H·CUP HEALTHCARE COST AND UTILIZATION PROJECT

AHRQ Agency for Healthcare Research and Quality

Changes in Emergency Department Visits in the Initial Period of the COVID-19 Pandemic (April–December 2020), 29 States

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Highlights

- Overall, the number of emergency department (ED) visits across 29 States was lower each month in April–December 2020 compared with the same month in 2019 (e.g., April: 3.8M vs. 7.0M), whereas the ED admission rate was higher (e.g., April: 18.1 vs. 13.4 percent).
- The total number of ED visits decreased by 25.7 percent in April–December 2020 compared with the same months in 2019; the number of ED visits resulting in hospitalization decreased by 9.8 percent over the same period.
- The percentage of COVID-19-related ED visits resulting in hospitalization varied considerably by month and State, with the largest variation in May 2020 and the smallest variation in November and December 2020.
- The number of treat-and-release ED visits associated with firearm-related injuries increased from 30,000 visits during April–December 2019 to 39,700 visits during the same months of 2020.
- The number of treat-and-release ED visits for a first-listed diagnosis of influenza decreased 96.0 percent (from 404,000 to 16,300 visits).

Introduction

In the United States in 2019, there were approximately 143 million emergency department (ED) visits, and about 14 percent of these ED visits resulted in hospitalization.[1] At the start of the COVID-19 pandemic, ED utilization overall declined substantially, with a 42 percent decrease in ED visits in April 2020 compared with April 2019.[2] Studies suggest patients may be avoiding care in the ED,[3,4] including patients with serious conditions,[5,6] or seeking other types of urgent care (e.g., telehealth).[7] Although studies have examined the change in the volume of ED visits before versus during the COVID-19 pandemic for certain patient demographic groups and conditions,[8–10] little is known about the variation in the type of conditions treated in the ED and change in the percentage of ED visits that result in hospitalization.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents data on ED visits from 29 States based on the 2019 and 2020 State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital. The initial period of the COVID-19 pandemic (April–December 2020) is compared with the same months of the prior year. ED visit volume and ED admission rate (defined as the percentage of ED visits that result in hospitalization) are presented for both time periods across all conditions and for COVID-19-related visits specifically. In addition, the variation in the ED admission rate across the 29 States is provided. Information on changes in ED visit volume and ED admission rate is presented by patient characteristics and for the conditions with the largest percentage increase and decrease between April–December 2019 and April–December 2020. Because the HCUP SID and SEDD cover nearly the entire universe of hospital encounters in a State, small differences can be evident but not meaningful. Thus, only differences greater than or equal to 10 percent are discussed in the text.

This analysis is limited to ED visits in 29 States (Alaska, Arizona, California, Connecticut, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Mississippi, Montana, Nevada, North Carolina, North Dakota, Ohio, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, and Wisconsin) for which HCUP SID and SEDD were available for April–December 2019 and April–December 2020. These States accounted for 61.5 percent of the resident U.S. population in 2020.[11] Information contained in this Statistical Brief was primarily obtained from the HCUP Summary Trend Tables.[12] The HCUP Summary Trend Tables, accessed as

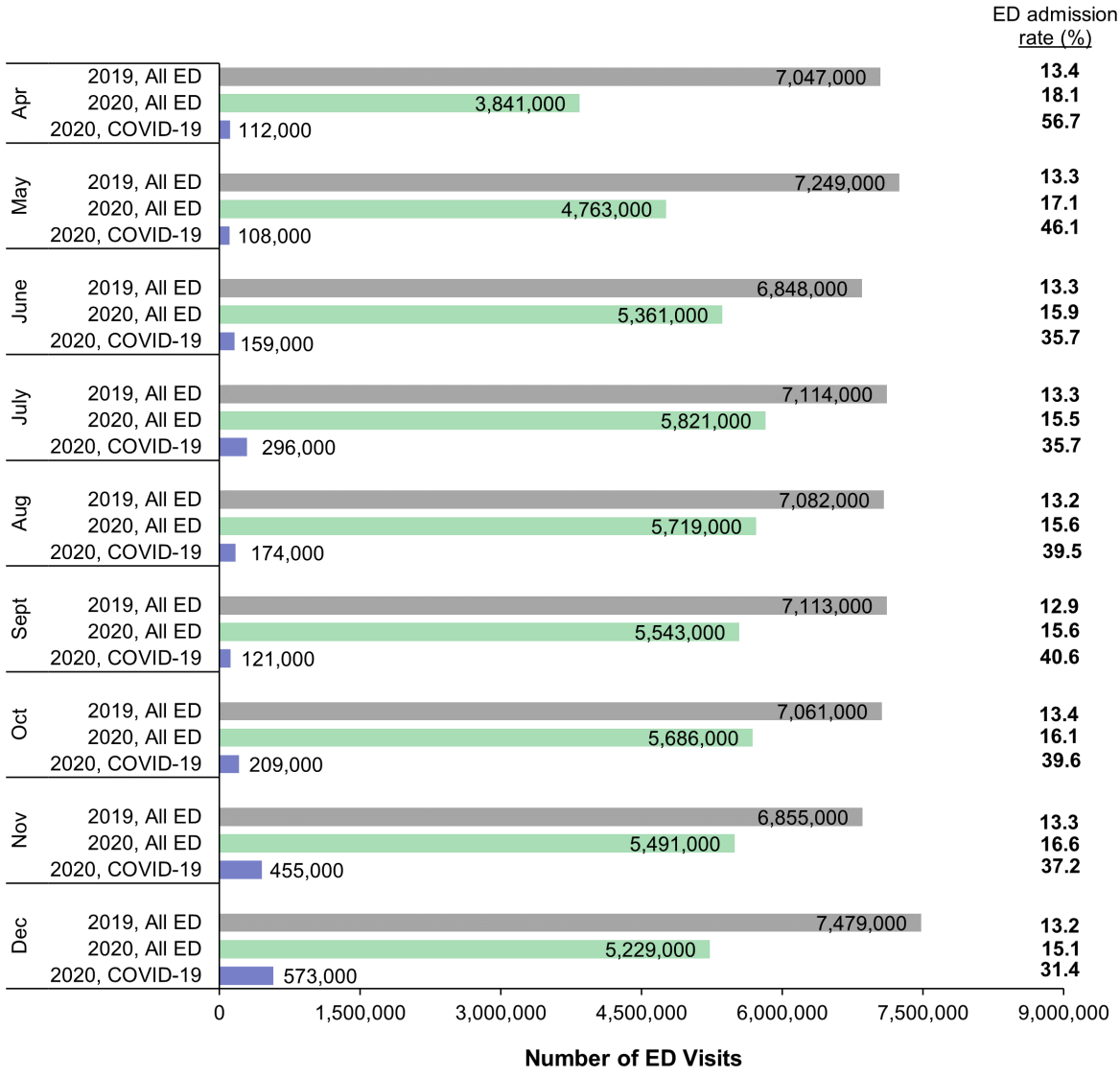
downloadable tables, provide State-specific monthly trends in hospital utilization for the most recent HCUP data available. These tables were also used to create the HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions[13] and will be updated periodically as more data become available.

