

Fetal and Perinatal Mortality, United States, 2006

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Abstract

Objectives—This report presents 2006 fetal and perinatal mortality data by maternal age, marital status, race, Hispanic origin, and state of residence, as well as by fetal birthweight, gestational age, plurality, and sex. Trends in fetal and perinatal mortality are also examined.

Methods—Descriptive tabulations of data are presented and interpreted.

Results—There were 25,972 reported fetal deaths at 20 weeks of gestation or more in the United States in 2006. The U.S. fetal mortality rate was 6.05 fetal deaths at 20 weeks of gestation or more per 1,000 live births, 3% lower than in 2005 (6.22). From 2005 to 2006, fetal mortality declined 3% for fetal deaths at 20–27 weeks of gestation, while the rate at 28 weeks or more did not decline significantly. This contrasts with the long-term trend of declines in fetal mortality at 28 weeks or more and stability at 20–27 weeks of gestation. Fetal mortality rates declined significantly for non-Hispanic black women from 2005 to 2006; however, rates for other racial and ethnic groups were essentially unchanged. In 2006, the fetal mortality rate for non-Hispanic black women (10.73) was more than twice the rate for non-Hispanic white (4.81) and Asian or Pacific Islander (4.89) women. The rate for American Indian or Alaska Native women (6.04) was 26% higher, and the rate for Hispanic women (5.29) was 10% higher, than the rate for non-Hispanic white women. Fetal mortality rates were higher than average for teenagers, women aged 35 and over, unmarried women, and women with multiple pregnancies.

Keywords: fetal death • perinatal death • stillbirth • pregnancy loss

Introduction

Fetal mortality—the intrauterine death of a fetus at any gestational age—is a major but often overlooked public health issue. Much of the public concern surrounding reproductive loss has focused on infant mortality, due in part to a lesser knowledge of the incidence, etiology, and prevention strategies for fetal mortality. The National Center for Health Statistics' (NCHS) National Survey of Family

Growth estimates that there are more than 1 million fetal losses per year in the United States (1), with the vast majority of these occurring before 20 weeks of gestation. Fetal mortality data from the National Vital Statistics System are usually presented for fetal deaths at 20 weeks of gestation or more. Even when only fetal deaths at 20 weeks or more are considered, nearly as many fetal deaths as infant deaths occur in the United States each year (Figure 1). The concept of a perinatal period emerged in the late 1940s as clinicians and researchers became increasingly aware of the relatively large number of deaths occurring in the period immediately before and after delivery (2). Perinatal mortality refers to death around the time of delivery and includes both fetal deaths (at least 20 weeks of gestation) and early infant (neonatal) deaths.

The U.S. fetal mortality rate declined from 25.0 fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths in 1942 (3) to 6.05 in 2006. The real decline in fetal mortality during this period was probably larger because reporting of fetal deaths has improved over time (4,5). This report presents detailed data on fetal and perinatal

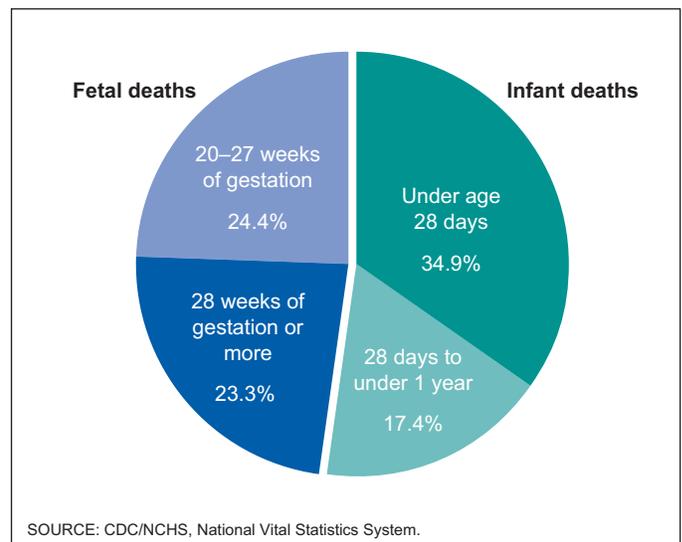


Figure 1. Percent distribution of fetal deaths at 20 weeks of gestation or more, and infant deaths: United States, 2006

deaths and mortality rates for the United States for 2006. Data are presented by maternal age, marital status, race, Hispanic origin, and state of residence, as well as by fetal gestational age at delivery, birthweight, plurality, and sex. Trends in fetal and perinatal mortality are also examined.

Methods

Data sources

Data in this report are drawn from two different NCHS vital statistics data files: the 2006 fetal death data set (for fetal deaths), and the 2006 period linked birth/infant death data set (linked file, for live births and infant deaths). The 2006 fetal death data set contains information from all Reports of Fetal Death filed in the 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam (6). In the linked file, the information from the death certificate is linked to the information from the birth certificate for each infant under age 1 year who died in 2006 (7,8). The purpose of the linkage is to use the many additional variables available from the birth certificate to conduct more detailed analyses of infant and perinatal mortality patterns. Infant deaths from the linked file are used in preference to those from the main mortality file for tabulating perinatal deaths because the linked file contains data by birth and maternal characteristics, similar to the fetal death file. Tables showing data by state also provide separate information for Puerto Rico, the Virgin Islands, and Guam; however, these data are not included in U.S. totals.

Fetal mortality

Fetal death refers to the intrauterine death of a fetus prior to delivery (see [Technical Notes](#)). Fetal mortality is generally divided into three periods: early (less than 20 completed weeks of gestation), intermediate (20–27 weeks of gestation), and late (28 weeks of gestation or more). Although the vast majority of fetal deaths occur early in pregnancy, most states in the U.S. only report fetal deaths at 20 weeks of gestation or more, and these intermediate and late fetal deaths are the subject of this report. Statistics on fetal death exclude data for induced terminations of pregnancy. Fetal mortality rates in this report are computed as the number of fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths at 20 weeks or more—the population at risk of the event (see [Technical Notes](#)).

Data limitations

There is substantial variation among states in reporting requirements and completeness of reporting for fetal death data, and these variations have important implications for data quality and completeness (see [Technical Notes](#)). The majority of states require reporting of fetal deaths at 20 weeks of gestation or more, or a minimum of 350 grams birthweight (roughly equivalent to 20 weeks), or some combination of the two. However, seven states and the U.S. Virgin Islands require reporting of fetal deaths at all periods of gestation (although three of these do not send data to NCHS for fetal deaths at less than 20 weeks of gestation), whereas one state requires reporting beginning at 16 weeks of gestation. At the other end of the spectrum, three states (New Mexico, South Dakota, and Tennessee) require

reporting of fetal deaths with birthweights of 500 grams or more (roughly equivalent to 22 weeks of gestation). Lack of full reporting for these states leads to a slight underestimate of the U.S. fetal mortality rate. For example, when data for these three states were excluded, the 2006 fetal mortality rate was 6.11, compared with 6.05 for all states combined.

There is substantial evidence that not all fetal deaths for which reporting is required are reported (6,9,10). Underreporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each state (see [Technical Notes](#)). Because reporting is generally incomplete near the lower limit of the reporting requirement, states that require reporting of all fetal deaths at any gestational age are likely to have more complete reporting of fetal deaths at 20 weeks or more than states that do not. The larger number of fetal deaths reported for these “all periods” states may result in higher perinatal mortality rates than for states whose reporting is less complete. In contrast, the lower fetal mortality rates for New Mexico, South Dakota, and Tennessee—the three states that only report fetal deaths of 500 grams or more—are likely due to differences in reporting, although real differences in fetal mortality risk may also be a factor. Thus, reporting completeness may account, in part, for differences in fetal and perinatal mortality rates among states. To promote the comparability of data by year and by state while including as much meaningful data as possible, this report presents data on fetal deaths with a stated or presumed period of gestation of 20 weeks or more (6); however, differences in reporting completeness may still affect some comparisons.

Correct interpretation of fetal death data must include an evaluation of the completeness of reporting of fetal deaths, as well as an evaluation of the completeness of reporting for the specific variables of interest (11–13). The percentage of not-stated responses for fetal death data varies substantially among variables and states (see [Technical Notes](#)). Fetal mortality rates for 2003 and 2004 have been revised from those reported previously due to the correction of a programming error (see [Technical Notes](#)).

Perinatal mortality

This report includes two different definitions of perinatal mortality. Perinatal definition I includes infant deaths under age 7 days and fetal deaths at 28 weeks of gestation or more. Perinatal definition II is the most inclusive definition and includes infant deaths under age 28 days and fetal deaths at 20 weeks or more. The denominators for all perinatal rate computations are per 1,000 live births plus fetal deaths for their respective time period (see [Technical Notes](#)). Definition I is preferred for international and state-specific comparisons due to differences among countries and states in the completeness of reporting of fetal deaths at 20–27 weeks of gestation. Definition II is useful for monitoring perinatal mortality throughout the gestational age spectrum because the majority of fetal deaths occur before 28 weeks of gestation.

2003 Revision of the U.S. Standard Report of Fetal Death

This report includes data for all states, 16 of which (California, Delaware, Florida, Idaho, Kansas, Kentucky, Maryland, Michigan, Nebraska, New Hampshire, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, and Washington) implemented the 2003 revision of the U.S. Standard Report of Fetal Death on or before January 1, 2006

(revised). In 2006, 43% of all fetal deaths at 20 weeks or more gestation in the U.S. occurred in these 16 states. The remaining reporting areas included in this report have data that are based on the 1989 revision of the U.S. Standard Report of Fetal Death (unrevised) (see [Technical Notes](#)). The variables included in this report are comparable between revisions; therefore, the 2003 revision had little effect on the data presented here.

Race and Hispanic origin

The race and Hispanic origin of the mother are reported independently on vital records. In tabulations of data by race and Hispanic origin, data for Hispanic persons are not further classified by race because the vast majority of women of Hispanic origin are reported as white. Data for American Indian or Alaska Native (AIAN) and Asian or Pacific Islander (API) women are not shown separately by Hispanic origin because the vast majority of these populations are non-Hispanic.

The 2003 revision of the U.S. Standard Report of Fetal Death allows the reporting of more than one race (multiple races) for each parent (14). In 2006, 17 states (the 16 revised states and Minnesota) allowed the reporting of more than one race for fetal death data (6). To provide uniformity and comparability of the data with data from unrevised states, multiple-race data were bridged to a single race (see [Technical Notes](#)).

Statistical significance

Statements in this report have been tested for statistical significance. A statement that a given mortality rate is higher or lower than another rate indicates that the rates are significantly different. For information on the methods used to test for statistical significance, as well as more detailed information on the collection, interpretation, and availability of fetal and perinatal data, see [Technical Notes](#).

Results

Trends in fetal and perinatal mortality

In 2006, the U.S. fetal mortality rate was 6.05 fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths, which was 3% lower than the rate of 6.22 in 2005 ([Table A](#)). Fetal mortality rates for 2003 and 2004 have been revised from those reported previously (see [Technical Notes](#)). The revised fetal mortality rates were 6.32 for 2003 and 6.28 for 2004. The fetal mortality rate in 2002 was 6.41. Although the trend has been generally downward, the 2005–2006 decline in the U.S. fetal mortality rate was the first statistically significant annual decline since 2002. Fetal mortality declined more slowly than infant mortality during the 1990s ([Figure 2](#)). However, the infant mortality rate plateaued from 2000 to 2005 (15), whereas the fetal mortality rate still showed some downward movement during that period ([Figure 2](#)). Both fetal and infant mortality rates declined by 3% from 2005 to 2006 (8).

The trend in fetal mortality rates by period of gestation is shown in [Figure 3](#). The fetal mortality rate at 20–27 weeks of gestation declined 3% from 2005 to 2006, after a prolonged plateau ([Table A](#) and [Figure 3](#)). The late fetal mortality rate (at 28 weeks or more) did not decline significantly from 2005 to 2006. Previously, the late fetal mortality rate declined 28% from 1990 to 2003, showed a nonsignificant increase in 2004, and then declined 4% from 2004 to 2005.

