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Potentially Avoidable Injuries to Mothers and Newborns During Childbirth, 2006

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Introduction

In 2006, there were 4.3 million childbirths in U.S. community hospitals, making the delivery of newborns the most common reason for hospitalization.¹ Because hospitalizations related to childbirth comprise a large portion of U.S. hospital care, and the quality of health care has been, and continues to be, a focal point of both past and current U.S. health care policy, it is important to better quantify and understand the impact of complications and adverse events for this key group of hospitalized patients. Identifying which types of patient safety problems exist for different sub-groups of patients is an important first step in developing interventions to reduce disparities and achieve high quality care for all patients.

To better assist healthcare decision makers in implementing this strategy, the Agency for Healthcare Research and Quality (AHRQ) has developed a set of Patient Safety Indicators (PSIs), which includes specific indicators for injuries and traumas that occur during childbirth-related hospitalizations.² These complications include injury to the newborn during birth (e.g., broken collarbone, an infection, or a head injury) and obstetrical traumas (i.e. perineum tears) occurring during vaginal delivery with and without instruments (e.g., forceps or other medical instruments). Such tears, which can happen even when medical instruments are not used or when an attempted vaginal delivery ends with cesarean-section, are often preventable.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on the rates of hospital patient safety events occurring during childbirth-related hospitalizations. Select AHRQ PSIs are used to develop rates by specific patient characteristics.³ The results for payer,

¹Russo, 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. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb71.pdf>.

²AHRQ Quality Indicators—Guide to Patient Safety Indicators, Version 3.1. Online. March 12, 2007. U.S. Agency for Healthcare Research and Quality http://qualityindicators.ahrq.gov/downloads/psi/psi_guide_v31.pdf.

³Unless otherwise noted, rates are adjusted by age, gender, age-gender interactions, or selected diagnostic risk factors.

Highlights

- Between 2000 and 2006, rates of potentially avoidable injuries to mothers during childbirth declined by more than 20 percent.
- Nearly 157,700 potentially avoidable injuries to mothers and newborns occurred during childbirth in 2006, and obstetrical traumas occurring during vaginal births with instruments accounted for the highest injury rates.
- Newborns covered by Medicaid had worse (i.e., higher) newborn injury rates than newborns covered by private insurance, though there appeared to be no differences in the rates of newborn injury between the wealthiest and poorest communities.
- For all delivery types, rates of obstetrical trauma for mothers were highest among women living in the wealthiest communities, and women with private insurance had higher obstetrical trauma rates than those with Medicaid.
- In general, both blacks and Hispanics had lower childbirth-related injury rates when compared to whites, while Asian-Pacific Islanders had worse outcomes for most injuries.
- Injury to the newborn occurred most often in those living in non-urban areas, while rates of obstetrical trauma for mothers were highest among women in large metropolitan areas. Although, the Northeast had one of the highest rates of obstetrical trauma with instrument assistance, it also had significantly worse rates of injury to the newborn.

race/ethnicity, and region are also presented as the injury rate of a comparison group relative to a specific reference group. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

In 2006, nearly 157,700 injuries to mothers and newborns occurred during childbirth and may have been potentially avoided (table 1). As expected, the highest rates of obstetrical traumas for mothers took place during vaginal births with instruments, occurring in 160.5 deliveries per 1,000 instrument-assisted vaginal births. However, figure 1 shows that the rates for all injuries to mothers during childbirth experienced significant decreases between 2000 and 2006. Obstetric traumas for mothers occurring during vaginal birth without instrument assistance fell 30 percent between 2000 and 2006 (from 51.7 deliveries to 36.2 deliveries per 1,000 vaginal deliveries without instrument assistance). Rates of obstetrical trauma occurring during vaginal birth with instrument and during cesarean section decreased about 20 percent each over this six-year time period.

Differences in childbirth-related injuries by gender and age

Table 2 displays rates of potentially avoidable injuries during childbirth by multiple patient characteristics, including gender and age. As indicated in this table, injury to the newborn was more common in newborn males, who had 1.7 injuries per 1,000 live births, as compared to 1.5 injuries per 1,000 live births among newborn females.

