The Unequal Burden of COVID-19 Deaths in Counties With High Proportions of Black and Hispanic Residents

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Background: Understanding the current burden of coronavirus disease 2019 (COVID-19) deaths in vulnerable populations will help inform efforts by policymakers to address disparities in COVID-19 outcomes.

Objective: The objective of this study was to examine the association between COVID-19 deaths and the county-level proportions of non-Hispanic Black and Hispanic residents.

Research Design and Methods: A retrospective study using COVID-19 mortality data from USA Facts linked to data from the US Census Bureau, the Health Resources & Services Administration Area Health Resources file, and the US Census Bureau. Negative binomial regression was used to estimate the association between the total county COVID-19 deaths during consecutive 30-day intervals and the proportion of non-Hispanic Blacks and Hispanic residents after adjusting for resident demographics, comorbidity burden, rurality, social determinants of health, and health care resources.

Results: In April, counties (n = 179) with > 40% Blacks had 6-fold higher death rates than counties (n = 1521) with <2% Blacks [incident rate ratio (IRR) = 6.58, 95% confidence interval (CI): 3.29–13.2, $P < 0.001$]. These counties had higher death rates until October, but were no different than referent counties in November. In April, death rates in counties with > 40% Hispanic residents were similar to death rates in counties with <2% Hispanic residents. Death rates in these counties peaked in August (IRR = 3.14, 95% CI: 1.69–5.82, $P < 0.001$) but were also no different than referent counties in November. These effects were robust after adjusting for county-level characteristics. Before August, death rates differed little by insurance status, but since then, counties with > 15% uninsurance rates had up to 2-fold higher mortality rates (IRR = 1.97, 95% CI: 1.19–3.27, $P < 0.001$) than counties with <5% uninsurance rates.

Conclusion: Counties with high concentrations of non-Hispanic Blacks were disproportionately affected by COVID-19 throughout most of the pandemic, but other social determinants of health such as health insurance are now playing a more prominent role than race and ethnicity.

Key Words: healthcare disparities, COVID-19, quality of health care

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There is a long history of racial inequity in the United States. Although coronavirus disease 2019 (COVID-19) was at first expected to be color-blind, it is clear that Blacks are disproportionately affected by COVID-19 compared with less socially vulnerable populations.[1] Using data from 203,434 deaths, of which race and ethnicity information on COVID-19 deaths was available for 78% of all deaths, the Centers for Disease Control and Prevention (CDC) reported that 18.3% of the decedents were non-Hispanic Blacks, while Blacks make up 12.3% of the US population.[2,3]

There are many possible causes for this disparity. One leading hypothesis is that Blacks are more likely to suffer from severe underlying conditions that predispose them to worse COVID-19 outcomes. However, Whites are more likely than Blacks to have risk factors identified by the CDC as being associated with severe COVID-19.[4] In the UK, analyses based on electronic health records on 17 million adults showed that Blacks were twice as likely to die from COVID-19 even after adjusting for a wide range of comorbidities, including cardiovascular disease, respiratory disease, asthma, neurological and autoimmune conditions.[5] The second possible explanation for COVID-19 disparities is that Blacks have a higher risk of exposure to COVID-19 infection (and hence of dying from COVID-19) because they are less able to socially distance and self-isolate. In particular, Blacks and Hispanics live in areas with higher housing density and in multigenerational households with elderly parents.

