

## STATISTICAL BRIEF #153

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### Readmissions to U.S. Hospitals by Diagnosis, 2010

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#### Introduction

The problem of readmissions to the hospital is receiving increased attention as a potential way to address problems in quality of care, cost of care, and care transitions.<sup>1,2</sup> Medicare reports 30-day hospital readmissions for acute myocardial infarction, congestive failure, and pneumonia for individual hospitals across the country.<sup>3</sup> Interventions are underway to reduce hospital readmissions at the state and national level.<sup>4,5</sup>

Prior research reports have focused on readmissions for specific conditions such as congestive heart failure, pneumonia, chronic obstructive pulmonary disease (COPD), and psychoses.<sup>6,7,8</sup> This Statistical Brief provides an overview of 30-day all-payer, all-cause readmissions to U.S. hospitals for a range of conditions in 2010, thereby presenting the most comprehensive national estimates on readmissions by condition.

In this Statistical Brief, *readmission* was defined as a subsequent hospital admission within 30 days following an original admission (or index stay) that occurred from January through November 2010. All-cause readmissions were examined; thus, readmissions may or may not include conditions that were listed as the principal diagnosis during the index stay. Readmissions were tracked across the same

#### Highlights

- For several of the most frequently treated conditions in U.S. hospitals, at least one in five cases resulted in a readmission within 30 days: congestive heart failure (24.7 percent), schizophrenia (22.3 percent), and acute and unspecified renal failure (21.7 percent).
- For several conditions, over one in four patients were readmitted: sickle cell anemia (31.9 percent), gangrene (31.6 percent), hepatitis (30.9 percent), diseases of the white blood cells (30.9 percent), and chronic renal failure (27.4 percent).
- For conditions with both large numbers of stays and high readmission rates, Medicare and especially Medicaid patients were more likely to be readmitted than privately insured or uninsured patients. For example, congestive heart failure readmission rates were 30.1 percent for Medicaid, 25.0 percent for Medicare, 19.5 percent for privately insured, and 17.1 for uninsured patients.
- For the same selected conditions, children and adolescents had the highest readmission rates only for complications of devices, implants or grafts (25.5 percent), compared to 19.2 percent for patients aged 65 years and older.

<sup>1</sup> Boutwell A, Jencks S. It's Not Six of One, Half-Dozen of the Other: A Comparative Analysis of Three Rehospitalization Measurement Systems for Massachusetts. 2011 AcademyHealth Annual Research Meeting and National Quality Forum. [www.qualityforum.org](http://www.qualityforum.org). Accessed March 21, 2013.

<sup>2</sup> 3M Health Information Systems. Potentially Preventable Readmissions Classification System, Methodology Overview, Document number GRP-139, May, 2008. <http://multimedia.3m.com/mws/mediawebserver?66666UuZjcFSLXTtNXMtmxMEEVuQEcuZgVs6EVs6E666666-->. Accessed March 21, 2013.

<sup>3</sup> Hospital Compare. Medicare Web site. <http://hospitalcompare.hhs.gov/>. Accessed March 21, 2013.

<sup>4</sup> Boutwell AE, Johnson MB, Rutherford P, Watson SR, Vecchioni N, Auerbach BS, Griswold P, Noga P, Wagner C. An early look at a four-state initiative to reduce avoidable hospital readmissions. Health Aff (Millwood). 2011 Jul;30(7):1272-80.

<sup>5</sup> Partnership for Patients: Better Care, Lower Costs. April, 2011. <http://www.healthcare.gov/news/factsheets/2011/04/partnership04122011a.html>. Accessed March 21, 2013.

<sup>6</sup> Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med 2009;360:1418-28.

<sup>7</sup> Stranges E, Barrett ML, Wier LM, Andrews RM. Readmissions for Heart Attack, 2009. HCUP Statistical Brief #140. August 2012. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb140.pdf>. Accessed March 21, 2013.

<sup>8</sup> Elixhauser A, Au D, Podulka J. Readmissions for Chronic Obstructive Pulmonary Disease, 2008. HCUP Statistical Brief #121. September, 2011. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb121.pdf>. Accessed March 21, 2013.

or different hospitals. Some readmissions may be planned or unavoidable—no attempt was made to remove these types of readmissions from the analysis.

Readmission rates using Healthcare Cost and Utilization Project (HCUP) data are presented for the most frequently treated conditions in U.S. hospitals during 2010 and for the conditions with the highest readmission rates. All estimates were taken from HCUPnet, the online query system that provides free access to information from HCUP.<sup>9</sup> For a subset of conditions, readmission rates are presented by age group and expected primary payer (insurance status). Patients younger than 1 year were excluded from this analysis. Readmission rates were calculated without risk adjustment.

Appendix A provides detailed information on readmission rates for most conditions treated in U.S. hospitals in 2010. The table provides information on the number of index stays for each condition, the number of all-cause readmissions within 30 days, and the percentage of index stays that were followed by a readmission within 30 days for any cause. Excluded were nonspecific conditions and any conditions with fewer than 5,000 index stays or fewer than 500 readmissions. Conditions are organized by etiology or body system.

## Findings

### *Readmission rates for the most frequently treated conditions*

Table 1 lists the 30 most frequently treated conditions in U.S. hospitals, with their 30-day readmission rates. The most frequent conditions and their readmission rates were pneumonia (15.7 percent), mood disorders (14.8 percent), osteoarthritis (4.8 percent), congestive heart failure (24.7 percent), and cardiac dysrhythmias (14.8 percent).

Among these most frequent conditions, the highest readmission rates were seen for congestive heart failure (24.7 percent), schizophrenia (22.3 percent), and acute and unspecified renal failure (21.7 percent). In other words, for these conditions over one in five patients were readmitted to the hospital within 30 days.

The lowest readmission rates were for childbirth-related procedures (trauma to perineum and vulva during childbirth, 0.8 percent; C-section, 1.5 percent), osteoarthritis (4.8 percent), and appendicitis (4.9 percent).

### *Conditions with the highest readmission rates*

Table 2 lists conditions ranked by the highest readmission rates. Because cancer readmissions are often planned, cancer is excluded from this table (although cancer-related conditions are included in the Appendix).

