

# Annual Summary of Vital Statistics: 2007



**WHAT'S KNOWN ON THIS SUBJECT:** The last annual summary article presented vital statistics information through 2006 (preliminary data).



**WHAT THIS STUDY ADDS:** This annual summary article presents preliminary 2007 and final 2006 data for both births and deaths.

## abstract

FREE

The number of births in the United States increased between 2006 and 2007 (preliminary estimate of 4 317 119) and is the highest ever recorded. Birth rates increased among all age groups (15 to 44 years); the increase among teenagers is contrary to a long-term pattern of decline during 1991–2005. The total fertility rate increased 1% in 2007 to 2122.5 births per 1000 women. This rate was above replacement level for the second consecutive year.

The proportion of all births to unmarried women increased to 39.7% in 2007, up from 38.5% in 2006, with increases noted for all race and Hispanic-origin groups and within each age group of 15 years and older. In 2007, 31.8% of all births occurred by cesarean delivery, up 2% from 2006. Increases in cesarean delivery were noted for most age groups and for non-Hispanic white, non-Hispanic black, and Hispanic women.

Multiple-birth rates, which rose rapidly over the last several decades, did not increase during 2005–2006. The 2007 preterm birth rate was 12.7%, a decline of 1% from 2006. The low-birth-weight rate also declined in 2007 to 8.2%.

The infant mortality rate was 6.77 infant deaths per 1000 live births in 2007, which is not significantly different from the 2006 rate. Non-Hispanic black infants continued to have much higher rates than non-Hispanic white and Hispanic infants. States in the southeastern United States had the highest infant and fetal mortality rates. The United States continues to rank poorly in international comparisons of infant mortality.

Life expectancy at birth reached a record high of 77.9 years in 2007. Crude death rates for children aged 1 to 19 years decreased by 2.5% between 2006 and 2007. Unintentional injuries and homicide were the first and second leading causes of death, respectively, accounting for 53.7% of all deaths to children and adolescents in 2007. *Pediatrics* 2010;125:4–15

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### KEY WORDS

birth, death, teenaged fertility, infant mortality, low birth weight, mortality, multiple births, cesarean rate, vital statistics, ICD-10, revised certificates

### ABBREVIATIONS

NCHS—National Center for Health Statistics  
IMR—infant mortality rate  
NMR—neonatal mortality rate  
PNMR—postneonatal mortality rate  
PMR—perinatal mortality rate  
FMR—fetal mortality rate  
EFMR—early fetal mortality rate  
LFMR—late fetal mortality rate  
OMB—Office of Management and Budget  
TFR—total fertility rate  
ART—assisted reproductive technologies  
LBW—low birth weight

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This annual article is a long-standing feature in *Pediatrics* and provides a summary of the most current vital statistics data for the United States. We have also included a special feature on the recent increase in birth rates for teenagers.

## METHODS

The data presented in this report were obtained from vital statistics records: birth certificates, fetal death reports, and death certificates for residents in all US states and the District of Columbia. Birth data for 2007 are preliminary and based on ~99% of records. Mortality data for 2007 are preliminary and based on ~90% of records. Birth and death data for 2006 and earlier years are final and include all records. More complete descriptions of vital statistics data systems are available elsewhere.<sup>1-6</sup>

Current vital statistics patterns and recent trends through 2006 and 2007 are presented in this report according to age, race, and Hispanic origin as well as other birth and death characteristics. More detailed data are available for final 2006 births than for preliminary 2007 births; therefore, some of the detailed analyses of birth patterns are presented by using 2006 data. Data on infant deaths from the linked birth/infant death data set, as well as data on fetal and perinatal mortality, are final data for 2005. Hispanic origin and race are collected as separate items in vital records. Persons of Hispanic origin may be of any race. A number of reporting areas allow for the reporting of multiple-race categories on birth and death certificates. However, until all areas revise their certificates to reflect updated reporting standards for race,<sup>7</sup> multiple-race data are "bridged" back to single-race categories.<sup>3,4,8,9</sup> For birth data, mother's marital status was reported directly in all but 2 states (Michigan and New York) in 2006 and 2007. Details

about the reporting of marital status in those 2 states and methods of edits and imputations applied to other items on the birth certificate are presented in publications of the National Center for Health Statistics (NCHS).<sup>1,3,5</sup>

Cause-of-death statistics in this report are based solely on the underlying cause of death compiled in accordance with the *International Classification of Diseases, 10th Revision* (ICD-10).<sup>10</sup> The underlying cause of death is defined as "(a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury."<sup>10</sup> Ranking for leading causes of death is based on number of deaths.<sup>11</sup> Infant mortality refers to the death of an infant younger than 1 year. Infant mortality rates (IMRs) were computed by dividing the total number of infant deaths in each calendar year by the total number of live births in the same year. Neonatal mortality rates (NMRs) are shown for infant deaths at <28 days, and postneonatal mortality rates (PNMRs) are shown for infant deaths at 28 days to younger than 1 year. The denominator for both rates is the number of live births. Perinatal mortality rates (PMRs) include fetal deaths at  $\geq 28$  weeks of gestation and infant deaths at <7 days of age. Fetal mortality rates (FMRs) are shown for fetal deaths at  $\geq 20$  weeks of gestation. Early fetal mortality rates (EFMRs) are shown for fetal deaths at 20 to 27 weeks of gestation, and late fetal mortality rates (LFMRs) are shown for fetal deaths at  $\geq 28$  weeks of gestation. FMRs and PMRs were computed by dividing the number of fetal or perinatal deaths by the number of live births plus fetal deaths of the gestational period specified in the numerator. Because of a programming error in the FMRs originally published by the NCHS, the FMRs have been recalculated for

this report and may differ from those originally published.<sup>12</sup>

The latest infant mortality statistics according to race and Hispanic origin are from the 2005 period linked birth/infant death data set.<sup>13</sup> In this data set, the death certificate was linked with the corresponding birth certificate for each infant who died in the United States in 2005. The purpose of this linkage was to use additional variables available from the birth certificate, such as birth weight, to better interpret infant mortality patterns.

Birth data for 2007 are for selected items that were collected by using both the 1989 (unrevised) and the 2003 (revised) US Standard Certificates of Live Birth. The 2003 revision is described in detail elsewhere.<sup>3,5,14,15</sup> A list of the 24 reporting areas with revised birth certificates in 2007 (accounting for 60% of births) is available elsewhere.<sup>1</sup> Information on prenatal care and smoking during pregnancy are not comparable between the 2 versions of the birth certificate.<sup>14,15</sup> Consequently, data on these topics are not combined for the revised and unrevised reporting areas. Prenatal care data are based on 18 reporting areas (accounting for 35% of 2006 births) that implemented the revised birth certificate as of January 1, 2006.<sup>3</sup> Information on smoking during pregnancy is based on the same reporting areas as for prenatal care, with the exclusion of Florida.<sup>3</sup> Trend analyses of prenatal care and smoking during pregnancy are compromised by the yearly change in the composition of revised and unrevised reporting areas. Information on prenatal care and smoking during pregnancy, based on limited geographic coverage, is not generalizable to the entire United States.

Mortality data for 2007 were collected by using both the 1989 (unrevised) and 2003 (revised) versions of the US Standard Certificates of Death. The 2003 revi-

**TABLE 1** Vital Statistics of the United States, Selected Years: 1915–2006 (Final) and 2007 (Preliminary)

	n			Rate <sup>a</sup>						
	2007	2006	2000	2007	2006	2000	1990	1980	1950	1915 <sup>b</sup>
Live births	4 317 119	4 265 555	4 058 814	14.3	14.2	14.4	16.7	15.9	24.1	29.5
Fertility rate	NA	NA	NA	69.5	68.5	65.9	70.9	68.4	106.2	125.0
Deaths	2 423 995	2 426 264	2 403 351	8.0	8.1	8.5	8.6	8.8	9.6	13.2
Age-adjusted rate	NA	NA	NA	7.6	7.8	8.7	9.4	10.4	14.5	21.7
Natural increase	1 893 124	1 839 291	1 655 463	6.3	6.1	5.9	8.1	7.1	14.5	16.3
Infant mortality	29 241	28 527	28 035	6.77	6.69	6.89	9.2	12.6	29.2	99.9
Population base (in thousands)	NA	NA	NA	301 621	299 398	281 422	248 710	226 546	150 697	100 546

Data for 2007 are preliminary. Data for 2006 and all earlier years are final. Populations are as of July 1 for 2006 and 2007 and as of April 1 in 1950, 1980, 1990, and 2000. Population for 1915 is the midyear estimate based on the April 15, 1910, census. NA indicates not applicable.

