

STATISTICAL BRIEF #89

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All-Cause Hospital Readmissions among Non-Elderly Medicaid Patients, 2007

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Introduction

In recent years, increasing attention has been drawn to hospital readmission as an outcome measure for assessing performance of the health care system. Research shows that nearly one in five Medicare patients in the Fee-for-Service (FFS) program had readmissions within 30 days of discharge from a hospital stay.¹ Reducing potentially preventable readmissions can improve quality of care while reducing cost. The Centers for Medicare and Medicaid Services (CMS) has begun publicly reporting hospital-specific, all-cause 30-day readmission rates for three medical conditions in the FFS program.² Despite growing interest in readmission rates little information is available on all-cause readmission rates for Medicaid patients. As revealed through the AHRQ Learning Network for State Medicaid Medical Directors,³ a significant number of states are measuring hospital readmissions for their Medicaid beneficiaries. Making national or multi-state benchmarks available can help the State Medicaid programs assess their data and identify potential areas for improvement.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on all-cause readmissions among non-elderly Medicaid patients in 2007. HCUP data are all-payer hospital discharge data, which offer the advantage of capturing data from both FFS and managed care Medicaid enrollees, as well as comparison data for other payers. The majority of State Medicaid programs have a high percentage of managed care enrollment, and CMS and some States are missing inpatient encounter data for managed care.

For this Statistical Brief, readmission rate is defined as the percentage of patients who have at least one readmission within a certain number of days after being discharged alive from their initial hospital stay. The initial stay is the patient's first hospital admission between January and November of 2007. Readmission rates 7, 14, and 30 days post-discharge are presented. Differences in 30-day readmission rates by patient age, gender, and presence of comorbidities are discussed. For reference, these summary statistics are also presented for patients with private insurance. In addition, readmission rates are provided for Medicaid patients by the principal diagnosis

Highlights

- Among non-obstetric Medicaid patients ages 21 to 64 who were hospitalized in 2007, about 1 in 10 had at least 1 readmission within 30 days after discharge from their first stay. More than half (56 percent) of these readmissions involved an initial hospital stay for circulatory diseases (15 percent), mental disorders (12 percent), respiratory diseases (11 percent), digestive diseases (10 percent), or alcohol/substance abuse (8 percent).
- Among non-obstetric patients, readmission rates also differed by gender, with men showing higher readmission rates than women (20 and 15 percent higher among Medicaid and privately insured patients, respectively).
- Medicaid patients had higher readmission rates than privately insured patients. For instance, the non-obstetric 30-day readmission rate was 10.7 percent for Medicaid adults compared with 6.3 percent for the privately insured.
- 30-day readmission rates increased with patient age, for both Medicaid and privately insured patients.
- 30-day readmission rates increased with the number of comorbidities. The non-obstetric adult readmission rates were consistently higher for Medicaid than for privately insured patients with the same number of comorbidities (1.5 to 1.7 times higher).

¹ Jencks SF, Williams MV, Coleman EA. Rehospitalizations among Patients in the Medicare Fee-for-Service Program. *N Engl J Med.* 2009;360(14):1418–28.

² CMS Hospital Compare (<https://www.hospitalcompare.hhs.gov>).

³ AHRQ Workshop for the State Medicaid Medical Directors. April 2009, Washington, D.C.

associated with the initial hospital stay. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

This report focuses on the non-elderly population only, and thus does not include individuals who are age 65 years old or above with dual coverage of Medicaid and Medicare. Readmissions are identified using encrypted unique patient numbers that enable tracking of patients across different hospitals within a state. Data are drawn from 10 states that demonstrate acceptable quality for this data element among both Medicaid and privately insured patients.

Findings

All-Cause 7-, 14-, and 30-Day Readmission Rates

Readmission rates increased with the number of days post-discharge. The 30-day readmission rate was higher than the 14-day rate, which was then higher than the 7-day rate (table 1).

