

# SARS-CoV-2 Positivity Rates Among Children of Racial and Ethnic Minority Groups in Mississippi

Kengo Inagaki, MD,<sup>a,b</sup> Padma Garg, MD,<sup>a</sup> Charlotte V. Hobbs, MD<sup>a</sup>

Coronavirus disease 2019 (COVID-19) has highlighted racial and ethnic disparities that have existed for decades.<sup>1</sup> Most researchers of such reports have focused on adults,<sup>2,3</sup> but health disparities in COVID-19 are being increasingly reported in children.<sup>4</sup> The American Deep South, including Mississippi, has historically grappled with racial and ethnic disparities<sup>5-7</sup> and has become an epicenter of the pandemic in the summer of 2020. In addition, Mississippi is one of the most resource-limited states in the country. However, reports on positivity rates, a parameter reflecting the epidemic burden and adequacy of testing, are lacking for this region. Delineating health disparities will help shape public health strategies in controlling the epidemic. In this study, we aimed to characterize the positivity rates for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) among children from different racial and ethnic groups in Mississippi.

## METHODS

We performed a retrospective study using a deidentified COVID-19 registry at the University of Mississippi Medical Center, which was deemed nonhuman subjects research per the institutional review board. The University performs SARS-CoV-2 reverse transcriptase polymerase chain reaction (RT-PCR) on nasopharyngeal samples collected at university hospitals and ambulatory and drive-by clinics, health

departments, and 12 hospitals and clinics outside of the university network statewide, representing a unique and diverse data set from private and public health services. Children aged  $\leq 18$  years who underwent SARS-CoV-2 RT-PCR between March 11, 2020, and August 12, 2020, were included in the analysis. Testing for any indication was included, as per previous reports.<sup>8</sup>

The primary exposure of interest was self-reported race and ethnicity. American Indian, Alaska Native, Asian American, Native Hawaiian or Pacific Islander, and multiracial were categorized as “other” races, on the basis of US Census standards (<https://www.census.gov>). Health insurance status was used as a surrogate for socioeconomic status and was categorized as Medicaid, private, and others. The primary outcome of interest was positive SARS-CoV-2 RT-PCR. Positivity rates were calculated as the number of positive cases divided by total individuals tested.

Bivariate analysis was performed by using a Pearson  $\chi^2$  test. Multivariable analysis was performed by developing a logistic regression model, and R software version 3.5.2 was used. Two-sided significance level was set at 0.05.

## RESULTS

Of 4802 children undergoing SARS-CoV-2 RT-PCR, 623 had a positive test result (13.0%). Minority children had higher positivity rates (non-Hispanic



Departments of <sup>a</sup>Pediatrics and <sup>b</sup>Population Health Science, Medical Center, University of Mississippi, Jackson, Mississippi

Dr Inagaki conceptualized and designed the study, collected data, conducted the initial analyses, interpreted data, drafted the initial manuscript, and reviewed and revised the manuscript; Dr Garg made significant contribution to data analysis and interpretation of data and revised the manuscript critically for important intellectual content; Dr Hobbs made significant contribution to data analysis and interpretation of data and revised the manuscript critically for important intellectual content; and all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved and approved the version to be published.

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Address correspondence to Kengo Inagaki, MD, Department of Pediatrics, University of Michigan / C.S. Mott Children's Hospital, 1500 E Medical Center Drive, Ann Arbor, MI 48374. E-mail: [kengo@med.umich.edu](mailto:kengo@med.umich.edu).

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Black: 15.8%, Hispanic: 24.6%) than non-Hispanic white children (5.9%) (Table 1). In multivariable analysis, the risk of nonwhite race and ethnicity remained substantial (Table 1). Of note, the “other insurance” category included Medicaid (2 patients), self-pay (1984 patients), and other insurance (65 patients).

Testing capacity expanded over the study period (Fig 1). Rates in Hispanic and other race children were erratic. Positivity rates in Black and white children increased over time. The rate in Black children was consistently and considerably higher than that of white children (Fig 1). Notably, positivity rates in the last 7 to 8 weeks of the study period (July

through August 2020) were ~20% among non-Hispanic Black children. These data are reflected in the statewide data reported to the American Academy of Pediatrics, which has shown that Mississippi is among the top in cumulative cases per 100 000 as of the most recent report.<sup>9</sup>

## DISCUSSION

We found substantially higher positivity rates for SARS-CoV-2 testing in minority children compared with white counterparts in Mississippi. This is the first report of positivity rate in children in the American Deep South, where health disparities are historic, and in Mississippi, one of the most resource-

limited American states. In addition, in this study, we review a larger sample size and wider state-coverage area than similar previous reports in children, and we cover the period from the beginning of epidemic to the lockdown and the release of lockdown measures with the start of the school year.

