H·CUP HEALTHCARE COST AND UTILIZATION PROJECT

AHRQ Agency for Healthcare Research and Quality

# Changes in Hospitalizations and In-Hospital Deaths for Adults Aged 18–64 Years in the Initial Period of the COVID-19 Pandemic (April–September 2020), 13 States

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## Introduction

Annually, there are approximately 17.0 million hospitalizations for adults aged 18–64 years in the United States, including for medical conditions (43 percent), maternal conditions (23 percent), surgeries (21 percent), mental health and substance use conditions (9 percent), and injuries (4 percent).[1] With the COVID-19 pandemic beginning in early 2020, hospital utilization changed considerably, as areas of the country saw spikes in COVID-19 cases and subsequent hospitalizations. Hospitalizations related to COVID-19 varied by State and across time.[2] The Centers for Disease Control and Prevention (CDC) reported higher rates of COVID-19 cases among adults aged 60 years and younger,[3] but little is known about the impact of the initial period of the pandemic on hospitalizations and in-hospital deaths overall for adults aged 18–64 years.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents data from 13 States on hospitalizations for adults aged 18–64 years across time periods with a focus on the initial impact of the COVID-19 pandemic. The number of hospitalizations and in-hospital deaths for patients aged 18–64 years is presented overall and by patient characteristics from April to September 2020 compared with State-level averages from April to September in 2016–2019. The percentages of all hospitalizations and in-hospital deaths related to COVID-19 for adults aged 18–64 years during the April–September 2020 timeframe are also provided. Because of the large sample size of the HCUP data, small differences can be statistically significant but not meaningful. Thus, only differences greater than or equal to 10 percent are discussed in the text.

This analysis is limited to discharges for adults aged 18–64 years treated in community, nonrehabilitation hospitals in 13 States (Colorado, Georgia, Iowa, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, Ohio, South Carolina, and Vermont) for which HCUP data were available for April–September 2016–2019 (State Inpatient Databases [SID]) and April–September 2020 (quarterly inpatient data). These States account for 24.7 percent of the resident U.S. population in 2019.[4,5] Information contained in this Statistical Brief was primarily obtained from the HCUP Summary Trend Tables.[6] The 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

### Highlights

- Across 13 States, the average number of hospitalizations for adults aged 18–64 years decreased 19 percent to about 68,000 while the average number of in-hospital deaths increased 44 percent to about 1,300 in April–June 2020 compared with the same months in previous years.
- In April–September 2020, the percentages of hospitalizations and in-hospital deaths related to COVID-19 for adults aged 18–64 years were 5 and 24 percent, respectively, corresponding to 101,900 adult hospitalizations and 7,500 in-hospital deaths related to COVID-19 across 13 States.
- Nearly 3 in 10 in-hospital deaths (29 percent) for patients aged 18–64 years from large metropolitan (metro) areas were COVID-19 related compared with 18 percent for same-aged patients from rural areas in April–September 2020 across 13 States.
- Across 13 States, the number of in-hospital deaths for Hispanic patients aged 18–64 years more than doubled in April–September 2020 compared with the same months in previous years; more than half of these deaths were COVID-19 related.
- Across expected payers, Medicare hospitalizations for adults aged 18–64 years decreased the most (21 percent) while those with an expected payer of self-pay/no charge had the largest increase in in-hospital deaths (55 percent) in April–September 2020 compared with the same months in previous years in 13 States.

