

## Overview of Clinical Conditions With Frequent and Costly Hospital Readmissions by Payer, 2018

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#### Introduction

Hospital readmissions are a leading healthcare concern, both in terms of implications for the quality of care provided to hospitalized patients and for the healthcare costs associated with readmission. Some readmissions, such as those for cancer and related treatment, are expected and planned, but many readmissions are not. Hospitals, health systems, and payers have implemented a variety of strategies, such as care coordination and patient education, to reduce preventable readmissions. National statistics about the clinical conditions with the highest number and rate of readmissions and the highest readmission costs can help identify areas of focus for initiatives aimed at reducing preventable readmissions.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on hospital inpatient conditions with high frequency and cost of readmissions among adults (aged 18 years and older) by expected payer using the 2018 Nationwide Readmissions Database (NRD). A *readmission* was defined as a subsequent hospital admission for any cause within 30 days following an initial stay (index admission) between January and November 2018. Three readmission metrics are presented overall and by expected payer: (1) conditions with the highest number of readmissions, (2) conditions with the highest readmission rate, and (3) conditions with the highest average readmission cost. The expected payer and condition (principal diagnosis) are based on the index admission. Index admissions for cancer and cancer-related therapies are included in overall readmission statistics but are not reported in condition-specific statistics.

#### Highlights

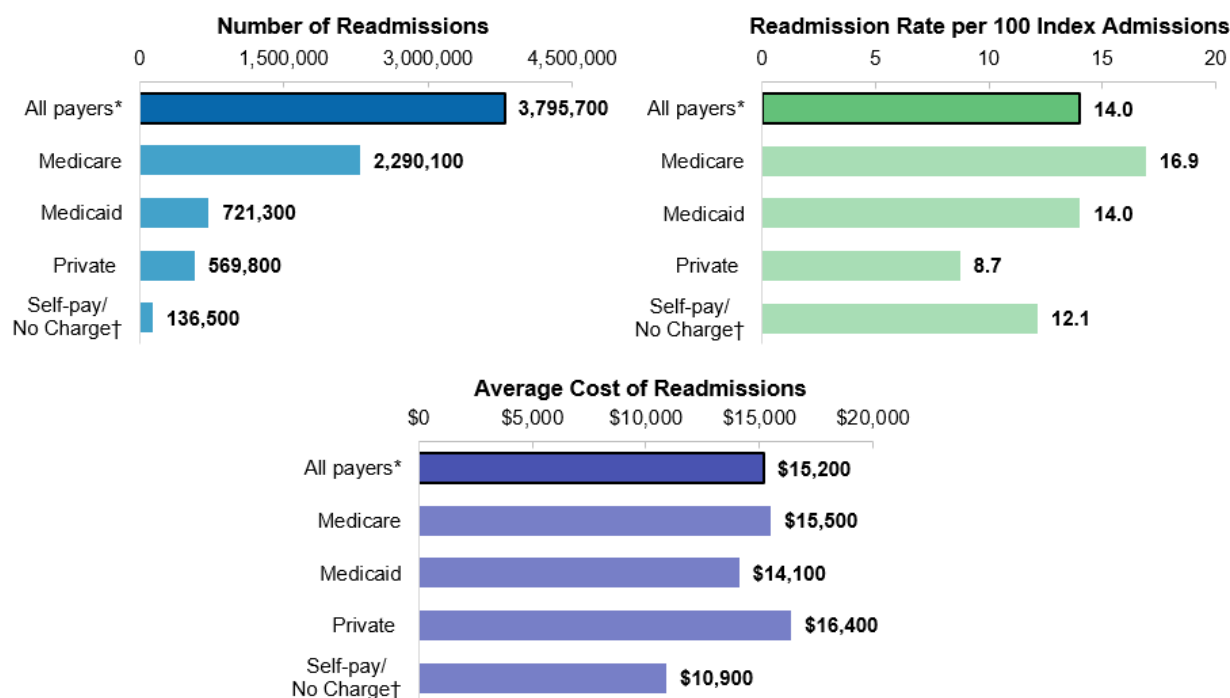
- In 2018, there were 3.8 million 30-day all-cause adult hospital readmissions, with a 14 percent readmission rate and an average readmission cost of \$15,200.
- Index (initial) admissions for septicemia accounted for the largest number of readmissions overall (8.3 percent) and by expected payer. Septicemia also had among the highest average readmission costs for Medicaid and self-pay/no charge stays, accounting for approximately 10 and 9 percent, respectively, of aggregate readmission costs.
- Index admissions for sickle cell trait/anemia had the highest readmission rate overall (36.1 percent) as well as among Medicare and Medicaid stays (37.2 and 39.4 percent, respectively).
- Heart failure was among the top five conditions at index admission with the highest number and highest rate of readmissions for Medicaid and self-pay/no charge stays.
- Overall, the highest average readmission cost was for index admissions for complication of transplanted organs or tissue (\$27,000), which also had the highest average readmission cost for privately insured stays (\$31,200) and the second highest average readmission cost for Medicare stays (\$24,200).

## Findings

### Overview of adult hospital readmissions by expected payer, 2018

Figure 1 presents three sets of statistics, overall and by expected payer, on 30-day all-cause adult hospital readmissions: the number of readmissions, the readmission rate, and the average cost of readmissions.

**Figure 1. Number, rate, and average cost of 30-day all-cause adult hospital readmissions, by expected payer, 2018**



Note: Number of readmissions is rounded to the nearest hundred. Average cost of readmission is rounded to the nearest \$100.

\* Statistics for "all payers" include 77,900 readmissions with an expected payer of "other" or missing/invalid expected payer information.

† Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

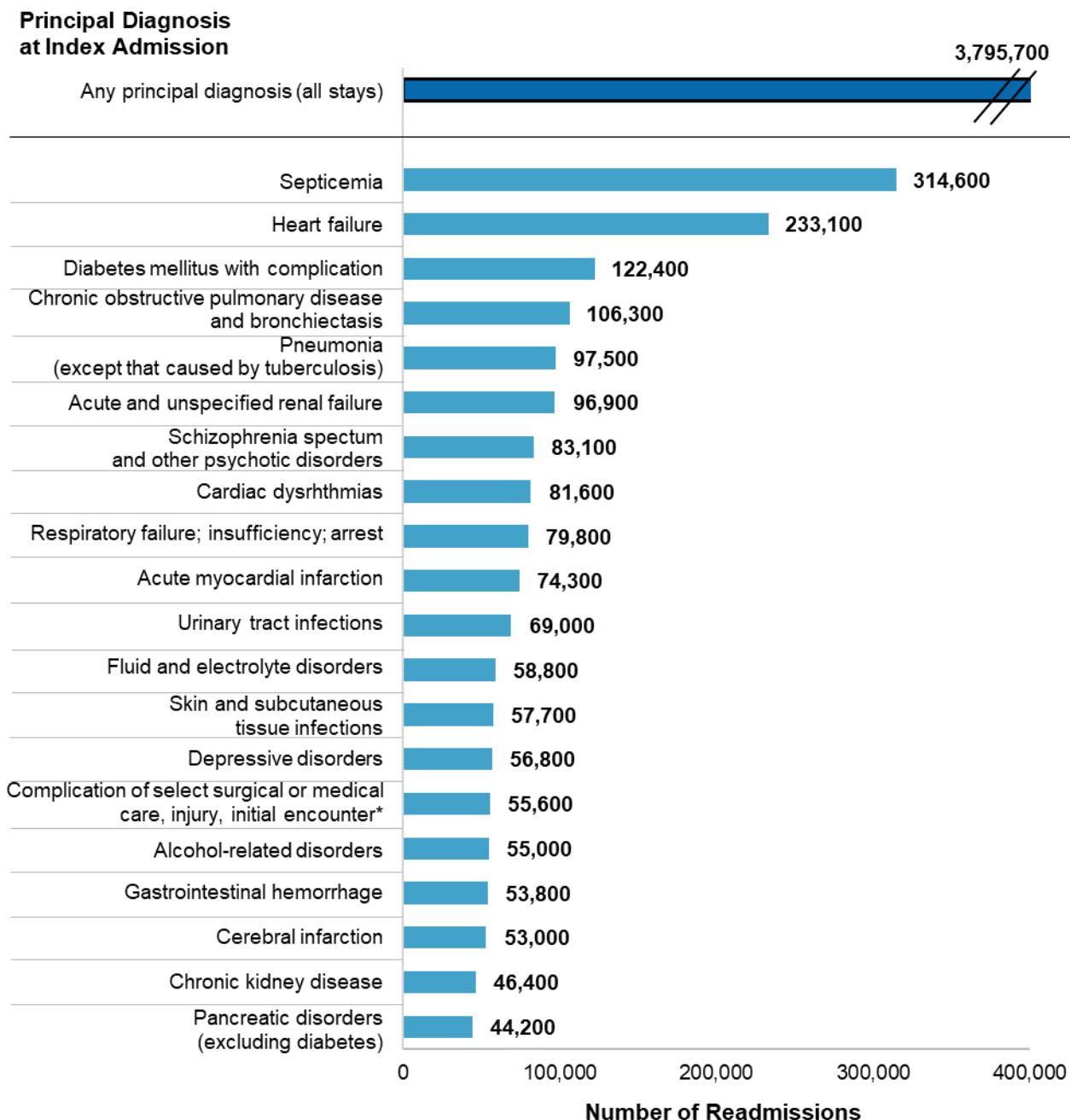
- **In 2018, there were a total of 3.8 million adult hospital readmissions within 30 days, with an average readmission rate of 14 percent and an average readmission cost of \$15,200.**

Across all expected payers in 2018, there were 3.8 million readmissions, of which Medicare accounted for 60.3 percent (2.3 million) and Medicaid accounted for 19.0 percent (721,300). The overall readmission rate was 14.0 per 100 index admissions, with Medicare stays having the highest readmission rate (16.9 percent) and privately insured stays having the lowest readmission rate (8.7 percent). The average readmission cost was \$15,200, ranging from \$10,900 for self-pay/no charge stays to \$16,400 for privately insured stays.

Conditions with the highest number of adult hospital readmissions by expected payer, 2018

Figure 2 presents the 20 principal diagnoses (conditions) at index admission with the highest number of 30-day all-cause hospital readmissions among adults in 2018.

**Figure 2. Top 20 principal diagnoses with the highest number of 30-day all-cause adult hospital readmissions, 2018**



Abbreviation: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as "neoplasms" (cancer) or "factors influencing health status and contact with health services" (e.g., encounter for antineoplastic therapies) are excluded from reporting. // indicates a break in the axis. Number of readmissions is rounded to the nearest hundred.

\* This includes complications, such as infection, for surgical or medical care other than those from cardiovascular, genitourinary, or internal orthopedic devices or from organ/tissue transplants.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **In 2018, 20 percent of adult hospital readmissions were associated with four conditions at index admission: septicemia, heart failure, diabetes, and chronic obstructive pulmonary disease (COPD).**

Hospital stays for septicemia at index admission had the highest number of 30-day all-cause readmissions in 2018 (314,600), accounting for 8.3 percent of all readmissions. The top four principal diagnoses at index admission—septicemia, heart failure, diabetes, and COPD—combined accounted for one in five readmissions.

- **The top 20 principal diagnoses at index admission with the highest number of 30-day all-cause readmissions accounted for nearly half of all readmissions (48.5 percent).**

Overall, approximately half (48.5 percent) of all readmissions in 2018 were associated with 20 principal diagnoses at index admission. Of these, four circulatory system diseases at index admission—heart failure, cardiac dysrhythmias, acute myocardial infarction, and cerebral infarction—constituted 11.6 percent of readmissions. Three respiratory conditions at index admission—COPD, pneumonia, and respiratory failure—accounted for another 7.5 percent of readmissions. Three genitourinary conditions at index admission—acute and unspecified renal failure, urinary tract infections, and chronic kidney disease—accounted for 5.6 percent of readmissions. Three mental and/or substance use disorders—schizophrenia, depressive disorders, and alcohol-related disorders—accounted for 5.1 percent of readmissions.

Table 1 presents the five principal diagnoses (conditions) at index admission with the highest number of 30-day all-cause hospital readmissions among adults by expected payer in 2018.

