HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

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Rates of Obstetric Trauma, 2009

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Introduction

Childbirth is one of the most common reasons for hospitalization in the U.S. health care system[1] and ensuring the safety of mothers and newborns is an important goal of health care quality improvement. Potentially avoidable injuries, such as obstetric trauma during vaginal deliveries, may lead to increased medical costs that include longer stays in the hospital, additional procedures, and poorer health outcomes for patients. The Agency for Healthcare Research and Quality (AHRQ) developed the Patient Safety Indicators, including measures of obstetric trauma, which can be used to assess quality and monitor disparities in this important aspect of health care.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) and State Inpatient Databases (SID). The analyses focus on national rates of obstetric trauma across age and racial/ethnic groups as well as trends in obstetric trauma over time. In addition, we provide comparisons for instrument-assisted deliveries versus deliveries without instrumentation. All differences between estimates that are noted in the text are statistically significant at the 0.05 or less probability level.

Findings

From 2000 to 2009, the frequency of instrument-assisted deliveries decreased by approximately 37.9 percent. In 2009, 7.9 percent of deliveries were instrument-assisted compared to 11.1 percent in 2000 (table 1).

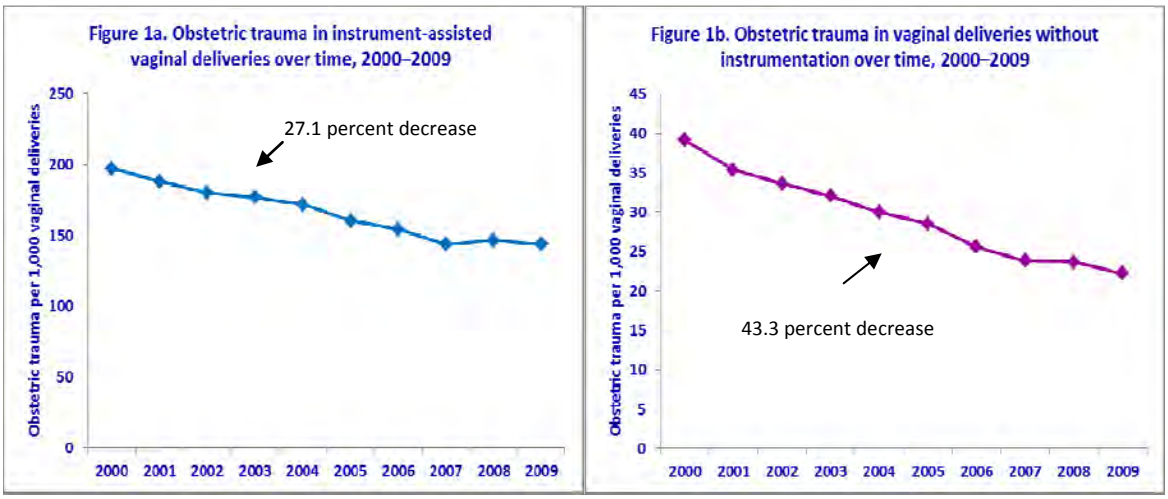
Highlights

- Between 2000 and 2009, rates of obstetric trauma per 1,000 vaginal deliveries decreased for both instrument-assisted deliveries and deliveries without instrumentation; however, rates decreased more rapidly among deliveries without instrumentation.
- In 2009, rates of obstetric trauma were highest among mothers aged 25–34 years compared to other age groups for both instrument-assisted deliveries (163.6 per 1,000 vaginal deliveries) and deliveries without instrumentation (24.9 per 1,000 vaginal deliveries). For both types of delivery, the highest rate (among 25–34 year olds) was more than 30 percent higher than the lowest rate.
- The rate of obstetric trauma was highest for Asian/Pacific Islanders and lowest for African-Americans. In 2009, compared to African-Americans, the rate of trauma in instrument-assisted deliveries was twice as high for Asian/Pacific Islanders (192.0 versus 83.2 per 1,000 deliveries). For deliveries without instrumentation, the rate of trauma was three times higher for Asian/Pacific Islanders (40.0 versus 13.2 per 1,000 deliveries) than among African-Americans.
- In 2009, hospitals in the Midwest had significantly higher rates of obstetric trauma in instrument-assisted deliveries (165.8 per 1,000 vaginal deliveries) than hospitals in the Northeast (148.2 per 1,000 vaginal deliveries), the South (134.3 per 1,000 vaginal deliveries), and the West (131.6 per 1,000 vaginal deliveries).
- In 2009, hospitals in the West had a significantly lower rate of obstetric trauma in deliveries without instrumentation (20.4 per 1,000 vaginal deliveries) compared to hospitals in the Northeast (23.5 per 1,000 vaginal deliveries), the Midwest (22.7 per 1,000 vaginal deliveries), and the South (22.4 per 1,000 vaginal deliveries).

