

## STATISTICAL BRIEF #32

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# Hospital Admissions That Began in the Emergency Department for Children and Adolescents, 2004

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### Introduction

In 2004, about half of all pediatric hospital stays (excluding births and adolescent pregnancy cases)<sup>1</sup> began in the emergency department (ED). The remaining hospitalizations were either routine in nature (i.e., a scheduled admission) or were transferred from another hospital or facility. Policymakers are concerned that a high percentage of hospitalizations among children and adolescents that begin in the ED might represent limited access to primary care or inadequate health insurance. Understanding ED utilization patterns may provide insight into the accessibility of preventive and ambulatory care among the pediatric population.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on characteristics of hospital admissions that originated in the ED for children under 18 years of age (excluding births and adolescent pregnancies) in 2004. Information is presented by geographic area and expected source of payment. Additionally, pediatric admissions through the ED are compared with similar admissions for adults. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

This brief is the first report of a two-part series on pediatric stays that began in the ED. Information on the most common reasons for pediatric hospitalizations that began in the ED is presented in Statistical Brief #33.<sup>2</sup>

### Findings

In 2004, children and adolescents under 18 years of age accounted for 6.7 million (17.3 percent) of the 38.7 million total hospital stays. Two-thirds of pediatric hospitalizations were related to births and maternal care. Excluding these cases, nearly half of the remaining 2.3 million pediatric stays (1.1 million hospitalizations) were admitted through the ED, a figure similar to adult admissions

### Highlights

- In 2004, about half of the 2.3 million hospitalizations for children and adolescents under 18 years (excluding births and pregnant adolescents) began in the ED.
- Relative to the populations in each region, children and adolescents in the Northeast were more likely to enter the hospital through the ED compared with other regions.
- The government program for low-income persons, Medicaid, bore the greatest burden of hospital admissions through the ED for the pediatric population. Medicaid covered 50.6 percent of such admissions, even though only 26.9 percent of children and adolescents were covered by the program in 2004.
- The mean cost for pediatric hospitalizations that began in the ED was \$5,400, compared with \$8,700 for non-ED admissions.
- The mean cost for hospitalizations that began in the ED was highest in the Northeast (\$6,000) and the West (\$5,700). The average cost in the Midwest and South was about \$5,000 per stay.
- The mean cost for pediatric uninsured hospital stays that began in the ED (\$4,800) was less than the cost of stays billed to Medicaid (\$5,600), but comparable to stays billed to private insurance (\$5,100).

<sup>1</sup>Births include hospital stays for a newborn child. Adolescent pregnancy stays include hospitalizations during which the patient was pregnant or gave birth.

<sup>2</sup>Merrill, C. T. (Thomson Healthcare) and Owens, P. L. (AHRQ). *Reasons for Being Admitted to the Hospital through the Emergency Department for Children and Adolescents, 2004*. HCUP Statistical Brief #33. June 2007. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb33.pdf>.

through the ED (table 1). However, after accounting for population size, children and adolescents experienced a much lower rate of admissions from the ED compared with adults (15.3 stays per 1,000 children versus 68.9 stays per 1,000 adults) (table 2).

Hospital stays for children and adolescents that began in the ED were less expensive and shorter than either routine, non-emergency pediatric stays or adult stays that began in the ED (table 1). Compared with other pediatric stays, hospitalizations for children and adolescents that started in the ED were, on average, \$3,300 less expensive (\$5,400 per stay compared with \$8,700 per stay) and about two days shorter (3.4 days versus 5.3 days). Both types of stays resulted in in-hospital death infrequently (under 1 percent of cases).

Relative to adult stays that began in the ED, comparable pediatric hospitalizations were, on average, \$3,200 less costly (\$5,400 per stay versus \$8,600 per stay), about two days shorter (3.4 days versus 5.2 days), and resulted in death about a tenth as often (0.4 percent versus 3.5 percent) (table 2). The less costly and shorter nature of pediatric stays originating in the ED may be attributable to the types of acute or preventable conditions with which children present at the ED—conditions that might be avoided with adequate primary and/or ambulatory care.<sup>2</sup>

#### *Differences in hospital admissions through the emergency department, by region*

Relative to the populations in each region, children and adolescents in the Northeast were more likely to enter the hospital through the ED (figure 1). The rate of pediatric admissions from the ED was over 50 percent greater in the Northeast (20.0 stays per 1,000 persons under 18) compared with the West and Midwest (about 13 stays per 1,000 persons under 18), and 28.3 percent greater than that of the South (15.6 stays per 1,000 persons under 18). Similarly, the rates for adults were highest in the Northeast and lowest in the West, though adult admission rates through the ED were considerably higher than for children in every region.

