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## Annual Summary of Vital Statistics: 2005

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### ABSTRACT

The general fertility rate in 2005 was 66.7 births per 1000 women aged 15 to 44 years, the highest level since 1993. The birth rate for teen mothers (aged 15 to 19 years) declined by 2% between 2004 and 2005, falling to 40.4 births per 1000 women, the lowest ever recorded in the 65 years for which there are consistent data. The birth rates for women  $\geq 30$  years of age rose in 2005 to levels not seen in almost 40 years. Childbearing by unmarried women also increased to historic record levels for the United States in 2005. The cesarean-delivery rate rose by 4% in 2005 to 30.2% of all births, another record high. The preterm birth rate continued to rise (to 12.7% in 2005), as did the rate for low birth weight births (8.2%). The infant mortality rate was 6.79 infant deaths per 1000 live births in 2004, not statistically different from the rate in 2003. Pronounced differences in infant mortality rates by race and Hispanic origin continue, with non-Hispanic black newborns more than twice as likely as non-Hispanic white and Hispanic infants to die within 1 year of birth. The expectation of life at birth reached a record high in 2004 of 77.8 years for all gender and race groups combined. Death rates in the United States continued to decline, with death rates decreasing for 9 of the 15 leading causes. The crude death rate for children aged 1 to 19 years did not decrease significantly between 2003 and 2004. Of the 10 leading causes of death for 2004 in this age group, only the rates for influenza and pneumonia showed a significant decrease. The death rates increased for intentional self-harm (suicide), whereas rates for other causes did not change significantly for children. A large proportion of childhood deaths continue to occur as a result of preventable injuries.

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#### Key Words

birth, death, teenage 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  
 OMB—Office of Management and Budget  
 LBW—low birth weight  
 VLBW—very low birth weight

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**T**HIS ANNUAL ARTICLE is a long-standing feature in *Pediatrics*. In this article we provide a summary of vital-statistics data through 2005. For birth data, the most current information for 2005 is based on preliminary data, whereas more detailed analyses were based on final data for 2004. For mortality data, the most current data are final 2004 data. We have included a special feature that focuses on the transition to the new birth certificate and related issues for states and the National Center for Health Statistics (NCHS).

## METHODS

The data presented in this report were obtained from vital-statistics records: birth certificates, fetal death reports, and death certificates for residents of the United States. Birth and death data for 2004 and earlier years are final and include all records. Birth data for 2005 are preliminary and based on 99.2% of records. More complete descriptions of vital-statistics data systems are available elsewhere.<sup>1-5</sup>

Current vital-statistics patterns and recent trends through 2004 and 2005 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 in the final birth file for 2004 than in the preliminary file for 2005, thus, some of the detailed analyses of birth patterns are not available. Data on infant deaths from the linked birth/infant death data set are final data for 2003. Hispanic origin and race are collected as separate items in vital records. Persons of Hispanic origin may be of any race, although most births and infant deaths of Hispanic origin are to white women. Because there are often important differences in child-bearing patterns between non-Hispanic white and Hispanic women, all tables that present data according to race include data separately for non-Hispanic white, non-Hispanic black, and Hispanic women. Data for Native American and Asian or Pacific Islander women are not shown separately according to Hispanic origin, because the vast majority of these women are not Hispanic.

The mother's marital status for birth data, underlying cause of death for deaths, and birth weight for infant deaths have the following special considerations: mothers' marital status was reported directly on the birth certificates or through the electronic birth-registration process in all but 2 states (Michigan and New York) in 2004 and 2005. 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 NCHS publications.<sup>1,3,5</sup>

Cause-of-death statistics in this report are based solely on the underlying cause of death, which is compiled in accordance with the *International Classification of Diseases, 10th Revision*.<sup>6</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 cir-

cumstances of the accident or violence which produced the fatal injury."<sup>6</sup> Ranking for leading causes of death is based on number of deaths.<sup>7</sup>

Infant mortality refers to the death of an infant <1 year old. 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 infants who died at between 0 and 27 days of age, and postneonatal mortality rates (PNMRs) are shown for infants who died at between 28 days and 1 year of age. 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 that occurred at  $\geq 20$  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. The IMR, NMR, PNMR, PMR, and FMR are all shown per 1000 live births.

The latest infant mortality statistics according to race and Hispanic origin are from the 2003-period linked birth/infant death data set.<sup>8</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 2003. The purpose of this linkage is to use additional variables available from the birth certificate, such as birth weight, to better interpret infant mortality patterns. Numbers of infant deaths were weighted to compensate for the infant deaths for whom the matching birth certificate could not be identified.<sup>8</sup> The weighting procedure results in the same overall IMR as that based on unlinked mortality data; however, small differences may exist because of geographic coverage differences, additional quality control, and weighting.<sup>8</sup>

Thirteen states (Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York [excluding New York City], Pennsylvania, South Carolina, Tennessee, Texas, Vermont [from July 1, 2005], and Washington) used the 2003 revision of the US standard certificate of live birth for data year 2005.<sup>3</sup> This article includes 2005 birth data for these 13 states and for the remaining 37 states, New York City, and the District of Columbia, which reported birth data that were based on the 1989 revision of the US standard certificate of live birth. (One state, Vermont, implemented the 2003 revised certificate midyear and reported data for the first half of the year using the 1989 certificate.) The prenatal-care and smoking-during-pregnancy items on the 2003 revision of the US standard certificate of live birth, however, differ from those on the 1989 certificate.<sup>9,10</sup> As a result, 2005 data on these items for states that implemented the revised certificates are not compatible with those from the states whose data were compiled with the 1989 revision. Findings are reported separately for these groups.

Eleven states (California, Idaho, Michigan, Montana, New Hampshire, New Jersey, New York [including New

York City], Oklahoma, South Dakota, Washington, and Wyoming) used the 2003 revision of the US standard certificate of death by 2004; the remaining 39 states and the District of Columbia collected and reported death data in 2004 on the basis of the 1989 revision of the US standard certificate of death.<sup>4</sup> Because the items presented in this report seem largely comparable despite changes to item wording and format in the 2003 revision, data from both groups of states are generally combined.

Births and mortality records that were provided according to reporting areas that used the 2003 revision of the US standard certificate of birth/death (as well as on the unrevised certificates of some additional states) allowed for reporting multiple race categories.<sup>1-4,11,12</sup> To provide uniformity and comparability of the data during the transition period, before all or most of the data would be available in the new multiple-race format, it was necessary to adjust the birth and mortality numerators by “bridging” the responses of those who reported >1 race (multiple race) to a single race.<sup>13,14</sup> The bridging procedure used was similar to the procedure used to bridge multiracial population estimates (see discussion on population denominators below).<sup>13,14</sup> Multiracial parents and decedents were imputed to a single race (either white, black, American Indian/Alaska native, or Asian/Pacific Islander) according to the combination of races, Hispanic origin, gender, and age indicated on the birth or death certificate.

Population denominators for the calculation of birth, death, and fertility rates are estimates that were based on the population enumerated by the US Census Bureau as of April 1, 2000. Estimates for 2000–2005 and the revised estimates for the intercensal period of 1991–1999 were produced under a collaborative arrangement between the US Census Bureau and the NCHS. Reflecting the new guidelines issued in 1997 by the Office of Management and Budget (OMB), the 2000 census included an option for individuals to report >1 race as appropriate for themselves and household members.<sup>11</sup> The 1997

OMB guidelines also provided for the reporting of Asian persons separately from native Hawaiians or other Pacific Islanders. Under the previous OMB standards issued in 1977, data for Asian or Pacific Islander persons were collected as a single group.<sup>12</sup> Birth and death certificates for most states currently collect only 1 race for mother and decedent in the same categories as specified in the 1977 OMB guidelines and do not report Asians separately from native Hawaiians or other Pacific Islanders. Thus, birth and death certificate data by race (the numerators for birth and death rates) are currently incompatible with the population data collected in the 2000 census (the denominators for the rates).

To produce birth and death rates for 2000–2005 and revised intercensal rates for the 1991–1999 period, it was necessary to bridge the reported population data for multiple-race persons back to single-race categories. In addition, the 2000 census counts were modified to be consistent with the 1977 OMB race categories, that is, to report the data for Asians and native Hawaiians or other Pacific Islanders as a combined category of Asian or Pacific Islanders.<sup>13</sup> The procedures used to produce the bridged populations have been described in separate publications.<sup>13-15</sup> As national vital-statistics data based on the 1997 OMB guidelines become available, the use of bridged populations can be discontinued.

