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Original Study

Race, Ethnicity, and 60-Day Outcomes After Hospitalization With COVID-19

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A B S T R A C T

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Objective: To examine racial and ethnic disparities in clinical, financial, and mental health outcomes within a diverse sample of hospitalized COVID-19—positive patients in the 60 days postdischarge.
Design: A cross-sectional study.
Setting and Participants: A total of 2217 adult patients who were hospitalized with a COVID-19—positive diagnosis as evidenced by test (reverse-transcriptase polymerase chain reaction), a discharge diagnosis of COVID-19 (ICD-10 code U07.1), or strong documented clinical suspicion of COVID-19 but no testing completed or recorded owing to logistical constraints (n=24).
Methods: Patient records were abstracted for the Mi-COVID19 data registry, including the hospital and insurer data of patients discharged from one of 38 participating hospitals in Michigan between March 16, 2020, and July 1, 2020. Registry data also included patient responses to a brief telephone survey on postdischarge employment, mental and emotional health, persistence of COVID-19—related symptoms, and medical follow-up. Descriptive statistics were used to summarize data; analysis of variance and Pearson chi-squared test were used to evaluate racial and ethnic variances among patient outcomes and survey responses.
Results: Black patients experienced the lowest physician follow-up postdischarge (n = 65, 60.2%) and the longest delays in returning to work (average 35.5 days). More than half of hospital readmissions within the 60 days following discharge were among nonwhite patients (n = 144, 55%). The majority of post-discharge deaths were among white patients (n = 153, 21.5%), most of whom were discharged on palliative care (n = 103). Less than a quarter of patients discharged back to assisted living, skilled nursing facilities, or subacute rehabilitation facilities remained at those locations in the 60 days following discharge (n = 48).
Conclusions and Implications: Increased attention to postdischarge care coordination is critical to reducing negative health outcomes following a COVID-19—related hospitalization.

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The COVID-19 pandemic has disproportionately affected Black and Latinx communities in the United States compared with white communities in both morbidity and mortality.[1,2] Hospitalization rates for Black and Latinx patients who have tested positive for COVID-19 are approximately 3 times higher than those of similar white patients (623.6, 698.1, and 210.3 per 100,000 population, respectively).[3] It is

therefore unsurprising that of the 216,635 COVID-19−related deaths in the United States to date for which we have race and ethnicity data available, 29.3% have been Black (34,374) or Latinx (29,063), which correlate with US population norms, in contrast to white persons in the United States, who account for approximately 76% of the population and 61.1% of deaths (132,315).[4,5] Notably, Black and Latinx adults have an increased prevalence of comorbid conditions such as obesity, diabetes, and chronic kidney disease, which have been associated with increased risk of severe illness due to COVID-19.[6−9] Further, significant numbers of Black and Latinx adults have occupations considered essential, requiring close contact with others, and thereby hindering the ability to effectively socially distance, self-isolate, or work from home.[10] Health disparities, or preventable differences in health outcomes, are known to be driven by a variety of economic, environmental, and social factors, including institutional or structural racism and bias in health treatment.[11−13] For example, a recent study by Kilaru et al that evaluated readmissions of patients with COVID-19 among 5 US emergency departments found that Black patients accounted for the majority (56.7%) of readmissions within 72 hours, whereas white patients only accounted for 16.7%.[14] Although it is clear that there are a number of disparities in COVID-19 outcomes for Black and Latinx adults, little is known about posthospitalization medical follow-up and outcomes for patients previously hospitalized with COVID-19. The following study investigates variation in 60-day postdischarge clinical, financial, and mental health outcomes of diverse patients with COVID-19.