Blacks and Hispanics are more likely to use public transportation and work as essential workers in public-facing industries such as the health sector, public safety, public transit, and the food industry.[6–9] The third explanation for

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COVID-19 disparities is that Blacks may be more likely to delay care for suspected COVID-19 infections because they are more often uninsured. Furthermore, Blacks with severe COVID-19 infections are more frequently hospitalized in safety-net hospitals which had worse outcomes even before the pandemic, and may now lack the resources to increase physical beds and staffing to respond adequately to surges in COVID-19 patients.[10]

Although there is now extensive literature and commentary showing that Blacks are disproportionately affected by COVID-19,[11–14] prior studies have not examined the dynamic nature of the COVID pandemic. COVID has affected different parts of the country in waves, and the impact of COVID on Blacks, Hispanics, and other socially disadvantaged populations may have changed over time. Dynamic analyses may provide actionable data for addressing disparities in COVID-19 deaths at the local level in near real time compared with cumulative analyses that may not reflect the current impact of COVID-19. Such dynamic area-level analyses may also be useful for understanding the role of the social determinants of health such as racial segregation, poverty, lack of insurance, and employment type, and how these change over time. The objective of this study is to examine the association between COVID-19 deaths over time and the county-level proportions of non-Hispanic Black (hereafter referred to as Black) and Hispanic residents. Because of the dynamic nature of the pandemic, we examined the unconditional and conditional association between COVID-19 deaths and race and ethnicity over time using stratified analyses. We also examined the extent to which uninsurance levels, poverty, and the proportion of essential workers contribute to COVID-19 deaths. Further evidence that counties with large socially disadvantaged populations have disproportionately high COVID-19 death rates may prompt policymakers to provide those communities with additional health care resources to meet current surges in COVID-19 infections, as well as laying the foundation for a more successful public health strategy to protect the most vulnerable populations in future public health emergencies.

METHODS

Data

This study was conducted using data from USA Facts on all 50 US states between March 1, 2020, and November 13, 2020.[15] This publicly available dataset has been previously validated using data from the Johns Hopkins University Center for Systems Science and Engineering.[16] We used the USA Facts data because this dataset reports each of the New York City counties separately, whereas the Johns Hopkins dataset reports data from all New York City counties as a single entity.[17] This dataset includes state and county identifiers and the cumulative number of COVID-19 deaths each day based on data from the CDC and public health departments.[13] This dataset was merged with data from the US Census Bureau,[18] Health Resources & Services Administration Area Health Resources File,[19] US Department of Agriculture,[20] Centers for Medicare & Medicaid Services (CMS) Geographic Variation Public Use File,[21] and the American Community Survey[22] (Supplemental Digital Content, Table 1, http://links.lww.com/MLR/C208). We did not submit this project to our institutional review board because our analyses are based on publicly available de-identified aggregated data that can be directly downloaded from the web without a data use agreement.

Study Sample

We identified 3144 counties in 50 states and Washington, DC, and excluded 18 because of missing data (Supplemental Digital Content, Fig. 1, http://links.lww.com/MLR/C208). The final analytic dataset consisted of 3126 counties.

Statistical Analysis

We separately examined the association between the total number of COVID-19 deaths during consecutive 30-day intervals and the county-level proportion of Black and Hispanic residents using negative binomial regression analysis for each 30-day interval between April 14 and November 14. We based this analysis on mortality data instead of case counts because disparities in testing availability could underestimate the impact of COVID on Black and Hispanic populations.[14] We treated the period between March 1 and April 14 as a single time interval despite spanning >30 days, and refer to this as the "April" cohort. Hereafter, we refer to each of the separate 30-day intervals by month for simplicity. We specified the county percentage of Black and Hispanic residents as categorical variables because we assumed that the association between the number of COVID-19 deaths and these variables of interest would be nonlinear. We did not divide counties into quartiles because the first, second, and third quartiles had percentages of Black residents that were lower than the overall proportion of Blacks in the general population (13.4%). Using quartiles as cutoffs could have led us to underestimate the association between COVID deaths and the county-level proportion of Blacks because most counties would have fewer Blacks than the US average. Instead, we chose cutoffs (0%–2%, 2.1%–4%, 4.1%–10%, 10.1%–20%, 201.1%–40%, and 40.1%–%) that would allow us to examine the association between COVID deaths and the county proportion of Blacks using a much more granular specification—with the highest category corresponding to the 95th percentile. We first specified a baseline model that only included the county percentage of Black and Hispanic residents. We then estimated multivariable models to generate conditional differences between counties with high proportions of Black and Hispanic residents compared with the referent counties with low proportions of Black and Hispanic residents. The model adjusted for resident demographics (proportion of male residents, residents aged 65 and older), comorbidity burden (average CMS hierarchical condition category score[23] of Medicare beneficiaries), rurality, structural factors [essential workers, use of public transportation, household crowding (percentage of household units with >1 person per room), household poverty], access to health care (uninsurance rates for residents under the age of 65), and county-wide health care resources [primary care doctors per 10,000 residents, hospital beds per 100,000 residents, intensive care unit (ICU) beds per 100,000 residents, and nursing home/skilled nursing beds per 100,000 residents].