Data for the international comparisons of births, birth rates, and IMRs were obtained from the 2003 *United Nations Demographic Yearbook*.<sup>16</sup>

## NATURAL INCREASE

Slightly >1.7 million persons were added to the US population in 2004 as a result of natural increase (the excess of births over deaths).<sup>14</sup> The rate of natural increase was 5.8 persons per 1000 population in 2004 (Table 1).

## BIRTHS

The preliminary estimate of births for the United States in 2005 was 4 140 419, an increase of 1% compared

**TABLE 1 Vital Statistics of the United States, 1915–2005 (Selected Years)**

	No.			Rate <sup>a</sup>						
	2005	2004	2000	2005	2004	2000	1990	1980	1950	1915 <sup>b</sup>
Live births	4 140 419	4 112 052	4 058 814	14.0	14.0	14.4	16.7	15.9	24.1	29.5
Fertility rate				66.7	66.3	65.9	70.9	68.4	106.2	125.0
Deaths	—	2 397 615	2 403 351	—	8.2	8.5	8.6	8.8	9.6	13.2
Age-adjusted rate				—	8.0	8.7	9.4	10.4	14.5	21.7
Natural increase	—	1 714 437	1 655 463	—	5.8	5.9	8.1	7.1	14.5	16.3
Infant mortality	—	27 936	28 035	—	6.79	6.89	9.2	12.6	29.2	99.9
Population base (in thousands)				296 410	293 655	281 422	248 710	226 546	150 697	100 546

Birth data for 2005 are preliminary. Birth, mortality, and infant mortality data for 2004 and all data for earlier years are final. Populations are as of July 1 for 2004 and 2005 and as of April 1 in 1950, 1980, 1990, and 2000. The population for 1915 is the midyear estimate based on the April 15, 1910, census. — indicates that data were not available.

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

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

with the final total for 2004 (Table 1).<sup>3</sup> The crude birth rate in 2005 was 14.0 births per 1000 total population, unchanged from 2004; the general fertility rate, defined as the number of births per 1000 women aged 15 to 44 years, rose slightly in 2004 to 66.7 births per 1000 women, the highest level since 1993. The total fertility rate rose slightly in 2005 to 2054.0, compared with 2045.5 in 2004. The total fertility rate 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. Because it is computed from age-specific birth rates, the total fertility rate is age adjusted; it is not affected by changes over time in age composition.

### Racial and Ethnic Composition

Fertility rates vary among race and ethnic groups (Table 2). In 2005, Hispanic women had the highest fertility rate (99.1 births per 1000 women aged 15–44 years in preliminary 2005 data) and non-Hispanic white women had the lowest fertility rate (58.4).<sup>3</sup> The rate rose between 2004 and 2005 for Hispanic and American Indian women, declined slightly for Asian and Pacific Islander women, and was essentially unchanged for non-Hispanic white and non-Hispanic black women. In 2005, 23.9% of all births in the United States were to Hispanic women, compared with 15% in 1990.<sup>1,3</sup>

### Trends in Age-Specific Birth Rates

#### Teen Childbearing

In 2005, the preliminary birth rate for teenagers declined 2%, falling to 40.4 births per 1000 women aged 15 to 19 years, a 35% drop compared with the most recent peak in 1991 (61.8) and the lowest ever recorded in the 65 years for which a consistent series of rates is available (Tables 2 and 3).<sup>1,3,17</sup> The decline among teenage age groups was concentrated among teenagers aged 15 to 17

years, for whom the birth rate fell 3%, to 21.4 births per 1000, another record low for the nation. The rate for this age group has dropped 45% since 1991. The rate for older teenagers, 18 to 19 years old, essentially stable at 69.9 births per 1000 according to preliminary data for 2005, was 26% lower than that in 1991 (94.0). The birth rate for the youngest teenage group, 10 to 14 years old, was unchanged in 2005 at 0.7 births per 1000 females.

From 2004 to 2005 teen birth rates fell 3% each for non-Hispanic white and non-Hispanic black teenagers 15 to 19 years of age (Table 3). The decline for young non-Hispanic black teenagers 15 to 17 years of age was 6% between 2004 and 2005 and 59% since 1991, the steepest reduction overall by race or age group (Fig 1 and Table 3).<sup>1,3</sup>

#### Childbearing for Women ≥20 Years Old

In 2005, the birth rate for women 20 to 24 years of age increased to 102.2 births per 1000 women, <1% over the rate in 2004, whereas the rate for women 25 to 29 years of age, the group with the highest rate among the age groups, was essentially unchanged (115.6).<sup>1,3</sup>

Birth rates for women aged ≥30 years have generally increased over the past 2 decades.<sup>18</sup> Between 2004 and 2005, the birth rate for women aged 30 to 34 years rose slightly to 95.9 births per 1000, the highest rate since 1964. The rate for women 35 to 39 years of age rose to 46.3 births per 1000, 2% over the rate in 2004 and the highest rate since 1965.<sup>3</sup> The birth rate for women aged 40 to 44 years also rose by 2% to 9.1, the highest rate since 1968, and the rate for women 45 to 49 years of age increased slightly to 0.6 births per 1000 women, the first increase in the rate since 2000 and the highest rate since 1970.<sup>1,3,5,18</sup>

#### Unmarried Mothers

The total number of births to unmarried women rose by 4% to 1 525 345 in 2005 (preliminary data), compared

**TABLE 2 Age-Specific Birth Rates and Total Fertility Rates According to Race and Hispanic Origin of Mother: United States, Preliminary 2005**

	Age-Specific Birth Rate According to Age (y) of Mother <sup>a</sup>								Total Fertility Rate <sup>b</sup>
	15–44 <sup>c</sup>	15–17	18–19	20–24	25–29	30–34	35–39	40–44	
Total	66.7	21.4	69.9	102.2	115.6	95.9	46.3	9.1	2054.0
Non-Hispanic White	58.4	11.5	48.1	81.5	109.3	97.2	45.7	8.3	1843.5
Non-Hispanic Black	67.2	34.9	102.9	126.7	103.0	68.5	34.3	8.2	2019.0
American Indian <sup>d</sup>	59.9	30.5	87.4	109.0	94.0	59.9	26.9	6.0	1749.0
Asian or Pacific Islander	66.6	8.2	30.1	61.0	108.0	115.1	61.9	13.9	1890.0
Hispanic <sup>e</sup>	99.1	48.4	134.2	169.6	148.8	106.5	54.0	12.9	2877.0

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. Nineteen states reported multiple-race data for all or part of 2005. 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 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.

Source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality, 2005.

**TABLE 3 Birth Rates for Teens According to Age, Race, and Hispanic Origin: United States, Final, Selected Years 1990–2004 and Preliminary 2005**

Age, Race, and Hispanic Origin of Mother	Birth Rate <sup>a</sup>					Percent Change, 1991–2005
	2005	2004	2000	1991	1990	
<b>15–19 y</b>						
All races	40.4	41.1	47.7	61.8	59.9	–35
Non-Hispanic white <sup>b</sup>	26.0	26.7	32.6	43.4	42.5	–40
Non-Hispanic black <sup>b</sup>	60.9	63.1	79.2	118.2	116.2	–48
Asian or Pacific Islander	16.9	17.3	20.5	27.3	26.4	–38
American Indian <sup>c</sup>	52.7	52.5	58.3	84.1	81.1	–37
Hispanic <sup>b,d</sup>	81.5	82.6	87.3	104.6	100.3	–22
<b>15–17 y</b>						
All races	21.4	22.1	26.9	38.6	37.5	–45
Non-Hispanic white <sup>b</sup>	11.5	12.0	15.8	23.6	23.2	–51
Non-Hispanic black <sup>b</sup>	34.9	37.1	50.1	86.1	84.9	–59
Asian or Pacific Islander	8.2	8.9	11.6	16.3	16.0	–50
American Indian <sup>c</sup>	30.5	30.0	34.1	51.9	48.5	–41
Hispanic <sup>b,d</sup>	48.4	49.7	55.5	69.2	65.9	–30
<b>18–19 y</b>						
All races	69.9	70.0	78.1	94.0	88.6	–26
Non-Hispanic white <sup>b</sup>	48.1	48.7	57.5	70.6	66.6	–32
Non-Hispanic black <sup>b</sup>	102.9	103.9	121.9	162.2	157.5	–37
Asian or Pacific Islander	30.1	29.6	32.6	42.2	40.2	–29
American Indian <sup>c</sup>	87.4	87.0	97.1	134.2	129.3	–35
Hispanic <sup>b,d</sup>	134.2	133.5	132.6	155.5	147.7	–14

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. Nineteen states in 2005 and 15 states in 2004 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 specific groups.

