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Trends in Infant Mortality by Cause of Death and Other Characteristics, 1960–88

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System
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Trends and patterns in U.S. infant mortality from 1960–88 are analyzed by age, race, sex, season, and cause of death. The report discusses major shifts in leading causes of infant mortality from 1960–88 and the recent divergence in mortality rates between black and white infants.

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Trends in Infant Mortality by Cause of Death and Other Characteristics, 1960–88

by Marian F. MacDorman, Ph.D., and Harry M. Rosenberg, Ph.D., Division of Vital Statistics

Highlights

From 1960 to 1988 the infant mortality rate for the United States declined by 60 percent from 26.0 to 10.0 infant deaths per 1,000 live births. The infant mortality rate declined slowly from 1960 to 1964, rapidly from 1965 to 1981, and then moderately from 1981 to 1988. Since 1970 neonatal (under 28 days) mortality has declined more rapidly than postneonatal (28 days–11 months) mortality, reversing the historic pattern of more rapid declines in postneonatal mortality. Because of this, a smaller percent of infant deaths occurred during the neonatal period in 1988 (64 percent) than in 1960 (72 percent).

The gap in mortality between black and white infants narrowed during the 1960's, but widened during the 1970's and 1980's. The ratio of black to white infant mortality rates (or mortality race ratio) declined from 1.93 in 1960 to 1.77 in 1971, due to a more rapid decline in postneonatal mortality for black than white infants. However, since 1971, the infant mortality race ratio increased substantially to 2.07 in 1988, reflecting the slower decline in neonatal mortality for black infants. While for many years the gap between black and white infant mortality was wider during the postneonatal than the neonatal period, the gap in 1988 was wider during the neonatal period.

In 1988 Congenital anomalies was the leading cause of infant death, followed by Sudden infant death syndrome (or SIDS), Disorders relating to short gestation and unspecified low birthweight, and Respiratory distress

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syndrome. These four causes combined accounted for about half of all infant deaths in 1988.

From 1960 to 1988 mortality from Congenital anomalies, the leading cause of infant death in 1988, declined more slowly than mortality for all causes of infant death combined. Mortality from Sudden infant death syndrome, the leading cause of postneonatal death, declined a little during 1980–88. As the causes of these conditions are incompletely understood, it has been difficult to develop effective prevention strategies that would result in further reductions in mortality from these leading causes of infant death.

Infant mortality from Disorders relating to short gestation and unspecified low birthweight declined rapidly from 1968 to 1978; however, since 1979 the rate of decline has slowed markedly, reflecting in part the lack of decline in low birth weight since 1980. In contrast, mortality from Respiratory distress syndrome, a cause of death closely associated with low birth weight, continued to decline rapidly during the 1980's, due to improved medical management. Trends in mortality for other leading causes of infant death are also described.

The causes of death contributing the most to the overall decline in infant mortality from 1960 to 1988 were Pneumonia and influenza, causes related to hypoxia and asphyxia and causes related to prematurity and low birth weight.

In 1988, 4 of the 10 leading causes of infant mortality taken together account for 42 percent of the difference in infant mortality between black and white infants. They are Disorders relating to short gestation and unspecified low birthweight (18 percent), Sudden infant death syndrome (11 percent), Respiratory distress syndrome (8 percent), and Newborn affected by maternal complications of pregnancy (5 percent). If the mortality rates for black infants from these four causes were reduced to the level for white infants, the overall infant mortality rate for black infants would be reduced in 1988 by 22 percent from 17.6 to 13.8 infant deaths per 1,000 live births.

The report also describes variations in causes of infant death by age, race, sex, and season of the year.

Introduction

Infant mortality is an important indicator of the health of a nation, as it is associated with a variety of factors such as maternal health, quality and access to medical care, socioeconomic conditions, and public health practices (1–5). While the infant mortality rate in the United States has declined more than 10 fold since 1900, it is still higher than that of a number of other industrialized nations (6). Further, the rate of decline in infant mortality has slowed markedly since 1981 (7). The mortality rate for black infants is twice that of white infants, and the prevalence of low birth weight—an important risk factor for infant mortality—has declined only slightly since 1960 (8,9).

For several years, it has been apparent that the United States was unlikely to meet many of the 1990 objectives for infant health established by the Surgeon General in 1980, particularly those relating to the percent of low-birth-weight infants, and to racial disparities in

pregnancy outcomes (10,11). Concern over these trends led to establishing the National Commission to Prevent Infant Mortality by the U.S. Congress in 1987 (12) and to a number of recent studies on ways to further reduce the infant mortality rate in the United States (13–15).

This report describes trends and patterns in infant mortality in the United States for the period 1960 to 1988. It focuses on the characteristics of the infant, including age, race, and sex, and on the leading causes of infant mortality. A previous report of the National Center for Health Statistics (NCHS) described trends in infant mortality from 1930 to 1964 (16). Mortality data shown in this report are based on information from death certificates filed in the 50 States and the District of Columbia (see appendix). The data are published annually in *Vital Statistics of the United States, Volume II, Mortality* (17), and are available on public-use data tapes beginning in 1968 (18).

Trends in infant mortality

In 1988 a total of 38,910 deaths of infants under 1 year of age were registered in the United States, compared with 110,873 in 1960. The 1988 infant mortality rate of 10.0 infant deaths per 1,000 live births, or about 1 percent of all births, was the lowest final rate ever recorded for the United States. This represents a great improvement over infant mortality in the early part of this century. Although precise data are not available for 1900, it is estimated that at least 10 percent of all infants born in the United States at that time died within the first year of life (19).

Statistics on infant mortality for the United States as a whole are available from the national vital

statistics system beginning in 1933, when the infant mortality rate was 58.1 (figure 1), slightly more than half that in 1900. The rapid reduction in infant mortality continued through the 1930's and 1940's, the rate declining by an average of 4.0 percent per year from 1933 to 1950. The rate of decline slowed markedly to 1.0 percent per year for the period 1950 to 1964. In 1964 the infant mortality rate was 24.8, only slightly lower than the rate of 29.2 recorded in 1950. Thereafter, until the early 1980's infant mortality declined rapidly, by an average of 4.5 percent per year, from 24.7 in 1965 to 11.9 in 1981. From 1981 to 1988 the rate of decline again slowed markedly to average 2.5 percent per year.

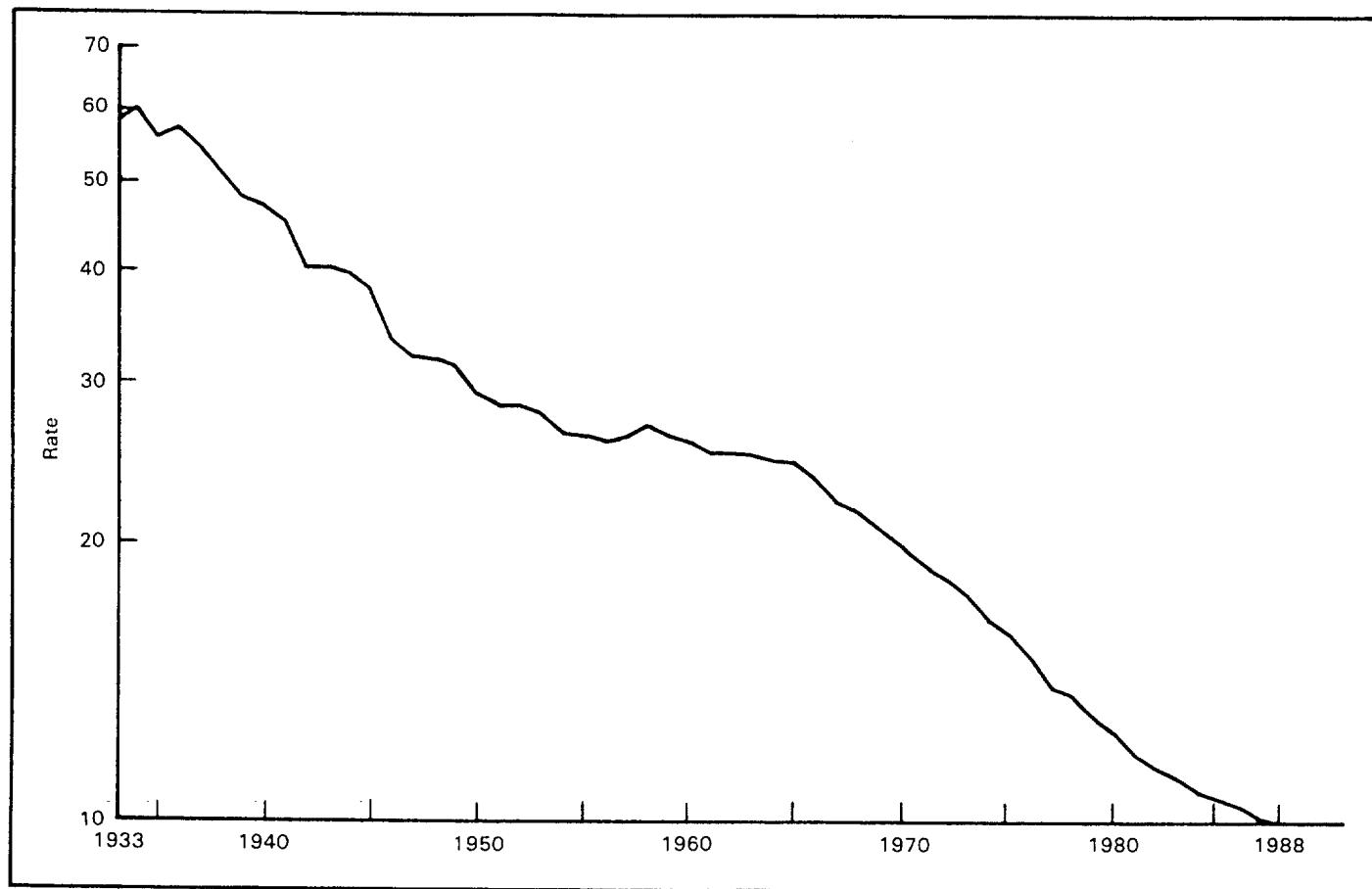


Figure 1. Infant mortality rates: United States, 1933-88.

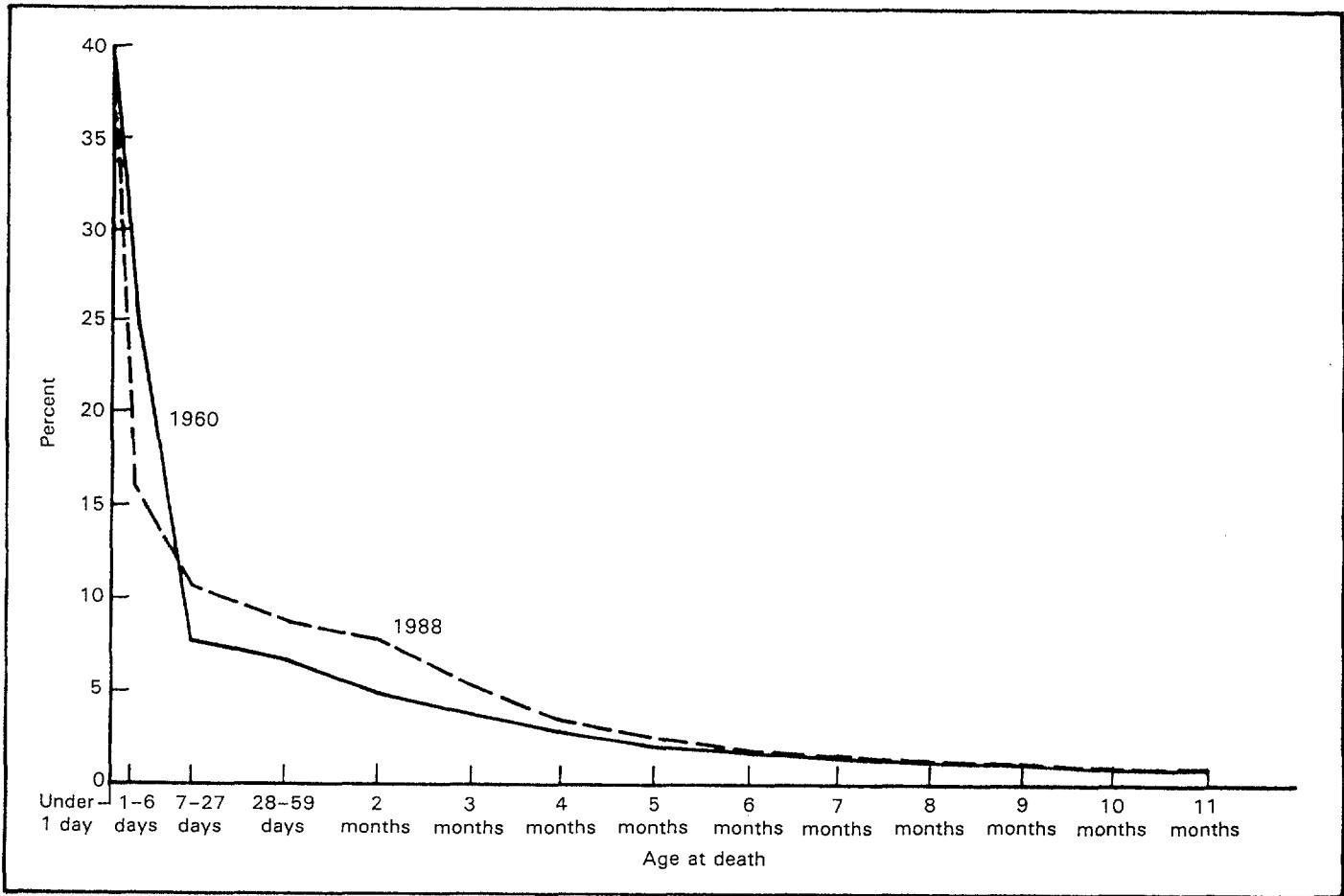


Figure 2. Percent distribution of infant deaths, by age at death: United States, 1960 and 1988

Age of infant

Deaths of infants are not uniformly distributed during the first year of life; they occur most frequently in the first few hours and days of life, then diminish gradually at a declining rate through the rest of the first year of life (figure 2). In 1988, 36.6 percent of all infant deaths occurred in the first 24 hours of life, 16.0 percent from 1 to 6 days of age, and 10.8 percent from 7 to 27 days of age. Altogether, 63.5 percent of all infant deaths occurred during the neonatal period (under 28 days). Only about a third (36.5 percent) of infant deaths in 1988 occurred during the postneonatal period (from 28 days–11 months of age).

Since 1960 the distribution of infant deaths by age has changed because of differences in the rate of decline in infant mortality by age. The percent of infant deaths occurring during the first week of life declined from 64.1 percent in 1960 to 52.6 percent in 1988. Conversely, the percent of infant deaths occurring between the second week and fourth month of life increased markedly from 26.3 percent in 1960 to 36.8 percent in 1988. At the other end of the age period for infants 6 to 11 months, there was little change, as less than 8 percent of infant deaths in 1960 and in 1988 occurred during that time period.

The shift in age at death between 1960 and 1988 has also led to changes in the distribution of infant deaths between the neonatal and postneonatal periods. In 1960, 71.9 percent of all infant deaths occurred during the neonatal period, compared with 63.5 percent in 1988; this was the result of a more rapid overall decline in neonatal than postneonatal mortality from 1960 to 1988 (figure 3). Neonatal mortality rates declined by 3.8 percent per year, from 18.7 infant deaths under 28 days of age per 1,000 live births in 1960 to 6.3 in 1988, while postneonatal mortality rates declined by 2.5 percent annually, from 7.3 to 3.6 deaths for infants 28 days–11 months of age per 1,000 live births.

The trend from 1960 to 1988 conceals two countervailing trends, one from 1960 to 1970, and one from 1970 to 1988. During the early part of this century postneonatal mortality declined more rapidly than neonatal mortality (20). This pattern continued through the 1960's. From 1960 to 1970 postneonatal mortality declined by an average of 3.9 percent per year, while neonatal mortality declined by an average of 2.1 percent per year. However, after 1970 this pattern reversed. From 1970 to 1981 neonatal mortality declined by an average of 5.6 percent per year, while postneonatal mortality declined by an average of only 2.1 percent per year (figure 3). The annual

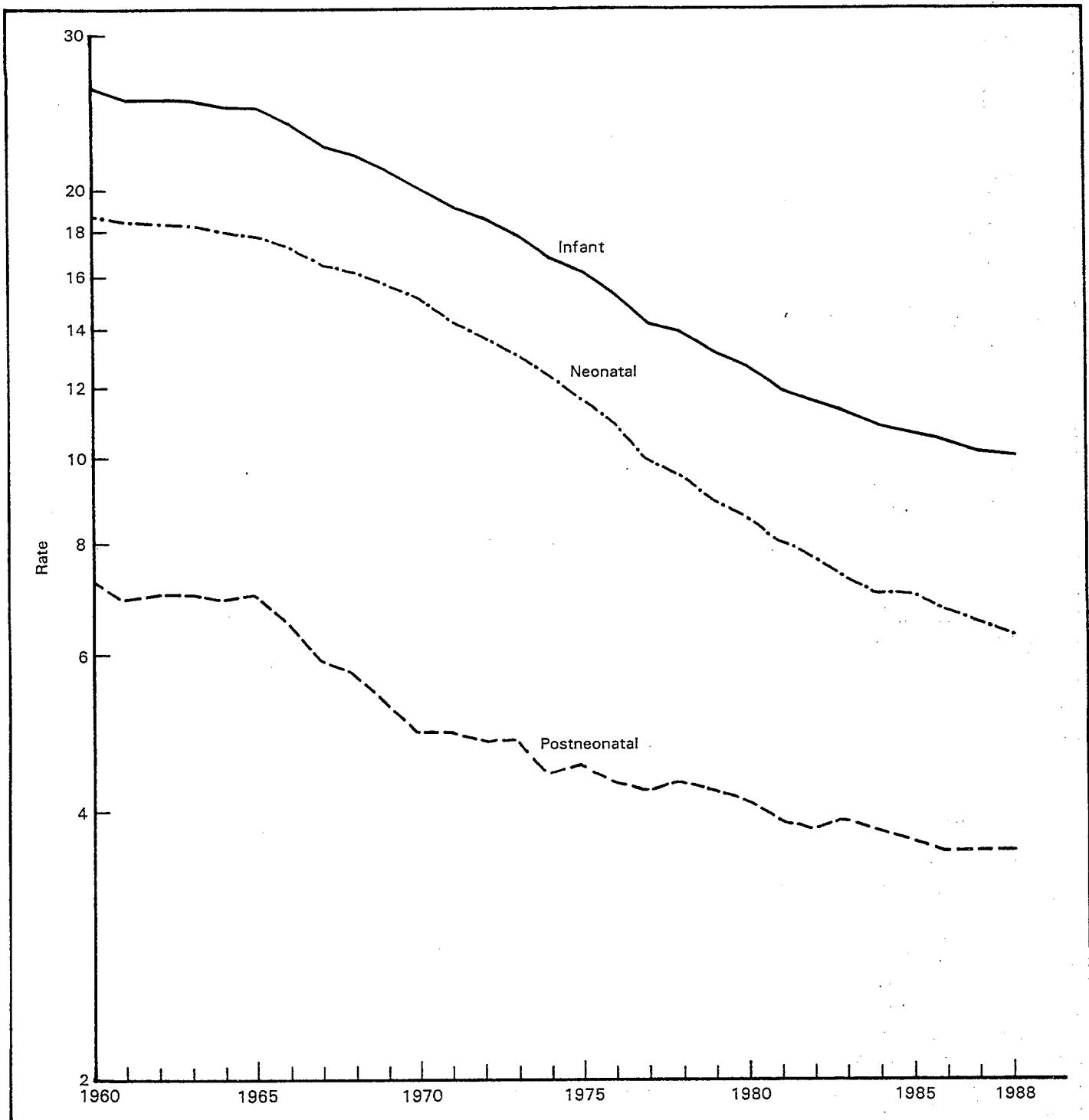


Figure 3. Infant, neonatal, and postneonatal mortality rates: United States, 1960-88

rates of decline slowed to 3.4 percent and 1.1 percent during the period 1981 to 1988.

Sex and race

Between 1960 and 1988 male infants had a greater chance of dying than female infants. In 1988, the infant mortality rate for males was 11.0 infant deaths per 1,000 live births, 24 percent higher than the rate of 8.9 for

females, resulting in a sex ratio (male divided by female mortality rates) of 1.24 (table A). In 1960 the rates were 29.3 and 22.6, respectively, a differential of 30 percent. With respect to neonatal mortality, the sex ratio has declined slightly from 1.32 in 1960 to 1.21 in 1988, while sex ratios for postneonatal mortality have remained constant. Sex ratios were lower for black than for white infants in 1960 (1.25 compared with 1.33) and 1988 (1.18 compared with 1.28).

Table A. Infant, neonatal, and postneonatal mortality rates and ratios, by sex and race: United States, 1960 and 1988

[Rates are number of infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths per 1,000 live births in specified group]

Age, race, and race ratio	1960				1988			
	Both sexes	Male	Female	Ratio male/female	Both sexes	Male	Female	Ratio male/female
Infant mortality rate	26.0	29.3	22.6	1.30	10.0	11.0	8.9	1.24
White	22.9	26.0	19.6	1.33	8.5	9.5	7.4	1.28
Black	44.3	49.1	39.4	1.25	17.6	19.0	16.1	1.18
Ratio black/white	1.93	1.89	2.01	...	2.07	2.00	2.18	...
Neonatal mortality rate	18.7	21.2	16.1	1.32	6.3	6.9	5.7	1.21
White	17.2	19.7	14.7	1.34	5.4	5.9	4.8	1.23
Black	27.8	31.1	24.5	1.27	11.5	12.5	10.4	1.20
Ratio black/white	1.62	1.58	1.67	...	2.13	2.12	2.17	...
Postneonatal mortality rate	7.3	8.1	6.5	1.25	3.6	4.0	3.2	1.25
White	5.7	6.3	4.9	1.29	3.1	3.6	2.7	1.33
Black	16.5	18.0	14.9	1.21	6.2	6.6	5.8	1.14
Ratio black/white	2.89	2.86	3.04	...	2.00	1.83	2.15	...

In 1960 the mortality rate was 44.3 for black infants, almost twice the rate of 22.9 for white infants, resulting in a ratio of black to white infant mortality rates (or mortality race ratio) of 1.93 (table A). The black neonatal mortality rate was 27.8 in 1960, compared with a rate of 17.2 for white neonates, resulting in a neonatal mortality race ratio of 1.62. In contrast, the postneonatal mortality rate of 16.5 for black infants was nearly three times the rate of 5.7 for white infants, resulting in a postneonatal mortality race ratio of 2.89.