Rates of obstetrical trauma for mothers tended to vary significantly by age and type of delivery. For example, trauma during vaginal delivery with instrument was highest in women 25 to 34 years old (193.0 deliveries per 1,000 vaginal deliveries with instruments). Trauma during vaginal delivery without instrument was highest in women 15 to 17 years old (48.0 deliveries per 1,000 deliveries without instrument assistance), but rates tended to decrease as women aged. Conversely, rates of trauma occurring during cesarean section increased as women aged.

Differences in childbirth-related injuries by community income and expected payer

Table 2 also shows rates of potentially avoidable injuries occurring during childbirth by community-level income and expected source of payment. Though there appeared to be no significant differences in the rate of newborn injury between the wealthiest and poorest communities, the rates of obstetrical trauma for mothers were higher for women residing in communities with higher median household incomes. In fact, women living in the wealthiest communities had obstetrical trauma rates for vaginal delivery with or without instruments that were 44 percent higher than women living in the poorest communities. Obstetrical trauma rates during cesarean delivery were 35 percent higher in the wealthiest communities, as compared to the poorest communities.

Figure 2 illustrates the relative rates of Medicaid and uninsured patients compared to those with private insurance for injuries to newborns and mothers during childbirth. Compared to private insurance, Medicaid and the uninsured, had better (i.e., lower) rates of obstetrical trauma for mothers occurring during delivery with or without instruments. Moreover, the rate of obstetrical trauma for mothers occurring during cesarean delivery was also lower among women covered by Medicaid than the rate experienced by women with private insurance. Conversely, newborns covered by Medicaid had worse (i.e., higher) newborn injury rates than newborns covered by private insurance. Uninsured newborns had similar rates of newborn injury as compared to newborns with private insurance.

Differences in childbirth-related injuries by race and ethnicity

Figure 3 denotes the relative rates for minority groups compared to whites of childbirth-related injuries. In general, both blacks and Hispanics had better, i.e., lower, injury rates when compared to whites, while Asian-Pacific Islanders had worse outcomes for most injuries occurring during childbirth.

Compared to whites, blacks and Hispanics had consistently lower rates of injury to the newborn during birth and obstetrical traumas for mothers occurring during vaginal delivery with and without instruments.

Moreover, the rate of obstetrical trauma for mothers occurring during cesarean delivery was also lower in Hispanics than the rate experienced by whites.

Conversely, the rates of obstetrical traumas occurring during vaginal delivery among Asian-Pacific Islanders were 25 to 47 percent higher than those for whites. However, Asian-Pacific Islanders had lower rates of injury to the newborn during birth.

Differences in childbirth-related injuries by urban-rural patient residence and region

Table 2 also shows that the rate of newborn injury increased as patient location became less metropolitan. In fact, the rate of injury to the newborn was 33 percent higher in the most remote locations, as compared to large metropolitan locations. However, obstetrical trauma rates for mothers, regardless of type of delivery, tended to decrease as patient location became less metropolitan. For all delivery types, rates of obstetrical trauma were highest among women living in large metropolitan areas.

As shown in table 2 and figure 4, there was also significant regional variation in the rates of potentially avoidable injuries to newborns and mothers during childbirth. The Northeast had significantly worse rates of injury to the newborn, with rates 24 to 32 percent higher than those in the West, South, and Midwest. The Northeast also had the highest rates of obstetrical trauma for mothers during vaginal delivery with instrument when compared to the West and South.

However, the Northeast had the lowest rates of obstetric trauma for mothers during vaginal delivery without instrument. In fact, the highest rates for this complication occurred in the Midwest, where rates were 19 percent higher than those in the Northeast. There were no significant regional differences for rates of obstetrical trauma occurring during cesarean delivery.

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2006 Nationwide Inpatient Sample (NIS) and the 2006 State Inpatient Databases (SID) disparities analysis file. Historical data were drawn from the 2000, 2001, 2002, 2003, 2004, and 2005 NIS. The SID disparities analysis file is designed to provide national estimates on disparities for the National Healthcare Disparities Report using weighted records from a sample of hospitals with good reporting of race and ethnicity from the following 25 states: AR, AZ, CA, CO, CT, FL, GA, HI, KS, MA, MD, MI, MO, NH, NJ, NY, OK, RI, SC, TN, TX, UT, VA, VT, and WI. The sample is designed to approximate a 40 percent stratified sample of U.S. community hospitals with information on all their discharges. Sampling stratifiers include hospital region, bed size, ownership, teaching status, and urban/rural location. The sample includes about 15 million discharges from almost 1,900 hospitals.

