

## STATISTICAL BRIEF #131

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### Complicating Conditions of Vaginal Deliveries and Cesarean Sections, 2009

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#### Introduction

In 2008, 94.1 percent of hospital stays for childbirth involved complicating conditions, such as umbilical cord complications, perineal lacerations, previous cesarean section, abnormality in fetal heart rate or rhythm, and problems of the amniotic cavity.<sup>1</sup> Some of these conditions are pre-existing diagnoses that can represent risk factors; others are complications of care, including complications associated with the mode of delivery. Complicating conditions can pose a serious risk to both maternal and infant health, and are associated with various adverse outcomes.<sup>2</sup> Understanding the complicating conditions associated with delivery—both vaginal delivery and Cesarean section (C-section)—is an important step towards the goal of reducing the rates of these complications.<sup>3</sup> While some conditions identified here may affect which mode of delivery is used, other conditions may result from the delivery itself. This report does not explicitly distinguish between these types of pre-existing conditions and complications of care because of limitations in the data.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) on hospitalizations for childbirth with and without complicating conditions in 2009. It examines stays for both vaginal deliveries and Cesarean sections and compares rates of complicating conditions among both types of stays. All data are reported from the maternal perspective (i.e., reflecting the experience of the

<sup>1</sup> Elixhauser, A. and Wier, L.M. *Complicating Conditions of Pregnancy and Childbirth, 2008*. HCUP Statistical Brief #113. May 2011. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb113.pdf>. (Accessed March 15, 2012).

<sup>2</sup> American Pregnancy Association, *Pregnancy Complications*. Available at <http://www.americanpregnancy.org/pregnancycomplications>. (Accessed March 15, 2012).

<sup>3</sup> An objective of the U.S. Department of Health & Human Services' *Healthy People 2020* is to reduce maternal illness and complications related to pregnancy during hospitalization for labor and delivery (U.S. Department of Health & Human Services, Maternal, Infant, and Child Health). Available at <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=26>. (Accessed March 15, 2012).

#### Highlights

- Of the 4.1 million hospital stays involving childbirth among females ages 15 to 44 years in 2009, vaginal deliveries accounted for 66.5 percent and C-section deliveries accounted for 33.5 percent. The vast majority of stays for both vaginal delivery and C-section listed at least one complicating condition (91.3 percent of vaginal delivery stays; 99.9 percent of C-section stays).
- Stays for vaginal deliveries tended to be shorter and less expensive than C-section stays. Stays for vaginal deliveries with complicating conditions were more costly than stays without complicating conditions.
- Among stays for vaginal delivery, the following common complicating conditions occurred at a rate of 100 or more for every 1,000 deliveries: umbilical cord complications, prolonged pregnancy, abnormal fetal heart rate or rhythm, and problems of the amniotic cavity (such as premature rupture of membranes and infection of the amniotic cavity).
- Among C-sections, the following common complicating conditions occurred at a rate of 100 or more for every 1,000 deliveries: previous C-section, fetal distress and abnormal forces of labor, abnormality in fetal heart rate or rhythm, malposition/malpresentation, umbilical cord complications, eclampsia and pre-eclampsia, anemia, problems of the amniotic cavity, and advanced maternal age.
- Complicating conditions that were more common among C-section than vaginal delivery included: fetopelvic disproportion/obstruction (78 times higher), previous C-section (20 times higher), malposition/malpresentation (8 times higher), and uterine fibroids (6 times higher).
- The only complicating condition that was more common among vaginal delivery was umbilical cord around neck with compression (2 times higher).

mother, not the newborn). For the purpose of this Brief, "complicating conditions" include all ICD-9-CM diagnosis codes that are in the section entitled "Complications of Pregnancy, Childbirth, and the Puerperium" as outlined under "Definitions".<sup>4</sup>

This Brief presents information on hospital utilization and patient characteristics for complicated and uncomplicated vaginal deliveries and C-sections. In addition, this report provides information on specific types of complicating conditions of delivery. During an individual stay, multiple complicating conditions may be recorded; some may be recorded as the principal diagnosis and some may be recorded as secondary diagnoses. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

## Findings

There were 4.1 million hospital stays involving childbirth among females 15 to 44 years old in 2009. As shown in table 1, vaginal deliveries accounted for approximately two-thirds of these stays (66.5 percent) while C-section deliveries accounted for the remainder (33.5 percent). The vast majority of both types of stays listed at least one complicating condition (91.3 percent of vaginal delivery stays; 99.9 percent of C-section stays). Only 1,300 C-section deliveries included no complicating conditions on the record.

