

COVID-19 Surges and Hospital Outcomes in the United States

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There has been a growing concern about the quality of inpatient care during the pandemic as hospitals were overwhelmed by the influx of COVID-19 patients and shortages of staff. However, monitoring the quality of care during the pandemic has proven to be difficult.¹ Evidence on the impact of the pandemic on hospital care, particularly the outcomes of routine inpatient care among non-COVID-19 patients, remains limited.

Most existing studies on hospital outcomes in the United States during the pandemic focus on COVID-19 care.²⁻⁸ In a few studies that included non-COVID-19 patients, trends in mortality rates were examined. One study found a temporary increase in hospital mortality of 0.3% for non-COVID-19 admissions in April 2020.⁷ The rate then returned to the previous level by the end of May 2020. A more recent study, which exclusively examined non-COVID-19 patients,⁸ found a similar trend in the mortality rate for the early months of the pandemic and observed that the rate rose again from October to December 2020. Both studies imply a corresponding relationship between mortality rates and pandemic surges.

This study builds on the existing literature and further explores the correspondence between pandemic surges and hospital outcomes. To measure the impact of the pandemic, the study starts with a COVID-19 onset indicator and then introduces a measure of hospital share of COVID-19 patients. The latter is used to quantify the “dose-effect” of COVID-19 surges, reflected as the influx of COVID-19 patients in hospitals. The study also examines a broader range of hospital outcomes. In addition to hospital mortality, as used in existing studies,²⁻⁸ this study assesses disposition outcomes: discharge or transfer to other hospitals, skilled nursing facilities (SNFs), or home care. Given the limited capacity and resources many hospitals have, discharging patients or transferring them to other facilities that are less crowded are more likely to be used as strategies to balance patient flows. An example is NYC Health + Hospitals, the largest public health care system in the country, which transferred patients across facilities within its system to reduce the burden of overwhelmed hospitals and possibly improve patient outcomes.⁹ It is unclear, however, to what extent strategies such as these were used across the country and how hospital outcomes were affected.

ABSTRACT

OBJECTIVES: To examine the impact of COVID-19 surges on hospital outcomes, particularly among non-COVID-19 patients.

STUDY DESIGN: An interrupted time series design.

METHODS: Using data from a large insurance claims clearinghouse, the study estimates the impact of the onset of the pandemic and the share of hospital COVID-19 patients on the likelihood of (1) in-hospital death, (2) in-hospital death or discharge to hospice, (3) discharge to other hospitals, (4) discharge to skilled nursing facilities (SNFs), and (5) discharge to home care.

RESULTS: The odds of in-hospital death were about 1.7 times that before the onset of the pandemic among all patients and 1.2 times that among non-COVID-19 patients. Increased share of COVID-19 patients was associated with higher odds of in-hospital death among all patients and non-COVID-19 patients. The effects were more pronounced among patients 45 years and older and those with septicemia or pneumonia, and they were also stronger during the months in which COVID-19 cases surged. Although no sizable changes were found in the odds of discharge to other hospitals or SNFs, transfers to home care grew during the pandemic.

CONCLUSIONS: The negative impact of the pandemic on mortality among non-COVID-19 patients confirms existing concerns about patient care. No evidence suggests large-scale changes in practices regarding discharge/transfer to other facilities. The findings shed light on future efforts to monitor and improve inpatient care as the pandemic evolves.

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TAKEAWAY POINTS

- ▶ Increased hospital mortality odds among non-COVID-19 patients imply that the quality of care was compromised as hospitals fought against COVID-19.
- ▶ Although no sizable changes were found in the odds of discharges to other hospitals, the growth of discharges to home care shows the promise of home health care as an alternative care option during the pandemic.
- ▶ As the pandemic evolves, it is vital to have timely feedback on patient outcomes to help providers maintain and improve quality of care and learn for the future.

This study analyzed all-cause hospitalizations in 2019 and 2020 using insurance claims data from a large claims clearinghouse. With an interrupted time series design, it examined hospital outcomes among all and non-COVID-19 patients as responses to the onset of the pandemic and changes in hospital share of COVID-19 patients.