[Figure 4](#) shows trends for perinatal mortality rates (definitions I and II) from 1990–2006. In 2006, the perinatal mortality rate, definition I, was 6.51, while the perinatal mortality rate, definition II, was 10.49. Perinatal mortality rates for both definitions I and II declined 2% from 2005 to 2006. Previously, both perinatal mortality rates had shown a downward trend, although annual declines were not statistically significant from 2003 to 2005 ([Figure 4](#) and [Table A](#)). The decline for perinatal definition I from 1990 to 2006 was more rapid (27%) than for

Table A. Fetal and perinatal mortality rates: United States, 1985, 1990, and 1995–2006

Year	Fetal mortality rate ¹			Perinatal mortality rate	
	Total ²	20–27 weeks ³	28 weeks or more ³	Definition I ⁴	Definition II ⁵
2006	6.05	3.10	2.97	6.51	10.49
2005	6.22	3.21	3.03	6.64	10.73
2004 [†]	6.28	3.17	3.14	6.73	10.78
2003 [†]	6.32	3.25	3.08	6.78	10.92
2002	6.41	3.24	3.19	6.91	11.05
2001	6.51	3.25	3.28	6.90	11.02
2000	6.61	3.31	3.32	6.97	11.19
1999	6.74	3.39	3.38	7.12	11.44
1998	6.73	3.35	3.41	7.21	11.50
1997	6.78	3.29	3.51	7.32	11.51
1996	6.91	3.33	3.60	7.43	11.64
1995	6.95	3.33	3.64	7.60	11.84
1990	7.49	3.22	4.30	8.95	13.12
1985	7.83	2.91	4.95	10.59	14.57

[†] Rates have been revised from those published previously; see [Technical Notes](#).

¹ Number of fetal deaths in specified group per 1,000 live births and fetal deaths.

² Fetal deaths with stated or presumed period of gestation of 20 weeks or more

³ Not-stated gestational age proportionally distributed; see [Technical Notes](#).

⁴ Infant deaths at less than 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more, per 1,000 live births and fetal deaths.

⁵ Infant deaths at less than 28 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more, per 1,000 live births and fetal deaths.

SOURCE: CDC/NCHS, National Vital Statistics System.

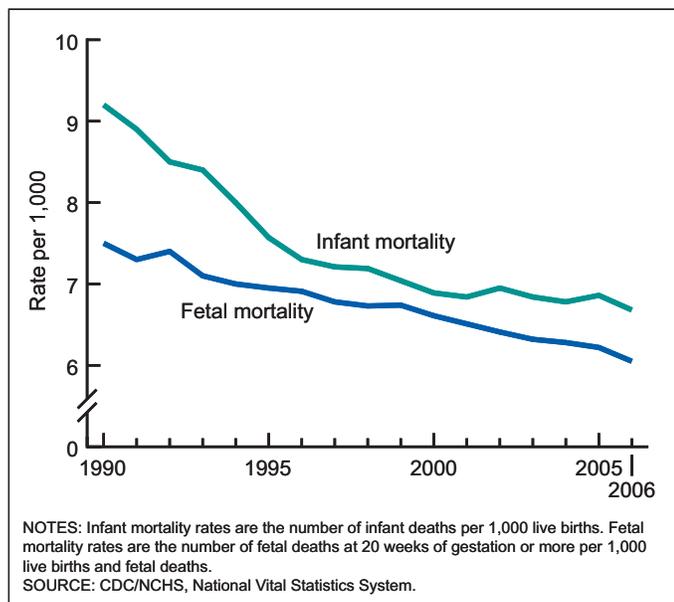


Figure 2. Fetal and infant mortality rates: United States, 1990–2006

definition II (20%) because definition I includes only late fetal deaths, and most of the decline in fetal mortality from 1990 to 2006 was among late fetal deaths.

Trends in numbers of fetal deaths, neonatal deaths (under 28 days), and live births—the components used to compute fetal and perinatal mortality rates—are shown in Table B. Consistent with a trend observed for many years, the number of fetal deaths at 20 weeks of gestation or more in 2006 (25,972) was 36% higher than the number of neonatal deaths (19,041). The total number of infant deaths in 2006 was 28,509 (8), about 10% higher than the total number of fetal deaths at 20 weeks of gestation or more.

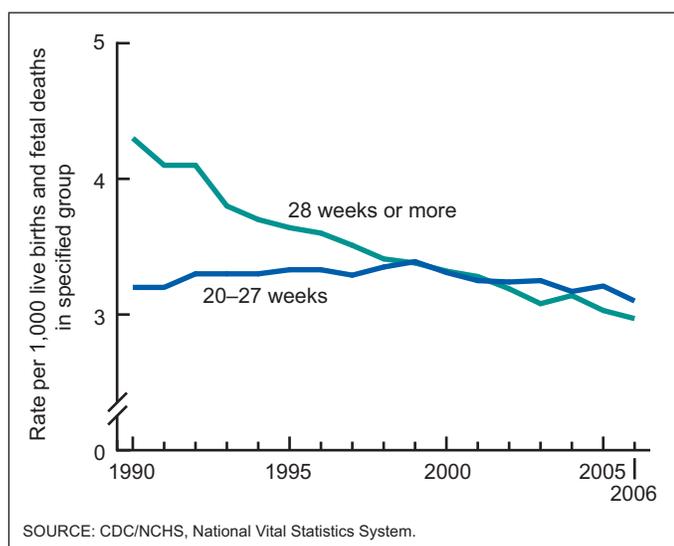


Figure 3. Fetal mortality rates, by period of gestation: United States, 1990–2006

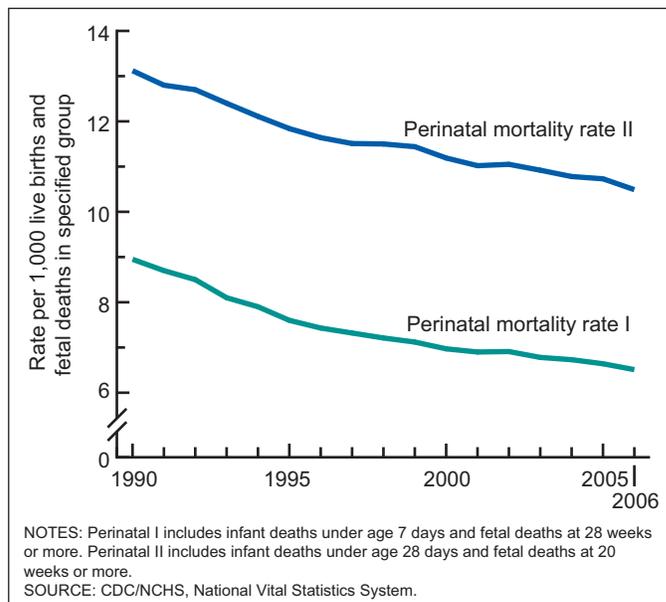


Figure 4. Perinatal mortality rates: United States, 1990–2006

Race and Hispanic origin

Fetal and perinatal mortality rates vary considerably by race and Hispanic origin of the mother (Table C and Figure 5). The fetal mortality rate for non-Hispanic white women was 4.81, similar to the rate of 4.89 for API women. In contrast, the fetal mortality rate of 10.73 for non-Hispanic black women was more than twice the rate for non-Hispanic white women. Nearly two-thirds (64%) of the difference between non-Hispanic black and non-Hispanic white fetal mortality was due to higher non-Hispanic black fetal mortality at 20–27 weeks of gestation, and about one-third (36%) was due to higher mortality at 28 weeks of gestation or more (Figure 5). The rate for AIAN women (6.04) was 26% higher, and the rate for Hispanic women (5.29) was 10% higher, than the rate for non-Hispanic white women. From 2005 to 2006, the fetal mortality rate declined 4% for non-Hispanic black women; however, changes for non-Hispanic white, AIAN, API, and Hispanic women were not statistically significant.

Differences by race and Hispanic origin in perinatal mortality rate, definition I, are shown in Figure 6. Rates were lowest for API women (4.83), followed by non-Hispanic white (5.34), Hispanic (5.76), and AIAN women (6.72). The rate for non-Hispanic black women (11.76) was the highest among the racial and ethnic groups, and was more than twice the rate for non-Hispanic white women.

Data by race and Hispanic origin for perinatal mortality rate, definition II, are shown in Figure 7. The patterns were similar to those for definition I: rates were lowest for API women (8.05), followed by non-Hispanic white (8.43), Hispanic (9.00), and AIAN women (10.31). The rate for non-Hispanic black women (19.58) was more than double the rate for non-Hispanic white women. Part of the higher risk of fetal and perinatal mortality for non-Hispanic black women relates to their higher risk of preterm delivery, although the reasons for this higher risk are not well understood (16–19).

Table B. Components of perinatal mortality: United States, 1985, 1990, and 1995–2006

Year	Fetal deaths			Infant deaths		Live births
	Total ¹	20–27 weeks ²	28 weeks or more ²	Less than 7 days	Less than 28 days	
2006	25,972	13,270	12,702	15,148	19,041	4,265,593
2005	25,894	13,327	12,567	15,013	18,782	4,138,573
2004 [†]	26,001	13,068	12,933	14,836	18,602	4,112,055
2003 [†]	26,004	13,348	12,656	15,152	18,935	4,090,007
2002	25,943	13,072	12,871	15,020	18,791	4,021,825
2001	26,373	13,122	13,251	14,622	18,275	4,026,036
2000	27,003	13,497	13,506	14,893	18,733	4,058,882
1999	26,884	13,457	13,427	14,874	18,700	3,959,417
1998	26,702	13,229	13,473	15,061	18,915	3,941,553
1997	26,486	12,800	13,686	14,827	18,507	3,880,894
1996	27,069	12,990	14,079	14,947	18,556	3,891,494
1995	27,294	13,043	14,251	15,483	19,186	3,899,589
1990	31,386	13,427	17,959	19,439	23,591	4,158,445
1985	29,661	10,958	18,703	21,317	25,573	3,760,833

[†] Numbers of fetal deaths for 2003 and 2004 have been revised from those previously reported; see Technical Notes.

¹Fetal deaths with stated or presumed period of gestation of 20 weeks or more.

²Not-stated gestational age proportionally distributed; see Technical Notes.

SOURCE: CDC/NCHS, National Vital Statistics System.

Table C. Fetal deaths and mortality rates by race and Hispanic origin of mother: United States, 1995–2006

Year	All races and origins	Non-Hispanic ¹		American Indian or Alaska Native	Asian or Pacific Islander	Hispanic ¹				Central and South American
		White	Black			Total	Mexican	Puerto Rican	Cuban	
Rate										
2006	6.05	4.81	10.73	6.04	4.89	5.29	4.84	6.09	5.46	4.74
2005	6.22	4.79	11.13	6.17	4.78	5.44	5.24	6.09	4.15	4.50
2004 [†]	6.28	4.94	11.29	6.11	4.80	5.51	5.17	6.25	5.46	4.61
2003 [†]	6.32	4.90	11.58	6.30	5.04	5.52	5.16	7.43	5.29	4.64
2002	6.41	5.14	11.47	6.24	4.95	5.71	5.42	7.03	5.32	4.76
2001	6.51	5.24	11.72	5.91	5.21	5.64	5.22	6.91	5.40	4.93
2000	6.61	5.26	11.97	5.54	5.17	5.79	5.48	6.61	7.55	4.73
1999	6.74	5.37	12.18	6.14	5.40	5.84	5.34	7.03	6.84	5.06
1998	6.73	5.42	11.75	5.85	5.12	5.74	5.23	6.31	5.59	5.38
1997	6.78	5.49	11.90	6.75	4.81	6.01	5.49	7.69	5.24	5.10
1996	6.91	5.70	11.81	6.43	5.11	6.03	5.45	7.56	6.15	5.44
1995	6.95	5.67	12.18	7.11	5.02	6.09	5.76	8.05	6.37	5.54
Number of deaths										
2006	25,972	11,147	6,695	290	1,184	5,523	3,490	410	93	788
2005	25,894	10,973	6,573	278	1,109	5,387	3,651	388	67	683
2004 [†]	26,001	11,410	6,608	270	1,106	5,248	3,521	385	82	665
2003 [†]	26,004	11,428	6,748	273	1,120	5,066	3,398	437	79	632
2002	25,943	11,690	6,654	266	1,050	5,002	3,393	406	76	601
2001	26,373	12,080	6,939	249	1,049	4,803	3,183	400	76	600
2000	27,003	12,324	7,264	232	1,042	4,728	3,189	386	102	538
1999	26,884	12,484	7,210	248	982	4,470	2,888	404	90	524
1998	26,702	12,453	6,712	237	888	4,197	2,696	362	74	521
1997	26,486	12,119	6,598	262	820	4,202	2,738	393	67	474
1996	27,069	12,731	6,518	245	852	4,169	2,669	384	77	509
1995	27,294	12,777	6,840	267	809	4,079	2,704	409	79	501

[†] Rates have been revised from those published previously; see Technical Notes.