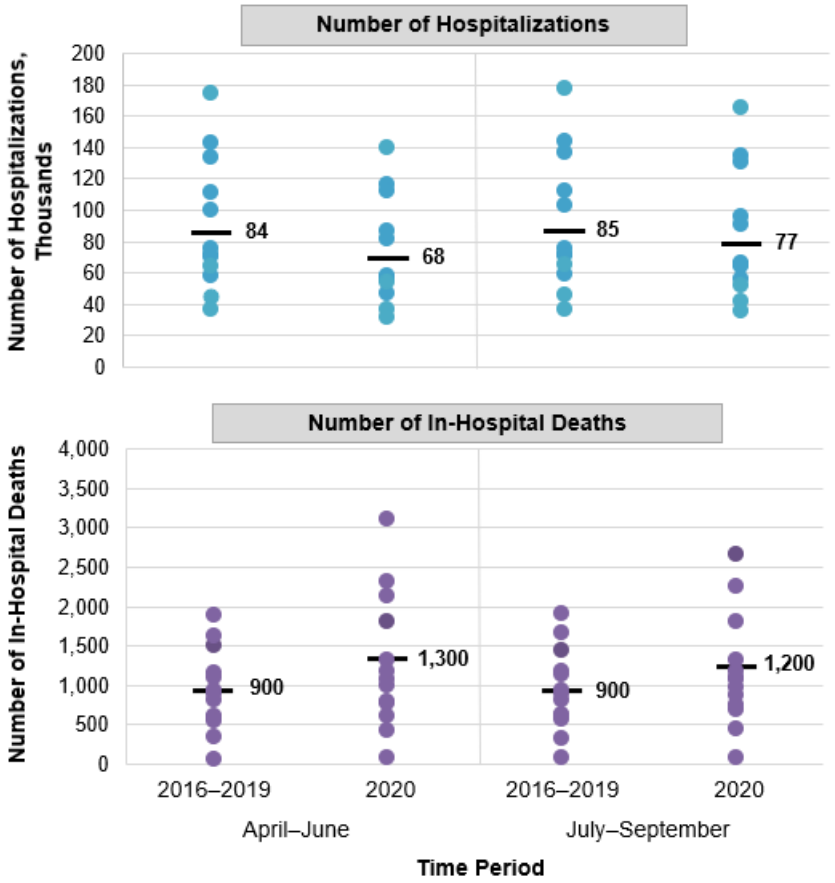
used to create the HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions[7] and will be updated as more quarterly data become available.

## Findings

*State-level hospitalizations and in-hospital deaths for adults aged 18–64 years, 2016–2019 and 2020*
Figure 1 displays the number of hospitalizations and in-hospital deaths for adults aged 18–64 years for each of the 13 States in April–September 2016–2019 and 2020. Each dot in the figure represents the State-specific number of hospitalizations or in-hospital deaths. The average number of hospitalizations and in-hospital deaths across these 13 States is also presented.

- On average, the *number of all hospitalizations for adults aged 18–64 years* in the 13 States examined decreased 19.0 percent in the second quarter of 2020 (April–June) compared with the same quarter in 2016–2019 (about 84,000 vs. 68,000 hospitalizations).
- On average, the *number of all-cause in-hospital deaths among patients aged 18–64 years* in the 13 States examined increased 44.4 percent and 33.3 percent in the second (April–June; about 900 to 1,300 deaths) and third (July–September; about 900 to 1,200 deaths) quarters of 2020 compared with the same quarters in 2016–2019, respectively.

**Figure 1. Number of hospitalizations (in thousands) and in-hospital deaths among adults aged 18–64 years in April–September 2020 compared with the average of April–September 2016–2019, by quarter, 13 States**




Notes: Number of in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

Figure 2 presents the number of hospitalizations and in-hospital deaths for adults aged 18–64 years by State, comparing April–September 2020 with the average from April–September 2016–2019. The percentage of hospitalizations and in-hospital deaths related to COVID-19 in April–September 2020 is also presented. States are listed in alphabetical order within U.S. census regions.