Findings

ED visit volume and ED admission rate in April–December 2019 and 2020

Figure 1 presents monthly information on ED visit volume and ED admission rate (percentage of ED visits that result in admission) overall in 2019 and 2020 and for ED visits related to COVID-19 in 2020. In total, there were 63,848,000 ED visits in April–December 2019 and 47,455,000 ED visits in April–December 2020. There were 2,208,000 COVID-19-related ED visits in April–December 2020, 37.4 percent of which resulted in admission.

Figure 1. Number of ED visits and ED admission rate, by month and type of visit, 29 States, April–December 2019 and 2020



Abbreviation: ED, emergency department

Note: The number of ED visits is rounded to the nearest thousand. The ED admission rate is the percentage of ED visits resulting in hospitalization.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **Overall, the number of ED visits was lower each month in April–December 2020 compared with the same month in 2019, whereas the ED admission rate was higher.**

  Across all 29 States, the decrease in the ED visit volume was largest in April 2020 versus the same month in 2019 (45.5 percent decrease, from 7.0 million ED visits in April 2019 to 3.8 million ED visits in April 2020).

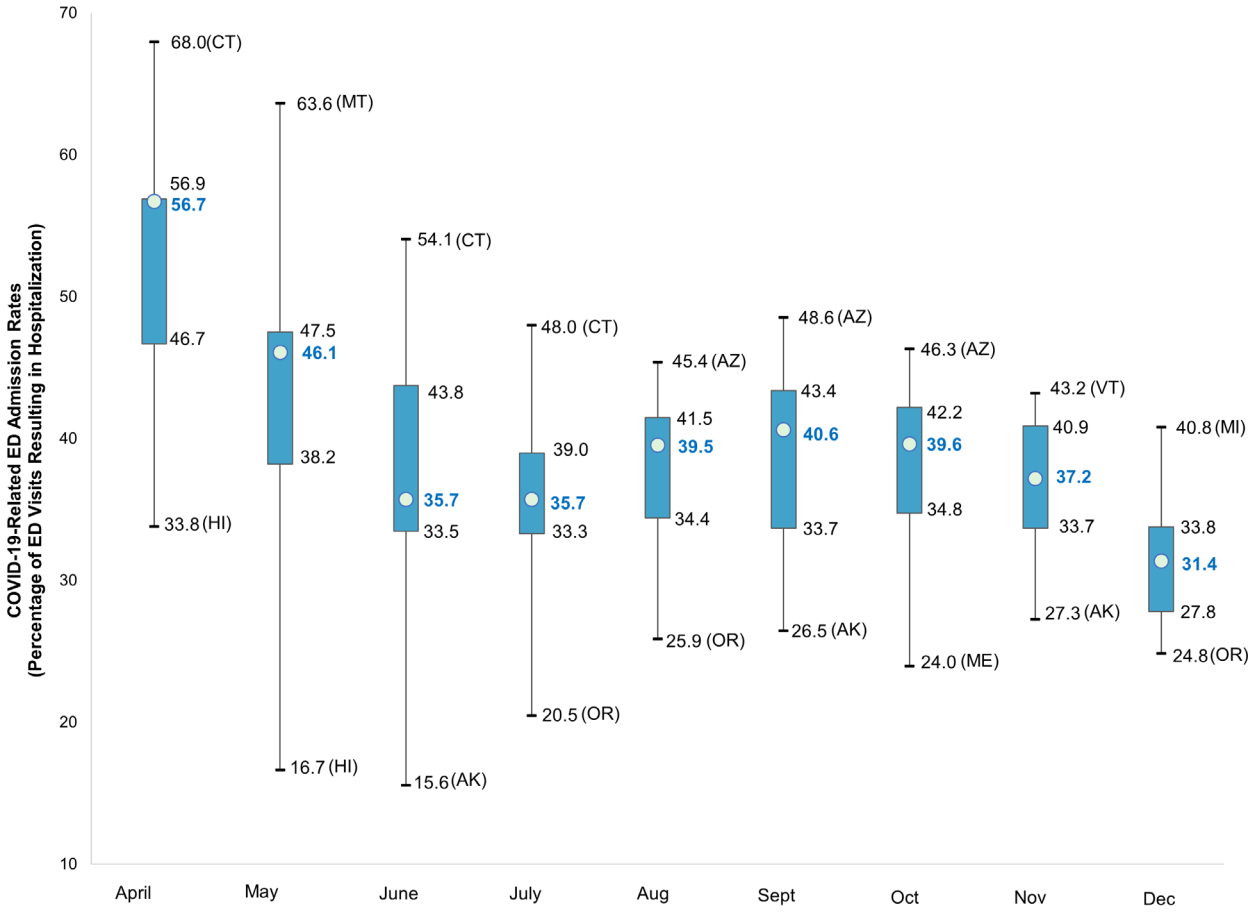
  April and May 2020 showed the largest increase in ED admission rates compared with the same months in 2019 (from 13.4 percent in April 2019 to 18.1 percent in April 2020 and from 13.3 percent in May 2019 to 17.1 percent in May 2020).

