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Transitions between Nursing Homes and Hospitals in the Elderly Population, 2009

William Spector, Ph.D., Ryan Mutter, Ph.D., Pamela Owens, Ph.D., Rhona Limcangco, Ph.D.

Introduction

The elderly are heavy users of hospitals and nursing home services. Elderly persons are disproportionately hospitalized when compared to younger persons and make up the vast majority of nursing home residents. In 2009, persons aged 65 and older represented 12.5 percent of the population but accounted for 34.3 percent of admissions to community hospitals and 89.7 percent of the nursing home population in the United States.[1,2,3] Both hospital and nursing home use are expected to increase as the Baby Boomers age.[4,5]

Nursing home residents have physical and/or cognitive deficits that may affect their ability to manage daily activities independently in the community. Consequently, for nursing home residents aged 65 and older, the reasons for hospitalization and the experience of hospital care are likely to be very different from patients hospitalized from the community. Many elderly persons enter a nursing home for short-stay rehabilitation after a hospitalization. The health status of patients discharged from hospitals to nursing homes is also likely to be different from those who return back to the community. Many hospitalizations from nursing homes and from the community are preventable,[6,7] but prevention strategies and quality of care concerns may be different for these two groups. Because the

Highlights

- In 2009, the rate of hospitalizations from nursing homes was 204.5 per 1,000 persons aged 65 years and older, compared to 310.7 per 1,000 elderly population living in the community. These rates are two to three times higher than the hospitalization rate for people under 65 (96.8 per 1,000 population).
- Compared to hospital admissions from the community, hospital admissions from nursing homes were longer (6.4 days versus 5.2 days), more likely to result in death (8.1 percent versus 3.8 percent), more likely to be for infection (29.8 percent of stays versus 16.2 percent), and less likely to be for surgery (14.2 percent of stays versus 29.0 percent).
- Compared to hospital admissions from the community, infection-related hospitalizations originating from nursing homes were more likely to be for septicemia (37.9 percent of infection-related stays versus 22.4 percent) and urinary tract infections (17.8 percent of infection-related stays versus 16.3 percent).
- Among hospitalizations from the community, those discharged to nursing home were more likely than those discharged back to the community to have been hospitalized for injury, infection, musculoskeletal disorder, or stroke and other cerebrovascular disorder.

[1] US Census Bureau. Current Population Survey Annual Social and Economic Supplement. Total population by age groups. 2009 [cited 2012 May]; Available from: http://www.census.gov/cps/data/cpstablecreator.html. (Accessed August 17, 2012)

[2] Harrington C, Carillo H, Dowdell M, Tang T, and Blank B. Table 4, "Nursing Facilities, Staffing, Residents, and Facility Deficiencies, 2005 through 2010. Department of Social and Behavioral Sciences, University of California, San Francisco. September 2010.

[3] Stranges E, Kowlessar N, and Elixhauser A, *Components of Growth in Inpatient Hospital Costs, 1997–2009*. AHRQ Statistical Brief #123. November 2011. U.S. Agency for Healthcare Research and Quality, Rockville, MD.

[4] Spillman, B.C. and J. Lubitz, New estimates of lifetime nursing home use: have patterns of use changed? *Medical Care*, 2002. 40(10): p. 965-75.

[5] Strunk, B.C., P.B. Ginsburg, and M.I. Banker, The effect of population aging on future hospital demand. *Health Affairs*, 2006. 25(3): p. w141-9.

[6] Ouslander, J.G., et al., Potentially avoidable hospitalizations of nursing home residents: frequency, causes, and costs. Journal of *the American Geriatrics Society, 2010*. 58(4): p. 627-35.

[7] Stranges E and Stocks C. *Potentially Preventable Hospitalizations for Acute and Chronic Conditions, 2008*. HCUP Statistical Brief #99. November 2010. U.S. Agency for Healthcare Research and Quality, Rockville, MD.

impacts of hospitalizations and nursing home care on health care costs are large, it is important to understand the reasons for transitions between hospitals and nursing homes and the difference in hospital use and cost for elderly residents of nursing homes compared to elderly who reside in the community.

This Statistical Brief compares two populations aged 65 and older: those hospitalized from the community and those who come from nursing homes. Data are from the 2009 State Inpatient Databases (SIDs) from the Healthcare Cost and Utilization Project (HCUP) for 41 states. We compare patient characteristics, reasons for hospitalization, hospital utilization, and discharge disposition patterns. This Brief also identifies the reasons for hospitalization among the elderly hospitalized from the community and discharged back to the community compared to those hospitalized from the community and discharged to nursing homes. Estimates are based on principal diagnosis. All differences between estimates noted in the text are significantly different at the 0.001 level.