<sup>a</sup> Rates per 1000 population except for fertility, which is per 1000 women aged 15 to 44 years, and infant mortality, which is per 1000 live births.

<sup>b</sup> Birth rate was adjusted to include states not in registration area (10 states and the District of Columbia when started in 1915). Death rate is for death registration area. The IMR is for birth registration area.

Data sources: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, and the US Census Bureau.

sion is described in detail elsewhere.<sup>15,16</sup> A list of the 25 reporting areas with revised death certificates as of January 1, 2007, is available elsewhere.<sup>2</sup> All mortality data items presented in this report are considered comparable between revisions; accordingly, revised and unrevised data are combined.

Population denominators for the calculation of birth, death, and fertility rates are estimates based on the population enumerated by the US Census Bureau as of April 1, 2000. Estimates for 2000–2007 and revised estimates for the intercensal period 1991–1999 were produced under a collaborative arrangement between the US Census Bureau and the NCHS. To produce birth and death rates for these time periods, reported population data for multiple-race persons were bridged back to single-race categories.<sup>8,9</sup> In addition, the 2000 census counts were modified to be consistent with the 1977 Office of Management and Budget (OMB) race categories.<sup>17</sup>

Data for the international comparisons of births and IMRs were obtained from the 2007 *United Nations Demographic Yearbook*.<sup>18</sup>

## NATURAL INCREASE

Almost 1.9 million persons were added to the US population in 2007 as a result of natural increase, or the excess of births over deaths (Table 1).<sup>1,2</sup> The rate

**TABLE 2** Age-Specific Birth Rates and TFRs According to Race and Hispanic Origin of Mother: United States, 2007 (Preliminary)

	Age-Specific Birth Rate According to Age of Mother <sup>a</sup>								TFR <sup>b</sup>
	15–44	15–17	18–19	20–24	25–29	30–34	35–39	40–44	
	y <sup>c</sup>	y	y	y	y	y	y	y	
Total	69.5	22.2	73.9	106.4	117.5	99.9	47.5	9.5	2122.5
Non-Hispanic white	60.1	11.8	50.5	83.3	108.8	99.7	45.8	8.6	1871.0
Non-Hispanic black	71.6	35.8	109.3	133.6	107.5	74.4	36.4	8.6	2134.5
Native American <sup>d</sup>	64.7	31.7	101.3	116.3	96.4	63.7	29.4	6.1	1860.5
Asian or Pacific Islander	71.4	8.4	30.7	66.2	117.9	125.1	66.3	14.5	2043.0
Hispanic <sup>e</sup>	102.1	47.8	137.1	178.5	155.6	110.8	56.4	13.4	2992.0

Race and Hispanic origin are reported separately on birth certificates. Persons of Hispanic origin may be of any race. Race categories are consistent with the 1977 OMB standards. Twenty-seven states reported multiple-race data for 2007. Multiple-race data for these states were bridged to the single-race categories of the 1977 OMB standards for comparability with other states.

<sup>a</sup> Rates per 1000 women in age-specific group.

<sup>b</sup> Sum of age-specific birth rates times 5 (includes rates for ages 10–14, 15–19, and 45–49 years, not shown separately).

<sup>c</sup> Relates the number of births to women of all ages to women aged 15 to 44 years.

<sup>d</sup> Includes births to Aleuts and Eskimos.

<sup>e</sup> Includes all persons of Hispanic origin of any race.

Data source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality.

of natural increase was 6.3 persons per 1000 population in 2007.

## BIRTHS\*

In 2007, there were 4 317 119 births, 1% more than in 2006 (4 265 555) and the highest number ever registered for the United States (Table 1).<sup>1</sup> The

\*Twenty-two reporting areas (California, Colorado, Delaware, Florida, Idaho, Indiana, Iowa, Kansas, Kentucky, Nebraska, New Hampshire, New York [excluding New York City], North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming) had implemented the revised birth certificate as of January 1, 2007.<sup>1</sup> Georgia and Michigan implemented the revised birth certificate during 2007; however, for Georgia, this occurred after January 1, and Michigan did not achieve full geographic coverage. These 24 revised states accounted for 60% of all births in 2007.

crude birth rate increased by nearly 1% in 2007 to 14.3 births per 1000 total population from 14.2 in 2006. The general fertility rate (the number of births per 1000 women aged 15–44 years) rose 1% in 2007 to 69.5. Birth rates increased among all age groups (15 to 44 years) (see Table 2 for age-specific rates for 2007). The total fertility rate (TFR) in 2007 was 2122.5 births per 1000 women, a 1% increase compared with the rate in 2006 (2100.5). The TFR estimates the number of births that a hypothetical group of 1000 women would have if they experienced, throughout their childbearing years, the age-specific birth rates observed in a given year.

## Racial and Ethnic Composition

The general fertility rate rose for each race and Hispanic-origin group between 2006 and 2007.<sup>1</sup> Increases ranged from <1% for Hispanic women to 6% for Asian or Pacific Islander women. Rates for non-Hispanic white and non-Hispanic black women rose 1%. Fertility rates differ widely among racial and ethnic groups (Table 2). Fertility rates in 2007 ranged from a low of 60.1 births per 1000 women aged 15 to 44 for non-Hispanic white women to a high of 102.1 for Hispanic women.

## Trends in Age-Specific Birth Rates

### Teenaged Childbearing

The birth rate for US teenagers rose ~1% in 2007 from 2006. The 2007 rate (based on 445 045 births) was 42.5 births per 1000 teenagers aged 15 to 19 years, up from 41.9 in 2006 and 40.5 in 2005 (Table 3; Fig 1).<sup>1</sup> The teenaged birth rate increased 5% between 2005 and 2007, with most of the increase occurring from 2005 to 2006. The birth rate for teenagers aged 15 to 17 years increased ~1% to 22.2 per 1000 in 2007 from 2006, and the birth rate for older teenagers aged 18 to 19 years rose 1% to 73.9 per 1000 (Table 3). More detailed discussion of the recent increases in teenaged birth rates is presented later in this article.

### Childbearing for Women Aged 20 Years and Older

The 2007 birth rate for women aged 20 to 24 years was 106.4 births per 1000 women (Table 2), an increase of <1% compared with 2006 (Fig 1).<sup>1</sup> The rate for women aged 25 to 29 years also increased in 2007 to 117.5 (a rise of 1%). Birth rates in 2007 for women aged 30 to 34 and 35 to 39 (99.9 and 47.5 births per 1000 women, respectively) were the highest reported since 1964, the end of the postwar “baby boom” (1946–1964).<sup>3,19</sup> The birth rate for women aged 30 to 34 years in-

**TABLE 3** Birth Rates for Teenagers According to Age, Race, and Hispanic Origin, United States, Selected Years: 1990–2006 (Final) and 2007 (Preliminary)

Age, Race, and Hispanic Origin of Mother	Birth Rate <sup>a</sup>						Percent Change	
	2007	2006	2005	2000	1991	1990	2006–2007	1991–2005
<b>15–19 y</b>								
All races	42.5	41.9	40.5	47.7	61.8	59.9	1	–34
Non-Hispanic white <sup>b</sup>	27.2	26.6	25.9	32.6	43.4	42.5	2	–40
Non-Hispanic black <sup>b</sup>	64.3	63.7	60.9	79.2	118.2	116.2	1	–48
Asian or Pacific Islander	17.3	17.0	17.0	20.5	27.3	26.4	2	–38
Native American <sup>c</sup>	59.0	55.0	52.7	58.3	84.1	81.1	7	–37
Hispanic <sup>b,d</sup>	81.7	83.0	81.7	87.3	104.6	100.3	–2	–22
<b>15–17 y</b>								
All races	22.2	22.0	21.4	26.9	38.6	37.5	1	–45
Non-Hispanic white <sup>b</sup>	11.8	11.8	11.5	15.8	23.6	23.2	0	–51
Non-Hispanic black <sup>b</sup>	35.8	36.2	34.9	50.1	86.1	84.9	–1	–59
Asian or Pacific Islander	8.4	8.8	8.2	11.6	16.3	16.0	–5	–50
Native American <sup>c</sup>	31.7	30.7	30.5	34.1	51.9	48.5	3	–41
Hispanic <sup>b,d</sup>	47.8	47.9	48.5	55.5	69.2	65.9	0	–30
<b>18–19 y</b>								
All races	73.9	73.0	69.9	78.1	94.0	88.6	1	–26
Non-Hispanic white <sup>b</sup>	50.5	49.3	48.0	57.5	70.6	66.6	2	–32
Non-Hispanic black <sup>b</sup>	109.3	108.4	103.0	121.9	162.2	157.5	1	–36
Asian or Pacific Islander	30.7	29.5	30.1	32.6	42.2	40.2	4	–29
Native American <sup>c</sup>	101.3	93.0	87.6	97.1	134.2	129.3	9	–35
Hispanic <sup>b,d</sup>	137.1	139.7	134.6	132.6	155.5	147.7	–2	–13

Race and Hispanic origin are reported separately on birth certificates. Persons of Hispanic origin may be of any race. Race categories are consistent with the 1977 OMB standards. Twenty-seven states in 2007, 23 in 2006, and 19 in 2005 reported multiple-race data. Multiple-race data for these states were bridged to the single-race categories of the 1977 OMB standards for comparability with other states.