[1] Russo C. A., Wier L., and Steiner C. *Hospitalizations Related to Childbirth, 2006*. HCUP Statistical Brief #71. April 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at http://www.hcup-us.ahrq.gov/reports/statbriefs/sb71.pdf. (Accessed March 21, 2012).

In general, rates of obstetric trauma per 1,000 deliveries were higher in instrument-assisted deliveries than in those without instrumentation. In 2009, the rate of obstetric trauma in instrument-assisted deliveries was more than six times the rate in deliveries without instrumentation (data not shown).

Over time, these rates decreased for both instrument-assisted deliveries and those performed without instrumentation (figures 1a and 1b). However, rates of obstetric trauma decreased more rapidly in deliveries without instrumentation (43.3 percent decrease for deliveries without instrumentation versus 27.1 percent decrease for assisted deliveries).



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample and AHRQ Quality Indicators, modified version of 4.1

Table 1 provides observed frequencies of each type of vaginal delivery by patient characteristics. Differences across patient groups in these observed counts do not require testing of statistical significance, and therefore, is not discussed in text.

Table 1. Patient characteristics—age, region, race by type of vaginal delivery

	Total	Instrument-assisted vaginal deliveries	Vaginal deliveries without instrumentation
Total (percentage)(2000)	3,126,900 (100.0%)	345,900 (11.1%)	2,781,000 (88.9%)
Total (percentage)(2009)	2,731,500 (100.0%)	214,800 (7.9%)	2,516,700 (92.1%)
Age			
10–17	102,300 (100.0%)	10,500 (10.3%)	91,800 (89.7%)
18–24	922,800 (100.0%)	73,700 (8.0%)	849,100 (92.0%)
25–34	1,375,300 (100.0%)	104,500 (7.6%)	1,270,800 (92.4%)
35–54	331,000 (100.0%)	26,200 (7.9%)	304,800 (92.1%)
Region			
Northeast	416,000 (100.0%)	26,000 (6.2%)	390,000 (93.8%)
Midwest	598,600 (100.0%)	51,000 (8.5%)	547,600 (91.5%)
South	1,063,900 (100.0%)	82,900 (7.8%)	981,000 (92.2%)
West	652,900 (100.0%)	54,900 (8.4%)	598,000 (91.6%)
Total	2,720,400 (100.0%)	208,300 (7.7%)	2,512,100 (92.3%)
Race*			
White, non-Hispanic	1,451,900 (100.0%)	117,300 (8.1%)	1,334,600 (91.9%)
African-American	386,300 (100.0%)	26,000 (6.7%)	360,300 (93.3%)
Hispanic	626,200 (100.0%)	40,400 (6.5%)	585,800 (93.5%)
Asian/Pacific Islander	133,700 (100.0%)	14,700 (11.0%)	119,000 (89.0%)
Other, non-Hispanic	122,300 (100.0%)	9,800 (8.0%)	112,500 (92.0%)

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample and AHRQ Quality Indicators, modified version of 4.1