Potential limitations of our study include those inherent in its retrospective design. Residual confounding in the regression model, which included health insurance status as a surrogate for socioeconomic status, is possible, although the high magnitude of difference after adjusting for available covariates suggests the presence of disparities. Also, as a single-center study, selection bias cannot be excluded in inferring the population level estimates, although wide coverage of testing in the state would theoretically mitigate this weakness.

These results highlight the need for more aggressive public health interventions targeted to children,<sup>10</sup> and minority children should not be left behind.

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## ABBREVIATIONS

COVID-19: coronavirus disease 2019  
 RT-PCR: reverse transcriptase polymerase chain reaction  
 SARS-CoV-2: severe acute respiratory syndrome coronavirus 2

**TABLE 1** Characteristics of Children Tested for SARS-CoV-2

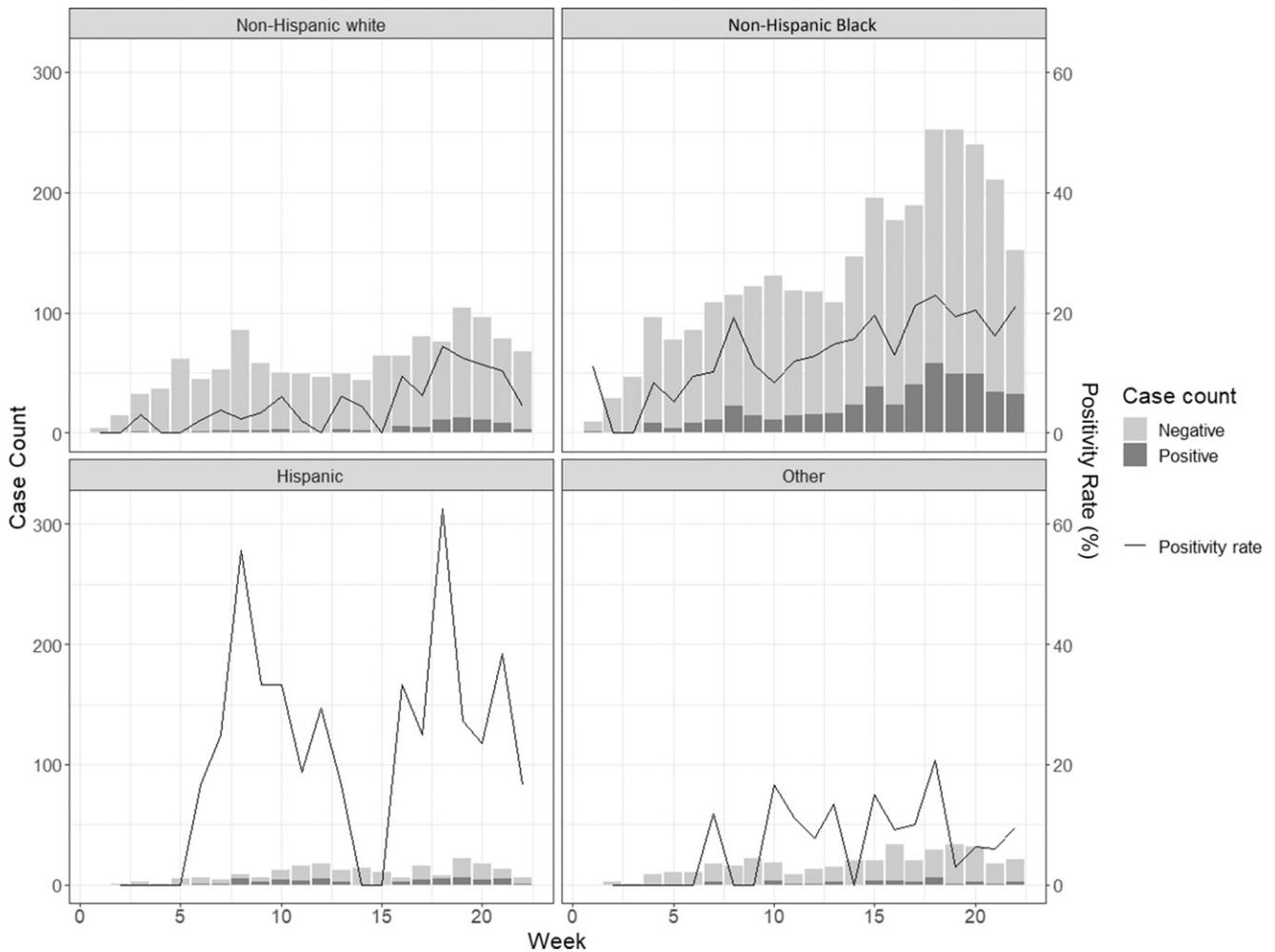
| Characteristics    | SARS-CoV-2 RT-PCR Test Result                   |  | Bivariate Analysis, <i>P</i> <sup>a</sup> | Positivity Rate, <sup>b</sup> % | Multivariable Analysis <sup>c</sup> |          |
|--------------------|---|--|---|---------------------------------|-------------------------------------|----------|
|                    | Negative<br>( <i>n</i> = 4179), <i>n</i><br>(%) | Positive<br>( <i>n</i> = 623), <i>n</i><br>(%) |   |                                 | Odds Ratio<br>(95% CI)              | <i>P</i> |
| Race and ethnicity |   |  | <.001                                     |                                 |                                     |          |
| Non-Hispanic white | 1183 (28.3)                                     | 74 (11.9)                                      |   | 5.9                             | Reference                           | —        |
| Non-Hispanic Black | 2505 (59.9)                                     | 470 (75.4)                                     |   | 15.8                            | 3.03<br>(2.34–3.96)                 | <.001    |
| Hispanic           | 153 (3.7)                                       | 50 (8.0)                                       |   | 24.6                            | 5.53<br>(3.66–8.33)                 | <.001    |
| Others             | 338 (8.1)                                       | 29 (4.7)                                       |   | 7.9                             | 1.17<br>(0.74–1.83)                 | .49      |
| Sex                |   |  | .79                                       |                                 |                                     |          |
