

Treat-and-Release Emergency Department Utilization and Costs for Traumatic and Nontraumatic Dental Conditions, 2019 and 2020

Statistical Brief #305 | March 2024

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Introduction

Prior to the COVID-19 pandemic, 95 percent of all emergency department (ED) visits involving dental conditions resulted in a discharge from the ED.¹ The pandemic affected both the utilization and cost of healthcare services.^{2,3} Empirical evidence from administrative data and self-reported surveys shows that the share of adults who visited a hospital ED in 2019 and 2020 was below pre-pandemic levels.^{2, 4-5}

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on treat-and-release ED utilization and costs for dental-related conditions. Results are stratified by age (comparing those aged 64 years and younger to those aged 65 years and older) using the weighted estimates from the 2019 and 2020 Nationwide Emergency Department Sample (NEDS). A treat-and-release ED visit (i.e., a visit that did not result in admission to the same hospital) for a dental condition was defined as a visit in which the services provided were primarily for dental conditions identified by one of 675 first-listed diagnosis codes from the International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM).⁶ Five ED utilization and cost metrics are presented: (1) annual number of visits, (2) annual visits per 100,000 people, (3) total annual costs, (4) individual visit costs, and (5) monthly number of visits.

All differences between estimates noted in the text are statistically significant at the 0.05 level or better. It is important to note that because of the large sample size of the NEDS data, small differences can be statistically significant but not clinically important.

Highlights

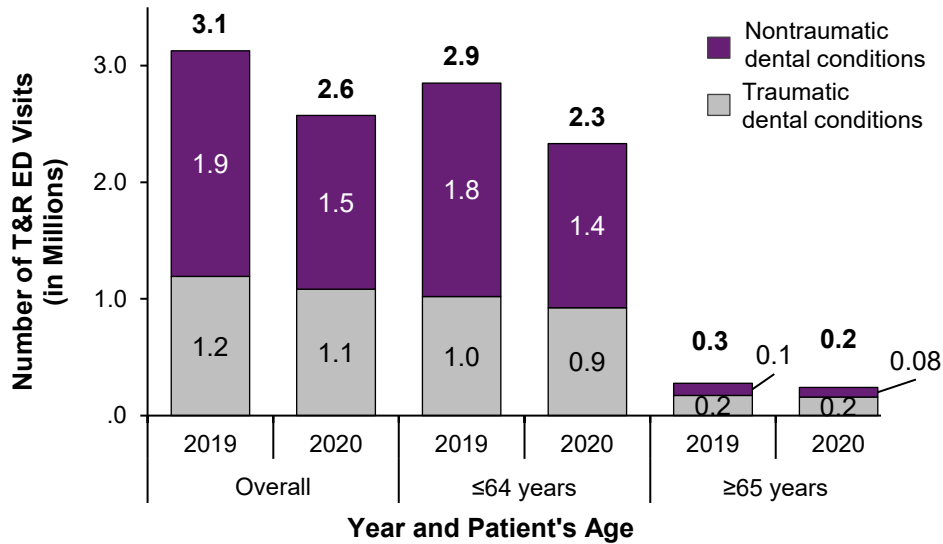
- The number of treat-and-release ED visits for dental conditions decreased by 17.7 percent from 2019 to 2020, the first year of the COVID-19 pandemic. The largest decline was in nontraumatic dental conditions (23.1%).
- Most of these dental conditions were nontraumatic: 61.8 percent in 2019 and 57.8 percent in 2020.
- While the aggregate treat-and-release ED costs for dental conditions remained the same from 2019 to 2020 (\$1.1 billion), the share of ED costs for traumatic dental conditions increased from 59.1% in 2019 to 63.2 percent in 2020 (+7%).
- In 2020, among patients aged 65 years and older, the median hospital cost of treating traumatic dental conditions in the ED (\$916) was 3.6 times higher than the cost for treating nontraumatic dental conditions (\$250). Among those aged 64 years and younger, the median cost for traumatic dental conditions was 1.8 times higher than the cost for nontraumatic dental conditions (\$292 vs. \$158).
- The monthly number of treat-and-release ED visits for dental conditions reached a new low in April 2020 (37.7% lower than April 2019) and remained below the 2019 monthly level for the remainder of 2020.