¹Figures exclude data from Maryland, Massachusetts, and Oklahoma in 1995–1997, Maryland and Oklahoma in 1998, and Oklahoma in 1999–2004, which did not report Hispanic origin on the fetal death report.

SOURCE: CDC/NCHS, National Vital Statistics System.

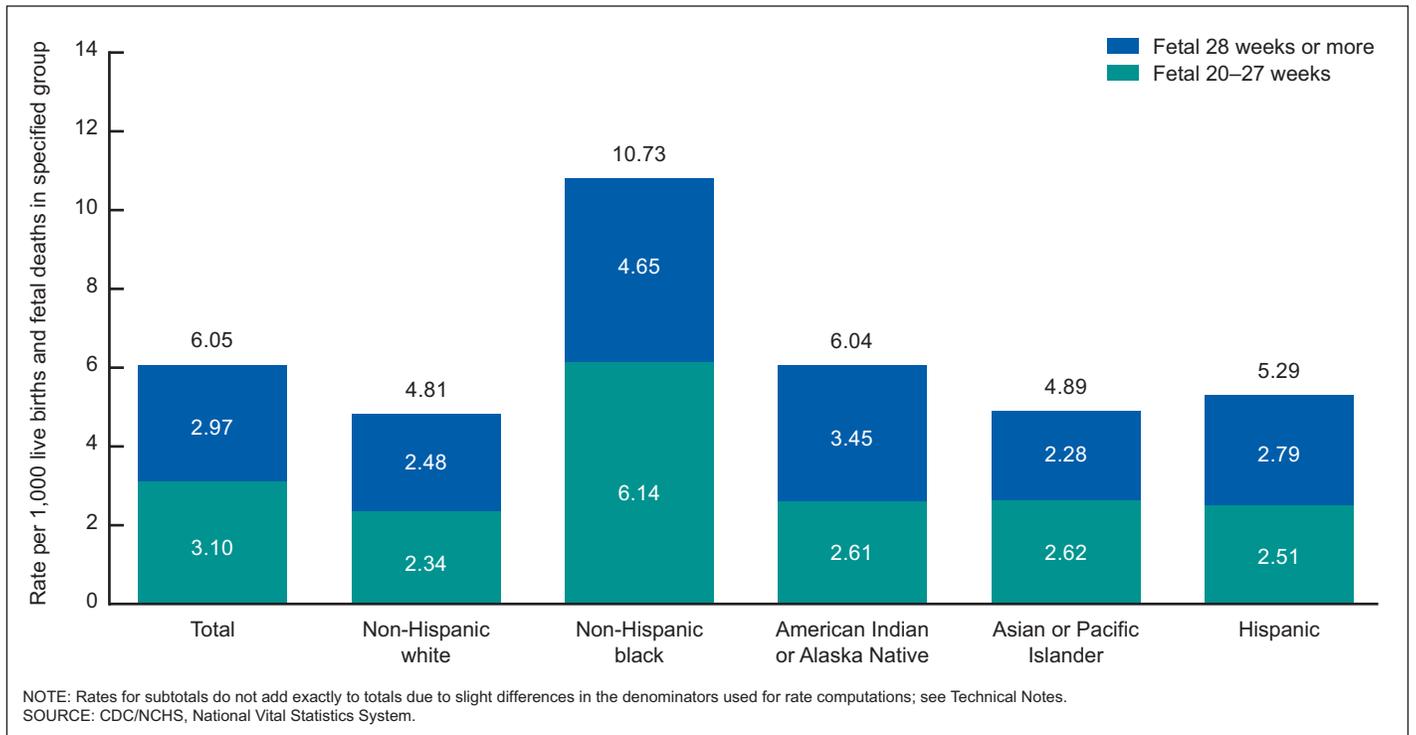


Figure 5. Fetal mortality rates, by race and Hispanic origin of mother: United States, 2006

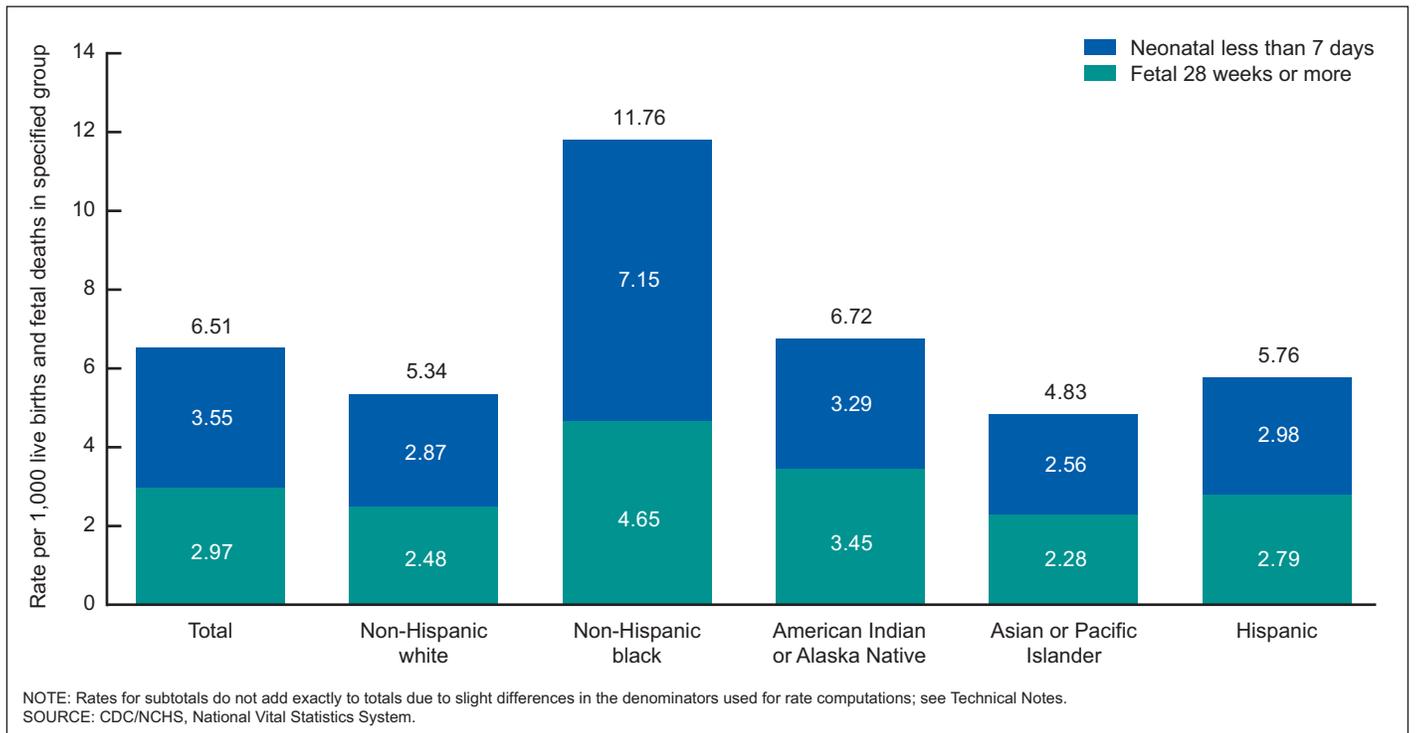


Figure 6. Perinatal mortality rates, definition I, by race and Hispanic origin of mother: United States, 2006

Maternal age

Fetal mortality rates vary considerably by maternal age. Rates were lowest for women aged 25–34 and higher for teenagers and those aged 35 and over (Table 1). The rates for teenagers under age 15 (13.12) and for women aged 45 and over (13.02) were more than

twice the rate of 5.40 for women aged 30–34, the lowest risk group. Rates for teenagers aged 15–17 (7.63) and 18–19 (6.98) were 41% and 29% higher, respectively, than for women aged 30–34. The higher risk for teenagers may relate to less favorable socioeconomic and behavioral conditions among pregnant teenagers, although

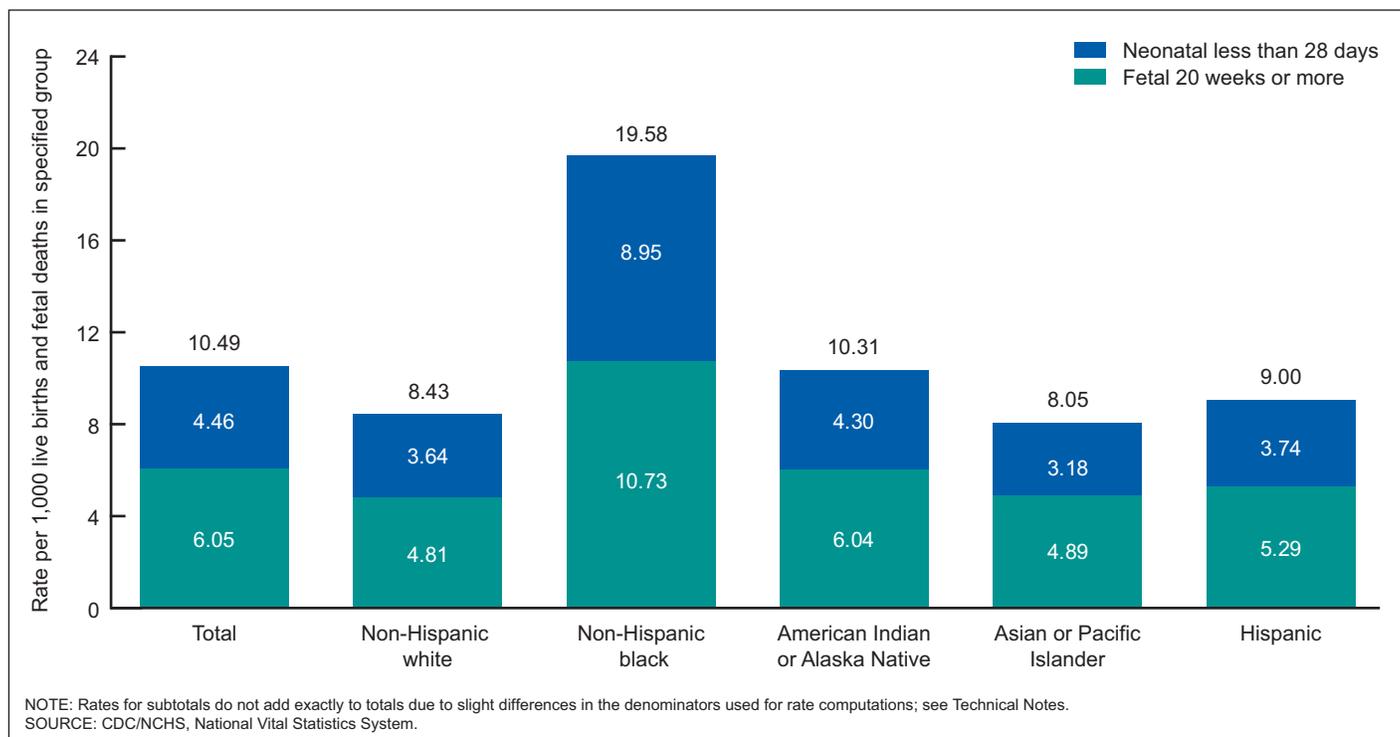


Figure 7. Perinatal mortality rates, definition II, by race and Hispanic origin of mother: United States, 2006

biologic immaturity may also play a role, particularly for the youngest teenagers (20,21). Maternal age 35 and over appears to be an independent risk factor for fetal death, even after adjusting for medical conditions that are more common among older women, such as hypertension, diabetes, placental problems, and multiple gestation (22,23). However, the magnitude of the elevated risk differs somewhat by race and gestational age (23,24).

