HEALTHCARE COST AND UTILIZATION PROJECT

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Hospitalizations Related to Childbirth, 2003

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Introduction

In economic and social terms, hospitalizations related to childbirth are an important part of the U.S. health care sector. In 2003, women experienced 4 million childbirths in U.S. community hospitals, making the delivery of infants the most common reason for hospitalization. During a woman's hospital stay for childbirth, several hospital procedures may be performed. The dramatic changes in utilization of certain obstetric procedures, such as Cesarean sections (C-sections), have drawn recent media attention given patient safety and cost concerns.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on childbirths occurring in U.S. community hospitals in 2003. All data are reported from the maternal perspective (i.e., reflecting the experience of the mother, not the newborn). Variations in the utilization and costs associated with childbirth-related hospitalizations are illustrated with a focused look at differences across mode of delivery and payer type. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

In 2003, the 4 million hospitalizations for women giving birth accounted for 11 percent of all stays in U.S. community hospitals. The average charge for these hospitalizations was $8,300, with aggregate annual charges (i.e., the national bill) totaling over $33 billion. Charges varied greatly depending on the mode of delivery (vaginal versus C-section) and the presence of complications. For example, charges for C-sections with complications averaged $15,500, which is 2.5 times the mean charge for uncomplicated vaginal births.

The mean length of stay (LOS) for all deliveries was 2.6 days. The amount of time women remained hospitalized following delivery also varied greatly, ranging from 2.1 days for uncomplicated vaginal deliveries to 4.6 days for C-sections with complications. Table 1 presents utilization, LOS, and charge information for the delivery of infants in U.S. community hospitals by mode of delivery.

Highlights

- In 2003, 4 million hospitalizations for women giving birth accounted for 11 percent of all stays in U.S. community hospitals.
- The average charge for childbirths was $8,300. The aggregate charges (i.e., national bill) for these hospital stays totaled over $33 billion. The average charges associated with uncomplicated C-sections were $11,500, which is more than $5,000 greater than the mean charge for all routine vaginal deliveries.
- The mean length of stay for all deliveries was 2.6 days. The amount of time women remained hospitalized following delivery varied greatly, ranging from 2.1 days for uncomplicated vaginal deliveries to 4.6 days for C-sections with complications.
- Over a quarter of childbirths were delivered via C-section—a 38 percent increase from 1997, when about a fifth of deliveries were performed via C-section.
- Since 1997, the rate of vaginal births after C-section (VBAC) has decreased from 35.3 VBACs per 100 women who had a previous C-section to 13.7 in 2003—a decline of more than 60 percent.
- In 2003, private insurance was billed for more than half of all childbirth-related hospital stays, totaling $17 billion, while 43 percent of the charges ($15 billion) were publicly financed through Medicaid.

Procedures commonly associated with hospital stays for childbirth

In 2003, the most common procedures performed in U.S. hospitals were related to childbirth. The two most frequent procedures overall were those that assisted with delivery of infants and C-sections, representing more than 3 million procedures combined. Other high-volume childbirth-related procedures included repair of current obstetric laceration and fetal monitoring. The high frequency of obstetric procedures was especially evident in the 18–44 age group, in which 44 percent of procedures were related to childbirth. Table 2 lists the procedures commonly associated with hospital stays for childbirth.

Utilization of specific obstetrical procedures: C-sections, vaginal birth after C-section (VBAC), episiotomies, and use of forceps

Of the 4 million childbirths that occurred in U.S. hospitals in 2003, over a quarter were delivered via C-section—a 38 percent increase from 1997, when about a fifth of deliveries were performed via C-section. The portion of C-sections that are "elective" (i.e., before the onset of labor) is on the rise.* The increase in elective C-sections has sparked recent attention, given mother and infant safety and cost concerns. For example, the average charges associated with uncomplicated C-sections were $11,500, which was more than $5,000 greater than the mean charge for all routine vaginal deliveries. A recent NIH State-of-the-Science conference addressed safety and quality concerns regarding Cesarean delivery upon maternal request; more information on this topic is available at http://consensus.nih.gov/2006/2006CesareanSOS027html.htm.

