Disparities in SARS-CoV-2 Testing for Hispanic/Latino Populations: An Analysis of State-Published Demographic Data

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ABSTRACT

Racial and ethnic minorities in the United States have been disproportionately affected by the COVID-19 pandemic, experiencing increased risk of infection, hospitalization, and death. In this study, we sought to examine race- and ethnicity-based differences in SARS-CoV-2 testing. We used publicly available US state dashboards to extract demographic data for COVID-19 cases and tests. Poisson regression models were used to model the effect of race and ethnicity on the number of SARS-CoV-2 tests performed per case. In total, just 8 states reported testing data by race and ethnicity. In regression models, race and ethnicity was a significant predictor of testing rate per case. In all states, Hispanic/Latino patients had a significantly lower testing rate than their non-Hispanic/Latino counterparts, with an incident rate ratio varying from 0.45 to 0.81, depending on the state and referent race category. These results suggest disparities in testing access among Hispanic/Latino individuals, who are already at a disproportionate risk for infection and severe outcomes.

KEY WORDS: COVID-19 diagnostic testing, pandemic response, racial and ethnic disparities, testing infrastructure

Diagnostic testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19), is a critical public health surveillance tool. Testing allows health professionals to gauge the current level of infection in the community, evaluate

the effectiveness of certain public health interventions, and target the distribution of public health resources. Prompt diagnosis of SARS-CoV-2 infection also permits linkage to appropriate care and the interruption of further case spread via the isolation of affected individuals.[1,2]

The COVID-19 pandemic has highlighted existing health-based disparities in the United States. In the early months of COVID-19, studies found that racial and ethnic minorities were, if tested, more likely to test positive for SARS-CoV-2 and consistently accounted for a greater proportion of cases than their respective shares of the population. Once infected, patients of color also experienced a greater risk for severe disease and mortality than White patients.[3,4] Disparities in infection rates and case fatality are highly pronounced in Hispanic/Latino individuals, for whom the likelihood of infection, hospitalization, and death remains elevated compared with White patients.[5,6]

While disparities in COVID-19 infection and death rates are known, inequities in diagnostic testing infrastructure remain generally unexplored. Prior research suggests that Hispanic/Latino individuals may experience substantial barriers to SARS-CoV-2 testing receipt.[7] Hispanic/Latino patients are less likely than their White counterparts to have health insurance, which limits access to COVID-19 testing and other care options.[8] Primary language and immigration

status also inform the care cascade; a survey administered to Spanish-speaking Latinx immigrants found that many reported restricted access to testing and treatment services and that a significant proportion feared "immigration ramifications" following visits to care centers.[9] Taken together, these factors suggest limited testing accessibility and/or outreach in Hispanic/Latino communities, where COVID-19 infection rates are often higher than those in White communities.[5,6] An additional study conducted in California found that Hispanic/Latino populations experienced the smallest improvements in test positivity during the early months of the pandemic, suggesting a failure to appropriately upscale testing outreach to account for transmission levels.[10] In this study, we sought to explore whether state-published testing data reflected these same disparities in access.

Methods

We examined all state-level COVID-19 "dashboards" for SARS-CoV-2 testing data by race and ethnicity. Dashboards were defined as any public-facing online data aggregator managed by the health departments of the 50 US states and the District of Columbia. Dashboards were identified by Internet search query. We included only states that reported the number or proportion of diagnostic tests administered by race and ethnicity. "Diagnostic tests" refers to molecular or antigen tests; data for antibody tests were excluded, as antibody data are not used to diagnose COVID-19. Demographic data were extracted manually from state dashboards by a team of data scientists. Data are current as of September 24, 2021, and are cumulative in nature: figures reported on state dashboards represent the total number of state-recorded cases and tests since the start of the pandemic. Case data by race and ethnicity were also obtained, with "case" defined as any individual with a positive molecular SARS-CoV-2 test or any individual with both a positive antigen test and clinical symptoms. We used Poisson regression to model the number of diagnostic tests conducted per case in each race and ethnicity strata. We used "tests per case" as our comparative metric to account for differences in case prevalence between categories. By adjusting for case levels, tests per case provide insight into whether states are appropriately scaling testing efforts to account for transmission. Certain states separated race data from ethnicity data in reporting; in states that reported ethnicity separately from race, non-Hispanic/Latino patients were selected as the referent group. In states that reported race and ethnicity data concurrently, non-Hispanic/Latino White patients were used as the referent group. All analyses were conducted with Stata Statistical Software: Release 17.0.

