

Perinatal Mortality in the United States: 1981–85

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Highlights

In 1985 there was a total of 40,568 deaths during the perinatal period, including 18,703 late fetal deaths (28 weeks or more of gestation) and 21,865 early infant deaths (under 7 days). The perinatal mortality rate continued its long-term downward trend, reaching a new low of 10.7 deaths per 1,000 live births and fetal deaths, down from the rate of 11.0 in 1984. In contrast to the infant mortality rate, the declining trend for perinatal mortality shows no evidence of slowing.

As in previous years, the perinatal mortality rate was higher for the black population (17.4) than the white population (9.6). The race differential widened between 1981 and 1985 because the rate of decline for the white population (15 percent) exceeded that of the black population (10 percent). The widening was observed for both the fetal and the neonatal components of perinatal mortality.

Males continued to experience higher perinatal mortality than did females. The nonmetropolitan perinatal mortality rate was higher than the metropolitan rate for both major race groups.

Introduction

This report describes recent levels of perinatal mortality in the United States; a previous report described trends in perinatal mortality during 1950–81 (NCHS, 1986). Perinatal deaths refer to the sum of spontaneous fetal deaths of a specified gestational age plus neonatal deaths. Three different definitions of perinatal mortality for the United States and each State are reported annually in *Vital Statistics of the United States, Volume II, Mortality, Part A*, beginning with 1979. They are derived from data on three vital events reported to the National Center for Health Statistics (NCHS)—fetal deaths, infant deaths, and live births. Measures of perinatal mortality supplement other statistics on fetal and infant mortality published by NCHS.

Components of perinatal mortality

Perinatal mortality can be described in terms of two components—fetal and neonatal deaths. A fetal death refers to the death of a product of human conception prior to complete extraction or expulsion from its mother, irrespective of the duration of pregnancy (NCHS, 1978). In this report, fetal deaths refer only to deaths of fetuses of at least 20 weeks' gestation. Fetal deaths can be characterized as "early" (20–27 weeks' gestation) and "late" (28 weeks or more gestation). Neonatal deaths refer to deaths to liveborn infants under 28 days of age; they also can be categorized as "early" (under 7 days) and "late" (7–27 days).

Effective with data for 1979, NCHS began publishing statistics for three perinatal measures. Perinatal Definition I, the most restrictive definition, refers only to fetal deaths of 28 weeks or more gestation and infant deaths of under 7 days. The most inclusive measure, Perinatal Definition II, refers to fetal deaths of 20 weeks or more gestation and infant deaths under 28 days of age. Perinatal Definition III includes fetal deaths of 20 weeks or more gestation and infant deaths under 7 days. This report focuses on Perinatal Definition I for the following reasons:

- Definition I limits the infant death group to those under 7 days; during this early infant period, prenatal conditions and circumstances surrounding the delivery are more influential to nonsurvival than are postnatal factors (Shapiro, Schlesinger, and Nesbitt, 1968).
- Definition I limits fetal deaths to those of 28 weeks or more gestation; such deaths appear to be better reported than those occurring before 28 weeks' gestation (NCHS, 1965).
- Almost three-fourths of all perinatal deaths by the broadest definition (II) occurred within the period encompassed by Definition I in 1985.
- Definition I is generally used for international comparisons.

Measures of perinatal mortality can be expressed as either a rate or a ratio. The perinatal rate is defined as the number of perinatal deaths per 1,000 live births and fetal deaths. The perinatal ratio is the number of perinatal deaths per 1,000 live births. The perinatal rate includes fetal deaths in both the numerator and the denominator; the perinatal ratio includes fetal deaths only in the numerator. The perinatal mortality rate—the preferred measure—is a closer estimate of risk of death in the perinatal period because for any data year the denominator more closely approximates the population at risk. However, actual numerical differences between perinatal mortality rates and ratios in the United States are small. For example, in 1985 the Definition I perinatal rate as 10.7 and the perinatal ratio was 10.8. For most States, differences between perinatal rates and perinatal ratios are less than 1 percent. Although this report emphasizes the perinatal mortality rates, most of the detailed tables show both rates and ratios.

The distribution of fetal and neonatal deaths combined by age for 1985 is shown in table A. The largest proportion of these perinatal events is accounted for by early neonatal deaths (39 percent), followed by late fetal deaths (34 percent). Early fetal deaths accounted for 20 percent of all perinatal deaths, and late neonatal deaths (8 percent) contributed least to reported perinatal mortality. Although the general distribution of the components of perinatal mortality has been the same for many years, changes have occurred in the relative contribution of each component: The percent of perinatal deaths in the late

Table A. Percent distribution of components of perinatal mortality: United States, 1950 and 1985

[For definition of terms, see text]

Component	1950	1985
Total	100.0	100.0
Early fetal deaths	10.3	19.6
Late fetal deaths	38.1	33.5
Early neonatal deaths	44.9	39.2
Late neonatal deaths	6.7	7.7

fetal and early neonatal periods has decreased, and the percent in the early fetal and late neonatal periods has increased, accordingly (table A). Thus, in 1950, perinatal deaths consisted of 10 percent early fetal deaths, 38 percent late fetal deaths, 45 percent early neonatal deaths, and 7 percent late neonatal deaths.

