

Changes in Pediatric Hospitalizations and In-Hospital Deaths in the Initial Period of the COVID-19 Pandemic (April–December 2020), 29 States

STATISTICAL BRIEF #291

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Introduction

Annually, there are approximately 5.3 million pediatric hospitalizations in the United States, including for births and neonatal conditions (71 percent), medical conditions (18 percent), surgeries (5 percent), mental health and substance use conditions (3 percent), injuries^a (2 percent), and maternal conditions (1 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 State-level reports compiled by the American Academy of Pediatrics and the Children's Hospital Association show pediatric COVID-19 cases and hospitalizations were infrequent at the beginning of the pandemic.³ Little is known, however, about the impact of the pandemic on all pediatric hospitalizations and in-hospital deaths in 2020.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents data from 29 States on pediatric hospitalizations 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 less than 18 years is presented overall and by patient characteristics from April to December 2020 using quarterly HCUP inpatient data compared with State-level averages from April to December in 2016–2019 using the HCUP State Inpatient Databases (SID). The percentage of all pediatric hospitalizations related to COVID-19 during the April–December 2020 timeframe is 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 pediatric patients treated in community, nonrehabilitation hospitals in 29 States (Arizona, California, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, Washington, and Wisconsin) for which HCUP data were available for April–December 2016–2019 and April–December 2020. These States accounted for 66.8

Highlights

- Across 29 States, the average number of pediatric hospitalizations decreased the most in the fourth quarter (19 percent decrease in October–December) while pediatric in-hospital deaths decreased the most in the second quarter (18 percent decrease in April–June) compared with the same months in previous years.
- In April–December 2020, the percentage of pediatric hospitalizations and in-hospital deaths related to COVID-19 across 29 States was 0.5 and 1.2 percent, respectively.
- Across patient characteristics examined, the percentage of pediatric hospitalizations related to COVID-19 was highest for Hispanic children (1.1 percent) in 29 States from April to December 2020.
- Patients from the lowest income areas and those with other non-Hispanic race/ethnicity had the largest decrease (19 percent) in pediatric hospitalizations in April–December 2020 compared with the same months in previous years across patient characteristics in 29 States.
- Patients from the highest income areas (20 percent) and those with non-Hispanic White race/ethnicity had the largest decrease (19 percent) in pediatric in-hospital deaths in April–December 2020 compared with the same months in previous years across patient characteristics in 29 States.

^a Each hospitalization was assigned to a single hospitalization type hierarchically, based on the following order of hospital stay principal diagnoses: maternal, neonatal, mental health/substance use, injury, surgical, and medical.

percent of the resident U.S. population aged less than 18 years 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 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 pediatric hospitalizations and in-hospital deaths, 2016–2019 and 2020

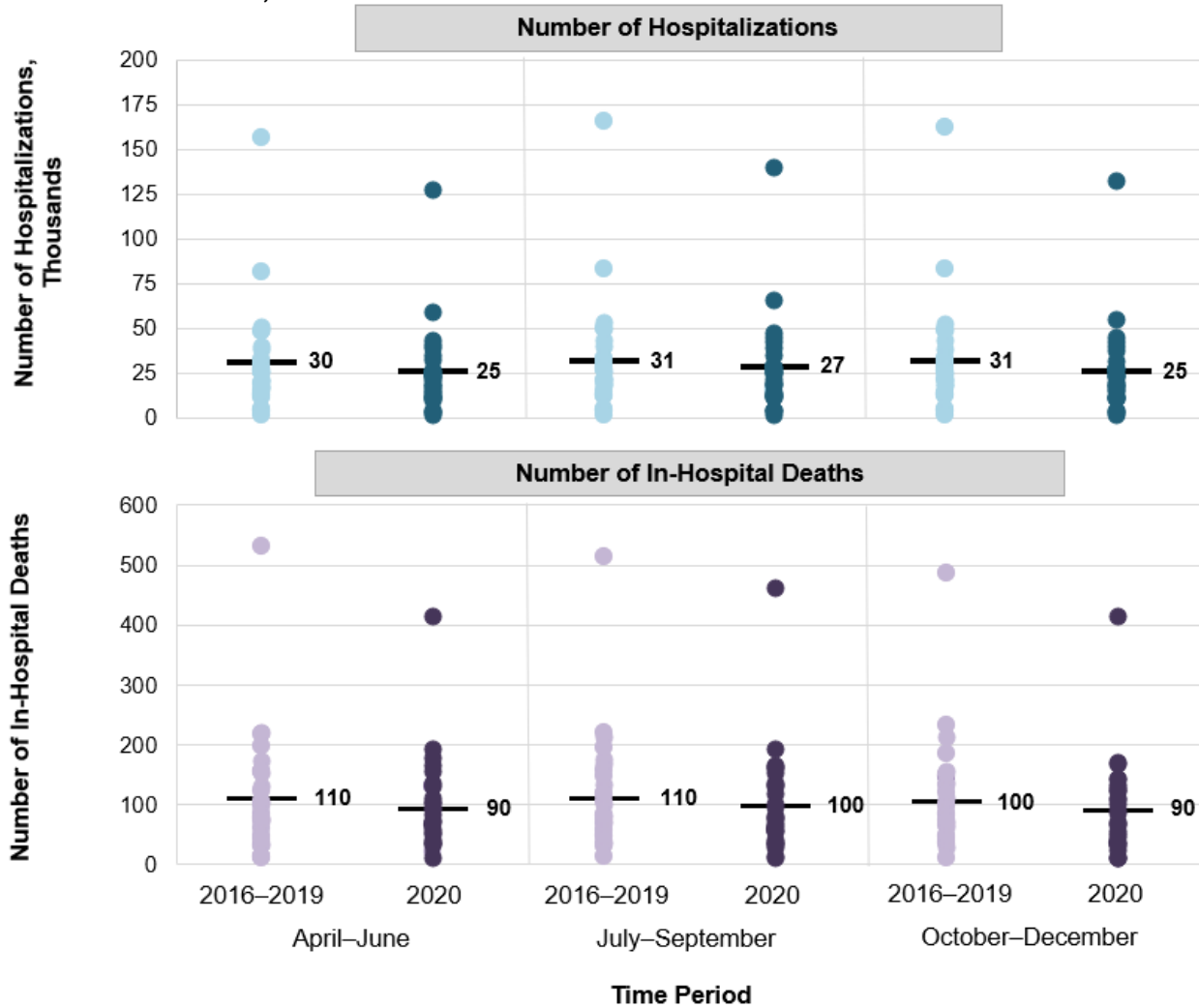
Figure 1 displays the number of hospitalizations and in-hospital deaths among patients aged less than 18 years for each of the 29 States in April–December 2016–2019^b and 2020. Each dot in the figure represents the State-specific number of hospitalizations or in-hospital deaths. The average number of hospitalizations and in-hospital deaths across these 29 States is also presented.

- On average, the *number of all pediatric hospitalizations* in the 29 States examined decreased 16.7, 12.9, and 19.4 percent in the second (April–June; about 30,000 to 25,000 hospitalizations), third (July–September; about 31,000 to 27,000 hospitalizations), and fourth (October–December; about 31,000 to 25,000 hospitalizations) quarters of 2020 compared with the same quarters in 2016–2019, respectively.^c
- On average, the *number of pediatric all-cause in-hospital deaths* across the 29 States examined decreased 18.2 and 10.0 percent in the second (April–June; from 110 to 90 deaths) and fourth (October–December; from 100 to 90 deaths) quarters of 2020 compared with the same quarters in 2016–2019, respectively.

^b Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

^c Hospitalizations include newborns, infants, and children aged 1–17 years. Nationally, in 2016–2018, approximately 77 percent of hospitalizations were for infants (including newborns and infants hospitalized within the first year of birth), and 23 percent were for children aged 1–17 years. Source: Agency for Healthcare Research and Quality. HCUPnet. Healthcare Cost and Utilization Project (HCUP). www.hcupnet.ahrq.gov/. Accessed February 2, 2022.

Figure 1. Number of hospitalizations (in thousands) and in-hospital deaths among patients aged less than 18 years by quarter, April–December 2020 compared with the average of April–December 2016–2019, 29 States



Notes: Number of in-hospital deaths is rounded to the nearest ten. Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years. Data values are suppressed for counts <11. Each dot in the figure represents the State-specific number of hospitalizations or in-hospital deaths.

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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

Figure 2 presents the number of hospitalizations and in-hospital deaths for patients aged less than 18 years by State, comparing April–December 2020 with the average from April–December 2016–2019.^d The percentage of pediatric hospitalizations related to COVID-19 in April–December 2020 is also presented. Similar State-level data are provided in the Appendix.

- The *number of all pediatric hospitalizations* decreased 15.8 percent in April–December 2020 compared with April–December 2016–2019 for all 29 States combined (from 2.6 to 2.2 million hospitalizations). Examined States in the Northeast had the largest decrease of 21.4 percent fewer hospitalizations (from 550,200 to 432,700 hospitalizations). Across examined States, New York had the largest decrease of 27.2 percent fewer hospitalizations (from 247,500 to 180,300 hospitalizations), while Washington and Maine had the smallest decrease of 10.7 and 10.0 percent (from 79,500 to 71,000 and from 12,000 to 10,800 hospitalizations), respectively (see Appendix).

Across 29 States, the percentage of all pediatric hospitalizations related to COVID-19 was low at 0.5 percent in April–December 2020, ranging from 0.0 percent in Vermont to 0.8 percent in Arizona, Illinois, and South Dakota (see Appendix).

- The *number of pediatric all-cause in-hospital deaths* decreased 13.0 percent in April–December 2020 versus the average in April–December 2016–2019 (from 9,200 to 8,000 deaths). The decrease was largest among examined States in the Northeast (25.0 percent decrease). Across the 29 examined States, the decrease was largest in New Jersey, where the number of pediatric in-hospital deaths decreased by nearly half (40.0 percent; from 250 to 150 deaths) (see Appendix).

The percentage of all-cause pediatric in-hospital deaths related to COVID-19 was 1.2 percent across 29 States (data not shown). Given this low frequency of pediatric in-hospital deaths overall, further data on pediatric in-hospital deaths related to COVID-19 by patient characteristics are not provided.

^d Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

Figure 2. Number of hospitalizations, in-hospital deaths, and percentage of hospitalizations related to COVID-19 among patients aged less than 18 years in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

Region	Time period	Number of hospitalizations	Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths
29 States (29 out of 50 States + DC; 67% of the population*)	Apr–Dec, 2016–2019	// 2,646,000		// 9,200
	Apr–Dec, 2020	// 2,228,900	0.5%	// 8,000
Northeast (6 out of 9 States; 84% of the population*)	Apr–Dec, 2016–2019	550,200		1,600
	Apr–Dec, 2020	432,700	0.5%	1,200
Midwest (11 out of 12 States; 97% of the population*)	Apr–Dec, 2016–2019	833,000		3,100
	Apr–Dec, 2020	713,300	0.5%	2,700
South (8 out of 16 States + DC; 39% of the population*)	Apr–Dec, 2016–2019	573,500		2,300
	Apr–Dec, 2020	503,800	0.5%	2,100
West (4 out of 13 States; 74% of the population*)	Apr–Dec, 2016–2019	689,300		2,200
	Apr–Dec, 2020	579,100	0.6%	1,900

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–December across these 4 years. // indicates a break in the axis.

* Percentage of the resident U.S. population aged less than 18 years in 2019.

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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

Patient characteristics associated with pediatric hospitalizations and in-hospital deaths, 2016–2019 and 2020

Figure 3 presents the number of hospitalizations and in-hospital deaths for patients aged less than 18 years in 29 States combined by location of patient residence (large metropolitan [metro], medium/small metro, and rural), comparing April–December 2020 with the average from April–December 2016–2019.^e The percentage of pediatric hospitalizations related to COVID-19 in April–December 2020 is also presented.

- The *number of all pediatric hospitalizations* decreased 17.1 percent in April–December 2020 compared with the average in April–December 2016–2019 for patients from large metro areas (from 1.6 to 1.3 million hospitalizations) compared with about a 14 percent decrease in medium/small metro (from 718,600 to 620,000 hospitalizations) and rural (from 342,700 to 296,100 hospitalizations) areas across 29 States.

Across 29 States, the percentage of hospitalizations related to COVID-19 was similar across patient locations (0.4 to 0.6 percent).

- The *number of pediatric all-cause in-hospital deaths* decreased by twice as much for patients from large metro areas (15.4 percent decrease; 5,200 to 4,400 deaths) as patients from rural areas (7.7 percent decrease; 1,300 to 1,200 deaths) in April–December 2020 versus the average in April–December 2016–2019.

Figure 3. Number of hospitalizations, in-hospital deaths, and percentage of hospitalizations related to COVID-19 among patients aged less than 18 years by location of patient residence in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

Patient location	Time period	Number of hospitalizations	Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths
Large metro	Apr–Dec, 2016–2019	1,579,200		5,200
	Apr–Dec, 2020	1,309,100	0.6%	4,400
Medium/ small metro	Apr–Dec, 2016–2019	718,600		2,700
	Apr–Dec, 2020	620,000	0.5%	2,400
Rural	Apr–Dec, 2016–2019	342,700		1,300
	Apr–Dec, 2020	296,100	0.4%	1,200

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–December 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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

^e Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

Figure 4 presents the number of hospitalizations and in-hospital deaths for patients aged less than 18 years in 29 States combined by patient race/ethnicity, comparing April–December 2020 with the average from April–December 2016–2019.^f The percentage of pediatric hospitalizations related to COVID-19 in April–December 2020 is also presented.

- The *number of all pediatric hospitalizations* decreased in April–December 2020 versus the average in April–December 2016–2019 for all race/ethnicity groups. The decreases ranged from an 18.6 percent decrease among pediatric patients with other non-Hispanic race/ethnicity (from 322,800 to 262,800 hospitalizations) to a 15.4 percent decrease among Hispanic pediatric patients (from 452,700 to 383,000 hospitalizations).

In April–December 2020, the percentage of all pediatric hospitalizations related to COVID-19 was highest for Hispanic pediatric patients (1.1 percent) and was triple the rate for non-Hispanic White pediatric patients (0.3 percent).

- The *number of pediatric all-cause in-hospital deaths* decreased in April–December 2020 versus the average in April–December 2016–2019 for all race/ethnicity groups, ranging from a 14.3 percent decrease for non-Hispanic Black (2,100 to 1,800 deaths) and Hispanic (1,400 to 1,200 deaths) pediatric patients to a 19.4 percent decrease for non-Hispanic White pediatric patients (3,600 to 2,900 deaths).

Figure 4. Number of hospitalizations, in-hospital deaths, and percentage of hospitalizations related to COVID-19 among patients aged less than 18 years by patient race/ethnicity in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

Patient race/ethnicity	Time period	Number of hospitalizations	Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths
White NH	Apr–Dec, 2016–2019	1,263,400		3,600
	Apr–Dec, 2020	1,056,400	0.3%	2,900
Black NH	Apr–Dec, 2016–2019	388,000		2,100
	Apr–Dec, 2020	317,900	0.7%	1,800
Hispanic	Apr–Dec, 2016–2019	452,700		1,400
	Apr–Dec, 2020	383,000	1.1%	1,200
Other NH	Apr–Dec, 2016–2019	322,800		1,100
	Apr–Dec, 2020	262,800	0.4%	900

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–December 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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

^f Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

Figure 5 presents the number of hospitalizations and in-hospital deaths for patients aged less than 18 years in 29 States combined by primary expected payer, comparing April–December 2020 with the average from April–December 2016–2019.⁹ The percentage of pediatric hospitalizations related to COVID-19 in April–December 2020 is also presented.

- The *number of all pediatric hospitalizations* decreased in April–December 2020 versus the average in April–December 2016–2019 for all expected payers, ranging from a 13.8 percent decrease for private insurance (1.2 to 1.0 million hospitalizations) to an 18.0 percent decrease for Medicaid (from 1.2 to 1.0 million hospitalizations).

In April–December 2020, 0.8 percent of all pediatric hospitalizations with Medicaid as the expected payer were related to COVID-19.

- The *number of pediatric all-cause in-hospital deaths* decreased in April–December 2020 versus the average in April–December 2016–2019 for all expected payers except self-pay/no charge (which was unchanged). The decrease was largest (15.6 percent) for private insurance as the expected payer (3,200 to 2,700 deaths).

Figure 5. Number of hospitalizations, in-hospital deaths, and percentage of hospitalizations related to COVID-19 among patients aged less than 18 years by primary expected payer in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

Primary expected payer	Time period	Number of hospitalizations	Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths
Private insurance	Apr–Dec, 2016–2019	1,204,700		3,200
	Apr–Dec, 2020	1,038,800	0.3%	2,700
Medicaid	Apr–Dec, 2016–2019	1,236,000		4,700
	Apr–Dec, 2020	1,013,900	0.8%	4,200
Self-pay/ No charge*	Apr–Dec, 2016–2019	114,400		700
	Apr–Dec, 2020	97,300	0.3%	700

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–December across these 4 years. Statistics on hospitalizations with an expected payer of Medicare are not shown because there are not enough data to present this group.

* 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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

⁹ Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

Figure 6 presents the number of hospitalizations and in-hospital deaths for patients aged less than 18 years in 29 States combined by community-level income, comparing April–December 2020 with the average from April–December 2016–2019.^h The percentage of all pediatric hospitalizations related to COVID-19 in April–December 2020 is also presented.

- The *number of all-cause pediatric hospitalizations* decreased 18.9 percent in April–December 2020 versus the average in April–December 2016–2019 for patients from the lowest income quartile (711,700 to 577,400 hospitalizations). This was the largest percentage decrease among the income categories.

In April–December 2020, the percentage of all-cause pediatric hospitalizations related to COVID-19 was highest (0.7 percent) among hospitalizations for patients residing in the lowest income quartile.

- The *number of pediatric all-cause in-hospital deaths* decreased in April–December 2020 versus the average in April–December 2016–2019 for all income quartiles. The percentage decrease was largest for pediatric patient from the highest income areas (20.0 percent; from 1,500 to 1,200 deaths).

Figure 6. Number of hospitalizations, in-hospital deaths, and percentage of hospitalizations related to COVID-19 among patients aged less than 18 years by community-level income in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

Community-level income	Time period	Number of hospitalizations	Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths
Lowest (Q1)	Apr–Dec, 2016–2019	711,700		3,200
	Apr–Dec, 2020	577,400	0.7%	2,800
Middle (Q2–Q3)	Apr–Dec, 2016–2019	1,309,900		4,500
	Apr–Dec, 2020	1,120,400	0.5%	3,900
Highest (Q4)	Apr–Dec, 2016–2019	604,200		1,500
	Apr–Dec, 2020	516,900	0.4%	1,200

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–December 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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 2021)

^h Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December across these 4 years.

Appendix. Number of hospitalizations, in-hospital deaths, and percentage of each related to COVID-19 among patients aged less than 18 years in April–December 2020 compared with the average of all hospitalizations in April–December 2016–2019, 29 States

State of hospitalization	Number of hospitalizations		Apr–Dec, 2020 percent related to COVID-19	Number of in-hospital deaths	
	Apr–Dec, 2016–2019*	Apr–Dec, 2020		Apr–Dec, 2016–2019*	Apr–Dec, 2020
All regions (29 States)	2,646,000	2,228,900	0.5	9,220	8,010
Northeast	550,200	432,700	0.5	1,650	1,220
CT	39,700	35,300	0.5	100	90
ME	12,000	10,800	0.1	40	40
NJ	98,900	74,900	0.7	250	150
NY	247,500	180,300	0.4	670	450
PA	146,900	127,100	0.5	580	490
VT	5,100	4,300	0.0	<15	<11
Midwest	833,000	713,300	0.5	3,090	2,700
IA	39,400	34,700	0.6	100	80
IL	147,200	120,800	0.8	480	370
IN	80,000	71,700	0.3	310	280
KS	37,600	32,400	0.3	100	100
MI	116,600	98,700	0.4	500	470
MN	75,300	62,200	0.7	210	160
MO	91,800	80,100	0.7	440	410
ND	12,100	10,500	0.5	40	30
OH	155,600	135,200	0.4	640	550
SD	14,000	12,300	0.8	30	30
WI	63,300	54,800	0.5	230	210
South	573,500	503,800	0.5	2,270	2,140
GA	125,800	111,900	0.6	400	370
KY	52,800	45,200	0.4	160	160
LA	61,100	52,500	0.6	320	290
MD	63,700	55,000	0.4	230	220
MS	37,100	32,000	0.5	140	150
SC	54,800	45,400	0.5	210	190
TN	85,400	79,900	0.5	450	420
VA	92,900	81,800	0.5	360	360
West	689,300	579,100	0.6	2,210	1,950
AZ	81,700	71,400	0.8	300	290
CA	484,400	399,300	0.6	1,530	1,290
OR	43,700	37,400	0.3	140	110
WA	79,500	71,000	0.3	240	250

Notes: Number of hospitalizations is rounded to the nearest hundred, and number of in-hospital deaths is rounded to the nearest ten. Values >10 but less than 15 are indicated by "<15." Data values are suppressed for counts <11.

* Counts for 2016–2019 represent the mean number of hospitalizations or in-hospital deaths during April–December 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 29 States (AZ, CA, CT, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, ND, NJ, NY, OH, OR, PA, SC, SD, TN, VA, VT, WA, and WI) (available as of October 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 pediatric patients aged less than 18 years treated in community, nonrehabilitation hospitals in 29 States (Arizona, California, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, Washington, and Wisconsin) for which HCUP data were available for April–December 2016–2019 and April–December 2020. These States account for the following percentages of the resident U.S. pediatric population aged less than 18 years: 66.8 percent of the total population, 69.5 percent of the non-Hispanic White population, 67.9 percent of the non-Hispanic Black population, 59.8 percent of the Hispanic population, and 70.0 percent of the other non-Hispanic race/ethnicity population, including but not limited to American Indian, Alaska Native, Asian, Native Hawaiian, and other Pacific Islander.^{4,5} 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 and in-hospital deaths, defined by the discharge disposition, are identified by any-listed ICD-10-CM code of U07.1 (2019 novel coronavirus disease) on the discharge record. Per coding guidelines,ⁱ 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

ⁱ 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 March 18, 2021.

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

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.¹ The value ranges for the income quartiles vary by year. Patients in the first quartile are assigned to the *lowest*

¹ Claritas. Claritas Demographic Profile by ZIP Code. www.claritas360.claritas.com/mybestsegments/. Accessed June 27, 2021.

income category, patients in the middle two quartiles are assigned to the *middle* income category, and patients in the highest quartile are assigned to the *highest* income category. The income quartile is missing for patients who are homeless or foreign.

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