**Table 1. Top five principal diagnoses with the highest number of 30-day all-cause adult hospital readmissions, by expected payer, 2018**

Principal diagnosis at index admission	Number of index admissions	30-day readmissions			Percent of total payer-specific readmissions
		Rank	Number	Rate*	
<b>Medicare</b>	<b>13,533,200</b>	-	<b>2,290,100</b>	<b>16.9</b>	<b>100.0</b>
Septicemia	1,144,300	1	213,900	18.7	9.3
Heart failure	775,900	2	178,000	22.9	7.8
Chronic obstructive pulmonary disease and bronchiectasis	387,600	3	78,000	20.1	3.4
Pneumonia (except that caused by tuberculosis)	437,000	4	73,800	16.9	3.2
Acute and unspecified renal failure	360,600	5	72,100	20.0	3.1
<b>Medicaid</b>	<b>5,144,200</b>	-	<b>721,300</b>	<b>14.0</b>	<b>100.0</b>
Septicemia	259,900	1	49,300	19.0	6.8
Schizophrenia spectrum and other psychotic disorders	166,100	2	39,300	23.7	5.4
Diabetes mellitus with complication	140,500	3	33,700	24.0	4.7
Heart failure	110,000	4	30,800	28.0	4.3
Alcohol-related disorders	113,800	5	24,600	21.6	3.4
<b>Private insurance</b>	<b>6,532,900</b>	-	<b>569,800</b>	<b>8.7</b>	<b>100.0</b>
Septicemia	281,900	1	37,600	13.3	6.6
Heart failure	89,400	2	15,800	17.6	2.8
Diabetes mellitus with complication	111,000	3	14,200	12.8	2.5
Hypertension and hypertensive-related conditions complicating pregnancy; childbirth; and the puerperium	171,700	4	11,100	6.4	1.9
Complication of select surgical or medical care, injury, initial encounter†	73,800	5	11,000	14.9	1.9
<b>Self-pay/No charge‡</b>	<b>1,123,700</b>	-	<b>136,500</b>	<b>12.1</b>	<b>100.0</b>
Septicemia	71,000	1	8,600	12.2	6.3
Alcohol-related disorders	43,200	2	8,300	19.1	6.1
Diabetes mellitus with complication	47,000	3	8,100	17.2	5.9
Depressive disorders	51,900	4	7,500	14.5	5.5
Heart failure	27,900	5	5,100	18.2	3.7

Abbreviation: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as "neoplasms" (cancer) or "factors influencing health status and contact with health services" (e.g., encounter for antineoplastic therapies) are excluded from reporting. A minimum volume threshold for index admissions was required for a CCSR category to be reported: 10,000 for Medicare, Medicaid, and private insurance and 5,000 for self-pay/no charge. Number of index admissions and readmissions are rounded to the nearest hundred.

\* Readmission rate is per 100 index admissions.

† This includes complications, such as infection, for surgical or medical care other than those from cardiovascular, genitourinary, or internal orthopedic devices or from organ/tissue transplants.

‡ Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **Septicemia and heart failure were among the top five conditions at index admission associated with the highest number of 30-day all-cause readmissions for each expected payer.**

For each expected payer, hospital stays for septicemia at index admission accounted for the most readmissions: Medicare (9.3 percent), Medicaid (6.8 percent), private insurance (6.6 percent), and self-pay/no charge (6.3 percent). Heart failure was also among the five conditions at index admission with the most readmissions for each expected payer: Medicare (7.8 percent), Medicaid (4.3 percent), private insurance (2.8 percent), and self-pay/no charge (3.7 percent).

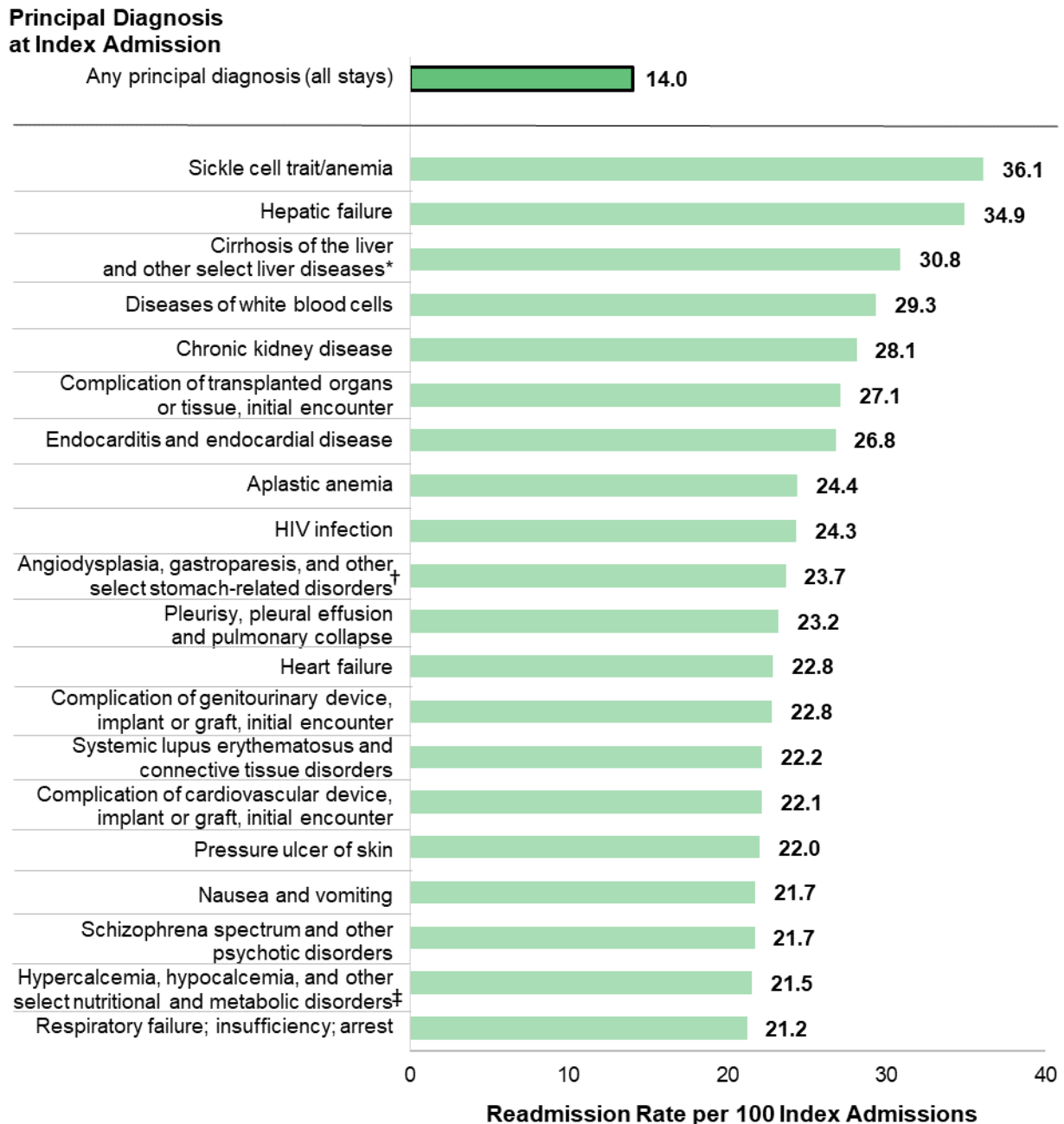
- **High numbers of readmissions were associated with index admissions for COPD and pneumonia among Medicare patients and for diabetes and mental and/or substance use disorders among Medicaid patients.**