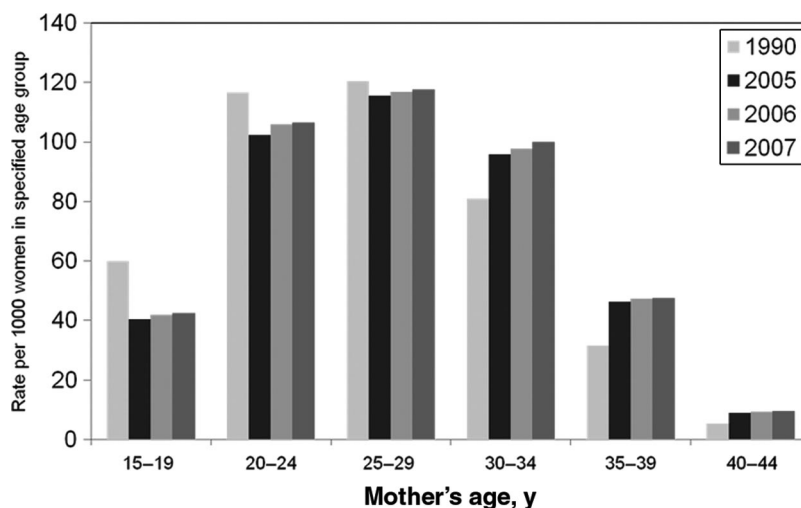
<sup>a</sup> Rates per 1000 women in specified group.

<sup>b</sup> In 1991 excludes data for New Hampshire and in 1990 excludes data for New Hampshire and Oklahoma, which did not report Hispanic origin on the birth certificate.

<sup>c</sup> Includes births to Aleuts and Eskimos.

<sup>d</sup> Includes all persons of Hispanic origin of any race.

Data source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality.



**FIGURE 1**

Birth rate according to age of the mother, United States, selected years: 1990, 2005, and 2006 (final) and 2007 (preliminary).

creased 2% between 2006 and 2007; a smaller (<1%) increase was reported for women aged 35 to 39 years. The birth rate for women aged 40 to 44

years increased 1% between 2006 and 2007 to 9.5 births per 1000 women, the highest rate since 1968. The birth rate for women aged 45 to 49 years in 2007

**TABLE 4** Percentage of Births With Selected Characteristics According to Race and Hispanic Origin of Mother, United States, Selected Years: 1990 and 2006 (Final) and 2007 (Preliminary)

	All Races			Non-Hispanic White			Non-Hispanic Black			Hispanic <sup>a</sup>		
	2007	2006	1990	2007	2006	1990 <sup>b</sup>	2007	2006	1990 <sup>b</sup>	2007	2006	1990 <sup>b</sup>
<b>Mother</b>												
<20 y of age	10.5	10.4	12.8	7.5	7.4	9.6	17.3	17.2	23.2	14.2	14.3	16.8
≥40 y of age	2.6	2.6	1.2	2.9	2.9	1.2	2.1	2.1	0.8	2.0	2.0	1.2
Unmarried	39.7	38.5	28.0	27.8	26.6	16.9	71.6	70.7	66.7	51.3	49.9	36.7
Diabetes during pregnancy	—	4.2	2.1	—	4.0	2.2	—	3.7	1.8	—	4.3	2.0
Pregnancy-associated												
Hypertension	—	3.9	2.7	—	4.4	3.0	—	4.6	2.8	—	2.8	1.8
Health care utilization												
Midwife-attended births <sup>c</sup>	—	7.4	3.9	—	7.1	3.2	—	7.0	4.4	—	8.4	6.2
Cesarean delivery rate	31.8	31.1	22.7	32.0	31.3	23.4	33.8	33.1	22.1	30.4	29.7	21.2
<b>Infant</b>												
<b>Birth weight</b>												
VLBW <sup>d</sup>	1.48	1.49	1.27	1.19	1.20	0.93	3.19	3.15	2.93	1.21	1.19	1.03
LBW <sup>d</sup>	8.2	8.3	7.0	7.2	7.3	5.6	13.8	14.0	13.3	6.9	7.0	6.1
<b>Gestational age</b>												
Very preterm birth <sup>e</sup>	2.04	2.04	1.92	1.64	1.66	1.33	4.08	4.08	4.63	1.82	1.80	1.69
Preterm birth <sup>e</sup>	12.7	12.8	10.6	11.5	11.7	8.5	18.3	18.5	18.9	12.3	12.2	11.0
<b>Multiple births per 1000 total births</b>												
Live births in twin deliveries (not percentage)	—	32.1	22.6	—	36.0	22.9	—	36.8	26.7	—	21.8	18.0
Live births in higher-order multiple deliveries (not percentage)	—	1.5	0.7	—	2.1	0.9	—	0.9	0.5	—	0.8	0.4

Race and Hispanic origin are reported separately on birth certificates. Persons of Hispanic origin may be of any race. Race categories are consistent with the 1977 OMB standards. Twenty-seven states in 2007 and 23 in 2006 reported multiple-race data. Multiple-race data for these states were bridged to the single-race categories of the 1977 OMB standards for comparability with other states. — indicates that data are not available.

<sup>a</sup> Includes all persons of Hispanic origin of any race.

<sup>b</sup> Excludes data for New Hampshire and Oklahoma, which did not report Hispanic origin.

<sup>c</sup> Delivered by certified nurse midwives.

<sup>d</sup> VLBW is birth weight of <1500 g (3 lb, 4 oz), and LBW is birth weight of <2500 g (5 lb, 8 oz).

<sup>e</sup> Very preterm indicates birth before 32 completed weeks of gestation, and preterm indicates birth before 37 completed weeks of gestation.

Data source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality.

was 0.6 (data not shown), which was unchanged from 2006. This rate has tripled since 1990.

### Unmarried Mothers

All measures of childbearing by unmarried women increased in the United States to historic levels in 2007.<sup>1,3,20,21</sup> The total number of births to unmarried women increased 4% from 2006, to 1 714 643. The 2007 total is up 26% from 2002, when the recent steep increases began. The birth rate for unmarried women rose 5% in 2007 to 52.9 births per 1000 unmarried women aged 15 to 44 years. The rate has increased 21% since 2002 (43.7), after several years of relative stability. The proportion of all births to unmarried women increased to 39.7% in 2007, up from 38.5% in 2006. This proportion increased for all race and Hispanic-origin population groups (Table 4).

Births to unmarried women increased from 2006 to 2007 within each age group of women older than 15 years. In 2007, ~6 in 7 births to teenagers, 60% of births to women aged 20 to 24, and almost one third of births to women aged 25 to 29 years were to unmarried women.<sup>1,21</sup>

### Smoking During Pregnancy†

For the 17 states with revised information on tobacco use in 2006, the overall smoking rate during pregnancy was 13.2%.<sup>3</sup> The rate for non-Hispanic white women (18.1%) was more than two thirds higher than that for non-Hispanic black women (10.6%) and >6

†Information on smoking during pregnancy is based on the same reporting areas as for prenatal care, with the exclusion of Florida.<sup>3</sup> The question about smoking on Florida's revised birth certificate is not consistent with those on the 1989 or 2003 versions of the standard birth certificate. California did not report tobacco use in 2006.

times as high as that for Hispanic women (2.8%).<sup>3</sup> These racial-ethnic variations are consistent with patterns observed for many years before the revision of the tobacco-use item.

Smoking patterns among population subgroups based on birth certificate data have been confirmed by surveillance and survey data, although there may be some underreporting of smoking on the birth certificate.<sup>22,23</sup>

### Prenatal Care‡

Prenatal care data based on the revised birth certificate show a markedly

‡Eighteen reporting areas (Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York [excluding New York City], North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming) had implemented the revised birth certificate as of January 1, 2006.<sup>3</sup> California was excluded, because it had not yet implemented the 2003 prenatal care item on its revised birth certificate.

less favorable picture of prenatal care utilization compared with data from the unrevised certificate; however, most of this difference can be attributed to changes in reporting and not to actual changes in prenatal care utilization.