Findings

Hospitalization rates were high for elderly nursing homes residents and for elderly community residents. For a sample of 22 states in 2009, the nursing home hospitalization rate was 204.5 per 1,000 elderly nursing home residents, and the community hospitalization rate was 310.7 per 1,000 elderly population in the community.[8] In contrast, the national non-elderly hospitalization rate was 96.8 per 1,000 non-elderly population in 2009.[9]

In 2009, 97.6 percent of hospital stays for the elderly were from the community and 2.4 percent were from nursing homes (table 1). Compared with the population admitted from the community, the population admitted from nursing homes was more likely to be female (63.6 percent versus 56.5 percent) and older (mean age 82.0 years versus 77.6 years).

Table 1. Characteristics of the population who had a hospital stay in 2009, population aged 65 and older

	Hospitalized from nursing homes N=219,000 (97.6%)	**Hospitalized from communities[2]** N=8,878,000 (2.4%)
Patient characteristics		
Gender (percentage) [1]		
Female	63.6	56.5
Male	36.4	43.5
Mean age, years	82.0	77.6
Age group (percentage)		
65–74	20.8	39.4
75–84	37.2	38.5
85+	42.0	22.1
Discharge disposition (percentage)[3]		
Home without home care	7.0	49.0
Transfers to other acute care facility	1.5	2.3
Nursing home	78.6	27.2
Home with home care	4.8	17.3
Died	8.1	3.8

[8] The rates are based on 22 States. See data source note for further explanation.

[9] Stranges E, Kowlessar N, and Elixhauser A, *Components of Growth in Inpatient Hospital Costs, 1997–2009*. AHRQ Statistical Brief #123. November 2011. U.S. Agency for Healthcare Research and Quality, Rockville, MD.

	Hospitalized from nursing homes N=219,000 (97.6%) *(continued)*	Hospitalized from communities[2] N=8,878,000 (2.4%) *(continued)*
Utilization characteristics		
Overall		
Mean length of stay, days	6.4	5.2
Mean hospital cost, dollars[4]	10,935.00	11,132.00
Surgical stays (percentage)[5]	14.2	29.0
Mean length of stay, days	9.0	6.0
Mean hospital cost, dollars	21,205.00	18,975.00
Medical stays (percentage)[5]	85.8	71.0
Mean length of stay, days	6.0	4.9
Mean hospital cost, dollars	9,233.00	7,936.00

[1] Percentage denotes column percent
[2] Includes transfers from another hospital
[3] Disposition "Against Medical Advice (AMA)" and "Discharge alive, destination unknown" not shown
[4] Hospital cost was missing for 104,346 inpatient visit records.
[5] Type of stay (surgical versus medical) was identified based on DRG codes

Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2009, from the following states: AR, AZ, CO, CT, FL, GA, HI, IA, IL, IN, KS, KY, LA, ME, MI, MN, MO, MT, NC, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY; admissions with rehabilitation DRG 945, 946 were excluded; hospitals with ≥5 percent missing point of origin variable were excluded.

Length of stay and cost
Stays originating from nursing homes were on average one day longer (6.4 versus 5.2 mean days) than stays originating from the community, while the mean total costs were only slightly lower ($10,935 versus $11,132).

Exploring costs for hospitalizations by type of stay
Costs for surgical stays were more than twice as high as costs for medical stays for admissions from both nursing homes and the community. Furthermore, for admissions from nursing homes, costs and length of stay were greater for both surgical and medical stays compared to admissions from the community. Despite the higher costs for surgical and medical stays for admissions from nursing homes, the much lower rate of surgery results in similar overall mean total costs.

Discharge patterns
As shown in table 1, the vast majority of hospital admissions from the nursing home were discharged back to a nursing home (78.6 percent), but 7.0 percent were discharged to the community without home care services and 4.8 percent were discharged to the community with home care services. Less than half of admissions from the community returned to the community without home health services (49.0 percent). An additional 17.3 percent returned to the community with home health services, and 27.2 percent were discharged to a nursing home.

In-hospital deaths were higher for admissions from nursing homes compared with admissions from the community (8.1 percent versus 3.8 percent).