| Male               | 2092 (50.1)                                     | 308 (49.4)                                     |   | 12.8                            | Reference                           | —        |
| Female             | 2084 (49.9)                                     | 315 (50.6)                                     |   | 13.1                            | 0.94<br>(0.79–1.11)                 | .46      |
| Age, y             |   |  | <.001                                     |                                 |                                     |          |
| <1                 | 670 (16.0)                                      | 47 (7.5)                                       |   | 6.6                             | Reference                           | —        |
| 1–4                | 1249 (29.9)                                     | 129 (20.7)                                     |   | 9.4                             | 1.47<br>(1.04–2.12)                 | .032     |
| 5–12               | 1220 (29.2)                                     | 195 (31.3)                                     |   | 13.8                            | 1.99<br>(1.42–2.84)                 | <.001    |
| 13–18              | 1040 (24.9)                                     | 252 (40.4)                                     |   | 19.5                            | 2.96<br>(2.11–4.22)                 | <.001    |
| Primary insurance  |   |  | <.001                                     |                                 |                                     |          |
| Private            | 704 (16.8)                                      | 67 (10.8)                                      |   | 8.7                             | Reference                           | —        |
| Medicaid           | 1790 (42.8)                                     | 190 (30.5)                                     |   | 9.6                             | 0.88<br>(0.65–1.19)                 | .39      |
| Other              | 1685 (40.3)                                     | 366 (58.7)                                     |   | 17.8                            | 1.49<br>(1.13–2.00)                 | .006     |

CI, confidence interval; —, not applicable.

<sup>a</sup> *P* values were obtained by using  $\chi^2$  test.

<sup>b</sup> Number of positive cases divided by total counts.

<sup>c</sup> Performed by developing a logistic regression model.



**FIGURE 1**  
Temporal trend of SARS-CoV-2 RT-PCR testing results among children in Mississippi by race and ethnicity. Week 1 is the period starting on March 11, 2020, and ending on March 17, 2020 (eg, week 5: April 8, 2020–April 14, 2020; week 10: May 13, 2020–May 19, 2020; week 15: June 17, 2020–June 23, 2020).

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