Findings

Number of Treat-and-Release ED Visits for Dental Conditions, Overall and by Age Group and Traumatic vs. Nontraumatic Conditions, 2019 and 2020

Figure 1 presents the number of treat-and-release ED visits for dental conditions by age group and trauma status in 2019 and 2020.

Figure 1. Number of treat-and-release ED visits for dental conditions in millions, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020



Abbreviations: ED = emergency department; T&R = treat-and-release.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

Table 1. Number of treat-and-release ED visits for dental conditions, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Type of dental condition	Overall		Aged ≤64 years		Aged ≥65 years	
	2019	2020	2019	2020	2019	2020
Overall	3,126,000	2,572,000	2,850,000	2,331,000	276,000	241,000
Traumatic	1,193,000	1,085,000	1,019,000	924,000	173,000	160,000
Nontraumatic	1,933,000	1,487,000	1,831,000	1,406,000	103,000	81,000

Abbreviations: ED = emergency department; T&R = treat-and-release.

Note: Estimates rounded to nearest 1,000.

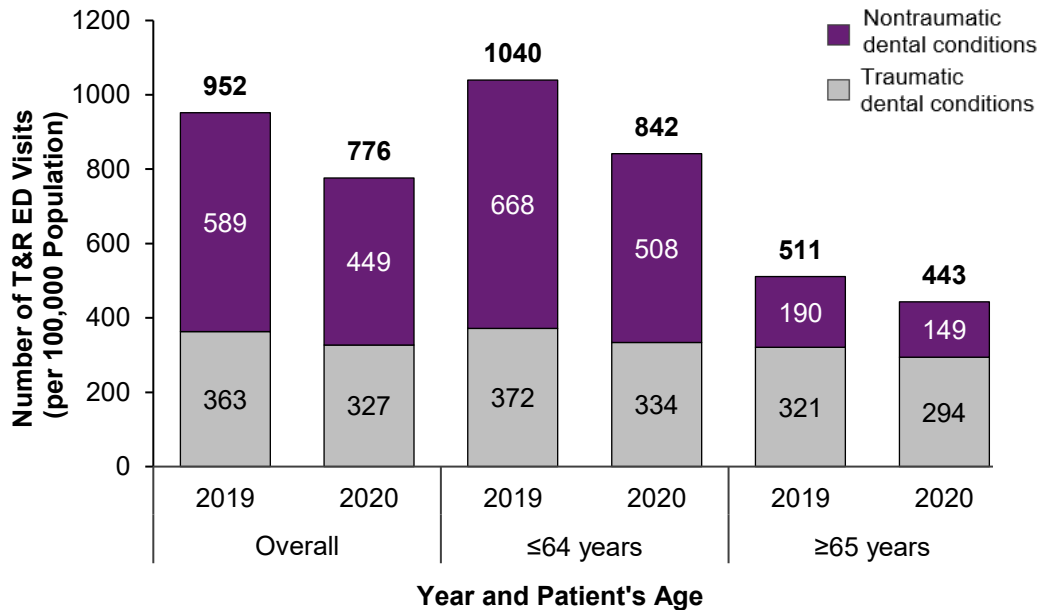
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

- Overall treat-and-release ED visits for dental conditions decreased by 17.7 percent from 2019 to 2020, while treat-and-release ED visits for nontraumatic dental conditions declined by 23.1 percent.
- Nine out of every 10 treat-and-release ED visits for dental conditions were among patients aged 64 years and younger (2019 and 2020).
- Among patients aged 65 years and older, most treat-and-release ED visits for dental conditions were traumatic (62.7% in 2019 and 66.4% in 2020), a substantially greater portion than that seen among patients aged 64 years and younger (35.8% in 2019 and 39.6% in 2020).

Number of Treat-and-Release Emergency Department Visits for Dental Conditions per 100,000 population, Overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Figure 2 presents U.S. population rates of treat-and-release ED visits for dental conditions, overall and by age group and trauma status from 2019 to 2020, with estimates reflecting the number of visits per 100,000 population.