Marital status

In 2006, one-half (50%) of fetal deaths were to unmarried women, compared with 38% of live births, in an area including 47 states and the District of Columbia (Tables D and E). Marital status was not reported for fetal deaths in California, Nevada, and New York. In general, fetal mortality rates were higher for unmarried than for married women (Table E). For non-Hispanic white women, the fetal mortality rate for unmarried women was 57% higher than for married women. Compared with married women, the rate for unmarried women was 13% higher for Hispanic women and 6% higher for non-Hispanic black women. Marital status may be a marker for the presence or absence of social, emotional, and financial resources (25,26).

Sex of fetus

In 2006, the fetal mortality rate for male fetuses was 6.24, 7% higher than for female (5.85) fetuses (Table E). For non-Hispanic black women, the fetal mortality rate was 14% higher for male than for female fetuses; however, differences were not statistically significant for non-Hispanic white and Hispanic women. The higher risk for males appears to relate in part to a higher risk of preterm delivery and preterm premature rupture of membranes among male fetuses

(27,28). A more detailed discussion of sex ratios for fetal deaths was included in a previous report (29).

Plurality

In 2006, 9% of fetal deaths occurred in multiple deliveries, compared with 3% of live births (Table D). A multiple delivery is one in which more than one fetus is delivered alive or dead at any time during the pregnancy, and a given multiple pregnancy may include any combination of fetal deaths or live births.

The fetal mortality rate for twins (15.73) was almost three times that for singletons (5.69) (Table E). The rate for triplet or higher-order deliveries (27.08) was nearly five times that for singletons. The increased risks for multiple pregnancies may relate in part to increased rates of preterm labor, fetal growth restriction, preeclampsia, congenital anomalies, and placental and cord problems (30,31). Also, many multiple pregnancies are the result of assisted reproductive technologies, and the use of these therapies may increase the risk of adverse outcomes (32,33).

Period of gestation

In general, a much larger percentage of fetal deaths than live births occur early in pregnancy. In 2006, more than one-third (35%) of all fetal deaths at 20 weeks of gestation or more occurred at 20–23 weeks of gestation, and more than one-half (51%) occurred at 20–27 weeks (Table 2).

Traditionally, fetal mortality rates by gestational age have been computed as the number of fetal deaths at a given gestational age per 1,000 live births and fetal deaths at that gestational age. Fetal mortality rates computed in this fashion are very high at the earliest gestational ages (where few live births occur), are lowest at 40 and 41 weeks of

Table D. Percentage of fetal deaths and live births with selected demographic, medical, and health characteristics: United States, 2006

Characteristic	Fetal deaths				Live births			
	Total ¹	Non-Hispanic			Total ¹	Non-Hispanic		
		White	Black	Hispanic		White	Black	Hispanic
Mother								
Under age 20	12.5	9.5	16.2	15.3	10.4	7.4	17.2	14.3
Aged 40 or over	4.4	4.9	3.4	4.2	2.6	3.0	2.1	2.0
Unmarried	49.9	37.0	72.4	52.4	38.5	27.2	71.1	49.3
Fetal and infant								
Birthweight:								
Less than 1,500 grams	65.1	62.1	71.8	62.5	1.5	1.2	3.2	1.2
Less than 2,500 grams	81.8	79.7	86.9	79.4	8.3	7.3	14.0	7.0
4,000 grams or more	1.8	1.8	1.5	2.4	7.8	9.2	4.2	7.4
Period of gestation:								
Less than 32 weeks	63.9	61.1	70.2	60.3	2.0	1.7	4.1	1.8
Preterm (less than 37 weeks)	81.7	80.0	86.2	78.7	12.8	11.7	18.5	12.2
Plural delivery	9.1	10.5	7.7	7.7	3.2	3.8	3.7	2.3

¹Includes races other than white and black, and origin not stated.²Excludes data from California, Nevada, and New York, which did not report marital status on the fetal death report.

NOTE: Not-stated responses excluded when computing percent distributions.

SOURCE: CDC/NCHS, National Vital Statistics System.

Table E. Fetal mortality rates, by selected characteristics and race and Hispanic origin of mother: United States, 2006

Characteristic	Fetal mortality rates ¹				Fetal deaths				Live births			
	All races ²	Non-Hispanic white	Non-Hispanic black	Hispanic	All races ²	Non-Hispanic white	Non-Hispanic black	Hispanic	All races ²	Non-Hispanic white	Non-Hispanic black	Hispanic
Plurality	6.05	4.81	10.73	5.29	25,972	11,147	6,695	5,523	4,265,593	2,308,654	617,260	1,039,079
Single	5.69	4.47	10.29	4.99	23,599	9,975	6,177	5,097	4,121,964	2,220,739	593,977	1,015,594
Twin	15.73	12.65	21.34	16.98	2,191	1,065	495	392	137,089	83,110	22,703	22,698
Triplet or higher-order	27.08	21.78	38.14	41.41	182	107	23	34	6,540	4,805	580	787
Sex of fetus	6.05	4.81	10.73	5.29	25,972	11,147	6,695	5,523	4,265,593	2,308,654	617,260	1,039,079
Male	6.24	4.87	11.41	5.36	13,717	5,795	3,630	2,861	2,184,260	1,184,310	314,607	530,875
Female	5.85	4.74	10.03	5.21	12,255	5,352	3,065	2,662	2,081,333	1,124,344	302,653	508,204
Male-female ratio	1.07	1.03	1.14	1.03	...	...	...	...	...	...	...	...
Marital status, total ³	6.04	4.73	10.54	5.23	20,731	9,542	5,748	3,525	3,413,023	2,007,996	539,417	670,826
Married	4.83	4.07	9.97	4.81	10,178	5,974	1,567	1,643	2,099,194	1,462,378	155,632	339,863
Unmarried	7.66	6.38	10.58	5.44	10,136	3,503	4,103	1,809	1,313,829	545,618	383,785	330,963
Unmarried-married ratio	1.59	1.57	1.06	1.13	...	...	...	...	...	...	...	...

... Category not applicable.

¹Rate per 1,000 live births and fetal deaths in specified group.²Includes races other than white and black, and origin not stated.³Excludes data from California, Nevada, and New York, which did not report marital status on the fetal death report. Includes records with marital status not stated.

SOURCE: CDC/NCHS, National Vital Statistics System.

gestation, and then increase slightly at 42 weeks of gestation or more. In 2006, the fetal mortality rate computed by this method was 500.28 at 20–23 weeks of gestation, declined sharply to a low of 0.88 at 40 weeks of gestation, and then increased to 1.76 for fetal deaths at 42 weeks of gestation or more (Table 2). Gestational age data are based primarily on the interval between the first day of the mother's last normal menstrual period (LMP) and the date of birth, and are subject to error due to imperfect maternal recall or misidentification of the LMP (6) (see Technical Notes).

Some researchers have suggested computing fetal mortality rates by gestational age by using a different denominator that would more

accurately represent the population at risk of the event (34–36). For fetal mortality at a given gestational age, a more appropriate indication of the population at risk of fetal death is actually all of the women who are still pregnant at that gestational age. This *prospective fetal mortality rate* is computed as the number of fetal deaths at a given gestational age (in single weeks), per 1,000 live births and fetal deaths at that gestational age or greater. Prospective fetal mortality rates are shown in Figure 8 for fetal deaths between 20 and 43 weeks of gestation. In general, rates were high at the earliest and latest gestational ages. The rate was high (0.51–0.60) at 20–22 weeks of gestation, and declined to a low of 0.19–0.20 at 27–33 weeks of gestation. The rate remained

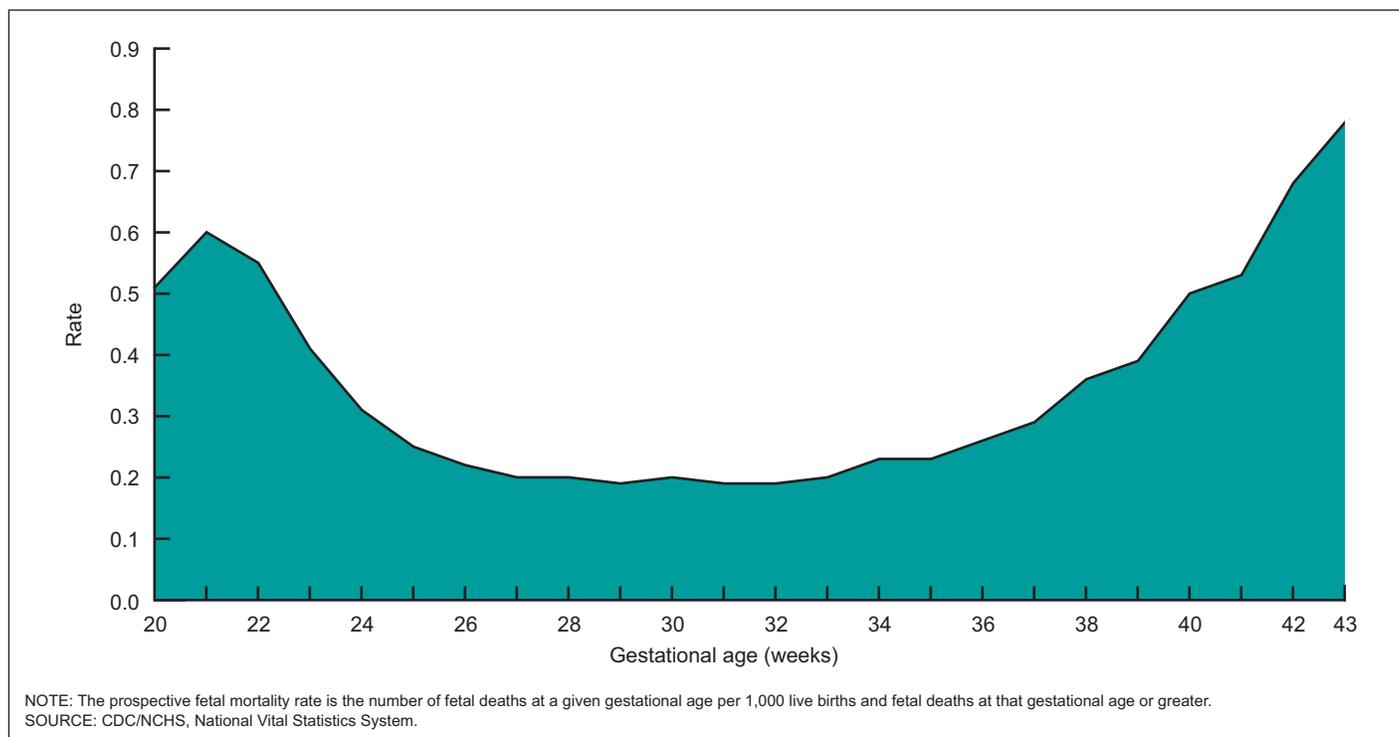


Figure 8. Prospective fetal mortality rate by single weeks of gestation: United States, 2006

relatively low until about 37 weeks of gestation and then increased rapidly to a high of 0.78 at 43 weeks of gestation. The lower rate at 20 weeks compared with 21 weeks of gestation probably reflects underreporting of fetal deaths at 20 weeks of gestation.

The prospective fetal mortality rate is useful in identifying two distinct peaks in fetal mortality risk: early fetal mortality (less than 23 weeks), and fetal mortality at 40 weeks of gestation or more. These two peaks suggest etiological differences. Much of the early fetal mortality is related to congenital anomalies, infections, uteroplacental insufficiency, and underlying maternal medical conditions (37–39). Fetal mortality at 40 weeks or more may be due to the previously mentioned conditions but may also be related to problems that manifest around the time of delivery, such as placental (abruptio, previa) and cord (prolapse) problems, or other problems in the labor and delivery process (38,39). Despite intensive investigations, for a substantial number of fetal deaths a specific cause of death cannot be determined (38,39).