The situation in 1988 was quite different. In 1988 the mortality rate for black infants was 17.6, more than twice the rate of 8.5 for white infants. This resulted in an infant mortality race ratio of 2.07, higher than the ratio of 1.93 in 1960. The black neonatal mortality rate was 11.5, over twice the neonatal mortality rate of 5.4 for white infants. This resulted in a neonatal mortality race ratio of 2.13, which was much higher than the ratio of 1.62 in 1960. In contrast, the black postneonatal mortality rate was 6.2, just twice the white rate of 3.1. The resulting postneonatal mortality race ratio of 2.00 is much lower than the ratio of 2.89 for 1960.

Trends in infant, neonatal, and postneonatal mortality rates for the black and white populations from 1960 to 1988 are shown in figure 4, with the same data being depicted as mortality race ratios in figure 5. Mortality has declined steadily for black and white infants from 1960 to 1988. Black infant mortality has been substantially higher than white infant mortality throughout the period. However, the rates of decline in both black and white infant mortality have varied substantially during the period. In addition, when the overall trend for infant mortality is divided into separate trends for neonatal and postneonatal mortality, racial differences in mortality experience become even more apparent.

From 1960 to 1971 mortality declined more rapidly for black than for white infants, leading to a narrowing in the

gap between black and white infant mortality (figure 4). The mortality rate for black infants declined by an average of 3.4 percent per year, compared with 2.6 percent per year for white infants. Because of this, the mortality race ratio declined from 1.93 in 1960 to a low of 1.77 in 1971 (figure 5). However, after 1971, this trend reversed. From 1971 to 1988, the mortality rate for black infants declined by an average of 3.1 percent per year, much more slowly than the decline of 4.0 percent per year for white infants. Consequently, the infant mortality race ratio increased steadily from a low of 1.77 in 1971 to a high of 2.07 in 1988.

This overall trend for infant mortality was a product of two sharply diverging trends: one for neonatal mortality and one for postneonatal mortality. The turning points for trends in the neonatal and postneonatal mortality race ratios, as with those for infants, seem to fall in the early to mid 1970's. The neonatal mortality race ratio was relatively stable through the early 1970's, the 1973 race ratio of 1.64 being just slightly higher than the 1960 ratio of 1.62. This was due to nearly equal rates of decline in black and white neonatal mortality from 1960 to 1973. However, since 1973, neonatal mortality has declined much more rapidly for white than for black infants, leading to an increase in the neonatal mortality race ratio from 1.64 in 1973 to 2.13 in 1987 and 1988. Before 1986 the ratio had never exceeded 2.00 in U.S. data on infant mortality.

In contrast to the trend in neonatal mortality, most of the decline in the postneonatal mortality race ratio occurred between 1966 and 1975, when the ratio plummeted from 2.86 to 2.08. The 1988 ratio of 2.00 was only slightly lower than the ratio of 2.08 for 1975. This indicates that black postneonatal mortality improved substantially relative to white postneonatal mortality during the period 1966 to 1975, but since then the rates of decline in black and white postneonatal mortality have been about the same.

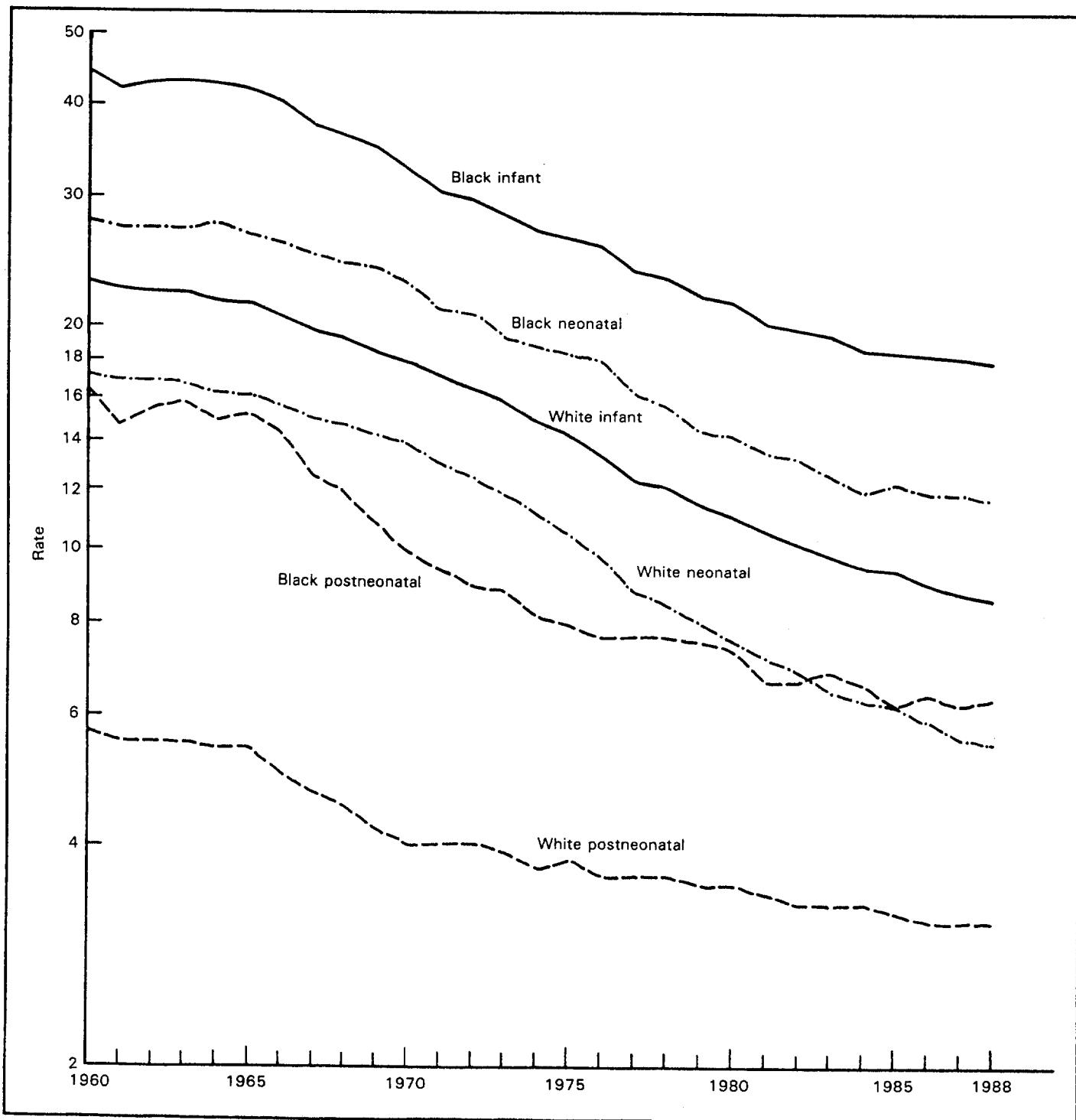


Figure 4. Infant, neonatal, and postneonatal mortality rates, by race: United States, 1960-88

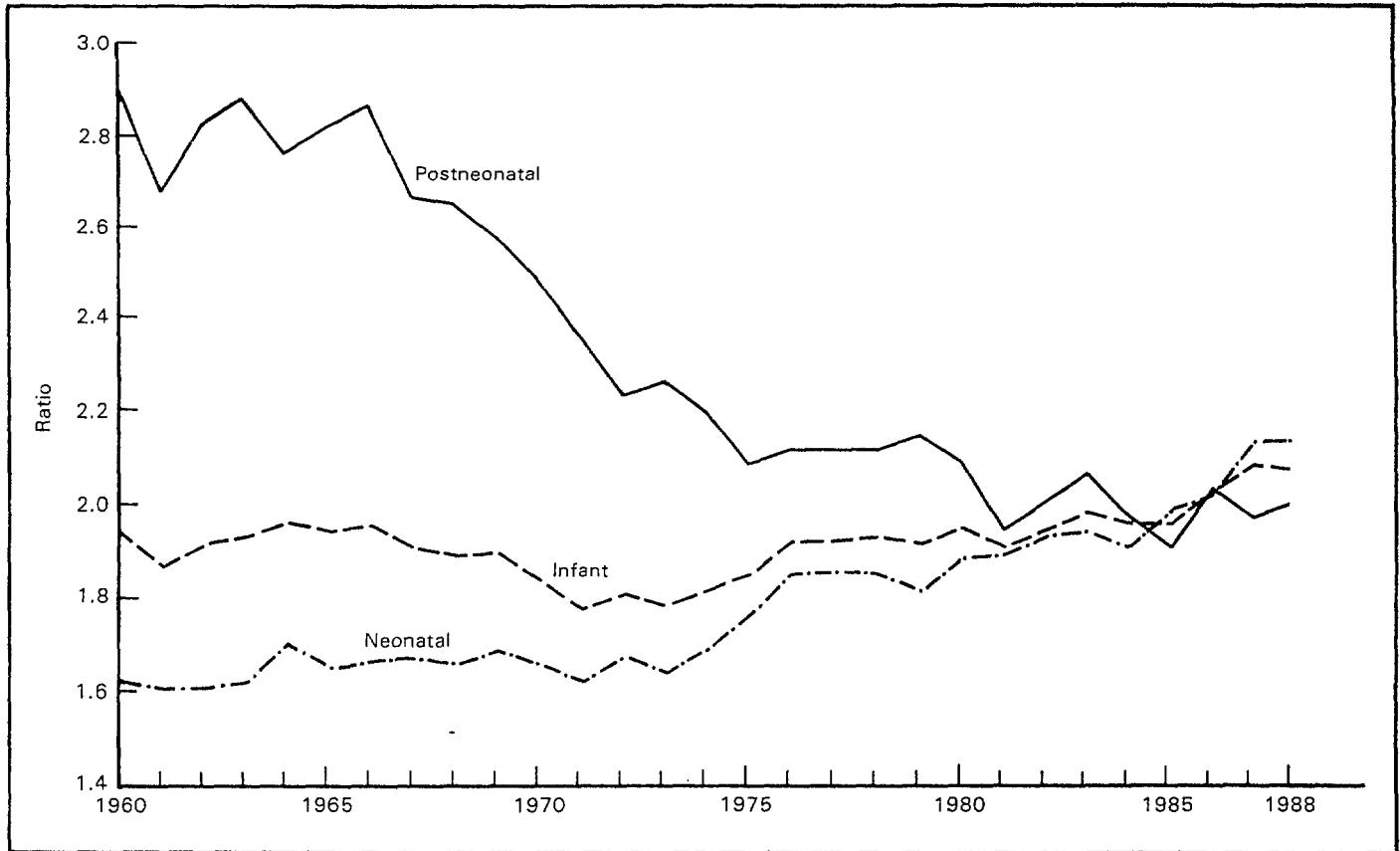


Figure 5. Infant, neonatal, and postneonatal mortality race ratios: United States, 1960-88

Leading causes of infant mortality

Comparability

Causes of death are classified according to the International Classification of Diseases (ICD) of the World Health Organization (21-23), which was revised three times during the period 1960 to 1988 as follows:

<i>Revision</i>	<i>Years in effect in the United States</i>
Seventh (ICD-7)	1958-67
Eighth (ICDA-8)	1968-78
Ninth (ICD-9)	1979-present

Designed to take into account advances in medical knowledge, the revisions can introduce discontinuities in time trends for particular causes of death. For some leading causes of infant death, large discontinuities in cause-of-death classification resulted from the introduction of the Eighth Revision, compared with less severe discontinuities from the introduction of the Ninth Revision. To facilitate trend analysis and to minimize the effect of comparability breaks between ICD revisions, trends in cause-specific infant mortality rates are examined separately for the three time periods when the Seventh, Eighth, and Ninth Revisions were in effect.

In addition, comparability ratios are provided. These ratios are a measure of the comparability in cause-of-death classification between successive revisions of the ICD. They are calculated by dividing the number of deaths for a specific cause-of-death category classified by one revision by the number of deaths for the most comparable category as classified in the previous revision (see appendix). A ratio near 1.0 indicates a close numerical correspondence in cause-of-death categories between the two revisions.

Cause-of-death rankings for infants are based on the tabulation lists in use during a specific ICD revision period (see appendix).

Trends

The 10 leading causes of infant death in 1960 and in 1988 are shown in table B. In 1960 these causes accounted for 79.2 percent of all infant deaths in the United States; in 1988, 65.8 percent. Trends in each of the leading causes of infant death in 1988 are examined from 1960 to 1988,

except when there are no comparable ICD-7 or ICDA-8 categories. Because of major changes in cause-of-death classification between 1960 and 1988, direct comparisons can be made for only 4 of the 10 leading causes of infant death in 1988, namely, Congenital anomalies, Disorders relating to short gestation and unspecified low birth-weight, Accidents and adverse effects, and Pneumonia and influenza. Trends in other leading causes of infant death are traced back as far as possible given changes in cause-of-death classification. In addition, differentials in cause-specific infant mortality rates are described by age at death, race, sex, and season of death.

1. Congenital anomalies

In 1988 a total of 8,141 infants died from Congenital anomalies (ICD-9 Nos. 740-759), the leading cause of infant death (table B). In that year Congenital anomalies accounted for approximately one out of every five infant deaths (20.9 percent). In 1960 this cause ranked third, and accounted for a smaller proportion, one out of every seven infant deaths (13.9 percent). Mortality from Congenital anomalies has been almost comparable across the three revision periods, with infant comparability ratios of 1.007 between the Eighth and Ninth Revisions, and 1.036 between the Seventh and Eighth Revisions (24-26).

The trend in mortality from Congenital anomalies was steadily downward throughout the 28-year period, declining from 361.4 infant deaths per 100,000 live births in 1960 to 208.2 in 1988 (figure 6). From 1960 to 1967 infant mortality from Congenital anomalies declined slowly, by an average rate of 1.3 percent per year; from 1968 to 1978, moderately, by 2.2 percent per year; and from 1979 to 1988, by 2.2 percent per year (table C). Infant deaths from Congenital anomalies are mainly concentrated in the neonatal period; in 1988, almost three-quarters (72.3 percent) of infant deaths due to Congenital anomalies occurred within the first 27 days of life (table D).

In 1988 the infant mortality rate from Congenital anomalies was 209.8 for the black population compared with 211.5 for the white population, resulting in a mortality race ratio of 0.99, the lowest such ratio among the leading causes of infant death (table E). This finding is consistent with data from the Centers for Disease Control's Birth Defects Monitoring Program, which indicate that while some specific types of Congenital anomalies are

Table B. Deaths under 1 year and infant mortality rates for the 10 leading causes of infant death: United States, 1960 and 1988
 [Rates are number of infant deaths per 100,000 live births in specified group]

Rank	Cause of death, 1960 (Seventh Revision International Classification of Diseases, 1955)	Number	Rate	Percent of total deaths
...	All causes	110,873	2604.0	100.0
1	Postnatal asphyxia and atelectasis	762	19,539	17.6
2	Immaturity, unqualified	776	19,458	17.5
3	Congenital malformations	750-759	15,389	13.9
4	Birth injuries	760,761	10,158	9.2
5	Influenza and pneumonia, except pneumonia of newborn ¹	480-493	9,828	8.9
6	Accidents	E800-E962	3,831	3.5
7	Pneumonia of newborn ¹	763	3,544	3.2
8	Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn	543,571,572	2,622	2.4
9	Hemolytic disease of newborn	770	2,145	1.9
10	Immaturity with mention of any other subsidiary condition	774	1,310	1.2
...	All other causes	Residual	23,049	20.8

Rank	Cause of death, 1988 (Ninth Revision International Classification of Diseases, 1975)	Number	Rate	Percent of total deaths
...	All causes	38,910	995.3	100.0
1	Congenital anomalies	740-759	8,141	20.9
2	Sudden infant death syndrome	798.0	5,476	14.1
3	Disorders relating to short gestation and unspecified low birthweight	765	3,268	8.4
4	Respiratory distress syndrome	769	3,181	8.2
5	Newborn affected by maternal complications of pregnancy	761	1,411	3.6
6	Accidents and adverse effects	E800-E949	936	2.4
7	Newborn affected by complications of placenta, cord, and membranes	762	907	2.3
8	Infections specific to the perinatal period	771	878	2.3
9	Intrauterine hypoxia and birth asphyxia	768	777	2.0
10	Pneumonia and influenza	480-487	641	1.6
...	All other causes	Residual	13,294	34.2

¹For analytical purposes in this report, these two causes have been combined to achieve better comparability.

much more common among black than white infants, others are much less common. Overall, the incidence rates for Congenital anomalies as a whole are slightly lower for black infants than for white infants (27). In 1988 Congenital anomalies was the leading cause of death for white infants, and the third leading cause of death for black infants.

Slightly more male than female infants died from Congenital anomalies in 1988. The mortality sex ratio (number of male deaths divided by the number of female deaths) was 1.11, compared with 1.24 for all infant deaths (table F). Deaths from this cause were distributed relatively uniformly throughout the year, and did not exhibit marked seasonal variations (table G).

2. Sudden infant death syndrome

Sudden infant death syndrome (SIDS), frequently called "crib death" or "cot death," was defined by the National Institute of Child Health and Human Development (NICHD) in 1990 as "the sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history" (28). The previous definition, adopted in 1969, did not require an examination of the death scene (29). There are no specific symptoms identifiable with SIDS; however, an autopsy usually reveals congestion and edema of the lungs and minor

inflammatory changes in the respiratory system. In the majority of cases, minor intrathoracic petechial hemorrhages are found (30). Because of these characteristic features, experts and researchers in the field consider SIDS a clearly identifiable distinctive entity even though the cause and mechanism of death remain unclear.

Beginning with data for 1973 NCHS instituted a separate cause-of-death category to distinguish deaths due to SIDS (ICDA-8 No. *795.0). Before 1973 there was no separate category for SIDS, and many SIDS deaths were probably classified under other category numbers in the "Symptoms, Signs, and Ill-Defined Conditions" chapter of the ICD, as well as under respiratory conditions, Accidental mechanical suffocation (ICDA-8 No. E913), and a variety of other causes (30-32).

In 1988 a total of 5,476 infants died from SIDS (ICD-9 No. 798.0), the second leading cause of infant death; SIDS accounted for about one in seven infant deaths (14.1 percent). Mortality from SIDS was quite comparable between the Eighth and Ninth Revisions of the ICD, with a comparability ratio of 0.995.

The trend in mortality from SIDS showed an initial rapid increase from 1973-79, reaching a peak of 152.5 infant deaths per 100,000 live births in 1980, then declining slightly to 140.1 in 1988 (figure 6). The initial increase in SIDS mortality between 1973 and 1978 may represent changes in diagnostic terminology rather than real in-

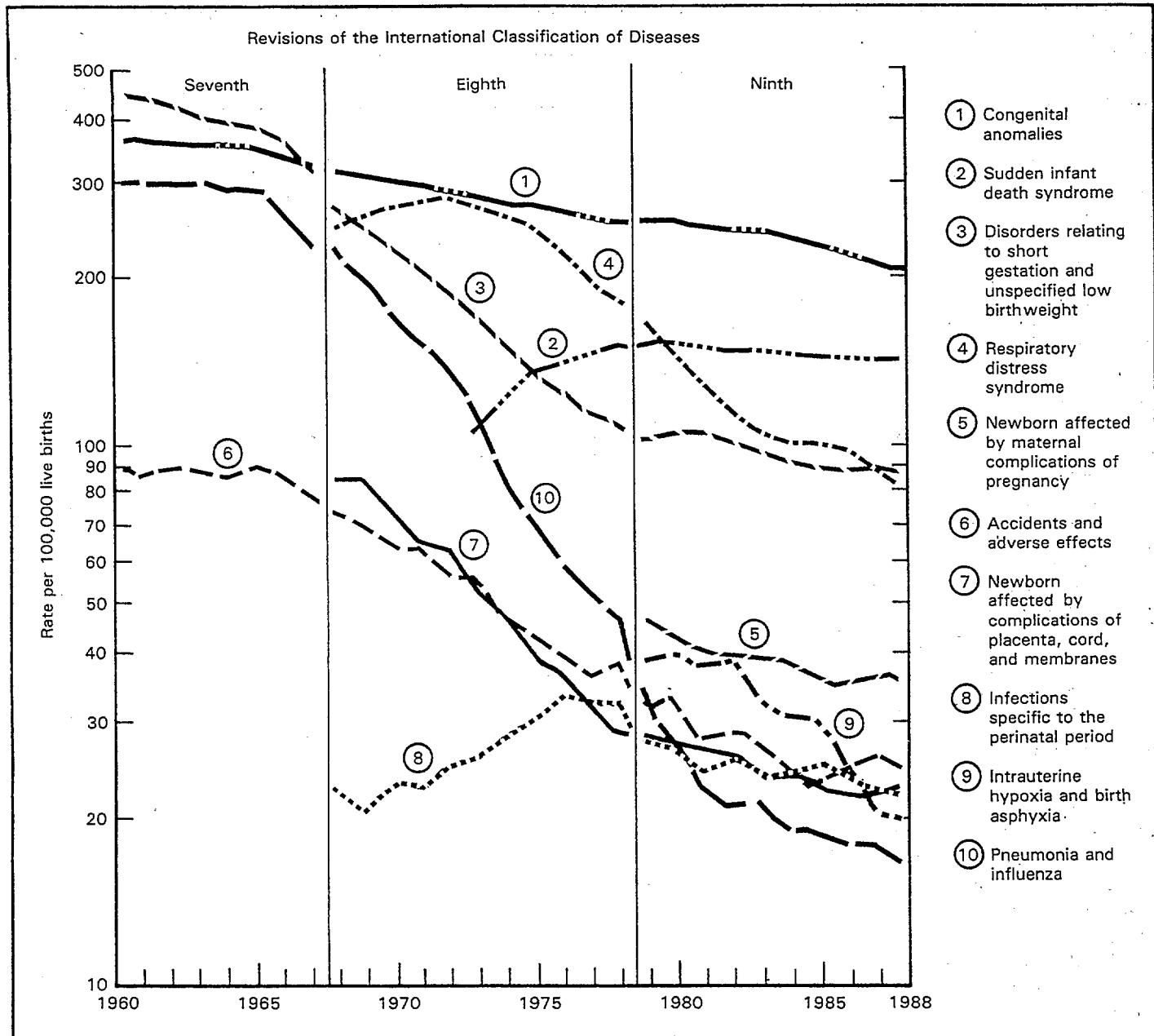


Figure 6. Infant mortality rates for the 10 leading causes of infant death in 1988: United States, 1960-88

creases in mortality from this cause.