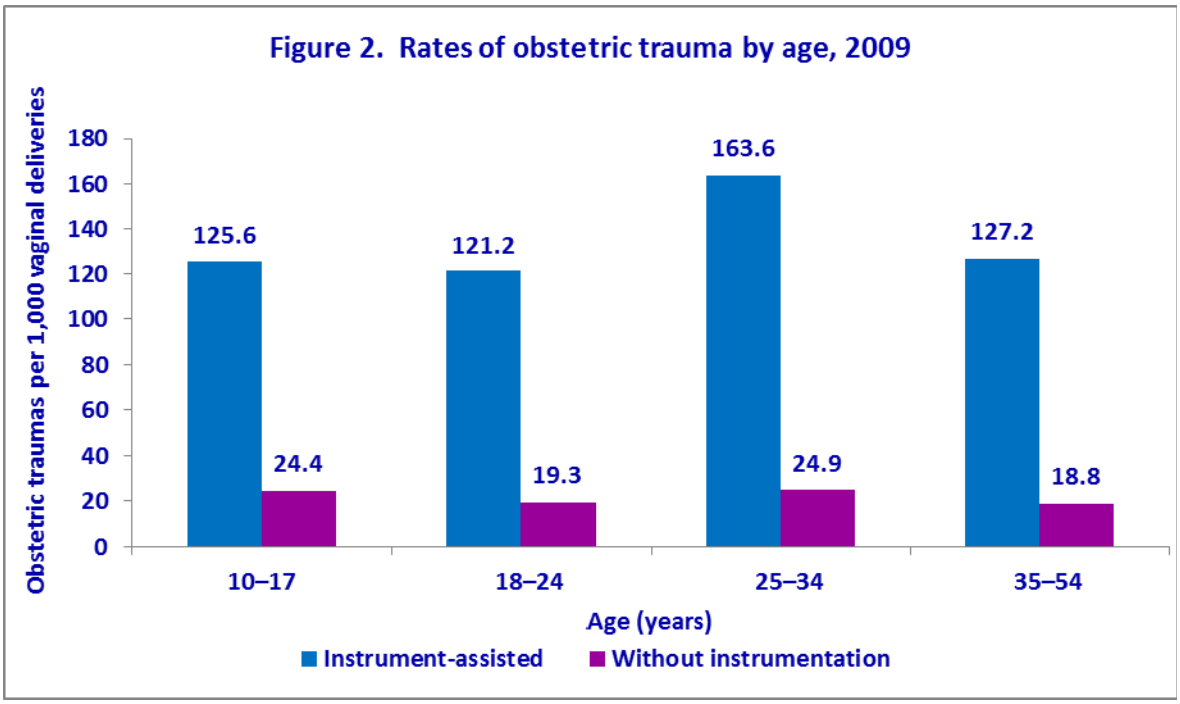
* Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and AHRQ Quality Indicators, modified version of 4.1

Rates of obstetric trauma by patient age

In 2009, rates of obstetric trauma were highest among mothers aged 25–34 years for both instrument-assisted deliveries and deliveries without instrumentation (figure 2). Among instrument-assisted deliveries, the rate of obstetric trauma was highest for mothers aged 25–34 years (163.6 per 1,000 deliveries). Compared to this age group, mothers aged 35–54 (127.2 per 1,000 deliveries), mothers aged 10–17 (125.6 per 1,000 deliveries), and mothers aged 18–24 (121.2 per 1,000 deliveries) had lower rates.

Mothers aged 25–34 years also had higher rates of trauma during deliveries without instrumentation (24.9 per 1,000 vaginal deliveries) compared to mothers aged 18–24 (19.3 per 1,000 vaginal deliveries) and 35–54 (18.8 per 1,000 vaginal deliveries).