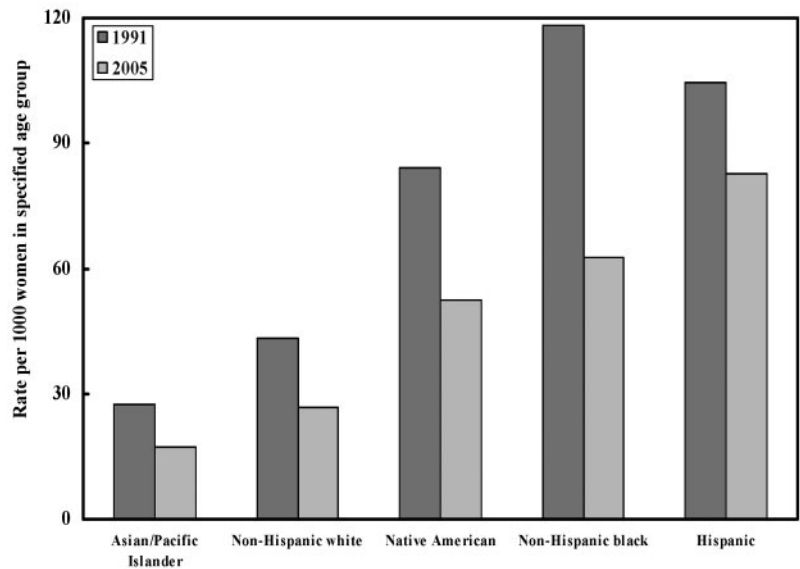
<sup>b</sup> In 1991 excludes data for New Hampshire and in 1990 excludes data for New Hampshire and Oklahoma, which did not report Hispanic origin on the birth certificate.

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

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

Source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality, 1990–1991, 2000, 2004–2005.

**FIGURE 1**  
Birth rates for teens 15 to 19 years of age according to race and Hispanic origin: United States, 1991 (final) and 2005 (preliminary).



with 1 470 189 in 2004.<sup>1,3,19</sup> During the period 2002–2005, the number of births to unmarried women increased 12% overall. The birth rate for unmarried

women increased 3% in 2005 to 47.6 per 1000 unmarried women aged 15 to 44 years, up from 46.1 in 2004. In 2005, the proportion of births to unmarried women

increased to 36.8%, compared with 35.8% in 2004 (Table 4). The proportions increased for all population groups by race and Hispanic origin.

### Smoking During Pregnancy

Smoking during pregnancy declined slightly to 10.2% in 2004 (final data), compared with 10.4% in 2003 for the 40 states, New York City, and the District of Columbia, which used the 1989 revised certificate (the data for 2003 shown in Table 5 are based on the same area).<sup>1</sup> The concern about smoking during pregnancy has been long-standing; smoking during pregnancy is linked to adverse pregnancy outcomes, including low birth weight (LBW), intrauterine growth retardation, miscarriage, and infant mortality, as well as negative consequences for child health and development.<sup>1,20-24</sup>

The percentage of mothers who smoked during pregnancy (according to race and Hispanic origin) was essentially unchanged from the previous year for non-Hispanic white (13.8%) and non-Hispanic black (8.4%) women. The rate for Hispanic women (2.6%), although substantially lower than that for the other groups, was also essentially stable.<sup>1,20</sup>

For the 7 states for which data on smoking are available from the 2003 revision for all of 2004 (Table 5), the overall smoking rate was 16.3%; the revised question

on smoking differs considerably from the question on the 1989 certificate, and it is expected that the revised question will elicit higher rates of smoking during pregnancy. The new question on maternal smoking should provide higher-quality, more-reliable information because women are afforded the chance to report that their smoking behavior has changed.<sup>1</sup>

### Prenatal Care

This report includes data on the timing of prenatal care based on both the 1989 and the 2003 revisions to the US standard certificate of live birth. The 2003 revision of the birth certificate introduced substantive changes in item wording and also to the sources of prenatal information. Accordingly, prenatal-care data for the 2 revisions are not directly comparable and are shown separately.<sup>1</sup> Data from the 1989 certificate are available for 41 states, New York City, and the District of Columbia. Data from the 2003 revision are available for 7 states (New York State excludes New York City). Some states used both certificates in 2004 and are not included in this analysis.

Timely initiation of prenatal care does not seem to have improved in the United States in 2004 (Table 5). On the basis of the reporting area of 41 states, New York City, and the District of Columbia for which comparable data using the 1989 certificate are available, 83.9% of

**TABLE 4** Percent of Births With Selected Characteristics According to Race and Hispanic Origin of Mother: United States, Final 1990, 2004, Preliminary 2005

	All Races			Non-Hispanic White			Non-Hispanic Black			Hispanic <sup>a</sup>		
	2005	2004	1990	2005	2004	1990 <sup>b</sup>	2005	2004	1990 <sup>b</sup>	2005	2004	1990 <sup>b</sup>
Mother												
<20 y of age	10.2	10.3	12.8	7.3	7.4	9.6	17.0	17.3	23.2	14.1	14.3	16.8
≥40 y of age	2.7	2.7	1.2	3.0	3.0	1.2	2.2	2.1	0.8	2.0	1.9	1.2
Unmarried	36.8	35.8	28.0	25.4	24.5	16.9	69.5	69.3	66.7	47.9	46.4	36.7
Diabetes during pregnancy	—	3.6	2.1	—	3.4	2.2	—	3.4	1.8	—	3.5	2.0
Pregnancy-associated hypertension	—	3.8	2.7	—	4.3	3.0	—	4.2	2.8	—	2.6	1.8
Health care utilization												
Midwife-attended births <sup>c</sup>	—	7.5	3.9	—	7.0	3.2	—	6.9	4.4	—	9.0	6.2
Cesarean-delivery rate	30.2	29.1	22.7	30.4	29.2	23.4	32.5	31.0	22.1	28.9	28.0	21.2
Infant												
Birth weight												
VLBW <sup>d</sup>	1.5	1.5	1.3	1.2	1.2	0.9	3.3	3.1	2.9	1.2	1.2	1.0
LBW <sup>d</sup>	8.2	8.1	7.0	7.3	7.2	5.6	13.9	13.7	13.3	6.9	6.8	6.1
Gestational age												
Very preterm birth <sup>e</sup>	1.3	2.0	1.92	1.1	1.6	1.33	2.3	4.1	4.63	1.2	1.8	1.69
Preterm birth <sup>e</sup>	13.5	12.5	10.6	12.5	11.5	8.5	19.4	17.9	18.9	12.9	12.0	11.0
Multiple births per 1000 total births												
Live births in twin deliveries (not percent)	—	32.2	22.6	—	36.3	22.9	—	35.6	26.7	—	21.5	18.0
Live births in higher-order multiple deliveries (not percent)	—	1.8	0.7	—	2.4	0.9	—	1.0	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. Nineteen states in 2005 and 15 states in 2004 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 were 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 <2500g (5 lb, 8 oz).

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

Source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality, 1990, 2004–2005.

**TABLE 5 Smoking Status During Pregnancy and Trimester of Pregnancy Prenatal Care Began According to Race and Hispanic Origin of Mother: 41 States, the District of Columbia, and New York City (Unrevised), 2003 and 2004 (Final), and 7 States (Revised), 2004 (Final)**

	Unrevised <sup>a</sup>		Revised <sup>b</sup>
	2004 <sup>c</sup>	2003 <sup>c</sup>	2004 <sup>d</sup>
All races			
Smoker <sup>e</sup>	10.2	10.4	16.3
First-trimester prenatal care	83.9	84.0	72.9
Non-Hispanic white			
Smoker <sup>e</sup>	13.8	13.8	19.0
First-trimester prenatal care	88.9	89.1	78.0
Non-Hispanic black			
Smoker <sup>e</sup>	8.4	8.4	13.0
First-trimester prenatal care	76.5	76.2	58.9
Hispanic <sup>f</sup>			
Smoker <sup>e</sup>	2.6	2.7	5.7
First-trimester prenatal care	77.5	77.3	56.5

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. Fifteen states reported multiple-race data in 2004. 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> Data are based on the 1989 revision of the US certificate of live birth; these data are not comparable with those based on the 2003 revision of the US certificate of live birth.