Birthweight

In 2006, one-third (33%) of fetal deaths at 20 weeks of gestation or more weighed less than 500 grams (1 lb 1 oz) at delivery, and nearly one-half (48%) weighed less than 750 grams (1 lb 12 oz) (Table 2). Fetal mortality rates were computed by the traditional method as the number of fetal deaths at a given birthweight per 1,000 fetal deaths and live births at that birthweight. The rate was highest for less than 500-gram fetuses and decreased rapidly with increasing birthweight. Fetal mortality rates were lowest at 3,000–3,999 grams, and then increased slightly for heavier fetuses (Table 2). However, 12% of fetal deaths in the United States in 2006 had unknown birthweight, and proportional distribution of unknown responses was not attempted because unknowns were more frequent

at earlier gestational ages (see Table II in Technical Notes). Thus, the birthweight-specific fetal mortality rates shown in Table 2 should be interpreted with caution and may be understated.

Although some researchers have questioned the traditional method of computing fetal mortality rates by birthweight (35), the prospective method of computation does not apply as easily to birthweight as to gestational age. Birthweight is not always a progressive variable for fetal deaths because a fetus may lose weight in utero if the death occurs several days or weeks before delivery (40). Also, a much higher proportion of fetal deaths than live births are small for gestational age, making birthweight comparisons between the two populations somewhat problematic (35,41).

Fetal and perinatal mortality rates, by state

Fetal and perinatal mortality rates by state are shown in Table 3. Comparisons of fetal and perinatal mortality rates by state are affected by differences in reporting requirements for fetal deaths among registration areas (see Technical Notes). Although most areas report fetal deaths starting at 20 weeks of gestation if not earlier, three areas (New Mexico, South Dakota, and Tennessee) report fetal deaths of 500 grams or more. Because 500 grams is roughly the equivalent of 22 weeks of gestation, fetal mortality rates are not comparable for these states for measures that include fetal deaths at 20 weeks of gestation or more. Also, small numbers of fetal deaths in some states lead to considerable random variation in fetal mortality rates between years. Table F attempts to address these problems by comparing fetal mortality rates for fetal deaths at 24 weeks of gestation or more for the latest 3-year period (2004–2006). The U.S. fetal mortality rate specially computed for this measure was 4.02 fetal deaths at 24 weeks of gestation or more per 1,000 live births and fetal deaths. When data were compared by state, fetal mortality rates were highest (5.00 or above) in Alabama, Arkansas, Mississippi,

Table F. Fetal deaths at 24 weeks of gestation or more and fetal mortality rates, by state or territory: 2004–2006

State or territory	Fetal deaths	Fetal mortality rate ¹
United States	50,580	4.02
Alabama	1,069	5.80
Alaska	123	3.85
Arizona	1,151	3.92
Arkansas	609	5.10
California	6,318	3.80
Colorado	790	3.78
Connecticut	454	3.60
Delaware	117	3.33
District of Columbia	113	4.60
Florida	3,112	4.55
Georgia	1,904	4.41
Hawaii	189	3.41
Idaho	277	3.95
Illinois	2,116	3.90
Indiana	1,153	4.37
Iowa	438	3.69
Kansas	486	4.02
Kentucky	780	4.56
Louisiana	843	4.42
Maine	137	3.24
Maryland	1,066	4.67
Massachusetts	834	3.57
Michigan	1,394	3.61
Minnesota	740	3.43
Mississippi	798	6.04
Missouri	952	3.99
Montana	122	3.41
Nebraska	308	3.87
Nevada	513	4.54
New Hampshire	148	3.40
New Jersey	1,335	3.87
New Mexico	209	2.39
New York	3,318	4.43
North Carolina	1,685	4.52
North Dakota	97	3.83
Ohio	1,825	4.06
Oklahoma	565	3.58
Oregon	437	3.11
Pennsylvania	1,797	4.07
Rhode Island	139	3.66
South Carolina	967	5.45
South Dakota	107	3.07
Tennessee	1,044	4.23
Texas	4,175	3.57
Utah	506	3.24
Vermont	70	3.56
Virginia	1,190	3.75
Washington	880	3.49
West Virginia	271	4.31
Wisconsin	804	3.75
Wyoming	105	4.81
Puerto Rico	884	5.85
Virgin Islands	43	8.76
Guam	87	8.65

¹Rate per 1,000 live births and specified fetal deaths.

NOTE: Fetal deaths with not-stated period of gestation are proportionally distributed to less than 24 weeks and 24 weeks or more; see Technical Notes. Numbers may not add to totals due to rounding.

SOURCE: CDC/NCHS, National Vital Statistics System.

South Carolina, Puerto Rico, the Virgin Islands, and Guam and were lowest (below 3.30) in Maine, New Mexico, Oregon, and Utah. Part of the variation even in this refined rate may be due to state differences in reporting.

Perinatal mortality rate, definition I, includes fetal deaths at 28 weeks of gestation or more and infant deaths at less than 7 days. This is the perinatal rate used most often for international comparisons because it is not affected by differences in reporting of fetal deaths at 20–27 weeks of gestation. It is also suitable for state-to-state comparisons because it minimizes the effect of state variations in fetal death reporting requirements. In 2006, the rate was 6.51 for the United States as a whole (Table 3). The highest rates (9.00 or above) were for the District of Columbia, Mississippi, Puerto Rico, the Virgin Islands, and Guam, whereas the lowest rates (below 5.00) were for Montana, New Mexico, South Dakota, Utah, and Vermont.

Perinatal definition II (fetal deaths at 20 weeks of gestation or more and infant deaths at less than 28 days) is the most inclusive perinatal definition and is useful for monitoring perinatal mortality throughout the gestational age spectrum because the majority of fetal deaths occur before 28 weeks of gestation. In 2006, perinatal mortality rate definition II was 10.49 for the United States as a whole. However, if data from the three states that only report fetal deaths of 500 grams or more (New Mexico, South Dakota, and Tennessee) were excluded, the rate was 10.53. Among the states with comparable data, the highest rates (above 15.0) were for the District of Columbia, Mississippi, Puerto Rico, the Virgin Islands, and Guam, whereas the lowest rates (below 8.0) were for Montana and Oregon.

Differences in population characteristics among areas (in regard to race, ethnicity, income, access to health care, and prevalence of risk behaviors such as maternal smoking) may help to explain differences in fetal and perinatal mortality rates among states. Caution must be used in interpreting observed differences in fetal and perinatal mortality rates among states because the differences may not be statistically significant.

Discussion

The U.S. fetal mortality rate was 6.05 in 2006, 3% lower than in 2005. The fetal mortality rate at 20–27 weeks of gestation declined by 3% from 2005 to 2006, while the fetal mortality rate at 28 weeks or more was essentially unchanged. These findings are in contrast to a long-term trend of declines in fetal mortality at 28 weeks of gestation or more and stability in fetal mortality at 20–27 weeks. Fetal mortality rates were also higher for a number of groups, including teenagers, women aged 35 and over, unmarried women, male fetuses, and multiple deliveries. Fetal and perinatal mortality rates varied considerably by state, reflecting differences in perinatal risk, as well as differences in fetal death reporting among states. In 2006, well over one-half (58%) of all perinatal deaths (definition II) in the United States were fetal deaths.

From 2005 to 2006, fetal mortality rates declined 4% for non-Hispanic black women, while rates for other racial and ethnic groups were essentially unchanged. Still, the fetal mortality rate for non-Hispanic black women (10.73) was more than twice the rate for non-Hispanic white women (4.81) in 2006. Part of the higher risk of fetal and perinatal mortality for non-Hispanic black women relates to their higher risk of preterm delivery (16–19); however, the reasons for the preterm disparity are not well understood. Factors frequently mentioned as contributing to the black-white fetal and perinatal mortality gap are racial differences in maternal preconception health, infection, income, access to quality health care, stress and racism, and cultural factors; however, much of the black-white disparity in perinatal mortality remains unexplained (17–19).

In addition to the variables discussed in this report, a wide variety of other risk factors for perinatal mortality have been identified, including maternal obesity, smoking during pregnancy, severe or uncontrolled hypertension or diabetes, congenital anomalies, infections, placental and cord problems, intrauterine growth retardation, previous poor pregnancy outcome or perinatal death, and previous cesarean section (41–50).

Much of the public concern regarding reproductive loss has concentrated on infant mortality, in part due to a lesser knowledge of the incidence, etiology, and prevention strategies for fetal mortality. However, interest in fetal mortality is increasing, particularly among the research community, with special issues or series of articles on fetal mortality appearing since 2010 in *The Lancet* (51), *Journal of the American Medical Association* (39,42), *Clinical Obstetrics and Gynecology* (52), *Seminars in Perinatology* (53), and *BMC Pregnancy and Childbirth* (54), among others. Several recent initiatives examine the etiology and prevention of fetal death, such as the Stillbirth Collaborative Research Network (39,42), and CDC's active fetal death surveillance in Iowa and metropolitan Atlanta (9). The International Stillbirth Alliance coordinates research, prevention, and family support activities (55). As enhanced research leads to the development of fetal death prevention strategies, the continued surveillance of fetal mortality levels and trends through the National Vital Statistics System will become increasingly useful. Research opportunities will be improved as more states implement the 2003 revision of the U.S. Standard Report of Fetal Death, with its expanded medical and health information (56,57). However, because long-standing concerns about data quality and completeness (9–13) reduce the usefulness of these data for public health surveillance, quality improvement efforts are needed.

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Table 1. Fetal deaths and mortality rates, by period of gestation and age, race, and Hispanic origin of mother: United States, 2006

Age, race, and Hispanic origin of mother	Fetal deaths			Fetal mortality rate ¹		
	Total	20–27 weeks ²	28 weeks or more ²	Total	20–27 weeks ²	28 weeks or more ²
All races ³	25,972	13,270	12,702	6.05	3.10	2.97
Less than 15 years	85	55	30	13.12	8.53	4.67
15–19 years	3,153	1,712	1,441	7.19	3.92	3.30
15–17 years	1,068	618	450	7.63	4.43	3.23
18–19 years	2,085	1,095	990	6.98	3.68	3.33
20–24 years	6,444	3,234	3,210	5.93	2.98	2.96
25–29 years	6,557	3,322	3,235	5.52	2.80	2.73
30–34 years	5,156	2,622	2,534	5.40	2.75	2.66
35–39 years	3,439	1,761	1,678	6.85	3.52	3.35
40–44 years	1,046	518	528	9.81	4.88	4.98
45 years and over	92	46	46	13.02	6.55	6.55
Non-Hispanic white	11,147	5,408	5,739	4.81	2.34	2.48
Less than 15 years	18	15	3	*	*	*
15–19 years	1,043	529	514	6.11	3.11	3.02
15–17 years	300	166	134	6.58	3.65	2.95
18–19 years	743	363	380	5.93	2.91	3.04
20–24 years	2,630	1,202	1,428	4.95	2.27	2.70
25–29 years	2,946	1,425	1,521	4.41	2.14	2.28
30–34 years	2,332	1,157	1,175	4.10	2.04	2.07
35–39 years	1,629	801	828	5.24	2.59	2.67
40–44 years	501	257	244	7.82	4.03	3.82
45 years and over	48	22	26	10.60	4.89	5.77
Non-Hispanic black	6,695	3,814	2,881	10.73	6.14	4.65
Less than 15 years	34	22	12	13.62	8.86	*
15–19 years	1,051	607	444	10.03	5.82	4.26
15–17 years	390	236	154	10.61	6.45	4.22
18–19 years	661	370	291	9.72	5.46	4.30
20–24 years	1,896	1,078	818	9.45	5.39	4.10
25–29 years	1,641	916	725	10.57	5.93	4.70
30–34 years	1,129	649	480	11.65	6.73	4.99
35–39 years	717	421	296	14.16	8.36	5.89
40–44 years	210	111	99	16.83	8.97	8.01
45 years and over	17	10	7	*	*	*
Hispanic ⁴	5,523	2,620	2,904	5.29	2.51	2.79
Less than 15 years	25	13	13	10.08	*	*
15–19 years	820	430	390	5.60	2.94	2.67
15–17 years	295	160	135	5.64	3.07	2.59
18–19 years	525	270	255	5.57	2.87	2.71
20–24 years	1,446	693	753	4.74	2.28	2.48
25–29 years	1,281	607	674	4.54	2.16	2.40
30–34 years	1,065	489	576	5.44	2.51	2.95
35–39 years	656	296	360	7.11	3.22	3.92
40–44 years	214	85	129	10.75	4.30	6.51
45 years and over	16	7	9	*	*	*

* Figure does not meet standards of reliability or precision; based on fewer than 20 fetal deaths in the numerator.