METHODS

Data

Data from a large insurance claims clearinghouse were accessed through the COVID-19 Research Database, a pro bono cross-industry collaborative.¹⁰ Hospital inpatient claims were extracted from institutional claims based on the type of bill codes (011x-012x). Admission dates were restricted to a 2-year period from January 1, 2019, to December 31, 2020. The analysis was conducted at the admission level. Each admission is a unique combination of patient, hospital, and admission date. If the same patient was admitted to the same hospital on a different date, it was considered as another admission. When multiple claims were associated with 1 admission, information would be compressed into 1 record for that admission. Patients in the data set were distinguished based on the Soundex of the last name and first name, date of birth, and gender. Hospitals were distinguished by the National Provider Identifier. The study excluded admissions from hospitals that submitted fewer than 100 claims in either 2019 or 2020. This is to reduce the effect of user entry and exit, or irregular use of the clearinghouse for claim submission, so that hospital admissions included in the study are from a stable set of hospitals. It resulted in a set of more than 570 hospitals with a total of more than 1 million admissions in 2019 and 2020.

The study also included county-level demographics and economic indicators from the 2010 US Census data. County-level characteristics were linked to admissions based on hospital facility zip codes obtained from the CMS National Plan and Provider Enumeration System data. A zip code-to-county crosswalk file from the Dartmouth Atlas Data website was used to facilitate the linkage.

Measures

Hospital outcomes in the study include hospital mortality and disposition at discharge. For mortality, we considered (1) in-hospital death and (2) in-hospital death or discharge to hospice. The second measure adds the outcome of discharge to hospice and accounts for

patients who are near the end of life. Together with in-hospital death, the combined measure can provide a more complete representation of the worst-case discharge status.^{6,11-13} To examine potential changes in hospital discharge practices, such as greater use of level-loading to balance patient flow, the study considered 3 types of dispositions: discharges/transfers to hospitals (short-term general hospitals), SNFs, and home care (skilled care provided by organized home health service organizations at patients' homes).

All dispositions were identified using discharge status codes.

To examine the effect of the pandemic, the study uses an indicator for the onset of the pandemic, which equals 1 from March 2020 onward, as well as a share of COVID-19 patients at hospital-month level, defined as the percentage of COVID-19-related admissions (with *International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM]* codes U071 or U072 as primary, secondary, or tertiary diagnoses) among all admissions in a hospital in a particular month.

The study also controlled for patient mix, hospitalization characteristics, and county-level socioeconomic characteristics. Specifically, the covariates include patient age at admission, sex, comorbidities, whether the admission was COVID-19 related, whether the patient was transferred from a different hospital or an SNF, admission timing (after hours, weekend, or regular hours), whether it was an emergent/urgent admission, racial/ethnic composition of county population (percentage of individuals who were non-Hispanic Black, Hispanic, and other races/ethnicities), percentage of rural population in the county, county unemployment rate, and median household income. Patient comorbidities were measured by the Elixhauser Comorbidity Index¹⁴ (with separate indicators for 31 comorbidities) using the *ICD-10-CM* codes of all listed diagnoses. County-level characteristics were based on hospital facility zip codes.

Analytic Approach

The study adopts an interrupted time series design and examines the changes in discharge outcomes using 2019-2020 inpatient claims data. In the following logit model, $\text{logit}(P_{ijklt})$ represents the logarithm of the odds of a particular outcome (eg, in-hospital death, in-hospital death or discharge to hospice, discharge to hospital, discharge to SNF, or discharge to home care) for patient i , at hospital j of state k , in month t . X_{ijklt} is a vector of covariates, including patient mix, admission characteristics, and county-level demographic and economic factors, as discussed above. Our variable of interest is COVID_t . In some specifications, it represents the COVID-19 onset indicator, which equals 1 for March 2020 and onward. In alternative specifications, it represents the share of COVID-19 patients at hospital level. State fixed effect δ_k was included to control for unobservable time-invariant state-specific characteristics. Month and year fixed effects λ_t were included to control for factors changing each month (January, ..., December) or year (2019 and 2020) that were common

to all patient admissions. The error term ϵ_{ijkl} was clustered at the hospital level. Regressions were conducted separately among all patients as well as non-COVID-19 patients.

$$\text{logit}(P_{ijkl}) = \alpha + X_{ijkl}\beta + \gamma\text{COVID}_t + \delta_k + \lambda_t + \epsilon_{ijkl}$$

