

## Expanded Health Data From the New Birth Certificate, 2006

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### Abstract

**Objectives**—This report presents 2006 data on new checkbox items exclusive to the 2003 U.S. Standard Certificate of Live Birth. Information is shown for checkboxes in the following categories: “risk factors in this pregnancy,” “obstetric procedures,” “characteristics of labor and delivery,” “method of delivery,” “abnormal conditions of the newborn,” and “congenital anomalies of the newborn.” These categories are included on both the 1989 and the 2003 U.S. Standard Certificates of Live Birth; however, many of the specific checkboxes were modified, or are new to the 2003 certificate. Data on selected new (not modified) checkboxes are presented in this report.

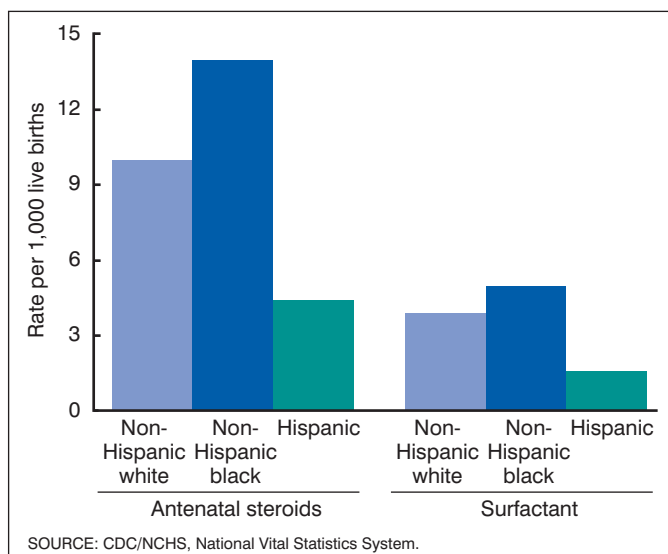
**Methods**—Descriptive statistics are presented on births occurring in 2006 to residents of the 19 states that had implemented the 2003 U.S. Standard Certificate of Live Birth as of January 1, 2006.

**Results**—There were 2,073,368 births to residents of the 19-state reporting area, representing 49 percent of 2006 U.S. births. The rate of prepregnancy diabetes was 6.8 per 1,000 births and gestational diabetes was 38.7; risk of both types of diabetes rose rapidly with advancing maternal age. Cervical cerclage was reported at a rate of 2.9 per 1,000. External cephalic version was used in 3.2 of every 1,000 births; its success rate decreased with increasing maternal age. Almost all attempts at forceps or vacuum delivery were successful. About 25 percent of women who had a cesarean delivery attempted a trial of labor. Fifteen percent of women received antibiotics during labor. Rates for antenatal steroids (8.4) and surfactant replacement therapy (3.2) decreased with increasing gestational age. Large differences by race and Hispanic origin were generally seen for the receipt of steroids and surfactant replacement therapy regardless of gestational age. Six percent of all infants were admitted to a neonatal intensive care unit (NICU).

**Keywords:** pregnancy risk factors • labor and delivery • surfactant • antenatal steroids

### Introduction

This report presents data for 2006 on selected checkboxes from the 2003 revision of the U.S. Standard Certificate of Live Birth (1). (See [Tables 1–6](#), [A–F](#), and [Figures 1–5](#). Selected checkboxes discussed in this report are shown in [Figure 2](#) and in bold in [Tables 1–6](#).) The 2003 revision provides an important opportunity to enhance the content and quality of birth certificate data. Detailed information on the 2003 revision is available elsewhere (1,2). As of January 1, 2006, 19 states had implemented the revision: California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming. This report presents 2006 data



**Figure 1. Rates of antenatal steroid and surfactant treatment, by race and Hispanic origin of mother: 19-state reporting area, 2006**

MEDICAL AND HEALTH INFORMATION		
<p><b>41. RISK FACTORS IN THIS PREGNANCY</b> (Check all that apply)</p> <p>Diabetes</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prepregnancy (Diagnosis prior to this pregnancy)</li> <li><input type="checkbox"/> Gestational (Diagnosis in this pregnancy)</li> </ul> <p>Hypertension</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prepregnancy (Chronic)</li> <li><input type="checkbox"/> Gestational (PIH, preeclampsia)</li> <li><input type="checkbox"/> Eclampsia</li> </ul> <ul style="list-style-type: none"> <li><input type="checkbox"/> Previous preterm birth</li> <li><input type="checkbox"/> Other previous poor pregnancy outcome (Includes perinatal death, small-for-gestational age/intrauterine growth restricted birth)</li> </ul>	<p><b>43. OBSTETRIC PROCEDURES</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cervical cerclage</li> <li><input type="checkbox"/> Tocolysis</li> </ul> <p>External cephalic version:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Successful</li> <li><input type="checkbox"/> Failed</li> <li><input type="checkbox"/> None of the above</li> </ul>	<p><b>46. METHOD OF DELIVERY</b></p> <p>A. Was delivery with forceps attempted but unsuccessful?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>B. Was delivery with vacuum extraction attempted but unsuccessful?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>C. Fetal presentation at birth</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cephalic</li> <li><input type="checkbox"/> Breech</li> <li><input type="checkbox"/> Other</li> </ul> <p>D. Final route and method of delivery (Check one)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vaginal/Spontaneous</li> <li><input type="checkbox"/> Vaginal/Forceps</li> <li><input type="checkbox"/> Vaginal/Vacuum</li> <li><input type="checkbox"/> Cesarean</li> </ul> <p>If cesarean, was a trial of labor attempted?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Yes</li> <li><input type="checkbox"/> No</li> </ul>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Pregnancy resulted from infertility treatment-If yes, check all that apply:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Fertility-enhancing drugs, Artificial insemination or Intrauterine insemination</li> <li><input type="checkbox"/> Assisted reproductive technology (e.g., in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT))</li> </ul> </li> <li><input type="checkbox"/> Mother had a previous cesarean delivery If yes, how many _____</li> <li><input type="checkbox"/> None of the above</li> </ul>	<p><b>44. ONSET OF LABOR</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Premature Rupture of the Membranes (prolonged, <math>\geq 12</math> hrs.)</li> <li><input type="checkbox"/> Precipitous Labor (&lt;3 hrs.)</li> <li><input type="checkbox"/> Prolonged Labor (<math>\geq 20</math> hrs.)</li> <li><input type="checkbox"/> None of the above</li> </ul>	<p><b>47. MATERNAL MORBIDITY</b> (Check all that apply) (Complications associated with labor and delivery)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Maternal transfusion</li> <li><input type="checkbox"/> Third or fourth degree perineal laceration</li> <li><input type="checkbox"/> Ruptured uterus</li> <li><input type="checkbox"/> Unplanned hysterectomy</li> <li><input type="checkbox"/> Admission to intensive care unit</li> <li><input type="checkbox"/> Unplanned operating room procedure following delivery</li> <li><input type="checkbox"/> None of the above</li> </ul>
<p><b>42. INFECTIONS PRESENT AND/OR TREATED DURING THIS PREGNANCY</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gonorrhoea</li> <li><input type="checkbox"/> Syphilis</li> <li><input type="checkbox"/> Chlamydia</li> <li><input type="checkbox"/> Hepatitis B</li> <li><input type="checkbox"/> Hepatitis C</li> <li><input type="checkbox"/> None of the above</li> </ul>	<p><b>45. CHARACTERISTICS OF LABOR AND DELIVERY</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Induction of labor</li> <li><input type="checkbox"/> Augmentation of labor</li> <li><input type="checkbox"/> Non-vertex presentation</li> <li><input type="checkbox"/> Steroids (glucocorticoids) for fetal lung maturation received by the mother prior to delivery</li> <li><input type="checkbox"/> Antibiotics received by the mother during labor</li> <li><input type="checkbox"/> Clinical chorioamnionitis diagnosed during labor or maternal temperature <math>\geq 38^{\circ}\text{C}</math> (<math>100.4^{\circ}\text{F}</math>)</li> <li><input type="checkbox"/> Moderate/heavy meconium staining of the amniotic fluid</li> <li><input type="checkbox"/> Fetal intolerance of labor such that one or more of the following actions was taken: in-utero resuscitative measures, further fetal assessment, or operative delivery</li> <li><input type="checkbox"/> Epidural or spinal anesthesia during labor</li> <li><input type="checkbox"/> None of the above</li> </ul>	
NEWBORN INFORMATION		
<p><b>48. NEWBORN MEDICAL RECORD NUMBER</b></p> <p>_____</p>	<p><b>54. ABNORMAL CONDITIONS OF THE NEWBORN</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Assisted ventilation required immediately following delivery</li> <li><input type="checkbox"/> Assisted ventilation required for more than six hours</li> <li><input type="checkbox"/> NICU admission</li> <li><input type="checkbox"/> Newborn given surfactant replacement therapy</li> <li><input type="checkbox"/> Antibiotics received by the newborn for suspected neonatal sepsis</li> <li><input type="checkbox"/> Seizure or serious neurologic dysfunction</li> <li><input type="checkbox"/> Significant birth injury (skeletal fracture(s), peripheral nerve injury, and/or soft tissue/solid organ hemorrhage which requires intervention)</li> <li><input type="checkbox"/> None of the above</li> </ul>	<p><b>55. CONGENITAL ANOMALIES OF THE NEWBORN</b> (Check all that apply)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Anencephaly</li> <li><input type="checkbox"/> Meningomyelocele/Spina bifida</li> <li><input type="checkbox"/> Cyanotic congenital heart disease</li> <li><input type="checkbox"/> Congenital diaphragmatic hernia</li> <li><input type="checkbox"/> Omphalocele</li> <li><input type="checkbox"/> Gastroschisis</li> <li><input type="checkbox"/> Limb reduction defect (excluding congenital amputation and dwarfing syndromes)</li> <li><input type="checkbox"/> Cleft Lip with or without Cleft Palate</li> <li><input type="checkbox"/> Cleft Palate alone</li> <li><input type="checkbox"/> Down Syndrome                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Karyotype confirmed</li> <li><input type="checkbox"/> Karyotype pending</li> </ul> </li> <li><input type="checkbox"/> Suspected chromosomal disorder                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Karyotype confirmed</li> <li><input type="checkbox"/> Karyotype pending</li> </ul> </li> <li><input type="checkbox"/> Hypospadias</li> <li><input type="checkbox"/> None of the anomalies listed above</li> </ul>
<p><b>49. BIRTHWEIGHT</b> (grams preferred, specify unit)</p> <p>_____</p> <p><input type="checkbox"/> grams <input type="checkbox"/> lb/oz</p>		
<p><b>50. OBSTETRIC ESTIMATE OF GESTATION:</b></p> <p>_____ (completed weeks)</p>		
<p><b>51. APGAR SCORE:</b></p> <p>Score at 5 minutes: _____</p> <p><b>If 5 minute score is less than 6,</b></p> <p>Score at 10 minutes: _____</p>		
<p><b>52. PLURALITY</b> - Single, Twin, Triplet, etc. (Specify) _____</p>		
<p><b>53. IF NOT SINGLE BIRTH</b> - Born First, Second, Third, etc. (Specify) _____</p>		

NOTE: Shaded portions are items shown in this report.  
SOURCE: CDC/NCHS, National Vital Statistics System.

**Figure 2. 2003 U.S. Standard Certificate of Live Birth, medical, health, and newborn sections**

for the 19-state reporting area in the following maternal, labor and delivery, and newborn categories: “risk factors in this pregnancy,” “obstetric procedures,” “characteristics of labor and delivery,” “method of delivery,” “abnormal conditions of the newborn,” and “congenital anomalies of the newborn” (Figure 2). Except for small differences in wording, these categories are included on both the

1989 and the 2003 U.S. Standard Certificates of Live Birth; however, many of the specific checkboxes included in these categories were modified or are entirely new to the 2003 certificate. Selected new (not modified) checkboxes are the focus of this report.

Data on births occurring to residents of states that implemented the 2003 U.S. Standard Certificate of Live Birth in 2005 (12 states) and

in 2004 (7 states) were presented in previous reports (3,4). Due to the changing reporting area, marked differences between this and prior reports are possible for some variables, especially for rarely reported events. Rates for all variables are not comparable from year to year.

A new feature of the “Expanded health data” report series for this year is highlighted analysis and discussion of selected topics of particular interest. The increasing number of revised states allows for more in-depth discussion of results. This year’s report includes highlighted analysis and discussion of steroids for fetal lung maturation received by the mother prior to delivery and surfactant replacement therapy received by the infant (also for fetal lung maturation), and serves as a follow-up to a brief discussion of differences in rates of steroids and surfactant treatment by race and Hispanic origin shown in last year’s report (3).