¹Rate per 1,000 live births and fetal deaths in specified group.²Fetal deaths with gestational age not stated were proportionally distributed; see Technical Notes.³Includes races other than white or black and origin not stated.⁴Includes all persons of Hispanic origin of any race.

SOURCE: CDC/NCHS, National Vital Statistics System.

Table 2. Fetal deaths and mortality rates, by birthweight, gestational age, and race and Hispanic origin of mother: United States, 2006

Birthweight (grams) and race and Hispanic origin of mother	Gestational age (weeks)											Fetal mortality rate ¹
	Total	20–23	24–27	28–31	32–33	34–36	37–39	40	41	42 or more	Not stated	
All races ²	25,972	8,831	4,161	3,255	1,635	2,881	3,224	702	316	425	542	6.05
Less than 500	7,515	5,386	1,384	372	84	105	56	17	8	20	83	529.49
500–749	3,480	1,483	1,319	453	60	37	45	7	3	13	60	232.17
750–999	1,523	202	564	576	79	40	16	–	1	4	41	107.66
1,000–1,249	1,147	70	188	506	178	124	37	3	6	14	21	71.74
1,250–1,499	1,032	46	94	424	205	170	60	7	3	7	16	55.16
1,500–1,999	2,050	50	73	426	519	598	259	37	15	37	36	28.68
2,000–2,499	1,844	–	27	117	262	781	479	70	23	44	41	8.34
2,500–2,999	1,744	–	27	51	82	501	779	133	63	71	37	2.21
3,000–3,499	1,365	–	–	27	31	196	736	184	85	82	24	0.82
3,500–3,999	731	–	–	10	9	93	346	134	61	63	15	0.64
4,000 or more	430	–	–	–	4	53	205	66	36	34	32	1.29
Not stated	3,111	1,594	485	293	122	183	206	44	12	36	60	---
Fetal mortality rate ¹	6.05	500.28	161.54	56.37	23.29	7.37	1.40	0.88	0.89	1.76	---	---
Non-Hispanic white	11,147	3,486	1,855	1,390	728	1,348	1,520	326	149	207	138	4.81
Less than 500	3,032	2,108	619	156	39	47	21	5	6	11	20	552.18
500–749	1,419	566	585	191	23	22	15	1	1	5	10	239.49
750–999	650	77	256	244	38	14	8	–	1	1	11	106.14
1,000–1,249	474	32	83	210	63	50	13	1	4	11	7	64.88
1,250–1,499	421	21	43	171	82	66	28	3	–	2	5	47.03
1,500–1,999	927	22	31	192	246	276	115	12	7	14	12	26.42
2,000–2,499	841	–	13	50	125	386	212	27	7	14	7	7.80
2,500–2,999	804	–	11	23	38	247	361	60	29	31	4	2.14
3,000–3,499	692	–	–	13	9	92	377	97	46	49	9	0.79
3,500–3,999	366	–	–	2	3	45	179	68	29	31	9	0.54
4,000 or more	182	–	–	–	1	18	84	32	14	20	13	0.85
Not stated	1,339	660	214	138	61	85	107	20	5	18	5	---
Fetal mortality rate ¹	4.81	520.07	171.52	51.93	21.88	6.74	1.20	0.74	0.76	1.59	---	---
Non-Hispanic black	6,695	2,664	1,086	869	408	649	632	138	63	74	112	10.73
Less than 500	2,316	1,746	381	101	23	25	16	3	1	2	18	470.35
500–749	1,008	436	362	141	20	5	17	2	–	4	21	196.99
750–999	368	58	134	139	17	9	2	–	–	1	8	85.01
1,000–1,249	317	18	43	150	54	36	8	1	2	1	4	70.21
1,250–1,499	281	12	25	116	53	55	11	2	1	3	3	57.89
1,500–1,999	508	14	16	113	120	151	61	9	4	13	7	29.08
2,000–2,499	414	–	8	29	56	166	112	19	9	8	7	8.26
2,500–2,999	371	–	4	11	25	103	161	28	14	16	9	2.38
3,000–3,499	235	–	–	7	7	39	121	36	11	9	5	0.99
3,500–3,999	107	–	–	3	3	13	50	21	10	6	1	0.95
4,000 or more	92	–	–	–	1	15	46	12	6	6	6	3.55
Not stated	678	380	113	59	29	32	27	5	5	5	23	---
Fetal mortality rate ¹	10.73	442.82	133.40	58.60	26.06	8.80	1.94	1.36	1.45	2.31	---	---
Hispanic ³	5,523	1,724	819	690	362	628	771	178	80	111	160	5.29
Less than 500	1,428	1,002	264	76	15	23	12	6	1	5	24	545.04
500–749	736	338	249	89	14	6	12	4	2	2	20	241.95
750–999	357	54	120	137	18	12	3	–	–	1	12	125.40
1,000–1,249	249	13	43	100	46	28	12	1	–	2	4	77.89
1,250–1,499	246	9	22	101	50	38	18	2	2	2	2	66.24
1,500–1,999	436	9	17	83	110	114	71	13	4	5	10	30.80
2,000–2,499	419	–	6	24	55	166	111	18	6	18	15	8.95
2,500–2,999	417	–	8	10	14	114	176	39	16	22	18	2.20
3,000–3,499	317	–	–	4	13	43	176	37	17	19	8	0.75
3,500–3,999	185	–	–	4	3	27	78	31	19	19	4	0.67
4,000 or more	120	–	–	–	2	17	58	19	12	7	5	1.56
Not stated	613	299	90	62	22	40	44	8	1	9	38	---
Fetal mortality rate ¹	5.29	495.97	156.09	54.23	21.53	6.87	1.40	0.89	0.89	1.75	---	---

– Quantity zero.

--- Category not applicable.

¹Rate per 1,000 live births and fetal deaths in specified group.²Includes races other than white or black and origin not stated.³Includes all persons of Hispanic origin of any race.

SOURCE: CDC/NCHS, National Vital Statistics System.

Table 3. Fetal and perinatal deaths and mortality rates: United States and each state and territory, 2006

State or territory	Fetal deaths ¹		Perinatal definition I ²		Perinatal definition II ³	
	Number of deaths	Mortality rate ⁴	Number of deaths ⁵	Mortality rate ⁴	Number of deaths ⁵	Mortality rate ⁴
United States	25,972	6.05	27,850	6.51	45,013	10.49
Alabama	573	8.98	545	8.58	937	14.69
Alaska	60	5.43	69	6.25	102	9.23
Arizona	564	5.48	644	6.27	1,009	9.80
Arkansas	308	7.46	336	8.17	508	12.31
California	2,974	5.26	3,177	5.63	4,929	8.72
Colorado	383	5.38	463	6.52	693	9.74
Connecticut	234	5.56	289	6.89	433	10.30
Delaware	70	5.80	100	8.31	141	11.69
District of Columbia	73	8.49	85	9.94	137	15.94
Florida	1,707	7.16	1,670	7.03	2,834	11.88
Georgia	1,005	6.72	1,025	6.88	1,795	12.00
Hawaii	128	6.70	118	6.20	214	11.20
Idaho	104	4.28	161	6.64	217	8.93
Illinois	1,042	5.74	1,227	6.78	1,940	10.68
Indiana	579	6.49	647	7.27	1,013	11.36
Iowa	234	5.73	208	5.11	368	9.01
Kansas	202	4.91	280	6.81	377	9.16
Kentucky	379	6.46	386	6.60	638	10.88
Louisiana	386	6.05	501	7.88	777	12.19
Maine	68	4.78	82	5.78	128	9.00
Maryland	618	7.91	670	8.61	1,066	13.65
Massachusetts	379	4.86	455	5.84	663	8.49
Michigan	707	5.52	859	6.72	1,366	10.66
Minnesota	352	4.76	378	5.13	594	8.04
Mississippi	432	9.29	418	9.04	736	15.83
Missouri	456	5.57	586	7.18	857	10.47
Montana	54	4.30	58	4.62	87	6.93
Nebraska	149	5.54	154	5.74	242	9.00
Nevada	275	6.82	269	6.70	449	11.14
New Hampshire	77	5.33	82	5.69	136	9.41
New Jersey	783	6.76	713	6.18	1,236	10.67
New Mexico ⁶	73	2.43	134	4.47	181	6.03
New York	1,992	7.90	1,526	6.08	2,940	11.66
North Carolina	852	6.62	991	7.73	1,564	12.15
North Dakota	49	5.65	56	6.47	80	9.23
Ohio	939	6.20	1,116	7.39	1,731	11.42
Oklahoma	301	5.54	323	5.96	539	9.92
Oregon	207	4.23	257	5.27	385	7.87
Pennsylvania	963	6.42	1,115	7.46	1,786	11.90
Rhode Island	58	4.67	88	7.09	122	9.81
South Carolina	589	9.38	514	8.23	933	14.87
South Dakota ⁶	32	2.68	59	4.94	75	6.28
Tennessee ⁶	400	4.72	665	7.86	886	10.45
Texas	2,162	5.38	2,271	5.67	3,752	9.34
Utah	243	4.52	259	4.83	432	8.04
Vermont	34	5.19	32	4.90	54	8.25
Virginia	658	6.07	700	6.48	1,182	10.90
Washington	495	5.67	452	5.19	756	8.65
West Virginia	138	6.55	120	5.72	217	10.30
Wisconsin	390	5.36	474	6.53	699	9.61
Wyoming	42	5.44	58	7.53	76	9.85
Puerto Rico	489	9.96	452	9.26	808	16.46
Virgin Islands	20	11.72	21	12.92	27	15.82
Guam	31	9.07	42	12.31	58	16.97

¹Fetal deaths with stated or presumed period of gestation of 20 weeks or more²Infant deaths at less than 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more. Fetal deaths with not-stated gestational age are proportionally distributed to 20–27 weeks and 28 weeks or more.³Infant deaths at less than 28 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more.⁴Rate per 1,000 live births and specified fetal deaths.⁵Numbers may not exactly add to totals due to rounding of proportionally distributed fetal deaths or weighted infant deaths.⁶State reports only fetal deaths of 500 grams or more; data for fetal and perinatal definition II are not comparable with data from other states.

SOURCE: CDC/NCHS, National Vital Statistics System.

Technical Notes

Definition of fetal death

“Fetal death” means death prior to the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy and which is not an induced termination of pregnancy. The death is indicated by the fact that after such expulsion or extraction, 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. Heartbeats are to be distinguished from transient cardiac contractions; respirations are to be distinguished from fleeting respiratory efforts or gasps.

This definition (58) has been adopted by the Centers for Disease Control and Prevention’s National Center for Health Statistics (NCHS) as the nationally recommended standard and is based on the definition published by the World Health Organization in 1950 and revised in 1988. The term “fetal death” is defined on an all-inclusive basis to end confusion arising from the use of such terms as stillbirth, spontaneous abortion, and miscarriage. All U.S. states and registration areas have definitions similar to the standard definition, except for Puerto Rico and Wisconsin, which have no formal definition (6,59). Fetal deaths do not include induced terminations of pregnancy.