The population bases for rates were obtained from Claritas, a vendor that compiles data from the U.S. Census Bureau. Claritas uses intra-census methods to estimate population subgroups.

Definitions

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. They exclude long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals, but these types of discharges are included if they are from community hospitals.

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.

Patient Safety Indicators

The AHRQ Patient Safety Indicators (PSI) (version 3.1) 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 healthcare system and that are likely amenable to prevention by changes at the system or provider level. These are referred to as complications or adverse events.

PSIs are defined on two levels: the provider-level and the area-level. Provider-level indicators provide a measure of the potentially preventable complication for patients who received their initial care and the complication of care within the same hospitalization. Provider-level indicators include only those cases where a secondary diagnosis code flags a potentially preventable complication. This Statistical Brief includes provider-level measures for hospital admission rates for the following four potentially preventable hospital complications and iatrogenic events:

PSI 17: Birth trauma-injury to newborn—How often a newborn infant experiences a problem during the birth process (labor or delivery) such as a broken collarbone, an infection, or a head injury. The reported rate is the number of births with injury to neonate per 1,000 live births (excluding preterm and osteogenesis imperfecta births). A definitional coding change for this indicator between 2003 and 2004 prevents the presentation of reliable trend information for this measure.

PSI 18: Obstetric trauma for mothers-vaginal delivery with instrument—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-vaginal delivery without instrument—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.

PSI 20: Obstetric trauma for mothers-cesarean delivery—How often a woman experiences a tear (trauma) in her perineum—the area between her vagina and rectum—or to any of the birth-related organs inside her body, during a cesarean (surgical) delivery of a baby. The reported rate is the number of cesarean deliveries noting obstetric trauma with 3rd or 4th degree lacerations per 1,000 cesarean deliveries.

Further information on the AHRQ QIs, including documentation and free software downloads, is available at <http://www.qualityindicators.ahrq.gov/index.htm>.

Risk adjustment

Except for the obstetrical trauma-cesarean delivery indicator, which describes the observed rate, the PSI rates used in this Statistical Brief were adjusted for select risk factors. The birth trauma measure was risk adjusted by gender. The obstetrical trauma measures for vaginal deliveries were risk adjusted using age and comorbidities. Regression-based standardization (designed by the developers of the PSI software) was used for risk adjustment.

The rate calculations also take into account the clustering of patients within hospitals and the hospital stratification aspects of the sampling design for the Nationwide Inpatient Sample (NIS) and the State

Inpatient Databases (SID) disparities analysis file. The patient safety event rates were weighted for national estimates. Pairwise t-tests were used to test for statistical significance of differences in patient safety (additional detail on the development of the files, risk adjustment methodology, and statistical approach is available in Coffey et al., 2008a and Coffey et al, 2008b).

Relative rates

Adjusted relative rates are calculated by dividing the comparison group adjusted patient safety event rate by the reference group adjusted rate. Comparison groups that have higher rates than the reference group have a relative rate greater than 1.0, while those with patient safety event rates lower than the reference group have a relative rate less than 1.0. A relative rate equal to 1.0 describes rates among comparison groups and the reference group that are similar. A relative rate significantly less than 1.0 or greater than 1.0 may signal disparities in the quality and safety of hospital care.

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 2006 SID disparities analysis file was limited to 25 states, 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 separately on race (white, black, Asian, and American Native) and ethnicity (Hispanic, non-Hispanic). State data organizations often collect Hispanic ethnicity as one of several categories that include race. Therefore, for multistate 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 race category to create 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.

Median community income level

Median community income level is the median household income of the patient's ZIP Code of residence. The cut-offs for the quartile designation is determined using ZIP Code demographic data obtained from Claritas.

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 Worker's 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.

