HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

STATISTICAL BRIEF #127

February 2012

30-Day Readmissions following Hospitalizations for Chronic vs. Acute Conditions, 2008

Jennifer Podulka, M.P.Aff., Marguerite Barrett, M.S., H. Joanna Jiang, Ph.D., and Claudia Steiner, M.D., M.P.H

Highlights

- The 30-day readmission rates for non-surgical hospitalizations for chronic conditions were higher than the readmission rates for acute conditions, regardless of payer or age group.
- For children aged 1–17, the 30-day readmission rate was two times higher when the initial stay was for treating a chronic condition as opposed to an acute condition, regardless of whether or not the initial stay involved surgical treatment.
- For privately-insured adults, ages 45 to 64 years old, the 30-day readmission rate following surgical hospitalizations was similar across chronic and acute conditions.
- In 2008, one in eight surgical hospitalizations resulted in a readmission within 30 days across all payer and age groups.
- In 2008, one in five non-surgical hospitalizations resulted in a readmission within 30 days across all payer and age groups.
- The 30-day readmission rates for privately-insured adults were consistently lower than adults covered by Medicaid, regardless of age group.

Introduction

Hospital readmissions are an important measure for assessing performance of the health care system.[1,2] One strategy for improving health care quality and lowering costs is to reduce the rates of preventable readmissions. Developing multi-state benchmarks for hospital readmission rates can help to identify opportunities for targeted improvement efforts. As a companion to Brief #115, *All-Cause Readmissions by Payer and Age, 2008*, this Statistical Brief presents data on hospital readmissions within 30 days following an initial hospitalization, stratified by whether or not the patient received surgical treatment during the initial stay.

The descriptive statistics presented are based on data from the Healthcare Cost and Utilization Project (HCUP) for 15 states in 2008.[3] These 15 states are geographically dispersed and account for 42 percent of the total U.S. resident population. The initial admission occurred between January and November of 2008.[4] A patient may have had multiple initial admissions. The initial event was classified as surgical based on the Diagnosis Related Group (DRG).[5] Surgical stays included procedures that are expected to require an operating room. For both surgical and non-surgical initial hospitalizations, the principal diagnosis was identified as a chronic or acute condition based on the Chronic Condition Indicator.[6] Differences in 30-day readmission rates are presented. The readmission could be for any cause and to a same or

[1] MedPAC Report to the Congress: Promoting Greater Efficiency in Medicare. June 2007. http://www.medpac.gov/documents/jun07_entirereport.pdf.

[2] Axon R. N., Williams M. V. Hospital Readmission as an Accountability Measure. JAMA. 2011;305(5):504-505.

[3] The 15 states include Arkansas, California, Florida, Hawaii, Louisiana, Massachusetts, Missouri, Nebraska, New Hampshire, New York, South Carolina, Tennessee, Utah, Virginia, and Washington. These states were selected based on availability of synthetic patient-level identifiers that enabled tracking of patients across time.

[4] Maternal discharges were excluded from consideration as an initial hospitalization.

[5] See definition section at the end of this Brief for additional information on methods.

[6] Information on the Chronic Condition Indicator is available at http://www.hcup-us.ahrq.gov/toolssoftware/chronic/chronic.jsp.

different hospital within the state. Results are limited to insured patients covered by Medicare, Medicaid, and private insurance at the initial hospitalization. Readmission rates are not risk-adjusted, but are stratified by age group and expected primary payer.

