HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

STATISTICAL BRIEF #255

March 2020

Inpatient Stays and Emergency Department Visits Involving Traumatic Brain Injury, 2017

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Highlights

- In 2017, over 1 million inpatient stays and treat-and-release ED visits had a diagnosis of traumatic brain injury (TBI) (100 TBI-related stays and 247 visits per 100,000 population).
- Population rates of TBI-related inpatient stays and treat-and-release ED visits were highest in low-income and rural areas and in the Midwest.
- Compared with other age groups, TBI-related inpatient stays for the youngest (<5 years) and oldest (65+ years) patients were more likely to involve cerebral hemorrhage, no loss of consciousness, and unintentional falls.
- One-fourth of TBI-related inpatient stays for patients <5 years old were caused by assault.
- Compared with inpatient stays without a TBI diagnosis, those stays principally for TBIs were more than 2 days longer, were 74 percent more costly, and had an in-hospital mortality rate that was 4 times higher.

Introduction

Traumatic brain injury (TBI) is defined as sudden damage to the brain caused by a bump, blow, jolt, or penetrating injury to the head.[1] TBIs have short- and long-term consequences, including the need for acute hospital care, emotional and behavioral changes (e.g., depression, attention-deficit hyperactivity disorder), impaired neurologic function, complications from intracranial hemorrhage, and death.[2,3] Children and older adults who sustain a TBI are at higher risk for these consequences, compared with individuals in other age groups.[4,5] Hospital-based care for TBI is often more costly, and the lasting effects of the injury may result in returning to the hospital for additional care.[6]

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on initial and subsequent TBI-related inpatient stays and treat-and-release emergency department (ED) visits (i.e., those that do not result in admission to the same hospital) using the 2017 National Inpatient Sample (NIS) and the 2017 Nationwide Emergency Department Sample (NEDS). Readmission rates following inpatient stays for TBI-related injuries also are presented using the 2017 Nationwide Readmissions Database (NRD). TBIs are categorized as those involving cerebral hemorrhage; mild to severe TBIs without cerebral hemorrhage, but that involve injuries more complex than concussion (e.g., cerebral edema); and uncomplicated concussion. First, patient and injury-related characteristics of inpatient stays and ED visits with any TBI diagnosis (principal or secondary) are shown. Second, outcomes of inpatient stays with a principal diagnosis of TBI are described, including length of stay, average cost per stay, and rates of in-hospital mortality and all-cause 30-day readmissions. Because of the large sample size of the HCUP NIS, NEDS, and NRD small differences can be statistically significant. Thus, only differences between groups greater than or equal to 10 percent are noted in the text.

[1] Centers for Disease Control and Prevention. Traumatic Brain Injury & Concussion. www.cdc.gov/traumaticbraininjury/index.html. Accessed November 25, 2019.
[2] Yeates KO, Swift E, Taylor HG, Wade SL, Drotar D, Stancin T, et al. Short- and long-term social outcomes following pediatric traumatic brain injury. Journal of the International Neuropsychological Society. 2004;10(3):412–26.
[3] Taylor CA, Bell JM, Breiding MJ, Xu L. Traumatic brain injury–related emergency department visits, hospitalizations, and deaths — United States, 2007 and 2013. Morbidity and Mortality Weekly Report. 2017;66(9):1–16.
[4] Ibid.
[5] Nishijima DK, Offerman SR, Ballard DW, Vinson DR, Chettipally UK, Rauchwerger AS, et al. Risk of traumatic intracranial hemorrhage in patients with head injury and preinjury warfarin or clopidogrel use. Academic Emergency Medicine. 2013;20(2):140–5.
[6] Van Deynse H, Van Belleghem G, Lauwaert D, Moens M, Pien K, Devos S, et al. The incremental cost of traumatic brain injury during the first year after a road traffic accident. Brain Injury. 2019;33(9):1234–44.

Findings

Characteristics of TBI-related inpatient stays and treat-and-release ED visits, 2017
Table 1 presents patient and hospitals characteristics of TBI-related inpatient stays and ED visits in 2017. The percentage distribution is shown, as well as the population rate for patient characteristics.

Table 1. Characteristics of TBI-related inpatient stays and treat-and-release ED visits, 2017

