

SOCIAL FACTORS, HEALTH CARE INEQUITIES AND VACCINATION

Edited by Jennie Jacobs Kronenfeld

RESEARCH IN THE SOCIOLOGY
OF HEALTH CARE

VOLUME 40

SOCIAL FACTORS, HEALTH CARE INEQUITIES AND VACCINATION

RESEARCH IN THE SOCIOLOGY OF HEALTH CARE

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EDITED BY

JENNIE JACOBS KRONENFELD

Arizona State University, USA



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INVESTOR IN PEOPLE

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SECTION 1

VACCINATION

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HOW RESIDENTIAL SEGREGATION MODERATES THE ASSOCIATION BETWEEN RACIAL/ETHNIC COMPOSITION AND COVID-19 VACCINATION RATES ACROSS METROPOLITAN COUNTIES IN THE US

Caroline Wolski, Kathryn Freeman Anderson
and Simone Rambotti

ABSTRACT

Purpose: Since the development of the COVID-19 vaccinations, questions surrounding race have been prominent in the literature on vaccine uptake. Early in the vaccine rollout, public health officials were concerned with the relatively lower rates of uptake among certain racial/ethnic minority groups. We suggest that this may also be patterned by racial/ethnic residential segregation, which previous work has demonstrated to be an important factor for both health and access to health care.

Methodology/Approach: In this study, we examine county-level vaccination rates, racial/ethnic composition, and residential segregation across the U.S. We compile data from several sources, including the American Community Survey (ACS) and Centers for Disease Control (CDC) measured at the county level.

Findings: We find that just looking at the associations between racial/ethnic composition and vaccination rates, both percent Black and percent White are

significant and negative, meaning that higher percentages of these groups in a county are associated with lower vaccination rates, whereas the opposite is the case for percent Latino. When we factor in segregation, as measured by the index of dissimilarity, the patterns change somewhat. Dissimilarity itself was not significant in the models across all groups, but when interacted with racial ethnic composition, it moderates the association. For both percent Black and percent White, the interaction with the Black-White dissimilarity index is significant and negative, meaning that it deepens the negative association between composition and the vaccination rate.

Research limitations/implications: *The analysis is only limited to county-level measures of racial/ethnic composition and vaccination rates, so we are unable to see at the individual-level who is getting vaccinated.*

Originality/Value of Paper: *We find that segregation moderates the association between racial/ethnic composition and vaccination rates, suggesting that local race relations in a county helps contextualize the compositional effects of race/ethnicity.*

Keywords: Race/ethnicity; residential segregation; COVID-19; vaccination rates; Infectious disease; US counties

INTRODUCTION

The COVID-19 pandemic has highlighted the existing racial/ethnic disparities in health outcomes, as well as health care delivery systems in the United States. Throughout the duration of the pandemic, research has shown that racial/ethnic minority populations, Blacks, Latinos, and Native Americans in particular, are disproportionately more likely to contract the virus and suffer from more severe complications of the infection, increasing the risk of hospitalization and death (Biggs et al. 2021; Bilal et al. 2021; Dasgupta et al. 2020; Freese et al. 2021; Gaynor and Wilson 2020; Karaye and Horney 2020; Khazanchi et al. 2020; Kim and Bostwick 2020; Neelon et al. 2021; Rifat and Liu 2021; Wrigley-Field et al. 2021). Moreover, other research has shown how this is patterned by neighborhood and region, with residents of minority segregated neighborhoods being at greater risk of poor COVID-19 health outcomes (Anderson, Lopez, and Simburger 2021; Yang, Choi, and Sun 2021). However, the rapid development of the COVID-19 vaccines during the first year of the pandemic presented a lifeline to individuals at risk of contracting the illness and experiencing severe disease outcomes. On December 11, 2020, less than a year after the SARS-CoV-2 virus was introduced in the U.S., the Food and Drug Administration (FDA) gave emergency approval for the first COVID-19 vaccine, the Pfizer-BioNTech mRNA vaccine (Lovenheim 2022). Just a week after that, on December 18, 2020, the Moderna mRNA vaccine was also granted emergency use authorization (Lovenheim 2022). Despite these early successes in the development of the vaccines, getting the vaccine distributed and encouraging vaccine uptake across a large proportion of the population has proved challenging (Alaran et al. 2021; Persad, Peek, and Emanuel 2020).

