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History Repeating—How Pandemics Collide with Health Disparities in the United States

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Abstract

Across the United States, public health responses to the COVID-19 pandemic have fallen short. COVID-19 has exacerbated longstanding public health shortfalls in disadvantaged communities. Was this predestined? Understanding where we are today requires reflection on our longer journey. Disparities cataloged during COVID-19 reflect the same unequal host exposure and susceptibility risks that shaped previous pandemics. In this review, we provide historical context to better understand current events and to showcase forgotten lessons which may motivate future action to protect our most vulnerable citizens.

Keywords Health disparities · COVID · Pandemic · United States · Public health

In the future we will look back on this epidemic of influenza with wonder and surprise; yes, in spite of our vaunted advancement, we have utterly failed in the recent crisis. — T.C. Brackeen (1918).

The 1918 Influenza (H1N1) Pandemic

When the 1918 pandemic began in the USA, city health departments had pre-existing authority to act. Health departments relied on established tactics used during previous polio and tuberculosis outbreaks, such as mandatory quarantines and public closures [1, 2]. As the number of cases climbed around the country, social distancing rules and quarantine restrictions were put in place. For example, San Antonio was placed under "the most rigid quarantine in the history of any Texas city" with "practically everything ordered closed" [3]. New Orleans took "dramatic steps" by closing all public schools and limiting the number of people on street cars [4]. In Oregon, not wearing a mask in public spaces was punishable by law [5]. In Los Angeles, the city required citizens to pay their taxes by mail rather than in person [7]. While these tactics were not new, the scale to which they were implemented was unprecedented [1].

Local media played a crucial role in shaping public understanding and attitudes during this pandemic. Some public health officials and local governments partnered with newspapers to broadcast new ordinances and to foster social buy-in (Fig. 1) [7].

Despite the advantages of such newspaper coverage, official public health orders were often inconsistent and unclear. There was no complementary effort to coordinate

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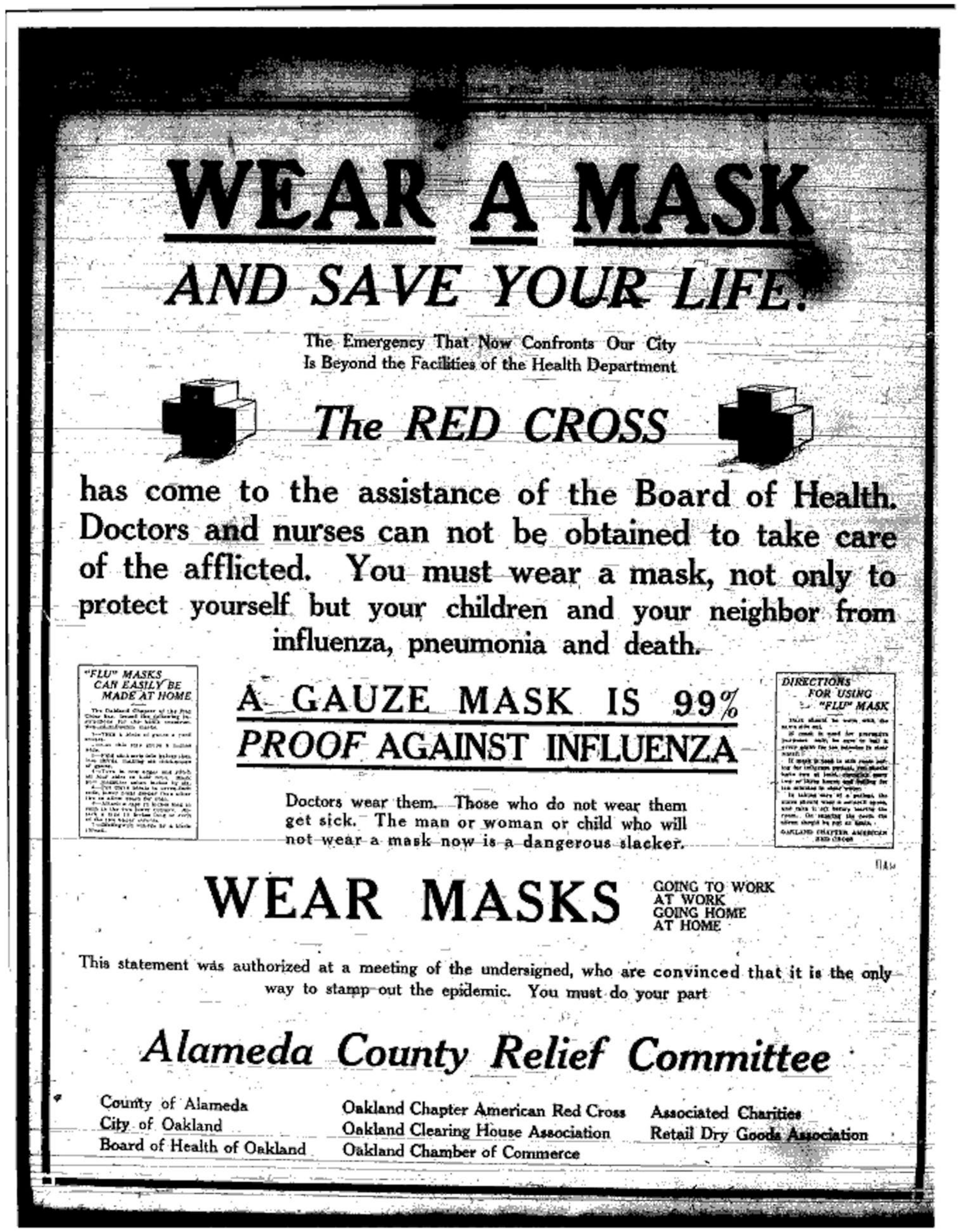