Urban-rural location of patient residence

Urban-rural measurement for patient residence was based on the U.S. Office of Management and Budget (OMB) definitions of Core-Based Statistical Areas. OMB classifies counties into metropolitan and micropolitan areas. For this Statistical Brief, the metropolitan areas were further divided into large and

small metropolitan areas using the Urban Influence Codes (UIC). Thus, for this report, counties were classified into one of four categories:

- Large metropolitan includes metropolitan areas with 1 million or more residents.
- Small metropolitan includes metropolitan areas with fewer than 1 million residents.
- Micropolitan includes non-metropolitan areas having an urban cluster of 10,000 to 49,999 residents.
- Non-metropolitan, non-micropolitan includes areas that are neither metropolitan nor micropolitan areas, i.e. counties with no town greater than 10,000 residents.

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

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
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
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 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
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 and Family 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 90 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 SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contain the universe of the inpatient discharge abstracts in the participating HCUP states, translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompass almost 90 percent of all U.S. community hospital discharges in 2006. The SID can be used to investigate questions 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.

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 2005*, located at <http://www.hcup-us.ahrq.gov/reports.jsp>.

For a detailed description of HCUP, the AHRQ Quality Indicators, and how estimates were developed for this Statistical Brief, please refer to the following publications:

AHRQ Quality Indicators—Guide to Patient Safety Indicators, Version 3.1. Online. March 12, 2007. U.S. Agency for Healthcare Research and Quality
http://qualityindicators.ahrq.gov/downloads/psi/psi_guide_v31.pdf

Coffey, R., Barrett, M., Houchens, R., Brady, J., Moy, E., Ho, K., Andrews, R. *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the Sixth (2008) National Healthcare Quality Report*. HCUP Methods Series Report # 2008-05. Online October 23, 2008 (a). U.S. Agency for Healthcare Research and Quality. Available: <http://www.hcup-us.ahrq.gov/reports/methods.jsp>

Coffey, R., Barrett, M., Houchens, R., Ho, K., Moy, E., Brady, J., Andrews, R. *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the Sixth (2008) National Healthcare Disparities Report*. HCUP Methods Series Report # 2008-06. Online October 23, 2008 (b). U.S. Agency for Healthcare Research and Quality. <http://www.hcup-us.ahrq.gov/reports/methods.jsp>

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

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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
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Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

Table 1. Hospitalizations involving potentially avoidable injuries to mothers and newborns during childbirth, 2006

	Total number of discharges	Number of discharges per 1,000 relevant discharges^{a,b}
Childbirth-related injuries		
Birth trauma— <i>injury to newborn</i>	8,877	1.6
Obstetric trauma for mothers— <i>vaginal delivery with instrument</i>	42,033	160.5
Obstetric trauma for mothers— <i>vaginal delivery without instrument</i>	101,494	36.2
Obstetric trauma for mothers— <i>cesarean delivery</i>	5,285	3.9

^a Birth trauma rate is adjusted by gender. Obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity. The rate of obstetric trauma occurring during cesarean delivery is reported as observed, not risk-adjusted.

^b Relevant discharges varies by measure: all live births (*injury to newborn measure*), all instrument-assisted vaginal deliveries (*trauma with instrument measure*), all vaginal deliveries without instrument assistance (*trauma without instrument measure*), and all cesarean deliveries (*trauma during cesarean delivery measure*).

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2006 and AHRQ Quality Indicators, version 3.1.

Table 2. Patient characteristics of potentially avoidable injuries to mothers and newborns during childbirth-related hospitalizations, 2006