The five conditions with the highest readmission rates were sickle cell anemia (31.9 percent), gangrene (31.6 percent), hepatitis (30.9 percent), diseases of the white blood cells (30.9 percent), and chronic renal failure (27.4 percent). In other words, over one in four patients were readmitted to the hospital within 30 days for these conditions.

### *Readmission rates by age and insurance status for selected conditions*

Figures 1–5 provide details on 30-day all-cause readmission rates for the five conditions from Table 2 that involved more than 300,000 index stays and had overall readmission rates of at least 20 percent.<sup>10</sup>

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<sup>9</sup> <http://hcupnet.ahrq.gov>

<sup>10</sup> Two additional conditions met these criteria; however, these conditions are the subject of separate HCUP Statistical Briefs. (Chronic obstructive pulmonary disease: <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb121.jsp> and Septicemia: forthcoming in 2013).

**Table 1. All-cause 30-day readmissions ranked by the most frequently treated conditions\* in U.S. hospitals, 2010**

Rank	Principal diagnosis for index hospital stay **	Number of index stays	30-day all-cause readmissions	
			Number of readmissions	Percent readmitted
1	Pneumonia	924,160	144,894	15.7
2	Mood disorders	883,245	131,125	14.8
3	Osteoarthritis	872,661	42,241	4.8
4	Congestive heart failure, nonhypertensive	847,073	209,017	24.7
5	Cardiac dysrhythmias	705,616	104,607	14.8
6	Septicemia (except in labor)	696,122	145,896	21.0
7	Coronary atherosclerosis	666,897	90,147	13.5
8	Trauma to perineum and vulva due to childbirth	610,073	5,046	0.8
9	Chronic obstructive pulmonary disease and bronchiectasis	606,186	126,443	20.9
10	Nonspecific chest pain	601,899	61,465	10.2
11	Complication of device, implant or graft	596,062	121,036	20.3
12	Spondylosis, intervertebral disc disorders, other back problems	579,103	47,774	8.2
13	Skin and subcutaneous tissue infections	576,902	64,680	11.2
14	Urinary tract infections	522,921	84,858	16.2
15	Acute myocardial infarction	520,901	85,932	16.5
16	Acute cerebrovascular disease	520,793	71,174	13.7
17	Diabetes mellitus with complications	480,958	97,784	20.3
18	Previous C-section	462,378	7,046	1.5
19	Complications of surgical procedures or medical care	453,266	81,353	17.9
20	Biliary tract disease	430,988	48,062	11.2
21	Schizophrenia and other psychotic disorders	397,166	88,629	22.3
22	Fluid and electrolyte disorders	396,551	73,721	18.6
23	Asthma	347,404	41,320	11.9
24	Acute and unspecified renal failure	326,586	70,756	21.7
25	Gastrointestinal hemorrhage	320,613	54,154	16.9
26	Intestinal obstruction without hernia	315,128	51,135	16.2
27	Fracture of neck of femur (hip)	291,847	38,668	13.2
28	Diverticulosis and diverticulitis	289,097	35,461	12.3
29	Pancreatic disorders (not diabetes)	282,159	49,936	17.7
30	Appendicitis and other appendiceal conditions	262,024	12,875	4.9

Source: Weighted national estimates from a readmissions analysis file derived from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), 2010, Agency for Healthcare Research and Quality (AHRQ).

\* Information is provided for diagnoses with 5,000 or more weighted index stays and 500 or more weighted readmissions. See text and Definitions for details on methods for calculating readmissions.

\*\* Clinical Classification Software (CCS) label. Excludes cancers and nonspecific CCS categories.

**Table 2. All-cause 30-day readmissions ranked by conditions with the highest readmission rates,\* U.S. hospitals, 2010**