To explore potential heterogeneous effects of the pandemic, mortality outcomes were also examined among different age groups (< 1, 1-17, 18-44, 45-64, 65-84, and ≥85 years), month groups (January-February, March-April, May-June, July-August, September-October, and November-December), and selected common diagnoses (septicemia, heart failure, pneumonia [except that caused by tuberculosis], acute myocardial infarction [AMI], acute and unspecified renal failure, and cerebral infarction). We used in-hospital death or discharge to hospice as the measure and focused on the effect among non-COVID-19 patients. In each month group, admissions that occurred in the corresponding 2 months of 2019 and 2020 were included. The COVID_t indicator, in this case, overlaps with the year fixed effect of 2020 in the regressions involving month groups of March-April, May-June, and so on through November-December. The estimated fixed effect of 2020 is reported for all month group regressions, representing the differences between the 2 years. The selected common diagnoses were those among the most common principal diagnoses for inpatient stay (excluding maternal/neonatal stays) based on the 2018 National Inpatient Sample (NIS) of the Healthcare Cost and Utilization Project (HCUP)¹⁵ and with the most deaths in our data. Diagnoses were classified by the Clinical Classifications Software Refined for ICD-10-CM default categorization scheme for the principal diagnosis.¹⁶

All analyses were performed in Stata version 16 (StataCorp).

RESULTS

Descriptive statistics are presented by year of admission in **Table 1**. The percentage of in-hospital deaths increased from 1.7% in 2019 to 2.7% in 2020. When discharge to hospice was added, the combined mortality measure showed an increase from 3.1% in 2019 to 4.3% in 2020. The frequency of discharges to a different hospital appeared to have little change from 2019 to 2020 (1.7% to 1.6%). The percentage of patients who were discharged to an SNF decreased from 9.2% in 2019 to 7.7% in 2020. The rate of discharge to home care, however, increased from 10.2% in 2019 to 11.8% in 2020. About 81% of all admissions in 2020 occurred in or after March 2020 (during the pandemic). The mean share of COVID-19 patients at the hospital level was 5.5% in 2020. Patient mix and admission characteristics had small differences across the 2 years. The mean age, percentages of admissions by sex or age group, and mean Elixhauser score in 2019 were similar to those in 2020. In 2020, 5.5% of all admissions were COVID-19 related; 6.6% of all patients were transferred from other hospitals (7.2% in 2019) and 1.9% were transferred from an SNF (1.5% in 2019). Percentages of after-hours admissions, weekend admissions, and emergent/urgent admissions were similar in the 2 years. County-level characteristics were also similar in the 2 years.

TABLE 1. Descriptive Statistics

	2019		2020		2019-2020
	n = 495,660		n = 490,486		
	Mean/%	SD	Mean/%	SD	P ^a
Hospital outcomes					
In-hospital death	1.7%		2.7%		<.01
In-hospital death or discharge to hospice	3.1%		4.3%		<.01
Discharge to a different hospital	1.7%		1.6%		.03
Discharge to SNF	9.2%		7.7%		<.01
Discharge to home care	10.2%		11.8%		<.01
COVID-19 variables					
During COVID-19	0.0%		81.4%		<.01
Share of COVID-19 patients, %	0.00	0.00	5.47	8.08	<.01
Patient admission characteristics					
Female	54.8%		55.2%		<.01
Age in years	47.71	26.83	47.36	26.79	<.01
Age groups in years					<.01
< 1	10.8%		11.4%		
1-17	4.4%		3.5%		
18-44	27.3%		28.8%		
45-64	25.3%		24.5%		
65-84	25.2%		24.9%		
≥85	7.0%		6.9%		
Elixhauser score	1.95	1.63	1.91	1.62	<.01
COVID-19–related admission	0.0%		5.5%		<.01
Transferred from hospital	7.2%		6.6%		<.01
Transferred from SNF	1.5%		1.9%		<.01
Admitted after hours	58.6%		58.7%		.20
Admitted on weekend	22.3%		22.7%		<.01
Emergent/urgent admission	71.7%		71.4%		<.01
County-level characteristics					
% non-Hispanic Black	8.83	8.79	8.67	8.48	<.01
% Hispanic	33.83	16.87	34.33	16.80	<.01
% other races/ethnicities	13.45	7.83	13.75	7.79	<.01
% rural	5.39	10.14	5.25	10.11	<.01
Unemployment rate	0.05	0.01	0.05	0.01	>.99
Median household income (in 2009 \$)	66,730	14,921	67,192	14,806	<.01

SNF, skilled nursing facility.

^aThe P values in this column were from t tests or χ^2 tests (for categorical variables) that compared the values in 2019 and 2020.