With the exception of septicemia and heart failure, the principal diagnoses at index admission with high numbers of 30-day all-cause readmissions varied by expected payer. For Medicare patients, two respiratory system diseases—COPD and pneumonia—were among the five diagnoses with the highest number of readmissions. Diabetes was among the five diagnoses with the most readmissions for Medicaid, private insurance, and self-pay/no charge. For both Medicaid and self-pay/no charge, two of the five diagnoses with the most readmissions were mental and/or substance use disorders: alcohol-related disorders (Medicaid and self-pay/no charge), schizophrenia (Medicaid), and depressive disorders (self-pay/no charge).

*Conditions with the highest rate of adult hospital readmissions by expected payer, 2018*

Figure 3 presents the 20 principal diagnoses (conditions) at index admission with the highest rate of 30-day all-cause hospital readmissions among adults in 2018.

**Figure 3. Top 20 principal diagnoses with the highest rate of 30-day all-cause adult hospital readmissions, 2018**



Abbreviation: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as “neoplasms” (cancer) or “factors influencing health status and contact with health services” (e.g., encounter for antineoplastic therapies) are excluded from reporting. A minimum volume threshold of 10,000 index admissions was required for a CCSR category to be reported.

\* This primarily includes cirrhosis of the liver as well as other liver diseases, excluding hepatic failure.

† This primarily includes angiodysplasia of the stomach and duodenum, gastroparesis, and adult hypertrophic pyloric stenosis as well as other select disorders of the stomach and duodenum.

‡ This primarily includes hypercalcemia, hypocalcemia, hypomagnesemia, and organ-limited amyloidosis as well as other select nutritional and metabolic disorders.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **In 2018, more than one in three adult hospitalizations for sickle cell trait/anemia and hepatic failure had a subsequent readmission within 30 days.**

Compared with an average readmission rate of 14.0 percent, the readmission rate was more than twice as high for five conditions at index admission: sickle cell trait/anemia (36.1 percent), hepatic failure (34.9 percent), cirrhosis of the liver (30.8 percent), diseases of white blood cells (29.3 percent), and chronic kidney disease (28.1 percent).

- **High readmission rates (greater than 20 percent) were common for index admissions for blood and immune system diseases, digestive system diseases, and complications of medical devices and procedures.**

Hospital stays for three blood and immune system diseases at index admission—sickle cell trait/anemia, diseases of white blood cells, and aplastic anemia—had high readmission rates. Three digestive system diseases—hepatic failure, cirrhosis of the liver, and angiodysplasia, gastroparesis, and other select stomach-related disorders—were among the 20 conditions at index admission with the highest readmission rates. A high readmission rate also occurred when the index admission was for complication of transplanted organs or tissue or for complication of genitourinary or cardiovascular devices.



Table 2 presents the five principal diagnoses (conditions) at index admission with the highest rate of 30-day all-cause hospital readmissions among adults by expected payer in 2018.

**Table 2. Top five principal diagnoses with the highest rate of 30-day all-cause adult hospital readmissions, by expected payer, 2018**

Principal diagnosis at index admission	Number of index admissions	30-day readmissions			Percent of total payer-specific readmissions
		Rank	Rate*	Number	
<b>Medicare</b>	<b>13,533,200</b>	-	<b>16.9</b>	<b>2,290,100</b>	<b>100.0</b>
Sickle cell trait/anemia	25,400	1	37.2	9,400	0.4
Hepatic failure	39,700	2	34.9	13,900	0.6
Cirrhosis of the liver and other select liver diseases†	41,300	3	31.0	12,800	0.6
Chronic kidney disease	121,300	4	28.6	34,700	1.5
Diseases of white blood cells	13,100	5	27.6	3,600	0.2
<b>Medicaid</b>	<b>5,144,200</b>	-	<b>14.0</b>	<b>721,300</b>	<b>100.0</b>
Sickle cell trait/anemia	32,100	1	39.4	12,600	1.7
Hepatic failure	17,700	2	38.6	6,900	1.0
Cirrhosis of the liver and other select liver diseases†	29,900	3	35.1	10,500	1.5
Chronic kidney disease	22,200	4	32.5	7,200	1.0
Heart failure	110,000	5	28.0	30,800	4.3
<b>Private insurance</b>	<b>6,532,900</b>	-	<b>8.7</b>	<b>569,800</b>	<b>100.0</b>
Hepatic failure	12,100	1	31.9	3,800	0.7
Cirrhosis of the liver and other select liver diseases†	22,200	2	26.6	5,900	1.0
Complication of transplanted organs or tissue, initial encounter	10,300	3	26.0	2,700	0.5
Chronic kidney disease	16,500	4	19.7	3,200	0.6
Pleurisy, pleural effusion and pulmonary collapse	11,500	5	18.6	2,100	0.4
<b>Self-pay/No charge‡</b>	<b>1,123,700</b>	-	<b>12.1</b>	<b>136,500</b>	<b>100.0</b>
Cirrhosis of the liver and other select liver diseases†	8,100	1	26.7	2,200	1.6
Alcohol-related disorders	43,200	2	19.1	8,300	6.1
Schizophrenia spectrum and other psychotic disorders	26,400	3	18.4	4,800	3.5
Regional enteritis and ulcerative colitis	5,400	4	18.3	1,000	0.7
Heart failure	27,900	5	18.2	5,100	3.7

Abbreviation: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as “neoplasms” (cancer) or “factors influencing health status and contact with health services” (e.g., encounter for antineoplastic therapies) are excluded from reporting. A minimum volume threshold for index admissions was required for a CCSR category to be reported: 10,000 for Medicare, Medicaid, and private insurance and 5,000 for self-pay/no charge. Number of index admissions and readmissions are rounded to the nearest hundred.

\* Readmission rate is per 100 index admissions.

† This primarily includes cirrhosis of the liver as well as other liver diseases, excluding hepatic failure.