A number of checkboxes new to the U.S. Standard Certificate of Live Birth and collected by the 19-state reporting area are not presented in this report. Some examples are breastfeeding, sources of payment for the delivery, receipt of Women, Infants, and Children (WIC) food for this pregnancy, and maternal morbidity (including uterine rupture).

A recent report, “Births: Final data for 2006” presents national data for checkboxes that are comparable between birth certificate revisions (e.g., prepregnancy hypertension and gestational hypertension) (5).

## Methods

Data are based on 100 percent of births registered in the 19 states that implemented the 2003 revision of the birth certificate as of January 1, 2006: California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming. The 2,073,368 births to residents of the 19 states (Table A) represent 49 percent of all 2006 U.S. births. Results for this limited reporting area are not generalizable to the country as a whole because they

are not a random sample of all births. The race and Hispanic origin distributions of births for the 19-state area are substantively different from those of the entire United States. In particular, Hispanic groups are overrepresented in these data while non-Hispanic white and non-Hispanic black births are underrepresented. Further, the Hispanic population composition in the reporting area differs from that of the United States with relatively more Mexican persons and relatively fewer Puerto Rican and Central and South American persons (Table B). Race and Hispanic origin are reported independently on the birth certificate. This report includes data for non-Hispanic white, non-Hispanic black, and Hispanic births. Information on American Indian or Alaska Native, Asian or Pacific Islander, and Hispanic subgroup births are not shown because of the small numbers of

**Table B. Percentage of live births, by selected demographic and health characteristics: United States and total of 19 reporting states, 2006**

Characteristic of mother	19 states <sup>1</sup>	United States
Race or Hispanic origin of mother		
Non-Hispanic white <sup>2</sup>	49.91	**54.12
Non-Hispanic black <sup>2</sup>	11.70	**14.47
Hispanic <sup>3</sup>	31.45	**24.36
Mexican	23.14	**16.84
Puerto Rican	1.44	**1.57
Cuban	0.68	**0.40
Central or South American	3.98	**3.88
Other and Unknown Hispanic	2.20	**1.68
American Indian or Alaska Native <sup>4</sup>	0.70	**1.12
Asian or Pacific Islander	6.00	**5.65
Unmarried women	38.55	38.49
Age of mother		
Under 20 years	10.60	**10.36
20–24 years	25.42	**25.33
25–29 years	27.38	**27.71
30–34 years	22.14	**22.28
35–39 years	11.76	**11.69
40–44 years	2.53	**2.47
45–49 years	0.16	**0.15
50–54 years	0.01	0.01
Characteristic of infant or delivery		
Very preterm <sup>5</sup>	1.94	**2.04
Preterm <sup>6</sup>	12.37	**12.80
Very low birthweight <sup>7</sup>	1.42	**1.49
Low birthweight <sup>8</sup>	7.97	**8.26
4,000 grams or more <sup>9</sup>	7.91	**7.82
Multiple births <sup>10,11</sup>	32.36	**33.67

\*\* Difference significant at  $p=0.05$ .

<sup>1</sup>California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excludes New York City), North Dakota, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

<sup>2</sup>Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. The multiple-race data for these were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see “Technical Notes” section.

<sup>3</sup>Includes persons of Hispanic origin of any race.

<sup>4</sup>Includes births to Aleut and Eskimo persons.

<sup>5</sup>Born prior to 32 completed weeks of gestation.

<sup>6</sup>Born prior to 37 completed weeks of gestation.

<sup>7</sup>Birthweight of less than 1,500 grams (3 pounds, 4 ounces).

<sup>8</sup>Birthweight of less than 2,500 grams (5 pounds, 8 ounces).

<sup>9</sup>Equivalent to 8 pounds, 14 ounces.

<sup>10</sup>Includes births in twin, triplet, and higher order multiple deliveries.

<sup>11</sup>The number of live births in multiple deliveries per 1,000 live births.

**Table A. Number and percentage of live births: Total of 19 reporting states and each state, 2006**

	Number	Percent
Total	2,073,368	100.0
California	562,440	27.1
Delaware	11,989	0.6
Florida	236,802	11.4
Idaho	24,184	1.2
Kansas	40,968	2.0
Kentucky	58,250	2.8
Nebraska	26,727	1.3
New Hampshire	14,378	0.7
New York <sup>1</sup>	130,219	6.3
North Dakota	8,621	0.4
Ohio	150,593	7.3
Pennsylvania	149,090	7.2
South Carolina	62,171	3.0
South Dakota	11,919	0.6
Tennessee	84,355	4.1
Texas	399,603	19.3
Vermont	6,511	0.3
Washington	86,876	4.2
Wyoming	7,672	0.4

<sup>1</sup>Excludes New York City.

NOTE: Figures may not add to 100.0 because of rounding.

births for this reporting area for many checkboxes. Differences between the 19-state reporting area and the United States in the distributions of births by maternal age, marital status, and infant characteristics, while significant, are much smaller.

A number of the obstetric procedures, characteristics of labor and delivery, and abnormal conditions of the newborn presented in this report are related to the risk of preterm and low birthweight delivery. To assist the reader in assessing the risk of these adverse pregnancy outcomes for the groups shown, preterm and low birthweight rates by maternal age and race and Hispanic origin are presented for this reporting area in **Table C**. **Tables 1–6** show data for selected checkboxes based on the 2003 revised birth certificate; checkboxes new to the certificate and discussed in this report are bolded for ease of reference.

## Results

### Risk factors in this pregnancy

The revised 2003 U.S. Standard Certificate of Live Birth includes eight specific pregnancy risk factors (**Table 1**, **Figure 2**). Information differentiating between prepregnancy diabetes and gestational diabetes is new to the revised certificate and is presented below. This information was missing for 1.6 percent of births to residents of the 19-state area (see **Table D** for state-specific data).

**Prepregnancy diabetes (DM)**, defined as a diagnosis of glucose intolerance *prior* to pregnancy (6), was reported for 6.8 per 1,000 women in the 19-state reporting area. **Gestational diabetes (GDM)**, diagnosis or recognition of glucose intolerance *during* pregnancy, a much more common condition, was reported at a rate of 38.7 per 1,000, or just under 4 percent of all mothers.

The risk of both DM and GDM rose rapidly with maternal age (**Table 1**). GDM rates among mothers aged 40 and over (84.7 per 1,000), for example, were more than 6 times those of teenaged mothers (12.2 per 1,000). The greater risk for older mothers is somewhat influenced by their greater likelihood of having a multiple birth (mothers of multiples are more likely to develop diabetes during pregnancy

regardless of their age) (3). However, even when GDM rates for women with singletons only are examined, the risk for older women is substantially elevated (3).

A number of morbidities affecting both mother and newborn have been associated with both DM and GDM (7). Women with diabetes are more likely to suffer medical complications such as hypertensive disorders during delivery (8); those who develop diabetes during pregnancy are more likely to develop insulin resistant diabetes later in life (8,9). Infants born to mothers with diabetes are at increased risk of obesity, glucose intolerance, and of diabetes as they age (8). DM is also a risk factor for newborn congenital anomalies (10). With proper treatment, however, the risk for these undesirable outcomes may be reduced (11,12).

Non-Hispanic black women were more likely than non-Hispanic white and Hispanic women to have DM, both overall (9.2 compared with 6.2 and 6.7 per 1,000), and in nearly all age groups (**Table 1**). In contrast, overall rates of GDM were highest for non-Hispanic white mothers. However, by 30 years of age and over, non-Hispanic black and Hispanic mothers were more likely to have developed GDM (**Figure 3**).

### Obstetric procedures

Three obstetric procedures are reported on the 2003 Revision of the U.S. Standard Certificate of Live Birth: “cervical cerclage,” “tocolysis,” and “external cephalic version.” Tocolysis has been reported previously (5); the other two procedures are new to the birth certificate. Information on obstetric procedures was missing on 1.5 percent of all records; see **Table D** for state-specific information.

**Cervical cerclage** (a technique to prevent premature delivery by averting or treating early dilation of the cervix with the use of cervical banding or suture) was reported at a rate of 2.9 per 1,000 births (**Table 2**). Rates rose steadily by maternal age. For example, the rates for women aged 35 and over were more than twice the rates for women under 25. Rates also differed by race and Hispanic origin; the rate for non-Hispanic black women (6.3 per 1,000) was twice the rate for non-Hispanic white women (3.0) and over three times the rate for

**Table C. Percentage of births, by gestational age and birthweight categories, maternal race and Hispanic origin, and maternal age: Total of 19 reporting states, 2006**

Characteristic of mother	Gestational age		Birthweight	
	Very preterm <sup>1</sup>	Preterm <sup>2</sup>	Very low birthweight <sup>3</sup>	Low birthweight <sup>4</sup>
All births . . . . .	2.0	12.5	1.4	8.0
Race and ethnicity:				
Non-Hispanic white . . . . .	1.7	11.6	1.2	7.3
Non-Hispanic black . . . . .	4.0	18.1	3.1	13.7
Hispanic . . . . .	1.7	12.1	1.2	6.9
Age of mother:				
Under 20 years . . . . .	2.7	14.4	1.8	9.6
20–24 years . . . . .	1.9	12.3	1.3	8.0
25–29 years . . . . .	1.7	11.5	1.3	7.2
30–34 years . . . . .	1.8	11.9	1.4	7.5
35–39 years . . . . .	2.1	13.7	1.6	8.6
40–45 years . . . . .	2.6	16.7	2.0	11.3

<sup>1</sup>Born prior to 32 completed weeks of gestation.

<sup>2</sup>Born prior to 37 completed weeks of gestation.

<sup>3</sup>Birthweight of less than 1,500 grams (3 pounds, 4 ounces).

<sup>4</sup>Birthweight of less than 2,500 grams (5 pounds, 8 ounces).

**Table D. Percentage of birth records for which data were not stated: Total of 19 reporting states and each state, 2006**

[By place of residence]

Area	Pregnancy risk factors	Obstetric procedures	Characteristics of labor and delivery	Method of delivery			Congenital anomalies	Abnormal conditions of newborn
				Attempted forceps	Attempted vacuum	Trial of labor		
Total of reporting areas <sup>1</sup>	1.6	1.5	1.4	5.7	5.8	2.4	1.8	1.7
California	0.2	0.2	0.2	11.2	11.0	0.0	0.2	1.7
Delaware	2.5	2.5	2.5	2.5	2.5	0.2	2.5	2.5
Florida	0.7	0.3	0.8	1.0	1.0	3.3	0.8	0.6
Idaho	2.7	2.6	2.6	2.9	2.7	0.8	2.7	2.6
Kansas	3.4	3.4	3.4	3.4	3.4	–	3.4	3.4
Kentucky	1.9	2.0	1.8	1.7	1.7	3.5	2.0	1.9
Nebraska	3.1	3.1	3.0	3.0	3.0	–	3.1	2.6
New Hampshire	10.2	11.0	10.8	10.2	10.2	0.0	13.6	3.0
New York (excluding New York City)	7.7	7.9	6.6	8.5	11.0	0.0	10.1	12.7
North Dakota	2.6	2.6	2.6	2.7	2.7	–	2.6	9.2
Ohio	2.9	1.3	1.8	1.4	1.4	0.0	1.9	2.2
Pennsylvania	1.9	1.9	1.9	1.9	1.9	9.3	1.9	1.9
South Carolina	5.1	5.1	5.1	5.1	5.1	0.0	5.1	5.1
South Dakota	2.7	1.8	2.2	1.8	1.8	0.1	1.8	2.6
Tennessee	0.6	0.6	0.6	0.6	0.6	0.0	0.6	0.6
Texas	0.2	0.2	0.2	5.1	5.0	5.9	0.2	0.2
Vermont	1.0	0.9	1.0	2.0	2.0	0.4	1.8	1.5
Washington	2.9	3.5	1.9	7.9	7.8	0.0	3.3	3.0
Wyoming	6.4	6.4	6.4	6.4	6.4	7.6	6.4	6.5

0.0 Quantity more than zero but less than 0.05.

– Quantity zero.

<sup>1</sup>Data are for states using the 2003 U.S. Standard Certificate of Live Birth. Births to residents of states using the 2003 U.S. Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth are coded as not stated. See "Technical Notes" section.

NOTE: The percentage nonresponse is the same for all specific checkboxes within a category except for the category "Method of Delivery," which allows for nonresponse in each specific checkbox shown.

Hispanic women (1.8). Among women who had cervical cerclage, more than one-half (56.8 percent) delivered at term (37 or more completed weeks of gestation).