The analysis presented in this Statistical Brief involves use of a new set of supplemental revisit variables, created to allow tracking a patient across time and hospital setting while adhering to strict privacy regulations. The variables enable the linking of hospital visits that belong to a unique person and the calculation of the elapsed time between visits on selected HCUP State Inpatient Database (SID), State Ambulatory Surgery Database (SASD), and State Emergency Department Database (SEDD) files.[7]

All numbers noted in the text and included in the tables are actual values, not estimates, as the data include a census of discharges, not a sample of discharges. In other words, we count the actual number of people with surgical and non-surgical hospitalizations in the 15 states and their readmissions. Because we analyze numbers for the actual population rather than a sample, there is no need to estimate how well the sample represents an underlying population. As a result, there is no sampling error associated with the calculated values presented and significance testing is not necessary.[8]

Findings

For patients hospitalized in the 15 observed states in 2008, the rate of 30-day readmissions following a surgical hospitalization varied from 6.1 percent to 19.1 percent across payer and age groups (figure 1 and table 1).[9] Readmission rates were consistently higher for non-surgical hospitalizations, varying from 8.6 percent to 28.4 percent across payer and age groups (figure 2 and table 2).

Surgical hospitalizations

In 2008, one in eight surgical hospitalizations resulted in a readmission within 30 days across all payer and age groups.

For children aged 1–17, the 30-day readmission rate following surgical hospitalizations for acute conditions was 6.3 and 8.7 percent for privately insured and Medicaid patients, respectively. The readmission rate increased two-fold when the surgical hospitalization was for treating a chronic condition (12.6 and 16.2 percent for the private and Medicaid patients, respectively).

The 30-day readmission rates following surgical hospitalizations for chronic conditions were higher than readmission rates for acute conditions for younger adults, ages 18 to 44 (7.6 percent versus 6.1 percent for the privately-insured and 16.3 percent versus 11.8 percent for Medicaid patients). For the older insured adults, ages 45 to 64 years old, the 30-day readmission rates following surgical hospitalizations were similar (less than one percentage point different) across chronic and acute conditions.

Readmission rates were lowest for privately-insured adults, ranging from 6.1 to 8.4 percent depending on the age and whether the initial hospitalization was for treating an acute or chronic condition. Readmission rates for Medicaid adults were higher, ranging from 11.8 percent to 19.1 percent depending on age and reason for the initial hospitalization.

---

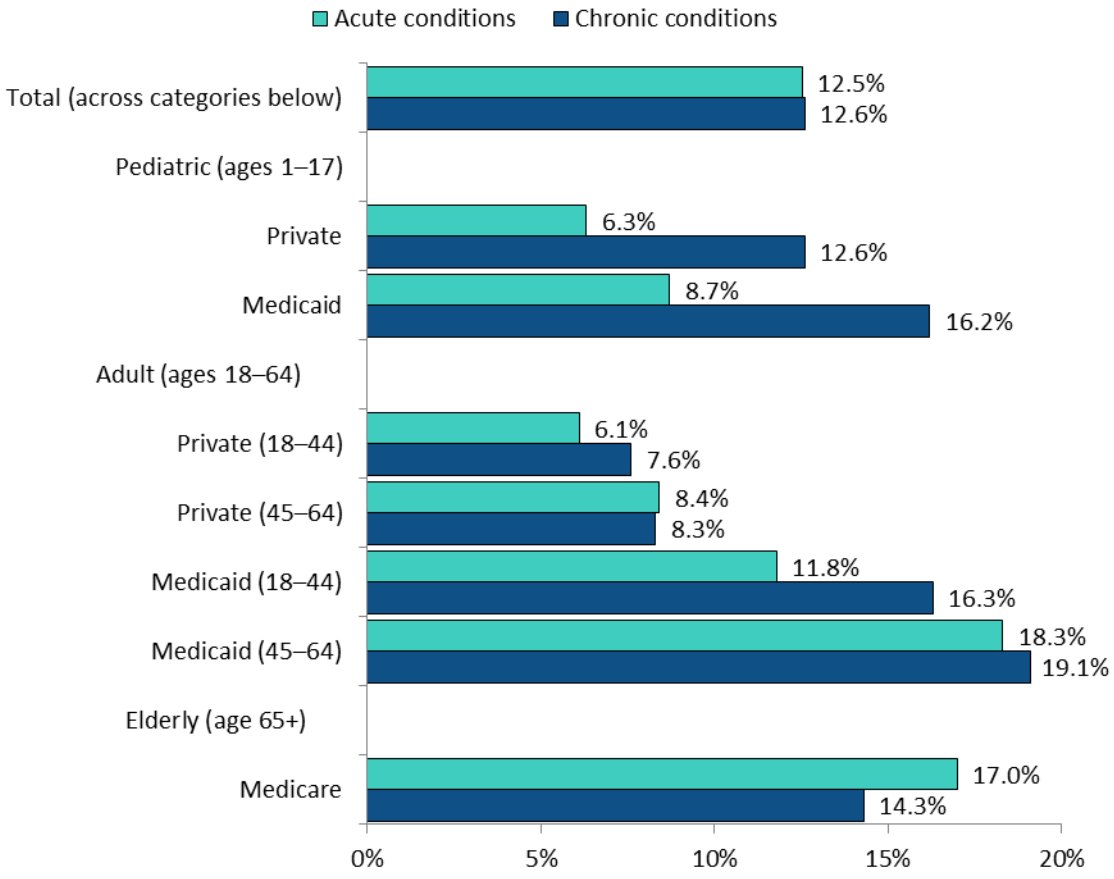
[7] Overview of the HCUP Supplemental Variables for Revisit Analyses available at http://www.hcup-us.ahrq.gov/toolssoftware/revisit/revisit.jsp.