<sup>b</sup> Data are based on the 2003 revision of the US certificate of live birth; these data are not comparable with those based on the 1989 revision of the US certificate of live birth.

<sup>c</sup> Excludes data from Florida, Idaho, Kentucky, New Hampshire, New York State (excluding New York City), Pennsylvania, South Carolina, Tennessee, and Washington.

<sup>d</sup> Includes data from Idaho, Kentucky, New York State (excluding New York City), Pennsylvania, South Carolina, Tennessee, and Washington.

<sup>e</sup> Unrevised data exclude California, which did not report tobacco use during pregnancy.

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

Source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality, 2003–2004.

mothers were reported to have begun care within the first 3 months of pregnancy, a level not significantly different from that reported for the same reporting area for 2003.<sup>1</sup> Levels of prenatal care in the first trimester rose slowly but steadily between 1990 and 2003. No change was observed in the percentage of women receiving late (care beginning in the third trimester of pregnancy) or no care between 2003 and 2004 (3.6%). Appropriate prenatal care can enhance pregnancy outcome by assessing risk, providing health care advice, and managing chronic and pregnancy-related health conditions.<sup>25–27</sup>

The percentage of women beginning care in the first trimester of pregnancy was essentially unchanged among the racial and Hispanic-origin groups in the 41-state reporting area between 2003 and 2004. Although large differences persist, efforts to reduce racial disparities in the timely receipt of prenatal care have met with some success. From 1990 to 2003, first-trimester care increased by 7% for non-Hispanic white women, 24% for non-Hispanic black women, and 29% for Hispanic women.

For the 7 revised states for which data from the 2003 revision are available for all of 2004, 72.9% of women

were reported to have begun care in the first 3 months of pregnancy; 6.2% of mothers were reported to have late or no prenatal care (Table 5). As noted above, the revised prenatal-care item is substantively different from the unrevised question; levels of prenatal-care utilization based on revised data are substantially lower than those based on unrevised data.

### Cesarean Delivery

In 2005, the preliminary rate of cesarean delivery rose 4% to 30.2% of all births, another record high for the United States (Table 4).<sup>1,3,28</sup> The cesarean rate declined somewhat during the early and mid-1990s but has risen 46% since 1996 (20.7). Rates increased between 2004 and 2005 for non-Hispanic white, non-Hispanic black, American Indian, Asian or Pacific Islander, and Hispanic women, as well as for each 5-year age group (Table 4). Since 1996, rates have risen by >40% for all age groups, including for young women <20 years of age (Fig 2).

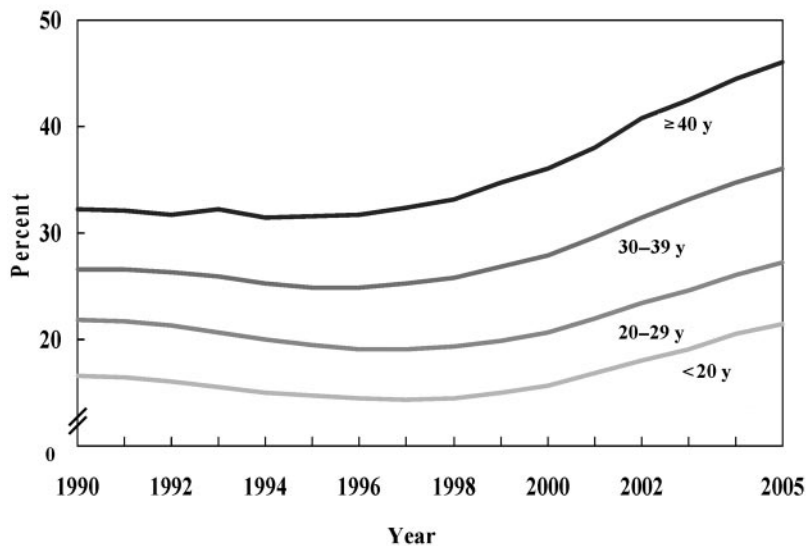
The escalation in the cesarean-delivery rate is being driven by both the rise in the primary cesarean-delivery rate and the steep decline in the rate of vaginal births after cesarean deliveries. Controversy continues on the risks, benefits, and long-term consequences of cesarean delivery.<sup>29–32</sup>

### Multiple Births

The twin birth rate rose by 2% in 2004 to 32.2 twins per 1000 total births, a record high (Table 4). The twinning rate has climbed 42% since 1990 (22.6) and 70% since 1980 (18.9).<sup>1,33</sup> In contrast, the rate of triplet and higher-order multiple births (triplet+) declined by 6% in 2004 to 176.9 per 100 000. The triplet and higher-order multiple-birth rate soared by >400% between 1980 and 1998; since 1999, however, this rate has been comparatively stable, trending slightly downward. The current-year level is 9% lower than the 1998 peak.<sup>1,33</sup> Twinning rates increased in 2004 for non-Hispanic white (36.3 in 2004) and non-Hispanic black (35.6) women. Triplet and higher-order multiple births declined among non-Hispanic white (243.4 per 100 000 for 2004) and non-Hispanic black (99.7) women.

Despite the recent small amelioration in triplet+ birth rates, levels remain fourfold higher than those observed before the introduction of fertility therapies in the early 1980s. The rising incidence of multiple births over the last 2 decades, especially that for higher-order multiples, has been associated with 2 related trends: the older age at childbearing and the increasing use of fertility therapies, which include ovulation-inducing drugs and assisted reproductive technologies.<sup>34–38</sup> The recent interruption in the upsurge of triplet+ births may be related, in part, to recommendations in the late 1990s (further refined in 2004) from the American Society of Reproductive Medicine, which was intended to prevent higher-order multiple pregnancies by limiting the number of

**FIGURE 2**  
 Cesarean-delivery rates according to age of mother: United States, 1990–2005 (preliminary).



embryos transferred.<sup>39,40</sup> A shift from the transfer of 3 embryos (a predictor of triplet and higher-order multiple deliveries) to 2 embryos seems to have occurred between the mid- to late 1990s and 2002 (the most recent year for which data are available).<sup>34,41</sup> Other factors also may have influenced the recent change in triplet and other higher-order multiple-birth rates.<sup>42,43</sup>

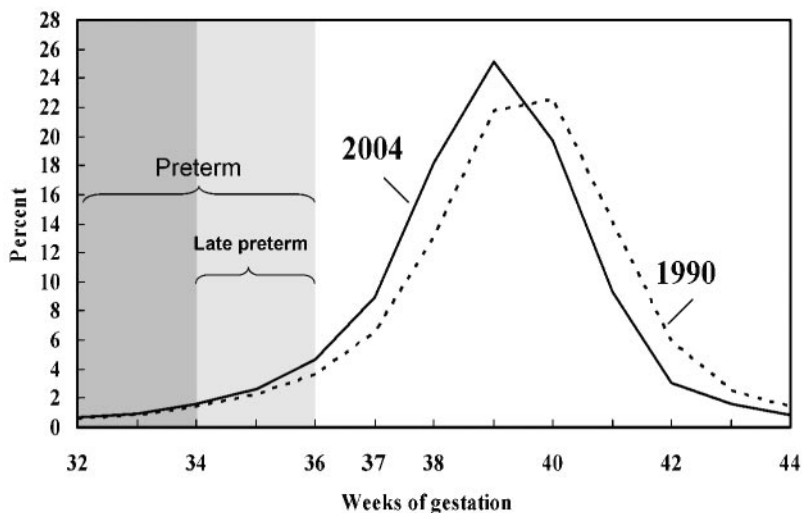
**Preterm Birth**

The percentage of births that were preterm (<37 completed weeks of gestation) rose from 12.5% to 12.7% from 2004 to 2005 (Fig 3 and Table 4). The percentage of infants delivered preterm has risen 20% since 1990 (10.6%). Preterm rates rose significantly for non-Hispanic white (11.7% for 2005), non-Hispanic black (18.4%), and Hispanic (12.1%) infants between 2004 and 2005. Rates for non-Hispanic white and Hispanic births have been rising for more than a decade, increas-

ing 38% for non-Hispanic white and 10% for Hispanic infants since 1990. The preterm rate for black infants declined modestly during the 1990s but has been on the rise since the year 2000. Preterm infants have higher mortality rates when compared with term infants.<sup>8</sup> Although the upswing in multiple births has had an important influence on recent trends in preterm birth rates, shorter gestations have also risen among singleton deliveries. The causes of preterm delivery are not fully understood, and until progress is made in this regard, substantial reduction in the preterm birth rate seems unlikely.<sup>1,3,44,45</sup>

