HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

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Co-occurrence of Physical Health Conditions and Mental Health and Substance Use Conditions Among Adult Inpatient Stays, 2010 Versus 2014

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Highlights

- Among approximately 30 million annual adult inpatient stays for physical health conditions or mental and/or substance use disorders (M/SUDs), the co-occurrence of these two types of conditions increased from 38.4 percent of stays in 2010 to 45.0 percent of stays in 2014.
- In 2014, 84.2 percent of 1.8 million stays for an M/SUD involved a co-occurring physical health condition, and 42.4 percent of 27.8 million stays for a physical health condition involved a co-occurring M/SUD.
- Among stays for an M/SUD in 2014, co-occurring physical health conditions—
  - Ranged from 71.6 percent of stays for adjustment disorders to 93.4 percent of stays for miscellaneous M/SUD disorders
  - Were most commonly essential hypertension or fluid and electrolyte disorders
  - Were more common among older patients
- Among stays for a physical health condition in 2014, co-occurring M/SUDs—
  - Were present for more than half of stays for respiratory conditions
  - Were most commonly screening and history of mental health and substance abuse
  - Were more common among males and patients aged 45–64 years old

Introduction

Physical health conditions and mental and/or substance use disorders (M/SUDs) are often treated, and their treatment paid for, through different mechanisms in the health care system.[1] Increasingly it is acknowledged that physical and mental health are intertwined, that the interaction between the illnesses can worsen the course of both illnesses, and that health plan benefits for treating M/SUDs should be on par with those for medical and surgical care.[2]

The co-occurrence of physical health conditions and M/SUDs is high for some populations. One literature review found that the prevalence of depression and anxiety ranged from 6 percent to as high as 80 percent among patients with chronic obstructive pulmonary disease (COPD) and from 10 percent to as high as 60 percent among patients with heart failure.[3]

When physical health conditions and M/SUDs occur together, they may complicate diagnosis, treatment, and disease progression. Conditions often go undiagnosed among patients with co-occurring physical and mental illnesses.[4] For example, COPD and heart failure may mask or mirror symptoms of depression, anxiety, and posttraumatic stress disorder, making their recognition and diagnosis less likely.[5] Additionally, physical

* This Statistical Brief was revised to include information on how many inpatient stays with a principal physical health diagnosis had a co-occurring M/SUD diagnosis related to tobacco use. This information is included on page 9.

[1] Horvitz-Lennon M, Kilbourne AM, Pincus HA. From silos to bridges: meeting the general health care needs of adults with severe mental illnesses. Health Affairs (Millwood). 2006;25(3):659–69.

[2] Substance Abuse and Mental Health Services Administration. Implementation of the Mental Health Parity and Addiction Equity Act (MHPAEA). January 24, 2017. www.samhsa.gov/health-financing/implementation-mental-health-parity-addiction-equity-act. Accessed September 21, 2017.

[3] Yohannes AM, Willgoss TG, Baldwin RC, Connolly MJ. Depression and anxiety in chronic heart failure and chronic obstructive pulmonary disease: prevalence, relevance, clinical implications and management principles. International Journal of Geriatric Psychiatry. 2010;25(12):1209–21.

[4] Horvitz-Lennon et al., 2006. Op. cit.

[5] Ratcliff CG, Barrera TL, Petersen NJ, Sansgiry S, Kauth MR, Kunik ME, et al. Recognition of anxiety, depression, and PTSD in patients with COPD and CHF: who gets missed? General Hospital Psychiatry. 2017;47:61–7.

health conditions can increase risk of psychological distress, exacerbate mental disorders, and compound functional impairment.[6,7] Likewise, individuals with a severe mental disorder have higher rates of chronic conditions, including hypertension and diabetes.[8,9]

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents data on the co-occurrence of physical health conditions and M/SUDs among adult inpatient stays in 2010 and 2014. Comparisons in the 2 years are made for the prevalence of stays for M/SUDs (i.e., principal diagnosis) with a co-occurring physical health condition (i.e., secondary diagnosis) and for the prevalence of stays for physical health conditions (i.e., principal diagnosis) with a co-occurring M/SUD (i.e., secondary diagnosis). Separately, for the two types of stays—M/SUD stays with a co-occurring physical health condition and physical health stays with a co-occurring M/SUD—the following statistics are presented for 2014: (1) the distribution of stays with co-occurring conditions by type of principal diagnosis, (2) the 10 most common specific co-occurring conditions, and (3) the distribution of stays with co-occurring conditions by select patient and hospital characteristics. Differences are noted in the text only if they are 10 percent or greater.

Findings

Co-Occurrence of Physical Health and M/SUDs

Co-occurrence of physical health conditions and M/SUDs among adult inpatient stays, 2010 versus 2014
Table 1 presents the number and percentage of adult inpatient stays involving either an M/SUD principal diagnosis with a co-occurring physical health condition, or a physical health principal diagnosis with a co-occurring M/SUD, in 2010 and 2014.

Table 1. Number and percentage of adult inpatient stays with a co-occurring physical health condition and M/SUD by principal diagnosis, 2010 and 2014

Principal diagnosis	Total number of stays		Stays, %	
	2010	2014	2010	2014
M/SUD or physical health	31,140,400	29,621,400	100.0	100.0
Co-occurring physical condition or M/SUD[a]	11,959,600	13,322,900	38.4	45.0
No co-occurring physical condition or M/SUD[a]	19,180,800	16,298,500	61.6	55.0
M/SUD	1,840,400	1,794,300	100.0	100.0
Co-occurring physical health condition	1,497,000	1,511,400	81.3	84.2
No co-occurring physical health condition	343,400	282,900	18.7	15.8
Physical health	29,300,000	27,827,100	100.0	100.0
Co-occurring M/SUD	10,462,600	11,811,500	35.7	42.4
No co-occurring M/SUD	18,837,400	16,015,600	64.3	57.6

Abbreviation: M/SUD, mental or substance use disorder

Notes: Number of stays is rounded to the nearest 100. Stays for social/administrative reasons and stays with a missing or invalid principal diagnosis were excluded from the analysis: 177,600 stays in 2010 and 130,600 stays in 2014.