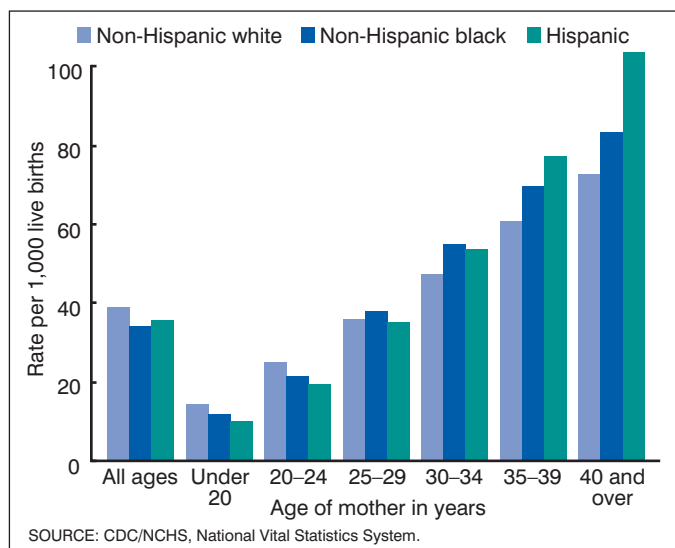
The rate of **external cephalic version (ECV)** was 3.2 per 1,000 births (Table 2). ECV is use of external manipulation to change fetal position from nonvertex (i.e., the presenting part of the infant's body

is not the upper or back part of the head) to vertex (top of the head facing in a downward position in the birth canal), so that the infant is in vertex presentation at delivery (6). Rates of ECV were generally similar by maternal age. Non-Hispanic white women were more likely to have ECV (4.5 per 1,000) compared with non-Hispanic black (2.4) and Hispanic women (1.8). Rates of ECV by reporting state ranged from 0.8 to 14.3 per 1,000 births; these differences may reflect variations in clinical practice or characteristics of birth or reporting of this procedure on the birth certificate (data not shown).

About 73 percent of ECVs were reported as successful (i.e., the fetal position was changed from nonvertex to vertex). Success rates generally decreased with increasing maternal age (Table 2). Success rates were similar between non-Hispanic black (76.1 percent) and non-Hispanic white (74.1 percent) women; the rate was moderately lower for Hispanic women (69.3 percent). Women who had a successful ECV were more likely to have a vaginal delivery (77.7 percent) than women with a failed ECV (10.4 percent) (data not shown). A previous study reported that among singleton births, a woman who had a successful ECV was as likely to have a vaginal delivery as a woman with a spontaneous vertex presentation (13). Data from the 19-state reporting area are consistent with this finding (data not shown).

### Characteristics of labor and delivery

Of the nine characteristics listed in Table 3, four are new to the 2003 Revision of the U.S. Standard Certificate of Live Birth and are discussed in this report: "non-vertex presentation," "antibiotics received by the mother during labor," "epidural or spinal anesthesia,"



**Figure 3. Rates of gestational diabetes, by age and race and Hispanic origin of mother: 19-state reporting area, 2006**

and “steroids (glucocorticoids) for fetal lung maturation received by the mother prior to delivery.” Information on characteristics of labor and delivery was missing on 1.4 percent of all records for 2006; levels of missing data by state are shown in [Table D](#).

The rate of **nonvertex presentation** was 17.9 per 1,000 live births in the 19-state reporting area. Clear evidence shows that nonvertex presentation is underreported. Levels for this checkbox are much lower than the combined “breech” and “other” presentation checkboxes under “method of delivery,” which are subsets of “non-vertex presentation.” Less than 2 percent of records indicate a nonvertex presentation compared with 7 percent for breech and other presentation ([Table 4](#)). Furthermore, nearly 8 out of 10 breech or other births are not classified as nonvertex. See “Technical Notes” section.

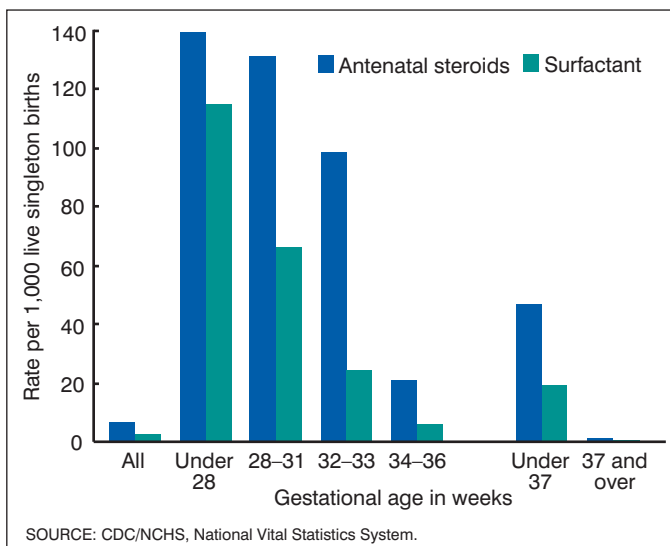
**Antibiotics during labor** reduce the risk of neonatal morbidity and mortality from such complications as preterm labor, premature rupture of membranes (PROM), and certain infections (14–16). About 15 percent (150.7 per 1,000) of all mothers received antibiotics during labor. Rates of treatment ranged from 106.4 per 1,000 Hispanic mothers to 209.0 per 1,000 non-Hispanic black mothers. For all race-ethnic groups, rates of antibiotic treatment were higher for younger mothers ([Table 3](#)).

More than one-half of all mothers received **epidural or spinal anesthesia** for pain relief (59.9 percent), with little variation among maternal age groups ([Table 3](#)). Non-Hispanic white mothers (69 percent) were more likely to receive anesthesia than non-Hispanic black (64 percent) and Hispanic mothers (47 percent).

Antenatal steroid treatment reduces the risk and severity of later development of respiratory distress syndrome and related complications in the infant, thus reducing infant mortality (17). **Steroids for fetal lung maturation were received by the mother prior to delivery** for 8.4 out of every 1,000 live births. The rate of steroid receipt varied among race-ethnic groups ([Figure 1](#)); non-Hispanic black women (14.0 per 1,000) were more likely to receive treatment than non-Hispanic white (10.0) and Hispanic women (4.4). This pattern held for all maternal age groups.

*Highlighted analysis of antenatal steroid treatment*—Rates of antenatal steroid treatment were highly dependent on gestational age, decreasing as gestational age increased (see [Figure 4](#), [Table E](#), and [Table F](#) for state-specific results). After excluding multiple births (preterm delivery is more common with multiples and rates of multiple birth differ by race and Hispanic origin), less than two (1.6) per 1,000 mothers who had a term singleton birth (37 or more completed weeks of gestation) received antenatal steroids compared with 46.6 mothers who had a preterm singleton birth. Among singleton births in specific preterm gestational age groups, 139.3 per 1,000 mothers who delivered prior to 28 weeks received antenatal steroids compared with 20.9 mothers who delivered between 34 and 36 weeks gestation (late preterm).

Rates of antenatal steroid treatment were similar for non-Hispanic black (58.9 per 1,000) and non-Hispanic white (58.1) mothers who had a preterm singleton birth, whereas the rate for Hispanic mothers was much lower (26.3). Within each preterm gestational age group, rates of treatment were lower for Hispanic mothers who had a singleton birth than for their non-Hispanic white and black counterparts ([Table E](#)). Differences in antenatal steroid treatment rates by race and Hispanic origin persisted when examined by maternal age and levels of maternal educational attainment (data not shown).



**Figure 4. Rates of antenatal steroid and surfactant treatment, by gestational age: 19-state reporting area, 2006**

Overall and preterm antenatal steroid treatment rates varied greatly by race and ethnicity among the 19 states in this reporting area (data not shown). Differences between non-Hispanic white and non-Hispanic black mothers of singleton preterm infants were inconsistent

**Table E. Rates of antenatal steroids for fetal lung maturation and surfactant replacement therapy, by gestational age and race and Hispanic origin of mother for singleton births: Total of 19 reporting states, 2006**

[Rates are number of live births with specified characteristic or condition per 1,000 live singleton births in specified group]

Gestational age	All races <sup>1</sup>	Non-Hispanic		
		White <sup>2</sup>	Black <sup>2</sup>	Hispanic <sup>3</sup>
<b>Antenatal steroids for fetal lung maturation</b>				
Total . . . . .	6.4	7.3	11.5	3.6
Under 28 weeks . . . . .	139.3	176.3	140.9	95.7
28–31 weeks . . . . .	131.2	163.9	142.8	83.0
32–33 weeks . . . . .	98.3	131.8	106.9	55.8
34–36 weeks . . . . .	20.9	28.7	22.8	10.2
Total preterm <sup>4</sup> . . . . .	46.6	58.1	58.9	26.3
37 and over weeks . . . . .	1.6	2.0	2.3	0.8
<b>Surfactant replacement therapy</b>				
Total . . . . .	2.5	3.0	4.1	1.4
Under 28 weeks . . . . .	115.1	152.4	107.2	80.4
28–31 weeks . . . . .	66.6	98.1	53.4	37.1
32–33 weeks . . . . .	24.5	38.4	21.4	11.0
34–36 weeks . . . . .	5.9	9.1	4.7	2.7
Total preterm <sup>4</sup> . . . . .	19.5	26.2	22.0	10.4
37 and over weeks . . . . .	0.5	0.6	0.7	0.3

<sup>1</sup>Includes other races not shown and origin not stated.  
<sup>2</sup>Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. The multiple-race data for these were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see “Technical Notes” section.  
<sup>3</sup>Includes all persons of Hispanic origin of any race.  
<sup>4</sup>Born prior to 37 completed weeks of gestation.

**Table F. Rates of steroids for fetal lung maturation and surfactant replacement therapy, by gestational age for singleton births: 19 reporting areas, 2006**

[Rates are number of live births with specified characteristic or condition per 1,000 live singleton births in specified group and area]

Area	Steroids			Surfactant		
	All	Preterm <sup>1</sup>	Term <sup>2</sup>	All	Preterm <sup>1</sup>	Term <sup>2</sup>
California . . . . .	2.7	24.6	0.4	0.7	6.5	0.1
Delaware . . . . .	4.0	26.4	*	2.5	18.3	*
Florida . . . . .	6.4	40.8	1.6	1.4	9.5	0.3
Idaho . . . . .	15.2	102.8	5.8	8.3	68.0	1.8
Kansas . . . . .	6.6	50.8	1.5	2.4	19.7	*
Kentucky . . . . .	15.1	91.5	3.3	3.3	20.1	0.6
Nebraska . . . . .	4.6	31.5	1.4	5.6	45.1	*
New Hampshire . . . . .	5.4	55.8	*	*	*	*
New York <sup>3</sup> . . . . .	3.4	27.3	0.8	3.6	33.3	0.4
North Dakota . . . . .	11.9	102.6	*	2.6	*	*
Ohio . . . . .	10.7	72.3	2.8	2.3	16.1	0.5
Pennsylvania . . . . .	12.0	98.1	2.3	5.1	44.0	0.7
South Carolina . . . . .	7.4	43.2	1.7	5.0	29.3	1.1
South Dakota . . . . .	14.2	94.7	4.3	6.1	48.4	*
Tennessee . . . . .	14.6	89.2	3.3	4.9	32.9	0.7
Texas . . . . .	5.0	31.1	1.4	3.1	20.0	0.7
Vermont . . . . .	6.6	54.1	*	6.6	78.6	*
Washington . . . . .	8.3	56.6	3.4	2.0	15.6	0.6
Wyoming . . . . .	5.3	37.2	*	*	*	*

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

<sup>1</sup>Born prior to 37 completed weeks of gestation.<sup>2</sup>Born after 37 or more completed weeks of gestation.<sup>3</sup>Excludes New York City.

by state; however, Hispanic mothers of singleton preterm infants were consistently less likely to receive antenatal steroid treatment than their non-Hispanic white and non-Hispanic black counterparts (among states with at least 20 singleton preterm births in each race or gestational age category). See the "Discussion" section for more information on this topic.

## Method of delivery

Three of the five checkboxes shown under "method of delivery" are newly reported on the 2003 U.S. Standard Certificate of Live Birth: "delivery with forceps attempted but unsuccessful," "delivery with vacuum extraction attempted but unsuccessful," and "trial of labor attempted" prior to cesarean delivery. Data were not stated for 5.7 percent of records on attempted forceps and 5.8 percent of records on attempted vacuum delivery. Data on attempted trial of labor were not reported for 2.4 percent of women who had a cesarean delivery. See [Table D](#) for state specific information.

Failed attempts to assist vaginal delivery using either **forceps** (0.4 percent) or **vacuum extraction** (0.8 percent) were rare ([Table 4](#)). When use of these methods was not successful, women were still more likely to have a vaginal (60 percent) compared with a cesarean delivery (40 percent). Rates of unsuccessful attempts at instrumental delivery varied only modestly by mother's age or race and Hispanic origin. Risk factors for a failed instrumental delivery include nulliparity and malposition of the infant's head (18).

The third new method of delivery checkbox provides information on whether vaginal delivery was attempted among women who had a cesarean delivery: **trial of labor was attempted prior to cesarean delivery**. This topic is of great interest due to the increasing rate of

cesarean delivery, the decreasing rate of vaginal delivery after a previous cesarean (VBAC) (5), and the risk for ill effects on the newborn from delivery without undergoing labor (19).