Medicaid patients had higher readmission rates than privately insured patients. For example, 30-day readmission rates for children (ages 0–20 years old, including newborns, but excluding obstetric patients) were 3.1% for Medicaid patients and 2.0% for the privately insured. Among adults (ages 21–64 years old), Medicaid patients were rehospitalized more frequently than private insurance patients, regardless of the readmission period. For instance, the non-obstetric 30-day readmission rate was 10.7 percent for Medicaid patients compared with 6.3 percent for the privately insured. The difference between these two payer groups was smaller among obstetrics (3.8 percent for Medicaid patients compared with 2.8 percent for the privately insured).

30-Day Readmissions by Patient Age and Gender

Table 2 shows that 30-day readmission rates increased with age and male gender, irrespective of payer. Patients under one year old, nearly two-thirds of pediatric Medicaid patients (64.4 percent), had the lowest 30-day readmission rate (2.6 percent), followed by 1–12 year olds (4.0 percent), and 13–20 year olds (4.2 and 6.1 percent for obstetric and non-obstetric patients, respectively). Among adults covered by Medicaid, 30-day obstetric readmission rates varied from 3.7 percent among 21–34 year olds to 4.7 percent among 35–50 year olds. Non-obstetric readmission rates were also higher among older than younger adults (11.8 percent among 45–64 year olds versus 9.5 percent among 21–44 year olds).

Non-obstetric 30-day Medicaid readmission rates were higher among males than females for both adult (11.8 versus 9.8 percent) and pediatric patients (3.3 versus 2.9 percent). Privately insured male patients also had higher 30-day readmission rates relative to their non-obstetric female counterparts. Readmission rates were higher for Medicaid patients than for their privately-insured counterparts in every age and gender category, except in the case of 13–20 year old obstetric patients where the privately insured had a slightly higher 30-day readmission rate.

30-Day Readmissions by Principal Diagnosis of the Initial Hospital Stay

Table 3 illustrates 30-day readmission rates and counts among adult (ages 21–64 years) Medicaid patients by Major Diagnostic Category for the initial hospital stay. Among these adults, 45 percent were obstetric patients who had the initial hospital stay related to pregnancy, childbirth, and post-partum conditions. These obstetric patients had a relatively low readmission rate (3.8 percent) and accounted for about one-fifth (21.7 percent) of all 30-day admissions.

Among non-obstetric adult patients, more than half (55.7 percent) of 30-day readmissions were attributable to those with the initial hospital stay for circulatory diseases (15.0 percent), mental disorders (12.0 percent), respiratory diseases (10.7 percent), digestive diseases (9.6 percent), or alcohol/substance abuse (8.4 percent). The 30-day readmission rates for patients in these five diagnostic categories ranged from around 10 percent for circulatory or digestive diseases, 11 percent for respiratory disease, 12 percent for mental disorders, to 13 percent for alcohol/substance abuse. Although cancers and neoplasms accounted for a relatively small proportion of all readmissions (2.0 percent), they exhibited highest readmission rate (37.4 percent), largely due to planned readmissions for cancer care.

30-Day Readmissions by Presence of Comorbidities

As shown in figure 1, the number of comorbidities present on the initial hospital stay was positively associated with 30-day readmission rates among non-obstetric adults, regardless of payer. For instance, the readmission rate was 8.2, 9.9, 11.3, and 14.2 percent for those with 0, 1, 2, or 3 and more comorbidities, respectively. Medicaid patients consistently demonstrated higher readmission rates relative to privately insured patients with the same number of comorbidities (range: 1.5 to 1.7 times higher).

Figure 2 shows that across five comorbidities associated with a higher risk of readmission, Medicaid patients were generally about 1.6 times more likely to be readmitted within 30 days of the initial hospital stay than privately insured patients. For instance, among non-obstetric adults with a comorbidity of anemia, readmission rate was 14.4 percent for Medicaid patients compared with 9.4 percent for the privately insured. The readmission rates for Medicaid patients with the other four comorbidities were 12.6 percent for those with a comorbidity of diabetes or chronic lung disease, 12.3 percent for those with substance abuse, and 11.9 percent for those with mental disorders. In contrast, 30-day readmission rates for the privately insured with the same comorbidities were about 8 percent (range: 7.3 to 8.1 percent).