	Birth trauma—injury to newborn		Obstetric trauma for mothers—vaginal delivery with instrument		Obstetric trauma for mothers—vaginal delivery without instrument		Obstetric trauma for mothers—cesarean delivery	
	Estimate ^{a,b}	p-value ^c	Estimate ^{a,b}	p-value ^c	Estimate ^{a,b}	p-value ^c	Estimate ^{a,b}	p-value ^c
Total	1.6	---	160.6	---	36.2	---	3.9	---
Gender								
Male ^d	1.7	NA	NA	NA	NA	NA	NA	NA
Female	1.5	0.000	160.6	---	36.2	---	3.9	---
Age group								
15 to 17 years	NA	NA	130.1	0.000	48.0	0.000	3.1	NS
18 to 24 years	NA	NA	133.2	0.000	35.1	0.000	2.8	0.000
25 to 34 years ^d	NA	NA	193.0	---	38.8	---	3.9	---
35 to 54 years	NA	NA	131.7	0.000	25.9	0.000	5.5	0.001
Median community income level								
First quartile (lowest income)	1.6	NS	133.1	0.000	30.5	0.000	3.4	0.008
Second quartile	1.7	NS	149.4	0.000	33.6	0.000	3.7	NS
Third quartile	1.6	NS	169.0	0.000	39.0	0.000	4.0	NS
Fourth quartile (highest income) ^d	1.5	---	191.2	---	44.0	---	4.6	---
Expected payment source								
Private insurance ^d	1.5	---	184.9	---	43.0	---	4.3	---
Medicare	DSU	DSU	157.4	0.026	34.0	0.000	DSU	DSU
Medicaid	1.7	0.002	127.2	0.000	29.1	0.000	3.5	0.043
Uninsured/self-pay/no charge	1.4	NS	167.7	0.000	33.1	0.000	3.8	NS
Race/ethnicity								
White non-Hispanic ^d	1.9	---	162.4	---	39.1	---	4.0	---
Black non-Hispanic	1.5	0.000	108.2	0.000	26.1	0.000	3.7	NS
Hispanic (of any race)	1.4	0.000	130.2	0.000	30.1	0.000	2.9	0.021
Asian and Pacific Islander, non-Hispanic	1.5	0.004	203.3	0.000	57.4	0.000	4.5	NS
Urban-rural location of patient residence								
Large metropolitan (metropolitan area 1 million residents or more) ^d	1.5	---	166.0	---	37.7	---	4.1	---
Small metropolitan (metropolitan area less than 1 million residents)	1.7	0.003	164.7	NS	35.2	0.000	4.0	NS
Micropolitan	1.8	0.001	139.3	0.000	33.2	0.000	2.9	0.021
Non-metropolitan, non-micropolitan	2.0	0.000	131.5	0.000	32.1	0.000	3.8	NS
Region								
Northeast ^d	2.1	---	176.5	---	34.0	---	4.1	---
Midwest	1.6	0.000	179.9	NS	40.3	0.000	4.8	NS
South	1.5	0.000	147.1	0.000	34.9	0.010	3.5	0.000
West	1.4	0.000	153.3	0.000	35.7	0.000	3.8	NS

^a Rate estimates are per 1,000 relevant hospital discharges. Birth trauma rate is adjusted by gender; when reporting by gender, there is no adjustment. Obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity; when reporting by age, there is no adjustment for age. The rate of obstetric trauma occurring during cesarean delivery is reported as observed, not risk-adjusted.

^b Relevant discharges varies by measure: all live births (injury to newborn measure), all instrument-assisted vaginal deliveries (trauma with instrument measure), all vaginal deliveries without instrument assistance (trauma without instrument measure), and all cesarean deliveries (trauma during cesarean delivery measure).

^c Relative to reference group.

^d Reference for *p*-value test statistics.

NA—Not applicable because age subgroups are not relevant for newborns (injury to newborn measure) and there are no obstetrical traumas among males because they occur in mothers only (obstetrical trauma measures).

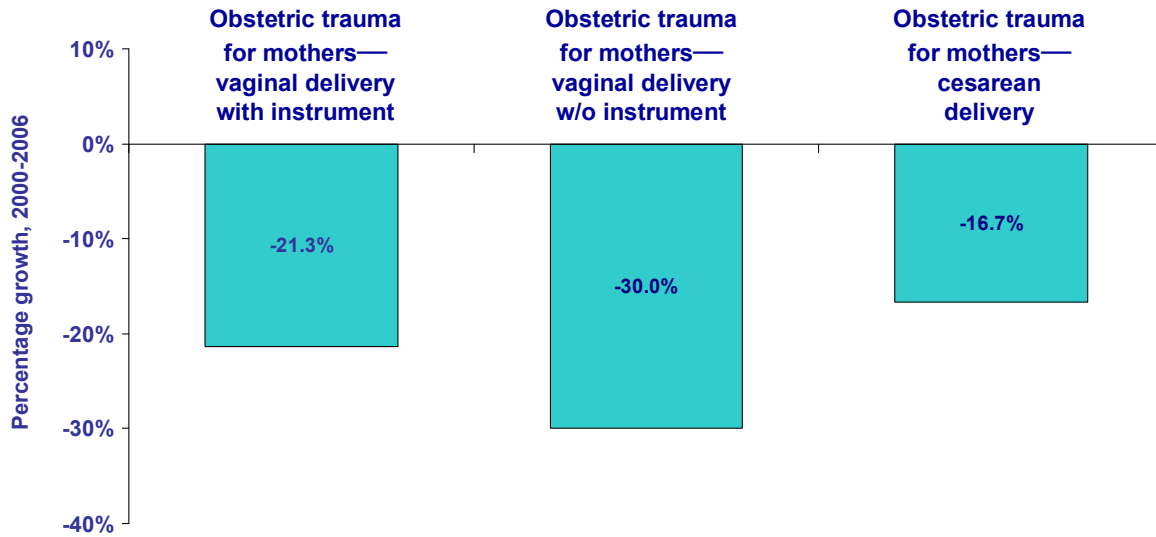
NS—Comparison to reference group is not statistically significant, at the 0.05 level or better.