Data for the 19-state reporting area indicate that about one-fourth of all women who had a cesarean delivery attempted a trial of labor ([Table 4](#)). Attempts at a trial of labor were reported most frequently among non-Hispanic black women (29.0 percent) and least frequently among Hispanic women (20.2 percent). The rate for non-Hispanic white women was 27.9 percent. Rates of attempted trial of labor generally decreased with advancing maternal age. Teenaged mothers were at least twice as likely to attempt a trial of labor as women aged 35 and over.

## Abnormal conditions of the newborn

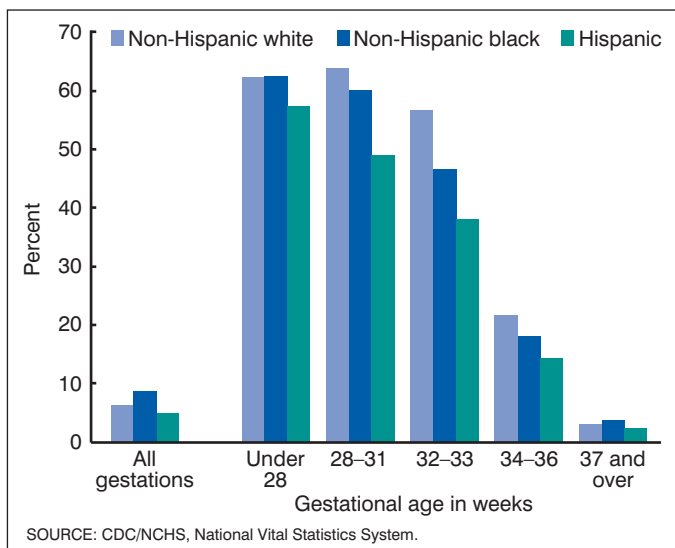
The 2003 U.S. Standard Certificate of Live Birth captures seven specific "abnormal conditions of the newborn." Five of these conditions are new to the birth certificate and are discussed below ([Table 5](#) and [Figure 2](#)). Information on whether a specific abnormal condition was reported was missing for 1.7 percent of all records for the 2006 reporting area; levels of unknown data vary by state ([Table D](#)).

The rate of **assisted ventilation immediately following delivery** was 42.5 per 1,000 births, or slightly more than 4 percent of all births. Twenty percent of newborns who received immediate ventilation (8.4 per 1,000 of all births) required **assisted ventilation for more than 6 hours after delivery**. Assisted ventilation is defined as when a newborn receives manual breaths with bag and mask (6) and is standard therapy for newborns in respiratory distress. Assisted ventilation of 6 hours or more suggests an infant in severe respiratory failure.

Infants born to non-Hispanic black mothers of all age groups were substantially more likely than non-Hispanic white and Hispanic infants to require ventilation therapy of both shorter and longer durations. Rates for Hispanic infants were substantially lower than those of the other two groups for all maternal age groups ([Table 5](#)).

Six percent of all infants in the 19-state reporting area (60.8 per 1,000 births) were **admitted to a neonatal intensive care unit (NICU)**, a facility or unit staffed and equipped to provide continuous mechanical ventilatory support for the newborn (6). Infants born to women aged 40 and over were 50 percent more likely to need NICU admission than those born to mothers in their twenties (8.6 percent compared with 5.7 percent). The magnitude of the difference by age was lowered only modestly when only singletons were examined (data not shown). Differences in NICU admittance were also observed by race and Hispanic origin. Overall, non-Hispanic black infants were nearly 40 percent more likely than non-Hispanic white and 75 percent more likely than Hispanic infants to receive NICU care ([Table 5](#)). These patterns by race and Hispanic origin differed by gestational age, however. NICU admission was more likely among term non-Hispanic black infants ([Figure 5](#)), but among the specific preterm categories between 28 and 36 weeks, rates were higher for non-Hispanic white infants. Rates were substantially lower for Hispanic infants at each gestational age group.

Newborns received **antibiotics for suspected neonatal sepsis** at a rate of 16.2 per 1,000 births. This therapy is typically given for bacterial infections acquired around delivery, such as infections developed as the result of premature rupture of the membranes (PROM). A separate checkbox under "characteristics of labor and delivery"



**Figure 5. Percentage of births admitted to a neonatal intensive care unit, by gestational age and race and Hispanic origin of mother: 19-state reporting area, 2006**

captures whether *the mother* received antibiotics during labor to prevent maternal and neonatal infection (see earlier section).

Infants born to teenaged mothers received prophylactic antibiotics more often than infants born to older mothers. By race and Hispanic origin, antibiotic treatment rates were highest for non-Hispanic black (20.9 per 1,000) and lowest for Hispanic infants (12.7).

**Surfactant replacement therapy** reduces infant mortality and morbidity caused by respiratory distress syndrome, meconium aspiration syndrome, and other pulmonary complications (20). In 2006, 3.2 of every 1,000 infants born in the 19-state reporting area received surfactant replacement therapy. As with antenatal steroids, which are used to enhance fetal lung maturation *prior* to delivery, the rate of surfactant use varied by race-ethnic group (Figure 1). Surfactant replacement therapy was used to treat 5.0 of every 1,000 non-Hispanic black infants compared with non-Hispanic white (3.9) and Hispanic (1.6) newborns. This pattern by race and Hispanic origin held across all maternal age groups.

**Highlighted analysis of surfactant replacement therapy**—Rates of surfactant replacement therapy varied greatly with gestational age (this highlighted analysis is limited to singleton births; see Figure 4 and Table E). Nearly 20 (19.5) of every 1,000 preterm (less than 37 weeks of gestation) singleton infants received surfactant replacement therapy compared with 0.5 for term infants (see Table F for state rates). There were large differences among specific preterm groups; 115.1 per 1,000 singleton infants born before 28 completed weeks received surfactant compared with 5.9 for late preterm singleton infants (34–36 weeks).

Surfactant replacement therapy was more common for singleton preterm non-Hispanic white infants (26.2 per 1,000) than for non-Hispanic black (22.0) and Hispanic infants (10.4). Racial and ethnic differences were more pronounced within specific preterm gestational age groups. In each preterm group, non-Hispanic white infants were much more likely to receive surfactant treatment than non-Hispanic black infants, who, in turn, were more likely to receive treatment than Hispanic infants (Table E). At most gestational ages, non-Hispanic white infants were more than twice as likely as Hispanic infants to

receive such treatment. Race and Hispanic origin differences persisted when examined by maternal age and levels of maternal educational attainment (data not shown).

Overall and preterm rates of surfactant replacement therapy by race and Hispanic origin varied greatly by reporting state (data not shown). Among preterm births, rates of surfactant treatment were similar for non-Hispanic white and non-Hispanic black infants while Hispanic infants were consistently less likely to receive treatment. This was the case in most of the 19 reporting states with at least 20 births in each race or gestational age category (data not shown). See the “Discussion” section for more information on this topic.

## Congenital anomalies

The leading cause of infant mortality in the United States is congenital anomalies (21). Infants with congenital anomalies are likely to have anatomic defects or metabolic disorders (22). Information is collected on 12 congenital anomalies, five of which are new to the 2003 revision of the certificate: “cyanotic congenital heart disease,” “limb reduction defect,” “cleft palate alone,” “suspected chromosomal disorder,” and “hypospadias” (Table 6). Less than 2 percent (1.8 percent) of births were missing information on congenital anomalies; see Table D for state variations. Because congenital anomalies are so rare, overall levels should be interpreted with caution. See the “Technical Notes” section.

**Cyanotic congenital heart disease**, which is caused by a lack of oxygen resulting in heart malformations, was reported in 41.8 per 100,000 births. Risk increased with maternal age, affecting 31.7 per 100,000 births to mothers under 20, compared with 86.4 births to mothers aged 40 and over. Risk was lowest for Hispanic infants (28.3 per 100,000) compared with non-Hispanic white (53.0) and non-Hispanic black (39.4) infants (data not shown). Research on the etiology of congenital heart disease is now focused on genetic factors; the cause remains unknown (22).

Overall, 38.4 per 100,000 live births were reported to have a **suspected chromosomal disorder** (malformation caused by detectable defects in chromosome structure) (6). For infants born to mothers under 35, the rate of suspected chromosomal disorder ranged from 29.6 to 34.8 per 100,000 compared with 58.1 infants born to mothers aged 35–39 and 147.0 for infants born to mothers aged 40 and over. Non-Hispanic white infants had the highest risk of suspected chromosomal disorders (47.7 per 100,000) compared with non-Hispanic black (26.8) and Hispanic (28.4) infants (data not shown).

**Hypospadias** is a malformation of the penis (correctable by surgery) (6) that occurred in 88.7 per 100,000 male births. There was no clear pattern for rates of hypospadias by age of mother; however, the data suggest slightly but not significantly higher risk for male infants born to mothers aged 40 and over (111.7 per 100,000) than for other maternal age groups (ranging from 80.7 to 94.4) (Table 6). Non-Hispanic white male infants were at higher risk of hypospadias (135.7 per 100,000) than their non-Hispanic black (58.3) and Hispanic (34.8) counterparts (data not shown). Other risk factors for hypospadias include primiparity and high body mass index (BMI) (23,24).

## Discussion

This is the third report on data exclusive to the 2003 U.S. Standard Certificate of Live Birth, now encompassing a 19-state



reporting area. With nearly one-half (49 percent) of all U.S. births represented by the revised birth certificate, it is now possible to delve more deeply into potentially informative new topics. More states adopt the revised certificate each year. In 2007, the revised reporting area increased to 24 states covering 54 percent of all births (4). By the end of 2010, it is expected that all but seven states will use the revised certificate. Thus, the revised certificate will represent more than 90 percent of expected U.S. births.

The data are representative of these 19 states only and are not generalizable to the country as a whole because the data are not a random sample. These 19 states differ significantly in their racial and Hispanic ethnicity composition as compared with all U.S. births (Table B). The revised 19-state reporting area currently has proportionally more Hispanic residents and fewer non-Hispanic white and non-Hispanic black residents than the total United States. Further, the composition of the Hispanic population of the 19-state reporting area is different from the U.S. Hispanic population. Specifically, the Hispanic population of the 19-state reporting area is composed of 74 percent Mexican persons compared with 69 percent of the U.S. Hispanic population. Relatively fewer Central and South Americans are in the 19-state reporting area (13 percent) than in the total United States (16 percent). Puerto Rican persons also comprise a smaller proportion of the 19-state reporting area Hispanic population than that of the United States (5 percent versus 6 percent). More than 45 percent of births in the 19-state population are to residents of California and Texas, which may explain the overrepresentation of Mexican births in this population.

Comparison of these data with other data sources yields varied results. For example, the rate of epidural and spinal anesthesia reported in the 19-state reporting area is approximately 60 percent, which is consistent with measures of epidural receipt during labor from other data sources ranging from 38 percent to 77 percent (25–27). Results for GDM (3.9 percent) are also comparable with other sources of data ranging from 2.8 percent to 7.0 percent (7,8,28). Measures of hypospadias based on these data, on the other hand, are lower than results from other sources (88.7 per 100,000 compared with 190 to 500 per 100,000) (22,23,29). For other variables, such as cervical cerclage and assisted ventilation, there are no comparable data. Distributions by race and ethnicity as well as age of mother are consistent with results shown in this report. Studies designed to assess the quality of these data are ongoing.

Year-to-year rates for all checkboxes are not comparable due to the changing reporting area. This is especially true for conditions that occur infrequently, such as ECV. Rates for attempted ECV changed from 3.4 per 1,000 births for the seven-state reporting area of 2004 (4), to 5.4 for the 12-state reporting area of 2005 (3), to 3.2 for the 19-state reporting area of 2006. Rates of successful ECV increased from 58 percent in 2004 (4) to 81 percent in 2005 (3), decreasing to 73 percent in 2006. It is likely that these results will continue to change as more states adopt the 2003 birth certificate.

It is important to note that 2006 was the first year of implementation of the revised certificate for 7 of the 19 states included in this reporting area. Due to the challenges inherent in the first years of data collection, data quality may suffer initially as hospitals and states become familiar with the new checkboxes and new collection processes.

This report paid special attention to racial and ethnic differences for antenatal steroids and surfactant replacement therapy. The

highlighted analyses of antenatal steroids and surfactant replacement therapy show substantial differences in overall and preterm rates of treatment between Hispanic mothers and infants and their non-Hispanic black and non-Hispanic white counterparts. Several possible explanations support the racial and ethnic variation for antenatal steroid and surfactant replacement therapy treatment rates. For example, racial and ethnic differences in rates of congenital anomalies may influence treatment decisions for an infant whose chance of survival is already extremely low. There also may be differences in rates of precipitous labor (less than 3 hours) that would decrease the chance of receiving antenatal steroid treatment by the mother. Among infants, possible racial and ethnic differences in the way in which the lungs mature may influence surfactant treatment rates.