Clinical reasons for hospitalization
The reasons for hospitalization varied for stays originating from nursing homes versus the community. (table 2). Overall, the top five reasons for hospital stays for adults aged 65 and older were heart disease, infections, injuries, digestive disorders, and respiratory disorders; these conditions accounted for 59.8 percent of hospitalizations. Hospital admissions from nursing homes were more likely to be for infections than hospital admissions from the community (29.8 percent versus 16.2 percent). Hospital admissions from nursing homes were also more likely to be related to respiratory disorders (10.5 percent versus 7.8

percent), but less likely to be related to heart disease (13.7 percent versus 19.1 percent), musculoskeletal disorders (1.9 percent versus 7.5 percent), and cancers (2.4 percent versus 5.7 percent).

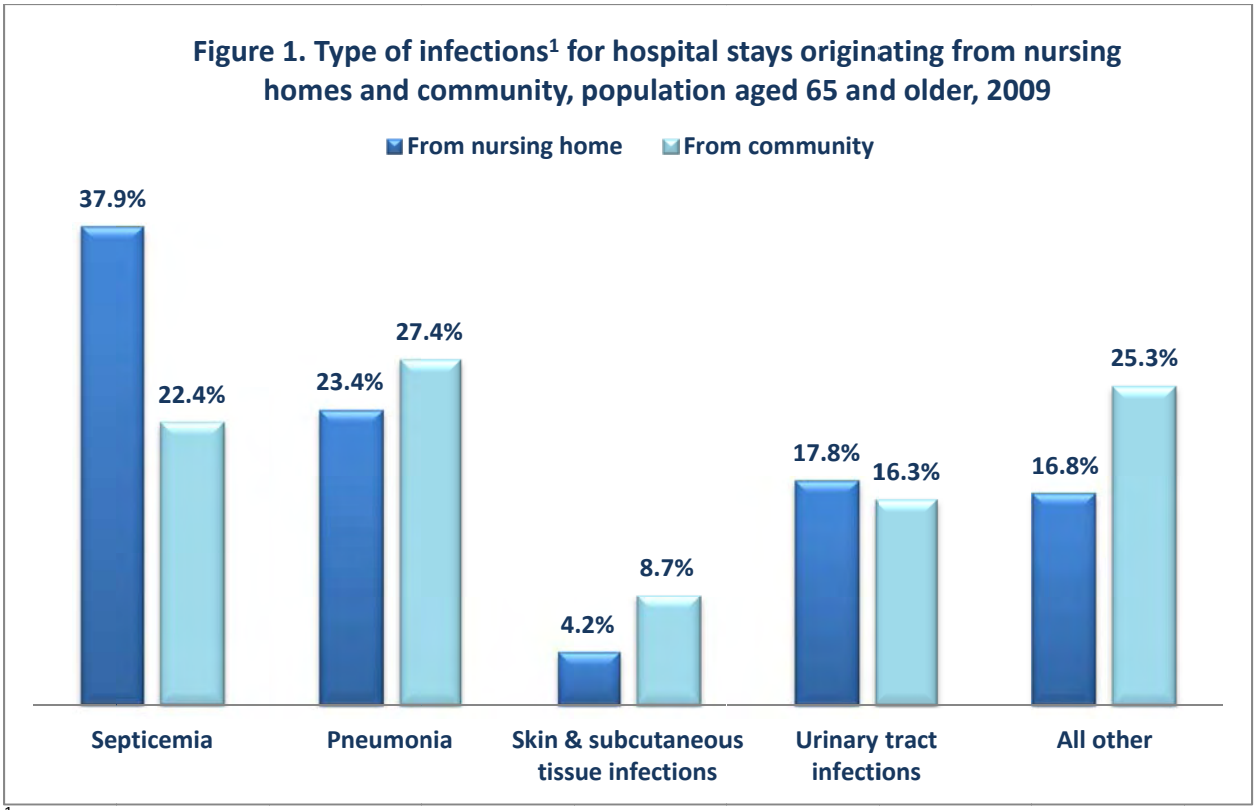
Table 2. Reasons for hospitalization for stays originating from nursing homes and the community, population aged 65 and older, 2009

	Hospitalized from nursing homes	Hospitalized from communities[1]
	Column percentage	**Column percentage**
Circulatory disorders	20.6	28.6
Heart disease	13.7	19.1
Stroke and other cerebrovascular diseases	3.4	4.8
Other circulatory disorders	3.5	4.7
Infections	29.8	16.2
Injuries	8.7	9.1
Digestive disorders	7.7	8.5
Respiratory disorders	10.5	7.8
Musculoskeletal disorders	1.9	7.5
Cancer	2.4	5.7
Genitourinary disorders	4.2	3.8
Endocrine disorders	4.1	3.8
Diabetes	1.2	1.2
Other	2.9	2.6
Signs and symptoms	1.9	2.5
Mental health disorders	3.0	2.1
All other	5.1	4.4

[1] Includes transfers from another hospital

Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2009, from the following states: AR, AZ, CO, CT, FL, GA, HI, IA, IL, IN, KS, KY, LA, ME, MI, MN, MO, MT, NC, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY; admissions with rehabilitation DRG 945, 946 were excluded; hospitals with >5 percent missing point of origin variable were excluded.