Characteristic	Inpatient stays			ED visits		
	N	%	Rate[a]	N	%	Rate[a]
Total, non-TBI injury-related stays or visits	**2,575,400**	**n/a**	**792**	**25,569,200**	**n/a**	**7,864**
Total, TBI-related stays or visits	**326,600**	**100.0**	**100**	**801,700**	**100.0**	**247**
Age, years						
<5	8,100	2.5	40	32,400	4.0	162
5–17	15,000	4.6	28	208,400	26.0	386
18–34	49,200	15.1	65	221,200	27.6	293
35–64	96,600	29.6	77	217,600	27.1	173
65+	157,700	48.3	314	122,200	15.2	243
Sex						
Male	198,500	60.8	124	428,800	53.5	268
Female	128,000	39.2	78	372,800	46.5	226
Primary expected payer[b]						
Medicare, 65+ years	136,000	41.6	—[a]	101,100	12.6	—[a]
Medicare, <65 years	14,800	4.5	—[a]	26,300	3.3	—[a]
Medicaid	52,600	16.1	—[a]	190,100	23.7	—[a]
Private insurance	85,100	26.1	—[a]	330,500	41.2	—[a]
Self-pay/No charge	20,300	6.2	—[a]	87,200	10.9	—[a]
Community-level income						
Quartile 1 (lowest)	90,200	27.6	110	209,600	26.1	256
Quartile 2	84,300	25.8	103	211,100	26.3	257
Quartile 3	77,200	23.6	95	192,800	24.1	236
Quartile 4 (highest)	67,800	20.7	85	174,500	21.8	219
Location of patient's residence						
Metro	273,700	83.8	98	645,800	80.6	232
Rural, adjacent to metro area	32,900	10.1	108	99,500	12.4	327
Rural, remote	17,300	5.3	110	52,300	6.5	331
Region of patient's residence						
Northeast	55,100	16.9	98	150,500	18.8	266
Midwest	74,300	22.7	109	196,300	24.5	288
South	117,700	36.0	96	268,800	33.5	218
West	76,900	23.5	99	182,100	22.7	236
Hospital ownership						
Public	51,400	15.7	—[a]	131,700	16.4	—[a]
Private	275,300	84.3	—[a]	670,000	83.6	—[a]
Teaching status						
Teaching	275,600	84.4	—[a]	496,500	61.9	—[a]
Nonteaching	51,000	15.6	—[a]	305,300	38.1	—[a]

Abbreviations: ED, emergency department; n/a, not applicable; TBI, traumatic brain injury

Notes: TBI-related stays/visits include initial and subsequent encounters; non-TBI injury-related stays/visits include only the initial encounter for the injury. Percentages may not add to 100 percent because of missing data. Numbers of stays/visits are rounded to the nearest hundred. Percentages are calculated based on nonrounded values.

[a] Rate per 100,000 population. Denominator data by payer are not available to calculate population rates. Population rates are calculated only for patient characteristics and not for hospital characteristics.

[b] Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment. 'Other' not shown (stays, 5.1%; visits, 7.7%).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and Nationwide Emergency Department Sample (NEDS), 2017

- **In 2017, there were over 1 million TBI-related inpatient stays and treat-and-release ED visits combined.**

  In 2017, there were 1,128,300 TBI-related inpatient stays and ED visits. Approximately 29 percent of these encounters were inpatient stays, corresponding to a rate of 100 per 100,000 population, and approximately 71 percent were ED visits, corresponding to a rate of 247 per 100,000 population. In comparison, the rates for initial stays and visits that were not TBI-related but that involved other injuries were 792 stays and 7,864 visits per 100,000 population.

- **The population rate of TBI-related inpatient stays generally increased with age, but for TBI-related treat-and-release ED visits the rate was highest among children aged 5–17 years. Both inpatient stay and ED visit rates were higher for males than for females.**

  The population rate of TBI-related inpatient stays ranged from 28 per 100,000 children aged 5–17 years to 314 per 100,000 adults aged 65 years or older. In contrast, the rate of TBI-related ED visits was highest among children aged 5–17 years (386 per 100,000 population) and lowest among children less than 5 years old and adults aged 35–64 years (162 and 173 per 100,000 population, respectively). The rates of both TBI-related inpatient stays and ED visits were higher for males than for females (124 vs. 78 stays and 268 vs. 226 visits per 100,000 population).

- **Population rates of TBI-related inpatient stays and treat-and-release ED visits were highest in lower-income communities and rural areas.**

  The population rate of TBI-related inpatient stays was 29 percent higher for patients who resided in the lowest-income communities (quartile 1: 110 per 100,000 population) compared with patients from the highest-income communities (quartile 4: 85 per 100,000 population). The rate of TBI-related ED visits was highest for patients who lived in communities with incomes in the bottom two quartiles (256 and 257 per 100,000 population) compared with patients who lived in communities with income in the highest quartile (219 per 100,000 population).

  Over 80 percent of TBI-related inpatient stays and ED visits were for patients who resided in metro areas (83.8 percent of stays and 80.6 percent of visits). However, population rates of TBI-related inpatient stays and ED visits were generally higher in rural than in metro areas. For instance, the rate of TBI-related ED visits for patients who resided in rural metro-adjacent areas (327 per 100,000 population) was 41 percent higher than the rate among patients who resided in metro areas (232 per 100,000 population).

  Finally, the population rate of TBI-related ED visits was highest in the Midwest and Northeast (288 and 266 per 100,000 population, respectively), compared with the West (236) and South (218).

Table 2 presents injury-related characteristics of TBI-related inpatient stays and ED visits in 2017.