Trends and differentials in perinatal mortality

Unless stated otherwise, in this report perinatal mortality refers to Perinatal Definition I and includes only fetal deaths of 28 weeks or more gestation and infant deaths under 7 days. In 1985, there were 40,568 perinatal deaths in the United States, a decrease of 5,286 (12 percent) from the number in 1981 (table B). The perinatal mortality rate of 10.7 perinatal deaths

Table B. Number of perinatal, late fetal, and early neonatal deaths and mortality rates by race: United States, 1979–85

[Perinatal and fetal rates are per 1,000 live births and specified fetal deaths; neonatal rates are per 1,000 live births]

Year	Deaths			Mortality rate		
	All races ¹	White	Black	All races ¹	White	Black
Perinatal ²						
1985	40,568	28,766	10,628	10.7	9.6	17.4
1984	40,702	29,148	10,389	11.0	9.9	17.4
1983	42,134	30,129	10,750	11.5	10.3	18.2
1982	45,372	32,651	11,431	12.3	11.0	19.1
1981	45,854	33,151	11,524	12.6	11.3	19.4
1980	48,091	34,621	12,322	13.2	11.9	20.7
1979	48,618	35,272	12,279	13.8	12.5	21.1
Late fetal						
1985	18,703	13,669	4,363	4.9	4.5	7.1
1984	19,136	14,146	4,342	5.2	4.8	7.3
1983	19,819	14,551	4,524	5.4	5.0	7.7
1982	21,666	16,034	4,862	5.9	5.4	8.1
1981	21,470	15,945	4,850	5.9	5.5	8.2
1980	22,599	16,638	5,324	6.2	5.7	8.9
1979	22,567	16,723	5,260	6.4	5.9	9.0
Early neonatal						
1985	21,865	15,097	6,265	5.8	5.0	10.3
1984	21,566	15,002	6,047	5.9	5.1	10.2
1983	22,315	15,578	6,226	6.1	5.4	10.6
1982	23,706	16,617	6,569	6.4	5.6	11.1
1981	24,384	17,206	6,674	6.7	5.9	11.4
1980	25,492	17,983	6,998	7.1	6.2	11.9
1979	26,051	18,549	7,019	7.5	6.6	12.1

¹Includes races other than white and black.

²Infant deaths under 7 days (early neonatal) and fetal deaths with stated or presumed gestation of 28 weeks or more (late fetal).

per 1,000 live births and fetal deaths is the lowest perinatal rate yet achieved in the United States; it represents a decrease of 15 percent since 1981, continuing the generally downward trend since 1950 (figure 1). In contrast to the trend in infant mortality (NCHS, 1987a), perinatal mortality has shown no slowing since 1979 (table B). The average annual decline in the perinatal mortality rate between 1982 and 1985 (5 percent) was somewhat greater than between 1979 and 1982 (4 percent). Reductions in the infant mortality rate during these periods averaged 4 percent between 1979 and 1982 and 3 percent between 1982 and 1985.

Trends in the two components of perinatal mortality—late fetal deaths and early neonatal deaths—have not been the same. The neonatal component shows a slowing in the downward trend. The average annual decline in the early neonatal mortality rate slowed from 5 percent during 1979 to 1982 to 3 percent between 1982 and 1985. In contrast, the decline in the late fetal mortality rate accelerated from 3 percent to 6 percent annually during these two periods, respectively. These patterns suggest that some deaths may have been postponed; thus, some deaths that occurred in the fetal period may have been postponed to the neonatal period. Similarly, some infant deaths may have been postponed from the neonatal to the postneonatal period.

Race differentials

The perinatal mortality rate for the black population in 1985 (17.4) was 1.8 times that of the white population (9.6), somewhat higher than the ratio of the rates in 1981 (1.7). During this period, the absolute difference in perinatal mortality rates between black and white infants narrowed from 8.1 infants per 1,000 live births and fetal deaths in 1981 to 7.8 in 1985.

Changes in both major components of perinatal mortality contributed to the widening of the race differential in perinatal mortality during 1981–85. Thus, while the late fetal mortality rate (fetal deaths of 28 weeks or more gestation) declined 17 percent, from 5.9 to 4.9 fetal deaths per 1,000 live births plus fetal deaths, the decline was greater for white infants (18 percent) than for black infants (13 percent). Similarly, while the early neonatal mortality rate (infant deaths under 7 days) declined by 13 percent (from 6.7 to 5.8 infant deaths per 1,000 live births), the decrease was 1½ times as large for the white population (15 percent) as for the black population (10 percent).