Fig. 1 Public service message encouraging masks (Oakland Tribune, October 23, 1918, p. 2) [7]

public health messaging at the national level. Many people resisted strict closures and downplayed the disease. Some publicly wrote of "influenza hysteria," which they claimed to be more deadly than the flu itself [9]. In late October 1918, the Columbus City Health Commissioner told reporters that the city would remain open, and that with "proper preventative measures and avoidance of hysteria, there is no danger of epidemic" [10]. As the pandemic wore on, criticism of public closures and masking grew (Fig. 2) [11].

Local officials lacked federal guidance and had to fend for themselves. In Colorado, the Rocky Mountain News reported that "many people ignore health board rules" [12]. On November 1918, the Pennsylvania State Health Commissioner Dr. Royer wrote that the pandemic "relief work [is] menaced by acts of the mayor" after the Pittsburgh mayor decided that he would no longer enforce bans on businesses or public spaces [13]. In Spokane, Washington, some police officers pushed back against mask mandates, forgoing them even while in uniform [14]. The city health officer demanded that any officers disobeying the mandate be immediately arrested. The Massachusetts State Department of Health Epidemiologist wrote that "the absence of uniform methods of organization…in the department of health have bungled…the handling of the influenza pandemic" [15].

At baseline, those who lived in urban settings in the Southeast had higher mortality rates from infectious diseases than any other US region [16]. This has been attributed to disproportionate mortality among African Americans [17,

AGGRESSIVE ANTI-FLU CAMPAIGN BEST METHOD TO COMBAT PLAGUE

San Francisco Declares Mask Checked Epidemic, Los Angeles Scorns It; New York Calls Closing Order Unnecessary; Boston Death Rate High.

MASKS NOT POPULAR; MANY PEOPLE IGNORE HEALTH BOARD RULES

One Salesgirl's Nose Goes to Sleep, Another Has Higher Power Guarding Her Health, That's Why They Don't Wear Flu Bibs.

Fig. 2 Newspaper headlines from Denver, CO (Rocky Mountain News, November 24, 1918, p. 5) [11, 12]

18]. From 1906 to 1920, African Americans in cities experienced a rate of death from infectious disease that was greater than what urban Whites experienced during the 1918 pandemic [16]. During the pandemic, cities that imposed synergistic non-pharmaceutical interventions, such as closure of public spaces and schools, isolation of infected individuals, quarantine of those with sick contacts, and mask mandates, had an estimated 50% lower death rate than cities that did not [19, 20]. Such measures were sustained for an average of only 2–8 weeks. After restrictions were released, cities typically faced a second wave of disease. No city suffered a second pandemic wave while measures remained in place [19]. Cities that ordered social distancing measures earlier and for longer periods of time—such as Indianapolis, Milwaukee, and Columbus—experienced lower death rates than cities who delayed such orders or enforced them for shorter periods. Cities that relaxed social distancing measures early on, such as St. Louis, often saw multiple spikes in influenza deaths. Philadelphia delayed implementing social distancing measures and enforced them for shorter periods of time compared to many cities. After the first 24 weeks of the pandemic, their death rates were the highest in the country, reaching 748 deaths per 100,000 people. Minneapolis had the lowest death rate at this time (267 deaths per 100,000 people), which is largely attributed to its early implementation of and prolonged adherence to public health measures that encouraged social distancing [18].