‡ Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **The principal diagnosis at index admission with the highest 30-day all-cause readmission rate in 2018 varied by expected payer: sickle cell trait/anemia (Medicare and Medicaid), hepatic failure (private insurance), and cirrhosis of the liver (self-pay/no charge).**

Among adult hospitalizations with an expected payer of Medicare or Medicaid, sickle cell trait/anemia and hepatic failure had the highest readmission rates, with more than one in three index admissions for these conditions having a subsequent readmission. Hepatic failure had the highest readmission rate (31.9 percent) among stays with an expected payer of private insurance. Cirrhosis of the liver had the highest readmission rate among self-pay/no charge stays (26.7 percent), and this condition was among the top five diagnoses at index admission with the highest readmission rates for the other expected payers as well (31.0 percent for Medicare, 35.1 percent for Medicaid, and 26.6 percent for private insurance).

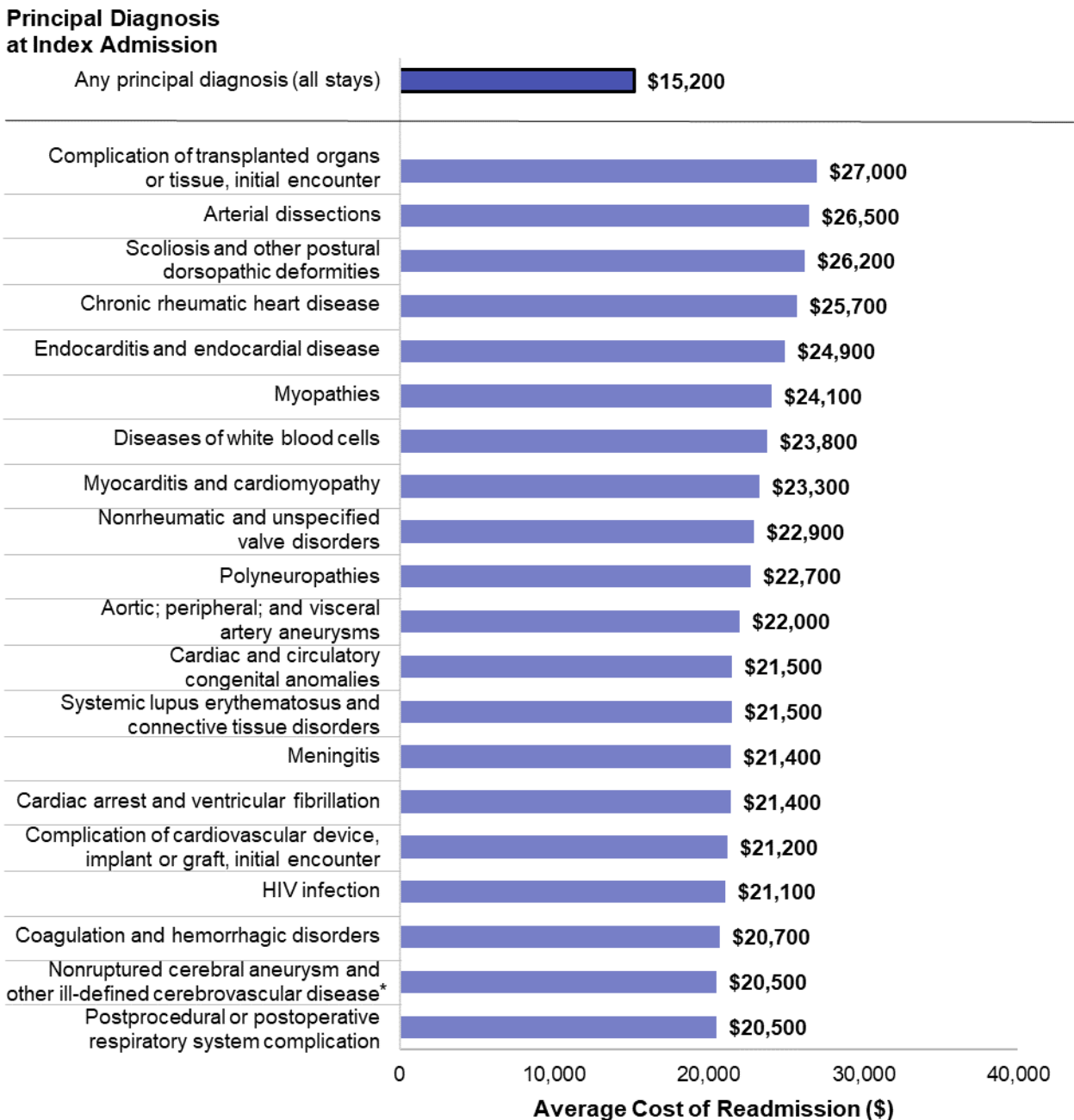
Index admissions for chronic kidney disease had among the highest readmission rates for Medicare (28.6 percent), Medicaid (32.5 percent), and private insurance (19.7 percent).

- **Heart failure (for Medicaid and self-pay/no charge) and alcohol-related disorders (for self-pay/no charge) had high rates and high numbers of 30-day all-cause readmissions.**

Although many conditions with the highest rates of readmissions (Table 2) did not have the highest absolute number of readmissions (Table 1), heart failure was in the top five conditions at index admission for both highest number and highest rate of readmissions for Medicaid and self-pay/no charge. Additionally, a principal diagnosis of alcohol-related disorders was among the top five conditions at index admission with the highest number and highest rate of readmissions for self-pay/no charge.

*Conditions with the highest average cost of adult hospital readmissions by expected payer, 2018*  
Figure 4 presents the 20 principal diagnoses (conditions) at index admission with the highest average cost of 30-day all-cause hospital readmissions among adults in 2018.

**Figure 4. Top 20 principal diagnoses with the highest average cost of 30-day all-cause adult hospital readmissions, 2018**



Abbreviation: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as "neoplasms" (cancer) or "factors influencing health status and contact with health services" (e.g., encounter for antineoplastic therapies) are excluded from reporting. A minimum volume threshold of 10,000 index admissions was required for a CCSR category to be reported. Average cost of readmission is rounded to the nearest \$100.

\* This primarily includes nonruptured cerebral aneurysm and posterior reversible encephalopathy as well as other select and ill-defined cerebrovascular disease.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **In 2018, index hospitalizations for complication of transplanted organs or tissue had the highest average cost of 30-day all-cause readmissions (\$27,000).**

The average cost of a readmission exceeded \$25,000 for four conditions at index admission: complication of transplanted organs or tissue (\$27,000), arterial dissections (\$26,500), scoliosis (\$26,200), and chronic rheumatic heart disease (\$25,700). Compared with an average readmission cost of \$15,200, readmissions for these four conditions at index admission were approximately 1.7 times more costly.