For the 18 states with revised prenatal care data in 2006, 69.0% of mothers were reported to have begun care within the first 3 months of pregnancy. The percentage of women who began care in the first trimester of pregnancy declined between 2005 and 2006, and the percentage of women with late or no care (beginning in the third trimester of pregnancy) increased, as also observed in states with the unrevised certificate.<sup>3</sup> Prenatal care utilization had risen fairly steadily during the 1990s through 2003<sup>24</sup>; the decline in 2006 follows 2 consecutive years in which prenatal care levels did not improve.<sup>25,26</sup>

Large disparities according to race and Hispanic origin persisted in prenatal care receipt for the 18 states with revised prenatal care data. In 2006, as in earlier years, non-Hispanic black and Hispanic women were more than twice as likely as non-Hispanic white women to receive late or no care (11.8%, 12.2%, and 5.2%, respectively).<sup>3</sup>

### Cesarean Delivery

The total cesarean-delivery rate rose 2% in 2007 to 31.8% of all births, marking the eleventh consecutive year of increase and another record high for the nation (Table 4).<sup>1</sup> This rate has climbed by >50% over the last decade (20.7% in 1996). Increases in the percentage of births delivered by cesarean were reported for most age groups (Fig 2) and for the largest race and Hispanic-origin groups.

The continuing rise in the total cesarean-delivery rate is a result of trends in the primary cesarean-delivery rate and the rate of vaginal

birth after cesarean delivery. The latest complete national data (2004) show that the primary cesarean-delivery rate decreased during 1989–1996 and then increased during 1996–2004. The rate of vaginal birth after cesarean delivery increased between 1989 and 1996 but decreased sharply between 1996 and 2004.<sup>26</sup> Data from both revised and unrevised reporting areas for 2004–2006 show a continuation of these trends.<sup>25</sup>

### Multiple Births

The rapid, unprecedented rise over the last several decades in multiple-birth rates was not observed in 2006. The 2006 twin birth rate was essentially unchanged for the second straight year at 32.1 per 1000 births (Table 4). This rate (twin deliveries per 1000 births) had risen 70% from 1980 to 2004. The rate of triplet and higher-order multiple births (triplet/+) declined 5% from 161.8 per 100 000 total births in 2005 to 153.3 in 2006. The triplet/+ rate (the number of triplets, quadruplets, quintuplets, and other higher-order multiples per 100 000 live births) climbed >400% during the 1980s and 1990s but has declined 21% since the all-time high in 1998 (193.5).

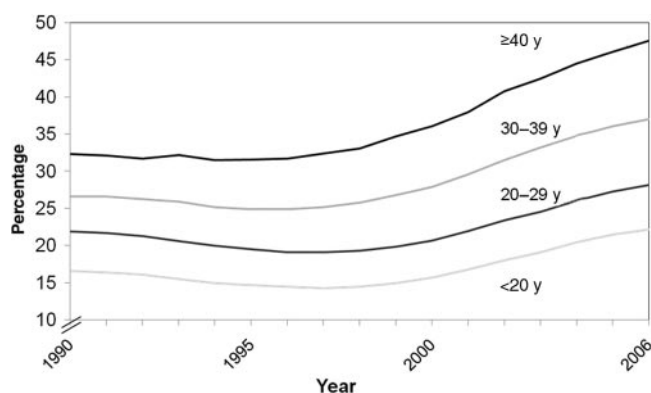
The upsurge in multiple births, particularly higher-order multiple births, has been attributed to older age at childbearing (women in their 30s are

more likely than younger women to conceive multiples spontaneously) and the growing availability and use of fertility-enhancing therapies, both assisted reproductive technologies (ART) such as in vitro fertilization and non-ART therapies such as ovulation-inducing drugs and artificial insemination.<sup>27,28</sup> Less than 20% of all triplets/+ born between 1997 and 2003 are estimated to have been naturally conceived.<sup>28,29</sup> In response to the unparalleled rise in higher-order multiple births and their attendant risk of poor outcome, the American Society of Reproductive Medicine published guidelines in the late 1990s (later updated)<sup>30–32</sup> that were intended to reduce the incidence of triplets/+ resulting from ART by limiting the number of embryos transferred. Studies since then have documented substantial declines in such transfers.<sup>33,34</sup>

One of every 8 twins and 1 of every 3 triplets are born very preterm (<32 weeks of gestation), compared with fewer than 2 of every 100 singletons.

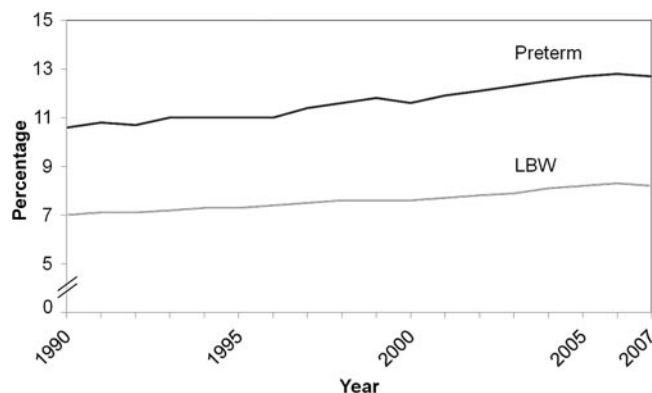
### Preterm Birth

The preterm birth rate was 12.7% for 2007, a slight decline of 1% from the 2006 level of 12.8% (Table 4; Fig 3).<sup>1</sup> The preterm rate (infants delivered at <37 completed weeks of gestation per 100 births) had previously been on the rise for more than 2 decades.<sup>3</sup> The decline



**FIGURE 2**

Cesarean-delivery rates according to age of the mother: United States, 1990–2006 (final).



**FIGURE 3**

Percent preterm and percent LBW: United States, 1990–2006 (final) and 2007 (preliminary). LBW is <2500 g, and preterm birth is <37 completed weeks of gestation.

for 2007 occurred predominantly among infants born at 34 to 36 weeks, or late preterm. The late-preterm rate, which had climbed >25% since 1990, was down slightly between 2006 and 2007, from 9.1% to 9.0%. The total preterm rate declined modestly among births to non-Hispanic white (from 11.7% to 11.5%) and non-Hispanic black (from 18.5% to 18.3%) mothers for 2006–2007 but was essentially unchanged among births to Hispanic women (12.3% for 2007).

The rise in the rate of multiple births over the last 2 decades has had a major influence on the overall preterm birth levels. Between 2005 and 2006, the preterm birth rate for singleton births rose from 11.0% to 11.1%; this rate has increased 14% since 1990. Nearly all of the increase in singleton preterm rates between 1990 and 2006 was among late-preterm births, up 20% during this time period.<sup>35</sup>

### Low Birth Weight

The low birth weight (LBW) (<2500 g) rate declined slightly in 2007 to 8.2%, from 8.3% in 2006 (Table 4; Fig 3).<sup>1</sup> The percentage of infants born at LBW had been rising fairly steadily since the mid-1980s (6.7% in 1984).<sup>3</sup> The very LBW (<1500 g) rate was unchanged at 1.48%, but the percentage of moderately LBW infants (1500–

2499 g) declined from 6.8 to 6.7 between 2006 and 2007. Small declines in total LBW were reported for each of the largest race and Hispanic-origin groups (Table 4).