Methods

A cross-sectional sample (n = 2217) of patients with confirmed or presumptive COVID-19 who were discharged between March 16, 2020, and July 1, 2020, from one of 38 hospitals participating voluntarily in the Michigan Mi-COVID19 initiative were included in the analysis. The Mi-COVID19 initiative is a multihospital collaborative quality initiative inclusive of 38 nonfederal, noncritical access hospitals throughout Michigan.[15] The participating hospital characteristics are described in detail elsewhere; however, of the 92 noncritical access hospitals in Michigan, 41.3% elected to participate in Mi-COVID19.[16] Participating hospitals were diverse in terms of size, teaching status, and ownership structure. At each hospital, trained clinical abstractors collected a pseudo-random sample of data from medical records of patients meeting the following inclusion criteria: age ≥18 years, positive COVID-19 test via reverse-transcriptase polymerase chain reaction, discharge diagnosis of COVID-19 (ICD-10 code U07.1), or strong documented clinical suspicion of COVID-10 but no testing completed or recording due to logistical constraints (n=24). All eligible patients were included when there was abstractor capacity. In instances where abstractor capacity was limited because of high COVID-19 volumes, a pseudo-randomization procedure was followed in which daily cases were time stamped by discharge and included in order of smallest minute value until capacity was reached. Racial and ethnic data abstracted from medical records included the following categories: Black (African American/Black), American Indian or Alaskan Native, Asian, white (Caucasian/white), Latinx (Hispanic/Latino), Native Hawaiian or Pacific Islander, Hawaiian, or Other. The category of Unknown was used when there was no indication of race or ethnicity in the abstracted medical data. Exclusion criteria included pregnancy, transition to hospice care within 3 hours of admission, and discharges against medical advice. All data were entered into the newly developed Mi-COVID19 patient data registry. In addition, patient insurer data were included in the registry.

Insurer data included documentation of deaths, rehospitalizations, physician visits, and any adverse events in the 60 days post hospital discharge. Further, survey results of a brief telephone questionnaire administered by data abstractors to registry participants alive and not residing in a health care or correctional facility were included in the final data set (Figure 1). Questionnaire variables were based on Michigan Hospital Medicine Safety Consortium (HMS) quality indicators with slight modifications for the patients with COVID-19.[15] Survey questions focused on employment, mental and emotional health, persistence of COVID-19−related symptoms, and physician follow-up. This study was reviewed and approved by the University of Michigan Medical School Institutional Review Board (IRBMED; HUM 00179611).

Statistical Analysis

SAS software version 9.4 (SAS Institute Inc, Cary, NC, USA) was used to complete all data analysis. Descriptive statistics were used to summarize the data whereas analysis of variance and Pearson chi-squared test were used to evaluate racial and ethnic variances among patient outcomes and survey responses.

Results

Of 2217 patients with COVID-19 discharged from 38 various Michigan hospitals, the majority, 52% (n=1156), were nonwhite [Black (n = 1029, 46.4%), Latinx (n = 75, 3.4%), or Asian (n = 52, 2.3%)]. White patients accounted for 40% (n=889) of the sample. An additional 172 patients were listed as other or unknown race. In the 60 days following hospital discharge, a substantial number of patients were rehospitalized (n = 262, 11.8%), remained in extended care facilities such as nursing homes (n = 74, 3.3%), or died (n = 288, 13%). Nonwhite patients accounted for more than half of hospital readmissions (n = 144, 55%); however, the highest percentage of deaths following discharge were among white patients (n = 153, 21.5%)—the majority of whom were discharged on palliative care (n = 103) to extended care facilities. For reference, of 339 patients who were initially discharged to extended care facilities, 123 were living at home prior to their hospital admission. Further, of 302 patients who were initially transferred from skilled nursing facilities to hospitals for COVID-19 treatment (Black n = 101, white n = 183, Latinx n = 5, Asian n = 1, Other/Unknown n = 12) less than half of these patients returned (n = 145; Black 47, 46.5%; white 89, 48.6%; Latinx 2, 40%; other/unknown 6, 50%). The most common COVID-19−related documented causes of death postdischarge were pneumonia (n = 122, 42.4%), refractory hypoxemia (n = 113, 39.2%), and sepsis (n = 67, 23.3%). White patients were most likely to have been documented to die from pneumonia (n = 67, 54.9%, P = .001), whereas refractory hypoxemia was the most common documented cause of death in Black patients (n = 67, 60.4%, P = .027). Table 1 provides additional details on patient location, causes of death, and adverse events in the 60 days following hospitalization with COVID-19.