The proportion of all infants born very preterm (<32 completed weeks of gestation) rose very slightly between 2004 and 2005 from 2.01% to 2.03% (Table 4). Late preterm births (34–36 weeks) increased more markedly from 8.9% to 9.1% for the same period.<sup>3</sup> No significant change was observed in the percentage of 32-

**FIGURE 3**  
 Percent distribution of births according to gestational age (32–44 weeks): United States, 1990 and 2004 (final).



to 33-week-gestation births. Much of the upturn in the preterm rate over recent years can be attributed to increases in late preterm births. Although at lower risk than those born at earlier gestational ages, infants delivered late preterm are at greater risk of compromised pregnancy outcome than those born later in pregnancy.<sup>8</sup>

### LBW

The percentage of infants born LBW (births weighing <2500 g) increased in 2005 to 8.2% of all births from 8.1% in 2004 (Table 4). The percentage of infants born LBW has increased >20% since the mid-1980s (6.7 in 1984); the current level is the highest level reported since 1968.<sup>1,3</sup> LBW rates rose 1% to 2% for non-Hispanic white, non-Hispanic black, and Hispanic infants between 2004 and 2005. Among all births, levels of both very low birth weight (VLBW; births weighing < 1500 g), and moderately LBW (births weighing 1500–2499 g) increased slightly for 2005 (see Table 4). LBW and especially VLBW are major predictors of infant morbidity and mortality. The risk of early death for infants born at moderately LBW (1500–2499 g) is 5 times higher than that of heavier infants; the risk for VLBW infants is >100 times that of infants born at  $\geq$ 2500 g.<sup>8</sup>

### INFANT MORTALITY

In 2004, 27 936 infant deaths (final data) were reported in the United States. The final 2004 IMR was 6.79 infant deaths per 1000 live births (final mortality data), which is not statistically different from the 2003 rate of 6.84 (linked birth/infant death data) (Fig 4 and Table 1).<sup>4,8</sup> After declining fairly steadily for >40 years, the rate unexpectedly increased in 2002 to 6.95.<sup>46</sup> The 2004 rate, although not significantly lower than that for the previous year, is significantly lower than that for 2002.<sup>4</sup> The NMR (birth through 27 days) declined to 4.52 in 2004 from 4.63 in 2003; the PNMR was essentially unchanged for 2004 at 2.27 per 1000 live births.<sup>4,8</sup>

Information from the linked birth/infant death data set for 2003 continued to demonstrate pronounced differences in IMRs according to race and Hispanic origin. Non-Hispanic black newborns continued to be more than twice as likely as non-Hispanic white and Hispanic infants (13.60 compared with 5.70 and 5.65 per 1000) to die within 1 year of birth.<sup>8</sup> The IMRs for all groups declined somewhat between 1995 and 2000 but were essentially stagnant in 2000–2003.

### Perinatal and Fetal Mortality

The PMR declined 2% between 2002 and 2003 from 6.91 to 6.74 per 1000 live births and fetal deaths (Fig 4). The PMR is defined as late fetal ( $\geq$ 28 weeks of gestation) and early neonatal (<7 days) deaths per 1000 births plus fetal deaths. The PMR has been declining fairly consistently for more than half a century.<sup>47</sup> The decrease in the PMR for 2002–2003 is attributable largely to the sizable drop in late fetal deaths (from 3.19 to 3.04 per 1000); only a small decline in early neonatal mortality was observed (from 3.73 to 3.70 per 1000 for 2002–2003).

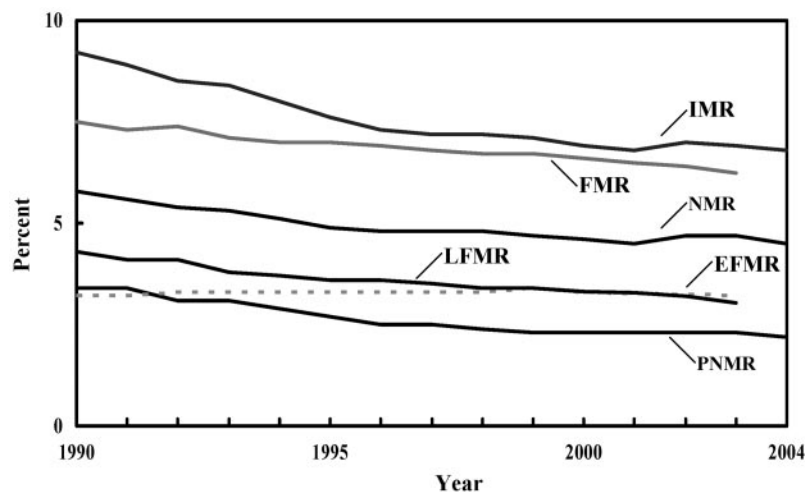
The 2003 FMR (fetal deaths of at least 20 weeks of gestation) was 6.23 per 1000 live births plus fetal deaths, down from 6.41 in 2002. The late FMR declined 5%; the early FMR (fetal deaths of 20–27 weeks) decreased very slightly from 3.24 to 3.21 between 2002 and 2003. The overall FMR has declined substantially over the last 50 years and is down 17% since 1990.<sup>48</sup> The decline over this period has been almost exclusively among late fetal deaths (down 29% for 1990 and 2003); the early FMR has not improved over this period.<sup>48</sup>

### Geographic Variation

Table 6 presents information on state variations in preterm birth and LBW for 2004 (latest year for which final state data are available). When examining preterm births according to state, >15% of all infants in Alabama, Louisiana, Mississippi, and South Carolina

FIGURE 4

Fetal (FMR; fetal deaths per 1000 live births plus fetal deaths), early fetal (EFMR; early fetal deaths [20–27 weeks' gestation] per 1000 live births plus fetal deaths), late fetal (LFMR; late fetal deaths [ $\geq$ 28 weeks' gestation] per 1000 live births plus fetal death), infant (IMR; infant deaths per 1000 live births), neonatal (NMR; neonatal deaths per 1000 live births), and postneonatal (PNMR; postneonatal deaths per 1000 live births) mortality rates: United States, 1990–2004 (final).



**TABLE 6 Percent Preterm and LBW According to Race and Hispanic Origin of Mother: United States and Each State, Final 2004**