The race differential in perinatal mortality rate is associated with the race differential in birth weight distributions. In 1985,

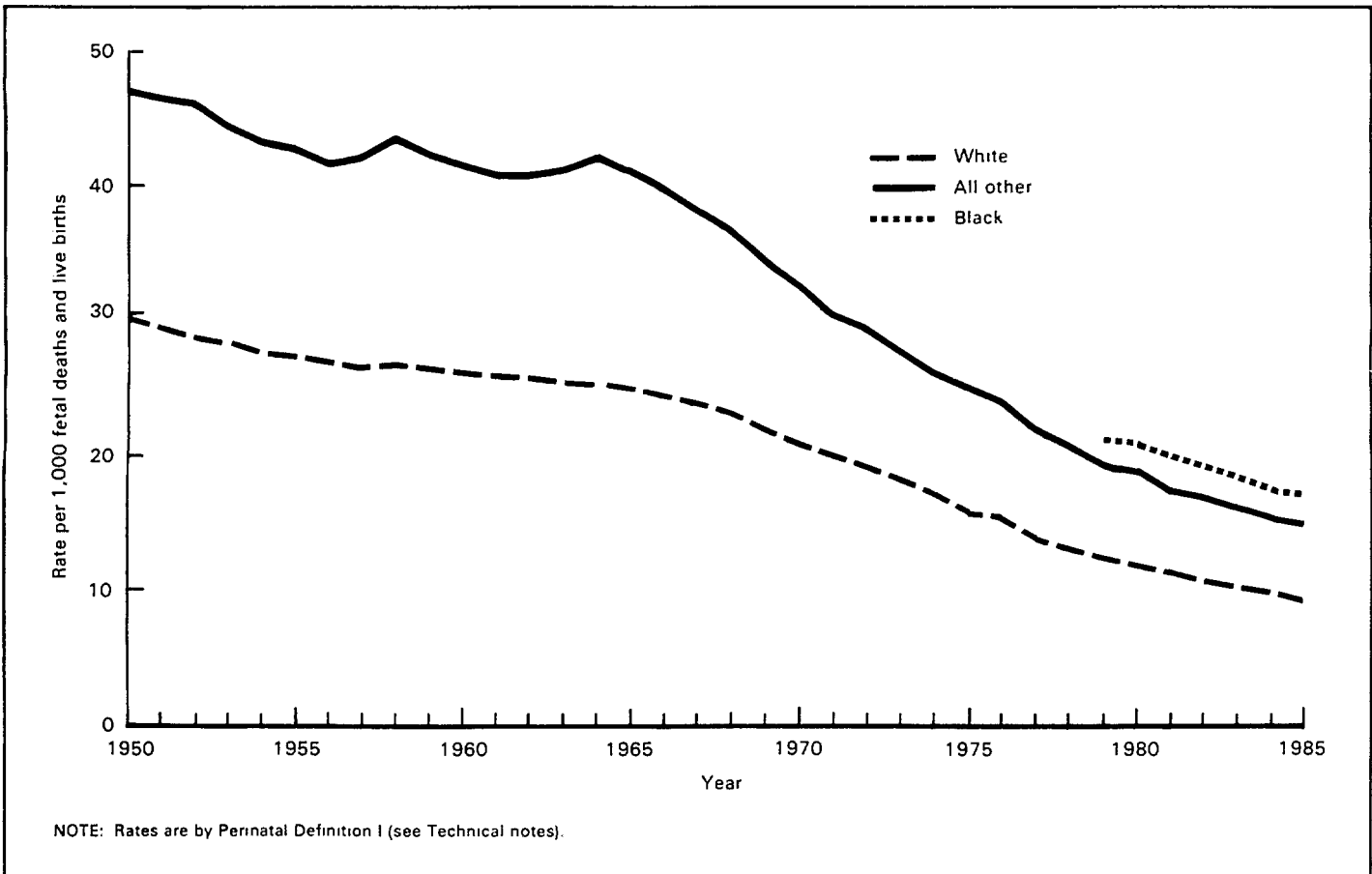


Figure 1. Perinatal mortality rates by race: United States, 1950–85

6 percent of white live births weighed 2,500 grams or less compared with 12 percent for black infants (NCHS, 1987b). The proportion of low birth weight among black infants has been consistently higher than among white infants; and there is no evidence of convergence in birth weight distributions of the two groups between 1981 and 1985. Approximately three-fourths of all neonatal deaths occur among low-birth-weight infants (NCHS, 1972; World Health Organization, 1978), and 74 percent of fetal deaths involve birth weights of 2,500 grams or less (see *Vital Statistics of the United States, Mortality, Part A, Volume II*, published annually).

Sex differentials

The sex differential in perinatal mortality in 1985 was 121:100, indicating that approximately 121 males died for every 100 females (table C). This is somewhat higher than the ratio in 1981 (119:100). In 1985, the perinatal mortality sex ratio was 122:100 for the white population and 119:100 for the black population.