Mortality Outcomes

The estimated effects of the pandemic on mortality outcomes are presented in **Table 2**. The pandemic was associated with higher odds of mortality. Among all patients, the odds of in-hospital

TABLE 2. Effect of the COVID-19 Pandemic on Mortality Measures*

	All patients		Non-COVID-19 patients	
	Model 1	Model 2	Model 1	Model 2
Effect on in-hospital death				
During COVID-19	1.728*** (0.091)		1.242*** (0.063)	
Share of COVID-19 patients		1.037*** (0.001)		1.016*** (0.002)
N	983,018	983,018	956,185	956,185
Effect on in-hospital death or discharge to hospice				
During COVID-19	1.561*** (0.063)		1.265*** (0.049)	
Share of COVID-19 patients		1.032*** (0.001)		1.014*** (0.002)
N	986,146	986,146	959,313	959,313

***P < .01.

*The table reports the odds ratios from logit regressions, with SEs (in parentheses) clustered at the hospital level. The top panel shows regression results on in-hospital death, and the bottom panel shows regression results on in-hospital death or discharge to hospice. The regressions also included female sex; age groups; the Elixhauser comorbidity indicators; admitted from another hospital; admitted from skilled nursing facility; admitted after hours; admitted on weekend; emergent/urgent admission; percentages of non-Hispanic Black individuals, Hispanic individuals, and individuals of other races/ethnicities in the county; percentage of rural population; unemployment rate; logarithm of median household income; state fixed effects; and year and month fixed effects.

death were about 1.7 times that before the onset of the pandemic (top panel). For in-hospital death or discharge to hospice (bottom panel), the odds increased to 1.6 times that before the pandemic. Excluding COVID-19 patients, the odds of in-hospital death and the odds of in-hospital death or discharge to hospice were still higher during the pandemic (1.2 and 1.3 times those before the pandemic, respectively). When the share of COVID-19–related admissions was used, the estimates also showed a significantly positive relationship. With a 1-percentage-point increase in the share of COVID-19–related admissions, the odds of in-hospital death would be 1.04 times that before the pandemic among all patients and 1.02 times that among non-COVID-19 patients (top panel). If the share of COVID-19–related admissions increased by 5 percentage points, the odds of in-hospital death would be 1.22 (=1.04⁵) times that before the pandemic among all patients and 1.10 (=1.02⁵) that among non-COVID-19 patients. The estimates were similar when in-hospital death or discharge to hospice was used.

Disposition at Discharge

The pandemic showed different impacts on the 3 types of dispositions (Table 3). The odds of discharge to a different hospital had no significant change. There was a decrease in the odds of discharge to SNF and an increase in the odds of discharge to home care after the pandemic. When the share of COVID-19 patients was used, the estimates showed consistent results on transfers to SNF. For discharges to home care, an increase in the share of COVID-19 patients was associated with lower odds of discharges during pandemic among all patients but no significant change among non-COVID-19 patients.

TABLE 3. Effect of the COVID-19 Pandemic on Disposition at Discharge*

	All patients		Non-COVID-19 patients	
	Model 1	Model 2	Model 1	Model 2
Effect on discharges to a different hospital				
During COVID-19	0.994 (0.055)		1.011 (0.055)	
Share of COVID-19 patients		1.001 (0.003)		1.003 (0.004)
N	986,146	986,146	959,313	959,313
Effect on discharges to SNF				
During COVID-19	0.719*** (0.018)		0.717*** (0.017)	
Share of COVID-19 patients		0.995*** (0.002)		0.995*** (0.002)
N	982,776	982,776	955,943	955,943
Effect on discharges to home care				
During COVID-19	1.160*** (0.039)		1.194*** (0.038)	
Share of COVID-19 patients		0.995*** (0.002)		1.000 (0.002)
N	983,018	983,018	956,185	956,185

SNF, skilled nursing facility.

***P < .01.

*The table reports the odds ratios from logit regressions, with SEs (in parentheses) clustered at hospital level. The top, middle, and bottom panels show regression results on discharge to a different hospital, discharge to SNF, and discharge to home care, respectively. The regressions also included female sex; age groups; the Elixhauser comorbidity indicators; admitted from another hospital; admitted from SNF; admitted after hours; admitted on weekend; emergent/urgent admission; percentages of non-Hispanic Black individuals, Hispanic individuals, and individuals of other races/ethnicities in the county; percentage of rural population; unemployment rate; logarithm of median household income; state fixed effects; and year and month fixed effects.

Heterogenous Effects

Table 4 shows the estimated effects of the pandemic on mortality among different age groups (top panel), admission months (middle panel), and selected common diagnoses (bottom panel). We used in-hospital death or discharge to hospice as the mortality measure and focused on non-COVID-19 patients.