Early in the vaccine rollout, due to limited supplies and cold storage requirements, access was difficult. Even though eligibility requirements favored the elderly and those with preexisting comorbidities, research demonstrated that time, access to reliable transportation, and internet access were key to being able to secure a vaccination appointment (Abdul-Mutakabbir et al. 2021; Prescott and Prescott 2021; Schmidt 2020; Wu 2022). Moreover, with regard to race, some work has shown that vaccine allocations were less likely to be made to predominantly racial/ethnic minority communities (Anderson and Ray-Warren 2022). With time, access to the vaccine has been made easier with ample supplies and time to develop the distribution infrastructure (Wu 2022). However, we still observe disparities in who is actually getting vaccinated. Research has demonstrated throughout the vaccine rollout that certain racial/ethnic minority groups have had lower rates of vaccine uptake, including Blacks and Latinos (Barry et al. 2021; Brown, Young, and Pro 2021; Crane, Faden, and Romley 2021; Hughes et al. 2021). However, more recent work has noted that this has shifted, where Latinos are getting vaccinated at higher rates than previously, and Whites appear now to be less likely to get vaccinated (Wu 2022). Yet, a disparity remains for Black Americans. Moreover, these patterns appear to vary by locale, both by the racial/ethnic composition of an area, as well as by state, region, or cities, with certain areas boasting much higher vaccination rates on average (Ndugga et al. 2022; Reitsma, Goldhaber-Fiebert, and Salomon 2021).

In this analysis, we aim to address the confluence of these two factors, by examining both area-level race/ethnicity, as well as how these patterns may differ by the extent of residential segregation in that county. In particular, given the patterns for both race/ethnicity, as well as segregation, we suggest that racial/ethnic segregation may shape the association between racial/ethnic composition and vaccine uptake. Specifically, we ask: How does county-level racial/ethnic composition relate to rates of COVID-19 vaccination uptake? And additionally, does the level of segregation in the county moderate this association? We expect that the racial and ethnic composition of counties will be related to patterns of vaccination uptake across areas. However, we expect that this will differ based on the local racial/ethnic context in terms of segregation. Given previous work on the ways in which segregation can impact overall health, access to resources, and the quality and provision of medical care, we expect that racial/ethnic minorities will be less likely to get vaccinated in more highly segregated contexts. First, we review the extant literature on the topic, especially the patterns specific to the COVID-19 pandemic.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The global pandemic has generated extensive scholarly conversation examining COVID-19 as not only a virus, but as a critical health crisis and distinct social problem that has resulted in disproportionate health consequences, especially for individuals living in socially vulnerable areas with higher concentrations of

low-income and racial/ethnic minority individuals. Since the emergence of the novel coronavirus, scholars have contributed a diverse set of perspectives and approaches to exploring the social nature of the disease. Extensive literature has focused on the disproportionate distribution of burden of COVID-19 including cases, hospitalizations, and mortality across social groups (Biggs et al. 2021; Bilal et al. 2021; Dasgupta et al. 2020; Freese et al. 2021; Gaynor and Wilson 2020; Karaye and Horney 2020; Khazanchi et al. 2020; Kim and Bostwick 2020; Neelon et al. 2021; Rifat and Liu 2021; Wrigley-Field et al. 2021). There has been a recent growth in studies centered around COVID-19 vaccinations; however, the existing literature remains limited due to the novelty of COVID-19 and their corresponding vaccines (Agarwal et al. 2021; Anderson and Ray-Warren 2022; Barry et al. 2021; Cardona et al. 2021; Crane, Faden, and Romley 2021; Njoku, Joseph, and Felix 2021; Reitsma, Goldhaber-Fiebert, and Salomon 2021). Further research is critical to building a comprehensive understanding of the unequal health consequences and access to health care and to identify the necessary interventions required to alleviate the health disparity. Few studies have addressed the relationship between segregation and COVID-19 mortality, and the literature is missing research that is focused on the direct relationship between segregation and COVID-19 vaccination. This study aims to fill the gap in the literature and explore county-level vaccination rates, racial/ethnic composition, and residential segregation.

