Original Report:
COVID-19

Racial and Ethnic Disparities in COVID-19: Rate Ratios Provide an Incomplete Picture of US Trends, April 2020 – March 2021

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Recent increasing rates of COVID-19 cases, hospitalizations, and deaths among non-Hispanic Whites have led to declining rate ratios at a time of continuing high burden of COVID-19 in American Indian/Alaska Native, Asian/Pacific Islander, African American, and Hispanic/Latino populations. The use of all epidemiological tools, including rate ratios and actual rates per 100,000 population, provides a more comprehensive assessment of the magnitude and trends of racial and ethnic disparities in COVID-19. *Ethn Dis*. 2022;32(2):109-112; doi:10.18865/ed.32.2.109

Keywords: COVID-19; Race; Ethnicity; Health Equity; Health Disparity

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Introduction

A central feature of the COVID-19 pandemic in the United States has been the disproportionately higher impact in underserved racial/ethnic minority populations compared to non-Hispanic Whites.[1] The Centers for Disease Control and Prevention (CDC) has nicely conveyed these disparities and their trends using rate ratios, which compares the incidence rates, person-time rates, or mortality rates of two groups.[2, 3] While these ratios are easy for the public to grasp and are widely cited, interpreting changes in their magnitude over time can be challenging. For example, the rate ratios for COVID-19 hospitalization in American Indian/Alaska Native, Black/African American, and Hispanic/Latino persons vs non-Hispanic White were 5.7, 4.7, and 4.6, respectively in August 2020.[2] By February 2021, these ratios had declined to 3.7, 2.9, and 3.1, respectively.[2] However, it was unclear whether this meant hospitalization rates had improved in the underserved population, worsened in the referent population (non-Hispanic Whites) or reflected different degrees of improvement and/or worsening in all populations. To further explore this, we examined actual rates per 100,000 population by race/ethnicity for COVID-19 cases, hospitalizations, and deaths using most recent data available from CDC.[4,5]

Methods

Cumulative incident rates (number of new cases in a specified time period divided by total number of population at risk) were calculated and examined quarterly (April-June 2020; July-September 2020; October-December 2020; January-March 2021) for racial/ethnic minority populations compared with non-Hispanic Whites. Case and death data by race/ethnicity are from the COVID-19 Case Surveillance Public Use Data with Geography, which are shared with CDC by health departments in states, territories, tribes, and municipalities.[4] Hospital data by race/ethnicity are from the CDC COVID-19-Associated Hospitalization Surveillance Network, that collects data on laboratory-confirmed COVID-19-associated hospitalizations among children and adults through a network of more than 250 acute-care hospitals in 14 states.[5]

Results

Racial/ethnic disparities were largest in April-June 2020 and July-

September 2020. The disparities have shifted with increasing cases, hospitalizations, and deaths from non-Hispanic Whites in October-December 2020 and January-March 2021. However, overall burden of COVID-19 among racial/ethnic minority populations have steadily increased, with disparities existing most consistently for hospitalizations associated with COVID-19.

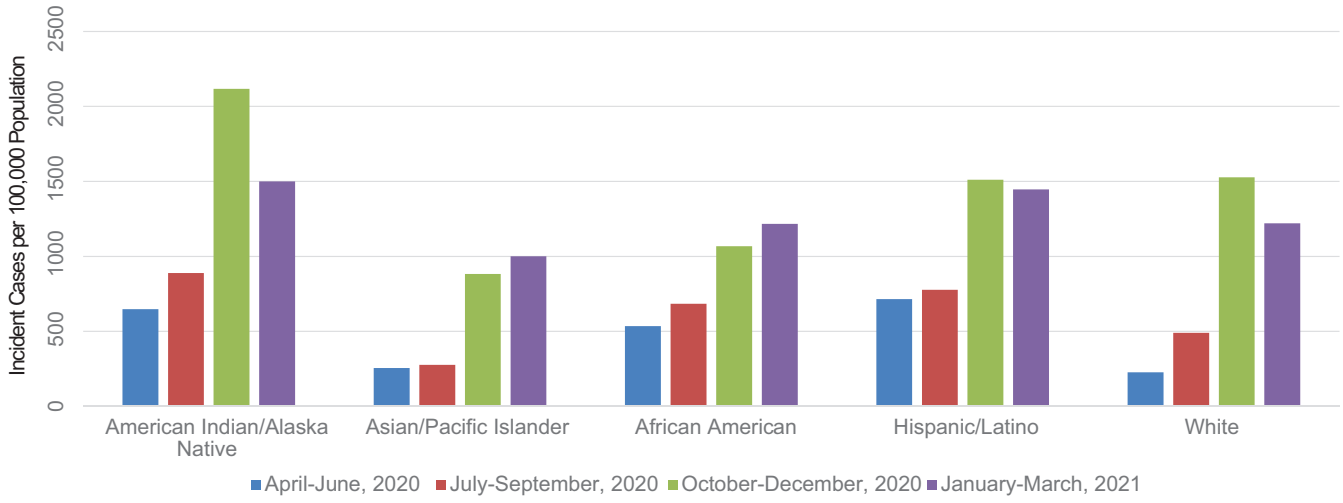
Quarterly examinations suggested that cumulative incident cases per 100,000 population was highest for Hispanics/Latinos in April-June 2020 and highest for American Indians/Alaska Natives in other quarters (Figure 1). Meanwhile, cumulative incident rates of COVID-19 cases increased dramatically among non-Hispanic Whites in October-December 2020 and January-March 2021, which are higher or comparable to rates among Hispanic/Latino, African American, and Asian/Pacific Islander populations.