Due to the design of the birth certificate, these data may not capture all antenatal steroid administration. The birth certificate asks only about steroid receipt after hospitalization for labor and delivery (Figure 2). Antenatal steroids may be given to a mother as an outpatient procedure days or weeks prior to the actual delivery hospitalization; treatment may be administered weekly and more than once (16). Therefore, any racial and ethnic differences in presentation of labor (early signs of preterm labor) could influence differences in reporting of these treatments by race.

Administration of surfactant replacement therapy also may not be captured by the birth certificate in cases of infant transfer (i.e., where the infant is sent to another hospital to receive a higher level of care). When this occurs, information about surfactant treatment is not recorded on the birth certificate because treatment may be delayed until the infant arrives at the second facility to ensure proper endotracheal tube placement and administration of surfactant (30). Thus, differences in transfer rates by race and Hispanic origin due to geographical location and access to adequate medical facilities may influence racial/ethnic differences in treatment rates.

Differences by race and Hispanic origin in receipt of medical treatment are not unique to antenatal steroids and surfactant replacement therapy. Indeed, for all of the interventions featured in this report (cervical cerclage, antibiotics for the infant, epidural or spinal anesthesia, etc.), Hispanic mothers and infants are consistently less likely overall to receive treatment than non-Hispanic white and non-Hispanic black mothers and infants. These data also suggest, however, that Hispanic mothers and infants may be less likely to need such interventions. For example, Hispanic women are less likely to suffer from GDM overall than non-Hispanic white and non-Hispanic black mothers, thus reducing the risk of NICU admission. Hispanic infants are less likely to present in a nonvertex position at delivery, reducing the need for ECV. Many of the potential explanations for antenatal steroids and surfactant replacement therapy given above may apply to the other interventions as well.

The racial and ethnic differences in treatment rates shown in this report are not unprecedented. Racial and ethnic disparities in other appropriate medical treatment and health care in general are well documented, even when controlling for confounding variables such as access to care and varying treatment policies (31,32). More research is necessary to discern where and why such differences occur among at risk pregnancies so that proper policies and education can maximize positive outcomes for all pregnancies.

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**Table 1. Number and rate of live births, by pregnancy risk factors, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006**

[Rates are number of live births with specified risk factor per 1,000 live births in specified group]

Risk factor and race and Hispanic origin of mother	All births <sup>1</sup>	Factor reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
<b>All races<sup>3</sup></b>										
Diabetes:										
<b>Prepregnancy (diagnosis prior to this pregnancy) . . .</b>	<b>2,073,368</b>	<b>13,871</b>	<b>6.8</b>	<b>2.5</b>	<b>4.2</b>	<b>6.6</b>	<b>8.6</b>	<b>11.6</b>	<b>15.7</b>	<b>33,743</b>
<b>Gestational (diagnosis in this pregnancy) . . . . .</b>	<b>2,073,368</b>	<b>78,899</b>	<b>38.7</b>	<b>12.2</b>	<b>22.6</b>	<b>36.9</b>	<b>51.3</b>	<b>67.9</b>	<b>84.7</b>	<b>33,743</b>
Hypertension:										
Prepregnancy (chronic) . . . . .	2,073,368	21,408	10.5	4.4	6.6	9.7	12.8	18.6	26.6	33,743
Gestational (PIH, preeclampsia) . . . . .	2,073,368	77,606	38.0	42.7	37.8	37.2	35.6	38.8	48.2	33,743
Eclampsia <sup>4</sup> . . . . .	1,581,715	2,541	1.6	2.3	1.6	1.5	1.4	1.7	2.0	22,208
Previous preterm birth . . . . .	2,073,368	36,117	17.7	6.3	16.7	19.3	20.0	21.5	21.7	33,743
Other previous poor pregnancy outcome . . . . .	2,073,368	40,666	19.9	7.0	15.8	21.1	23.3	28.6	34.4	33,743
Mother had a previous cesarean delivery <sup>5</sup> . . . . .	1,362,918	251,915	187.6	111.9	153.9	174.9	207.8	236.8	250.4	19,817
<b>Non-Hispanic white<sup>6</sup></b>										
Diabetes:										
<b>Prepregnancy (diagnosis prior to this pregnancy) . . .</b>	<b>1,034,778</b>	<b>6,287</b>	<b>6.2</b>	<b>2.9</b>	<b>4.6</b>	<b>6.0</b>	<b>7.1</b>	<b>8.8</b>	<b>11.4</b>	<b>24,029</b>
<b>Gestational (diagnosis in this pregnancy) . . . . .</b>	<b>1,034,778</b>	<b>39,466</b>	<b>39.0</b>	<b>14.6</b>	<b>25.1</b>	<b>36.2</b>	<b>47.2</b>	<b>60.9</b>	<b>72.7</b>	<b>24,029</b>
Hypertension:										
Prepregnancy (chronic) . . . . .	1,034,778	12,150	12.0	5.6	8.1	11.0	13.7	18.9	24.0	24,029
Gestational (PIH, preeclampsia) . . . . .	1,034,778	44,099	43.6	49.0	45.7	44.4	40.2	40.6	46.9	24,029
Eclampsia <sup>4</sup> . . . . .	690,848	1,326	2.0	2.6	2.1	1.8	1.7	2.0	2.4	15,653
Previous preterm birth . . . . .	1,034,778	21,414	21.2	7.5	20.0	22.3	23.0	24.5	24.9	24,029
Other previous poor pregnancy outcome . . . . .	1,034,778	25,001	24.7	9.4	19.4	24.4	27.7	34.4	41.4	24,029
Mother had a previous cesarean delivery <sup>5</sup> . . . . .	669,069	116,072	177.4	90.3	139.3	159.1	194.0	226.4	244.3	14,564
<b>Non-Hispanic black<sup>6</sup></b>										
Diabetes:										
<b>Prepregnancy (diagnosis prior to this pregnancy) . . .</b>	<b>242,621</b>	<b>2,189</b>	<b>9.2</b>	<b>3.1</b>	<b>5.1</b>	<b>10.1</b>	<b>15.3</b>	<b>20.5</b>	<b>25.3</b>	<b>3,689</b>
<b>Gestational (diagnosis in this pregnancy) . . . . .</b>	<b>242,621</b>	<b>8,158</b>	<b>34.1</b>	<b>11.9</b>	<b>21.6</b>	<b>38.1</b>	<b>55.2</b>	<b>69.5</b>	<b>83.4</b>	<b>3,689</b>
Hypertension:										
Prepregnancy (chronic) . . . . .	242,621	5,119	21.4	7.0	11.7	22.2	35.1	51.9	70.9	3,689
Gestational (PIH, preeclampsia) . . . . .	242,621	11,743	49.1	53.0	45.0	46.6	49.9	59.1	70.9	3,689
Eclampsia <sup>4</sup> . . . . .	173,034	524	3.1	4.4	2.5	2.8	2.6	4.2	*	2,389
Previous preterm birth . . . . .	242,621	6,608	27.7	9.1	26.3	33.9	36.8	34.5	35.0	3,689
Other previous poor pregnancy outcome . . . . .	242,621	6,358	26.6	9.8	22.5	32.6	36.4	39.0	41.8	3,689
Mother had a previous cesarean delivery <sup>5</sup> . . . . .	160,488	29,953	189.0	120.4	167.9	189.1	214.5	243.8	237.5	2,035

See footnotes at end of table.

**Table 1. Number and rate of live births, by pregnancy risk factors, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006—Con.**

[Rates are number of live births with specified risk factor per 1,000 live births in specified group]

Risk factor and race and Hispanic origin of mother	All births <sup>1</sup>	Factor reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
Hispanic <sup>7</sup>										
Diabetes:										
Prepregnancy (diagnosis prior to this pregnancy) . . .	651,982	4,313	6.7	2.0	3.2	6.3	10.1	15.2	22.4	3,630
Gestational (diagnosis in this pregnancy) . . . . .	651,982	23,178	35.7	10.3	19.3	35.1	53.8	77.6	103.3	3,630
Hypertension:										
Prepregnancy (chronic) . . . . .	651,982	3,233	5.0	2.2	2.9	4.2	6.9	10.8	20.2	3,630
Gestational (PIH, preeclampsia) . . . . .	651,982	18,522	28.6	33.8	26.2	25.5	27.9	34.0	46.4	3,630
Eclampsia <sup>4</sup> . . . . .	598,529	580	1.0	1.4	0.9	0.8	0.9	0.9	*	2,607
Previous preterm birth . . . . .	651,982	6,477	10.0	4.1	8.9	11.0	12.4	14.0	12.7	3,630
Other previous poor pregnancy outcome . . . . .	651,982	7,369	11.4	3.8	8.6	13.3	14.7	17.1	21.8	3,630
Mother had a previous cesarean delivery <sup>5</sup> . . . . .	445,882	89,765	202.2	125.5	166.9	195.9	233.7	256.9	269.4	2,029

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

<sup>1</sup>Total number of births to residents of areas reporting specified pregnancy risk factor.

<sup>2</sup>No response reported for pregnancy risk factor item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>3</sup>Includes other races not shown and origin not stated.

<sup>4</sup>Excludes data for Idaho, Kentucky, Nebraska, Pennsylvania, South Carolina, Tennessee, and Washington.

<sup>5</sup>Excludes women who have not had a previous pregnancy and for whom total birth order is unknown or not stated.

<sup>6</sup>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 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. These multiple-race data were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see "Technical Notes" section.

<sup>7</sup>Includes all persons of Hispanic origin of any race.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

**Table 2. Rates of obstetric procedures, by age and race and Hispanic origin of mother: Total of 19 reporting states, 2006**

[Rates are number of live births with specified obstetric procedure per 1,000 live births in specified group]

Obstetric procedure and race and Hispanic origin of mother	All births <sup>1</sup>	Procedure reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
All races <sup>3</sup>										
<b>Cervical cerclage</b> . . . . .	<b>2,073,368</b>	<b>5,993</b>	<b>2.9</b>	<b>1.3</b>	<b>2.0</b>	<b>3.0</b>	<b>3.6</b>	<b>4.4</b>	<b>5.3</b>	<b>31,083</b>
Tocolysis . . . . .	2,073,368	24,025	11.8	12.8	12.1	11.5	11.3	11.6	11.7	31,083
<b>External cephalic version</b> . . . . .	<b>2,073,368</b>	<b>6,625</b>	<b>3.2</b>	<b>3.1</b>	<b>3.1</b>	<b>3.4</b>	<b>3.3</b>	<b>3.2</b>	<b>3.4</b>	<b>31,083</b>
<i>Percent successful</i> <sup>4</sup> . . . . .	<b>2,073,368</b>	<b>4,819</b>	<b>72.7</b>	<b>75.7</b>	<b>75.4</b>	<b>73.1</b>	<b>71.3</b>	<b>68.6</b>	<b>63.3</b>	<b>31,083</b>
Non-Hispanic white <sup>5</sup>										
<b>Cervical cerclage</b> . . . . .	<b>1,034,778</b>	<b>3,056</b>	<b>3.0</b>	<b>1.2</b>	<b>1.9</b>	<b>2.9</b>	<b>3.7</b>	<b>4.5</b>	<b>5.7</b>	<b>22,310</b>
Tocolysis . . . . .	1,034,778	15,447	15.3	19.5	16.5	15.0	14.1	13.4	14.1	22,310
<b>External cephalic version</b> . . . . .	<b>1,034,778</b>	<b>4,559</b>	<b>4.5</b>	<b>5.1</b>	<b>4.6</b>	<b>4.7</b>	<b>4.3</b>	<b>4.0</b>	<b>4.5</b>	<b>22,310</b>
<i>Percent successful</i> <sup>4</sup> . . . . .	<b>1,034,778</b>	<b>3,376</b>	<b>74.1</b>	<b>76.9</b>	<b>77.3</b>	<b>75.3</b>	<b>72.2</b>	<b>68.5</b>	<b>63.8</b>	<b>22,310</b>
Non-Hispanic black <sup>5</sup>										
<b>Cervical cerclage</b> . . . . .	<b>242,621</b>	<b>1,517</b>	<b>6.3</b>	<b>2.0</b>	<b>4.4</b>	<b>8.0</b>	<b>9.7</b>	<b>11.0</b>	<b>11.5</b>	<b>3,025</b>
Tocolysis . . . . .	242,621	3,330	13.9	15.2	13.6	13.2	14.0	14.6	12.3	3,025
<b>External cephalic version</b> . . . . .	<b>242,621</b>	<b>586</b>	<b>2.4</b>	<b>2.8</b>	<b>2.2</b>	<b>2.5</b>	<b>2.4</b>	<b>2.5</b>	*	<b>3,025</b>
<i>Percent successful</i> <sup>4</sup> . . . . .	<b>242,621</b>	<b>446</b>	<b>76.1</b>	<b>87.9</b>	<b>76.9</b>	<b>75.0</b>	<b>69.8</b>	<b>59.6</b>	*	<b>3,025</b>
Hispanic <sup>6</sup>										
<b>Cervical cerclage</b> . . . . .	<b>651,982</b>	<b>1,145</b>	<b>1.8</b>	<b>1.1</b>	<b>1.3</b>	<b>1.7</b>	<b>2.3</b>	<b>3.0</b>	<b>3.3</b>	<b>3,318</b>
Tocolysis . . . . .	651,982	3,718	5.7	6.1	5.6	5.4	5.5	6.7	6.2	3,318
<b>External cephalic version</b> . . . . .	<b>651,982</b>	<b>1,177</b>	<b>1.8</b>	<b>1.6</b>	<b>1.8</b>	<b>1.7</b>	<b>2.0</b>	<b>2.0</b>	<b>2.1</b>	<b>3,318</b>
<i>Percent successful</i> <sup>4</sup> . . . . .	<b>651,982</b>	<b>816</b>	<b>69.3</b>	<b>67.3</b>	<b>70.8</b>	<b>67.8</b>	<b>72.5</b>	<b>68.9</b>	*	<b>3,318</b>

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

<sup>1</sup>Total number of births to residents of areas reporting specified obstetric procedure.