Vaginal birth after C-section (VBAC) is the delivery of a newborn vaginally for a woman who has previously given birth via C-section. In the past, research indicated that many women who underwent a C-section may be able to deliver vaginally safely and inexpensively. However, recent evidence has better quantified the risk of a VBAC compared with a repeat C-section. Although the absolute risk of uterine rupture is small, the perinatal outcomes when this occurs can be poor.† Since 1997, the rate of VBACs has decreased from 35.3 VBACs per 100 women who had a previous C-section to 13.7 in 2003—a decline of more than 60 percent. In contrast, the rate of repeat C-sections increased from 64.7 per 100 women who had a previous C-section to 86.3—an increase of 33 percent. Figure 1 illustrates the decreased rate of VBACs compared with repeat C-sections in 2003 versus 1997.

The rise in the rate of C-sections was accompanied by a simultaneous decrease in two procedures commonly performed in vaginal births: episiotomies and use of forceps. From 1997 to 2003, episiotomies and use of forceps during childbirth decreased by 35 percent and 27 percent, respectively. Figure 2 presents the utilization trends of C-sections, episiotomies, and use of forceps from 1997 to 2003.

Differences by payer

Given the substantial costs associated with childbirth, it is critical to understand how this financial responsibility is distributed across payer types. Table 3 displays the number of hospital stays, average LOS, and charge information for the delivery of infants for each payer type. Private insurers and the Medicaid program were billed for 94 percent of childbirth-related hospitalizations. The remaining 6 percent of charges were billed to Medicare, "other" insurance plans, or uninsured individuals.‡

In 2003, private insurance was billed for more than half of all childbirth-related hospital stays, totaling $17 billion, while 43 percent of the charges ($15 billion) were publicly financed through Medicaid. Of all hospitalizations billed to private insurers and Medicaid, 6 of the top 10 procedures were for pregnancy- and childbirth-related procedures: procedures to assist delivery, circumcision, repair of current obstetric laceration, C-section, fetal monitoring, and artificial rupture of membranes to assist delivery. Deliveries involving C-sections accounted for the highest aggregate charges of all childbirth-related stays—with a national bill of over $14.5 billion. Private insurance was billed for 53 percent of C-section deliveries, while Medicaid was billed for 41 percent.

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*Meikle, S., Steiner, C., Zhang, J., et al. A National Estimate of the Elective Primary Cesarean Delivery Rate. *Obstetrics & Gynecology,* July 2005; 105(4): 751–756.

†Landon, M., Hauth, J., Leveno, K., et al. Maternal and Perinatal Outcomes Associated with a Trial of Labor after Prior Cesarean Delivery. *New England Journal of Medicine,* December 2004; 351(25): 2581–2589.

‡Medicare insures a small number of individuals who are under 65 years of age.

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2003 Nationwide Inpatient Sample (NIS).

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.

Charges
Charges represent what the hospital billed for the case. Hospital charges reflect the amount the hospital charged for the entire hospital stay and do not include professional (MD) fees. For the purposes of this Statistical Brief, charges are rounded to the nearest hundred dollars.

Payer
Up to two payers can be coded for a hospital stay in HCUP data. When this occurs, the following hierarchy was used:

- If either payer is listed as Medicaid, payer is “Medicaid.”
- For non-Medicaid stays, if either payer is listed as Medicare, payer is “Medicare.”
- For stays that are neither Medicaid nor Medicare, if either payer is listed as private insurance, payer is “private insurance.”
- For stays that are not Medicaid, Medicare or private insurance, if either payer is some other third party payer, payer is “other,” which consists of Worker’s Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
- For stays that have no third-party payer and the payer is listed as “self-pay” or “no charge,” the payer is “uninsured.”

Diagnoses, Procedures, ICD-9-CM, Clinical Classifications Software (CCS), and Diagnosis-Related Groups (DRGs)
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. All-listed diagnoses include the principal diagnosis plus these additional secondary conditions.

The principal procedure is the procedure that was performed for definitive treatment rather than one performed for diagnostic or exploratory purposes (i.e., the procedure that was necessary to take care of a complication). If two procedures appear to meet this definition, the procedure most related to the principal diagnosis was selected as the principal procedure. All-listed procedures include all procedures performed during the hospital stay.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 12,000 ICD-9-CM diagnosis codes and over 3,500 ICD-9-CM procedure codes.