DSU—Data do not meet the criteria for statistical reliability, data quality, or confidentiality.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project—Nationwide Inpatient Sample, 2006; State Inpatient Databases disparities analysis file, 2006; and AHRQ Quality Indicators, version 3.1. The disparities analysis file is designed to provide national estimates on racial and ethnic disparities for the National Healthcare Disparities Report using weighted records from a sample of hospitals from 25 states.



Figure 1. Rates of potentially avoidable injuries to mothers during childbirth-related hospitalizations have declined, 2000-2006*

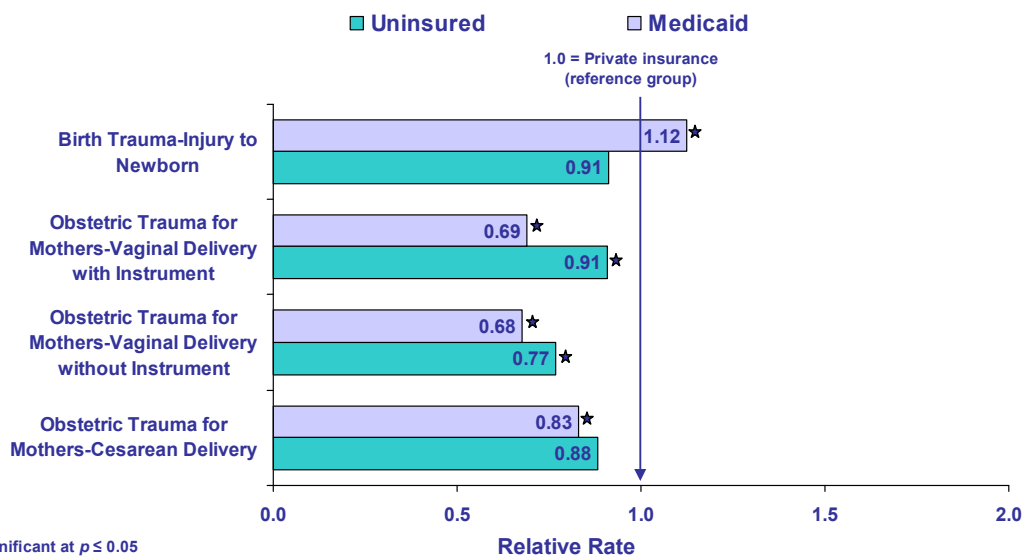


*Obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity. Reliable trend information for birth trauma rates is not available due to coding changes for the indicator between 2003 and 2004.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2006 and AHRQ Quality Indicators, version 3.1.