In addition to being the second leading cause of infant death in 1988, SIDS was the leading cause of postneonatal death; over two-thirds (70.3 percent) of SIDS deaths occurred at 28 days-3 months of age (table D). In 1988 SIDS was the leading cause of death for black infants and the second leading cause for white infants. The infant mortality rate of 226.2 for black infants was nearly twice the rate of 123.8 for white infants, resulting in a mortality race ratio of 1.83, slightly less than the ratio of 2.07 for all infant deaths.

Substantially more male than female infants died from SIDS in 1988. The mortality sex ratio was 1.44 for SIDS compared with 1.24 for all infant deaths. There was also a seasonal variation in the number of SIDS deaths, with a larger

number of deaths occurring during the fall and winter months. In 1988 the number of SIDS deaths was 76 percent higher during the winter months from January to March, than during the summer months from July to September.

3. Disorders relating to short gestation and unspecified low birthweight

A total of 3,268 infants died from Disorders relating to short gestation and unspecified low birthweight (ICD-9 No. 765), making this the third leading cause of infant death in 1988. The infant mortality rate from this cause was 83.6 infant deaths per 100,000 live births. In 1960 almost 18 percent of all infant deaths were classified to Immaturity, unqualified (ICD-7 No. 776), the most nearly

Table C. Average annual percent change in infant mortality rates for the 10 leading causes of infant death in 1988: United States, 1960–88

Cause of death (Ninth Revision International Classification of Diseases, 1975)						Average annual percent change					
						1979–88	1968–78		1960–67		
All causes						-3.0		-4.5		-2.1	
Congenital anomalies	740–759					-2.2		-2.2		-1.3	
Sudden infant death syndrome	798.0					-0.8		1+7.4		...	
Disorders relating to short gestation and unspecified low birthweight	765					-2.0		-8.5		-4.2	
Respiratory distress syndrome	769					-7.0		-2.7		...	
Newborn affected by maternal complications of pregnancy	761					-2.8		
Accidents and adverse effects	E800–E949					-2.8		-6.2		-2.0	
Newborn affected by complications of placenta, cord, and membranes	762					-2.0		-10.5		...	
Infections specific to the perinatal period	771					-2.4		+3.7		...	
Intrauterine hypoxia and birth asphyxia	768					-7.4		
Pneumonia and influenza	480–487					-7.3		-14.7		-4.6	

¹Based on data for 1973–78.

Table D. Percent distribution of infant deaths for the 10 leading causes of infant death, by age at death: United States, 1988

Cause of death (Ninth Revision International Classification of Diseases, 1975)	Total	Total	Under	1–23	1–6	7–27	Total	28–59	2	3	4	5	6–11
	infant	neonatal	1 hour	hours	days	days	post-neonatal	days	months	months	months	months	months
All causes	100.0	63.5	10.5	26.1	16.0	10.8	36.5	8.8	7.9	5.5	3.7	2.7	7.9
Congenital anomalies	740–759	100.0	72.3	9.8	23.8	23.9	14.9	27.7	7.1	4.5	3.7	2.7	2.0
Sudden infant death syndrome	798.0	100.0	6.7	*	*	0.9	5.7	93.3	24.6	27.3	18.4	9.5	5.2
Disorders relating to short gestation and unspecified low birthweight	765	100.0	97.9	29.5	61.5	6.1	0.8	2.1	0.8	*	*	*	*
Respiratory distress syndrome	769	100.0	93.0	2.5	35.6	38.5	16.5	7.0	2.8	1.0	*	0.8	0.6
Newborn affected by maternal complications of pregnancy	761	100.0	99.4	40.3	53.9	4.4	*	*	*	*	*	*	*
Accidents and adverse effects	E800–E949	100.0	7.9	*	*	2.1	3.6	92.1	11.5	12.9	8.1	7.7	8.4
Newborn affected by complications of placenta, cord, and membranes	762	100.0	99.1	42.2	43.8	10.3	2.9	*	*	*	*	*	*
Infections specific to the perinatal period	771	100.0	94.9	4.8	26.5	30.2	33.4	5.1	3.0	*	*	*	*
Intrauterine hypoxia and birth asphyxia	768	100.0	93.2	15.8	30.0	29.5	17.9	6.8	*	*	*	*	*
Pneumonia and influenza	480–487	100.0	19.3	*	3.4	5.8	9.7	80.7	15.1	18.4	12.3	10.8	6.7
All other causes	Residual	100.0	61.9	8.2	25.8	15.9	11.9	38.1	8.4	6.9	4.8	4.0	3.3

NOTE: * Denotes measure based on less than 20 deaths.

Table E. Infant mortality rates and rankings for the 10 leading causes of infant death, by race: United States, 1988

[Rates are number of infant deaths per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	All races		White		Black		Ratio black/white
	Rank	Rate	Rank	Rate	Rank	Rate	
All causes	995.3	...	851.1	...	1762.0	2.07
Congenital anomalies	740–759	1	208.2	1	211.5	3	209.8
Sudden infant death syndrome	798.0	2	140.1	2	123.8	1	226.2
Disorders relating to short gestation and unspecified low birthweight	765	3	83.6	4	56.7	2	219.9
Respiratory distress syndrome	769	4	81.4	3	70.5	4	142.4
Newborn affected by maternal complications of pregnancy	761	5	36.1	5	28.7	5	75.7
Accidents and adverse effects	E800–E949	6	23.9	6	20.9	6	41.8
Newborn affected by complications of placenta, cord, and membranes	762	7	23.2	7	20.2	8	39.9
Infections specific to the perinatal period	771	8	22.5	8	18.8	7	41.5
Intrauterine hypoxia and birth asphyxia	768	9	19.9	9	17.3	9	34.5
Pneumonia and influenza	480–487	10	16.4	10	12.7	10	33.3
All other causes	Residual	...	340.0	...	269.9	...	696.8

Table F. Infant deaths and mortality rates, by sex, and mortality sex ratios for the 10 leading causes of infant death: United States, 1988

[Rates are number of infant deaths per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	Number		Rate		Ratio male/female	
	Male	Female	Male	Female		
All causes	22,007	16,903	1,099.0	886.3	1.24	
Congenital anomalies	740-759	4,384	3,757	218.9	197.0	1.11
Sudden infant death syndrome	798.0	3,295	2,181	164.6	114.4	1.44
Disorders relating to short gestation and unspecified low birthweight	765	1,859	1,409	92.8	73.9	1.26
Respiratory distress syndrome	769	1,914	1,267	95.6	66.4	1.44
Newborn affected by maternal complications of pregnancy	761	786	625	39.3	32.8	1.20
Accidents and adverse effects	E800-E949	530	406	26.5	21.3	1.24
Newborn affected by complications of placenta, cord, and membranes	762	502	405	25.1	21.2	1.18
Infections specific to the perinatal period	771	481	397	24.0	20.8	1.15
Intrauterine hypoxia and birth asphyxia	768	441	336	22.0	17.6	1.25
Pneumonia and influenza	480-487	381	260	19.0	13.6	1.40
All other causes	Residual	7,434	5,860	371.3	307.3	1.21

Table G. Deaths under 1 year for the 10 leading causes of infant death, by quarter of calendar year: United States, 1988

Cause of death (Ninth Revision International Classification of Diseases, 1975)	Total	Ratio highest/lowest quarter					
		Jan.-March	April-June	July-Sept.	Oct.-Dec.		
All causes	38,910	9,930	9,388	9,444	10,148	1.08	
Congenital anomalies	740-759	8,141	1,927	1,980	2,122	2,112	1.10
Sudden infant death syndrome	798.0	5,476	1,706	1,160	970	1,640	1.76
Disorders relating to short gestation and unspecified low birthweight	765	3,268	755	823	859	831	1.14
Respiratory distress syndrome	769	3,181	766	822	796	797	1.07
Newborn affected by maternal complications of pregnancy	761	1,411	307	377	379	348	1.23
Accidents and adverse effects	E800-E949	936	218	221	270	227	1.24
Newborn affected by complications of placenta, cord, and membranes	762	907	206	229	225	247	1.20
Infections specific to the perinatal period	771	878	213	223	238	204	1.17
Intrauterine hypoxia and birth asphyxia	768	777	215	183	192	187	1.17
Pneumonia and influenza	480-487	641	249	145	111	136	2.24
All other causes	Residual	13,294	3,368	3,225	3,282	3,419	1.06

comparable cause of death. Mortality from this cause has declined rapidly so that only about 8 percent of infant deaths in 1988 were classified as due to Disorders relating to short gestation and unspecified low birthweight (figure 6). Comparability for this cause of death has been affected by changes in cause-of-death classification. The infant comparability ratio for this cause is 0.963 between the Eighth and Ninth Revisions, and 0.868 between the Seventh and Eighth Revisions (25,26).

Infant mortality from Disorders relating to short gestation and unspecified low birthweight declined at a moderate rate of 4.2 percent per year from 1960 to 1967, then at twice that rate, at 8.5 percent per year from 1968 to 1978. Since then the pace of decline from this cause has slowed markedly, to only 2.0 percent per year from 1979 to 1988.

The majority of deaths from Disorders relating to short gestation and unspecified low birthweight occur

within the first few days of life. In 1988, 91.0 percent of deaths from this cause occurred within the first 24 hours after birth, while 97.1 percent occurred within the first 7 days.

A striking differential associated with this cause is the much higher mortality rate for black infants as compared with white infants. Although the rate for white infants has continued to decline in recent years, the rate for black infants has declined very little since 1979. The 1979 rate for black infants was 227.0 infant deaths per 100,000 live births, three times the rate of 75.6 for white infants. In 1988 the rate for black infants was 219.9, nearly four times the rate of 56.7 for white infants.

The mortality sex ratio for Disorders relating to short gestation and unspecified low birthweight was 1.26, almost the same as the ratio of 1.24 for all infant deaths. There was no marked seasonal variation in the number of infant deaths from this cause.

4. Respiratory distress syndrome

Respiratory distress syndrome (ICD-9 No. 769) is a disorder of the newborn characterized by difficult and labored breathing and cyanosis. It occurs most often to low-birth-weight or premature infants and is often related to incomplete lung development at the time of birth. Two types of Respiratory distress syndrome have been identified, Hyaline membrane disease in which a hyaline-like membrane lines the respiratory passages, and idiopathic Respiratory distress syndrome.

With the adoption of ICDA-8 in 1968, a separate cause-of-death category was instituted for Respiratory distress syndrome (RDS). Before 1968 many deaths due to Respiratory distress syndrome were classified under Ill-defined diseases peculiar to early infancy (ICD-7 No. 773). During ICDA-8, Respiratory distress syndrome and Hyaline membrane disease were given two separate classifications, ICDA-8 Nos. 776.2 and 776.1, respectively. With the adoption of ICD-9 in 1979, Hyaline membrane disease was included under the title of Respiratory distress syndrome. For this analysis, the two ICDA-8 categories Respiratory distress syndrome and Hyaline membrane disease are combined to create a category more comparable to the ICD-9 category for Respiratory distress syndrome. For the combined category, the infant comparability ratio between the Eighth and Ninth Revisions is 1.071.

In 1988 there were 3,181 infant deaths from Respiratory distress syndrome (ICD-9 No. 769), the fourth leading cause of infant death. The infant mortality rate from this cause was 81.4 infant deaths per 100,000 live births; RDS accounted for 8.2 percent of all infant deaths in 1988. After an initial increase from 1968 to 1972, which may have been due to changes in reporting of infant deaths from RDS, infant mortality from RDS declined rapidly, by an average of 6.8 percent per year from 1972 to 1978 (figure 6). From 1979 to 1988 infant mortality from RDS continued to decline rapidly, by an average of 7.0 percent per year.

The majority of deaths from RDS occur in the first few days of life. In 1988, 76.5 percent of infant deaths from RDS occurred within the first 7 days of life, and 93.0 percent within the first 27 days.

In 1988 the infant mortality rate from RDS was 142.4 infant deaths per 100,000 live births for black infants, as compared with 70.5 for white infants, resulting in a mortality race ratio of 2.02, very close to the ratio of 2.07 for all causes of infant death combined. RDS was the third leading cause of death for white infants and the fourth leading cause of death for black infants.

Substantially more male than female infants died from RDS. The mortality sex ratio for RDS was 1.44, higher than the ratio of 1.24 for all infant deaths. There were no marked seasonal variations in deaths from RDS.

5. Newborn affected by maternal complications of pregnancy

Effective with the Ninth Revision, a separate cause-of-death category was instituted for Newborn affected by

maternal complications of pregnancy (ICD-9 No. 761). There was no comparable ICDA-8 category, although many deaths currently classified under this category would have previously been classified under the broader category of All other complications of pregnancy and childbirth (ICDA-8 No. 769; see appendix). More than 90 percent of the 1988 deaths from this cause were attributed to complications related to multiple pregnancies, premature rupture of membranes, or incompetent cervix.

In 1988 a total of 1,411 infants died from Newborn affected by maternal complications of pregnancy; this cause accounted for 3.6 percent of all infant deaths in that year. From 1979 to 1988, the infant mortality rate from Newborn affected by maternal complications of pregnancy declined by 22.2 percent, from 46.4 infant deaths per 100,000 live births to 36.1, or by an average rate of 2.8 percent per year. Deaths from Newborn affected by maternal complications of pregnancy were heavily concentrated within the first few days of life; in 1988, 94.2 percent of the infant deaths from this cause occurred within the first 24 hours of life.

In 1988 the mortality race ratio from Newborn affected by maternal complications of pregnancy was 2.64, considerably higher than the ratio of 2.07 for all infant deaths. Slightly more male than female infants died from Newborn affected by maternal complications of pregnancy. The mortality sex ratio was 1.20, very similar to the ratio of 1.24 for all infant deaths. There were no marked seasonal variations in deaths from this cause.

6. Accidents and adverse effects

In 1988, 936 infants died from Accidents and adverse effects (ICD-9 Nos. E800-E949), the sixth leading cause of infant death. The infant mortality rate from Accidents and adverse effects declined from 90.0 infant deaths per 100,000 live births in 1960 to 23.9 in 1988. Infant mortality from Accidents and adverse effects declined slowly, by 2.0 percent per year from 1960 to 1967, and then rapidly, by 6.2 percent per year, from 1968 to 1978. From 1979 to 1988, the rate of decline again slowed to average 2.8 percent per year. Accidents was also the sixth leading cause of infant death in 1960. Mortality from Accidents and adverse effects has been relatively comparable between the Seventh, Eighth, and Ninth Revisions, with infant comparability ratios of 0.935 between the Eighth and Ninth Revisions, and 0.916 between the Seventh and Eighth Revisions.

Unlike most other causes of infant mortality, infant deaths from Accidents and adverse effects are distributed fairly uniformly by age throughout the first year of life (table D). In 1988 the mortality rate from Accidents and adverse effects was 41.8 for black infants, twice the rate of 20.9 for white infants. The mortality sex ratio for Accidents and adverse effects was 1.24, the same as the sex ratio for all causes of infant death combined. There were no marked seasonal variations in infant deaths from this cause.

7. Newborn affected by complications of placenta, cord, and membranes

Effective with the Ninth Revision, a separate cause-of-death category was instituted for Newborn affected by complications of placenta, cord, and membranes (ICD-9 No. 762), which is similar to the combination of Eighth Revision titles Complications of placenta (ICDA-8 No. 770) and Complications of umbilical cord (ICDA-8 No. 771). To facilitate comparison, these two titles are combined for the purposes of trend analysis, resulting in an infant comparability ratio of 1.039 between the Eighth and Ninth Revisions. There was no comparable Seventh Revision category.

In 1988 there were 907 infant deaths from Newborn affected by complications of placenta, cord, and membranes, making it the seventh leading cause of infant death. The infant mortality rate from this cause declined from 85.8 infant deaths per 100,000 live births in 1968 to 23.2 in 1988. From 1968 to 1978, infant mortality from this cause declined very rapidly, by an average of 10.5 percent per year; but the rate of decline slowed markedly to average 2.0 percent per year from 1979 to 1988.

In 1988, 86.0 percent of the deaths from Newborn affected by complications of placenta, cord, and membranes occurred within the first day of life. The mortality rate of 39.9 for black infants was almost twice the rate of 20.2 for white infants, resulting in a mortality race ratio of 1.98, compared with a ratio of 2.07 for all infant deaths. Slightly more males than females died from this cause, resulting in a mortality sex ratio of 1.18, compared with a ratio of 1.24 for all infant deaths. There were no marked seasonal variations in the number of infant deaths for this cause.

8. Infections specific to the perinatal period

The majority of the deaths classified under Infections specific to the perinatal period (ICD-9 No. 771) were due to Septicemia, and the most nearly comparable cause of death under the Eighth Revision was Septicemia (ICDA-8 No. 038). There was no comparable ICD-7 category. The comparability ratio between Infections specific to the perinatal period (ICD-9 No. 771) and Septicemia (ICDA-8 No. 038) was 0.894. In 1988 a total of 878 infants died from Infections specific to the perinatal period, the eighth leading cause of infant death.

After an initial period characterized by little change between 1968 and 1971, the infant mortality rate from this cause increased by 45.9 percent from 1971 to 1976. The rate was relatively stable from 1976 to 1978; since then it has declined by an average of 2.4 percent per year from 28.1 infant deaths per 100,000 live births in 1979 to 22.5 in 1988.

Septicemia is a generalized bacterial infection, which can be caused by a variety of microorganisms, and is documented by a positive blood culture. It is often nosocomial or maternal in origin, and disproportionately affects preterm infants, because of their greater constitutional

frailty, and because they are exposed to more invasive life-saving procedures, carrying an elevated risk of infection. The increase in mortality from Infections specific to the perinatal period from 1971 to 1976 may reflect the increased use of sophisticated life-support techniques for high-risk infants (33).

In 1988 the large majority of deaths from Infections specific to the perinatal period occurred during the neonatal period. More than 60 percent occurred within the first 7 days of life and about 95 percent within the first 27 days.

In 1988 the mortality rate from Infections specific to the perinatal period was 41.5 for black infants, over twice the rate of 18.8 for white infants. The mortality race ratio was 2.21, somewhat higher than the ratio of 2.07 for all causes of infant death combined. The mortality sex ratio was 1.15, compared with a ratio of 1.24 for all infant deaths. There were no marked seasonal variations in infant deaths from this cause.

9. Intrauterine hypoxia and birth asphyxia

Effective with the Ninth Revision, a separate cause-of-death category was established for Intrauterine hypoxia and birth asphyxia (ICD-9 No. 768). There was no comparable ICDA-8 category, although many deaths currently classified to this cause were previously subsumed under the broader category Asphyxia of newborn, unspecified (ICDA-8 No. 776.9).

In 1988 there were 777 infant deaths from Intrauterine hypoxia and birth asphyxia. The infant mortality rate from this cause declined by half, from 39.9 infant deaths per 100,000 live births in 1979 to 19.9 in 1988, or by an average of 7.4 percent per year. Infant deaths from this cause were highly concentrated within the first weeks of life. A total of 75.3 percent of the 1988 infant deaths from this cause occurred within the first 7 days of life, while 93.2 percent occurred within the first 27 days.

The 1988 mortality rate of 34.5 for black infants was twice the rate of 17.3 for white infants, resulting in a mortality race ratio of 1.99, compared with the ratio of 2.07 for all infant deaths. The mortality sex ratio of 1.25 was also very similar to the ratio of 1.24 observed for all infant deaths. There were no marked seasonal variations in infant deaths for this cause.

10. Pneumonia and influenza

In 1988 there were 641 infant deaths from Pneumonia and influenza (ICD-9 Nos. 480-487), the 10th leading cause of infant death. The infant mortality rate from Pneumonia and influenza was 16.4 infant deaths per 100,000 live births. For analytical purposes in this report, the two ICD-7 categories Influenza and pneumonia, except pneumonia of newborn (ICD-7 Nos. 480-483, 490-493) and Pneumonia of newborn (ICD-7 No. 763) have been combined to achieve better comparability. In 1960 this combined category would have been ranked as the fourth leading cause of infant death. After accounting for this

difference, comparability between the Seventh and Eighth Revisions was moderate, with an infant comparability ratio of 1.075 (25). However, comparability between the Eighth and Ninth Revisions was poor, with an infant comparability ratio of 0.747 (26).

Since 1960 the infant mortality rate from Pneumonia and influenza has exhibited the most rapid decline of any of the 10 leading causes of infant death in 1988. Infant mortality from this cause declined by 4.6 percent per year from 1960 to 1967. From 1968 to 1978, infant mortality from Pneumonia and influenza declined very rapidly, by 14.7 percent per year, and from 1979 to 1988, by 7.3 percent per year.

Infant deaths from Pneumonia and influenza are distributed more regularly throughout the first year of life than deaths from all causes combined. In 1988 less than 20 percent of infant deaths from Pneumonia and influenza occurred within the neonatal period, compared with 63.5 percent for all infant deaths. The mortality rate from Pneumonia and influenza was 33.3 for black infants, more than 2.6 times the rate of 12.7 for white infants. Although separate data for black infants are not available for 1960, the mortality rate from Pneumonia and influenza for all other infants (the majority of whom are black) was nearly 4 times the rate for white infants. In 1960 it would have been ranked as the leading cause of death for all other infants, and the fifth leading cause of death for white infants; by 1988 it had dropped to the 10th leading cause of infant death for black and white infants.

In 1988 the mortality sex ratio for Pneumonia and influenza was 1.40, slightly higher than the ratio of 1.24 for all infant deaths. Deaths from Pneumonia and influenza were highly concentrated during the winter months of the year. Well over twice as many infants died from Pneumonia and influenza during the winter months from January to March than during the summer months from July to September.

Other important causes of infant death

In addition to the 10 leading causes of infant mortality in 1988, other causes of infant death have also played an important role in infant mortality in the United States from 1960 to 1988. These include the leading causes of infant death in 1960. Some of the leading causes in 1960 were also included among the 10 leading causes in 1988, and have already been discussed. These include Congenital malformations (ICD-7 Nos. 750-759), Immaturity, unqualified (ICD-7 No. 776), Influenza and pneumonia, except pneumonia of newborn (ICD-7 Nos. 480-493), Pneumonia of the newborn (ICD-7 No. 763), and Accidents (ICD-7 Nos. E800- E962) (see table B and appendix). Another leading cause in 1960—Immaturity with mention of any other subsidiary condition (ICD-7 No. 774)—has no comparable Eighth or Ninth Revision category because of changes between the Seventh and Eighth Revisions in the rules for coding this cause of death.