The survey response rate for participants still alive, not in extended care facilities, prisons, or hospitals was 42.3% (n = 596/1410; Black 297, 43.6%; Asian 11, 26.2%; white 230, 47.6%; Latinx 19, 36.5%; other/unknown 40, 30.1%). Patient survey responses indicate that some patients were unable to return to work because of their health in the 60 days following hospitalization (n = 59, 9.8%). Black patients experienced the longest delays in returning to work (average 35.5 days, range 1-79 days), whereas Latinx patients experienced the shortest delays (average 10.5 days, range 6-15 days). When asked to rate the level of financial impact that COVID-19 had on themselves and their families, nonwhite patients, including those listed as "unknown" or "other," were most likely to report moderate to severe financial effects (n = 86, 64.6%), using all or most of their savings (n = 47, 81.0%), or not being able to cover the cost of necessities (n = 31, 91.2%) compared with white patients. In addition, participants were asked if they sought care since discharge for any mental health concerns such as depression or anxiety; only 6% of respondents across racial and
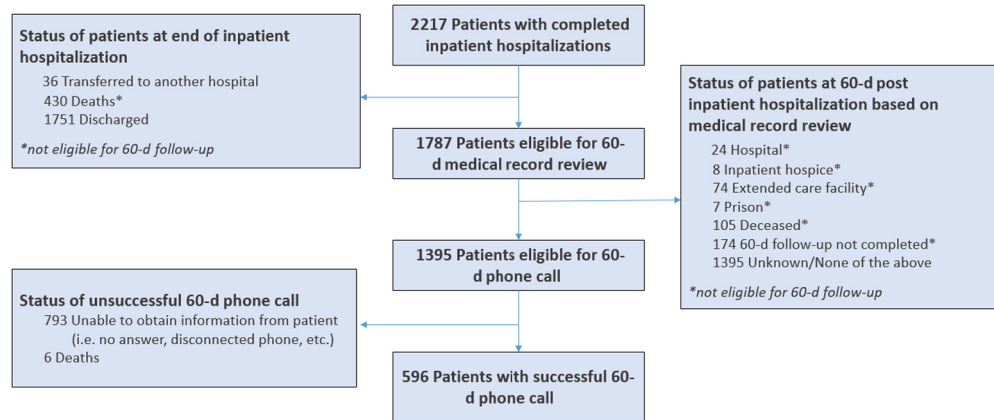
Fig. 1. Flow chart of patient follow-up process for the Mi-COVID19 registry. Overall, 80.6% (n=1787) of the initial sample were eligible for 60-day medical record review, and 62.9% (n=1395) of the sample were eligible for the 60-day phone call.

ethnic groups reported doing so (n = 37; Black 14, 4.7%; Asian 1, 9%; white 17, 7.4%; Latinx 2, 10.5%; other/unknown 3, 7.6%). A total of 108 patients (17.9%) reported no follow-up visits with a primary care physician or other provider in the 60 days following discharge. More than half (64.8%) of patients who received no follow-up care were Black (n = 65, 60.2%) or Latinx (n = 5, 4.6%), whereas white patients accounted for 26.9% of the group (n = 29). Table 2 provides additional survey details and Table 3 provides additional information on patient insurance type.

Discussion

The COVID-19 pandemic has resulted in a record number of hospitalizations and subsequent deaths that have disproportionately affected persons of color. Despite making up only 23% of the population in Michigan,[17] Black patients accounted for 46% of patient hospitalizations. Although most COVID-19–related deaths take place before hospital discharge, patients remain at risk for postdischarge complications and hardship in the immediate weeks following hospitalization. Our study suggests that Black patients may be particularly vulnerable to COVID-19–related complications and extended recovery periods. Although we do not know what the long-term outcomes of COVID-19 are on mental health, they are likely to be substantial.[18] Decreased physician follow-up postdischarge may exacerbate this risk. Given current hospital and long-term care staffing challenges along with a growing national shortage of primary care physicians, navigating care following hospital discharge can be particularly challenging for the most vulnerable patients.[19,20] Further, long-standing concerns of persons of color engaging in health interactions with providers such as not feeling acknowledged, not understanding treatment instructions, and not feeling prioritized may continue to hinder much needed follow-up.[21,22]