Figure 2. Number of treat-and-release ED visits for dental conditions per 100,000 population, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020



Abbreviations: ED = emergency department; T&R = treat-and-release.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

Table 2. Number of treat-and-release ED visits for dental conditions per 100,000 population, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Type of dental condition	Overall		Aged ≤64 years		Aged ≥65 years	
	2019	2020	2019	2020	2019	2020
Overall	952	776	1,040	842	511	443
Traumatic	363	327	372	334	321	294
Nontraumatic	589	449	668	508	190	149

Abbreviation: ED = emergency department.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

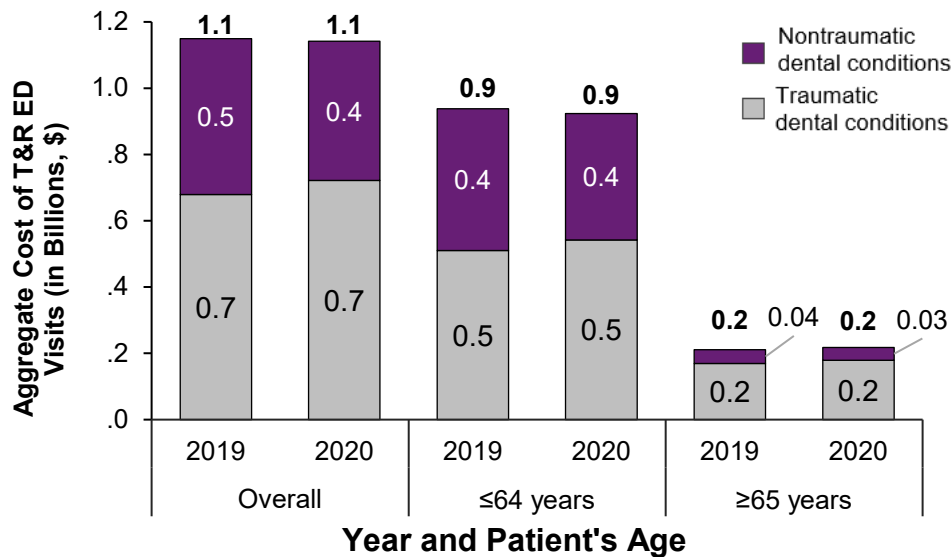
- In 2020, there were 776 dental ED visits per 100,000 people; this was 18.5 percent lower than the number of visits in 2019 (952 per 100,000 people).
- Dental ED utilization declined the most for nontraumatic dental conditions both among those aged 64 years and younger (-24.0%) and those aged 65 years and older (-21.6%).
- In both 2019 and 2020, dental ED utilization was twice as common among those aged 64 years and younger compared with those aged 65 years and older (per 100,000 people: 1,040 vs. 511 [2019]; and 842 vs. 443 [2020]).

Aggregate Cost of Treat-and-Release Emergency Department Visits for Dental Conditions, Overall and by Age Group and Traumatic vs. Nontraumatic Condition, 2019 and 2020

Figure 3 presents estimates of the aggregate cost of treat-and-release ED visits for dental conditions, overall and by age group and traumatic vs. nontraumatic conditions from 2019 to 2020. Costs reflect expenses incurred in the

production of hospital services, such as wages, supplies, and utility costs.

Figure 3. Aggregate cost in billions of treat-and-release ED visits for dental conditions, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020



Abbreviations: ED = emergency department; T&R = treat-and-release.

Note: No adjustment was made for inflation.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

Table 3. Aggregate hospital costs of treat-and-release ED visits for dental conditions, overall and by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Type of dental condition	Overall		Aged ≤64 years		Aged ≥65 years	
	2019	2020	2019	2020	2019	2020
Overall	\$1,148,935,000	\$1,141,306,000	\$937,539,000	\$923,145,000	\$211,396,000	\$218,162,000
Traumatic	\$679,029,000	\$721,491,000	\$509,978,000	\$542,445,000	\$169,051,000	\$179,046,000
Nontraumatic	\$469,906,000	\$419,815,000	\$427,560,000	\$380,699,000	\$42,346,000	\$39,116,000

Note: Rounded to nearest \$1,000. No adjustment was made for inflation.