All populations showed increasing hospitalization rates in October-December 2020, especially for American Indians/Alaska Natives and non-Hispanic Whites (Figure 2). This explains why the hospitalization rate ratios for African Americans and Hispanics/Latinos (using non-Hispanic Whites as the referent population) have declined over the course of the pandemic. Cumulative rates per 100,000 population of hospitalizations was highest for American Indians/Alaska Natives in October-December 2020 and January-March 2021. Hospitalization rates for African Americans increased from October-December 2020 to January-March 2021, which is particularly alarming.

Cumulative incident deaths per 100,000 population was also highest for American Indians/Alaska Natives in October-December 2020 and January-March 2021 (Figure 3). Meanwhile, cumulative incident deaths increased from July-September 2020 to October-December 2020 for all minority populations. However, death rates for non-Hispanic Whites were higher than that for African American, Asian/Pacific Islander, and Hispanic/Latino populations in October-December 2020 and January-March 2021. The declining rate ratios are largely due to demographic shift of risk for infection and hospitalization among Non-Hispanic Whites in the recent quarters.

Discussion

The COVID-19 pandemic has provided important lessons for public health practitioners and researchers on the importance of addressing health inequities. Cumulative and quarterly rates per 100,000 population by race/ethnicity for confirmed cases, hospitalizations, and deaths from COVID-19 demonstrated early disproportionate impact in underserved and vulnerable