Beginning in the Eighth Revision under modification Rule 6—Trivial conditions—if immaturity is reported along with another condition, the other condition is selected as the underlying cause of death in preference to immaturity.

The remaining 4 of the 10 leading causes of infant death in 1960—Postnatal asphyxia and atelectasis (ICD-7 No. 762), Birth injuries (ICD-7 Nos. 760, 761), Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn (ICD-7 Nos. 543, 571, 572), and Hemolytic disease of newborn (ICD-7 No. 770) are discussed. In addition, Diseases of heart is also discussed because of its numerical importance, even though it is not a rankable cause of death for infants.

Postnatal asphyxia and atelectasis

In 1960 the leading cause of infant death was Postnatal asphyxia and atelectasis (ICD-7 No. 762), which accounted for 19,539, or 17.6 percent of the 110,873 infant deaths reported for that year. The most nearly comparable Ninth Revision category is Intrauterine hypoxia and birth asphyxia (ICD-9 No. 768, see appendix), which was discussed previously as the ninth leading cause of infant mortality in 1988. However, Postnatal asphyxia and atelectasis is a much broader category that includes not only asphyxia associated with childbirth, but also apnea, asphyxia, and pulmonary atelectasis occurring at any time within the first year of life. The infant mortality rate from Postnatal asphyxia and atelectasis declined by an average of 3.3 percent per year from 458.9 infant deaths per 100,000 live births in 1960 to 363.1 in 1967. The most nearly comparable Eighth Revision category, Asphyxia of newborn, unspecified (ICDA-8 No. 776.9) declined rapidly by an average of 11.3 percent per year between 1968 and 1978. The decline in Intrauterine hypoxia and birth asphyxia has already been discussed. While Postnatal asphyxia and atelectasis was the leading cause of infant death in 1960, Intrauterine hypoxia and birth asphyxia was ranked ninth in 1988. This shift in rank is due to the much broader classification category used in 1960, as well as to declines in infant mortality from this cause that were more rapid than the decline for all causes of infant death combined.

Birth injuries

In 1960, 10,158 infants died from Birth injuries (ICD-7 Nos. 760-761), the fourth leading cause of infant death. The infant mortality rate from Birth injuries declined by an average of 3.5 percent per year from 238.6 infant deaths per 100,000 live births in 1960 to 186.3 in 1967. The most nearly comparable Eighth Revision categories were Difficult labor with mention of birth injury (ICDA-8 Nos. 764-768(0-3)) combined with Birth injury without mention of cause (ICDA-8 No. 772), although comparability with this combination of causes was poor (see appendix). The infant mortality rate from this cause declined slowly, by 1.2 percent per year from 1968 to 1978. The infant

mortality rate from Birth trauma (ICD-9 No. 767), the most nearly comparable Ninth Revision category, declined rapidly, by an average of 17.9 percent per year, from 32.3 in 1979 to 5.5 in 1988. Birth trauma was the 14th leading cause of infant death in 1988. This shift is related to the broader classification category used in 1960 as well as to the very rapid decline in mortality from this cause from 1979 to 1988.

Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn

In 1960, 2,622 infants died from Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn (ICD-7 Nos. 543, 571, and 572), the eighth leading cause of infant death in that year. In this category, the term diarrhea of newborn refers to diarrhea of infants under 28 days of age. The majority of deaths in this category are in fact due to diarrhea of infants between 28 days and 11 months of age. The infant mortality rate from this cause declined rapidly, by an average of 10.1 percent per year, from 61.6 infant deaths per 100,000 live births in 1960 to 29.3 in 1967.

Comparability ratios make it possible to examine trends for the broader cause-of-death category Certain gastrointestinal diseases, of which Gastritis, duodenitis, enteritis, and colitis comprise a large portion. The infant mortality rate from Certain gastrointestinal diseases declined rapidly by an average of 9.9 percent per year from 75.7 in 1960 to 36.6 in 1967. The rate of decline slowed markedly to average 3.0 percent per year from 1968 to 1978. A major break in comparability for Certain gastrointestinal diseases occurred between the Eighth and Ninth Revisions, with the Ninth Revision category being much less inclusive (see appendix). The infant mortality rate for Certain gastrointestinal diseases (ICD-9 Nos. 008-009, 535,555-558) declined by an average of 7.5 percent per year, from 9.7 in 1979 to 4.8 in 1988.

Hemolytic disease of newborn

Hemolytic disease of newborn (ICD-7 No. 770), the ninth leading cause of infant death in 1960, refers primarily to erythroblastosis fetalis and related conditions caused by incompatibility of blood types between an Rh negative mother and an Rh positive fetus. The infant mortality rate from this cause declined by an average of 5.5 percent per year from 50.4 infant deaths per 100,000 live births in 1960 to 33.8 in 1967. The rate of decline increased to 13.5 percent per year from 1968 to 1978, when the infant mortality rate fell from 27.2 to 6.4. A major break in comparability for Hemolytic disease of newborn occurred between the Eighth and Ninth Revisions with the Ninth Revision category—Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice—being much less inclusive (see appendix). The infant mortality rate for this less inclusive category declined rapidly by 8.6 percent per year, from 2.7 in 1979 to 1.2 in 1988. This serious disease has been largely controlled through improved medical technol-

ogy; deaths from Hemolytic disease of newborn due to isoimmunization and other perinatal jaundice are now relatively rare.

Diseases of heart

Despite its numerical importance, Diseases of heart has not been considered a rankable cause of death for infants, because it was not included in the tabulation list for infant causes of death (see appendix). It is of note that a large number of these deaths are assigned to vague cardiovascular subcategories such as Cardiac arrest (ICD-9 No. 427.5) or Heart failure (ICD-9 No. 428). Of the 871 infant deaths from Diseases of heart in 1988, half were coded to either Cardiac arrest (394 infant deaths) or Heart failure (42 infant deaths), neither category of which provides useful information as to the underlying cause of death of the infant. The remaining 435 infant deaths from Diseases of heart were classified to a variety of subcategories, including 196 deaths due to Diseases of pulmonary circulation (ICD-9 Nos. 415-417) and 106 deaths due to Cardiomyopathy (ICD-9 No. 425). Had this category been considered rankable, Diseases of heart would have been the ninth leading cause of infant death in 1988.

Infant mortality from Diseases of heart has increased substantially from 1960-88. From 1960-67, the infant mortality rate from this cause increased rapidly by an average of 8.7 percent per year from 6.4 to 11.5 infant deaths per 100,000 live births. From 1968-78 the rapid increase continued, averaging 7.8 percent per year from 11.9 in 1968 to 25.3 in 1978. From 1979 to 1988, the infant mortality rate from Diseases of heart increased slowly, by an average of 1.3 percent per year, from 19.8 in 1979 to 22.3 in 1988. Comparability for this cause of death was fair between the Eighth and Ninth Revisions, with an infant comparability ratio of 0.822, and good between the Seventh and Eighth Revisions, with a ratio of 1.025.

Much of the increase in infant mortality from Diseases of heart is due to increases in the number of infant deaths assigned to the vague subcategory cardiac arrest. Although cardiac arrest did not have a unique ICD number in the Seventh Revision, the infant mortality rate for Functional diseases of heart (ICD-7 No. 433) to which cardiac arrest is indexed increased nearly five-fold, from 1.4 in 1960 to 6.5 in 1967. Although mortality for other subcomponents of Diseases of heart also increased or decreased from 1960-67, this large increase for Functional diseases of heart can account for all of the increase in infant mortality from Diseases of heart from 1960-67. The infant mortality rate from Cardiac arrest (ICDA-8 No. 427.2) increased from 4.2 in 1968 to 14.0 in 1978. This increase alone accounts for almost three-quarters (73.1 percent) of the large increase in infant mortality from Diseases of heart from 1968 to 1978. The infant mortality rate from Cardiac arrest (ICD-9 No. 427.5) increased from 9.9 in 1979 to 10.1 in 1988, thus accounting for only 8 percent of the much smaller increase in infant mortality from Diseases of heart from 1979 to 1988.

Other subcategories of Diseases of heart also contributed to the increase in infant mortality from this cause from 1968 to 1988. From 1968 to 1978 the infant mortality rate from Chronic diseases of pericardium, nonrheumatic (ICDA-8 No. 423) increased from 0.1 to 2.2 infant deaths per 100,000 live births, while the infant mortality rate from

Pulmonary heart disease (ICDA-8 No. 426) increased from 1.0 to 2.7. Similarly, from 1979 to 1988, the infant mortality rate from Diseases of pulmonary circulation (ICD-9 Nos. 415-417) increased from 1.8 to 3.9, contributing to the overall increase in infant mortality from Diseases of heart during that period.

Discussion

Infant mortality in the United States has declined approximately 10 fold since the beginning of this century, from an estimated 100 infant deaths per 1,000 live births in 1900 to 10.0 in 1988. Despite these reductions, the international ranking of the United States in infant mortality has fallen from 12th in 1960 (34) to 24th in 1987 (6). The U.S. infant mortality rate of 10.1 in 1987 was about twice that of number one ranked Japan (6). The recent slowing in the rate of decline in infant mortality during the 1980's has also generated concern. In addition, the approximate twofold differential in mortality rates for black compared with white infants has persisted and even increased in recent years.

Trends by age and race

Between 1960 and 1988 infant mortality in the United States declined by about 60 percent, from 26.0 infant deaths per 1,000 live births in 1960 to 10.0 in 1988, though the rate of decline was not constant throughout the period. Initially, the rate of decline was slow from 1960 to 1965, then rapid from 1965 to 1981, and then moderately slow from 1981 to 1988.

Initially, postneonatal mortality declined more rapidly than neonatal mortality, but after 1970 neonatal mortality declined more rapidly. These different rates of decline resulted in a shift in the distribution of infant deaths by age, with a smaller percentage (63.5) occurring in the neonatal period in 1988, than in 1960 (71.9 percent).

There were also important differences in mortality trends for black and white infants. Infant mortality rates declined markedly from 1960 to 1988 for both major race groups. From 1960 to 1971, infant mortality between the two major race groups converged. The mortality race ratio declined from 1.93 in 1960 to 1.77 in 1971. This was due to a more rapid decline in black than white postneonatal mortality during the late 1960's and early 1970's.

Beginning in 1971 the relative gain in infant mortality for the black population stopped, and the race ratio began to widen. This resulted from a sharp slowdown, then cessation, in the relative improvements in black postneonatal mortality, coupled with an increase in the rate of decline in white neonatal mortality. In 1988 the mortality rate for black infants was 17.6, slightly more than twice the rate of 8.5 for white infants, yielding a mortality race ratio of 2.07, compared with 1.77 in 1971, and 1.93 in 1960.

It is interesting to note the recent crossover in neonatal and postneonatal mortality race ratios since 1984 (figure 5). From 1960-84 the postneonatal mortality race ratio was higher and the neonatal mortality race ratio lower than the overall infant mortality race ratio. However, in 1985, the two ratios crossed over, so that the neonatal mortality race ratio was higher, and the postneonatal mortality race ratio lower than the overall infant ratio. The neonatal mortality race ratio of 2.13 in 1987 and 1988 was the highest ratio recorded since infant mortality statistics began to be collected nationally (17). The recent increase in low birth weight for black infants from 12.5 percent in 1986 to 13.0 percent in 1988 (9,35) may explain in part the increase in the neonatal mortality race ratio from 1986 to 1988 (see discussion below).

Causes of death

Since 1960 major changes have occurred in the cause-of-death profile for infants. These result from a combination of factors including changes in medical care, socio-economic conditions, and public health practices. Nearly all of the leading causes of infant mortality have declined since 1960; the most dramatic reductions were during the Eighth Revision (from 1968 to 1978), when mortality from all causes of infant death combined also declined most rapidly.

Infant mortality rates declined most rapidly for infectious diseases such as Pneumonia and influenza and Certain gastrointestinal diseases, thus continuing the declines in infectious diseases that began early in this century. This has been attributed in part to improvements in public health infrastructure (for example, piped water and sewer), housing, and medicine (19). Although mortality from most infectious diseases declined rapidly from 1960 to 1988, an exception to this trend is for Infections specific to the perinatal period, the majority of which are Septicemia deaths. The increase in infant mortality from this cause from 1971-76 may reflect the increasingly invasive treatment of very ill or premature infants in neonatal intensive care units (33). Since 1977 the infant mortality rate from Infections specific to the perinatal period has declined slowly.

Infant mortality rates also declined very rapidly for Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice. This cause of death has been

reduced largely through the advent of prophylaxis from Rh sensitization through the use of Rh_o(D) immune globulin (36). Deaths from this cause are now relatively rare.

The rapid decline in infant mortality from Disorders relating to short gestation and unspecified low birthweight from 1968 to 1978 may have resulted from the increased treatment of premature and low-birth-weight infants in neonatal intensive care units. However, the rate of decline in infant mortality from this cause slowed markedly from 1979 to 1988, suggesting that much of the decline in mortality from this cause made possible by the new medical technology had already taken place. In contrast, mortality from Respiratory distress syndrome, another cause of infant death closely associated with low birth weight, continued to decline rapidly during the 1980's. It is not clear that any one therapeutic intervention in the care of these infants can be singled out as responsible for this decline.

Infant mortality from perinatal conditions such as Newborn affected by complications of placenta, cord, and membranes, Intrauterine hypoxia and birth asphyxia, and Birth trauma all declined more rapidly than infant mortality for all causes combined. Improvements in obstetric techniques during the period 1960 to 1988 may have contributed to the rapid declines in infant mortality from these causes (33). Infant mortality from Newborn affected by maternal complications of pregnancy declined at a slightly slower rate than mortality from all causes of death combined from 1979 to 1988.

Infant mortality from Accidents and adverse effects also declined more rapidly than mortality for all causes of death combined. This decrease may be related to recent safety regulation of products designed for infant use (that is, clothes, toys, and furniture), mandatory car seat use, and public education in accident prevention (37,38).

Infant mortality declined more slowly for some causes of infant death, such as Infections specific to the perinatal period (discussed above), Sudden infant death syndrome, and Congenital anomalies. Because the underlying causes of Sudden infant death syndrome are poorly understood, it has been difficult to design effective measures to combat this disease. Although genetic and environmental causes play a role in the etiology of congenital anomalies, the majority of congenital anomalies are of unknown origin, and thus have proven less responsive to prevention efforts than some other causes of infant death (39).

In contrast to most other causes of infant death, infant mortality from Diseases of heart increased from 1968 to 1988. The reason for this is not known, but may be related to reporting changes rather than to real increases in risk.

The cause-of-death profile of infant mortality in 1988 reflects both continuity and change from that of a generation earlier. This is the result of differences in the rate of decline in infant mortality for specific causes of death. Because of major changes in comparability between 1960 and 1988 (and because only 4 of the 10 leading causes of infant death in 1988 can be directly traced back to 1960), it is possible to comment only broadly on the degree of contribution of individual causes of infant death to the

overall decline in infant mortality during the period. However, by far, the most important contributing causes to the overall decline in infant mortality from 1960 to 1988 were Pneumonia and influenza, hypoxia and asphyxia-related causes, and immaturity and low-birth-weight-related causes.

Differentials in the leading causes of infant death in 1988 by age, sex, and season of the year

There were substantial differences in the distribution of the 10 leading causes of infant death by age, sex, and season of the year. For some causes of infant death, the vast majority of deaths occur very early within the first few days of life, while for others, deaths are more uniformly distributed throughout the first year. In 1988 more than 9 out of 10 infant deaths occurred within the first day of life for the causes Disorders relating to short gestation and unspecified low birthweight, and Newborn affected by maternal complications of pregnancy. More than 9 out of 10 infant deaths occurred within the first 27 days of life for Respiratory distress syndrome, Newborn affected by complications of placenta, cord, and membranes, Intrauterine hypoxia and birth asphyxia, and Infections specific to the perinatal period. Conversely, more than 8 out of 10 infant deaths occurred during the postneonatal period for Sudden infant death syndrome, Accidents and adverse effects, and Pneumonia and influenza.

There is an association between early death and low birth weight. Many of the causes of infant death with high proportions of neonatal deaths occur largely to low-birth-weight infants. Conversely, many causes with high proportions of postneonatal deaths occur more often to normal-birth-weight infants (40).

Although mortality for male infants was 24 percent higher on the average than for female infants in 1988, there was some variation in the mortality sex ratio for different causes of death. Substantially more male than female infants die from Respiratory distress syndrome and Sudden infant death syndrome (mortality sex ratios of 1.44). Only slightly more male than female infants die from Congenital anomalies (1.11).

Mortality from most causes of infant death is distributed fairly regularly throughout the year. However, a few causes exhibit marked seasonal variations. About twice as many infants die from Pneumonia and influenza during the winter as during the summer months, as the incidence of these diseases increases markedly during the winter months. Deaths from Sudden infant death syndrome also exhibit a marked seasonal pattern, with many more infants dying during the fall and winter months. As the causes of SIDS are not fully understood, the causes of its marked seasonal pattern have not been firmly established.

Differentials in the leading causes of infant death in 1988 by race

The twofold differential in mortality between black and white infants reflects large variations by cause of

Table H. Percent contribution of the 10 leading causes of infant death to the difference between black and white infant mortality rates: United States, 1988

[Rates are number of infant deaths per 100,000 live births in specified group]

Cause of death (Ninth Revision International Classification of Diseases, 1975)	Rate		Difference in rate (black-white)	Percent contribution to difference
	Black	White		
All causes	1,762.0	851.1	910.9	100.0
Congenital anomalies	740-759	209.8	211.5	-1.7
Sudden infant death syndrome	798.0	226.2	123.8	102.4
Disorders relating to short gestation and unspecified low birthweight	765	219.9	56.7	163.2
Respiratory distress syndrome	769	142.4	70.5	71.9
Newborn affected by maternal complications of pregnancy:	761	75.7	28.7	47.0
Accidents and adverse effects.	E800-E949	41.8	20.9	20.9
Newborn affected by complications of placenta, cord, and membranes	762	39.9	20.2	19.7
Infections specific to the perinatal period	771	41.5	18.8	22.7
Intrauterine hypoxia and birth asphyxia	768	34.5	17.3	17.2
Pneumonia and influenza	480-487	33.3	12.7	20.6
All other causes	Residual	696.8	269.9	426.9
				46.9

death. For some causes of infant death, mortality is nearly the same for black and white infants; for other causes of death, the differences are much greater than twofold. For only 1 of the 10 leading causes of infant mortality in 1988—Congenital anomalies—is the mortality rate for black infants close to that for white infants, with a mortality race ratio of 0.99. A wide gap exists between this and the next closest ratio, which is 1.83 for SIDS.

Most causes of infant death exhibit mortality race ratios close to the ratio of 2.07 for all causes of infant death combined. However, for a few causes the ratios are much higher. Black infants are 2.6 times more likely to die from Pneumonia and influenza and from Newborn affected by maternal complications of pregnancy than white infants. For Disorders relating to short gestation and unspecified low birthweight, black infants are 3.9 times as likely to die from this cause as white infants, the highest ratio among the 10 leading causes of infant death in 1988. This may reflect the much higher incidence of low birth weight for black infants compared with white infants (discussed below). The higher black infant mortality rates from Pneumonia and influenza may reflect differentials in access to medical care and in environmental exposures.

The difference in mortality between black and white infants in 1988 can be examined by assessing the relative contribution of the leading causes of infant death to the overall differential. Four leading causes of infant death taken together account for 42.2 percent of the difference in mortality rates between black and white infants (table H). One cause alone—Disorders relating to short gestation and unspecified low birthweight—accounts for the greatest share of the difference (17.9 percent). The other leading causes in order of their relative contribution are Sudden infant death syndrome (11.2 percent), Respiratory distress syndrome (7.9 percent), and Newborn affected by maternal complications of pregnancy (5.2 percent). If black infant mortality rates for these four causes were equal to the white rates, the overall mortality rate for black infants would have decreased by 22 percent, from

17.6 to 13.8 infant deaths per 1,000 live births. The remaining leading causes each account for less than 3 percent of the difference between black and white infant mortality rates. A large share of the difference between black and white infant mortality (46.9 percent) is explained by differences in other causes of death not included in the 10 leading causes.

Associated factors

Other variables not presented in this report may explain some of the trends and differentials in infant mortality, in particular the slowing in the rate of decline in infant mortality in the United States since 1980, and the persistent and increasing racial disparities in infant mortality. Prominent among these are low birth weight, or the birth of an infant weighing less than 2,500 grams or 5½ pounds, which has been identified as one of the most important risk factors for infant death (15). More than 60 percent of all infant deaths in the United States occur to the less than 7 percent of infants born at low birth weight (41). Infant mortality rates for low-birth-weight infants (those weighing less than 2,500 grams at birth) are more than 20 times those for normal-birth-weight infants (those weighing 2,500 grams or more at birth) (41). The percent of low-birth-weight births increased from 7.7 percent in 1960 to 8.3 percent in 1965 and 1966, thereafter declining to 6.8 percent in 1980 (35,42). However, the percent of low-birth-weight births plateaued from 1980 to 1986, and then increased to 6.9 percent in 1987 and 1988, primarily due to increases in low birth weight for black infants (9,35). Because the percent of low-birth-weight births has actually increased slightly since 1980, the continued, but slowing decline in infant mortality since 1980 is entirely attributable to reductions in birth weight-specific infant mortality rates. The plateauing and recent increase in the percent of low-birth-weight births in the United States has probably had a major impact on the recent slowing in the rate of decline in infant mortality during the 1980's.

In recent years the gap between black and white low-birth-weight rates has been widening. From 1985 to 1988 the incidence of black low-birth-weight births increased from 12.4 to 13.0 percent, while low-birth-weight rates for white infants were the same in 1988 as in 1985, 5.6 percent (9,35). Although racial differences in mortality from predominantly postneonatal causes of infant death such as SIDS, Accidents and adverse effects, and Pneumonia and influenza remain important, mortality race ratios were highest in 1988 for those causes of infant death closely associated with low birth weight. In addition, three out of the four leading causes of infant death that contributed the most to the gap between black and white infant mortality, namely Disorders relating to short gestation and unspecified low birthweight, Respiratory distress syndrome, and Newborn affected by maternal complications of pregnancy, occurred mainly to low-birth-weight infants (40). Large differences by race in the incidence of low birth weight contribute substantially to black-white differentials in infant mortality (43,44). The recent increase in the incidence of low birth weight for black infants may explain in part the recent divergence in mortality rates between black and white infants in the United States.