State of Residence	Percent Preterm <sup>a</sup>				Percent LBW <sup>b</sup>			
	All Races <sup>c</sup>	Non-Hispanic White	Non-Hispanic Black	Hispanic <sup>d</sup>	All Races <sup>c</sup>	Non-Hispanic White	Non-Hispanic Black	Hispanic <sup>d</sup>
United States <sup>e</sup>	12.5	11.5	17.9	12.0	8.1	7.2	13.7	6.8
Alabama	16.1	14.0	21.3	13.9	10.4	8.5	15.1	6.8
Alaska	10.5	8.8	13.2	9.4	6.0	5.1	9.3	5.4
Arizona	13.3	12.6	18.4	13.4	7.2	7.3	12.0	6.8
Arkansas	13.1	12.1	17.7	11.0	9.3	8.1	15.5	6.0
California	10.7	9.8	15.1	10.9	6.7	6.3	12.4	6.1
Colorado	12.3	11.6	17.3	13.0	9.0	8.7	14.6	8.6
Connecticut	10.1	9.2	14.2	10.8	7.8	6.7	12.7	8.5
Delaware	13.1	12.0	17.0	11.1	9.0	7.4	13.8	6.2
District of Columbia	14.4	8.8	17.1	13.5	11.1	5.6	14.1	7.8
Florida	13.4	11.9	18.2	12.5	8.5	7.3	13.1	7.0
Georgia	12.8	11.4	16.8	9.5	9.3	7.4	14.0	6.0
Hawaii	12.1	9.3	15.3	12.2	7.9	6.2	10.2	7.9
Idaho	11.0	10.9	f	10.8	6.8	6.6	f	7.0
Illinois	13.1	11.9	19.0	11.8	8.4	7.3	14.6	6.7
Indiana	13.2	12.6	18.6	12.3	8.1	7.5	13.6	6.3
Iowa	11.8	11.5	16.5	12.0	7.0	6.9	11.0	6.1
Kansas	11.8	11.5	16.9	11.6	7.3	7.0	13.7	6.3
Kentucky	14.4	14.1	18.4	13.8	8.8	8.4	13.3	7.2
Louisiana	15.6	12.5	20.1	12.1	10.9	8.0	15.2	7.7
Maine	10.6	10.5	14.3	f	6.4	6.4	f	f
Maryland	13.3	11.4	17.0	12.5	9.3	7.4	13.2	7.3
Massachusetts	11.3	10.8	15.7	11.6	7.8	7.2	11.8	8.6
Michigan	12.3	11.2	18.3	10.9	8.3	7.1	14.5	6.4
Minnesota	10.5	10.2	12.9	10.2	6.5	6.0	10.5	6.3
Mississippi	17.9	14.8	22.1	14.8	11.6	8.7	15.5	7.4
Missouri	13.0	11.9	19.3	12.5	8.3	7.3	14.0	6.6
Montana	11.6	11.1	f	11.0	7.6	7.6	f	8.6
Nebraska	11.8	11.8	14.2	11.5	7.0	7.0	11.8	5.9
Nevada	13.5	12.8	19.1	12.8	8.0	7.8	13.8	6.3
New Hampshire	10.1	10.2	14.7	9.7	6.8	6.9	f	6.3
New Jersey	12.4	11.1	17.9	12.7	8.3	7.2	13.7	7.2
New Mexico	12.6	11.6	18.0	12.7	8.1	8.0	14.7	8.2
New York	11.7	10.3	16.4	12.2	8.2	6.9	13.0	7.5
North Carolina	13.5	12.1	18.2	11.9	9.0	7.7	14.2	6.4
North Dakota	12.4	12.1	f	13.3	6.6	6.4	f	f
Ohio	12.5	11.6	17.5	12.3	8.5	7.5	14.0	7.0
Oklahoma	12.7	12.4	16.6	11.3	8.0	7.8	13.0	6.6
Oregon	10.1	10.0	13.3	9.8	6.0	6.0	10.6	5.2
Pennsylvania	11.8	10.7	16.9	13.4	8.2	7.1	13.5	9.3
Rhode Island	11.8	10.7	15.5	13.7	8.0	7.3	11.0	8.3
South Carolina	15.5	13.1	20.7	12.1	10.2	7.9	15.3	6.3
South Dakota	11.2	10.5	f	8.4	6.9	6.9	f	f
Tennessee	14.5	13.7	18.9	11.4	9.2	8.2	13.8	6.0
Texas	13.7	12.9	18.9	13.3	8.0	7.4	13.9	7.2
Utah	10.8	10.5	17.0	12.0	6.7	6.3	10.8	7.6
Vermont	8.3	8.1	f	f	6.4	6.3	f	f
Virginia	12.1	11.0	16.4	11.0	8.3	7.0	12.8	6.4
Washington	10.3	9.9	13.6	10.9	6.2	5.7	11.1	6.1
West Virginia	14.0	13.9	17.1	13.2	9.3	9.1	14.3	f
Wisconsin	11.2	10.5	17.2	10.8	7.0	6.2	13.6	6.4
Wyoming	11.6	11.0	f	13.6	8.6	8.5	f	8.4
Puerto Rico	17.8	—	—	—	11.5	—	—	—
Virgin Islands	16.3	f	17.3	16.0	11.4	f	13.3	7.5
Guam	16.2	f	f	f	8.5	f	f	f
American Samoa	—	—	—	—	3.3	—	—	—
Northern Marianas	12.3	—	—	—	7.6	—	—	—

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. Fifteen states reported multiple-race data for 2004. 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 the data were not available.

<sup>a</sup> Percent of births <37 weeks of gestation.

<sup>b</sup> Percent of births <2500 g (5 lb, 8 oz).

<sup>c</sup> Includes races other than white and black.

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

<sup>e</sup> Total excludes data for the territories.

<sup>f</sup> Figure does not meet standards of reliability or precision (defined as <20 births in the numerator).

Source: Centers for Disease Control and Prevention/NCHS, National Vital Statistics System, natality, 2004.

(15.5%–17.9%) were born preterm, compared with ≤10.1% of infants in Connecticut, New Hampshire, Oregon, and Vermont (8.3%–10.1%). For 2004, >10% of all infants in Alabama, Louisiana, Mississippi, South Carolina, and the District of Columbia were born at LBW (10.2%–11.6%), compared with <6.5% of infants in Alaska, Maine, Oregon, Vermont, and Washington (6.0%–6.4%). Variations by state in preterm births and LBW reflect compositional differences by race, ethnicity, and socioeconomic status in the population in addition to other factors (eg, incidence of multiple birth) that are associated with preterm or LBW births.

### Leading Causes of Infant Death

More than half of all infant deaths in 2004 were attributable to 5 leading causes: congenital malformations (20%), disorders relating to short gestation and LBW, not elsewhere classified (17%), sudden infant death syndrome (8%), newborn affected by maternal complications of pregnancy (maternal complications) (6%), and unintentional injuries (4%).<sup>4</sup> Final data for 2004 indicate that the order of the leading causes of death changed slightly between 2003 and 2004 as unintentional injuries moved from the sixth to the fifth leading cause.<sup>4</sup>

The rank order of leading causes of death can vary according to race or Hispanic origin. For example, in 2003, as in earlier years, LBW (not congenital malformations) was the leading cause of death among non-Hispanic black and Puerto Rican infants.<sup>8</sup>

### INTERNATIONAL COMPARISONS

Table 7 shows births, birth rates, and IMRs for the United States and 25 other countries with populations of >2 500 000 and with IMRs less than the rate for the United States in both 2002 and 2003. The countries are ordered from lowest to highest IMR in 2003. Six countries had an IMR that was half that of the US rate in 2003, and another 9 countries had rates that were two thirds that of the US IMR. The US rate remained relatively stable over the 3 years (2001–2003), as have the rates for ~40% of the other countries listed in Table 7. Only 4 countries, Portugal, Greece, Israel, and New Zealand, experienced a distinctive decline in the IMR between 2002 and 2003, although the rate for Israel was similar in 2001 and 2003.

The position of the United States relative to other countries remains unfavorable in terms of IMRs. There are a number of potential reasons for this position, including the high percentage of LBW infants, the heterogeneity of the US population relative to many other developed countries, and continuing disparities in health among disadvantaged relative to more advantaged groups.<sup>1,46,49</sup> Some researchers have suggested that the reporting of vital events in the United States may be more complete than in other developed countries.<sup>49–54</sup>

**TABLE 7** Number of Live Births and Birth Rates for 2003 and IMR for 2001, 2002, and 2003 for Countries of >2 500 000 With IMR Less Than That for the United States in 2002 and 2003

Country <sup>a</sup>	No. of Births in 2003	Birth Rates 2003	IMR		
			2003	2002	2001
Hong Kong	46 965	6.9	2.3	2.3	2.6
Singapore	37 485	9.0	2.7	3.0	2.4
Japan	1 123 610	8.8	3.0	3.0	3.1
Finland	56 630	10.9	3.1	3.0	3.2
Sweden	99 157	11.1	3.1	3.3	3.7
Norway	56 458	12.4	3.4	3.5	3.9
Czech Republic	93 685	9.2	3.9	3.9	4.0
Spain	439 863 <sup>b</sup>	10.5 <sup>b</sup>	3.9	4.1	4.1
Greece	104 420	9.5	4.0	5.8	5.1
Portugal	112 515	10.8	4.1	5.0	5.0
Germany	706 721	8.6	4.2	4.2	4.3
Switzerland	71 848	9.8	4.3	4.5	5.0
France	760 300 <sup>b</sup>	12.7 <sup>b</sup>	4.4 <sup>b</sup>	4.4	4.5
Denmark	64 682	12.0	4.4	4.4	4.9
Austria	76 944	9.5	4.5	4.1	4.8
Italy	539 503	9.4	4.6	4.3	4.6
Australia	251 161	12.6	4.8	5.0	5.3
Netherlands	200 297	12.3	4.8	5.1	5.4
Israel	144 936	21.7	4.9 <sup>b</sup>	5.4 <sup>b</sup>	5.1 <sup>b</sup>
New Zealand	56 134	14.0	4.9	5.6	5.3
Korea	493 471 <sup>b</sup>	10.3 <sup>b</sup>	5.0 <sup>b</sup>	5.1	5.4
Ireland	61 517	15.4	5.1	5.1	5.7
United Kingdom	695 549	11.7	5.3 <sup>b</sup>	5.2	5.5
Canada	330 919 <sup>b</sup>	10.5 <sup>b</sup>	—	5.4	5.2
Cuba	136 795	12.2	6.3 <sup>b</sup>	6.5	6.2
United States	4 089 950	14.1	6.9	7.0	6.8

<sup>a</sup> Belgium is excluded because data are not available for 2002 or 2003.