Table C. Perinatal mortality rates by race and sex: United States, 1985

[Rates are for Perinatal Definition I; see Technical notes. Rates are per 1,000 live births and specified fetal deaths]

Race	Both sexes	Male	Female	Sex ratio
All races ¹	10.7	11.5	10.0	121
White	9.6	10.3	8.9	122
Black	17.4	18.5	16.1	119

¹Includes races other than white and black.

Table D. Perinatal mortality rates by race for metropolitan and nonmetropolitan counties and percent difference between metropolitan and nonmetropolitan counties: United States, 1985

[Rates are for Perinatal Definition I; see Technical notes. Rates are per 1,000 live births and specified fetal deaths]

Race	Total	Metropolitan counties	Nonmetropolitan counties	Percent difference ¹
All races ²	10.7	10.7	10.8	+1.0
White	9.6	9.5	9.9	+4.2
Black	17.4	17.2	18.1	+5.2

¹Percent difference is computed as:

$$\frac{r_N - r_M}{r_M} \times 100$$

where r_N = rate for nonmetropolitan counties

r_M = rate for metropolitan counties.

²Includes races other than white and black.

Geographic variation

As in 1981, perinatal mortality rates in 1985 were slightly higher in nonmetropolitan than in metropolitan counties (table D). The rate for nonmetropolitan counties was 10.8 deaths per 1,000 live births and fetal deaths compared with 10.7 for metropolitan counties. The geographic differential is even greater by race: For the white population, nonmetropolitan rates were 4 percent higher than metropolitan rates and for the black population, 5 percent higher.

Perinatal mortality rates also varied by geographic division and by State. Among the divisions in 1985, the East South Central Division had the highest rate, about 18 percent above the national figure. Higher rates prevailed there for both race groups compared with the national average for each group—6 percent higher for the white population and 8 percent higher for the black population. The Pacific and West North Central Divisions had the lowest rates for the white population (6 percent below the rate for the U.S. white population), and the Mountain Division had the lowest rate for the black population (32 percent below the rate for the U.S. black population).

The analysis of geographic variation in perinatal mortality is restricted to Perinatal Definition I, which includes only fetal deaths of 28 weeks or more gestation and infant deaths under 7 days. The usefulness of other perinatal indices for interstate comparisons appears to be limited by variation in completeness of reporting fetal deaths between 20 and 28 weeks' gestation. Other data limitations that affect geographic comparability are discussed in the Technical notes.

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Table 1. Perinatal mortality ratios for 3 definitions, by race: United States, 1950-85

[Perinatal Definition I includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more; Perinatal Definition II includes fetal deaths with stated or presumed period of gestation of 20 weeks or more; Perinatal Definition III includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more. Presumed gestational age not stated was changed beginning in 1969; see Technical notes. Ratios per 1,000 live births]

Year	Perinatal Definition I ¹				Perinatal Definition II				Perinatal Definition III			
	All races	White	All other		All races	White	All other		All races	White	All other	
			Total	Black			Total	Black			Total	Black
1985 ²	10.8	9.6	15.3	17.5	14.8	13.1	21.7	24.8	13.7	12.1	20.1	23.0
1984 ²	11.1	10.0	15.5	17.5	15.2	13.5	21.8	24.7	14.1	12.5	20.3	23.1
1983 ²	11.6	10.4	16.3	18.3	15.7	13.9	23.1	26.1	14.6	12.8	21.6	24.3
1982 ²	12.3	11.1	17.2	19.3	16.6	14.7	24.0	27.0	15.3	13.6	22.3	25.0
1981 ²	12.6	11.4	17.6	19.6	17.0	15.1	24.6	27.4	15.7	13.9	22.8	25.3
1980 ²	13.3	11.9	18.9	20.9	17.7	15.7	26.0	28.7	16.3	14.4	24.0	26.5
1979 ²	13.9	12.6	19.5	21.2	18.3	16.2	26.7	29.3	16.9	15.0	24.8	27.2
1978 ²	14.7	13.1	21.1	---	19.2	16.9	28.7	---	17.7	15.5	26.7	---
1977 ²	15.5	14.0	21.9	---	19.8	17.5	29.5	---	18.3	16.2	27.1	---
1976 ²	16.9	15.2	24.1	---	21.4	19.0	31.5	---	19.8	17.6	29.1	---
1975 ²	17.9	16.2	25.3	---	22.3	19.9	32.8	---	20.7	18.5	30.4	---
1974 ²	19.1	17.4	26.3	---	23.7	21.4	34.2	---	22.2	20.0	31.8	---
1973 ²	20.2	18.5	27.9	---	25.2	22.6	36.4	---	23.6	21.2	34.2	---
1972 ²	21.4	19.5	30.0	---	26.3	23.5	38.7	---	24.8	22.2	36.4	---
1971 ²	21.9	20.0	30.6	---	27.6	24.8	40.8	---	26.3	23.6	38.7	---
1970 ²	23.2	21.1	33.2	---	29.3	26.2	44.0	---	27.8	24.9	41.7	---
1969	24.2	22.0	34.8	---	29.7	26.6	45.1	---	28.2	25.3	42.5	---
1968	26.1	23.8	37.7	---	31.9	28.5	48.6	---	30.4	27.3	46.0	---
1967	26.5	23.9	38.9	---	32.1	28.5	49.6	---	30.6	27.2	46.9	---
1966	27.2	24.6	39.9	---	32.9	29.2	50.9	---	31.2	27.8	47.8	---
1965	28.0	25.2	41.3	---	33.8	30.0	52.6	---	31.2	28.5	49.3	---
1964	28.4	25.5	43.2	---	34.3	30.3	54.7	---	32.5	28.8	51.2	---
1963 ³	28.2	25.6	41.8	---	34.0	30.4	52.8	---	32.2	28.8	49.4	---
1962 ³	28.5	26.0	41.7	---	34.3	30.8	52.7	---	32.4	29.3	49.2	---
1961	28.6	26.2	41.7	---	34.5	31.0	53.2	---	32.6	29.4	49.4	---
1960	28.9	26.5	42.4	---	34.8	31.4	53.6	---	32.8	29.7	49.6	---
1959	29.1	26.6	43.3	---	35.2	31.6	55.0	---	33.1	29.9	50.7	---
1958	29.6	27.0	44.5	---	36.0	32.3	56.5	---	33.6	30.4	51.9	---
1957	29.2	26.8	43.0	---	35.4	32.1	54.6	---	33.1	30.1	50.0	---
1956	29.3	26.9	42.8	---	35.4	32.1	54.2	---	33.1	30.2	49.8	---
1955	30.0	27.7	43.9	---	36.2	32.9	55.6	---	34.0	31.1	51.4	---
1954	30.2	27.8	44.3	---	36.5	33.3	55.9	---	34.2	31.3	51.5	---
1953	31.0	28.6	45.4	---	37.3	34.2	57.0	---	34.9	32.1	52.3	---
1952	31.6	29.0	47.5	---	38.1	34.6	60.3	---	35.6	32.5	55.2	---
1951	32.2	29.8	47.5	---	38.9	35.6	59.4	---	36.3	33.3	54.8	---
1950	33.0	30.5	48.1	---	39.7	36.4	60.0	---	37.0	34.1	55.3	---