- **Among the 20 conditions at index admission with the highest average cost of 30-day all-cause readmissions, 8 involved circulatory system diseases.**

Eight of the 20 conditions at index admission with the highest average readmission cost (exceeding \$20,000) were circulatory system diseases: arterial dissections, chronic rheumatic heart disease, endocarditis and endocardial disease, myocarditis and cardiomyopathy, nonrheumatic and unspecified valve disorders, artery aneurysms, cardiac arrest and ventricular fibrillation, and nonruptured cerebral aneurysm and other ill-defined cerebrovascular disease.

Table 3 presents the five principal diagnoses (conditions) at index admission with the highest average cost of 30-day all-cause hospital readmissions among adults by expected payer in 2018.

**Table 3. Top five principal diagnoses with the highest average cost of 30-day all-cause adult hospital readmissions, by expected payer, 2018**

Principal diagnosis at index admission	Number of index admissions	30-day readmissions			Percent of total payer-specific readmission costs
		Rank	Average cost, \$	Aggregate cost, \$ millions	
<b>Medicare</b>	<b>13,533,200</b>	-	<b>15,500</b>	<b>35,500</b>	<b>100.0</b>
Chronic rheumatic heart disease	16,100	1	25,800	87	0.2
Complication of transplanted organs or tissue, initial encounter	27,100	2	24,200	180	0.5
Nonrheumatic and unspecified valve disorders	96,000	3	22,500	359	1.0
Diseases of white blood cells	13,100	4	21,800	79	0.2
Aortic; peripheral; and visceral artery aneurysms	45,000	5	21,300	121	0.3
<b>Medicaid</b>	<b>5,144,200</b>	-	<b>14,100</b>	<b>10,200</b>	<b>100.0</b>
Acute hemorrhagic cerebrovascular disease	11,000	1	23,500	34	0.3
Complication of cardiovascular device, implant or graft, initial encounter	19,000	2	22,000	108	1.1
Septicemia	259,900	3	19,800	976	9.6
Complication of internal orthopedic device or implant, initial encounter	14,500	4	19,700	42	0.4
Complication of select surgical or medical care, injury, initial encounter*	47,000	5	19,600	193	1.9
<b>Private insurance</b>	<b>6,532,900</b>	-	<b>16,400</b>	<b>9,400</b>	<b>100.0</b>
Complication of transplanted organs or tissue, initial encounter	10,300	1	31,200	84	0.9
Complication of cardiovascular device, implant or graft, initial encounter	21,000	2	26,000	90	1.0
Acute hemorrhagic cerebrovascular disease	19,000	3	24,800	53	0.6
Aortic; peripheral; and visceral artery aneurysms	10,200	4	24,000	25	0.3
Heart failure	89,400	5	23,500	370	3.9
<b>Self-pay/No charge†</b>	<b>1,123,700</b>	-	<b>10,900</b>	<b>1,500</b>	<b>100.0</b>
Traumatic brain injury (TBI); concussion, initial encounter	7,700	1	18,200	10	0.7
Complication of select surgical or medical care, injury, initial encounter*	7,500	2	16,100	21	1.4
Fracture of the lower limb (except hip), initial encounter	12,500	3	15,800	16	1.1
Septicemia	71,000	4	15,000	129	8.6
Acute myocardial infarction	26,500	5	15,000	33	2.2

Abbreviation: ICM-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Principal diagnosis is assigned to a single default CCSR category. CCSR categories classified as “neoplasms” (cancer) or “factors influencing health status and contact with health services” (e.g., encounter for antineoplastic therapies) are excluded from reporting. A minimum volume threshold for index admissions was required for a CCSR category to be reported: 10,000 for Medicare, Medicaid, and private insurance and 5,000 for self-pay/no charge. Number of index admissions is rounded to the nearest hundred. Average cost of readmission is rounded to the nearest \$100.

\* This includes complications, such as infection, for surgical or medical care other than those from cardiovascular, genitourinary, or internal orthopedic devices or from organ/tissue transplants.

† Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Readmissions Database (NRD), 2018

- **Across payers, the highest average costs of 30-day all-cause readmissions were associated with those index admissions primarily for circulatory system diseases and injuries, including complications of medical devices or procedures.**

For stays with an expected payer of Medicare or Medicaid, the highest average cost of readmissions was associated with those index admissions for a circulatory system disease: chronic rheumatic heart disease for Medicare (\$25,800) and acute hemorrhagic cerebrovascular disease for Medicaid (\$23,500). The second highest average readmission cost involved index admissions for treating complications of medical devices or procedures: complication of transplanted organs or tissues for Medicare (\$24,200) and complication of cardiovascular device for Medicaid (\$22,000).

For stays with an expected payer of private insurance, the highest average readmission costs were associated with those index admissions for treating complication of transplanted organs or tissue (\$31,200) and complication of cardiovascular device (\$26,000). For stays that were expected to be self-pay or no charge, those index admissions for treating two types of injuries had the highest average readmission costs: traumatic brain injury (\$18,200) and complication of select surgical or medical care (\$16,100).

- **Index admissions for septicemia had among the highest average readmission costs for Medicaid and self-pay/no charge and also accounted for a substantial portion of aggregate readmission costs.**

For both Medicaid and self-pay/no charge, septicemia was among the conditions at index admission with the highest average readmission costs (\$19,800 and \$15,000, respectively). Index admissions for septicemia also accounted for a large portion of aggregate readmission costs: 9.6 percent for Medicaid and 8.6 percent for self-pay/no charge.

## About Statistical Briefs

Healthcare Cost and Utilization Project (HCUP) Statistical Briefs provide basic descriptive statistics on a variety of topics using HCUP administrative healthcare data. Topics include hospital inpatient, ambulatory surgery, and emergency department use and costs, quality of care, access to care, medical conditions, procedures, and patient populations, among other topics. The reports are intended to generate hypotheses that can be further explored in other research; the reports are not designed to answer in-depth research questions using multivariate methods.

## Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2018 Nationwide Readmissions Database (NRD).

## Definitions

*Diagnoses, ICD-10-CM, Clinical Classifications Software Refined (CCSR) for ICD-10-CM 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 conditions that coexist at the time of admission that require or affect patient care treatment received or management, or that develop during the inpatient stay. *All-listed diagnoses* include the principal diagnosis plus the secondary conditions.

ICD-10-CM is the International Classification of Diseases, Tenth Revision, Clinical Modification. There are over 70,000 ICD-10-CM diagnosis codes.