Many observers at the time described the 1918 pandemic as "socially neutral" [21]. However, race and income were critical to how the pandemic was experienced by the public [22, 23]. In 1918, the early case fatality rate for influenza for non-White individuals was initially higher than for White individuals, particularly in urban areas [22, 24, 25]. However, by late 1918, the morbidity and mortality rates in the Black population fell below those for Whites [17]. This was surprising to many, as mortality from respiratory diseases had previously been significantly greater among Blacks than Whites [26]. This was the only year across the entire twentieth century during which the US Black population experienced lower mortality rates from influenza than the White population. This was a widely acknowledged observation shared by both White public health officials and Black care providers [27]. Black soldiers stationed in the USA had lower influenza hospitalization rates than Whites throughout the country, and much lower than Whites from the south [26]. The US Public Health Service reported that in seven cities with large Black populations, the incidence rate among the Black population was lower than the White population, after adjusting for sex and age [24]. For example, in the fall of 1918, Philadelphia reported 11,875 white deaths due to influenza and pneumonia compared to 812 black deaths [27].

While the exact mechanisms responsible for these differences remain undefined, several theories are plausible. It could be hypothesized that Black urban communities were more likely to have exposure to the early milder strains, conferring at least partial immunity to later, more virulent waves of the pandemic. However, most of the Black population in the USA lived in the rural South, which did not have a well-documented influenza wave prior to autumn 1918. Another possible explanation is that many Black individuals who moved north during the First Great Migration were living in segregated and over-crowded conditions. Such segregation may have been "quarantined" Black communities from higher disease transmission in White areas. However, due to potential underreporting and questionable accuracy of data collection, it is difficult to definitively conclude what factors accounted for lower morbidity and mortality in the Black population during the fall of 1918.

Pre-existing respiratory diseases in the Blacks may have played an important role in the overall higher case fatality rate for this population. Blacks had higher mortality rates from all respiratory diseases than Whites prior to the pandemic [26]. In cities such as Baltimore, Maryland, and Detroit, tuberculosis was one of the leading causes of death in the Black population [17, 24]. Individuals with lung damage from tuberculosis were potentially predisposed to severe sequelae from influenza infection.

Native Americans suffered worst from influenza. The infection rate was 24% and total mortality among Navajos has been estimated to be as high as 12%, with 60% of deaths occurring in children under 15 years old [21]. Between October 1, 1918, and March 31, 1919, over 2% (6,270/304,854) of the general population died [26]. The national mortality rate was four times greater than the White population and overall life expectancy dropped by 11 years [63]. These represent underestimates due to incomplete reporting [26].

Data on influenza morbidity and mortality reveal that impact of the virus was intimately linked to socioeconomic status. Patients with lower socio-economic status had higher incidence, morbidity, and case fatality rates after accounting for race, sex, and age [24, 28, 29]. The "very poor" had a case fatality rate of 2.8 per 100 cases, while the "well-to-do" had a case fatality rate of 1.5 per 100 cases [24]. The study also found that crowded conditions within households significantly impacted morbidity rates [24, 26]. More rooms per person in a household was associated with a decreased attack rate [24, 29]. In Boston, it was found that families who lived in more crowded quarters were more likely to contract influenza and to have multiple cases within their household [26, 29]. Interestingly, data from the US Public Health Service failed to identify a relationship between influenza attack rate and population density, geographical region, or rural/urban location [26]. Certain social risk factors, such as literacy rates, were associated with influenza and pneumonia mortality during this period [30].

Access to care also predicted mortality [21]. Most cities lacked healthcare workers, who themselves were susceptible to infection. Many nurses and doctors had been pulled away for war efforts [8]. Staffing shortages across the USA had never been so acute [31]. Officials in Los Angeles noted that their hospitals were working with a "heavy handicap" after 7 doctors and 42 nurses contracted the flu [6]. In Syracuse, doctors and nurses treated patients around the clock in state hospitals, often forgoing their own private practices [32]. The four hospitals in the area were completely full and reported that 100 of their nurses had contracted influenza, forcing hospitals to urge civilians to volunteer. On October 1918, Nashville city hospitals had to turn patients away [33]. On February 1919, a Fredericksburg Virginia hospital was forced to close because nearly all of their nurses were ill [34]. In San Francisco, on a day where 33 new cases were reported, 11 of those cases were nurses [35].