Over the past several decades, national LBW levels have been strongly influenced by the large growth in the rate of multiple births, more than one half of which are delivered at <2500 g (see “Multiple Births”). However, when only births in singleton deliveries are examined, a substantial rise in LBW is also observed between 1990 and 2006.<sup>3</sup> The full birth weight distribution has changed markedly in recent years for all births and for singletons only. During 1990–2006, the percentage of singleton births weighing <3500 g increased, whereas that for heavier infants declined.<sup>1,24</sup> The decline at 3500 to 4499 g (7 lb 12 oz to 9 lb 14 oz) is of special concern, because infant mortality is lowest at these weights (ref 13 and NCHS, unpublished data from the Period Linked Birth/Infant Death Data Set, 2005). The reasons behind the shift toward lower birth weights may be similar to those suggested for the national trend toward shorter gestational ages, that is, obstetric intervention earlier in pregnancy, older maternal age at childbearing, and increased use of infertility therapies.<sup>36–39</sup>

## INFANT AND PERINATAL MORTALITY

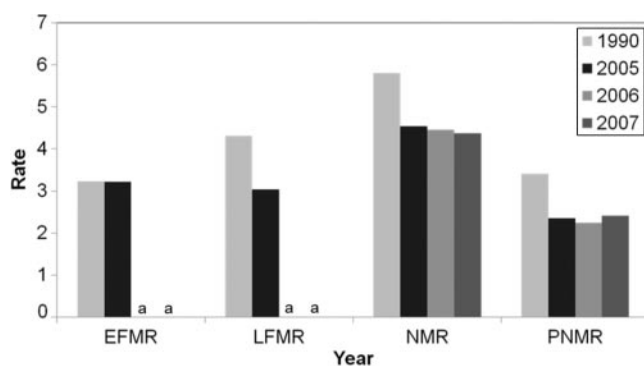
In 2007, a total of 29 241 infant deaths were reported in the United States.<sup>2</sup> The IMR was 6.77 infant deaths per 1000 live births, not significantly different from the 2006 rate of 6.69 (Table 1). The IMR increased in 2002<sup>40,41</sup> after declining steadily for more than 4 decades. From 2002 through 2005, the IMR was essentially unchanged,<sup>42–44</sup> and then it decreased by 2.6% between 2005 and 2006.<sup>4</sup> The 2007 NMR was 4.37, not significantly different from the 2006 rate of 4.45 (Fig 4). The 2007 PNMR increased to 2.40 from 2.24 in 2006.

The 2005 linked birth/infant death data show wide variation in IMRs according to race and Hispanic origin. The highest rate, 13.63 deaths per 1000 live births, for infants of non-Hispanic black mothers was more than double the rate of infants born to non-Hispanic white and Hispanic mothers (5.76 and 5.62, respectively).<sup>13</sup> Rates vary considerably among Hispanic subgroups, ranging from 4.42 for Cuban mothers to 8.30 for Puerto Rican mothers. The IMRs for these groups declined slightly between 1995 and 2000 but have not improved since.

### Perinatal and Fetal Mortality

The 2005 PMR (per 1000 live births plus specified fetal deaths) was 6.64 in 2005. This was not significantly different from the 2004 rate of 6.73.<sup>45,46</sup> The PMR has been declining fairly consistently for more than half a century.

§Twenty-five reporting areas (California, Connecticut, Delaware, District of Columbia, Florida, Idaho, Kansas, Michigan, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York City, New York State [excluding New York City], Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Texas, Utah, Washington, and Wyoming) had implemented the 2003 revision of the US Standard of Certificate of Death by the beginning of 2007; the remaining 27 areas collected and reported data in 2007 on the basis of the 1989 (unrevised) version of the death certificate.<sup>2</sup>



**FIGURE 4**

EFMR, LFMR, NMR, and PNMR, United States, selected years: 1990, 2005, and 2006 (final) and 2007 (preliminary). <sup>a</sup>Data not available. EFMR represents early fetal deaths (20–27 weeks of gestation) per 1000 live births plus specified fetal deaths; LFMR, late fetal deaths ( $\geq 28$  weeks of gestation) per 1000 live births plus specified fetal deaths; NMR, neonatal deaths per 1000 live births; and PNMR, postneonatal deaths per 1000 live births.

In 2005, 25 894 fetal deaths at  $\geq 20$  weeks of gestation were reported in the United States.<sup>45</sup> The 2005 FMR was 6.22 per 1000 live births plus specified fetal deaths. This was not significantly different from the 2004 level of 6.28 or the 2003 level of 6.32. During 1990–2003, the FMR declined by an average of 1.4% per year.

No significant changes were observed between 2004 and 2005 in either early or late fetal mortality. The EFMR for 2005 was 3.17; the LFMR was 3.14 (Fig 4). Virtually all the decrease in the overall FMR from 1990 through 2003 can be attributed to declines in late fetal mortality; early fetal mortality did not decline.<sup>47</sup>

### Geographic Variation

Table 5 presents information on infant, neonatal, and fetal mortality according to state for 2003–2005 combined. Three years of data are combined to produce more statistically stable state-specific rates. Among states, IMRs ranged from 4.78 per 1000 live births in Minnesota to 10.74 in Mississippi. The IMR for the District of Columbia was 12.22. State NMRs ranged from 3.18 in Minnesota to 6.44 in Delaware. The NMR for the District of Columbia was 8.54. State FMRs ranged from 2.62 in New Mexico to 6.08 in Mississippi.

States with the highest IMRs and FMRs were clustered in the southeastern United States.

### Leading Causes of Infant Death

More than half of all infant deaths in 2007 (Table 6) were attributable to 5 leading causes: congenital malformations, deformations, and chromosomal abnormalities (accounting for 19.7% of all infant deaths); disorders relating to short gestation and LBW, not elsewhere classified (16.0%); sudden infant death syndrome (SIDS) (7.2%); newborn affected by maternal complications of pregnancy (6.1%); and accidents (unintentional injuries) (4.2%).<sup>2</sup> The 5 leading causes of infant death were the same in 2006.<sup>4</sup>

### INTERNATIONAL COMPARISONS

Table 7 shows births and IMRs for 2004, 2005, and 2006 for the United States and 28 other countries with populations of  $>2\,500\,000$  and IMRs less than the US rate in 2006.<sup>18</sup> Final 2007 data are not available for the United States and several other countries. Singapore and Ireland are excluded for having only 1 year of available data. The countries are ordered from the lowest to highest IMR in 2006. Seven countries had an IMR less than half the US rate in 2006 (2005 for Hong

**TABLE 5** IMR, NMR, and FMR: United States and Each State, 2003–2005 (Final)

State of Residence	IMR <sup>a</sup>	NMR <sup>b</sup>	FMR <sup>c</sup>
United States	6.83	4.56	4.09
Alabama	8.96	5.40	5.72
Alaska	6.45	3.24	3.90
Arizona	6.69	4.46	4.04
Arkansas	8.29	5.11	5.01
California	5.22	3.54	3.89
Colorado	6.27	4.57	3.88
Connecticut	5.53	4.03	3.53
Delaware	9.03	6.44	3.25
District of Columbia	12.22	8.54	4.65
Florida	7.24	4.66	4.61
Georgia	8.35	5.61	4.68
Hawaii	6.67	4.66	3.49
Idaho	6.12	3.92	4.20
Illinois	7.53	5.13	3.98
Indiana	7.87	5.30	4.19
Iowa	5.40	3.40	3.56
Kansas	7.12	4.65	3.97
Kentucky	6.79	4.00	4.54
Louisiana	9.79	5.80	4.69
Maine	5.87	4.39	2.88
Maryland	8.00	5.77	4.54
Massachusetts	4.89	3.69	3.71
Michigan	8.02	5.59	3.65
Minnesota	4.78	3.18	3.41
Mississippi	10.74	6.21	6.08
Missouri	7.63	5.09	4.20
Montana	6.35	3.50	3.55
Nebraska	5.89	3.75	3.94
Nevada	5.86	3.69	4.50
New Hampshire	5.02	3.85	3.22
New Jersey	5.44	3.84	3.93
New Mexico	6.13	3.62	2.62
New York	6.02	4.24	4.53
North Carolina	8.58	5.95	4.67
North Dakota	6.35	4.81	3.21
Ohio	7.82	5.27	4.11
Oklahoma	7.86	4.63	4.15
Oregon	5.68	3.81	3.17
Pennsylvania	7.30	5.18	4.15
Rhode Island	6.20	4.78	3.30
South Carolina	9.03	6.08	5.37
South Dakota	7.18	4.26	3.39
Tennessee	8.87	5.67	4.24
Texas	6.45	4.19	3.64
Utah	4.92	3.39	3.37
Vermont	5.37	3.81	2.99
Virginia	7.50	5.18	3.91
Washington	5.39	3.39	3.62
West Virginia	7.73	4.84	4.64
Wisconsin	6.34	4.30	3.67
Wyoming	6.95	4.63	4.75

FMRs shown here are for fetal deaths of  $\geq 24$  weeks of gestation to control for differences in state reporting requirements and improve state-to-state comparisons. Fetal deaths with no stated period of gestation are proportionally distributed to  $<24$  and  $\geq 24$  weeks.

<sup>a</sup> Infant deaths ( $<1$  year) per 1000 live births.

<sup>b</sup> Neonatal deaths ( $<28$  days) per 1000 live births.

<sup>c</sup> Fetal deaths of  $\geq 24$  weeks of gestation per 1000 live births plus specified fetal death.