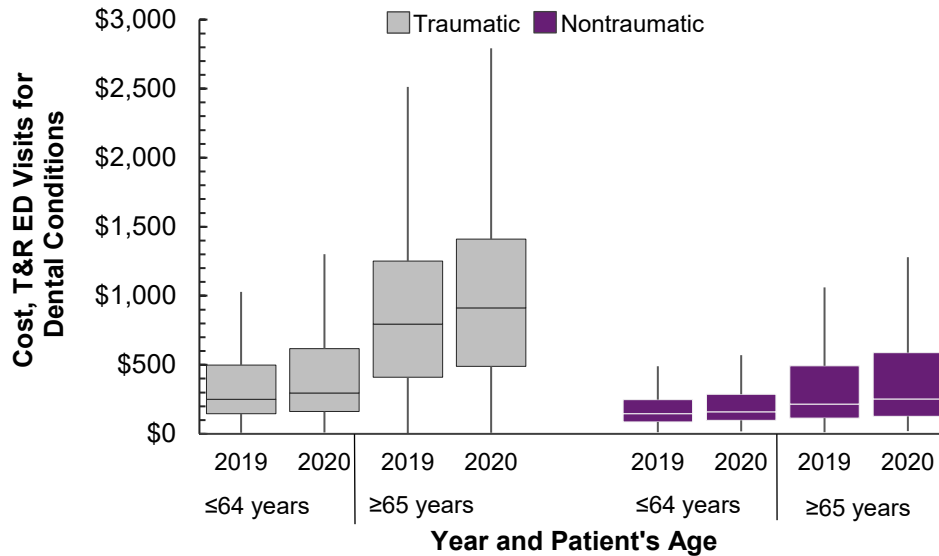
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

- Despite declines in utilization, ED costs for dental conditions remained unchanged from 2019 to 2020, with more than 80 percent of total ED costs accruing for those aged 64 years and younger.
- While traumatic dental conditions only comprised 38.2 percent of dental ED visits in 2019 and 42.2 percent of visits in 2020, they accounted for 59.1 percent of the aggregate costs in 2019 and 63.2 percent of the aggregate costs in 2020.
- While older adults (≥65 years) constituted only 9 percent of the dental ED visit volume, they accounted for 18–19 percent of aggregate costs (2019 and 2020).

Cost for Treat-and-Release Emergency Department Visit for Dental Conditions, by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Figure 4 presents trends in cost for treat-and-release ED visits for dental conditions by age group and traumatic versus nontraumatic conditions from 2019 to 2020. Costs reflect the estimated allowable direct and indirect costs, including labor, supplies, and overhead.⁷

Figure 4. Cost for treat-and-release ED visits for dental conditions by age group and traumatic vs. nontraumatic conditions, 2019 and 2020



Abbreviations: ED = emergency department; IQR = interquartile range; T&R = treat-and-release.

Notes: The vertical line length (“whiskers”) is the largest observation that is ≤the third quartile +1.5 times the IQR. No adjustment was made for inflation.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

Table 4. Cost for treat-and-release ED visits for dental conditions by age group and traumatic vs. nontraumatic conditions, 2019 and 2020

Individual dental visit cost	Traumatic				Nontraumatic			
	Aged ≤64 years		Aged ≥65 years		Aged ≤64 years		Aged ≥65 years	
	2019	2020	2019	2020	2019	2020	2019	2020
First quartile	\$144	\$161	\$414	\$496	\$86	\$98	\$114	\$126
Median	\$248	\$292	\$798	\$916	\$145	\$158	\$214	\$250
Third quartile	\$502	\$620	\$1,252	\$1,414	\$244	\$281	\$495	\$591
IQR	\$358	\$459	\$838	\$918	\$158	\$183	\$381	\$465

Abbreviations: ED = emergency department; IQR = inter-quartile range; T&R = treat-and-release.

Note: No adjustment was made for inflation.

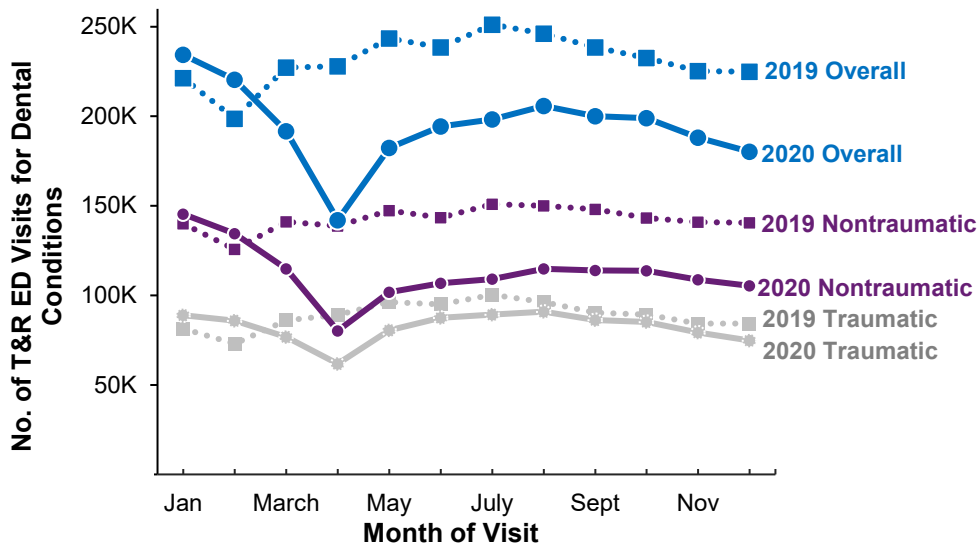
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

