

STATISTICAL BRIEF #113

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Complicating Conditions of Pregnancy and Childbirth, 2008

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Introduction

Complications during pregnancy can pose a serious risk to both maternal and infant health, and are associated with various adverse outcomes, including miscarriage, hemorrhage, preterm labor, and low birth weight.¹ 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.²

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) on pregnancy and childbirth hospitalizations with complicating conditions in 2008. All data are reported from the maternal perspective (i.e., reflecting the experience of the 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."³

This Brief presents information on hospital utilization and patient characteristics for the following types of hospital stays for:

- complicated pregnancy during which no delivery occurred ("non-delivery with complicating conditions"),
- delivery with complicated pregnancy or delivery ("delivery with complicating conditions"), and
- delivery without any mention of complicated pregnancy or delivery ("delivery without complicating conditions").

In addition, this report provides information on specific types of complicating conditions of pregnancy and delivery. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

There were 4,673,700 pregnancy and delivery hospital stays recorded in these hospital discharge data among females ages 15 to 44 years in 2008. As shown in table 1, there were 473,700 non-delivery

Highlights

- Among the 4.2 million deliveries in 2008, 94.1 percent listed some type of pregnancy complication.
- Stays with pregnancy-related complications tended to be longer (2.9 days for non-delivery stays and 2.7 days for delivery stays) than delivery stays without complications (1.9 days).
- Maternal stays with complications were about fifty percent more costly (\$4,100 for non-delivery stays and \$3,900 for delivery stays) than delivery stays without complications (\$2,600).
- Maternal stays with pregnancy and delivery-related complications accounted for \$17.4 billion, or nearly 5 percent of total hospital costs in the United States.
- Among non-delivery maternal stays, the following conditions occurred at a rate of 100 or more for every 1,000 hospital stays: early or threatened labor, infections of the genitourinary tract, and hypertension, including eclampsia and pre-eclampsia.
- Among maternal stays with delivery, the following conditions occurred at a rate of 50–99 for every 1,000 deliveries: umbilical cord complications, 1st and 2nd degree perineal lacerations, previous C-section, and abnormal fetal heart rate or rhythm.
- Patients 35 to 44 years accounted for 15 percent of maternal stays with complicating conditions (with or without delivery), but comprised only 1 percent of delivery stays without complicating conditions.

maternal hospital stays with complicating conditions as a principal or secondary diagnosis. Among the 4.2 million deliveries in 2008, the vast majority (94.1 percent) listed some type of complicating condition.

Stays with pregnancy-related complicating conditions tended to be longer (2.9 days for non-delivery stays and 2.7 days for delivery stays) than delivery stays without complicating conditions (1.9 days). Maternal stays with complicating conditions were also about 50 percent more costly (\$4,100 for non-delivery stays

Table 1. Pregnancy and childbirth stays with and without complicating conditions*, 2008

	Non-delivery stays with complicating conditions	Delivery stays	
		With complicating complications	Without complicating complications
Total number of discharges (% of all pregnancy and childbirth stays) (% of all childbirth stays)	473,700 (10.1%) (-)	3,950,300 (84.5%) (94.1%)	249,700 (5.3%) (5.9%)
Mean length of stay, days	2.9	2.7	1.9
Mean hospital costs	\$4,100	\$3,900	\$2,600
Aggregate costs	\$1.9 billion	\$15.5 billion	\$0.6 billion
Discharge against medical advice	1.88%	0.06%	0.04%
Mean age, years	27.2	27.7	25.5
<i>Health insurance (percentage distribution)</i>			
Medicare	1.6%	0.7%	0.5%
Medicaid	45.5%	39.7%	50.5%
Uninsured	6.5%	3.5%	4.4%
Private insurance	42.9% [‡]	53.2%	41.8%
Other	3.3%	2.7% [‡]	2.8%
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2008			
* Complicating conditions include all conditions that are categorized as complications of pregnancy, delivery, or the puerperium based on ICD-9-CM diagnosis codes.			
Note: Counts of hospital stays are based on all-listed diagnoses, but each stay is counted only once.			
‡ Values are not statistically different from values for delivery stays without complicating conditions at p<0.05.			

and \$3,900 for delivery stays) than delivery stays without complications (\$2,600). Maternal stays with pregnancy and delivery-related complicating conditions accounted for \$17.4 billion, or nearly 5 percent of total hospital costs in the United States.