Table 2. Characteristics of injuries for TBI-related inpatient stays and treat-and-release ED visits, 2017

Injury characteristic	TBI-related inpatient stays		TBI-related treat-and-release ED visits	
	N	%	N	%
Total	**326,600**	**100.0**	**801,700**	**100.0**
Principal (vs. secondary) TBI diagnosis	216,200	66.2	—[a]	—[a]
Subsequent (vs. initial) encounter	27,800	8.5	13,800	1.7
Head injury type				
Cerebral hemorrhage	227,400	69.6	81,000	10.1
Epidural[b]	13,500	4.1	3,900	0.5
Subdural[b]	149,800	45.9	50,100	6.3
Subarachnoid[b]	97,300	29.8	27,900	3.5
Intracerebral[b]	19,000	5.8	6,000	0.7
TBI, mild to severe, without cerebral hemorrhage	48,900	15.0	138,100	17.2
Concussion, uncomplicated	50,400	15.4	582,600	72.7
Loss of consciousness				
>30 minutes or loss of any duration with death	14,800	4.5	2,800	0.3
≤30 minutes	40,400	12.4	123,000	15.3
Loss of unspecified duration	130,000	39.8	230,800	28.8
None	141,400	43.3	445,100	55.5
Intent and mechanism of injury				
Unintentional, fall	168,700	51.7	319,900	39.9
Unintentional, MVT/other transport	79,200	24.2	165,600	20.7
Assault, all mechanisms	17,700	5.4	68,300	8.5
Unintentional, struck by/against	6,700	2.1	150,800	18.8
Other intent/mechanism	11,900	3.7	29,600	3.7
None listed	42,400	13.0	67,600	8.4
Sports-related diagnoses				
Contact or collision	800	0.3	52,600	6.6
Limited contact	5,700	1.7	40,300	5.0
Noncontact	6,400	2.0	24,500	3.1
Other	600	0.2	3,100	0.4
None listed	313,100	95.8	681,300	85.0

Abbreviations: ED, emergency department; MVT, motor vehicle traffic; TBI, traumatic brain injury

Notes: Numbers of stays and visits are rounded to the nearest hundred. Percentages are calculated based on nonrounded values.

[a] The order of diagnoses for ED data does not represent principal or secondary reasons for the encounter, as it does for inpatient data, and thus is not shown.

[b] The four types of cerebral hemorrhage sum to more than the total because records could have multiple types of cerebral hemorrhage.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and Nationwide Emergency Department Sample (NEDS), 2017

- **Whereas most TBI-related inpatient stays involved cerebral hemorrhage, most TBI-related treat-and-release ED visits involved an uncomplicated concussion.**

  Most TBI-related inpatient stays involved cerebral (epidural, subdural, subarachnoid, or intracerebral) hemorrhage (69.6 percent), the most common type of which was subdural (45.9 percent). Another 15.4 percent of stays involved a concussion without cerebral hemorrhage or other injuries more complex than concussion. In contrast, 72.7 percent of TBI-related ED visits involved an uncomplicated concussion and only 10.1 percent involved cerebral hemorrhage.

- **Over half of TBI-related inpatient stays and nearly 45 percent of TBI-related treat-and-release ED visits involved loss of consciousness of some duration.**

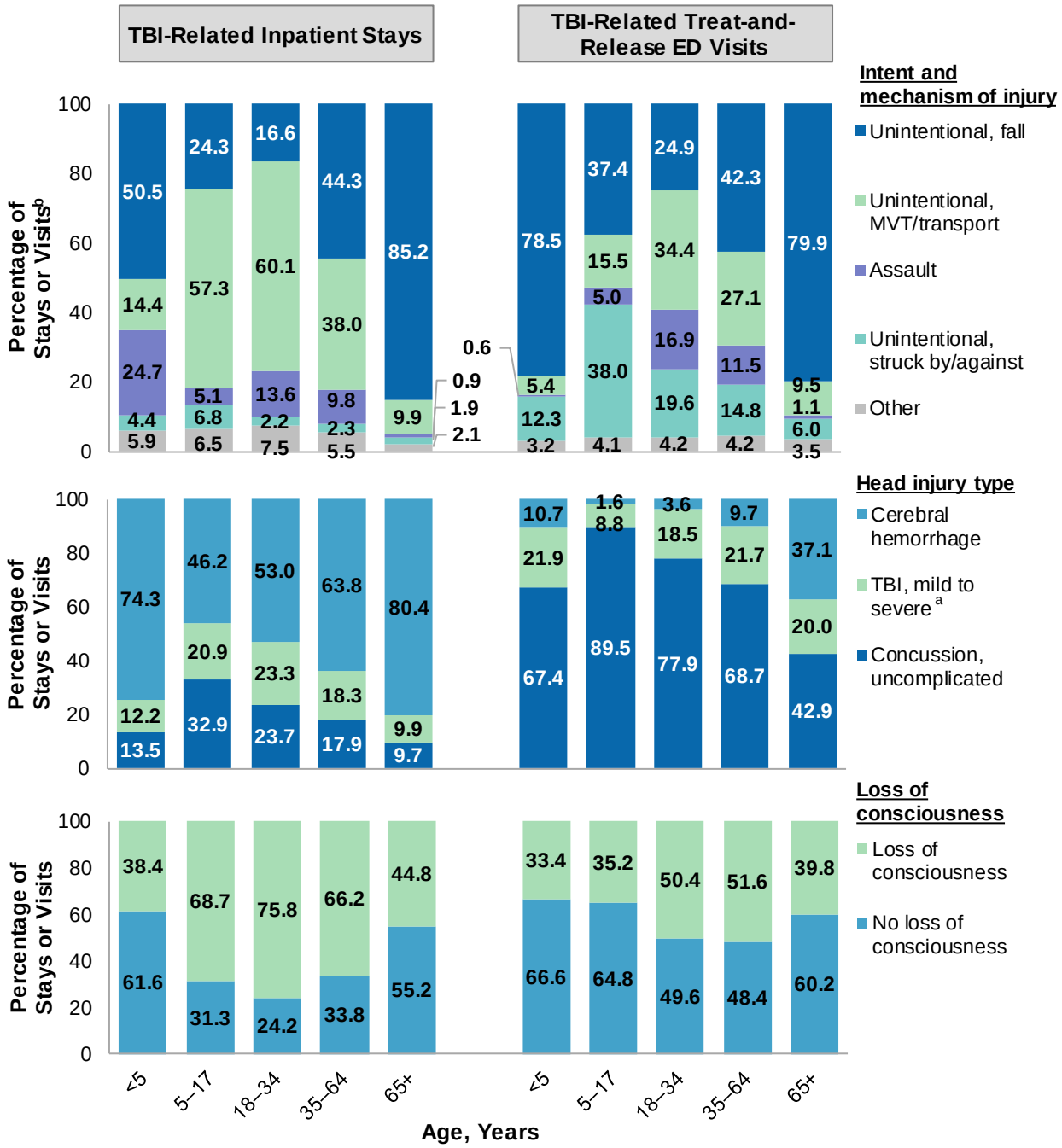
  Among TBI-related inpatient stays, 4.5 percent involved a loss of consciousness of more than 30 minutes or any duration of loss with death (vs. 0.3 percent of TBI-related ED visits); 12.4 percent involved a loss of consciousness of less than or equal to 30 minutes (vs. 15.3 percent of ED visits); and 39.8 percent involved a loss of consciousness of unknown duration (vs. 28.8 percent of ED visits).