[8] Houchens, R. Inferences with HCUP State Databases Final Report. HCUP Methods Series Report # 2010-05. Online October 12, 2010. U.S. Agency for Healthcare Research and Quality. Available: http://www.hcup-us.ahrq.gov/reports/methods/2010_05.pdf. Accessed on January 24, 2012.

[9] The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. The readmission rate is the total number of readmissions (matched to respective initial admissions) divided by the total number of initial admissions. Because patients could have more than one initial admission during the year, the readmission rate does not indicate the share of patients readmitted.

For patients age 65 and older covered by Medicare, the 30-day readmission rate following surgical hospitalizations was lower for chronic conditions than for acute conditions (14.3 percent versus 17.0 percent). This is different from the patterns observed in other age and payer groups, where the 30-day readmission rate following surgical hospitalizations was similar or higher for chronic conditions.

Figure 1. 30-day readmission rates following surgical hospitalizations for acute and chronic conditions, by expected payer and age group, 2008



Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008, from the following 15 states: AR, CA, FL, HI, LA, MA, MO, NE, NH, NY, SC, TN, UT, VA, WA

Non-surgical hospitalizations

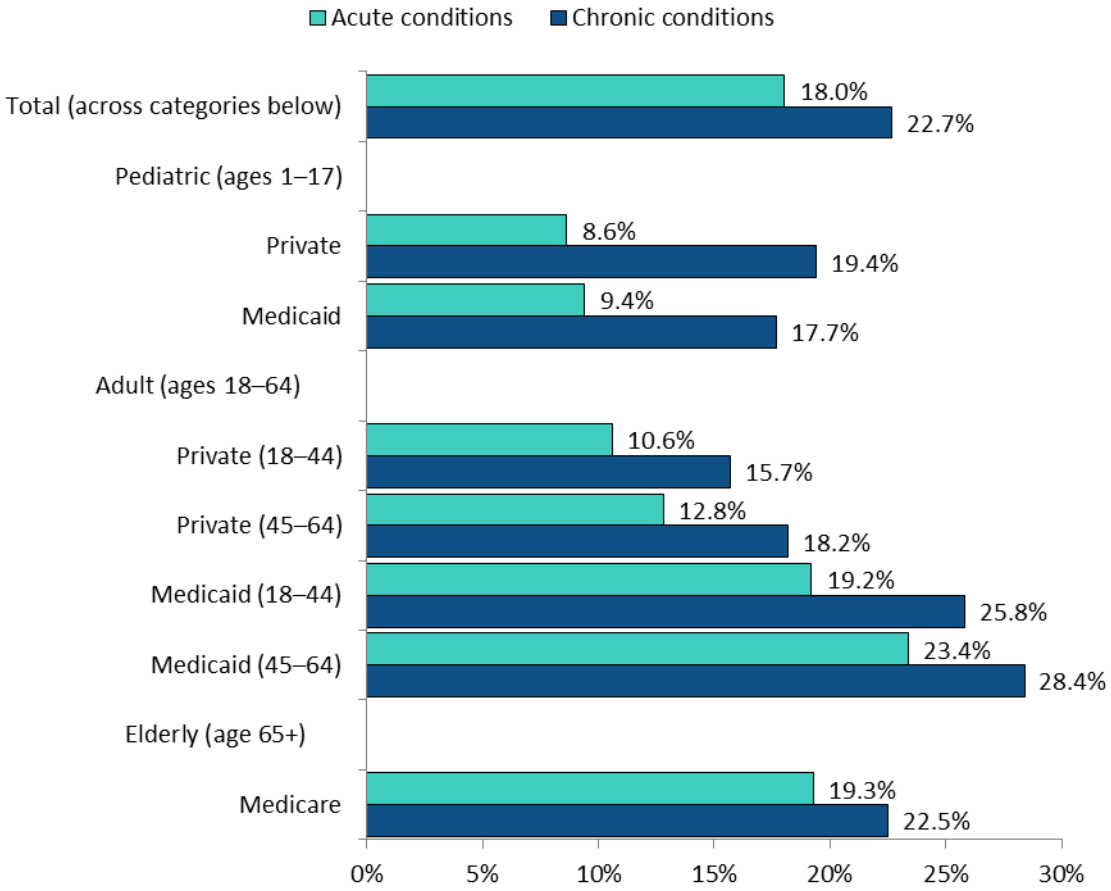
In 2008, one in five non-surgical hospitalizations resulted in a readmission within 30 days across all payer and age groups. For non-surgical hospitalizations for acute conditions, the 30-day readmission rate was 18.0 percent across payer and age groups. For similar hospitalizations for chronic conditions, the 30-day readmission rate was higher at 22.7 percent.