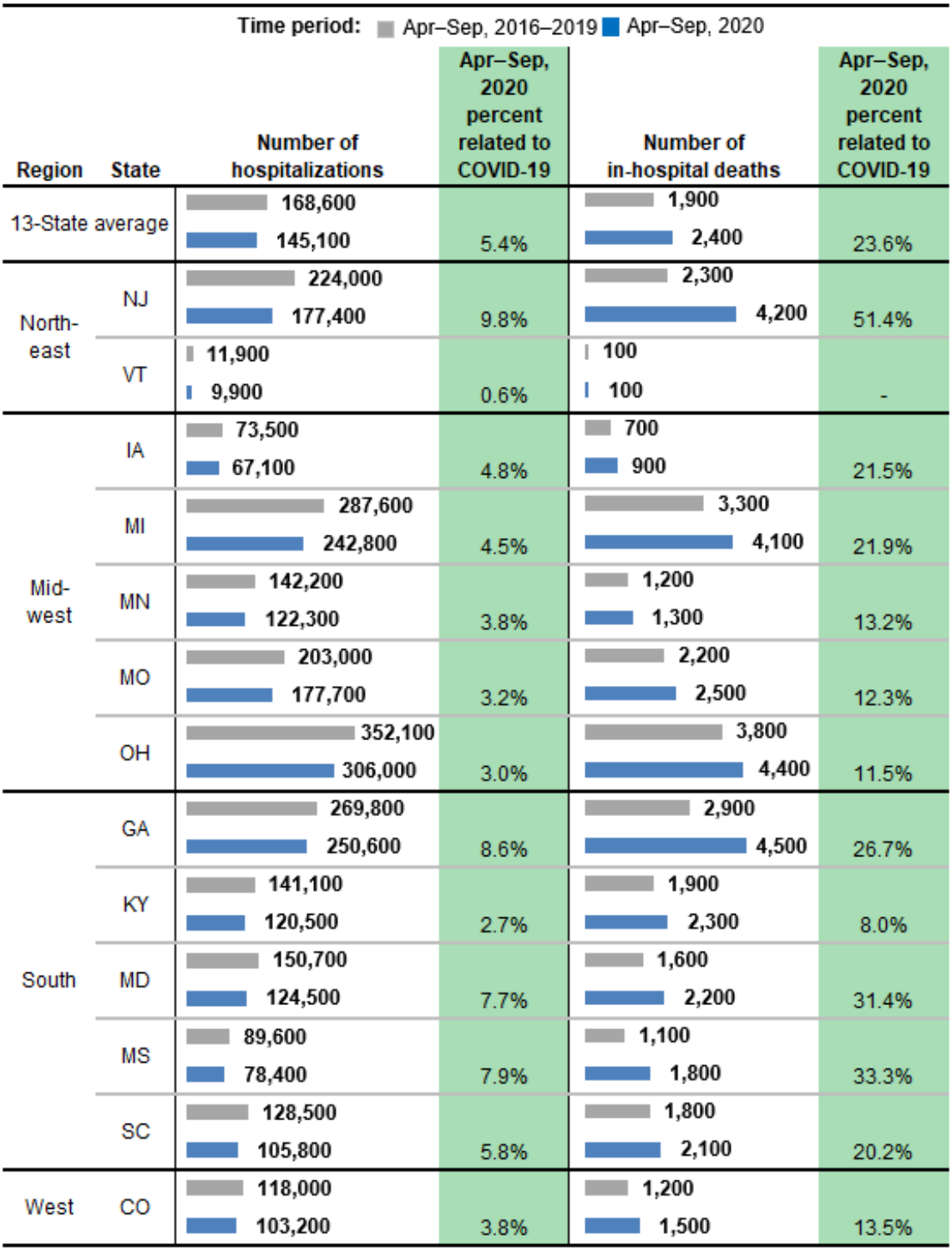
- The *number of all hospitalizations for adults aged 18–64 years* decreased in April–September 2020 compared with the average in April–September 2016–2019 for all 13 States examined. New Jersey had the largest decrease, with a 20.8 percent reduction in hospitalizations (from 224,000 to 177,400 hospitalizations).

  On average across 13 States, 5.4 percent of all hospitalizations were related to COVID-19 in April–September 2020, ranging from 0.6 percent in Vermont to 9.8 percent in New Jersey.

- The *number of all-cause in-hospital deaths among patients aged 18–64 years* in April–September 2020 versus the average in April–September 2016–2019 increased for 12 of 13 States examined (Vermont was unchanged). The increase was largest in New Jersey, where the number of in-hospital deaths increased by 82.6 percent (from 2,300 to 4,200 deaths).

  Across the 13 States, 23.6 percent of in-hospital deaths among patients aged 18–64 years were related to COVID-19 in April–September 2020. Half of in-hospital deaths among patients aged 18–64 years in New Jersey (51.4 percent) were related to COVID-19.

**Figure 2. Number of hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among adults aged 18–64 years in April–September 2020 compared with the average of all hospitalizations in April–September 2016–2019, 13 States**




| Region | State | Number of hospitalizations | Apr–Sep, 2020 percent related to COVID-19 | Number of in-hospital deaths | Apr–Sep, 2020 percent related to COVID-19 |
|---|---|---|---|---|---|
| 13-State average | | 168,600<br>145,100 | 5.4% | 1,900<br>2,400 | 23.6% |
| North-east | NJ | 224,000<br>177,400 | 9.8% | 2,300<br>4,200 | 51.4% |
| | VT | 11,900<br>9,900 | 0.6% | 100<br>100 | - |
| Mid-west | IA | 73,500<br>67,100 | 4.8% | 700<br>900 | 21.5% |
| | MI | 287,600<br>242,800 | 4.5% | 3,300<br>4,100 | 21.9% |
| | MN | 142,200<br>122,300 | 3.8% | 1,200<br>1,300 | 13.2% |
| | MO | 203,000<br>177,700 | 3.2% | 2,200<br>2,500 | 12.3% |
| | OH | 352,100<br>306,000 | 3.0% | 3,800<br>4,400 | 11.5% |
| South | GA | 269,800<br>250,600 | 8.6% | 2,900<br>4,500 | 26.7% |
| | KY | 141,100<br>120,500 | 2.7% | 1,900<br>2,300 | 8.0% |
| | MD | 150,700<br>124,500 | 7.7% | 1,600<br>2,200 | 31.4% |
| | MS | 89,600<br>78,400 | 7.9% | 1,100<br>1,800 | 33.3% |
| | SC | 128,500<br>105,800 | 5.8% | 1,800<br>2,100 | 20.2% |
| West | CO | 118,000<br>103,200 | 3.8% | 1,200<br>1,500 | 13.5% |

Notes: Number of hospitalizations and in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years. Data calculations are suppressed for counts <11.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

*Patient characteristics associated with hospitalizations and in-hospital deaths for adults aged 18–64 years, 2016–2019 and 2020*

Figure 3 presents the number of hospitalizations and in-hospital deaths for adults aged 18–64 years in 13 States combined by location of patient residence, comparing April–September 2020 with the average from April–September 2016–2019. The percentage of hospitalizations and in-hospital deaths related to COVID-19 in April–September 2020 is also presented.

- The *number of all hospitalizations for adults aged 18–64 years* decreased 14.0 percent, 12.9 percent, and 15.2 percent in April–September 2020 compared with the average in April–September 2016–2019 in large metro areas (1,126,900 to 969,300 hospitalizations), medium/small metro areas (628,000 to 546,700 hospitalizations), and rural areas (434,600 to 368,700 hospitalizations), respectively.

  At the beginning of the pandemic across the 13 States with available data, the percentage of hospitalizations related to COVID-19 among patients aged 18–64 years was higher for patients residing in large metro versus rural areas (6.4 vs. 4.1 percent).

- The *number of all-cause in-hospital deaths among patients aged 18–64 years* increased 39.7 percent, 21.9 percent, and 24.5 percent among hospitalizations for patients from large metro areas (11,600 to 16,200), medium/small metro areas (7,300 to 8,900), and rural areas (5,300 to 6,600), respectively, in April–September 2020 versus the average in April–September 2016–2019.

  Nearly 3 in 10 in-hospital deaths among hospitalizations among patients aged 18–64 years residing in large metro areas (29.0 percent) were COVID-19 related in April–September 2020.

**Figure 3. Number of hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among adults aged 18–64 years by location of patient residence in April–September 2020 compared with the average of all hospitalizations in April–September 2016–2019, 13 States**

| Patient location | Time period | Number of hospitalizations | Apr–Sep, 2020 percent related to COVID-19 | Number of in-hospital deaths | Apr–Sep, 2020 percent related to COVID-19 |
|---|---|---|---|---|---|
| Large metro | Apr–Sep, 2016–2019 | 1,126,900 | | 11,600 | |
| | Apr–Sep, 2020 | 969,300 | 6.4% | 16,200 | 29.0% |
| Medium/ small metro | Apr–Sep, 2016–2019 | 628,000 | | 7,300 | |
| | Apr–Sep, 2020 | 546,700 | 4.4% | 8,900 | 18.2% |
| Rural | Apr–Sep, 2016–2019 | 434,600 | | 5,300 | |
| | Apr–Sep, 2020 | 368,700 | 4.1% | 6,600 | 17.8% |

Notes: Number of hospitalizations and in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

Figure 4 presents the number of hospitalizations and in-hospital deaths for adults aged 18–64 years in 13 States combined by patient race/ethnicity, comparing April–September 2020 with the average from April–September 2016–2019. The percentage of hospitalizations and in-hospital deaths related to COVID-19 in April–September 2020 is also presented.

- The *number of all hospitalizations for adults aged 18–64 years* decreased by at least 10 percent in April–September 2020 versus the average in April–September 2016–2019 for non-Hispanic White patients (17.0 percent; 1,414,600 to 1,174,500 hospitalizations) and non-Hispanic Black patients (11.9 percent; 504,900 to 445,000 hospitalizations).

  In April–September 2020, the percentage of hospitalizations related to COVID-19 among patients aged 18–64 years ranged from 2.8 percent for non-Hispanic White patients to 15.2 percent for Hispanic patients.

- The *number of all-cause in-hospital deaths among patients aged 18–64 years* increased in April–September 2020 versus the average in April–September 2016–2019 for all race/ethnicity groups. The smallest increase was for non-Hispanic White patients (13.4 percent; from 15,700 to 17,800 deaths), while the number for Hispanic patients more than doubled (166.7 percent; from 900 to 2,400 deaths). The number of in-hospital deaths for non-Hispanic Black patients aged 18–64 years increased 45.8 percent (5,900 to 8,600 deaths).

  Overall, 13.2 percent of all in-hospital deaths among non-Hispanic White adults aged 18–64 years were COVID-19 related in April–September 2020, but nearly 6 in 10 (58.6 percent) adult in-hospital deaths for Hispanic patients were related to COVID-19.

**Figure 4. Number of hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among adults aged 18–64 years by patient race/ethnicity in April–September 2020 compared with the average of all hospitalizations in April–September 2016–2019, 13 States**

| Patient race/ ethnicity | Time period | Number of hospitalizations | Apr–Sep, 2020 percent related to COVID-19 | Number of in-hospital deaths | Apr–Sep, 2020 percent related to COVID-19 |
|---|---|---|---|---|---|
| White NH | Apr–Sep, 2016–2019 | 1,414,600 | | 15,700 | |
| | Apr–Sep, 2020 | 1,174,500 | 2.8% | 17,800 | 13.2% |
| Black NH | Apr–Sep, 2016–2019 | 504,900 | | 5,900 | |
| | Apr–Sep, 2020 | 445,000 | 8.6% | 8,600 | 31.5% |
| Hispanic | Apr–Sep, 2016–2019 | 123,200 | | 900 | |
| | Apr–Sep, 2020 | 127,900 | 15.2% | 2,400 | 58.6% |
| Other NH | Apr–Sep, 2016–2019 | 88,000 | | 800 | |
| | Apr–Sep, 2020 | 81,500 | 9.2% | 1,500 | 42.5% |

Abbreviation: NH, non-Hispanic

Notes: Number of hospitalizations and in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

Figure 5 presents the number of hospitalizations and in-hospital deaths for adults aged 18–64 years in 13 States combined by primary expected payer, comparing April–September 2020 with the average from April–September 2016–2019. The percentage of hospitalizations and in-hospital deaths related to COVID-19 in April–September 2020 is also presented.

- The *number of all hospitalizations for adults aged 18–64 years* decreased in April–September 2020 versus the average in April–September 2016–2019 for all expected payers, with the largest decrease among hospitalizations with an expected payer of Medicare (21.3 percent; 383,800 to 302,000 hospitalizations).

  In April–September 2020, the percentage of hospitalizations related to COVID-19 among patients aged 18–64 years was highest for hospitalizations with self-pay/no charge as an expected payer (6.8 percent).

- The *number of all-cause in-hospital deaths among patients aged 18–64 years* increased in April–September 2020 versus the average in April–September 2016–2019 for all expected payers, ranging from a 25.0 percent increase for stays with an expected payer of private insurance (8,000 to 10,000 deaths) to a 55.0 percent increase for those with an expected payer of self-pay/no charge (2,000 to 3,100 deaths).

  The percentage of adult in-hospital deaths related to COVID-19 among patients aged 18–64 years in April–September 2020 ranged from 18.9 percent for stays with Medicaid as an expected payer to 26.9 percent for stays with private insurance as an expected payer.

**Figure 5. Number of hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among adults aged 18–64 years by primary expected payer in April–September 2020 compared with the average of all hospitalizations in April–September 2016–2019, 13 States**

| Primary expected payer | Time period | Number of hospitalizations | Apr–Sep, 2020 percent related to COVID-19 | Number of in-hospital deaths | Apr–Sep, 2020 percent related to COVID-19 |
|---|---|---|---|---|---|
| Private insurance | Apr–Sep, 2016–2019 | 901,800 | | 8,000 | |
| | Apr–Sep, 2020 | 770,500 | 5.7% | 10,000 | 26.9% |
| Medicare | Apr–Sep, 2016–2019 | 383,800 | | 6,500 | |
| | Apr–Sep, 2020 | 302,000 | 5.3% | 8,200 | 23.7% |
| Medicaid | Apr–Sep, 2016–2019 | 672,000 | | 6,300 | |
| | Apr–Sep, 2020 | 591,000 | 4.1% | 8,400 | 18.9% |
| Self-pay/ No charge* | Apr–Sep, 2016–2019 | 142,600 | | 2,000 | |
| | Apr–Sep, 2020 | 142,400 | 6.8% | 3,100 | 21.4% |

Notes: Number of hospitalizations and in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years.

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

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

Figure 6 presents the number of hospitalizations and in-hospital deaths for adults aged 18–64 years in 13 States combined by community-level income, comparing April–September 2020 with the average from April–September 2016–2019. The percentage of hospitalizations and in-hospital deaths related to COVID-19 in April–September 2020 is also presented.

- The *number of all hospitalizations for adults aged 18–64 years* decreased more for patients residing in the highest income areas (16.0 percent; 374,300 to 314,400 hospitalizations) compared with patients from the middle (13.7 percent; 1,036,500 to 894,900 hospitalizations) and the lowest (13.2 percent; 759,600 to 659,500 hospitalizations) income areas in April–September 2020 versus the average in April–September 2016–2019.

  In April–September 2020, the percentage of hospitalizations related to COVID-19 for patients aged 18–64 years was highest among hospitalizations for patients residing in the lowest (5.8 percent) income quartile.

- The *number of all-cause in-hospital deaths among patients aged 18–64 years* increased in April–September 2020 versus the average in April–September 2016–2019 for hospitalizations for patients from all income quartiles. The increase was largest for patients residing in the lowest income quartile (33.7 percent; 9,500 to 12,700 deaths).

  Across the 13 States, the percentage of in-hospital deaths related to COVID-19 among patients aged 18–64 years in April–September 2020 was highest for patients residing in the highest income quartile (27.2) and lowest for patients residing in the middle-income quartiles (22.1 percent).

**Figure 6. Number of all hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among adults aged 18–64 years by community-level income in April–September 2020 compared with the average of all hospitalizations in April–September 2016–2019, 13 States**

| Community-level income | Time period | Number of hospitalizations | Apr–Sep, 2020 percent related to COVID-19 | Number of in-hospital deaths | Apr–Sep, 2020 percent related to COVID-19 |
|---|---|---|---|---|---|
| Lowest (Q1) | Apr–Sep, 2016–2019 | 759,600 | | 9,500 | |
| | Apr–Sep, 2020 | 659,500 | 5.8% | 12,700 | 24.0% |
| Middle (Q2–Q3) | Apr–Sep, 2016–2019 | 1,036,500 | | 10,900 | |
| | Apr–Sep, 2020 | 894,900 | 5.1% | 14,100 | 22.1% |
| Highest (Q4) | Apr–Sep, 2016–2019 | 374,300 | | 3,500 | |
| | Apr–Sep, 2020 | 314,400 | 5.4% | 4,600 | 27.2% |

Abbreviation: Q, quartile

Notes: Number of hospitalizations and in-hospital deaths is rounded to the nearest hundred. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–September across these 4 years. Quartile is based on the national distribution of community-level income.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2016–2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

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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 2016–2019 State Inpatient Databases (SID) and 2020 quarterly inpatient data. Information based on quarterly data should be considered preliminary, as additional quarterly data may become available over time. This analysis is limited to patients treated in community, nonrehabilitation hospitals in 13 States (Colorado, Georgia, Iowa, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, Ohio, South Carolina, and Vermont) for which HCUP data were available for April–September 2016–2019 and April–September 2020. These States account for the following percentages of the resident U.S. population: 24.7 percent of the total population, 28.0 percent of the non-Hispanic White population, 32.7 percent of the non-Hispanic Black population, 11.9 percent of the Hispanic population, and 18.0 percent of the other non-Hispanic population, including but not limited to American Indian, Alaska Native, Asian, Native Hawaiian, and other Pacific Islander.[1,2] All of the information for 2020 contained in this Statistical Brief can be found in the HCUP Summary Trend Tables at www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp.

The HCUP inpatient data contain the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multistate comparisons and analyses. The inpatient data encompass more than 95 percent of all U.S. community hospital discharges. The inpatient data 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.

*Types of hospitals included in HCUP State Inpatient Databases (and quarterly inpatient data)*
This analysis used SID and quarterly inpatient data limited to information 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.

## Definitions

*Diagnoses and ICD-10-CM*
The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are conditions that coexist at the time of admission that require or affect patient care treatment received or management, or that develop during the inpatient stay. *All-listed diagnoses* include the principal diagnosis plus the secondary conditions.

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

*Case definition*
COVID-19-related hospitalizations are identified by any-listed ICD-10-CM code of U07.1 (2019 novel coronavirus disease) on the discharge record. Per coding guidelines,[a] 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.

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

*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

[a] Centers for Disease Control and Prevention, National Center for Health Statistics. ICD-10-C Official Guidelines for Coding and Reporting FY 2021 (October 1, 2020 - September 30, 2021). www.cdc.gov/nchs/data/icd/10cmguidelines-FY2021.pdf. Accessed March 18, 2021.

Rural area:

- Micropolitan: Counties in a nonmetropolitan area of 10,000–49,999 residents
- Noncore: Counties in a nonmetropolitan and nonmicropolitan area

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

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

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

Due to variability in coding in "other" payer by State (from 1.6 to 7.4 percent) and difficulty with interpretation, estimates of "other" expected payers were excluded from the Statistical Brief. Less than 0.01 percent of discharges were missing information on expected payer.

Prior to 2017, hospital stays that were expected to be billed to the State Children's Health Insurance Program (SCHIP) may be classified as Medicaid or Other, depending on the structure of the State program. Because most State data do not identify SCHIP as a separate expected payer, it is not possible to present this information separately. Beginning with 2017 data, hospital stays that were expected to be billed to SCHIP are included under Medicaid.

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

*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.[b] The value ranges for the income quartiles vary by year. Patients in the first quartile are designated as having the *lowest* income, patients in the middle two quartiles are designated as having *middle* income, and patients in the highest quartile are designated as having the *highest* income. The income quartile is missing for patients who are homeless or foreign.

[b] Claritas. Claritas Demographic Profile by ZIP Code. claritas360.claritas.com/mybestsegments/. Accessed June 27, 2021.

## 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
**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
**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

## For More Information

For information on COVID-19 resources at AHRQ, refer to the AHRQ COVID-19 Resources page: www.ahrq.gov/coronavirus/index.html. For other information on COVID-19 healthcare utilization, refer to the HCUP Statistical Briefs located at www.hcup-us.ahrq.gov/reports/statbriefs/sb_covid.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 Inpatient Databases (SID), please refer to the following database documentation:

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 October 2020. www.hcup-us.ahrq.gov/sidoverview.jsp. Accessed January 22, 2021.

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

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