A variety of socioeconomic and medical variables have an impact on racial differences in infant mortality and low birth weight in the United States. Infants of poor mothers are reported to be at increased risk of infant death (1,45). In 1985 almost three times as many black as white children (44 percent, as compared with 16 percent) were living in families with incomes below the poverty level (46). In part because of income differentials, black women in the United States were less likely to have health insurance that covers the costs of pregnancy and childbirth (2,14) and thus were less likely to obtain adequate prenatal care during pregnancy (9). Other variables associated with elevated risks of infant mortality and low birth weight, which are higher among black than white mothers, are unmarried status, lower educational level, and teenage childbearing (3,4,15).

Although the decline in infant mortality in the United States from 1960 to 1988 has been substantial, it has not kept pace with the declines experienced by many other industrialized countries (6). The recent slowing in the rate of decline in infant mortality during the 1980's, the plateauing and recent increase in the percent of low-birth-weight births, and the persistent and increasing differences in the risk of death between black and white infants have generated national concern.

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Symbols

- Data not available
 - . . . Category not applicable
 - Quantity zero
 - 0.0 Quantity more than zero but less than 0.05
 - Z Quantity more than zero but less than 500 where numbers are rounded to thousands
 - * Figure does not meet standard of reliability or precision (estimate is based on fewer than 20 births in numerator or denominator)
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Table 1. Infant, neonatal, and postneonatal deaths by race and sex: United States, 1960-88

[Beginning 1970 excludes deaths of nonresidents of the United States: see appendix. Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days-11 months) deaths in specified group]

Age and year	All races ¹			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Infant deaths									
1988	38,910	22,007	16,903	25,925	14,878	11,047	11,840	6,503	5,337
1987	38,408	21,798	16,610	25,810	14,763	11,047	11,461	6,391	5,070
1986	38,891	22,224	16,667	26,564	15,284	11,280	11,204	6,305	4,899
1985	40,030	22,958	17,072	27,864	16,218	11,646	11,063	6,127	4,936
1984	39,580	22,359	17,221	27,608	15,805	11,803	10,881	5,961	4,920
1983	40,627	22,969	17,658	28,301	16,131	12,170	11,242	6,259	4,983
1982	42,401	24,073	18,328	29,659	16,965	12,694	11,642	6,485	5,157
1981	43,305	24,452	18,853	30,478	17,411	13,067	11,757	6,451	5,306
1980	45,526	25,804	19,722	31,880	18,290	13,590	12,603	6,958	5,645
1979	45,665	25,980	19,685	32,079	18,502	13,577	12,586	6,933	5,653
1978	45,945	26,088	19,857	32,212	18,423	13,789	12,747	7,099	5,648
1977	46,975	26,875	20,100	33,199	19,229	13,970	12,863	7,141	5,722
1976	48,265	27,320	20,945	34,163	19,548	14,615	13,142	7,255	5,887
1975	50,525	28,812	21,713	36,173	20,919	15,254	13,409	7,353	6,056
1974	52,776	30,305	22,471	38,249	22,209	16,040	13,584	7,572	6,012
1973	55,581	31,986	23,595	40,239	23,414	16,825	14,411	8,043	6,368
1972 ²	60,182	34,710	25,472	43,460	25,422	18,038	15,738	8,710	7,028
1971	67,981	39,098	28,883	49,842	28,954	20,888	17,131	9,535	7,596
1970	74,667	42,847	31,820	54,876	31,725	23,151	18,687	10,511	8,176
1969	75,073	43,280	31,793	55,108	32,158	22,950	18,882	10,522	8,360
1968	76,263	44,026	32,237	55,902	32,735	23,167	19,219	10,640	8,579
1967	79,028	45,442	33,586	57,533	33,565	23,968	20,372	11,236	9,136
1966	85,516	49,173	36,343	61,749	36,010	25,739	22,427	12,429	9,998
1965	92,866	53,419	39,447	67,198	39,098	28,100	24,230	13,507	10,723
1964	99,783	57,348	42,435	72,728	42,211	30,517	25,721	14,357	11,364
1963 ³	103,390	59,734	43,656	73,727	42,969	30,758	24,824	13,919	10,905
1962 ³	105,479	60,939	44,540	75,812	44,270	31,542	24,911	13,905	11,006
1961	107,956	62,126	45,836	80,781	46,989	33,792	25,573	14,242	11,331
1960	110,873	63,936	46,937	82,479	48,063	34,416	26,691	14,912	11,779
Neonatal deaths									
1988	24,690	13,911	10,779	16,346	9,296	7,050	7,695	4,263	3,432
1987	24,627	13,872	10,755	16,448	9,308	7,140	7,520	4,190	3,330
1986	25,212	14,274	10,938	17,256	9,824	7,432	7,297	4,096	3,201
1985	26,179	14,948	11,231	18,233	10,536	7,697	7,340	4,075	3,265
1984	25,691	14,400	11,291	18,058	10,240	7,818	7,002	3,811	3,191
1983	26,507	14,949	11,558	18,603	10,565	8,038	7,277	4,049	3,228
1982	28,335	15,983	12,352	19,959	11,325	8,634	7,744	4,293	3,451
1981	29,121	16,383	12,738	20,592	11,707	8,885	7,900	4,339	3,561
1980	30,618	17,252	13,366	21,686	12,355	9,331	8,303	4,582	3,721
1979	30,980	17,539	13,441	22,141	12,696	9,445	8,270	4,528	3,742
1978	31,618	18,014	13,604	22,482	12,867	9,615	8,534	4,802	3,732
1977	32,860	18,766	14,094	23,540	13,601	9,939	8,749	4,849	3,900
1976	34,587	19,546	15,041	24,798	14,160	10,638	9,217	5,075	4,142
1975	36,416	20,827	15,589	26,478	15,350	11,128	9,371	5,135	4,236
1974	38,738	22,330	16,408	28,692	16,718	11,974	9,475	5,293	4,182
1973	40,664	23,535	17,129	30,201	17,647	12,554	9,898	5,558	4,340
1972 ²	44,432	25,768	18,664	32,844	19,296	13,548	10,984	6,108	4,876
1971	50,496	29,232	21,264	38,025	22,164	15,861	11,848	6,684	5,164
1970	56,279	32,487	23,792	42,563	24,725	17,838	13,028	7,371	5,657
1969	56,085	32,675	23,410	42,408	24,918	17,490	12,995	7,363	5,632
1968	56,456	32,931	23,525	42,904	25,309	17,595	12,885	7,245	5,640
1967	58,127	33,743	24,384	43,890	25,797	18,093	13,573	7,563	6,010
1966	61,941	35,948	25,993	46,717	27,410	19,307	14,471	8,119	6,352
1965	66,419	38,507	27,912	50,242	29,346	20,896	15,401	8,708	6,693
1964	72,026	41,792	30,234	54,593	31,933	22,660	16,688	9,425	7,263
1963 ³	74,648	43,565	31,083	55,477	32,608	22,869	15,676	8,857	6,819
1962 ³	76,346	44,500	31,846	57,219	33,687	23,532	15,833	8,874	6,959
1961	78,482	45,580	32,902	60,982	35,748	25,234	16,573	9,318	7,255
1960	79,733	46,290	33,443	62,085	36,331	25,754	16,764	9,450	7,314

Table 1. Infant, neonatal, and postneonatal deaths by race and sex: United States, 1960–88—Con.

[Beginning 1970 excludes deaths of nonresidents of the United States; see appendix. Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group]

Age and year	All races ¹			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Postneonatal deaths									
1988	14,220	8,096	6,124	9,579	5,582	3,997	4,145	2,240	1,905
1987	13,781	7,926	5,855	9,362	5,455	3,907	3,941	2,201	1,740
1986	13,679	7,950	5,729	9,308	5,460	3,848	3,907	2,209	1,698
1985	13,851	8,010	5,841	9,631	5,682	3,949	3,723	2,052	1,671
1984	13,889	7,959	5,930	9,550	5,565	3,985	3,879	2,150	1,729
1983	14,120	8,020	6,100	9,698	5,566	4,132	3,965	2,210	1,755
1982	14,066	8,090	5,976	9,700	5,640	4,060	3,898	2,192	1,706
1981	14,184	8,069	6,115	9,886	5,704	4,182	3,857	2,112	1,745
1980	14,908	8,552	6,356	10,194	5,935	4,259	4,300	2,376	1,924
1979	14,685	8,441	6,244	9,938	5,806	4,132	4,316	2,405	1,911
1978	14,327	8,074	6,253	9,730	5,556	4,174	4,213	2,297	1,916
1977	14,115	8,109	6,006	9,659	5,628	4,031	4,114	2,292	1,822
1976	13,678	7,774	5,904	9,365	5,388	3,977	3,925	2,180	1,745
1975	14,109	7,985	6,124	9,695	5,569	4,126	4,038	2,218	1,820
1974	14,038	7,975	6,063	9,557	5,491	4,066	4,109	2,279	1,830
1973	14,917	8,451	6,466	10,038	5,767	4,271	4,513	2,485	2,028
1972 ²	15,750	8,942	6,808	10,616	6,126	4,490	4,754	2,602	2,152
1971	17,485	9,866	7,619	11,817	6,790	5,027	5,283	2,851	2,432
1970	18,388	10,360	8,028	12,313	7,000	5,313	5,659	3,140	2,519
1969	18,988	10,605	8,383	12,700	7,240	5,460	5,887	3,159	2,728
1968	19,807	11,095	8,712	12,998	7,426	5,572	6,334	3,395	2,939
1967	20,901	11,699	9,202	13,643	7,768	5,875	6,799	3,673	3,126
1966	23,575	13,225	10,350	15,032	8,600	6,432	7,956	4,310	3,646
1965	26,447	14,912	11,535	16,956	9,752	7,204	8,829	4,799	4,030
1964	27,757	15,556	12,201	18,135	10,278	7,857	9,033	4,932	4,101
1963 ³	28,742	16,169	12,573	18,250	10,361	7,889	9,148	5,062	4,086
1962 ³	29,133	16,439	12,694	18,593	10,583	8,010	9,078	5,031	4,047
1961	29,474	16,540	12,934	19,799	11,241	8,558	9,000	4,924	4,076
1960	31,140	17,646	13,494	20,394	11,732	8,662	9,927	5,462	4,465

¹Includes races other than white and black.

²Deaths based on a 50-percent sample.

³Figures by race exclude data for residents of New Jersey; see appendix.

Table 2. Infant, neonatal, and postneonatal mortality rates by race and sex: United States, 1960–88

[Beginning 1970 excludes deaths of nonresidents of the United States; see appendix. Rates are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths per 1,000 live births in specified group]

Age and year	All races ¹			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Infant mortality rate									
1988	10.0	11.0	8.9	8.5	9.5	7.4	17.6	19.0	16.1
1987	10.1	11.2	8.9	8.6	9.6	7.6	17.9	19.6	16.0
1986	10.4	11.5	9.1	8.9	10.0	7.8	18.0	20.0	16.0
1985	10.6	11.9	9.3	9.3	10.6	8.0	18.2	19.9	16.5
1984	10.8	11.9	9.6	9.4	10.5	8.3	18.4	19.8	16.9
1983	11.2	12.3	10.0	9.7	10.8	8.6	19.2	21.1	17.2
1982	11.5	12.8	10.2	10.1	11.2	8.9	19.6	21.5	17.7
1981	11.9	13.1	10.7	10.5	11.7	9.2	20.0	21.7	18.3
1980	12.6	13.9	11.2	11.0	12.3	9.6	21.4	23.3	19.4
1979	13.1	14.5	11.6	11.4	12.8	9.9	21.8	23.7	19.8
1978	13.8	15.3	12.2	12.0	13.4	10.6	23.1	25.4	20.8
1977	14.1	15.8	12.4	12.3	13.9	10.7	23.6	25.9	21.3
1976	15.2	16.8	13.6	13.3	14.8	11.7	25.5	27.8	23.2
1975	16.1	17.9	14.2	14.2	15.9	12.3	26.2	28.3	24.0
1974	16.7	18.7	14.6	14.8	16.8	12.8	26.8	29.4	24.1
1973	17.7	19.9	15.4	15.8	17.9	13.6	28.1	30.9	25.2
1972 ²	18.5	20.8	16.0	16.4	18.6	14.0	29.6	32.4	26.8
1971	19.1	21.4	16.7	17.1	19.3	14.7	30.3	33.3	27.3
1970	20.0	22.4	17.5	17.8	20.0	15.4	32.6	36.2	29.0
1969	20.9	23.4	18.1	18.4	20.9	15.8	34.8	38.3	31.1
1968	21.8	24.5	18.9	19.2	21.9	16.4	36.2	39.6	32.7
1967	22.4	25.2	19.6	19.7	22.4	16.9	37.5	41.0	33.9
1966	23.7	26.6	20.6	20.6	23.5	17.7	40.2	44.0	36.2
1965	24.7	27.7	21.5	21.5	24.4	18.5	41.7	45.9	37.4
1964	24.8	27.8	21.6	21.6	24.4	18.6	42.3	46.8	37.8
1963 ³	25.2	28.4	21.9	22.2	25.1	19.0	42.8	47.3	38.1
1962 ³	25.3	28.6	21.9	22.3	25.4	19.1	42.6	47.1	38.1
1961	25.3	28.4	22.0	22.4	25.4	19.3	41.8	46.2	37.5
1960	26.0	29.3	22.6	22.9	26.0	19.6	44.3	49.1	39.4
Neonatal mortality rate									
1988	6.3	6.9	5.7	5.4	5.9	4.8	11.5	12.5	10.4
1987	6.5	7.1	5.8	5.5	6.1	4.9	11.7	12.9	10.5
1986	6.7	7.4	6.0	5.8	6.4	5.1	11.7	13.0	10.5
1985	7.0	7.8	6.1	6.1	6.9	5.3	12.1	13.2	10.9
1984	7.0	7.7	6.3	6.2	6.8	5.5	11.8	12.7	10.9
1983	7.3	8.0	6.5	6.4	7.1	5.7	12.4	13.6	11.2
1982	7.7	8.5	6.9	6.8	7.5	6.0	13.1	14.3	11.8
1981	8.0	8.8	7.2	7.1	7.8	6.3	13.4	14.6	12.3
1980	8.5	9.3	7.6	7.5	8.3	6.6	14.1	15.3	12.8
1979	8.9	9.8	7.9	7.9	8.8	6.9	14.3	15.5	13.1
1978	9.5	10.5	8.4	8.4	9.3	7.4	15.5	17.2	13.7
1977	9.9	11.0	8.7	8.7	9.8	7.6	16.1	17.6	14.5
1976	10.9	12.0	9.7	9.7	10.7	8.5	17.9	19.5	16.3
1975	11.6	12.9	10.2	10.4	11.7	9.0	18.3	19.8	16.8
1974	12.3	13.8	10.7	11.1	12.6	9.6	18.7	20.6	16.7
1973	13.0	14.6	11.2	11.8	13.5	10.1	19.3	21.4	17.2
1972 ²	13.6	15.4	11.7	12.4	14.1	10.5	20.7	22.7	18.6
1971	14.2	16.0	12.3	13.0	14.8	11.2	21.0	23.3	18.5
1970	15.1	17.0	13.1	13.8	15.5	11.9	22.8	25.4	20.1
1969	15.6	17.7	13.3	14.2	16.2	12.0	23.9	26.8	21.0
1968	16.1	18.3	13.8	14.7	16.9	12.4	24.3	26.9	21.5
1967	16.5	18.7	14.2	15.0	17.2	12.7	25.0	27.5	22.3
1966	17.2	19.5	14.8	15.6	17.9	13.2	25.9	28.8	23.0
1965	17.7	20.0	15.2	16.1	18.3	13.8	26.5	29.6	23.3
1964	17.9	20.3	15.4	16.2	18.5	13.8	27.5	30.7	24.2
1963 ³	18.2	20.7	15.6	16.7	19.1	14.1	27.0	30.1	23.8
1962 ³	18.3	20.9	15.7	16.9	19.4	14.2	27.1	30.0	24.1
1961	18.4	20.8	15.8	16.9	19.3	14.4	27.1	30.2	24.0
1960	18.7	21.2	16.1	17.2	19.7	14.7	27.8	31.1	24.5

Table 2. Infant, neonatal, and postneonatal mortality rates by race and sex: United States, 1960–88—Con.

[Beginning 1970 excludes deaths of nonresidents of the United States; see appendix. Rates are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths per 1,000 live births in specified group]

Age and year	All races ¹			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Postneonatal mortality rate									
1988	3.6	4.0	3.2	3.1	3.6	2.7	6.2	6.6	5.8
1987	3.6	4.1	3.2	3.1	3.6	2.7	6.1	6.8	5.5
1986	3.6	4.1	3.1	3.1	3.6	2.7	6.3	7.0	5.6
1985	3.7	4.2	3.2	3.2	3.7	2.7	6.1	6.6	5.6
1984	3.8	4.2	3.3	3.3	3.7	2.8	6.5	7.1	5.9
1983	3.9	4.3	3.4	3.3	3.7	2.9	6.8	7.4	6.1
1982	3.8	4.3	3.3	3.3	3.7	2.8	6.6	7.3	5.9
1981	3.9	4.3	3.5	3.4	3.8	3.0	6.6	7.1	6.0
1980	4.1	4.6	3.6	3.5	4.0	3.0	7.3	7.9	6.6
1979	4.2	4.7	3.7	3.5	4.0	3.0	7.5	8.2	6.7
1978	4.3	4.7	3.9	3.6	4.0	3.2	7.6	8.2	7.0
1977	4.2	4.8	3.7	3.6	4.1	3.1	7.6	8.3	6.8
1976	4.3	4.8	3.8	3.6	4.1	3.2	7.6	8.4	6.9
1975	4.5	4.9	4.0	3.8	4.2	3.3	7.9	8.5	7.2
1974	4.4	4.9	3.9	3.7	4.1	3.3	8.1	8.9	7.3
1973	4.8	5.3	4.2	3.9	4.4	3.4	8.8	9.6	8.0
1972 ²	4.8	5.4	4.3	4.0	4.5	3.5	8.9	9.7	8.2
1971	4.9	5.4	4.4	4.0	4.5	3.5	9.4	10.0	8.7
1970	4.9	5.4	4.4	4.0	4.4	3.5	9.9	10.8	8.9
1969	5.3	5.7	4.8	4.2	4.7	3.8	10.8	11.5	10.2
1968	5.7	6.2	5.1	4.5	5.0	3.9	11.9	12.6	11.2
1967	5.9	6.5	5.4	4.7	5.2	4.1	12.5	13.4	11.6
1966	6.5	7.2	5.9	5.0	5.6	4.4	14.3	15.3	13.2
1965	7.0	7.7	6.3	5.4	6.1	4.7	15.2	16.3	14.0
1964	6.9	7.6	6.2	5.4	5.9	4.8	14.9	16.1	13.6
1963 ³	7.0	7.7	6.3	5.5	6.1	4.9	15.8	17.2	14.3
1962 ³	7.0	7.7	6.2	5.5	6.1	4.8	15.5	17.0	14.0
1961	6.9	7.6	6.2	5.5	6.1	4.9	14.7	16.0	13.5
1960	7.3	8.1	6.5	5.7	6.3	4.9	16.5	18.0	14.9

¹Includes races other than white and black.

²Deaths based on a 50-percent sample.

³Figures by race exclude data for residents of New Jersey; see appendix.

Table 3. Live births by race: United States, 1960–88

[Beginning 1970 excludes births to nonresidents of the United States; see appendix]

Year	All races	White	Total	All other
				Black
1988	3,909,510	3,046,162	863,348	671,976
1987	3,809,394	2,992,488	816,906	641,567
1986	3,756,547	2,970,439	786,108	621,221
1985	3,760,561	2,991,373	769,188	608,193
1984 ¹	3,669,141	2,923,502	745,639	592,745
1983 ¹	3,638,933	2,904,250	734,683	586,027
1982 ¹	3,680,537	2,942,054	738,483	592,641
1981 ¹	3,629,238	2,908,669	720,569	587,797
1980 ¹	3,612,258	2,898,732	713,526	589,616
1979 ¹	3,494,398	2,808,420	685,978	577,855
1978 ¹	3,333,279	2,681,116	652,163	551,540
1977 ¹	3,326,632	2,691,070	635,562	544,221
1976 ¹	3,167,788	2,567,614	600,174	514,479
1975 ¹	3,144,198	2,551,996	592,202	511,581
1974 ¹	3,159,958	2,575,792	584,166	507,162
1973 ¹	3,136,965	2,551,030	585,935	512,597
1972 ¹	3,258,411	2,655,558	602,853	531,329
1971 ²	3,555,970	2,919,746	636,224	564,960
1970 ²	3,731,386	3,091,264	640,122	572,362
1969 ²	3,600,206	2,993,614	606,592	543,132
1968 ²	3,501,564	2,912,224	589,340	531,152
1967 ³	3,520,959	2,922,502	598,457	543,976
1966 ²	3,606,274	2,993,230	613,044	558,244
1965 ²	3,760,358	3,123,860	636,498	581,126
1964 ²	4,027,490	3,369,160	658,330	607,556
1963 ^{2,4}	4,098,020	3,326,344	638,928	580,658
1962 ^{2,4}	4,167,362	3,394,068	641,580	584,610
1961 ²	4,268,326	3,600,864	667,462	611,072
1960 ²	4,257,850	3,600,744	657,106	602,264

¹Based on 100 percent of births in selected States; and on a 50-percent sample of births in all other States.²Based on a 50-percent sample of births.³Based on a 20- to 50-percent sample of births.⁴Figures by race exclude data for residents of New Jersey; see appendix.

Table 4. Infant, neonatal, and postneonatal deaths from 55 selected causes, by race: United States, 1960 and 1967

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Lists, Seventh Revision, 1955.]