Figure 2. Rates of potentially avoidable injuries to newborns and mothers during childbirth-related hospitalizations among Medicaid and uninsured patients relative to patients covered by private insurance, 2006*

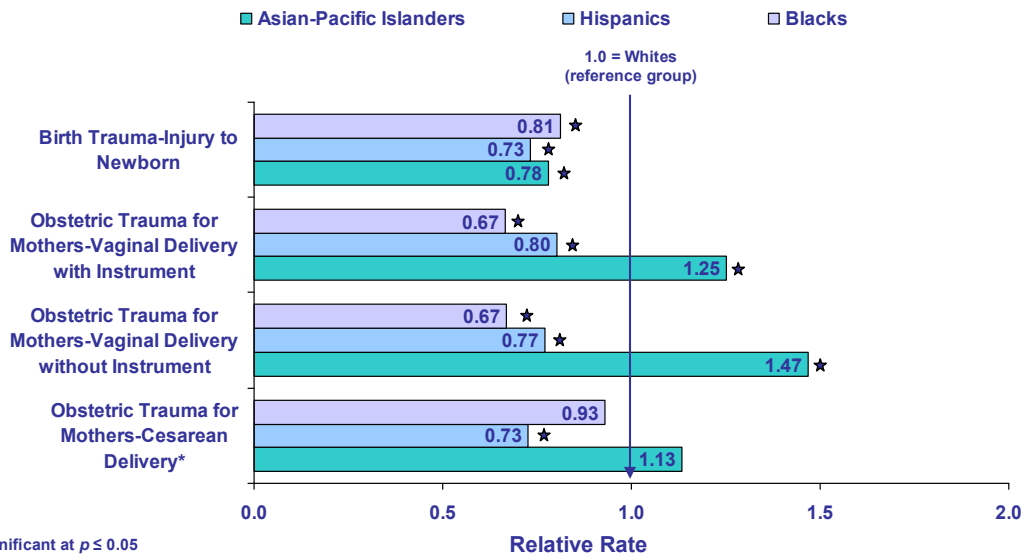


* Birth trauma rate is adjusted by gender; obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project — Nationwide Inpatient Sample, 2006 and AHRQ Quality Indicators, version 3.1.



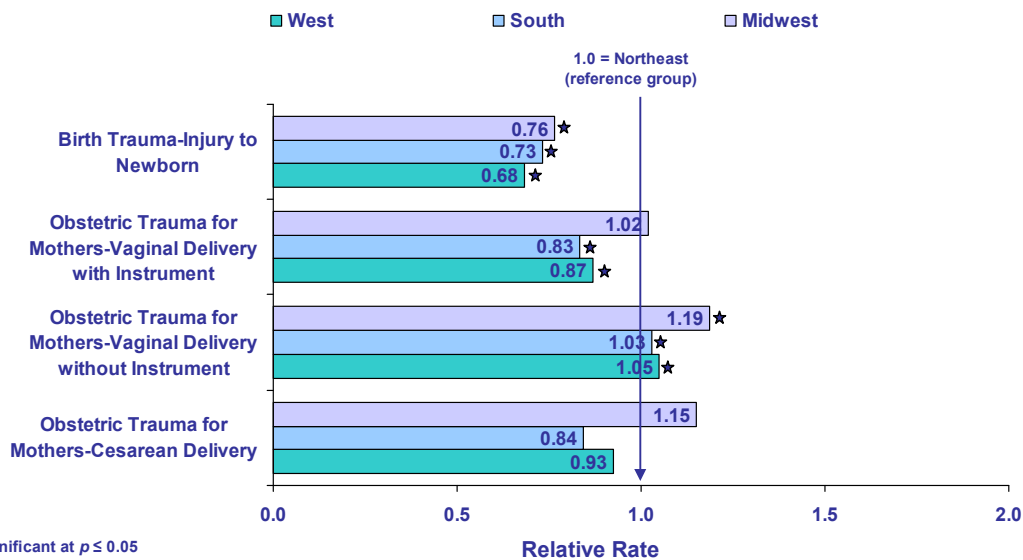
Figure 3. Rates of potentially avoidable injuries to newborns and mothers during childbirth-related hospitalizations among minorities relative to whites, 2006*



* Birth trauma rate is adjusted by gender; obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity. Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, disparities analysis file, 2006. The disparities analysis file is designed to provide national estimates on racial and ethnic disparities for the National Healthcare Disparities Report using weighted records from a sample of hospitals from 25 states.



Figure 4. Rates of potentially avoidable injuries to newborns and mothers during childbirth-related hospitalizations among other regions relative to the Northeast, 2006*



* Birth trauma rate is adjusted by gender; obstetric trauma rates, except cesarean delivery, are adjusted by age and comorbidity. Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project - Nationwide Inpatient Sample, 2006 and AHRQ Quality Indicators, version 3.1.