Discharge against medical advice was more common among non-delivery stays with complicating conditions (1.9 percent) compared to delivery stays with or without pregnancy-related complicating conditions (less than 0.1 percent). Among all women 18–44, less than 1 percent (0.9 percent) are discharged against medical advice (data not shown).

Rates and characteristics of complicating conditions, 2008

Table 2 shows the rates of complicating conditions among maternal stays. During an individual stay, multiple complicating conditions may be recorded; some may be more recorded as the principal diagnosis and some may be recorded as the secondary diagnosis. This table provides a complete accounting of all complicating conditions regardless of their severity.

Non-delivery stays

As shown in table 2, among non-delivery maternal stays, the following complicating conditions occurred at a rate of 100 or more for every 1,000 hospital stays:

- early or threatened labor (208 per 1,000 stays)
- infections of genitourinary tract (132 per 1,000 stays)
- hypertension including eclampsia and pre-eclampsia (113 per 1,000 stays)

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

- anemia (99 per 1,000 stays)
- diabetes or abnormal glucose tolerance (82 per 1,000 stays)
- hyperemesis gravidarum (vomiting) (63 per 1,000 stays)
- poor fetal growth (60 per 1,000 stays)
- ectopic pregnancy (56 per 1,000 stays)
- advanced maternal age (56 per 1,000 stays)
- hemorrhage (52 per 1,000 stays)

Delivery stays

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

- umbilical cord complications (233 per 1,000 stays)
- perineal lacerations (158 1st degree and 168 2nd degree lacerations per 1,000 stays)
- previous cesarean section (167 per 1,000 stays)
- abnormality in fetal heart rate or rhythm (148 per 1,000 stays)
- prolonged pregnancy (121 per 1,000 stays)
- polyhydramnios and problems of the amniotic cavity (117 per 1,000 stays)
- advanced maternal age (117 per 1,000 stays)
- anemia during pregnancy (112 per 1,000 stays)
- fetal distress and abnormal forces of labor (111 per 1,000 stays)

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

- hypertension including eclampsia and pre-eclampsia (94 per 1,000 stays)
- early or threatened labor (81 per 1,000 stays)
- malposition, malpresentation (80 per 1,000 stays)
- diabetes or abnormal glucose tolerance (68 per 1,000 stays)
- poor fetal growth (54 per 1,000 stays)
- fetopelvic disproportion (54 per 1,000 stays)

Table 2. Counts, rates, and mean maternal age for all-listed complicating conditions for maternal stays with and without delivery, 2008