African Americans faced additional barriers to healthcare due to segregated care. Black nurses were prohibited from serving in the military or working in the Red Cross during the early days of the pandemic [36]. The pandemic eventually forced the Army to lift its ban on Black nurses. Many hospitals across the country severely reduced their accessibility to Blacks or denied care outright. In Richmond, Virginia, many Black patients were treated in hospital basements until an elementary school was finally converted into a field hospital. In Philadelphia, only two hospitals accepted Black patients. The medical director of one of those hospitals fought to convert a Black school into a clinic to treat additional patients. He accomplished this without any financial support from the city, even though the city had supported several emergency clinics for non-Black populations. When the only hospital that treated black patients in Baltimore reached capacity, it was forced to turn patients away [27].

2009 H1N1 Pandemic

The recent H1N1 pandemic provides a timelier context to the COVID-19 pandemic. Cases of H1N1 swine flu began to be reported in the USA in early 2009, ultimately resulting in more than 60 million case events [37]. Many of these did not necessitate medical attention, which complicates demographic analysis [38]. The total estimated number of deaths was between 8868 and 18,306 [39].

One case series reviewed 377 fatalities; 328 had demographic correlates. Fatality rates varied by race, with the greatest proportion of deaths seen in White non-Hispanic patients (41.4%), followed by Hispanic (28.2%), Black non-Hispanic (20.7%), Asian/Pacific Islander (7.9%), and American Indian/Alaskan Native (1.9%). Hispanic patients accounted for 61% of deaths early in the pandemic in April and May of 2009, but only 25% of deaths in June and July. By this time point, most mortality events occurred in White non-Hispanic (44%) or Black non-Hispanic patients (21%). Although the racial composition of H1N1 fatalities shifted across the pandemic, Hispanic patients remained highest overall risk for death [40]. Occupation-specific disparities were also prominent, with 45% of all deaths with demographic information ($n = 169$) occurring among employed individuals, 30.2% in unemployed individuals, and 24.9% in students or children. Among employed individuals, the authors categorized occupations according to risk, finding that "high-risk" employment (i.e., frontline healthcare or public safety workers) comprised the lowest percentage of deaths (4%). "Medium-risk" (i.e., individuals with close contacts, such as teachers) and "low-risk" (i.e., individuals without close contacts) accounted for 40.8% and 55.3%, respectively [40]. In their discussion, the authors speculate that older individuals who had been exposed to "antigenically similar" influenza strains in the past seemed to have increased immunity to H1N1. Since most of the members of their "high-risk" group were healthcare workers, it could reasonably be assumed that these individuals were more likely to have yearly influenza vaccines which may have provided cross reactive immunity to H1N1. This could explain the lower mortality risk seen in "high-risk" individuals and adults.

Another study of 103 hospitalized cases focused on H1N1's relative impact on Native American populations in Alaska. Native populations had a hospitalization rate of 56/100,000 versus 14/100,000 for Whites and 21–33/100,000 for African Americans [41].

H1N1 transmission patterns reported in Wisconsin paralleled the 1918 pandemic. The mortality rate was higher in urban populations during both waves, similar to 1918. Rates of hospitalization during the first wave in Milwaukee were highest amongst minority groups, with 48% of hospitalized patients being Black and 29% being White. The second wave of infection was associated with higher morbidity and mortality rates than the first. Hospitalized patients during this second wave were three times less likely to be Black, five times less likely to be Asian, and two times less likely to be Hispanic than during the initial wave. Such risk trends during the second wave paralleled the 1918 pandemic. The authors speculate that this racially defined pattern of hospitalizations may have resulted from geographic segregation of minority neighborhoods, leading to differential exposure of minority groups to less virulent early strains of the virus and protective immunity [42].

Individuals in Illinois who had been hospitalized with H1N1 were surveyed for self-reported barriers to care. These included: lack of availability of sick leave, fear of missing work, language barriers, transportation issues, dislike of hospitals and crowded emergency rooms, desire to stay only with a known provider, and nihilism regarding efficacy of care. The time from symptom onset to hospitalization for Black and Hispanic respondents was 4 days, while for White respondents, it was only 2 days. Those who had barriers to seeking medical care had 2.69 days before hospital admission, while those without barriers only had 1.89 days [43].

Other documented racial patterns of health behavior adoption were complex and mixed. One study found that African American, Hispanics, and American Indians/Alaska natives were more likely to adopt preventative behaviors such as hand washing and social distancing compared with non-Hispanic whites during the pandemic [44]. However, the authors also found that minorities were less likely than Whites to seek the H1N1 vaccine. During the H1N1 pandemic, many individuals contracted disease and required hospitalization even after the vaccine became available. When asked why they did not receive the vaccine, many respondents stated that the lack of availability prevented them from getting vaccinated [45]. Taken together, patient race appears to have played a multifactorial role in determining the risk of exposure, susceptibility to complications, and access to care for H1N1 in the USA [46].