<sup>b</sup> Provisional data.

Source: United Nations Demographic Yearbook, 2003

Reporting changes in vital events have been hypothesized as a reason for the rise in the past few decades in the most vulnerable births (those weighing <1500 g at birth), but the evidence for this hypothesis is limited.<sup>46</sup> Reducing health disparities among our most disadvantaged groups must remain a priority over the next decade.

### DEATHS

There were 2 397 615 deaths (final data) in the United States in 2004 (Table 1), 50 673 less than the 2 448 288 deaths reported in 2003. The crude death rate for 2004 was 816.5 deaths per 100 000 population, a 3.0% decrease from the final 2003 rate of 841.9. 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 for 2004 was 800.8 deaths per 100 000 US standard population.<sup>4</sup> This rate was 3.8% lower than the final 2003 age-adjusted death rate of 832.7 and was a record low for the United States.<sup>2,4</sup>

## Expectation of Life

The estimated expectation of life 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 prevailing during the year of their birth. In 2004, the expectation of life at birth reached a record high of 77.8 years, an increase of 0.3 years from the previous year.<sup>2,4</sup> Life expectancy increased from the previous year by 0.5 years for black males, 0.4 years for white males, 0.3 years for white females, and 0.2 years for black females, setting record highs for the 4 groups. In 2004, life expectancy at birth was 80.8 years for white females, 76.3 years for black females, 75.7 years for white males, and 69.5 years for black males.

## Causes of Death

The 15 leading causes of death in 2004 (final data) accounted for >80% of all US deaths (Table 8). Between 2003 and 2004, age-adjusted death rates declined significantly for 9 of the 15 leading causes of death, as follows: heart disease by 6.6%, cancer by 2.3%, cerebrovascular diseases (stroke) by 6.5%, chronic lower respiratory diseases by 5.1%, diabetes mellitus (diabetes) by 3.2%, influenza and pneumonia by 10.0%, nephritis, nephritic syndrome, and nephrosis (kidney disease) by 1.4%, septicemia by 3.4%, and chronic liver disease and cirrhosis by 3.2%. Although there were declines in the death rates for homicide and Parkinson's disease, these declines were not statistically significant.<sup>4</sup> Among the 13 leading causes of death in 2004, age-adjusted death rates increased for essential (primary) hypertension and hypertensive renal disease (hypertension) by 4.1%, Alzheimer disease by 1.9%, and unintentional injuries by

1.1%. Alzheimer disease moved from eighth to seventh place in the leading-cause list.

## Deaths Among Children

A total of 25 325 children and adolescents between the ages of 1 and 19 years died in the United States in 2004 (Table 9).<sup>4</sup> The death rate for children aged 1 to 19 years in 2004 was 32.7 per 100 000 population, 0.9% lower than the rate of 33.0 in 2003. Although all of the tabulated age groups between 1 and 19 years of age produced downward mortality trends, the death rates did not decrease by a statistically significant margin for any of the age groups except for 1- to 4-year-olds.

For all children aged 1 to 19 years, the first and second leading causes of death in 2004 were unintentional injuries and homicide, respectively. Unintentional injuries accounted for 44.0% of all deaths, and homicide accounted for 10.4%. The death rate for both of these leading causes did not change between 2003 and 2004. Among the 10 leading causes of death for this age group, the only death rate that decreased significantly between 2003 and 2004 was that for influenza and pneumonia (40%). A significant increase was registered only for suicide (18.2%). Table 9 provides detailed information on the 5 leading causes of death according to rank in 2004 as well as the number of deaths, the percent of deaths, and the age-specific death rate for each of the leading causes for 2003 and 2004. Although the rates for some causes increased or decreased in specific age groups, the overall patterns of these death rates did not change significantly from 2003 to 2004.

**TABLE 8 Mortality From 15 Leading Causes of Death: United States, 2003 and 2004**

Causes of Death and <i>International Classification of Diseases, 10th Revision</i> Codes	Rank <sup>a</sup>	2004			2003		
		No.	Percent	Rate <sup>b</sup>	No.	Percent	Rate <sup>b</sup>
All causes	—	2 397 615	100.0	800.8	2 448 288	100.0	832.7
Diseases of heart (I00–I09, I11, I13, I20–I51)	1	652 486	27.2	217.0	685 089	28.0	232.3
Malignant neoplasms (C00–C97)	2	553 888	23.1	185.8	556 902	22.7	190.1
Cerebrovascular diseases (I60–I69)	3	150 074	6.3	50.0	157 689	6.4	53.5
Chronic lower respiratory diseases (J40–J47)	4	121 987	5.1	41.1	126 382	5.2	43.3
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	5	112 012	4.7	37.7	109 277	4.5	37.3
Diabetes mellitus (E10–E14)	6	73 138	3.1	24.5	74 219	3.0	25.3
Alzheimer's disease (G30)	7	65 965	2.8	21.8	63 457	2.6	21.4
Influenza and pneumonia (J10–J18)	8	59 664	2.5	19.8	65 163	2.7	22.0
Nephritis, nephrotic syndrome and nephrosis (N00–N07, N17–N19, N25–N27)	9	42 480	1.8	14.2	42 453	1.7	14.4
Septicemia (A40–A41)	10	33 373	1.4	11.2	34 069	1.4	11.6
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	11	32 439	1.4	10.9	31 484	1.3	10.8
Chronic liver disease and cirrhosis (K70, K73–K74)	12	27 013	1.1	9.0	27 503	1.1	9.3
Essential (primary) hypertension and hypertensive renal disease (I10, I12)	13	23 076	1.0	7.7	21 940	0.9	7.4
Parkinson's disease (G20–G21)	14	17 989	0.8	6.1	17 997	0.7	6.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	15	17 357	0.7	5.9	17 732	0.7	6.0

<sup>a</sup> Rank based on 2004 data. Ranking is shown for 15 leading causes. For an explanation of ranking procedures, see the technical notes in ref 2.

<sup>b</sup> Age-adjusted death rate per 100 000 US standard population.

Source: CDC NCHS, National Vital Statistics System, mortality, 2003–2004.