- **Overall, 15 percent of TBI-related treat-and-release ED visits were sports-related.**

  Overall, 6.6 percent of TBI-related treat-and-release ED visits involved contact or collision sports and another 8.5 percent involved other sports-related injuries, compared with 0.3 and 3.9 percent of TBI-related inpatient stays. Sports-related injuries were most common among patients aged 5–17 years, constituting 13.3 percent of TBI-related inpatient stays and 35.9 percent of TBI-related ED visits in this age group (data not shown). Overall, 3.2 percent of TBI-related inpatient stays and 21.1 percent of TBI-related ED visits among children aged 5–17 years involved contact or collision sports specifically (data not shown).

Figure 1 displays select TBI characteristics of inpatient stays and ED visits in 2017, by patient age group.

Figure 1. Intent/mechanism of injury, type of head injury, and loss of consciousness among TBI-related inpatient stays and treat-and-release ED visits, by patient age group, 2017



Abbreviations: ED, emergency department; TBI, traumatic brain injury

[a] TBI, mild to severe, is without cerebral hemorrhage.

[b] The percentage of stays or visits with each intent/mechanism is calculated out of stays and visits with a listed intent/mechanism. The percentage of stays and visits with no listed intent/mechanism was similar across hospital settings and age groups, ranging from 8 to 11 percent (not shown).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and Nationwide Emergency Department Sample (NEDS), 2017

- **A higher percentage of TBI-related inpatient stays for patients in the youngest and oldest age groups involved unintentional falls, cerebral hemorrhage, and no loss of consciousness, compared with stays for patients in other age groups.**

  Half of TBI-related stays for patients younger than 5 years old (50.5 percent) and more than four in five stays for patients aged 65 years or older (85.2 percent) were caused by unintentional falls compared with 16.6–44.3 percent of stays among patients aged 5–64 years. Approximately three-fourths or more of TBI-related inpatient stays for patients aged less than 5 years old (74.3 percent) and for patients aged 65 years or older (80.4 percent) involved cerebral hemorrhage, compared with less than 65 percent of stays for individuals aged 5–64 years. At the same time, a greater percentage of TBI-related inpatient stays for patients in the youngest and oldest age groups had no loss of consciousness compared with stays for patients of other ages (61.6 and 55.2 vs. 24.2–33.8 percent).

- **Unintentional MVT and other transport incidents was the leading cause of TBI-related inpatient stays for patients aged 5–34 years and the leading cause of treat-and-release ED visits for patients aged 18–34 years.**

  Approximately 60 percent of TBI-related inpatient stays for patients aged 5–34 years were caused by unintentional MVT and other transport incidents, and over one-third of TBI-related treat-and-release ED visits for patients aged 18–34 years also had this cause.

- **A higher percentage of TBI-related inpatient stays for patients less than 5 years old and of TBI-related treat-and-release ED visits for patients aged 18–34 years were caused by assault, compared with other age groups.**

  One-fourth (24.7 percent) of TBI-related inpatient stays for patients less than 5 years old were caused by assault, compared with 13.6 percent of stays for patients aged 18–34 years and less than 10 percent for individuals in other age groups. Of TBI-related treat-and-release ED visits for patients aged 18–34 years, 16.9 percent were caused by assault, compared with 11.5 percent of visits for patients aged 35–64 years and 5 percent or less of visits for individuals in other age groups.

Outcomes of TBI-related inpatient stays, 2017

Table 3 presents outcomes of inpatient stays with a principal TBI diagnosis in 2017, by select patient, hospital, and injury-related characteristics.