Table 1
Sixty-Day Follow-up by Race and Ethnicity of COVID-19–Positive Patients (N = 2217)

Variable	White (n = 889)	Black (n = 1029)	Asian (n = 52)	Latinx (n = 75)	Other/ Unknown (n = 172)	$P > F$
Location at 60 days, n (%)						
Deceased	153 (21.5)	111 (13.2)	5 (10.2)	7 (11.3)	12 (8.2)	<.001
Inpatient hospice	6 (0.8)	2 (0.2)	0 (0)	0 (0)	0 (0)	.34
Hospital	12 (1.7)	11 (1.3)	0 (0)	0 (0)	1 (0.7)	.61
Extended care facility	47 (6.6)	21 (2.5)	2 (4.1)	3 (4.8)	1 (0.7)	<.001
Prison	2 (0.3)	4 (0.5)	0 (0)	0 (0)	1 (0.7)	.89
Cause of death, n (%)						
Sepsis	34 (4.8)	25 (3.0)	4 (8.2)	2 (3.2)	2 (1.4)	.07
Stroke	2 (0.3)	1 (0.1)	0 (0)	0 (0)	0 (0)	.89
Heart failure	8 (1.1)	4 (0.5)	0 (0)	1 (1.6)	0 (0)	.35
Refractory acidosis	6 (0.7)	12 (1.2)	1 (1.9)	0 (0)	0 (0)	.36
Refractory hypoxemia	37 (4.2)	67 (6.5)	0 (0)	1 (1.3)	8 (4.7)	.027
Refractory shock	12 (1.4)	21 (2.0)	0 (0)	0 (0)	2 (1.2)	.41
Comfort care	72 (10.1)	21 (2.5)	4 (8.2)	4 (6.5)	2 (1.4)	<.001
Fatal cardiac arrhythmia	2 (0.3)	6 (0.7)	1 (2.0)	0 (0)	1 (0.7)	.45
COVID-19	121 (17.0)	81 (9.7)	5 (10.2)	4 (6.5)	10 (6.8)	<.001
Pneumonia	67 (9.4)	44 (5.3)	5 (10.2)	3 (4.8)	3 (2.0)	.001
None of the above	14 (2.0)	15 (1.8)	0 (0)	1 (1.6)	1 (0.7)	.72
Other infection	2 (0.3)	4 (0.5)	0 (0)	0 (0)	0 (0)	.84
Noninfectious cause	6 (0.8)	8 (1.0)	0 (0)	1 (1.6)	0 (0)	.69
Venous thromboembolism	0 (0)	3 (0.4)	0 (0)	1 (1.6)	0 (0)	.09
Clostridium difficile infection	0 (0)	2 (0.2)	0 (0)	0 (0)	0 (0)	.68
Myocardial infarction	4 (0.6)	3 (0.4)	0 (0)	0 (0)	1 (0.7)	.90
Confirmed or suspected pulmonary	6 (0.8)	12 (1.4)	0 (0)	0 (0)	2 (1.4)	.63
Stroke/CVA	1 (0.1)	2 (0.2)	0 (0)	1 (1.6)	0 (0)	.19

CVA, cerebrovascular accident.
The percentage of responses was based on item response/data for each variable. Patients may have multiple causes of death listed.

