,023	716	255	52
4	794	125	666	452	185	29
5 or more	1,130	274	861	555	247	59
				Rate		
All races ¹	7.5	36.5	6.9	6.8	7.6	5.7
Total-birth order:						
1	7.3	41.9	6.8	6.6	7.7	5.6
2	6.4	34.2	6.0	5.8	6.8	4.5
3	7.1	32.2	6.6	6.7	6.7	5.0
4	8.3	30.1	7.6	7.6	8.2	6.2
5 or more	12.0	40.1	10.7	11.1	10.2	8.2
White	6.4	28.1	6.1	6.0	6.7	4.9
1	6.4	33.0	6.0	5.9	7.0	5.0
2	5.5	24.6	5.3	5.2	5.9	4.1
3	6.1	24.4	5.8	5.9	5.8	4.0
4	6.9	24.0	6.6	6.5	7.1	6.0
5 or more	10.1	31.7	9.4	9.8	8.8	6.8
Black	13.7	52.1	11.8	12.7	10.7	8.3
1	13.4	66.8	11.7	12.5	10.7	8.4
2	12.0	53.4	10.4	11.1	9.6	6.4
3	12.8	45.7	11.3	12.3	9.7	8.5
4	14.3	38.6	12.7	14.0	11.5	7.4
5 or more	18.7	52.4	15.6	17.2	13.6	12.0

¹Includes races other than white and black.

Table 10. Fetal deaths and fetal mortality rates for women aged 25 years and over by trimester prenatal care began, period of gestation, educational attainment of women, and race of woman: Total of 35 States, 1990

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods of gestation, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 weeks or more gestation]

Maternal education, period of gestation, educational attainment, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
All gestational periods, all races ¹						
				Number		
Total	12,501	865	11,635	7,108	4,182	345
Less than 12 years	2,188	360	1,892	755	978	159
12 years	4,904	431	4,496	2,655	1,733	108
13 years or more	5,409	173	5,175	3,620	1,470	85
White	9,331	448	8,883	5,662	2,988	233
Less than 12 years	1,602	212	1,426	587	725	114
12 years	3,522	183	3,341	2,092	1,181	68
13 years or more	4,207	92	4,086	2,941	1,087	58
Black	2,701	403	2,298	1,191	1,009	98
Less than 12 years	470	132	360	132	194	34
12 years	1,271	258	1,036	494	502	40
13 years or more	961	80	857	528	305	24
20–27 weeks						
Total	4,877	448	4,475	2,988	1,458	29
Less than 12 years	707	171	570	271	292	7
12 years	1,968	220	1,777	1,117	652	8
13 years or more	2,214	105	2,093	1,558	522	13
White	3,467	203	3,296	2,284	996	16
Less than 12 years	489	96	415	202	209	4
12 years	1,346	84	1,279	845	429	5
13 years or more	1,637	41	1,591	1,217	367	7
Black	1,243	240	1,012	609	391	12
Less than 12 years	190	68	133	60	70	3
12 years	572	140	447	247	197	3
13 years or more	485	65	411	278	128	5
28 weeks or more						
Total	7,624	422	7,158	4,130	2,717	311
Less than 12 years	1,476	190	1,314	483	682	149
12 years	2,938	212	2,721	1,541	1,082	98
13 years or more	3,199	67	3,086	2,068	947	71
White	5,864	247	5,586	3,386	1,986	214
Less than 12 years	1,110	117	1,007	385	514	108
12 years	2,177	99	2,065	1,251	753	61
13 years or more	2,572	51	2,497	1,728	720	49
Black	1,458	165	1,284	584	616	84
Less than 12 years	278	65	226	72	124	30
12 years	698	120	589	248	305	36
13 years or more	478	13	447	250	178	19
All gestational periods, all races ¹						
				Rate		
Total	6.8	34.5	6.5	4.7	17.6	7.2
Less than 12 years	8.4	29.7	7.7	4.9	13.4	7.7
12 years	7.7	46.8	7.2	5.1	18.7	6.3
13 years or more	5.8	43.1	5.6	4.3	20.2	7.9
White	6.1	28.2	5.8	4.3	16.7	6.5
Less than 12 years	7.6	24.7	7.1	4.6	12.3	6.7
12 years	6.7	36.0	6.4	4.7	17.6	5.8
13 years or more	5.2	38.9	5.1	4.0	20.1	7.9
Black	13.4	48.9	11.9	8.6	22.6	10.8
Less than 12 years	14.4	42.6	12.2	7.7	19.7	13.7
12 years	15.0	67.3	12.8	9.0	23.4	9.2
13 years or more	11.5	55.6	10.4	7.9	22.8	10.5