- **Although the volume of COVID-19-related ED visits increased from April 2020 to December 2020, the percentage of COVID-19-related ED visits resulting in hospitalization generally decreased.**

  Across the 29 States, the number of COVID-19-related ED visits increased more than fivefold from 112,000 in April 2020 to 573,000 in December 2020. In contrast, the percentage of COVID-19-related ED visits resulting in hospital admission decreased from 56.7 percent in April 2020 to 31.4 percent in December 2020.

Figure 2 displays the monthly distribution of the State-specific COVID-19 ED admission rates (i.e., percentage of COVID-19-related ED visits that resulted in hospitalization). The figure shows the lowest State-specific ED admission rate (minimum) and the highest State-specific ED admission rate (maximum), as well as the interquartile range of the State-specific ED admission rates (blue box). The monthly ED admission rate using the aggregated data from the 29 States (pooled rate) is presented in blue text.

Figure 2. Variation in the State-specific rates of COVID-19-related ED visits resulting in hospitalization, by month, April–December 2020



Abbreviation: ED, emergency department

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **The percentage of COVID-19-related ED visits resulting in hospitalization varied considerably by month and State, with the differences in ED admission rates across the States decreasing over time.**

  In May 2020, the State with the highest percentage of COVID-19-related ED visits resulting in hospitalization was Montana (63.6 percent), whose rate was almost four times higher than Hawaii's (16.7 percent).

  In November and December 2020, the highest State-specific percentage of COVID-19-related ED visits resulting in hospitalization was only 1.6 times higher than the lowest State-specific percentage (November: Vermont, 43.2 percent, vs. Alaska, 27.3 percent; December: Michigan, 40.8 percent, vs. Oregon, 24.8 percent).

Table 1 presents information on total ED visit volume and number of ED visits resulting in hospitalization by patient characteristic in April through December 2019 and 2020 across the 29 States.

Table 1. Number of ED visits, number of ED visits resulting in hospitalization, and percentage change, by patient characteristic, 29 States, April–December 2019 and 2020

Patient characteristic	Total number of ED visits (in thousands)			Number of ED visits resulting in hospitalization (in thousands)		
	Apr–Dec 2019	Apr–Dec 2020	Percentage change	Apr–Dec 2019	Apr–Dec 2020	Percentage change
Total across 29 States	**63,848.4**	**47,455.3**	**–25.7**	**8,465.1**	**7,635.0**	**–9.8**
Age group, years						
0–17	11,744.7	5,630.7	–52.1	373.1	234.1	–37.3
18–64	38,698.6	31,002.3	–19.9	4,114.6	3,844.8	–6.6
65+	13,405.0	10,822.3	–19.3	3,977.4	3,556.2	–10.6
Sex						
Male	28,599.0	21,914.2	–23.4	4,082.6	3,789.3	–7.2
Female	35,249.4	25,541.1	–27.5	4,382.5	3,845.7	–12.2
Race and ethnicity						
Hispanic	10,293.5	7,223.8	–29.8	1,045.1	1,001.6	–4.2
Black, non-Hispanic	13,488.5	9,681.8	–28.2	1,418.6	1,313.5	–7.4
White, non-Hispanic	34,904.0	26,709.5	–23.5	5,365.8	4,731.4	–11.8
Other, non-Hispanic	3,970.9	2,882.4	–27.4	532.9	488.4	–8.3
Urban-rural location of patient's residence						
Large metro	32,418.1	23,541.8	–27.4	4,562.0	4,100.6	–10.1
Medium and small metro	19,657.5	14,816.6	–24.6	2,643.9	2,403.4	–9.1
Rural	11,616.7	8,996.8	–22.6	1,241.1	1,118.1	–9.9
Community-level income						
Quartile 1 (lowest)	22,194.3	16,090.9	–27.5	2,654.2	2,398.4	–9.6
Quartiles 2 and 3	30,709.7	23,302.4	–24.1	4,099.3	3,748.3	–8.6
Quartile 4 (highest)	9,806.8	7,177.2	–26.8	1,534.9	1,335.3	–13.0