Table 2
Sixty-Day Follow-up Phone Call by Race

Variable	White, n (%) (n = 889)	Black, n (%) (n = 1029)	Asian, n (%) (n = 52)	Latinx, n (%) (n = 75)	Other/Unknown, n (%) (n = 172)	P > F
Phone call response rate: Able to obtain phone call information, n (%)	231 (47.0)	300 (43.4)	11 (26.2)	21 (38.9)	39 (30.0)	<.001
Completed survey: Successful phone call survey information, n (%)	230 (47.6)	297 (43.6)	11 (26.2)	19 (36.5)	39 (30.0)	<.001
Employment status prior to COVID-19, n (%)						
Full-time	75 (32.6)	87 (29.3)	7 (63.6)	6 (31.6)	19 (48.7)	.027
Part-time	16 (7.0)	21 (7.1)	1 (9.1)	0 (0)	1 (2.6)	.62
None	121 (52.6)	126 (42.4)	3 (27.3)	11 (57.9)	12 (30.8)	.019
Patient declined to respond	17 (7.4)	62 (20.9)	0 (0)	2 (10.5)	5 (12.8)	<.001
Essential worker status: Service or health care worker prior to COVID-19, n (%)	84 (9.5)	106 (10.3)	11 (21.2)	4 (5.3)	23 (13.4)	.025
Returning to work, n (%)						
Able to return to work	57 (62.6)	61 (56.5)	7 (87.5)	2 (33.3)	8 (40.0)	.09
Modified duties upon returning to work	19 (33.3)	12 (19.7)	1 (14.3)	0 (0)	3 (37.5)	.33
Reduced hours	12 (21.1)	5 (8.2)	0 (0)	0 (0)	1 (12.5)	.22
Modified duties	6 (10.5)	3 (4.9)	1 (14.3)	0 (0)	1 (12.5)	.73
Worked remotely	6 (10.5)	6 (9.8)	0 (0)	0 (0)	2 (25.0)	.57
Modified duties due to health status	17 (8.7)	5 (2.0)	0 (0)	0 (0)	2 (7.4)	.015
Unable to return to work, n (%)						
Unable to return to work	34 (14.8)	47 (15.8)	1 (9.1)	4 (21.1)	12 (30.8)	.13
Unable due to job loss − furlough	6 (17.6)	17 (36.2)	0 (0)	0 (0)	3 (25.0)	.25
Unable to return due to health issues	25 (73.5)	22 (46.8)	1 (100.0)	4 (100.0)	7 (58.3)	.05
Days from Discharge to work return, mean (min, max)	28.79 (0,72)	35.48 (1,79)	20.86 (8,42)	10.50 (6,15)	23.50 (0,54)	.06
Level of financial impact, n (%)						
Extreme	4 (1.7)	7 (2.4)	1 (9.1)	0 (0)	0 (0)	.37
Severe	9 (3.9)	32 (10.8)	0 (0)	3 (15.8)	2 (5.1)	.021
Moderate	36 (15.7)	32 (10.8)	1 (9.1)	7 (36.8)	9 (23.1)	.007
Mild	35 (15.2)	39 (13.1)	1 (9.1)	1 (5.3)	7 (17.9)	.66
None	106 (46.1)	78 (26.3)	6 (54.5)	4 (21.1)	10 (25.6)	<.001
Patient declined to respond	39 (17.0)	104 (35.0)	2 (18.2)	4 (21.1)	9 (23.1)	<.001
Financial costs, n (%)						
You used up all or most of your savings	11 (5.8)	38 (20.2)	2 (22.2)	4 (26.7)	3 (10.7)	<.001
You were unable to pay for necessities like food, heat, or housing	3 (1.6)	27 (14.4)	1 (11.1)	2 (13.3)	1 (3.6)	<.001
You were contacted by a collection agency	4 (2.1)	12 (6.4)	1 (11.1)	4 (26.7)	0 (0)	<.001
You skipped or delayed getting medical care you thought you needed because of the cost	6 (3.2)	10 (5.3)	1 (11.1)	2 (13.3)	2 (7.1)	.32
You took less medication than what was prescribed to you because of the cost	5 (2.6)	6 (3.2)	0 (0)	2 (13.3)	2 (7.1)	.18
None of the above	151 (79.5)	125 (66.5)	7 (77.8)	8 (53.3)	21 (75.0)	.026
Days from discharge to visit, n (%)						
<15 d	153 (66.5)	146 (49.2)	8 (72.7)	12 (63.2)	15 (38.5)	<.001
15-30 d	25 (10.9)	51 (17.2)	1 (9.1)	3 (15.8)	8 (20.5)	.24
>30 d	12 (5.2)	23 (7.7)	1 (9.1)	1 (5.3)	5 (12.8)	.47
Reasons for not seeing PCP, n (%)						
Concerned regarding cost	1 (0.4)	2 (0.7)	0 (0)	0 (0)	0 (0)	.97
Unable to find PCP/PCP unavailable	0 (0)	11 (4.7)	0 (0)	0 (0)	3 (9.4)	.007

PCP, primary care physician.
The percentage of responses was based on item response/data for each variable.