[a] Co-occurrence was defined as a principal diagnosis of either an M/SUD or a physical health condition with a secondary diagnosis of the other condition (either physical health or M/SUD).

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National (Nationwide) Inpatient Sample (NIS), 2010 and 2014

[6] Horvitz-Lennon M, Kilbourne AM, Pincus HA. From silos to bridges: meeting the general health care needs of adults with severe mental illnesses. Health Affairs (Millwood). 2006;25(3):659–69.
[7] Whooley MD, de Jonge P, Vittinghoff E, Otte C, Moos R, Carney RM, et al. Depressive symptoms, health behaviors, and risk of cardiovascular events in patients with coronary heart disease. JAMA. 2008;300(20):2379–88.
[8] Horvitz-Lennon et al., 2006. Op. cit.
[9] Sokal J, Messias E, Dickerson FB, Kreyenbuhl J, Brown CH, Goldberg RW, et al. Comorbidity of medical illnesses among adults with serious mental illness who are receiving community psychiatric services. Journal of Nervous and Mental Disease. 2004;192(6):421–7.

- **From 2010 to 2014, the co-occurrence of physical health conditions and M/SUDs among adult inpatient stays became more common.**

  Of approximately 30 million annual adult inpatient stays, the percentage of stays with an M/SUD or physical health principal diagnosis and a co-occurring physical health condition or M/SUD, respectively, increased from 38.4 percent of stays in 2010 to 45.0 percent of stays in 2014. Conversely, the percentage of M/SUD or physical health stays *without* a co-occurring physical health condition or M/SUD, respectively, decreased from 61.6 to 55.0 percent of stays. This pattern was observed among both M/SUD and physical health stays.

  Among stays for M/SUDs, the percentage with a co-occurring physical health condition increased from 81.3 to 84.2 percent and the percentage without a co-occurring physical health condition decreased from 18.7 to 15.8 percent. Similarly, among stays for physical health conditions, the percentage with a co-occurring M/SUD increased from 35.7 to 42.4 percent and the percentage without a co-occurring M/SUD decreased from 64.3 to 57.6 percent.

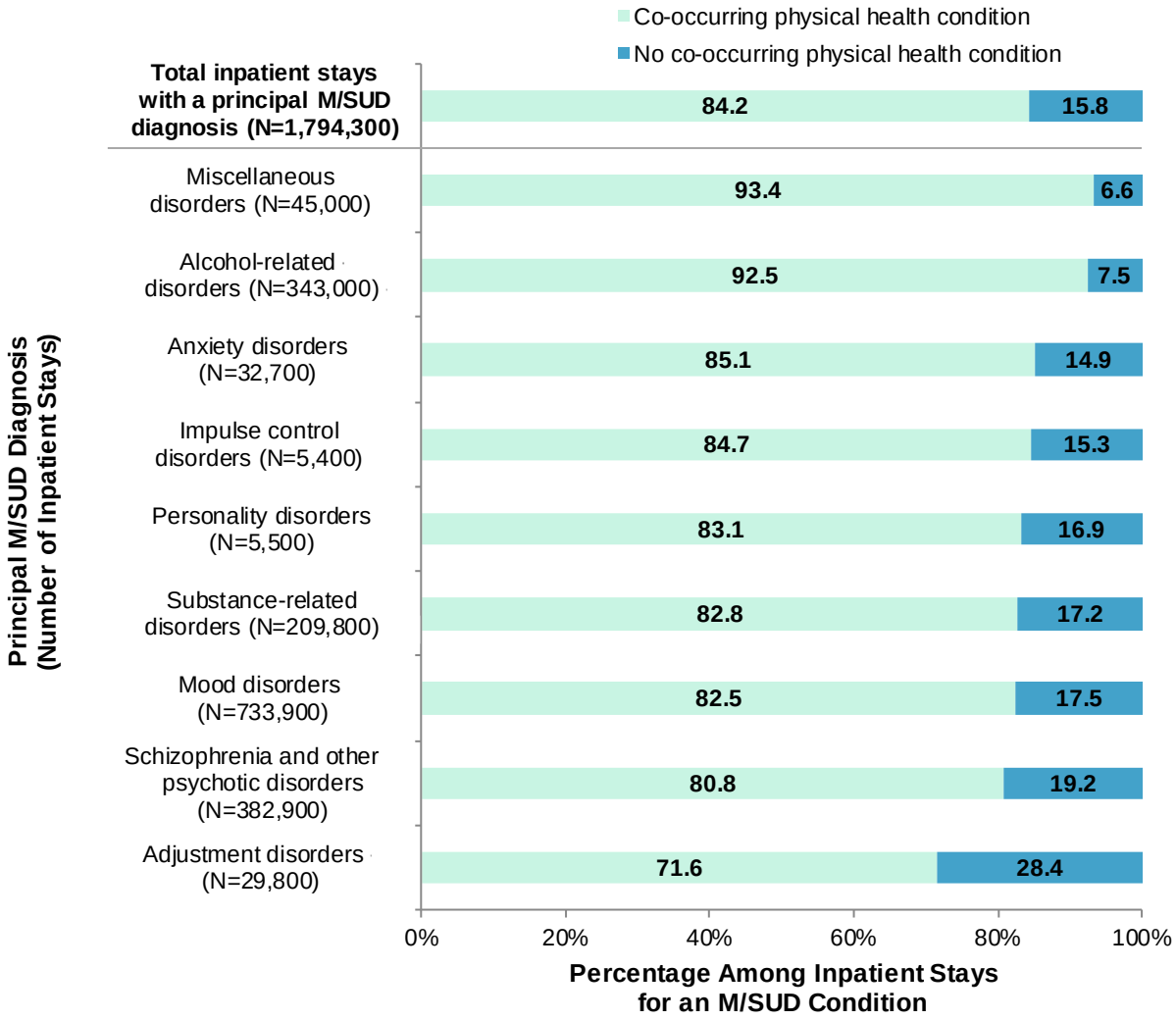
- **The co-occurrence of physical health conditions and M/SUDs was more common among stays with an M/SUD principal diagnosis than among stays with a physical health principal diagnosis.**

