EXHIBIT 7

Letters

Racial Differences in Statewide Suicide Mortality Trends in Maryland During the Coronavirus Disease 2019 (COVID-19) Pandemic

Mental health experts have predicted changing patterns of suicidality during the coronavirus disease 2019 (COVID-19) pandemic, but national mortality data remain unavailable.[1] African American individuals are disproportionately impacted by the virologic and socioeconomic consequences of COVID-19, with probable implications for mental health. We hypothesized rising suicide mortality among Black residents of Maryland during COVID-19 crisis periods.[2] Characterizing these trends may inform policy with implications for population health.

Methods | Maryland's chief medical examiner investigates all unnatural deaths in the state. Race/ethnicity and date of death

Table. Suicide Mortality During Periods of Interest by Race/Ethnicity[a]

Race/ethnicity	No.			2017-2019 Mean	2020	Change, %	P value
	2017	2018	2019				
January 1-March 4							
Total	95	92	84	90.3	95	5.2	.98
Black	16	20	18	18.0	14	−22.2	.70
White	71	65	61	65.7	70	6.6	.78
Hispanic	4	2	2	2.7	1	NA	NA
Asian	2	3	2	2.3	3	NA	NA
Other	2	2	1	1.7	3	NA	NA
Unknown	0	0	0	0	4	NA	NA
March 5-May 7							
Total	100	94	92	95.3	71	−25.5	.04
Black	8	14	12	11.3	22	94.1	.01
White	89	74	72	78.3	43	−45.1	<.001
Hispanic	0	2	2	1.3	2	NA	NA
Asian	2	3	1	2.0	3	NA	NA
Other	0	0	2	0.7	0	NA	NA
Unknown	1	1	3	1.7	1	NA	NA
May 8-July 7							
Total	94	119	73	95.3	70	−26.6	.04
Black	18	18	17	17.7	14	−20.8	.68
White	72	88	46	68.7	48	−30.1	.03
Hispanic	1	7	2	3.3	4	NA	NA
Asian	1	4	6	3.7	3	NA	NA
Other	1	1	0	0.7	0	NA	NA
Unknown	1	1	2	1.3	1	NA	NA
All periods (January 1-July 7)							
Total	289	305	249	281	236	−16.0	.02
Black	42	52	47	47.0	50	6.4	.25
White	232	227	179	212.7	161	−24.3	.002
Hispanic	5	11	6	7.3	7	NA	NA
Asian	5	10	9	8.0	8	NA	NA
Other	3	3	3	3.0	3	NA	NA
Unknown	2	2	5	3.0	7	NA	NA

Abbreviation: NA, not applicable.

[a] Differences between daily suicide counts in 2020 compared with the mean daily counts in 2017 to 2019 for paired dates are assessed by Wilcoxon signed rank test. Percentage change and significance of difference not assessed for race/ethnicity with fewer than 10 suicide mortalities per year. Regarding periods for comparison (2017 to 2019), counts among both Black and White Maryland residents were relatively stable over time and did not differ significantly between years for 2017 to 2018, 2018 to 2019, or 2017 to 2019 for any period reported within either racial group with the exception of White residents during the period from May 8, 2020, to July 7, 2020, which differed from both 2017 and 2018.

Figure. Interrupted Time Series Analysis of Suicide Mortality During Coronavirus Disease 2019 (COVID-19)
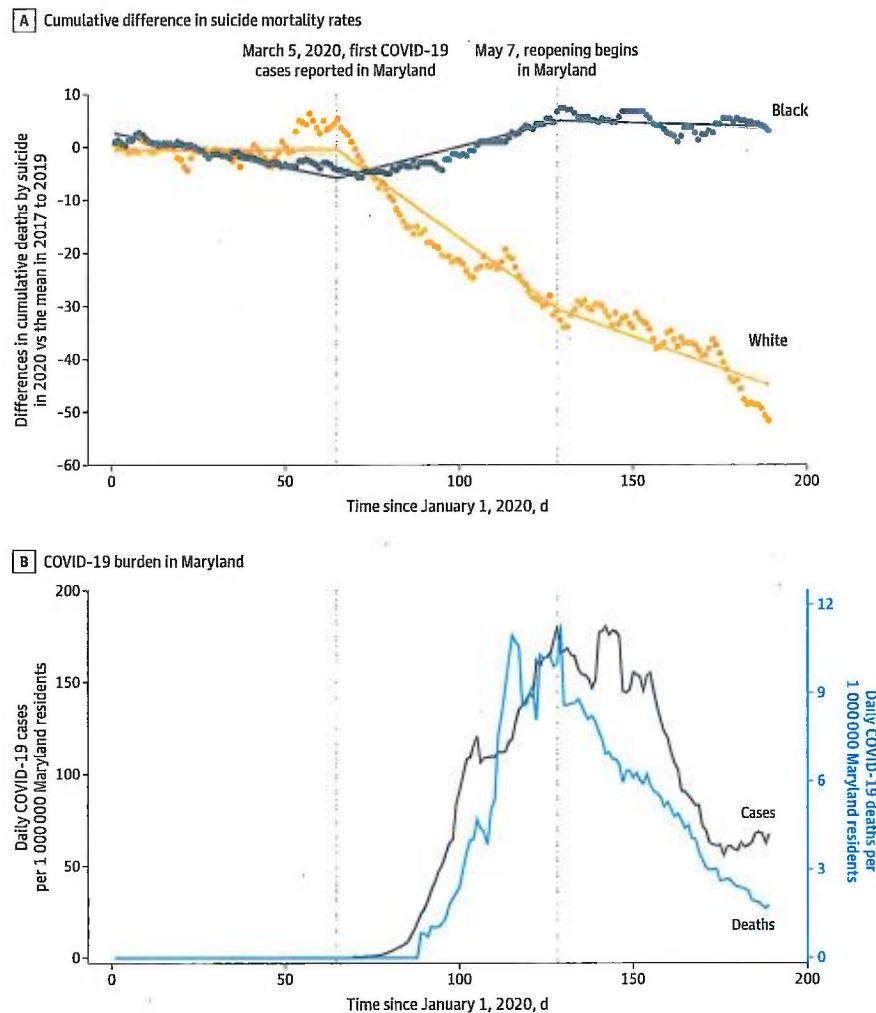
A. Interrupted time series analysis of cumulative difference in suicide mortality rates in 2020 compared with means from 2017 to 2019 using cumulative difference plots. Plotted values indicate difference in cumulative suicide mortality in 2020 compared with historical means from 2017 to 2019 (a value of zero represents no difference; a value of −1 indicates that mean cumulative suicide mortality from 2017 to 2019 exceeded that of 2020 [from January 1, 2020, to July 7, 2020] by 1 decedent; and a value of 1 indicates that cumulative suicide mortality in 2020 [from January 1, 2020, to July 7, 2020] exceeded historical values by 1 decedent). Values were not adjusted for differing population sizes of Black and White residents and therefore the magnitude of differences from historical values may not be compared between these 2 groups. Changes in slope indicate changes in daily rates of suicide mortality between periods of interest, corrected for 2017 to 2019 mean cumulative suicide mortality for corresponding dates. As such, this figure represents progressive divergence from historical cumulative suicide counts with positive slopes indicating increasing cumulative suicide counts compared with historical values and negative slopes indicating decreasing cumulative suicide counts compared with historical values. Shaded areas of fitted lines represent 95% CIs. B, COVID-19 burden in Maryland during periods of interest is presented to provide historical context, illustrating the 7-day average of confirmed new COVID-19 cases per day per 1 000 000 Maryland residents (black) and the 7-day average of COVID-19–related deaths per day per 1 000 000 Maryland residents (blue) as reported by the Johns Hopkins University Center for Systems Science and Engineering.

were extracted for 1079 suicide decedents from comprehensive chief medical examiner records for suicide deaths from January 1, 2017, to July 7, 2020. This study was deemed exempt from review by the Johns Hopkins Institutional Research Board as the deidentified data were deemed not human subjects research.