Since 2000, the National Standards for Culturally and Linguistically Appropriate Services (CLAS) have been made available by the US Department of Health and Human Services to guide organizations in

Table 3
Insurance by Race

Insurance Status	All Patients					
	White, n	Black, n	Asian, n	Latinx, n	Other/Unknown, n	Total, n
Commercial	136	237	18	14	35	440
Medicaid	72	168	6	14	33	293
Medicare	559	486	13	28	73	1159
Other	111	109	11	13	14	258
Self-Pay	9	22	4	5	14	54
Total	887	1022	52	74	169	2204

Missing data n = 14.

developing practices and policies that improve equitable care and reduce health disparities, with variable uptake.[23,24] CLAS standards recommend the collection and maintenance of accurate and reliable demographic data to facilitate effective monitoring and evaluation of service delivery outcomes. In this study, nearly 8% of participants had no clearly identified race or ethnicity. Further investigation by the authors of how participating hospitals collect patient race and ethnicity data found wide variation in data collection methods with low levels of patient self-reported data.

Furthermore, in the state of Michigan, it is estimated that individuals of Middle Eastern or North African descent account for approximately 3.5% of the population; however, currently, clinical documentation systems generally do not capture this ethnic identity. In addition, the selection of biracial or multiracial are not available options within most health care documentation systems. The lack of self-reported patient race and ethnicity data likely contribute to discrepant recorded information.[25] Therefore, a significant

opportunity exists for hospital systems, insurers, and the electronic health record industry to develop improved mechanisms to accurately capture patient race and ethnicity data to better identify ethnic and racial disparities in care, treatment, and outcomes. Advanced statistical approaches such as the Bayesian Surname and Geocoding (BSG) method[26] and use of logistic models that include census and patient-level data[27] are promising for accurately predicting individual race and ethnicity data when self-report data are not available. Health equity assessments and differential reporting should take place despite the small sample sizes of particular ethnic and racial groups within some settings to allow for the identification of potentially adverse health outcomes among the most vulnerable. Within this study, the sample of Asian and Latinx patients were considerably small (Asian n = 52, Latinx n = 75). Not collapsing all nonwhite participants into 1 group for all analysis allowed for more nuanced analysis and the identification of ethnically and racially variant outcomes.

Finally, patient follow-up in the immediate weeks following hospital discharge is imperative. This follow-up may be initiated by transferring hospital staff, insurer case managers, or transfer facility staff. Patient and family education should include expected health outcomes with realistic recovery trajectories as appropriate. Further, patients and families should be provided information on when they need to contact a health provider, how to access available community resources, and how to find a local provider that will see them following a positive COVID-19 diagnosis. Patient resources, such as the COVID-19 Caregivers Workbook, which provides information on hospital postdischarge care, may also be helpful to patients and families.[28]

Limitations

A limitation of this study, and the data set that was used, is the lack of social variables such as income and education to include within the analytic models. However, for the past 17 years, the National Healthcare Quality and Disparities Report has identified racial and ethnic disparities affecting care and health outcomes for Black, Latinx, and other persons of color across a variety of health care quality measures in US delivered health care.[29] Another limitation was the response rate (42.3%) of telephone survey data that was included in the sample. As with any telephone survey, it is difficult to ascertain if the survey responses are representative of those who did not respond to the survey. Survey responses across delivery methods typically have about a 33% response rate with telephone responses often being significantly lower.[30,31] Notwithstanding this limitation, eligible patients included in the sample had a complete chart review prior to the telephone survey completion, and data were extracted similarly regardless of patient status or participation in the survey (Figure 1). Individuals who were rehospitalized or transferred to an extended care facility may have been under-represented in survey responses because of the follow-up contact method. Further, although the MiCOVID-19 registry is composed of about a third of Michigan acute care hospitals, including most of the major hospitals servicing COVID-19 patients, volunteer hospitals may not represent hospitals not participating in similar quality improvement initiatives.