  Physical health stays were over 15 times more common overall than M/SUD stays (27.8 vs. 1.8 million in 2014). As a result, the vast majority of stays with co-occurring physical health conditions and M/SUDs involved a physical health principal diagnosis with a co-occurring M/SUD (11.8 million of 13.3 million stays, or 89 percent, in 2014). However, it was much more common for stays with an M/SUD principal diagnosis to involve a co-occurring physical health condition than it was for stays with a physical health principal diagnosis to involve a co-occurring M/SUD (84.2 vs. 42.4 percent in 2014).

M/SUD Stays With a Co-Occurring Physical Health Condition

Distribution and characteristics of adult M/SUD stays with a co-occurring physical health condition, 2014
Figure 1 displays the percentage of adult inpatient stays for an M/SUD with and without a co-occurring physical health condition in 2014, by specific type of M/SUD diagnosis.

Figure 1. Percentage of adult M/SUD stays with and without a co-occurring physical health condition, by type of M/SUD diagnosis, 2014



Abbreviation: M/SUD, mental or substance use disorder

Notes: Number of stays is rounded to the nearest 100. Principal diagnoses are grouped according to the Clinical Classifications Software (CCS). CCS categories are shown only if they are for conditions with greater than 5,000 total inpatient stays. Miscellaneous disorders include eating, sexual, and sleep-related disorders as well as other unspecified behavioral disorders.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

- **Among adult inpatient stays for an M/SUD, co-occurring physical health conditions were most common among stays for miscellaneous and alcohol-related disorders.**

  In 2014, among adult stays for an M/SUD, co-occurring physical health conditions were most common among stays for miscellaneous and alcohol-related disorders (93.4 and 92.5 percent, respectively) and least common among stays for adjustment disorders and schizophrenia/other psychotic disorders (71.6 and 80.8 percent, respectively).

Table 2 presents the 10 most common co-occurring physical health conditions among adult inpatient stays with an M/SUD principal diagnosis in 2014.

Table 2. Ten most common co-occurring physical health conditions among adult M/SUD stays (N=1,794,300), 2014

Co-occurring physical health condition	%
Essential hypertension	30.6
Fluid and electrolyte disorders	14.8
Esophageal disorders	14.1
Disorders of lipid metabolism	13.7
Diabetes without complications	11.4
Spondylosis; intervertebral disc disorders; other back problems	9.7
Asthma	9.6
Deficiency and other anemia	8.8
Thyroid disorders	8.6
Allergic reactions	8.3

Abbreviation: M/SUD, mental or substance use disorder

Notes: Number of stays is rounded to the nearest 100. Co-occurring conditions are grouped according to the Clinical Classifications Software (CCS).

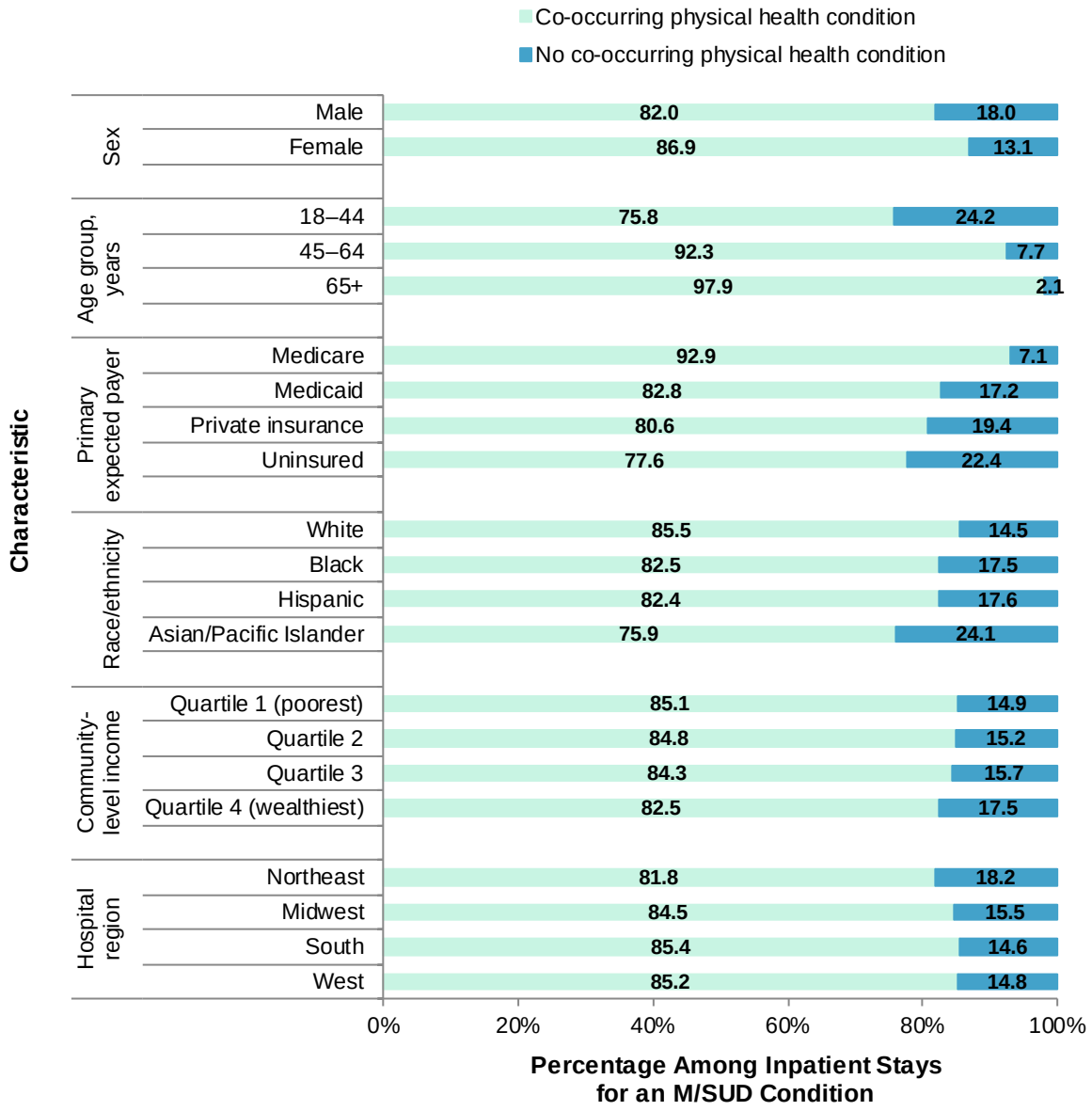
Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