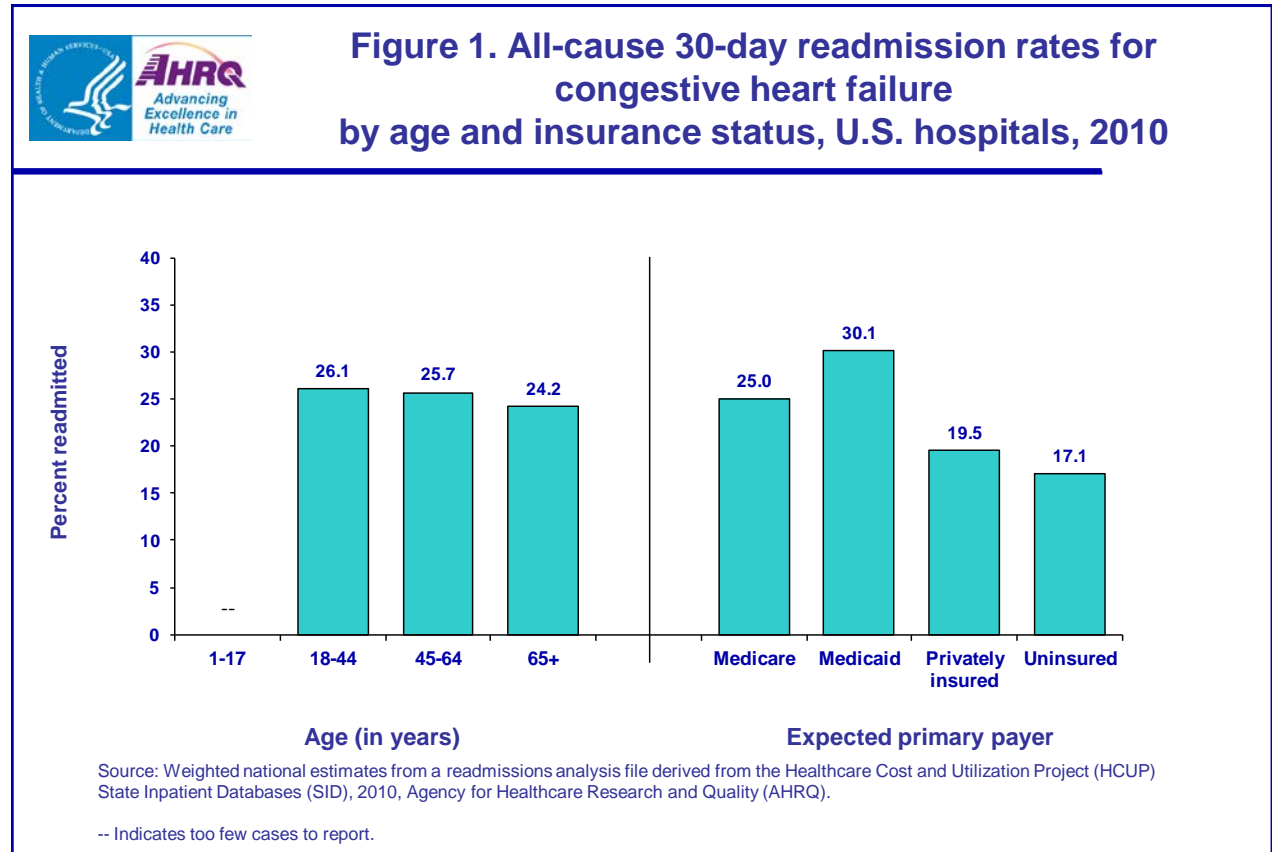
Rank	Principal diagnosis for index hospital stay **	Number of index stays	30-day all-cause readmissions	
			Number of readmissions	Percent readmitted
1	Sickle cell anemia	87,326	27,837	31.9
2	Gangrene	33,786	10,693	31.6
3	Hepatitis	37,480	11,593	30.9
4	Disease of white blood cells	54,861	16,771	30.6
5	Chronic renal failure	17,394	4,766	27.4
6	Systemic lupus erythematosus and connective tissue disorders	18,850	5,123	27.2
7	Mycoses	23,026	6,222	27.0
8	HIV infection	34,958	9,230	26.4
9	Screening and history of mental health and substance abuse	60,417	15,695	26.0
10	Peritonitis and intestinal abscess	25,219	6,315	25.0
11	Congestive heart failure, nonhypertensive	847,073	209,017	24.7
12	Personality disorders	5,436	1,316	24.2
13	Nutritional deficiencies	9,845	2,355	23.9
14	Coagulation and hemorrhagic disorders	33,397	7,920	23.7
15	Respiratory failure, insufficiency, arrest (adult)	260,781	59,842	22.9
16	Nausea and vomiting	51,833	11,854	22.9
17	Schizophrenia and other psychotic disorders	397,166	88,629	22.3
18	Acute and unspecified renal failure	326,586	70,756	21.7
19	Aspiration pneumonitis, food/vomitus	147,837	31,772	21.5
20	Hypertension with complications and secondary hypertension	211,243	45,309	21.4
21	Chronic ulcer of skin	50,845	10,823	21.3
22	Pleurisy, pneumothorax, pulmonary collapse	101,298	21,485	21.2
23	Early or threatened labor	179,175	37,797	21.1
24	Septicemia	696,122	145,896	21.0
25	Anemia	203,098	42,374	20.9
26	Chronic obstructive pulmonary disease and bronchiectasis	606,186	126,443	20.9
27	Aortic and peripheral arterial embolism or thrombosis	26,104	5,381	20.6
28	Heart valve disorders	100,327	20,613	20.5
29	Diabetes mellitus with complications	480,958	97,784	20.3
30	Complication of device, implant or graft	596,062	121,036	20.3

Source: Weighted national estimates from a readmissions analysis file derived from Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), 2010, Agency for Healthcare Research and Quality (AHRQ).

\* Information is provided for diagnoses with 5,000 or more weighted index stays and 500 or more weighted readmissions. See text and Definitions for details on methods for calculating readmissions.

\*\* Clinical Classification Software (CCS) label. Excludes cancers and nonspecific CCS categories.

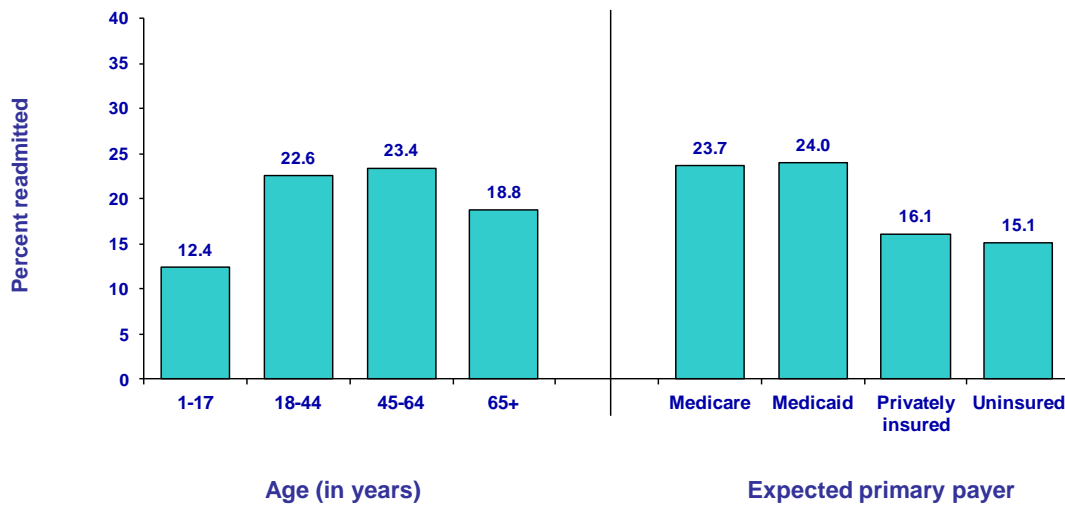
Figure 1 shows that readmission rates for congestive heart failure were relatively uniform across age groups, ranging from 24.2 percent to 26.1 percent. The highest readmission rate was seen for patients with a primary expected payer of Medicaid (30.1 percent) compared to 25.0 percent for Medicare-covered patients, 19.5 percent for privately insured patients, and 17.1 percent for the uninsured.



Readmission rates for schizophrenia are shown in figure 2. The highest readmission rates were seen for patients aged 18–44 years (22.6 percent) and 45–64 years (23.4 percent). Readmission rates for patients with a primary expected payer of Medicare (23.7 percent) and Medicaid (24.0 percent) were about 50 percent higher than for other patients (15.1–16.1 percent).



