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Diagnostic Groups with Rapidly Increasing Costs, by Payer, 2001–2007

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Introduction

Inpatient care comprises the largest portion of health care spending in the United States.[1] As health care costs continue to rise and the population ages, policy makers are increasingly concerned about the growing burden of hospital-based medical care expenses on the government, tax payers, consumers, and employers. Identifying the conditions that generate the most rapid increases in hospital costs can inform the discussion of medical care costs.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) and identifies which ten conditions generated the most rapidly increasing hospital costs between 2001 and 2007. Hospital costs tend to reflect the actual costs of production (excluding physician expenses). Information is presented for four payer groups: Medicare, Medicaid, private insurance, and self-pay (uninsured). All differences between estimates provided in the text are statistically significant at the 0.05 level or better. Costs for 2001 were adjusted to 2007 dollars using the overall Consumer Price Index (CPI).

Findings

During the seven-year period from 2001 to 2007, inflation-adjusted hospital costs grew by 24.6 percent to $343 billion (table 1). From 2001 to 2007, there was a 17.2 percent rise in mean costs per stay and a 6.3 percent increase in the number of hospital discharges. Increases varied by payer and stemmed from changes in inpatient costs and hospitalization rates. For example, although discharges incurred for private insurance demonstrated the largest increase in mean cost per stay (20.8 percent), there was a decline in the number of stays incurred for private insurance (2.9 percent). In contrast, the average cost per hospitalization incurred for Medicaid and the uninsured grew relatively slowly (about 14 percent), but it was coupled with dramatic growth in the number of total hospital stays (20.1 and 29.9 percent, respectively).

Highlights

- From 2001 to 2007, inflation-adjusted hospital costs grew by 24.6 percent to $343 billion. There was a 17.2 percent rise in mean costs per stay and a 6.3 percent increase in the number of hospital discharges; however, not all payers experienced these increases equally.
- Although discharges incurred for private insurance demonstrated the largest increase in mean cost per stay (20.8 percent), there was a decline in the number of stays incurred for private insurance (2.9 percent). In contrast, while the average cost per hospitalization incurred for Medicaid and the uninsured grew more slowly (about 14 percent), it was coupled with dramatic growth in the number of total hospital stays (20.1 and 29.9 percent, respectively).
- Among the ten conditions with the most rapidly increasing hospital inpatient costs, blood infection demonstrated the largest growth in aggregate costs (174.1 percent) and the highest aggregate cost ($12.3 billion in 2007).
- For seven of the top ten conditions with rapidly growing costs, the growth in aggregate costs for stays incurred for uninsured more than doubled from 2001 to 2007 (105.6 to 228.1 percent increase).
- Degenerative joint disease was the most expensive condition among the top growers incurred for private insurance in 2007 ($4.6 billion); total hospitalization costs for this condition more than doubled from 2001 to 2007.

[1] Hartman M, Martin A, McDonnell P, Catlin A. *National Health Spending in 2007: Slower Drug Spending Contributes to Lowest Rate of Overall Growth Since 1998*. Health Affairs. 28(1): 246–261, January 2009.

Hospital stays for common conditions with the most rapidly increasing hospital inpatient costs
The top ten principal conditions that generated the most rapid increases in total hospital costs from 2001 to 2007 are shown in table 2. The aggregate costs of stays for these ten conditions ($48.6 billion) accounted for 14.2 percent of the costs of all hospitalizations in 2007. Of note, several chronic conditions with high aggregate costs and frequent hospitalization—including heart disease, cancer, stroke, and diabetes,—were not among the top 10 conditions with the most increases in total aggregate costs.

The overall aggregate costs for the ten conditions grew by 104.5 percent between 2001 and 2007. Among the ten conditions with the most rapidly increasing hospital inpatient costs, blood infection demonstrated the largest growth in aggregate costs (174.1 percent) and the highest aggregate cost ($12.3 billion in 2007). From 2001 to 2007, the number of stays with a principal diagnosis of blood infection nearly doubled (97.1 percent; 675,400 stays in 2007). Total costs for hospitalizations due to intestinal infection and acute kidney failure increased similarly (148 percent), but the number of stays for these two conditions differed; stays for intestinal infection grew by 69.5 percent and those for acute kidney failure grew 177.6 percent.

Among the ten conditions with the most rapidly increasing hospital costs, degenerative joint disease (osteoarthritis) accounted for the greatest number of stays (814,900) and the second highest aggregate costs ($11.8 billion) in 2007.

Hospital stays for conditions with the most rapidly increasing hospital inpatient costs, by payer
Table 3 presents the 2001 to 2007 growth in number of stays and total costs for the top ten conditions by payer.

Across all payers, total aggregate costs more than doubled for stays due to blood infection and acute kidney failure. Total costs for stays due to intestinal infection also experienced rapid growth, particularly for Medicare-covered patients (204.7 percent). The number of stays for intestinal infection incurred for Medicare grew dramatically (142.2 percent) compared to growth in the number of uninsured, Medicaid-covered, or privately insured stays for intestinal infection. Degenerative joint disease was the most expensive condition incurred for private insurance ($4.6 billion) with a 120.3 percent increase in total costs for this condition from 2001 to 2007.

For seven of the top ten conditions, the growth in aggregate costs for stays incurred for uninsured more than doubled from 2001 to 2007 (range: 105.6 to 228.1 percent increase). The total costs for uninsured stays with a principal diagnosis of kidney failure increased 179.2 percent to $133.3 million in 2007. Relative to other payers, uninsured stays accounted for the smallest proportion of total aggregate costs for each of the top ten conditions. For four of the top ten conditions—blood infection, acute kidney failure, respiratory insufficiency, arrest, or failure, and skin and subcutaneous skin infections—the uninsured demonstrated greater increases in growth in total costs and number of hospital stays than the other three payer groups.

Payer differences in demographic mix and service coverage are evident for several of the top ten conditions with the most rapidly increasing hospital costs. For example, more than half of the total costs for five of the top ten conditions with the most rapidly increasing hospital costs was for Medicare patients: acute kidney failure (67.8 percent), blood infection (65.2 percent), respiratory insufficiency, arrest, or failure (62.6 percent), intestinal infection (60.6 percent), and degenerative joint disease (55.1 percent). Degenerative joint disease, which typically becomes more common and debilitating with age, generated the second highest amount of cost for Medicare ($6.5 billion) in 2007.

Private insurance was the primary expected payer for approximately half of all stays with a principal diagnosis of previous C-section (51.3 percent) and demonstrated a 55.7 percent growth in total costs for this diagnosis from 2001 to 2007. Medicaid was the primary expected payer for 41.4 percent of previous C-section stays and demonstrated a 95.1 percent growth in total costs for this diagnosis.

Figure 1 shows the percentage contribution to growth in total costs for conditions with the most rapidly increasing hospital inpatient costs from 2001 to 2007 by payer. Growth in costs incurred for Medicare contributed to more than half (55 percent) of the $24.8 billion increase in total costs for the top ten conditions across all payers. Figure 2 shows that the growth in stays incurred for Medicare accounted for

about half of the combined growth in total stays for these conditions with rapidly growing costs (1.7 million stays).

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP Nationwide Inpatient Sample (NIS), 2001 and 2007.

Definitions

Procedures and Clinical Classifications Software (CCS)
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.

CCS categorizes procedure codes into clinically meaningful categories.[2] This "clinical grouper" makes it easier to quickly understand patterns of procedure use.

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.

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).[3] 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.

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.

[2] HCUP CCS. Healthcare Cost and Utilization Project (HCUP). June 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp
[3] HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2007. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp

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
Louisiana Department of Health and Hospitals
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 Mexico Health Policy Commission
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
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 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.

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 2007*, located at http://www.hcup-us.ahrq.gov/reports.jsp.

For a detailed description of HCUP, 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.