Abbreviations: ED, emergency department; metro, metropolitan

Notes: Other non-Hispanic races and ethnicities include Asian/Pacific Islander, American Indian/Alaska Native, and Other. Information on race and ethnicity is unavailable from some States; the missingness amounts to 1.7% of ED visits in 2019 and 1.9% of ED visits in 2020. About 2% of ED visits are missing information on community-level income in both 2019 and 2020. For other characteristics reported in this table, the percentage of missing information is no more than 0.3%. Percentage change is calculated from unrounded values.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **The number of ED visits across the 29 States decreased across all patient characteristics in April–December 2020 compared with the same months in 2019.**

  The number of ED visits decreased across all patient characteristics, by 26 percent overall and by 23 to 30 percent for most patient characteristics, except patient age group. The number of ED visits for patients aged 0–17 years decreased 52.1 percent from April–December 2019 to April–December

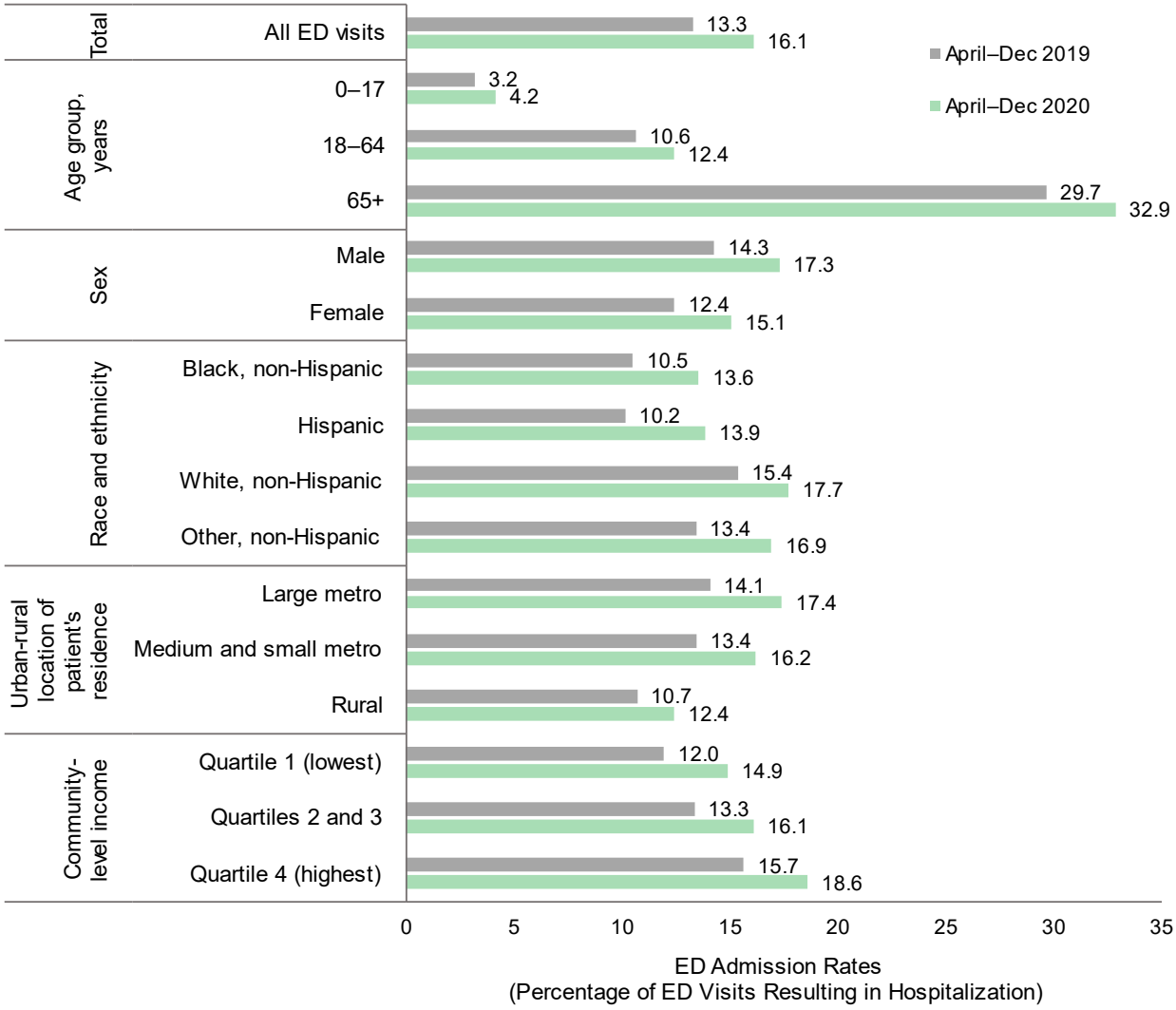
2020, while the number of ED visits for patients aged 18–64 and 65+ years decreased just 19.9 and 19.3 percent, respectively.