¹Figures for gestational age not stated are distributed for fetal deaths; see Technical notes.

²Excludes infant and fetal deaths and live births occurring to nonresidents of the United States.

³Figures by race exclude data for residents of New Jersey; see *Vital Statistics of the United States, 1962 and 1963, Vol. II, Mortality, Part A, Technical Appendix.*

Table 2. Perinatal deaths and mortality ratios and rates for 3 definitions, by race and sex: United States, 1985

[Perinatal Definition I includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more; Perinatal Definition II includes infant deaths under 28 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more; Perinatal Definition III includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more; see Technical notes. Ratios per 1,000 live births. Rates per 1,000 live births and specified fetal deaths]

Race and sex ¹	Perinatal Definition I ²			Perinatal Definition II			Perinatal Definition III		
	Deaths	Ratio	Rate	Deaths	Ratio	Rate	Deaths	Ratio	Rate
All races.....	40,568	10.8	10.7	55,840	14.8	14.7	51,526	13.7	13.6
Male.....	22,217	11.5	11.5	30,666	15.9	15.8	28,202	14.6	14.5
Female.....	18,351	10.0	10.0	25,174	13.7	13.6	23,324	12.7	12.6
White.....	28,766	9.6	9.6	39,187	13.1	13.0	36,051	12.1	12.0
Male.....	15,830	10.3	10.3	21,608	14.1	14.0	19,781	12.9	12.8
Female.....	12,936	8.9	8.9	17,579	12.1	12.0	16,270	11.2	11.1
All other.....	11,802	15.3	15.2	16,653	21.7	21.4	15,475	20.1	19.9
Male.....	6,387	16.3	16.2	9,058	23.1	22.9	8,421	21.5	21.3
Female.....	5,415	14.3	14.2	7,595	20.1	19.9	7,054	18.7	18.5
Black.....	10,628	17.5	17.4	15,078	24.8	24.5	14,003	23.0	22.7
Male.....	5,764	18.7	18.5	8,210	26.6	26.3	7,637	24.7	24.4
Female.....	4,864	16.2	16.1	6,868	22.9	22.7	6,366	21.2	21.0

¹Figures for sex not stated are distributed for fetal deaths; see Technical notes.

²Figures for gestational age not stated are distributed for fetal deaths; see Technical notes.