Table 3. Outcomes of inpatient stays with a principal TBI diagnosis, by select characteristics, 2017

Patient, hospital, or injury characteristic	Length of stay, days, mean	Cost per stay, $, mean	In-hospital death, %	All-cause 30-day readmission, %
Total, stays with no TBI diagnosis in any field	**4.6**	**12,100**	**1.9**	**12.6**
Total, stays principally diagnosed for TBI	**6.8**	**21,000**	**7.9**	**11.9**
Age, years				
<5	5.4	20,400	4.4	3.1
5–17	7.0	27,300	6.3	2.4
18–34	8.2	30,600	8.5	5.9
35–64	7.8	25,000	7.6	11.1
65+	6.0	16,600	8.2	14.6
Sex				
Male	7.5	23,700	8.7	12.0
Female	5.7	17,100	6.7	11.8
Primary expected payer				
Medicare, 65+ years	5.8	16,100	7.7	14.8
Medicare, <65 years	6.9	20,700	6.8	16.8
Medicaid	9.7	32,500	8.2	9.7
Private insurance	6.9	23,900	7.1	7.8
Self-pay/No charge[a]	6.1	20,900	12.2	7.3
Hospital ownership				
Public	7.7	29,200	9.8	11.0
Private	6.6	19,600	7.6	12.1
Teaching status				
Teaching	6.9	22,000	8.2	11.9
Nonteaching	6.0	16,000	6.6	11.9
Head injury type				
Cerebral hemorrhage	7.0	21,800	8.4	13.1
Epidural	6.7	26,000	3.9	7.6
Subdural	6.9	20,900	8.4	15.4
Subarachnoid	7.1	22,900	8.6	10.3
Intracerebral	7.2	21,700	9.6	10.1
TBI, mild to severe, without hemorrhage	7.9	24,200	10.1	8.3
Concussion, uncomplicated	2.9	10,000	0.4	5.4
Loss of consciousness				
Any	7.6	25,200	11.2	10.3
None	5.9	16,400	4.3	13.5
Intent and mechanism of injury				
Unintentional, fall	5.7	16,400	6.9	13.8
Unintentional, MVT/other transport	8.6	31,000	8.4	6.8
Assault all mechanisms	6.8	22,600	6.6	9.0
Unintentional, struck by/against	4.8	15,700	4.4	11.2
Sports-related diagnoses				
Contact or collision	1.9	8,400	—[b]	2.9
Limited contact	5.0	21,000	4.0	5.6
Noncontact	5.2	17,600	6.7	11.0

Abbreviations: ED, emergency department; MVT, motor vehicle traffic; TBI, traumatic brain injury

Notes: Costs are rounded to the nearest hundred. Other payers, intents/mechanisms, and sports-related diagnoses are not shown.

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

[b] Suppressed because of cell size <11.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and Nationwide Readmissions Database (NRD), 2017

- **Compared with inpatient stays without a TBI diagnosis, those principally for TBIs were longer, were costlier, and had an in-hospital mortality rate that was 4 times higher.**

  The mean length of inpatient stays with a principal TBI diagnosis was 6.8 days, which was more than 2 days longer than for stays without a TBI diagnosis (4.6 days). Furthermore, compared with costs for non-TBI-related stays, those for TBI were 74 percent costlier (average cost per stay: $21,000 vs. $12,100) and the percentage resulting in in-hospital deaths was 4 times higher (7.9 vs. 1.9 percent).

- **The all-cause 30-day readmission rate following stays for TBI generally increased with age and was higher following stays for subdural hemorrhage than other types of head injury.**

  The 30-day readmission rate following index (i.e., initial) stays with a principal TBI diagnosis ranged from 2.4 percent for patients aged 5–17 years to 14.6 percent for patients aged 65 years or older. Readmission rates also were higher following stays for cerebral hemorrhage (13.1 percent), particularly for those with subdural hemorrhage (15.4 percent), compared with stays for TBI without hemorrhage (8.3 percent) or uncomplicated concussion (5.4 percent),

- **More than 1 in 10 stays for TBI with an expected payer of self-pay/no charge died in the hospital.**

  For patients with an expected payer of self-pay/no charge, 12.2 percent of stays resulted in in-hospital death. This was higher than for any other payer group (ranging from 6.8 percent for patients aged less than 65 years with an expected payer of Medicare to 8.2 percent for patients with an expected payer of Medicaid).

- **Inpatient stays for TBI at public and nonteaching hospitals, as well as those involving cerebral hemorrhage or mild to severe TBIs, loss of consciousness, or unintentional MVT or other transport incidents were longer, were costlier, and had higher in-hospital mortality rates than other stays.**

  Public and nonteaching hospitals. Compared with inpatient stays for TBIs treated at private hospitals, those treated at public hospitals had a longer average length of stay (7.7 vs. 6.6 days), a higher average cost per stay ($29,200 vs. $19,600), and a higher in-hospital mortality rate (9.8 vs. 7.6 percent). Similarly, compared with inpatient stays for TBIs treated at nonteaching hospitals, those treated at teaching hospitals were on average 1 day longer (6.9 vs. 6.0 days), had a higher average cost per stay ($22,000 vs. $16,000), and had a higher in-hospital mortality rate (8.2 vs. 6.6 percent).