CCS categorizes ICD-9-CM diagnoses and procedures into approximately 250 clinically meaningful categories. This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

DRGs comprise a patient classification system that categorizes patients into groups that are clinically coherent and homogeneous with respect to resource use. DRGs group patients according to diagnosis, type of treatment (procedures), age, and other relevant criteria. Each hospital stay has one DRG assigned to it.

The following codes were used to identify childbirth-related diagnoses and procedures:
- Childbirth codes: DRG codes of 370-375.
- C-section code: CCS all-listed procedure code of 134.
- Previous C-section code: CCS all-listed diagnosis code of 189.
- Episiotomy code: CCS all-listed procedure code of 133.
- Use of forceps code: CCS all-listed procedure code of 135.

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 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 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.

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

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

Arizona Department of Health Services
California Office of Statewide Health Planning & Development
Colorado Health & Hospital Association
Connecticut Integrated Health Information (Chime, Inc.)
Florida Agency for Health Care Administration
Georgia GHA: An Association of Hospitals & Health Systems
Hawaii Health Information Corporation
Illinois Health Care Cost Containment Council and Department of Public Health
Indiana Hospital & Health Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Department for Public Health
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 Division of Health Care Financing and Policy, Department of Human Resources
New Hampshire Department of Health & Human Services
New Jersey Department of Health & Senior Services
New York State Department of Health

North Carolina Department of Health and Human Services
Ohio Hospital Association
Oregon Office for Oregon Health Policy and Research and 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 & Family Services

For additional HCUP statistics, visit HCUPnet, our interactive query system at www.hcup.ahrq.gov.

References

For a detailed description of HCUP and 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.

Design of the HCUP Nationwide Inpatient Sample, 2003. Online. June 14, 2005. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS_2003_Design_Report.jsp

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. http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf

Suggested Citation

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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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Rockville, MD 20850

Table 1. Utilization, length of stay, and charge information for the delivery of infants in U.S. community hospitals, by mode of delivery,* 2003

Type of delivery	Number of hospital stays	Mean length of stay	Mean charges	Aggregate charges (national bill)
All types of delivery	4,052,301	2.6	$8,300	$33,794,352,000
Vaginal delivery without complication	2,418,100	2.1	$6,200	$15,086,685,000
Vaginal delivery with complication	328,000	2.7	$8,200	$2,681,654,400
Vaginal delivery with sterilization &/or dilation and curettage (D&C)	132,700	2.3	$10,400	$1,381,470,400
Vaginal delivery with operating room procedure except sterilization and/or D&C	3,200	3.3	$16,000	$50,580,800
C-section without complication	893,400	3.4	$11,500	$10,295,105,300
C-section with complication	277,000	4.6	$15,500	$4,298,856,100

*Hospitalization for childbirth and delivery type identified by DRGs 370-375.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2003.

Table 2. Procedures commonly associated with hospitalizations for childbirth, 2003*

All-listed procedures	Number of hospital stays with this procedure	Percentage of childbirths with this procedure
Medical induction, manually assisted delivery, and other procedures to assist delivery	1,946,500	48.0%
Repair of current obstetric laceration	1,260,600	31.1%
Cesarean section	1,171,400	28.9%
Fetal monitoring	912,500	22.5%
Artificial rupture of membranes to assist delivery	808,400	19.9%
Episiotomy	564,500	13.9%
Forceps, vacuum, and breech delivery	311,900	7.7%
Other therapeutic obstetrical procedures	132,400	3.3%
Removal ectopic pregnancy	20,300	0.5%
Diagnostic amniocentesis	17,400	0.4%

*Hospitalization for childbirth determined by DRGs 370-375.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2003.