- **Although both the total number of ED visits and the number of ED visits resulting in admission decreased in April–December 2020 compared with the same months in 2019, the number of ED visits decreased more than the number of visits resulting in admission across the 29 States.**

  The total number of ED visits decreased by 25.7 percent in April–December 2020 compared with 2019; in contrast, the number of ED visits resulting in hospitalization decreased by only 9.8 percent over the same period. The largest difference in the percentage change between the total number of ED visits and the number of ED visits resulting in hospitalization was among Hispanic patients (29.8 and 4.2 percent decrease, respectively) and among Black non-Hispanic patients (28.2 and 7.4 percent decrease, respectively).

Figure 3 presents information on ED admission rates by patient characteristic in April through December 2019 and 2020 across the 29 States. The ED admission rate is defined as the percentage of ED visits that result in hospitalization.

Figure 3. ED admission rates, by patient characteristic, 29 States, April–December 2019 and 2020



Abbreviations: ED, emergency department; metro, metropolitan

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **The ED admission rate across the 29 States increased for all patient characteristics in April–December 2020 compared with the same timeframe in 2019.**

  In April–December 2020, the highest ED admission rates were for patients aged 65 years and older (32.9 percent), those living in communities in the highest income quartile (18.6 percent), those who are White non-Hispanic (17.7 percent), those living in large metropolitan areas (17.4 percent), and males (17.3 percent).

  The overall ED admission rate increased from 13.3 (April–December 2019) to 16.1 percent (April–December 2020), a change of 21.4 percent. The largest meaningful increase in ED admission rates during this period occurred among Hispanic patients (10.2 and 13.9 percent, a 36.6 percent change), Black non-Hispanic patients (10.5 and 13.6 percent, a 29.0 percent change), and patients residing in the lowest income communities (12.0 and 14.9 percent, a 24.6 percent change).

Changes in ED visit volume by condition in April–December 2019 and 2020
Tables 2 and 3 present information on ED visit volume in April–December 2019 and 2020 by select conditions. The ED visit volume for the five conditions with the greatest percentage change during this period is presented for treat-and-release ED visits (Table 2) and ED visits resulting in hospitalization (Table 3). Selection of conditions was made separately for first-listed/principal and all-listed diagnoses. Conditions listed have at least 10,000 ED visits in 2019 and at least a 10 percent change between 2019 and 2020. Each table displays the condition chiefly responsible for the ED service or hospitalization (first-listed or principal, respectively) and all-listed conditions that coexisted at the time of the ED visit or hospitalization. Hyphens indicate that a condition was not in the top five for the respective selection criteria (first-listed/principal and all-listed diagnoses).

Table 2. Top five conditions with the greatest percentage change (more than 10 percent) in the number of treat-and-release ED visits, 29 States, April–December 2019 and 2020

Conditions based on first-listed diagnosis, Clinical Classifications Software Refined (CCSR) category	Number of treat-and-release ED visits based on *first-listed* diagnosis (in thousands)			Number of treat-and-release ED visits based on *all-listed* diagnoses (in thousands)		
	Apr–Dec 2019	Apr–Dec 2020	Percentage change	Apr–Dec 2019	Apr–Dec 2020	Percentage change
All ED Visits - All conditions	55,383.3	39,820.3	–28.1	55,383.3	39,820.3	–28.1
COVID-19 (INF012)	—	1,226.3	—	—	1,382.2	—
Conditions with the greatest percentage increase						
Exposure, encounters, screening or contact with infectious disease (FAC016)	125.7	595.6	373.8	1,221.6	5,411.0	342.9
Firearm-related injury (EXT005)	—	—	—	30.0	39.7	32.6
Cataract and other lens disorders (EYE002)	—	—	—	26.3	34.1	29.9
Other and ill-defined cerebrovascular disease (CIR024)	—	—	—	46.2	57.5	24.3
Hallucinogen-related disorders (MBD022)	—	—	—	17.8	21.9	23.5
Conditions with the greatest percentage decrease						
Influenza (RSP003)	404.0	16.3	–96.0	452.2	23.9	–94.7
Acute bronchitis (RSP005)	741.5	170.0	–77.1	953.4	256.5	–73.1
Otitis media (EAR001)	666.0	186.0	–72.1	932.6	260.1	–72.1
Intestinal infection (DIG001)	178.4	61.3	–65.7	215.9	82.5	–61.8
Sinusitis (RSP001)	246.9	90.9	–63.2	420.1	175.2	–58.3

Abbreviation: ED, emergency department

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses (www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp). First-listed diagnosis is assigned to a single default CCSR category. CCSR categories with fewer than 10,000 ED visits in 2019 are excluded. Percentage change is calculated from unrounded values. Only one condition for first-listed diagnosis, Exposure, encounters, screening or contact with infectious disease (FAC016), met the requirement of at least 10,000 ED visits in 2019 and an increase of at least 10 percent between 2019 and 2020.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **The number of treat-and-release ED visits related to exposure, encounters, screening, or contact with infectious disease increased by more than 300 percent in April–December 2020 compared with the same months in 2019.**

  As expected, the condition with the largest *increase* in ED visit volume was exposure, encounters, screening, or contact with infectious disease (including COVID-19). Treat-and-release ED visits for this condition (first listed) increased 373.8 percent, from 125,700 visits in 2019 to 595,600 visits in 2020. In addition, treat-and-release ED visits with this condition listed as any diagnosis increased 342.9 percent, from 1.2 million visits in 2019 to 5.4 million visits in 2020.