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2007 State Inpatient Databases for ten states: Arizona, Arkansas, Florida, Hawaii, Missouri, Nebraska, New Hampshire, New York, South Carolina, and Tennessee. For pediatrics, only three states are included in the analysis: Arizona, Nebraska, and South Carolina. These states were selected because they demonstrate acceptable quality for the unique patient number. That is, at least 90% of the discharge records for each payer population have a valid unique patient number. For pediatrics, of these ten states, only three (AZ, NE, SC) meet this criterion.

Definitions

Diagnoses, Diagnosis Related Groups (DRGs) and Major Diagnostic Categories (MDCs)

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.

MDCs are broad groups of DRGs that relate to an organ or a body system (digestive system, for example) and not to an etiology. For example, MDC 01—Diseases and Disorders of the Nervous System, MDC 02—Diseases and Disorders of the Eye, MDC 03—Diseases and Disorders of the Ear, Nose, Mouth, and Throat. Each hospital stay has one DRG and one MDC assigned to it.

Comorbidity

Comorbidities are coexisting medical conditions that are not directly related to the principal diagnosis, or the main reason for admission, and are likely to have originated prior to the hospital stay. Comorbidities can make a hospital stay more expensive and complicated. For more information on the Comorbidity Software tool used in this Statistical Brief see <http://www.hcup-us.ahrq.gov/toolssoftware/comorbidity/comorbidity.jsp>.

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 individual patient identified by the encrypted unique patient number. Each patient is included only once in the present analysis. This differs from discharge-level analysis, in which a person who is admitted to the hospital multiple times in one year would be counted each time as a separate "discharge" from the hospital.

Readmission

Readmission rate is defined as the number of patients who had at least one readmission within a certain number of days (e.g., 7, 14, or 30 days) after being discharged alive from the initial hospital stay divided by the total number of the patients who had their initial stay between January and November 2007. Excluded from the analysis are patients who died at the initial stay or whose initial stay occurred in December of 2007 which disqualified them from the 30-day follow up. 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 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 Children's Health Insurance Program (CHIP) may be included here. Because most state data do not identify CHIP 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.

Up to two 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:

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 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 encompass almost 90 percent of all U.S. community hospital discharges in 2007. 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 2007, located at <http://www.hcup-us.ahrq.gov/reports.jsp>.

For a detailed description of HCUP and more information on the design of the SID, 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 State Inpatient Databases, 2007. Online. July 17, 2009. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.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. Readmission Rates by 7, 14, and 30 Days Post-Discharge of the Initial Hospital Stay, 2007

	Total number of patients	Readmission rate		
		7-day	14-day	30-day
Pediatrics (ages 0–20 years)				
Overall				
Medicaid	152,133	1.1%	1.9%	3.3%
Private insurance	107,600	0.9%	1.4%	2.2%
Obstetric				
Medicaid	26,461	1.5% *	2.6% *	4.2% *
Private insurance	4,589	1.6%	2.8%	4.6%
Non-obstetric				
Medicaid	125,672	1.1%	1.8%	3.1%
Private insurance	103,011	0.9%	1.3%	2.0%
Adults (ages 21–64 years)				
Overall				
Medicaid	677,610	2.6%	4.6%	7.6%
Private insurance	1,468,381	1.9%	3.3%	5.4%
Obstetric				
Medicaid	304,825	1.5%	2.4%	3.8%
Private insurance	378,844	1.2%	1.8%	2.8%
Non-obstetric				
Medicaid	372,785	3.5%	6.3%	10.7%
Private insurance	1,089,537	2.2%	3.9%	6.3%

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN.

Note: Analyses on adults are based on all ten states; analyses on newborns and pediatrics are based on three states only (AZ, NE, SC).

All observed differences between Medicaid and privately insured patients are statistically significant at $p < .05$ level except for those indicated by *.