**TABLE 6** Deaths, Percentage of Total Deaths, and Mortality Rates for the 10 Leading Causes of Infant Death: United States, 2006 (Final) and 2007 (Preliminary)

Causes of Death and <i>International Classification of Diseases, 10th Revision Codes</i> (Second Edition, 2004)	Rank <sup>a</sup>	2007			2006		
		<i>n</i>	%	Rate <sup>b</sup>	<i>n</i>	%	Rate <sup>b</sup>
All causes	—	29 241	100.0	677.3	28 527	100.0	668.8
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	1	5769	19.7	133.6	5819	20.4	136.4
Disorders related to short gestation and LBW not elsewhere classified (P07)	2	4678	16.0	108.4	4841	17.0	113.5
Sudden infant death syndrome (R95)	3	2118	7.2	49.1	2323	8.1	54.5
Newborn affected by maternal complications of pregnancy (P01)	4	1770	6.1	41.0	1683	5.9	39.5
Accidents (unintentional injuries) (V01–X59)	5	1238	4.2	28.7	1147	4.0	26.9
Newborn affected by complications of placenta, cord, and membranes (P02)	6	1139	3.9	26.4	1140	4.0	26.7
Bacterial sepsis of newborn (P36)	7	790	2.7	18.3	807	2.8	18.9
Respiratory distress of newborn (P22)	8	735	2.5	17.0	825	2.9	19.3
Neonatal hemorrhage (P50–P52, P54)	9	614	2.1	14.2	618	2.2	14.5
Diseases of the circulatory system (I00–I99)	10	612	2.1	14.2	543	1.9	12.7

— indicates that data are not applicable.

<sup>a</sup> Rank is based on 2007 data. For an explanation of ranking procedures, see ref <sup>11</sup>.

<sup>b</sup> IMRs are per 100 000 live births.

Data source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System: mortality, 2007 and 2006 ([www.cdc.gov/nchs/nvss/mortality\\_tables.htm](http://www.cdc.gov/nchs/nvss/mortality_tables.htm)).

Kong), and the rate was <3.0 infant deaths per 1000 live births for 4 countries. The US IMR declined by 2.6% between 2005 and 2006, after a plateau from 2002 through 2005. Between 2004 and 2006, the IMR was stable for 10 other countries and declined distinctively for 9 other countries. Discussed elsewhere<sup>40,48–52</sup> are potential reasons that the United States has a higher IMR than other industrialized countries.

## DEATHS

There were 2 423 995 deaths in the United States in 2007 (Table 1), 2269 less than in 2006. Age-adjusted death rates are better indicators of the risk of mortality over time than crude death rates, because they control for variations in the age composition of the population. The age-adjusted death rate decreased significantly by 2.1% from 776.5 deaths per 100 000 US standard population in 2006, to 760.3 in 2007.<sup>2</sup> This was a record low for the United States.<sup>2,4</sup>

In 2007, life expectancy at birth reached a record high of 77.9 years and was 80.7 years for white women, 77.0 years for black women, 75.8 years for white men, and 70.2 years for black men.<sup>2</sup> The esti-

mated life expectancy at birth for a given year represents the average number of years that a group of infants would be expected to live if, throughout their lifetime, they were to experience the age-specific death rates that prevailed during the year of their birth.

## Deaths Among Children

A total of 23 976 children and adolescents aged 1 to 19 years died in the United States in 2007 (Table 8).<sup>2,4</sup> The death rate for children aged 1 to 19 years decreased by a statistically significant 2.5% from 31.5 per 100 000 population in 2006 to 30.7 in 2007.

For all children aged 1 to 19 years, the leading cause of death was unintentional injuries, which accounted for 42.1% of all deaths in 2007 and 42.9% of all deaths in 2006. The second leading cause of death was homicide, which accounted for 11.5% of all deaths in 2007 and 12.4% of all deaths in 2006. Between 2006 and 2007, the death rate decreased significantly for unintentional injuries, homicide, suicide, and heart disease but did not change significantly for the other leading causes of death among children.

**TABLE 7** Number of Live Births and IMRs for 2004, 2005, and 2006 for Countries of >2 500 000 With IMRs Less Than the United States in 2006

Country	No. of Births in 2006	IMR		
		2006	2005	2004
Hong Kong	65 626	1.8 <sup>a</sup>	2.3	2.7
Japan	1 092 674	2.6	2.8	2.8
Sweden	105 913	2.8	2.4	3.1
Finland	58 840	2.8	3.0	3.3
Norway	58 545	3.2	3.1	3.2
Czech Republic	105 831	3.3	3.4	3.7
Portugal	105 449	3.3	3.5	3.8
France	796 896	3.6	3.6	3.9
Austria	77 914	3.6	4.2	4.5
Greece	112 042	3.7	3.8	4.1
Italy	560 010	3.8	3.8	3.9
Spain	481 102	3.8	3.8	4.0
Germany	672 724	3.8	3.9	4.1
Korea	451 514	3.8	4.2	4.6
Denmark	64 984	3.8	4.4	4.4
Israel	148 170	4.0	4.4	4.6
Belgium	121 382	4.0	3.7	3.8
Switzerland	73 371	4.4	4.2	4.2
Netherlands	185 057	4.4	4.9	4.4
Australia	265 423	4.7	5.0	4.6
United Kingdom	748 563	5.0	5.1	5.0
New Zealand	59 193	5.1	5.1	5.6
Croatia	41 446	5.2	5.7	6.1
Cuba	111 323	5.3	6.2	5.8
Canada	350 181	—	5.4	5.3
Hungary	99 871	5.7	6.2	6.6
Poland	374 244	6.0	6.4	6.8
Malaysia	465 112	6.2	6.6	6.5
United States	4 265 555	6.7	6.9	6.8

— indicates that data are not available.

<sup>a</sup> Provisional data.

Data source: Tables 9 and 15. In: *United Nations Demographic Yearbook, 2007*. New York, NY: United Nations; 2009:328–338, 405–413.

## BIRTH RATES FOR TEENAGERS INCREASING

Childbearing by US teenagers increased in 2007 for the second consecutive year, in contrast with the long-term decline in adolescent birth rates that extended from 1991 through 2005 (Table 3).<sup>1</sup> Rates decreased 34% before increasing 5% between 2005 and 2007. The upward trend for teenagers during 2005–2007 is similar to the concurrent trends in birth rates for women in all age groups. Maternal demographic, social, and health risks are of concern for teenagers and women at the older end of the reproductive age spectrum. In this section, we highlight the recent

**TABLE 8** Deaths and Death Rates for the 5 Leading Causes of Childhood Death in Specified Age Groups: United States, 2006 (Final) and 2007 (Preliminary)

Age, Causes of Death and <i>International Classification of Diseases, 10th Revision Codes</i> (Second Edition, 2004)	Rank <sup>a</sup>	2007			2006		
		<i>n</i>	%	Rate <sup>b</sup>	<i>n</i>	%	Rate <sup>b</sup>
<b>Total: 1–19 y</b>							
All causes	—	23 976	100.0	30.7	24 519	100.0	31.5
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	10 101	42.1	12.9	10 527	42.9	13.5
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	2	2768	11.5	3.5	3047	12.4	3.9
Malignant neoplasms (C00–C97)	3	1928	8.0	2.5	1959	8.0	2.5
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	4	1647	6.9	2.1	1774	7.2	2.3
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	5	1043	4.4	1.3	1087	4.4	1.4
Diseases of heart (I00–I09, I11, I13, I20–I51)	6	688	2.9	0.9	774	3.2	1.0
Influenza and pneumonia (J09–J18) <sup>c</sup>	7	269	1.1	0.3	266	1.1	0.3
Cerebrovascular diseases (I60–I69)	8	216	0.9	0.3	222	0.9	0.3
Chronic lower respiratory diseases (J40–J47)	9	215	0.9	0.3	219	0.9	0.3
Septicemia (A40–A41)	10	203	0.8	0.3	222	0.9	0.3
<b>1–4 y</b>							
All causes	—	4651	100.0	28.2	4631	100.0	28.4
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	1566	33.7	9.5	1610	34.8	9.9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	2	506	10.9	3.1	515	11.1	3.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	3	365	7.8	2.2	366	7.9	2.2
Malignant neoplasms (C00–C97)	4	361	7.8	2.2	377	8.1	2.3
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	163	3.5	1.0	161	3.5	1.0
<b>5–9 y</b>							
All causes	—	2697	100.0	13.6	2735	100.0	13.9
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	949	35.2	4.8	1044	38.2	5.3
Malignant neoplasms (C00–C97)	2	471	17.5	2.4	459	16.8	2.3
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	3	191	7.1	1.0	182	6.7	0.9
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	4	133	4.9	0.7	149	5.4	0.8
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	92	3.4	0.5	90	3.3	0.5
<b>10–14 y</b>							
All causes	—	3394	100.0	16.7	3414	100.0	16.6
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	1208	35.6	5.9	1214	35.6	5.9
Malignant neoplasms (C00–C97)	2	458	13.5	2.3	448	13.1	2.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	3	205	6.0	1.0	241	7.1	1.2
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	4	190	5.6	0.9	216	6.3	1.0
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	5	166	4.9	0.8	162	4.7	0.8
<b>15–19 y</b>							
All causes	—	13 235	100.0	61.6	13 739	100.0	64.4
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	6378	48.2	29.7	6659	48.5	31.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	2	2065	15.6	9.6	2291	16.7	10.7
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	3	1452	11.0	6.8	1555	11.3	7.3
Malignant neoplasms (C00–C97)	4	638	4.8	3.0	675	4.9	3.2
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	316	2.4	1.5	360	2.6	1.7

— indicates that data are not applicable.