COVID-19 Health Outcomes

The rise of COVID-19 has resulted in a rapid growth of scholarly work that aims to understand the distribution of health outcomes across different social groups and social environments. A number of studies have taken a spatial approach to exploring COVID-19 health outcomes and found that the rates of COVID-19 cases, hospitalization, and mortality are unequal across different locales in the United States. On the county-level, counties that rank higher on the social vulnerability index and counties with higher percentages of low-income, housing instability, and racial/ethnic minorities are associated with higher rates of COVID-19 burden (Biggs et al. 2021; Bilal et al. 2021; Dasgupta et al. 2020; Freese et al. 2021; Gaynor and Wilson 2020; Karaye and Horney 2020; Khazanchi et al. 2020; Kim and Bostwick 2020; Neelon et al. 2021; Rifat and Liu 2021; Wrigley-Field et al. 2021). In particular, Black, Hispanic, and Native American racial/ethnic groups experience higher rates of cases, hospitalization, and mortality (Acosta et al. 2021; Bassett, Chen, and Krieger 2020; Cordes and Castro 2020; Khanijahani and Tomassoni 2021; Laurencin et al. 2021; Marrett 2021; Mude et al. 2021; Tai et al. 2021).

Additional research has demonstrated that the distribution of COVID-19 burden is unequal by income and socio-economic status of both individuals and areas. Low-income is linked to higher rates of COVID-19-associated mortality (Liao and Maio 2021; Oronce et al. 2020; Sepulveda and Brooker 2021; Tan et al. 2021). Furthermore, the pandemic has resulted in economic consequences that have increased socioeconomic disparities in the United States. For

example, job loss due to COVID-19 business closures has resulted in loss of employer-sponsored health coverage and increased housing instability, therefore increasing risk of exposure and COVID-19 burden (Ahmad et al. 2020; Banthin et al. 2020; Benfer et al. 2021; Bryan et al. 2020; Bundorf, Gupta, and Kim 2021; Cordes and Castro 2020; Dorn and Gordon 2021; Gangopadhyaya, Karpman, and Aarons 2020; Jones and Grigsby-Toussaint 2020; Kamis et al. 2021; Leifheit et al. 2021; Miller, Wherry, and Mazumder 2021; Varshney and Adalbert 2021; Woolhandler and Himmelstein 2020). However, it is critical to take an intersectional approach to understand the narrative of COVID-19 racial/ethnic disparity. Low-income is unequal across social groups, bearing negative consequences to racial/ethnic minority groups. Furthermore, racial/ethnic minorities are more likely to work in the essential worker labor force making them less likely to work from home and are concentrated in socially vulnerable areas with increased unstable housing, increasing risk of COVID-19 burden (Do and Frank 2020; McCormack et al. 2020; Oronce et al. 2020; Tai et al. 2021). Thus, the relationship between low-income and COVID-19 burden is not only related to socioeconomic disparity, but moreover, reflective of racial/ethnic disparities.

Although extensive literature has explored the relationships between COVID-19 burden and low-income and social vulnerability, there is very limited research that addresses the association between segregation and COVID-19 health outcomes directly. The available literature has largely examined COVID-19-related mortality rates prior to 2021 and is thus limited in temporal scope. For example, Khanijahani and Tomassoni (2021) found a significant association between the percent of residents living in concentrated disadvantage and Black-concentrated tracts and the rate of mortality associated with COVID-19. Additional research indicated a significant association between COVID-19-related mortality segregation between non-Whites and Whites (Tian et al. 2021). Paul et al. (2021) contributed to this literature and found that Black-White residential segregation led to an increase in COVID-19 mortality rates in only urban areas, compared to rural areas. Another study found that early in the pandemic across four U.S. cities, racial/ethnic clustering at the neighborhood level was associated with higher infection rates (Anderson et al. 2021).