**Figure 2. All-cause 30-day readmission rates for schizophrenia and other psychotic conditions by age and insurance status, U.S. hospitals, 2010**



Source: Weighted national estimates from a readmissions analysis file derived from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), 2010, Agency for Healthcare Research and Quality (AHRQ).

Readmission rates for acute and unspecified renal failure are depicted in figure 3. Readmission rates were similar for all adult age groups (19.0–22.1 percent), but again were substantially higher for patients with a primary expected payer of Medicare (22.7 percent) or covered by Medicaid (25.0 percent) than for other patients (13.3–17.0 percent).

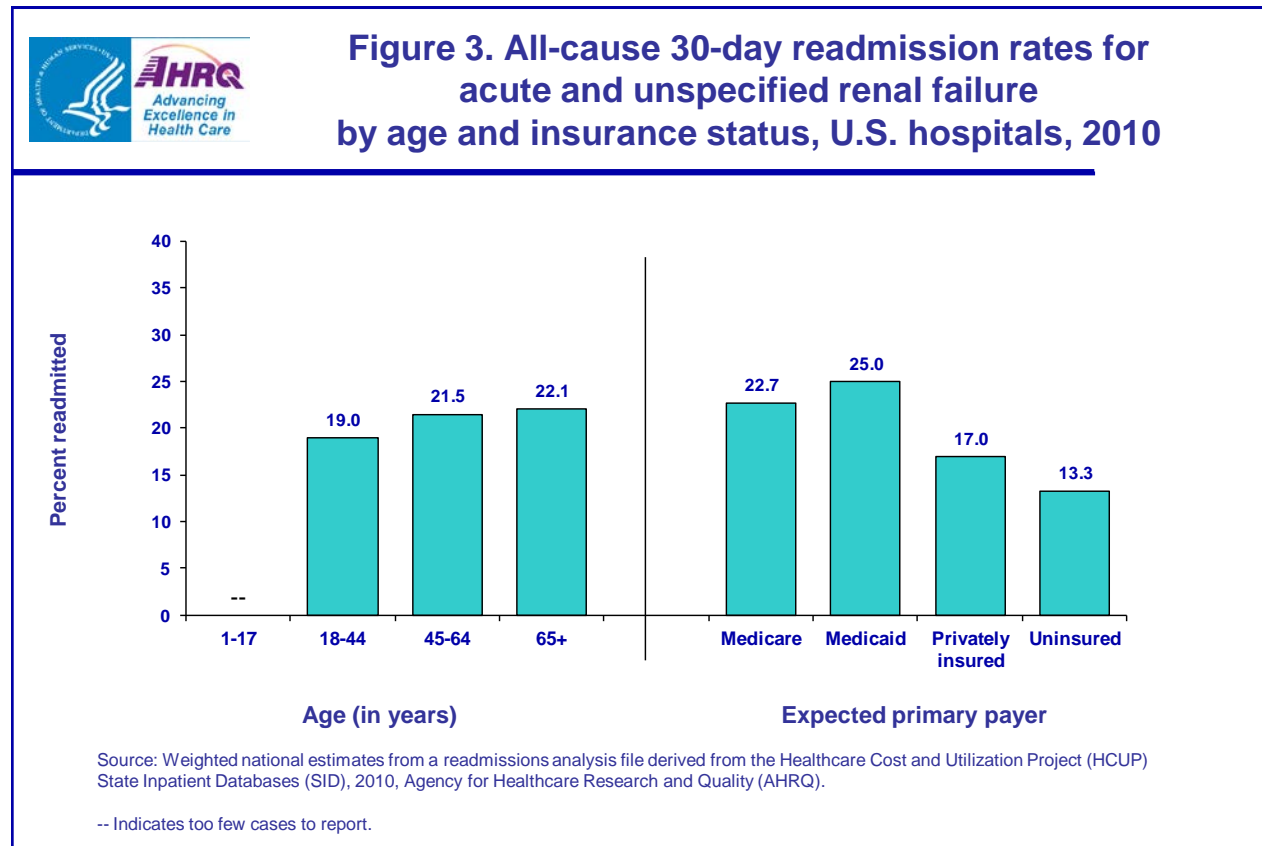
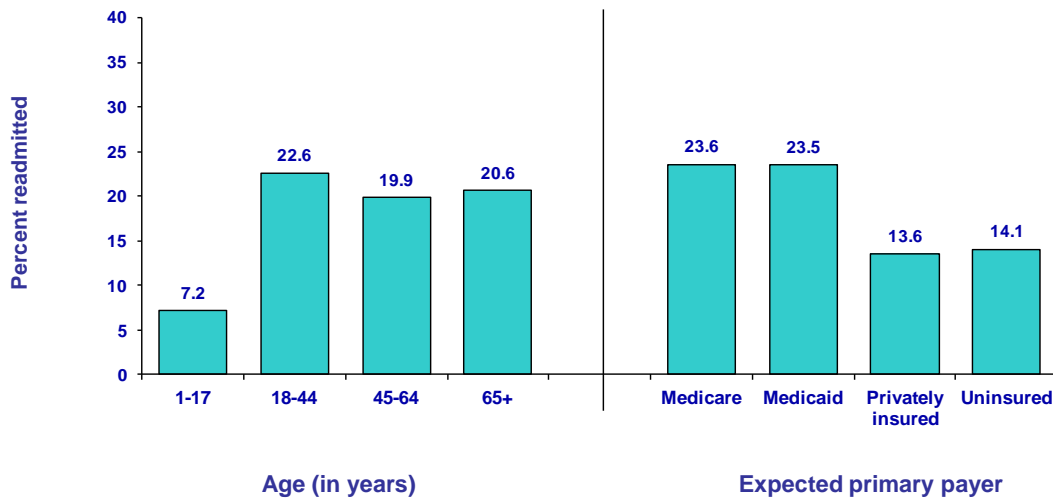


Figure 4 shows readmission rates for diabetes mellitus with complications. The highest readmission rate was for patients aged 18–44 years (22.6 percent), followed closely by patients aged 65 years and older (20.6 percent) and 45–64 years (19.9 percent). Readmission rates were nearly identical for patients covered by Medicare (23.6 percent) and Medicaid (23.5 percent); these rates were about 70 percent higher than rates for the privately insured and uninsured (13.6–14.1 percent).