Conclusions and Implications

This study identifies significant racial and ethnic disparities in health, finances, and care delivery in the 60 days following hospitalization for COVID-19 infection. Although much of the current public health response to the Coronavirus pandemic has focused on prevention and treatment, additional attention is needed to improve post-acute care, including reducing rehospitalizations and preventing unanticipated postdischarge deaths. Integrating more culturally responsive health care delivery practices such as obtaining patient self-reported race and ethnicity data along with other social determinants of health information, such as income and education, can facilitate identifying the most vulnerable patients and ensuring they receive appropriate follow-up care and are connected to available supports.

References

1. House Committee on Energy & Commerce. Hearing on "Health Care Inequality: Confronting Racial and Ethnic Disparities in COVID 19 and the Health Care System."; June 17, 2020. Virtual hearing via Cisco Webex; 116th Congress, Subcommittee on Health.
2. Stulpin C. Communities of color experience higher rates of COVID-19-related hospitalizations, deaths. Infectious Disease News. Healio News. Available at: https://www.healio.com/news/infectious-disease/20200515/communities-of-color-experience-higher-rates-of-covid19related-hospitalizations-deaths. Accessed October 14, 2020. May 15, 2020.
3. Centers for Disease Control and Prevention. COVIDView weekly summary: Week 1 ending January 9, 2021. US Department of Health and Human Services. Available at: https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-view/#hospitalizations. Accessed January 20, 2021. Published 2021.
4. US Census Bureau. Quick facts: United States. US Department of Commerce. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045219. Accessed January 20, 2021. Published 2021.
5. Centers for Disease Control and Prevention. Demographic trends of Covid-19 cases and deaths in the US reported to CDC. US Department of Health and Human Services. Available at: https://covid.cdc.gov/covid-data-tracker/#demographics. Accessed January 20, 2021. Updated January 19, 2021.
6. Centers for Disease Control and Prevention. People with certain medical conditions. Available at: https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html#:~:text=Adults%20of%20any%20age%20with%20the%20following%20conditions%20are%20at,COPD%20(chronic%20obstructive%20pulmonary%20disease). Accessed December 1, 2020. Updated November 30, 2020.
7. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults and youth: United States, 2015-2016. NCHS Data Brief. CDC Stacks: Public Health Publications; 2017, p. 288. Available at: https://stacks.cdc.gov/view/cdc/49223. Accessed December 1, 2010.
8. Centers for Disease Control and Prevention. Chronic kidney disease in the United States, 2019. US Department of Health and Human Services, 2019. Available at: https://www.cdc.gov/kidneydisease/pdf/2019_National-Chronic-Kidney-Disease-Fact-Sheet.pdf.
9. Centers for Disease Control and Prevention. National Diabetes Statistics Report 2020: Estimates of Diabetes and Its Burden in the United States. Washington, DC: US Department of Health and Human Services; 2020.
10. US Bureau of Labor Statistics. Labor force statistics from current population survey. United States Department of Labor, 2020. Available at: https://www.bls.gov/cps/cpsaat11.htm. Accessed December 5, 2020.
11. Gay T, Hammer S, Ruel E. Examining the relationship between institutionalized racism and COVID-19. City Commun 2020;19(3):523–530.
12. Westby A, Okah E, Ricco J. Race-based treatment decisions perpetuate structural racism. Am Fam Physician 2020;102:136–137.
13. Bailey ZD, Krieger N, Agénor M, et al. Structural racism and health inequities in the USA: evidence and interventions. Lancet 2017;389:1453–1463.
14. Kilaru AS, Lee K, Snider CK, et al. Return hospital admissions among 1419 COVID-19 patients discharged from five U.S. emergency departments. Acad Emerg Med 2020;27:1039–1042.
15. Michigan Hospital Medicine Safety Consortium. Collaborating to improve care for hospitalized patients in Michigan. Available at: https://mi-hms.org/. Accessed December 2, 2020. Updated November 25, 2020.
16. Vaughn VM, Gandhi TN, Petty LA, et al. Empiric antibacterial therapy and community-onset bacterial coinfection in patients hospitalized with Coronavirus Disease 2019 (COVID-19): A multi-hospital cohort study. Clinical Infectious Diseases 2021;72:e533–e541.
17. US Census Bureau. Quick facts: Michigan. Washington, DC: US Census Bureau. Available at: https://www.census.gov/quickfacts/MI.
18. Czeisler ME, Lane RI, Petrosky EP, et al. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24-30, 2020. MMWR Morb Mortal Wkly Rep 2020;69:1049–1057.
19. Miceli S. How can hospitals overcome staffing and supply shortages amid Covid-19 surges. The National Academies of Sciences, Engineering, & Medicine. Available at: https://www.nationalacademies.org/news/2020/08/how-can-hospitals-overcome-staffing-and-supply-shortages-amid-covid-19-surges. Accessed December 5, 2020. Updated August 7, 2020.
20. Association of American Medical Colleges. The complexities of physician supply and demand: projections from 2018 to 2033. 2020. Available at: https://www.aamc.org/system/files/2020-06/stratcomm-aamc-physician-workforce-projections-june-2020.pdf. Accessed December 5, 2020.
21. Cuevas AG, O'Brien K, Saha S. African American experiences in healthcare: "I always feel like I'm getting skipped over.". Health Psychol 2016;35:987–995.
22. Robinson-Lane SG, Vallerand AH. Pain treatment practices of community-dwelling black older adults. Pain Manag Nurs 2018;19:46–53.