Maternal stays for vaginal deliveries tended to be shorter and less expensive than C-section stays. Vaginal deliveries with complicating conditions were more costly than those without complicating conditions, and C-section deliveries were the most expensive. Length of stay for vaginal delivery stays without complicating conditions (1.9 days) was shorter than for vaginal delivery stays with complicating conditions (2.2 days). C-sections deliveries had the longest length of stay at 3.5 days. In aggregate, maternal stays for childbirth cost \$15.9 billion, about 4.4 percent of community hospital costs in the United States (data not shown).

On average, women hospitalized for vaginal deliveries without complicating conditions were younger (25.3 years) than women receiving C-section deliveries (28.6 years). There was no difference in average age between C-sections and vaginal deliveries with complicating conditions.

Table 1 shows that Medicaid and private insurance were the most common expected payers for all delivery stays. Medicaid was billed for the majority of vaginal delivery stays without complicating conditions (56.3 percent), while private insurance paid for 36.0 percent of these stays. Private insurance

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<sup>4</sup> This classification of pregnancy-associated complicating conditions is more inclusive than those diagnoses considered complications by Diagnostic Related Group (DRG) codes. Depending on the DRG assignment, an ICD-9-CM pregnancy or delivery complication code may not be considered a complication. For example, the following ICD-9-CM codes all fall into DRG 775 – "Vaginal delivery without complicating diagnoses" but are listed as complications based on ICD-9-CM codes:

64311-hyperemesis gravidarum with metabolic disturbance	64831-drug dependence
64321-late vomiting of pregnancy	64881-abnormal glucose tolerance
64622-renal disease not otherwise specified	65221-breech presentation
64661-genitourinary infection	

paid for a larger share of vaginal delivery stays with complicating conditions (47.9 percent), while Medicaid paid for less than half of these stays (44.4 percent). Among C-section deliveries, private insurance was the predominant payer, covering 51.8 percent, while Medicaid paid for 41.6 percent.

The rates of different types of deliveries were similar across location, community income level, and region (data not shown).<sup>5</sup>

**Table 1. Delivery stays with and without complicating conditions\*, 2009**

	Vaginal deliveries		Cesarean section deliveries†
	With complicating conditions	Without complicating conditions	
Total number of discharges	2,485,700	237,100	1,373,300
(Percentage of all childbirth stays)	60.7%	5.8%	33.5%
Rate per 1,000 population <sup>1</sup>	40.1	3.8	22.1
Mean length of stay, days	2.2	1.9	3.5
Mean hospital costs	\$3,200	\$2,600	\$5,300
Aggregate costs (billions)	\$8.0	\$0.6	\$7.3
Mean age, years	27.1	25.3	28.6
<i>Health insurance (percentage distribution)</i>			
Medicare	0.5	0.5	0.6
Medicaid	44.4	56.3	41.6
Uninsured	4.4	4.5	3.3
Private insurance	47.9	36.0	51.8
Other	2.6	2.5	2.4

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2009

\* Complicating conditions include all conditions that are categorized as complications of pregnancy, delivery, or the puerperium based on ICD-9-CM diagnosis codes.

† Excludes 1,300 C-section deliveries for which no complicating conditions were indicated on the record.

<sup>1</sup> Females ages 15 to 44.

Note: Counts of hospital stays are based on all-listed diagnoses, but each stay is counted only once.