Significant increases in the odds of in-hospital death or discharge to hospice were found among the 3 older age groups of non-COVID-19 patients (aged 45-64, 65-84, and ≥85 years), with the highest increase among patients 85 years or older (the odds were 1.4 times that before the pandemic).

When admissions were grouped by month, there were no significant differences between the odds of in-hospital death or discharge to hospice in January and February of 2020 and those in 2019. In all the other month groups, being admitted in 2020 (or during COVID-19) was associated with higher odds of in-hospital death or discharge to hospice among non-COVID-19 patients. The magnitudes of the odds ratios were higher in March-April, July-August, and November-December than in May-June and September-October. The timing largely coincided with the peaks and falls of COVID-19 cases.¹⁷

Among the 6 selected common diagnoses, non-COVID-19 patients with septicemia and pneumonia (except that caused by tuberculosis)

TABLE 4. Effect of the COVID-19 Pandemic on In-Hospital Death or Discharge to Hospice Among Non-COVID-19 Patients by Age Group, Admission Month, and Diagnosis*

Effect by age group						
	< 1 year	1-17 years	18-44 years	45-64 years	65-84 years	≥ 85 years
During COVID-19	0.985 (0.352)	1.965 (1.614)	1.022 (0.140)	1.219*** (0.091)	1.264*** (0.068)	1.417*** (0.094)
N	107,105	29,759	269,796	236,565	236,370	66,162
Effect by admission month						
	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
2020	0.981 (0.049)	1.265*** (0.051)	1.199*** (0.039)	1.247*** (0.046)	1.098*** (0.036)	1.344*** (0.048)
N	82,030	152,040	153,463	164,378	165,799	150,872
Effect by diagnosis						
	Septicemia	Heart failure	AMI	Cerebral infarction	Pneumonia	Renal failure
During COVID-19	1.228*** (0.090)	1.058 (0.141)	1.049 (0.184)	1.142 (0.217)	1.616** (0.335)	1.293 (0.257)
N	71,023	28,813	15,469	14,236	14,370	12,371

AMI, acute myocardial infarction.

P* < .05; *P* < .01.

*The table reports the odds ratios from logit regressions, with SEs (in parentheses) clustered at hospital level. The top panel shows the regression results by age group. The regressions also included female sex; the Elixhauser comorbidity indicators; admitted from another hospital; admitted from skilled nursing facility; admitted after hours; admitted on weekend; emergent/urgent admission; percentages of non-Hispanic Black individuals, Hispanic individuals, and individuals of other races/ethnicities in the county; percentage of rural population; unemployment rate; logarithm of median household income; state fixed effects; and year and month fixed effects. The middle panel shows the regression results by month group. Only admissions occurred during the listed months were included. The regressions also included all variables listed above plus age group indicators. The bottom panel shows the regressions by diagnosis. Pneumonia cases exclude those caused by tuberculosis. Renal failure cases include acute and unspecified cases. The control variables included in the regressions were the same as in the middle panel.

as the principal diagnoses experienced higher mortality during the pandemic than in 2019. No significant change was found in the mortality rate for heart failure, AMI, acute and unspecified renal failure, or cerebral infarction.

DISCUSSION

The COVID-19 pandemic brought unprecedented challenges to hospitals and health systems. Although central attention has been paid to the care and outcomes of patients with COVID-19, it is also vital to monitor the quality of routine hospital care and discharge outcomes among non-COVID-19 patients. This study uses insurance claims data and quantifies the changes in mortality and disposition at discharge among all and non-COVID-19 patients. Before the pandemic, the overall in-hospital mortality rate for all inpatient stays remained at or under 2.0% from 2009 to 2019.^{18,19} With this stable pretrend, the increased mortality was clearly due to the onset of the pandemic. The findings confirm the concern that hospital outcomes were compromised during the pandemic, after adjusting for patient mix, admission characteristics, and county-level sociodemographic characteristics. The pandemic increased the odds of in-hospital death (or in-hospital death and discharge to hospice) among not only COVID-19 patients but also non-COVID-19 patients. As the share of COVID-19 patients

in a hospital increased, the odds of in-hospital death increased among all patients as well as non-COVID-19 patients. The effects were more pronounced among patients 45 years and older and were also stronger during the months in which COVID-19 cases surged. The finding of increased mortality among non-COVID-19 patients with septicemia and pneumonia during the pandemic is largely consistent with evidence from the United States and other countries.^{8,20-22} Although this study found no significant changes in outcomes among patients with heart failure, AMI, acute and unspecified renal failure, or cerebral infarction, which aligns with the findings of some studies,^{23,24} there is also evidence suggesting increased mortality^{20,22} or time-varying mortality for some or all of those conditions.^{8,21}