Source: COVID Data Tracker

NIH National Heart, Lung, and Blood Institute

Figure 1. COVID-19-associated cases by race and ethnicity

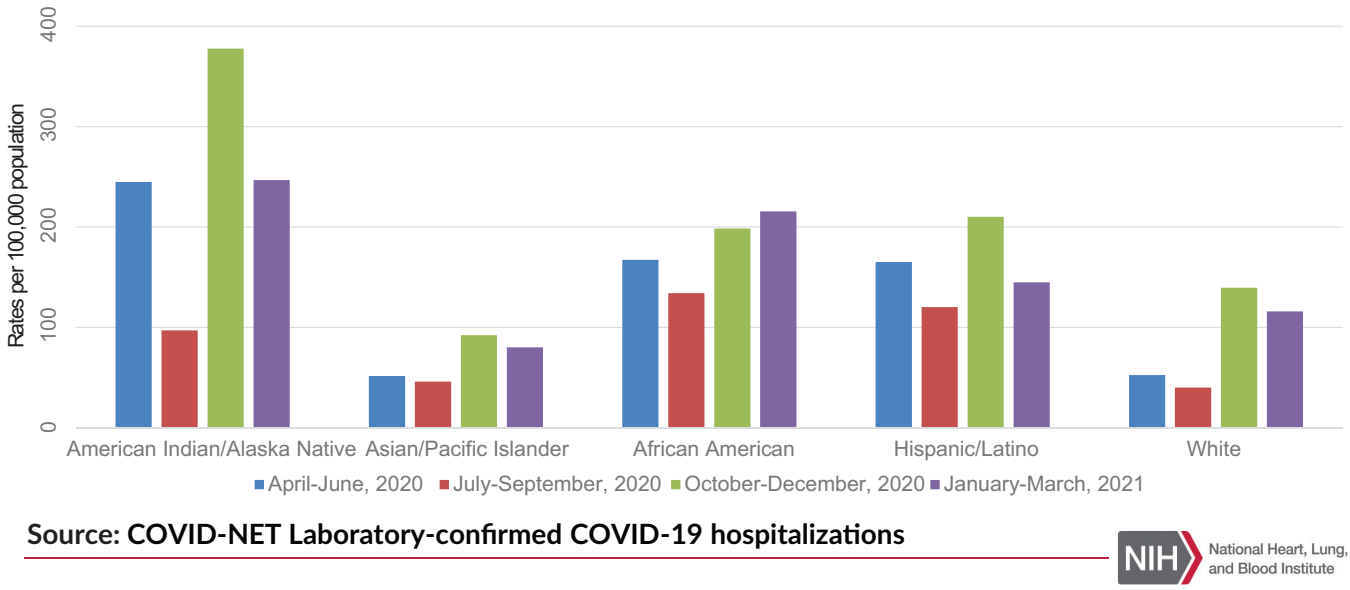


Figure 2. COVID-19-associated hospitalization rates by race and ethnicity

populations and then spread to others. This could be an important lesson about racial/ethnic and SES privilege in the form of employment opportunities, working environment, health care access, housing situations, etc. which serve to protect at least initially against novel infectious diseases during a global pandemic.[6] Using all epidemiology tools including rate ratios and actual rates helps provide a complete picture of the progression of the disease and a better understanding of how to prepare for subsequent pandemics in ways that will mitigate exacerbation of disparities from the beginning.

A decline in racial/ethnic disparities is not a desirable outcome if the decline is due to worsening rates in non-Hispanic Whites; especially in the setting of a continuing high burden in American Indian/Alaska Native, Asian/Pacific Islander, African American, and Hispanic/Latino populations. The most recent CDC report using data from 20% of US hospital admissions also found that disparities in hospitalization by race/ethnicity became less pronounced as risk increased among non-Hispanic White population.[3] As a result, declining rate ratios do not necessarily reflect any improvement of cases, hospitalizations, and deaths among health disparities populations.

These data from CDC highlight the persistence of racial/ethnic disparities in COVID-19, which reflect the long-existing disparities in access to care, quality of health care, and adverse impact of social determinants of health.[7] Moreover, low socioeconomic status (SES) including income, education, and joblessness have worsened the COVID-19 risk for not only racial/ethnic minority populations but also Whites with low SES or living in rural underserved areas. Active community engagement to reach all underserved and disproportionally impacted communities is crucial for the success of pandemic response.

Continued public health surveillance of health inequities in COVID-19 pandemic is needed to identify where to target limited resources such as testing, contact tracing, personal protective equipment, treatments, and vaccines. Initiatives such as the NIH Community Engagement Alliance (CEAL) Against COVID-19 Disparities (https://covid19community.nih.gov/) are also necessary for promoting inclusive participation among disproportionately impacted communities. Most importantly, renewed emphasis on community engagement and outreach to address misinformation and build trusting relationships in disproportionately impacted communities is crucial.