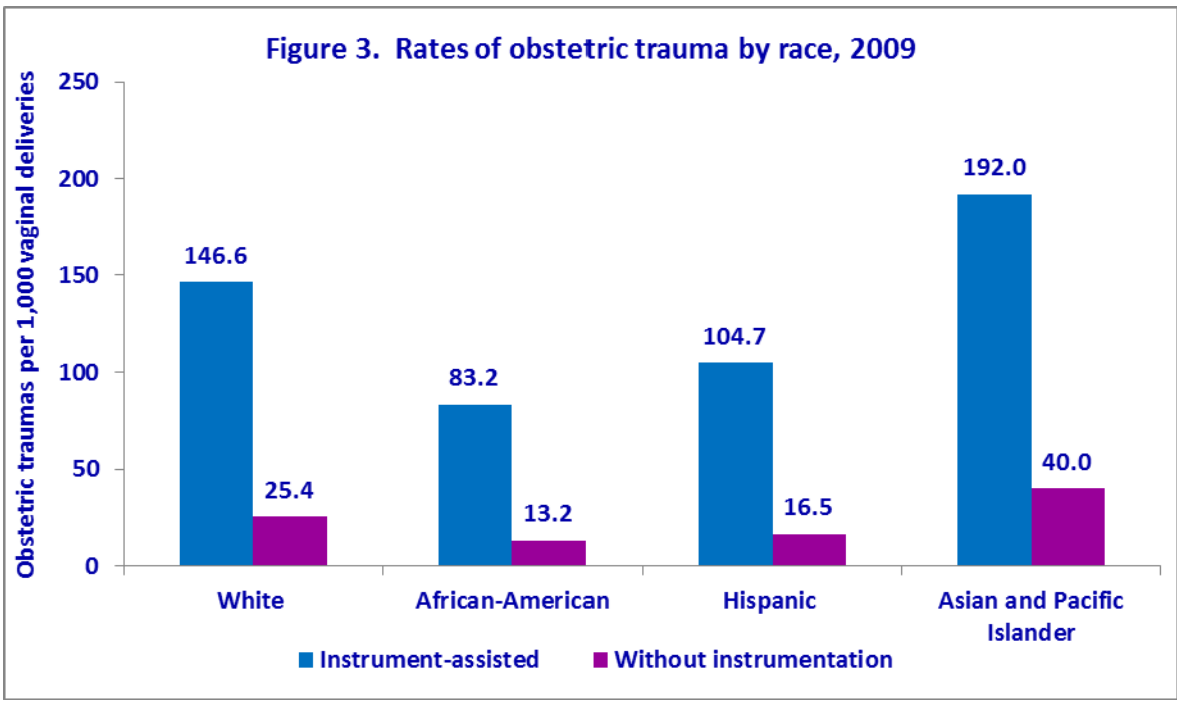
In both types of delivery (instrument-assisted and without instruments), the rate of obstetric trauma among 25–34 year olds was more than 30 percent higher than the lowest rate.



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample and AHRQ Quality Indicators, modified version of 4.1

Rates of obstetric trauma by race/ethnicity, 2009
In instrument-assisted deliveries, Asian/Pacific Islanders had higher rates of obstetric trauma (192.0 per 1,000 vaginal deliveries) than whites (146.6 per 1,000 vaginal deliveries), Hispanics (104.7 per 1,000 vaginal deliveries), and African-Americans (83.2 per 1,000 vaginal deliveries) (figure 3). The rate of obstetric trauma during instrument-assisted deliveries for Asian/Pacific Islanders (highest rate) was more than two times higher than the rate for African-Americans (lowest rate).

Deliveries without instrumentation showed a similar pattern. The rate of obstetric trauma for Asian/Pacific Islanders (40.0 per 1,000 vaginal deliveries) was higher than whites (25.4 per 1,000 vaginal deliveries), Hispanics (16.5 per 1,000 vaginal deliveries), and African-Americans (13.2 per 1,000 vaginal deliveries). The rate of obstetric trauma for deliveries without instrumentation for Asian/Pacific Islanders (highest rate) was three times that of the rate for African-Americans (lowest rate).

