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## Racial Disparities in Potentially Avoidable Hospitalizations During the COVID-19 Pandemic

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### Abstract

**Introduction:** Potentially avoidable hospitalizations are disproportionately experienced by racial and ethnic minorities and expose these groups to unnecessary iatrogenic harm (including the risk of nosocomial COVID-19) and undue financial burden. In working toward an overarching goal of eliminating racial and ethnic health disparities, it is important to understand whether and to what extent potentially avoidable hospitalizations have changed by race and ethnicity during the COVID-19 pandemic.

**Methods:** This single-center pre–post study included patients admitted to any UCLA Health hospital for an ambulatory care–sensitive condition between March–August 2019 (prepandemic period) and March–August 2020 (postpandemic period). Investigators measured the change in number of potentially avoidable hospitalizations (defined per the Agency for Healthcare Research and Quality guidelines) stratified by race and ethnicity, and calculated 95% CIs for these hospitalizations using a cluster bootstrap procedure.

**Results:** Between March 1 and August 31, 2020, 347 of 4,838 hospitalizations (7.2%) were potentially avoidable, compared with 557 of 6,248 (8.9%) during the same 6-month period in 2019. Potentially avoidable hospitalizations decreased by 50.3% (95% CI=41.2%, 60.9%) among

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non-Hispanic Whites, but only by 8.0% (95% CI= -16.2%, 39.9%) among African Americans (50.3% vs 8.0%,  $p=0.015$ ).

**Conclusions:** Racial disparities in potentially avoidable hospitalizations increased during the COVID-19 pandemic at a large urban health system. Given that pre-pandemic rates of potentially avoidable hospitalizations were already higher among racial and ethnic minorities, especially African Americans, this finding should cause alarm and lead to further exploration of the complex factors contributing to these disparities.

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## INTRODUCTION

The fear of nosocomial transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has caused many patients to avoid both inpatient and outpatient care during the coronavirus disease 2019 (COVID-19) pandemic.<sup>1,2</sup> Although a portion of forgone hospitalizations likely represent emergent conditions that dangerously go untreated,<sup>3,4</sup> a subset may be accounted for by conditions that could be treated appropriately in the outpatient setting but have been treated historically in the hospital. The latter group falls into the category of potentially avoidable hospitalizations, which the Agency for Healthcare Research and Quality defines as admissions for any ambulatory care-sensitive condition (ACSC) that could be avoided by timely outpatient management.<sup>5</sup> Avoidable hospitalizations are associated with preventable iatrogenic harm (including nosocomial infection) and unnecessary healthcare expenditures.<sup>6</sup>

Racial and ethnic disparities in the rates of potentially avoidable hospitalizations predate the pandemic and are markers for unequal access to outpatient care.<sup>7, 8, 9</sup> Given that racial and ethnic disparities in hospitalization rates exist among patients with COVID-19,<sup>10,11</sup> it is hypothesized that the pandemic would exacerbate inequities in access to care manifested by unequal reductions in potentially avoidable hospitalizations by race/ethnicity. If true, this finding would reveal a new way in which racial and ethnic minorities are exposed to higher rates of unnecessary iatrogenic harm and undue financial burden, the former being particularly detrimental during a pandemic.

A better understanding of new pathways through which systemic healthcare inequities may be propagated during the COVID-19 pandemic is important to set the stage for health policies to address such racial and ethnic disparities.<sup>12</sup> To this end, this study: (1) measures the number and change in potentially avoidable hospitalizations during the pandemic and (2) examines whether and to what extent these changes vary by race and ethnicity.

## METHODS

This pre-post study included all patients without COVID-19 admitted under inpatient status to a nonintensive care unit internal medicine service (N=12,089) at a UCLA Health hospital (2 tertiary care hospitals serving all payors and populations, both with large urban, suburban, and rural catchment areas). Patients with missing or unspecified racial/ethnic data were excluded ( $n=1,003$ , 8.3%), yielding 11,086 patients. The postpandemic period spanned March 1–August 31, 2020, and the prepandemic period spanned March 1–August 31, 2019 to adjust for illness seasonality. The analysis included Asian, non-Hispanic Black/African

American (referred to as African American in the remaining part of this paper), Hispanic/Latinx (referred to as Latinx in the remaining part of this paper), and non-Hispanic White racial/ethnic groups; all other racial/ethnic identities experienced <10 admissions for ACSCs during the postpandemic period and were excluded. Race/ethnicity is self-reported and is entered into the electronic health record at the time of profile creation.

Per the Agency for Healthcare Research and Quality guidelines,<sup>5</sup> investigators calculated potentially avoidable hospitalizations using UCLA Health data from discharges with a principal ICD-10-CM code for any 1 of the following 6 ACSCs: chronic obstructive pulmonary disease/asthma, hypertension, congestive heart failure, community-acquired pneumonia, diabetes complications/uncontrolled diabetes, and urinary tract infection ( $n=904$ ). Diabetes-related lower extremity amputation was excluded because this study did not include surgical services.

Percentage changes in the number of avoidable hospitalizations were evaluated using a cluster bootstrap procedure, clustering at the level of patients, with 100,000 bootstrap samples. The authors calculated the 95% CIs for overall and differential changes between racial/ethnic groups. The  $p$ -values were obtained by inverting the bootstrap CIs using a 2-sided 0.05 significance level. Analyses were performed using R, version 3.6.2.

## RESULTS

Patients admitted for ACSCs during the COVID-19 pandemic were younger and less often female than those admitted pre-pandemic (Table 1).

Between March 1 and August 31, 2020, 347 of 4,838 hospitalizations (7.2%) were potentially avoidable, compared with 557 of 6,248 (8.9%) during the same 6-month period of 2019 (Table 2). Reductions in potentially avoidable hospitalizations among non-Hispanic White (−50.3%, 95% CI= −60.9%, −41.2%,  $p<0.001$ ) and Latinx (−32.3%, 95% CI= −59.8%, −12.2%,  $p<0.001$ ) patients were statistically significant, whereas reductions among African American (−8.0%, 95% CI= −39.9%, 16.2%) and Asian (−16.1%, 95% CI= −75.7%, 20.4%) patients were not statistically different from 0% (Table 2). The relative differences in magnitudes of reduction were only statistically significant between African American and non-Hispanic White patients ( $p=0.015$ ).

In a small-sample exploratory analysis (Table 3), admissions for 3 ACSCs exhibited particularly discordant changes between non-Hispanic Whites and African Americans during the pandemic: congestive heart failure (−55% vs −15%), diabetes (−58% vs 127%), and pneumonia (58% vs 700%).

## DISCUSSION

Racial disparities in potentially avoidable hospitalizations increased during the COVID-19 pandemic at this large urban health system. The absolute magnitude of difference between non-Hispanic Whites and African Americans was large (50% vs 8%) and significant. Furthermore, the relative change in potentially avoidable hospitalizations as a percentage of total hospitalizations increased among African Americans but decreased among non-

Hispanic Whites (1.8% vs -2.9%). Given that the prepandemic rates of potentially avoidable hospitalizations are already higher among racial and ethnic minorities, especially among African Americans,<sup>7, 8, 9</sup> this finding should cause alarm and lead to the further exploration of the complex factors contributing to these disparities. These findings suggest that without careful consideration of these factors, well-intended one-size-fits-all efforts to reduce potentially avoidable hospitalizations could further widen the disparities.

There are several hypotheses that may explain the unequal reductions in potentially avoidable hospitalizations. Non-Hispanic White patients may be more able to shift the management of ACSCs to the outpatient setting as a result of better functional access to care (e.g., differing types of employment, transportation) and other social determinants of health that are unequally distributed through persisting structural racism.<sup>13</sup> In addition, racial and ethnic minority patients likely present to the hospital with greater severity of disease and comorbidities due to weathering (the lifetime cumulative exposure to socioeconomic disadvantage and discrimination),<sup>14</sup> thereby necessitating admission even during the COVID-19 pandemic. It also is possible that this finding reflects a disproportionate increase in the number of emergency department visits by members of racial and ethnic minorities, given that they receive a greater portion of their health care through emergency departments relative to non-Hispanic Whites.<sup>15</sup> Thus, these disparate reductions in potentially avoidable hospitalizations likely result from complex interactions of longstanding racial and ethnic inequities for the social determinants of health. These hypotheses can neither be confirmed nor refuted in this brief report and require further investigation.

Although many of the samples in the exploratory analysis are too small to interpret meaningfully, they suggest that admission for congestive heart failure, diabetes, and pneumonia may be major contributors to this disparity, and so may be of particular interest in future research and health policy.

### Limitations

First, as noted previously, this brief report does not incorporate many of the known medical and nonmedical contributors to health and health disparities. Future investigations should examine the role of comorbidities and socioeconomic factors. Second, this analysis assumed a common population pool of patients between the 2 time periods. Third, the sample size was relatively small and was from a single health system. Fourth, avoidable hospitalizations do not elucidate the underlying causes of system inefficiencies and rely on ICD-10 codes. Finally, given the rates of false-negative SARS-CoV-2 tests,<sup>16</sup> a portion of pneumonia admissions that disproportionately burdened African Americans could have been undetected COVID-19 and therefore could have been misclassified as potentially avoidable hospitalizations.