#### *Differences in hospital admissions through the emergency department, by payer*

Medicaid (the government insurance program for low-income individuals) and private insurance were billed for over 90 percent of pediatric hospital stays that began in the ED (figure 2). The government bore a heavy burden of hospital admissions through the ED with about half (50.6 percent) of such admissions billed to Medicaid, even though only 26.9 percent of children and adolescents were covered by Medicaid in 2004. Uninsured hospital stays and those covered by private insurance showed the opposite pattern: while 65.6 percent of patients under 18 years of age had some private insurance coverage, private insurance was billed for only 41.0 percent of hospital admissions through the ED. Similarly, 11.2 percent of U.S. children and adolescents were uninsured in 2004, but only 5.2 percent of admissions through the ED were uninsured. These same insurance patterns existed for adult hospital stays that began in the ED.

#### *Costs of hospitalizations from the emergency department, by region and payer*

The mean costs for hospitalizations from the ED were greatest in the Northeast and West and for stays billed to Medicaid (figure 3). The average cost for these stays in the Northeast and West were \$6,000 and \$5,700, respectively, while the mean cost in the Midwest and South was about \$5,000. The average cost of Medicaid stays was about \$500 more per hospitalization than that billed to private insurance (\$5,600 for Medicaid versus \$5,100 for private insurance). The mean cost for uninsured stays (\$4,800) was less than the cost of stays billed to Medicaid but comparable to stays billed to private insurance. Similarly, for the adult population, the average cost of hospitalizations that originated in the ED were greatest in the Northeast and West and for those stays covered by government payers.

## **Data Source**

The estimates in this Statistical Brief are based on data from the HCUP 2004 Nationwide Inpatient Sample (NIS). Supplemental sources included data on regional population estimates from the Estimates of the Resident Population by Single-Year of Age and Sex for the United States and States: July 1, 2005 (SC-EST2005-AGESEX\_RES), Population Estimates Program, U.S. Bureau of the Census, Release date: August 4, 2006 ([http://www.census.gov/popest/states/asrh/files/SC\\_EST2005\\_AGESEX\\_RES.csv](http://www.census.gov/popest/states/asrh/files/SC_EST2005_AGESEX_RES.csv)) and health insurance coverage data from the U.S. Census Bureau, Current Population Reports, P60-229, Table C-2, Health Insurance Coverage by Age: 1987 to 2004; Income, Poverty, and Health Insurance Coverage in the United States: 2004, U.S. Government Printing Office, Washington, D.C. 2005 (<http://www.census.gov/prod/2005pubs/p60-229.pdf>).

## 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.

### *Pediatric, neonatal, and maternal cases*

Definitions of pediatric, birth, and maternal cases are as follows:

- Pediatric cases: hospital stays for individuals under 18 years of age
- Birth cases: hospital stays during which a child is born (identified via diagnosis codes of V3000 to V3901 with the last 2 digits being "00" or "01" in any diagnosis field)
- Maternal cases: hospital stays for females who are pregnant or gave birth (identified via NEOMAT code of "1" or "3")

### *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

### *Payer*

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

- If either payer is listed as Medicaid, the payer is "Medicaid."
- For non-Medicaid stays, if either payer is listed as Medicare, the payer is "Medicare."
- For stays that are neither Medicaid nor Medicare, if either payer is listed as private insurance, the payer is "private insurance."
- For stays that are not Medicaid, Medicare or private insurance, if either payer is some other third-party payer, the 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."

### *Costs and charges*

Total hospital charges were converted to costs using HCUP cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).<sup>3</sup> Costs will tend to reflect the actual costs of production, while charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States. Hospital charges reflect the amount the hospital charged for the entire hospital stay and does not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundreds.

<sup>3</sup>HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2003. U.S. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp>

### *Emergency admission*

Admission source indicates where the patient was located prior to admission to the hospital. Emergency admission indicates the patient was admitted to the hospital through the emergency department.

### **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  
**Arkansas** Department of Health & Human 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** Cabinet for Health and Family Services  
**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  
**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](http://www.hcup.ahrq.gov).

### For More Information

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, 2004*. Online. August 8, 2006. U.S. Agency for Healthcare Research and Quality. [http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS\\_2004\\_Design\\_Report.pdf](http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS_2004_Design_Report.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). U.S. Agency for Healthcare Research and Quality. <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>

### Suggested Citation

Merrill, C. T. (Thomson Healthcare) and Owens, P. L. (AHRQ). *Hospital Admissions That Began in the Emergency Department for Children and Adolescents, 2004*. HCUP Statistical Brief #32. June 2007. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb32.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 [hcp@ahrq.gov](mailto:hcp@ahrq.gov) or send a letter to the address below:

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**Table 1. Pediatric hospitalizations that began in the ED compared with pediatric hospitalizations that did not begin in the ED, 2004\***

	<b>Hospital stays for children and adolescents that began in the ED*</b>	<b>Hospital stays for children and adolescents that did <u>not</u> begin in the ED*</b>
Number of hospital stays (percentage of all pediatric hospital stays)	1,119,213 (49.4%)	1,144,700 (50.6%)
Mean length of stay, days	3.4	5.3
Mean hospital cost	\$5,400	\$8,700
Aggregate costs (percentage of total national cost)	\$6.0 billion	\$9.9 billion
Percent female	44.6%	53.7%
Percentage died in hospital	0.4%	0.7%

\*Pediatric admissions are defined as stays for individuals under 18 years of age and exclude births and maternal cases.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.

**Table 2. Pediatric hospitalizations that began in the ED compared with adult hospitalizations that began in the ED, 2004\***

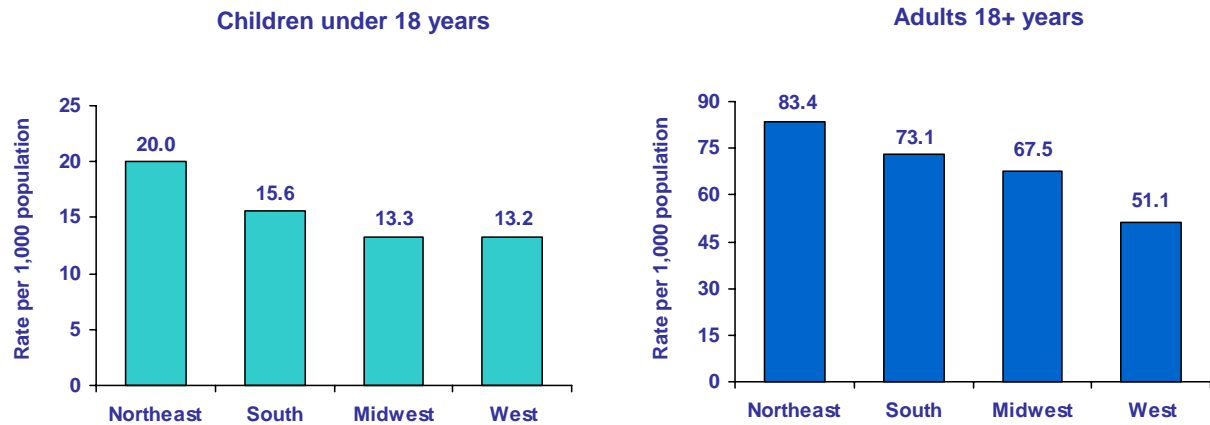
	<b>Hospital stays for children and adolescents that began in the ED*</b>	<b>Hospital stays for adults that began in the ED*</b>
Number of hospital stays (percentage of all hospital stays for each population)	1,119,213 (49.4%)	15,176,300 (55.6%)
Rate of hospital stays per 1,000 persons	15.3	68.9
Mean length of stay, days	3.4	5.2
Mean hospital cost	\$5,400	\$8,600
Aggregate costs (percentage of total national cost)	\$6.0 billion	\$130.9 billion
Percentage died in hospital	0.4%	3.5%

\*Pediatric admissions are defined as stays for individuals under 18 years of age and adult admissions include stays for individuals greater than 17 years of age. Births and maternal cases are excluded.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.



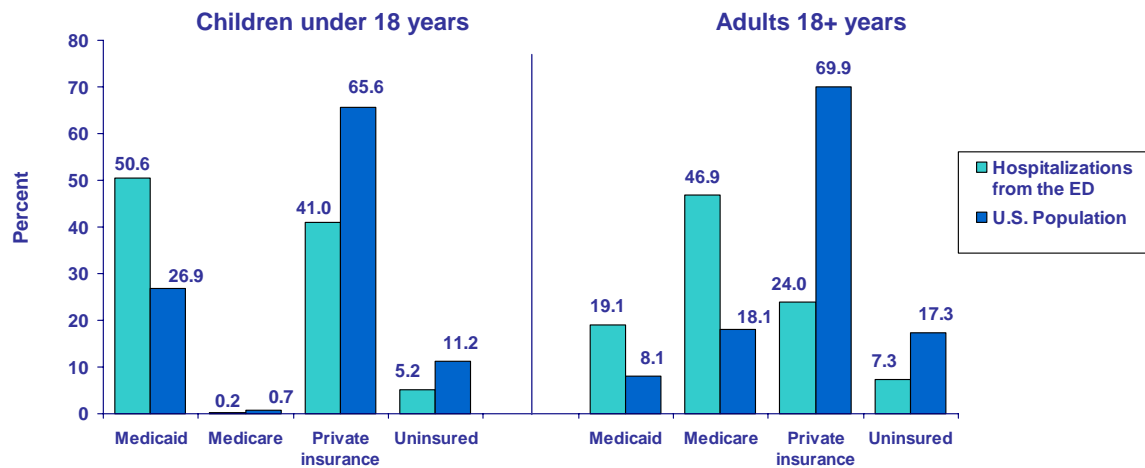
**Figure 1. Rate of hospitalizations that began in the emergency department, by age group and region, 2004**



Sources: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004; U.S. Bureau of the Census, Population Estimates Program, Estimates of the Resident Population by Single-Year of Age and Sex for the United States and States: July 1, 2005 (SC-EST2005-AGESEX\_RES), Release Date: August 4, 2006.



**Figure 2. Distribution of hospitalizations from the emergency department and health insurance coverage, by age group and payer, 2004**



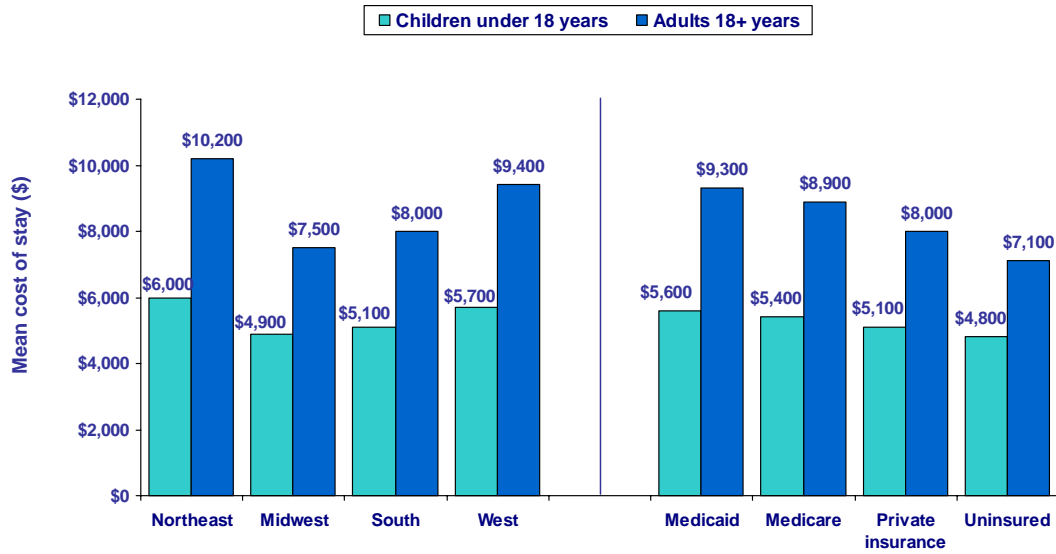
\*A small number of cases not represented on the graph were covered by other types of insurance, such as Workers' Compensation, TRICARE, Title V, and other government programs.

\*\*Percentages for the U.S. population total more than 100 percent because individuals can be enrolled in more than one type of insurance.

Sources: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004; U.S. Census Bureau, Current Population Reports, P60-229, Table C-2, Health Insurance Coverage by Age: 1987 to 2004; *Income, Poverty, and Health Insurance Coverage in the United States: 2004*, U.S. Government Printing Office, Washington, D.C., 2005.



**Figure 3. Costs of hospitalizations that began in the emergency department, by age group, region, and payer, 2004**



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.