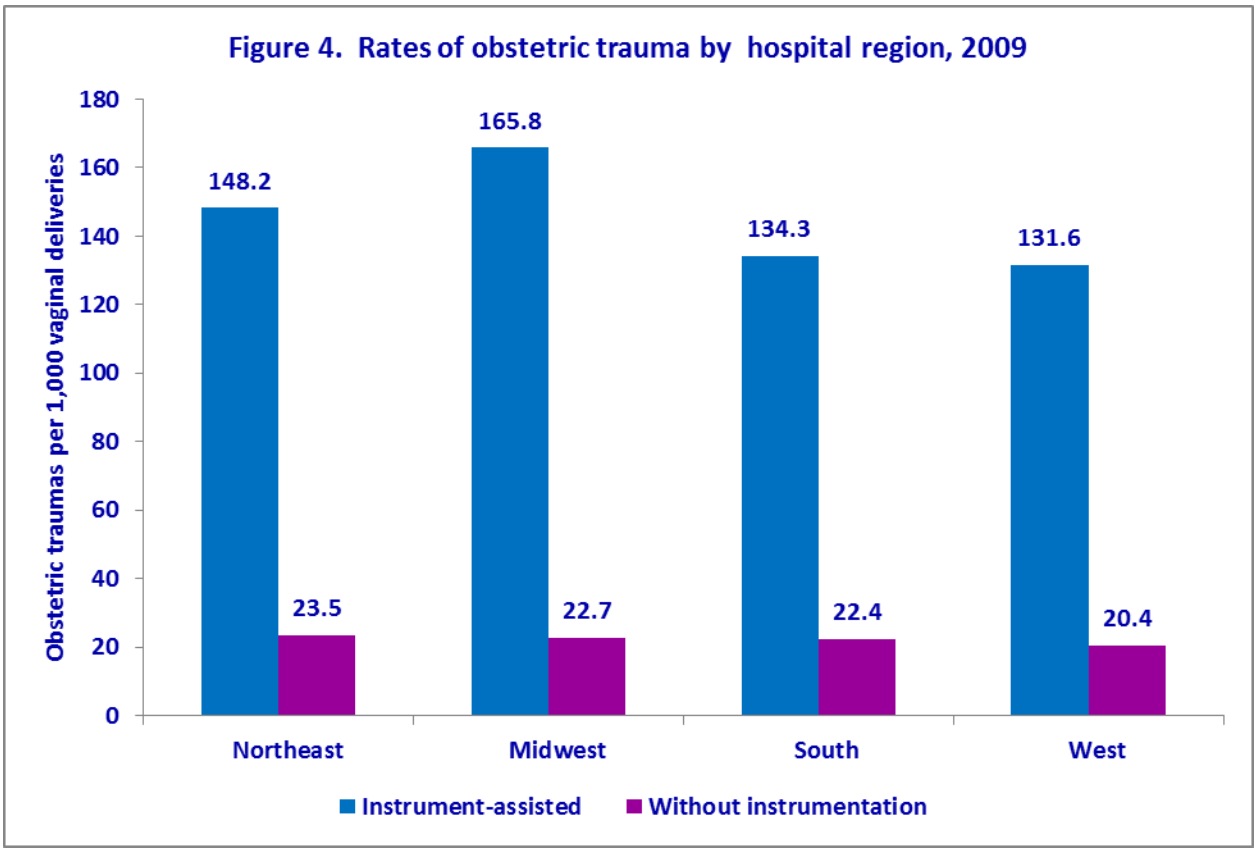


Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and AHRQ Quality Indicators, modified version of 4.1

Rates of obstetric trauma by hospital region, 2009
Across regions, hospitals in the Midwest demonstrated a significantly higher rate of obstetric trauma in instrument-assisted deliveries in 2009 (165.8 per 1,000 vaginal deliveries), than hospitals in the Northeast (148.2 per 1,000 deliveries), the South (134.3 per 1,000 deliveries), and the West (131.6 per 1,000 deliveries) (figure 4).

Among deliveries without instrumentation, hospitals in the West (20.4 per 1,000 vaginal deliveries) had a significantly lower rate of obstetric trauma than those located in the Northeast (23.5 per 1,000 vaginal deliveries), the Midwest (22.7 per 1,000 vaginal deliveries), and the South (22.4 per 1,000 vaginal deliveries).

The variation across regions was greater for instrument-assisted deliveries than for deliveries without instrumentation. For instrument-assisted deliveries, the difference between the region with the highest rate (Midwest) and the lowest rate (West) was about 25 percent. In comparison, for deliveries without instrumentation, the difference between the region with the highest rate (Northeast) and the lowest rate (West) was 15 percent.



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample and AHRQ Quality Indicators, modified version of 4.1

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2009 NIS and the 2009 State Inpatient Databases (SID) disparities analysis file. Historical data were drawn from the 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008 NIS. The SID disparities analysis file is designed to provide national estimates on disparities for the National Healthcare Disparities Report. It uses weighted records from a sample of hospitals with good reporting of race and ethnicity from the following 36 States: AR, AZ, CA, CO, CT, FL, GA, HI, IA, IL, KS, KY, MA, MD, ME, MI, MO, NH, NJ, NM, NV, NY, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, and WY. The 2009 NIS contains all discharge data from 1,050 hospitals located in 44 States, approximating a 20 percent stratified sample of U.S. community hospitals. The sampling frame for the 2009 NIS is a sample of hospitals that comprises approximately 95 percent of all hospital discharges in the United States. Sampling stratifiers include hospital region, bed size, ownership, teaching status, and urban/rural location.

Definitions

Patient Safety Indicators
The AHRQ Patient Safety Indicators (PSI; version 4.1) were used for this analysis to identify the admissions of interest and for risk-adjustment. The PSIs, a component of the AHRQ quality indicators (QIs), are a set of measures that can be used with hospital inpatient discharge and administrative data to provide a perspective on quality. PSIs screen for problems that patients experience as a result of exposure to the health care system and are likely amenable to prevention by changes at the system or provider-levels. These are referred to as *complications* or *adverse events*. Obstetric trauma was measured using two of the AHRQ PSIs.