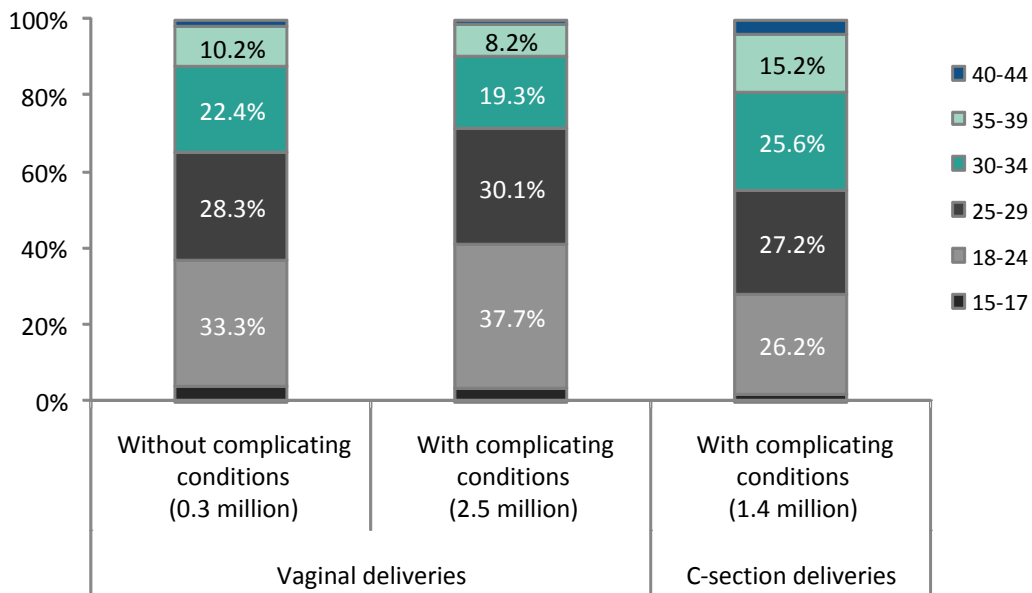
<sup>5</sup> The rate of C-section deliveries with complications was higher in large fringe metro areas than in medium and small metro areas. Hospitalization rates for vaginal deliveries without complicating conditions were highest in the poorest communities and declined with increasing income. Rates of vaginal deliveries without complicating conditions were higher in the South than in the Northeast and Midwest.

Figure 1 presents the distribution of each type of childbirth stay by maternal age; stays for which “advanced maternal age” was the only complicating condition are included in the “without complicating conditions” categories here.

Among the 2.5 million vaginal deliveries with complicating conditions, women between the ages of 18 and 29 years accounted for over two-thirds of cases—37.7 percent were for females 18–24 years old and 30.1 percent of these stays were for females 25–29 years old. Females over 35 accounted for less than 10 percent of vaginal deliveries with complicating conditions.

In contrast, the 1.4 million stays for C-sections with complicating conditions were more evenly distributed across three age groups: 18–24, 25–29, and 30–34 years old. Only about half of cases were in the 18–29 year age ranges—26.2 percent were for 18–24 year olds and 27.2 percent were for 25–29 year olds. Females over age 35 accounted for almost 20 percent of C-sections.

**Figure 1. Percentage distribution of childbirth stays with and without complicating conditions<sup>‡</sup> by age group, 2009\***



<sup>‡</sup>Stays for which advanced maternal age was the only complicating condition are included in the "without complicating conditions" category.

\*Excludes 2,100 C-section deliveries for which no complicating conditions were indicated on the record.

Note: Bar segments representing 4 percent or less are not labeled.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2009

### *Rates and characteristics of complicating conditions, 2009*

Table 2 shows the rates of complicating conditions among delivery stays. This table provides a complete accounting of all complicating conditions regardless of their severity, time of onset, or cause.

#### *Vaginal delivery stays*

Among maternal stays with vaginal delivery, the following common complicating conditions occurred at a rate of 100 or more for every 1,000 deliveries:

- umbilical cord complications (270 per 1,000 stays)
- prolonged pregnancy (139 per 1,000 stays)
- abnormality in fetal heart rate or rhythm (125 per 1,000 stays)
- problems of the amniotic cavity (106 per 1,000 stays)

The following complicating conditions occurred at a rate of 50–99 for every 1,000 deliveries:

- anemia during pregnancy (94 per 1,000 stays)
- advanced maternal age (87 per 1,000 stays)
- hypertension including eclampsia and pre-eclampsia (77 per 1,000 stays)
- fetal distress and abnormal forces of labor (71 per 1,000 stays)
- early or threatened labor (66 per 1,000 stays)
- diabetes or abnormal glucose tolerance (55 per 1,000 stays)

#### *C-section stays*

Among maternal stays with C-section, the following common complicating conditions occurred at a rate of 100 or more for every 1,000 deliveries:

- previous C-section (446 per 1,000 stays)
- fetal distress and abnormal forces of labor (185 per 1,000 stays)
- abnormality in fetal heart rate or rhythm (185 per 1,000 stays)
- malposition, malpresentation (183 per 1,000 stays)
- umbilical cord complications (160 per 1,000 stays)
- hypertension including eclampsia and pre-eclampsia (137 per 1,000 stays)
- anemia during pregnancy (133 per 1,000 stays)
- problems of the amniotic cavity (126 per 1,000 stays)
- advanced maternal age (117 per 1,000 stays)

The following complicating conditions occurred at a rate of 50–99 for every 1,000 deliveries:

- early or threatened labor (99 per 1,000 stays)
- diabetes or abnormal glucose tolerance (94 per 1,000 stays)
- prolonged pregnancy (90 per 1,000 stays)
- fetopelvic disproportion, obstruction (88 per 1,000 stays)

**Table 2. Counts, rates, and mean maternal age for all-listed complicating conditions for delivery stays, by delivery mode, 2009**

	Complicating conditions for delivery stays					
	Vaginal delivery			Cesarean delivery		
	Number	Rate per 1,000 stays	Mean age	Number	Rate per 1,000 stays	Mean age
<b>Complications mainly related to pregnancy</b>	<b>1,499,250</b>	<b>603.2</b>	<b>27.1</b>	<b>866,710</b>	<b>631.1</b>	<b>28.6</b>
Hemorrhage during pregnancy; abruptio placenta; placenta previa	26,050	10.5	27.4	47,220	34.4	29.6
Placenta previa	—	—	—	18,650	13.6	31.6
Abruptio placenta	17,050	6.9	27.2	25,280	18.4	28.2
Other hemorrhage during pregnancy; childbirth and the puerperium	5,820	2.3	27.0	45,000	3.5	29.1
Hypertension complicating pregnancy; childbirth and the puerperium	190,590	76.7	27.3	188,510	137.3	28.8
Preeclampsia and eclampsia	74,820	30.1	26.4	95,320	69.4	28.2
Other hypertension in pregnancy	117,910	47.4	27.8	96,250	70.1	29.5
Early or threatened labor	164,720	66.3	26.5	136,010	99.0	28.7
Early onset of delivery	163,820	65.9	26.5	135,830	98.9	28.8
Prolonged pregnancy	346,010	139.2	27.0	123,480	89.9	27.3
Diabetes or abnormal glucose tolerance complicating pregnancy; childbirth; or the puerperium	136,230	54.8	30.2	128,590	93.6	31.1
Other complications of pregnancy	1,043,140	419.7	26.9	613,620	446.8	28.6
Infections of genitourinary tract during pregnancy	24,800	10.0	25.2	17,460	12.7	27.2
Anemia during pregnancy	233,250	93.8	25.7	182,860	133.2	27.8
Infectious and parasitic complications in mother affecting pregnancy	73,230	29.5	26.7	46,580	33.9	28.0
Other and unspecified complications of pregnancy	853,910	343.5	27.2	486,090	354.0	28.8
<b>Indications for care in pregnancy; labor; and delivery</b>	<b>565,650</b>	<b>227.6</b>	<b>27.5</b>	<b>1,138,580</b>	<b>829.1</b>	<b>28.7</b>
Malposition; malpresentation	55,700	22.4	27.3	251,230	182.9	28.9
Breech presentation	6,730	2.7	28.1	115,530	84.1	29.1
Other malposition; malpresentation	49,400	19.9	27.2	148,070	107.8	28.7

**Table 2. Counts, rates, and mean maternal age for all-listed complicating conditions for delivery stays, by delivery mode, 2009 (continued)**