Table 2. 30-Day Readmission Rates by Patient Demographic Characteristics, 2007

	Medicaid		Private insurance	
	Total number of patients	Readmission rate	Total number of patients	Readmission rate
Pediatrics (ages 0–20 years)				
Age (in years)				
<1	97,986	2.6%	76,336	1.5%
1–12	17,822	4.0%	14,204	3.2%
13–20, Obstetric	26,450	4.2% *	4,586	4.6%
13–20, Non-obstetric	9,812	6.1%	12,456	4.1%
Gender (Non-obstetric only)				
Female	60,105	2.9%	49,493	1.9%
Male	65,578	3.3%	53,521	2.2%
Adults (ages 21–64 years)				
Age (in years)				
Obstetric				
21–34	274,039	3.7%	291,738	2.8%
35–50	30,786	4.7%	87,106	3.1%
Non-obstetric				
21–44	181,326	9.5%	374,572	5.3%
45–64	191,459	11.8%	714,965	6.8%
Gender (Non-obstetric only)				
Female	208,858	9.8%	596,590	5.9%
Male	163,927	11.8%	492,947	6.7%

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN.

Note: Adults are based on all ten states; newborns and pediatrics are based on three states only (AZ, NE, SC).

All observed differences between Medicaid and privately insured patients are statistically significant at $p < .05$ level except for those indicated by *.

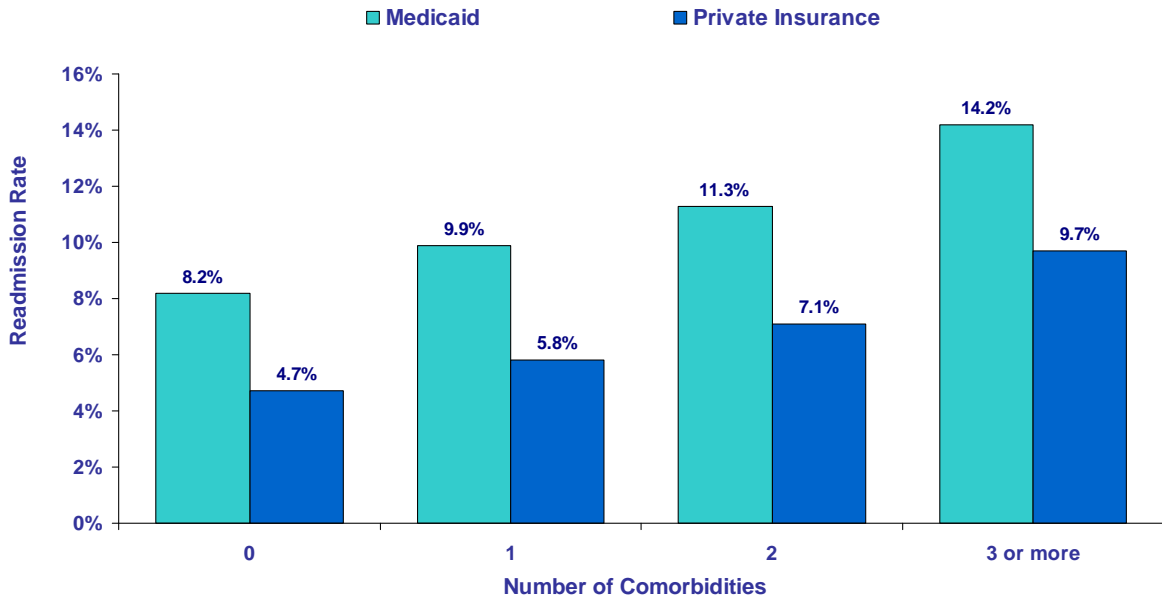
Table 3. Rates and Counts of 30-Day Readmission by Major Diagnostic Category (MDC) at Initial Hospital Stay, for Adult Medicaid Patients (ages 21-64 years), 2007