PSI 18: Obstetric trauma for mothers that had vaginal delivery assisted by instrumentation. This measures how often a woman experiences a tear (trauma) to her perineum—the area between her vagina and rectum—while giving birth, when a health care provider is helping to deliver her baby using a forceps or other medical instrument. The reported rate is the number of instrument-assisted vaginal deliveries noting obstetric trauma with 3rd or 4th degree lacerations per 1,000 instrument-assisted vaginal deliveries.

PSI 19: Obstetric trauma for mothers that had vaginal delivery without instrument assistance. This measures how often a woman experiences a tear (trauma) to her perineum—the area between her vagina and rectum—while giving birth. The reported rate is the number of vaginal deliveries without instrument assistance noting obstetric trauma with 3rd or 4th degree lacerations per 1,000 vaginal deliveries without instrument assistance.

ICD-9-CM Obstetric trauma diagnosis codes:

66420 Delivery with third degree laceration—unspecified as to episode of care or not applicable
66421 Delivery with third degree laceration—during delivery
66424 Delivery with third degree laceration—postpartum condition or complication
66430 Trauma to perineum and vulva during delivery, fourth-degree perineal laceration
66431 Trauma to perineum and vulva during delivery, fourth-degree perineal laceration
66434 Trauma to perineum and vulva during delivery, fourth-degree perineal laceration

ICD-9-CM Instrument-assisted delivery procedure codes:

720 Low forceps operation
721 Low forceps operation with episiotomy
7221 Mid forceps operation with episiotomy
7229 Other mid forceps operation
7231 High forceps operation with episiotomy
7239 Other high forceps operation
724 Forceps rotation of fetal head

7251 Partial breech extraction with forceps to aftercoming head
7253 Total breech extraction with forceps to aftercoming head
726 Forceps application to aftercoming head
7271 Vacuum extraction with episiotomy
7279 Vacuum extraction delivery
728 Other specified instrumental delivery
729 Unspecified instrumental delivery

Reporting of race and ethnicity
Race and ethnicity measures can be problematic in hospital discharge databases. Some States do not collect information on race/ethnicity from hospitals, and within States that collect the information, some hospitals do not code race and ethnicity reliably. The 2009 SID were used to create a disparities analysis file that was limited to 36 States that report race/ethnicity data and to hospitals within those states with good reporting of race and ethnicity.

Data on Hispanics are collected differently among the states and also can differ from the census methodology of collecting information on race (white, African-American, Asian, American Indian/Alaska Native) separately from ethnicity (Hispanic, non-Hispanic). State data organizations often collect Hispanic ethnicity as one of several categories that include race. Therefore, for multi-state analyses, HCUP creates the combined categorization of race and ethnicity for data from States that report ethnicity separately. When a State data organization collects Hispanic ethnicity separately from race, HCUP uses Hispanic ethnicity to override any other racial category. This creates a Hispanic category for the uniformly coded race/ethnicity data element, while also retaining the original race and ethnicity data. This Statistical Brief reports the HCUP uniform coding of race/ethnicity for the following categories: white, non-Hispanic; black, non-Hispanic; Asian/Pacific Islanders, non-Hispanic, and Hispanic.

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:

Alaska State Hospital & 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 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.

About the SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contains the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multi-state comparisons and analyses. Together, the SID encompasses 95 percent of all U.S. community hospital discharges in 2009. The SID can be used to investigate questions that are unique to one State; to compare data from two or more states; to conduct market area variation analyses; and to identify State-specific trends in inpatient care utilization, access, charges, and outcomes.

About the NHQR/DR

The *National Healthcare Disparities Report* (NHDR) is an annual report, commissioned by Congress in 1999 and first published in 2003, which tracks disparities in health care delivery. Although the emphasis is on disparities related to race, ethnicity, and socioeconomic status (SES), this directive includes a charge to examine disparities in "priority populations"—groups with unique health care needs or issues that require special focus. The NHDR was designed and produced by AHRQ, with support from the Department of Health and Human Services (DHHS) and private sector partners.

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 about 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 (accessed March 21, 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 21, 2012).

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Acknowledgments

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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:

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