We included an offset variable equal to the log of the county population since the number of COVID-19 deaths is proportional to the county population. Because county death rates within the same state may not be independent, we used cluster robust variance estimators using the state as the unit of clustering.[24] We examined model fit by plotting the observed and predicted death counts after dividing the sample into 20 equal-sized groups. We then used the intraclass correlation coefficient to examine the agreement between the observed and predicted death count across these ventiles of risk.

All analyses were performed using STATA 16.1 (StataCorp). We report results as incident rate ratios (IRRs), with *P*-values <0.05 considered statistically significant. To further characterize the association between COVID-19 incident deaths and race and ethnicity, we estimated adjusted death rates per 100,000 residents using average marginal effects. Because this analysis was based on preexisting data with a fixed sample size, no a priori power analysis was performed. We include the STATA code for the main analyses in the Supplemental Digital Content (http://links.lww.com/MLR/C209).

RESULTS

Compared with counties with 10% or fewer Black residents (n = 2338), counties with 10% or more Black residents (n = 788) had fewer residents age 65 and older (17.2% vs. 19.4%; $P < 0.001$), higher comorbidity scores (CMS hierarchical condition category score: 1.03 vs. 0.93, $P < 0.001$), higher population density (553 residents per square mile vs. 117, $P < 0.001$), fewer essential workers (16.5% vs. 20.7%, $P < 0.001$), more workers traveling to work by public transportation (1.55% vs. 0.70%, $P < 0.001$), more families living below the poverty level (15.1%. vs. 10.4%, $P < 0.001$), more uninsured residents (12.8% vs. 11.0%, $P < 0.001$), more ICU beds per 10,000 residents (12.6 vs. 7.96, $P < 0.01$), and more cumulative COVID-19 deaths per 100,000 residents (101 vs. 53, $P < 0.001$) (Supplemental Digital Content, Table 2, http://links.lww.com/MLR/C208). In comparison to counties with 10% or fewer Hispanic residents (n = 2384), counties with >10% Hispanic residents (n = 742) had fewer residents age 65 and older (17.1% vs. 19.3%, $P < 0.001$), higher population density (536 residents vs. 131 residents per square mile, $P < 0.001$), about the same percentage of essential workers (19.8% vs. 19.3%, $P = 0.10$), more workers traveling to work by public transportation (1.92% vs. 0.60%, $P < 0.001$), more household units with >1 person per room (3.79%. vs. 1.98%, $P < 0.001$), more uninsured residents (15.1% vs. 10.3%, $P < 0.001$), fewer hospital beds per 100,000 residents (237 vs. 272, $P < 0.05$), and higher cumulative COVID-19 deaths per 100,000 residents (71 vs. 67, $P = 0.007$) (Supplemental Digital Content, Table 2, http://links.lww.com/MLR/C208).

In April, without any adjustment, counties (n = 179) with >40% Blacks had an incidence risk ratio that was over 6 times that of counties (n = 1521) with <2% Blacks [IRR = 6.58; 95% confidence interval (CI): 3.29–13.2, $P < 0.001$] (Table 1). Counties with a high proportion of Black residents continued to experience much higher death rates until October when the IRR decreased to 2.05 (95% CI: 1.43–2.94, $P < 0.001$), and then in November when the IRR was <1 (IRR = 0.70, 95% CI:

TABLE 1. Risk of COVID-19 Death as a Function of County Percentage of Non-Hispanic Black and Hispanic Residents (Unadjusted)

		IRR (95% CI)								
	Counties	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**
Non-Hispanic Blacks (%)									
0%–2%	1521	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2.1%–4%	363	1.53* (1.06–2.20)	1.78** (1.22–2.59)	1.56** (1.15–2.10)	1.28 (0.86–1.90)	1.07 (0.87–1.32)	1.24* (1.01–1.52)	1.06 (0.86–1.31)	0.74* (0.57–0.97)
4.1%–10%	454	1.73** (1.21–2.49)	2.16*** (1.47–3.19)	1.89*** (1.35–2.65)	1.51* (1.08–2.11)	1.47** (1.12–1.93)	1.42*** (1.16–1.75)	1.08 (0.86–1.34)	0.68** (0.54–0.86)
10.1%–20%	297	2.88*** (1.84–4.52)	2.93*** (1.90–4.51)	2.40*** (1.59–3.64)	2.11*** (1.45–3.06)	2.31*** (1.58–3.37)	1.95*** (1.43–2.67)	1.28 (0.97–1.68)	0.69* (0.52–0.92)
20.1%–40%	312	3.54*** (2.06–6.07)	4.11*** (2.72–6.20)	3.38*** (2.23–5.12)	3.43*** (2.28–5.16)	3.93*** (2.73–5.66)	3.33*** (2.23–4.97)	1.73*** (1.34–2.23)	0.8 (0.59–1.08)
40.1%–%	179	6.58*** (3.29–13.17)	6.18*** (4.10–9.32)	6.84*** (4.76–9.81)	6.58*** (4.48–9.67)	5.81*** (3.66–9.24)	4.10*** (3.02–5.57)	2.05*** (1.43–2.94)	0.70* (0.53–0.93)
Hispanics (%)									
0%–2%	659	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2.1%–4%	878	1.03 (0.73–1.44)	0.87 (0.67–1.14)	0.91 (0.63–1.32)	1.08 (0.78–1.50)	1.17 (0.93–1.46)	1.04 (0.84–1.29)	1.22 (0.94–1.58)	1.14 (0.91–1.42)
4.1%–10%	847	1.00 (0.68–1.47)	1.00 (0.76–1.31)	1.14 (0.77–1.69)	1.27 (0.82–1.97)	1.2 (0.88–1.63)	0.94 (0.74–1.18)	0.91 (0.69–1.21)	0.88 (0.68–1.13)
10.1%–20%	360	1.63 (0.89–2.98)	1.44 (0.93–2.24)	1.52 (0.90–2.57)	1.70 (0.98–2.97)	1.62* (1.06–2.48)	1.03 (0.73–1.44)	0.78 (0.56–1.08)	0.72 (0.52–1.01)
20.1%–40%	230	1.78 (0.83–3.81)	1.47 (0.74–2.91)	1.48 (0.73–3.02)	2.02* (1.14–3.56)	2.52*** (1.53–4.14)	1.15 (0.81–1.64)	0.75 (0.51–1.11)	0.67* (0.46–0.97)
40.1%–%	152	1.17 (0.53–2.59)	1.06 (0.61–1.85)	1.14 (0.61–2.15)	3.30*** (2.03–5.36)	6.46*** (3.36–12.40)	3.33** (1.62–6.86)	1.69 (0.85–3.37)	1.04 (0.57–1.90)

CI indicates confidence interval; COVID-19, coronavirus disease 2019; IRR, incident rate ratio; Ref, reference.
*$P < 0.05$.
**$P < 0.01$.
***$P < 0.001$.

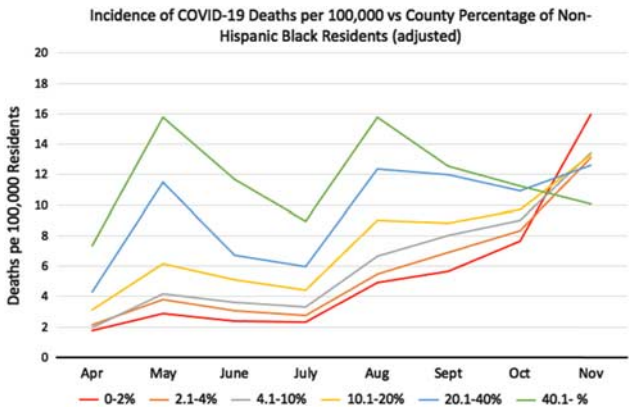

FIGURE 1. Data points represent county-level incident death rates per 100,000 residents as a function of the proportion of non-Hispanic Black residents after adjusting for resident demographics, comorbidity burden, rurality, structural factors, access to health care, and health care resources. COVID-19 indicates coronavirus disease 2019.

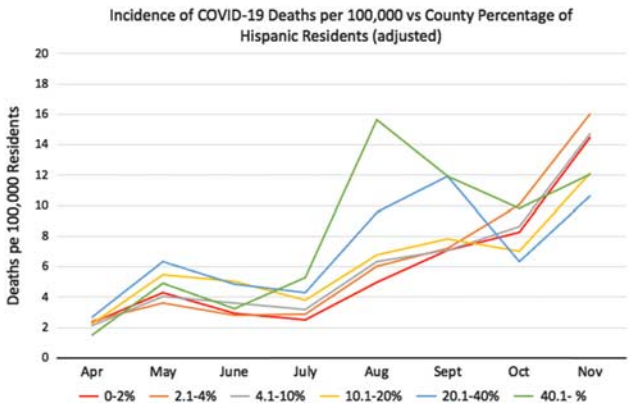

FIGURE 2. Data points represent county-level incident death rates per 100,000 residents as a function of the proportion of Hispanic residents after adjusting for resident demographics, comorbidity burden, rurality, structural factors, access to health care, and health care resources. COVID-19 indicates coronavirus disease 2019.

0.53–0.93, $P < 0.05$) (Table 1, Supplemental Digital Content, Fig. 2, http://links.lww.com/MLR/C208). After adjusting for resident demographics, comorbidity burden, rurality, social determinants of health, access to health care, and health care resources, we continued to find that predominantly Black counties had substantially higher COVID death rates compared with the referent until October (Fig. 1, Supplemental Digital Content, Table 3, http://links.lww.com/MLR/C208).

In comparison, at the beginning of the pandemic, death rates in counties with >40% Hispanic residents were similar to death rates in counties with <2% Hispanic residents (IRR = 1.17, 95% CI: 0.53–2.59, $P > 0.05$) (Table 1, Supplemental Digital Content, Fig. 3, http://links.lww.com/MLR/C208). Starting in July, death rates in counties with 40% or more Hispanic residents began to rise, peaked in August (IRR = 6.46, 95% CI: 3.36–12.4, $P < 0.001$), and then declining in November to be similar to counties with the fewest Hispanics (IRR = 1.04, 95% CI: 0.57–1.90, $P > 0.05$). After adjusting for county-level covariates (described above), death rates were similarly elevated in counties with high proportions of Hispanic residents, but to a lesser extent (Fig. 2, Supplemental Digital Content, Table 3, http://links.lww.com/MLR/C208).

We also found that at the beginning of the pandemic, counties with higher proportions of workers using public transportation had higher death rates early on (April, IRR: 5.79, 95% CI: 2.90–11.57, $P < 0.001$), and then lower rates of death later in the pandemic (Supplemental Digital Content, Table 3, http://links.lww.com/MLR/C208). In comparison, while counties with higher proportions of essential workers did not have higher rates of death early on in the pandemic, death rates in these counties were about 2-fold higher compared with counties with the lowest percentage of essential workers in October and November (November, IRR: 2.56, 95% CI: 1.96–3.33, $P < 0.001$) (Fig. 3, Supplemental Digital Content, Table 3, http://links.lww.com/MLR/C208). We also found that early in the pandemic, county rates of household poverty and uninsurance were not associated with the death rate. However, starting in August, counties with larger proportions of households in poverty and lower uninsurance rates experienced higher death rates. In November, counties with rates of household poverty exceeding 20% had nearly 2-fold higher rates of death (IRR = 1.87, 95% CI: 1.36–2.58, $P < 0.001$), and counties with >15% uninsurance had 50% higher rates of death (IRR = 1.49, 95% CI: 1.04–2.14, $P < 0.05$) (Fig. 4, Supplemental Digital Content, Table 3, http://links.lww.com/MLR/C208).

The fully adjusted models were well-calibrated based on the comparison of the observed and predicted number of deaths after dividing counties into 20 equal-sized groups (Supplemental Digital Content, Fig. 4, http://links.lww.com/MLR/C208), with intraclass correlation coefficients of 0.99 for all models based on the comparison of the observed and predicted deaths across the 20 ventiles.

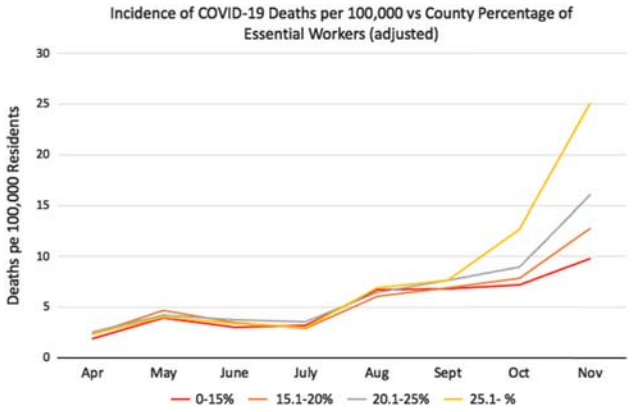

FIGURE 3. Data points represent county-level incident death rates per 100,000 residents as a function of the proportion of essential workers after adjusting for resident demographics, comorbidity burden, rurality, structural factors, access to health care, and health care resources. COVID-19 indicates coronavirus disease 2019.

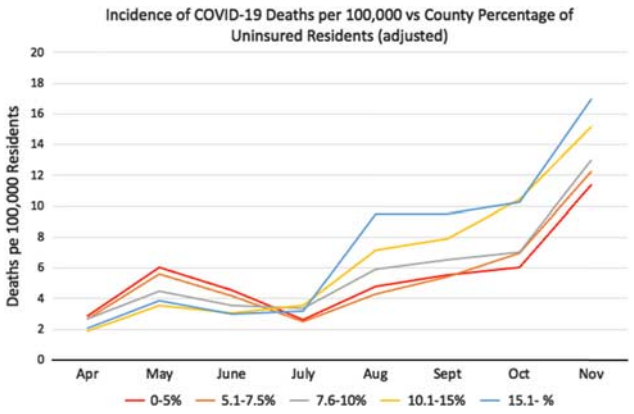

FIGURE 4. Data points represent county-level incident death rates per 100,000 residents as a function of the proportion of uninsured individuals under the age of 65 after adjusting for resident demographics, comorbidity burden, rurality, structural factors, access to health care, and health care resources. COVID-19 indicates coronavirus disease 2019.

DISCUSSION

COVID-19 has affected communities of color and other socially disadvantaged populations differently over time. At the beginning of the pandemic, counties with the highest proportion of Black residents had 4- to 6-fold higher mortality rates compared with counties with the lowest proportion of Blacks. Counties with the highest proportion of Hispanic residents saw a sharp rise in COVID deaths during the Summer months. These disparities were attenuated after adjusting for county-level measures of demographics, comorbidity burden, household poverty, essential workers, household crowding, and uninsurance levels. Mortality rates in counties with few Black and Hispanic residents have increased over time and are now similar to counties with high proportions of Blacks and Hispanics. In this more recent pandemic phase, other social determinants of health are more strongly associated with disparities in mortality. Until July, counties with the highest levels of uninsurance and essential workers had death rates similar to counties with fewer essential workers and low levels of uninsurance, but then experienced up to 2-fold higher rates of COVID deaths beginning in August and October, respectively.

Our findings are consistent with earlier studies showing that counties with higher proportions of Black and other socially vulnerable populations have higher numbers of COVID-19 cases and deaths.[1,13,14,25–27] In addition, our study may explain the CDC findings, based on data from 159,778 deaths, that Hispanics were not more likely to die from COVID than Whites: Hispanics constitute 18.5% of the population[28] and account for 14.7% of deaths.[2] Our study shows that counties with high proportions of Hispanic residents had disproportionately higher death rates in July, August, and September, but not at the beginning of the pandemic, nor more recently. Thus, our study builds on prior research by showing that the racial and sociodemographic disparities that became evident early in the pandemic have evolved and changed over time. In particular, counties' racial and ethnic makeup is not driving area-level COVID death rates in the most recent months included in this analysis. Instead, county levels of household poverty, lack of insurance, and essential workers are now most strongly associated with the COVID mortality rate.

Although disparities in COVID-19 deaths may not be surprising, the sheer magnitude of these disparities should alert US policymakers to the urgent need to address potential causes of this extreme level of disparity. Racial and socioeconomic disparities in health outcomes are longstanding and have been extensively documented. Black males have the shortest life expectancy compared with all other racial and ethnic groups.[7] There is a shocking 15-year gap in life expectancy between the richest and the poorest people in the United States.[29] Our finding that counties with the highest levels of uninsurance have 50% or higher rates of COVID-19 deaths demonstrates that health insurance may be an important determinant of COVID-19 outcomes. One possible remedy is for states that have not yet expanded Medicaid access to urgently reconsider their decision given the association between uninsurance and COVID-19 deaths. Our findings likely underestimate the true impact of the lack of insurance since our analysis did not account for the early jump in the unemployment rate from 3.7% to 11.1%[30] and the fact that unemployed persons are 2.5 times as likely to be uninsured compared with employed persons.[31] The need to expand Medicaid access in nonexpansion states is underscored by the 13.8% insurance gap between employed and unemployed persons in expansion states compared with the 22.6% gap in nonexpansion states.[32]

It is noteworthy that counties with the highest proportion of essential workers now have the highest COVID death rates. In particular, lower-paid health care workers who work with the elderly may not seek health care even after contracting COVID-19 because they lack health insurance and may continue to work while sick because they do not have paid sick leave[33]: 11.5% of nursing home staff and 14.9% of home care workers are uninsured, and 26.6% of health care workers with direct patient contact have risk factors predisposing them to poor COVID-19 outcomes.[34] Policymakers should prioritize extending insurance coverage to uninsured health care workers, not only as a matter of fairness but also because it may reduce the spread of COVID-19 among vulnerable older persons who reside in nursing homes or rely on assistance from home care workers at home.

We also found that household crowding was associated with increased numbers of COVID-19 deaths. One fourth of the US population occupies dwellings where self-isolation is not possible because they lack sufficient space and bathrooms.[35] Compared with non-Hispanic Whites, Hispanics and Blacks have over 70% higher odds of living in housing units unsuitable for self-isolation.[35] It may be reasonable for policymakers to expand housing assistance to offer people living in such household units access to rooms in underutilized hotels with medical supervision if they need to quarantine.[35] Such a program may help stem the spread of COVID-19 while providing financial support to the hospitality industry and its employees, which as of July 30, 2020, had more than half of the available hotel rooms unoccupied and has sustained job losses of 4.8 million.[36]

Our study was not designed to rigorously evaluate the association between COVID deaths and the availability of health care resources. Our finding that ICU bed availability was associated with COVID-19 mortality should be considered as hypothesis-generating. In theory, communities with fewer ICU beds would be expected to have more COVID-19 deaths because of the essential role of ICUs in managing the severe manifestations of COVID-19.[37] Despite disparities in COVID-19 mortality, communities with more Black residents had greater numbers of ICU beds per 10,000 residents—which may be due, in part, to the fact that counties with more Black residents also had much greater population densities. In contrast, Kanter et al[38] recently reported that lower-income communities have fewer ICU beds than higher-income communities after aggregating zip codes into health services area. It is possible that we found no association between ICU bed capacity and COVID-19 deaths because our analyses were at the county-level, instead of health service areas that aggregate zip codes to the areas where residents receive most of their hospital care. It is also possible that ICUs in counties with more Black and Hispanic residents may have been overwhelmed by COVID-19 admissions despite having more ICU beds because of the disproportionate numbers of infections in minority residents. Even if communities of color have adequate numbers of ICU beds, the resources (such as ventilators and nurse staffing) available for hospitals to handle critically ill COVID-19 patients are likely much lower in less affluent minority communities.[10]

Some of the disparities in COVID-19 outcomes may stem from the hospitals where patients receive care. Safety-net hospitals, which treat many of the most vulnerable patients, tend to have worse outcomes compared with other hospitals for many conditions,[39–41] and COVID-19 is probably no exception. Anecdotally, patients in affluent parts of New York City, the initial epicenter of the pandemic, were more likely to access advanced therapies such as heart-lung bypass machines and remdesivir, while minority patients in outlying boroughs were treated in understaffed hospitals and ICUs.[10] Using established ambulance protocols, ambulances took COVID-19 patients from the communities with the greatest number of COVID-19 cases to the nearest hospital leading to hospital overcrowding in the most affected communities with the fewest resources.[10] As discussed by Kanter et al,[38] policymakers should consider changes in emergency medical system protocols: COVID-19 patients should be transported to hospitals with the necessary resources to care for COVID-19 patients, and not to the closest hospital. Hospitals should also be provided with financial incentives to care for vulnerable COVID-19 patents who are more likely to be uninsured and whose cost of care is likely to exceed hospital reimbursement.[38]

Our study has several potential limitations. First, we used an ecological design and conducted this study at the county-level and not at the level of individual residents. Therefore, our results should be interpreted as average county effects. It is currently not possible to perform these analyses at the individual level because national population-based individual resident-level data are not yet available. On the one hand, our findings do not measure the strength of the association between an individual's race, ethnicity, and other social determinants of health and the risk of death from COVID-19. But our findings do reflect the aggregated risk to individuals living in communities with large numbers of Black and other socially vulnerable residents. Since where a person lives may be as important to health outcomes as their individual risk factors, our findings shed important light on how communities with large concentrations of Black and other socially vulnerable individuals fare compared with other communities. Second, many COVID-19 deaths are unreported. Our analysis may underestimate the association between mortality and social vulnerability because COVID-19 deaths are more likely to be underreported in vulnerable populations with inadequate access to health care. Third, although we included many county-level characteristics, there may be other important county-level characteristics that may account for the disparities that we report. However, the unadjusted analysis results are arguably as important as the results of the adjusted analyses because these findings represent the most objective assessment of the impact of COVID-19 on Blacks and Hispanics. Finally, the COVID-19 pandemic is continuing, and our analysis is limited to data up to and including November 14, 2020.

CONCLUSION

Counties with high concentrations of socially vulnerable residents continue to have the highest death rates. However, counties with disproportionate numbers of Black and Hispanic residents no longer have the highest death rates. Instead, counties with high proportions of essential workers and uninsured individuals now have the highest death rates in the United States. In light of these findings, states that have not expanded Medicaid access should reconsider.

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