Introduction to the HCUP Nationwide Inpatient Sample, 2007. Online. June 16, 2009. U.S. Agency for Healthcare Research and Quality.
http://www.hcup-us.ahrq.gov/db/nation/nis/NIS_2007_INTRODUCTION.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

Houchens R.L., Elixhauser A. *Using the HCUP Nationwide Inpatient Sample to Estimate Trends. (Updated for 1988–2004)*. HCUP Methods Series Report #2006-05 Online. August 18, 2006. U.S. Agency for Healthcare Research and Quality.
http://www.hcup-us.ahrq.gov/reports/2006_05_NISTrendsReport_1988-2004.pdf

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http://www.hcup-us.ahrq.gov/reports/statbriefs/sb91.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 hcup@ahrq.gov or send a letter to the address below:

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Rockville, MD 20850

Table 1. Change in hospital stays and costs by payer, 2001–2007

Primary Expected Payer	Total costs (2007)	Mean cost per stay (2007)	Total hospital stays (2007)	Percentage change in:		
				Total costs (2001–2007)*	Mean cost per stay (2001–2007)	Total hospital stays (2001–2007)
Medicare	$155,863,779,000	$10,838	14,381,700	22.5	16.9	4.8
Medicaid	$50,415,753,000	$6,579	7,663,000	37.1	14.1	20.1
Private insurance	$107,484,034,000	$7,834	13,719,700	17.3	20.8	-2.9
Uninsured	$16,481,474,000	$7,134	2,310,200	48.5	14.3	29.9
Total (All Payers)	**$343,313,877,000**	**$8,682**	**39,542,000**	**24.6%**	**17.2%**	**6.3%**

*2001 costs were adjusted to 2007 dollars using the overall Consumer Price Index.

There are an additional 1.4 million discharges with “other” as the primary expected payer. "Other" payer includes Workers' Compensation, TRICARE, CHAMPUS, CHAMPVA, Title V, and other government programs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2001 and 2007

Table 2. Common conditions with the most rapidly increasing hospital inpatient costs, 2001–2007

Principal CCS Diagnosis	Total costs (2007)	Total hospital stays (2007)	Percentage change in:	
			Total costs (2001–2007)*	Total hospital stays (2001–2007)
Blood infection (septicemia)	$12,336,477,000	675,400	174.1	97.1
Intestinal infection	$1,657,390,000	235,900	148.7	69.5
Acute kidney failure	$4,022,154,000	400,000	148.3	177.6
Diseases of white blood cells	$791,691,000	67,400	95.6	40.2
Respiratory insufficiency, arrest, failure	$7,778,034,000	385,800	90.1	93.1
Degenerative joint disease (osteoarthritis)	$11,800,160,000	814,900	85.0	62.5
Previous C-section	$2,405,022,000	561,700	73.3	56.6
Poisoning by other medications and drugs	$820,034,000	138,600	67.4	22.0
Skin and subcutaneous tissue infections	$3,643,917,000	604,100	65.5	54.5
Brain injury	$3,345,606,000	189,800	64.9	35.6
Total for top 10 conditions*	**$48,600,484,000**	**4,073,700**	**104.5%**	**71.2%**

*2001 costs were adjusted to 2007 dollars using the overall Consumer Price Index.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2001 and 2007

Table 3. Common conditions with the most rapidly increasing hospital inpatient costs, by expected primary payer, 2001–2007