MDC at First Admission	Total number of patients	Readmission rate	Readmission counts	% of all readmissions	% of all readmissions among non-obstetrics
Pregnancy, Childbirth, & Puerperium	304,825	3.8%	12,497	21.7	--
Circulatory System	57,456	10.4%	6,761	11.7	15.0
Mental	40,504	11.8%	5,402	9.4	12.0
Respiratory System	37,458	11.4%	4,854	8.4	10.7
Digestive	37,788	10.3%	4,348	7.5	9.6
Alcohol/Substance Abuse	24,779	13.0%	3,811	6.6	8.4
Hepatobiliary System and Pancreas	18,866	12.3%	2,679	4.7	5.9
Nervous System	24,919	9.5%	2,645	4.6	5.9
Kidney & Urinary Tract	16,450	12.4%	2,326	4.0	5.1
Musculoskeletal System & Connective Tissue	24,495	8.3%	2,219	3.9	4.9
Endocrine, Nutritional, & Metabolic	16,115	10.7%	1,976	3.4	4.4
Skin, Subcutaneous Tissue & Breast	17,024	8.0%	1,484	2.6	3.3
Female Reproductive System	16,412	6.4%	1,142	2.0	2.5
Myeloproliferative & Poorly Differentiated Neoplasms	2,476	37.4%	1,133	2.0	2.5
Blood, Blood Forming Organs, & Immunological	5,741	14.1%	932	1.6	2.1
Injuries, Poisonings, & Toxic Effects of Drugs	9,429	8.4%	906	1.6	2.0
Infection & Parasite	6,871	11.5%	876	1.5	1.9
Ear, Nose, Mouth, & Throat	6,069	7.2%	490	0.9	1.1
Human Immunodeficiency Virus Infections	2,404	17.2%	485	0.8	1.1
Factors Influencing Health Status & Other Contacts with Health Services	2,969	9.9%	345	0.6	0.8
Male Reproductive System	1,482	7.2%	116	0.2	0.3
Multiple Significant Trauma	1,364	7.9%	115	0.2	0.3
Eye	954	6.9%	74	0.1	0.3
Burns	672	6.1%	43	0.1	0.1

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN.



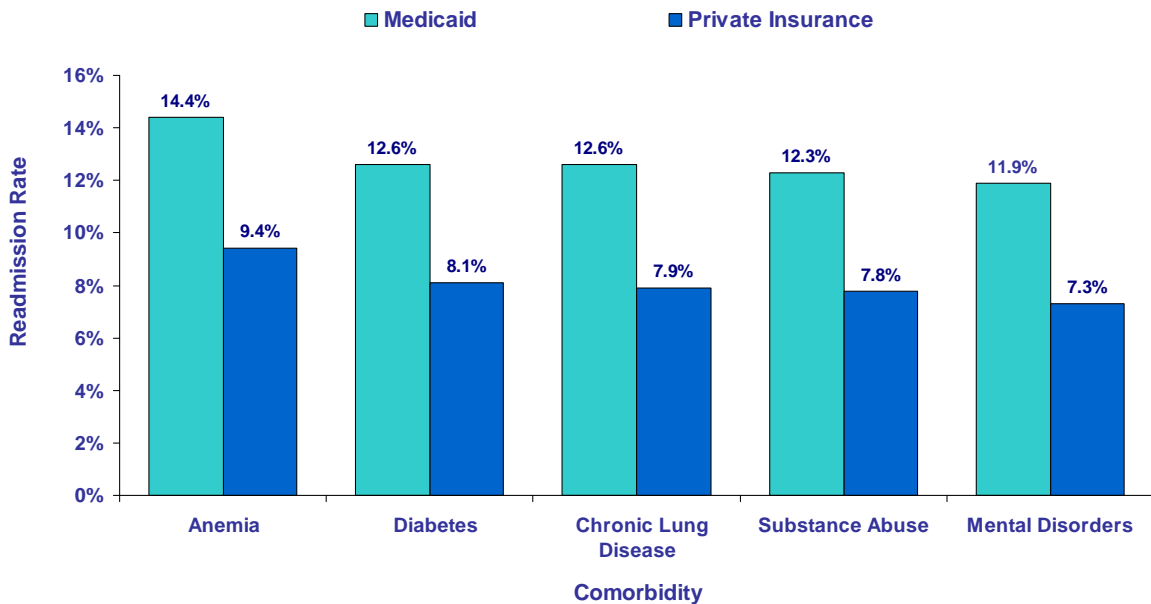
Figure 1. Non-obstetric adult 30-day readmission rates were consistently higher among Medicaid than privately insured patients for any number of comorbidities, 2007



Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN



Figure 2. Non-obstetric adult 30-day readmission rates were higher for Medicaid than for privately insured across particular comorbid conditions, 2007



Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN