

1 **Do Black Lives Matter in the American Public’s Mitigation Responses to the Covid-19**
2 **Pandemic? An Analysis of Mask Wearing and Racial/ethnic Disparities in Deaths from**
3 **COVID-19**

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11 **Abstract**

12 *Background:* Mask-wearing has varied considerably throughout the COVID-19 pandemic and
13 has been most often associated with political affiliation and specific health beliefs. The purpose
14 of this study was to determine the relationship between mask usage, neighborhood racial
15 segregation, and racial disparities in COVID-19 deaths.

16 *Methods:* We used linear regression to assess whether the racial/ethnic composition of deaths
17 and residential segregation predicted Americans’ decisions to wear masks in July 2020.

18 *Results:* After controlling for mask mandates, mask usage increased when the White death rates
19 relative to Black and Hispanic rates increased.

20 *Conclusions:* Mask wearing may be shaped by an insensitivity to Black and Hispanic deaths and
21 a corresponding unwillingness to engage in health protective behaviors. The broader history of
22 systemic racism and residential segregation may also explain why white Americans do not wear
23 masks or perceive themselves to be at risk when communities of color are disproportionately
24 affected by COVID-19.

25

26 **Keywords:** Racism; Racial bias; COVID-19; Health equity

27

28 **Declarations**

29 *Ethics approval and consent to participate.* Not applicable.

30 *Consent for publication.* Not applicable.

31 *Availability of data and materials.* All data for this study are publicly available.

32 *Code availability.* Not applicable.

33 *Conflict of Interest/Competing interests.* The authors declare that they have no competing
34 interests.

35 *Funding.* Not applicable.

36 *Authors' contributions.* JHB led the conceptualization of the study, the methodological approach,
37 and formal analysis of the data. BF and AM prepared the original draft. All authors reviewed,
38 edited, and gave final approval for the manuscript.

39 *Acknowledgements.* None.

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41

42 *In the United States, wearing a mask is not just politicized. It is racialized.* (Rhea
43 Boyd, The Nation, 7-9-20)

44 **Background**

45 Nationally, available data from the CDC and other sources reveal that Black and Latinx
46 Americans account for a disproportionate number of COVID-19 related cases, hospitalizations,
47 and deaths(1–4). A vast and growing body of research suggests that racial disparities in mortality
48 are associated with underlying differences in comorbidities that are shaped by the influence of
49 structural racism and access to health care (5,6). Because COVID-19 is a novel coronavirus, the
50 public, elected officials, and even scientists are continually learning how to mitigate its
51 devastating impact. While the learning curve may be slow in some ways, there is widespread
52 scientific agreement regarding the use of facial coverings to slow, if not prevent the spread. By
53 mid-July 2020, masks were mandatory in 21 states, with more states considering the adoption of
54 such policies (7). Yet, mask usage in the U.S. has proved controversial and selectively adopted.
55 In June of 2020, for example, a national poll found that less than two-third of Americans agreed
56 that it was important to wear a mask (8) and only a slightly higher percentage (73%) of
57 Americans stated that they had worn a mask in a public setting (9).

58 From national polls and peer-reviewed studies conducted during the COVID-19 pandemic, we
59 have learned important correlates of mask usage in the context of a novel respiratory pathogen.
60 Researchers have focused primarily on political affiliation, finding that voting patterns and
61 exposure to misinformation predict adherence to public health guidance regarding masks (8,10).
62 Other studies have extended this work, finding that political affiliation is associated with the
63 usage of specific news sources and different levels of knowledge and beliefs related to COVID-

64 19(11), including mask wearing and efforts to socially distance (12). Further contributing to
65 uneven mask usage is a significant amount of misinformation circulating regarding the
66 effectiveness of masks, creating what public health experts have called an “infodemic” (13).
67 Given evidence that masks are an important part of public health efforts to mitigate COVID-19
68 transmission, research is necessary to understand additional factors that are associated with
69 decisions to adopt this recommendation.

70 Few studies have explored other social or cultural factors that underlie mask usage, especially
71 considering the continued severity of the pandemic and striking racial/ethnic disparities in
72 COVID-19 infections and outcomes. It is important for researchers, accordingly, to understand
73 when and in what contexts Americans feel compelled to wear masks specifically and follow
74 public health guidance more generally. It is possible, for example, that reasons for refusing to
75 wear a mask may extend beyond political affiliation and exposure to misinformation and differ
76 by race or ethnicity. While some white Americans contend that mask requirements infringe on
77 their civil rights (13), there may exist a mask conundrum for Black Americans. After mask
78 requirements were implemented across the country, several news outlets featured stories
79 highlighting the concerns of Black communities regarding the risk of police profiling of Black
80 men wearing face coverings (14–16). By early June, multiple accounts of Black men targeted for
81 wearing masks - and for not wearing masks - were documented across the country (17). This
82 lose-lose scenario is captured by the statement of Aaron Thomas, an educator in Ohio: “I want to
83 stay alive but I also want to stay alive” (18). At the same time, survey data showed that Black
84 and Hispanic Americans were more likely than white Americans to report concern that they
85 would require hospitalization from COVID or unknowingly spread the disease to others,

86 supporting mask wearing among these populations (19). This evidence suggests that factors other
87 than political affiliation may be important correlates of mask usage.

88 Because COVID-19 death rates are twice as high among Black Americans in the U.S.(20), it is
89 possible that mask wearing reflects different perceptions of risk related to COVID-19 exposure
90 and outcomes. More specifically, because American communities continued to be segregated by
91 race (21), white Americans may feel less vulnerable to COVID-19 because fewer individuals in
92 their close proximity may have become infected or have been killed by this novel illness. It is
93 important, accordingly, to consider whether different types of racism, especially residential
94 segregation, are associated with mask usage among white Americans. There is compelling
95 evidence that contemporary forms of racism such as color-blind racism or racial apathy are
96 present in more than half of white Americans (22,23) and may help perpetuate residential
97 segregation through opposition to policies that advance racial equity (24,25). We ask, therefore,
98 whether white Americans wear masks as often when Black, as opposed to white Americans, are
99 dying at higher rates in the surrounding state. According to prominent pediatrician, public health
100 advocate, and scholar Rhea Boyd, “opposition to public health interventions, like masking, have
101 also become a material manifestation of America’s racism, particularly anti-Black racism” (26).
102 To test this, we assess whether mask usage among white Americans is associated with who is
103 dying from COVID-19 in the surrounding community. To our knowledge, this is the first study
104 to quantitatively examine how mask usage relates to differential outcomes in COVID-19 deaths
105 by race.

106 **Methods**

107 **Data**

108 Our data on mask usage, demographic factors, mask mandates, and COVID-19 death rate
109 disparities come from multiple sources. Mask wearing reflects the percentage of state residents
110 who report wearing a mask whenever they are in public and was measured by the Institute for
111 Health Metrics and Evaluation at the University of Washington (27). State Mask Mandate
112 indicates whether a state-level mask wearing mandate had been adopted as of July 20, 2020 (28).
113 Racial Segregation data is from 2013-2015 and is based on a Dissimilarity Index, produced by
114 the U.S. Census bureau where Black-White segregation levels range from 0-100, with 100 being
115 the most spatially segregated by race (29).

116 Our focal independent variables are Black-White and Hispanic-White disparities in racial death
117 rates which included 45 states with available data. To construct indices of racial disparities in
118 COVID-19 deaths we draw on data from the Kaiser Family Foundation's State COVID Racial
119 Data Tracker (30) including COVID-19 deaths through July 21st, 2020. The racial death disparity
120 index reflects the ratio of Black or Hispanic death rates to White death rates in each state (Black
121 or Hispanic deaths divided by White deaths). If the death rates for Blacks or Hispanics in a
122 particular state are identical to the death rate for Whites, the racial death disparity index will
123 equal 1.0. Racial death disparity index values less than 1.0 indicate that Blacks (or Hispanics)
124 are underrepresented relative to Whites while values greater than unity would indicate that
125 Blacks (or Hispanics) are overrepresented in a state's COVID-19 death counts. Table 1 reports
126 disproportionate COVID-19 deaths by race and Figure 1 demonstrates the geographic pattern of
127 disparities.