<sup>a</sup> Rank is based on 2007 data. Ranking is shown for 5 leading causes for specified age groups (see ref <sup>11</sup>).

<sup>b</sup> Rate per 100 000 population in specified group.

<sup>c</sup> New code J09 (influenza due to identified avian influenza virus) was added to the category in 2007.

Data source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System: mortality, 2007 and 2006 ([www.cdc.gov/nchs/nvss/mortality\\_tables.htm](http://www.cdc.gov/nchs/nvss/mortality_tables.htm)).

changes in teenaged pregnancy and birth rates.

Teenaged pregnancy and childbearing are ongoing public concerns and the focus of considerable public policy debate. Infants born to teenaged

mothers are at elevated risk of poor birth outcomes, including higher rates of LBW, preterm birth, and infant death.<sup>3,13,55</sup> The limited educational, social, and financial resources often available to adolescent mothers add to their

higher risk profile.<sup>54</sup> A recent study revealed that the public costs of teenaged childbearing in the United States are approximately \$9 billion annually.<sup>55</sup>

The 14-year decline in teenaged birth rates began to slow in the early part of this decade. At its 1991 peak, the rate was 61.8 births per 1000 females aged 15 to 19 years; it decreased to 40.5 in 2005 and then increased to 42.5 in 2007. The overall rate decreased ~3% per year from 1991 to 2003, and then by only 1% per year from 2003 to 2005. Thus, the recent increase was preceded by the slowing decline but, nonetheless, caught the public and the public health community somewhat by surprise.

The recent increases between 2005 and 2007 were somewhat larger for older teenagers aged 18 to 19 years (up 6%) than for younger teenagers aged 15 to 17 (up 4%). Among population subgroups, the increases have been largest for American Indian or Alaska Native teenagers (up 12% during 2005–2007). Rates for non-Hispanic white and black teenagers increased 5–6% each, whereas the rate for Hispanic teenagers was essentially unchanged.

The teenaged pregnancy rate (computed from the sums of live births, induced abortions, and fetal losses) for 2005 was down 2% from 2004, at 70.6 per 1000 women aged 15 to 19 years.<sup>56</sup> In recent years, abortion rates have dropped more rapidly than birth rates among teenagers. Because abortion estimates are not available for 2006 and 2007, it is not possible to assess whether and to what extent teenaged pregnancy rates have increased as have birth rates. A recent analysis of data from the Centers for Disease Control and Prevention Youth Risk Behavior Survey revealed that the declines in sexual activity and improvements in contraceptive use among high school students, which were measured between 1991 and 2007, occurred entirely between 1991 and 2003, with no significant

changes in these key behaviors since 2003.<sup>57</sup> These patterns may be factors in the recent upturn in 2006 and 2007 in the teenaged birth rate. Data from the 2006–2008 National Survey of Family Growth (NSFG)<sup>58</sup> conducted by the NCHS will help clarify changes in sexual activity and contraceptive use and the reasons behind these changes for teenagers (and for adult women), including possible changes in attitudes toward childbearing. The new data from the NSFG are expected to be available by early 2010.

## REFERENCES

- Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2007. *Natl Vital Stat Rep.* 2009;57(12):1–23
- Xu J, Kochanek KD, Tejada-Vera B. Deaths: preliminary data for 2007. *Natl Vital Stat Rep.* 2009;58(1):1–52
- Martin JA, Hamilton BE, Sutton PD, et al. Births: final data for 2006. *Natl Vital Stat Rep.* 2009;57(7):1–104
- Heron M, Hoyert DL, Murphy SL, Xu J, Kochanek KD, Tejada-Vera B. Deaths: final data for 2006. *Natl Vital Stat Rep.* 2009; 57(14):1–136
- National Center for Health Statistics. Detailed technical notes to the United States 2006 data: natality. In: User Guide to the 2006 Natality Public Use File. Available at: [ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Dataset\\_Documentation/DVS/natality/UserGuide2006.pdf](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/DVS/natality/UserGuide2006.pdf). Accessed November 19, 2009
- National Center for Health Statistics. Detailed technical notes to the United States 2006 data: mortality. Forthcoming.
- Office of Management and Budget. Revisions to the standards for the classification of federal data on race and ethnicity. Available at: [www.whitehouse.gov/omb/fedreg/ombdir15.html](http://www.whitehouse.gov/omb/fedreg/ombdir15.html). Accessed July 15, 2009
- Ingram DD, Parker JD, Schenker N, et al. United States Census 2000 with bridged race categories. *Vital Health Stat 2.* 2003; (135):1–55
- Schenker N, Parker JD. From single-race reporting to multiple-race reporting: using imputation methods to bridge the transition. *Stat Med.* 2003;22(9):1571–1587
- World Health Organization. *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision.* 2nd ed. Geneva, Switzerland: World Health Organization; 2004
- Heron M. Deaths: leading causes for 2005. *Natl Vital Stat Rep.* 2009; 56:18
- National Center for Health Statistics. Notice of error in the 2003 and 2004 fetal death data files and reports, and instructions for correcting the data file error. In press
- Mathews TJ, MacDorman MF. Infant mortality statistics from the 2005 period linked birth/infant death data set. *Natl Vital Stat Rep.* 2005;57(2):1–32
- National Center for Health Statistics. U.S. Standard Certificate of Live Birth, 2003 revision. Available at: [www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf](http://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf). Accessed August 7, 2009
- National Center for Health Statistics. Report of the panel to evaluate the U.S. standard certificates and reports: appendix B. Available at: [www.cdc.gov/nchs/data/dvs/panelreport\\_acc.pdf](http://www.cdc.gov/nchs/data/dvs/panelreport_acc.pdf). Accessed July 15, 2009
- National Center for Health Statistics. 2003 revision of the U.S. Standard Certificate of Death. Available at: [www.cdc.gov/nchs/data/dvs/DEATH11-03final-acc.pdf](http://www.cdc.gov/nchs/data/dvs/DEATH11-03final-acc.pdf). Accessed July 15, 2009
- Office of Management and Budget. Race and ethnic standards for federal statistics and administrative reporting. 1977. Statistical Policy Directive 15. Available at: <http://wonder.cdc.gov/wonder/help/populations/bridged-race/directive15.html>. Accessed November 19, 2009
- United Nations. Tables 9 and 15. In: *United Nations Demographic Yearbook, 2007.* New York, NY: United Nations; 2009. Available at <http://unstats.un.org/unsd/demographic/products/dyb/dyb2007.htm>. Accessed November 19, 2009
- National Center for Health Statistics. Vital statistics of the United States, 2003, volume I, natality. Available at: [www.cdc.gov/nchs/products/vsus.htm](http://www.cdc.gov/nchs/products/vsus.htm). Accessed November 19, 2009
- Ventura SJ, Bachrach CA. Nonmarital childbearing in the United States, 1940–99. *Natl Vital Stat Rep.* 2000;48(16):1–40
- Ventura SJ. Changing patterns of nonmarital childbearing in the United States. *NCHS Data Brief.* 2009;(18):1–8. Available at: [www.cdc.gov/nchs/data/databriefs/db18.htm](http://www.cdc.gov/nchs/data/databriefs/db18.htm). Accessed August 7, 2009
- Chandra A, Martinez GM, Mosher WD, et al. Fertility, family planning, and reproductive health of U.S. women: data from the 2002 National Survey of Family Growth. *Vital Health Stat 23.* 2005;(25):1–160
- Phares TM, Morrow B, Lansky A, et al. Surveillance for disparities in maternal health-related behaviors selected states, Pregnancy Risk Assessment Monitoring System (PRAMS), 2000–2001. *MMWR Surveill Summ.* 2004;53(4):1–16
- Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: final data for 2003. *Natl Vital Stat Rep.* 2005;54(2): 1–116
- Martin JA, Hamilton BE, Sutton PD, et al; Centers for Disease Control and Prevention, National Center for Health Statistics National Vital Statistics System. Births: final data for 2005. *Natl Vital Stat Rep.* 2007;56(6):1–121
- Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Kirmeyer S. Births: final data for 2004. *Natl Vital Stat Rep.* 2006;55(1): 1–102
- Wilcox LS, Kiely JL, Melvin CL, Martin MC. Assisted reproductive technologies: estimates of their contribution to multiple births and newborn hospital days in the population. Efforts to speed up data receipt and processing are ongoing.<sup>65</sup>