- **ED visits related to injuries from firearms and those related to hallucinogens were among the five conditions with the greatest percentage increase in the number of treat-and-release ED visits.**

  Treat-and-release ED visits associated with firearm-related injuries (listed as any diagnosis) increased 32.6 percent, from 30,000 visits in 2019 to 39,700 visits in 2020. Treat-and-release ED visits associated with hallucinogen-related disorders (listed as any diagnosis) increased 23.5 percent, from 17,800 visits in 2019 to 21,900 visits in 2020.

- **Three respiratory conditions were among the five conditions with the greatest percentage decrease in the number of treat-and-release ED visits.**

  Influenza (96.0 and 94.7 percent change), acute bronchitis (77.1 and 73.1 percent change), and sinusitis (63.2 and 58.3 percent change) were among the top five conditions (based on either the first-listed diagnosis or all-listed diagnoses, respectively) with the greatest percentage *decrease* in the number of treat-and-release ED visits in April–December 2020 compared with the same months in 2019.

Table 3. Top five conditions with the greatest percentage change (more than 10 percent) in the number of ED visits resulting in hospitalization, 29 States, April–December 2019 and 2020

Conditions based on principal diagnosis, Clinical Classifications Software Refined (CCSR) category	Number of ED visits resulting in hospitalization based on the *principal* diagnosis (in thousands)			Number of ED visits resulting in hospitalization based on *all-listed* diagnoses (in thousands)		
	Apr–Dec 2019	Apr–Dec 2020	Percentage change	Apr–Dec 2019	Apr–Dec 2020	Percentage change
All ED visits - All conditions	8,465.1	7,635.0	–9.8	8,465.1	7,635.0	–9.8
COVID-19 (INF012)	—	539.0	—	—	826.0	—
Conditions with the greatest percentage increase						
Nausea and vomiting (SYM004)	10.5	12.5	19.2	—	—	—
Exposure, encounters, screening or contact with infectious disease (FAC016)	—	—	—	321.6	3,398.5	956.8
Viral infection (excluding COVID-19) (INF008)	—	—	—	471.8	926.3	96.3
Pneumonia (RSP002)	—	—	—	924.0	1,314.5	42.3
Firearm-related injury (EXT005)	—	—	—	13.8	19.1	38.5
Cardiac arrest or ventricular fibrillation (CIR018)	—	—	—	90.7	113.5	25.2
Conditions with the greatest percentage decrease						
Influenza (RSP003)	18.8	1.2	–93.6	47.7	7.3	–84.6
Acute bronchitis (RSP005)	45.3	7.6	–83.3	197.9	62.5	–68.4
Other specified upper respiratory infections (RSP006)	15.2	5.4	–64.7	105.5	46.3	–56.1
Asthma (RSP009)	56.1	24.3	–56.7	—	—	—
COPD (RSP008)	185.0	95.1	–48.6	—	—	—
Otitis media (EAR001)	—	—	—	25.1	9.7	–61.5
Nephritis; nephrosis; renal sclerosis (GEN001)	—	—	—	140.0	79.4	–43.3

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department

Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses (www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp). Principal diagnosis is assigned to a single default CCSR category. CCSR categories with fewer than 10,000 ED visits in 2019 are excluded. The CCSR category FAC014, Medical examination/evaluation, is excluded from the reporting of conditions with the largest percentage increase. Percentage change is calculated from unrounded values. Only one condition for principal diagnosis, Nausea and vomiting (SYM004), met the requirement of at least 10,000 ED visits in 2019 and an increase of at least 10 percent between 2019 and 2020.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD) and a subset of the State Inpatient Databases (SID) that includes information on ED visits that result in an admission to the same hospital, April–December 2019 and 2020, 29 States

- **Exposure, encounters, screening, or contact with infectious disease (including COVID-19) *increased* by more than 900 percent in April–December 2020 compared with the same months in 2019.**

  Similar to treat-and-release ED visits, the condition or type of encounter with the largest increase in ED visits (for all-listed diagnoses) resulting in hospitalization was exposure, encounters, screening, or contact with infectious disease (which includes COVID-19 and other infectious diseases). ED visits requiring hospitalizations for this type of encounter (all listed) increased 956.8 percent, from 321,600 ED visits in 2019 to 3,398,500 ED visits in 2020.

- **Viral infection (excluding COVID-19), pneumonia, and cardiac arrest or ventricular fibrillation were among the top five conditions with the greatest percentage *increase* in the number of ED visits resulting in hospitalization.**

  ED visits resulting in hospitalization with any-listed diagnosis indicating a viral infection, pneumonia, or cardiac arrest or ventricular fibrillation increased in April–December 2020 compared with the same months in 2019 (96.3 percent, 42.3 percent, and 25.2 percent, respectively).