The American COVID-19 Pandemic Experience—a Mixture of Racially-Defined "Subpandemics"

American life expectancy has abruptly declined by 1 year during the COVID-19 era. Racial and ethnic groups have not contributed to this rise in mortality equally. For example, life expectancy of White males decreased by about 10 months in the first half of 2020. Over the same period, life expectancy for Black males fell by 3 years. Before COVID, life expectancy of Black males was 4 years shorter than that of White males. Six months into the pandemic, this disparity had widened to 6 years [47].

The baseline prevalence of health comorbidities, which is a downstream consequence of environmental, social, and healthcare access hardships experienced by disadvantaged populations, has contributed significantly to COVID-19's unequal impact [48, 49]. Black and Hispanic Americans are more likely than Whites to be diagnosed with obesity, hypertension, or diabetes [55]. Individuals with these conditions are more likely to experience adverse clinical COVID-19 outcomes [50, 51]. One study of COVID-19 mortality in Seattle found that 58% of all pandemic deaths occurred in diabetic patients, while half of these cases occurred in obese individuals [51, 52]. Such disproportionate chronic health burden is even starker in American Indian/Alaskan Native populations. The baseline age-adjusted mortality rate is 40% higher in this group than for the full US population [53]. The Indian Health Service has reported that diabetes-related mortality is 3 times greater than the national average [54]. Mortality rates from respiratory illnesses, such as pneumonia and influenza, and cardiovascular disease are also greater in the AI/AN population [53].

Downstream of these pre-existing health disparities, Black, Hispanic, and AI/AN populations have suffered higher infection, hospitalization, and death rates from COVID-19 than non-Hispanic Whites. The US Centers for Disease Control and Prevention (CDC) has reported that COVID-19 deaths among Hispanic or Latino, non-Hispanic Black, and AI/AN groups exceed their numerical representation within the total US population. A study published on June 2020 found that Blacks accounted for 34% of the total national COVID-19 mortality, despite representing only 13% of the population. In New York, Black individuals make up 22% of the population but suffered 28% of COVID-19 deaths. Hispanic individuals constitute 29% of the population but suffered 34% of COVID deaths [55]. US counties with a higher proportion of Black residents experienced a higher prevalence of COVID-19 diagnoses and deaths [56]. One study found that Black patients had 2.7 times the odds of being hospitalized for COVID-19 compared to non-Hispanic White patients after adjusting for age, sex, comorbidities and income [57]. Another study analyzed disparities in COVID-19 cases (defined by the authors as > 5% actual difference between proportion of cases and proportion of the population for underrepresented racial and ethnic groups) in 205 COVID-19 "hotspot" counties across 33 states. For those counties that reported demographic totals, nearly all (96.2%) noted disproportionately high case rates in minority populations [58]. Latino communities were particularly hard hit in locations with a higher population prevalence of heart disease and dense residential occupancy [59].

Native Americans have suffered the most severe consequences of all. On August 2020, the CDC reported that the cumulative incidence of COVID-19 in AI/AN populations was 3.5 times higher than that for non-Hispanic whites in 23 states [60]. On December 2020, the CDC investigated mortality rates in AI/AN individuals compared to non-Hispanic whites in 14 states. They found a pronounced COVID-19-related AI/AN mortality burden, particularly in young age groups. Among 20–29- and 30–39-year-olds, COVID-related mortality rates were a staggering 10.5 and 11.2 times higher than for non-Hispanic Whites of the same age, respectively [61]. Between April 30 and June 24, 2020, in Arizona, nearly 16% of COVID-related hospitalizations involved AI/AN individuals, despite representing only 4% of the state's population at large [62].

In addition to baseline health comorbidities, it bears mentioning that, as for prior pandemics, social and environmental determinants (e.g., housing density and insecurity, employment industry and status, private versus public transportation use) have undoubtedly contributed to pandemic disparities via increased exposure risk prior to availability of vaccines. Following infection, structural obstacles to healthcare access can intensify morbidity/mortality risk in vulnerable populations. Differential vaccine hesitancy may ultimately create stubborn negative feedback loops driving persistent localized transmission/re-infection, clinical morbidity, and worsened financial and social pressure within at-risk communities.