Table 10. Fetal deaths and fetal mortality rates for women aged 25 years and over by trimester prenatal care began, period of gestation, educational attainment of women, and race of woman: Total of 35 States, 1990—Con.

[Fetal deaths include only those with stated or presumed period of gestation of 20 weeks or more; see [Technical notes](#). Not stated values are proportionally distributed; see [Technical notes](#). Rates are number of fetal deaths per 1,000 live births and fetal deaths in specified group. Rates by gestation include all live births for rates at all periods of gestation, live births of 20 or more weeks of gestation for rates at 20–27 weeks of gestation, and live births of 28 or more weeks of gestation for rates at 28 weeks or more gestation]

Maternal education, period of gestation, educational attainment, and race of woman	All fetal deaths	Prenatal care				
		No prenatal care	Any care	Trimester prenatal care began		
				1st	2nd	3rd
				Rate		
20–27 weeks						
Total	2.7	18.2	2.5	2.0	6.2	0.6
Less than 12 years	2.7	14.4	2.3	1.8	4.0	*
12 years	3.1	24.5	2.9	2.2	7.1	*
13 years or more	2.4	26.7	2.3	1.8	7.3	*
White	2.3	13.0	2.2	1.7	5.6	*
Less than 12 years	2.3	11.4	2.1	1.6	3.6	*
12 years	2.6	16.9	2.5	1.9	6.5	*
13 years or more	2.0	17.7	2.0	1.7	6.9	*
Black	6.2	29.9	5.3	4.4	8.9	*
Less than 12 years	5.9	22.5	4.6	3.5	7.2	*
12 years	6.8	37.8	5.6	4.5	9.3	*
13 years or more	5.8	45.8	5.0	4.2	9.7	*
28 weeks or more						
Total	4.2	17.9	4.0	2.7	11.6	6.5
Less than 12 years	5.8	16.5	5.4	3.2	9.4	7.2
12 years	4.7	24.8	4.4	3.0	11.8	5.8
13 years or more	3.5	18.1	3.3	2.5	13.2	6.6
White	3.8	16.2	3.7	2.6	11.2	6.0
Less than 12 years	5.3	14.1	5.0	3.1	8.8	6.4
12 years	4.2	20.4	4.0	2.8	11.3	5.2
13 years or more	3.2	22.6	3.1	2.4	13.5	6.7
Black	7.4	22.4	6.8	4.3	14.1	9.4
Less than 12 years	8.8	23.2	7.8	4.3	12.9	12.3
12 years	8.5	35.1	7.5	4.6	14.6	8.4
13 years or more	5.8	*	5.5	3.8	13.6	*

* Figure does not meet standard of reliability or precision.

¹Includes races other than white or black.

Appendix

Contents

- Technical notes 26
 - Source of data 26
 - Classification of data 27
 - Quality of data 28
 - Random variation 29

Appendix table

- I. Percent distribution of characteristics of fetal deaths in selected States and in the United States, 1990 26

Appendix

Technical notes

Source of data

Fetal deaths

Each year fetal-death statistics are based on all reports of fetal death received by the National Center for Health Statistics (NCHS), but a reporting criteria was used to limit the number of States included in the tables of this report. States

were included only if reporting was at least 80 percent complete for education and prenatal care variables in 1990. Results for a subset of States are believed to be reasonably representative of all States based on comparison of characteristics for the subsets of States to all States (see [table I](#)). The largest differences are that the States in [tables 6, 8, and 9](#) have 13 percent more nonmetropolitan residents than the total United States (23.1 percent compared with 20.5 percent). Each

Table I. Percent distribution of characteristics of fetal deaths in selected States and in the United States, 1990