- Between 2019 and 2020, the median hospital cost for an ED visit increased by 17.7 percent for patients aged 64 and younger with traumatic dental conditions, from \$248 in 2019 to \$292 in 2020. The median hospital cost for an ED visit increased by 16.8 percent for patients aged 65 and older with a nontraumatic dental condition, from \$214 in 2019 to \$250 in 2020.
- In 2020, costs became more wider ranging. Most notably, the interquartile range, or the difference between the third quartile and the first quartile, among patients aged 64 years and younger with traumatic dental conditions increased from \$358 in 2019 to \$459 in 2020, a 28.2 percent increase in variation.
- Among subgroups, the lowest median ED visit cost in 2020 was for nontraumatic dental conditions among patients aged 64 years and younger (median cost: \$145, interquartile range [IQR]: \$158). The highest cost was for traumatic dental conditions among patients aged 65 years and older (median cost: \$916, IQR: \$918).

Number of Treat-and-Release Emergency Department Visits for Dental Conditions, by Month and Traumatic vs. Nontraumatic Conditions, 2019 and 2020

Figure 5 presents trends in the number of treat-and-release ED visits for dental conditions each month in 2019 and 2020, by traumatic versus nontraumatic conditions.

Figure 5. Number of treat-and-release ED visits for dental conditions by month and traumatic vs. nontraumatic conditions, 2019 and 2020



Abbreviations: ED = emergency department; T&R = treat-and-release.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

Table 5. Number of treat-and-release ED visits for dental conditions, by month and traumatic vs. nontraumatic conditions, 2019 and 2020

Month of T&R ED Visit	2019			2020		
	Traumatic	Nontraumatic	Total	Traumatic	Nontraumatic	Total
Jan	81,000	140,000	221,000	89,000	145,000	234,000
Feb	73,000	126,000	199,000	86,000	135,000	220,000
March	86,000	141,000	227,000	77,000	115,000	192,000
April	89,000	139,000	228,000	62,000	80,000	142,000
May	96,000	147,000	243,000	81,000	102,000	182,000
June	95,000	143,000	238,000	87,000	107,000	194,000
July	100,000	151,000	251,000	89,000	109,000	198,000
Aug	96,000	150,000	246,000	91,000	115,000	206,000
Sept	90,000	148,000	238,000	86,000	114,000	200,000
Oct	89,000	143,000	233,000	85,000	114,000	199,000
Nov	84,000	141,000	225,000	79,000	109,000	188,000
Dec	84,000	140,000	225,000	75,000	105,000	180,000

Abbreviation: ED = emergency department.

Note: Total visits do not match total ED visits due to missingness on month of service (10.2% in 2019 and 9.7% in 2020).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS), 2019–2020.

- The number of ED visits for dental conditions reached a low point (142,000) in April 2020, when such visits were 37.7 percent lower than visits in April 2019 (228,000).
- From May through December 2020, the number of ED dental visits remained at least 14.6 percent lower each month compared with such visits in 2019.
- The persistent lower utilization pattern in 2020 included a 25.8 percent reduction in nontraumatic ED dental visits and a 10.7 percent decline in visits for traumatic conditions during the final 10 months of 2020 compared with visit volumes for the same 10-month period in 2019.

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- ¹⁰ Pickens GT, Liang L, Roemer M. HCUP Cost-to-Charge Ratio Methodologies. 2021. HCUP Methods Series Report # 2021-05. Rockville, MD: Agency for Healthcare Research and Quality; December 2021. hcup-us.ahrq.gov/reports/methods/MS2021-05-CCR-Methodologies.pdf. Accessed February 15, 2024.