Results

Just 8 states provided a breakdown of testing data by race and ethnicity: Delaware, Illinois, Indiana, Kansas,

TABLE
Association Between Race and Ethnicity Category and Tests Conducted per Case

State	Race and Ethnicity Category	IR ($\frac{\text{Tests}}{\text{Cases}}$)	IRR (95% Confidence Interval)
Delaware	Non-Hispanic/Latino	6.02 ($\frac{643\ 144}{106\ 849}$)	Reference
	Hispanic/Latino	3.89 ($\frac{74\ 975}{19\ 275}$)	0.646 (0.641-0.651)[a]
Illinois	Non-Hispanic White	15.8 ($\frac{10\ 800\ 023}{684\ 416}$)	Reference
	Hispanic/Latino	8.20 ($\frac{2\ 226\ 366}{271\ 567}$)	0.520 (0.519-0.520)[a]
Indiana	Non-Hispanic/Latino	3.98 ($\frac{2\ 108\ 395}{529\ 267}$)	Reference
	Hispanic/Latino	3.21 ($\frac{173\ 384}{54\ 088}$)	0.805 (0.801-0.809)[a]
Kansas	Non-Hispanic/Latino	3.81 ($\frac{1\ 002\ 362}{263\ 318}$)	Reference
	Hispanic/Latino	2.67 ($\frac{136\ 567}{51\ 085}$)	0.702 (0.698-0.706)[a]
Missouri	Non-Hispanic/Latino	12.6 ($\frac{6\ 085\ 258}{482\ 133}$)	Reference
	Hispanic/Latino	7.40 ($\frac{201\ 797}{27\ 280}$)	0.586 (0.583-0.589)[a]
Nevada	Non-Hispanic White	4.54 ($\frac{541\ 492}{119\ 342}$)	Reference
	Hispanic/Latino	2.03 ($\frac{222\ 529}{109\ 711}$)	0.447 (0.445-0.449)[a]
Rhode Island	Non-Hispanic White	3.73 ($\frac{299\ 986}{80\ 515}$)	Reference
	Hispanic/Latino	1.93 ($\frac{76\ 015}{39\ 461}$)	0.517 (0.513-0.521)[a]
Utah	Non-Hispanic White	7.14 ($\frac{2\ 348\ 581}{329\ 152}$)	Reference
	Hispanic/Latino	4.53 ($\frac{433\ 463}{95\ 792}$)	0.634 (0.632-0.636)[a]

Abbreviations: IR, incidence rate; IRR, incident rate ratio.
[a]P < .001.

Missouri, Nevada, Rhode Island, and Utah. Results from the Poisson models are presented in the Table. Incidence rate (IR) refers to the number of tests conducted per case in each race and ethnicity group. Incidence rate ratio (IRR) denotes the difference between each given category and the indicated reference group.

Per the results of our models, Hispanic/Latino individuals received significantly fewer tests per case than non-Hispanic/Latino (IRR range, 0.59-0.81) and non-Hispanic/Latino White individuals (0.45-0.63). The difference appeared more pronounced between Hispanic/Latino and non-Hispanic/Latino White patients. The most significant between-group difference was observed in Nevada, where non-Hispanic/Latino individuals received less than half as many tests per case as non-Hispanic White patients (IRR = 0.45). It is also worth noting that Nevada has the greatest proportion of Hispanic/Latino individuals by population of any state on this list, suggesting a substantial unmet testing need in this state. The lowest overall test per case figure was seen in Rhode Island, with 1.93 tests conducted per case among Hispanic/Latino individuals. All comparisons were significant at a *P* value of .001, suggesting persistent, major disparities across states.

The raw number of tests per case also provides substantial insight into state-level testing infrastructure. In Rhode Island, fewer than 2 tests were administered per case among Hispanic/Latino individuals. In Illinois and Nevada, in contrast, the number of tests per case within this same stratum exceeded 8. The greatest ratio overall was observed among non-Hispanic White patients in Illinois, at 15 tests per case. These findings suggest substantial between-state differences in testing infrastructure and uptake, even among White patients.