Cause of death	Under 1 year			Under 28 days			28 days–11 months			
	Total	White	All other	Total	White	All other	Total	White	All other	
1960										
All causes	110,873	82,479	28,394	79,733	62,085	17,648	31,140	20,394	10,746	
Dysentery, all forms	045–048	140	60	80	8	2	6	132	58	74
Septicemia and pyemia	053	408	289	119	—	—	—	408	289	119
Whooping cough	056	73	24	49	4	—	4	69	24	45
Meningococcal infections	057	196	161	35	13	11	2	183	150	33
Tetanus	061	69	20	49	67	19	48	2	1	1
Other infective and parasitic diseases	001–044,049–052,054,055,058–060,062–138	557	374	183	102	64	38	455	310	145
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	140–205	298	258	40	41	31	10	257	227	30
Benign neoplasms and neoplasms of unspecified nature	210–239	138	119	19	56	49	7	82	70	12
Diseases of thymus gland	273	115	97	18	26	23	3	89	74	15
Meningitis, except meningococcal and tuberculous	340	872	570	302	214	164	50	658	406	252
Other diseases of nervous system and sense organs	330–334,341–398	950	725	225	172	134	38	778	591	187
Acute upper respiratory infections	470–475	417	273	144	60	40	20	357	233	124
Influenza and pneumonia, except pneumonia of newborn	480–493	9,828	5,835	3,993	53	24	29	9,775	5,811	3,964
Influenza	480–483	538	252	286	53	24	29	485	228	257
Pneumonia, except pneumonia of newborn	490–493	9,290	5,583	3,707	—	—	—	9,290	5,583	3,707
Bronchitis	500–502	656	513	143	51	37	14	605	476	129
Other diseases of respiratory system	510–522,525–527	1,539	1,101	438	201	157	44	1,338	944	394
Pulmonary congestion and hypostasis	522	184	148	36	56	45	11	128	103	25
Other chronic interstitial pneumonia	525	933	645	288	12	7	5	921	638	283
Bronchiectasis	526	1	1	—	—	—	—	1	1	—
Other diseases of lung and pleural cavity	527.2	236	162	74	43	30	13	193	132	61
All other diseases of respiratory system	510–521,527.1	185	145	40	90	75	15	95	70	25
Hernia and intestinal obstruction	560,561,570	922	771	151	669	596	73	253	175	78
Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn	543,571,572	2,622	1,270	1,352	6	4	2	2,616	1,266	1,350
Other diseases of digestive system	530–542,544–553,573–587	676	512	164	328	252	76	348	260	88
Congenital malformations	750–759	15,389	13,426	1,963	9,981	8,819	1,162	5,408	4,607	801
Spina bifida and meningocele	751	1,096	1,031	65	581	545	36	515	486	29
Congenital hydrocephalus and other congenital malformations of nervous system and sense organs	752,753	1,645	1,423	222	867	768	99	778	655	123
Congenital malformations of circulatory system	754	7,589	6,589	1,000	4,460	3,931	529	3,129	2,658	471
Other congenital malformations	750,755–759	5,059	4,383	676	4,073	3,575	498	986	808	178
Certain diseases of early infancy	760–776	67,074	51,260	15,814	65,486	50,424	15,062	1,588	836	752
Birth injuries	760,761	10,158	8,379	1,779	10,146	8,371	1,775	12	8	4
Without mention of immaturity	(.0)	4,001	3,146	855	3,993	3,142	851	8	4	4
With immaturity	(.5)	6,157	5,233	924	6,153	5,229	924	4	4	—
Intracranial and spinal injury at birth	760	3,175	2,457	718	3,175	2,457	718	—	—	—
Without mention of immaturity	(.0)	1,857	1,466	391	1,857	1,466	391	—	—	—
With immaturity	(.5)	1,318	991	327	1,318	991	327	—	—	—

Other birth injury	761	6,983	5,922	1,061	6,971	5,914	1,057	12	8	4
Without mention of immaturity	(.0)	2,144	1,680	464	2,136	1,676	460	8	4	4
With immaturity	(.5)	4,839	4,242	597	4,835	4,238	597	4	4	—
Postnatal asphyxia and atelectasis	762	19,539	15,209	4,330	19,248	15,009	4,239	291	200	91
Without mention of immaturity	(.0)	5,255	4,153	1,102	5,025	3,991	1,034	230	162	68
With immaturity	(.5)	14,284	11,056	3,228	14,223	11,018	3,205	61	38	23
Pneumonia of newborn	763	3,544	2,372	1,172	3,544	2,372	1,172
Without mention of immaturity	(.0)	2,563	1,687	876	2,563	1,687	876
With immaturity	(.5)	981	685	296	981	685	296
Diarrhea of newborn	764	463	217	246	460	217	243	3	—	3
Without mention of immaturity	(.0)	362	165	197	360	165	195	2	—	2
With immaturity	(.5)	101	52	49	100	52	48	1	—	1
Other infections of newborn	765–768	779	535	244	768	528	240	11	7	4
Without mention of immaturity	(.0)	506	353	153	496	347	149	10	6	4
With immaturity	(.5)	273	182	91	272	181	91	1	1	—
Neonatal disorders arising from certain diseases of mother during pregnancy	769	1,001	779	222	988	767	221	13	12	1
Without mention of immaturity	(.0–.4)	354	260	94	345	251	94	9	9	—
With Immaturity	(.5–.9)	647	519	128	643	516	127	4	3	1
Hemolytic disease of newborn (erythroblastosis)	770	2,145	1,994	151	2,124	1,979	145	21	15	6
Without mention of immaturity	(.0–.2)	1,702	1,579	123	1,686	1,567	119	16	12	4
With immaturity	(.5–.7)	443	415	28	438	412	26	5	3	2
Hemorrhagic disease of newborn	771	620	438	182	614	435	179	6	3	3
Without mention of immaturity	(.0)	393	270	123	389	267	122	4	.3	1
With immaturity	(.5)	227	168	59	225	168	57	2	—	2
III-defined diseases peculiar to early infancy, including nutritional maladjustment	772,773	8,057	6,008	2,049	7,233	5,631	1,602	824	377	447
Without mention of immaturity	(.0)	2,353	1,621	732	1,650	1,295	355	703	326	377
With immaturity	(.5)	5,704	4,387	1,317	5,583	4,336	1,247	121	51	70
Immaturity with mention of any other subsidiary condition	774	1,310	930	380	1,036	786	250	274	144	130
Immaturity, unqualified	776	19,458	14,399	5,059	19,325	14,329	4,996	133	70	63
Symptoms and ill-defined conditions	780–793,795	2,518	972	1,546	1,036	406	630	1,482	566	916
All other diseases	Residual	1,386	1,049	337	432	346	86	954	703	251
Accidents	E800–E962	3,831	2,672	1,159	598	392	206	3,233	2,280	953
Inhalation and ingestion of food or other object causing obstruction or suffocation	E921, E922	1,204	902	302	294	213	81	910	689	221
Accidental mechanical suffocation in bed and cradle	E924	1,018	683	335	130	76	54	888	607	281
Other accidental causes	E800–E920, E923, E925–E962	1,609	1,087	522	174	103	71	1,435	984	451
Homicide	E964, E980–E984	199	128	71	129	91	38	70	37	33

Table 4. Infant, neonatal, and postneonatal deaths from 55 selected causes, by race: United States, 1960 and 1967—Con.

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Lists, Seventh Revision, 1955]

Cause of death	Under 1 year			Under 28 days			28 days–11 months		
	Total	White	All other	Total	White	All other	Total	White	All other
1967									
All causes	79,028	57,533	21,495	58,127	43,890	14,237	20,901	13,643	7,258
Dysentery, all forms045–048	32	11	21	6	4	2	26	7	19
Septicemia and pyemia053	282	171	111	1	1	—	281	170	111
Whooping cough056	29	9	20	1	—	1	28	9	19
Meningococcal infections057	167	144	23	14	10	4	153	134	19
Tetanus061	25	5	20	23	5	18	2	—	2
Other infective and parasitic diseases001–044,049–052,054,055,058–060,062–138	396	287	109	71	55	16	325	232	93
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues140–205	196	165	31	37	29	8	159	136	23
Benign neoplasms and neoplasms of unspecified nature210–239	97	79	18	44	38	6	53	41	12
Diseases of thymus gland273	35	32	3	5	4	1	30	28	2
Meningitis, except meningococcal and tuberculous340	679	455	224	221	170	51	458	285	173
Other diseases of nervous system and sense organs330–334,341–398	519	384	135	24	20	4	495	364	131
Acute upper respiratory infections470–475	293	185	108	26	15	11	267	170	97
Influenza and pneumonia, except pneumonia of newborn480–493	5,716	3,374	2,342	5	4	1	5,711	3,370	2,341
Influenza480–483	79	30	49	5	4	1	74	26	48
Pneumonia, except pneumonia of newborn490–493	5,637	3,344	2,293	5,637	3,344	2,293
Bronchitis500–502	314	204	110	24	13	11	290	191	99
Other diseases of respiratory system510–522,525–527	1,385	910	475	108	81	27	1,277	829	448
Pulmonary congestion and hypostasis522	139	109	30	27	21	6	112	88	24
Other chronic interstitial pneumonia525	981	633	348	10	7	3	971	626	345
Bronchiectasis526	1	—	1	—	—	—	1	—	1
Other diseases of lung and pleural cavity527.2	178	103	75	25	16	9	153	87	66
All other diseases of respiratory system510–521,527.1	86	65	21	46	37	9	40	28	12
Hernia and intestinal obstruction560,561,570	685	567	118	492	424	68	193	143	50
Gastritis, duodenitis, enteritis, and colitis, except diarrhea of newborn543,571,572	1,031	504	527	—	—	—	1,031	504	527
Other diseases of digestive system530–542,544–553,573–587	321	217	104	163	109	54	158	108	50
Congenital malformations750–759	11,632	9,852	1,780	7,850	6,765	1,085	3,782	3,087	695
Spina bifida and meningocele751	859	798	61	512	480	32	347	318	29
Congenital hydrocephalus and other congenital malformations of nervous system and sense organs752,753	935	782	153	528	455	73	407	327	80
Congenital malformations of circulatory system754	5,655	4,713	942	3,428	2,912	516	2,227	1,801	426
Other congenital malformations750,755–759	4,183	3,559	624	3,382	2,918	464	801	641	160
Certain diseases of early infancy760–776	48,271	35,668	12,603	47,382	35,192	12,190	889	476	413
Birth injuries760,761	6,561	5,198	1,363	6,555	5,194	1,361	6	4	2
Without mention of immaturity(0)	2,390	1,823	567	2,387	1,821	566	3	2	1
With immaturity(5)	4,171	3,375	796	4,168	3,373	795	3	2	1
Intracranial and spinal injury at birth760	2,102	1,521	581	2,102	1,521	581	—	—	—
Without mention of immaturity(0)	1,052	785	267	1,052	785	267	—	—	—
With immaturity(5)	1,050	736	314	1,050	736	314	—	—	—

Other birth injury.....	761	4,459	3,677	782	4,453	3,673	780	6	4	2
Without mention of immaturity.....	(.0)	1,338	1,038	300	1,335	1,036	299	3	2	1
With immaturity.....	(.5)	3,121	2,639	482	3,118	2,637	481	3	2	1
Postnatal asphyxia and atelectasis.....	762	12,783	9,525	3,258	12,536	9,372	3,164	247	153	94
Without mention of immaturity.....	(.0)	3,452	2,639	813	3,253	2,511	742	199	128	71
With immaturity.....	(.5)	9,331	6,886	2,445	9,283	6,861	2,422	48	25	23
Pneumonia of newborn.....	763	2,219	1,510	709	2,219	1,510	709
Without mention of immaturity.....	(.0)	1,626	1,093	533	1,626	1,093	533
With immaturity.....	(.5)	.593	417	176	.593	417	176
Diarrhea of newborn.....	764	225	95	130	222	94	128	3	1	2
Without mention of immaturity.....	(.0)	188	77	111	186	76	110	2	1	1
With immaturity.....	(.5)	37	18	19	36	18	18	1	-	1
Other infections of newborn.....	765-768	825	547	278	817	541	276	8	6	2
Without mention of immaturity.....	(.0)	437	290	147	430	284	146	7	6	1
With immaturity.....	(.5)	388	257	131	387	257	130	1	-	1
Neonatal disorders arising from certain diseases of mother during pregnancy.....	769	557	434	123	532	417	115	25	17	8
Without mention of immaturity.....	(0-.4)	224	168	56	203	154	49	21	14	7
With immaturity.....	(.5-.9)	333	266	67	329	263	66	4	3	1
Hemolytic disease of newborn (erythroblastosis).....	770	1,191	1,105	86	1,186	1,102	84	5	3	2
Without mention of immaturity.....	(0-.2)	826	766	60	822	763	59	4	3	1
With immaturity.....	(.5-.7)	365	339	26	364	339	25	1	-	1
Hemorrhagic disease of newborn.....	771	519	371	148	514	368	146	5	3	2
Without mention of immaturity.....	(.0)	283	208	75	278	205	73	5	3	2
With immaturity.....	(.5)	236	163	73	236	163	73	-	-	-
Ill-defined diseases peculiar to early infancy, including nutritional maladjustment.....	772,773	10,211	7,817	2,394	9,821	7,629	2,192	390	188	202
Without mention of immaturity.....	(.0)	2,212	1,648	564	1,873	1,489	384	339	159	180
With immaturity.....	(.5)	7,999	6,169	1,830	7,948	6,140	1,808	51	29	22
Immaturity with mention of any other subsidiary condition.....	774	1,271	893	378	1,138	815	323	133	78	55
Immaturity, unqualified.....	776	11,909	8,173	3,736	11,842	8,150	3,692	67	23	44
Symptoms and ill-defined conditions.....	780-793,795	2,620	1,286	1,334	683	262	421	1,937	1,024	913
All other diseases.....	Residual	1,326	1,003	323	519	403	116	807	600	207
Accidents.....	E800-E962	2,751	1,870	881	311	202	109	2,440	1,668	772
Inhalation and ingestion of food or other object causing obstruction or suffocation.....	E921,E922	620	433	187	82	57	25	538	376	162
Accidental mechanical suffocation in bed and cradle.....	E924	522	346	176	54	33	21	468	313	155
Other accidental causes.....	E800-E920,E923,E925-E962	1,609	1,091	518	175	112	63	1,434	979	455
Homicide.....	E964,E980-E984	226	151	75	117	84	33	109	67	42

Table 5. Infant, neonatal, and postneonatal deaths from 65 selected causes, by race: United States, 1968, 1974, and 1978

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Eighth Revision, Adapted, 1965]

Cause of death	Under 1 year			Under 28 days			28 days–11 months			
	Total	White	All other	Total	White	All other	Total	White	All other	
1968										
All causes	76,263	55,902	20,361	56,456	42,904	13,552	19,807	12,998	6,809	
Diarrheal diseases	009	926	435	491	153	78	75	773	357	416
Whooping cough	033	27	13	14	1	1	—	26	12	14
Meningococcal infections	036	157	128	29	12	9	3	145	119	26
Tetanus	037	3	—	3	3	—	3	—	—	—
Septicemia	038	800	518	282	558	368	190	242	150	92
Viral diseases	040–079	278	218	60	80	63	17	198	155	43
Congenital syphilis	090	15	7	8	13	5	8	2	2	—
Other infective and parasitic diseases	Remainder of 000–136	270	155	115	61	35	26	209	120	89
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	140–209	164	139	25	47	42	5	117	97	20
Benign neoplasms and neoplasms of unspecified nature	210–239	90	71	19	44	37	7	46	34	12
Diseases of thymus gland	254	43	37	6	4	4	—	39	33	6
Cystic fibrosis	273.0	126	119	7	54	49	5	72	70	2
Diseases of the blood and blood-forming organs	280–289	146	100	46	53	41	12	93	59	34
Meningitis	320	524	325	199	169	129	40	355	196	159
Other diseases of nervous system and sense organs	321–389	487	367	120	54	44	10	433	323	110
Acute upper respiratory infections	460–465	301	187	114	33	19	14	268	168	100
Bronchitis and bronchiolitis	466,490,491	531	352	179	41	20	21	490	332	158
Influenza and pneumonia	470–474,480–486	7,907	4,804	3,103	1,795	1,176	619	6,112	3,628	2,484
Influenza	470–474	133	60	73	13	7	6	120	53	67
Pneumonia	480–486	7,774	4,744	3,030	1,782	1,169	613	5,992	3,575	2,417
Other chronic interstitial pneumonia	517	24	20	4	5	5	—	19	15	4
All other diseases of respiratory system	492,493,500–516,518,519	559	385	174	175	123	52	384	262	122
Hernia and intestinal obstruction	550–553,560	639	511	128	478	401	77	161	110	51
Gastritis, duodenitis, enteritis, and colitis of noninfectious origin	535,561,563	44	27	17	4	3	1	40	24	16
Other diseases of digestive system	520–534,536,537,540–543,562,564–577	410	286	124	217	147	70	193	139	54
Congenital anomalies	740–759	11,052	9,405	1,647	7,485	6,482	1,003	3,567	2,923	644
Anencephalus	740	959	894	65	935	871	64	24	23	1
Spina bifida	741	744	682	62	439	406	33	305	276	29
Congenital hydrocephalus	742	530	450	80	271	229	42	259	221	38
Other congenital anomalies of central nervous system and eye	743,744	430	369	61	271	233	38	159	136	23
Congenital anomalies of heart	746	4,371	3,635	736	2,611	2,236	375	1,760	1,399	361
Other congenital anomalies of circulatory system	747	744	636	108	456	393	63	288	243	45
Congenital anomalies of respiratory system	748	450	377	73	395	331	64	55	46	9
Congenital anomalies of digestive system	749–751	819	649	170	495	387	108	324	262	62
Congenital anomalies of genitourinary system	752,753	399	349	50	326	291	35	73	58	15
Congenital anomalies of musculoskeletal system	754–756	328	281	47	271	236	35	57	45	12
Down's disease	759.3	120	102	18	45	37	8	75	65	10
Other congenital syndromes affecting multiple systems	759.0–759.2,759.4–759.9	957	827	130	812	709	103	145	118	27
Other and unspecified congenital anomalies	745,757,758	201	154	47	158	123	35	43	31	12

Certain causes of mortality in early infancy	760-769.2,769.4-772,774-778	43,707	32,921	10,786	43,441	32,749	10,692	266	172	94
Chronic circulatory and genitourinary diseases in mother	760	21	16	5	21	16	5	-	-	-
Other maternal conditions unrelated to pregnancy	761	463	385	78	451	374	77	12	11	1
Syphilis	761.0	4	1	3	4	1	3	-	-	-
Diabetes mellitus	761.1	237	216	21	236	215	21	1	1	-
Rubella	761.3	21	18	3	10	8	2	11	10	1
All other maternal conditions unrelated to pregnancy	761.2,761.4-761.7, 761.9	201	150	51	201	150	51	-	-	-
Toxemia of pregnancy	762	229	162	67	228	162	66	1	-	1
Maternal antepartum and intrapartum infection	763	249	163	86	246	160	86	3	3	-
Difficult labor	764-768	714	544	170	714	544	170	-	-	-
With mention of birth injury	(.0-.3)	215	159	56	215	159	56	-	-	-
Without mention of birth injury	(.4,.9)	499	385	114	499	385	114	-	-	-
All other complications of pregnancy and childbirth	769.0-769.2,769.4,769.5,769.9	5,582	4,216	1,366	5,569	4,207	1,362	13	9	4
Conditions of placenta	770	2,588	2,223	365	2,583	2,218	365	5	5	-
Conditions of umbilical cord	771	416	333	83	411	329	82	5	4	1
Birth injury without mention of cause	772	2,054	1,479	575	2,016	1,449	567	38	30	8
Hemolytic disease of newborn	774,775	952	879	73	939	869	70	13	10	3
Hyaline membrane disease	776.1	4,551	3,812	739	4,533	3,800	733	18	12	6
Respiratory distress syndrome	776.2	3,717	2,879	838	3,692	2,862	830	25	17	8
Asphyxia of newborn, unspecified	776.9	10,257	7,729	2,528	10,231	7,711	2,520	26	18	8
All other anoxic and hypoxic conditions not elsewhere classifiable	776.0,776.3,776.4	758	557	201	743	549	194	15	8	7
Immaturity, unqualified	777	9,423	6,399	3,024	9,358	6,371	2,987	65	28	37
Postmaturity	778.1	4	4	-	4	4	-	-	-	-
Hemorrhagic disease of newborn	778.2	439	314	125	439	314	125	-	-	-
All other conditions of newborn	778.0,778.3,778.9	1,290	827	463	1,263	810	453	27	17	10
Symptoms and ill-defined conditions	780-796	2,958	1,586	1,372	737	337	400	2,221	1,249	972
Accidents	E800-E949	2,520	1,740	780	267	186	81	2,253	1,554	699
Inhalation and ingestion of food or other object causing obstruction or suffocation	E911,E912	771	519	252	107	71	36	664	448	216
Accidental mechanical suffocation	E913	761	535	226	58	37	21	703	498	205
Other accidental causes	E800-E910,E914-E949	988	686	302	102	78	24	886	608	278
Homicide	E960-E978	163	115	48	73	51	22	90	64	26
All other causes	Residual	1,392	931	461	399	300	99	993	631	362

Table 5. Infant, neonatal, and postneonatal deaths from 65 selected causes, by race: United States, 1968, 1974, and 1978—Con.