- **Nearly one-third of adult stays for an M/SUD involved hypertension.**

  Among stays with an M/SUD principal diagnosis, the most common co-occurring physical health condition was essential hypertension (30.6 percent of stays). Four other physical health conditions each were involved in more than 10 percent of stays for M/SUDs: fluid and electrolyte disorders (14.8 percent), esophageal disorders (14.1 percent), disorders of lipid metabolism (13.7 percent), and diabetes without complications (11.4 percent).

Figure 2 displays the percentage of adult inpatient stays for an M/SUD with and without a co-occurring physical health condition in 2014, by patient and hospital characteristics.

Figure 2. Percentage of adult M/SUD stays with and without a co-occurring physical health condition, by patient and hospital characteristics, 2014



Abbreviation: M/SUD, mental or substance use disorder

Note: Other or missing payers and other or missing races/ethnicities are not shown.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

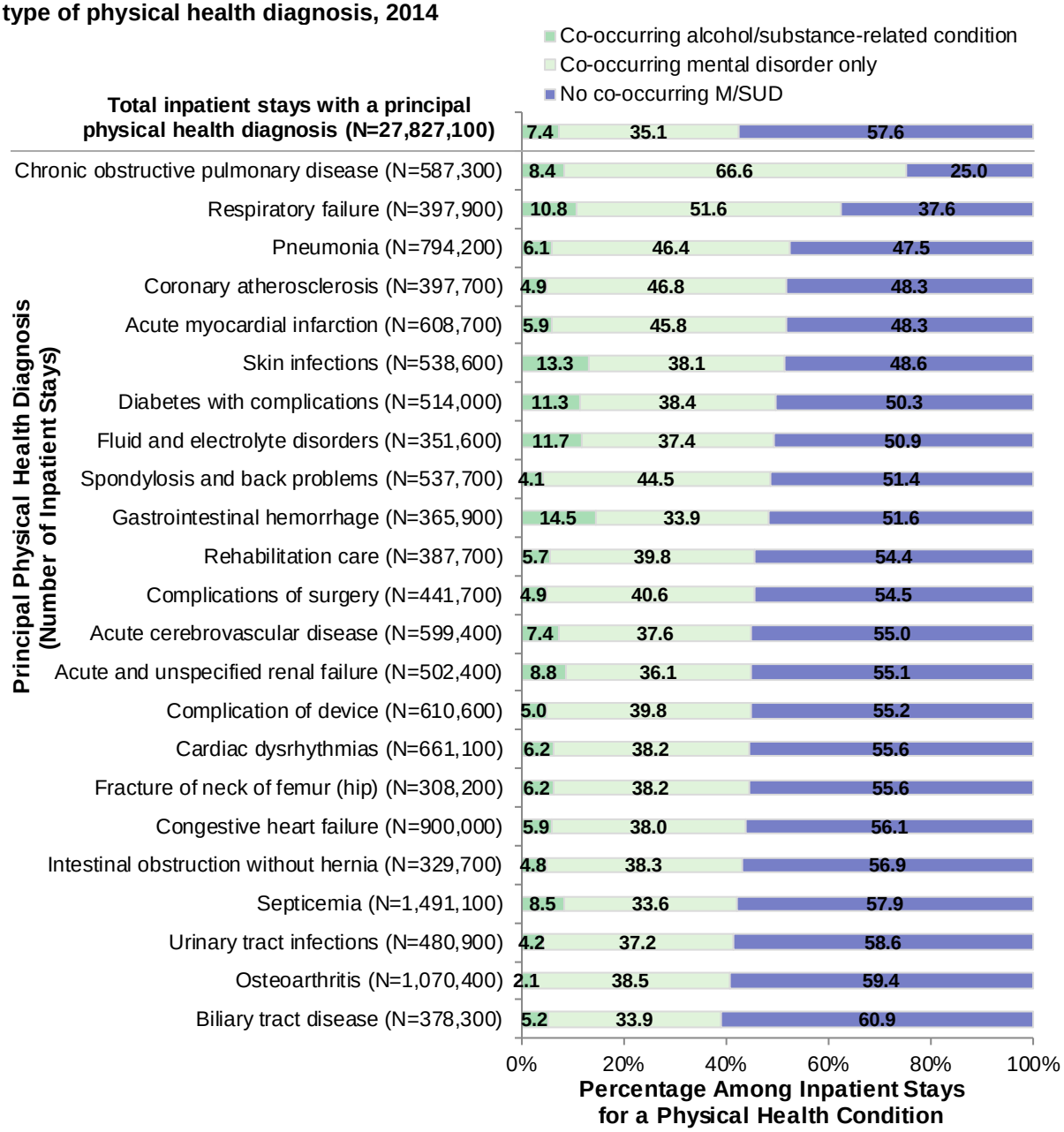
- **The percentage of stays for an M/SUD that involved a co-occurring physical health condition increased with age, but there were few other differences across subgroups.**