Data Sources

This Statistical Brief uses data from the HCUP 2019 and 2020 Nationwide Emergency Department Sample (NEDS). The analysis included all data from the NEDS that originated from the HCUP State Emergency Department Databases (SEDD) to 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). For additional information about the HCUP NEDS, please visit: <https://hcup-us.ahrq.gov/nedsoverview.jsp>.

This Statistical Brief also relies on U.S. population estimates, for 2019 and 2020, using mid-year estimates (April 1–July 1), as reported by the U.S. Census Bureau's Population Estimates Program. The population estimate at any given time starts with a population base (e.g., the last decennial census or the previous point in the time series),

adds births, subtracts deaths, and adds net migration (both international and domestic). For additional information, please visit: <https://www.census.gov/programs-surveys/popest/tables/2010-2020/national/totals/-national.html>.

Population Studied

This Statistical Brief examines treat-and-release ED visits with a first-listed diagnosis of a dental condition, using the Clinical Classification Software Refined (CCSR) for ICD-10-CM diagnoses of DEN001.⁸ The unit of analysis is a visit, not a person or patient. This means that a person who is admitted to the ED multiple times for a dental condition in 1 year will be counted each time as a separate admission to the ED. Our case definition excludes all ED admissions for dental conditions that led to an inpatient admission to the same hospital for 2019 and 2020 (1.8 percent and 1.9 percent respectively, of all ED visits).

Definitions

Age

Refers to the patient's age at the time of admission. For age-adjusted populations, we relied on the U.S. Census mid-year (July 1) estimates for denominators.

Diagnosis

For ED visits that are 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. In cases where the first-listed diagnosis is a symptom or problem, a diagnosis has not been established (confirmed) by the provider.

ICD-10-CM

The first-listed diagnosis on an ED record is coded using the ICD-10-CM. The ICD-10-CM is the International Classification of Diseases, Tenth Revision, Clinical Modification coding system. There are over 70,000 ICD-10-CM diagnosis codes.

Clinical Classification Software Refined (CCSR) for ICD-10-CM Diagnoses

The CCSR aggregates over 73,000 ICD-10-CM diagnosis codes into 540 clinically meaningful categories. 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. The first-listed diagnosis code is assigned to a single default CCSR code, based on clinical coding guidelines, etiology and pathology of diseases, and standards set by other Federal agencies. This Statistical Brief used CCSR v2023.1. For more information on the CCSR, see https://hcup-us.ahrq.gov/toolsoftware/ccsr/ccs_refined.jsp.

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).⁹ *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.¹⁰ Hospital charges reflect the amount the hospital billed for the entire ED visit and do not include professional (physician) fees. Further information on the Emergency Department Cost-to-Charge Ratio can be found at: <https://hcup-us.ahrq.gov/db/ccr/ed-ccr/ed-ccr.jsp>. We present nominal dollars, not adjusted for inflation.

Calculations

Percentage change

Percentage change between groups was calculated using the following formula:

$$\text{Percentage change} = \left(\frac{\text{Group 2 value} - \text{Group 1 value}}{\text{Group 1 value}} \right) \times 100,$$

where group 2 = estimates from 2020 and group 1 = estimates from 2019

Population rates

Rates per 100,000 population were calculated using dental treat-and-release ED visit totals in the numerator and

population totals from the U.S. Census Bureau in the denominator. Individuals hospitalized multiple times are counted more than once in the numerator.

$$\text{Population rate} = \left(\frac{\text{Number of HCUP visits for a given year}}{\text{Number of U.S. residents July 1 for a given year}} \right) \times 100,000$$

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. For more information about HCUP, see: <https://hcup-us.ahrq.gov/>.

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

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

About NEDS

The HCUP Nationwide Emergency Department Sample (NEDS) is a unique and powerful database that yields national estimates of 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 decision making regarding

this critical source of care. The NEDS is produced annually; it began 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 2019 NEDS is 33,147,251 (weighted, this represents 143,432,284 ED visits). The unweighted sample size for the 2020 NEDS is 28,037,034 (weighted, this represents 123,278,165 ED visits).

Suggested Citation

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For More Information

For more information on this and other topics, please visit our HCUP Statistical Briefs topic area page located at www.hcup-us.ahrq.gov/reports/statbriefs/sbtopic.jsp.

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- HCUPnet, HCUP's interactive query system, at <https://datatools.ahrq.gov/hcupnet>
- HCUP Summary Trend Tables at www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp for monthly information on hospital utilization

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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