	Complicating conditions for delivery stays					
	Vaginal delivery			Cesarean delivery		
	Number	Rate per 1,000 stays	Mean age	Number	Rate per 1,000 stays	Mean age
Fetopelvic disproportion; obstruction	74,690	30.0	27.3	120,850	88.0	27.0
Fetopelvic disproportion	—	—	—	66,400	48.4	26.4
Other disproportion or obstruction	73,610	29.6	27.3	78,790	57.4	27.4
Previous cesarean section	56,810	22.9	29.9	612,170	445.8	29.8
Fetal distress and abnormal forces of labor	175,960	70.8	27.7	254,520	185.3	27.0
Fetal distress	—	—	—	—	—	—
Uterine inertia	58,810	23.7	27.1	244,280	177.9	26.9
Precipitate labor	87,940	35.4	28.1	—	—	—
Other abnormal forces of labor	30,040	12.1	27.7	10,470	7.6	28.2
Problems of amniotic cavity	263,000	105.8	27.2	173,560	126.4	28.3
Premature rupture of membranes	97,970	39.4	27.5	49,530	36.1	28.8
Infection of amniotic cavity	34,880	14.0	26.0	34,610	25.2	26.9
Other problems of amniotic cavity	141,200	56.8	27.3	99,820	72.7	28.6
<b>Complications during labor</b>	<b>1,748,440</b>	<b>703.4</b>	<b>27.2</b>	<b>224,380</b>	<b>163.4</b>	<b>28.8</b>
Umbilical cord complication	670,100	269.6	27.3	219,940	160.2	28.8
Cord around neck with compression	120,650	48.5	27.5	32,670	23.8	28.4
Other and unspecified cord entanglement with or without compression	520,310	209.3	27.3	171,490	124.9	28.9
Other umbilical cord complications	36,200	14.6	27.4	19,920	14.5	28.7
Trauma to perineum and vulva	1,412,610	568.3	27.2	—	—	—
First degree perineal laceration	613,380	246.8	26.8	—	—	—
Second degree perineal laceration	641,140	257.9	27.9	—	—	—
Third degree perineal laceration	68,790	27.7	27.4	—	—	—
Fourth degree perineal laceration	17,540	7.1	26.2	—	—	—
Other perineal laceration and trauma	114,830	46.2	25.8	—	—	—
Forceps delivery	40,320	16.2	25.8	—	—	—

**Table 2. Counts, rates, and mean maternal age for all-listed complicating conditions for delivery stays, by delivery mode, 2009 (continued)**

	Complicating conditions for delivery stays					
	Vaginal delivery			Cesarean delivery		
	Number	Rate per 1,000 stays	Mean age	Number	Rate per 1,000 stays	Mean age
<b>Other complications of birth; puerperium affecting management of mother</b>	<b>1,024,860</b>	<b>412.3</b>	<b>28.6</b>	<b>713,800</b>	<b>519.8</b>	<b>29.8</b>
Postpartum hemorrhage <sup>†</sup>	82,040	33.0	27.0	27,750	20.2	29.1
Complications of the puerperium	39,940	16.1	28.0	45,250	33.0	28.6
Cervical incompetence	9,880	4.0	28.8	9,410	6.9	30.5
Rhesus isoimmunization	57,140	23.0	27.1	28,060	20.4	28.4
Intrauterine death <sup>‡</sup>	13,030	5.2	27.4	—	—	—
Failed induction	—	—	—	50,640	36.9	27.2
Other obstetrical trauma	72,090	29.0	25.8	11,630	8.5	30.1
Other and unspecified complications of birth; puerperium affecting management of mother	850,910	342.3	29.1	632,020	460.2	30.1
Uterine fibroids*	9,960	4.0	33.2	33,540	24.4	33.8
Poor fetal growth*	43,510	17.5	25.8	38,710	28.2	28.0
Excessive fetal growth*	37,870	15.2	28.8	65,170	47.5	28.9
Advanced maternal age (35 years and older)*	217,430	87.5	37.5	160,570	116.9	37.7
Abnormality in fetal heart rate or rhythm*	309,910	124.7	26.9	254,200	185.1	27.6
Insufficient prenatal care*	73,900	29.7	24.5	25,980	18.9	26.0

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2009

— Indicates fewer than 5,000 weighted discharges.

<sup>†</sup> Postpartum hemorrhage is defined as blood loss greater than 500 cc for vaginal delivery and greater than 1000cc for C-section delivery. Source: Baskett TF. Complications of the third stage of labour. In: *Essential Management of Obstetrical Emergencies*. 3rd ed. Bristol, England: Clinical Press; 1999:196–201.

<sup>‡</sup> Following intrauterine fetal death, the standard of care suggests that vaginal delivery with induction should be offered to the patient thus most deliveries following intrauterine death will be vaginal. Source: ACOG Practice Bulletin No. 102: management of stillbirth. *Obstet Gynecol*. 2009 Mar;113(3):748–61.

Note: Condition counts are based on all-listed diagnoses and are not mutually exclusive; multiple conditions can be listed during a single hospital stay. Information is suppressed for conditions with frequencies less than 5,000. All categories are based on the multi-level CCS, except for categories indicated with \*, which is based on ICD-9-CM diagnosis codes.



### *Differences in rates of complicating conditions between stays with vaginal delivery and C-section*

Rates for the following complicating conditions were at least twice as high among C-section stays as among vaginal delivery stays. Some of these complicating conditions may represent indications for C-section:

- previous C-section (20 times more common)
- malposition, malpresentation (8 times more common)
- uterine fibroids (6 times more common)
- hemorrhage during pregnancy (3 times more common), including abruptio placenta (3 times more common)
- uterine inertia (8 times more common)
- excessive fetal growth (3 times more common)
- fetal distress and abnormal forces of labor (2 times more common)
- preeclampsia and eclampsia (2 times more common)
- complications of the puerperium (2 times more common)

Three specific complications of the puerperium were more common among C-section deliveries than among vaginal deliveries (data not shown in table). Complications of surgical wounds were 10 times higher among C-section deliveries—7.5 stays per 1,000 C-section deliveries versus 0.7 stays per 1,000 vaginal deliveries. Major postpartum infection occurred nearly five times more often among C-section deliveries—5.5 stays per 1,000 C-section deliveries versus 1.2 stays per 1,000 vaginal deliveries. Finally, postpartum fever was over two times higher for C-sections—5.0 stays per 1,000 C-section deliveries versus 2.1 stays per 1,000 vaginal deliveries.

Rates for umbilical cord around the neck with compression were nearly twice as high among vaginal deliveries (270 per 1,000 stays) as among C-section deliveries (160 per 1,000 stays).

### **Data Source**

The estimates in this Statistical Brief are based upon data from the 2009 HCUP Nationwide Inpatient Sample (NIS). Supplemental sources included data from the U.S. Census Bureau, Population Division, Annual Estimates of the Population for the United States, Regions, and Divisions and U.S. Census Bureau, Current Population Reports, P60-226, Coverage by Type of Health Insurance.

Many hypothesis tests were conducted for this Statistical Brief. Thus, to decrease the number of false-positive results, we reduced the significance level to 0.0001 for individual tests.

### **Definitions**

#### *Diagnoses, ICD-9-CM, and Clinical Classifications Software (CCS)*

The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are concomitant conditions that coexist at the time of admission or that develop during the stay.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 13,600 ICD-9-CM diagnosis codes.

CCS categorizes ICD-9-CM diagnoses into a manageable number of clinically meaningful categories.<sup>6</sup> This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures. For table 2, the Multi-Level CCS was used to examine more specific categories of conditions. The Multi-Level CCS is a hierarchical system that is defined using both single-level CCS groupings and ICD-9-CM codes.

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<sup>6</sup> HCUP Clinical Classifications Software (CCS). Healthcare Cost and Utilization Project (HCUP). U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at [www.hcup-us.ahrq.gov/toolsoftware/ccs/ccs.jsp](http://www.hcup-us.ahrq.gov/toolsoftware/ccs/ccs.jsp). Updated March 2012. (Accessed March 15, 2012).

For this report, CCS codes 177–195 were used to identify complicating conditions of pregnancy and childbirth. Delivery stays were identified by ICD-9-CM diagnosis codes 640.0–676.9, where the fifth digit is 1 or 2, or ICD-9-CM 650. Maternal stays were identified as having an all-listed ICD-9-CM diagnosis code in the delivery range or an all-listed CCS code 177–195. All stays were limited to patients ages 15 to 44 years.

#### *Types of hospitals included in HCUP*

HCUP is based on data from community hospitals, defined as short-term, non-Federal, general and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. However, if a patient received long-term care, rehabilitation, or treatment for psychiatric or chemical dependency conditions in a community hospital, the discharge record for that stay will be included in the NIS.

#### *Unit of analysis*

The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate "discharge" from the hospital.

#### *Costs and charges*

Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).<sup>7</sup> Costs will tend to reflect the actual costs of production, while charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States. Hospital charges reflect the amount the hospital charged for the entire hospital stay and does not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundred.

#### *Payer*

Payer is the expected primary payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into more general groups:

- Medicare: includes fee-for-service and managed care Medicare patients.
- Medicaid: includes fee-for-service and managed care Medicaid patients. Patients covered by the State Children's Health Insurance Program (SCHIP) may be included here. Because most state data do not identify SCHIP patients specifically, it is not possible to present this information separately.
- Private Insurance: includes Blue Cross, commercial carriers, and private HMOs and PPOs.
- Other: includes Workers' Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
- Uninsured: includes an insurance status of "self-pay" and "no charge."