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Eighth Revision, Adapted, 1965]

Cause of death	Under 1 year			Under 28 days			28 days–11 months		
	Total	White	All other	Total	White	All other	Total	White	All other
1974									
All causes	52,776	38,249	14,527	38,738	28,692	10,046	14,038	9,557	4,481
Diarrheal diseases	646	375	271	337	208	129	309	167	142
Whooping cough	13	11	2	—	—	—	13	11	2
Meningococcal infections	47	34	13	9	8	1	38	26	12
Tetanus	3	3	—	3	3	—	—	—	—
Septicemia	910	620	290	695	496	199	215	124	91
Viral diseases	191	148	43	62	50	12	129	98	31
Congenital syphilis	7	3	4	6	3	3	1	—	1
Other infective and parasitic diseases	Remainder of 000–136	107	42	53	38	15	96	69	27
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	140–209	115	90	25	15	11	100	79	21
Benign neoplasms and neoplasms of unspecified nature	210–239	61	50	11	30	27	31	23	8
Diseases of thymus gland	254	19	16	3	4	4	15	12	3
Cystic fibrosis	273.0	67	64	3	17	16	1	50	48
Diseases of the blood and blood-forming organs	280–289	178	126	52	75	58	17	103	68
Meningitis	320	567	366	201	213	146	67	354	220
Other diseases of nervous system and sense organs	321–389	439	316	123	47	36	11	392	280
Acute upper respiratory infections	460–465	108	65	43	12	10	2	96	55
Bronchitis and bronchiolitis	466,490,491	189	127	62	6	4	2	183	123
Influenza and pneumonia	470–474,480–486	2,613	1,645	968	767	526	241	1,846	1,119
Influenza	470–474	36	28	8	3	2	1	33	26
Pneumonia	480–486	2,577	1,617	960	764	524	240	1,813	1,093
Other chronic interstitial pneumonia	517	27	19	8	8	—	19	11	8
All other diseases of respiratory system	492,493,500–516,518,519	453	319	134	125	97	28	328	222
Hernia and intestinal obstruction	550–553,560	497	420	77	416	357	59	81	18
Gastritis, duodenitis, enteritis, and colitis of noninfectious origin	535,561,563	51	32	19	26	16	10	25	16
Other diseases of digestive system	520–534,536,537,540–543,562,564–577	310	216	94	175	118	57	135	98
Congenital anomalies	740–759	8,607	7,119	1,488	5,968	5,016	952	2,639	2,103
Anencephalus	740	748	685	63	728	668	60	20	17
Spina bifida	741	455	413	42	264	241	23	191	172
Congenital hydrocephalus	742	362	294	68	214	180	34	148	114
Other congenital anomalies of central nervous system and eye	743,744	353	290	63	243	202	41	110	88
Congenital anomalies of heart	746	3,181	2,596	585	2,011	1,658	353	1,170	938
Other congenital anomalies of circulatory system	747	633	504	129	397	325	72	236	179
Congenital anomalies of respiratory system	748	656	530	126	475	392	83	181	138
Congenital anomalies of digestive system	749–751	382	290	92	193	141	52	189	149
Congenital anomalies of genitourinary system	752,753	285	236	49	253	212	41	32	24
Congenital anomalies of musculoskeletal system	754–756	264	223	41	215	183	32	49	40
Down's disease	759.3	90	76	14	39	34	5	51	42
Other congenital syndromes affecting multiple systems	759.0–759.2,759.4–759.9	1,015	840	175	807	677	130	208	163

Other and unspecified congenital anomalies	745,757,758	183	142	41	129	103	26	54	39	15
Certain causes of mortality in early infancy	760-769,2,769.4-772,774-778	28,712	20,821	7,891	28,397	20,592	7,805	315	229	86
Chronic circulatory and genitourinary diseases in mother	760	6	5	1	6	5	1	-	-	-
Other maternal conditions unrelated to pregnancy	761	256	202	54	249	199	50	7	3	4
Syphilis	761.0	2	-	2	1	-	1	1	-	1
Diabetes mellitus	761.1	130	112	18	130	112	18	-	-	-
Rubella	761.3	11	5	6	7	4	3	4	1	3
All other maternal conditions unrelated to pregnancy	761.2,761.4-761.7,761.9	113	85	28	111	83	28	2	2	-
Toxemia of pregnancy	762	115	84	31	115	84	31	-	-	-
Maternal antepartum and intrapartum infection	763	173	110	63	169	108	61	4	2	2
Difficult labor	764-768	413	321	92	411	319	92	2	2	-
With mention of birth injury	(0.-3)	132	102	30	131	101	30	1	1	-
Without mention of birth injury	(.4,.9)	281	219	62	280	218	62	1	1	-
All other complications of pregnancy and childbirth	769.0-769,2,769.4,769.5,769.9	3,342	2,455	887	3,327	2,443	884	15	12	3
Conditions of placenta	770	1,203	966	237	1,197	961	236	6	5	1
Conditions of umbilical cord	771	304	247	57	301	244	57	3	3	-
Birth injury without mention of cause	772	1,792	1,301	491	1,774	1,288	486	18	13	5
Hemolytic disease of newborn	774,775	340	295	45	334	290	44	6	5	1
Hyaline membrane disease	776.1	4,300	3,379	921	4,235	3,330	905	65	49	16
Respiratory distress syndrome	776.2	4,022	3,036	986	3,924	2,963	961	98	73	25
Asphyxia of newborn, unspecified	776.9	4,652	3,283	1,369	4,632	3,266	1,366	20	17	3
All other anoxic and hypoxic conditions not elsewhere classifiable	776.0,776.3,776.4	750	516	234	736	507	229	14	9	5
Immaturity, unqualified	777	4,719	3,105	1,614	4,687	3,086	1,601	32	19	13
Postmaturity	778.1	6	4	2	6	4	2	-	-	-
Hemorrhagic disease of newborn	778.2	588	399	189	585	397	188	3	2	1
All other conditions of newborn	778.0,778.3,778.9	1,731	1,113	618	1,709	1,098	611	22	15	7
Symptoms and ill-defined conditions	780-796	4,700	3,024	1,676	615	372	243	4,085	2,652	1,433
Accidents	E800-E949	1,453	1,034	419	166	112	54	1,287	922	365
Inhalation and ingestion of food or other object causing obstruction or suffocation	E911,E912	442	320	122	64	47	17	378	273	105
Accidental mechanical suffocation	E913	285	202	83	27	15	12	258	187	71
Other accidental causes	E800-E910,E914-E949	726	512	214	75	50	25	651	462	189
Homicide	E960-E978	166	92	74	36	23	13	130	69	61
All other causes	Residual	1,478	987	491	455	337	118	1,023	650	373

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Table 5. Infant, neonatal, and postneonatal deaths from 65 selected causes, by race: United States, 1968, 1974, and 1978—Con.

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Eighth Revision, Adapted, 1965.]

Cause of death	Under 1 year			Under 28 days			28 days–11 months		
	Total	White	All other	Total	White	All other	Total	White	All other
1978									
All causes	45,945	32,212	13,733	31,618	22,482	9,136	14,327	9,730	4,597
Diarrheal diseases009	706	365	341	412	213	199	294	152	142
Whooping cough033	5	2	3	—	—	—	5	2	3
Meningococcal infections036	97	80	17	5	3	2	92	77	15
Tetanus037	—	—	—	—	—	—	—	—	—
Septicemia038	1,093	761	332	854	619	235	239	142	97
Viral diseases040-079	171	126	45	74	59	15	97	67	30
Congenital syphilis090	6	4	2	5	4	1	1	—	1
Other infective and parasitic diseases Remainder of 000-136	190	123	67	91	62	29	99	61	38
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues140-209	132	110	22	32	30	2	100	80	20
Benign neoplasms and neoplasms of unspecified nature210-239	57	48	9	33	31	2	24	17	7
Diseases of thymus gland254	12	9	3	—	—	—	12	9	3
Cystic fibrosis273.0	37	32	5	8	7	1	29	25	4
Diseases of the blood and blood-forming organs280-289	146	82	64	47	29	18	99	53	46
Meningitis320	532	360	172	174	120	54	358	240	118
Other diseases of nervous system and sense organs321-389	487	369	118	46	34	12	441	335	106
Acute upper respiratory infections460-465	55	40	15	4	4	—	51	36	15
Bronchitis and bronchiolitis466,490,491	149	102	47	5	2	3	144	100	44
Influenza and pneumonia470-474,480-486	1,533	963	570	393	274	119	1,140	689	451
Influenza470-474	34	16	18	3	2	1	31	14	17
Pneumonia480-486	1,499	947	552	390	272	118	1,109	675	434
Other chronic interstitial pneumonia517	27	18	9	9	7	2	18	11	7
All other diseases of respiratory system492,493,500-516,518,519	406	288	118	108	82	26	298	206	92
Hernia and intestinal obstruction550-553,560	495	398	97	421	347	74	74	51	23
Gastritis, duodenitis, enteritis, and colitis of noninfectious origin535,561,563	32	18	14	15	10	5	17	8	9
Other diseases of digestive system520-534,536,537,540-543,562,564-577	303	198	105	126	71	55	177	127	50
Congenital anomalies740-759	8,404	6,830	1,574	5,943	4,902	1,041	2,461	1,928	533
Anencephalus740	759	676	83	739	657	82	20	19	1
Spina bifida741	295	257	38	163	139	24	132	118	14
Congenital hydrocephalus742	344	282	62	189	159	30	155	123	32
Other congenital anomalies of central nervous system and eye743,744	286	243	43	180	155	25	106	88	18
Congenital anomalies of heart746	2,829	2,284	545	1,681	1,388	293	1,148	896	252
Other congenital anomalies of circulatory system747	847	632	215	639	478	161	208	154	54
Congenital anomalies of respiratory system748	708	562	146	623	502	121	85	60	25
Congenital anomalies of digestive system749-751	281	214	67	143	108	35	138	106	32
Congenital anomalies of genitourinary system752,753	291	253	38	261	227	34	30	26	4
Congenital anomalies of musculoskeletal system754-756	214	171	43	163	132	31	51	39	12
Down's disease759.3	82	71	11	37	34	3	45	37	8
Other congenital syndromes affecting multiple systems759.0-759.2,759.4-759.9	1,275	1,030	245	985	809	176	290	221	69

Other and unspecified congenital anomalies	745,757,758	193	155	38	140	114	26	53	41	12
Certain causes of mortality in early infancy	760–769,2,769.4–772,774–778	21,987	14,997	6,990	21,421	14,626	6,795	566	371	195
Chronic circulatory and genitourinary diseases in mother	760	11	8	3	11	8	3	—	—	—
Other maternal conditions unrelated to pregnancy	761	126	90	36	119	86	33	7	4	3
Syphilis	761.0	—	—	—	—	—	—	—	—	—
Diabetes mellitus	761.1	52	40	12	51	40	11	1	—	1
Rubella	761.3	2	1	1	2	1	1	—	—	—
All other maternal conditions unrelated to pregnancy	761.2,761.4–761.7,761.9	72	49	23	66	45	21	6	4	2
Toxemia of pregnancy	762	79	57	22	78	57	21	1	—	1
Maternal antepartum and intrapartum infection	763	198	130	68	196	129	67	2	1	1
Difficult labor	764–768	268	197	71	268	197	71	—	—	—
With mention of birth injury	(0.3)	61	46	15	61	46	15	—	—	—
Without mention of birth injury	(4.9)	207	151	56	207	151	56	—	—	—
All other complications of pregnancy and childbirth	769.0–769.2,769.4,769.5,769.9	2,480	1,724	756	2,466	1,717	749	14	7	7
Conditions of placenta	770	768	594	174	766	594	172	2	—	2
Conditions of umbilical cord	771	177	137	40	176	137	39	1	—	1
Birth injury without mention of cause	772	1,851	1,347	504	1,844	1,343	501	7	4	3
Hemolytic disease of newborn	774,775	213	178	35	206	175	31	7	3	4
Hyaline membrane disease	776.1	2,667	1,971	696	2,506	1,856	650	161	115	46
Respiratory distress syndrome	776.2	3,324	2,409	915	3,030	2,218	812	294	191	103
Asphyxia of newborn, unspecified	776.9	2,955	1,945	1,010	2,929	1,927	1,002	26	18	8
All other anoxic and hypoxic conditions not elsewhere classifiable	776.0,776.3,776.4	610	395	215	603	389	214	7	6	1
Immaturity, unqualified	777	3,677	2,214	1,463	3,652	2,201	1,451	25	13	12
Postmaturity	778.1	1	—	1	1	—	1	—	—	—
Hemorrhagic disease of newborn	778.2	489	321	168	487	319	168	2	2	—
All other conditions of newborn	778.0,778.3,778.9	2,093	1,280	813	2,083	1,273	810	10	7	3
Symptoms and ill-defined conditions	780–796	5,713	3,725	1,988	635	402	233	5,078	3,323	1,755
Accidents	E800–E949	1,262	880	382	117	75	42	1,145	805	340
Inhalation and ingestion of food or other object causing obstruction or suffocation	E911,E912	296	194	102	28	17	11	268	177	91
Accidental mechanical suffocation	E913	242	167	75	14	9	5	228	158	70
Other accidental causes	E800–E910,E914–E949	724	519	205	75	49	26	649	470	179
Homicide	E960–E978	161	94	67	35	21	14	126	73	53
All other causes	Residual	1,747	1,190	557	605	448	157	1,142	742	400

Table 6. Infant, neonatal, and postneonatal deaths from 61 selected causes, by race: United States, 1979, 1983, and 1988

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Ninth Revision, 1975]

Cause of death	Under 1 year				Under 28 days				28 days–11 months			
	All races		All other		All races		All other		All races		All other	
	White	Total	Black	White	Total	Black	White	Total	Black	White	Total	Black
1979												
All causes	45,665	32,079	13,586	12,586	30,980	22,141	8,839	8,270	14,685	9,938	4,747	4,316
Certain intestinal infections. 008–009	106	59	47	44	9	6	3	3	97	53	44	41
Whooping cough. 033	6	4	2	2	–	–	–	–	6	4	2	2
Meningococcal infection 036	89	79	10	10	5	3	2	2	84	76	8	8
Septicemia. 038	262	159	103	96	262	159	103	96
Viral diseases. 045–079	155	116	39	34	61	49	12	11	94	67	27	23
Congenital syphilis. 090	6	4	2	1	5	3	2	1	1	1	–	–
Remainder of infectious and parasitic diseases. 001–007, 010–032, 034–035, 037, 039–041, 080–088, 091–139	87	62	25	21	12	9	3	3	75	53	22	18
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues. 140–208	116	95	21	19	14	10	4	3	102	85	17	16
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature. 210–239	48	41	7	7	13	12	1	1	35	29	6	6
Diseases of thymus gland 254	8	6	2	–	1	1	–	–	7	5	2	–
Cystic fibrosis. 277.0	38	35	3	2	5	5	–	–	33	30	3	2
Diseases of blood and blood-forming organs 280–289	122	81	41	34	34	17	17	11	88	64	24	23
Meningitis 320–322	441	273	168	151	143	92	51	49	298	181	117	102
Other diseases of nervous system and sense organs 323–389	540	399	141	121	38	30	8	4	502	369	133	117
Acute upper respiratory infections 460–465	94	58	36	36	8	4	4	4	86	54	32	32
Bronchitis and bronchiolitis 466, 490–491	151	104	47	44	8	5	3	3	143	99	44	41
Pneumonia and influenza 480–487	1,129	703	426	395	278	192	86	83	851	511	340	312
Pneumonia 480–486	1,120	699	421	391	276	192	84	81	844	507	337	310
Influenza 487	9	4	5	4	2	–	2	2	7	4	3	2
Remainder of diseases of respiratory system 470–478, 492–519	515	332	183	170	83	56	27	26	432	276	156	144
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550–553, 560	171	123	48	40	91	75	16	12	80	48	32	28
Gastritis, duodenitis, and noninfective enteritis and colitis. 535, 555–558	232	129	103	90	40	22	18	17	192	107	85	73
Remainder of diseases of digestive system 520–534, 536–543, 562–579	250	176	74	67	62	43	19	19	188	133	55	48
Congenital anomalies 740–759	8,923	7,288	1,635	1,434	6,387	5,298	1,089	951	2,536	1,990	546	483
Anencephalus and similar anomalies 740	775	698	77	59	762	690	72	56	13	8	5	3
Spina bifida 741	270	232	38	29	151	134	17	14	119	98	21	15
Congenital hydrocephalus 742.3	312	248	64	60	202	160	42	39	110	88	22	21
Other congenital anomalies of central nervous system and eye 742.0–742.2, 742.4–742.9, 743	313	249	64	57	203	171	32	30	110	78	32	27
Congenital anomalies of heart 745–746	2,867	2,341	526	464	1,687	1,408	279	249	1,180	933	247	215
Other congenital anomalies of circulatory system 747	854	640	214	188	615	455	160	138	239	185	54	50
Congenital anomalies of respiratory system. 748	568	447	121	108	501	403	98	86	67	44	23	22
Congenital anomalies of digestive system. 749–751	263	222	41	37	96	79	17	17	167	143	24	20
Congenital anomalies of genitourinary system 752–753	412	351	61	57	384	330	54	50	28	21	7	7

Congenital anomalies of musculoskeletal system	754-756	653	543	110	95	559	466	93	79	94	77	17	16
Down's syndrome	758.0	122	102	20	18	41	38	3	2	81	64	17	16
Other chromosomal anomalies	758.1-758.9	495	401	94	81	324	270	54	44	171	131	40	37
All other and unspecified congenital anomalies	744,757,759	1,019	814	205	181	862	694	168	147	157	120	37	34
Certain conditions originating in the perinatal period	760-779	23,322	15,933	7,389	7,002	22,483	15,371	7,112	6,735	839	562	277	267
Newborn affected by maternal conditions which may be unrelated to present pregnancy	760	126	82	44	42	118	77	41	40	8	5	3	2
Newborn affected by maternal complications of pregnancy	761	1,621	1,064	557	514	1,607	1,058	549	506	14	6	8	8
Newborn affected by complications of placenta, cord, and membranes	762	970	749	221	209	962	744	218	206	8	5	3	3
Newborn affected by other complications of labor and delivery	763	147	109	38	33	145	109	36	31	2	-	2	2
Slow fetal growth and fetal malnutrition	764	56	41	15	15	53	39	14	14	3	2	1	1
Disorders relating to short gestation and unspecified low birthweight	765	3,495	2,122	1,373	1,312	3,469	2,105	1,364	1,303	26	17	9	9
Disorders relating to long gestation and high birthweight	766	-	-	-	-	-	-	-	-	-	-	-	-
Birth trauma	767	1,129	810	319	296	1,110	798	312	289	19	12	7	7
Intrauterine hypoxia and birth asphyxia	768	1,393	964	429	389	1,339	927	412	374	54	37	17	15
Fetal distress in liveborn infant	768.2-768.4	287	202	85	69	282	199	83	67	5	3	2	2
Birth asphyxia	768.5-768.9	1,106	762	344	320	1,057	728	329	307	49	34	15	13
Respiratory distress syndrome	769	5,458	3,997	1,461	1,378	5,180	3,798	1,382	1,301	278	199	79	77
Other respiratory conditions of newborn	770	3,954	2,682	1,272	1,216	3,628	2,461	1,167	1,112	326	221	105	104
Infections specific to the perinatal period	771	981	712	269	256	948	691	257	246	33	21	12	10
Neonatal hemorrhage	772	924	671	253	237	924	671	253	237	-	-	-	-
Hemolytic disease of newborn, due to isoimmunization, and other perinatal jaundice	773-774	95	75	20	19	83	69	14	14	12	6	6	5
Syndrome of "Infant of a diabetic mother" and neonatal diabetes mellitus	775.0-775.1	17	11	6	6	17	11	6	6	-	-	-	-
Hemorrhagic disease of newborn	776.0	15	9	6	6	15	9	6	6	-	-	-	-
All other and ill-defined conditions originating in the perinatal period	775.2-775.9,776.1-779	2,941	1,835	1,106	1,074	2,885	1,804	1,081	1,050	56	31	25	24
Symptoms, signs, and ill-defined conditions	780-799	5,899	3,835	2,064	1,879	540	356	184	167	5,359	3,479	1,880	1,712
Sudden infant death syndrome	798.0	5,279	3,489	1,790	1,630	415	276	139	126	4,864	3,213	1,651	1,504
Symptoms, signs, and all other ill-defined conditions	780-797,798.1-799	620	346	274	249	125	80	45	41	495	266	229	208
Accidents and adverse effects	E800-E949	1,080	744	336	309	88	60	28	26	992	684	308	283
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation	E911-E912	256	168	88	83	23	11	12	11	233	157	76	72
Accidental mechanical suffocation	E913	181	127	54	49	11	7	4	4	170	120	50	45
Other accidental causes and adverse effects	E800-E910,E914-E949	643	449	194	177	54	42	12	11	589	407	182	166
Homicide	E960-E969	170	96	74	70	37	22	15	14	133	74	59	56
Child battering and other maltreatment	E967	63	34	29	28	5	2	3	3	58	32	26	25
Other homicide	E960-E966,E968-E969	107	62	45	42	32	20	12	11	75	42	33	31
All other causes	Residual	1,705	1,145	560	508	535	400	135	125	1,170	745	425	383

Table 6. Infant, neonatal, and postneonatal deaths from 61 selected causes, by race: United States, 1979, 1983, and 1988—Con.