	Complicating conditions for maternal stays					
	Without delivery			With delivery		
	Number	Rate per 1,000 stays	Mean age	Number	Rate per 1,000 stays	Mean age
Abortion-related disorders	29,200	61.6	28.1	–	–	–
Spontaneous abortion	16,400	34.6	28.1	–	–	–
Induced abortion	5,300	11.2	27.8	–	–	–
Post-abortion complications	7,500	15.8	28.4	–	–	–
Complications mainly related to pregnancy	404,400	853.7	27.1	2,429,000	614.9	27.6
Ectopic pregnancy	26,700	56.3	29.0	–	–	–
Hemorrhage during pregnancy; abruptio placenta; placenta previa	24,600	51.9	28.6	76,600	19.4	28.7
Placenta previa	–	–	–	22,100	5.6	31.0
Abruptio placenta	–	–	–	44,500	11.3	27.8
Other hemorrhage during pregnancy; childbirth and the puerperium	19,400	40.9	28.7	12,100	3.1	28.0
Hypertension complicating pregnancy; childbirth and the puerperium	53,400	112.8	29.1	372,600	94.3	28.0
Preeclampsia and eclampsia	21,000	44.3	28.6	166,000	42.0	27.4
Other hypertension in pregnancy	33,000	69.6	29.4	210,600	53.3	28.5
Early or threatened labor	98,300	207.5	26.4	321,200	81.3	27.5
Threatened premature labor	90,100	190.2	26.4	–	–	–
Early onset of delivery	–	–	–	319,000	80.8	27.6
Other early or threatened labor	8,200	17.3	25.8	–	–	–
Prolonged pregnancy	–	–	–	478,700	121.2	27.0
Diabetes or abnormal glucose tolerance complicating pregnancy; childbirth; or the puerperium	38,700	81.6	29.5	266,800	67.5	30.6
Other complications of pregnancy	280,900	593.1	26.7	1,708,600	432.5	27.5
Infections of genitourinary tract during pregnancy	62,500	131.9	24.8	44,500	11.3	25.8
Anemia during pregnancy	46,900	99.0	26.7	441,600	111.8	26.7
Missed abortion	16,200	34.2	28.8	–	–	–
Hyperemesis gravidarum	29,600	62.5	26.0	–	–	–
Infectious and parasitic complications in mother effecting pregnancy	22,500	47.5	26.6	108,500	27.5	27.2
Other and unspecified complications of pregnancy	194,700	411.1	26.9	1,379,100	349.1	27.8
Thyroid dysfunction in pregnancy*	11,100	23.5	30.2	91,000	23.0	31.2
Tobacco use in pregnancy*	28,500	60.1	25.9	214,400	54.3	25.5
Obesity in pregnancy*	12,400	26.2	28.4	125,900	31.9	27.8
Indications for care in pregnancy; labor; and delivery	49,300	104.2	28.3	1,738,200	440.0	28.3
Malposition; malpresentation	8,900	18.8	28.3	317,400	80.4	28.6
Breech presentation	5,900	12.5	28.0	123,800	31.3	29.1
Other malposition; malpresentation	–	–	–	206,900	52.4	28.3
Fetopelvic disproportion; obstruction	–	–	–	213,900	54.1	27.1
Fetopelvic disproportion	–	–	–	80,900	20.5	26.4
Other disproportion or obstruction	–	–	–	164,400	41.6	27.2
Previous cesarean section	22,700	47.9	29.3	658,000	166.6	29.8