Historically significant break points were selected: March 5 (first COVID-19 case in Maryland, resulting in a statewide emergency declaration) and May 7 (first reopen-

ing of public spaces in Maryland). The resultant periods of interest were period 1 (January 1, 2020, to March 4, 2020 [pre–COVID-19]); period 2 (March 5, 2020, to May 7, 2020 [progressive closure]); and period 3 (May 8, 2020, to July 7, 2020 [progressive reopening]). Daily suicide mortality in 2020 was stratified by race/ethnicity and compared with mean values from 2017 to 2019 for these periods using paired, 2-tailed, Wilcoxon signed rank tests. Significance was set at $P < .05$.

To visualize divergence from historical norms, adjusting for seasonality, cumulative difference plots were constructed illustrating differences between cumulative suicide mortality in 2020 compared with means from 2017 to 2019 for each period. To investigate changes in suicide mortality between periods of interest, interrupted time series analysis was conducted using segmented regression. A slope change model was hypothesized and evaluated.

Results | Data included a total of 1079 suicide decedents: 289 in 2017, 305 in 2018, 249 in 2019, and 236 in 2020 (Table). During period 2, mean (SD) suicide mortality increased among Black residents (0.344 [0.541] per day in 2020 vs 0.177 [0.245] per day from 2017 to 2019; $P < .01$) and decreased among White residents (0.672 [0.837] per day in 2020 vs 1.224 [0.631] per day in 2017 to 2019; $P < .001$). During period 3, suicide mortality did not differ from historical values among Black residents (0.230 [0.529] per day in 2020 vs 0.290 [0.336] per day in 2017 to 2019; $P = .68$) but decreased among White residents (0.787 [1.018] per day in 2020 vs 1.126 [0.618] per day in 2017 to 2019; $P = .03$). Daily suicide mortality in 2020 did not differ from the means in 2017 to 2019 for either race during period 1.

In the Figure, panel A presents cumulative difference plots representing cumulative suicide mortality in 2020 minus mean values for corresponding dates in 2017 to 2019. Deaths among Black residents of Maryland displayed increased slope following March 5, 2020 (β = 0.300 suicides per day; 95% CI, 0.279-0.320; $P < .001$) and decreased slope following May 7, 2020 (β = −0.187 suicides per day; 95% CI, −0.209 to 0.165; $P < .001$) on the interrupted time series analysis. Deaths among White residents displayed decreased slope following March 5, 2020 (β = −0.477 suicides per day; 95% CI, −0.528 to −0.427; $P < .001$) and increased slope following May 7, 2020 (β = 0.239 suicides per day; 95% CI, 0.186-0.292; $P < .001$).

Discussion | These findings suggest changing suicide trends during the pandemic with opposite effects observed between Black and White residents of Maryland. Among Black residents, suicide mortality appeared to double during period 2 compared with the means in 2017 to 2019. In contrast, suicide mortality appeared nearly halved among White residents during periods 2 and 3 compared with the means of 2017 to 2019. Population sizes did not change substantially between 2017 and 2019.[3]

To our knowledge, this study is the first to characterize suicide trends by race/ethnicity during COVID-19, highlighting the importance of timely identification of high-risk groups. Black individuals are disproportionately impacted by COVID-19.[2,4] Increased suicide mortality in period 2, when deaths due to COVID-19 peaked and Maryland was locked down, reflects this difference. The unexpected decrease in suicides among White residents may be due to greater capacity for remote work or benefits from relief efforts. Further research is needed to characterize these trends. As continuing pandemic restrictions represent public health priorities,[5] policy interventions and targeted resource allocation may be warranted to mitigate disparities impacting Black individuals.[6]

This study has important limitations. State variations in race relations, COVID-19 experiences, government responses, and suicide trends limit generalizability, and suicide counts rather than rates were analyzed to avoid artificial inflation of relatively small counts in the analyses. Comparisons of suicide mortality with the means of previous years may be limited by COVID-19-independent trends in suicidality and year-to-year variations. Results should be interpreted cautiously.

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