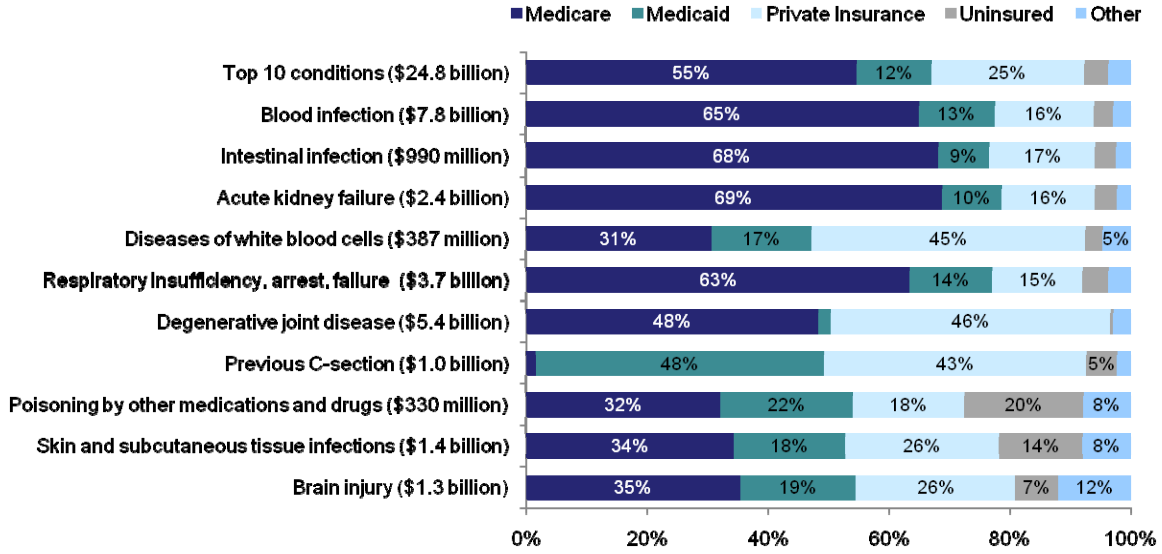
	Medicare-covered stays			Medicaid-covered stays			Privately insured stays			Uninsured stays		
		Percentage change in:			Percentage change in:			Percentage change in:			Percentage change in:	
Principal CCS Diagnosis	Total costs (2007)	Total costs (2001-2007)*	Total hospital stays (2001-2007)	Total costs (2007)	Total costs (2001-2007)*	Total hospital stays (2001-2007)	Total costs (2007)	Total costs (2001-2007)*	Total hospital stays (2001-2007)	Total costs (2007)	Total costs (2001-2007)*	Total hospital stays (2001-2007)
Blood infection (septicemia)	$8,042,095,000 (65.2%)	172.4	97.4	$1,495,334,000 (12.1%)	192.4	96.7	$2,126,870,000 (17.2%)	152.5	83.3	$369,400,000 (3.0%)	228.1	161.3
Intestinal infection	$1,005,133,000 (60.6%)	204.7	142.2	$167,021,000 (10.1%)	103.2	38.8	$391,223,000 (23.6%)	79.5	21.6	$57,941,000 (3.5%)	138.0	66.5
Acute kidney failure	$2,728,034,000 (67.8%)	153.6	180.9	$385,473,000 (9.6%)	160.4	176.1	$685,966,000 (17.1%)	118.7	153.9	$133,361,000 (3.3%)	179.2	229.9
Diseases of white blood cells	$259,810,000 (32.8%)	84.1	37.9	$114,596,000 (14.5%)	127.2	64.9	$369,589,000 (46.7%)	90.2	31.3	$19,811,000 (2.5%)	126.2	75.4
Respiratory insufficiency, arrest, failure	$4,868,177,000 (62.6%)	92.4	93.5	$1,051,069,000 (13.5%)	93.0	97.7	$1,374,290,000 (17.7%)	66.9	72.1	$259,078,000 (3.3%)	154.1	178.2
Degenerative joint disease (osteoarthritis)	$6,502,722,000 (55.1%)	67.5	47.7	$283,110,000 (2.4%)	66.8	43.8	$4,582,120,000 (38.8%)	120.3	92.7	$69,848,000 (0.6%)	75.5	68.7
Previous C-section	$22,395,000 (0.9%)	260.4†	296.0†	$996,215,000 (41.4%)	95.1	79.2	$1,233,469,000 (51.3%)	55.7	38.2	$93,742,000 (3.9%)	124.5	109.2
Poisoning by other medications and drugs	$224,816,000 (27.4%)	89.4	43.4	$180,754,000 (22.0%)	66.8	17.8	$222,264,000 (27.1%)	37.8	-0.3	$146,388,000 (17.9%)	79.7	38.7
Skin and subcutaneous tissue infections	$1,498,116,000 (41.1%)	49.5	32.3	$589,969,000 (16.2%)	81.3	86.5	$971,188,000 (26.7%)	61.1	46.7	$389,118,000 (10.7%)	105.6	108.6
Brain injury	$945,035,000 (28.2%)	97.5	67.7	$538,541,000 (16.1%)	88.2	37.3	$1,207,564,000 (36.1%)	40.4	11.1	$357,746,000 (10.7%)	35.0	30.2