Table 3. Utilization, length of stay, and charge information for the delivery of infants in U.S.. community hospitals, by payer type,* 2003

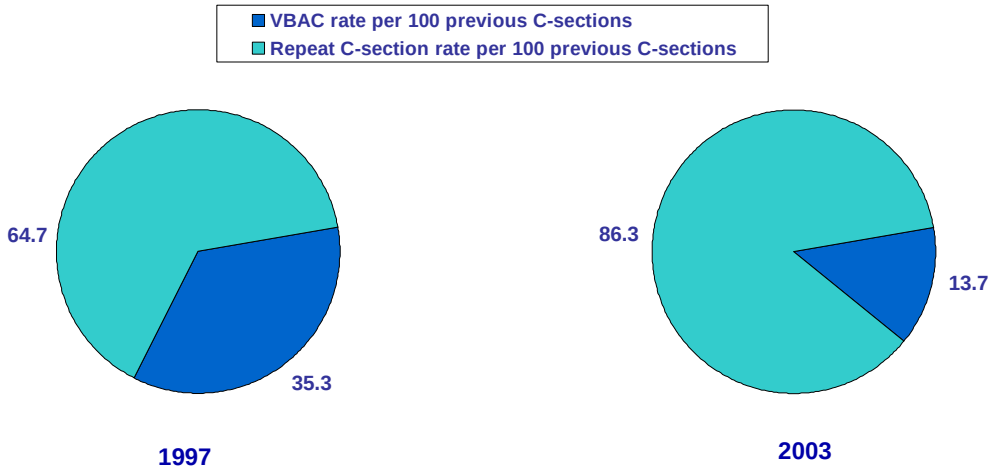
Payer	Number of hospital stays for childbirth	Mean length of stay	Mean charges	Aggregate charges (national bill)
Medicare†	2,205	2.5	6,900	145,530,600
Medicaid	1,670,146	2.5	8,600	14,441,703,400
Private insurance	2,143,671	2.7	8,100	17,378,331,800
Uninsured	127,245	2.4	8,900	1,125,783,300
Other insurance	83,488	2.5	8,000	667,161,200

*Hospitalization for childbirth determined by DRGs 370-375. A small number of hospitalizations are missing corresponding payer data.

†Medicare provides health insurance for a limited number of individuals under the age of 65.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2003.

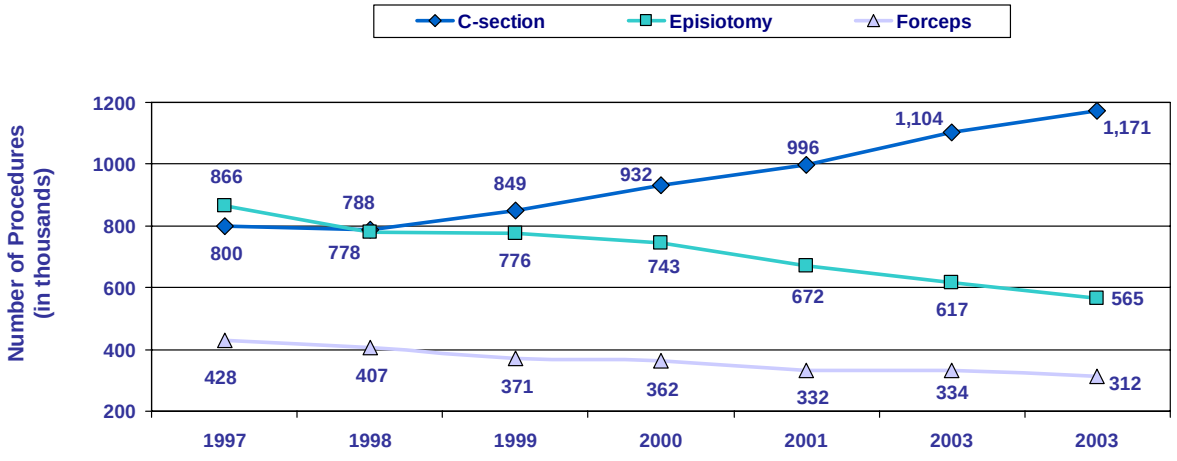
Figure 1. Growing rates of repeat C-sections, 1997–2003*



*Based on all-listed diagnoses and DRGs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1997–2003.

Figure 2. Trend of C-section, episiotomy, and forceps procedures, 1997–2003*



*Based on all-listed diagnoses and DRGs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1997–2003.