Discussion

These data indicate that disparities in COVID-19 transmission and outcome patterns also extend to testing. Compared with non-Hispanic/Latino patients, Hispanic/Latino patients received significantly fewer COVID-19 tests, even when accounting for potentially disparate case levels. The between-group gap widened when the referent category was limited to non-Hispanic White patients. These results corroborate prior findings that testing outreach and accessibility for Hispanic/Latino individuals may be insufficient to account for transmission and case levels.

These disparities likely persist for myriad reasons. Job status is known to play a role in COVID-19 testing accessibility and frequency, and in the early stages of the pandemic, Hispanic/Latino individuals experienced greater job loss than any other demographic category.[11] Many Hispanic/Latino individuals also face language barriers at health care facilities, which likely lead to lower testing uptake.[10] Furthermore, studies of vaccination rates have found that many immigrants from Latin American countries feel unsure of where to obtain COVID-19 care and feel they have less access to care-related information. It is likely immigration status is a major component in testing uptake,[9,12] though it was not captured in our data set.

This study is subject to certain limitations. In addition to the absence of information on immigration status, age data were not available by race and ethnicity category, thus preventing adjustment for this potential confounder. Furthermore, only 8 states publicly reported testing data by race and ethnicity; therefore, our results are not generalizable

Implications for Policy & Practice

- These results suggest that we must work to reduce disparities in COVID diagnosis, not just case and death rates. This may require active campaigns to expand access and uptake of testing in communities that are underrepresented in the data set.

- Testing outreach is important because prompt diagnosis connects patients to lifesaving care and illuminates patterns of transmission within communities.

- Underdiagnosis of COVID-19 results in increased transmission of the virus and thus increased case rates, which are of particular concern in underserved or disenfranchised communities.

- Specific elements to incorporate in testing outreach campaigns include hiring Hispanic/Latinx community health workers. In addition, while we did not have geographic data at our utility, a 2021 analysis by Grigsby-Toussaint et al[13] suggests that "increase[d] placement" of COVID-19 testing sites in primarily Hispanic/Latinx (and Black) neighborhoods is likely to increase testing uptake, as many of these neighborhoods reported a dearth of testing resources.

- A 2021 review by Galletly et al[9] highlighted language barriers as a significant impediment to testing and care uptake. As such, the increased provision of Spanish-language outreach materials may help close the testing gap. Spanish-speaking Hispanic/Latinx care workers may also increase testing accessibility and uptake.[9]

- It is very likely these disparities exist across the country, though data were only available for 8 states. It is important that state health departments invest in reporting demographic-level data for testing, where possible. The standardization of demographic data across states is also important to allow for national-level surveillance of testing trends and disparities.

to the United States as a whole. The absence of demographic data in the remaining states is itself an important finding; however, it suggests there are major detection gaps in surveillance programs. Even among states analyzed, demographic data were frequently incomplete, with each jurisdiction including an "unknown" race and ethnicity category in its reports. The proportion of tests listed as "unknown" is as follows: Delaware, 11.6%; Illinois, 39.8%; Indiana, 44.3%; Kansas, 33.8%; Missouri, 38.2%; Rhode Island, 52.8%; and Utah, 9.8%. Only Nevada provided a complete demographic breakdown for all tests. Tests assigned to an "unknown" demographic category were excluded from analyses; this introduces a degree of uncertainty in reported IRRs. However, the persistence of the observed disparity between Hispanic/Latino and non-Hispanic/Latino categories across multiple states, despite various degrees of missingness, suggests that these disparities are real and not artifacts of reporting gaps.

We also acknowledge the disparities among other disenfranchised groups in the United States, which are an appropriate subject for future review. Among the studied populations, lower testing rates likely reflect a need for increased resource allocation and outreach. Testing positivity is often an early sign of case growth,[2] and testing is the first step in linking patients to necessary care. Without complete, standardized demographic data, we risk substantial knowledge gaps in the transmission patterns of COVID-19. We must properly address these discrepancies in testing uptake and accessibility in order to mitigate the impact of COVID-19 on vulnerable communities.

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