*2001 costs were adjusted to 2007 dollars using the overall Consumer Price Index.

†Stays with a principal diagnosis of previous C-section remained few in number (1,400 in 2001 and 5,500 in 2007) and had the lowest total costs ($22.4 million in 2007).

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2001 and 2007

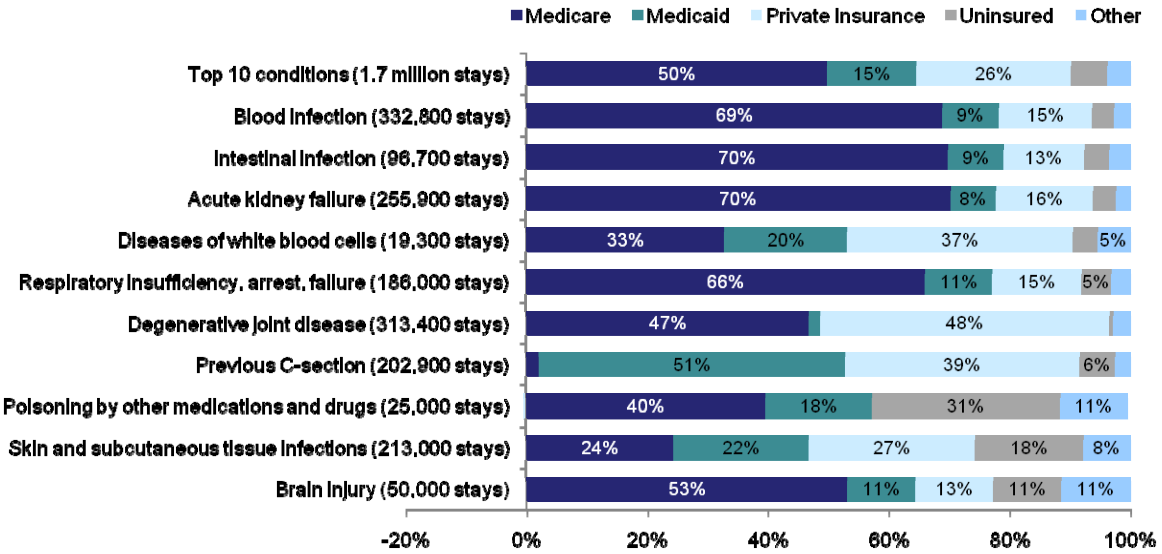
Figure 1. Percentage contribution to change in total costs for conditions with the most rapidly increasing hospital inpatient costs, by payer, 2001–2007



Dollar amounts in parentheses represent the inflation-adjusted increase in total costs from 2001 to 2007. Percentages less than 5 percent are not labeled. "Other" payer includes Workers' Compensation, TRICARE, CHAMPUS, CHAMPVA, Title V, and other government programs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2001–2007

Figure 2. Percentage contribution to growth in inpatient stays for conditions with the most rapidly increasing hospital inpatient costs, by payer, 2001–2007



Number of stays in parentheses represent the increase in total stays from 2001 to 2007. Percentages less than 5 percent are not labeled. "Other" payer includes Workers' Compensation, TRICARE, CHAMPUS, CHAMPVA, Title V, and other government programs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2001–2007