  Among stays for an M/SUD condition, co-occurring physical health conditions were more common among adults aged 45–64 years (92.3 percent) and 65 years and older (97.9 percent) than among adults aged 18–44 years (75.8 percent). Co-occurring physical health conditions also were more common among patients with Medicare (92.9 percent) than among patients in other payer categories (less than 83 percent) and among Whites (85.5 percent) than among Asian/Pacific Islanders (75.9 percent). Other differences between subgroups were not greater than 10 percent.

Physical Health Stays With a Co-Occurring M/SUD Condition

Distribution and characteristics of adult physical health stays with a co-occurring M/SUD, 2014
Figure 3 displays the percentage of adult inpatient stays for a physical health condition with and without a co-occurring M/SUD in 2014, by specific type of physical health condition. Stays with a co-occurring M/SUD were subdivided into those with a co-occurring alcohol/substance-related condition (with or without a co-occurring mental disorder) and those with a co-occurring mental disorder only (i.e., without a co-occurring alcohol/substance-related condition).

Figure 3. Percentage of adult physical health stays with and without a co-occurring M/SUD, by type of physical health diagnosis, 2014



Abbreviation: M/SUD, mental or substance use disorder

Notes: Number of stays is rounded to the nearest 100. Principal diagnoses are grouped according to the Clinical Classifications Software (CCS). CCS categories are shown only if they are for high-volume conditions with greater than 300,000 total inpatient stays; unrelated to pregnancy; and not "other" CCS categories that group a heterogeneous set of diagnoses.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

- **Among adult inpatient stays for a physical health condition, co-occurring M/SUDs were most common among stays for respiratory diseases.**

  In 2014, among adult stays for a physical health condition, co-occurring M/SUDs were most common among stays for respiratory diseases, including COPD (75.0 percent), respiratory failure (62.4 percent), and pneumonia (52.5 percent). Co-occurring M/SUDs were least common among stays for biliary tract disease (39.1 percent), osteoarthritis (40.6 percent), and urinary tract infections (41.4 percent).

- **Among adult inpatient stays for a physical health condition, co-occurring mental disorders were more common than co-occurring alcohol/substance-related conditions.**

  Depending on the principal diagnosis, 34–67 percent of stays for physical health conditions had a co-occurring mental health diagnosis (with no secondary diagnosis of an alcohol/substance-related condition). Another 2–15 percent of stays for a physical health condition had a secondary diagnosis of an alcohol/substance-related condition (of which more than half also had a secondary mental health diagnosis, data not shown).

- **Over 10 percent of stays with a principal diagnosis of gastrointestinal hemorrhage, skin infections, fluid and electrolyte disorders, diabetes with complications, and respiratory failure had a co-occurring alcohol/substance-related condition.**

  Although co-occurring mental disorders were highest for stays with a principal diagnosis of COPD, this condition did not rank among the physical health conditions with the highest percentage of co-occurring alcohol/substance-related conditions. The most common physical health principal diagnoses with a co-occurring alcohol/substance-related condition were gastrointestinal hemorrhage (14.5 percent), skin infections (13.3 percent), fluid and electrolyte disorders (11.7 percent), diabetes with complications (11.3 percent), and respiratory failure (10.8 percent). Co-occurring alcohol/substance-related conditions were least common among stays for osteoarthritis (2.1 percent).

Table 3 presents the 10 most common co-occurring M/SUDs among adult inpatient stays with a physical health principal diagnosis in 2014.

Table 3. Ten most common co-occurring M/SUDs among adult physical health stays (N=27,827,100), 2014

Co-occurring M/SUD	N	%
Screening and history of mental health and substance abuse codes	7,449,100	26.8
Mood disorders	3,937,700	14.2
Anxiety disorders	2,866,700	10.3
Alcohol-related disorders	1,160,600	4.2
Substance-related disorders	1,114,100	4.0
Schizophrenia and other psychotic disorders	439,300	1.6
Miscellaneous disorders	301,000	1.1
Attention-deficit, conduct, and disruptive behavior disorders	124,300	0.4
Adjustment disorders	91,100	0.3
Suicide, intentional self-inflicted injury	74,800	0.3

Abbreviation: M/SUD, mental or substance use disorder

Notes: Number of stays is rounded to the nearest 100. Co-occurring conditions are grouped according to the Clinical Classifications Software (CCS). Miscellaneous disorders include eating, sexual, and sleep-related disorders as well as other unspecified behavioral disorders.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

- **Over one-fourth of adult stays for a physical health condition had a secondary diagnosis of screening and history of mental health and substance abuse.**