  Cerebral hemorrhage. Inpatient stays for cerebral hemorrhage on average lasted 7.0 days, cost $21,800, and had an overall in-hospital mortality rate of 8.4 percent. Among all types of cerebral hemorrhage, intracerebral hemorrhage had the highest in-hospital mortality rate (9.6 percent). In comparison, stays for uncomplicated concussion on average lasted 2.9 days, cost $10,000, and had an in-hospital mortality rate of 0.4 percent. Stays for mild to severe TBIs with injuries more complex than concussion were longer (7.9 days), were costlier ($24,200), and had a higher in-hospital mortality rate (10.1 percent) than stays for either cerebral hemorrhage or uncomplicated concussion.

  Loss of consciousness. Inpatient stays for TBI that involved loss of consciousness on average lasted 7.6 days, cost $25,200, and had an in-hospital mortality rate of 11.2 percent. In comparison, stays for TBI among patients who did not lose consciousness on average lasted 5.9 days, cost $16,400, and had an in-hospital mortality rate of 4.3 percent.

  Unintentional MVT incidents. Inpatient stays for TBIs caused by MVT and other transport incidents lasted an average of 8.6 days and cost $31,000, and 8.4 percent of these stays resulted in in-hospital death. In contrast, these statistics were much lower among stays for TBIs caused by unintentional falls, unintentional injuries involving being struck by or against something, and assaults.

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 2017 National Inpatient Sample (NIS), Nationwide Emergency Department Sample (NEDS), and Nationwide Readmissions Database (NRD). Supplemental sources included population denominator data for use with HCUP databases, derived from information available from the U.S. Census Bureau.[7]

Definitions

Diagnoses, ICD-10-CM, and Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses
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-10-CM is the International Classification of Diseases, Tenth Revision, Clinical Modification diagnosis coding system. In October 2015, ICD-10-CM replaced the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis coding system for most inpatient and outpatient medical encounters. There are over 70,000 ICD-10-CM diagnosis codes.

The CCSR for ICD-10-CM aggregates the diagnosis codes into a manageable number of clinically meaningful categories.[8] The CCSR for ICD-10-CM 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.

Case definition
The CCSR categories defining traumatic brain injury (TBI) are listed below. The exact ICD-10-CM codes included in these categories can be found in the CCSR documentation.[9]

- INJ008: Traumatic brain injury (TBI); concussion, initial encounter
- INJ045: Traumatic brain injury (TBI); concussion, subsequent encounter

[7] Barrett M, Coffey R, Levit K. Population Denominator Data for Use with the HCUP Databases (Updated with 2016 Population Data). HCUP Methods Series Report #2017-04. October 17, 2017. U.S. Agency for Healthcare Research and Quality. www.hcup-us.ahrq.gov/reports/methods/2017-04.pdf. Accessed February 28, 2020.
[8] 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 January 2020. www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp. Accessed February 27, 2020.
[9] Ibid.

Type of traumatic brain injury
Types of traumatic brain injury were identified by the following values for the first through fifth digits of the ICD-10-CM codes in the TBI-related CCSR categories. If multiple codes were present, the following hierarchy was used to assign the record to only one category.

- Cerebral hemorrhage
    - S064X: Epidural
    - S065X: Subdural
    - S066X: Subarachnoid
    - S0634, S0635, S0636: Intracerebral hemorrhage
- TBI, mild to severe
    - S0631, S0632, or S0633: Contusion and laceration of cerebrum
    - S0637, S0638: Contusion, laceration, or hemorrhage of cerebellum or brainstem
    - S062X: Diffuse traumatic brain injury
    - S0630: Focal traumatic brain injury
    - S0681 or S0682: Injury of blood vessels of head or carotid artery
    - S061X: Traumatic cerebral edema
    - S0689 or S069X: Other intracranial injury
- Concussion, uncomplicated
    - S060X: Concussion

Loss of consciousness
Loss of consciousness was identified by the following values for the sixth digit of the ICD-10-CM codes in the TBI-related CCSR categories. If multiple codes were present, the following hierarchy was used to assign the record to only one category.

- >30 minutes or loss of any duration with death
    - 7 or 8: Loss of any duration with death
    - 2: 31 minutes to <1 hour
    - 3: 1 hour to <6 hours
    - 4: 6 to 24 hours
    - 5 or 6: >24 hours
- ≤30 minutes
    - 1: 30 minutes or less
- Loss of unspecified duration
    - 9: Loss of unspecified duration
- No loss of consciousness
    - 0: None

Intent and mechanism of injury
Intent and mechanism of injury were identified by the ICD-10-CM external cause of injury matrix for causes other than poisoning developed by the Centers for Disease Control and Prevention.[10] If multiple codes were present, the following hierarchy was used to assign the record to only one category:

- Assault, all mechanisms
- Self-harm, all mechanisms
- Unintentional, motor vehicle traffic (MVT) collision or other transport, which included the following mechanisms:
    - MVT-occupant
    - MVT-motorcyclist
    - MVT-pedal cyclist
    - MVT-pedestrian
    - MVT-other
    - MVT-unspecified
    - Motor vehicle-nontraffic
    - Pedal cyclist, other
    - Pedestrian, other

[10] Centers for Disease Control and Prevention. Proposed ICD-10-CM External Cause of Injury Matrix for Causes other than Poisoning. ftp.cdc.gov/pub/TBI/injury/icd10/ICD-10-CM_Non-Poisoning_Cause_Matrix.xlsx. Accessed November 26, 2019.