The CCSR aggregates ICD-10-CM diagnosis codes into a manageable number of clinically meaningful categories.<sup>a</sup> The CCSR is intended to be used analytically to examine patterns of healthcare in terms of cost, utilization, and outcomes; rank utilization by diagnoses; and risk-adjust by clinical condition. The CCSR capitalizes on the specificity of the ICD-10-CM coding scheme and allows ICD-10-CM codes to be classified in more than one category. Approximately 10 percent of diagnosis codes are associated with more than one CCSR category because the diagnosis code documents either multiple conditions or a condition along with a common symptom or manifestation. For this Statistical Brief, the principal diagnosis code is assigned to a single default CCSR based on clinical coding guidelines, etiology and pathology of diseases, and standards set by other Federal agencies. The assignment of the default CCSR for the principal diagnosis is available starting with version v2020.2 of the software tool. ICD-10-CM coding definitions for each CCSR category presented in this Statistical Brief can be found in the *CCSR reference file*, available at [www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs\\_refined.jsp#download](http://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp#download). For this Statistical Brief, v2021.1 of the CCSR was used.

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 (procedure), age, and other relevant criteria. Each hospital stay has one assigned DRG.

## 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 of the same year. 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 having a readmission. No more than one readmission is counted within the 30-day period, because the outcome measure assessed is "percentage of admissions that 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

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<sup>a</sup> Agency for Healthcare Research and Quality. HCUP Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality. Updated November 2020. [www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs\\_refined.jsp](http://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp). Accessed January 22, 2021.

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 initial (starting point) admission. Thus, a single patient can be counted multiple times during the course of the January through November observation period. In addition, initial 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 initial admission for a subsequent readmission. Admissions were disqualified from the analysis as initial admissions if they could not be followed for 30 days for one of the following reasons: (1) the patient died in the hospital, (2) information on length of stay was missing, or (3) the patient was discharged in December.

#### *Types of hospitals included in the HCUP Nationwide Readmissions Database*

The Nationwide Readmissions Database (NRD) 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). The NRD includes obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical center hospitals. Excluded are long-term care facilities such as rehabilitation, long-term acute care, psychiatric, and alcoholism and chemical dependency hospitals. However, if a patient received long-term care, rehabilitation, or treatment for a psychiatric or chemical dependency condition in a community hospital, the discharge record for that stay will be included in the NRD.

#### *Unit of analysis*

The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in 1 year will be counted each time as a separate discharge from the hospital.

#### *Costs and charges*

Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS).<sup>b</sup> *Costs* reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs; *charges* represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used. Hospital charges reflect the amount the hospital billed for the entire hospital stay and do not include professional (physician) fees. For the purposes of this Statistical Brief, missing charges were imputed using the mean charge for the DRG before converting charges to costs. Costs are reported to the nearest hundred.

#### *How HCUP estimates of costs differ from National Health Expenditure Accounts*

There are a number of differences between the costs cited in this Statistical Brief and spending as measured in the National Health Expenditure Accounts (NHEA), which are produced annually by CMS.<sup>c</sup> The largest source of difference comes from the HCUP coverage of inpatient treatment only in contrast to the NHEA inclusion of outpatient costs associated with emergency departments and other hospital-based outpatient clinics and departments as well. The outpatient portion of hospitals’ activities has been growing steadily and may exceed half of all hospital revenue in recent years. On the basis of the American Hospital Association Annual Survey, 2018 outpatient gross revenues (or charges) were about 49 percent of total hospital gross revenues.<sup>d</sup>

Smaller sources of differences come from the inclusion in the NHEA of hospitals that are excluded from HCUP. These include Federal hospitals (Department of Defense, Veterans Administration, Indian Health Services, and Department of Justice [prison] hospitals) as well as psychiatric, substance abuse, and long-

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<sup>b</sup> Agency for Healthcare Research and Quality. HCUP Cost-to-Charge Ratio (CCR) Files. Healthcare Cost and Utilization Project (HCUP). 2001–2017. Agency for Healthcare Research and Quality. Updated September 2020. [www.hcup-us.ahrq.gov/db/state/costtocharge.jsp](http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp). Accessed January 22, 2021.

<sup>c</sup> For additional information about the NHEA, see Centers for Medicare & Medicaid Services (CMS). National Health Expenditure Data. CMS website. Updated December 17, 2019. [www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html?redirect=/NationalHealthExpendData/](http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html?redirect=/NationalHealthExpendData/). Accessed January 22, 2021.

<sup>d</sup> American Hospital Association. TrendWatch Chartbook, 2020. Table 4.2. Distribution of Inpatient vs. Outpatient Revenues, 1995–2018. [www.aha.org/system/files/media/file/2020/10/TrendwatchChartbook-2020-Appendix.pdf](http://www.aha.org/system/files/media/file/2020/10/TrendwatchChartbook-2020-Appendix.pdf). Accessed January 22, 2021.



term care hospitals. A third source of difference lies in the HCUP reliance on billed charges from hospitals to payers, adjusted to provide estimates of costs using hospital-wide cost-to-charge ratios, in contrast to the NHEA measurement of spending or revenue. HCUP costs estimate the amount of money required to produce hospital services, including expenses for wages, salaries, and benefits paid to staff as well as utilities, maintenance, and other similar expenses required to run a hospital. NHEA spending or revenue measures the amount of income received by the hospital for treatment and other services provided, including payments by insurers, patients, or government programs. The difference between revenues and costs includes profit for for-profit hospitals or surpluses for nonprofit hospitals.

### *Expected payer*

To make coding uniform across all HCUP data sources, the expected payer for the hospital stay combines detailed categories into general groups:

- Medicare: includes fee-for-service and managed care Medicare
- Medicaid: includes fee-for-service and managed care Medicaid
- Private insurance: includes commercial nongovernmental payers, regardless of the type of plan (e.g., private health maintenance organizations [HMOs], preferred provider organizations [PPOs])
- Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment
- Other payers: includes other Federal and local government programs (e.g., TRICARE, CHAMPVA, Indian Health Service, Black Lung, Title V) and Workers' Compensation

Hospital stays that were expected to be billed to the State Children's Health Insurance Program (SCHIP) are included under Medicaid.