When more than one payer is listed for a hospital discharge, the first-listed payer is used.

#### **About HCUP**

HCUP is a family of powerful health care databases, software tools, and products for advancing research. Sponsored by the Agency for Healthcare Research and Quality (AHRQ), HCUP includes the largest all-payer encounter-level collection of longitudinal health care data (inpatient, ambulatory surgery, and emergency department) in the United States, beginning in 1988. HCUP is a Federal-State-Industry Partnership that brings together the data collection efforts of many organizations—such as State data organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

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<sup>7</sup> HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at [www.hcup-us.ahrq.gov/db/state/costtocharge.jsp](http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp). Updated August 2011. (Accessed March 15, 2012).

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

**Alaska** State Hospital and Nursing Home Association  
**Arizona** Department of Health Services  
**Arkansas** Department of Health  
**California** Office of Statewide Health Planning and Development  
**Colorado** Hospital Association  
**Connecticut** Hospital Association  
**Florida** Agency for Health Care Administration  
**Georgia** Hospital Association  
**Hawaii** Health Information Corporation  
**Illinois** Department of Public Health  
**Indiana** Hospital Association  
**Iowa** Hospital Association  
**Kansas** Hospital Association  
**Kentucky** Cabinet for Health and Family Services  
**Louisiana** Department of Health and Hospitals  
**Maine** Health Data Organization  
**Maryland** Health Services Cost Review Commission  
**Massachusetts** Division of Health Care Finance and Policy  
**Michigan** Health & Hospital Association  
**Minnesota** Hospital Association  
**Mississippi** Department of Health  
**Missouri** Hospital Industry Data Institute  
**Montana** MHA – An Association of Montana Health Care Providers  
**Nebraska** Hospital Association  
**Nevada** Department of Health and Human Services  
**New Hampshire** Department of Health & Human Services  
**New Jersey** Department of Health  
**New Mexico** Health Policy Commission  
**New York** State Department of Health  
**North Carolina** Department of Health and Human Services  
**Ohio** Hospital Association  
**Oklahoma** State Department of Health  
**Oregon** Health Policy and Research  
**Pennsylvania** Health Care Cost Containment Council  
**Rhode Island** Department of Health  
**South Carolina** State Budget & Control Board  
**South Dakota** Association of Healthcare Organizations  
**Tennessee** Hospital Association  
**Texas** Department of State Health Services  
**Utah** Department of Health  
**Vermont** Association of Hospitals and Health Systems  
**Virginia** Health Information  
**Washington** State Department of Health  
**West Virginia** Health Care Authority  
**Wisconsin** Department of Health Services  
**Wyoming** Hospital Association

### About the NIS

The HCUP Nationwide Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, nonrehabilitation hospitals). The NIS is a sample of hospitals and includes all patients from each hospital, regardless of payer. It is drawn from a sampling frame that contains hospitals comprising about 95 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at both the national

and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use.

### For More Information

For more information about HCUP, visit <http://www.hcup-us.ahrq.gov/>.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at <http://hcupnet.ahrq.gov/>.

For information on other hospitalizations in the U.S., download *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States in 2009*, located at <http://www.hcup-us.ahrq.gov/reports.jsp>.

For a detailed description of HCUP, more information on the design of the NIS, and methods to calculate estimates, please refer to the following publications:

*Introduction to the HCUP Nationwide Inpatient Sample, 2009*. Online. May 2011. U.S. Agency for Healthcare Research and Quality. Available at [http://www.hcup-us.ahrq.gov/db/nation/nis/NIS\\_2009\\_INTRODUCTION.pdf](http://www.hcup-us.ahrq.gov/db/nation/nis/NIS_2009_INTRODUCTION.pdf). (Accessed March 15, 2012).

Houchens, R., Elixhauser, A. *Final Report on Calculating Nationwide Inpatient Sample (NIS Variances, 2001*. HCUP Methods Series Report #2003-2. Online. June 2005 (revised June 6, 2005). U.S. Agency for Healthcare Research and Quality. Available at <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>. (Accessed March 15, 2012).

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at [hcup@ahrq.gov](mailto:hcup@ahrq.gov) or send a letter to the address below:

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