<sup>2</sup>No response reported for obstetric procedure item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>3</sup>Includes other races not shown and origin not stated.

<sup>4</sup>The number of successful ECVs per 100 live births to women with an attempted ECV in specified group.

<sup>5</sup>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 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. These multiple-race data were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see "Technical Notes" section.

<sup>6</sup>Includes all persons of Hispanic origin of any race.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

**Table 3. Number and rate of live births, by characteristics of labor and delivery, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006**

[Rates are number of live births with specified characteristic per 1,000 live births in specified group]

Labor and delivery characteristic and race and Hispanic origin of mother	All births <sup>1</sup>	Characteristic reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
<b>All races<sup>3</sup></b>										
Induction of labor . . . . .	2,073,368	465,237	227.7	237.8	236.9	236.4	218.6	204.0	188.6	30,027
Augmentation of labor . . . . .	2,073,368	399,600	195.6	241.9	215.7	198.0	176.2	153.6	136.4	30,027
<b>Non-vertex presentation . . . . .</b>	<b>2,073,368</b>	<b>36,567</b>	<b>17.9</b>	<b>12.1</b>	<b>13.7</b>	<b>16.7</b>	<b>21.2</b>	<b>25.4</b>	<b>33.2</b>	<b>30,027</b>
<b>Steroids (glucocorticoids) for fetal lung maturation . . . . .</b>	<b>2,073,368</b>	<b>17,187</b>	<b>8.4</b>	<b>9.4</b>	<b>8.1</b>	<b>8.0</b>	<b>8.1</b>	<b>9.1</b>	<b>11.0</b>	<b>30,027</b>
<b>Antibiotics received by mother during labor . . . . .</b>	<b>2,073,368</b>	<b>307,992</b>	<b>150.7</b>	<b>171.0</b>	<b>156.1</b>	<b>148.2</b>	<b>143.2</b>	<b>142.5</b>	<b>142.5</b>	<b>30,027</b>
Clinical chorioamnionitis during labor . . . . .	2,073,368	22,929	11.2	16.8	12.1	10.8	9.8	8.7	7.1	30,027
Moderate/heavy meconium staining of amniotic fluid . . . . .	2,073,368	86,434	42.3	47.9	44.0	42.4	40.0	38.3	39.1	30,027
Fetal intolerance of labor . . . . .	2,073,368	92,235	45.1	50.6	45.1	44.0	43.4	45.4	48.0	30,027
<b>Epidural or spinal anesthesia during labor<sup>4</sup> . . . . .</b>	<b>1,922,775</b>	<b>1,134,850</b>	<b>598.7</b>	<b>603.2</b>	<b>590.6</b>	<b>595.4</b>	<b>608.3</b>	<b>606.0</b>	<b>580.9</b>	<b>27,298</b>
<b>Non-Hispanic white<sup>5</sup></b>										
Induction of labor . . . . .	1,034,778	286,215	282.5	318.9	306.8	294.9	264.6	239.8	218.1	21,573
Augmentation of labor . . . . .	1,034,778	210,484	207.7	267.3	234.9	214.2	187.6	163.1	145.7	21,573
<b>Non-vertex presentation . . . . .</b>	<b>1,034,778</b>	<b>21,700</b>	<b>21.4</b>	<b>15.9</b>	<b>16.2</b>	<b>19.6</b>	<b>24.6</b>	<b>28.5</b>	<b>36.0</b>	<b>21,573</b>
<b>Steroids (glucocorticoids) for fetal lung maturation . . . . .</b>	<b>1,034,778</b>	<b>10,106</b>	<b>10.0</b>	<b>12.1</b>	<b>9.9</b>	<b>9.8</b>	<b>9.6</b>	<b>9.8</b>	<b>11.7</b>	<b>21,573</b>
<b>Antibiotics received by mother during labor . . . . .</b>	<b>1,034,778</b>	<b>171,431</b>	<b>169.2</b>	<b>195.0</b>	<b>174.3</b>	<b>168.7</b>	<b>163.0</b>	<b>160.3</b>	<b>158.2</b>	<b>21,573</b>
Clinical chorioamnionitis during labor . . . . .	1,034,778	9,605	9.5	13.2	10.3	9.7	8.6	7.6	6.7	21,573
Moderate/heavy meconium staining of amniotic fluid . . . . .	1,034,778	38,468	38.0	41.9	39.3	38.0	36.9	35.6	36.5	21,573
Fetal intolerance of labor . . . . .	1,034,778	50,503	49.8	59.6	50.9	49.4	47.6	47.5	49.8	21,573
<b>Epidural or spinal anesthesia during labor<sup>4</sup> . . . . .</b>	<b>918,864</b>	<b>618,928</b>	<b>687.9</b>	<b>726.5</b>	<b>691.1</b>	<b>685.9</b>	<b>689.7</b>	<b>674.3</b>	<b>636.4</b>	<b>19,175</b>
<b>Non-Hispanic black<sup>5</sup></b>										
Induction of labor . . . . .	242,621	50,628	211.4	226.2	211.1	211.7	205.8	195.8	186.5	3,106
Augmentation of labor . . . . .	242,621	50,621	211.3	260.9	226.6	202.2	181.2	147.3	128.4	3,106
<b>Non-vertex presentation . . . . .</b>	<b>242,621</b>	<b>3,929</b>	<b>16.4</b>	<b>11.8</b>	<b>13.6</b>	<b>16.2</b>	<b>20.7</b>	<b>25.6</b>	<b>34.7</b>	<b>3,106</b>
<b>Steroids (glucocorticoids) for fetal lung maturation . . . . .</b>	<b>242,621</b>	<b>3,353</b>	<b>14.0</b>	<b>14.0</b>	<b>12.7</b>	<b>13.6</b>	<b>14.9</b>	<b>17.7</b>	<b>19.9</b>	<b>3,106</b>
<b>Antibiotics received by mother during labor . . . . .</b>	<b>242,621</b>	<b>50,051</b>	<b>209.0</b>	<b>241.0</b>	<b>218.8</b>	<b>197.9</b>	<b>187.9</b>	<b>179.9</b>	<b>183.4</b>	<b>3,106</b>
Clinical chorioamnionitis during labor . . . . .	242,621	2,796	11.7	18.1	12.1	9.7	8.5	9.3	7.2	3,106
Moderate/heavy meconium staining of amniotic fluid . . . . .	242,621	12,576	52.5	56.7	51.2	52.1	51.2	50.6	59.8	3,106
Fetal intolerance of labor . . . . .	242,621	14,707	61.4	70.1	61.7	56.1	58.4	62.0	67.4	3,106
<b>Epidural or spinal anesthesia during labor<sup>4</sup> . . . . .</b>	<b>218,840</b>	<b>138,087</b>	<b>639.5</b>	<b>665.3</b>	<b>645.0</b>	<b>630.2</b>	<b>629.3</b>	<b>618.4</b>	<b>609.9</b>	<b>2,901</b>

See footnotes at end of table.

**Table 3. Number and rate of live births, by characteristics of labor and delivery, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006—Con.**

[Rates are number of live births with specified characteristic per 1,000 live births in specified group]

Labor and delivery characteristic and race and Hispanic origin of mother	All births <sup>1</sup>	Characteristic reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
Hispanic <sup>6</sup>										
Induction of labor . . . . .	651,982	105,308	162.3	180.0	166.8	160.6	153.3	148.2	143.4	3,255
Augmentation of labor . . . . .	651,982	111,155	171.3	213.0	187.3	165.5	148.0	131.7	120.1	3,255
<b>Non-vertex presentation . . . . .</b>	<b>651,982</b>	<b>8,121</b>	<b>12.5</b>	<b>9.0</b>	<b>10.5</b>	<b>12.0</b>	<b>14.9</b>	<b>18.2</b>	<b>25.1</b>	<b>3,255</b>
<b>Steroids (glucocorticoids) for fetal lung maturation . . . . .</b>	<b>651,982</b>	<b>2,882</b>	<b>4.4</b>	<b>5.3</b>	<b>4.2</b>	<b>3.7</b>	<b>4.3</b>	<b>5.8</b>	<b>7.4</b>	<b>3,255</b>
<b>Antibiotics received by mother during labor . . . . .</b>	<b>651,982</b>	<b>68,993</b>	<b>106.4</b>	<b>120.5</b>	<b>109.7</b>	<b>101.0</b>	<b>100.3</b>	<b>101.5</b>	<b>106.0</b>	<b>3,255</b>
Clinical chorioamnionitis during labor . . . . .	651,982	7,674	11.8	18.8	13.6	10.7	8.5	7.0	5.6	3,255
Moderate/heavy meconium staining of amniotic fluid . . . . .	651,982	29,209	45.0	48.6	46.3	45.0	42.7	41.2	40.1	3,255
Fetal intolerance of labor . . . . .	651,982	21,243	32.7	35.0	31.9	30.5	32.2	38.1	39.6	3,255
<b>Epidural or spinal anesthesia during labor<sup>4</sup>. . . . .</b>	<b>645,245</b>	<b>301,788</b>	<b>470.0</b>	<b>493.8</b>	<b>465.7</b>	<b>457.3</b>	<b>472.2</b>	<b>478.7</b>	<b>472.1</b>	<b>3,188</b>

<sup>1</sup>Total number of births to residents of areas reporting specified labor and delivery characteristic.

<sup>2</sup>No response reported for characteristic of labor and delivery item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>3</sup>Includes other races not shown and origin not stated.

<sup>4</sup>Excludes data for Ohio. See "Technical Notes" section.

<sup>5</sup>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 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. These multiple-race data were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see "Technical Notes" section.

<sup>6</sup>Includes all persons of Hispanic origin of any race.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.