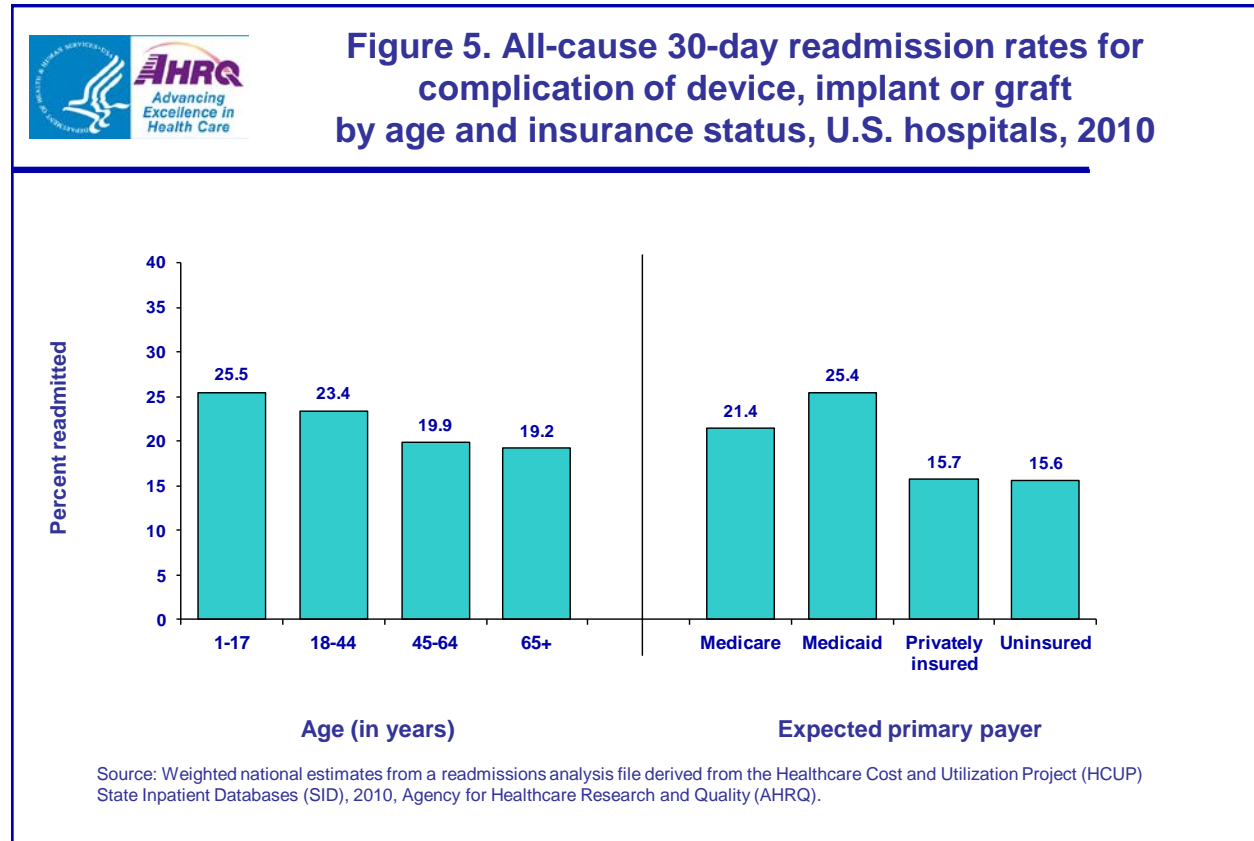
**Figure 4. All-cause 30-day readmission rates for diabetes with complications by age and insurance status, U.S. hospitals, 2010**



Source: Weighted national estimates from a readmissions analysis file derived from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), 2010, Agency for Healthcare Research and Quality (AHRQ).



Finally, figure 5 depicts readmission rates for patients with an index stay during which their principal diagnosis was complication of device, implant, or graft. The highest readmission rate was for children aged 1–17 years (25.5 percent). Similarly, the readmission rate for Medicaid-covered patients was 25.4 percent; this rate was nearly 20 percent higher than rates for Medicare (21.4 percent) and over 60 percent higher than those for privately insured and uninsured patients (15.6–15.7 percent).



Overall, across select conditions with high volume (more than 300,000 index stays) and high readmission rates (at least 20 percent), the 30-day readmission rate varied by age group and condition. For some conditions (complication of device, implant or graft), children had a higher readmission rate than adults; for other conditions (schizophrenia and other psychotic conditions, diabetes with complications), children had a lower readmission rate than adults. In terms of payer, patients with Medicare and Medicaid coverage consistently had higher readmission rates than patients with private insurance or those who were uninsured.