    - Other land transport
    - Other transport
- Unintentional, fall
- Unintentional, struck by/against
- All other intents/mechanisms

Ultimately, self-harm was grouped with all other intents/mechanisms in the analysis.

Non-TBI injury-related stays and visits
Initial stays and visits that were not TBI-related but that involved other injuries were identified based on all-listed diagnoses by the following ICD-10-CM codes and CCSR categories, which can be found in the CCSR documentation.[11] Subsequent encounters for the same injuries were not included.

- CCSR category: INJ001–INJ007 or INJ009–INJ027 or INJ032 (initial encounter)
- ICD-10-CM diagnosis code: T8404 (periprosthetic fracture) with A in the 7th position (initial encounter)

Sports-related diagnoses
The following ICD-10-CM codes were used to define sports-related injuries.[12]

Table 4. ICD-10-CM codes used to define sports-related injuries

ICD-10-CM code	Description
Contact or collision	
Y9312	Activity, springboard and platform diving
Y9313	Activity, water polo
Y9322	Activity, ice hockey
Y9361	Activity, American tackle football
Y9363	Activity, rugby
Y9365	Activity, lacrosse and field hockey
Y9366	Activity, soccer
Y9367	Activity, basketball
Y9371	Activity, boxing
Y9372	Activity, wrestling
Y9375	Activity, martial arts
Limited contact	
Y9317	Activity, water skiing and wake boarding
Y9318	Activity, surfing, windsurfing and boogie boarding
Y9319	Activity, other involving water and watercraft
Y9321	Activity, ice skating
Y9323	Activity, snow (alpine) (downhill) skiing, snowboarding, sledding, tobogganing and snow tubing
Y9324	Activity, cross country skiing
Y9329	Activity, other involving ice and snow
Y9343	Activity, gymnastics
Y9344	Activity, trampolining
Y9345	Activity, cheerleading
Y9349	Activity, other involving dancing and other rhythmic movements
Y9351	Activity, roller skating (inline) and skateboarding
Y9352	Activity, horseback riding

[11] 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 January 2020. www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp. Accessed February 27, 2020.
[12] Rice SG, American Academy of Pediatrics Council on Sports Medicine and Fitness. Medical conditions affecting sports participation. Pediatrics. 2008;121(4):841–8.

ICD-10-CM code	Description
Y9355	Activity, bike riding
Y9357	Activity, non-running track and field events
Y9359	Activity, other involving other sports and athletics played individually
Y9362	Activity, American flag or touch football
Y9364	Activity, baseball
Y9368	Activity, volleyball (beach) (court)
Y9369	Activity, other involving other sports and athletics played as a team or group
Noncontact/noncollision	
Y9301	Activity, walking, marching and hiking
Y9302	Activity, running
Y9311	Activity, swimming
Y9314	Activity, water aerobics and water exercise
Y9315	Activity, underwater diving and snorkeling
Y9316	Activity, rowing, canoeing, kayaking, rafting and tubing
Y9341	Activity, dancing
Y9342	Activity, yoga
Y9353	Activity, golf
Y9354	Activity, bowling
Y9356	Activity, jumping rope
Y936A	Activity, physical games generally associated with school recess, summer camp and children
Y9373	Activity, racquet and hand sports
Y9374	Activity, frisbee
Y93A1	Activity, exercise machines primarily for cardiorespiratory conditioning
Y93A2	Activity, calisthenics
Y93A3	Activity, aerobic and step exercise
Y93A4	Activity, circuit training
Y93A5	Activity, obstacle course
Y93A6	Activity, grass drills
Y93A9	Activity, other involving cardiorespiratory exercise
Y93B1	Activity, exercise machines primarily for muscle strengthening
Y93B2	Activity, push-ups, pull-ups, sit-ups
Y93B3	Activity, free weights
Y93B4	Activity, pilates
Y93B9	Activity, other involving muscle strengthening exercises
Y9381	Activity, refereeing a sports activity
Other	
Y9331	Activity, mountain climbing, rock climbing and wall climbing
Y9332	Activity, rappelling
Y9333	Activity, BASE jumping
Y9334	Activity, bungee jumping
Y9335	Activity, hang gliding
Y9339	Activity, other involving climbing, rappelling and jumping off
Y9379	Activity, other specified sports and athletics

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

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 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 National Inpatient Sample
The National 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.

Types of hospitals included in the HCUP Nationwide Emergency Department Sample
The Nationwide Emergency Department Sample (NEDS) 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 NEDS includes specialty, pediatric, public, and academic medical hospitals. Excluded are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Hospitals included in the NEDS have hospital-owned emergency departments (ED) and no more than 90 percent of their ED visits resulting in admission.

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 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) or the ED visit, not a person or patient. This means that a person who is admitted to the hospital or seen in the ED multiple times in 1 year will be counted each time as a separate discharge from the hospital or visit in the ED.

Population rates
Rates of stays or visits per 100,000 population were calculated using 2017 hospital discharge and treat-and-release ED visit totals in the numerator and U.S. Census Bureau[13] estimates of the 2017 U.S. population in the denominator. Individual patients hospitalized or seen in the ED multiple times are counted more than once in the numerator.