**Table 4. Live births, by method of delivery, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006**

[Percentages are number of live births with specified method of delivery per 100 live births in specified group]

Method of delivery and race and Hispanic origin of mother	All births	Method reported	All ages <sup>1</sup>	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
All races <sup>3</sup>				Percent						
<b>Attempted forceps/unsuccesful. . . . .</b>	<b>2,073,368</b>	<b>6,976</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>119,101</b>
<b>Attempted vacuum extraction/unsuccesful. . . . .</b>	<b>2,073,368</b>	<b>14,666</b>	<b>0.8</b>	<b>0.9</b>	<b>0.8</b>	<b>0.7</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>120,731</b>
Fetal presentation at birth:										
Cephalic. . . . .	2,073,368	1,805,989	92.9	94.2	93.8	93.2	92.2	91.3	89.6	129,479
Breech. . . . .	2,073,368	71,313	3.7	2.5	2.9	3.5	4.3	5.0	6.2	129,479
Other . . . . .	2,073,368	66,587	3.4	3.3	3.3	3.3	3.5	3.7	4.2	129,479
Final route and method of delivery:										
Vaginal/Spontaneous . . . . .	2,073,368	1,295,818	63.4	70.8	67.8	64.8	59.7	54.2	47.7	28,510
Vaginal/Forceps . . . . .	2,073,368	16,844	0.8	1.1	0.9	0.8	0.8	0.6	0.6	28,510
Vaginal/Vacuum . . . . .	2,073,368	79,503	3.9	5.4	4.0	3.7	3.6	3.3	3.0	28,510
Cesarean . . . . .	2,073,368	652,693	31.9	22.8	27.3	30.6	35.9	41.9	48.7	28,510
<b>Cesarean/trial of labor attempted<sup>4</sup>. . . . .</b>	<b>652,693</b>	<b>160,996</b>	<b>25.3</b>	<b>41.7</b>	<b>30.5</b>	<b>25.4</b>	<b>21.0</b>	<b>18.5</b>	<b>17.5</b>	<b>15,541</b>
Non-Hispanic white <sup>5</sup>										
<b>Attempted forceps/unsuccesful. . . . .</b>	<b>1,034,778</b>	<b>3,844</b>	<b>0.4</b>	<b>0.5</b>	<b>0.4</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>43,206</b>
<b>Attempted vacuum extraction/unsuccesful. . . . .</b>	<b>1,034,778</b>	<b>8,339</b>	<b>0.8</b>	<b>1.1</b>	<b>1.0</b>	<b>0.9</b>	<b>0.7</b>	<b>0.7</b>	<b>0.6</b>	<b>45,306</b>
Fetal presentation at birth:										
Cephalic. . . . .	1,034,778	917,896	93.2	94.8	94.3	93.6	92.4	91.5	90.0	49,853
Breech. . . . .	1,034,778	40,559	4.1	3.0	3.3	3.8	4.7	5.3	6.2	49,853
Other . . . . .	1,034,778	26,470	2.7	2.2	2.4	2.5	2.9	3.2	3.8	49,853
Final route and method of delivery:										
Vaginal/Spontaneous . . . . .	1,034,778	636,492	62.8	69.4	67.3	64.9	60.0	54.8	48.3	20,729
Vaginal/Forceps . . . . .	1,034,778	10,590	1.0	1.5	1.1	1.1	0.9	0.8	0.8	20,729
Vaginal/Vacuum . . . . .	1,034,778	43,514	4.3	6.3	4.7	4.3	3.8	3.4	3.2	20,729
Cesarean . . . . .	1,034,778	323,453	31.9	22.8	26.9	29.7	35.2	41.0	47.7	20,729
<b>Cesarean/trial of labor attempted<sup>4</sup>. . . . .</b>	<b>323,453</b>	<b>88,404</b>	<b>27.9</b>	<b>49.5</b>	<b>35.5</b>	<b>29.2</b>	<b>23.1</b>	<b>20.0</b>	<b>18.5</b>	<b>6,159</b>
Non-Hispanic black <sup>5</sup>										
<b>Attempted forceps/unsuccesful. . . . .</b>	<b>242,621</b>	<b>859</b>	<b>0.4</b>	<b>0.5</b>	<b>0.4</b>	<b>0.3</b>	<b>0.4</b>	<b>0.3</b>	<b>*</b>	<b>11,412</b>
<b>Attempted vacuum extraction/unsuccesful. . . . .</b>	<b>242,621</b>	<b>1,669</b>	<b>0.7</b>	<b>0.9</b>	<b>0.7</b>	<b>0.7</b>	<b>0.7</b>	<b>0.7</b>	<b>0.6</b>	<b>11,538</b>
Fetal presentation at birth:										
Cephalic. . . . .	242,621	214,322	93.8	95.3	94.6	93.6	92.6	91.4	90.2	14,212
Breech. . . . .	242,621	7,181	3.1	2.1	2.6	3.3	4.0	4.9	5.7	14,212
Other . . . . .	242,621	6,906	3.0	2.5	2.8	3.1	3.3	3.7	4.1	14,212
Final route and method of delivery:										
Vaginal/Spontaneous . . . . .	242,621	149,617	62.4	69.1	65.4	62.4	56.9	50.0	44.6	2,750
Vaginal/Forceps . . . . .	242,621	1,755	0.7	1.2	0.7	0.6	0.5	0.6	0.5	2,750
Vaginal/Vacuum . . . . .	242,621	7,458	3.1	4.8	3.3	2.5	2.3	2.3	2.2	2,750
Cesarean . . . . .	242,621	81,041	33.8	24.9	30.6	34.5	40.2	47.2	52.7	2,750
<b>Cesarean/trial of labor attempted<sup>4</sup>. . . . .</b>	<b>81,041</b>	<b>22,788</b>	<b>29.0</b>	<b>45.2</b>	<b>32.4</b>	<b>25.8</b>	<b>22.9</b>	<b>21.0</b>	<b>20.5</b>	<b>2,452</b>

See footnotes at end of table.

**Table 4. Live births, by method of delivery, age, and race and Hispanic origin of mother: Total of 19 reporting states, 2006—Con.**

[Percentages are number of live births with specified method of delivery per 100 live births in specified group]

Method of delivery and race and Hispanic origin of mother	All births	Method reported	All ages <sup>1</sup>	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
Hispanic <sup>6</sup>										
<b>Attempted forceps/unsuccessful. . . . .</b>	<b>651,982</b>	<b>1,949</b>	<b>0.3</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>52,062</b>
<b>Attempted vacuum extraction/unsuccessful. . . . .</b>	<b>651,982</b>	<b>3,828</b>	<b>0.6</b>	<b>0.8</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>51,378</b>
Fetal presentation at birth:										
Cephalic. . . . .	651,982	550,347	91.9	93.1	92.6	92.0	91.2	90.2	88.1	53,370
Breech. . . . .	651,982	18,589	3.1	2.2	2.5	3.0	3.7	4.7	6.2	53,370
Other . . . . .	651,982	29,676	5.0	4.7	4.9	5.0	5.1	5.1	5.7	53,370
Final route and method of delivery:										
Vaginal/Spontaneous . . . . .	651,982	421,457	64.9	72.3	69.1	65.3	59.6	53.9	47.7	2,944
Vaginal/Forceps . . . . .	651,982	3,391	0.5	0.9	0.6	0.4	0.4	0.4	0.3	2,944
Vaginal/Vacuum . . . . .	651,982	20,241	3.1	4.7	3.3	2.7	2.6	2.4	2.4	2,944
Cesarean . . . . .	651,982	203,949	31.4	22.1	27.0	31.6	37.4	43.3	49.7	2,944
<b>Cesarean/trial of labor attempted<sup>4</sup>. . . . .</b>	<b>203,949</b>	<b>39,887</b>	<b>20.2</b>	<b>33.3</b>	<b>23.3</b>	<b>18.6</b>	<b>16.3</b>	<b>15.4</b>	<b>15.1</b>	<b>6,432</b>

<sup>1</sup> Figure does not meet standards of reliability or precision; based on fewer than 20 births in the numerator.

<sup>2</sup> Total number of births to residents of areas reporting the specified item.

<sup>3</sup> No response reported for method of delivery item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>4</sup> Includes other races not shown and origin not stated.

<sup>5</sup> Cesarean/trial of labor attempted is number of women who attempted a trial of labor prior to cesarean delivery per 100 cesarean births.

<sup>6</sup> 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 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. These multiple-race data were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see "Technical Notes" section.

<sup>7</sup> Includes all persons of Hispanic origin of any race.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

**Table 5. Abnormal conditions of the newborn, by age and race and Hispanic origin of mother: Total of 19 reporting states, 2006**

[Rates are number of live births with specified condition per 1,000 live births in specified group]

Abnormal condition and race and Hispanic origin of mother	All births <sup>1</sup>	Condition reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2,3</sup>
All races <sup>4</sup>										
Assisted ventilation required immediately following delivery . . . . .	2,073,368	86,595	42.5	45.0	41.9	41.0	41.9	44.5	48.5	34,811
Assisted ventilation required for more than six hours . . . . .	2,073,368	17,216	8.4	9.5	8.3	7.8	8.2	9.1	11.3	34,809
NICU admission . . . . .	2,073,368	123,922	60.8	62.6	57.0	56.8	61.1	70.5	86.2	34,813
Surfactant replacement therapy given to newborn . . . . .	2,073,368	6,462	3.2	3.6	3.1	2.9	3.1	3.5	4.2	34,808
Antibiotics received by newborn for suspected neonatal sepsis . . . . .	2,073,368	33,092	16.2	20.1	17.0	15.4	14.8	15.4	17.6	34,806
Seizure or serious neurologic dysfunction . . . . .	2,073,368	528	0.3	0.3	0.3	0.3	0.2	0.2	0.4	34,807
Significant birth injury . . . . .	2,073,368	1,188	0.6	0.5	0.5	0.5	0.6	0.7	0.8	34,806
Non-Hispanic white <sup>5</sup>										
Assisted ventilation required immediately following delivery . . . . .	1,034,778	49,382	48.9	51.4	47.8	47.2	49.1	51.0	54.8	24,239
Assisted ventilation required for more than six hours . . . . .	1,034,778	9,704	9.6	11.1	9.5	9.0	9.5	9.9	11.3	24,237
NICU admission . . . . .	1,034,778	63,252	62.6	63.6	58.5	59.0	63.6	70.2	84.1	24,243
Surfactant replacement therapy given to newborn . . . . .	1,034,778	3,965	3.9	4.8	3.9	3.7	3.8	4.0	4.4	24,237
Antibiotics received by newborn for suspected neonatal sepsis . . . . .	1,034,778	18,101	17.9	22.5	19.3	17.3	16.7	16.2	18.4	24,236
Seizure or serious neurologic dysfunction . . . . .	1,034,778	310	0.3	0.3	0.4	0.3	0.3	0.2	*	24,236
Significant birth injury . . . . .	1,034,778	700	0.7	0.7	0.7	0.6	0.7	0.6	1.0	24,236
Non-Hispanic black <sup>5</sup>										
Assisted ventilation required immediately following delivery . . . . .	242,621	13,959	58.4	58.5	56.2	57.8	61.4	62.1	64.7	3,646
Assisted ventilation required for more than six hours . . . . .	242,621	3,191	13.4	13.8	12.5	12.6	14.3	15.3	17.5	3,646
NICU admission . . . . .	242,621	20,806	87.1	83.8	78.8	83.5	97.4	110.1	126.9	3,645
Surfactant replacement therapy given to newborn . . . . .	242,621	1,203	5.0	4.9	4.5	4.7	5.6	6.9	7.0	3,645
Antibiotics received by newborn for suspected neonatal sepsis . . . . .	242,621	4,991	20.9	22.8	20.8	18.9	20.6	22.8	25.8	3,645
Seizure or serious neurologic dysfunction . . . . .	242,621	59	0.2	*	*	*	*	*	*	3,645
Significant birth injury . . . . .	242,621	87	0.4	*	0.3	*	*	*	*	3,645
Hispanic <sup>6</sup>										
Assisted ventilation required immediately following delivery . . . . .	651,982	19,190	29.6	33.9	29.8	27.6	27.8	30.8	35.4	4,430
Assisted ventilation required for more than six hours . . . . .	651,982	3,492	5.4	6.4	5.2	4.5	5.3	6.3	9.5	4,430
NICU admission . . . . .	651,982	32,327	49.9	52.5	46.6	45.0	50.2	63.9	78.1	4,430
Surfactant replacement therapy given to newborn . . . . .	651,982	1,045	1.6	2.1	1.6	1.2	1.6	1.8	3.3	4,430
Antibiotics received by newborn for suspected neonatal sepsis . . . . .	651,982	8,229	12.7	17.1	12.9	11.3	10.9	12.5	14.5	4,430
Seizure or serious neurologic dysfunction . . . . .	651,982	127	0.2	0.3	0.2	0.2	*	*	*	4,430
Significant birth injury . . . . .	651,982	299	0.5	0.4	0.4	0.5	0.5	0.6	*	4,429

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

<sup>1</sup>Total number of births to residents of areas reporting specified abnormal condition.

<sup>2</sup>No response reported for abnormal condition of the newborn item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>3</sup>A small number of records for Ohio with no abnormal conditions were incorrectly coded as unknown. This inconsistency has no impact on rates for specific abnormal conditions.

<sup>4</sup>Includes other races not shown and origin not stated.

<sup>5</sup>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 Office of Management and Budget (OMB) standards. All states in the 19-state reporting area reported multiple-race data for 2006. These multiple-race data were bridged to the single-race categories of the 1977 OMB standards for comparability with other states; see "Technical Notes" section.