- **Firearm-related injuries were among the top five conditions with the greatest percentage *increase* in the number of ED visits resulting in hospitalization.**

  ED visits resulting in hospitalization with any-listed diagnosis indicating an injury related to a firearm increased 38.5 percent, from 13,800 visits in 2019 to 19,100 visits in 2020.

- **Respiratory conditions dominated the list of top conditions for both principal diagnosis and all-listed diagnoses with the greatest percentage *decrease* in the number of ED visits resulting in hospitalization.**

  Influenza (93.6 and 84.6 percent change), acute bronchitis (83.3 and 68.4 percent change), and other specified upper respiratory infections (64.7 and 56.1 percent change) were among the top five conditions (based on either the principal diagnosis or all-listed diagnoses, respectively) with the greatest percentage *decrease* in ED visits resulting in hospitalization in April–December 2020 compared with the same months in 2019. ED visits resulting in hospitalization with a principal diagnosis of asthma or chronic obstructive pulmonary disease decreased 56.7 and 48.6 percent, respectively, in April–December 2020 compared with the same period in 2019. The change in ED visits resulting in hospitalization for these latter two conditions did not qualify for the top five conditions (all-listed diagnoses) that decreased during this period.

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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 2019–2020 State Emergency Department Databases (SEDD) and State Inpatient Databases (SID) for 29 States for which there were monthly data available through December 2020 in the HCUP Summary Trend Tables. The States included in this Statistical Brief were Alaska, Arizona, California, Connecticut, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Mississippi, Montana, Nevada,

North Carolina, North Dakota, Ohio, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, and Wisconsin. The SEDD include ED visits that do not result in admission to the same hospital, such as treat-and-release ED visits, transfers to other hospitals or health facilities, encounters during which the patient left against medical advice, and cases in which the patient died while receiving ED care. The SID capture inpatient stays, including those that originate in the ED and result in an admission to the same hospital. This Statistical Brief uses all records from the SEDD and the subset of SID records specific to ED admissions.

Definitions

Diagnoses, ICD-10-CM, and Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses
For emergency department (ED) visits in which the patient is treated and released, the *first-listed diagnosis* represents the condition, symptom, or problem identified in the medical record to be chiefly responsible for the ED services provided (i.e., ED visits for a particular condition). In cases where the first-listed diagnosis is a symptom or problem, a diagnosis has not been established (confirmed) by the provider.[a] For ED visits that result in an inpatient admission to the same hospital, the first-listed diagnosis is the *principal diagnosis*, the condition established after study to be chiefly responsible for the patient's admission to the hospital.[b] *Secondary diagnoses* are conditions that coexist at the time of the ED visit or inpatient admission, that require or affect patient care treatment received or management, or that develop during the inpatient stay.[c] *All-listed diagnoses* include the first-listed (principal) diagnosis plus the secondary conditions (i.e., ED visits related to or associated with a condition).

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

The CCSR aggregates ICD-10-CM diagnosis codes into a manageable number of clinically meaningful categories.[d] The CCSR is intended to be used analytically to examine patterns of healthcare in terms of cost, utilization, and outcomes; rank utilization by diagnoses; and risk-adjust by clinical condition. The CCSR capitalizes on the specificity of the ICD-10-CM coding scheme and allows ICD-10-CM codes to be classified in more than one category. Approximately 10 percent of diagnosis codes are associated with more than one CCSR category because the diagnosis code documents either multiple conditions or a condition along with a common symptom or manifestation. For this Statistical Brief, the principal/first-listed 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. The assignment of the default CCSR for the first-listed diagnosis for outpatient data is available starting with version v2021.1 of the software tool. ICD-10-CM coding definitions for each CCSR category presented in this Statistical Brief can be found in the *CCSR reference file*, available at www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp#download. For this Statistical Brief, v2021.2 of the CCSR was used.

Case definition
COVID-19-related ED visits are identified by an ICD-10-CM code of U07.1 (2019 novel coronavirus disease) on the ED visit record. Per coding guidelines,[e] the use of U07.1 is based on documentation by the provider or documentation of a positive COVID-19 test result. The ICD-10-CM code for COVID-19 was implemented beginning April 1, 2020. As such, there may be some measurement error in the identification of cases.

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[a] Centers for Medicare & Medicaid Services. ICD-10-CM Official Guidelines for Coding and Reporting FY 2022, Section IV-G. Updated April 1, 2022. www.cms.gov/files/document/fy-2022-icd-10-cm-coding-guidelines.pdf. Accessed September 2, 2022.
[b] Centers for Medicare & Medicaid Services. ICD-10-CM Official Guidelines for Coding and Reporting FY 2022, Section II. Updated April 1, 2022. www.cms.gov/files/document/fy-2022-icd-10-cm-coding-guidelines.pdf. Accessed September 2, 2022.
[c] Centers for Medicare & Medicaid Services. ICD-10-CM Official Guidelines for Coding and Reporting FY 2022, Section III. Updated April 1, 2022. www.cms.gov/files/document/fy-2022-icd-10-cm-coding-guidelines.pdf. Accessed September 2, 2022.
[d] Agency for Healthcare Research and Quality. Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality. Updated February 2022. www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp. Accessed September 2, 2022.
[e] Centers for Disease Control and Prevention, National Center for Health Statistics. ICD-10-CM Official Guidelines for Coding and Reporting FY 2021 (October 1, 2020 - September 30, 2021). www.cdc.gov/nchs/data/icd/10cmguidelines-FY2021.pdf. Accessed September 2, 2022.