For pediatrics under 18 years old, the 30-day readmission rate following non-surgical hospitalizations for acute conditions was 8.6 and 9.4 percent for privately insured and Medicaid patients, respectively. The readmission rate increased two-fold when the non-surgical hospitalization was for treating a chronic condition (19.4 and 17.7 percent for the private and Medicaid patients, respectively).

For insured adults under age 65, the 30-day readmission rates for non-surgical hospitalizations for acute conditions ranged from 10.6 to 23.4 percent across payers and age groups. In comparison, readmission rates for chronic conditions were consistently higher and ranged from 15.7 to 28.4 percent.

Likewise, among the elderly covered by Medicare, the 30-day readmission rate following non-surgical hospitalizations was higher for chronic conditions than for acute conditions (22.5 percent versus 19.3 percent).

Figure 2. 30-day readmission rates following non-surgical hospitalizations for acute and chronic conditions, by expected payer and age group, 2008



Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008, from the following 15 states: AR, CA, FL, HI, LA, MA, MO, NE, NH, NY, SC, TN, UT, VA, WA

Table 1. 30-day readmission rates following surgical hospitalizations for acute and chronic conditions, by expected payer and age group, 2008

	Surgical hospitalizations for chronic conditions			Surgical hospitalizations for acute conditions		
	Number of discharges	Number of readmissions	30-day readmission rate	Number of discharges	Number of readmissions	30-day readmission rate
Total (across categories below)	1,670,200	210,300	12.6%	937,900	117,400	12.5%
Pediatric (ages 1–17)						
Private	14,300	1,800	12.6%	23,700	1,500	6.3%
Medicaid	13,900	2,300	16.2%	22,000	1,900	8.7%
Adult (ages 18 to 64)						
Private (ages 18–44)	147,000	11,200	7.6%	165,700	10,100	6.1%
Private (ages 45–64)	476,600	39,600	8.3%	229,000	19,200	8.4%
Medicaid (ages 18–44)	34,800	5,700	16.3%	50,700	6,000	11.8%
Medicaid (ages 45–64)	67,700	12,900	19.1%	41,700	7,600	18.3%
Elderly (age 65 and older)						
Medicare	786,800	112,500	14.3%	321,600	54,700	17.0%