Table 3. Perinatal deaths and mortality ratios and rates for 3 definitions, by race, for metropolitan and nonmetropolitan counties: United States, 1985

[Perinatal Definition I includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more; Perinatal Definition II includes infant deaths under 28 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more; Perinatal Definition III includes infant deaths under 7 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more; see Technical notes. Frequencies for Perinatal Definition I may not add to totals; see Technical notes. Ratios per 1,000 births. Rates per 1,000 live births and specified fetal deaths]

Geographic area and race	Perinatal Definition I ¹			Perinatal Definition II			Perinatal Definition III		
	Deaths	Ratio	Rate	Deaths	Ratio	Rate	Deaths	Ratio	Rate
United States.....	40,568	10.8	10.7	55,840	14.8	14.7	51,526	13.7	13.6
White.....	28,766	9.6	9.6	39,187	13.1	13.0	36,051	12.1	12.0
All other.....	11,802	15.3	15.2	16,653	21.7	21.4	15,475	20.1	19.9
Black.....	10,628	17.5	17.4	15,078	24.8	24.5	14,003	23.0	22.7
Metropolitan counties.....	31,075	10.8	10.7	42,800	14.8	14.7	39,498	13.7	13.6
White.....	21,456	9.5	9.5	29,254	13.0	12.9	26,901	11.9	11.9
All other.....	9,619	15.2	15.1	13,546	21.4	21.2	12,597	19.9	19.7
Black.....	8,741	17.3	17.2	12,374	24.5	24.2	11,496	22.8	22.5
Nonmetropolitan counties.....	9,485	10.8	10.8	13,040	14.9	14.8	12,028	13.7	13.6
White.....	7,307	9.9	9.9	9,933	13.5	13.4	9,150	12.4	12.3
All other.....	2,178	15.9	15.8	3,107	22.7	22.4	2,878	21.0	20.7
Black.....	1,884	18.2	18.1	2,704	26.2	25.8	2,507	24.3	23.9

¹Figures for gestational age not stated are distributed for fetal deaths; see Technical notes.

Table 4. Perinatal Definition I mortality rates and ratios by race: United States, division, and State, 1985

[Perinatal Definition I includes infant deaths under 7 days and fetal deaths with stated or presumed gestation of 28 weeks or more. Rates per 1,000 live births and specified fetal deaths; ratios per 1,000 live births]

Division and State	Rate				Ratio			
	All races	White	All other		All races	White	All other	
			Total	Black			Total	Black
United States	10.7	9.6	15.2	17.4	10.8	9.6	15.3	17.5
New England	9.8	9.3	15.7	18.9	9.9	9.3	15.8	19.0
Maine	9.4	9.5	-	-	9.4	9.6	-	-
New Hampshire	9.3	9.4	*3.3	*7.5	9.3	9.4	*3.3	*7.5
Vermont	9.2	9.2	-	-	9.2	9.3	-	-
Massachusetts	9.7	9.0	15.5	19.0	9.7	9.0	15.6	19.1
Rhode Island	9.4	8.8	14.8	*19.0	9.4	8.8	14.9	*19.3
Connecticut	10.8	9.7	17.7	19.3	10.8	9.7	17.7	19.4
Middle Atlantic	11.4	10.3	15.2	16.6	11.5	10.4	15.3	16.6
New York	11.5	10.4	14.6	16.1	11.5	10.4	14.7	16.2
New Jersey	11.1	9.8	15.4	16.8	11.1	9.8	15.5	16.9
Pennsylvania	11.6	10.7	16.5	17.5	11.6	10.7	16.6	17.5
East North Central	11.0	9.7	17.6	18.6	11.1	9.7	17.7	18.7
Ohio	10.7	9.8	15.6	16.2	10.7	9.8	15.7	16.3
Indiana	11.4	10.4	18.8	19.2	11.5	10.5	18.9	19.3
Illinois	12.4	10.4	18.8	19.7	12.4	10.5	19.0	19.9
Michigan	10.6	9.1	17.7	19.0	10.7	9.1	17.8	19.1
Wisconsin	9.0	8.2	15.0	17.3	9.0	8.3	15.1	17.4
East North Central	9.4	9.0	12.9	14.5	9.4	9.0	13.0	14.5
Minnesota	9.3	9.2	10.7	15.9	9.4	9.3	10.8	16.0
Iowa	8.8	8.7	12.1	*10.3	8.9	8.7	12.2	*10.4
Missouri	9.6	8.6	14.7	14.9	9.7	8.6	14.8	15.0
North Dakota	8.0	7.9	9.0	-	8.0	7.9	9.0	-
South Dakota	9.5	9.4	9.9	-	9.6	9.5	10.0	-
Nebraska	10.0	9.7	13.4	14.6	10.1	9.8	13.5	14.7
Kansas	9.6	9.2	12.5	14.3	9.6	9.3	12.6	14.4
South Atlantic	12.5	10.0	18.2	19.0	12.5	10.0	18.3	19.2
Delaware	13.8	11.3	21.6	22.4	13.8	11.3	21.7	22.6
Maryland	12.3	9.1	18.6	20.2	12.4	9.1	18.7	20.3
District of Columbia	20.2	11.4	22.1	22.9	20.4	11.4	22.3	23.1
Virginia	12.1	10.0	17.8	19.5	12.2	10.1	18.0	19.7
West Virginia	11.5	10.9	22.6	24.5	11.5	11.0	22.8	24.8
North Carolina	11.9	10.0	16.4	17.1	12.0	10.0	16.5	17.2
South Carolina	14.8	10.1	21.9	22.3	14.9	10.2	22.1	22.5
Georgia	12.9	10.4	17.3	17.8	13.0	10.5	17.5	17.9
Florida	11.6	9.8	17.0	17.6	11.7	9.8	17.2	17.8
East South Central	12.6	10.2	18.8	19.0	12.7	10.2	19.0	19.2
Kentucky	12.0	11.1	19.7	20.4	12.0	11.2	19.9	20.5
Tennessee	11.6	9.5	18.6	18.9	11.7	9.5	18.7	19.0
Alabama	13.3	10.8	18.1	18.2	13.4	10.8	18.3	18.4
Mississippi	13.8	8.8	19.4	19.5	13.9	8.8	19.6	19.7
West South Central	10.5	9.5	14.2	15.4	10.6	9.6	14.3	15.5
Arkansas	11.2	9.8	15.4	15.3	11.3	9.9	15.5	15.4
Louisiana	12.5	9.6	16.8	17.3	12.6	9.6	17.0	17.5
Oklahoma	10.5	10.4	11.0	14.8	10.6	10.4	11.1	14.9
Texas	9.9	9.4	12.9	14.0	10.0	9.4	12.9	14.1
Mountain	9.3	9.2	10.0	11.9	9.3	9.2	10.1	11.9
Montana	9.4	8.7	14.3	-	9.5	8.8	14.5	-
Idaho	10.4	10.6	*7.2	-	10.5	10.6	*7.3	-
Wyoming	10.2	10.2	*9.5	*9.9	10.2	10.3	*9.6	*9.9
Colorado	9.5	9.3	11.2	11.3	9.5	9.3	11.2	11.3
New Mexico	9.5	9.6	9.0	*11.5	9.5	9.6	9.0	*11.5
Arizona	9.5	9.4	10.3	13.1	9.6	9.4	10.3	13.1
Utah	8.2	8.3	*7.7	*10.0	8.3	8.3	*7.7	*10.0
Nevada	8.0	7.8	8.8	12.9	8.0	7.9	8.8	13.0
Pacific	9.3	9.0	10.5	15.2	9.3	9.0	10.5	15.3
Washington	8.4	8.4	8.4	12.9	8.5	8.5	8.4	12.9
Oregon	8.2	8.3	7.2	*10.2	8.3	8.4	7.2	*10.2
California	9.6	9.2	11.0	15.4	9.6	9.2	11.0	15.5
Alaska	8.1	7.8	9.0	*13.6	8.2	7.8	9.0	*13.7
Hawaii	8.8	7.7	9.2	*17.7	8.8	7.8	9.2	*17.8