For this Statistical Brief, a hierarchy was used to assign the payer category based on the primary and secondary expected payer to give precedence to public payers (Medicare and then Medicaid) over commercial insurance. In addition, an indication of any insurance was checked before assigning the payer category to self-pay/no charge:<sup>6</sup>

- If the primary or secondary expected payer indicates Medicare, then the payer category is assigned to Medicare. This categorization includes patients who are dually eligible for Medicare and Medicaid under Medicare.
- If not Medicare and the primary or secondary expected payer indicates Medicaid, then the payer category is Medicaid.
- If not Medicare or Medicaid and the primary or secondary expected payer indicates private insurance, then the payer category is private.
- If not Medicare, Medicaid, or private and the primary expected payer indicates self-pay, no charge, or other categories such as charity, then the payer category is self-pay/no charge.
- Stays for other types of payers are not reported in this Statistical Brief because this is a small group of mixed payers such as State and local programs.

Categorization of readmission counts and costs by expected payer was based on the index admission. The concordance between the expected payer coded at the index admission and the expected payer coded at readmission varies by payer: 98 percent for Medicare, 95 percent for Medicaid, 93 percent for private, and 80 percent for self-pay/no charge (percentages based on the 2013 NRD).

## **About HCUP**

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of healthcare databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). HCUP databases bring together the data collection efforts of State data organizations, hospital associations, and private data organizations (HCUP Partners) and the Federal government to create a national information resource of encounter-level healthcare data. HCUP includes the largest collection of longitudinal hospital

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<sup>6</sup> The NRD available for purchase through the HCUP Central Distributor includes the data element for the primary expected payer but not the data element for the secondary expected payer.

care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to healthcare programs, and outcomes of treatments at the national, State, and local market levels.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

<b>Alaska</b> Department of Health and Social Services	<b>Nevada</b> Department of Health and Human Services
<b>Alaska</b> State Hospital and Nursing Home Association	<b>New Hampshire</b> Department of Health & Human Services
<b>Arizona</b> Department of Health Services	<b>New Jersey</b> Department of Health
<b>Arkansas</b> Department of Health	<b>New Mexico</b> Department of Health
<b>California</b> Office of Statewide Health Planning and Development	<b>New York</b> State Department of Health
<b>Colorado</b> Hospital Association	<b>North Carolina</b> Department of Health and Human Services
<b>Connecticut</b> Hospital Association	<b>North Dakota</b> (data provided by the Minnesota Hospital Association)
<b>Delaware</b> Division of Public Health	<b>Ohio</b> Hospital Association
<b>District of Columbia</b> Hospital Association	<b>Oklahoma</b> State Department of Health
<b>Florida</b> Agency for Health Care Administration	<b>Oregon</b> Association of Hospitals and Health Systems
<b>Georgia</b> Hospital Association	<b>Oregon</b> Office of Health Analytics
<b>Hawaii</b> Laulima Data Alliance	<b>Pennsylvania</b> Health Care Cost Containment Council
<b>Hawaii</b> University of Hawai'i at Hilo	<b>Rhode Island</b> Department of Health
<b>Illinois</b> Department of Public Health	<b>South Carolina</b> Revenue and Fiscal Affairs Office
<b>Indiana</b> Hospital Association	<b>South Dakota</b> Association of Healthcare Organizations
<b>Iowa</b> Hospital Association	<b>Tennessee</b> Hospital Association
<b>Kansas</b> Hospital Association	<b>Texas</b> Department of State Health Services
<b>Kentucky</b> Cabinet for Health and Family Services	<b>Utah</b> Department of Health
<b>Louisiana</b> Department of Health	<b>Vermont</b> Association of Hospitals and Health Systems
<b>Maine</b> Health Data Organization	<b>Virginia</b> Health Information
<b>Maryland</b> Health Services Cost Review Commission	<b>Washington</b> State Department of Health
<b>Massachusetts</b> Center for Health Information and Analysis	<b>West Virginia</b> Department of Health and Human Resources, West Virginia Health Care Authority
<b>Michigan</b> Health & Hospital Association	<b>Wisconsin</b> Department of Health Services
<b>Minnesota</b> Hospital Association	<b>Wyoming</b> Hospital Association
<b>Mississippi</b> State Department of Health	
<b>Missouri</b> Hospital Industry Data Institute	
<b>Montana</b> Hospital Association	
<b>Nebraska</b> Hospital Association	

## About the NRD

The HCUP Nationwide Readmissions Database (NRD) is a calendar-year, discharge-level database constructed from the HCUP State Inpatient Databases (SID) with verified patient linkage numbers that can be used to track a person across hospitals within a State. The 2018 NRD is available for purchase through the HCUP Central Distributor. The NRD is designed to support various types of analyses of national readmission rates. The database includes discharges for patients with and without repeat hospital visits in a year and those who have died in the hospital. Repeat stays may or may not be related. The criteria to determine the relationship between hospital admissions are left to the analyst using the NRD. The NRD was constructed as a sample of convenience consisting of 100 percent of the eligible discharges. Discharge weights for national estimates are developed using the target universe of community hospitals (excluding rehabilitation and long-term acute care hospitals) in the United States. Over time, the sampling frame for the NRD will change; thus, the number of States contributing to the NRD will vary from year to year. The NRD is intended for national estimates only; no regional, State-, or

hospital-specific estimates can be produced. The unweighted sample size for the 2018 NRD is 17,686,511 (weighted, this represents 35,460,557 inpatient stays).

## For More Information

For other information on readmissions and revisits, refer to the HCUP Statistical Briefs located at [www.hcup-us.ahrq.gov/reports/statbriefs/sb\\_readmission.jsp](http://www.hcup-us.ahrq.gov/reports/statbriefs/sb_readmission.jsp).

For additional HCUP statistics, visit:

- HCUP Fast Stats at [www.hcup-us.ahrq.gov/faststats/landing.jsp](http://www.hcup-us.ahrq.gov/faststats/landing.jsp) for easy access to the latest HCUP-based statistics for healthcare information topics
- HCUPnet, HCUP's interactive query system, at [www.hcupnet.ahrq.gov/](http://www.hcupnet.ahrq.gov/)
- HCUP Summary Trend Tables at [www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp](http://www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp) for monthly information on hospital utilization

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

For a detailed description of HCUP and more information on the design of the Nationwide Readmissions Database (NRD), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the Nationwide Readmissions Database (NRD). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated December 2020. [www.hcup-us.ahrq.gov/nrdoverview.jsp](http://www.hcup-us.ahrq.gov/nrdoverview.jsp). Accessed January 22, 2021.

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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 healthcare 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 email us at [hcup@ahrq.gov](mailto:hcup@ahrq.gov) or send a letter to the address below:

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