23. Office of Minority Health. National culturally and linguistically appropriate services standards. Washington, DC: US Department of Health and Human Services. Available at: https://thinkculturalhealth.hhs.gov/clas/standards. Accessed December 5, 2020.

24. Barksdale CL, Rodick WH, Hopson R, et al. Literature review of the national CLAS standards: Policy and practical implications in reducing health disparities. J Racial Ethn Health Disparities 2017;4:632–647.

25. Polubriaginof FCG, Ryan P, Salmasian H, et al. Challenges with quality of race and ethnicity data in observational databases. J Am Med Inform Assoc 2019;26: 730–736.

26. Elliott MN, Fremont A, Morrison PA, et al. A new method for estimating race/ethnicity and associated disparities where administrative records lack self-reported race/ethnicity. Health Serv Res 2008;43:1722–1736.

27. Xue Y, Harel O, Aseltine RH. Imputing race and ethnic information in administrative health data. Health Serv Res 2019;54:957–963.

28. BioSocial Methods Collaborative and HEART Research Project Team. 2020. Preparing to go home after a COVID-19 hosptial stay. COVID-19 Patient & Caregiver Collaborative Care Workbook. Ann Arbor: Michigan Medicine; 2020. https://doi.org/10.3998/2027.42/163715. Available at: https://deepblue.lib.umich.edu/bitstream/handle/2027.42/163715/Workbook_7_PreparingToGoHome_1.0.0.pdf?sequence=11&isAllowed=y. Accessed December 5, 2020.

29. Agency for Healthcare Research and Quality (AHRQ). 2019 National Healthcare Quality and Disparities Report. AHRQ Pub. No. 20(21)-0045-EF. Bethesda, MD: Agency for Healthcare Research and Quality, 2020. Available at: https://www.ahrq.gov/sites/default/files/wysiwyg/research/findings/nhqrdr/2019qdr-final-es.pdf. Accessed December 20, 2020.

30. Lindemann N. What's the average survey response rate (2019 benchmark). Available at: https://surveyanyplace.com/average-survey-response-rate/. Accessed January 20, 2021. Updated August 8, 2019.

31. Kennedy C, Hartig H. Response rates in telephone surveys have resumed their decline. Pew Research Center. Available at: https://www.pewresearch.org/fact-tank/2019/02/27/response-rates-in-telephone-surveys-have-resumed-their-decline/. Accessed January 20, 2021. Updated February 27, 2019.