Not only were hospital admissions from nursing homes more likely to be for infections than admissions from the community, but the types of infections differed (figure 1). Admissions from nursing homes were more likely to be for septicemia (37.9 percent versus 22.4 percent) and for urinary tract infections (17.8 percent versus 16.3 percent). However, admissions from nursing homes were less likely to be for skin and subcutaneous tissue infections (4.2 percent versus 8.7 percent), or pneumonia (23.4 percent versus 27.4 percent).



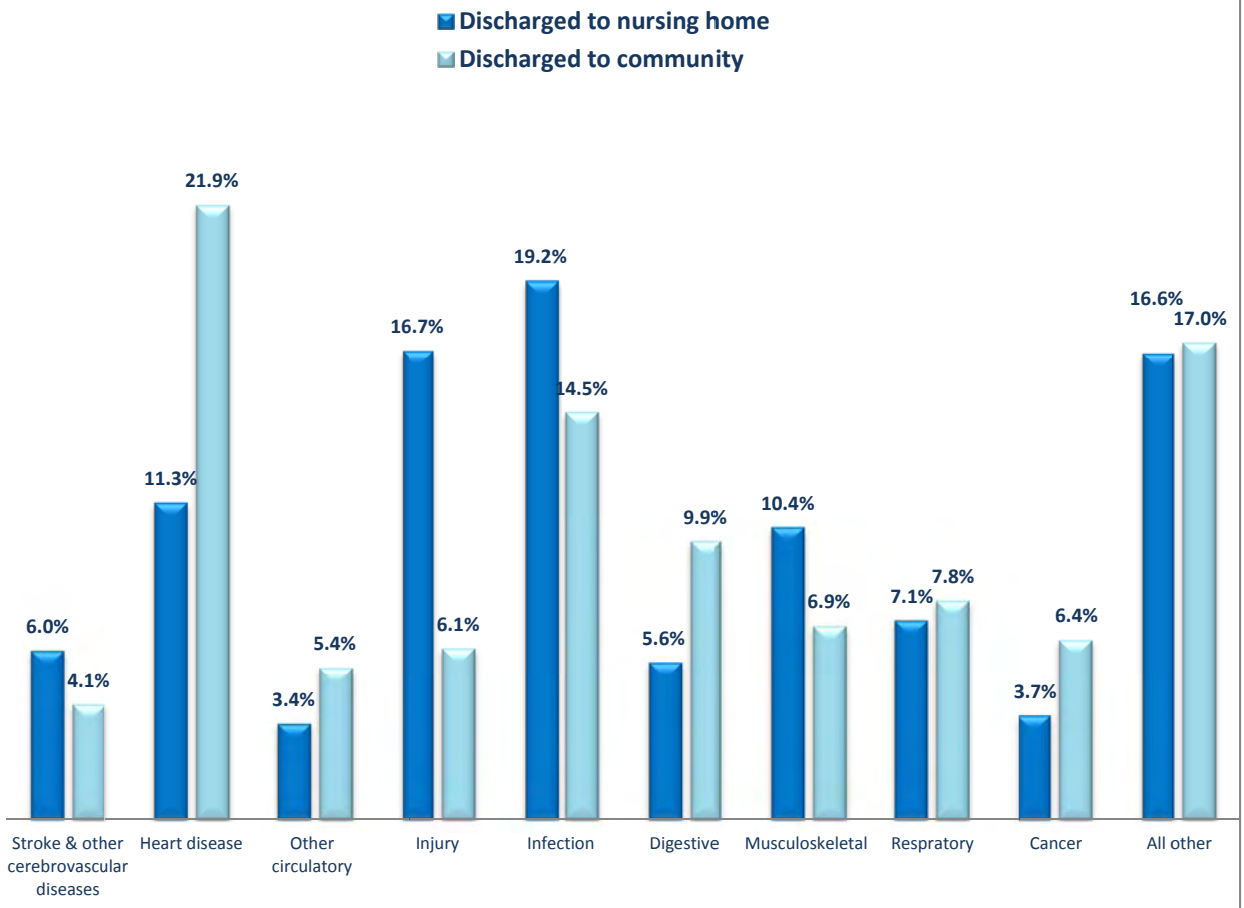
[1] Principal diagnosis of infection

Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2009, from the following states: AR, AZ, CO, CT, FL, GA, HI, IA, IL, IN, KS, KY, LA, ME, MI, MN, MO, MT, NC, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY; admissions with rehabilitation DRG 945, 946 were excluded; hospitals with >5 percent missing point of origin variable were excluded.

Among hospital admissions from the community, those that resulted in discharge back to the community had different reasons for hospitalization than those that resulted in discharge to a nursing home (figure 2). Hospitalizations resulting in discharge to a nursing home were more likely to be for an injury (16.7 percent versus 6.1 percent), infection (19.2 percent versus 14.5 percent), musculoskeletal disorders (10.4 percent versus 6.9 percent), or stroke and other cerebrovascular diseases (6.0 percent versus 4.1 percent).

Hospitalizations resulting in discharge to the community were more likely to be for heart diseases (21.9 percent versus 11.3 percent), other circulatory disorders (5.4 percent versus 3.4 percent), digestive disorders (9.9 percent versus 5.6 percent), respiratory disorders (7.8 percent versus 7.1 percent), and cancer (6.4 percent versus 3.7 percent).

Figure 2. Major reasons for hospitalization for stays originating in the community, by discharge disposition, population age 65 and older, 2009



Source: AHRQ, Center for Delivery, Organization and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2009, from the following states: AR, AZ, CO, CT, FL, GA, HI, IA, IL, IN, KS, KY, LA, ME, MI, MN, MO, MT, NC, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY; admissions with rehabilitation DRG 945, 946 were excluded; hospitals with >5 percent missing point of origin variable were excluded.

Data Source