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)		Number of index stays	30-day all-cause readmissions	
			Number of readmissions	Percent readmitted
<b>Infectious and Parasitic Diseases</b>				
1	Tuberculosis	5,064	653	12.9
2	Septicemia (except in labor)	696,122	145,896	21.0
3	Bacterial infection, unspecified site	5,654	721	12.8
4	Mycoses	23,026	6,222	27.0
5	HIV infection	34,958	9,230	26.4
6	Hepatitis	37,480	11,593	30.9
7	Viral infections	56,477	5,849	10.4
10	Immunizations and screening for infectious diseases	7,128	1,034	14.5
<b>Neoplasms</b>				
11	Cancer of head and neck	28,530	6,020	21.1
12	Cancer of esophagus	11,054	3,170	28.7
13	Cancer of stomach	19,528	5,111	26.2
14	Cancer of colon	89,183	14,388	16.1
15	Cancer of rectum and anus	39,395	8,090	20.5
16	Cancer of liver and intrahepatic bile duct	17,980	5,077	28.2
17	Cancer of pancreas	31,054	8,512	27.4
18	Cancer of other GI organs, peritoneum	18,461	4,379	23.7
19	Cancer of bronchus, lung	117,172	24,893	21.2
21	Cancer of bone and connective tissue	12,242	3,307	27.0
24	Cancer of breast	76,838	6,120	8.0
25	Cancer of uterus	35,278	3,923	11.1
26	Cancer of cervix	16,090	2,457	15.3
27	Cancer of ovary	22,064	4,753	21.5
28	Cancer of other female genital organs	6,132	1,025	16.7
29	Cancer of prostate	82,794	5,016	6.1
32	Cancer of bladder	30,244	6,465	21.4
33	Cancer of kidney and renal pelvis	42,028	5,074	12.1
35	Cancer of brain and nervous system	32,382	6,649	20.5
36	Cancer of thyroid	22,335	1,494	6.7
38	Non-Hodgkin's lymphoma	34,769	12,712	36.6
39	Leukemias	31,157	13,008	41.8
40	Multiple myeloma	15,427	4,381	28.4
41	Cancer, other primary	6,146	1,781	29.0
42	Secondary malignancies	177,796	44,647	25.1
43	Malignant neoplasm without specification of site	6,636	1,670	25.2
44	Neoplasms of unspecified nature or uncertain behavior	42,002	9,551	22.7
45	Maintenance chemotherapy, radiotherapy	126,113	82,601	65.5
46	Benign neoplasm of uterus	156,836	6,186	3.9

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)	Number of index stays	30-day all-cause readmissions	
		Number of readmissions	Percent readmitted
<b>Endocrine, Nutritional, and Metabolic Diseases and Immunity Disorders</b>			
48 Thyroid disorders	40,936	3,072	7.5
49 Diabetes mellitus without complication	20,776	1,776	8.5
50 Diabetes mellitus with complications	480,958	97,784	20.3
52 Nutritional deficiencies	9,845	2,355	23.9
54 Gout and other crystal arthropathies	17,506	2,710	15.5
55 Fluid and electrolyte disorders	396,551	73,721	18.6
56 Cystic fibrosis	10,518	1,366	13.0
<b>Diseases of Blood and Blood-Forming Organs</b>			
59 Anemia	203,098	42,374	20.9
60 Acute posthemorrhagic anemia	27,199	5,239	19.3
61 Sickle cell anemia	87,326	27,837	31.9
62 Coagulation and hemorrhagic disorders	33,397	7,920	23.7
63 Disease of white blood cells	54,861	16,771	30.6
<b>Mental Disorders</b>			
650 Adjustment disorders	49,073	3,980	8.1
651 Anxiety disorders	45,102	5,519	12.2
652 Attention-deficit, conduct, and disruptive behavior disorders	18,218	1,692	9.3
653 Delirium, dementia, and amnestic and other cognitive disorders	131,003	21,566	16.5
655 Disorders diagnosed in infancy, childhood, or adolescence	5,613	753	13.4
656 Impulse control disorders, NEC	12,204	1,652	13.5
657 Mood disorders	883,245	131,125	14.8
658 Personality disorders	5,436	1,316	24.2
659 Schizophrenia and other psychotic disorders	397,166	88,629	22.3
660 Alcohol-related disorders	245,289	45,033	18.4
661 Substance-related disorders	212,612	32,050	15.1
663 Screening and history of mental health and substance abuse	60,417	15,695	26.0
670 Miscellaneous mental disorders	43,193	4,189	9.7
<b>Diseases of Nervous System and Sense Organs</b>			
76 Meningitis	32,909	2,565	7.8
77 Encephalitis	8,487	1,219	14.4
79 Parkinson's disease	13,089	2,118	16.2
80 Multiple sclerosis	21,708	2,529	11.6
82 Paralysis	7,394	987	13.3
83 Epilepsy, convulsions	252,200	31,965	12.7
84 Headache, including migraine	70,782	7,373	10.4
85 Coma, stupor, and brain damage	16,823	2,740	16.3
89 Blindness and vision defects	5,364	521	9.7
90 Inflammation, infection of eye	15,984	1,201	7.5

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)		Number of index stays	30-day all-cause readmissions	
			Number of readmissions	Percent readmitted
92	Otitis media and related conditions	9,855	738	7.5
93	Conditions associated with dizziness or vertigo	69,022	4,964	7.2
<b>Diseases of the Circulatory System</b>				
96	Heart valve disorders	100,327	20,613	20.5
97	Peri-, endo-, and myocarditis, cardiomyopathy	66,648	11,986	18.0
98	Essential hypertension	72,930	7,721	10.6
99	Hypertension with complications and secondary hypertension	211,243	45,309	21.4
100	Acute myocardial infarction	520,901	85,932	16.5
101	Coronary atherosclerosis	666,897	90,147	13.5
102	Nonspecific chest pain	601,899	61,465	10.2
103	Pulmonary heart disease	162,269	25,599	15.8
105	Conduction disorders	58,074	6,386	11.0
106	Cardiac dysrhythmias	705,616	104,607	14.8
107	Cardiac arrest and ventricular fibrillation	8,063	1,398	17.3
108	Congestive heart failure, nonhypertensive	847,073	209,017	24.7
109	Acute cerebrovascular disease	520,793	71,174	13.7
110	Occlusion or stenosis of precerebral arteries	111,833	11,877	10.6
112	Transient cerebral ischemia	166,904	16,436	9.8
113	Late effects of cerebrovascular disease	18,829	2,981	15.8
114	Peripheral and visceral atherosclerosis	162,792	28,031	17.2
115	Aortic, peripheral, and visceral artery aneurysms	73,143	11,247	15.4
116	Aortic and peripheral arterial embolism or thrombosis	26,104	5,381	20.6
118	Phlebitis, thrombophlebitis and thromboembolism	154,023	23,640	15.3
120	Hemorrhoids	30,467	4,003	13.1
<b>Diseases of the Respiratory System</b>				
122	Pneumonia	924,160	144,894	15.7
123	Influenza	10,284	776	7.5
124	Acute and chronic tonsillitis	31,874	1,097	3.4
125	Acute bronchitis	78,848	7,461	9.5
127	Chronic obstructive pulmonary disease and bronchiectasis	606,186	126,443	20.9
128	Asthma	347,404	41,320	11.9
129	Aspiration pneumonitis, food/vomitus	147,837	31,772	21.5
130	Pleurisy, pneumothorax, pulmonary collapse	101,298	21,485	21.2
131	Respiratory failure, insufficiency, arrest (adult)	260,781	59,842	22.9
132	Lung disease due to external agents	5,477	966	17.6
<b>Diseases of the Digestive System</b>				
135	Intestinal infection	207,083	36,451	17.6
136	Disorders of teeth and jaw	25,722	1,621	6.3
137	Disease of mouth, excluding dental	19,009	1,966	10.3