Technical notes

Sources of data

Counts of fetal deaths are based on data from reports of fetal deaths; counts of infant deaths are based on certificates of death; and counts of live births are based on information from certificates of live birth. For detailed information on the processing, classification, and tabulation of these events, see the technical appendixes of *Vital Statistics of the United States*, Volume I, Natality, and Volume II, Mortality.

Classification of data

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. The first day of the last normal menstrual period is used as the initial date because it can be more accurately determined than the date of conception, which usually occurs 2 weeks after LMP. Data on period of gestation are computed from information on "date of delivery" and "date last normal menses began." If "date last normal menses began" is not on the record or the calculated gestation falls beyond a duration considered biologically plausible, "gestation in weeks" or "physician's estimate of gestation" is used.

Gestation not stated—A fetal death with gestation not stated is presumed to be of 20 weeks or more gestation if (1) the death occurred in a State that requires reporting of all fetal deaths of gestational age 20 weeks or more, or (2) the fetus weighed 500 grams or more in a State that requires reporting of all fetal deaths regardless of gestational age. For Perinatal Definition I fetal deaths with gestation not stated but presumed to be 20 weeks or more are allocated to 28 weeks or more according to the proportion of fetal deaths with stated gestational age that fall into that category. For Perinatal Definitions II and III, fetal deaths with presumed gestation of 20 weeks or more are included with those of stated gestation of 20 weeks or more. For all three definitions, fetal deaths with not-stated sex are allocated within gestational age groups on the basis of the distribution of stated cases.

Race—The race of the fetus or infant is based on the race of the parents. If the parents are of different races, the following rules apply. (1) When only one parent is white, the fetus or infant is assigned to the other parent's race. (2) When neither parent is white, the fetus or infant is assigned to the father's race with one exception: If the mother is Hawaiian or part-Hawaiian, the fetus or infant is classified as Hawaiian.

When race of one parent is missing or ill-defined, the race of the other determines that of the fetus or infant. When the race of both parents is missing, the race of the fetus or infant is allocated to the specific race of the fetus or infant on the preceding record.

Quality of data

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

State requirements for reporting of fetal deaths vary. Most of the States require reporting of fetal deaths of gestations of 20 weeks or more. There is substantial evidence that not all fetal deaths for which reporting is required are reported.