128 Table 1 about here

129 While racial disparity levels vary, the index for Black-White death exceeds 1.0 in 36 states; the
130 index for Hispanic-White death exceeds 1.0 in 18 states.

131 **Results**

132 Table 2 provides descriptive statistics for all analysis variables. The focal outcome measure -
133 state mask wearing - shows considerable variation in the percentage of respondents who report
134 wearing masks every time they are in public (Mean = 4.22; S.D = 1.33). Our primary predictor
135 variables – racial disparities in COVID-19 deaths – varies widely across the states: Black-White
136 disparities (Mean = 1.92; S.D = 1.07) exceed Hispanic-White disparities (Mean = .97; S.D =
137 .59). State policies regarding mask mandates also vary (Mean = .279; S.D = .454) with slightly
138 more than one-quarter of states having adopted mandates in some form. Racial segregation levels
139 are relatively high (Mean = 58.17; S.D = 11.71), but vary considerably across states and range
140 from 37 to 78 in our sample.

141 Table 2 about here

142 The regression models in Table 3 examine 1) the degree to which differences in COVID-19
143 deaths by race predict mask wearing; 2) this same prediction after adjusting for the presence of a
144 mask mandate; 3) this same prediction with the addition of mask mandates and state-level racial
145 segregation; As such, the primary predictor of interest in these models was disparity in
146 racial/ethnic death rates.

147 Table 3 about here

148 The results reported in Model 1 examine the association between state mask wearing practices
149 and race specific death rate disparities. Results in the first column show that Black/White
150 COVID-19 death rate disparities are marginally inversely related ($b=-.361, p<.10$) to self-
151 reported mask usage. Residents in states with greater Black/White COVID-19 death disparities
152 report lower levels of mask wearing compared to states with lower disparities. Results in the

153 second column of Model 1 show that deaths from COVID-19 among Hispanic populations are
154 strongly inversely related ($b=-.888$, $p<.001$) to self-reported mask usage. Both Black (Adj. $R^2 =$
155 $.054$) and Hispanic (Adj. $R^2 = .118$) COVID-19 death rates account for a significant share of the
156 variance in Model 1.

157 The results reported in Model 2, which examines the association between state mask wearing
158 practices and race specific death rate disparities, with controls for state mask mandates, show
159 that this relationship is reduced but remains significant with regard to both Black-White and
160 Hispanic-White death rate disparities. Black-White death rate disparities are marginally
161 inversely associated ($b=-.279$, $p<.10$) with state mask wearing practices while Hispanic-White
162 death rate disparities are moderately inversely associated ($b=-.587$, $p<.05$) with state mask
163 wearing practices. Thus, even in states with mask mandates, residents in states with higher racial
164 disparities in COVID-19 related deaths, report lower levels of mask wearing compared to
165 residents in states with smaller disparities in Black-White and Hispanic-White COVID-19
166 related deaths. Not surprisingly, the addition of the state mask mandate measure in Model 2,
167 substantially increases the variance accounted for in both the Black-White (Adj. $R^2 = .420$) and
168 Hispanic-White (Adj. $R^2 = .418$) equations.

169 The results reported in the full model (Model 4) examining the association between state mask
170 wearing practices and race specific death rate disparities, with controls for mask mandates also
171 include a segregation index as a proxy measure of a state's structural racial inclusivity.
172 Segregation appears to substantially mediate the relationship between state mask wearing
173 practices and Black-White death rate disparities, and to partially mediate the relationship
174 between state mask wearing practices and Hispanic-White death rate disparities. When racial
175 segregation (Dissimilarity Index) is included in the full model, the Black-White death rate

176 disparity measure is no longer significantly associated with state mask wearing practices. In
177 contrast, including racial segregation in the full model reduces, but does not eliminate, the
178 association ($b=-.446$, $p<.10$) between state mask wearing practices and Hispanic-White death
179 rate disparities. The inclusion of the segregation measure in Model 3, modestly increases the
180 variance accounted for in both the Black-White (Adj. $R^2 = .453$) and Hispanic-White (Adj. $R^2 =$
181 $.474$) equations. Mask mandates are clearly the most important determinant of state mask
182 wearing practices in our analyses.