<sup>6</sup>Includes all persons of Hispanic origin of any race.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

**Table 6. Number and rate of live births by congenital anomaly of the newborn, by age of mother: Total of 19 reporting states, 2006**

[Rates are number of live births with specified anomaly per 100,000 live births in specified group]

Congenital anomaly	All births <sup>1</sup>	Congenital anomaly reported	All ages	Under 20 years	20–24 years	25–29 years	30–34 years	35–39 years	40–54 years	Not stated <sup>2</sup>
Total										
Anencephaly . . . . .	2,073,368	207	10.2	11.5	11.3	10.0	9.1	9.3	*	36,339
Menigocele or spina bifida . . . . .	2,073,368	296	14.5	17.0	13.1	15.9	12.9	14.7	*	36,339
<b>Cyanotic congenital heart disease . . . . .</b>	<b>2,073,368</b>	<b>852</b>	<b>41.8</b>	<b>31.7</b>	<b>38.7</b>	<b>38.3</b>	<b>45.6</b>	<b>48.8</b>	<b>86.4</b>	<b>36,339</b>
Congenital diaphragmatic hernia . . . . .	2,073,368	240	11.8	9.2	9.8	13.3	12.5	12.2	*	36,339
Omphalocele . . . . .	2,073,368	168	8.2	13.3	7.7	7.5	6.7	8.4	*	36,339
Gastroschisis . . . . .	2,073,368	533	26.2	86.9	42.3	14.9	6.2	*	*	36,339
Limb reduction defect . . . . .	2,073,368	325	16.0	21.6	19.4	14.7	12.5	12.2	*	36,339
Cleft lip with or without cleft palate . . . . .	2,073,368	1,160	56.9	69.9	63.5	54.5	48.1	52.6	60.6	36,339
Cleft palate alone . . . . .	2,073,368	447	21.9	19.3	24.0	23.3	18.9	21.9	*	36,339
Down syndrome . . . . .	2,073,368	1,000	49.1	25.3	29.6	26.2	45.6	102.7	360.1	36,339
<b>Suspected chromosomal disorder . . . . .</b>	<b>2,073,368</b>	<b>782</b>	<b>38.4</b>	<b>32.2</b>	<b>34.8</b>	<b>29.6</b>	<b>32.9</b>	<b>58.1</b>	<b>147.0</b>	<b>36,339</b>
<b>Hypospadias<sup>3</sup> . . . . .</b>	<b>2,073,368</b>	<b>925</b>	<b>45.4</b>	<b>43.7</b>	<b>46.0</b>	<b>48.4</b>	<b>42.7</b>	<b>41.2</b>	<b>57.0</b>	<b>36,339</b>
<b>Males only<sup>4</sup> . . . . .</b>	<b>1,061,483</b>	<b>925</b>	<b>88.7</b>	<b>85.3</b>	<b>90.0</b>	<b>94.4</b>	<b>83.4</b>	<b>80.7</b>	<b>111.7</b>	<b>18,826</b>

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

<sup>1</sup>Total number of births to residents of areas reporting specified congenital anomaly.

<sup>2</sup>No response reported for congenital anomaly item; includes births to residents of states using the 2003 Standard Certificate of Live Birth occurring in states using the 1989 Standard Certificate of Live Birth.

<sup>3</sup>Denominator includes both male and female births.

<sup>4</sup>Male births only.

NOTE: Includes California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

## Technical Notes

### Sources of data

Data in this report are based on 100 percent of births registered in the 19 states—California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming—that implemented the 2003 U.S. Standard Certificate of Live Birth as of January 1, 2006. The 2,073,368 births to residents of the 19 states comprise 49 percent of all U.S. 2006 births (Table A).

### The 2003 Revision of the U.S. Standard Certificate of Live Birth

The 2003 revision of the birth certificate was seen as an important opportunity to improve data quality, primarily through the development of detailed, standardized collection techniques. For example, detailed requirements for electronic birth registration systems, separate worksheets for the mother and the hospital staff, and a comprehensive guidebook for birthing facilities were developed (1,6). The new electronic systems incorporate standardized data collection instruments, improved methods for capturing data, immediate query of suspect data, query and edit guidelines, and detailed definitions. The guidebook for birthing facilities, available both electronically and in hard copy, includes detailed definitions, recommended sources, and common key words and abbreviations to help hospital staff accurately and completely report the necessary information. See [http://www.cdc.gov/nchs/vital\\_certs\\_rev.htm](http://www.cdc.gov/nchs/vital_certs_rev.htm) for more information on the 2003 revision.

A number of topics new to the U.S. Standard Certificate of Live Birth and collected by the 19-state reporting area are not presented in this report. Some examples are breastfeeding, sources of payment for the delivery, receipt of WIC food for the pregnancy, and maternal morbidity (including uterine rupture).

### Age of mother

Age of mother is computed from the mother's and infant's dates of birth as reported on the birth certificate. Births reported to occur to mothers aged under 10 or over 54 are imputed according to the age of mother from the previous records with the same race and total birth order (total of live births and fetal deaths).

### Hispanic origin

Race and Hispanic origin are reported separately on the birth certificate. Data shown by race include persons of Hispanic or non-Hispanic origin. Data shown for Hispanic persons include all persons of Hispanic origin of any race. Data are shown separately for non-Hispanic white women because there are substantial differences in childbearing patterns between non-Hispanic white and Hispanic women.

### Single, multiple, and “bridged” race

The 2003 revision of the U.S. Standard Certificate of Live Birth allows the reporting of more than one race (multiple race) for each parent (1). Accordingly, multiple race data were reported by each of

the states included in this report. Racial data for 2006 from the vital records of the majority of states, however, are still based on the 1989 revision of the U.S. Standard Certificate of Live Birth. The 1989 revision follows the 1977 Office of Management and Budget (OMB) standard that allows only a single race to be reported (33,34). In order to provide uniformity and comparability of the data during the transition period when combining data from all states, before all or most of the data are available in the new multiple race format, it was necessary to “bridge” the responses of those who reported more than one race (multiple race) to one, single race. Information on the processing and tabulation of data by race is presented in a recent report (5).

### Gestational age

The primary measure used to determine the gestational age of the newborn is the interval between the first day of the mother's last normal menstrual period (LMP) and the date of birth. This is subject to error for several reasons, including imperfect maternal recall or misidentification of LMP because of postconception bleeding, delayed ovulation, or intervening early miscarriage. These data are edited for LMP based gestational ages that are clearly inconsistent with the infant's plurality and birthweight, but reporting problems for this item persist and may occur more frequently among some subpopulations and among births with shorter gestations (4,35).

### Characteristics of labor and delivery

The 2003 U.S. Standard Certificate of Live Birth includes the checkbox “**non-vertex presentation**” under the category “characteristics of labor and delivery.” Nonvertex presentation is defined as any presentation other than vertex (i.e., any presentation other than the upper or back part of the baby's head) (6). Also included on the 2003 certificate under the category “method of delivery, fetal presentation at birth,” are the checkboxes “breech” and “other” (noncephalic) presentation. Although “breech” and “other” presentations in the “method of delivery” category are by definition subsets of “non-vertex presentation,” the individual and combined levels for “breech” and “other” presentations are substantively higher than those for “non-vertex presentation” in “characteristics of labor and delivery” (7.1 percent for “breech” or “other” compared with 1.8 percent for “non-vertex”), indicating that the latter checkbox is underreported. Furthermore, 64.6 percent of breech and 92.1 percent of other presentations were not classified as nonvertex. Additional evidence of potential data quality issues with the “non-vertex presentation” checkbox is that 16.1 percent of births classified as nonvertex are classified as cephalic (vertex) deliveries.

Data for receipt of epidural or spinal anesthesia were excluded for Ohio, which did not collect these data consistent with recommendations of the 2003 U.S. Standard Certificate of Live Birth.

### Congenital anomalies

Historically, congenital anomalies have been underreported on the birth certificate (36). This has been attributable, at least in part, to the inclusion of anomalies on the 1989 U.S. Standard Certificate of Live Birth, which may have been difficult to detect within the short period between birth and completion of the child's birth certificate (37). The 2003 Revision of the U.S. Standard Certificate of Live Birth

attempted to improve reporting of congenital anomalies by including only those diagnosable within 24 hours of birth using conventional, widely available diagnostic techniques (2). As more data based on the revised certificate become available, it will be possible to determine whether this change has had the intended effect.

Data for **hypospadias** are edited to exclude this condition where the record was coded as female.

## Computations of percentages and percent distributions

Births for which a particular characteristic is unknown were subtracted from the figures for total births that were used as denominators before percentages and percent distributions were computed. The percentage of records with missing information is shown by state in **Table D**. These levels include all births to residents in the reporting area occurring outside of the reporting area (i.e., in a jurisdiction that has not adopted the 2003 U.S. Standard Certificate of Live Birth). This percentage was 1.8 percent for the 19-state reporting area for 2006 with levels ranging from 0.2 percent (California) to 11.1 percent (New Hampshire) and 13.2 percent (Vermont).

The comparatively high level of unknown data for New Hampshire reflects the fact that 10.2 percent of births to New Hampshire residents occurred out of state (mostly in Massachusetts) and in states that have not yet implemented the 2003 Revision of the U.S. Standard Certificate of Live Birth. For example, by residence, the percentage unknown for New Hampshire for obstetric procedures was 11.0 percent (**Table D**). However, when the unknown rate was examined by occurrence (i.e., only for births that occurred in the state) the unknown rate decreased to 0.9 percent (data not shown). Similarly, the high level for New York reflects the 6.6 percent of births to New York State residents that occurred either in New York City or in other states that have not yet implemented the revised certificate. Again, when the same checkbox was examined by occurrence, there was a marked decrease in the rate of unknowns.

## Random variation and significance testing for natality data

The number of births reported for an area is essentially a complete count, because more than 99 percent of all births are registered. Although this number is not subject to sampling error, it may be affected by nonsampling errors in the registration process such as mistakes in recording the mother's residence or age during the registration process. When the number of births is used for analytic purposes (i.e., the comparison of numbers, rates, and percentages over time for different areas or between different groups), the number of events that *actually* occurred can be thought of as one outcome in a large series of possible results that *could have* occurred under the same (or similar) circumstances. When considered in this way, the number of births is subject to random variation and a probable range of values can be estimated from the actual figures, according to certain statistical assumptions. For further information see the "Technical Notes" section of "Births: Final data for 2006" (4).

## Definitions of selected medical terms

Definitions for the checkboxes exclusive to the 2003 revision and discussed in this report are shown below. Detailed definitions, recommended sources, and keywords for the medical and health items are available in the "Guide to completing the facility worksheets for the certificate of live birth and report of fetal death" (6).

### Risk factors in this pregnancy

*Diabetes*—Glucose intolerance requiring treatment.

*Prepregnancy (chronic)*—Diagnosis before this pregnancy.

*Gestational*—Diagnosis during this pregnancy.

### Obstetric procedures

*Cervical cerclage*—Circumferential banding or suture of the cervix to prevent or treat passive dilation.

*External cephalic version*—Attempted conversion of a fetus from a nonvertex to a vertex presentation by external manipulation.

### Characteristics of labor and delivery

*Nonvertex presentation*—Includes any nonvertex fetal presentation, that is, presentation of a part of the infant's body other than the upper and back part of the infant's head.

*Steroids (glucocorticoids) for fetal lung maturation received by the mother before delivery*—Medications given to the mother before delivery specifically to accelerate fetal lung maturation in anticipation of preterm delivery (e.g., betamethasone, dexamethasone).

*Antibiotics received by the mother during delivery*—Antibacterial medication given systemically (intravenous or intramuscular) to the mother between the onset of labor and the actual delivery (e.g., ampicillin, clindamycin).

*Epidural or spinal anesthesia during labor*—Administration to the mother of a regional anesthetic to control the pain of labor; distribution of the analgesic effect is limited to the lower body.

### Method of delivery

*Was delivery with forceps attempted but unsuccessful?*—Obstetric forceps were applied to the fetal head in an unsuccessful attempt at vaginal delivery.

*Was delivery with vacuum extraction attempted but unsuccessful?*—Ventouse or vacuum cup was applied to the fetal head in an unsuccessful attempt at vaginal delivery.

*If cesarean, was a trial of labor attempted?*—If the delivery was cesarean, whether prior to the cesarean delivery labor was allowed, augmented, or induced, with plans for a vaginal delivery.

### Abnormal conditions of the newborn

*Assisted ventilation required immediately following delivery*—Infant given minimal breaths for any duration with bag and mask or bag and endotracheal tube within the first several minutes from birth; excludes free flow oxygen only and laryngoscopy for aspiration of meconium.

*Assisted ventilation required for more than 6 hours*—Infant given mechanical ventilation (breathing assistance) by any method for more than 6 hours.

*Neonatal intensive care unit (NICU) admission*—Admission of the newborn into a facility or unit staffed and equipped to provide continuous mechanical ventilatory support at any time during the infant's hospital stay following delivery.

*Surfactant replacement therapy*—Endotracheal instillation of a surface-active suspension for treating surfactant deficiency due to preterm birth or pulmonary injury resulting in respiratory distress.

*Antibiotics for neonatal sepsis*—Any antibacterial drug (penicillin, ampicillin, gentamicin, cefotaxime, etc.) given systemically (intravenous or intramuscular); does not include antibiotics given to infants who are not suspected of having neonatal sepsis.

## Congenital anomalies

*Cyanotic heart disease*—Congenital heart defects resulting in lack of oxygen that cause cyanosis.

*Suspected chromosomal disorder*—Includes any constellation of congenital malformations resulting from, or compatible with, known syndromes caused by detectable defects in chromosome structure.

*Hypospadias*—Incomplete closure of the male urethra resulting in the urethral meatus opening on the ventral surface of the penis.

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