For States having a minimum gestational period requirement, underreporting of fetal deaths may occur near the lower limit. In areas requiring the reporting of fetal deaths of 20 weeks or more, the total number reported for 20–23 weeks is lower than the number reported for 24–27 and 28–31 weeks' gestation. In contrast, in areas requiring reporting of all fetal deaths, regardless of the period of gestation, the number reported for 20–23 weeks is larger than the number for 24–27 and 28–31 weeks.

To maximize comparability of data by year and by State, fetal death and perinatal mortality statistics are based on fetal deaths of 20 weeks or more gestation. Beginning with 1969, fetal deaths of not-stated gestation were excluded for States requiring reporting of all products of conception except for those with a stated birth weight of 500 grams or more. In 1985 this rule applied to the following States: Colorado, Georgia, Hawaii, New York, Rhode Island, and Virginia.

Variations in fetal death reporting requirements and practices have implications for comparing perinatal rates among States. Because reporting is generally poorer near the lower limit of the reporting requirement, States that require reporting of all products of conception regardless of gestation are likely to have more complete reporting of fetal deaths of 20–27 weeks' gestation than are other States. The larger number of fetal deaths reported by these "all periods" States may result in higher perinatal rates compared to States in which reporting is less complete. Accordingly, reporting completeness may account, in part, for differences among the State perinatal rates, particularly differences for Perinatal Definitions II and III which use data for fetal deaths of 20–27 weeks.

Comparability problems also arise from the inconsistent application of the definition of fetal death by individual reporting units. For example, some live-born infants who die shortly after birth, particularly those born prematurely who die before the umbilical cord is severed or while the placenta is still attached, may erroneously be reported as fetal deaths. This type of error may be more of a problem in States lacking a precise definition of fetal death. Errors in application of the definition of live birth and fetal death can have the effect of increasing perinatal ratios by decreasing the number of live births in the denominator. Perinatal rates, however, are not as affected by this type of error.

Another problem that may affect comparability of perinatal rates among States involves fetal deaths with unknown gestation. Thirteen percent of all U.S. fetal death records are of unknown gestational age. There is considerable variation among the States in the proportion of fetal deaths of unknown gestation. These fetal deaths are allocated in the perinatal statistics to 20–27 weeks and to 28 weeks or more according to the proportion of fetal deaths with known gestation that fall into the two categories. For example, a State that requires reporting of all products of conception and also has a relatively high proportion of fetal deaths with unknown gestation may have a larger proportionate share of fetal deaths allocated to 20–27 weeks than a State that has a similar proportion of fetal deaths with unknown gestation but which requires reporting only for 20 weeks or more gestation.

Computation of rates and ratios

The rates and ratios shown in this report were computed using the following formulas.

$$\begin{aligned} &\text{Perinatal Definition II mortality rate per 1,000 live births and fetal deaths} \\ &= \frac{\text{Number of infant deaths under 28 days + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during a period}}{\text{Number of live births + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during the same period}} \times 1,000 \end{aligned}$$

$$\begin{aligned} &\text{Perinatal Definition II mortality ratio per 1,000 live births} \\ &= \frac{\text{Number of infant deaths under 28 days + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during a period}}{\text{Number of live births during the same period}} \times 1,000 \end{aligned}$$

$$\begin{aligned} &\text{Perinatal Definition III mortality rate per 1,000 live births and fetal deaths} \\ &= \frac{\text{Number of infant deaths under 7 days + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during a period}}{\text{Number of live births + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during the same period}} \times 1,000 \end{aligned}$$

$$\begin{aligned} &\text{Perinatal Definition III mortality ratio per 1,000 live births} \\ &= \frac{\text{Number of infant deaths under 7 days + number of fetal deaths with stated or presumed period of gestation of 20 weeks or more during a period}}{\text{Number of live births during the same period}} \times 1,000 \end{aligned}$$

$$\begin{aligned} &\text{Perinatal Definition I mortality rate per 1,000 live births and fetal deaths} \\ &= \frac{\text{Number of infant deaths under 7 days + number of fetal deaths with stated or presumed period of gestation of 28 weeks or more during a period}}{\text{Number of live births + number of fetal deaths with stated or presumed period of gestation of 28 weeks or more during the same period}} \times 1,000 \end{aligned}$$

$$\begin{aligned} &\text{Perinatal Definition I mortality ratio per 1,000 live births} \\ &= \frac{\text{Number of infant deaths under 7 days + number of fetal deaths with stated or presumed period of gestation of 28 weeks or more during a period}}{\text{Number of live births during the same period}} \times 1,000 \end{aligned}$$

Symbols

- - - Data not available
 - ... Category not applicable
 - Quantity zero
 - 0.0 Quantity more than zero but less than 0.05
 - Z Quantity more than zero but less than 500 where numbers are rounded to thousands
 - * Figure does not meet standards of reliability or precision (based on fewer than 20 perinatal deaths)
-

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