183 **Discussion**

184 The aim of this study was to understand additional factors that underlie patterns of mask
185 wearing in the midst of the COVID-19 pandemic in the United States. Mask wearing has
186 emerged as a cornerstone of the public health approach to mitigating new infections and deaths
187 from the disease. Still, mask wearing in the United States is uneven and previous studies have
188 mostly focused on the role that political affiliation and ideology play in shaping adherence to this
189 public health recommendation. We explored whether self-reported mask usage in a state is
190 related to COVID-19 death disparities in states, which may serve as a proxy for the level of risk
191 that exists.

192 Our findings suggest that the percentage of individuals who wear masks is associated
193 with who is dying from COVID-19 in the state. After controlling for mask mandates, which aim
194 to increase adherence to public health guidelines, mask usage increased when the White death
195 rates relative to Black and Hispanic rates increased. Conversely, individuals wear masks less
196 frequently when Black and Hispanic death rates relative to White death rates are higher. There
197 are two plausible interpretations of these findings that may provide support for two
198 complementary models of how racism shapes COVID-19 outcomes: 1) that Americans do not

199 perceive themselves to be at risk when people of color are dying because U.S. communities are
200 highly segregated by race and 2) because many Americans endorse racial apathy, or at a
201 minimum harbor unconscious implicit biases, they may therefore be less concerned about Black
202 or Hispanic deaths.

203 Residential segregation persists in the U.S. as a legacy of institutionalized racism. Many
204 studies document the impact of segregation on wealth accumulation and numerous acute and
205 chronic health conditions such as hypertension, asthma, and infant mortality (31–34). Residential
206 segregation may shape COVID-19 disparities insofar as chronic diseases, which
207 disproportionately affect Americans of color, increase vulnerability to morbidity and mortality
208 from COVID-19. But the effects of residential segregation may go even further in damaging
209 public health. If severe and fatal cases of COVID-19 are concentrated in communities of color
210 where many White Americans are not exposed to the severe threat posed by this disease,
211 individuals may be less likely to adopt public health practices, such as mask wearing. Indeed, we
212 find in our study that when controlling for the level of residential segregation in a state, this
213 factor at least partially helps us understand why mask usage may be lower when Black-White
214 and Hispanic-White death rate disparities are more pronounced in a state.

215 Still, there are likely other factors that are important to consider. In particular, we focus
216 on the persistence of systemic racism, but are unable to directly measure other forms of racism
217 such as racial apathy, or an ambivalence toward policies that are perceived as disproportionately
218 aimed at helping Black or Hispanic Americans (35,36). Although this framework has been used
219 to explain support for policies that explicitly focus on racial advancement such as affirmative
220 action, we argue that mask wearing may also be perceived as a race-based policy when deaths
221 are disproportionately concentrated among Black and Hispanic Americans and other people of

222 color. Although our data do not allow us to test this relationship, future research should explore
223 whether racial apathy in particular may be reflected in an insensitivity to Black and Hispanic
224 deaths and a corresponding unwillingness to engage in health protective behaviors such as mask
225 usage.

