HEALTHCARE COST AND UTILIZATION PROJECT

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Reasons for Being Admitted to the Hospital through the Emergency Department for Children and Adolescents, 2004

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Highlights

- Among children and adolescents, respiratory disorders were the most frequent reason for admission to the hospital through the ED, accounting for 27.8 percent of all such admissions.
- Asthma was the single most common reason for hospital stays that began in the ED with over 95,000 hospital admissions (accounting for 8.5 percent of all pediatric admissions through the ED).
- For the youngest children (age 0 to 4), respiratory conditions —mainly acute bronchitis, pneumonia, and asthma— comprised about 40 percent of stays that began in the ED.
- Injuries first treated in the ED that resulted in admission to the hospital increased with age among children and adolescents. About 4 percent of children under 1 were admitted through the ED compared with about 30 percent of 15 to 17 year olds.

Introduction

In 2004, over 1 million children and adolescents entered the hospital through the emergency department (ED), accounting for roughly half of all pediatric hospital stays (excluding births and adolescent pregnancy cases).[1] Understanding the reasons why children and adolescents are admitted to the hospital from the ED can help identify conditions for which emergency utilization potentially could be avoided if adequate primary care were available. Examining admissions through the ED is critical to addressing problems of potential overcrowding in the ED, increased costs associated with emergency care, and problems in quality of and access to primary care.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on the most common reasons for hospitalizations that began in the ED for patients under 18 years of age and compares these pediatric stays with similar stays for adults. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

This brief is the second report of a two-part series on pediatric stays that began in the ED. General information on utilization and cost characteristics of pediatric hospital admissions that began in ED is presented in Statistical Brief #32.[2]

Findings

In 2004, children and adolescents under 18 years of age accounted for 17.3 percent (6.7 million) of the 38.7 million total hospital stays. Two-thirds of pediatric hospitalizations were related to either births or maternal care. Excluding these cases, nearly half of the remaining pediatric stays (1.1 million hospitalizations) were admitted through the ED. Children and adolescents were often seen in the ED and subsequently admitted to the hospital for acute or preventable conditions, such as asthma or injury.

[1] Births include hospital stays for a newborn child. Adolescent pregnancy stays include hospitalizations during which the patient was pregnant or gave birth.

[2] 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

Reasons for admission to the hospital through the ED for children and adolescents
Figure 1 shows the reasons for child and adolescent hospital admissions from the ED compared with adults, organized by body system. Respiratory disorders accounted for 27.8 percent of all pediatric admissions through the ED. Injuries and digestive disorders were the next most common category of conditions, comprising 16.6 percent and 14.2 percent, respectively, of all pediatric admissions through the ED. Endocrine and nervous system conditions each constituted about 7 percent of admissions. Mental health and substance abuse (MHSA) disorders comprised 5.1 percent of pediatric stays that began in the ED.

Table 1 presents the 20 most frequent specific conditions for which children and adolescents were admitted to the hospital through the ED. These 20 conditions accounted for about two-thirds of all pediatric admissions through the ED. Asthma was the single most common condition with over 95,000 admissions (accounting for 8.5 percent of all pediatric admissions through the ED). This was followed by two conditions also related to the respiratory system—pneumonia and acute bronchitis. These top three conditions accounted for nearly one-quarter of all pediatric admissions through the ED. Appendicitis and fluid/electrolyte disorders ranked 4th and 5th with 64,200 and 53,300, respectively, hospital admissions originating from the ED. Other top 20 conditions included mood disorders (ranked 8th), fractures of the leg and arm (ranked 11th and 12th), and brain injury (ranked 13th).

Reasons for admission to the hospital through the ED, by pediatric age groupings
The reasons why children and adolescents were admitted through the ED varied by age group (figure 2 and table 2). For the youngest children (0 to 4 years), respiratory conditions—mainly acute bronchitis, pneumonia, and asthma—comprised about 40 percent of stays that began in the ED. This percentage dropped to 25.6 percent for 5 to 9 year olds and declined even further for 10 to 14 year olds (12.0 percent) and 15 to 17 year olds (7.9 percent).

For children under one year of age, acute bronchitis was the single most common reason for admission accounting for over 1 in 5 admissions from the ED. For 1 to 4 and 5 to 9 year olds, asthma was the most common reason for admission with about 1 in 7 cases admitted through the ED. Asthma admissions from the ED decreased with age. For 10 to 14 year olds asthma accounted for 1 in 15 admissions and represented only 1 in 35 stays for 15 to 17 year olds (data not shown).

In contrast, admissions for injuries cases through the ED increased with age among children and adolescents—from 4.4 percent in children under 1 (data not shown) to 30.1 percent for 15 to 17 year olds. Stays for MHSA conditions that began in the ED also increased with age accounting for less than 1 percent of stays for children 1 to 4 years of age (data not shown) to over 15 percent for 15 to 17 year olds.

R*easons for admission to the hospital through the ED, pediatric stays versus adult stays*
Adults were admitted to the hospital from the ED for different reasons than children and adolescents (table 3). While respiratory conditions were largely responsible for such admissions in the pediatric population, adults were most frequently admitted for circulatory system disorders. Heart-related conditions, such as congestive heart failure, chest pain, hardening of the arteries, heart attack, stroke, and irregular heart beat, accounted for over a quarter (27.2 percent) of all adult stays that began in the ED among adults. This is most likely due to the chronic nature of many circulatory diseases that render them less common in the pediatric population. However, similar to younger patients, conditions of the digestive and respiratory systems, and injuries, accounted for a large portion of stays that originated in the ED among adults. One specific condition that was common in both adult and pediatric stays that began in the ED was pneumonia, which accounted for 5.2 percent of adults stays and 7.4 percent of pediatric stays.

Data Source

The estimates in this Statistical Brief are based on data from the HCUP 2004 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.

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”)

Diagnoses, ICD-9-CM, and Clinical Classifications Software (CCS)
The principal diagnosis is that condition established after study to be chiefly responsible for the patient’s admission to the hospital. Secondary diagnoses are concomitant conditions that coexist at the time of admission or that develop during the stay.

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

CCS categorizes ICD-9-CM diagnoses into 260 clinically meaningful categories.[3] This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

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:

[3]HCUP Clinical Classifications Software (CCS). Healthcare Cost and Utilization Project (HCUP). August 2006. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp

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.

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

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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Table 1. Top 20 most common reasons for admission to the ED for children and adolescents, 2004*

Rank	Condition (CCS code)	Number of admissions through the ED	Percentage of all admissions through the ED
1	Asthma	95,400	8.5
2	Pneumonia	83,200	7.4
3	Acute bronchitis	75,900	6.8
4	Appendicitis	64,200	5.7
5	Fluid and electrolyte disorders	53,300	4.8
6	Epilepsy, convulsions	35,100	3.1
7	Urinary tract infections	31,500	2.8
8	Mood disorders (depression and bipolar disorder)	29,000	2.6
9	Intestinal infection	27,200	2.4
10	Skin and subcutaneous tissue infections	27,100	2.4
11	Fracture of leg	24,600	2.2
12	Fracture of arm	24,400	2.2
13	Brain injury	23,600	2.1
14	Other infections of upper respiratory tract (nose, throat, trachea)	23,500	2.1
15	Other conditions occurring around the time of birth	22,600	2.0
16	Viral infections	22,100	2.0
17	Meningitis	20,800	1.8
18	Inflammation of stomach and intestines (noninfectious gastroenteritis)	20,300	1.8
19	Fever of unknown origin	18,400	1.6
20	Diabetes mellitus with complications	15,800	1.4
Top 20 most frequent conditions admitted through the ED		738,000	65.9%
All other conditions admitted through the ED		381,200	34.1%
Total admissions through the ED for children and adolescents		1,119,200	100%

*Includes individuals under 18 years of age and excludes births and maternal cases.

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

Table 2. Top five specific conditions that resulted in admission to the hospital from the ED for children and adolescents, by age group, 2004*

Age Groups									
Under 1 year		1-4 years		5-9 years		10-14 years		15-17 years	
Condition (CCS Code)	Number of admissions through the ED (percent)	Condition (CCS Code)	Number of admissions through the ED (percent)	Condition (CCS Code)	Number of admissions through the ED (percent)	Condition (CCS Code)	Number of admissions through the ED (percent)	Condition (CCS Code)	Number of admissions through the ED (percent)
Acute bronchitis	57,900 (21.4)	Asthma	44,000 (15.1%)	Asthma	24,800 (13.7%)	Appendicitis	27,000 (14.0%)	Appendicitis	17,300 (9.4%)
Other conditions occurring around the time of birth	22,500 (8.3)	Pneumonia	39,600 (13.6%)	Appendicitis	16,800 (9.3%)	Asthma	13,100 (6.8%)	Mood disorders (depression and bipolar disorder)	15,100 (8.2%)
Pneumonia	21,600 (8.0)	Fluid and electrolyte disorders	29,000 (10.0%)	Pneumonia	13,800 (7.6%)	Mood disorders (depression and bipolar disorder)	11,700 (6.1%)	Brain injury	7,900 (4.3%)
Urinary tract infections	14,200 (5.2)	Acute bronchitis	16,700 (5.7%)	Fracture of arm	9,500 (5.2%)	Fracture of leg	8,300 (4.3%)	Fracture of leg	7,300 (4.0%)
Fluid and electrolyte disorders	12,600 (4.7)	Epilepsy, convulsions	15,400 (5.3%)	Fluid and electrolyte disorders	7,100 (3.9%)	Diabetes mellitus with complications	6,700 (3.5%)	Poisoning by other medi-cations and drugs	7,000 (3.8%)

*Includes individuals under 18 years of age and excludes births and maternal cases.

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

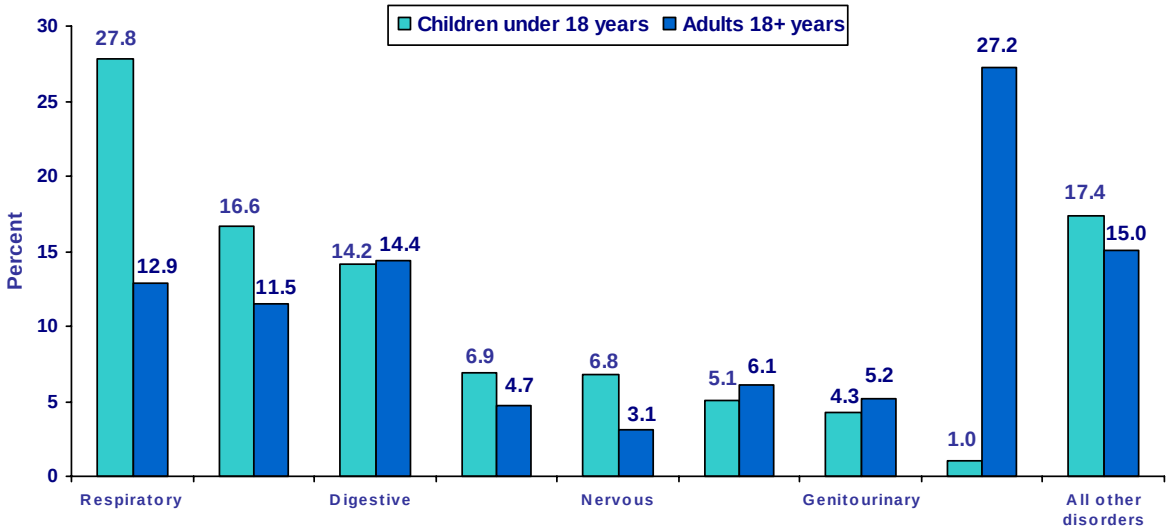
Table 3. Top 20 most common reasons for admission to the ED for adults, 2004*

Rank	Condition (CCS code)	Number of admissions through the ED	Percentage of all cases admitted through the ED
1	Congestive heart failure	787,100	5.2
2	Pneumonia	785,700	5.2
3	Chest pain	685,900	4.5
4	Hardening of the heart arteries and other heart disease	482,900	3.2
5	Heart attack (acute myocardial infarction)	446,000	2.9
6	Stroke (acute cerebrovascular disease)	423,400	2.8
7	Irregular heart beat (cardiac dysrhythmias)	421,700	2.8
8	Chronic obstructive lung disease	391,900	2.6
9	Urinary tract infection	343,700	2.3
10	Septicemia	330,600	2.2
11	Mood disorders (depression and bipolar disorder)	316,600	2.1
12	Diabetes mellitus with complications	315,400	2.1
13	Fluid and electrolyte disorders	310,600	2.1
14	Skin and subcutaneous tissue infections	290,400	1.9
15	Gall bladder disease	268,300	1.8
16	Gastrointestinal hemorrhage	252,100	1.7
17	Hip fracture	240,700	1.6
18	Pancreatic disorders	221,400	1.5
19	Intestinal obstruction without hernia	220,000	1.5
20	Fainting	217,800	1.4
Top 20 most frequent conditions admitted through the ED		7,752,200	51.1%
All other conditions admitted through the ED		7,424,100	48.9%
Total admissions through the ED for adults		15,176,300	100%

*Includes individuals over 17 years of age and excludes maternal cases.

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

Figure 1. Reasons for hospitalizations admitted through the emergency department, by body system and age group, 2004*

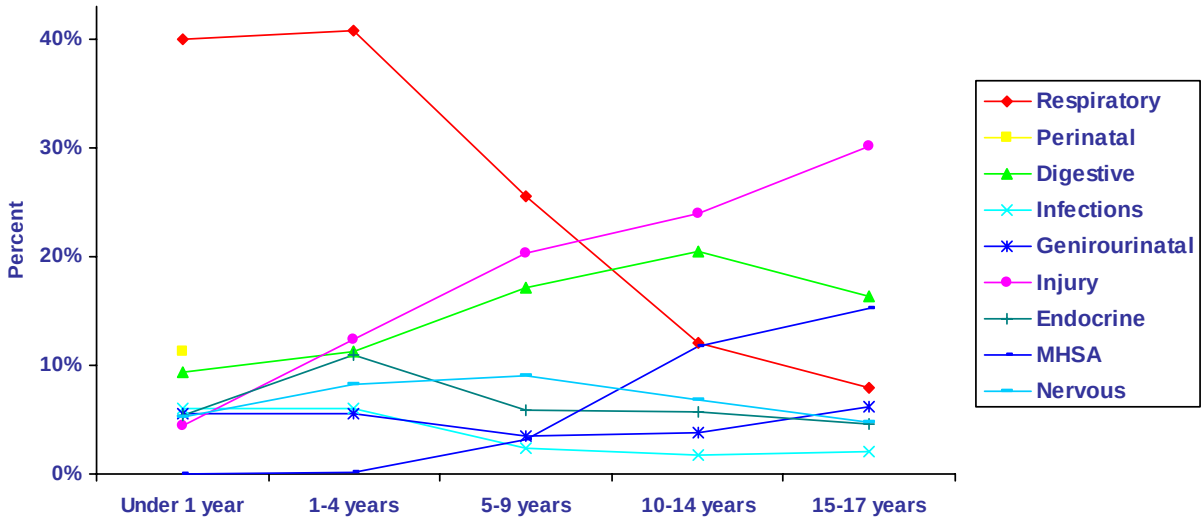


*Based on principal diagnosis; excludes births and maternal cases.

Note: All other disorders include: infections, perinatal conditions, skin disorders, blood disorders, congenital disorders, musculoskeletal disorders, and neoplasms.

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

Figure 2. Reasons for hospitalizations admitted through the emergency department, by body system and pediatric age group, 2004*



*Based on principal diagnosis; excludes births and maternal cases.

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