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)	Number of index stays	30-day all-cause readmissions	
		Number of readmissions	Percent readmitted
138 Esophageal disorders	125,280	16,921	13.5
139 Gastroduodenal ulcer (except hemorrhage)	42,462	6,170	14.5
140 Gastritis and duodenitis	99,130	15,355	15.5
142 Appendicitis and other appendiceal conditions	262,024	12,875	4.9
143 Abdominal hernia	174,459	19,885	11.4
144 Regional enteritis and ulcerative colitis	94,732	17,579	18.6
145 Intestinal obstruction without hernia	315,128	51,135	16.2
146 Diverticulosis and diverticulitis	289,097	35,461	12.3
147 Anal and rectal conditions	47,035	5,326	11.3
148 Peritonitis and intestinal abscess	25,219	6,315	25.0
149 Biliary tract disease	430,988	48,062	11.2
152 Pancreatic disorders (not diabetes)	282,159	49,936	17.7
153 Gastrointestinal hemorrhage	320,613	54,154	16.9
154 Noninfectious gastroenteritis	144,507	17,262	11.9
<b>Diseases of the Genitourinary System</b>			
156 Nephritis, nephrosis, renal sclerosis	7,561	1,473	19.5
157 Acute and unspecified renal failure	326,586	70,756	21.7
158 Chronic renal failure	17,394	4,766	27.4
159 Urinary tract infections	522,921	84,858	16.2
160 Calculus of urinary tract	154,073	15,938	10.3
163 Genitourinary symptoms and ill-defined conditions	32,102	5,711	17.8
164 Hyperplasia of prostate	55,298	5,505	10.0
165 Inflammatory conditions of male genital organs	23,662	2,344	9.9
167 Nonmalignant breast conditions	19,482	1,668	8.6
168 Inflammatory disease of female pelvic organs	38,989	3,225	8.3
169 Endometriosis	33,918	1,621	4.8
170 Prolapse of female genital organs	105,048	2,847	2.7
171 Menstrual disorders	87,633	4,311	4.9
172 Ovarian cyst	36,491	2,374	6.5
173 Menopausal disorders	9,602	654	6.8
<b>Complications of Pregnancy, Childbirth, and the Puerperium</b>			
180 Ectopic pregnancy	20,948	784	3.7
182 Hemorrhage during pregnancy, abruptio placenta, placenta previa	46,191	6,847	14.8
183 Hypertension complicating pregnancy, childbirth and the puerperium	230,927	22,091	9.6
184 Early or threatened labor	179,175	37,797	21.1
185 Prolonged pregnancy	250,122	3,591	1.4
186 Diabetes or abnormal glucose tolerance complicating pregnancy	84,725	5,384	6.4
187 Malposition, malpresentation	132,312	2,918	2.2
188 Fetopelvic disproportion, obstruction	65,609	1,255	1.9

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)	Number of index stays	30-day all-cause readmissions	
		Number of readmissions	Percent readmitted
189 Previous C-section	462,378	7,046	1.5
190 Fetal distress and abnormal forces of labor	170,752	3,893	2.3
191 Polyhydramnios and other problems of amniotic cavity	179,406	7,028	3.9
192 Umbilical cord complication	161,112	1,284	0.8
193 Trauma to perineum and vulva	610,073	5,046	0.8
196 Normal pregnancy and/or delivery	208,463	1,559	0.7
<b>Diseases of the Skin and Subcutaneous Tissue</b>			
197 Skin and subcutaneous tissue infections	576,902	64,680	11.2
199 Chronic ulcer of skin	50,845	10,823	21.3
<b>Diseases of the Musculoskeletal System and Connective Tissue</b>			
201 Infective arthritis and osteomyelitis	70,424	12,199	17.3
202 Rheumatoid arthritis and related disease	14,836	1,587	10.7
203 Osteoarthritis	872,661	42,241	4.8
205 Spondylosis, intervertebral disc disorders, other back problems	579,103	47,774	8.2
207 Pathological fracture	59,946	11,781	19.7
210 Systemic lupus erythematosus and connective tissue disorders	18,850	5,123	27.2
<b>Congenital Anomalies</b>			
213 Cardiac and circulatory congenital anomalies	23,824	2,610	11.0
214 Digestive congenital anomalies	6,100	626	10.3
215 Genitourinary congenital anomalies	7,480	729	9.7
<b>Injury and Poisoning</b>			
225 Joint disorders and dislocations, trauma-related	31,027	2,222	7.2
226 Fracture of neck of femur (hip)	291,847	38,668	13.2
227 Spinal cord injury	13,188	1,609	12.2
228 Skull and face fractures	45,409	3,164	7.0
229 Fracture of upper limb	136,326	10,895	8.0
230 Fracture of lower limb	234,607	23,540	10.0
232 Sprains and strains	29,538	2,356	8.0
233 Intracranial injury	162,589	18,304	11.3
234 Crushing injury or internal injury	85,422	7,744	9.1
235 Open wounds of head, neck, and trunk	29,547	2,028	6.9
236 Open wounds of extremities	38,921	2,847	7.3
237 Complication of device, implant or graft	596,062	121,036	20.3
238 Complications of surgical procedures or medical care	453,266	81,353	17.9
239 Superficial injury, contusion	40,973	4,975	12.1
240 Burns	34,452	3,431	10.0
241 Poisoning by psychotropic agents	60,590	6,496	10.7
242 Poisoning by other medications and drugs	107,558	13,426	12.5
243 Poisoning by nonmedicinal substances	15,356	1,121	7.3