Finally, incomplete reporting of demographic data and mortality rates in AI/AN populations during COVID-19 echo shortsighted practices from a century ago [60, 61]. Although 80% of US states were reporting demographic information by race and ethnicity on April 2020, fewer than half specifically included AI/AN group nomenclature, instead referring to them as "other" [64]. In a study analyzing hospitalizations by race, only 8 of 12 included states reported information for AI/AN populations [62]. Clearer insight into racially defined COVID-19 pandemic transmission and morbidity remains an unmet priority.

The "End of the Beginning"— How Will We Shape Our Legacy in the COVID-19 Vaccination Era?

With reinvigorated federal commitment towards COVID-19 containment following the turnover of administrations, a new chance exists to break the cycle of repeated missteps from earlier pandemics. The structural barriers to this will not be eliminated instantly but can be identified and addressed through policy. This could prove crucial towards preventing longstanding inequitable COVID-19 transmission in socially vulnerable communities.

The most direct way to do this is through vaccine distribution and delivery. At every point since their emergency approval, vaccines have reached minority communities last and least effectively. Root causes of this disparity include poor access to shots and lower recipient trust and acceptance. Both issues are deeply interwoven with historical consequences of systemic racism and are difficult to separate. National surveys collected at the time of emergency approval in the late 2020 confirmed that baseline COVID-19 vaccine hesitancy in Black individuals was as high as 35–40% [65, 66]. Additional questioning also confirmed that up to half of Black adults were "not confident that the development of a COVID-19 vaccine (took) the needs of Black people into account" [65]. These attitudes softened somewhat in subsequent mid-Winter surveys, and efforts were scaled up across many metro areas to specifically target vaccine distribution to minority communities. However, the preexisting lack of health and social resources continued to make vaccination access much more challenging in disadvantaged, minority-majority neighborhoods, thwarting even well-intentioned policies [66, 68]. Remarkably, no more than half of US states explicitly took race, ethnicity, or social disadvantage into account in their vaccination planning. A survey of 47 publicly available state plans by the Kaiser Family Foundation just prior to vaccine approval revealed that only 25 states acknowledged health equity issues as part of their vaccine distribution planning [69].

Not surprisingly, vaccination rates in US minority groups have lagged significantly since the introduction of shots [70]. The first report of county-level vaccination rates by the Washington Post on March 2021 confirmed majority Black (15.3%) and majority Hispanic (16%) counties to have lower vaccination rates than White majority counties (18.6%) [67].

Our local experience in Memphis mirrors this, lending urgency to the situation. Baseline vaccine hesitancy in African Americans has been high. A community survey of 400 Memphians on November 2020 mirrored national trends, confirming that 45% of surveyed Black individuals would refuse a free vaccine [71]. Unfortunately, these attitudes overlap with high health burden. According to publicly available Health Department data, over 56% of COVID-19 cases in Shelby County (the home county of Memphis) have been diagnosed in African Americans (baseline 48.5% of the general population). Over 11% of cases have been found in Hispanic populations (baseline 5.6% of general population) [72].

By late April 2021, Memphis reached a tipping point whereby disproportionate vaccination in White neighborhoods began driving the concentration of remaining COVID-19 transmission towards minority communities. The pandemic had split in two, with demographics defining their boundaries. By the end of April, public reporting showed that approximately 30% of the county had received at least one vaccination dose. African Americans (36%) and Hispanics (4%) were disproportionately underrepresented in this population [73]. Most strikingly, 76% of COVID-19 cases surveyed by the county in April self-reported as African American [72]. Over 30% were employed in manufacturing or warehousing industries and 54% were between the ages of 18–44. By July 2021, geospatial mapping of COVID-19 case distribution confirmed that zip codes with the highest median income and proportion of White residents continued to have the highest vaccination and lowest case rates (Fig. 3) [74]. A troubling inverse distribution of lagging vaccination and elevated case rates was observed in low-income, minority-majority zip codes.

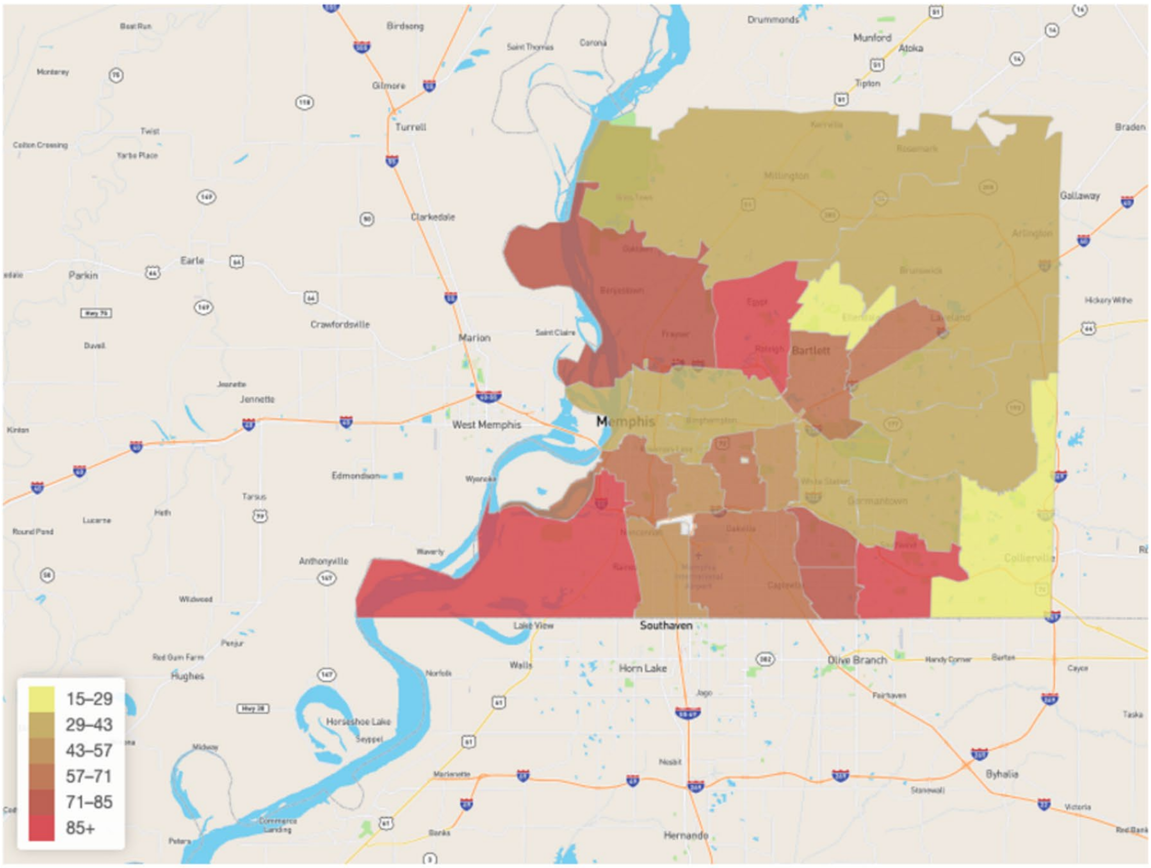
Taken together, without data-driven vaccination outreach, COVID-19 threatens to linger indefinitely in minority communities, fueled by focally transmission among younger people working in industrial jobs with limited health benefits and protections. The impact could be magnified by emerging COVID-19 variants with higher transmissibility, virulence, and reinfection rates. This risks reemergence of spread across the entire region. Downstream morbidity of COVID-19 (i.e., "long COVID") may eventually become segregated and endemic, with older generations suffering accelerated mortality and younger generations shouldering avoidable chronic debility. We would be forced to learn to live with, rather than from the severe health impacts of the pandemic.

Conclusions—Breaking Free from History

Much remains possible to shape the future of COVID-19, but equitable recovery will require decisive action. The historical missteps reviewed here continue to echo through to today. For example, limiting COVID-19 vaccination distribution to "efficient" large-scale drive-through sites requires vulnerable populations to overcome potential transportation obstacles. In Memphis, publicly funded at-home and neighborhood vaccination programs were pursued only after vaccination numbers at drive-through sites began to wane.

A real-world example of aggressive corrective action is provided by our own local leadership of the National Institutes of Health (NIH) Community Engagement Alliance (CEAL) Against COVID-19 Disparities project (https://covid19community.nih.gov/). Tennessee is one of 11 states funded by this program to spearhead statewide COVID-19 awareness and education research in at-risk African American, Hispanic, and AI/AN populations. One of our co-authors (A.S.) serves as a principal investigator for the western region of Tennessee. The ongoing aims of this program include (1) engagement of community partners to identify factors that contribute to COVID-19 disparities in disproportionately impacted communities in Western Tennessee and (2) implementation of community-engaged research and outreach focused on increasing COVID-19 knowledge and awareness, increasing testing, and optimizing vaccine uptake. The second aim leverages an ongoing prospective randomized controlled clinical trial. Research participants in both the control and intervention groups are provided culturally tailored COVID-19 prevention messaging. Those enrolled in the intervention group receive health promotion plus a range of resources and services to help them address social and structural inequities, including money, food, PPE, health care services, and mental health services. Outcome measures include qualitative COVID-19 knowledge and awareness metrics, self-reported COVID-19 safety prevention behaviors, and testing/vaccination uptake rates.

Such community-centered approaches which take vaccination and services directly to the underserved through culturally sensitive trust-brokered relationships promise to reduce our collective risk for smoldering COVID-19 transmission. In addition to increasing vaccine availability and access to medical care, such measures would facilitate educational outreach to vulnerable populations to reduce the impact of misinformation and vaccine hesitancy. Insights from such innovation promise to serve us well during future pandemics and could mark a milestone in our history in which we break a cycle of lost opportunities to protect the health of the entire American population.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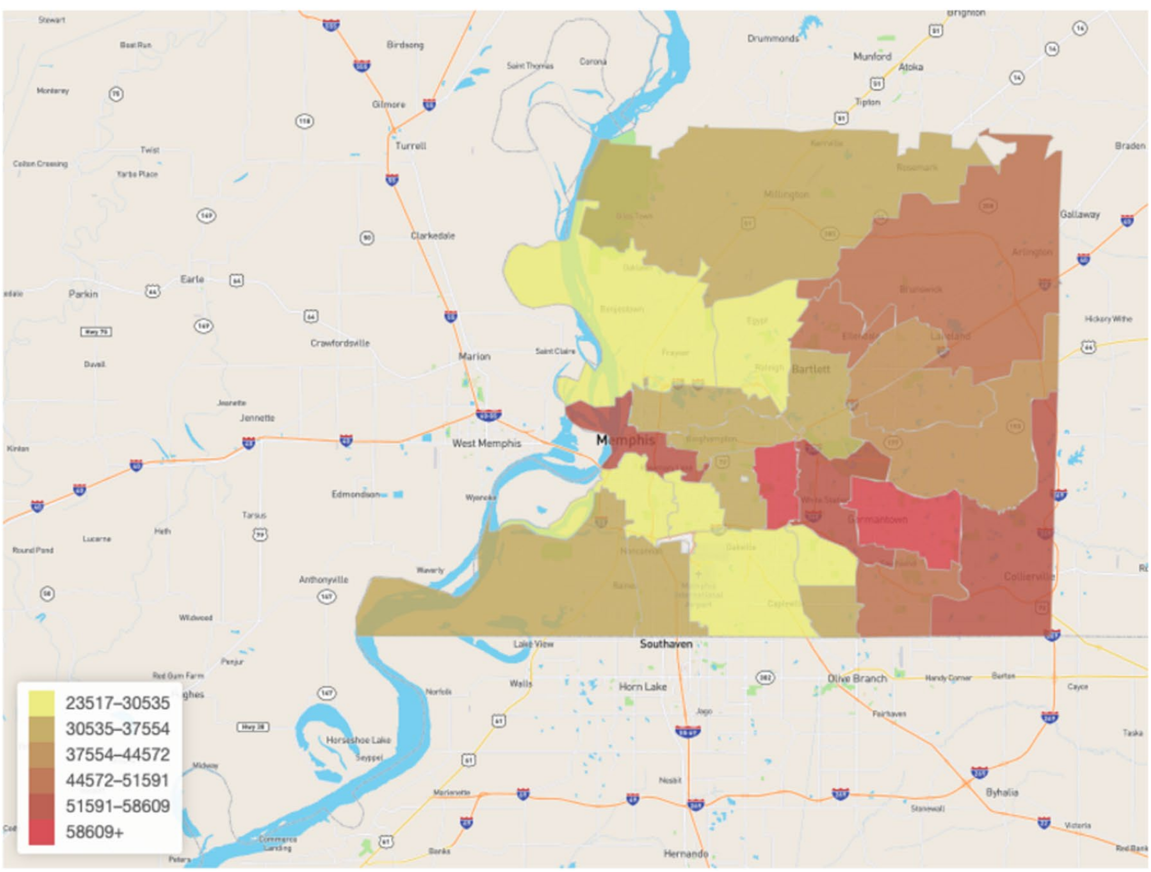
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◂**Fig. 3** Prior 14-day COVID-19 case rates per 100,000 (above, lowest to highest rates represented yellow to red) and total COVID-19 vaccinations (below, lowest to highest numbers represented yellow to red) geospatially mapped by zip code in Shelby County, TN [74]

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Author Contribution All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by GMC and SS. The first draft of the manuscript was written by GMC, SS, and DS, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Declarations

Ethics Approval and Consent to Participate Not applicable.

Consent for Publication Not applicable.

Competing Interests The authors declare no competing interests.

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