Past research has demonstrated that the patterns of disproportionate health outcomes that were present pre-pandemic are reflected in the current context of COVID-19. The unequal distribution of COVID-19 health outcomes underlines the critical need for equal access to health care and health care utilization, especially in segregated, socially vulnerable areas with high concentrations of low-income and racial/ethnic minorities. In the context of COVID-19, vaccine uptake is critical to alleviating the health disparity across social groups.

COVID-19 Vaccine Uptake

Similar to the spatial patterning of COVID-19 burden, the distribution of COVID-19 vaccination rates is disproportionate across geo-spatial location, bearing consequences to residents of socially disadvantaged areas with greater populations of racial/ethnic minorities individuals (Agarwal et al. 2021; Anderson

and Ray-Warren 2022; Barry et al. 2021; Cardona et al. 2021; Crane, Faden, and Romley 2021; Njoku, Joseph, and Felix 2021; Pingali et al. 2021; Reitsma, Goldhaber-Fiebert, and Salomon 2021; Wong et al. 2021). Additional research has demonstrated that counties that rank higher on the social vulnerability index have lower county-level vaccination rates (Barry et al. 2021; Brown, Young, and Pro 2021; Crane, Faden, and Romley 2021; Hughes et al. 2021). Moreover, the vaccine disparity between high and low social vulnerability counties is non-static and has increased throughout the pandemic (Crane, Faden, and Romley 2021). Measures of social vulnerability include socioeconomic status, race/ethnicity, and housing instability. Although social vulnerability indicates a likely relationship between segregation and COVID-19 vaccine uptake, further research is necessary to test the direct relationship between segregation and COVID-19 vaccine uptake, especially throughout the course of the pandemic.

The COVID-19 literature has demonstrated that the health inequalities that were present pre-pandemic, are not only reflected in patterns of COVID-19 health outcomes and access to health care, but moreover, the disparity is magnified. Past scholarly work has found that concentrated neighborhood disadvantage impacts mortality and health outcomes through unequal access to health care services (Kirby and Kaneda 2005), increased exposure to environmental toxins and increased likelihood of experiencing occupational hazards, social isolation and disorder, and poor-quality education systems and housing (Braveman et al. 2010; Holt-Lunstad et al. 2015; Massey 2004; Schulz et al. 2002; Williams and Collins 2001). Concentrated neighborhood disadvantage is, furthermore, disproportionately endured by racial and ethnic minorities within the context of segregated areas, particularly Black and Latino populations (Anderson 2016; Hummer 1996; Williams and Sternthal 2010).

In the context of COVID-19, past literature has identified that socially vulnerable areas with high concentrations of racial/ethnic minority and low-income individuals are associated with greater rates of COVID-19 burden (Biggs et al. 2021; Bilal et al. 2021; Dasgupta et al. 2020; Freese et al. 2021; Gaynor and Wilson 2020; Karaye and Horney 2020; Khazanchi et al. 2020; Kim and Bostwick 2020; Neelon et al. 2021; Rifat and Liu 2021; Wrigley-Field et al. 2021) and lower rates of COVID-19 vaccine uptake (Barry et al. 2021; Brown, Young, and Pro 2021; Crane, Faden, and Romley 2021; Hughes et al. 2021). Segregation is linked to social factors that indicate social vulnerability and are associated with COVID-19 vaccine uptake including concentrated low-income and racial/ethnic minority populations. Williams and Collins (2001) theorized that segregation, the institutionalized discriminatory practice that placed racial/ethnic groups into separated residential areas, is a fundamental cause of racial health disparities. Segregation has resulted in geospatial areas with high concentrations of racial/ethnic minorities and low-income individuals (Williams and Collins 2001) and produces negative health outcomes by way of housing instability, limited educational and employment opportunities, environmental toxins, and access to health care (Williams and Collins 2001). As such, empirical research has linked racial/ethnic segregation to a wide variety of poor health and health care outcomes, such as mortality, including infant mortality, overall poorer