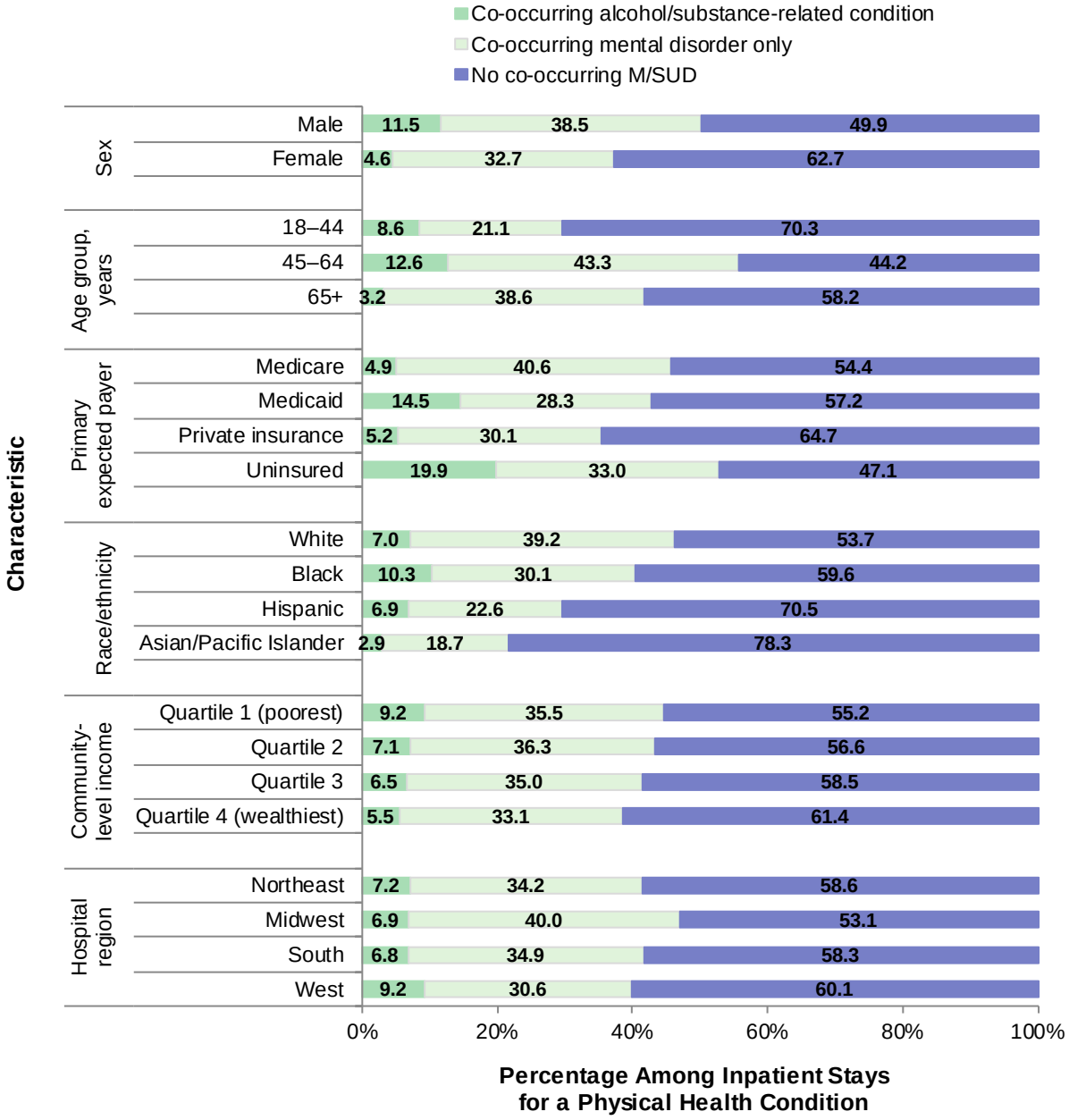
  Among stays with a physical health principal diagnosis, the most common co-occurring M/SUD diagnosis was screening and history of mental health and substance abuse (26.8 percent of stays). Two other M/SUDs each were involved in more than 10 percent of stays for physical health conditions: mood disorders (14.2 percent) and anxiety disorders (10.3 percent).

- **Most stays with a secondary diagnosis of screening and history of mental health and substance abuse involved tobacco use.**

  Of the 7,449,100 stays with a secondary diagnosis of screening and history of mental health and substance abuse, nearly all had a diagnosis of tobacco use disorder or history of tobacco use (7,409,500 or 99 percent; data not shown). Further, 4,594,000 of these stays (61.7 percent of 7,449,100) had a diagnosis of tobacco use disorder or history of tobacco use and no other M/SUD diagnosis. The next most common diagnoses within the category of screening and history of mental health and substance abuse were personal history of alcoholism (35,100 stays) and personal history of adult physical and sexual abuse (16,900 stays).

Figure 4 displays the percentage of adult inpatient stays for physical health conditions with and without a co-occurring M/SUD in 2014, by patient and hospital characteristics. Stays with a co-occurring M/SUD were subdivided into those with a co-occurring alcohol/substance-related condition (with or without a co-occurring mental disorder) and those with a co-occurring mental disorder only (i.e., without a co-occurring alcohol/substance-related condition).