The information in this Statistical Brief is based upon data from the HCUP 2009 State Inpatient Databases (SID) from the following 41 states: Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. Hospitalizations with DRG codes for rehabilitation (945 and 946) were excluded. Admissions from hospitals where greater than or equal to 5 percent of encounters had a missing value in the point of origin field were also excluded. In calculating the hospitalization rate for the elderly, analyses were based on a subset of 22 States with one percent or fewer of their records excluded based on the 5 percent hospital exclusion criteria: Arizona, Connecticut, Florida, Hawaii, Kansas, Kentucky, Maine, Minnesota, Montana, North Carolina, Nebraska, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, Wisconsin, and Wyoming.

The following supplemental data sources were used to calculate the hospitalization rates for elderly nursing home residents and elderly persons from the community:

- For the number of nursing home residents by state: Harrington C et al. 2010 "Nursing Facilities, Staffing, Residents, and Facility Deficiencies, 2005 through 2010," Department of Social and Behavioral Sciences, University of California, San Francisco, table 4.
- For the percentage of residents 65 years and older (prevalence) in nursing homes, by state (http://ltcfocus.org/StateTable.aspx).
- For the number of U.S. civilian noninstitutionalized (e.g., living outside nursing homes) populations 65 years and older by state, 2009, U.S. Census Bureau. Current Population Survey Table Creator. Current Population Survey Annual Social and Economic Supplement (http://www.census.gov/cps/data/cpstablecreator.html).

Definitions

Nursing home and community

For this Brief, nursing home residents were defined as hospital discharges where the point of origin was a transfer from a skilled nursing facility (SNF) or intermediate care facility. Stays originating from the nursing home to the emergency department who are then admitted to the hospital have a nursing home point of origin. Stays not identified with a nursing home point of origin were classified as coming from the community. "Community" includes coming from home with or without home care, or transfers from hospital, emergency room, ambulatory surgery center, hospice, as well as court/law enforcement. Stays originating in the community had a point of origin from the emergency room (62 percent), home with or without home care (30 percent) or transfer from other hospital (4 percent).