### CONCLUSIONS

The current data indicate that potentially avoidable hospitalizations decreased more among non-Hispanic Whites compared with African Americans during the first 6 months of the COVID-19 pandemic, suggesting that African Americans are relatively overburdened by these types of admissions and their associated risks (e.g., nosocomial infection). These

findings also uncover a previously unidentified way in which the pandemic may be exacerbating pre-existing healthcare disparities (possibly including access to outpatient care), and may inform future research and health policy that seek to address racial and ethnic health inequities.

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**Table 1.**

Basic Demographics for All Patients During Pre-Pandemic (March–August 2019) and Pandemic (March–August 2020) Times

Variable	Admissions for ACSCs			All admissions		
	Pre-pandemic	Pandemic	<i>p</i> -value <sup>a</sup>	Pre-pandemic	Pandemic	<i>p</i> -value <sup>a</sup>
Age, years	70.9	66.6	<b>0.001</b>	67.0	66.1	<b>0.014</b>
Female, n (%) Admissions, n	293 (52.6)	158 (45.5)	0.053	3,150 (50.4)	2,380 (49.2)	0.29
African American	100	92	–	791	637	–
Asian	31	26	–	580	439	–
Latinx	96	65	–	1,272	1,153	–
Non-Hispanic White	330	164	–	3,605	2,609	–
Total	557	347	–	6,248	4,838	–

Note: Boldface indicates statistical significance ( $p < 0.05$ ).

<sup>a</sup>*P*-values for changes in admissions by race/ethnicity are calculated from bootstrap CIs and presented in Table 2.

ACSC, ambulatory care-sensitive condition.



**Table 2.**

Number of Potentially Avoidable Hospitalizations Stratified by Race/Ethnicity During Pre-Pandemic and Pandemic Times

Race/Ethnicity	Pre-pandemic <sup>a</sup> n (%)	Pandemic <sup>a</sup> n (%)	Absolute % change (95% CI) <sup>b</sup>	Intra-group p-value <sup>c</sup>	Inter-group p-value <sup>d</sup>
African American	100 (12.6)	92 (14.4)	-8.0 (-39.9, +16.2)	0.56	<b>0.015</b>
Asian	31 (5.3)	26 (5.9)	-16.1 (-75.7, +20.4)	0.47	0.22
Latinx	96 (7.5)	65 (5.6)	-32.3 (-59.8, -12.2)	<b>&lt;0.001</b>	0.20
Non-Hispanic White	330 (9.2)	164 (6.3)	-50.3 (-60.9, -41.2)	<b>&lt;0.001</b>	-
Total	557 (8.9)	347 (7.2)	-37.7 (-47.1, -29.3)	<b>&lt;0.001</b>	-

Note: Boldface indicates statistical significance ( $p < 0.05$ ).

<sup>a</sup>Number of potentially avoidable hospitalizations, numbers in parentheses are percent of total admissions for that race/ethnicity during that period.

<sup>b</sup>In number of potentially avoidable hospitalizations from pre-pandemic to pandemic times.

<sup>c</sup>Testing if absolute % change is statistically different from 0% within each racial/ethnic group.

<sup>d</sup>Comparing absolute % change to that of non-Hispanic White patients.

**Table 3.**

Number of Admissions for ACSCs During the Early COVID-19 Pandemic (March–August 2020) Stratified by Race<sup>a</sup>

Variable	African American n (%)	Asian n (%)	Latinx n (%)	White <sup>b</sup> n (%)	Total n (%)
CHF	47 (–15)	12 (–14)	26 (–41)	70 (–55)	155 (–42)
COPD/asthma	4 (–77)	6 (+20)	5 (–44)	13 (–71)	28 (–63)
Diabetes	25 (+127%)	2 (0)	17 (+6)	33 (–58)	77 (+20)
Hypertension	5 (–17)	0 (–100)	2 (–75)	8 (–11)	15 (–40)
Pneumonia	8 (+700)	1 (–67)	4 (–50)	18 (–58)	31 (–44)
UTI	3 (–70)	5 (0)	11 (0)	22 (–49)	41 (–41)
Total	92 (–8)	26 (–16)	65 (–32)	164 (–50)	347 (–38)

<sup>a</sup>Numbers in parentheses represent the absolute percent change from pre-pandemic times for that specific ACSC and race/ethnicity.

<sup>b</sup>Non-Hispanic White.

ACSC, ambulatory care-sensitive condition; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; UTI, urinary tract infection.

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