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008, 15 states (Arkansas, California, Florida, Hawaii, Louisiana, Massachusetts, Missouri, Nebraska, New Hampshire, New York, South Carolina, Tennessee, Utah, Virginia, and Washington)

Table 2. 30-day readmission rates following non-surgical hospitalizations for acute and chronic conditions, by expected payer and age group, 2008

	Non-surgical hospitalizations for chronic conditions			Non-surgical hospitalizations for acute conditions		
	Number of discharges	Number of readmissions	30-day readmission rate	Number of discharges	Number of readmissions	30-day readmission rate
Total (across categories below)	2,883,700	653,600	22.7%	3,231,900	583,100	18.0%
Pediatric (ages 1–17)						
Private	51,800	10,000	19.4%	59,300	5,100	8.6%
Medicaid	77,200	13,700	17.7%	93,700	8,800	9.4%
Adult (ages 18–64)						
Private (ages 18–44)	201,400	31,600	15.7%	231,300	24,500	10.6%
Private (ages 45–64)	371,600	67,600	18.2%	447,300	57,300	12.8%
Medicaid (ages 18–44)	215,100	55,500	25.8%	138,800	26,600	19.2%
Medicaid (ages 45–64)	235,800	67,000	28.4%	198,600	46,500	23.4%
Elderly (age 65 and older)						
Medicare	1,355,100	304,900	22.5%	1,725,600	333,000	19.3%

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008, 15 states (Arkansas, California, Florida, Hawaii, Louisiana, Massachusetts, Missouri, Nebraska, New Hampshire, New York, South Carolina, Tennessee, Utah, Virginia, and Washington)

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2008 State Inpatient Databases for 15 states: Arkansas, California, Florida, Hawaii, Louisiana, Massachusetts, Missouri, Nebraska, New Hampshire, New York, South Carolina, Tennessee, Utah, Virginia, and Washington. These states were selected based on availability of synthetic patient-level identifiers that enabled the tracking of patients across time.

Definitions

Diagnoses and diagnosis related groups (DRGs)
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. For the purpose of this Brief, principal diagnosis was used to distinguish hospitalizations for chronic and acute conditions.

DRGs comprise a patient classification system that categorizes patients into groups that are clinically coherent and homogeneous with respect to resource use. DRGs group patients according to diagnosis, type of treatment (procedures), age, and other relevant criteria. For the purpose of this Brief, DRGs were used to distinguish surgical and non-surgical hospitalizations. 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 DRG, but the same patient who also has a coronary angioplasty is categorized into a surgical DRG.

Chronic Condition Indicator
The Chronic Condition Indicator is created to facilitate health services research on diagnoses using administrative data. This classification system allows researchers to readily determine if a diagnosis is a chronic condition. In addition, the tool groups all diagnoses into body systems so that users can create indicators listing which specific body systems are affected by a chronic condition. The Chronic Condition Indicator categorizes all ICD-9-CM diagnosis codes as chronic or not chronic. A chronic condition is defined as a condition that lasts 12 months or longer and meets one or both of the following tests: (a) it places limitations on self-care, independent living, and social interactions; (b) it results in the need for ongoing intervention with medical products, services, and special equipment (see Perrin et al., 1993). The identification of chronic conditions is based on all 5-digit ICD-9-CM codes. E Codes, or external cause of injury codes, are not classified, because all injuries are assumed to be acute.