Reporting requirements for fetal death data

Reporting requirements for fetal deaths vary by state, and these differences have important implications for comparisons of fetal and perinatal mortality rates by state. Table I shows the period of gestation at which fetal death reporting is required for each reporting area. The majority of states require reporting of fetal deaths at 20 weeks of gestation or more, or a minimum of 350 grams birthweight (roughly equivalent to 20 weeks), or some combination of the two. However, seven states and the U.S. Virgin Islands require reporting of fetal deaths at all periods of gestation (although three of these do not send data for fetal deaths at less than 20 weeks to NCHS), whereas one state requires reporting beginning at 16 weeks of gestation. At the other end of the spectrum, three states (New Mexico, South Dakota, and Tennessee) require reporting of fetal deaths with birthweights of 500 grams or more (roughly equivalent to 22 weeks of gestation). Lack of full reporting for these states leads to a slight underestimate of the U.S. fetal mortality rate. For example, when data for these three states were excluded, the fetal mortality rate was 6.11 in 2006, compared with 6.05 for all states combined.

There is substantial evidence that not all fetal deaths for which reporting is required are reported (6,10). Underreporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each state. This is illustrated in the Figure, which compares the percentage of fetal deaths at 20 weeks or more that are at 20–27 weeks of gestation by state reporting requirements. In general, fetal deaths tend to be somewhat underreported near the lower limit of the reporting requirement. For those states requiring reporting of fetal deaths at all periods of gestation, 58% of fetal deaths at 20 weeks or more were at 20–27 weeks, whereas for states requiring reporting of fetal deaths at 500 grams or more, only 28% were at 20–27 weeks, thus indicating substantial underreporting of early fetal deaths.

Variations in fetal death reporting requirements and practices have implications for comparing fetal and perinatal mortality rates among

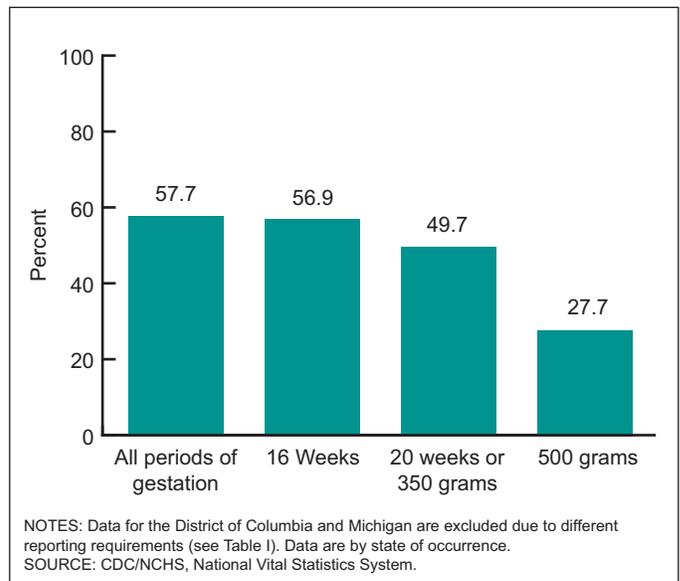


Figure. Percentage of fetal deaths at 20–27 weeks among all fetal deaths at 20 weeks or more, according to state reporting requirements: 2006

states. Because reporting is generally incomplete near the lower limit of the reporting requirement, states that require reporting of all fetal deaths at any gestational age are likely to have more complete reporting of fetal deaths at 20 weeks or more than those states that do not. The larger number of fetal deaths reported for these “all periods” states may result in higher perinatal mortality rates than those rates reported for states whose reporting is less complete. Accordingly, reporting completeness may account in part for differences in fetal and perinatal mortality rates among states. To promote the comparability of data by year and by state while including as much meaningful data as possible, this report presents data on fetal deaths with a stated or presumed period of gestation of 20 weeks or more (6).

Percentage of unknown responses by characteristics

Table II shows the percentage of unknown responses for particular variables shown in this report, in the fetal death file, and for U.S. live births. In general, percentages of unknown responses are considerably higher for fetal deaths than for live births, and among fetal deaths the percentage unknown is higher for fetal deaths that occur earlier in the gestational period. In the tables in this report, unknown responses are shown in frequencies tables but are excluded from the computation of percent distributions and fetal and perinatal mortality rates. Thus, rates published in this report by variables with a substantial percentage of unknown responses (such as birthweight) may understate the “true” rates of fetal mortality for that characteristic.

The 1989 and 2003 revisions of the U.S. Standard Certificates and Reports

This report includes data for 16 states (California, Delaware, Florida, Idaho, Kansas, Kentucky, Maryland, Michigan, Nebraska, New Hampshire, Oklahoma, Pennsylvania, South Dakota, Texas,

Table I. Period of gestation and weight minimums at which fetal death reporting is required, by reporting area: United States, 2006

Area	All periods of gestation	16 weeks	20 weeks	20 weeks or 350 grams	20 weeks or 400 grams	20 weeks or 500 grams	5 months	350 grams	500 grams
Alabama			X						
Alaska			X						
Arizona					X				
Arkansas	¹ X								
California			X						
Colorado	¹ X								
Connecticut			X						
Delaware								² X	
District of Columbia						X			
Florida			X						
Georgia	¹ X								
Hawaii	X								
Idaho					X				
Illinois			X						
Indiana			X						
Iowa			X						
Kansas								X	
Kentucky					X				
Louisiana					X				
Maine			X						
Maryland			³ X						
Massachusetts					X				
Michigan						X			
Minnesota			X						
Mississippi					X				
Missouri					X				
Montana								² X	
Nebraska			X						
Nevada			X						
New Hampshire					X				
New Jersey			X						
New Mexico									X
New York	X								
New York (excluding New York City)	X								
New York City	X								
North Carolina			X						
North Dakota			X						
Ohio			X						
Oklahoma			X						
Oregon			X						
Pennsylvania		X							
Rhode Island	X								
South Carolina					X				
South Dakota									X
Tennessee									⁴ X
Texas			X						
Utah			X						
Vermont			⁵ X						
Virginia	X								
Washington			X						
West Virginia			X						
Wisconsin					X				
Wyoming			X						
Puerto Rico							X		
Virgin Islands	X								
Guam					X				

¹Although state law requires the reporting of fetal deaths of all periods of gestation, only data for fetal deaths at 20 weeks or more are provided to NCHS.

²If weight is unknown, 20 completed weeks of gestation or more.

³If gestational age is unknown, weight of 500 grams or more.

⁴If weight is unknown, 22 completed weeks of gestation or more.

⁵If gestational age is unknown, weight of 400 grams or more (15 ounces or more).

SOURCE: CDC/NCHS, National Vital Statistics System.

Table II. Percentage of unknown responses for selected variables for fetal deaths and live births: United States, 2006

Variable	Fetal deaths			Live births ²
	Total ¹	20–27 weeks	28 weeks or more	
Marital status ³	2.01	2.20	1.49	0.04
Hispanic origin	5.22	5.62	4.21	0.71
Period of gestation	2.09	...	...	0.60
Birthweight	9.88	12.48	6.59	[†] 0.03

... Category not applicable.

[†] For the linked file, not-stated birthweight is imputed for records with known period of gestation; the percentage of unknown responses before imputation is 0.11.

¹ Includes fetal deaths with stated or presumed period of gestation of 20 weeks or more.

² Based on the denominator file for the linked file. Figures for the linked file differ slightly from the natality file.

³ For fetal deaths, excludes data for residents of California, Nevada, and New York, which did not report marital status on the fetal death report. For live births, excludes data from Michigan and New York, which did not report marital status on the birth certificate. For births only, marital status was inferred for nonreporting states, and not-stated marital status was imputed in reporting states (16).

SOURCE: CDC/NCHS, National Vital Statistics System.

Utah, and Washington) that implemented the 2003 revision of the U.S. Standard Report of Fetal Death on or before January 1, 2006 (revised). Data from all other areas are based on the 1989 revision (unrevised).

For live births, 19 states [California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming] implemented the 2003 revision of the U.S. Standard Certificate of Birth by January 1, 2006. Data from all other areas are based on the 1989 revision.

For infant deaths included in perinatal mortality rates, 21 states (California, Connecticut, Florida, Idaho, Kansas, Michigan, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Texas, Utah, Washington, and Wyoming) implemented the 2003 revision of the U.S. Standard Certificate of Death as of January 1, 2006. Data from all other areas are based on the 1989 revision. The 2003 revision of the U.S. Standard Certificates and Reports is described in detail elsewhere (56). Because the variables included in this report are comparable between the 1989 and 2003 revisions, these changes had little effect on the data included here.

Change in fetal and perinatal mortality rates for 2003 and 2004

The fetal and perinatal mortality data for 2003 and 2004 shown in this report have been revised from those published in previous reports (29,60). In the 2003 and 2004 fetal death data files, as a result of a programming error, some fetal death records with not-stated gestational ages that should have been included in the 20 weeks or more group were erroneously assigned to the less than 20 week group. Because most reports of fetal death data include only fetal deaths at 20 weeks or more, this error led to a slight underestimate of fetal mortality rates published in previous reports (29,60).

Table III shows the effect of correcting this error on U.S. fetal and perinatal mortality rates. It should be emphasized that although the corrected rates are different from those originally published, the statements about statistical significance or lack thereof made in previous reports do not change (29,60,61). In other words, the U.S. fetal mortality rate did not decline significantly from 2002 to 2003, 2003 to 2004, 2004 to 2005, or 2003 to 2005. There was a significant decline in the fetal mortality rate from 2002 to 2004 and from 2002 to 2005. More detailed

Table III. Corrected fetal and perinatal deaths and mortality rates: United States, 2003 and 2004

Event	2003				2004			
	Rate ¹		Number of deaths		Rate ¹		Number of deaths	
	Corrected	Originally reported	Corrected	Originally reported	Corrected	Originally reported	Corrected	Originally reported
Total fetal ²	6.32	6.23	26,004	25,653	6.28	6.20	26,001	25,655
20–27 weeks ³	3.25	3.21	13,348	13,168	3.17	3.13	13,068	12,894
28 weeks or more ³	3.08	3.04	12,656	12,485	3.14	3.09	12,933	12,761
Perinatal definition I ⁴	6.78	6.74	27,808	27,637	6.73	6.69	27,769	27,597
Perinatal definition II ⁵	10.92	10.83	44,939	44,588	10.78	10.70	44,603	44,257

¹ Rates are per 1,000 live births and fetal deaths in specified group.

² Fetal deaths with stated or presumed period of gestation of 20 weeks or more.

³ Fetal deaths with not-stated gestational age are proportionally distributed.

⁴ Infant deaths at less than 7 days and fetal deaths with stated or presumed period of gestation of 28 weeks or more.

⁵ Infant deaths at less than 28 days and fetal deaths with stated or presumed period of gestation of 20 weeks or more.

SOURCE: CDC/NCHS, National Vital Statistics System.

tables documenting the problem, and sample SAS code needed to correct for the problem, are available at: <http://www.cdc.gov/nchs/data/dvs/fetaldeath0304problems.pdf>. The 2003 and 2004 fetal death data available through VitalStats, NCHS' online data tabulation system (<http://www.cdc.gov/nchs/VitalStats.htm>), have been corrected and can be used to provide control totals for program verification.

Computation of rates

Fetal mortality rates in this report are computed as the number of fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths at 20 weeks or more. Perinatal mortality rates are computed in a similar fashion, as shown below. The denominators for all fetal and perinatal mortality rates are live births plus fetal deaths in the specified gestational age group, thus representing the population at risk of the event.

$$\text{Fetal mortality rate} = \frac{\text{Fetal deaths at 20 weeks of gestation or more}}{\text{Live births and fetal deaths at 20 weeks or more}} \times 1,000$$

Perinatal mortality rate, definition I =

$$\frac{\text{Fetal deaths at 28 weeks or more and infant deaths under 7 days}}{\text{Live births and fetal deaths at 28 weeks or more}} \times 1,000$$

Perinatal mortality rate, definition II =

$$\frac{\text{Fetal deaths at 20 weeks or more and infant deaths under 28 days}}{\text{Live births and fetal deaths at 20 weeks or more}} \times 1,000$$

In each case, the fetal deaths included in the denominator of each rate mirror the fetal deaths included in the numerator. Thus, rates for subtotals in [Figures 5–7](#) do not exactly add to the total fetal or perinatal rates due to the slightly different denominators used to compute the subtotal rates. A previous NCHS report (62) contains information on the historical development of various perinatal measures. An asterisk (*) is shown in place of any rate based on fewer than 20 fetal or perinatal deaths in the numerator.