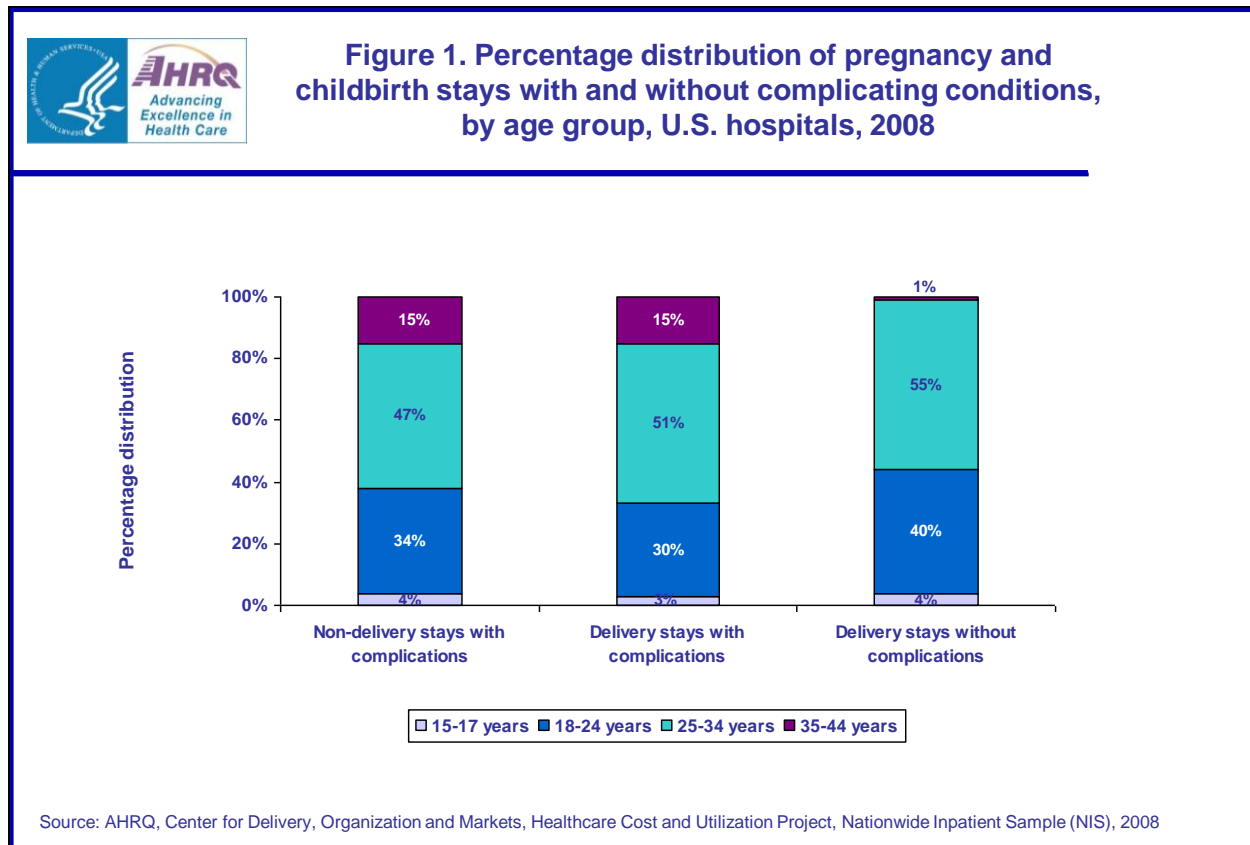
Fetal distress and abnormal forces of labor	–	–	–	439,200	111.2	27.1
Fetal distress	–	–	–	8,200	2.1	27.0
Uterine inertia	–	–	–	312,700	79.2	26.8
Precipitate labor	–	–	–	85,400	21.6	28.1
Other abnormal forces of labor	–	–	–	39,100	9.9	27.1
Polyhydramnios and other problems of amniotic cavity	19,400	41.0	27.5	462,800	117.2	27.6
Premature rupture of membranes	6,800	14.4	27.5	152,100	38.5	27.7
Infection of amniotic cavity	–	–	–	75,700	19.2	26.4
Other problems of amniotic cavity	12,000	25.3	27.5	259,900	65.8	27.7
Complications during labor	–	–	–	2,028,500	513.5	27.4
Umbilical cord complication	–	–	–	919,900	232.9	27.7
Cord around neck with compression	–	–	–	168,400	42.6	27.7
Other and unspecified cord entanglement with or without compression	–	–	–	704,400	178.3	27.7
Other umbilical cord complications	–	–	–	58,400	14.8	27.9
Trauma to perineum and vulva	–	–	–	1,452,800	367.8	27.3
First degree perineal laceration	–	–	–	622,400	157.6	26.8
Second degree perineal laceration	–	–	–	663,000	167.8	27.9
Third degree perineal laceration	–	–	–	75,300	19.1	27.3
Fourth degree perineal laceration	–	–	–	20,300	5.1	26.1
Other perineal laceration and trauma	–	–	–	119,200	30.2	25.8
Forceps delivery	–	–	–	40,600	10.3	25.7
Other complications of birth; puerperium affecting management of mother	157,400	332.3	28.8	1,828,300	462.8	29.0
Postpartum hemorrhage	6,100	12.8	28.7	117,200	29.7	27.5
Complications of the puerperium	41,500	87.7	27.6	111,400	28.2	28.4
Cervical incompetence	14,600	30.8	29.3	19,900	5.0	29.4
Rhesus isoimmunization	–	–	–	92,200	23.3	27.8
Intrauterine death	–	–	–	17,400	4.4	27.7
Failed induction	6,100	13.0	27.0	49,500	12.5	27.1
Other obstetrical trauma	–	–	–	87,900	22.3	26.5
Other and unspecified complications of birth; puerperium affecting management of mother	95,500	201.5	29.7	1,554,600	393.5	29.5
Uterine fibroids*	–	–	–	43,500	11.0	33.6
Poor fetal growth*	–	–	–	83,000	21.0	26.8
Excessive fetal growth*	–	–	–	112,300	28.4	28.9
Advanced maternal age (35 years and older)*	26,500	56.0	37.8	460,800	116.6	37.5
Abnormality in fetal heart rate or rhythm*	8,200	17.2	27.3	584,500	148.0	27.1
Insufficient prenatal care*	8,600	18.2	25.2	107,000	27.1	24.8

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2008

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.