<i>Characteristic</i>	<i>States included in tables 1, 3-5</i>	<i>States included in tables 6, 8, 9</i>	<i>States included in table 10</i>	<i>United States</i>
Maternal age	100.0	100.0	100.0	100.0
Under 20 years	15.5	16.1	15.6	15.2
20-34 years	72.8	72.4	72.7	72.7
35 years and over	11.7	11.5	11.7	12.2
Maternal race	100.0	100.0	100.0	100.0
White	71.4	68.6	71.1	67.2
Black	25.3	28.4	25.7	29.3
American Indian	0.9	0.8	0.8	0.9
Chinese	0.2	0.2	0.2	0.2
Japanese	*	*	*	0.1
Hawaiian	*	*	*	0.1
Filipino	0.5	0.4	0.5	0.5
Other Asian or Pacific Islander	1.4	1.3	1.3	1.5
Other	0.2	0.2	0.2	0.2
Total-birth order	100.0	100.0	100.0	100.0
1	30.9	31.1	31.1	29.7
2	23.9	24.0	24.0	23.4
3	17.1	17.1	17.0	16.9
4	10.1	10.1	10.1	10.1
5 or more	13.3	13.3	13.3	13.8
Not stated	4.6	4.4	4.5	6.1
Place of residence	100.0	100.0	100.0	100.0
Metropolitan	78.7	76.9	78.8	79.5
Nonmetropolitan	21.3	23.1	21.2	20.5
Period of gestation	100.0	100.0	100.0	100.0
20-23 weeks	22.7	23.7	22.8	24.8
24-27 weeks	15.1	15.4	15.2	15.2
28 weeks and over	57.1	56.3	57.1	53.5
Unknown	5.1	4.6	4.9	6.5
Fetal birthweight	100.0	100.0	100.0	100.0
1,499 grams or less	53.2	53.9	53.7	52.1
1,500-2,499 grams	17.2	17.1	17.4	16.1
2,500 grams or more	22.1	21.6	22.1	20.4
Not stated	7.4	7.4	6.9	11.4
Fetal sex	100.0	100.0	100.0	100.0
Male	53.2	53.2	53.2	53.8
Female	46.8	46.8	46.8	46.2
Number	22,098	23,361	21,497	31,386

* Figure does not meet standard of reliability or precision.

NOTE: Due to rounding, percents may not add to total.

of the three groups of selected States have substantially less reporting of unknown or not stated period of gestation or birthweight.

Fetal mortality data are shown for a total of 37 States except for the Hispanic population where data are shown for 31 States and for data by both prenatal care and education, which are shown for 35 States. The States included in this report for maternal education are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, and Wyoming. The States included for trimester prenatal care began are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, New Hampshire, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, and Wyoming.

Month prenatal care began and maternal education was not reported for approximately 10 percent of the records for the selected States. Deaths and live births for which either month prenatal care began or maternal education were not known were proportionally allocated according to the proportion of deaths with known values. The allocated numbers do not necessarily add to the totals.

The data are provided to the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program (VSCP). Beginning with 1989, most States provided NCHS, through the VSCP, computer tapes of data coded according to NCHS specifications. The State-coded demographic data are not used in tabulating fetal deaths in data year 1990.

Tabulations of fetal deaths were based solely on information obtained by NCHS from copies of original reports of fetal deaths from State registration offices, except registration offices in New York State (excluding New York City), which only submitted State-coded data in 1990. The information from these copies was edited, coded, and tabulated. All mortality information taken from these records was transferred by NCHS to magnetic tape for computer processing.

Standard certificates and reports

The U.S. Standard Report of Fetal Death is used as a model to attain uniformity in the contents of forms used to collect fetal mortality information. Although States may make modifications, the reports or certificates of most States conform closely in content and arrangement to the standard.

The standard report is revised periodically by the national vital statistics agency through consultation with State health officers and registrars; Federal agencies concerned with vital statistics; national, State, and county medical societies; and others working in such fields as public health, social welfare, demography, and insurance. This revision procedure has ensured

careful evaluation of each item in terms of its current and future usefulness for legal, medical and health, demographic, and research purposes. New items have been added when necessary, and old items have been modified to ensure better reporting; or in some cases, items have been dropped when their usefulness appeared to be limited. A new revision of the U.S. Standard Report of Fetal Death was recommended for State use beginning January 1, 1989.

The fetal-death reporting system of the United States encompasses the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam.

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (5) recommended that spontaneous fetal deaths at a gestation of 20 weeks or more or a weight of 350 grams or more be reported. The forms used to collect fetal death data are to be considered legally required statistical reports rather than legal documents.

Beginning with 1970 fetal deaths, procedures were implemented to separate reports of spontaneous fetal deaths from those of induced terminations of pregnancy. These procedures are still in use.

Classification of data

The principal value of vital statistics data is realized through the presentation of rates; fetal mortality rates are computed by relating the fetal deaths of a class to the live births and fetal deaths of a similarly defined class. Vital statistics of fetal deaths and live births must therefore be classified according to similarly defined systems and tabulated in comparable groups. Even when the variables common to both, such as age and race, have been similarly classified and tabulated, inconsistencies in reporting between the fetal death report and birth certificate may result in significant discrepancies.

Race

For vital statistics in the United States for 1990, fetal deaths are classified by race—white, black, American Indian, Chinese, Hawaiian, Japanese, Filipino, Other Asian or Pacific Islander, and Other.

The white category includes, in addition to persons reported as white, those reported as Mexican, Puerto Rican, Cuban, and all other Caucasians. The American Indian category includes American, Alaskan, Canadian, Eskimo, and Aleut.

The tables in this report, however, do not present data for this detailed classification by race. In all the tables that show data by race, the divisions are all races combined, white, and black.

Beginning with data year 1989, NCHS changed the method of tabulating live birth and fetal death data by race from race of child to race of mother. In previous years, birth and fetal death tabulations were by race of child, as determined statistically by an algorithm based on information reported for the mother and father. (See *Vital Statistics of the United States*, 1990, Volume II, Mortality, Part A, Technical

Appendix, (6) and the *Vital and Health Statistics* series report “Effect on Mortality Rates of the 1989 Change in Tabulating Race” (7) for further details.)

When the race of the mother is unknown, the mother is assigned to the father’s race; when information for both parents is missing, the race of the mother is assigned to the specific race of the mother of the preceding record with known race.

Period of gestation

The period of gestation is the number of completed weeks elapsed between the first day of the last normal menstrual period (LMP) and the date of delivery. (See *Vital Statistics of the United States*, 1990, Volume II, Mortality, Part A, Technical Appendix, (6) for further details.)

Age of woman

Beginning with data for 1989, the U.S. Standard Report of Fetal Death asks for the mother’s date of birth. Age of woman is computed from the woman’s date of birth and the date of the termination of the pregnancy. For those States whose reports do not contain an item on the woman’s date of birth, reported age of the woman (in years) is used. The age of the woman is edited by NCHS for upper and lower limits. When women are reported to be under 10 years of age or 50 years of age and over, the age of the woman is considered not stated and is assigned as follows: Age on all fetal-death records with age of woman not stated is assigned according to the age appearing on the record previously processed for a woman of identical race and having the same total-birth order (total of live births and other terminations).

Marital status

In *Vital Statistics of the United States*, 1990, Volume I, Natality (8) and the *1990 Detail Natality Public-Use Documentation* (9), not stated marital status for live birth data is assigned. In 1990 marital status was reported directly on the birth certificates of 44 States and the District of Columbia. In the remaining six States, which lack such an item (California, Connecticut, Michigan, Nevada, New York, and Texas), marital status is inferred from a comparison of the child’s and parents’ surnames. A birth in a nonreporting State is classified as occurring to a married woman if the parents’ surnames are the same, or if the child’s and father’s surnames are the same and the mother’s current surname cannot be obtained from the informant item on the birth certificate. A birth in a nonreporting State is classified as occurring to an unmarried woman if the father’s name is missing, if the parents’ surnames are different, or if the father’s and child’s surnames are different and the mother’s current surname is missing. When marital status is not stated on the birth certificate of a reporting area, the woman is considered married. For this report, not stated marital status for live birth data (0.01 percent of records in the selected areas) was not assigned to married among reporting

States so that not stated marital status was allocated with identical procedures for the live birth and fetal death records (8).

Instead, fetal deaths and live births with unknown or not-stated values are distributed according to the proportions with known values. Not stated marital status is distributed before not stated education or prenatal care. Allocated numbers do not necessarily add to the totals.

Total-birth order

Total-birth order is the sum of the number of live births, number of other terminations including both spontaneous and induced terminations, and the current delivery. Not stated total-birth order is distributed according to the proportions with known values. This distribution is done before distributing not stated education or prenatal care. The allocated numbers do not necessarily add to the totals.

Quality of data

Completeness of registration

All States have adopted laws that require the registration of births and the reporting of fetal deaths. It is believed that more than 99 percent of the births occurring in this country are registered.

Reporting requirements for fetal deaths vary somewhat from State to State (see “[Comparability and completeness of data](#)”). Overall reporting is not as complete for fetal deaths as for births, but it is believed to be relatively complete for fetal deaths at a gestation of 28 weeks or more. Tabulated national statistical data on fetal deaths include only fetal deaths occurring at a stated or presumed gestation of 20 weeks or more.

Comparability and completeness of data—Registration area requirements for reporting fetal deaths vary. Most of these areas require reporting of fetal deaths at gestations of 20 weeks or more (see *Vital Statistics of the United States*, 1990, Volume II, Mortality, Part A, Technical Appendix (6). There is substantial evidence that not all fetal deaths for which reporting is required are reported (10).

Underreporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each State. Thus, for States requiring reporting of all periods of gestation, fetal deaths occurring at younger gestational ages are less completely reported. The reporting of fetal deaths at 20–23 weeks of gestation may be more complete for those States that report fetal deaths at all periods of gestation than for others.

The tables in this report are based on fetal deaths occurring at gestations of 20 weeks or more. These tables also include fetal deaths for which gestation is not stated for those States requiring reporting at 20 weeks or more of gestation only. Fetal deaths of not stated gestation were excluded for Georgia, which required reporting of all products of conception except for those with a stated birthweight of 500 grams or more.

Computation of rates

Fetal deaths with unknown or not-stated values are distributed according to the proportions with known values before rates are computed. An asterisk is shown in place of any derived statistic based on fewer than 20 cases in the numerator or denominator.

Random variation

Although the fetal death data in this report are not subject to sampling error, they may be affected by random variation in the number of fetal deaths involved. When the number of events is small, perhaps less than 100, and the probability of such an event is small, considerable caution must be observed in interpreting the data.

If the rate R_1 corresponding to N_1 events is compared with the rate R_2 corresponding to N_2 events, the difference between the two rates may be regarded as statistically significant at the 0.05 level of significance if it exceeds

$$2 \sqrt{\frac{R_1^2}{N_1} + \frac{R_2^2}{N_2}}$$

Additional information on random variation may be found in the Technical Appendix from *Vital Statistics of the United States*, 1990, Volume II, Mortality, Part A (6).