226 Our study has several limitations that are important to consider. First, our use of cross-
227 sectional data does not allow us to assess causality in patterns of mask usage. Second, our use of
228 state-level data does not provide insight into individual factors that shape mask usage. Finally,
229 we present data from July 2020 when mask usage still varied considerably across the U.S. Mask
230 usage has since risen considerably and may be less strongly associated with social factors as the
231 pandemic has progressed. In addition, the patterns for Black-White and Hispanic-White
232 disparities reflects the specific time period covered in our study. The differences found for
233 Blacks and Hispanics likely reflect the fact that during the early summer of 2020, the eastern and
234 southern states where Black Americans are more concentrated (compared to Hispanics) were
235 also locations where the virus spread most rapidly. As such, patterns of racial disparities changed
236 as different regions of the U.S. were affected in the third surge of COVID-19 during Winter
237 2021.

238 **Conclusions**

239 Public health scholars and practitioners have been active in recent years in demonstrating the
240 pernicious effects of racism on public health. Most of this focus has been on structural racism
241 and its impact on numerous social determinants of health. Our study provides evidence that the
242 persistence of anti-Black and anti-Hispanic attitudes in the U.S. must be included in efforts to
243 identify and address racism in the U.S. These attitudes not only shape support for policies that
244 stand to redress long-standing racial/ethnic health disparities (37,38), but may help us understand

245 resistance to public health measures, such as mask wearing, during the COVID-19 pandemic.
246 Disparities in morbidity and mortality in the context of the novel coronavirus pandemic have
247 brought to the forefront a much older and more enduring public health crisis: racial
248 discrimination. Exploring and addressing the structural and individual context of racism in the
249 U.S. will help us improve public health and better prepare for the public health challenges to
250 come.

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380 **Table 1. State Level Racial (Black-White and Hispanic-White) Disparities in COVID-19**
 381 **Deaths**

State	Black-White Death Disparity	Hispanic-White Death Disparity
AK	--	--
AL	2.27	1.02
AR	2.28	1.43
AZ	.96	.88
CA	2.15	1.25
CO	1.89	1.03
CT	1.36	.48
DC	5.53	3.98
DE	1.22	.66
FL	1.47	1.10
GA	1.75	.58
IA	1.87	1.31
ID	.96	.44
IL	2.77	1.71
IN	1.99	.36
KS	4.40	1.20
KY	2.14	1.55
LA	2.23	.54
MA	1.08	.55
MD	1.60	1.28
ME	2.21	--
MI	4.29	.60
MN	1.28	.67
MO	4.50	.71
MS	1.83	.93
NC	1.85	1.09
NE	1.95	2.44
NH	2.37	.89
NJ	1.44	.95
NV	1.45	.60
NY	1.11	.68
OH	1.67	.53
OK	.96	--

OR	1.70	1.05
PA	2.21	.87
RI	.90	.54
SC	2.52	.97
TN	2.87	2.51
TX	1.01	.68
UT	2.89	2.48
VA	1.33	1.26
VT	--	--
WA	.77	.95
WI	4.86	1.91
WY	.00	.93
Total	44	44

382 States with Black / Hispanic Overrepresentation (Disparity Index > 1.00) highlighted in Bold

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Table 2. Descriptive Statistics for Analysis Variables

Variable	Mean	S.D
Mask Wearing Practices	4.28	1.399
Mask Mandates	.279	.454
Black-White Death Disparities	1.915	1.068
Hispanic-White Death Disparities	.968	.589
Segregation Index	58.168	11.706

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Table 3. Mask Wearing and State Racial Death Disparities

	Model 1		Model 2		Model 3	
	<u>Black- White</u>	<u>Hispanic- White</u>	<u>Black- White</u>	<u>Hispanic- White</u>	<u>Black- White</u>	<u>Hispanic- White</u>
Racial Death Disparities	-.361† .197	-.888*** .348	-.279† .155	-.587* .287	-.152 .165	-.446† .280
State Mask Law 1=Yes			1.890*** .364	1.755*** .373	2.083*** .369	1.994*** .370
Segregation Index					-.030† .016	-.033* .014
Constant	4.95*** .430	5.14*** .390	4.263*** .361	4.36*** .357	5.752*** .885	6.13*** .845
Adj. R ²	.054	.118	.420	.418	.453	.474

387 † p ≤ .10; * p ≤ .05; ** p ≤ .01; *** p ≤ .001

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