Patient characteristics of maternal hospitalizations

The average age for patients with complicating conditions was about 2 years older (27.2 years for non-delivery stays and 27.7 years for complicated delivery stays) than for patients delivering without complicating conditions (25.5 years). Figure 1 shows that patients 35 to 44 years accounted for 15 percent of maternal stays with complicating conditions (with or without delivery), but comprised only 1 percent of delivery stays without complicating conditions.

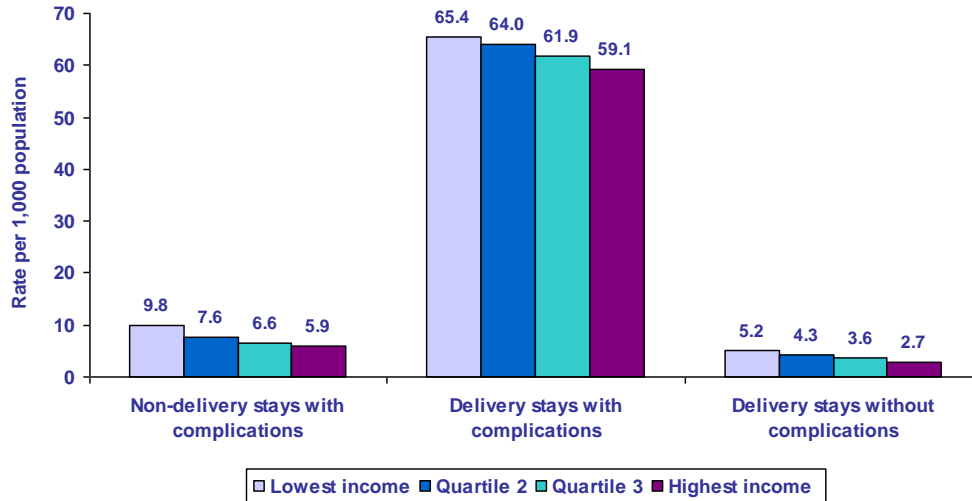


As shown in table 1, Medicaid and private insurance were the most common expected payers for all maternity stays. For non-delivery stays with complicating conditions, Medicaid was the most common expected payer (45.5 percent), closely followed by private insurance (42.9 percent). Private insurance was the most common expected payer for delivery stays with complicating conditions (53.2 percent), followed by Medicaid (39.7 percent). About half of all delivery stays without complicating conditions of pregnancy were billed to Medicaid (50.5 percent), while 41.8 percent were billed to private insurance.

Hospitalization rates for non-delivery stays with complicating conditions and delivery stays (with and without complicating conditions) were highest in the poorest communities and declined with increasing income (figure 2). Across all three types of maternal stays, the rate of stays was higher for women living in large urban areas and rural areas (micropolitan and noncore) and lower for women living in medium and small metropolitan areas (figure 3).



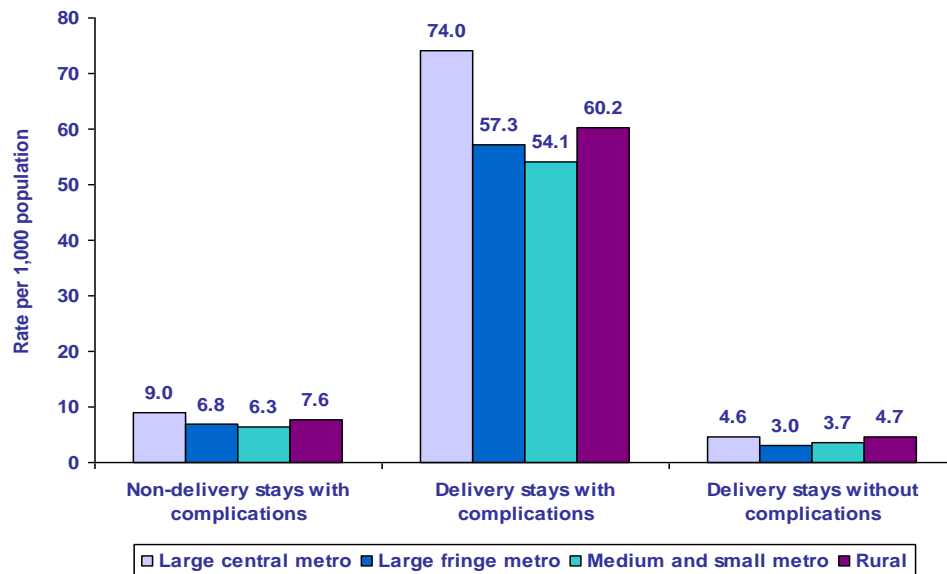
Figure 2. Rates of pregnancy and childbirth stays with and without complicating conditions, by community income, U.S. hospitals, 2008



Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample (NIS), 2008

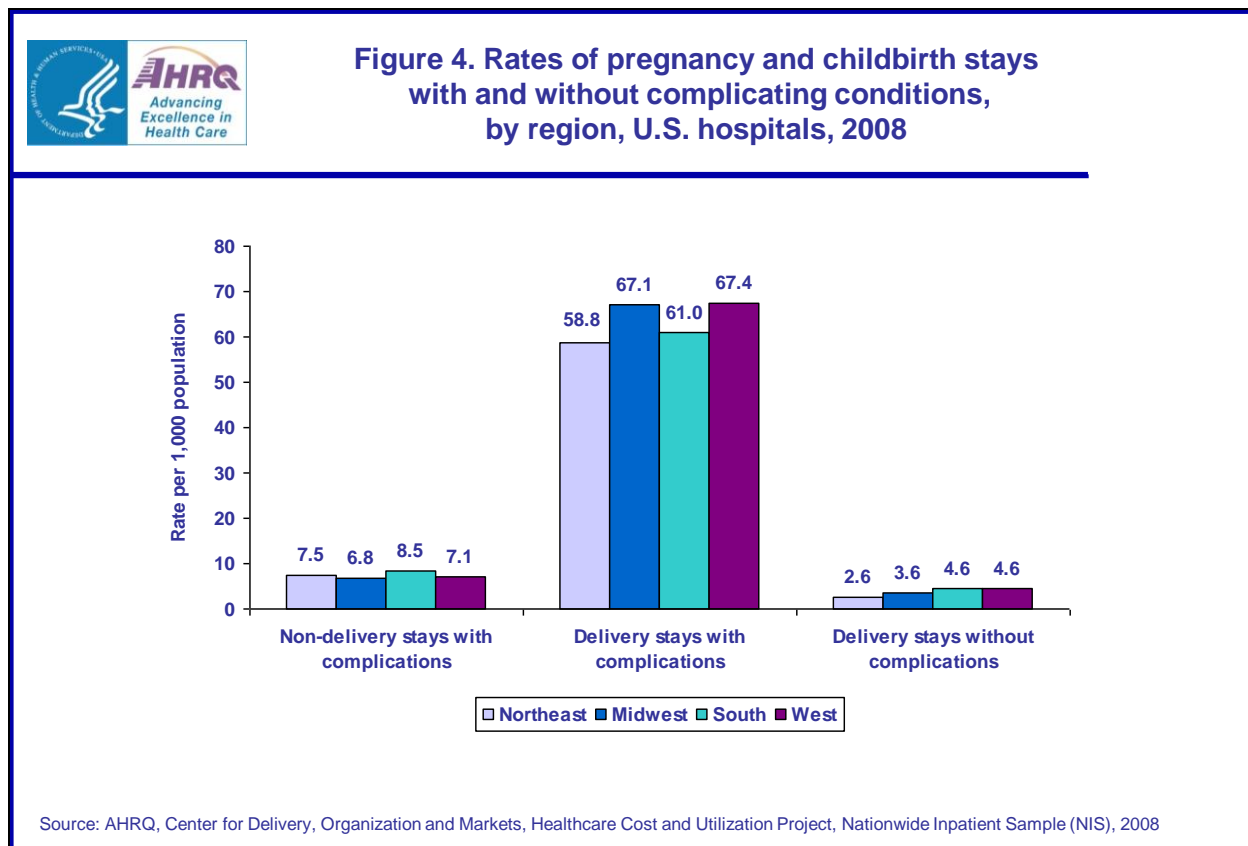


Figure 3. Rates of pregnancy and childbirth stays with and without complicating conditions, by patient residence, U.S. hospitals, 2008



Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample (NIS), 2008

Figure 4 shows the rates of pregnancy and childbirth stays with and without complicating conditions by region. Regional differences were not statistically significant for stays with complications (with or without delivery). Delivery stays without complications were lowest in the Northeast and highest in the South and West.



Data Source

The estimates in this Statistical Brief are based upon data from the 2008 HCUP Nationwide Inpatient Sample (NIS). Supplemental sources included data on regional population estimates from “Table 1: Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009 (NST-EST2009-01),” Population Division, U.S. Census Bureau, Release date: December 2009 (<http://www.census.gov/popest/states/NST-ann-est.html>).

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.⁴ 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.⁵

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 OB-GYN, ENT, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Please note, a discharge of this nature will be included in the NIS if it occurred in a community hospital.

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).⁶ 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.

Urban-rural location

Urban-rural location is one of six categories as defined by the National Center for Health Statistics:

- **Large Central Metropolitan:** Central counties of metropolitan areas with a population of 1 million or greater
- **Large Fringe Metropolitan:** Fringe counties of counties of metropolitan areas with a population of 1 million or greater
- **Medium Metropolitan:** Counties in metro area of 250,000–999,999 population
- **Small Metropolitan:** Counties in metro areas of 50,000–249,999 population
- **Micropolitan:** Micropolitan counties, i.e. a non-metropolitan county with an area of 10,000 or more population
- **Non-core:** Non-metropolitan and non-micropolitan counties

In this report, medium and small metropolitan were combined into one category and micropolitan and non-core were combined and labeled “rural.”

Median community-level income

Median community-level income is the median household income of the patient’s ZIP Code of residence. The cut-offs for the quartile designation are determined using ZIP Code demographic data obtained from Claritas. The income quartile is missing for homeless and foreign patients.

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.

Region

Region is one of the four regions defined by the U.S. Census Bureau:

- Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
- Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
- South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
- West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

Discharge status

Discharge status indicates the disposition of the patient at discharge from the hospital, and includes the following six categories: routine (to home), transfer to another short-term hospital, other transfers (including skilled nursing facility, intermediate care, and another type of facility such as a nursing home), home health care, against medical advice (AMA), or died in the hospital.

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.

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

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
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 and Senior Services
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 Association of Hospitals and Health Systems
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, non-rehabilitation 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 www.hcup-us.ahrq.gov.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at www.hcup.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 2008*, 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:

Steiner, C., Elixhauser, A., Schnaier, J. The Healthcare Cost and Utilization Project: An Overview. *Effective Clinical Practice* 5(3):143–51, 2002.

Introduction to the HCUP Nationwide Inpatient Sample, 2008. Online. May 2010. Agency for Healthcare Research and Quality. http://hcup-us.ahrq.gov/db/nation/nis/NIS_2008_INTRODUCTION.pdf

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). Agency for Healthcare Research and Quality. <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>

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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 or send a letter to the address below:

Irene Fraser, Ph.D., Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

¹ American Pregnancy Association, Pregnancy Complications. <http://www.americanpregnancy.org/pregnancycomplications/>

² U.S. Department of Health & Human Services, Maternal, Infant, and Child Health. <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=26>

³ This classification of pregnancy complications 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
64321-late vomiting of pregnancy
64622-renal disease not otherwise specified
64661-genitourinary infection
64831-drug dependence
64881-abnormal glucose tolerance
65221-breech presentation

⁴ HCUP CCS. Healthcare Cost and Utilization Project (HCUP). December 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp.

⁵ Elixhauser A., Steiner C., Palmer L. *Clinical Classifications Software (CCS), 2011.* U.S. Agency for Healthcare Research and Quality. Available: <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/CCSUsersGuide.pdf>

⁶ HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2008. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp.