HEALTHCARE COST AND UTILIZATION PROJECT

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Frequency and Costs of Hospital Admissions for Injury, 2004

Pamela L. Owens, Ph.D., C. Allison Russo, M.P.H., and Carol Stocks, R.N., M.H.S.A.

Introduction

Injuries have a substantial effect on the physical, emotional, and financial health of millions of Americans. They also have a significant impact on the health care system, accounting for over one-third of all emergency department visits and accumulating over $80 billion per year in direct medical care costs (i.e., the costs of hospital care, outpatient clinic care, rehabilitation, etc.).[1] Injuries include conditions such as fractures, dislocations, open wounds, sprains and strains, burns, head injuries, and spinal cord injuries.

This Statistical Brief focuses on some of the most severe injuries—those that result in hospitalization. Specifically, utilization and cost data from the Healthcare Cost and Utilization Project (HCUP) are examined for patients admitted primarily for injury in 2004.[2] The frequency and cost of these hospital stays are compared with those for all other conditions by age group and primary source of payment. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

In 2004, nearly 5 percent of all hospital admissions—about 1.9 million hospitalizations—were for the treatment of an injury. These stays accrued almost $19.5 billion in hospital costs, accounting for 6.6 percent of the total cost of hospital care in the United States.

General characteristics of hospital stays for injuries

Table 1 demonstrates that, compared to stays for other conditions in 2004, stays for injuries generated greater costs, originated in the emergency department (ED) more often, and resulted in more in-hospital deaths. The average cost per hospital stay specifically for the treatment of an injury was $2,800 more than the average cost for hospital stays for all other conditions ($10,300 and $7,500, respectively). Even when adjusted for length of stay, the average cost per day remained about $500 higher for injury-related hospitalizations. Moreover, 77.9 percent of all hospital stays for injury originated in the ED, while 41.7 percent of hospitalizations for all

Highlights

- In 2004, injuries accounted for approximately 1.9 million hospitalizations, representing nearly 5 percent of all hospital stays in the United States. Hospital costs for these injuries totaled $19.5 billion.
- Hospital stays for injuries were more costly, more likely to originate in the emergency department, and resulted in a higher in-hospital mortality rate than hospital stays for all other conditions.
- People age 65 and older made up a disproportionate share of hospital stays for injuries, accounting for 36.9 percent of all injury hospital stays but comprising only 12.4 percent of the population.
- In 2004, 12.2 percent of injury stays were uninsured, while only 5.0 percent of all non-injury related stays were uninsured.
- Mean hospital costs for injuries were highest among patients ages 45 to 64 ($11,100) and those patients covered by Medicaid ($11,200).

[1] National Center for Injury Prevention and Control. *CDC Acute Injury Care Research Agenda: Guiding Research for the Future.* Online. May, 2005. Centers for Disease Control and Prevention. http://www.cdc.gov/ncipc/dir/ACRAgenda.pdf (Accessed October 19, 2006)

[2] The definition of injury used in this statistical brief is consistent with the State and Territorial Injury Prevention Directors Association's (STIPDA) *Consensus Recommendations for Using Hospital Discharge Data for Injury Surveillance.* http://stipda.org/associations/5805/files/hdd.pdf (Accessed October 31, 2006)

other conditions began in the ED. Differences also emerge when considering the topic of in-hospital mortality: 2.4 percent of patients admitted to the hospital for an injury died in the hospital, which is significantly higher than the average in-hospital death rate of 2.1 percent for all other conditions.

Hospital stays for injuries, by age
The distribution of hospital stays for injury varied by age (figure 1). People age 65 and older made up disproportionately more hospital stays for injury, while youth less than 18 accounted for disproportionately fewer hospital stays for injury. In 2004, adults ages 65 and older accounted for the most hospital stays for injury (36.9 percent), but comprised only 12.4 percent of the population. In contrast, youth less than 18 accounted for the fewest injury hospital stays (11.2 percent), while representing 24.9 percent of the population. Adults ages 18 to 44 accounted for 31.4 percent of injury stays, and adults ages 45 to 64 accounted for 20.5 percent of injury stays.

Hospital stays for injuries, by primary payer
In 2004, 12.2 percent of injury stays were uninsured, while only 5.0 percent of all non-injury related stays were uninsured (figure 2). Moreover, compared to Medicaid and private insurance, Medicare was the primary payer for a disproportionate share of hospital stays for injury. While 36.7 percent of injury hospitalizations were billed to Medicare in 2004, only 13.7 percent of the population was covered by Medicare. In contrast, only 32.6 percent of injury stays were billed to private insurance, even though 68.1 percent of the population was covered by private insurance. Medicaid was billed for 11.6 percent of injury hospitalizations, which was comparable to the percentage of the population covered by Medicaid (12.9 percent).

Hospital costs for injuries, by age and primary payer
The mean hospital costs specifically for the treatment of an injury varied by age and payer (figure 3), with the most expensive injury stays being for patients ages 45 to 64 ($11,100) and those with Medicaid ($11,200). Injury stays for patients under age 18 were the least expensive ($7,600), costing $3,500 less than injury stays for patients ages 45 to 64. Injury stays billed to private insurance were slightly less than Medicaid ($400), while those billed to Medicare were $1,400 less than those billed to Medicaid. Injury stays for uninsured patients were the least expensive ($8,800), nearly $2,400 less than the hospital costs to Medicaid.

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 insurance coverage estimates from Table HI05: Health Insurance Coverage Status and Type of Coverage by State and Age for All People: 2005, 2006 Annual Social and Economic Supplement, Current Population Survey, U.S. Census Bureau, Release date: August 29, 2006 (http://pubdb3.census.gov/macro/032006/health/h05_000.htm). Other sources included data on age group population estimates from Table 1: Annual Estimates of the Population by Sex and Five-Year Age Groups for the United States: April 1, 2000 to July 1, 2005 (NC-EST2005-01), Release Date: May 10, 2006 (http://www.census.gov/popest/national/asrh/NC-EST2005/NC-EST2005-01.xls).

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.

Diagnoses and ICD-9-CM
The principal diagnosis is that condition established after study to be chiefly responsible for the patient's admission to the hospital.

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.

For this Statistical Brief, injuries were defined in a manner consistent with the State and Territorial Injury Prevention Directors Association's (STIPDA) *Consensus Recommendations for Using Hospital Discharge Data for Injury Surveillance.*[3] Records with a principal ICD-9-CM diagnosis code in the range of 800–909.2, 909.4, 909.9, 910–994.9, 995.5–995.59, and 995.80–995.85 were identified as injury hospitalizations. Although not used in this brief, there are other common definitions of injury developed by various sources, such as the American College of Surgeons' National Trauma Data Bank (http://www.facs.org/trauma/ntdb.html) and the National Center for Health Statistics' Web report from the National Hospital Discharge Survey (http://www.cdc.gov/nchs/data/ad/ad371.pdf).

Costs and charges
Total hospital charges were converted to costs using cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).[4] 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.

Emergency department as source of admission
Emergency admission indicates the patient was admitted to the hospital through the emergency department.

Primary payer
Each hospitalization and its related hospital bill are attributed to the payer who was expected by the hospital to pay the major portion of the bill (i.e., the expected primary payer). The expected primary source of payment at admission may not be the ultimate primary payer. To make coding uniform across all HCUP data sources, the payer variable combines detailed payers into more general groups:
– Medicaid includes fee-for-service and managed care Medicaid patients.
– Medicare includes fee-for-service and managed care Medicare patients.
– Private insurance includes Blue Cross, commercial carriers, and private HMOs and PPOs.
– Other includes Workers' Compensation, TRICARE/VA, Title V, and other government programs.
– Uninsured includes an insurance status of "self-pay" and "no charge."

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 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-

[3]Injury Surveillance Workgroup. Consensus Recommendations for Using Hospital Discharge Data for Injury Surveillance. Online. 2003. State and Territorial Injury Prevention Directors Association. http://stipda.org/associations/5805/files/hdd.pdf (Accessed October 31, 2006)

[4]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. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp

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.

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, 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:

Irene Fraser, Ph.D., Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

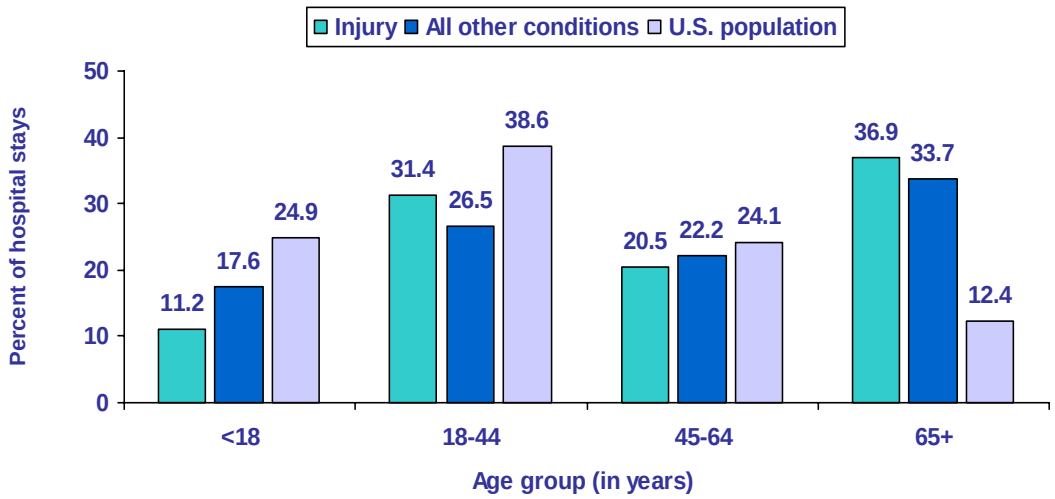
Table 1. Hospitalizations for injury compared to hospitalizations for all other conditions, 2004*

	Hospital stays for injury	All other hospital stays
Number of hospital stays (percentage of all hospital stays)	1,896,600 (4.9%)	36,765,200 (95.1%)
Aggregate costs (percentage of total national costs)	$19.5 billion (6.6%)	$275.3 billion (93.4%)
Mean hospital cost	$10,300	$7,500
Mean hospital cost per day	$2,100	$1,600
Mean length of stay, days	4.8	4.6
Percentage admitted through the emergency department	77.9%	41.7%
Percentage died in hospital	2.4%	2.1%

*Based on principal diagnosis.

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

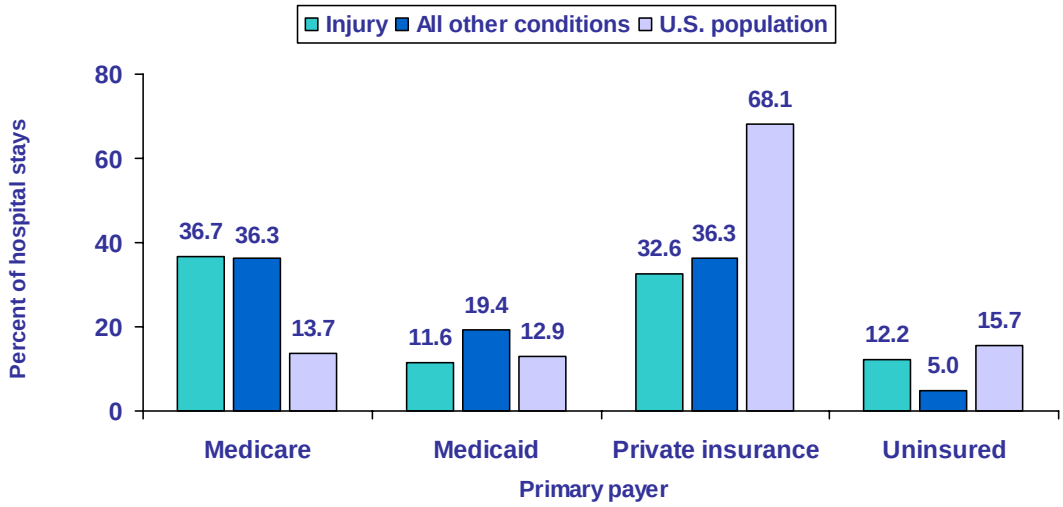
Figure 1. Distribution of hospital stays for injuries compared to all other conditions, by age group, 2004*



*Based on principal diagnosis.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004; U.S. Census Bureau, Population Division, Table 1: Annual Estimates of the Population by Sex and Five-Year Age Groups for the United States: April 1, 2000 to July 1, 2005 (NC-EST2005-01), Release Date: May 10, 2006.

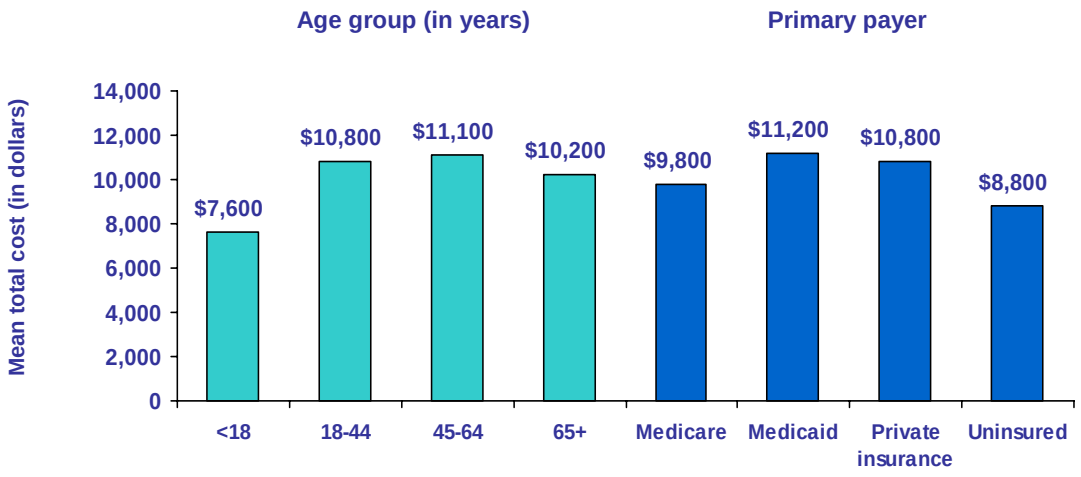
Figure 2. Distribution of hospital stays for injuries compared to all other conditions, by primary payer, 2004*



*Based on principal diagnosis.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004; Table HI05: Health Insurance Coverage Status and Type of Coverage by State and Age for All People: 2005, 2006 Annual Social and Economic Supplement, Current Population Survey, U.S. Census Bureau, Release date: August 29, 2006 .

Figure 3. Mean hospital costs for injuries, by age and primary payer, 2004*



*Based on principal diagnosis.

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