Vital and Health Statistics series descriptions

- SERIES 1. **Programs and Collection Procedures**—These reports describe the data collection programs of the National Center for Health Statistics. They include descriptions of the methods used to collect and process the data, definitions, and other material necessary for understanding the data.
- SERIES 2. **Data Evaluation and Methods Research**—These reports are studies of new statistical methods and include analytical techniques, objective evaluations of reliability of collected data, and contributions to statistical theory. These studies also include experimental tests of new survey methods and comparisons of U.S. methodology with those of other countries.
- SERIES 3. **Analytical and Epidemiological Studies**—These reports present analytical or interpretive studies based on vital and health statistics. These reports carry the analyses further than the expository types of reports in the other series.
- SERIES 4. **Documents and Committee Reports**—These are final reports of major committees concerned with vital and health statistics and documents such as recommended model vital registration laws and revised birth and death certificates.
- SERIES 5. **International Vital and Health Statistics Reports**—These reports are analytical or descriptive reports that compare U.S. vital and health statistics with those of other countries or present other international data of relevance to the health statistics system of the United States.
- SERIES 6. **Cognition and Survey Measurement**—These reports are from the National Laboratory for Collaborative Research in Cognition and Survey Measurement. They use methods of cognitive science to design, evaluate, and test survey instruments.
- SERIES 10. **Data From the National Health Interview Survey**—These reports contain statistics on illness; unintentional injuries; disability; use of hospital, medical, and other health services; and a wide range of special current health topics covering many aspects of health behaviors, health status, and health care utilization. They are based on data collected in a continuing national household interview survey.
- SERIES 11. **Data From the National Health Examination Survey, the National Health and Nutrition Examination Surveys, and the Hispanic Health and Nutrition Examination Survey**—Data from direct examination, testing, and measurement on representative samples of the civilian noninstitutionalized population provide the basis for (1) medically defined total prevalence of specific diseases or conditions in the United States and the distributions of the population with respect to physical, physiological, and psychological characteristics, and (2) analyses of trends and relationships among various measurements and between survey periods.
- SERIES 12. **Data From the Institutionalized Population Surveys**—Discontinued in 1975. Reports from these surveys are included in Series 13.
- SERIES 13. **Data From the National Health Care Survey**—These reports contain statistics on health resources and the public's use of health care resources including ambulatory, hospital, and long-term care services based on data collected directly from health care providers and provider records.
- SERIES 14. **Data on Health Resources: Manpower and Facilities**—Discontinued in 1990. Reports on the numbers, geographic distribution, and characteristics of health resources are now included in Series 13.
- SERIES 15. **Data From Special Surveys**—These reports contain statistics on health and health-related topics collected in special surveys that are not part of the continuing data systems of the National Center for Health Statistics.
- SERIES 16. **Compilations of Advance Data From Vital and Health Statistics**—Advance Data Reports provide early release of information from the National Center for Health Statistics' health and demographic surveys. They are compiled in the order in which they are published. Some of these releases may be followed by detailed reports in Series 10–13.
- SERIES 20. **Data on Mortality**—These reports contain statistics on mortality that are not included in regular, annual, or monthly reports. Special analyses by cause of death, age, other demographic variables, and geographic and trend analyses are included.
- SERIES 21. **Data on Natality, Marriage, and Divorce**—These reports contain statistics on natality, marriage, and divorce that are not included in regular, annual, or monthly reports. Special analyses by health and demographic variables and geographic and trend analyses are included.
- SERIES 22. **Data From the National Mortality and Natality Surveys**—Discontinued in 1975. Reports from these sample surveys, based on vital records, are now published in Series 20 or 21.
- SERIES 23. **Data From the National Survey of Family Growth**—These reports contain statistics on factors that affect birth rates, including contraception, infertility, cohabitation, marriage, divorce, and remarriage; adoption; use of medical care for family planning and infertility; and related maternal and infant health topics. These statistics are based on national surveys of childbearing age.
- SERIES 24. **Compilations of Data on Natality, Mortality, Marriage, Divorce, and Induced Terminations of Pregnancy**—These include advance reports of births, deaths, marriages, and divorces based on final data from the National Vital Statistics System that were published as supplements to the *Monthly Vital Statistics Report (MVSR)*. These reports provide highlights and summaries of detailed data subsequently published in *Vital Statistics of the United States*. Other supplements to the MVSR published here provide selected findings based on final data from the National Vital Statistics System and may be followed by detailed reports in Series 20 or 21.

For answers to questions about this report or for a list of reports published in these series, contact:

Data Dissemination Branch
National Center for Health Statistics
Centers for Disease Control and Prevention
Public Health Service
6525 Belcrest Road, Room 1064
Hyattsville, MD 20782
(301) 436-8500
E-mail: nchsquery@nch10a.em.cdc.gov
Internet: <http://www.cdc.gov/nchswwww/nchshome.htm>

DEPARTMENT OF
HEALTH AND HUMAN SERVICES

Public Health Service
Centers for Disease Control and Prevention
National Center for Health Statistics
6525 Belcrest Road
Hyattsville, Maryland 20782

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

BULK RATE
POSTAGE & FEES PAID
PHS/NCHS
PERMIT NO. G-281