Prospective fetal mortality rate

When fetal mortality is examined at a given gestational age, the prospective fetal mortality rate may provide a more appropriate indication of the population at risk of fetal death because the denominator for this rate is all of the women who are still pregnant at that gestational age. The prospective fetal mortality rate is computed as the number of fetal deaths at a given gestational age (in single weeks) per 1,000 live births and fetal deaths at that gestational age or greater. Records with not-stated gestational age are excluded from totals before computations are begun.

Prospective fetal mortality rate_w is

$$\text{Fetal deaths}_w / (\sum_w^{\text{max}} \text{fetal deaths} + \sum_w^{\text{max}} \text{live births}) \times 1,000$$

where *w* is specific gestational age in weeks and max is highest gestational age in weeks.

Multiple-race data

Beginning in 2003, some states revised their race reporting to allow respondents to select one or more race categories, to comply with the current (1997) Office of Management and Budget (OMB)

standards (63). For fetal deaths, 17 states (the 16 revised states plus Minnesota) reported multiple-race data in 2006. For 2006 births, 23 states (the 19 revised states plus Hawaii, Michigan, Minnesota, and Utah) reported multiple-race data. Eventually, all U.S. states will report multiple-race data. However, in the interim the numerators for fetal mortality rates are incompatible with the denominators (births). To compute rates, it is necessary to “bridge” data for multiple-race persons to single-race categories, using methods described elsewhere (64–67). This has been done for fetal and perinatal mortality rates by race presented in this report. Once all states revise their registration systems to be compliant with the current OMB standards, the use of bridged data can be discontinued.

Period of gestation

The primary measure used to determine the gestational age of the fetus is the interval between the first day of the mother's last normal menstrual period (LMP) and the date of delivery. It is subject to error for several reasons, including imperfect maternal recall or misidentification of the LMP because of postconception bleeding, delayed ovulation, or intervening early miscarriage. These data are edited for LMP-based gestational ages that are clearly inconsistent with birthweight and plurality, but reporting problems for this item persist. If the date of LMP is not reported, or if the computed period of gestation is inconsistent with birthweight, the clinical or obstetric estimate of gestation is used (16.1% of fetal death records and 5.6% of live birth records in 2006). These procedures are described in more detail elsewhere (16,68).

Gestational age not stated

Fetal deaths with not-stated gestational age are presumed to be 20 weeks of gestation or more if the state requires reporting of all fetal deaths at 20 weeks or more, or if the fetus weighed 500 grams or more in those states requiring reporting of all fetal deaths regardless of gestational age. Furthermore, in [Tables A, B, 1, and 3](#) fetal deaths with not-stated gestational age are allocated to 20–27 weeks and 28 weeks or more according to the proportion of fetal deaths with stated gestational age that fall into each category (proportional distribution). Similarly, for [Table F](#), fetal deaths with not-stated gestational age are proportionally distributed into the 20–23 week and 24 weeks or more categories. Proportional distribution is not performed for data in tables that show more detailed gestational age categories ([Table 2](#)). The allocation of not-stated gestational age for fetal deaths is made individually for each maternal age, race, and Hispanic origin group and state.

Random variation in fetal and perinatal mortality rates

The number of fetal deaths, perinatal deaths, and live births reported for an area represent complete counts of such events. As such, they are not subject to sampling error, although they are subject to nonsampling error in the registration process. However, when the figures are used for analytic purposes, such as the comparison of rates over time, for different areas, or among different subgroups, the number of events that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances (69). As a result, numbers

of births, fetal deaths, perinatal deaths, and fetal and perinatal mortality rates are subject to random variation. The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

In general, distributions of vital events may be assumed to follow the normal distribution. When the number of events is large, the relative standard error (RSE) is usually small. When the number of events is small (perhaps less than 100) and the probability of such an event is small, considerable caution must be used in interpreting the data. Such infrequent events may be assumed to follow a Poisson probability distribution. Estimates of RSEs and 95% confidence intervals are shown below. In the formulas, D is the number of fetal or perinatal deaths and B is the number of live births plus fetal deaths used as the denominator in computing fetal and perinatal mortality rates.

The formulas for the two RSEs are as follows:

$$\text{RSE}(D) = 100 \cdot \sqrt{\frac{1}{D}}$$

and

$$\text{RSE}(B) = 100 \cdot \sqrt{\frac{1}{B}}$$

For example, if for group A the number of fetal deaths was 238 and the number of live births plus fetal deaths in the denominator was 32,650, the fetal mortality rate is 7.29 fetal deaths per 1,000 live births and fetal deaths.

The RSE of the deaths is

$$\text{RSE} = 100 \cdot \sqrt{\frac{1}{238}} = 6.48,$$

whereas the RSE for the births plus fetal deaths in the denominator is

$$\text{RSE} = 100 \cdot \sqrt{\frac{1}{32,650}} = 0.55.$$

The formula for the RSE of the fetal mortality rate is:

$$\text{RSE} = 100 \cdot \sqrt{\frac{1}{D} + \frac{1}{B}}$$

Thus, the RSE for the example above is

$$\text{RSE} = 100 \cdot \sqrt{\frac{1}{238} + \frac{1}{32,650}} = 6.51.$$

Normal distribution

When the number of events is greater than 100, the normal distribution is used to estimate the 95% confidence intervals of a rate, R_1 , as follows:

$$\text{Lower: } R_1 - 1.96 \cdot R_1 \cdot \frac{\text{RSE}(R_1)}{100}$$

$$\text{Upper: } R_1 + 1.96 \cdot R_1 \cdot \frac{\text{RSE}(R_1)}{100}$$

Thus, for Group A:

$$\text{Lower: } 7.29 - \left(1.96 \cdot 7.29 \cdot \frac{6.51}{100} \right) = 6.36$$

$$\text{Upper: } 7.29 + \left(1.96 \cdot 7.29 \cdot \frac{6.51}{100} \right) = 8.22$$

Thus, the chances are 95 out of 100 that the true fetal or perinatal mortality rate for Group A lies somewhere in the 6.36–8.22 interval.

Poisson distribution

When the number of events in the numerator is less than 100, the confidence interval for the rate R_1 can be estimated based on the Poisson distribution using the values in [Table IV](#).

$$\text{Lower: } R_1 \cdot L(0.95, D_{\text{adj}})$$

$$\text{Upper: } R_1 \cdot U(0.95, D_{\text{adj}})$$

where D_{adj} is the adjusted number of fetal or perinatal deaths (rounded to the nearest integer) used to take into account the RSE of the number of deaths in the numerator and the number of live births plus fetal deaths in the denominator, and is computed as follows:

$$D_{\text{adj}} = \frac{D \cdot B}{D + B}$$

where $L(0.95, D_{\text{adj}})$ and $U(0.95, D_{\text{adj}})$ refer to the values in [Table IV](#) corresponding to the value of D_{adj} .

For example, if for Group B the number of fetal deaths was 73, the number of live births plus fetal deaths in the denominator was 11,422, and the fetal mortality rate was 6.39:

$$D_{\text{adj}} = \frac{(73 \cdot 11,422)}{(73 + 11,422)} = 73$$

the 95% confidence interval (using the formula in [Table IV](#) for 1–99 infant deaths) is

$$\text{Lower: } 6.39 \cdot 0.78384 = 5.01$$

$$\text{Upper: } 6.39 \cdot 1.25735 = 8.03$$

Comparison of two fetal or perinatal mortality rates

If either of the two rates to be compared is based on less than 100 deaths, the confidence intervals for both rates should be computed and checked to see if they overlap. If so, the difference is not statistically significant at the 95% level. If they do not overlap, the difference is statistically significant. If both rates (R_1 and R_2) to be compared are based on 100 or more deaths, the following z-test should be used to define a significance test statistic:

$$z = \frac{R_1 - R_2}{\sqrt{R_1^2 \left(\frac{\text{RSE}(R_1)}{100} \right)^2 + R_2^2 \left(\frac{\text{RSE}(R_2)}{100} \right)^2}}$$

If $|z| \geq 1.96$, then the difference is statistically significant at the 0.05 level and if $|z| < 1.96$, the difference is not significant.

Table IV. Values of L and U for calculating 95% confidence limits for numbers of events and rates when the number of events is less than 100

N	L	U	N	L	U
1	0.02532	5.57164	51	0.74457	1.31482
2	0.12110	3.61234	52	0.74685	1.31137
3	0.20622	2.92242	53	0.74907	1.30802
4	0.27247	2.56040	54	0.75123	1.30478
5	0.32470	2.33367	55	0.75334	1.30164
6	0.36698	2.17658	56	0.75539	1.29858
7	0.40205	2.06038	57	0.75739	1.29562
8	0.43173	1.97040	58	0.75934	1.29273
9	0.45726	1.89831	59	0.76125	1.28993
10	0.47954	1.83904	60	0.76311	1.28720
11	0.49920	1.78928	61	0.76492	1.28454
12	0.51671	1.74680	62	0.76669	1.28195
13	0.53246	1.71003	63	0.76843	1.27943
14	0.54671	1.67783	64	0.77012	1.27698
15	0.55969	1.64935	65	0.77178	1.27458
16	0.57159	1.62394	66	0.77340	1.27225
17	0.58254	1.60110	67	0.77499	1.26996
18	0.59266	1.58043	68	0.77654	1.26774
19	0.60207	1.56162	69	0.77806	1.26556
20	0.61083	1.54442	70	0.77955	1.26344
21	0.61902	1.52861	71	0.78101	1.26136
22	0.62669	1.51401	72	0.78244	1.25933
23	0.63391	1.50049	73	0.78384	1.25735
24	0.64072	1.48792	74	0.78522	1.25541
25	0.64715	1.47620	75	0.78656	1.25351
26	0.65323	1.46523	76	0.78789	1.25165
27	0.65901	1.45495	77	0.78918	1.24983
28	0.66449	1.44528	78	0.79046	1.24805
29	0.66972	1.43617	79	0.79171	1.24630
30	0.67470	1.42756	80	0.79294	1.24459
31	0.67945	1.41942	81	0.79414	1.24291
32	0.68400	1.41170	82	0.79533	1.24126
33	0.68835	1.40437	83	0.79649	1.23965
34	0.69253	1.39740	84	0.79764	1.23807
35	0.69654	1.39076	85	0.79876	1.23652
36	0.70039	1.38442	86	0.79987	1.23499
37	0.70409	1.37837	87	0.80096	1.23350
38	0.70766	1.37258	88	0.80203	1.23203
39	0.71110	1.36703	89	0.80308	1.23059
40	0.71441	1.36172	90	0.80412	1.22917
41	0.71762	1.35661	91	0.80514	1.22778
42	0.72071	1.35171	92	0.80614	1.22641
43	0.72370	1.34699	93	0.80713	1.22507
44	0.72660	1.34245	94	0.80810	1.22375
45	0.72941	1.33808	95	0.80906	1.22245
46	0.73213	1.33386	96	0.81000	1.22117
47	0.73476	1.32979	97	0.81093	1.21992
48	0.73732	1.32585	98	0.81185	1.21868
49	0.73981	1.32205	99	0.81275	1.21746
50	0.74222	1.31838			

Availability of fetal and perinatal data

Fetal death data files and user's guides are available for downloading from the NCHS website at: http://www.cdc.gov/nchs/data_access/VitalStatsOnline.htm. Each data file contains all of the variables included in this report plus many additional variables (6). Fetal death data are also available through VitalStats, NCHS's online data tabulation system, at: <http://www.cdc.gov/nchs/VitalStats.htm>. Additional information on fetal and perinatal mortality is available from: <http://www.cdc.gov/nchs>.

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