Figure 4. Percentage of adult physical health stays with and without a co-occurring M/SUD, by patient and hospital characteristics, 2014



Abbreviation: M/SUD, mental or substance use disorder

Note: Other or missing payers and other or missing races/ethnicities are not shown.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2014

- **Males, patients aged 45–64 years, uninsured patients, and those treated in hospitals in the Midwest had a higher percentage of physical health stays that involved a co-occurring M/SUD compared with other subgroups.**

  Among stays for physical health conditions, co-occurring M/SUDs were more common among—

  - Males than females (50.1 vs. 37.3 percent)
  - Patients aged 45–64 years (55.8 percent) compared with adults younger than 45 years old (29.7 percent) and older than 64 years old (41.8 percent)
  - Uninsured patients (52.9 percent) compared with those whose stay was paid by Medicare (45.6 percent), Medicaid (42.8 percent), or private insurance (35.3 percent)
  - Whites (46.3 percent) and Blacks (40.4 percent) compared with Hispanics (29.5 percent) and Asian/Pacific Islanders (21.7 percent)
  - Individuals residing in the poorest areas (quartile 1, 44.8 percent) compared with those residing in the wealthiest areas (quartile 4, 38.6 percent)
  - Patients treated in hospitals in the Midwest (46.9 percent) compared with patients treated in hospitals in other regions of the United States (40–42 percent)

- **Males, patients aged 45–64 years, Blacks, Medicaid and uninsured patients, and those treated in hospitals in the West had a higher percentage of physical health stays that involved a co-occurring alcohol/substance-related condition compared with other subgroups.**

  Among stays for physical health conditions, co-occurring alcohol/substance-related conditions were more common among—

  - Males than females (11.5 vs. 4.6 percent)
  - Patients aged 45–64 years (12.6 percent) compared with adults younger than 45 years old (8.6 percent) and older than 64 years old (3.2 percent)
  - Patients who were uninsured (19.9 percent) and those with Medicaid (14.5 percent) compared with patients whose stay was paid by Medicare (4.9 percent) or private insurance (5.2 percent)
  - Blacks (10.3 percent) compared with Whites (7.0 percent), Hispanics (6.9 percent), and Asian/Pacific Islanders (2.9 percent)
  - Individuals residing in the poorest areas (quartile 1, 9.2 percent) compared with those residing in the wealthiest areas (quartile 4, 5.5 percent)
  - Patients treated in hospitals in the West (9.2 percent) compared with those treated in hospitals in other regions of the United States (7 percent)

About Statistical Briefs

Healthcare Cost and Utilization Project (HCUP) Statistical Briefs provide basic descriptive statistics on a variety of topics using HCUP administrative health care 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 2014 National Inpatient Sample (NIS). Historical data were drawn from the 2010 Nationwide Inpatient Sample (NIS). Supplemental sources included population denominator data for use with HCUP databases, derived from information available from the U.S. Census Bureau.[10]

Definitions

Diagnoses, ICD-9-CM, and Clinical Classifications Software (CCS)
The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are concomitant conditions that coexist at the time of admission or develop during the stay. *All-listed diagnoses* include the principal diagnosis plus these additional secondary conditions.

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 diagnosis codes into a manageable number of clinically meaningful categories.[11] 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.

Case definition
The CCS categories defining mental or substance use disorder (M/SUD) and physical health diagnoses are shown in Table 4. CCS categories classified as neither M/SUD nor physical health are not often listed as a principal diagnosis and include codes such as those for social/administrative issues (e.g., homelessness) that may provide context for a stay related to an M/SUD or physical health condition. Inpatient stays with a principal CCS category classified as neither M/SUD nor physical health were excluded from the analysis, as were stays with a missing or invalid principal diagnosis; in total, 177,600 stays were excluded in 2010 and 130,600 stays were excluded in 2014.

[10] Barrett M, Coffey R, Levit K. Population Denominator Data for Use with the HCUP Databases (Updated with 2016 Population Data). HCUP Methods Series Report #2016-04. October 17, 2017. U.S. Agency for Healthcare Research and Quality. www.hcup-us.ahrq.gov/reports/methods/2017-04.pdf. Accessed January 18, 2018.
[11] Agency for Healthcare Research and Quality. HCUP Clinical Classifications Software (CCS) for ICD-9-CM. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated March 2017. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp. Accessed January 18, 2018.

Table 4. CCS categories defining M/SUD and physical health conditions

CCS number	CCS description	Categorization
650	Adjustment disorders	M/SUD
651	Anxiety disorders	M/SUD
652	Attention-deficit, conduct, and disruptive behavior disorders	M/SUD
655	Disorders usually diagnosed in infancy, childhood, or adolescence	M/SUD
656	Impulse control disorders, not elsewhere classifiable	M/SUD
657	Mood disorders	M/SUD
658	Personality disorders	M/SUD
659	Schizophrenia and other psychotic disorders	M/SUD
660	Alcohol-related disorders	M/SUD
661	Substance-related disorders	M/SUD
662	Suicide and intentional self-inflicted injury	M/SUD
663	Screening and history of mental health and substance abuse codes	M/SUD
670	Miscellaneous mental health disorders	M/SUD
653	Delirium, dementia, and amnestic and other cognitive disorders	Physical
654	Developmental disorders	Physical
255	Administrative/social admission	Neither
256	Medical examination/evaluation	Neither
257	Other aftercare	Neither
258	Other screening for suspected conditions (not mental disorders or infectious disease)	Neither
259	Residual codes; unclassified	Neither
1–254, 2601–2621	See CCS documentation[a]	Physical

Abbreviations: CCS, Clinical Classifications Software, M/SUD, mental or substance use disorder
[a] Agency for Healthcare Research and Quality. HCUP Clinical Classifications Software (CCS) for ICD-9-CM. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated March 2017. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp. Accessed January 18, 2018.