**Appendix. All-cause 30-day readmissions and costs for selected diagnoses,\* U.S. hospitals, 2010**

Principal diagnosis for index hospital stay (Clinical Classification Software [CCS] diagnosis category number and label)	Number of index stays	30-day all-cause readmissions	
		Number of readmissions	Percent readmitted
<b>Symptoms, Signs, and Ill-Defined Conditions</b>			
245 Syncope	235,483	24,686	10.5
246 Fever of unknown origin	53,785	9,322	17.3
247 Lymphadenitis	13,632	1,242	9.1
248 Gangrene	33,786	10,693	31.6
250 Nausea and vomiting	51,833	11,854	22.9
251 Abdominal pain	166,071	26,993	16.3
252 Malaise and fatigue	33,141	6,054	18.3
253 Allergic reactions	23,860	2,482	10.4
254 Rehabilitation care, fitting of prostheses, adjustment of devices	47,035	5,008	10.6

Source: Weighted national estimates from a readmissions analysis file derived from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), 2010, Agency for Healthcare Research and Quality (AHRQ).

\* Information is provided for diagnoses with 5,000 or more weighted index stays and 500 or more weighted readmissions. See text and Definitions for details on methods for calculating readmissions.

## Data Source

The estimates in this Statistical Brief are based on a readmissions analysis file that was created with the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). These databases include reliable, verified synthetic patient identifiers that can be used to track a person across hospitals within a State. Estimates were taken from HCUPnet, the online query system that provides free access to information from HCUP: <http://hcupnet.ahrq.gov/>. HCUPnet provides access to health statistics and information on hospital inpatient and emergency department utilization, and it includes analytic tables using the readmissions analysis file. HCUPnet provides additional detailed results and sortable tables that provide instant information on readmissions to the hospital within 30 days of discharge.

For 2010, readmissions data were available from 18 States: Alaska, Arkansas, California, Florida, Georgia, Hawaii, Louisiana, Massachusetts, Mississippi, Missouri, Nebraska, New Mexico, New York, South Carolina, Tennessee, Utah, Virginia, and Washington. These 18 States are geographically dispersed and accounted for 46 percent of the total U.S. resident population and 45 percent of the total U.S. hospitalizations. The readmissions analysis file included 14.0 million unweighted discharges.

The study population in this readmissions analysis file included discharges from community, non-rehabilitation, non-specialty hospitals. Weights for national estimates were developed using poststratification on hospital characteristics (Census region, urban-rural location, teaching capabilities, bed size, and control/ownership) and patient age groups.

## Definitions

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

For the index stay, the diagnoses examined in this Statistical Brief are based on the CCS for the 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 approximately 14,000 ICD-9-CM diagnosis codes.

CCS categorizes ICD-9-CM diagnoses into a manageable number of clinically meaningful categories.<sup>11</sup> This "clinical grouper" makes it easier to quickly understand patterns of diagnoses. CCS categories identified as "Other" typically are not reported; these categories include miscellaneous, otherwise unclassifiable diagnoses that may be difficult to interpret as a group.

### *Readmissions*

The 30-day readmission rate is defined as the number of admissions for each condition for which there was at least one subsequent hospital admission within 30 days divided by the total number of admissions from January through November 2010. That is, when patients are discharged from the hospital, they are followed for 30 days in the data. If any readmission to the same or different hospital occurs during this time period, the admission is counted as a readmission. No more than one readmission is counted within the 30-day period, because the outcome measure assessed here is "percentage of admissions who are readmitted." If a patient was transferred to a different hospital on the same day or was transferred within the same hospital, the two events were combined as a single stay and the second event was not counted as a readmission; that is, transfers were not considered a readmission. In the case of admissions for which there was more than one readmission in the 30-day period, the data presented in this Statistical Brief reflect the characteristics and costs of the first readmission.

Every qualifying hospital stay is counted as a separate index (starting point) admission. Thus, a single patient can be counted multiple times during the course of the January through November observation period. In addition, index admissions do not require a prior "clean period" with no hospitalizations; that is, a hospital stay may be a readmission for a prior stay and the index admission for a subsequent

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<sup>11</sup> HCUP Clinical Classifications Software (CCS). Healthcare Cost and Utilization Project (HCUP). U.S. Agency for Healthcare Research and Quality, Rockville, MD. Updated March 2013. <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp>. Accessed March 21, 2013.



readmission. Admissions were disqualified from the analysis as index admissions if they could not be followed for 30 days for one of the following reasons: (1) admissions in which the patient died in the hospital, (2) admissions missing information on length of stay, and (3) admissions discharged in December 2010.

#### *Types of hospitals included in HCUP*

HCUP is based on data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals.

#### *Payer (Insurance Status)*

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 patients covered by fee-for-service and managed care Medicare
- Medicaid: includes patients covered by fee-for-service and managed care Medicaid. 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 health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- Other: includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs
- Uninsured: includes expected primary payer of "self-pay" and "no charge."

When more than one payer is listed for a hospital discharge, the first-listed payer is used.

#### **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** Center for Health Information and Analysis  
**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  
**New Mexico** Department of Health  
**New York** State Department of Health  
**North Carolina** Department of Health and Human Services  
**North Dakota** (data provided by the Minnesota Hospital Association)  
**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** 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 more than 95 of all U.S. community hospital discharges in 2010. 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.

### About HCUPnet

HCUPnet is an online query system that offers instant access to the largest set of all-payer health care databases publicly available. HCUPnet has an easy step-by-step query system, allowing for tables and graphs to be generated on national and regional statistics as well as trends for community hospitals in the United States. HCUPnet generates statistics using data from HCUP's Nationwide Inpatient Sample (NIS), the Kids' Inpatient Database (KID), the Nationwide Emergency Department Sample (NEDS), the State Inpatient Databases (SID), and the State Emergency Department Databases (SEDD).

### 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/>. HCUPnet provides ready-to-use tables on readmission rates by condition and procedure (using Clinical Classification Software categories), diagnosis related groups (DRGs), and major diagnostic categories (MDCs).

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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](mailto:hcup@ahrq.gov) or send a letter to the address below:

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