The reasons for compromised hospital outcomes among non-COVID-19 patients during the pandemic are multifaceted. Patients hospitalized during the pandemic could be sicker than those in the prepandemic period because of delayed or forgone care in the initial phase of the pandemic.^{25,26} Resource strain, such as shortages of staff, medical supplies, and hospital beds,²⁷ could also affect patient care. In this study sample, non-COVID-19 patients were younger, with slightly lower Elixhauser scores and a lower share of emergent/urgent admission

(data not shown) during the pandemic than in the prepandemic period, which shows no sign of a sicker patient population during the pandemic. The study also incorporated hospital capacity data from HHS and tested its association with mortality rates. Among a subset of hospitals that matched with HHS hospital capacity data, intensive care unit (ICU) bed occupation rate was significantly associated with mortality (result not shown), supporting resource strain as a dominant mechanism for the increased mortality among non-COVID-19 patients. Such an association is also in line with existing studies, which found ICU bed use to be an important indicator of hospital strain and a strong predictor of increased mortality and worsened health outcomes.²⁸⁻³⁰

The results on disposition at discharge reflect the extent to which hospitals might have leveled load demand to balance patient flow. This study found that hospital-to-hospital transfers were not more common during the pandemic. Discharges to SNFs declined, possibly due to the already high incidence of COVID-19 in nursing homes. Only the odds of discharge to home care had a small increase since the onset of the pandemic. Overall, there were no sizable changes in the odds of transfers, thus no evidence supporting that hospitals level-loaded demand on a large scale. Compared with SNFs and other inpatient facilities, home care appears to be a promising alternative setting of care delivery during the pandemic. The results echo a

reported preference shift from SNF to home care among patients and providers during the pandemic.³¹

Limitations

This study has limitations. First, the data from the insurance claims database may not be nationally representative. Therefore, we compared patient characteristics, monthly patient volume shares, and in-hospital mortalities in our 2019 data with those in the 2018 NIS from HCUP. The result shows that patient and hospitalization characteristics in our data largely resemble those in the NIS sample (eAppendix Table [available at ajmc.com]). The shares of monthly volumes and in-hospital death rate were also similar in the 2 data sets. Second, some patient characteristics, such as race/ethnicity and payer type, were not available in the data. Thus, analyses related to racial/ethnic groups and insurance status were not possible. Last, the study did not examine some alternative hospital outcome measures, such as length of stay, 30-day mortality, and readmission rates, due to the lack of data or data limitations. Because these measures may also respond to hospital practice changes during the pandemic, future research is warranted to assess outcome measures like these.

CONCLUSIONS

The study is among the first to quantify the impact of COVID-19 surges on hospital discharge outcomes, particularly among non-COVID-19 patients. Increased mortality odds among non-COVID-19 patients imply that the quality of care was compromised as hospitals fought against COVID-19. Although no sizable changes were found in the odds of discharges to other hospitals, the growth of discharges to home care shows the promise of home health care as an alternative care option during the pandemic. As the pandemic evolves, it is vital to have timely feedback on patient outcomes to help providers maintain and improve quality of care and learn for the future. ■

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eAppendix Table. Patient and Hospitalization Characteristics of Admissions in 2019 Study Data and 2018 HCUP National Inpatient Sample

	2019 study data		2018 HCUP NIS sample	
	Mean	Std. Error of mean	Mean	Std. Error of mean
Female	0.55	<0.01	0.56	<0.01
Age	47.71	0.04	49.88	0.20
Age group, %				
<1	10.85		11.33	
1-17	4.42		3.49	
18-44	27.15		23.76	
45-64	25.26		24.15	
65-84	25.26		29.17	
85+	7.07		8.09	
In-hospital death	0.02	<0.01	0.02	<0.01
Admission on a weekend	0.22	<0.01	0.21	<0.01
Admission month, %				
Jan	8.37		8.95	
Feb	7.68		7.90	
Mar	8.41		8.52	
Apr	7.97		8.17	
May	8.26		8.47	
Jun	7.82		8.13	
Jul	8.42		8.34	
Aug	8.7		8.52	
Sep	8.52		8.02	
Oct	8.76		8.52	
Nov	8.27		8.10	
Dec	8.82		8.26	

Note: 2018 HCUP National Inpatient Sample (NIS) statistics were adapted from HCUP Weighted Summary Statistics Report: NIS 2018 Core File.