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Ninth Revision, 1975]

Cause of death	Under 1 year				Under 28 days				28 days–11 months			
	All races	White	All other		All races	White	All other		All races	White	All other	
			Total	Black			Total	Black			Total	Black
1983												
All causes	40,627	28,301	12,326	11,242	26,507	18,603	7,904	7,277	14,120	9,698	4,422	3,965
Certain intestinal infections. 008-009	131	65	66	64	5	3	2	2	126	62	64	62
Whooping cough. 033	5	5	—	—	—	—	—	—	5	5	—	—
Meningococcal infection 036	62	50	12	11	3	3	—	—	59	47	12	11
Septicemia. 038	303	199	104	96	303	199	104	96
Viral diseases. 045-079	146	102	44	31	31	24	7	5	115	78	37	26
Congenital syphilis. 090	7	3	4	4	5	2	3	3	2	1	1	1
Remainder of infectious and parasitic diseases. 001-007,010-032,034-035, 037,039-041,080-088,091-139	84	48	36	30	18	9	9	8	66	39	27	22
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues 140-208	132	105	27	20	25	17	8	5	107	88	19	15
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature 210-239	53	43	10	7	16	13	3	3	37	30	7	4
Diseases of thymus gland 254	4	4	—	—	—	—	—	—	4	4	—	—
Cystic fibrosis. 277.0	28	25	3	2	4	3	1	—	24	22	2	2
Diseases of blood and blood-forming organs 280-289	91	53	38	30	22	10	12	5	69	43	26	25
Meningitis 320-322	318	203	115	106	85	53	32	31	233	150	83	75
Other diseases of nervous system and sense organs 323-389	509	404	105	90	36	36	—	—	473	368	105	90
Acute upper respiratory infections 460-465	62	46	16	15	1	1	—	—	61	45	16	15
Bronchitis and bronchiolitis 466,490-491	123	80	43	34	5	4	1	1	118	76	42	33
Pneumonia and influenza 480-487	769	465	304	279	160	109	51	48	609	356	253	231
Pneumonia 480-486	763	460	303	278	159	109	50	47	604	351	253	231
Influenza 487	6	5	1	1	1	—	1	1	5	5	—	—
Remainder of diseases of respiratory system 470-478,492-519	502	346	156	142	95	76	19	18	407	270	137	124
Hernia of abdominal cavity and intestinal obstruction without mention of hernia 550-553,560	105	74	31	30	49	36	13	13	56	38	18	17
Gastritis, duodenitis, and noninfective enteritis and colitis. 535,555-558	140	79	61	53	27	17	10	8	113	62	51	45
Remainder of diseases of digestive system 520-534,536-543,562-579	214	156	58	50	46	30	16	14	168	126	42	36
Congenital anomalies 740-759	8,732	7,026	1,706	1,443	6,428	5,222	1,206	1,017	2,304	1,804	500	426
Anencephalus and similar anomalies. 740	699	608	91	63	685	594	91	63	14	14	—	—
Spina bifida 741	122	107	15	13	63	55	8	7	59	52	7	6
Congenital hydrocephalus 742.3	227	172	55	50	129	100	29	24	98	72	26	26
Other congenital anomalies of central nervous system and eye 742.0-742.2,742.4-742.9,743	323	258	65	58	180	148	32	29	143	110	33	29
Congenital anomalies of heart 745-746	2,570	2,042	528	434	1,505	1,199	306	259	1,065	843	222	175
Other congenital anomalies of circulatory system 747	923	686	237	216	709	512	197	182	214	174	40	34
Congenital anomalies of respiratory system. 748	907	725	182	155	840	680	160	134	67	45	22	21
Congenital anomalies of digestive system. 749-751	163	123	40	35	64	53	11	9	99	70	29	26
Congenital anomalies of genitourinary system 752-753	498	430	68	61	468	405	63	56	30	25	5	5
Congenital anomalies of musculoskeletal system 754-756	738	631	107	85	653	563	90	70	85	68	17	15

Down's syndrome	758.0	84	64	20	18	25	20	5	3	59	44	15	15
Other chromosomal anomalies	758.1-758.9	643	525	118	98	429	353	76	61	214	172	42	37
All other and unspecified congenital anomalies	744,757,759	835	655	180	157	678	540	138	120	157	115	42	37
Certain conditions originating in the perinatal period.	760-779	19,157	12,715	6,442	6,051	18,160	12,070	6,090	5,723	997	645	352	328
Newborn affected by maternal conditions which may be unrelated to present pregnancy.	760	137	84	53	49	122	77	45	42	15	7	8	7
Newborn affected by maternal complications of pregnancy	761	1,452	998	454	432	1,443	992	451	430	9	6	3	2
Newborn affected by complications of placenta, cord, and membranes	762	869	631	238	213	863	626	237	212	6	5	1	1
Newborn affected by other complications of labor and delivery.	763	92	69	23	20	90	68	22	19	2	1	1	1
Slow fetal growth and fetal malnutrition	764	43	34	9	9	39	31	8	8	4	3	1	1
Disorders relating to short gestation and unspecified low birthweight.	765	3,332	1,932	1,400	1,338	3,297	1,913	1,384	1,323	35	19	16	15
Disorders relating to long gestation and high birthweight	766	-	-	-	-	-	-	-	-	-	-	-	-
Birth trauma	767	445	337	108	99	434	327	107	98	11	10	1	1
Intrauterine hypoxia and birth asphyxia	768	1,199	845	354	328	1,125	791	334	311	74	54	20	17
Fetal distress in liveborn infant.	768.2-768.4	242	169	73	68	225	157	68	63	17	12	5	5
Birth asphyxia	768.5-768.9	957	676	281	260	900	634	266	248	57	42	15	12
Respiratory distress syndrome	769	3,682	2,671	1,011	934	3,445	2,514	931	859	237	157	80	75
Other respiratory conditions of newborn	770	3,438	2,265	1,173	1,103	2,962	1,966	996	934	476	299	177	169
Infections specific to the perinatal period	771	870	629	241	215	830	600	230	206	40	29	11	9
Neonatal hemorrhage	772	524	349	175	163	523	349	174	162	1	-	1	1
Hemolytic disease of newborn, due to Isoimmunization, and other perinatal jaundice	773-774	61	40	21	20	53	35	18	18	8	5	3	2
Syndrome of "infant of a diabetic mother" and neonatal diabetes mellitus	775.0-775.1	18	14	4	4	17	13	4	4	1	1	-	-
Hemorrhagic disease of newborn	776.0	7	6	1	1	7	6	1	1	-	-	-	-
All other and ill-defined conditions originating in the perinatal period	775.2-775.9,776.1-779	2,988	1,811	1,177	1,123	2,910	1,762	1,148	1,096	78	49	29	27
Symptoms, signs, and ill-defined conditions	780-799	5,927	3,981	1,946	1,748	541	333	208	184	5,386	3,648	1,738	1,564
Sudden infant death syndrome	798.0	5,305	3,613	1,692	1,518	403	249	154	135	4,902	3,364	1,538	1,383
Symptoms, signs, and all other ill-defined conditions	780-797,798.1-799	622	368	254	230	138	84	54	49	484	284	200	181
Accidents and adverse effects	E800-E949	956	667	289	267	70	51	19	18	886	616	270	249
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation	E911-912	189	130	59	53	19	14	5	5	170	116	54	48
Accidental mechanical suffocation	E913	174	115	59	59	10	6	4	4	164	109	55	55
Other accidental causes and adverse effects	E800-E910,E914-E949	593	422	171	155	41	31	10	9	552	391	161	146
Homicide	E960-E969	193	104	89	81	36	16	20	17	157	88	69	64
Child battering and other maltreatment	E967	57	33	24	22	6	1	5	5	51	32	19	17
Other homicide	E960-E966,E968-E969	136	71	65	59	30	15	15	12	106	56	50	47
All other causes	Residual	1,874	1,253	621	558	639	465	174	154	1,235	788	447	404

Table 6. Infant, neonatal, and postneonatal deaths from 61 selected causes, by race: United States, 1979, 1983, and 1988—Con.

[Data are infant (under 1 year), neonatal (under 28 days), and postneonatal (28 days–11 months) deaths in specified group. Numbers after causes of death are category numbers of the International Classification of Diseases, Ninth Revision, 1975; Beginning 1987 includes category number *042–*044; see appendix]

Cause of death	Under 1 year				Under 28 days				28 days–11 months				
	All races		All other		All races		All other		All races		All other		
	Total	White	Total	Black	Total	White	Total	Black	Total	White	Total	Black	
1988													
All causes	38,910	25,925	12,985	11,840	24,690	16,346	8,344	7,695	14,220	9,579	4,641	4,145	
Certain intestinal infections	008–009	85	45	40	39	3	2	1	1	82	43	39	38
Whooping cough	033	4	3	1	1	—	—	—	—	4	3	1	1
Meningococcal infection	036	72	54	18	16	5	3	2	1	67	51	16	15
Septicemia	038	245	155	90	82	245	155	90	82
Viral diseases	045–079	110	80	30	25	30	21	9	9	80	59	21	16
Congenital syphilis	090	17	4	13	13	14	4	10	10	3	—	3	3
Remainder of infectious and parasitic diseases	001–007,010–032, 034–035,037,039–041,*042–*044,080–088,091–139	207	111	96	94	14	9	5	5	193	102	91	89
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues	140–208	89	70	19	18	12	10	2	2	77	60	17	16
Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature	210–239	60	53	7	4	30	26	4	3	30	27	3	1
Diseases of thymus gland	254	5	4	1	1	—	—	—	—	5	4	1	1
Cystic fibrosis	277.0	10	9	1	1	3	2	1	1	7	7	—	—
Diseases of blood and blood-forming organs	280–289	75	47	28	19	22	12	10	2	53	35	18	17
Meningitis	320–322	205	135	70	62	38	26	12	12	167	109	58	50
Other diseases of nervous system and sense organs	323–389	454	334	120	104	45	37	8	7	409	297	112	97
Acute upper respiratory infections	460–465	43	24	19	16	—	—	—	—	43	24	19	16
Bronchitis and bronchiolitis	466,490–491	115	73	42	37	3	—	3	3	112	73	39	34
Pneumonia and influenza	480–487	641	387	254	224	124	79	45	41	517	308	209	183
Pneumonia	480–486	635	384	251	222	124	79	45	41	511	305	206	181
Influenza	487	6	3	3	2	—	—	—	—	6	3	3	2
Remainder of diseases of respiratory system	470–478,492–519	420	262	158	135	54	35	19	18	366	227	139	117
Hernia of abdominal cavity and intestinal obstruction without mention of hernia550–553,560	77	49	28	27	30	21	9	8	47	28	19	19
Gastritis, duodenitis, and noninfective enteritis and colitis535,555–558	101	57	44	40	15	8	7	6	86	49	37	34
Remainder of diseases of digestive system520–534,536–543,562–579	203	135	68	63	36	21	15	15	167	114	53	48
Congenital anomalies	740–759	8,141	6,442	1,699	1,410	5,887	4,737	1,150	954	2,254	1,705	549	456
Anencephalus and similar anomalies	740	533	449	84	62	516	441	75	54	17	8	9	8
Spina bifida	741	69	54	15	14	47	38	9	8	22	16	6	6
Congenital hydrocephalus	742.3	171	130	41	36	86	71	15	12	85	59	26	24
Other congenital anomalies of central nervous system and eye	742.0–742.2,742.4–742.9,743	333	265	68	55	193	156	37	31	140	109	31	24
Congenital anomalies of heart	745–746	2,582	2,062	520	434	1,471	1,202	269	231	1,111	860	251	203
Other congenital anomalies of circulatory system	747	584	425	159	138	425	303	122	106	159	122	37	32
Congenital anomalies of respiratory system	748	1,109	856	253	217	1,006	787	219	187	103	69	34	30
Congenital anomalies of digestive system	749–751	107	72	35	26	55	39	16	12	52	33	19	14

Congenital anomalies of genitourinary system	752-753	505	428	77	64	470	404	66	54	35	24	11	10
Congenital anomalies of musculoskeletal system	754-756	601	488	113	89	537	435	102	81	64	53	11	8
Down's syndrome	758.0	119	90	29	24	46	42	4	4	73	48	25	20
Other chromosomal anomalies	758.1-758.9	795	637	158	127	555	447	108	85	240	190	50	42
All other and unspecified congenital anomalies	744,757,759	633	486	147	124	480	372	108	89	153	114	39	35
Certain conditions originating in the perinatal period	760-779	18,036	11,060	6,976	6,566	16,942	10,378	6,564	6,183	1,094	682	412	383
Newborn affected by maternal conditions which may be unrelated to present pregnancy	760	147	83	64	57	137	81	56	52	10	2	8	5
Newborn affected by maternal complications of pregnancy	761	1,411	875	536	509	1,402	871	531	504	9	4	5	5
Newborn affected by complications of placenta, cord, and membranes	762	907	615	292	268	899	608	291	267	8	7	1	1
Newborn affected by other complications of labor and delivery	763	60	40	20	18	58	39	19	17	2	1	1	1
Slow fetal growth and fetal malnutrition	764	38	20	18	18	36	18	18	18	2	2	-	-
Disorders relating to short gestation and unspecified low birthweight	765	3,268	1,726	1,542	1,478	3,198	1,684	1,514	1,451	70	42	28	27
Disorders relating to long gestation and high birthweight	766	-	-	-	-	-	-	-	-	-	-	-	-
Birth trauma	767	216	148	68	59	209	143	66	58	7	5	2	1
Intrauterine hypoxia and birth asphyxia	768	777	527	250	232	724	481	243	227	53	46	7	5
Fetal distress in liveborn infant	768.2-768.4	193	132	61	56	178	119	59	55	15	13	2	1
Birth asphyxia	768.5-768.9	584	395	189	176	546	362	184	172	38	33	5	4
Respiratory distress syndrome	769	3,181	2,148	1,033	957	2,958	2,004	954	884	223	144	79	73
Other respiratory conditions of newborn	770	3,588	2,269	1,319	1,241	3,008	1,913	1,095	1,030	580	356	224	211
Infections specific to the perinatal period	771	878	574	304	279	833	546	287	263	45	28	17	16
Neonatal hemorrhage	772	324	198	126	116	321	196	125	115	3	2	1	1
Hemolytic disease of newborn, due to isoimmunization, and other perinatal jaundice	773-774	45	34	11	10	39	31	8	7	6	3	3	3
Syndrome of "infant of a diabetic mother" and neonatal diabetes mellitus	775.0-775.1	8	7	1	1	8	7	1	1	-	-	-	-
Hemorrhagic disease of newborn	776.0	3	1	2	2	3	1	2	2	-	-	-	-
All other and ill-defined conditions originating in the perinatal period	775.2-775.9,776.1-779	3,185	1,795	1,390	1,321	3,109	1,755	1,354	1,287	76	40	36	34
Symptoms, signs, and ill-defined conditions	780-799	6,486	4,342	2,144	1,918	587	369	218	195	5,899	3,973	1,926	1,723
Sudden infant death syndrome	798.0	5,476	3,771	1,705	1,520	368	248	120	108	5,108	3,523	1,585	1,412
Symptoms, signs, and all other ill-defined conditions	780-797,798.1-799	1,010	571	439	398	219	121	98	87	791	450	341	311
Accidents and adverse effects	E800-E949	936	638	298	281	74	52	22	20	862	586	276	261
Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation	E911-912	145	95	50	48	7	4	3	3	138	91	47	45
Accidental mechanical suffocation	E913	198	120	78	72	11	8	3	3	187	112	75	69
Other accidental causes and adverse effects	E800-E910,E914-E949	593	423	170	161	56	40	16	14	537	383	154	147
Homicide	E960-E969	315	180	135	127	60	34	26	24	255	146	109	103
Child battering and other maltreatment	E967	108	71	37	34	8	5	3	3	100	66	34	31
Other homicide	E960-E966,E968-E969	207	109	98	93	52	29	23	21	155	80	75	72
All other causes	Residual	1,758	1,172	586	517	662	460	202	175	1,096	712	384	342

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Appendix

Technical notes

on methods

Nature and sources of data

Data shown in this report are based on information from all death certificates filed in the 50 States and the District of Columbia, except for 1972 data that are based on a 50-percent sample of death certificates. Mortality statistics are based on information coded by the National Center for Health Statistics (NCHS) from copies of original death certificates received from the State registration offices and on State-coded data provided to NCHS through the Vital Statistics Cooperative Program (VSCP).

Since 1971 an increasing number of States have submitted precoded demographic data on computer tapes to NCHS as part of the VSCP. By 1985 all States were providing precoded demographic data on computer tapes to NCHS. In 1974 States began submitting precoded medical (cause-of-death) data on computer tapes as well. In 1988 the following 22 States submitted precoded medical data: California, Colorado, Florida, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Nebraska, New Hampshire, New York State (excluding New York City), North Carolina, Pennsylvania, South Carolina, Texas, Vermont, Virginia, and Wisconsin. In addition, NCHS contracted with Colorado, Kansas, Mississippi, and Wisconsin to precode medical data for the following five States: Alaska, Delaware, Idaho, North Dakota, and Wyoming. The remaining 23 VSCP States, New York City, and the District of Columbia submitted copies of the original certificates from which NCHS coded the medical data.

Data for the United States as a whole refer to events occurring within the United States. Beginning with 1970 vital statistics data exclude births and deaths to nonresidents of the United States. All data exclude fetal deaths.

New Jersey, 1962–63—New Jersey omitted the race item from its birth and death certificates beginning in 1962. The item was restored in the latter part of 1962. However, the certificate revision without the race item was used for most of 1962 and 1963. Therefore figures by race for 1962 and 1963 exclude New Jersey.

Completeness of reporting

Some underregistration of births and deaths occurred before 1960 (9,17). In 1960 birth registration for the United States was estimated to be 99.1 percent complete,

and registration has improved since then (9). Death registration is believed to have been at least as complete as birth registration during the same period.

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with World Health Organization (WHO) regulations, which specify the classification system used by member nations for classifying causes of death, the form of the medical certification used to collect cause-of-death data, and the procedures used in coding cause-of-death data. Tabulations of cause-of-death data presented in this report are based solely on the underlying cause of death, which is defined by WHO as "(a) the disease or injury which initiated the train of events leading directly to death, or (b) as the circumstances of the accident or violence which produced the fatal injury (23)." The underlying cause of death is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the International Classification of Diseases (ICD), and associated selection rules. In general, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. Cause-of-death data were coded according to procedures outlined in annual issues of Part 2a of the *NCHS Instruction Manual* (47).

WHO specifies that member nations classify causes of death by the current *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*. This classification system is revised periodically to take into account advances in medical knowledge. Causes of death from 1979 to present were classified according to the *Ninth Revision International Classification of Diseases* (23). From 1968–78 causes of death were classified according to the Eighth Revision, and from 1958–67, according to the Seventh Revision.

Changes in the classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. For instance, in successive revisions a particular cause of death may be relocated from one chapter of the ICD to another. An example of this was the reassignment of many infant deaths due to Septicemia from the Infectious Diseases Chapter in the Eighth Revi-

Table I. Most nearly comparable category numbers and infant comparability ratios for selected causes of infant death

Ninth revision list title	Most nearly comparable category numbers by revision and years in use			Infant comparability ratios
	Ninth: 1979–present	Eighth: 1968–78	Seventh: 1958–67	
Congenital anomalies	740–759	740–759	750–759	9th/8th = 1.007 8th/7th = 1.036
Sudden infant death syndrome	798.0	795.0	(¹)	9th/8th = 0.995
Respiratory distress syndrome	(I) 769 (II) 769	776.1, 776.2 776.1	(¹) 773	9th/8th = 1.071 9th/8th = 2.313 8th/7th = ^{2,3} 0.459
Disorders relating to short gestation and unspecified low birthweight	765	777	776	9th/8th = 0.963 8th/7th = 0.868
Newborn affected by maternal complications of pregnancy	761	769.0–769.2, 769.4, 769.5, 769.9	773	9th/8th = ³ 0.552 8th/7th = ^{2,3} 0.563
Intrauterine hypoxia and birth asphyxia	768	776.9	762	9th/8th = ³ 0.327 8th/7th = 0.871
Infections specific to the perinatal period	771	038	053	9th/8th = 0.894 8th/7th = ³ 2.837
Accidents and adverse effects	E800–E949	E800–E949	E800–E962	9th/8th = 0.935 8th/7th = ² 0.916
Newborn affected by complications of placenta, cord, and membranes	(I) 762 (II) 762	770, 771 770	761 761	9th/8th = 1.039 8th/7th = ^{2,3} 0.674 9th/8th = 1.300 8th/7th = ^{2,3} 0.580
Pneumonia and influenza	480–487	470–474, 480–486	480–483, 490–493, 763	9th/8th = 0.747 8th/7th = 1.075
Birth trauma	767	764–768 (.0–.03), 772	760, 761	9th/8th = 0.715 8th/7th = ³ 0.330
Certain gastrointestinal diseases	008–009, 535, 555–558	004, 006–009, 535, 561, 563	045–048, 543, 571, 572, 764	9th/8th = ³ 0.468 8th/7th = 1.075
Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice	773–774	774, 775	770	9th/8th = 0.730 8th/7th = ² 0.799
Diseases of heart	390–398, 402, 404–429	390–398, 402, 404, 410–429	400–402, 410–443	9th/8th = ² 0.822 8th/7th = ² 1.025

NOTE: For some causes of infant death two sets of comparable categories are shown, identified as I and II. Categories shown in I are those used to facilitate the analyses in this report; they represent combinations of titles selected to be most comparable in successive revisions. Categories shown in II are the traditionally produced single most nearly comparable title in successive revisions.

¹There was no comparable Seventh Revision category for this cause.

²In the absence of a comparability ratio for this cause, an approximation of the ratio is the number of deaths assigned to the category in the first year of the more recent Revision divided by the number assigned to the most nearly comparable category in the last year of the previous Revision. The most nearly comparable category is identified as either the most nearly comparable title or the category to which the cause or its components were indexed in the previous Revision.

³Category not considered sufficiently comparable for the purposes of trend analysis.

sion to the Perinatal Chapter in the Ninth Revision. Discontinuities may also result from changes in the rules used to select the underlying cause of death from the possible several morbid conditions listed on the death certificate. In addition, altogether new terminology for a cause of death is sometimes introduced, such as Respiratory distress syndrome (ICDA-8 No. 776.2), which was introduced beginning with the Eighth Revision.

After each ICD revision, NCHS undertakes comparability studies that give a quantitative estimate of the extent of the discontinuity in trend data for specific cause-of-death categories between the successive revision periods. In a comparability study, the same death certificates are dual-coded using the old and new revisions. "Comparability ratios" for cause-of-death categories are calculated by

dividing the number of deaths classified to a category using the new revision by the number of deaths classified to the most nearly comparable category in the previous revision (24–26). A comparability ratio near 1.000 indicates a close correspondence in cause-of-death classification between revision periods. The ratios are especially relevant for the beginning of the new revision period, but they may lose their specificity over time, as diagnostic practices and terminology change. Nevertheless, they are an essential tool in analyzing trends in causes of death that span more than one revision period. Comparability ratios between the Eighth and Ninth Revisions, and between the Seventh and Eighth Revisions, are published in NCHS reports (24–26). Comparability ratios for causes of infant death in this report are shown in table I.

Codes for HIV infection

Beginning with data for 1987, NCHS introduced category numbers *042-*044 for classifying and coding Human immunodeficiency virus (HIV) infection. The asterisk before the category numbers indicates that these codes are not part of the Ninth Revision of the ICD. Deaths classified to HIV infection are included, but not shown separately, in the category Remainder of infectious and parasitic diseases in the List of 61 Selected Causes of Infant Death shown in table 6. Before 1987 deaths involving HIV infection were classified to Deficiency of cell-mediated immunity (ICD-9 No. 279.1), contained in the category All other causes; to Pneumocystosis (ICD-9 No. 136.3), contained in the category Remainder of infectious and parasitic diseases; to Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues; and to a number of other causes.

From 1983 to 1986 acquired immunodeficiency syndrome and HIV infection, when reported on the death certificate, were assigned to the category Deficiency of cell-mediated immunity, which also contained non-HIV infection deaths. Because the rules for selecting the underlying cause of death were developed before the identification of HIV infection, other conditions mentioned on the death certificate were often selected as the underlying cause of death during this period. As a consequence, detailed cause-of-death data for 1988 shown in table 6 are

not strictly comparable with data for previous years. This change does not have an impact on the data on leading causes of death discussed in the body of this report.

Cause-of-death rankings

Cause-of-death rankings for infants are based on tabulation lists in use during a specified ICD revision period. For the Ninth Revision, the list is the List of 61 Selected Causes of Infant Death and HIV infection (48); for the Eighth Revision, the List of 65 Selected Causes of Infant Death (49); and for the Seventh Revision, the List of 55 Selected Causes of Infant Death (50).

The cause-of-death titles Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions are not ranked for the List of 61 Selected Causes of Infant Death. For the List of 65 Selected Causes of Infant Death, the titles Certain causes of mortality in early infancy and Symptoms and ill-defined conditions are not ranked. For the List of 55 Selected Causes of Infant Death the titles Certain diseases of early infancy and Symptoms and ill-defined conditions are not ranked. For all three lists, category titles that begin with the words "Other" and "All other" are not ranked. When one of the titles that represents a subtotal is ranked (for example, Pneumonia and influenza), its component parts are not ranked.

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

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