A patient with a principal diagnosis of congestive heart failure (a chronic condition), who has a cardiac defibrillator implant, would be classified as having a **surgical hospitalization** for a **chronic condition**; yet the same patient without an operating room procedure is classified as having a **non-surgical hospitalization** for a **chronic condition**. A patient with a principal diagnosis of pneumonia (an acute condition), who only has a chest X-ray, is classified as having **a non-surgical hospitalization** for an **acute condition** because the chest x-ray does not require an operating room. If the patient requires an operation because the lung does not expand properly, then the patient is classified as having a **surgical hospitalization** for an **acute condition**.

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. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Please note, a discharge of this nature will be included in the SID if it occurred in a community hospital.

Unit of analysis
The unit of analysis is the individual patient identified by the synthetic patient-level identifier. A patient may be counted multiple times if he or she has multiple admissions to the hospital in a year.

Readmission
Readmission rate is defined as the number of times patients had a repeat admission within 30 days after being discharged alive from an initial hospital stay divided by the total number of initial stays between January and November 2008. Each hospital stay can be a new initial stay. Thus, a patient is allowed to have multiple initial stays, regardless of the time elapsed between admissions. For example, if one admission is January 10 and the next admission is January 20, followed by a third admission on January 27th, and a fourth on March 30th, all four are counted in the denominator of the readmission rates. The January 20th and January 27th admissions are counted in the numerator for the 30-day readmissions relative to the January 10th admission. The January 27th admission also counts as a 30-day readmission of the January 20th admission. The March 30th stay is not counted as a readmission, as it is outside the 30-day window of any previous stay. The final count is 4 initial hospital stays with three 30-day readmissions. Excluded from the analysis are discharges with missing age, expected payer, length of stay, or principal diagnosis, in addition to discharges without a valid DRG. Discharges for patients who died at an initial stay or whose initial stay occurred in December of 2008 were also disqualified because they could not be followed for 30 days. If a patient was transferred to a different hospital on the same day as or next day after discharge from the previous stay, the two admissions were combined as a single stay. Transfers, thus, were not considered as a readmission.

Payer
Payer is based on the first hospital stay in the year with non-missing expected payer. 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. Medicare covers qualified individuals who are 65 and older, disabled, or have end-stage renal disease (ESRD).
- 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.
- Uninsured includes an insurance status of "self-pay" and "no charge". Readmission rates for the uninsured are not included in this Brief because the number of uninsured patients in the analysis file was substantially smaller than the number of insured patients, regardless of age.

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

- For purpose of this Statistical Brief, if either payer is listed as Medicare, the payer is "Medicare".
- For non-Medicare stays, if either payer is listed as Medicaid, the payer is "Medicaid".
- For stays that are neither Medicare nor Medicaid, if either payer is listed as private insurance, the payer is "private insurance".

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 & 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
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 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 SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contains 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 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 2008*, located at http://www.hcup-us.ahrq.gov/reports.jsp.

For more information on the design of the SID, more information on the HCUP Revisit Files, and methods to make inferences based on state databases, please refer to the following publications:

Introduction to the HCUP State Inpatient Databases. Online. June 2010. U.S. Agency for Healthcare Research and Quality. http://hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.pdf

Overview of the HCUP Supplemental Variables for Revisit Analyses available at http://www.hcup-us.ahrq.gov/toolssoftware/revisit/revisit.jsp.

Houchens, R. *Inferences with HCUP State Databases Final Report*. HCUP Methods Series Report # 2010-05. Online October 12, 2010. U.S. Agency for Healthcare Research and Quality. Available: http://www.hcup-us.ahrq.gov/reports/methods/2010_05.pdf.

Suggested Citation

Podulka, J. (Thomson Reuters), Barrett, M. (Thomson Reuters), Jiang, H.J. (AHRQ), and Steiner, C. (AHRQ). *30-Day Readmissions following Hospitalizations for Chronic vs. Acute Conditions, 2008*. HCUP Statistical Brief #127. February 2012. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb127.pdf

* * *

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