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## CONCLUSIONS

Vital statistics remain a valuable tool for monitoring the health of the US

- United States. *Fertil Steril*. 1996;65(2):361–366
28. Reynolds MA, Schieve LA, Martin JA, Jeng G, Macaluso M. Trends in multiple births conceived using assisted reproductive technology, United States, 1997–2000. *Pediatrics*. 2003;111(5 pt 2):1159–1166
  29. Dickey RP. The relative contribution of assisted reproductive technologies and ovulation induction to multiple birth in the United States 5 years after the Society for Assisted Reproductive Technology/American Society for Reproductive Medicine recommendation to limit the number of embryos transferred. *Fertil Steril*. 2007;88(6):1554–1561
  30. American Society for Reproductive Medicine. *Guidelines on Number of Embryos Transferred: A Practice Committee Report—A Committee Opinion*. Revised. Birmingham, AL: American Society for Reproductive Medicine; 1999
  31. Practice Committees of the Society for Assisted Reproductive Technology and the American Society for Reproductive Medicine. Guidelines on number of embryos transferred. *Fertil Steril*. 2004;82(suppl 1):S1–S2
  32. Practice Committees of the Society for Assisted Reproductive Technology and the American Society for Reproductive Medicine. Guidelines on number of embryos transferred. *Fertil Steril*. 2006;86(5 suppl 1):S51–S52
  33. Jain T, Missmer SA, Hornstein MD. Trends in embryo-transfer practice and in outcomes of the use of assisted reproductive technology in the United States. *N Engl J Med*. 2004;350(16):1639–1645
  34. Stern JE, Cedars MI, Jain T, et al; Society for Assisted Reproductive Technology Writing Group. Assisted reproductive technology practice patterns and the impact of embryo transfer guidelines in the United States. *Fertil Steril*. 2007;88(2):275–282
  35. Martin JA, Kirmeyer SK, Osterman M, Shepherd RA. Born a bit too early: recent trends in late preterm births. *NCHS Data Brief*. 2009;(24). Available at: [www.cdc.gov/nchs/data/databriefs/db24.htm](http://www.cdc.gov/nchs/data/databriefs/db24.htm). Accessed November 19, 2009
  36. Davidoff MJ, Dias T, Damus K, et al. Changes in gestational age distribution among U.S. singleton births: impact on rates of late preterm birth, 1992 to 2002. *Semin Perinatol*. 2006;30(1):8–15
  37. Ananth CV, Joseph KS, Oyelese Y, Kitaw D. Trends in preterm birth and perinatal mortality among singletons: United States, 1999 through 2000. *Obstet Gynecol*. 2005;105(5 pt 1):1084–1091
  38. Yang Q, Greenland S, Flanders D. Associations of maternal age- and parity-related factors with trends in low-birthweight rates: United States, 1989 through 2000. *Am J Public Health*. 2006;96(5):856–861
  39. Schieve LA, Rasmussen SA, Buck GM, et al. Are children born after assisted reproductive technology at increased risk for adverse health outcomes? *Obstet Gynecol*. 2004;103(6):1154–1163
  40. MacDorman MF, Martin JA, Mathews TJ, Hoyert DL, Ventura SJ. Explaining the 2001–02 infant mortality increase: data from the linked birth/infant death data set. *Natl Vital Stat Rep*. 2005;53(12):1–23
  41. Kochanek KD, Murphy SL, Anderson RN, Scott C. Deaths: final data for 2002. *Natl Vital Stat Rep*. 2004;53(5):1–116
  42. Hoyert DL, Heron MP, Murphy SL, Kung HC. Deaths: final data for 2003. *Natl Vital Stat Rep*. 2006;54(13):1–120
  43. Miniño AM, Heron MP, Murphy SL, Kochanek KD. Deaths: final data for 2004. *Natl Vital Stat Rep*. 2007;55(19):1–120
  44. Kung HC, Hoyert DL, Xu J, Murphy SL. Deaths: final data for 2005. *Natl Vital Stat Rep*. 2008;56(10):1–124
  45. MacDorman MF, Kirmeyer S. Fetal and perinatal mortality, United States, 2005. *Natl Vital Stat Rep*. 2009;57(8):1–20
  46. MacDorman MF, Kirmeyer S. The challenge of fetal mortality. *NCHS Data Brief*. 2009;(16):1–8. Available at: [www.cdc.gov/nchs/data/databriefs/db16.pdf](http://www.cdc.gov/nchs/data/databriefs/db16.pdf). Accessed November 19, 2009
  47. MacDorman MF, Munson ML, Kirmeyer S. Fetal and perinatal mortality, United States, 2004. *Natl Vital Stat Rep*. 2007;56(3):1–20
  48. MacDorman MF, Mathews TJ. Behind international rankings of infant mortality: how the United States compares with Europe. *NCHS Data Brief*. 2009;(23). Available at: [www.cdc.gov/nchs/data/databriefs/db23.htm](http://www.cdc.gov/nchs/data/databriefs/db23.htm). Accessed November 19, 2009
  49. Sepkowitz, S. International rankings of infant mortality and the United States' vital statistics, natality data collecting system: failure and success. *Int J Epidemiol*. 1995;24(3):583–588
  50. Kramer MS, Platt RW, Yang H, Haglund B, Cnattingius S, Bergsjö P. Registration artifacts in international comparisons of infant mortality. *Paediatr Perinat Epidemiol*. 2002;16(1):16–22
  51. Phelan ST, Goldenberg R, Alexander G, Oliver SP. Perinatal mortality and its relationship to reporting of low-birthweight infants. *Am J Public Health*. 1998;88(8):1236–1239
  52. Joseph KS, Kramer MS. Recent trends in Canadian infant mortality rates: effect of changes in registration of live newborns weighing less than 500 g. *CMAJ*. 1996;155(8):1047–1052
  53. Menacker F, Martin JA, MacDorman MF, Ventura SJ. Births to 10–14 year-old mothers, 1990–2002: trends and health outcomes. *Natl Vital Stat Rep*. 2004;53(7):1–19
  54. Hoffman SD, Maynard RA, eds. *Kids Having Kids: Costs and Social Consequences of Teen Pregnancy*. Washington, DC: Urban Institute; 2008
  55. Hoffman SD. *By the Numbers: The Public Costs of Teen Childbearing*. Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy; 2006
  56. Ventura SJ, Abma JC, Mosher WD, Henshaw SK. Estimated pregnancy rates by outcome for the United States, 1990–2005: an update. *Natl Vital Stat Rep*. 2009;58(4):1–16
  57. Santelli JS, Orr M, Lindberg LD, Diaz DC. Changing behavioral risk for pregnancy among high school students in the United States, 1991–2007. *J Adolesc Health*. 2009;45(1):25–32
  58. National Center for Health Statistics. About the National Survey of Family Growth: cycle 7—a continuous survey. Available at: [www.cdc.gov/nchs/nsfg/about\\_nsfg.htm](http://www.cdc.gov/nchs/nsfg/about_nsfg.htm). Accessed August 31, 2009
  59. US Department of Health and Human Services. *A National Strategy to Prevent Teen Pregnancy: Annual Report, 1999–2000*. Washington, DC; US Department of Health and Human Services: 2000
  60. National Campaign to Prevent Teen and Unplanned Pregnancy. Mission statement. In: Responsible behavior, responsible policies. 2008:2. Available at: [www.thenationalcampaign.org/about-us/PDF/AboutUs.pdf](http://www.thenationalcampaign.org/about-us/PDF/AboutUs.pdf). Accessed August 10, 2009
  61. Finer L, Henshaw S. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. *Perspect Sex Reprod Health*. 2006;38(2):90–96
  62. Kirby D. *Emerging Answers 2007: Research Findings on Programs to Reduce Teen Pregnancy and Sexually Transmitted Diseases*. Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy; 2006
  63. National Center for Health Statistics. About the National Vital Statistics System. Available at: [www.cdc.gov/nchs/nvss/about\\_nvss.htm](http://www.cdc.gov/nchs/nvss/about_nvss.htm). Accessed October 19, 2009

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