Diagnoses, ICD-9-CM, and Clinical Classifications Software (CCS)

The reason for hospital stay was based on principal diagnosis. 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 13,600 ICD-9-CM diagnosis codes. CCS categorizes ICD-9-CM diagnoses into a manageable number of clinically meaningful categories.[10] This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

Reasons for hospitalization

For this report, reasons for hospitalizations were defined as follows:

	CCS categories (all single-level categories unless identified as multilevel)
Circulatory disorders	
Heart disease	96 Heart valve disorders 97 Cardiomyopathy 100 Acute myocardial infarction 101 Coronary atherosclerosis and other heart disease 102 Nonspecific chest pain 103 Pulmonary heart disease 104 Other and ill-defined heart disease 105 Conduction disorders 106 Cardiac dysrhythmias 107 Cardiac arrest and ventricular fibrillation 108 Congestive heart failure

[10] HCUP CCS. Healthcare Cost and Utilization Project (HCUP). December 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp (Accessed September 7, 2012)

Stroke & other cerebrovascular diseases	109 Stroke (acute cerebrovascular disease) 110–113 Other cerebrovascular diseases
Other circulatory disorders	98,99 Hypertension 114–117 Diseases of arteries; arterioles; and capillaries 118–121 Diseases of veins and lymphatics
Infections	1 Tuberculosis 2 Septicemia 3 Bacterial infection; unspecified site 4 Mycoses 5 HIV infection 6 Hepatitis 7 Viral infection 8 Other infections; including parasitic 9 Sexually transmitted infections 90 Inflammation; infection of eye 122 Pneumonia 123 Influenza 124 Acute and chronic tonsillitis 125 Acute bronchitis 126 Other upper respiratory infections 135 Intestinal infection 159 Urinary tract infections 197 Skin and subcutaneous tissue infections 201 Infective arthritis and osteomyelitis 7.2.2.2 Other peri-; endo-; and myocarditis* 16.10.2.6 Postoperative infection*
Injuries	225–244 Injury and poisoning
Digestive disorders	136–155 Diseases of the digestive system
Respiratory disorders	127–131 Diseases of the respiratory system
Musculoskeletal disorders	202–212 Diseases of the musculoskeletal system and connective tissue
Cancer	11–47 Neoplasms
Genitourinary disorders	156–175 Diseases of the genitourinary system
Endocrine disorders	
Diabetes	49–50 Diabetes mellitus
Other	50–58 Endocrine; nutritional; and metabolic diseases and immunity disorders
Signs and symptoms	245–258 Symptoms; signs; and ill-defined conditions and factors influencing health status
Mental health disorders	663 Screening and of mental health and substance abuse codes

*Multilevel CCS category and diagnoses

Surgical and non-surgical hospitalizations

Medicare Severity Diagnosis-Related Groups (MS-DRGs) comprise a patient classification system that categorizes patients into groups that are clinically coherent and homogeneous with respect to resource use. MS-DRGs group patients according to diagnosis, type of treatment (procedures), age, and other relevant criteria. For the purpose of this Brief, MS-DRGs were used to distinguish surgical and non-surgical hospitalizations. MS-DRGs consider a hospitalization as surgical if the reported procedures were expected to require an operating room. For example, a patient with chest pain who has only a diagnostic cardiac catheterization is categorized into a non-surgical MS-DRG, but a patient who also has a coronary angioplasty is categorized into a surgical MS-DRG.

Disposition from hospital

Disposition at the time of discharge from the hospital is defined as follows: discharge to nursing home (skilled nursing facility [SNF], intermediate care facility [ICF]) and discharge to community (routine with and without home health care).

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).[11] Costs will reflect the actual expenses incurred in the production of hospital services, such as wages, supplies and utility costs, while charges represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used. Hospital charges reflect the amount the hospital billed 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 hundred.

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:

Alaska State Hospital and Nursing Home Association
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

[11] HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2009. Agency for Healthcare Research and Quality, R., MD. Available at www.hcup-us.ahrq.gov/db/state/costtocharge.jsp. (Accessed September 7, 2012)

Minnesota Hospital Association
Mississippi Department of Health
Missouri Hospital Industry Data Institute
Montana MHA - An Association of Montana Health Care Providers
Nebraska Hospital Association
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
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
Oregon Health Policy and Research
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 SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contain the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompasses 95 percent of all U.S. community hospital discharges in 2009. The SID can be used to investigate questions unique to one State; to compare data from two or more States; to conduct market area variation analyses; and to identify State-specific trends in inpatient care utilization, access, charges, and outcomes.

For More Information

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

For additional HCUP statistics, visit HCUPnet, our interactive query system, at http://hcupnet.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, 2009* located at http://www.hcup-us.ahrq.gov/reports.jsp.

For more information on the SID, please refer to Introduction to the *HCUP State Inpatient Databases*. Online. May 2012. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.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:

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