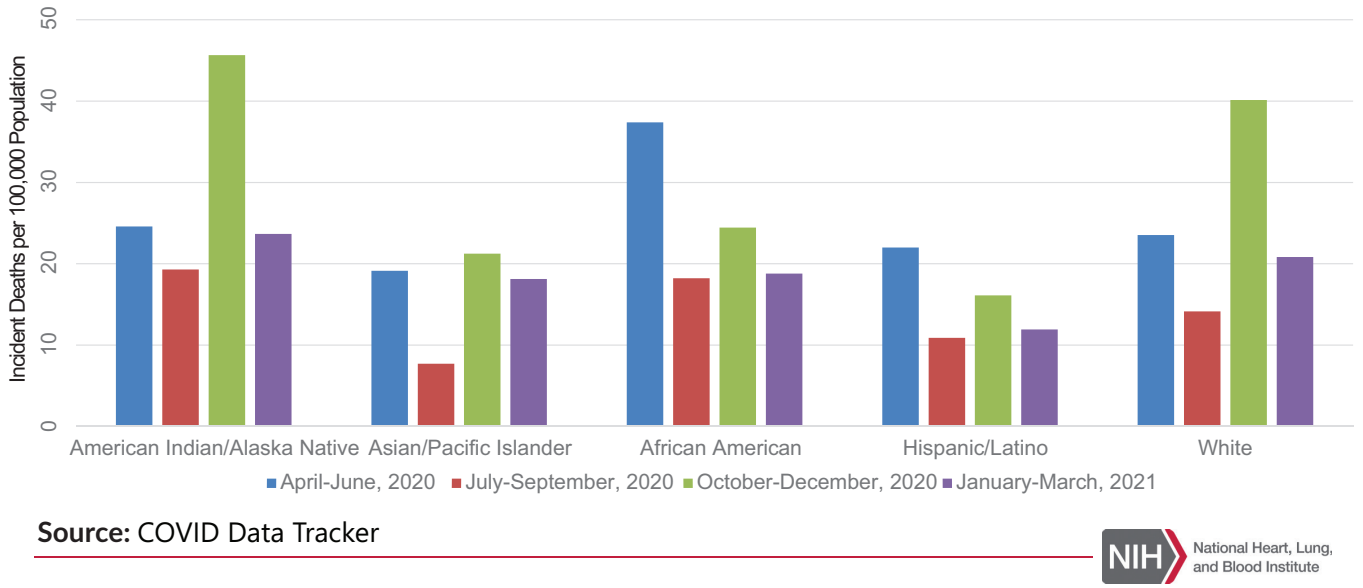


Figure 3. COVID-19-associated deaths by race and ethnicity

Conclusion

Rate ratios represent a relatively simple metric for gauging the magnitude of COVID-19 disparities in underserved racial/ ethnic populations relative to non-Hispanic Whites. However, the decline in rate ratios over time can mask important adverse trends in underserved populations if the actual rates rise in the referent population. In the United States., recent increasing rates of COVID-19 cases, hospitalizations, and deaths among non-Hispanic Whites have led to declining rate ratios at a time of continuing high burden of COVID-19 in American Indian/Alaska Native, Asian/Pacific Islander, African American, and Hispanic/Latino populations. The use of all epidemiological tools, including rate ratios and actual rates per 100,000 population, provides a more comprehensive assessment of the magnitude and trends of racial and ethnic disparities in COVID-19.

Acknowledgments

The authors thank all the support from the National Heart, Lung, and Blood Institute, National Institutes of Health and all those who contributed to the collection of COVID-19 tracking data from the Centers for Disease Control and Prevention.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute, National Institutes of Health, or the United States Department of Health and Human Services.

Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Zhang, Stoney, Mensah; Acquisition of data: Zhang; Data analysis and interpretation: Zhang, Stoney, Mensah; Manuscript draft: Zhang, Stoney, Mensah; Statistical expertise: Zhang, Mensah; Acquisition of funding: N/A; Administrative: Zhang, Stoney, Mensah; Supervision: Mensah

References

1. Webb Hooper M, Nápoles AM, Pérez-Stable EJ. COVID-19 and racial/ethnic disparities. *JAMA*. 2020;323(24):2466-2467. https://doi.org/10.1001/jama.2020.8598 PMID:32391864
2. Centers for Disease Control and Prevention. Risk for COVID-19 Infection, Hospitalization, and Death by Race/Ethnicity. Last accessed April 16, 2021. https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html
3. Romano SD, Blackstock AJ, Taylor EV, et al. Trends in racial and ethnic disparities in COVID-19 hospitalizations, by region - United States, March-December 2020. *MMWR Morb Mortal Wkly Rep*. 2021;70(15):560-565. https://doi.org/10.15585/mmwr.mm7015e2 PMID:33857068
4. Centers for Disease Control and Prevention. *COVID-19 Response. COVID-19 Case Surveillance Public Use Data with Geography (version date: March 31, 2021)*. April 17, 2021.
5. Centers for Disease Control and Prevention. *COVID-19 Response. Coronavirus Disease 2019 (COVID-19)-Associated Hospitalization Surveillance Network (COVID-NET) (version date: March 31, 2021)*. April, 17, 2021.
6. Link BG, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav*. 1995;35(Spec No):80-94. https://doi.org/10.2307/2626958 PMID:7560851
7. Riley WT, Mensah GA. Social determinants of health and implementation research: lessons from the COVID-19 pandemic. *Ethn Dis*. 2021;31(1):5-8. https://doi.org/10.18865/ed.31.1.5 PMID:33519150