H·CUP HEALTHCARE COST AND UTILIZATION PROJECT

AHRQ Agency for Healthcare Research and Quality

COVID-19-Related Hospitalizations in 13 States, by Patient Race/Ethnicity, 2020

STATISTICAL BRIEF #276
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Introduction

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on COVID-19-related hospitalizations using 2019 State Inpatient Databases (SID) and 2020 quarterly inpatient data from 13 States. Differences in monthly hospitalizations by patient race/ethnicity from April to September 2020 are compared with the same months in the prior year. Variation in utilization, average length of stay, and in-hospital mortality is illustrated. 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 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 2019 and April–September 2020. These States account for 24.7 percent of the resident U.S. population in 2019.[1,2] All information contained in this Statistical Brief (except age-adjusted rates) can be found in the HCUP Summary Trend Tables.[3] 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 will be updated as more quarterly data become available. The analysis in this Statistical Brief is based on data available as of March 2021.

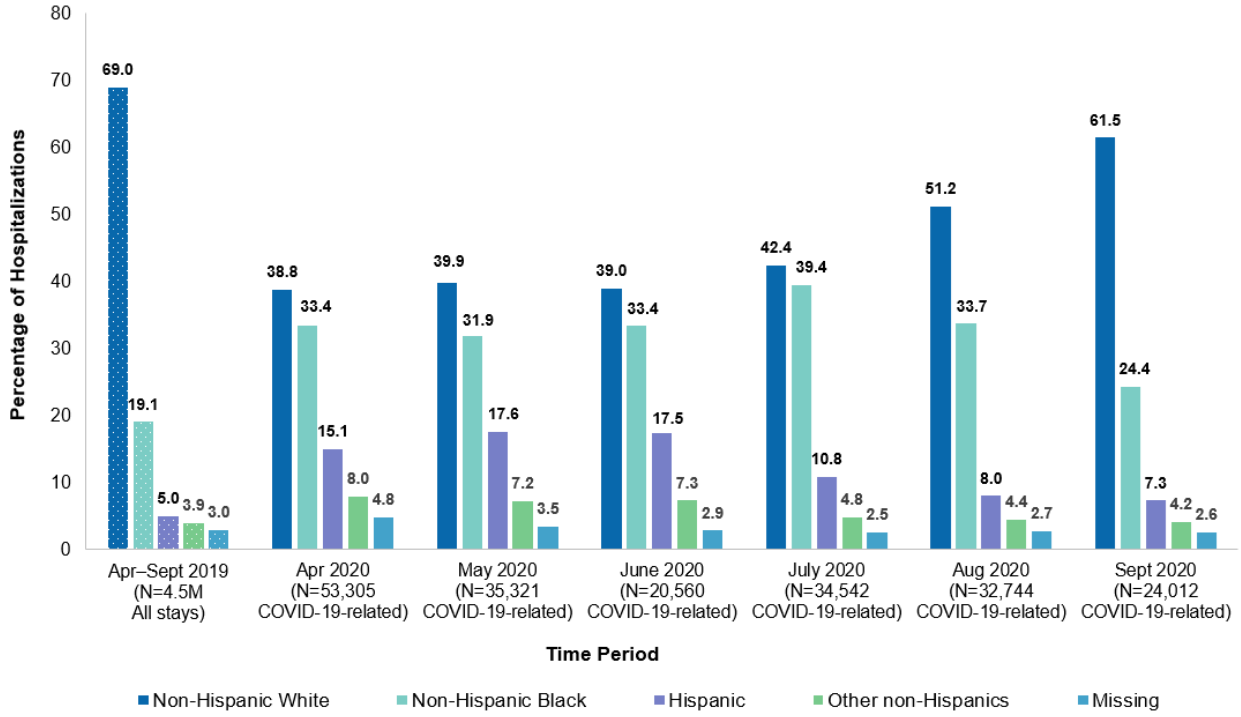
Findings

Differences in COVID-19-related hospitalizations, by patient race/ethnicity, April–September 2020
Figure 1 displays the distribution of COVID-19-related hospitalizations in 13 States in each of 6 months, April, May, June, July, August, and September 2020, by patient race/ethnicity. As a reference, the distribution of all hospitalizations in the same States during April–September 2019 is also shown.

Highlights

- Using the distribution of all hospitalizations in 2019 as a reference, non-Hispanic Black, Hispanic, and other non-Hispanic patients in the 13 States accounted for a disproportionate share of COVID-19-related hospitalizations in April–September 2020.
- Although little variation in the average length of COVID-19-related hospitalizations was noted by patient race/ethnicity from April to August 2020, non-Hispanic Black patients with COVID-19 had longer lengths of hospitalizations than all other patients in September 2020.
- For each of the race/ethnicity groups of patients with COVID-19, the observed (unadjusted) in-hospital mortality rates declined between April through July 2020 and increased slightly in August and September 2020.
- In April 2020, across the 13 states, the COVID-19-related age-adjusted in-hospital mortality rate for Hispanic and other non-Hispanic patients was higher than that for non-Hispanic Black patients. In May, June, July, and September 2020, the age-adjusted in-hospital mortality rates for Hispanic and other non-Hispanic patients with COVID-19 were higher than the rates for non-Hispanic White and non-Hispanic Black patients.
- Age-adjusted in-hospital mortality rates varied by patient race/ethnicity and by the State in which the patient was hospitalized.

Figure 1. Distribution of COVID-19-related hospitalizations in April–September 2020 compared with all hospitalizations in April–September 2019, by patient race/ethnicity, 13 States



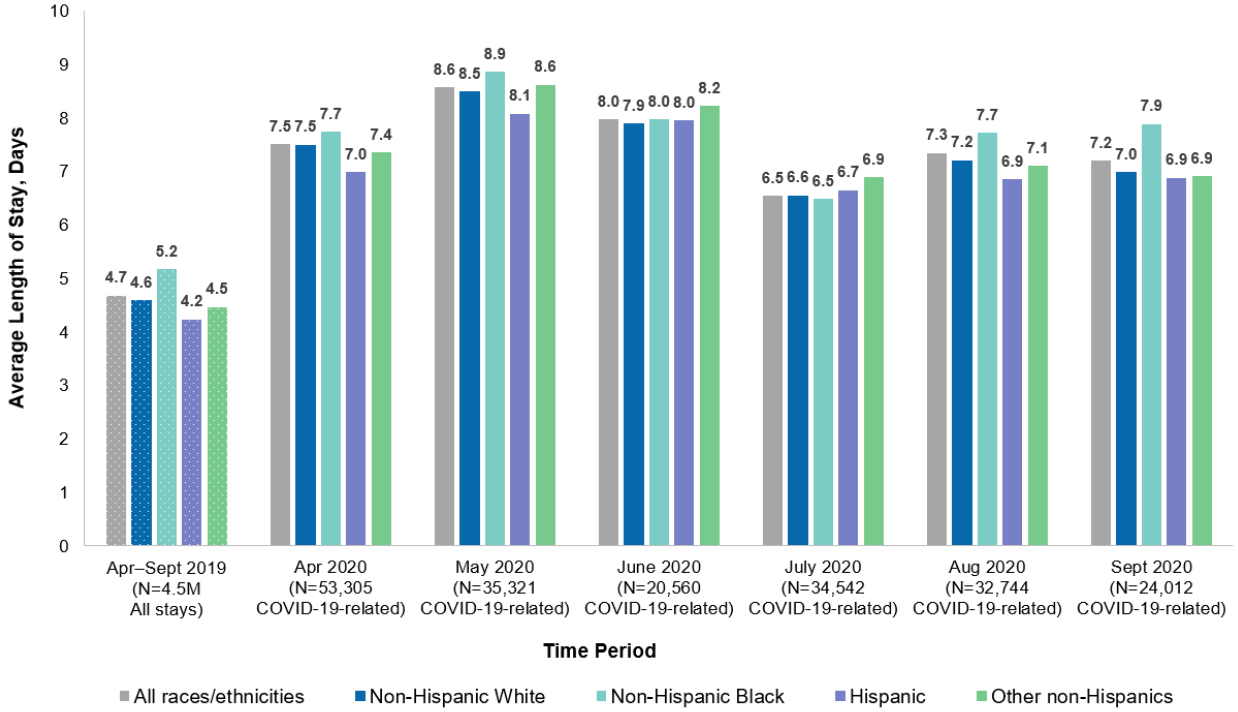
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

- Using the distribution of all hospitalizations in 2019 as a reference, non-Hispanic Black, Hispanic, and other non-Hispanic patients in the 13 States accounted for a disproportionate share of COVID-19-related hospitalizations in April–September 2020.
- Non-Hispanic Black, Hispanic, and other non-Hispanic patients combined accounted for a larger share of COVID-19-related hospitalizations in April, May, June, and July 2020 than non-Hispanic White patients (55.0–58.2 vs. 38.8–42.4 percent, respectively).
- Non-Hispanic White patients accounted for a larger share of COVID-19-related hospitalizations in August and September 2020 compared with non-Hispanic Black, Hispanic, and other non-Hispanic patients combined (51.2 and 61.5 percent vs. 46.1 and 35.9 percent, respectively).

Differences in average length of COVID-19-related hospitalizations, by patient race/ethnicity, April–September 2020

Figure 2 presents the average length of COVID-19-related hospitalizations in April–September 2020 across 13 States, by race/ethnicity of the patient. As a reference, the average length of all hospitalizations during April–September 2019 across the 13 States is also shown.

Figure 2. Average length of stay for COVID-19-related hospitalizations in April–September 2020 compared with all hospitalizations in April–September 2019, by patient race/ethnicity, 13 States



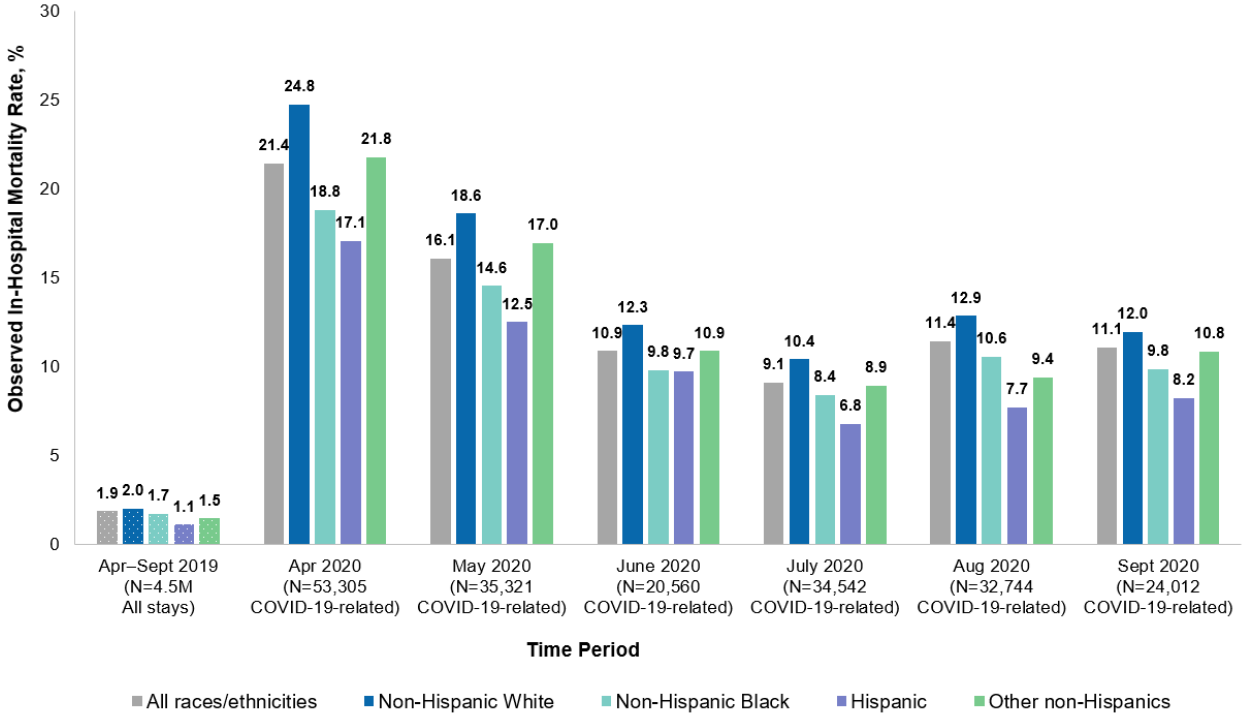
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

- Looking across the time periods, the average length of COVID-19-related hospitalizations in the 13 States was longest in May 2020 (8.6 days), with minimal variation by patient race/ethnicity.
- The average length of COVID-19-related hospitalizations in the 13 States was shortest in July 2020 (6.5 days), with minimal variation by patient race/ethnicity.
- In September 2020, non-Hispanic Black patients had longer lengths of stay than non-Hispanic White, Hispanic, and other non-Hispanic patients (7.9 vs. 7.0, 6.9, and 6.9 days, respectively).

Differences in in-hospital mortality for COVID-19-related hospitalizations, by patient race/ethnicity, April–September 2020

Figure 3 displays the observed (unadjusted) in-hospital mortality rate for COVID-19-related hospitalizations for each month during April–September 2020 across 13 States, by race/ethnicity of the patient. As a reference, the all-cause observed (unadjusted) in-hospital mortality rates across the 13 States during April–September 2019 are also shown. The observed in-hospital mortality rates do not account for differences in the age distribution across population subgroups.

Figure 3. Observed COVID-19-related in-hospital mortality rate in April–September 2020 compared with the observed all-cause in-hospital mortality rate in April–September 2019, by patient race/ethnicity, 13 States

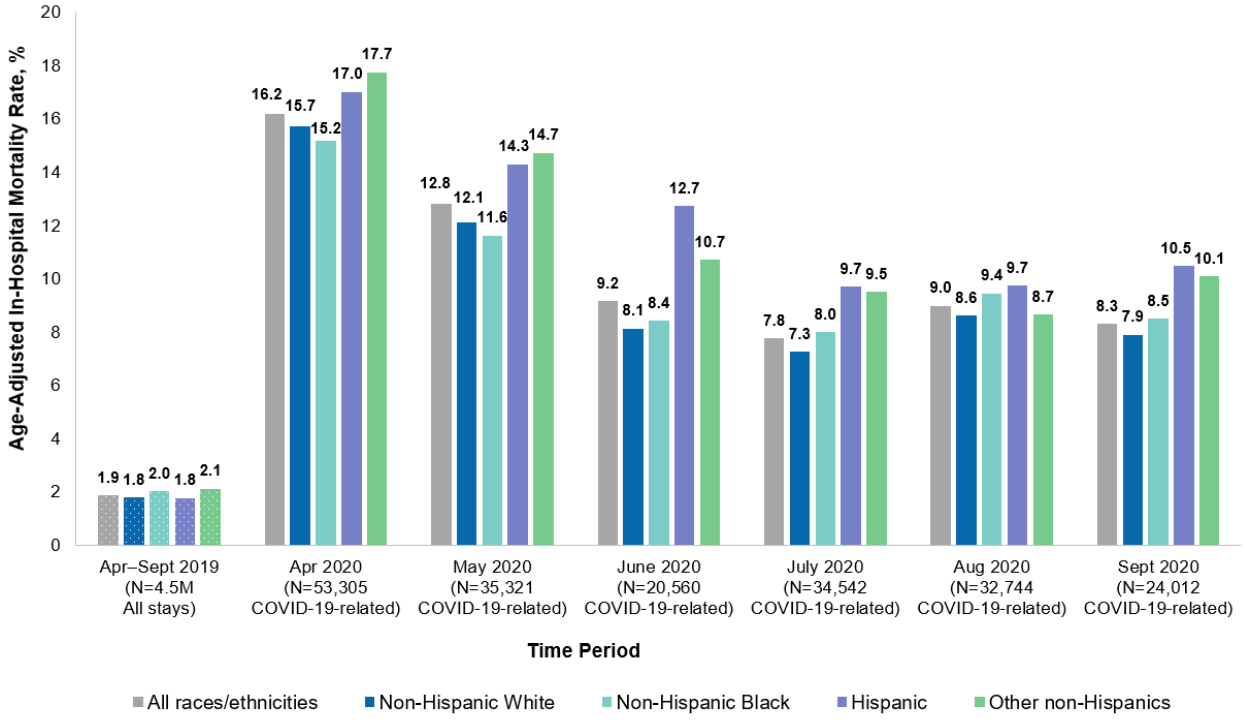


Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 2019 State Inpatient Databases (SID) and 2020 quarterly data from 13 States (CO, GA, IA, KY, MD, MI, MN, MO, MS, NJ, OH, SC, and VT) (available as of March 2021)

- Among all patients with COVID-19 in the 13 States, more than 1 in 5 died in the hospital in April 2020 (21.4 percent), and about 1 in 10 died in the hospital in September 2020 (11.1 percent).
- For each of the race/ethnicity groups of patients with COVID-19, the observed (unadjusted) in-hospital mortality rates declined from April through July 2020 and then increased slightly in August and September 2020.

To account for the differences in in-hospital mortality due to age, Figure 4 displays the age-adjusted in-hospital mortality rate for COVID-19-related hospitalizations in April–September 2020 across 13 States, by race/ethnicity of the patient. The magnitude of the rates presented in this figure is dependent on the standard population used to adjust for age. In this case, the standard population is the nationwide hospitalized population in 2018. These age-adjusted in-hospital mortality rates are useful for comparisons across groups or time after accounting for the age distribution of the population. As a reference, the all-cause age-adjusted in-hospital mortality rates across the 13 States during April–September 2019 are also shown.

Figure 4. COVID-19-related age-adjusted in-hospital mortality rate in April–September 2020 compared with the all-cause in-hospital mortality rate in April–September 2019, by patient race/ethnicity, 13 States



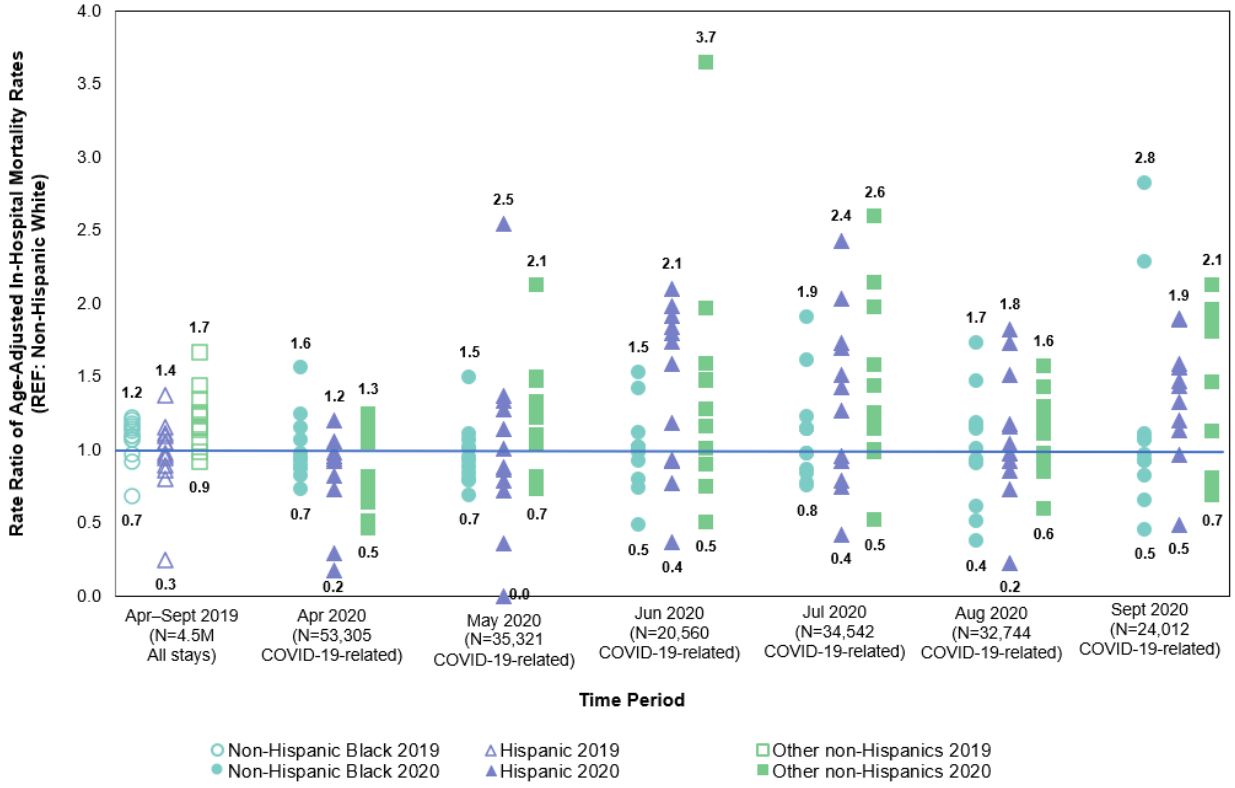
Note: In-hospital mortality rates were adjusted for age based on the national age distribution of hospitalizations for patients in the 2018 Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 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)

- Across all race/ethnicity groups, the monthly COVID-19-related age-adjusted in-hospital mortality rates in the 13 States declined between April and July 2020 (16.2 to 7.8 per 100 standard hospitalized population). The monthly COVID-19-related age-adjusted in-hospital mortality rate increased between July and August–September 2020 (7.8 to 9.0 and 8.3 per 100 standard hospitalized population, respectively).
- Across these 13 States, the COVID-19-related age-adjusted in-hospital mortality rates for Hispanic and other non-Hispanic patients were 18–57 percent higher than the rates for non-Hispanic White and non-Hispanic Black patients in May, June, July, and September 2020. In April 2020, the COVID-19-related age-adjusted in-hospital mortality rate for both Hispanic and other non-Hispanic patients was more than 10 percent higher than that for non-Hispanic Black patients, but not non-Hispanic White patients.
- In August 2020, across these 13 States, the COVID-19-related age-adjusted in-hospital mortality rate for Hispanic patients was more than 10 percent higher than the rates for non-Hispanic White and other non-Hispanic patients (9.7 vs. 8.6 and 8.7 per 100 standard hospitalized population, respectively).

Figure 5 displays the State variation in the rate ratio (RR) of COVID-19-related age-adjusted in-hospital mortality rates in April–September 2020, by patient race/ethnicity. As a reference, age-adjusted in-hospital mortality RRs for all hospitalizations during April–September 2019 in each State are shown. Each dot in the figure represents one State's age-adjusted in-hospital mortality RR for a specific race/ethnicity group (i.e., age-adjusted in-hospital mortality rate for a specific race/ethnicity group in a State divided by the age-adjusted in-hospital mortality rate for non-Hispanic White patients in the same State). If there were fewer than 30 discharges in a State-specific race/ethnicity category, the corresponding age-adjusted State-specific in-hospital mortality RR is suppressed.

Figure 5. State-specific COVID-19-related age-adjusted in-hospital mortality rate ratios in April–September 2020 compared with the State-specific all-cause in-hospital mortality rate ratios in April–September 2019, by patient race/ethnicity, 13 States



Abbreviation: REF, reference group

Note: If there were fewer than 30 discharges in a State-specific race/ethnicity category, the corresponding age-adjusted State-specific in-hospital mortality rate ratio is suppressed. In-hospital mortality rates were adjusted for age based on the national age distribution of hospitalizations for patients in the 2018 Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), 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)

- State-specific COVID-19-related age-adjusted in-hospital mortality RRs varied by race/ethnicity and across time. In April 2020, the variation in State-specific RRs (relative to non-Hispanic White patients) was fairly small (0.7 to 1.6 for non-Hispanic Black patients, 0.2 to 1.2 for Hispanic patients, and 0.5 to 1.3 for other non-Hispanic patients). Variation across States increased from April to September 2020. In September 2020, the variation in State-specific age-adjusted in-hospital mortality RRs ranged from 0.5 to 2.8 for non-Hispanic Black patients, 0.5 to 1.9 for Hispanic patients, and 0.7 to 2.1 for other non-Hispanic patients (relative to non-Hispanic White patients).
- In June through September 2020, more than half of the States showed COVID-19-related age-adjusted in-hospital mortality RRs > 1.0 for Hispanic and other non-Hispanic patients, indicating that these patients, relative to non-Hispanic White patients, were more likely to die in the hospital after adjusting for age.

References

[1] Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for the United States: April 1, 2010 to July 1, 2019 (NC-EST2019-SR11H). U.S. Census Bureau, Population Division. Release Date: June 2020. www.census.gov/newsroom/press-kits/2020/population-estimates-detailed.html. Accessed March 1, 2021.
[2] Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for Colorado, Georgia, Iowa, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, Ohio, South Carolina, and Vermont: April 1, 2010 to July 1, 2019 (NC-EST2019-SR11H-nn). U.S. Census Bureau, Population Division. Release Date: June 2020. www.census.gov/data/tables/time-series/demo/popest/2010s-state-detail.html. Accessed March 1, 2021.
[3] Agency for Healthcare Research and Quality. HCUP Summary Trend Tables. Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality. Updated December 2020. www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp. Accessed February 10, 2021.

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 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 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 contained in this Statistical Brief (except age-adjusted rates) 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. In the aggregate, 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.

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 other non-Hispanics (Asian/Pacific Islander, American Indian/Alaska Native, Other).

In-hospital mortality rate, age-adjusted in-hospital mortality rate, and in-hospital mortality rate ratio
The simplest in-hospital mortality rate is the observed in-hospital mortality rate, defined as the total number of COVID-19-related deaths in the hospital divided by the number of patients hospitalized with COVID-19. However, the observed in-hospital mortality rate does not account for the age distribution of the population.

Because in-hospital mortality rates generally increase with age, another important measure is the age-adjusted mortality rate. The age-adjusted in-hospital mortality rate (in-hospital mortality per 100 standard population) is the proportion of patients with COVID-19 who died while in the hospital, standardized using the direct method and the age distribution of a standard population. The standard population is the nationwide hospitalized population in 2018, using data from the 2018 HCUP National Inpatient Sample (NIS). The rates represent the expected in-hospital mortality rates if the observed age-specific rates were applied to the same standard population.

The age-adjusted in-hospital mortality rate ratio is defined as the age-adjusted in-hospital mortality rate of one group divided by the age-adjusted in-hospital mortality rate of the comparison, or reference, group.

[a] 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 February 10, 2021.

State-specific age-adjusted in-hospital mortality rates are suppressed for groups with fewer than 30 discharges.

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 at 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

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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