Types of hospitals included in HCUP State Emergency Department Databases
This analysis used the State Emergency Department Databases (SEDD) limited to data from community hospitals with a hospital-owned ED. Community hospitals are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). Community hospitals include specialty, pediatric, public, and academic medical center hospitals. Excluded for this analysis are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals.

Types of hospitals included in HCUP State Inpatient Databases
This analysis used the State Inpatient Databases (SID) limited to 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). Community hospitals include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical center hospitals. Excluded for this analysis are long-term care facilities such as rehabilitation, 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 was included in the analysis.

Unit of analysis
The unit of analysis is the ED visit, not a person or patient. This means that a person who is seen in the ED multiple times in 1 year will be counted each time as a separate visit in the ED.

Percentage change
Percentage change between groups was calculated using the following formula:

$$\text{Percentage change} = \left(\frac{\text{2020 value} - \text{2019 value}}{\text{2019 value}}\right) \times 100$$

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 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 and ethnicity data element, while also retaining the original race and ethnicity data. This Statistical Brief reports race and ethnicity for the following categories: Hispanic, non-Hispanic Black, non-Hispanic White, and other non-Hispanic races and ethnicities (including Asian/Pacific Islander, American Indian/Alaska Native, and Other).

Location of patients' residence
Place of residence is based on the urban-rural classification scheme for U.S. counties developed by the National Center for Health Statistics (NCHS) and based on the Office of Management and Budget (OMB) definition of a metropolitan service area as including a city and a population of at least 50,000 residents. For this Statistical Brief, we collapsed the NCHS codes into the following three categories:

Large metropolitan (metro) area:

- Large Central Metropolitan: Counties in a metropolitan area with 1 million or more residents that satisfy at least one of the following criteria: (1) containing the entire population of the largest principal city of the metropolitan statistical area (MSA), (2) having their entire population contained within the largest principal city of the MSA, or (3) containing at least 250,000 residents of any principal city in the MSA
- Large Fringe Metropolitan: Counties in a metropolitan area with 1 million or more residents that do not qualify as large central metropolitan counties

Medium/small metro area:

- Medium Metropolitan: Counties in a metropolitan area of 250,000–999,999 residents
- Small Metropolitan: Counties in a metropolitan area of 50,000–249,999 residents

Rural area:

- Micropolitan: Counties in a nonmetropolitan area of 10,000–49,999 residents
- Noncore: Counties in a nonmetropolitan and nonmicropolitan 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.[f] The value ranges for the income quartiles vary by year. The income quartile is missing for patients who are homeless or foreign or have a missing or invalid ZIP Code reported on the record.

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
Alaska Hospital and Healthcare Association
Arizona Department of Health Services
Arkansas Department of Health
California Department of Health Care Access and Information
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
Hawaii University of Hawai'i at Hilo
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
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

[f] Claritas. Claritas Demographic Profile by ZIP Code. https://claritas360.claritas.com/mybestsegments/. Accessed September 2, 2022.

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
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 SEDD

The HCUP State Emergency Department Databases (SEDD) include information from hospital-owned emergency departments (EDs) from data organizations participating in HCUP, translated into a uniform format to facilitate multistate comparisons and analyses. The SEDD capture the universe of records on ED visits in participating HCUP States that do not result in an admission to the same hospital (i.e., encounters for patients who are treated in the ED and then released in the ED, transferred to another hospital or health facility, left against medical advice, or died while receiving ED care). The SEDD contain a core set of clinical and nonclinical information on all patients, including individuals covered by Medicare, Medicaid, or private insurance, as well as those whose stays were not expected to be covered by insurance. The SEDD can be used to investigate questions unique to one State, to compare data from two or more States, to conduct market-area variation analyses, and to identify State-specific trends in injury surveillance, emerging infections, and other conditions treated in the ED.

About the SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contain the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompass more than 95 percent of all U.S. community hospital discharges. The SID capture information on all types of inpatient discharges, including those admitted through the emergency department of the hospital, direct admissions, and transfers from acute care hospitals and other types of health facilities. The SID can be used to investigate questions unique to one State, to compare data from two or more States, to conduct market-area variation analyses, and to identify State-specific trends in inpatient care utilization, access, charges, and outcomes.

For More Information

For other information on COVID-19, refer to the COVID-19 HCUP Statistical Briefs topic area located at www.hcup-us.ahrq.gov/reports/statbriefs/sbtopic.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/
- HCUP Summary Trend Tables at www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp for monthly information on hospital utilization
- HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions at www.hcup-us.ahrq.gov/datavisualizations/covid-19-inpatient-trends.jsp

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 State Emergency Department Databases (SEDD) and State Inpatient Databases (SID), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the State Emergency Department Databases (SEDD). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated September 2021. www.hcup-us.ahrq.gov/seddoverview.jsp. Accessed March 9, 2022.

Agency for Healthcare Research and Quality. Overview of the State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated September 2021. www.hcup-us.ahrq.gov/sidoverview.jsp. Accessed March 9, 2022.

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of healthcare in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please email us at hcup@ahrq.gov or send a letter to the address below:

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