**TABLE 9 Deaths and Death Rates for the 5 Leading Causes of Childhood Death in Specified Age Groups in 2004: United States, 2003 and 2004**

Age, Causes of Death, and <i>International Classification of Diseases, 10th Revision Codes</i>	Rank <sup>a</sup>	2004			2003		
		No.	%	Rate <sup>b</sup>	No.	%	Rate <sup>b</sup>
<b>Total: 1–19 y</b>							
All causes	—	25 325	100.0	32.7	25 514	100.0	33.0
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	11 132	44.0	14.4	11 090	43.5	14.4
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	2	2638	10.4	3.4	2638	10.3	3.4
Malignant neoplasms (C00–C97)	3	2149	8.5	2.8	2158	8.5	2.8
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	4	1985	7.8	2.6	1737	6.8	2.2
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	5	1215	4.8	1.6	1150	4.5	1.5
Diseases of heart (I00–I09, I11, I13, I20–I51)	6	798	3.2	1	843	3.3	1.1
Influenza and pneumonia (J10–J18)	7	268	1.1	0.3	390	1.5	0.5
Chronic lower respiratory diseases (J40–J47)	8	253	1.0	0.3	257	1.0	0.3
Septicemia (A40–A41)	9	198	0.8	0.3	221	0.9	0.3
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior (D00–D48)	10	187	0.7	0.2	171	0.7	0.2
<b>1–4 y</b>							
All causes	—	4785	100.0	29.9	4965	100.0	31.5
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	1641	34.3	10.3	1717	34.6	10.9
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	2	569	11.9	3.6	541	10.9	3.4
Malignant neoplasms (C00–C97)	3	399	8.3	2.5	392	7.9	2.5
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	4	377	7.9	2.4	376	7.6	2.4
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	187	3.9	1.2	186	3.7	1.2
<b>5–9 y</b>							
All causes	—	2888	100.0	14.7	2898	100.0	14.7
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	1126	39.0	5.7	1096	37.8	5.5
Malignant neoplasms (C00–C97)	2	526	18.2	2.7	516	17.8	2.6
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	3	205	7.1	1	180	6.2	0.9
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	4	122	4.2	0.6	122	4.2	0.6
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	83	2.9	0.4	104	3.6	0.5
<b>10–14 y</b>							
All causes	—	3946	100.0	18.7	4056	100.0	19.1
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	1540	39.0	7.3	1522	37.5	7.2
Malignant neoplasms (C00–C97)	2	493	12.5	2.3	560	13.8	2.6
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	3	283	7.2	1.3	244	6.0	1.2
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	4	207	5.2	1	202	5.0	1.0
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	5	184	4.7	0.9	206	5.1	1.0
<b>15–19 y</b>							
All causes	—	13 706	100	66.1	13 595	100.0	66.4
Accidents (unintentional injuries) (V01–X59, Y85–Y86)	1	6825	49.8	32.9	6755	49.7	33.0
Assault (homicide) (*U01–*U02, X85–Y09, Y87.1)	2	1932	14.1	9.3	1938	14.3	9.5
Intentional self-harm (suicide) (*U03, X60–X84, Y87.0)	3	1700	12.4	8.2	1487	10.9	7.3
Malignant neoplasms (C00–C97)	4	731	5.3	3.5	690	5.1	3.4
Diseases of heart (I00–I09, I11, I13, I20–I51)	5	366	2.7	1.8	393	2.9	1.9

<sup>a</sup> Rank is based on 2004 data. Ranking is shown for 5 leading causes of death for specified age groups. For an explanation of ranking procedures, see the technical notes in ref 2.

<sup>b</sup> Rate per 100 000 population.

Source: CDC/NCHS, National Vital Statistics System, mortality, 2003–2004.

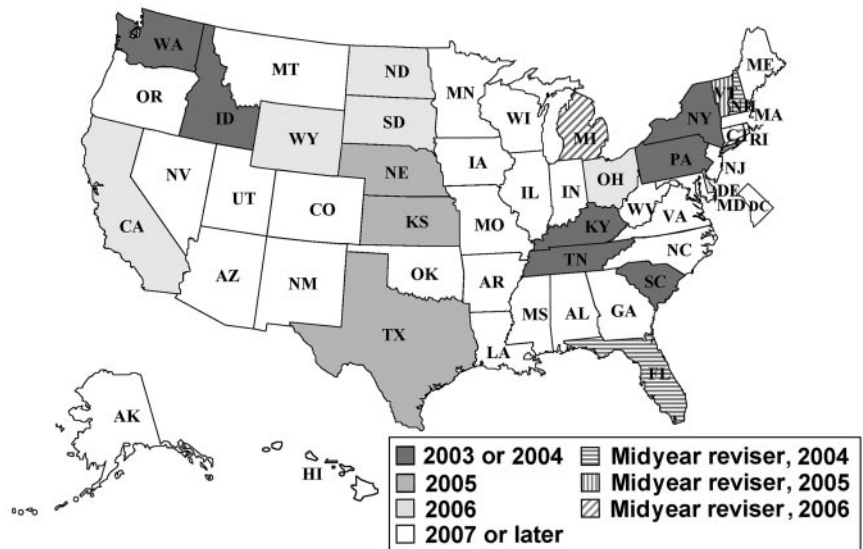
**THE TRANSFORMATION OF VITAL STATISTICS: IMPLICATIONS FOR THE AVAILABILITY OF PERINATAL DATA**

As we discussed in an earlier *Pediatrics* article,<sup>55</sup> the nation's vital-statistics system continues to undergo sweeping transformation. This transformation is the result of comprehensive changes to the US standard certificate of live birth and report of fetal death and to fundamental changes to the systems that collect these data.<sup>9,56</sup> The states and independent reporting areas (heretofore referred to as the states) are transitioning

to the new certificates/systems over the course of several years, a period to extend from 2003 until at least 2008. A number of states still have no definite plans for implementation of the new certificate or report. This staggered, delayed transition has important implications for the availability of national birth, fetal death, and linked birth/infant death data. (Because of the fewer content changes to the US standard certificate of death, current mortality data are less affected.)

FIGURE 5

Implementation of the 2003 revised birth certificate. Note that New York State but not New York city implemented the revised certificate for 2004.



### Delayed Release of Birth, Fetal Death, and Linked Birth/Infant Death Data

Beginning with data year 2003, in which 2 states implemented the new birth certificate, the NCHS began accommodating data from the 57 independent reporting areas on the basis of both the 2003 US standard certificate of live birth (revised) and the 1989 US standard certificate of live birth (unrevised).<sup>57</sup> For 2004, the number of states using the 2003 revision increased to 9, with 2 states revising during the year (ie, these states provided a combination of revised and unrevised data; Fig 5).<sup>1</sup> For 2005, a total of 13 states provided data from the 2003 revision for the full year, with 1 revised during 2005.<sup>3</sup> Another complication is that multiple race of mother and father is on a different track. For 2003, 6 states provided multiple-race data (1 state provided these data for December only).<sup>57</sup> In 2004, the number of states increased to a total of 15 and rose again in 2005 to 19 (1 state provided 2005 multiple-race data for selected facilities only).<sup>1,3</sup> Implementation of the revised fetal death reports is on a similar but somewhat slower track than that of birth.

The need to accommodate and review data from both the revised (including a number of completely new data items) and unrevised certificates from a changing mix of reporting areas has slowed data processing and, subsequently, data release. Also, and not unexpectedly, the receipt of data from some revising states has slowed somewhat from previous years as data providers and the state health agencies adjust to the new systems and data. As a result of these challenges, national reports and files based on these data are markedly delayed. For example, the annual NCHS reports (and data files) on final birth data for 2003 and 2004 were released 9 months later than the final 2002 report, that is, the last report “pre-revision.”<sup>1,57,58</sup> This article, the “Annual Summary of Vital

Statistics,” also is being published some months later than it was in previous years.

### Lack of National Data for Key Items

The revised birth certificate and fetal death report include important modifications to wording and/or sources for several key items that are traditionally presented in this article: educational attainment, maternal tobacco use, and prenatal care. Although collected on both the revised and unrevised certificates, data on these items are not considered comparable between revisions. As a result, national data on these items will not be available for several years, which limits our ability to describe trends, patterns, and potential associations.

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#### CIRCUMCISION MAY CUT RISK OF HIV

“Circumcising adult men may cut in half their risk of getting the AIDS virus through heterosexual intercourse, the US government announced Wednesday, as it shut down two studies in Africa testing the link. The National Institutes of Health closed the studies in Kenya and Uganda early, when safety monitors took a look at initial results this week and spotted the protection. The studies' uncircumcised men are being offered the chance to undergo the procedure. The link between male circumcision and HIV prevention was noted as long ago as the late 1980s. The first major clinical trial, of 3000 men in South Africa, found last year that circumcision cut the HIV risk by 60 percent. Still, many AIDS specialists had been awaiting the NIH's results as a final confirmation. ‘Male circumcision can lower both an individual's risk of infection, and hopefully the rate of HIV spread through the community,’ said AIDS expert Dr Anthony Fauci, director of the NIH's National Institute of Allergy and Infectious Diseases”

**Associated Press. New York Times. December 13, 2006**

Noted by Roger Soll, MD

## Annual Summary of Vital Statistics: 2005

Brady E. Hamilton, Arialdi M. Miniño, Joyce A. Martin, Kenneth D. Kochanek,  
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