[13] Barrett M, Coffey R, Levit K. Population Denominator Data for Use with the HCUP Databases (Updated with 2016 Population Data). HCUP Methods Series Report #2017-04. October 17, 2017. U.S. Agency for Healthcare Research and Quality. www.hcup-us.ahrq.gov/reports/methods/2017-04.pdf. Accessed February 28, 2020.

Population rate = $\left(\frac{\text{number of stays or visits}}{\text{number of U.S. residents}}\right)$ x 100,000

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).[14] *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, costs are reported to the nearest hundred.

Location of patient's residence

Place of residence is based on the rural-urban continuum codes (RUCC) for U.S. counties developed by the United States Department of Agriculture (USDA).[15] For this Statistical Brief, we collapsed the RUCC codes into the following three categories:

Metro:

- Counties in metro areas of 1 million population or more
- Counties in metro areas of 250,000 to 1 million population
- Counties in metro areas of fewer than 250,000 population

Rural (nonmetro), adjacent to metro area:

- Urban population of 20,000 or more, adjacent to a metro area
- Urban population of 2,500 to 19,999, adjacent to a metro area
- Completely rural or less than 2,500 urban population, adjacent to a metro area

Rural (nonmetro), remote area:

- Urban population of 20,000 or more, not adjacent to a metro area
- Urban population of 2,500 to 19,999, not adjacent to a metro area
- Completely rural or less than 2,500 urban population, not adjacent to a metro area

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 produces population estimates and projections based on data from the U.S. Census Bureau.[16] The value ranges for the income quartiles vary by year. The income quartile is missing for patients who are homeless or foreign.

Expected payer

To make coding uniform across all HCUP data sources, the primary expected payer for the hospital stay or ED visit 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])

[14] 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 December 2019. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp. Accessed February 3, 2020.

[15] United States Department of Agriculture. Rural-Urban Continuum Codes. www.ers.usda.gov/data-products/rural-urban-continuum-codes/. Accessed February 27, 2020.

[16] Claritas. Claritas Demographic Profile by ZIP Code. claritas360.claritas.com/mybestsegments/. Accessed February 3, 2020.

- 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 or ED visits that were expected to be billed to the State Children's Health Insurance Program (SCHIP) are included under Medicaid.

For this Statistical Brief, when more than one payer is listed for a hospital discharge or ED visit, 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

Discharge status
Discharge status reflects the disposition of the patient at discharge from the hospital, including patients who died in the hospital.

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 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:

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
Delaware Division of Public Health
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Laulima Data Alliance, a subsidiary of the Healthcare Association of Hawaii
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 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 unweighted sample size for the 2017 NIS is 7,159,694 (weighted, this represents 35,798,453 inpatient stays).

About the NEDS

The HCUP Nationwide Emergency Department Database (NEDS) is a unique and powerful database that yields national estimates of emergency department (ED) visits. The NEDS was constructed using records from both the HCUP State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID). The SEDD capture information on ED visits that do not result in an admission (i.e., patients who were treated in the ED and then released from the ED, or patients who were transferred to another hospital); the SID contain information on patients initially seen in the ED and then admitted to the same

hospital. The NEDS was created to enable analyses of ED utilization patterns and support public health professionals, administrators, policymakers, and clinicians in their decisionmaking regarding this critical source of care. The NEDS is produced annually beginning in 2006. Over time, the sampling frame for the NEDS has changed; thus, the number of States contributing to the NEDS varies from year to year. The NEDS is intended for national estimates only; no State-level estimates can be produced. The unweighted sample size for the 2017 NEDS is 33,506,645 (weighted, this represents 144,814,803 ED visits).

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 2017 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 2017 NRD is 17,978,754 (weighted, this represents 35,790,513 inpatient stays).

For More Information

For other information on injuries, including traumatic brain injury, refer to the HCUP Statistical Briefs located at www.hcup-us.ahrq.gov/reports/statbriefs/sb_injurypoisoning.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 healthcare information topics
- HCUPnet, HCUP's interactive query system, at www.hcupnet.ahrq.gov/

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

For a detailed description of HCUP and more information on the design of the National Inpatient Sample (NIS), Nationwide Emergency Department Sample (NEDS), and Nationwide Readmissions Database (NRD), 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 December 2019. www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed February 3, 2020.

Agency for Healthcare Research and Quality. Overview of the Nationwide Emergency Department Sample (NEDS). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated December 2019. www.hcup-us.ahrq.gov/nedsoverview.jsp. Accessed February 3, 2020.

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 2019. www.hcup-us.ahrq.gov/nrdoverview.jsp. Accessed February 3, 2020.

Suggested Citation

Reid LD (AHRQ), Fingar KR (IBM Watson Health). Inpatient Stays and Emergency Department Visits Involving Traumatic Brain Injury, 2017. HCUP Statistical Brief #255. March 2020. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb255-Traumatic-Brain-Injury-Hospitalizations-ED-Visits-2017.pdf.

Acknowledgments

The authors would like to acknowledge the contributions of Minya Sheng and Tim Burrell of IBM Watson Health.

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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 e-mail us at hcup@ahrq.gov or send a letter to the address below:

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This Statistical Brief was posted online on March 31, 2020.