Co-occurrence was defined as a principal CCS diagnosis of either an M/SUD or a physical health condition with a secondary CCS diagnosis of the other condition (either physical health or M/SUD). Thus, there were two types of stays involving the co-occurrence of M/SUD and physical health conditions: (1) an M/SUD principal diagnosis with a secondary diagnosis of a physical health condition and (2) a physical health condition principal diagnosis with a secondary diagnosis of an M/SUD condition.

For Figures 3 and 4, physical health stays with a co-occurring M/SUD condition were subdivided into two categories:

- Those with a co-occurring alcohol/substance-related condition (CCS 660, Alcohol-related disorders, and CCS 661, Substance-related disorders), with or without a co-occurring mental disorder
- Those with a co-occurring mental disorder only (CCS 650, 651, 652, 655, 656, 657, 658, 659, 662, 663, and 670), without a co-occurring alcohol/substance-related condition

Tobacco use disorder was defined using the ICD-9-CM diagnosis code 305.1, and history of tobacco use was defined using the ICD-9-CM diagnosis code V15.82. The ICD-9-CM diagnosis codes V11.3 and V15.41 defined personal history of alcoholism and personal history of adult physical and sexual abuse, respectively.

Types of hospitals included in the HCUP National (Nationwide) Inpatient Sample
The National (Nationwide) Inpatient Sample (NIS) 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 NIS includes obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Beginning in 2012, long-

term acute care hospitals are also excluded. 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 NIS.

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.

Community-level income
Community-level income is based on the median household income of the patient's ZIP Code of residence. Quartiles are defined so that the total U.S. population is evenly distributed. Cut-offs for the quartiles are determined annually using ZIP Code demographic data obtained from Claritas, a vendor that adds value to data from the U.S. Census Bureau.[12] The value ranges for the income quartiles vary by year. The income quartile is missing for patients who are homeless or foreign.

Payer
Payer is the expected payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into 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
- Private Insurance: includes Blue Cross, commercial carriers, and private health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- Uninsured: includes an insurance status of *self-pay* and *no charge*
- Other: includes Workers' Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs

Hospital stays billed to the State Children's Health Insurance Program (SCHIP) may be classified as Medicaid, Private Insurance, or Other, depending on the structure of the State program. Because most State data do not identify patients in SCHIP specifically, it is not possible to present this information separately.

For this Statistical Brief, when more than one payer is listed for a hospital discharge, the first-listed payer is used.

Region
Region is one of the four regions defined by the U.S. Census Bureau:

- Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
- Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
- South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
- West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

Reporting of race and ethnicity
Data on Hispanic ethnicity are collected differently among the States and also can differ from the census methodology of collecting information on race (White, Black, Asian/Pacific Islander, American Indian/Alaska Native, Other (including mixed race)) separately from ethnicity (Hispanic, non-Hispanic). State data organizations often collect Hispanic ethnicity as one of several categories that include race. Therefore, for multistate analyses, HCUP creates the combined categorization of race and ethnicity for

[12] Claritas. Claritas Demographic Profile by ZIP Code. https://claritas360.claritas.com/mybestsegments/. Accessed June 6, 2018.

data from States that report ethnicity separately. When a State data organization collects Hispanic ethnicity separately from race, HCUP uses Hispanic ethnicity to override any other race category to create a Hispanic category for the uniformly coded race/ethnicity data element, while also retaining the original race and ethnicity data. This Statistical Brief reports race/ethnicity for the following categories: Hispanic, non-Hispanic White, non-Hispanic Black, and Asian/Pacific Islander.

About HCUP

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of health care 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 health care data. HCUP includes the largest collection of longitudinal hospital 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 health care 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:

Alaska Department of Health and Social Services
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
District of Columbia 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
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 State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
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 Office of Health Analytics
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
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 Department of Health and Human Resources, West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About the NIS

The HCUP National (Nationwide) Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, nonrehabilitation hospitals). The NIS includes all payers. It is drawn from a sampling frame that contains hospitals comprising more than 95 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use. Over time, the sampling frame for the NIS has changed; thus, the number of States contributing to the NIS varies from year to year. The NIS is intended for national estimates only; no State-level estimates can be produced.

The 2012 NIS was redesigned to optimize national estimates. The redesign incorporates two critical changes:

- Revisions to the sample design—starting with 2012, the NIS is now a *sample of discharge records from all HCUP-participating hospitals*, rather than a sample of hospitals from which all discharges were retained (as is the case for NIS years before 2012).

- Revisions to how hospitals are defined—the NIS now uses the *definition of hospitals and discharges supplied by the statewide data organizations* that contribute to HCUP, rather than the definitions used by the American Hospital Association (AHA) Annual Survey of Hospitals.

The new sampling strategy is expected to result in more precise estimates than those that resulted from the previous NIS design by reducing sampling error: for many estimates, confidence intervals under the new design are about half the length of confidence intervals under the previous design. The change in sample design for 2012 necessitates recomputation of prior years' NIS data to enable analyses of trends that use the same definitions of discharges and hospitals.

For More Information

For other information on mental health and substance abuse, refer to the HCUP Statistical Briefs located at www.hcup-us.ahrq.gov/reports/statbriefs/sb_mhsa.jsp.

For additional HCUP statistics, visit:

- HCUP Fast Stats at www.hcup-us.ahrq.gov/faststats/landing.jsp for easy access to the latest HCUP-based statistics for health information topics
- HCUPnet, HCUP's interactive query system, at www.hcupnet.ahrq.gov/

For more information about HCUP, visit www.hcup-us.ahrq.gov/nisoverview.jsp.

For a detailed description of HCUP and more information on the design of the National (Nationwide) Inpatient Sample (NIS), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the National (Nationwide) Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated February 2018. https://www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed February 12, 2018.

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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:

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